COREL™

CorelDRAW® GRAPHICS SUITE X6

Macro Programming Guide

Contents

Introduction

Welcome to the Macro Programming Guide!

This resource can help you explore the macro-related features and functions of CorelDRAW® and Corel® PHOTO-PAINT™. An understanding of these features and functions can help you automate tasks or develop commercial solutions that integrate with the software.

In this resource

This resource contains the following sections.

Section	Description
"Understanding automation" on page 4	Introduction to the concepts of automation and macros, and to the macro-programming formats supported by the software
"Getting started with macros" on page 25	Overview of the macro-related tools and features of the software
"Creating macros" on page 42	How to write, record, run, and debug macros
"Making macros user-friendly" on page 54	How to enhance the usability of macros through dialog boxes, toolbar buttons, user interaction, and documentation
"Organizing and deploying macros" on page 68	How to organize and deploy the macros you create
"Understanding the CorelDRAW object model" on page 71	Overview of the most important features and functions of the CorelDRAW object model

Also included is a **glossary** (see page 144), which defines many of the key terms used in this documentation.

Most of the code examples provided in this documentation are written in VBA.

In this section

This section contains the following topics:

About this resource

This resource assumes that the reader has experience with at least one procedural programming language, such as BASIC, Microsoft® Visual Basic® (VB), C, C++, Java™, Pascal, Cobol, or Fortran.

This resource does not describe the basics of procedural programming (such as functions, conditional branching, and looping). Therefore, before using this documentation, non-programmers are strongly advised to learn basic programming in a language such as Microsoft® Visual Basic® for Applications (VBA).

Most of the code examples provided in this documentation are written in VBA.

For more detailed instruction on the VB programming environment and on VBA, see Microsoft Visual Basic Help, which is available from the **Help** menu in the Macro Editor.

For a more basic introduction to macros, please see the topic "Working with macros" in the main Help file for the application. You can access the main Help from within an application by clicking **Help ▸ Help topics**.

Documentation conventions

The following table explains the documentation conventions used in this resource.

Wherever you see this	You'll find
✎	A note — describes required conditions for performing a procedure or presents other essential information
💡	A tip — describes helpful information such as shortcuts, alternate methods, or benefits that are related to a procedure
bold text	The name of a control or other element on the user interface
<*text in italics and between angle brackets*>	A placeholder for user-specified information, such as a path or filename
`monospace text`	A reference to coding

About additional resources

This topic describes how to get even more information about macros or the software.

For more information about macros

This software provides additional resources that contain helpful information about macros. These additional resources, located in the **Data** folder for the installed software, are described in the following table.

Resource	Description and filename
Macro Help for CorelDRAW	Provides comprehensive information about the CorelDRAW object model and the macro-related features and functions of the application **draw_om.chm**

Resource	Description and filename
Macro Help for Corel PHOTO-PAINT	Provides comprehensive information about the Corel PHOTO-PAINT object model and the macro-related features and functions of the application **pp_om.chm**
Object-model diagram for CorelDRAW	Provides a hierarchical representation of the CorelDRAW object model **CorelDRAW Object Model Diagram.pdf**
Object-model diagram for Corel PHOTO-PAINT	Provides a hierarchical representation of the Corel PHOTO-PAINT object model **Corel PHOTO-PAINT Object Model Diagram.pdf**

For a more basic introduction to macros, please see the topic "Working with macros" in the main Help file for the application. You can access the main Help from within an application by clicking **Help ▸ Help topics**.

For more information about the software

A variety of additional resources for the software are also available to you.

For comprehensive information about the features in the software, you can consult its installed documentation:

- The program group for the software (on the Windows® **Start** menu) includes a **Documentation** folder, which provides easy access to various installed resources.
- Each program offers in-product Help, displayed by clicking **Help ▸ Help topics**.

For even more information about the software, see the following Web-based resources.

Resource	Description and URL
CorelDRAW website	Provides the latest news, tips and tricks, and information about upgrades **www.corel.com/coreldraw**
Corel® Support Services website	Provides prompt and accurate information about product features, specifications, pricing, availability, services, and technical support **www.corel.com/support**
Corel® Knowledge Base™	Provides a repository of articles written by the Corel Technical Support Services team in response to questions by users **www.corel.com/knowledgebase**
CorelDRAW online community	Provides interaction with other users through sharing experiences, asking questions, and receiving help and suggestions **www.coreldraw.com**

You can submit any comments or suggestions about the software by using the contact information provided at **www.corel.com/contact**.

Understanding automation

Before you begin to work with macros, you need to understand the concept of automation. This section provides basic information about automation and about the macro-programming formats that are supported by the software.

In this section

This section contains the following topics:

What is automation?

Many actions that you perform in the software can be combined with other, related actions into a single automated solution. Automating repetitive tasks saves time, reduces effort, and lets you perform operations that are too complex to perform manually.

Automation can be used by programmers and nonprogrammers alike.

This documentation does not teach programming skills to nonprogrammers; rather, it helps experienced programmers develop useful solutions within the software. If you are not a programmer, you may want to refer to other programming-related resources before continuing to read this documentation.

What is a macro?

Most macros are created to automate a series of tasks within an application. The simplest meaning of the term “macro” is the recording of a group of related actions that can be played back automatically, in sequence, whenever you need to perform them. Macros consist of instructions that are written in a programming language, and some programming languages provide access to additional, more advanced, actions that cannot be recorded.

For the purposes of this documentation, a macro refers to a coded solution that performs tasks in the application by automating functions and subroutines (see “Using functions and subroutines” on page 15).

Although you can record a sequence of actions in the software, the real power of automation is that you can add conditions and looping mechanisms to a recording. As an example, let’s consider a simple macro that applies a red fill and a 1-point outline to a selected shape. By adding a condition and a looping mechanism to the code, you can produce a macro that seeks out each selected shape and applies only the fill to text shapes and only the outline to all other shape types.

After you create a macro, you can ensure that it has the desired outcome by setpping through its code one line a a time, or “debugging” it. When you are happy with the macro, you can keep it for future use and even share it with others.

Which sample macros are available?

The software includes sample VBA macros, which supply additional functionality, demonstrate automation in the suite, and provide sample code.

The following sample VBA macros are included for CorelDRAW:

- File converter (**FileConverter.gms**) — converts a vector or bitmap to a specified vector or bitmap format. You can choose export parameters by using dialog boxes associated with particular filters. You can also save each page as a separate file and set various page properties, such as size, orientation, and background color. The following file formats are supported: AI, BMP, CDR, CGM, CMX, CPT, DSF, DXF, EPS, GIF, JPEG, PCT, PNG, PPF, SVG, SWF, TIF, WMF, and WPG.
- Calendar wizard (**CalendarWizard.gms**) — generates customized calendars. You can choose the date range, layout, font, color, language, and many other options. You can also add holidays and moon phases.

The following sample VBA macro is included for Corel PHOTO-PAINT:

- HTML slide show creator (**Slideshow.gms**) — generates an HTML slide show from the images you specify. Open files can be added, ordered, and published as a series of HTML files, each of which displays one image and provides navigation buttons. You can create a title, alternate text, and a name for each slide. You can also choose a location and a name for the delineation folder; select the image folder; and specify notes, a caption, a URL, and more.

Which automation environments are supported?

For CorelDRAW versions 6 through 9, the only method of automating tasks was using the Corel SCRIPT™ language. Solution developers used Corel SCRIPT to create intelligent mini-applications for drawing shapes, repositioning and resizing shapes, opening and closing documents, and setting styles within CorelDRAW.

Although the Corel SCRIPT language was useful for automating basic tasks, a more flexible and powerful solution became necessary. For version 10, CorelDRAW was enhanced with support for the Microsoft Visual Basic for Applications (VBA) engine, which handled behind-the-scenes automation. The addition of VBA made CorelDRAW immediately accessible to millions of VBA and Microsoft Visual Basic (VB) developers around the world. Since then, VBA has been supported by every version of the CorelDRAW software suite.

More recently, the software suite added support for Microsoft® Visual Studio® Tools for Applications (VSTA), the successor to VBA.

Although CorelDRAW no longer includes the Corel SCRIPT editor, it does include the Corel SCRIPT run-time engine. Therefore, you can easily migrate scripts that were written for earlier versions of CorelDRAW to later versions of the software. For information on using Corel SCRIPT with CorelDRAW, see “Working with scripts” in the main Help file for CorelDRAW (**draw.chm**).

In Corel PHOTO-PAINT, you can automate tasks by using VBA or VSTA to create a macro, or by using Corel SCRIPT to create a script. A macro is the better choice if you want to write the code that is required to carry out the task (by using VBA or VSTA), while a script is the better choice if you want to record the steps that are required to carry out the task (by using Corel SCRIPT). For information on using

Corel SCRIPT with Corel PHOTO-PAINT, see "Working with scripts" in the main Help file for Corel PHOTO-PAINT (**corelpp.chm**).

By supporting VBA and VSTA, the software suite offers a platform for the following:

- developing powerful corporate graphical solutions — such as automated ticket generators, customized calendars, and batch file-processors
- streamlining workflows — such as with on-the-fly page-layout mechanisms
- customizing default software features — such as the creation, alignment, or transformation of objects
- ...and much more!

VBA and VSTA each provide their own fully integrated development environment (IDE), with contextual pop-up lists, syntax highlighting, line-by-line debugging, and visual designer windows. These features are particularly helpful to inexperienced developers.

For more information on VBA and VSTA, see the following topics:

- "What is VBA?" on page 6
- "What is VSTA?" on page 8

What is VBA?

Microsoft Visual Basic for Applications (VBA) is a built-in programming environment that can be used to automate repetitive functions and create intelligent solutions in the software that supports it. VBA is a subset of the Microsoft Visual Basic (VB) object-driven programming environment. Usually, VBA is integrated into another application to customize functionality within that application.

VBA is both a language and an editor. The VBA language cannot be used without its editor, and the VBA editor is the only utility in which VBA code can be edited or VBA programs can be run.

The VBA language is an event-driven programming language. In other words, it is used to write code that produces a response to an action, such as clicking a button or choosing an option from a list box. When the action occurs, the appropriate event is called, and the code for that event is executed. Events can be simple or complex. For instance, you can code a single line that displays a message box or write an entire procedure that interacts with a database.

With traditional procedural programming (or "object-driven programming"), the program starts at the first line and executes one line at a time. VB provides an example of an object-driven programming environment.

Most of the code examples provided in this documentation are written in VBA.

The VBA editor — called the "Macro Editor" (formerly the "Visual Basic Editor") in CorelDRAW and Corel PHOTO-PAINT — is an integrated development environment (IDE) that lets you manipulate the objects that are exposed by the object model of the application. To help you code macros, the Macro Editor provides context-sensitive Help for all the object-model elements that are available to you.

VBA is an in-process automation controller. In other words, VBA can be used to control software features that can be automated, and VBA runs efficiently by bypassing the interprocess synchronization mechanisms. However, the automation that the in-process VBA can access can also be accessed by the following:

- external out-of-process automation controllers (OLE clients)
- applications that are developed in programming languages (such as VB, Visual C++, Windows® Script Host, and C++) that can be used to develop OLE clients

- the VBA engines of other applications

VBA provides a set of tools for customizing the graphical user interface of the software. These tools let you process and present data efficiently and effectively. Advantages of using VBA include the following:

- familiarity of the VB language
- rapid application development (RAD) IDE
- fast run-time performance of the resulting integrated solutions
- extensible forms package that supports ActiveX® controls for creating user interfaces
- access to the full Windows application programming interface (API) and the underlying file system
- connectivity to corporate data
- integration with other software that is based on component object models (COMs)

VBA lets you customize an application to suit your needs, or even integrate it with another VBA-enabled application by referencing the object-model components of the second application. Although VBA was developed by Microsoft and is built into almost all its desktop applications (including Microsoft Office), Microsoft licenses the technology to other companies (including Corel Corporation; Autodesk, Inc., in AutoCAD®; and IntelliCAD Technology Consortium, in IntelliCAD®). Software products that support VBA can typically be used to control each other, and they can even be used to control some software products that do not support VBA. Consequently, you can use VBA to build solutions in CorelDRAW and Corel PHOTO-PAINT that access a wide variety of other software products: databases, word processors, XML editors, and more.

For a complete list of applications that support VBA, see the Microsoft website.

How does VBA differ from VB and VBScript?

The VB programming system is an advanced set of programming tools that provides advanced functionality and components for the Windows operating system and other Windows-based programs. For example, unlike VBA or VBScript, VB lets you create application extensions (DLL files) and stand-alone executable programs (EXE files). (The programs that you create with VBA must run inside the host application.)

VB is a “visual”version of the BASIC programming language — that is, it provides visual cues within the editor. As a result, VB is an easy language to learn. In addition, Microsoft has greatly enhanced the original BASIC language, so that VB is both powerful and fast (although not as powerful as Java or C++, nor as fast as C).

VBA is a subset of the VB programming language, and it uses the programming structure of VB to manipulate the object-model elements that are exposed by an application. The manipulation of these objects results in small packets of code procedures within the application. These code procedures and resulting projects are called “add-ins.”

VBScript (sometimes referred to as Microsoft Visual Basic, Scripting Edition) is also a subset of the VB programming language. VBScript is a Web-based HTML document scripting language.

How does VBA differ from Java and JavaScript?

VBA is similar to Java and JavaScript® in that it is a high-level, procedural programming language with full garbage collection and very little memory-pointer support. (For more information, see “Allocating memory” on page 16.) In addition, code that is developed in VBA, much like code developed in Java and JavaScript, supports on-demand compilation and can be executed without being compiled.

VBA is also similar to JavaScript in that it cannot be executed as a stand-alone application. JavaScript is embedded within Web pages as a mechanism for manipulating the document object model (DOM) of the Web browser. Likewise, VBA programs are executed inside a host environment (such as CorelDRAW or Corel PHOTO-PAINT) to manipulate the object model of the host.

Most VBA applications can be compiled to p-code to make them run more quickly, although the difference is hardly noticeable because of the sophistication of today's computer hardware. Similar compilation is possible with Java, but not with JavaScript.

Finally, whereas VBA uses a single equals sign (=) for both comparison and assignment, Java and JavaScript use a single equals sign (=) for assignment and two equals signs (==) for Boolean comparison. (For more information, see "Using Boolean comparison and assignment" on page 17.)

How does VBA differ from C and C++?

Like C and C++, VB uses functions. In VB, functions can be used to return a value, but subroutines cannot be used in that way. However, functions are used in C and C++, regardless of whether you want to return a value. (For more information, see "Using functions and subroutines" on page 15.)

VBA allocates and frees memory transparently. In C and C++, however, the developer is responsible for most memory management. As a result, using strings in VBA is even simpler than using the **CString** class in C++.

Finally, whereas VBA uses a single equals sign (=) for both comparison and assignment, C and C++ use a single equals sign (=) for assignment and two equals signs (==) for Boolean comparison. (For more information,see "Using Boolean comparison and assignment" on page 17.)

How does VBA differ from WSH?

Windows Script Host (WSH) is an out-of-process automation controller that lets you do occasional scripting and automation of Windows tasks and can be used to control software. Although WSH is a useful addition to the Windows operating system, WSH scripts tend to be slow because they must run out of process, and they cannot be compiled (and must be interpreted as they are executed).

WSH is a host for a number of scripting languages, each of which has its own syntax. However, the standard language that WSH uses is a macro language that resembles VB, so for standard scripts, the syntax is the same as in VBA.

What is VSTA?

The successor to VBA, Microsoft Visual Studio Tools for Applications (VSTA) is based on Microsoft Visual Studio 2008. In CorelDRAW and Corel PHOTO-PAINT, the VSTA feature supports the .NET framework and enables development in two programming languages: Visual Basic .NET and Visual C#.

Most of the code examples provided in this documentation are written in VBA.

The VSTA Editor in CorelDRAW and Corel PHOTO-PAINT is an integrated development environment (IDE) that lets you create VSTA solutions for the software.

How does VSTA compare with VBA?

Both VSTA and VBA allow you to create powerful macro solutions. With VSTA, you use the VSTA Editor as an IDE, and you use Visual Basic .NET or Visual C# as a programming language. With VBA, you use the Macro Editor as an IDE, and you use VBA as a programming language.

If you want to perform any of the following tasks, you can use either VSTA or VBA:

- customize or extend the features of the software
- interact with other applications that use Visual Basic 6 — or with other compatible components that are external to the software
- interact with Web-based services
- customize the IDE with add-ins
- create macro projects — with multi-threading support, if desired
- access macro projects programmatically
- generate macro code dynamically
- store macro code in a pre-compiled format
- hide macro code from other macro authors
- debug macro projects
- create customized user interfaces for macro projects

However, if you want to perform any of the following tasks, you must use VSTA:

- access the .NET framework natively — to support using Managed Add-in Framework (MAF), referencing .NET assemblies directly, running customized code on the Common Language Runtime (CLR), enforcing .NET security policies, or creating user interfaces by using .NET WinForms
- fully customize the IDE
- create macro projects that are certified to run on Windows Vista
- create macro projects that support 64-bit processors
- create macro projects that support server-side customizations
- create macro projects that support all data types, including `BigDecimal` and `Int64`
- create macro projects and macro assemblies that persist without the use of structured storage
- open and modify macro projects in Visual Studio
- compile macro projects to DLL assemblies
- run macro projects out of process
- run macro projects without causing the host application to stop execution at errors or breakpoints
- isolate macro projects from one another; run macro projects independently, and stop them during runtime without affecting other running projects
- author macros within managed code
- prevent servers from running customized user interfaces for macro projects

What are the main elements of automation?

If you've ever developed object-oriented code in C++, Borland Delphi, or Java, you're already familiar with programming-related concepts such as "objects," "classes," "properties," and "methods." However, let's reexamine these terms as they apply to automating CorelDRAW and Corel PHOTO-PAINT.

In this topic

This topic contains the following subtopics:

What is an object model?

An object model represents the hierarchy of items (or "objects") that make up an application and defines the interrelationships of the objects within that hierarchy. In an object model, each object is a child of another object, which is a child of yet another object, and so on. Furthermore, each object in an object model is defined by a property, a method, or an event, or a combination of these items.

Besides providing a high level of structure, an object model also lets you use object types (or "classes") in various ways. For example, a **Shape** object of type "group" is used to contain other **Shape** objects, each of which is from type "group" or some other type, such as "rectangle," "curve," or "text."

This high level of organization makes the object model easy to use, yet powerful.

How is an object model used in automation?

Automating CorelDRAW or Corel PHOTO-PAINT is accomplished by using the object model of the application to access the various objects in a document and make changes to those objects.

In CorelDRAW and Corel PHOTO-PAINT, the **Application** object represents the top of the object hierarchy: the program itself. All objects are children or grandchildren (or great-grandchildren, and so on) of the application.

Starting with the **Application** object, you can "drill down" through the layers of hierarchy in the object model until you find the desired, and usually the more specific, object. To reference the desired object, you must use a standard notation to separate each level of the object hierarchy. As in many object-oriented languages, the automation environment requires the use of a period or "dot operator" (`.`) to indicate that the object on the right is a member (or child) of the object on the left.

```
Application.Documents(1).Pages(1).Layers(1).Shapes(1).Name = "ABC"
```

An object requires its full hierarchical (or "fully qualified") reference unless a shortcut is available to it (or unless it has an implicit or implied meaning). An object shortcut is merely a syntactic replacement for the long-hand version of an object. For example, the shortcut object `ActiveLayer` replaces the long-hand version `Application.ActiveDocument.ActivePage.ActiveLayer`, while the object shortcut `ActiveSelection` replaces the long-hand version `Application.ActiveDocument.Selection`.

For more information on object shortcuts, see "Using object shortcuts" on page 22.

What is a class?

A class is the definition or description of an object. A class outlines the properties, methods, and events that apply to a type of object in an application; it acts as a template for all objects of that type class. To use a metaphor, the class "car" is a small vehicle with an engine and four wheels.

An object is an instance of a class. To extend the car metaphor, the actual, physical car purchased for the purposes of driving is an object (that is, an instance of the class "car").

In the context of CorelDRAW and Corel PHOTO-PAINT, each open document is an instance of the **Document** class, each page in the document is an instance of the **Page** class, and each layer (and each shape on each layer) are more instances of more classes. For example, `Document` represents the **Document** class in the software program. However, `ActiveDocument` represents an object within that class because it makes specific reference to one object.

As previously discussed, objects are often made up of other smaller objects. For example, a car contains four objects of the class "wheel," two objects of the class "headlight," and so on. Each of these child objects has the same properties and methods of its class-type. This parent/child relationship of objects is an important one to recognize, particularly when referencing an individual object.

Some classes "inherit" features from their parents. For example, in the context of CorelDRAW and Corel PHOTO-PAINT, the **Shape** type has many subtypes (or "inherited types"), including **Rectangle**, **Ellipse**, **Curve**, and **Text**. All these subtypes can make use of the basic members of the **Shape** type, including methods for moving and transforming the shape and for setting its color. However, the subtypes also have their own specialist members; for example, a **Rectangle** can have corner radii, whereas **Text** has an associated **Font** property.

What is a collection?

A collection is similar to an array of objects; it is an object that contains a group of objects that are similar in type. These objects share the same properties, methods, and events, and they are uniquely identified within the collection by their index number or their name. Collection objects act in the same manner and are always plural.

For example, `Documents` represent the **Documents** collection class in the software program. However, `Documents.Item (1)` references the first **Document** object in that collection.

What is a property?

A property is like an adjective in that it represents an attribute or characteristic quality of an object. Properties can be returned or set, or they can be read-only.

Most classes have properties. As an illustration, the properties of the class "car" are that it is small, it has an engine, and it has four wheels. Every instance of the class "car" (that is, every object in that class) also has properties such as color, speed, and number of seats. Read-only properties are fixed by the design of the class; for example, the number of wheels or seats does not (usually) vary from car to car. However, other properties can be changed after the object has been created; for example, the speed of the car can go up and down, and, with a bit of help, its color can be changed.

In the context of CorelDRAW and Corel PHOTO-PAINT, **Document** objects have a name, a resolution, and horizontal and vertical ruler units; individual shapes have outline properties and fill properties, as well as a position and a rotation factor; and text objects have text properties, which may include the text itself. For example, `ActiveDocument.Name` represents the **Name** property of a **Document** object; it specifies the name of the active document.

What is a method?

A method is like a verb in that it represents an action that can be performed by or on an object. In the example of a class "car," the car can be made to go faster and slower, so two methods for the class are "accelerate" and "decelerate."

In the context of CorelDRAW and Corel PHOTO-PAINT, documents have methods for creating new pages, layers have methods for creating new shapes, and shapes have methods for applying transformations and effects. For example, `ActiveDocument.Close` represents the **Close** method of a **Document** object; it closes the active document.

What is an event?

An event is like a noun in that it represents an action that takes place within an object. An event is triggered by an action, such as a mouse click, a key press, or a system timer. An event can be coded to trigger appropriate response in its object.

For example, the `ActiveDocument.AfterSave` event triggers an action in the **Document** object after it has been saved.

What is an enumeration?

An enumeration (also called an "enumerated type") represents a fixed value in the procedures and functions of the coding for a macro. Whereas a variable temporarily stores a changing data value, the value of an enumeration does not change.

What is a constant?

A constant is an instance of an enumeration, and an enumeration groups similar constants together.

For example, `AddinFilter` is an enumeration, yet it contains several constants, including `AddinFilterNone` and `AddinFilterNew`.

How is automation coding structured?

Your programming knowledge should help you learn to automate the software, regardless of your level of experience with Microsoft Visual Basic for Applications (VBA) or Microsoft Visual Studio Tools for Applications (VSTA).

In this topic

This topic contains the following subtopics:

The Macro Editor formats all VBA coding for you (see "Formatting code automatically" on page 31). The only way to customize the formatting is to change the size of the indentations.

VBA can be used to create object-oriented classes. However, this function is a feature of the programming language and is therefore not discussed in detail in this documentation.

Declaring variables

In VBA, the construction for declaring variables is as follows:

```
Dim foobar As Integer
```

The built-in data types are `Byte`, `Boolean`, `Integer`, `Long`, `Single`, `Double`, `String`, `Variant`, and several other less-used types including `Date`, `Decimal`, and `Object`.

Variables can be declared anywhere within the body of a function, or at the top of the current module. However, it is generally a good idea to declare a variable before it is used; otherwise, the compiler interprets it as a `Variant`, and inefficiencies can be incurred at run time.

Booleans take `False` to be `0` and `True` to be any other value, although converting from a `Boolean` to a `Long` results in `True` being converted to a value of `–1`.

To get more information about one of the built-in data types, type it in the **Code** window of the Macro Editor, select it, and then press **F1**.

Data structures can be built by using the following VBA syntax:

```
Public Type fooType
  item1 As Integer
  item2 As String
End Type
Dim myTypedItem As fooType
```

The items within a variable declared as type `fooType` are accessed by using dot notation:

```
myTypedItem.item1 = 5
```

Declaring strings

Using strings is much simpler in VBA than in C. In VBA, strings can be added together, truncated, searched forwards and backwards, and passed as simple arguments to functions.

To add two strings together in VBA, simply use the concatenation operator (`&`) or the addition operator (`+`):

```
Dim string1 As String, string2 As String
string2 = string1 & " more text" + " even more text"
```

In VBA, there are many functions for manipulating strings, including `InStr()`, `Left()`, `Mid()`, `Right()`, `Len()`, and `Trim()`.

Declaring enumerations

To declare an enumeration in VBA, use the following construction:

```
Public Enum fooEnum
  ItemOne
  ItemTwo
  ItemThree
End Enum
```

By default, the first item in an enumerated type is assigned a value of `0`.

Declaring arrays

To declare an array in VBA, use parentheses — that is, the `(` and `)` symbols:

```
Dim barArray (4) As Integer
```

The value defines the index of the last item in the array. Because array indexes are zero-based by default, there are five elements in the preceding sample array (that is, elements `0` thru `4`, inclusive).

Arrays can be resized by using `ReDim`. For example, the following VBA code adds an extra element to `barArray` but preserves the existing contents of the original five elements:

```
ReDim Preserve barArray (6)
```

Upper and lower bounds for an array can be determined at run time by using the functions `UBound()` and `LBound()`.

Multidimensional arrays can be declared by separating the dimension indexes with commas, as in the following VBA example:

```
Dim barArray (4, 3)
```

Using functions and subroutines

VBA uses both functions and subroutines (or "subs"). Functions can be used to return a value, but subs cannot.

In VBA, functions and subs do not need to be declared before they are used, nor before they are defined. In fact, functions and subs need to be declared only if they actually exist in external system DLLs.

Typical functions in a language such as Java or C++ can be structured as follows:

```
void foo( string stringItem ) {

  // The body of the function goes here

}

double bar( int numItem ) { return 23.2; }
```

In VBA, however, functions are structured as in the following example:

```
Public Sub foo (stringItem As String)

  ' The body of the subroutine goes here

End Sub

Public Function bar (numItem As Integer) As Double bar = 23.2

End Function
```

To force a function or sub to exit immediately, you can use `Exit Function` or `Exit Sub` (respectively).

Ending lines

In VBA, each statement must exist on its own line, but no special character is required to denote the end of each line. (In contrast, many other programming languages use a semicolon to separate individual statements.)

To break a long VBA statement over two or more lines, each of the lines (other than the last line) must end with an underscore (_) preceded by at least one space:

```
newString = fooFunction ("This is a string", _

                         5, 10, 2)
```

You can combine several statements in a single VBA line by separating them with colons:

```
a = 1 : b = 2 : c = a + b
```

A VBA line cannot end with a colon. VBA lines that end with a colon are labels that are used by the `Goto` statement.

Including comments

Comments in VBA — similarly to in ANSI, C++, and Java — can be created only at the end of a line. Comments begin with an apostrophe (') and terminate at the end of the line.

Each line of a multi-line comment must begin with its own apostrophe in VBA:

```
a = b ' This is a really interesting piece of code that

      ' requires so much explanation that I needed to break

      ' the comment over multiple lines.
```

To comment out large sections of VBA code, use the following syntax (similarly to in C or C++):

```
#If 0 Then ' That's a zero, not the letter 'oh'.

  ' All this code will be ignored by

  ' the compiler at run time!

#End If
```

Allocating memory

VBA does not support C-style memory pointers. Memory allocation and garbage collection are automatic and transparent, just as in Java and JavaScript (and some C++ code).

Passing arguments

Most languages, including C++ and Java, pass an argument to a procedure as a copy of the original. If the original must be passed, then one of two things can happen:

- a memory pointer is passed that directs the procedure to the original argument in memory
- a reference to the original argument is passed

Microsoft Visual Basic (VB) has the same requirements for passing arguments. In VB, passing a copy of the original argument is called “passing by value” and passing a reference to the original is called “passing by reference.”

By default, function and subroutine parameters are passed by reference. A reference to the original variable is passed in the argument of the procedure; changing the value of that argument, in effect, changes the value of the original variable value as well. In this way, more than one value can be returned from a function or subroutine. To explicitly annotate the code to indicate that an argument is being passed by reference, you can prefix the argument with `ByRef`.

If you want to prevent a procedure from changing the value of the original variable, you can force the copying of an argument. To do this in VBA, prefix the argument with `ByVal`, as shown in the example that follows. The functionality of `ByRef` and `ByVal` is similar to the ability of C and C++ to pass a copy of a variable, or to pass a pointer to the original variable.

```
Private Sub fooFunc (ByVal int1 As Integer, _

                     ByRef long1 As Long, _

                     long2 As Long) ' Passed ByRef by default
```

In the preceding VBA example, arguments `long1` and `long2` are both, by default, passed by reference. Modifying either argument within the body of the function modifies the original variable; however, modifying `int1` does not modify the original because it is a copy of the original.

Defining scope

You can define the scope of a data type or procedure (or even an object). Data types, functions, and subroutines (and members of classes) that are declared as private are visible only within that module (or file). By contrast, functions that are declared as public are visible throughout all the modules; however, you may need to use fully qualified referencing if the modules are almost out of scope — for example, if you are referencing a function in a different project.

Unlike C, VBA does not use braces — that is, the `{` and `}` symbols — to define local scope. Local scope in VBA is defined by an opening function or subroutine definition statement (that is, `Function` or `Sub`) and a matching `End` statement (that is, `End Function` or `End Sub`). Any variables declared within the function are available only within the scope of the function itself.

Using Boolean comparison and assignment

In Microsoft Visual Basic (VB), Boolean comparison and Boolean assignment are both performed by using a single equals sign (=):

```
If a = b Then c = d
```

By contrast, many other languages use a double equals sign for Boolean comparison and a single equals sign for Boolean assignment:

```
if( a == b ) c = d;
```

The following code, which is valid in C, C++, Java, and JavaScript, is invalid in VBA:

```
if( ( result = fooBar( ) ) == true )
```

The preceding example would be written in VBA as the following:

```
result = fooBar( )

If result = True Then
```

For other Boolean comparisons, VBA uses the same operators as other languages (except for the operators for "is equal to" and "is not equal to"). All the Boolean-comparison operators are provided in the following table.

Comparison	VBA operator	C-style operator
Is equal to	`=`	`==`
Is not equal to	`<>`	`!=`
Is greater than	`>`	`>`
Is less than	`<`	`<`
Is greater than or equal to	`>=`	`>=`
Is less than or equal to	`<=`	`<=`

The result of using a Boolean operator is always either `True` or `False`.

Using logical and bitwise operators

In VBA, logical operations are performed by using the keywords `And`, `Not`, `Or`, `Xor`, `Imp`, and `Eqv`, which perform the logical operations AND, NOT, OR, Exclusive-OR, logical implication, and logical equivalence (respectively). These operators also perform Boolean comparisons.

The following code shows a comparison written in C or a similar language:

```
if( ( a && b ) || ( c && d ) )
```

This example would be written as follows in VBA:

```
If ( a And b ) Or ( c And d ) Then
```

Alternatively, the preceding VBA code could be written in the following full long-hand form:

```
If ( a And b = True ) Or ( c And d = True ) = True Then
```

The following table provides a comparison of the four common VBA logical and bitwise operators, and the C-style logical and bitwise operators that are used by C, C++, Java, and JavaScript.

VBA operator	C-style bitwise operator	C-style Boolean operator
`And`	`&`	`&&`

VBA operator	C-style bitwise operator	C-style Boolean operator
`Not`	`~`	`!`
`Or`	`|`	`||`
`Xor`	`^`	

Providing message boxes and input boxes

In VBA, you can present simple messages to the user by using the `MsgBox` function:

```
Dim retval As Long

retval = MsgBox("Click OK if you agree.", _

                 vbOKCancel, "Easy Message")

If retval = vbOK Then

  MsgBox "You clicked OK.", vbOK, "Affirmative"

End If
```

You can also get strings from the user by using `InputBox` function:

```
Dim inText As String
inText = InputBox("Input some text:", "type here")
If Len(inText) > 0 Then
  MsgBox "You typed the following: " & inText & "."
End If
```

If the user clicks **Cancel**, the length of the string returned in `inText` is zero.

For information on creating more complex user interfaces, see "Making macros user-friendly" on page 54.

Referencing objects

If you want to create a reference to an object so that you can treat that reference like a variable (`sh`, in the following VBA example for CorelDRAW), you can use the `Set` keyword.

```
Dim sh As Shape

Set sh = ActiveSelection.Shapes.Item(1)
```

After you create this reference, you can treat it as though it were the object itself.

```
sh.Outline.Color.GrayAssign 35
```

If the selection is changed while `sh` is still in scope, `sh` references the original shape from the old selection and is unaffected by the new selection. You cannot simply assign the object to the variable as in the following example:

```
Dim sh As Shape
sh = ActiveSelection.Shapes.Item(1)
```

To release an object, you must set its reference value to `Nothing`.

```
Set sh = Nothing
```

You can also test whether a variable references a valid object by using the `Nothing` keyword.

```
If sh Is Nothing Then MsgBox "sh is de-referenced."
```

Objects do not need to be explicitly released. In most cases, VB releases the object upon disposal of the variable when you exit the function or subroutine.

Referencing collections

Many objects are members of collections. A collection is similar to an array, except that it contains objects rather than values. However, members of collections can be accessed in the same way as arrays. For example, a collection that is used frequently in CorelDRAW is the collection of shapes on a layer: The object `ActiveLayer` references either the current layer or the layer that is selected in the **Object Manager** docker.

CorelDRAW contains many collections: A document contains pages, a page contains layers, a layer contains shapes, a curve contains subpaths, a subpath contains segments and nodes, a text range contains lines and words, a group contains shapes, and the application contains windows. All these collections are handled by VBA in the same way.

Referencing collection items

To reference the shapes on a layer, the collection of shapes for that layer is used: `ActiveLayer.Shapes`. To reference the individual shapes in the collection, the `Item()` property is used. Here is a VBA example for CorelDRAW:

```
Dim sh As Shape
Set sh = ActiveLayer.Shapes.Item(1)
```

Most elements of a collection start at `1` and increase. For the collection `ActiveLayer.Shapes`, `Item(1)` is the item at the “top” or “front” of the layer — in other words, it is the item that is in front of all other shapes. Furthermore, because each item in the `ActiveLayer` collection is an object of type `Shape`, you can reference any item in VBA merely by appending the appropriate dot-notated member:

```
ActiveLayer.Shapes.Item(1).Outline.ConvertToObject
```

Sometimes, individual items have names. If the item you are looking for has an associated name (and you know what the name is and which collection the item is in), you can use that name to reference the item directly, as in the following VBA example for CorelDRAW:

```
Dim sh1 As Shape, sh2 As Shape
```

```
Set sh1 = ActiveLayer.CreateRectangle(0, 5, 7, 0)

sh1.Name = "myShape"

Set sh2 = ActiveLayer.Shapes.Item("myShape")
```

Also, because an item is usually the implied or default member of a collection, it is not strictly required. For this reason, the last line of the preceding VBA code can be rewritten as follows:

```
Set sh2 = ActiveLayer.Shapes("myShape")
```

Counting collection items

All collections have a property called `Count`. This read-only property gives the number of members in the collection, as in the following VBA example for CorelDRAW:

```
Dim count As Long

count = ActiveLayer.Shapes.Count
```

The returned value is not only the number of items in the collection: Because the collection starts from `1`, it is also the index of the last item.

Parsing collection items

It is often necessary to parse through the members of a collection to check or change the properties of each item.

By using the `Item()` and `Count` members, it is straightforward to step through a collection of items. With each iteration, it is possible to test the properties of the current item, or to call its methods. The following VBA code for CorelDRAW restricts all shapes on the layer to no wider than ten units:

```
Dim I As Long, count As Long

count = ActiveLayer.Shapes.Count

For I = 1 to count

  If ActiveLayer.Shapes.Item(i).SizeWidth > 10 Then

    ActiveLayer.Shapes.Item(i).SizeWidth = 10

  End If

Next I
```

There is, however, a more convenient way of parsing a collection in VBA. Instead of using the `Count` property and a **For-Next** loop, this technique uses a **For-Each-In** loop:

```
Dim sh As Shape

For Each sh In ActiveLayer.Shapes

  If sh.SizeWidth > 10 Then
```

```
      sh.SizeWidth = 10
    End If
  Next sh
```

If you want to copy the selection and then parse it later when it is no longer selected, copy the selection into a `ShapeRange` object:

```
  Dim sr As ShapeRange
  Dim sh As Shape
  Set sr = ActiveSelectionRange
  For Each sh In sr
    ' Do something with each shape
  Next sh
```

Using object shortcuts

Shortcuts are provided for some frequently accessed objects. Using shortcuts requires less typing, so shortcuts are easier to use than their longhand versions. (Also, using shortcuts can improve run-time performance because the compiler does not need to determine every object in a long dot-separated reference.)

For CorelDRAW, a shortcut can be used on its own as a property of the `Application` object. The following table provides these shortcuts and their long forms. (For a description of any item, see the "Object Model Reference" section of the Macros Help file for CorelDRAW [**draw_om.chm**].)

Shortcut	**Long form**
`ActiveLayer`	`ActivePage.ActiveLayer`
`ActivePage`	`ActiveDocument.ActivePage`
`ActiveSelection`	`ActiveDocument.Selection`
`ActiveSelectionRange`	`ActiveDocument.SelectionRange`
`ActiveShape`	`ActiveDocument.Selection.Shapes(1)`
`ActiveView`	`ActiveWindow.ActiveView`
`ActiveWindow`	`ActiveDocument.ActiveWindow`

For Corel PHOTO-PAINT, a shortcut can be used on its own as a property of the Corel PHOTO-PAINT `Application` object. The following table provides these shortcuts and their long forms. (For a description of any item, see the "Object Model Reference" section of the Corel PHOTO-PAINT Macros Help file [**pp_om.chm**].)

Shortcut	**Long form**
`ActiveLayer`	`ActivePage.ActiveLayer`

Shortcut	Long form
`ActiveWindow`	`ActiveDocument.ActiveWindow`

For CorelDRAW, the following shortcuts can also be used as members of a given `Document` object:

- `ActiveLayer`
- `ActivePage`
- `ActiveShape`
- `ActiveWindow`

For Corel PHOTO-PAINT, the following shortcuts can also be used as members of a given `Document` object:

- `ActiveLayer`
- `ActiveWindow`

For CorelDRAW, the `Document` object also has the properties `Selection` and `SelectionRange`, which let you get the selection or selection range (respectively) from a specified document regardless of whether that document is active.

Providing event handlers

While running, CorelDRAW and Corel PHOTO-PAINT raise various events to which macros can respond through the use of event handlers — subroutines with specific, defined names. Each macro project defines its event handlers in one of the following code modules:

- **ThisMacroStorage** — for macro projects that are stored in Global Macro Storage (GMS) files
- **ThisDocument** — for macro projects that are stored in documents

The **GlobalMacroStorage** object is a virtual object that represents each and all open documents. The **GlobalMacroStorage** object has several events that are raised at the time of any event, such as opening, printing, saving, or closing a document (although the range of events is actually greater than this because each one has a "before" and "after" event).

To respond to an event, you must provide an event handler — a subroutine in any **ThisMacroStorage** module with a specific name for which the application is pre-programmed to search. However, the application does check all **ThisMacroStorage** modules in all installed projects; for this reason, you can create an event-driven solution and distribute it as a single project file just as you would provide any other solution. Each project can have only one **ThisMacroStorage** module, and it is automatically created when the project is first created.

In VBA, you can add event handlers to a **ThisMacroStorage** module by using the Macro Editor. For example, a CorelDRAW macro solution may need to respond to the closing of a document by logging the closure in a file as part of a workflow-management system. To respond to the opening of a document, the solution must respond to the `OpenDocument` event for the `GlobalMacroStorage` class. To create this event handler in VBA, do the following:

- Open a **ThisMacroStorage** module for editing in the Macro Editor.
- Next, choose **GlobalMacroStorage** from the **Object** list box at the top of the **Code** window, and then choose **DocumentOpen** from the **Procedure** list box.

The Macro Editor creates a new, empty subroutine called `GlobalMacroStorage_DocumentOpen()`— or, if that subroutine already exists, the Macro Editor places the cursor into it. To then add the name of the opened file to the log, you need only write some code. To reduce the size of the **ThisMacroStorage** module, you can assign this event-logging task to a public subroutine in another module. This technique lets the run-time interpreter more easily parse all the **ThisMacroStorage** modules each time an event is raised. The following VBA code illustrates this example for CorelDRAW:

```
Private Sub GlobalMacroStorage_OpenDocument(ByVal Doc As Document, _

ByVal FileName As String)

Call LogFileOpen(FileName)

End Sub
```

Here is a small sample of the events available in CorelDRAW:

Event	Description
`Start`	Raised when the user starts the application
`DocumentNew`	Raised when a document is created; passes a reference to the document
`DocumentOpen`	Raised when a document is opened; passes a reference to the document
`DocumentBeforeSave`	Raised before a document is saved; passes the file name of the document as a parameter
`DocumentAfterSave`	Raised after a document is saved; passes the file name of the document as a parameter
`DocumentBeforePrint`	Raised before the **Print** dialog box is displayed
`DocumentAfterPrint`	Raised after a document is printed
`SelectionChange`	Raised when a selection changes
`DocumentClose`	Raised before a document is closed
`Quit`	Raised when the user quits the application

Event handlers for frequent events — such as events related to the **Shape** class — should be as efficient as possible, to keep the application running as quickly as possible.

Getting started with macros

Now that you understand a bit about automation, you're ready to get started with macros. This section provides an overview of the macro-related tools and features of CorelDRAW and Corel PHOTO-PAINT.

In this section

This section contains the following topics:

- "Setting up the automation feature" on page 25
- "Using the Macros toolbar" on page 26
- "Using the Macro Manager docker" on page 27
- "Using the Add-in Manager" on page 28
- "Using the Macro Editor" on page 28
- "Using the VSTA Editor" on page 40

Setting up the automation feature

Before you can develop and run macros in the software, you may need to set up the automation features for VBA and VSTA.

When you perform a "typical installation" of the software, the VBA and VSTA features are installed by default. However, you can manually install them if necessary. You can also specify various options for VBA.

For details on setting up the automation feature, see the following procedures:

- "To install the VBA and VSTA features" on page 25
- "To specify VBA options" on page 25

To install the VBA and VSTA features

1 Access the setup, and follow the on-screen instructions for modifying the software.

2 On the **Features** page of the setup, enable the following check boxes in the **Utilities** list box:
   - **Visual Basic for Applications**
   - **Visual Studio Tools for Applications**

To specify VBA options

1 Click **Tools** ▸ **Options**.

2 In the **Workspace** list of categories, click **VBA**.

3 In the **Security** area, specify how to control the risk of running malicious macros by clicking **Security options**.

   If you want to bypass this security feature, enable the **Trust all installed GMS modules** check box, and then proceed to step 6.

4 On the **Security level** page of the **Security** dialog box, enable one of the following options:

- **Very high** — allows only macros installed in trusted locations to run. All other signed and unsigned macros are disabled.
- **High** — allows only signed macros from trusted sources to run. Unsigned macros are automatically disabled.
- **Medium** — lets you choose which macros run, even if they are potentially harmful.
- **Low (not recommended)** — allows all potentially unsafe macros to run. Enable this setting if you have virus-scanning software installed, or if you check the safety of all documents that you open.

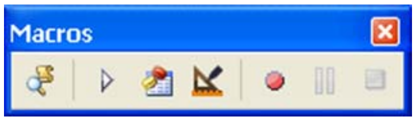
5 On the **Trusted publishers** page of the **Security** dialog box, review which macro publishers are trusted. Click **View** to display details on the selected macro publisher, or click **Remove** to delete the selected macro publisher from the list.

If desired, you can enable or disable the **Trust access to Visual Basic project** check box for the selected macro publisher.

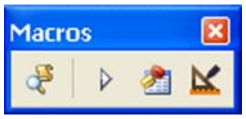
6 Disable the **Delay load VBA** check box if you want to load the VBA feature at start-up.

Using the Macros toolbar

CorelDRAW and Corel PHOTO-PAINT feature a **Macros** toolbar that provides easy access to several macro-related featues, such as the Macro Editor.



*The **Macros** toolbar in CorelDRAW*



*The **Macros** toolbar in Corel PHOTO-PAINT*

Using the Macros toolbar in CorelDRAW

In CorelDRAW, the **Macros** toolbar features the following buttons:

- **Macro Manager** button — opens the **Macro Manager** docker
- **Run Macro** button — runs a macro
- **Macro Editor** button — opens the Macro Editor
- **Disable application events** button — switches the Macro Editor between its modes for designing and running macros
- **Start Recording** button — records a macro
- **Pause Recording** button — pauses the recording of a macro
- **Stop Recording** button — stops the recording of a macro

To display the **Macros** toolbar in CorelDRAW, click **Window ▸ Toolbars ▸ Macros**. A check mark next to the command indicates that the toolbar is displayed.

Using the Macros toolbar in Corel PHOTO-PAINT

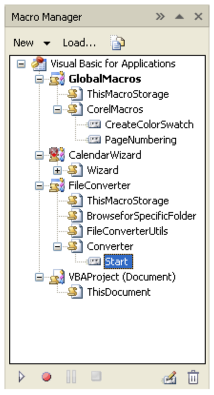
In Corel PHOTO-PAINT, the **Macros** toolbar features the following buttons:

- **Macro Manager** button — opens the **Macro Manager** docker
- **Run Macro** button — runs a macro
- **Macro Editor** button — opens the Macro Editor
- **Disable application events** button — switches the Macro Editor between its modes for designing and running macros

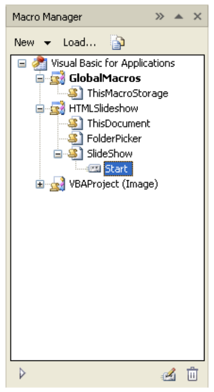
To display the **Macros** toolbar in Corel PHOTO-PAINT, click **Window** ▸ **Toolbars** ▸ **Macros**. A check mark next to the command indicates that the toolbar is displayed.

Using the Macro Manager docker

In CorelDRAW and Corel PHOTO-PAINT, macros are stored in code modules, which are stored in macro projects. The **Macro Manager** docker provides a list of all existing VBA macro projects, plus the code modules and macros that are stored in them. You can use the **Macro Manager** docker to perform various tasks related to macro projects, code modules, and macros (see “Creating macros” on page 42).



*The **Macro Manager** docker in CorelDRAW, with a macro selected*



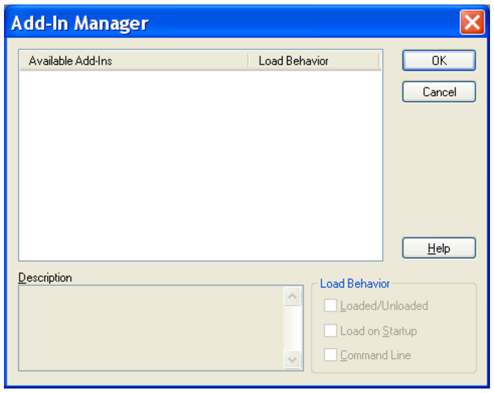
*The **Macro Manager** docker in Corel PHOTO-PAINT, with a macro selected*

To display the **Macro Manager** docker, do one of the following:

- Click **Tools** ▸ **Macros** ▸ **Macro Manager**.
- Click the **Macro Manager** button on the **Macros** toolbar.

Using the Add-in Manager

An add-in is a separate module that extends the functionality of an application. The Add-in Manager for CorelDRAW and Corel PHOTO-PAINT displays a list of all registered add-ins for the application.



The Add-in Manager

To open the Add-in Manager, click **Tools** ▸ **Macros** ▸ **Add-in Manager**. You can then use the Add-in Manager to perform various tasks related to add-ins.

You can use a registered add-in by clicking **Tools** ▸ **Macros** ▸ **Add-ins** and then choosing the add-in.

Using the Macro Editor

CorelDRAW and Corel PHOTO-PAINT provide an integrated development environment (IDE) for creating VBA macro projects. Called the Macro Editor, this IDE is similar to the one included with the full version of Visual Basic. You can use the Macro Editor to perform various tasks related to VBA macros, such as the following:

- browsing the contents of a VBA macro project
- developing and debugging VBA macro code
- setting object properties for VBA macros
- creating dialog boxes or "forms" for VBA macros

You cannot use the Macro Editor to compile executable (EXE) program files.

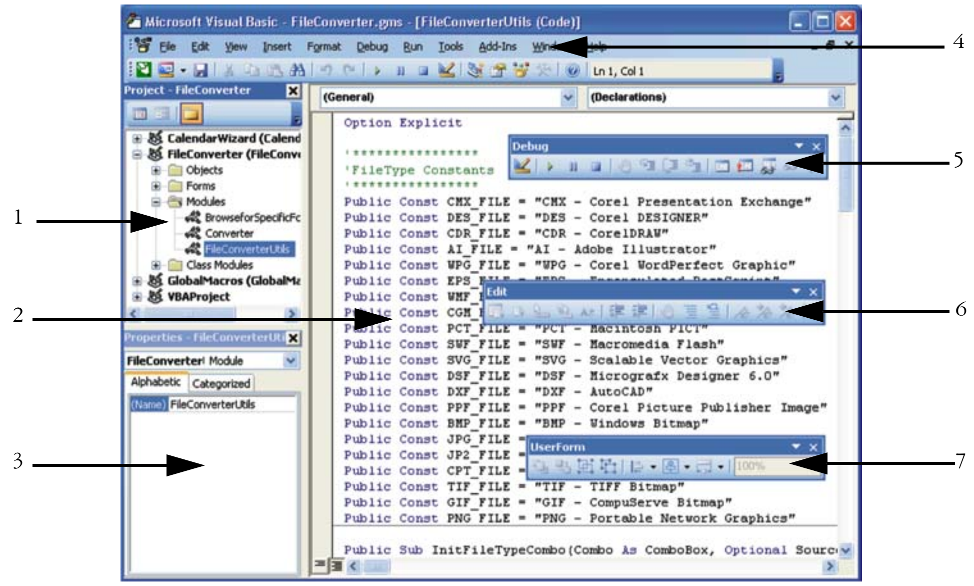
The Macro Editor features three main areas:

- Project Explorer — lets you browse macro projects and their contents. For more information, see "Using the Project Explorer" on page 30.
- **Code** window — lets you work with macro code. For more information, see "Using the Code window" on page 31.
- **Properties** window — lists all editable properties for the selected object. For more information, see "Using the Properties window" on page 34.

The Macro Editor also features four main toolbars:

- **Standard** toolbar — is the default toolbar
- **Debug** toolbar — contains buttons for common debugging tasks
- **Edit** toolbar — contains buttons for common code-editing tasks
- **UserForm** toolbar — contains buttons specific to designing dialog boxes

For more information on these toolbars, see "Using the Macro Editor toolbars" on page 35.



```
Option Explicit

'*****************
'FileType Constants
'*****************
Public Const CMX_FILE = "CMX - Corel Presentation Exchange"
Public Const DES_FILE = "DES - Corel DESIGNER"
Public Const CDR_FILE = "CDR - CorelDRAW"
Public Const AI_FILE = "AI - Adobe Illustrator"
Public Const WPG_FILE = "WPG - Corel WordPerfect Graphic"
Public Const EPS_
Public Const WMF_
Public Const CGM_
Public Const PCT_FILE = "PCT - Macintosh PICT"
Public Const SWF_FILE = "SWF - Macromedia Flash"
Public Const SVG_FILE = "SVG - Scalable Vector Graphics"
Public Const DSF_FILE = "DSF - Micrografx Designer 6.0"
Public Const DXF_FILE = "DXF - AutoCAD"
Public Const PPF_FILE = "PPF - Corel Picture Publisher Image"
Public Const BMP_FILE = "BMP - Windows Bitmap"
Public Const JPG_FILE =
Public Const JP2_FILE =
Public Const CPT_FILE =
Public Const TIF_FILE = "TIF - TIFF Bitmap"
Public Const GIF_FILE = "GIF - CompuServe Bitmap"
Public Const PNG_FILE = "PNG - Portable Network Graphics"

Public Sub InitFileTypeCombo(Combo As ComboBox, Optional Sourc
```

The Macro Editor (CorelDRAW version shown) features the following:
1) Project Explorer; 2) ***Code*** *window; 3)* ***Properties*** *window;*
4) ***Standard*** *toolbar; 5)* ***Debug*** *toolbar; 6)* ***Edit*** *toolbar;*
7) ***UserForm*** *toolbar*

The Macro Editor also lets you access the Object Browser, which displays the entire object model of each referenced component and of the host application. For more information, see "Using the Object Browser" on page 35.

Although the Macro Editor opens in a separate window from its host application, it runs within the process of that application. To display the Macro Editor, do any of the following:

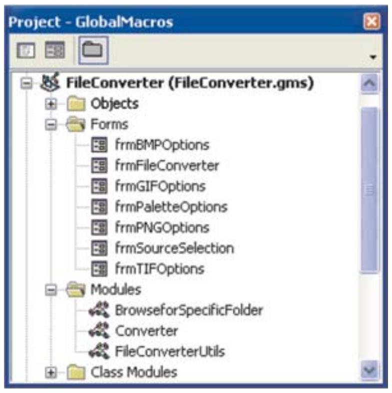
- Click **Tools** ▸ **Macros** ▸ **Macro Editor** on the main menu in the application.
- Click the **Macro Editor** button on the **Macros** toolbar.
- Right-click **Visual Basic for Applications** in the **Macro Manager** docker, and then click **Show IDE**.
- Press **Alt** + **F11**.

To switch between the Macro Editor and the application, use the Windows taskbar, or press **Alt + F11** or **Alt + Tab**.

For more detailed information on constructing code procedures and setting properties, please see the Microsoft Visual Basic for Applications Help file, which is available from the **Help** menu in the Macro Editor.

Using the Project Explorer

The Project Explorer is essential for navigating macro projects and their contents: documents and objects, forms, modules, and class modules (or "classes").



Project - GlobalMacros

- FileConverter (FileConverter.gms)
  - Objects
  - Forms
    - frmBMPOptions
    - frmFileConverter
    - frmGIFOptions
    - frmPaletteOptions
    - frmPNGOptions
    - frmSourceSelection
    - frmTIFOptions
  - Modules
    - BrowseforSpecificFolder
    - Converter
    - FileConverterUtils
  - Class Modules

Each type of component in the Project Explorer has an icon assigned to it:

Icon	Item
	macro project
	folder
	document or object (CorelDRAW)
	document or object (Corel PHOTO-PAINT)
	form
	module
	class module (or "class")

To display or hide the Project Explorer, do any of the following:

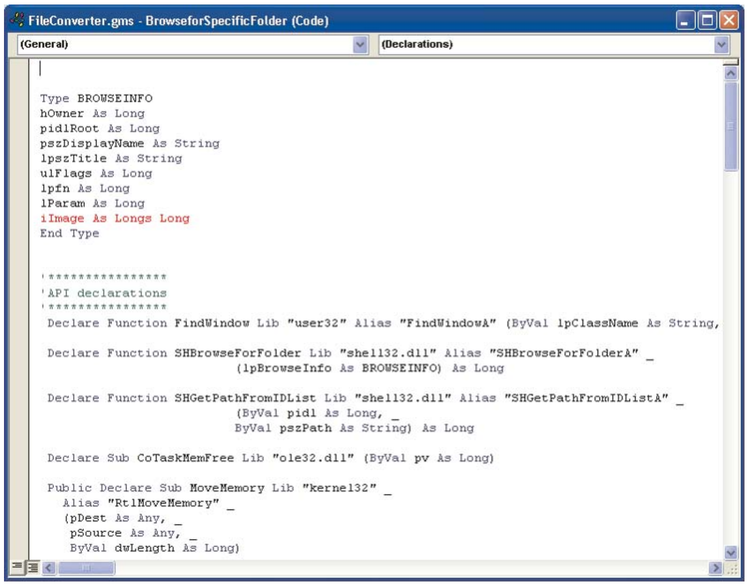
- Click **View ▸ Project Explorer**.
- Click the **Project Explorer** button on the **Standard** toolbar.
- Press **Ctrl + R**.

Using the Code window

The **Code** window is where you spend most of your time when working on macros. A standard code editor in the style of Microsoft Visual Studio, the **Code** window lets you do the following:

- **format code automatically**
- **color syntax automatically**
- **check syntax automatically**
- **jump to definitions**
- **use contextual pop-up lists and automatic completion**

If you are already familiar with any of the Microsoft Visual Studio editors, the **Code** window will be entirely familiar to you.



```
Type BROWSEINFO
hOwner As Long
pidlRoot As Long
pszDisplayName As String
lpszTitle As String
ulFlags As Long
lpfn As Long
lParam As Long
iImage As Longs Long
End Type


'****************
'API declarations
'****************
 Declare Function FindWindow Lib "user32" Alias "FindWindowA" (ByVal lpClassName As String,

 Declare Function SHBrowseForFolder Lib "shell32.dll" Alias "SHBrowseForFolderA" _
                         (lpBrowseInfo As BROWSEINFO) As Long

 Declare Function SHGetPathFromIDList Lib "shell32.dll" Alias "SHGetPathFromIDListA" _
                         (ByVal pidl As Long, _
                         ByVal pszPath As String) As Long

 Declare Sub CoTaskMemFree Lib "ole32.dll" (ByVal pv As Long)

 Public Declare Sub MoveMemory Lib "kernel32" _
   Alias "RtlMoveMemory" _
   (pDest As Any, _
    pSource As Any, _
    ByVal dwLength As Long)
```

*The **Code** window*

To display the **Code** window, do one of the following:

- Click **View ▸ Code**.
- Press **F7**.

Formatting code automatically

The Macro Editor formats code automatically for you. Even the capitalization of keywords, functions, subroutines, and variables is taken care of by the Macro Editor, irrespective of what you type. You cannot custom-format code, although you can set the indentation for each line, as well as the placing of custom line breaks.

If you use the returned value when calling a function, the parentheses around the parameters are mandatory (just as in most modern programming languages):

```
a = fooFunc (b, c)
```

However, if the returned value from a function call is being discarded, or if you are calling a subroutine, the parentheses must be left out (unlike in most other languages):

```
barFunc d, e

fooBarSub f
```

If you prefer always to see the parentheses, use the `Call` keyword before the function call or subroutine call:

```
Call barFunc (d, e)

Call fooBarSub (f)
```

Coloring syntax automatically

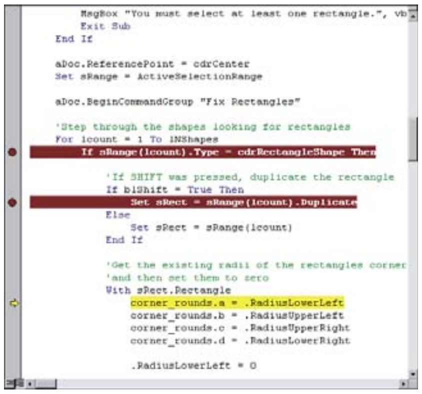
As you develop code in the **Code** window, the Macro Editor colors each word according to its classification.

Word color	Classification
Blue	Automation keyword or programming statement
Green	Comment
Black	All other text

The **Code** window also uses the following colorization techniques:

Colorization technique	Classification
Red text	Line of code containing errors
White text on blue background	Selected text
Text highlighted in yellow	Line where execution is paused for debugging
White text on red background and red dot in the left margin	Breakpoint set for debugging purposes For more information, see "Setting breakpoints" on page 52.
Blue dot in the left margin	Bookmark set in the code

These syntax-colorization techniques make the code much easier to read.



```
        MsgBox "You must select at least one rectangle.", vb
        Exit Sub
    End If

    aDoc.ReferencePoint = cdrCenter
    Set sRange = ActiveSelectionRange

    aDoc.BeginCommandGroup "Fix Rectangles"

    'Step through the shapes looking for rectangles
    For lcount = 1 To lNShapes
        If sRange(lcount).Type = cdrRectangleShape Then

            'If SHIFT was pressed, duplicate the rectangle
            If blShift = True Then
                Set sRect = sRange(lcount).Duplicate
            Else
                Set sRect = sRange(lcount)
            End If

            'Get the existing radii of the rectangles corner
            'and then set them to zero
            With sRect.Rectangle
                corner_rounds.a = .RadiusLowerLeft
                corner_rounds.b = .RadiusUpperLeft
                corner_rounds.c = .RadiusUpperRight
                corner_rounds.d = .RadiusLowerRight

                .RadiusLowerLeft = 0
```

Syntax coloring and highlighting

Breakpoints and bookmarks are lost when you quit the application.

The Macro Editor lets you modify the default colors for syntax highlighting. Click **Tools** ▶ **Options**, and choose your settings on the **Editor Format** page.

Checking syntax automatically

Every time you move the cursor out of a line of code, the Macro Editor checks the syntax of the code in that line; if an error is found, the line is colored red and a pop-up warning is displayed. This real-time checking is useful (particularly when you are learning to program macros) because it indicates many possible errors in the code without having you run the code.

The Macro Editor lets you disable pop-up warnings. Click **Tools** ▶ **Options**, **click** the **Editor** tab, and then disable the **Auto Syntax Check** check box. Although the Macro Editor still checks the syntax and colors erroneous lines red, it stops displaying a warning when you paste text from another line of code.

Jumping to definitions

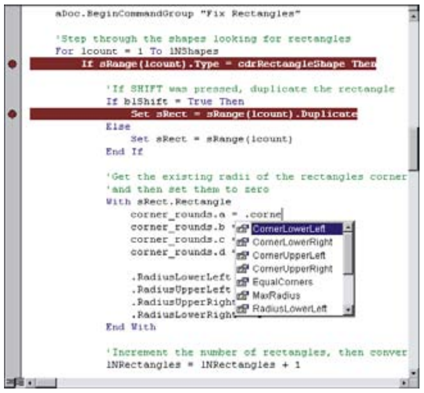
The Macro Editor lets you jump directly to the definition of a variable, function, or object.

Desired definition	Procedure	Destination
Variable	Right-click the variable in the **Code** window, and then click **Definition**.	The definition of the variable in the code
Function	Right-click the function in the **Code** window, and then click **Definition**.	The definition of the function in the code
Object	Right-click the object in the **Code** window, and then click **Definition**.	The definition of the object in the Object Browser

To return to where you requested the definition, right-click anywhere in the **Code** window, and then click **Last Position**.

Using contextual pop-up lists for automatic completion

The Macro Editor adds the functions you write and the variables you define to an internal list that contains all built-in keywords and enumerated values. As you type, the Macro Editor displays a contextual list of words that are valid candidates for insertion at the current position. This auto-completion feature makes code development quicker and more convenient.



```
aDoc.BeginCommandGroup "Fix Rectangles"

'Step through the shapes looking for rectangles
For lcount = 1 To lNShapes
    If sRange(lcount).Type = cdrRectangleShape Then

        'If SHIFT was pressed, duplicate the rectangle
        If blShift = True Then
            Set sRect = sRange(lcount).Duplicate
        Else
            Set sRect = sRange(lcount)
        End If

        'Get the existing radii of the rectangles corner
        'and then set them to zero
        With sRect.Rectangle
            corner_rounds.a = .corne
            corner_rounds.b =
            corner_rounds.c =
            corner_rounds.d =

            .RadiusLowerLeft
            .RadiusUpperLeft
            .RadiusUpperRight
            .RadiusLowerRight
        End With

        'Increment the number of rectangles, then conver
        lNRectangles = lNRectangles + 1
```

An auto-completion pop-up list

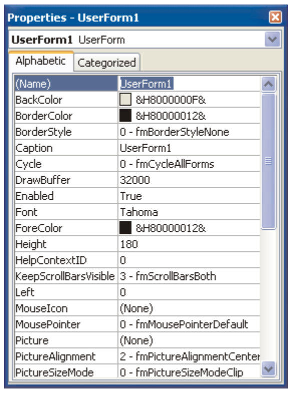
If you type the first few characters of the word you want to use, the pop-up list advances to the nearest candidate that matches those characters. Select the desired word, and then do one of the following:

- type the character to follow the word (typically a space, line feed, parenthesis, period, or comma)
- enter only the word by pressing **Tab** or **Ctrl + Enter**

To force the pop-up menu display, press **Ctrl + Spacebar**; the menu scrolls to the word that most closely matches the characters that you have typed so far. This technique is particularly useful for filling parameter lists when calling a function or subroutine. If there is only one exact match, the Macro Editor inserts the word without popping up the list; to display the pop-up list for the selected keyword at any time without auto-filling it, press **Ctrl + J**.

Using the Properties window

The **Properties** window lists all editable properties for the selected object. Many macro objects — including projects, modules, and forms and their controls — have property sheets that can be modified.



(Name)	UserForm1
BackColor	&H8000000F&
BorderColor	■ &H80000012&
BorderStyle	0 - fmBorderStyleNone
Caption	UserForm1
Cycle	0 - fmCycleAllForms
DrawBuffer	32000
Enabled	True
Font	Tahoma
ForeColor	■ &H80000012&
Height	180
HelpContextID	0
KeepScrollBarsVisible	3 - fmScrollBarsBoth
Left	0
MouseIcon	(None)
MousePointer	0 - fmMousePointerDefault
Picture	(None)
PictureAlignment	2 - fmPictureAlignmentCenter
PictureSizeMode	0 - fmPictureSizeModeClip

*The **Properties** window, with the properties of a form displayed*

The **Properties** window is automatically updated when you select an object, or when you change the properties of the selected object by using other methods (for example, by using the mouse to move and resize form controls).

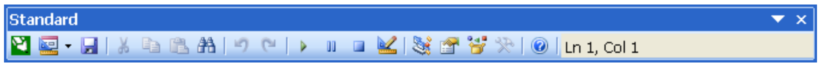
To display or hide the **Properties** window, do any of the following:

- Click **View ▸ Properties Window**.
- Click the **Properties Window** button on the **Standard** toolbar.
- Press **F4**.

Using the Macro Editor toolbars

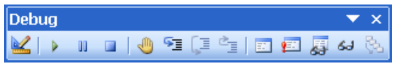
The Macro Editor features four toolbars — **Standard**, **Debug**, **Edit**, and **UserForm** — that you can use to perform macro-related tasks.

The **Standard** toolbar is the default toolbar.



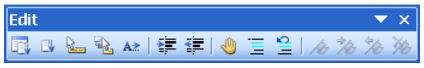
The ***Standard*** *toolbar (CorelDRAW version shown)*

The **Debug** toolbar contains buttons for common debugging tasks (see “Debugging macros” on page 50).



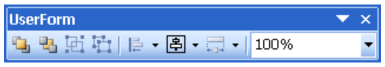
The ***Debug*** *toolbar*

The **Edit** toolbar contains buttons for common code-editing tasks.



The ***Edit*** *toolbar*

The **UserForm** toolbar contains buttons specific to designing dialog boxes (see “Designing dialog boxes” on page 58).



The ***UserForm*** *toolbar*

To display or hide a toolbar, click **View ▸ Toolbars**, and then click the corresponding command. A check mark next to a command indicates that its toolbar is currently displayed.

You can “float” a toolbar by dragging it from the menu bar.

You can dock a toolbar by dragging it to the menu bar.

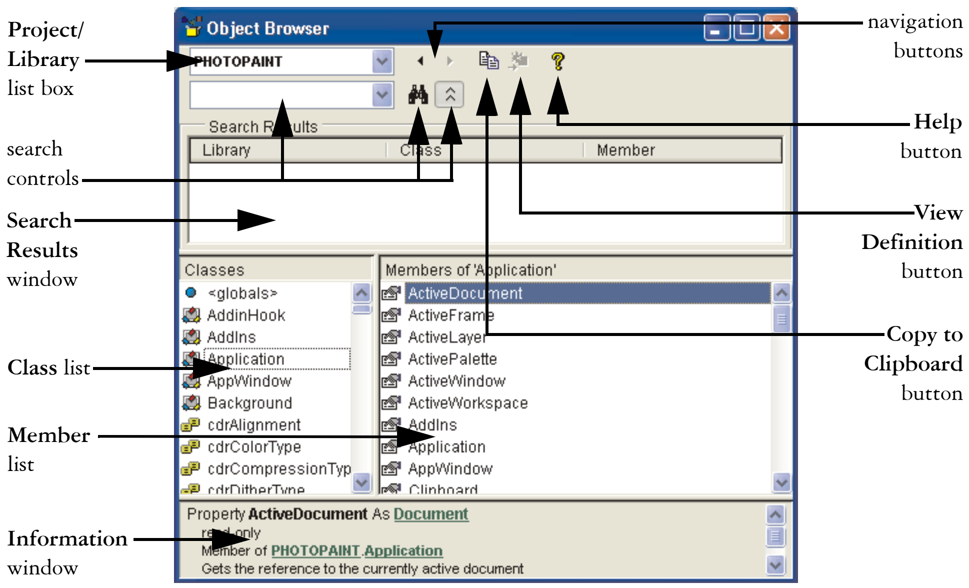
Using the Object Browser

The Object Browser is one of the most useful tools that is provided by the Macro Editor. In an easy-to-use, structured format, the Object Browser displays the entire object model of each referenced component and, most importantly, of CorelDRAW and Corel PHOTO-PAINT.

Referenced components include all ActiveX or Object Linking and Embedding (OLE) objects that are used by the project.

The **Object Browser** window features the following items:

- **Project/Library** list box — lists all referenced components (projects and libraries). Choosing a project or library from this list updates the Object Browser to display only the items for that project or library. Generally, displaying only one project or library at a time makes it easier to use the Object Browser.
- navigation buttons — let you cycle through your selections from the Object Browser
- **Copy to Clipboard** button — copies the current selection to the Clipboard
- **View Definition** button — displays where the current selection is defined in the **Code** window
- **Help** button — displays a Help topic for the current selection. You can also access this Help topic by pressing **F1**.
- search controls — let you search the selected project or library for a given string. For more information, see "Using the search controls" on page 40.
- **Search Results** window — displays the results of a search. For more information, see "Using the search controls" on page 40.
- **Class** list — displays all class-related items for the selected project or library. For more information, see "Using the Class list" on page 37.
- **Member** list — displays the members of the selected class. For more information, see "Using the Member list" on page 38.
- **Information** window — displays information about the selected class or class member. For more information, see "Using the Information window" on page 39.



Property **ActiveDocument** As Document
read only
Member of PHOTOPAINT.Application
Gets the reference to the currently active document

*The **Object Browser** window (Corel PHOTO-PAINT version shown)*

To open the Object Browser from within the Macro Editor, do any of the following:

- Click **View** ▸ **Object Browser**.
- Click the **Object Browser** button on the **Standard** toolbar.
- Press **F2**.

To reference the object model of another application, click **Tools** ▸ **References**. Referenced components can be accessed by the macro code.

Using the Class list

Every project and library has an object model that contains the following class-related items, which are displayed in the **Class** list: global values, classes, modules, types, and enumerations.

Global values apply to an entire project or library, and they include individual members from enumerations (such as text-paragraph alignments, shape types, and import/export filters).

Classes contain properties, methods, and events. For more information, see "What is a class?" on page 11.

For documentation on all classes available to CorelDRAW or Corel PHOTO-PAINT, see the "Object Model Reference | Classes" section of the Macros Help file for the application.

Modules contain macro code.

For documentation on all modules available to CorelDRAW, see the "Object Model Reference | Modules" section of the Macros Help file for the application.

Types are customized data types that supplement the built-in data types that are provided by the automation environment (see "Declaring variables" on page 13).

For documentation on all types available to CorelDRAW, see the "Object Model Reference | Types" section of the Macros Help file for the application.

Enumerations represent fixed values in the procedures and functions of the coding for a macro. For more information, see "What is an enumeration?" on page 12.

For documentation on all enumerations available to CorelDRAW or Corel PHOTO-PAINT, see the "Object Model Reference | Enumerations" section of the Macros Help file for the application.

Each type of item in the **Class** list has an icon assigned to it:

Icon	**Item**
●	global value
▣	class
✱	module
▨	type
▤	enumeration

To access the Help topic for a selected item, click the **Help** button, or press **F1**.

Using the Member list

When you choose an item from the **Class** list, the members of that item appear in the **Member** list. Class members include the following:

- properties
- methods
- events
- constants

A property can be a simple type (such as a Boolean, integer, or string), or it can be a class or enumeration from the **Class** list. A property that is based on a class from the **Class** list inherits all members of that class.

Many classes have a default property. The default property is implied if no property name is given when getting or setting the value of the parent object. For example, collection types have the default property **Item**, which can be indexed; in such instances, it is not necessary to specify the **Item** property. Here,

```
    ActiveSelection.Shapes.Item(1).Selected = False
```

is the same as the shorter

```
    ActiveSelection.Shapes(1).Selected = False
```

because **Item** is the default or implied property of a collection of shapes.

For documentation on all properties available to CorelDRAW or Corel PHOTO-PAINT, see the “Object Model Reference | Properties” section of the Macros Help file for the application.

Methods are commonly known as “member functions” — functions that a class can perform on itself. A good example is the **Move** method of the **Shape** class in CorelDRAW, which moves a shape by using an [x, y] vector. The following code moves the selected shapes 2 measurement units to the right and 3 measurement units upwards:

```
    ActiveSelection.Move 2, 3
```

If the return value of a function is not used, the function call does not take parentheses around the argument list unless the `Call` keyword is used.

For documentation on all methods available to CorelDRAW or Corel PHOTO-PAINT, see the “Object Model Reference | Methods” section of the Macros Help file for the application.

Events are associated with some classes. You can set up an event handler that is called when that event occurs in the application; this functionality lets you develop sophisticated applications that respond automatically to what is happening within the application. Commonly handled events include the **BeforePrint**, **BeforeSave**, **PageActivate**, **SelectionChange**, and **ShapeMove** events of the **Document** class in CorelDRAW.

For documentation on all events available to CorelDRAW or Corel PHOTO-PAINT, see the “Object Model Reference | Events” section of the Macros Help file for the application.

The constants displayed in the **Member** list are members of enumerations or are defined as public in a module. Enumerations group related items from a closed list — such as CorelDRAW shape types, import/export filters, and alignments — for use anywhere an integer value is required.

In CorelDRAW and Corel PHOTO-PAINT, many constants begin with **cdr** (for example, **cdrEPS** and **cdrLeftAlignment**), while others begin with **clr**, **cui**, **pdf**, **pnt**, or **prn**. Visual Basic also has its own constants, including ones (such as **vbKeyEnter**) for keystrokes and ones (such as **vbOK**) for dialog-box buttons.

For documentation on all constants available to CorelDRAW or Corel PHOTO-PAINT, see the "Object Model Reference | Constants" section of the Macros Help file for the application.

Each type of item in the **Member** list has an icon assigned to it:

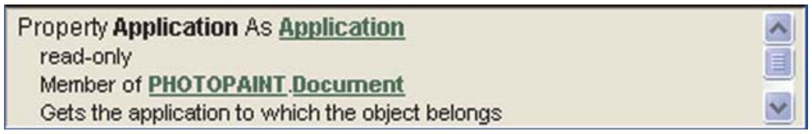
Icon	Item
	property
	default property
	method
	event
	constant

To access the Help topic for a selected item, click the **Help** button, or press **F1**.

Using the Information window

The **Information** window provides information about the selected class or class member. This information includes the following:

- a prototype of the item
- an indication of whether the item is a read-only property
- the parent of the item
- a short description of the item



Property **Application** As Application
read-only
Member of PHOTOPAINT.Document
Gets the application to which the object belongs

*The **Information** window for the **Document.Application** property in Corel PHOTO-PAINT*

The **Information** window provides hyperlinks to all referenced types and classes that are defined within the current object model. For example, the information for the **Document.Application** property in Corel PHOTO-PAINT (see the preceding figure) includes the following hyperlinks:

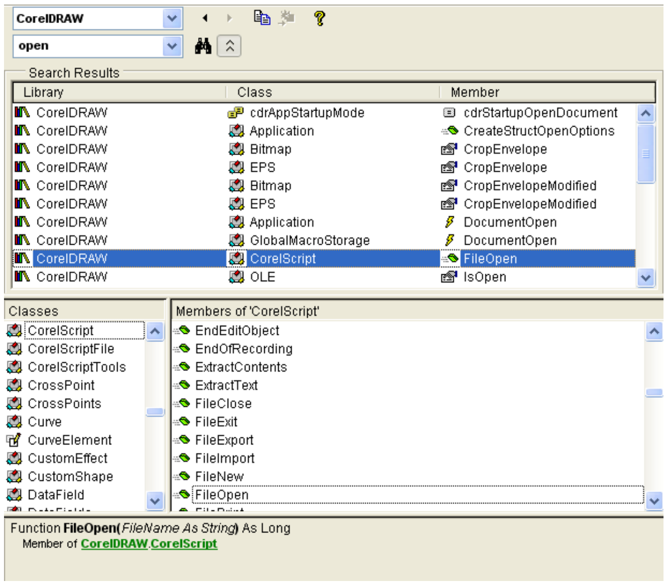
- **Application** — accesses the **Application** class, because **Application** is both the type of the **Document.Application** property and a class in the **PHOTOPAINT** library
- **PHOTOPAINT** — accesses the class for the **PHOTOPAINT** library, which contains all classes in the Corel PHOTO-PAINT object model

- **Document** — accesses the **Document** class, which is the parent of the **Application** property

When the **Information** window is not tall enough to reveal its complete contents, a scroll bar is provided. To increase the height of the **Information** window, drag the top border of the window upwards.

Using the search controls

The search controls let you search the selected project or library for a given string. Searching is useful when you can only partly remember the name of a class or class member, or when you want to find classes and members that have similar names (such as those containing the word "open").



Library	Class	Member
CorelDRAW	cdrAppStartupMode	cdrStartupOpenDocument
CorelDRAW	Application	CreateStructOpenOptions
CorelDRAW	Bitmap	CropEnvelope
CorelDRAW	EPS	CropEnvelope
CorelDRAW	Bitmap	CropEnvelopeModified
CorelDRAW	EPS	CropEnvelopeModified
CorelDRAW	Application	DocumentOpen
CorelDRAW	GlobalMacroStorage	DocumentOpen
CorelDRAW	CorelScript	FileOpen
CorelDRAW	OLE	IsOpen

Classes
CorelScript
CorelScriptFile
CorelScriptTools
CrossPoint
CrossPoints
Curve
CurveElement
CustomEffect
CustomShape
DataField

Members of 'CorelScript'
EndEditObject
EndOfRecording
ExtractContents
ExtractText
FileClose
FileExit
FileExport
FileImport
FileNew
FileOpen

Function **FileOpen(***FileName As String***)** As Long
Member of CorelDRAW.CorelScript

Searching the CorelDRAW object model

To search the classes and members of the selected object model, type a string into the **Search** box, and then click the **Search** button . The **Search Results** window displays, in alphabetical order, all matches. Clicking a match advances the **Class** list and **Member** list to that item and displays the **Information** window for that item.

Matching class names have a blank **Member** column in the **Search Results** window.

To hide the **Search Results** window, click the **Hide Search Results** button .

Using the VSTA Editor

CorelDRAW and Corel PHOTO-PAINT provide an integrated development environment (IDE) for creating VSTA macro projects. Called the VSTA Editor, this IDE is similar to the Macro Editor (which is the IDE for VBA macro projects in CorelDRAW and Corel PHOTO-PAINT). You can use the VSTA Editor to perform various tasks related to VSTA macros.

By default, the software creates VSTA folders at the following location:

- for CorelDRAW: **My Documents\Corel\VSTA\CorelDRAW**
- for Corel PHOTO-PAINT: **My Documents\Corel\VSTA\Corel PHOTO-PAINT**

Be sure to load VSTA add-ins from the following location:

- for CorelDRAW: **My Documents\Corel\VSTA\CorelDRAW\Addins**
- for Corel PHOTO-PAINT: **My Documents\Corel\VSTA\Corel PHOTO-PAINT\Addins**

You can open the VSTA Editor from within CorelDRAW or Corel PHOTO-PAINT. Although the VSTA Editor opens in a separate window, it runs within the process of its host application. To open the VSTA Editor, do any of the following:

- Click **Tools** ▸ **Macros** ▸ **VSTA Editor** on the main menu in the application.
- Press **Alt + Shift + F12**.

To switch between the VSTA Editor and the application, use the Windows taskbar, or press **Alt + Shift F12** or **Alt + Tab**.

For more detailed information on VSTA and its programming environment, please consult the **Help** menu in the VSTA Editor.

Creating macros

Now that you are familiar with the concept of automation and with the macro-related tools and features of CorelDRAW and Corel PHOTO-PAINT, you are ready to create macros.

In this section

This section contains the following topics:

Creating macro projects

The process of creating a macro begins with creating a macro project. A macro project can be created in one of two ways:

- as a Global Macro Storage (GMS), or "project," file
- in a document

Using GMS files

For best results in storing and distributing a macro project, it is highly recommended that you use a GMS file. GMS files are stored in the **GMS** folder for the application, the location of which depends on the type of macro project.

Macro-project type	GMS folder
Default projects installed with the software	**X:\Program Files\Corel\<*suite*>\<*program*>\GMS** Legend: • **X:** is the drive and **Program Files\Corel\<*suite*>** is the path where the software suite is installed • **<*program*>** is the program subfolder
User-created projects on Windows 7 and Windows Vista®	**X:\Users\<*username*>\AppData\Roaming\Corel\<*suite*>\<*program*>\GMS** Legend: • **X:** is the drive where the software is installed • **<*username*>** is the name of the user • **<*suite*>** is the folder where the software suite is installed • **<*program*>** is the application subfolder

Macro-project type	GMS folder
User-created projects on Windows XP	**X:\Documents and Settings\<*username*>\Application Data\Corel\<*folder*>\<*application*>\GMS** Legend: • **X:** is the drive where the software is installed • <*username*> is the name of the user • <*suite*> is the folder where the software suite is installed • <*program*> is the program subfolder

Understanding macro projects

The **Macro Manager** docker provides basic tools for working with macro projects. For access to more advanced tools, you can use the Macro Editor (for VBA macro projects) or the VSTA Editor (for VSTA macro projects).

In the Macro Editor, a VBA macro project is broken into four types of components, which are displayed as the following folders in the Project Explorer (see "Using the Project Explorer" on page 30):

- **<*application*> Objects** — contains a single item that is used mostly for event handling: **ThisMacroStorage** for GMS-based macro projects, or **ThisDocument** for document-based macro projects. For normal code, this module is not used.
- **Forms** — contains customized dialog boxes and user interfaces, plus the code to control them
- **Modules** — contains code modules, for storing general code and macros
- **Class Modules** — contains object-oriented Visual Basic class modules (which are not discussed in this documentation)

In the Macro Editor, you cannot move a component from one folder to another within the same project. However, you can drag a component to another project to make a copy of it there.

Related procedures

For details on creating macro projects, see the following procedures:

- "To create a macro project" on page 43
- "To add a dialog box to a macro project" on page 44
- "To add a code module to a macro project" on page 44
- "To add a class module to a macro project" on page 45

To create a macro project

- In the **Macro Manager** docker, do one of the following:
  - Click **Visual Basic for Applications** in the list, click **New**, and then click **New macro project**.
  - Right-click **Visual Basic for Applications** in the list, and then click **New macro project**.

Project names must follow normal variable-naming conventions: They must begin with an alphabetic character, and they must not contain spaces nor special characters other than underscores (_).

You can also

Load a macro project	Do one of the following: • Click **Visual Basic for Applications** in the list, click **Load**, and then choose the project. • Right-click **Visual Basic for Applications** in the list, click **Load macro project**, and then choose the project.
Rename a macro project	Right-click the project in the list, and then click **Rename**. You can also rename a macro project from within the Macro Editor. Click the project in the Project Explorer, and then edit the **(Name)** value in the **Properties** window. Press **Enter** to commit your changes.
Copy a GMS-based macro project	Right-click the project in the list, click **Copy to**, and then choose the target location for the copy. **NOTE:** You cannot copy a document-based macro project. Such projects are stored within a document and cannot be managed separately from that document.
Unload a GMS-based macro project	Right-click the macro project in the list, and then click **Unload macro project**. **NOTE:** You can close a document-based macro project only by closing the document in which it is stored.

Some macro projects are locked and cannot be modified.

To add a dialog box to a macro project

1 In the Project Explorer of the Macro Editor, right-click the project.

2 Click **Insert** ▸ **UserForm**.

A form is added to the **Forms** folder for the project.

Some macro projects are locked and cannot be modified.

For more information, see “Providing dialog boxes for macros” on page 56.

To add a code module to a macro project

• Do one of the following:
  - In the **Macro Manager** docker, click the project in the list, click **New**, and then click **New module**.
  - In the **Macro Manager** docker, right-click the project in the list, and then click **New module**.
  - In the Project Explorer of the Macro Editor, right-click the project, and then click **Insert** ▸ **Module**.

You can also

Display or hide all code modules in the **Macro Manager** docker	In the **Macro Manager** docker, click the **Simple mode** button.
Edit a code module	In the **Macro Manager** docker, do one of the following: • Click the module in the list, and then click the **Edit** button. • Right-click the module in the list, and then click **Edit**. The code module opens in the Macro Editor.
Rename a code module	In the **Macro Manager** docker, right-click the module in the list, and then click **Rename**.
Delete a code module	In the **Macro Manager** docker, do one of the following: • Click the module in the list, and then click the **Delete** button. • Right-click the module in the list, and then click **Delete**.

Some macro projects are locked and cannot be modified.

To add a class module to a macro project

1 In the Project Explorer of the Macro Editor, right-click the project.

2 Click **Insert** ▶ **Class Module**.

A new class module is added to the **Class Modules** folder for the project.

Some macro projects are locked and cannot be modified.

Detailed documentation on creating class modules is beyond the scope of this documentation.

Writing macros

You can manually code a macro by writing it in the Macro Editor or the VSTA Editor. (Alternatively, in CorelDRAW, you can create a VBA macro by recording it. For information, see “Recording macros” on page 46.) Macros that are developed in the Macro Editor or the VSTA Editor can take advantage of full programming control, including conditional execution, looping, and branching. In effect, you can write macros that are programs in their own right.

In this documentation, all macro code is referred to as a macro. In some contexts, however, a macro is just those parts of the code that can be run by CorelDRAW or Corel PHOTO-PAINT.

To write a macro, you must first add it to a code module for the desired macro project. You can edit, rename, or even delete macros.

For details on writing macros, see the following procedures:

- “To add a macro to a macro project” on page 46

- "To edit a VBA macro" on page 46
- "To delete a VBA macro" on page 46

To add a macro to a macro project

- In the **Macro Manager** docker, do one of the following:
  - Click the desired container module in the macro project, click **New**, and then click **New macro**.
  - Right-click the desired container module in the macro project, and then click **New macro**.

Some macro projects are locked and cannot be modified.

To edit a VBA macro

- In the **Macro Manager** docker, do one of the following:
  - Click the macro in the list, and then click the **Edit** button.
  - Right-click the macro in the list, and then click **Edit**.

  The macro opens in the Macro Editor.

Some macro projects are locked and cannot be modified.

For detailed information on manually coding macros, see "How is automation coding structured?" on page 13.

To delete a VBA macro

- In the **Macro Manager** docker, do one of the following:
  - Click the macro in the list, and then click the **Delete** button.
  - Right-click the macro in the list, and then click **Delete**.

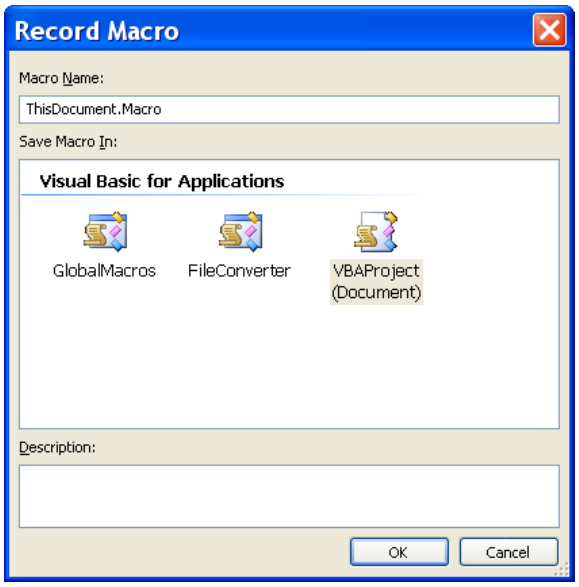
Some macro projects are locked and cannot be modified.

Recording macros

CorelDRAW offers a recording feature that lets you create a macro without needing to manually code it. For many simple and repetitive tasks, recorded macros are a quick, efficient solution: They store the sequence of keys that you press and the mouse actions that you perform within the application. You may prefer to create macros by recording them if you are not familiar with the object model for the application, or if you are not sure which objects and methods to use.

In Corel PHOTO-PAINT, actions can be recorded as Corel SCRIPT scripts but not as VBA or VSTA macros. For information on recording scripts, see "Working with scripts" in the main Help file for Corel PHOTO-PAINT (**corelpp.chm**).

If you want to store a recorded macro for future use, you can save it by using the **Record Macro** dialog box. Saving a recorded macro is particularly useful if you want to extend or customize its functionality by editing it in the Macro Editor.



*The **Record Macro** dialog box*

However, if you want to use a recorded macro during the current session only, you can record a temporary macro.

For details on recording macros, see the following procedures:

- "To record and save a macro" on page 47
- "To record a temporary macro" on page 48

To record and save a macro

1 Do one of the following:

- Click **Tools** ▸ **Macros** ▸ **Start recording**, or click the **Start recording** button ● on the **Macros** toolbar, to store the macro in the default macro project for recordings.
- In the **Macro Manager** docker, click the project in which to store the macro, and then click the **Record** button ●.

The **Record Macro** dialog box appears.

2 In the **Macro name** box, type a name for the macro.

Macro names can contain numerals, but they must begin with a letter. Macro names cannot contain spaces or non-alphanumeric characters other than underscores (_).

3 Type a description of the macro in the **Description** box, and then click **OK**.

4 Perform the actions that you want to record.

The application begins recording your actions. If you want to pause recording, do one of the following:

- Click **Tools** ▸ **Macros** ▸ **Pause recording**. Repeat this step to resume recording.
- Click the **Pause recording** button ⏸ on the **Macros** toolbar or in the **Macro Manager** docker. Repeat this step to resume recording.

5 To stop recording, do one of the following:

- Click **Tools** ▸ **Macros** ▸ **Stop recording**.
- Click the **Stop recording** button on the **Macros** toolbar or in the **Macro Manager** docker.
- Press **Ctrl + Shift + O**.

You cannot record a macro if all available macro projects are locked..

Not all actions can be recorded — some because of their complexity (although many such actions can be manually coded in the Macro Editor). When an action cannot be recorded, a comment is placed in the macro code (“`The recording of this command is not supported`.”), but the recording process continues until you stop it. You can view any comments in the code by opening the macro in the Macro Editor.

You can specify the default macro project for recordings by right-clicking the project in the **Macro Manager** docker, and then clicking **Set as recording project**. However, you cannot specify a locked macro project.

You can cancel recording a macro, and discard any commands recorded thus far, by clicking **Tools** ▸ **Macros** ▸ **Cancel recording**.

You can also

Save the actions in the **Undo** list as a VBA macro	Click **Tools** ▸ **Undo**, perform the actions that you want to record, and then click the **Save list to a VBA macro** button in the **Undo** docker.

To record a temporary macro

1 Do one of the following:

- Click **Tools** ▸ **Macros** ▸ **Record temporary macro**.
- Press **Ctrl + Shift + R**.

2 Perform the actions that you want to record.

The application begins recording your actions. If you want to pause recording, do one of the following:

- Click **Tools** ▸ **Macros** ▸ **Pause recording**. Repeat this step to resume recording.
- Click the **Pause recording** button on the **Macros** toolbar or in the **Macro Manager** docker. Repeat this step to resume recording.

3 To stop recording, do one of the following:

- Click **Tools** ▸ **Macros** ▸ **Stop recording**.
- Click the **Stop recording** button on the **Macros** toolbar or in the **Macro Manager** docker.
- Press **Ctrl + Shift + O**.

The macro is temporarily saved to the default recording project. When the current session is ended, the macro is deleted from that project.

You cannot record a temporary macro if all available macro projects are locked.

Not all actions can be recorded.

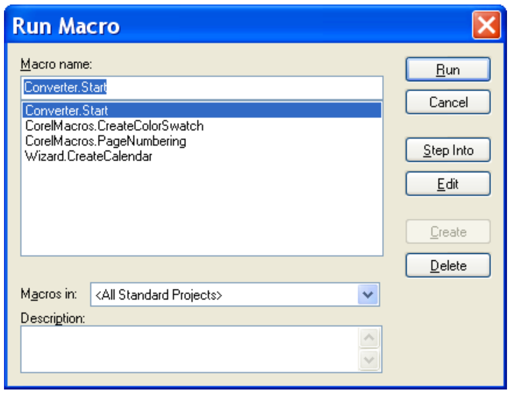
You can specify the default recording project by right-clicking the project in the **Macro Manager** docker, and then clicking **Set as recording project**. (You cannot specify a locked macro project.) If you want, you can create multiple temporary recordings by assigning each one to its own macro project.

You can cancel recording a macro, and discard any commands recorded thus far, by clicking **Tools** ▸ **Macros** ▸ **Cancel recording**.

Running macros

You can run saved macros in one of two ways:

- from directly within CorelDRAW or Corel PHOTO-PAINT
- from within the Macro Editor



*The **Run Macro** dialog box*

You can also run any temporary macro recorded in CorelDRAW.

For details on running macros, see the following procedures:

- "To run a saved macro" on page 49
- "To run a temporary macro" on page 50

To run a saved macro

- Do one of the following:
  - Click **Tools** ▸ **Macros** ▸ **Run macro**, or click the **Run macro** button ▷ on the **Macros** toolbar. From the **Macros in** list box, choose the project or file in which the macro is stored. From the **Macro name** list, choose the macro. Click **Run**.
  - In the **Macro Manager** docker, double-click the macro in the list.
  - In the **Macro Manager** docker, click the macro in the list, and then click the **Run** button ▷.
  - In the **Macro Manager** docker, right-click the macro in the list, and then click **Run**.
  - In the Macro Editor, click anywhere in the subroutine that forms the macro, and then click **Run** ▸ **Run macro**.

To run a temporary macro

- Do one of the following:
  - Click **Tools** ▸ **Macros** ▸ **Run temporary macro**.
  - Press **Ctrl + Shift + P**.

This option is enabled only after you record a temporary macro.

If you have created multiple temporary macros, you must specify which macro project contains the one that you want to run. Right-click the project in the **Macro Manager** docker, and then click **Set as recording project**.

Debugging macros

To ensure that your macros run as expected, it's important to debug them.

The Macro Editor provides four windows for debugging VBA code. The Macro Editor also provides two strong debugging facilities that are common to language editors: setting breakpoints, and stepping through code.

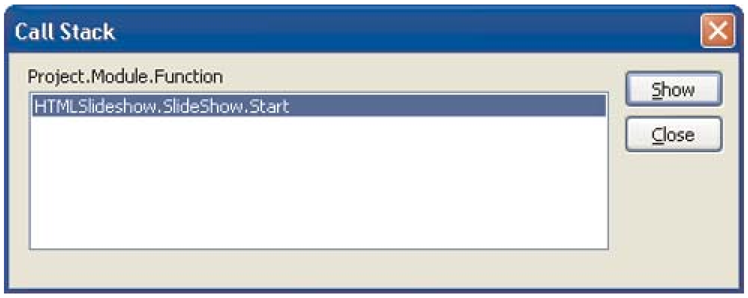
The Macro Editor also supports two advanced debugging techniques that are not discussed in this documentation: Making changes to the code while it is running, and watching and changing variables.

Using the debugging windows

The Macro Editor provides four windows for debugging VBA code: the **Call Stack** window, the **Immediate** window, the **Locals** window, and the **Watches** window. All of these windows provide important information about the state of functions and variables while an application is running.

The **Call Stack** window is a modal dialog box that lists which function calls which function. In long, complicated applications, this information is useful for tracing the steps to a particular function being called. To visit a function listed in the window, select the function name and then click **Show**, or else close the window.

To display the **Call Stack** window, click **View** ▸ **Call Stack**.

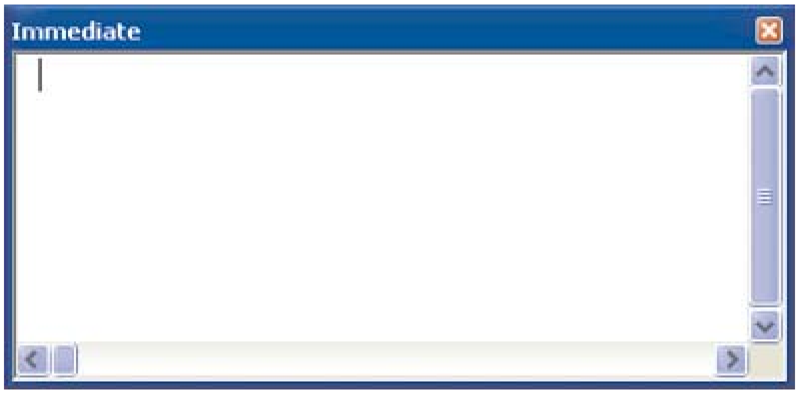


HTMLSlideshow.SlideShow.Start

*The **Call Stack** window*

The **Immediate** window lets you type in and run arbitrary lines of code while a macro is paused. This functionality is useful for getting or setting the property of an object in the document, or for setting the value of a variable in the code. To run a piece of code, type it in the **Immediate** window, and then press **Enter**; the code is executed immediately.

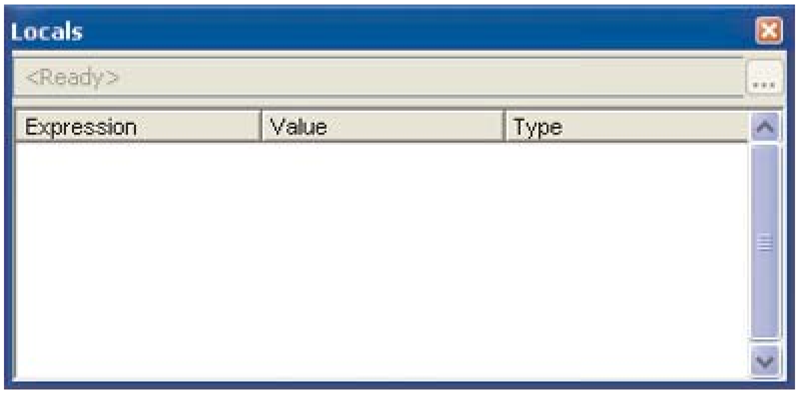
To display the **Immediate** window, click **View** ▸ **Immediate window**.



*The **Immediate** window*

The **Locals** window displays all variables and objects that exist within the current scope. The type and value for each variable are listed in the columns next to the name of the variable. Some variables and objects have several children, which can be displayed by clicking the button next to the parent. Many variables let you edit their value by clicking it.

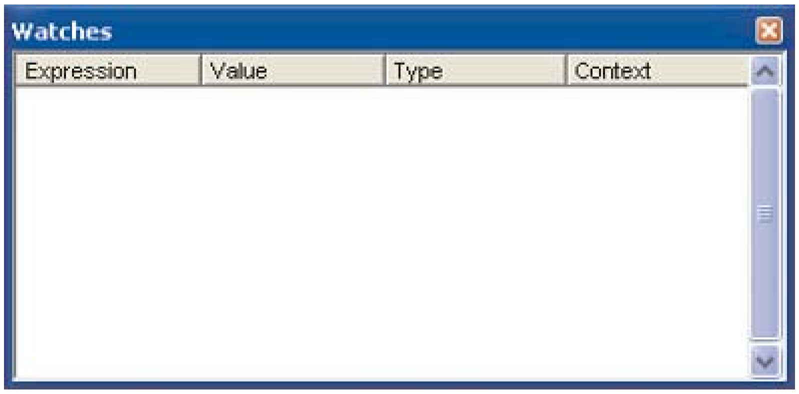
To display the **Locals** window, click **View** ▸ **Locals window**.



*The **Locals** window*

The **Watches** window is used to watch specific variables or object properties. This functionality is useful for watching just one or two values rather than searching for them among all the values in the **Locals** window.

To display the **Watches** window, click **View** ▸ **Watch window**.

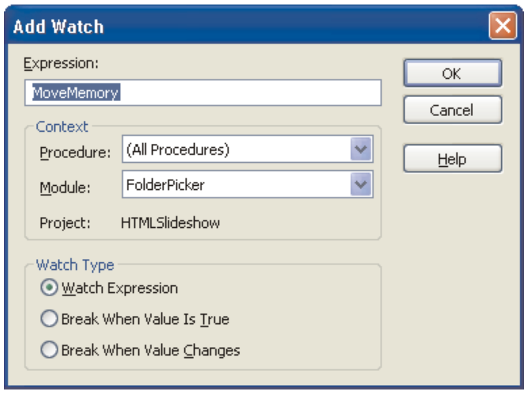


*The **Watches** window*

To add a value to the **Watches** window, do one of the following:

- Select the variable or object and its property, and then drag the selection onto the **Watches** window.
- Click the item, and then click **Debug ▸ Quick watch**.

The **Add Watch** dialog appears.



Expression: MoveMemory

Procedure: (All Procedures)

Module: FolderPicker

Project: HTMLSlideshow

(● Watch Expression) ○ Break When Value Is True ○ Break When Value Changes

*The **Add Watch** dialog box*

Select the item that you want to watch, select any conditions for this watch, and then click **OK**. If the condition becomes true, the application pauses to let you examine the code.

Setting breakpoints

A breakpoint is a marker in a line of code that causes execution to pause. To continue, you must either restart the execution or step through the subsequent lines of code.

To set or clear a breakpoint, click the line, and then click **Debug ▸ Toggle breakpoint**. By default, the line is highlighted in dark red, and a red dot is placed in the margin.

To restart the code after it pauses at a breakpoint, click **Run ▸ Continue**. To pause the execution of the code (immediately exiting from all functions and discarding all return values), click **Run ▸ Reset**.

You can also "run to cursor" — that is, execute the code until it reaches the line that the cursor is on, and then pause at that line. To do this, click the line where you want execution to pause, and then click **Debug ▸ Run to cursor**.

To clear all breakpoints, click **Debug ▸ Clear all breakpoints**.

If the line with the breakpoint (or the cursor, when "running to cursor") is not executed because it is in a conditional (if-then-else) block, the code does not stop at that line.

Breakpoints are not saved. They are lost when you close the Macro Editor.

Stepping through the code

When execution pauses at a breakpoint, you can continue through the code one line at a time. This functionality, called "stepping through the code," lets you do the following:

- examine the values of individual variables after each line
- determine how the code affects the values
- determine how the values affect the code

To step through the code, click **Debug ▸ Step into**. The execution advances to every line in all called functions and subroutines.

To step through each line of the current function or subroutine but not through the lines of each called function or subroutine, click **Debug ▸ Step over**. The called functions and subroutines are executed, but not line-by-line.

To execute the rest of the current function or subroutine but pause when the function or subroutine returns to the point where it was called, click **Debug ▸ Step out**. This technique is a quick way of returning to the point of entry of a function, to continue stepping through the code of the calling function.

Making macros user-friendly

An important part of many macro solutions is the user interface. A well-designed interface improves the ease-of-use, power, and acceptance of a macro solution. Simple user interfaces can be created with toolbars, while more complex interfaces can be created with dialog boxes or dockers — and can even allow the user to interact with the mouse.

However, for some macro solutions, a user interface alone is not enough. To make a macro solution as user-friendly as possible, you can provide documentation for it.

In this section

This section contains the following topics:

- "Providing toolbars for macros" on page 54
- "Providing dialog boxes for macros" on page 56
- "Providing user interaction for macros" on page 64
- "Providing documentation for macros" on page 66

Providing toolbars for macros

A toolbar provides a basic interface that enhances the user's experience with your macro solution. Toolbars are useful because their buttons are memorable even if small, and because those buttons can be set to display meaningful captions and helpful tooltips.

Designing toolbars for macros

When creating toolbars, you should plan carefully. Having multiple small toolbars containing a few related buttons is better than having one big toolbar containing all of the buttons for all of your macros. By breaking your buttons into small groups, it is much easier to deploy them with the projects to which they belong.

For more information, see the following procedures:

- "To create a macro toolbar" on page 55
- "To add buttons to a macro toolbar" on page 55

Associating images or icons with macros

Macro commands can have an image or icon associated with them. This image or icon can be displayed or hidden on toolbars and menus, and it can be sized as small (16 × 16 pixels), medium (32 × 32 pixels), or large (48 × 48 pixels).

For more information, see the following procedure:

- "To associate an image or icon with a macro" on page 55

Setting captions and tooltips for macros

Each macro can have both a caption and a tooltip. The caption is displayed whenever the menu command is used and can be displayed as part of a button, while the tooltip appears when the pointer hovers over the button or menu item.

For more information, see the following procedures:

- "To set a caption for a macro" on page 55
- "To set a tooltip for a macro" on page 56

To create a macro toolbar

1 Click **Tools** ▸ **Options**.

2 Click **Workspace** ▸ **Customization** ▸ **Command bars**.

3 Click New.

4 Type a name for the toolbar.

5 Enable the check box next to the name of the toolbar.

To add buttons to a macro toolbar

1 Click **Workspace** ▸ **Customization** ▸ **Commands**.

2 Choose **Macros** from the **Commands** list box.

The list displays the fully qualified names of all of the public, parameter-free subroutines from all of the installed project (GMS) files.

3 Drag a macro from the list to the toolbar.

The macro appears on the toolbar with the default macro icon.

To associate an image or icon with a macro

1 Click **Workspace** ▸ **Customization** ▸ **Commands**.

2 Choose **Macros** from the **Commands** list box.

The list displays the fully qualified names of all of the public, parameter-free subroutines from all of the installed project (GMS) files.

3 Select a macro in the **Command** list.

4 Click the **Appearance** tab, and then do one of the following:

- To apply a Windows bitmap (BMP) image to the macro, click **Import**, navigate to where the image is stored, and select it. The colors in the image are mapped to their closest available matches.
- To create a customized icon for the macro, edit the pixels displayed in the **Image** area.

To set a caption for a macro

1 Click **Workspace** ▸ **Customization** ▸ **Commands**.

2 Choose **Macros** from the Commands list box.

The list displays the fully qualified names of all of the public, parameter-free subroutines from all of the installed project (GMS) files.

3 Select a macro in the **Command** list.

4 Click the **Appearance** tab, and then type the caption in the **Caption** box.

To specify a character in the caption as an accelerator that can be activated in combination with the **Alt** key, type an ampersand (**&**) in front of that character. This accelerator key applies only to menu commands, which display accelerator characters with an underscore (**_**).

To set a tooltip for a macro

1 Click **Workspace** ▸ **Customization** ▸ **Commands**.

2 Choose **Macros** from the **Commands** list box.

The list displays the fully qualified names of all of the public, parameter-free subroutines from all of the installed project (GMS) files.

3 Select a macro in the **Command** list.

4 Click the **General** tab, and then type the tooltip in the **Tooltip help** box.

Providing dialog boxes for macros

A dialog box provides a user-friendly interface for more complex macro solutions.

For best results, all dialog boxes must provide the following:

- a meaningful title
- an obvious function for cancelling or closing the dialog box
- an easy-to-use layout
- a Help button from which users can access how-to documentation
- a tooltip (that is, a **ControlTipText** string) for every control

There are two types dialog boxes: modal and modeless.

Understanding modal dialog boxes

A modal dialog box locks the application until the user acts on and then closes the dialog box. Most built-in dialog boxes for macro solutions are modal, and most modal dialog boxes provide the following buttons:

- **OK** — performs an action and then closes the dialog box. This button is the default.
- **Cancel** — closes the dialog box without performing an action. This button provides the same functionality as the **Close** button in the upper-right corner of a dialog box.

In addition, some modal dialog boxes provide the following button:

- **Apply** — performs an action that can be commited by clicking the **OK** button or cancelled by clicking the **Cancel** button

Finally, most wizard-style dialog boxes provide the following buttons:

- **Previous** — returns to the previous page. This button can be disabled on the first page of the dialog box.
- **Next** — advances to the next page. This button can be replaced by a **Finish** button on the last page of the dialog box.
- **Finish** — performs the action for the dialog box and then closes the dialog box

Understanding modeless dialog boxes

A modeless dialog box does not lock the application, so the user can leave the dialog box open and continue working in the application. In this way, modeless dialog boxes behave like dockers. Most modeless dialog boxes provide the following buttons:

- **Apply** or **Create** — performs an action (and can, in fact, be specially labeled to describe that action). This button is typically the default.
- **Close** — closes the dialog box. This button is used after the action is applied.

Choosing between modal and modeless dialog boxes

Before you can create a dialog box for your macro solution, you must decide whether to make it modal or modeless by considering what you want the dialog box to achieve.

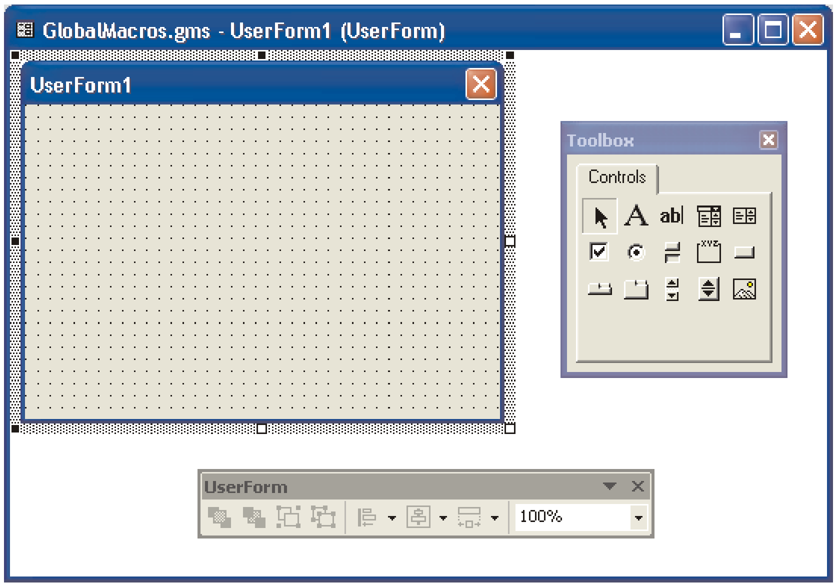
For example, let's say that you are creating a "one-shot" end-to-end solution such as a customized **Print** dialog box or **Save** dialog box. In this case, you would provide a modal dialog box because it is unlikely that the user would want to apply the specified settings repeatedly.

On the other hand, let's say that you are creating a solution for setting up an effect to apply to a selection of shapes. To let the user specify the desired settings and then apply them repeatedly, you would provide a modeless dialog box.

After choosing which type of dialog box to provide, you are ready to set it up. For information, see "Setting up dialog boxes" on page 57. After setting up a dialog box, you are ready to code it. For information, see "Coding dialog boxes" on page 59.

Setting up dialog boxes

The Form Designer in the Macro Editor provides easy access to the tools for setting up a dialog box. You can access the Form Designer by creating a new, blank dialog box. In the Project Explorer, right-click the project to which you want to add a dialog box, and then click **Insert ▶ UserForm**.



A blank form in the Form Designer

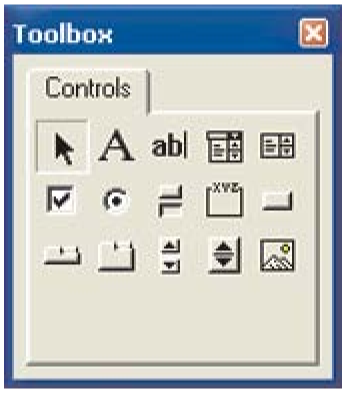
The Form Designer provides two main features for designing dialog boxes:

- the **Form Designer** toolbox
- The **UserForm** toolbar

The Form Designer also provides functions for naming and testing dialog boxes.

Designing dialog boxes

The **Form Designer** toolbox is the main utility for designing dialog boxes. It lets you add controls to a dialog box by dragging them from the toolbox.



*The **Form Designer** toolbox*

The **Form Designer** toolbox lets you add the following controls to a dialog box:

Icon	Control name	Function
A	Label	Provides static text, such as instructions or captions
ab|	TextBox	Provides an area for typing text. For information on coding this control, see “Providing text boxes in dialog boxes” on page 60.
▤	ComboBox	Provides a list from which a single item can be selected; optionally, also provides an area for typing text. For information on coding this control, see “Providing combination boxes and list boxes in dialog boxes” on page 61.
▤	ListBox	Provides a list from which multiple items can be selected. For information on coding this control, see “Providing combination boxes and list boxes in dialog boxes” on page 61.
☑	CheckBox	Provides a check box that can be enabled (by clicking to display a check mark), disabled (by clicking to remove the check mark), or grayed (that is, made unavailable)
◉	OptionButton	Provides a “radio button” that is linked to other radio buttons with the same **GroupName** property, such that only one of the buttons can be enabled at a time
⇄	ToggleButton	Provides a button that can be toggled (to appear pressed or not pressed)

Icon	Control name	Function
	Frame	Groups items together so that they move with the frame
	CommandButton	Provides a button that can be clicked to commit an assigned action. For information on coding this control, see “Providing buttons in dialog boxes” on page 61.
	TabStrip	Provides separate views of related controls
	MultiPage	Provides multiple pages of controls
	ScrollBar	Provides immediate access to a range of values by scrolling
	SpinButton	Enhances another control (such as a **TextBox** control) so that the value for that control can be set more quickly
	Image	Provides an image. For information on coding this control, see “Providing images in dialog boxes” on page 63.

The **Form Designer** toolbox also features a **Pick** tool , which lets you select and move the controls on a dialog box.

To display a Help topic containing information about a selected dialog-box control in the Form Designer, press **F1**.

The Form Designer also provides access to the **UserForm** toolbar, which you can use when designing a dialog box. For information on this toolbar, see “Using the Macro Editor toolbars” on page 35.

Naming dialog boxes

After you have finished designing your dialog box, you may want to change its title. Click the dialog box to select it, and then in the **Properties** window, change the **Caption** property.

For clarity, you can give each dialog box a unique, descriptive name by using the **Properties** window. However, remember to follow the standard programming conventions for naming variables.

Testing dialog boxes

At any time, you can test your dialog box by pressing **F5** to run it.

After you finish setting up your dialog box, you can start coding it. For information, see “Coding dialog boxes” on page 59.

Coding dialog boxes

After setting up a dialog box, you can develop the VBA code for displaying it. You can also develop the code for providing its text boxes, combination boxes and list boxes, buttons, and images.

Displaying dialog boxes

The **Show** method for a dialog box lets you determine how the dialog box is displayed.

For example, the following code uses the **Show** method to display the dialog box **frmFooForm**:

```
frmFooForm.Show
```

In addition, the **Show** method provides a **Modal** parameter, which lets you specify whether the dialog box is modal or modeless. A value of **vbModal** (or 1) for this parameter creates a modal dialog box, while a value of **vbModeless** (or **0**) creates a modeless dialog box. The following VBA example creates a modeless dialog box:

```
frmFooForm.Show vbModeless
```

To open a dialog box from a macro that is available from within the application itself, you must create a public subroutine within a code module. However, a subroutine cannot be made available from within the application if the subroutine exists either within the code for a dialog box or within a class module. In addition, the subroutine cannot take any parameters.

The following VBA example subroutine opens **frmFooForm** as a modeless dialog box:

```
Public Sub showFooForm()

  frmFooForm.Show vbModeless

End Sub
```

When a dialog box loads, it triggers its own **UserForm_Initialize** event. From this event handler, you must initialize all the relevant controls on the dialog box. For more information, see "Providing event handlers" on page 23.

Finally, you can also use the **Show** method to open additional dialog boxes from within the current one, as in the following VBA example:

```
UserForm2.Show vbModal
```

However, control is not returned to you until all open dialog boxes are unloaded.

Providing text boxes in dialog boxes

Text boxes (that is, **TextBox** controls) are the mainstay of user input. They are simple to use and quick to program, and they are suitable for a number of purposes.

To set the text in a text box when initializing it, set the **Text** (default or implicit) property for the **TextBox** control, as in the following VBA example:

```
txtWidth.Text = "3"

txtHeight = "1"
```

To get the value of a **TextBox** control, get its **Text** property in the **Properties** window, as in the following VBA example:

```
Call SetSize(txtWidth.Text, txtHeight.Text)
```

Providing combination boxes and list boxes in dialog boxes

In a combination box (that is, a **ComboBox** control), the user can either choose an item from the list or type a value into the text box. You can prevent users from being able to type into a **ComboBox** control by setting its **Style** property (in the **Properties** window) to **fmStyleDropDownList**.

In a list box (that is, a **ListBox** control), the user can choose one or more items (typically, from between three and ten items) from the list.

To populate a list of any type, you must call the member function **AddItem** for the list. This function takes two parameters: the string or numerical value, and the position in the list. The position parameter is optional, so omitting it inserts the item at the last position in the list. For example, the following VBA code populates the list **ComboBox1** with four items:

```
ComboBox1.AddItem 1

ComboBox1.AddItem 2

ComboBox1.AddItem 3

ComboBox1.AddItem 0, 0
```

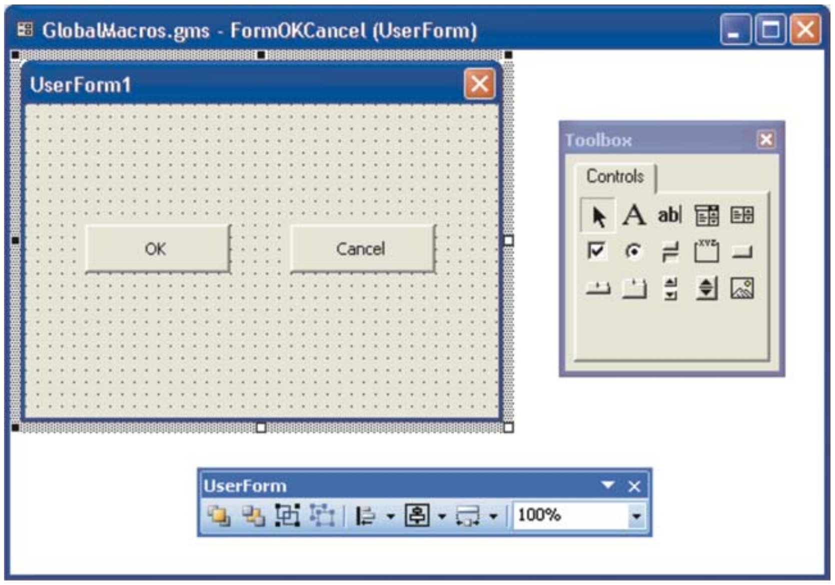
To test which item is selected when the **OK** button is clicked, test the **ListIndex** property for the list.

To get the value of the caption for a selected combination box or list box, test the **Text** property for the item, as in the following VBA example:

```
Dim retList As String

retList = ComboBox1.Text
```

Providing buttons in dialog boxes

You can add a button to a dialog box by using the **CommandButton** control. Click the dialog box to add a default-sized button, or drag to create a custom-sized one. Click the caption to edit it, or select the button and edit its **Caption** property in the **Properties** window. You might also want to change the name of the button to something more descriptive, such as **buttonOK** or **buttonCancel**.



Designing buttons in the Form Designer

Most dialog boxes have an **OK** button and a **Cancel** button. However, no button functions until its dialog box has code for handling the click event for the button. (This is because dialog boxes in VBA and VSTA are event-driven.)

For an **OK** button, you can set its **Default** property to **True** so that the event handler for the button is called when the user presses **Enter** to activate the dialog box. That way, the click-event handler for the button performs the functionality of the dialog box and then unloads that dialog box.

If the dialog box is used to set the size of the selected CorelDRAW shapes by setting their width and height, then the click-event handler for the **OK** button could resemble the following VBA code sample (which assumes you have already created two text boxes called **txtWidth** and **txtHeight**):

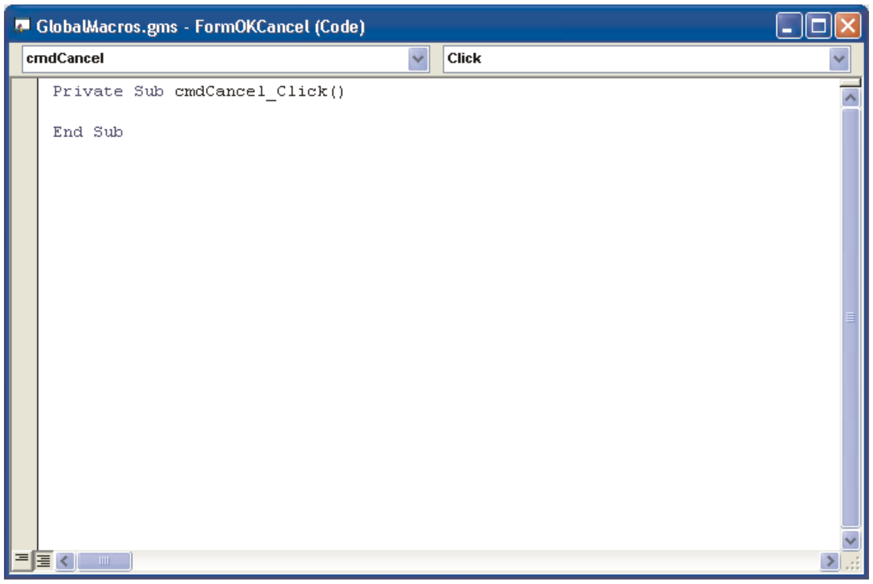
```
Private Sub buttonOK_Click()

  Me.Hide

  Call SetSize(txtWidth.Text, txtHeight.Text)

  Unload Me

End Sub
```

Similarly, the size-setting CorelDRAW subroutine could resemble the following:

```
Private Sub SetSize(width As String, height As String)

  ActiveDocument.Unit = cdrInch

  ActiveSelection.SetSize CDbl(width), CDbl(height)

End Sub
```

From inside the code module for the dialog box, the dialog-box object is implicit, so all the controls can be simply accessed by name. From other modules, the controls must be accessed through their full name (as in **UserForm1.buttonOK**).

The **Cancel** button is the simplest control: it must dismiss the form without doing anything else. To add a cancel action to a **Cancel** button, double-click the button from within the Form Designer to display its code in the **Code** window. This creates a new subroutine called **cmdCancel_Click**:



```
Private Sub cmdCancel_Click()

End Sub
```

*The **Code** window with code for a **Cancel** button*

The following VBA code, if applied to a **Cancel** button, dismisses the dialog box when the button is clicked:

```
Private Sub cmdCancel_Click()

    Unload Me

End Sub
```

If you continue by setting the **Cancel** property for the dialog box to **True**, then when the user presses **Escape**, the **cmdCancel_Click** event is triggered and the provided code unloads the form.

Providing images in dialog boxes

The **Image** control is used to place graphics on a dialog box. The image (a bitmap) is contained in the **Picture** property, so you can either load an RGB image from a file (such as a GIF, JPEG, or Windows Bitmap BMP file) or paste one into the property.

At run time, you can change the **Picture** property if you want to load a new image into the **Image** control. To change the **Picture** property, use the function **LoadPicture** and provide a path to the new image file, as in the following VBA example:

```
Image1.Picture = LoadPicture("C:\Images\NewImage.gif")
```

Providing user interaction for macros

One way to make your macro solutions more user-friendly is to optimize them for user interaction, such as mouse input. A macro that captures mouse actions gives users real-time influence on the result of that macro.

The CorelDRAW object model provides three main ways to receive mouse input from users, as explained in the following topics:

- “Capturing mouse clicks” on page 64
- “Capturing mouse drags” on page 65
- “Capturing coordinates” on page 66

Capturing mouse clicks

To get the position of a single mouse click, you can use the **GetUserClick** method of the **Document** class. This method pauses the macro until the specified period of time elapses, or until the user clicks in the document or presses **Escape**. Here is a VBA example that uses the **Document.GetUserClick** method:

```
Dim doc As Document, retval As Long

Dim x As Double, y As Double, shift As Long

Set doc = ActiveDocument

doc.Unit = cdrCentimeter

retval = doc.GetUserClick(x, y, shift, 10, True, cdrCursorPick)
```

The following parameters for the **Document.GetUserClick** method are coded into the preceding example:

- The variable `x` returns the horizontal position of the mouse click.
- The variable `y` returns the vertical position of the mouse click.
- The parameter `shift` returns the combination of the **Shift**, **Ctrl**, and **Alt** keys that is held down by the user when clicking the mouse. The **Shift**, **Ctrl**, and **Alt** keys are assigned values of 1, 2, and 4 (respectively), the sum of which is the returned value.
- The value `10` specifies the number of seconds for the user to click in the document.
- The value `True` specifies that the `SnapToObjects` parameter is enabled.
- The value `cdrCursorPick` specifies that the icon for the **Pick** tool is used for the cursor icon. (You cannot use a custom icon.)

One of the following values is returned:

- 0 — The user successfully completes the click.
- 1 — The user cancels by pressing **Escape**.
- 2 — The operation times out.

The returned coordinates are relative to the origin of the page and, unless explicity specified, are in document units.

To get the shapes under the returned click point, you can use the method **SelectShapesAtPoint** (which is a member of **Page**), as in the following VBA example:

```
doc.ActivePage.SelectShapesAtPoint x, y, True
```

A value of `True` selects unfilled objects, while `False` does not select unfilled objects.

Capturing mouse drags

To get the position of a mouse drag (or an area or rectangle), you can use the **GetUserArea** method of the **Document** class. This method pauses the macro until the specified period of time elapses, or until the user clicks, drags, and releases in the document or presses **Escape**. Here is a VBA example that uses the **Document.GetUserArea** method:

```
Dim doc As Document, retval As Long, shift As Long

Dim x1 As Double, y1 As Double, x2 As Double, y2 As Double

Set doc = ActiveDocument

doc.Unit = cdrCentimeter

retval = doc.GetUserArea(x1, y1, x2, y2, shift, 10, True, cdrCursorExtPick)

ActivePage.SelectShapesFromRectangle x1, y1, x2, y2, False
```

The following parameters for the **Document.GetUserArea** method are coded into the preceding example:

- The variables `x1` and `y1` return the horizontal and vertical positions (respectively) of the upper-left corner of the area.
- The variables `x2` and `y2` return the horizontal and vertical positions (respectively) of the lower-right corner of the area.
- The parameter `shift` returns the combination of the **Shift**, **Ctrl**, and **Alt** keys that is held down by the user when dragging the mouse. The **Shift**, **Ctrl**, and **Alt** keys are assigned values of 1, 2, and 4 (respectively), the sum of which is the returned value.
- The value `10` specifies the number of seconds for the user to click in the document.
- The value `True` specifies that the `SnapToObjects` parameter is enabled.
- The value `cdrCursorExtPick` specifies the icon to use for the cursor.

In the preceding example, the code ends by selecting the shapes that lie completely within the area by using the **Page.SelectShapesFromRectangle** method.

One of the following values is returned:

- 0 — The user successfully completes the selection.
- 1 — The user cancels by pressing **Escape**.
- 2 — The operation times out.

This method returns two points that are interpreted as the corners of a rectangle. However, the two points can also be used as the start point and end point of a mouse drag.

The returned coordinates are relative to the origin of the page and, unless explicity specified, are in document units.

Capturing coordinates

When capturing mouse actions, or when developing a complex macro solution, you may want to convert between screen coordinates and document coordinates. This conversion is done with the methods **ScreenToDocument** and **DocumentToScreen** of the **Window** class.

The following VBA example converts a set of screen coordinates into a point in the document that is visible in the active window:

```
Dim docX As Double, docY As Double

ActiveDocument.Unit = cdrMillimeter

ActiveWindow.ScreenToDocument 440, 500, docX, docY
```

The following VBA example returns the screen coordinates of a point in the document as it appears on the screen:

```
Dim screenX As Long, screenY As Long

ActiveDocument.Unit = cdrMillimeter

ActiveWindow.DocumentToScreen 40, 60, screenX, screenY
```

In both examples, the converted coordinates are returned in the last two parameters.

Screen coordinates start from the upper-left corner of the screen, so positive y-values are down the screen, whereas negative y-values are up the screen.

You can test whether a set of coordinates (that is, a point) is inside, outside, or on the outline of a curve by using the **Shape.IsOnShape** method. For a set of document coordinates, this method returns one of the following:

- **cdrInsideShape** — if the coordinate is inside the shape
- **cdrOutsideShape** — if the coordinate is outside the shape
- **cdrOnMarginOfShape** — if the coordinate is on or near the outline of the shape

For example, the following VBA code tests where the point (4, 6) is in relation to the active shape:

```
Dim onShape As Long

ActiveDocument.Unit = cdrInch

onShape = ActiveShape.IsOnShape(4, 6)
```

Providing documentation for macros

To make a macro as user-friendly as possible, you can provide documentation for it.

One solution is to create a Readme file or a printed manual. Another solution is to incorporate the documentation directly into the user interface for the macro, but this method uses up valuable on-screen “real estate.” Yet another solution is to create an online Help system, but this method requires special tools and a fair amount of additional work.

Perhaps the simplest way to provide macro documentation is in the form of a plain-text file. In fact, upon installation, a macro project can create a registry value that points to the location of this file. In VBA, the following function can be used to open a plain-text file (where the parameter `file` provides the full path to the file, such as **C:\ReadMe.txt**):

```
Public Sub launchNotepad(file As String)

  Shell "Notepad.exe" & " " & file, vbNormalFocus

End Sub
```

A much more powerful solution is to provide documentation in HTML format. HTML provides numerous benefits over plain-text, including support for graphics and for hypertext links (such as to specific locations in the document — for example, **index.html#middle**). In VBA, the following function can be used to open an HTML file (where the parameter `url` provides the full path to the file — such as **C:\ReadMe.txt** — or a URL for the file):

```
' Put this Declare statement before all Subs and Functions!

Declare Function ShellExecute Lib "shell32.dll" _

    Alias "ShellExecuteA" (ByVal hwnd As Long, _

    ByVal lpOperation As String, ByVal lpFile As String, _

    ByVal lpParameters As String, ByVal lpDirectory As String, _

    ByVal nShowCmd As Long) As Long

Public Sub launchBrowser(url As String)

    ShellExecute 0, vbNullString, url, vbNullString, vbNullString, 5

End Sub
```

Organizing and deploying macros

When you've finished developing your macro solution, you can make it available to other users.

In this section

This section contains the following topics:

- "Organizing macros" on page 68
- "Deploying macros" on page 68

Organizing macros

To make your macro solutions easy to deploy, you can organize them. Here are some tips:

- To sort your macros, use a separate code module for each macro, and then group related macros into a single GMS file.
- To help users find the entry point to a macro, place all public subroutines into a single code module so that the macro can be called from within the application.

Deploying macros

You can deploy macro solutions to users for installation. You can deploy GMS files or workspaces, or both.

Deploying GMS files

Every document has an intrinsic GMS file. For this reason, you can explicitly distribute a macro as part of a document because when that document is opened, the user has immediate access to its macros. This deployment technique lets you, for example, set up a macro to track how much time the user has spent editing a document.

Alternatively, you can distribute the code module that contains the macro. However, this deployment method requires users to manually integrate the code module into an existing project file.

The simplest and most reliable way to deploy a macro project is to use its GMS file. To begin, you must export the GMS file from your computer. Then, each user must import the GMS file by using the **Macro Manager** docker. For more information, see the following procedures:

- "To export a GMS file" on page 69
- "To import a GMS file" on page 69

Deploying workspaces

Some macro solutions include a customized workspace that contains relevant toolbars, menus, and shortcut keys. You can deploy the features of a customized workspace to users by creating a Corel workspace (XSLT) file. You can export a subset of workspace features — such as individual menus, individual toolbars, or complete sets of shortcut keys — if you want users to install only those features, or you can export the entire workspace if you prefer. For more information, see “To export workspace features” on page 69.

Users can install customized workspace features by importing the XSLT files that you provide. For more information, see “To import workspace features” on page 69.

In CorelDRAW, users can also import workspace features by using the **Application.ImportWorkspace** method.

To export a GMS file

- Locate the GMS file on your computer, and make it available to your users.

  For help locating this folder, see “Using GMS files” on page 42.

To import a GMS file

1 Save the GMS file to a **GMS** folder on your computer.

  For help locating this folder, see “Using GMS files” on page 42.

2 In the **Macro Manager** docker, do one of the following:
  - Click **Visual Basic for Applications** in the list, click **Load**, and then choose the project.
  - Right-click **Visual Basic for Applications** in the list, and then click **Load macro project**.

To export workspace features

1 Right-click the menu bar, and click **Customize** ▸ **Workspace** ▸ **Export Workspaces**.

2 In the list, enable the check boxes next to the workspace features that you want to export:
  - **Dockers** — includes the sizes and positions of dockers
  - **Menus** — lets you choose which menus to include
  - **Shortcut Keys** — includes all available shortcut keys
  - **Status Bar** — includes the status bar
  - **Toolbars** — lets you choose which toolbars to include

  Enable all check boxes if you want to export the entire workspace.

3 Click **Save**.

4 In the **File name** box, type a filename.

  The specified workspace features are saved to a single Corel workspace (XSLT) file with the specified filename.

If you want, you can export each workspace feature to a separate file. Simply export one item at a time to create a series of XSLT files.

When you export shortcut keys, you export all shortcut keys. If you want to distribute only a few keys, create a new workspace, remove all shortcut keys from it, and then add only the desired keys.

To import workspace features

1 Right-click the toolbar, and click **Customize** ▸ **Workspace** ▸ **Import Workspaces**.

2 Click **Browse**.

3 Select the desired Corel workspace (XSLT) file, and then click **Next**.

4 In the list, enable the check boxes next to the workspace features that you want to import:

- **Dockers** — includes the sizes and positions of dockers
- **Menus** — lets you choose which menus to include
- **Shortcut Keys** — includes all available shortcut keys
- **Status Bar** — includes the status bar
- **Toolbars** — lets you choose which toolbars to include

Enable all check boxes if you want to import the entire workspace.

5 Click **Next**.

6 Choose a destination for the workspace features by doing one of the following:

- Enable the **Current workspace** option to import the specified workspace features into the current workspace, and then click **Next**.
- Enable the **New workspace** option to import the specified workspace features into a new workspace. Click **Next**, and provide details about the workspace. Click **Next**.

7 Confirm the details of the import, and then click **Finish**.

The specified workspace features are imported into the specified workspace.

If the name of an incoming toolbar is the same as an existing toolbar, the incoming toolbar is renamed.

If an imported command calls an uninstalled macro, it does not function.

Understanding the CorelDRAW object model

In CorelDRAW, the **Application** object is the root of all other objects and is used if no other root object is specified.

Documents, pages, layers, shapes, and filters are among the most important objects in the CorelDRAW object model. Understanding these objects — and their relationships to one another — is the key to understanding the CorelDRAW object model.

In this section

This section contains the following topics:

All code examples in this section are written in VBA.

For a visual representation of the object model, please see the object-model diagram at **X:\Program Files\Corel\<*folder*>\Data** (where **X:** is the drive and **<*folder*>** is the folder where the software is installed):

- **CorelDRAW Object Model Diagram.pdf**

Understanding the object-model hierarchy

The main structure of the CorelDRAW object model can be summarized as follows:

- The **Application** object contains a **Documents** collection of all open **Document** objects. When a CorelDRAW document is created or opened, a corresponding **Document** object is added to the **Documents** collection for the **Application** object.
- Each **Document** object contains a **Pages** collection of all the **Page** objects (or "pages") in that document.
- Each **Page** object contains a **Layers** collection of all the **Layer** objects (or "layers") on that page.
- Each **Layer** object contains a **Shapes** collection of all the **Shape** objects (or "shapes") on that layer.

In addition, the object model contains a set of filter objects, which provide support for files from other technical-graphics applications. Import filters are governed by the **Layer** class, while export filters are governed by the **Document** class.

For a visual representation of the object model, please see the object-model diagram at **X:\Program Files\Corel\<*folder*>\Data** (where **X:** is the drive and **<*folder*>** is the folder where the software is installed):

- **CorelDRAW Object Model Diagram.pdf**

Working with the Application object

In CorelDRAW, the **Application** object is the root of all other objects and is used if no other root object is specified. You can use the application's **Application** object to reference the application's object model from an out-of-process controller.

```
Dim cdr As CorelDRAW.Application

Set cdr = CreateObject("CorelDRAW.Application")
```

If desired, you can avoid using the **CreateObject** keyword in the preceding example by importing the target type library and using the data types directly.

Working with documents

Each open document, or **Document** object, is a member of the **Application.Documents** collection. The documents in that collection appear in the order in which they were created or opened.

CorelDRAW provide a number of properties, methods, and events for working with documents, the most useful of which are listed in the following table.

Class	Member	Description
ActiveView	**OriginX** property and **OriginY** property	Combine to specify the origin of the active view For more information, see "Panning" on page 84.
ActiveView	**SetViewPoint** method	Specifies the origin of the active view For more information, see "Panning" on page 84.
ActiveView	**Zoom** property	Specifies the zoom factor of the active view For more information, see "Zooming" on page 84.
AddInHook	**New** event	Is triggered when a document is created For more information, see "Creating documents" on page 80.
Application	**ActiveDocument** property	Provides direct access to the active document For more information, see "Activating documents" on page 81.

Class	Member	Description
Application	**CreateDocument** method or **CreateDocumentFromTemplate** method	Create a document For more information, see “Creating documents” on page 80.
Application	**DocumentAfterExport** event	Is triggered when a document is exported (that is, when the **Export** dialog box closes) For more information, see “Exporting files from documents” on page 86.
Application	**DocumentAfterPrint** event	Is triggered when a document is printed (that is, when the **Print** dialog box closes) For more information, see “Printing documents” on page 89.
Application	**DocumentAfterSave** event	Is triggered when a document is saved (that is, when the **Save** dialog box closes) For more information, see “Saving documents” on page 85.
Application	**DocumentBeforeExport** event	Is triggered when the **Export** dialog box opens For more information, see “Exporting files from documents” on page 86.
Application	**DocumentBeforePrint** event	Is triggered when the **Print** dialog box opens For more information, see “Printing documents” on page 89.
Application	**DocumentBeforeSave** event	Is triggered when the **Save** dialog box opens For more information, see “Saving documents” on page 85.
Application	**DocumentClose** event	Is triggered when a document is closed For more information, see “Closing documents” on page 91.
Application	**DocumentNew** event	Is triggered when a document is created For more information, see “Creating documents” on page 80.
Application	**DocumentOpen** event	Is triggered when a document is opened For more information, see “Opening documents” on page 80.
Application	**Documents** property	Contains the collection of open documents For more information, see “Activating documents” on page 81.

Class	Member	Description
Application	**OpenDocument** method	Opens a document For more information, see “Opening documents” on page 80.
Application	**QueryDocumentClose** event	Is triggered when the user responds to a request to close a document For more information, see “Closing documents” on page 91.
Application	**QueryDocumentExport** event	Is triggered when the user responds to a request to export a document For more information, see “Exporting files from documents” on page 86.
Application	**QueryDocumentPrint** event	Is triggered when the user responds to a request to print a document For more information, see “Printing documents” on page 89.
Application	**QueryDocumentSave** event	Is triggered when the user responds to a request to save a document For more information, see “Saving documents” on page 85.
Application	**WindowActivate** event	Is triggered when a window is activated For more information, see “Activating documents” on page 81.
Application	**WindowDeactivate** event	Is triggered when a window is deactivated For more information, see “Activating documents” on page 81.
Document	**Activate** method	Activates a document For more information, see “Activating documents” on page 81.
Document	**ActiveWindow** property	Provides direct access to the active window for a document For more information, see “Working with windows” on page 82.
Document	**AfterExport** event	Is triggered when a document is exported (that is, when the **Export** dialog box closes) For more information, see “Exporting files from documents” on page 86.

Class	Member	Description
Document	**AfterPrint** event	Is triggered when a document is printed (that is, when the **Print** dialog box closes) For more information, see “Printing documents” on page 89.
Document	**AfterSave** event	Is triggered when a document is saved (that is, when the **Save** dialog box closes) For more information, see “Saving documents” on page 85.
Document	**BeforeExport** event	Is triggered when the **Export** dialog box opens For more information, see “Exporting files from documents” on page 86.
Document	**BeforePrint** event	Is triggered when the **Print** dialog box opens For more information, see “Printing documents” on page 89.
Document	**BeforeSave** event	Is triggered when the **Save** dialog box opens For more information, see “Saving documents” on page 85.
Document	**BeginCommandGroup** method and **EndCommandGroup** method	Combine to create a “command group” that reduces a series of programmed, document-related actions to a single, undoable step For more information, see “Creating command groups for documents” on page 85.
Document	**Close** event	Is triggered when a document is closed For more information, see “Closing documents” on page 91.
Document	**Close** method	Closes a document For more information, see “Closing documents” on page 91.
Document	**CreateView** method	Creates a document view For more information, see “Working with views” on page 83.
Document	**Export** method, **ExportEx** method, or **ExportBitmap** method	Exports a file from a document For more information, see “Exporting files from documents” on page 86.

Class	Member	Description
Document	**FilePath** property, **FileName** property, or **FullFileName** property	Specifies the file path or filename (or both) of a saved document For more information, see “Activating documents” on page 81.
Document	**GetUserArea** method	Returns information about a document area that the user drags with the mouse For more information, see “Capturing mouse drags” on page 65.
Document	**GetUserClick** method	Returns information about a document position that the user clicks with the mouse For more information, see “Capturing mouse clicks” on page 64.
Document	**Open** event	Is triggered when a document is opened For more information, see “Opening documents” on page 80.
Document	**PrintOut** method and **PrintSettings** property	Combine to print a document by using the specified settings For more information, see “Printing documents” on page 89.
Document	**PublishToPDF** method and **PDFSettings** property	Combine to publish a document to PDF by using the specified settings For more information, see “Publishing documents to PDF” on page 88.
Document	**QueryClose** event	Is triggered when the user responds to a request to close a document For more information, see “Closing documents” on page 91.
Document	**QueryExport** event	Is triggered when the user responds to a request to export a document For more information, see “Exporting files from documents” on page 86.
Document	**QueryPrint** event	Is triggered when the user responds to a request to print a document For more information, see “Printing documents” on page 89.

Class	Member	Description
Document	**QuerySave** event	Is triggered when the user responds to a request to save a document For more information, see “Saving documents” on page 85.
Document	**ReferencePoint** property	Specifies the reference point for the document For more information, see “Setting document properties” on page 82.
Document	**SaveAs** method or **Save** method	Saves a document For more information, see “Saving documents” on page 85.
Document	**Unit** property	Specifies the unit of measurement for the document For more information, see “Setting document properties” on page 82.
Document	**WorldScale** property	Specifies the drawing scale for the document For more information, see “Setting document properties” on page 82.
Document	**Views** property	Contains the collection of views for a document For more information, see “Working with views” on page 83.
GlobalMacro Storage	**DocumentAfterExport** event	Is triggered when a document is exported (that is, when the **Export** dialog box closes) For more information, see “Exporting files from documents” on page 86.
GlobalMacro Storage	**DocumentAfterPrint** event	Is triggered when a document is printed (that is, when the **Print** dialog box closes) For more information, see “Printing documents” on page 89.
GlobalMacro Storage	**DocumentAfterSave** event	Is triggered when a document is saved (that is, when the **Save** dialog box closes) For more information, see “Saving documents” on page 85.
GlobalMacro Storage	**DocumentBeforeExport** event	Is triggered when the **Export** dialog box opens For more information, see “Exporting files from documents” on page 86.

Class	Member	Description
GlobalMacro Storage	**DocumentBeforePrint** event	Is triggered when the **Print** dialog box opens For more information, see “Printing documents” on page 89.
GlobalMacro Storage	**DocumentBeforeSave** event	Is triggered when the **Save** dialog box opens For more information, see “Saving documents” on page 85.
GlobalMacro Storage	**DocumentClose** event	Is triggered when a document is closed For more information, see “Closing documents” on page 91.
GlobalMacro Storage	**DocumentNew** event	Is triggered when a document is created For more information, see “Creating documents” on page 80.
GlobalMacro Storage	**DocumentOpen** event	Is triggered when a document is opened For more information, see “Opening documents” on page 80.
GlobalMacro Storage	**QueryDocumentClose** event	Is triggered when the user responds to a request to close a document For more information, see “Closing documents” on page 91.
GlobalMacro Storage	**QueryDocumentExport** event	Is triggered when the user responds to a request to export a document For more information, see “Exporting files from documents” on page 86.
GlobalMacro Storage	**QueryDocumentPrint** event	Is triggered when the user responds to a request to print a document For more information, see “Printing documents” on page 89.
GlobalMacro Storage	**QueryDocumentSave** event	Is triggered when the user responds to a request to save a document For more information, see “Saving documents” on page 85.
GlobalMacro Storage	**WindowActivate** event	Is triggered when a window is activated For more information, see “Activating documents” on page 81.

Class	Member	Description
GlobalMacro Storage	**WindowDeactivate** event	Is triggered when a window is deactivated For more information, see “Activating documents” on page 81.
View	**Activate** method	Applies a saved view to the document window For more information, see “Working with views” on page 83.
Window	**Activate** method	Activates a document window For more information, see “Working with windows” on page 82.
Window	**ActiveView** property	Provides direct access to the active view for a document window For more information, see “Working with views” on page 83.
Window	**Close** method	Closes a document window For more information, see “Working with windows” on page 82.
Window	**NewWindow** method	Creates a document window For more information, see “Working with windows” on page 82.
Window	**Next** property	Accesses the next window for a document For more information, see “Working with windows” on page 82.
Window	**Previous** property	Accesses the previous window for a document For more information, see “Working with windows” on page 82.

For detailed information on any property, method, or event, see “Object Model Reference” section in the Macros Help file for the application.

In this topic

For more information on document-related activities, see the following subtopics:

- “Creating documents” on page 80
- “Opening documents” on page 80
- “Activating documents” on page 81
- “Setting document properties” on page 82
- “Displaying documents” on page 82
- “Modifying documents” on page 84

- “Creating command groups for documents” on page 85
- “Saving documents” on page 85
- “Exporting files from documents” on page 86
- “Publishing documents to PDF” on page 88
- “Printing documents” on page 89
- “Closing documents” on page 91

Files of all supported formats can be imported. Imported files are placed on document layers, so information on importing files is provided in the section on working with layers (see “Importing files into layers” on page 100) rather than in this section on working with documents.

Creating documents

The **Application** object has two methods for creating documents: **CreateDocument** and **CreateDocumentFromTemplate**.

The **Application.CreateDocument** method creates an empty document based on the default page size, orientation, and styles:

```
Application.CreateDocument() As Document
```

The **Application.CreateDocumentFromTemplate** method creates an untitled document from a specified template (CDT) file:

```
Application.CreateDocumentFromTemplate(Template As String, _

                        [IncludeGraphics As Boolean = True])As Document
```

Both of these functions return a reference to the new document, so they are typically used as follows:

```
Dim newDoc as Document

Set newDoc = CreateDocument
```

The new document becomes active immediately and can be referenced by using the **Application.ActiveDocument** property. For more information on this property, see “Activating documents” on page 81.

If you want, you can use event handlers to respond to events that are triggered by creating a document:

- **AddinHook.New**
- **Application.DocumentNew**
- **GlobalMacroStorage.DocumentNew**

Opening documents

To open a document, you can use the **Application.OpenDocument** method.

```
Dim doc As Document

Set doc = OpenDocument("C:\graphic1.cdr")
```

If you want, you can use event handlers to respond to events that are triggered by opening a document:

- **Application.DocumentOpen**
- **Document.Open**
- **GlobalMacroStorage.DocumentOpen**

Activating documents

Each open document is a member of the **Application.Documents** collection. The documents in that collection appear in the order in which they were created or opened.

To reflect the actual stacking order of the documents, you must use the **Application.Windows** collection.

The **Application.ActiveDocument** property provides direct access to the active document — that is, the document that is in front of all the other documents in the application window. **ActiveDocument** is an object of type **Document** and, therefore, has the same members — properties, methods, and objects — as the **Document** class.

If no documents are open, **ActiveDocument** returns nothing. You can check for open documents by using the following VBA code:

```
If Documents.Count = 0 Then

  MsgBox "There aren't any open documents.", vbOK, "No Docs"

  Exit Sub

End If
```

The **Document.Activate** method activates a document so that it can be referenced by **ActiveDocument**. The following VBA code activates the third open document (if three or more documents are open):

```
Documents(3).Activate
```

Using the **Document.Activate** method on the **Application.ActiveDocument** property has no effect.

If you want, you can specify which open document to activate by referencing the one of the following properties:

- **Document.FilePath** — checks only the file path (for example, **C:\My Documents**)
- **Document.FileName** — checks only the filename (for example, **Graphic1.cdr**)
- **Document.FullFileName** — checks both the file path and the filename (for example, **C:\My Documents\Graphic1.cdr**)

You can check the filename of each open document by using the following VBA code:

```
Public Function findDocument(filename As String) As Document

  Dim doc As Document

  For Each doc In Documents

    If doc.FileName = filename Then Exit For
```

```
      Set doc = Nothing
    Next doc
    Set findDocument = doc
  End Function
```

You can then activate the returned document by using the **Document.Activate** method.

Setting document properties

You can specify the reference point, unit of measurement, and drawing scale for a document by using the corresponding properties of the **Document** class.

The **Document.ReferencePoint** property specifies the reference point for a document. This point is referenced when positioning the objects in that document.

The **Document.Unit** property specifies the unit of measurement for a document. This unit is used to position and size the objects in that document.

The **Document.WorldScale** property specifies the drawing scale for a document. The drawing scale lets you make the distances in a drawing proportionate to real-world distances; for example, you can specify that 1 inch in the drawing corresponds to 1 meter in the physical world.

These properties affect all elements in your document, such as the objects that you draw. For optimal results, choose the settings that best fit your macro solution.

Displaying documents

You can simultaneously display multiple windows for a single document. For example, a large document can be displayed with one window zoomed in to the upper-right corner of the document and another zoomed in to the lower-right corner. Although the individual windows can be zoomed and panned independently, turning the page in one window affects all windows.

By using the View Manager, you can create views that have individual display settings. Choosing a saved view displays the page according to the settings for that view.

In VBA, the **Window** object provides access to the windows that contain each **View** object for (or view of) a given document. The **Window** object represents a frame, while the **View** object displays the document inside that frame.

Besides letting you work with windows and views, the application lets you display documents by zooming and panning.

Working with windows

Each **Document** object has a **Windows** collection for displaying that document. To switch between windows, use the **Window.Activate** method:

```
ActiveDocument.Windows(2).Activate
```

The **Document.ActiveWindow** property provides direct access to the active window — that is, the document window that is in front of all other document windows.

The next window and previous window for the active document are referenced in the **Window.Next** and **Window.Previous** properties:

```
ActiveWindow.Next.Activate
```

To create a new window, use the **Window.NewWindow** method:

```
ActiveWindow.NewWindow
```

To close a window (and the document, if it has only one open window), use the **Window.Close** method:

```
ActiveWindow.Close
```

If you want, you can use event handlers to respond to events that are triggered by activating a window:

- **Application.WindowActivate**
- **GlobalMacroStorage.WindowActivate**

You can also use event handlers to respond to events that are triggered by deactivating a window:

- **Application.WindowDeactivate**
- **GlobalMacroStorage.WindowDeactivate**

Working with views

The **Window.ActiveView** property and the **Document.Views** property both represent document views. Each **Window** object has one **ActiveView** object, which represents the current view of the document; saving the display settings for an **ActiveView** object creates a view. In contrast, each **Document** object has a collection of **View** objects in its **Views** property; choosing a **View** object activates the corresponding saved view, which contains the display settings for the corresponding **ActiveView** object.

The only way to access an **ActiveView** object is from the **Window.ActiveView** property.

You can create a **View** object and add it to a **Document.Views** collection. The following VBA code adds the current **ActiveView** settings to the **Views** collection:

```
ActiveDocument.Views.AddActiveView "New View"
```

You can also create a view with specific settings by using the **Document.CreateView** method. The following VBA code creates a new **View** object that accesses the position (3, 4) in inches, uses a zoom factor of 95%, and displays page 6:

```
ActiveDocument.Unit = cdrInch

ActiveDocument.CreateView "New View 2", 3, 4, 95, 6
```

To apply a saved view to the active window, call the **View.Activate** method:

```
ActiveDocument.Views("New View").Activate
```

Zooming

To zoom an **ActiveView** object by a set amount, set the **ActiveView.Zoom** property by specifying a double value in percent. For example, the following VBA code sets the zoom factor to 200%:

```
ActiveWindow.ActiveView.Zoom = 200.0
```

You can also zoom by using the following methods of the **ActiveView** class:

- **SetActualSize**
- **ToFitAllObjects**
- **ToFitArea**
- **ToFitPage**
- **ToFitPageHeight**
- **ToFitPageWidth**
- **ToFitSelection**
- **ToFitShape**
- **ToFitShapeRange**

Panning

To pan an **ActiveView** object, you can move its origin by modifying the **ActiveView.OriginX** and **ActiveView.OriginY** properties. The following VBA code pans the document 5 inches to the left and 3 inches up:

```
Dim av As ActiveView

ActiveDocument.Unit = cdrInch

Set av = ActiveWindow.ActiveView

av.OriginX = av.OriginX - 5

av.OriginY = av.OriginY + 3
```

Alternatively, you can use the **ActiveView.SetViewPoint** method:

```
Dim av As ActiveView

ActiveDocument.Unit = cdrInch

Set av = ActiveWindow.ActiveView

av.SetViewPoint av.OriginX - 5, av.OriginY + 3
```

Modifying documents

You can modify a document regardless of whether it is active.

Modifying an inactive document does not activate that document. To activate a document, you must use its **Activate** method (see “Activating documents” on page 81).

The following VBA code adds a layer named “fooLayer” to the third open document:

```
Dim doc As Document

Set doc = Documents(3)

doc.ActivePage.CreateLayer "fooLayer"
```

The following VBA code uses the **findDocument()** function to add a layer named “fooLayer” to the inactive document named **barDoc.cdr**:

```
Dim doc As Document

Set doc = findDocument("barDoc.cdr")

If Not doc Is Nothing Then doc.ActivePage.CreateLayer "fooLayer"
```

Creating command groups for documents

Two very useful methods of the **Document** class combine to create a “command group,” which can reduce a series of programmed, document-related actions to a single, undoable step. These methods — **BeginCommandGroup** and **EndCommandGroup** — are demonstrated in the following VBA example:

```
Dim sh As Shape

ActiveDocument.BeginCommandGroup "CreateCurveEllipse"

    Set sh = ActiveLayer.CreateEllipse(0, 1, 1, 0)

    sh.ConvertToCurves

ActiveDocument.EndCommandGroup
```

The preceding code sets the **Undo** string in the **Edit** menu as **Undo CreateCurveEllipse**. Clicking this command undoes not only the **ConvertToCurves** operation but also the **CreateEllipse** operation.

A command group can contain many hundreds of commands, if required. Creating command groups can make your macros appear to be fully integrated into the application.

Saving documents

Two methods can be used for saving documents: **Document.SaveAs** and **Document.Save**.

The **Document.SaveAs** method saves a document by using the specified file path and filename. You can use this method to save a previously unsaved document or to save an existing document to a different file.

The **Document.SaveAs** method provides an optional parameter that lets you access the **StructSaveAsOptions** class to specify additional settings.

The **Document.Save** method saves over an existing document file — that is, by using the existing file path and filename for the document.

If you want, you can use event handlers to respond to events that are triggered by opening the **Save** dialog box:

- **Application.DocumentBeforeSave**
- **Document.BeforeSave**
- **GlobalMacroStorage.DocumentBeforeSave**

You can also use event handlers to respond to events that are triggered by saving a document and closing the **Save** dialog box:

- **Application.DocumentAfterSave**
- **Document.AfterSave**
- **GlobalMacroStorage.DocumentAfterSave**

Finally, you can also use event handlers to respond to events that are triggered when the user responds to a request to save a document:

- **Application.QueryDocumentSave**
- **Document.QuerySave**
- **GlobalMacroStorage.QueryDocumentSave**

Exporting files from documents

Files of all supported formats can be exported.

Files are exported at the **Document** level because the range of exported objects can extend over multiple layers and multiple pages. However, files are imported at the **Layer** level because each imported object is assigned to a specified layer on a specified page (see "Importing files into layers" on page 100).

The **Document** class has three file-export methods — **Export**, **ExportEx**, and **ExportBitmap** — all of which can export to the bitmap and vector formats.

The wide selection of supported file formats is due to the vast number of filters that are available to the application. Each filter lets you work with the files from another graphics application. To learn more about working with these filters, see "Working with import filters and export filters" on page 138.

If you want, you can use event handlers to respond to events that are triggered by opening the **Export** dialog box:

- **Application.DocumentBeforeExport**
- **Document.BeforeExport**
- **GlobalMacroStorage.DocumentBeforeExport**

You can also use event handlers to respond to events that are triggered by exporting a document and closing the **Export** dialog box:

- **Application.DocumentAfterExport**
- **Document.AfterExport**
- **GlobalMacroStorage.DocumentAfterExport**

Finally, you can also use event handlers to respond to events that are triggered when the user responds to a request to export a document:

- **Application.QueryDocumentExport**
- **Document.QueryExport**
- **GlobalMacroStorage.QueryDocumentExport**

Understanding the Document.Export method

To export a page, you require only the **Document.Export** method, a filename, and a filter type. The following VBA code exports the current page to a TIFF bitmap file:

```
ActiveDocument.Export "C:\ThisPage.eps", cdrTIFF
```

However, the preceding code gives little control over the output of the image. More control is obtained by including a **StructExportOptions** object, as in the following VBA code:

```
Dim expOpts As New StructExportOptions

expOpts.ImageType = cdrCMYKColorImage

expOpts.AntiAliasingType = cdrNormalAntiAliasing

expOpts.ResolutionX = 72

expOpts.ResolutionY = 72

expOpts.SizeX = 210

expOpts.SizeY = 297

ActiveDocument.Export "C:\ThisPage.eps", cdrTIFF, cdrCurrentPage, expOpts
```

A **StructPaletteOptions** object can also be included in the function call for palette-based image formats, if you want to provide the settings for automatically generating the palette.

Understanding the Document.ExportEx method

The **Document.ExportEx** method is the same as the **Document.Export** method, except that **ExportEx** can retreive the dialog-box settings for a filter and apply those settings to the export:

```
Dim eFilt As ExportFilter

Set eFilt = ActiveDocument.ExportEx("C:\ThisPage.eps", cdrEPS)

If eFilt.HasDialog = True Then

  If eFilt.ShowDialog = True Then

      eFilt.Finish

    End If

Else

  eFilt.Finish

End If
```

Understanding the Document.ExportBitmap method

The **Document.ExportBitmap** method is similar to the **Document.ExportEx** method in that it returns an

ExportFilter object that can be used to display the **Export** dialog box. However, the **ExportBitmap** method simplifies the coding by taking the individual members of the **StructExportOptions** object as parameters:

```
Dim eFilt As ExportFilter
Set eFilt = ActiveDocument.ExportBitmap("C:\Selection.eps", _
              cdrTIFF, cdrSelection, cdrCMYKColorImage, _
              210, 297, 72, 72, cdrNormalAntiAliasing, _
              False, True, False, cdrCompressionLZW)
eFilt.Finish
```

Publishing documents to PDF

Publishing documents to PDF is a two-step process. The first step is to specify the PDF settings (although this step can be skipped by specifying those settings from the application or by using the default settings). The second step is to export the file.

To specify the PDF settings, you can use the **Document.PDFSettings** property. This property is an object of type **PDFVBASettings** and contains properties for all PDF settings that can be set in the **Publish To PDF** dialog box.

The following VBA code exports pages 2, 3, and 5 to a PDF file named **MyPDF.pdf**:

```
Dim doc As Document
Set doc = ActiveDocument
With doc.PDFSettings
  .Author = "Corel Corporation"
  .Bookmarks = True
  .ColorMode = pdfRGB
  .ComplexFillsAsBitmaps = False
  .CompressText = True
  .DownsampleGray = True
  .EmbedBaseFonts = True
  .EmbedFonts = True
  .Hyperlinks = True
  .Keywords = "Test, Example, Corel, CorelDRAW, PublishToPDF"
  .Linearize = True
```

```
    .PageRange = "2-3, 5"

    .pdfVersion = pdfVersion13

    .PublishRange = pdfPageRange

    .TrueTypeToType1 = True

  End With

  doc.PublishToPDF "C:\MyPDF.pdf"
```

The following VBA example gives more control to the user by displaying the **Publish to PDF Settings** dialog box:

```
  Dim doc As Document

  Set doc = ActiveDocument

  If doc.PDFSettings.ShowDialog = True Then

    doc.PublishToPDF "C:\MyPDF.pdf"

  End If
```

Profiles for PDF settings can be saved and loaded by using the **PDFVBASettings.Save** method and **PDFVBASettings.Load** method (respectively).

Printing documents

Using VBA to print documents is straightforward: almost all settings that are available in the **Print** dialog box are available to the **Document.PrintSettings** property. When these properties are set, printing the document is simply a matter of calling the **Document.PrintOut** method.

For example, the following VBA code prints three copies of pages 1, 3, and 4 to a level-3 PostScript® printer:

```
  With ActiveDocument.PrintSettings

    .Copies = 3

    .PrintRange = prnPageRange

    .PageRange = "1, 3-4"

    .Options.PrintJobInfo = True

    With .PostScript

      .DownloadType1 = True

      .Level = prnPSLevel3

    End With
```

```
End With

ActiveDocument.PrintOut
```

Each page in the **Print** dialog box has a corresponding object-model class that contains all settings for that page. The following table lists these classes.

Page in Print dialog box	Class in object model
General	**PrintSettings**
Layout	**PrintSettings** and **PrintLayout**
Separations	**PrintSeparations** and **PrintTrapping**
Prepress	**PrintPrepress**
PostScript	**PrintPostScript**
Misc	**PrintOptions**

You cannot set layout options in VBA. However, if necessary, you can open the **Print** dialog box by using the **PrintSettings.ShowDialog** method.

You can print only the selected objects in a document by setting the **PrintSettings.PrintRange** property to **prnSelection**.

You can use a specific printer in the **Application.Printers** collection by specifying it in the **PrintSettings.Printer** property.

You can save a printing profile by using the **PrintSettings.Save** method.

You can access a saved printing profile by using the **PrintSettings.Load** method, but be sure to specify the full path to the profile.

You can reset the print settings by using the **PrintSettings.Reset** method.

If you want, you can use event handlers to respond to events that are triggered by opening the **Print** dialog box:

- **Application.DocumentBeforePrint**
- **Document.BeforePrint**
- **GlobalMacroStorage.DocumentBeforePrint**

You can also use event handlers to respond to events that are triggered by printing a document and closing the **Print** dialog box:

- **Application.DocumentAfterPrint**
- **Document.AfterPrint**
- **GlobalMacroStorage.DocumentAfterPrint**

Finally, you can also use event handlers to respond to events that are triggered when the user responds to a request to print a document:

- **Application.QueryDocumentPrint**
- **Document.QueryPrint**
- **GlobalMacroStorage.QueryDocumentPrint**

Closing documents

You can close a document by calling the **Document.Close** method.

The following VBA code closes the active document and activates the document behind it:

```
ActiveDocument.Close
```

If the code closes a document that is not active, the document referenced by the **Application.ActiveDocument** property does not change.

You must explicitly test the **Dirty** property for a document and take appropriate action if that document has been modified.

You can also close a document by using the **Close** method of the **Document** object itself (as in `doc.Close`).

If you want, you can use event handlers to respond to events that are triggered by closing a document:

- **Application.DocumentClose**
- **Document.Close**
- **GlobalMacroStorage.DocumentClose**

You can also use event handlers to respond to events that are triggered when the user responds to a request to close a document:

- **Application.QueryDocumentClose**
- **Document.QueryClose**
- **GlobalMacroStorage.QueryDocumentClose**

Working with pages

Each page, or **Page** object, is a member of the **Document.Pages** collection for the document in which it appears. The pages in a **Document.Pages** collection appear in the order in which they appear in that document — for example, the fifth page in the active document is `ActiveDocument.Pages.Item(5)`. If pages are added, reordered, or deleted, the affected **Pages** collection is immediately updated to reflect the new page order of that document.

CorelDRAW provide a number of properties, methods, and events for working with pages, the most useful of which are listed in the following table.

Class	Member	Description
Application	**ActivePage** property	Provides direct access to the active page of the active document For more information, see “Activating pages” on page 94.
Application	**PageSizes** property	Contains the collection of defined page sizes for the application For more information, see “Using defined page sizes” on page 96.
Document	**ActivePage** property	Provides direct access to the active page of a document For more information, see “Activating pages” on page 94.

Class	Member	Description
Document	**AddPages** method or **AddPagesEx** method	Adds blank pages to the end of a document For more information, see “Creating pages” on page 93.
Document	**InsertPages** method or **InsertPagesEx** method	Inserts pages at the specified location in a document For more information, see “Creating pages” on page 93.
Document	**MasterPage** property	Specifies the default page size For more information, see “Specifying the default page size” on page 95.
Document	**PageActivate** event	Is triggered when a page is activated For more information, see “Activating pages” on page 94.
Document	**PageChange** event	Is triggered when a page is deactivated For more information, see “Activating pages” on page 94.
Document	**PageCreate** event	Is triggered when a page is created For more information, see “Creating pages” on page 93.
Document	**PageDelete** event	Is triggered when a page is deleted For more information, see “Deleting pages” on page 97.
Document	**Pages** property	Contains the collection of pages for a document For more information, see “Activating pages” on page 94.
Page	**Activate** method	Activates a page For more information, see “Activating pages” on page 94.
Page	**Delete** method	Deletes a page For more information, see “Deleting pages” on page 97.
Page	**MoveTo** method	Moves a page to the specified location in a document For more information, see “Reordering pages” on page 95.
Page	**SetSize** method	Sets the size of a page For more information, see “Specifying the size and orientation of pages” on page 95.
PageSize	**BuiltIn** property	Returns **True** if a page size is built-in (rather than user-defined) For more information, see “Using defined page sizes” on page 96.
PageSize	**Delete** method	Deletes a user-defined page size For more information, see “Using defined page sizes” on page 96.

Class	Member	Description
PageSize	**Height** property	Specifies the height of a defined page size For more information, see "Using defined page sizes" on page 96.
PageSize	**Name** property	Specifies the name of a defined page size For more information, see "Using defined page sizes" on page 96.
PageSize	**Width** property	Specifies the width of a defined page size For more information, see "Using defined page sizes" on page 96.

For detailed information on any property, method, or event, see "Object Model Reference" section in the Macros Help file for the application.

In this topic

For more information on page-related activities, see the following subtopics:

- "Creating pages" on page 93
- "Activating pages" on page 94
- "Reordering pages" on page 95
- "Sizing pages" on page 95
- "Modifying pages" on page 96
- "Deleting pages" on page 97

Creating pages

The methods for creating pages belong to the **Document** class.

Both the **Document.AddPages** method and the **Document.AddPagesEx** method add the specified number of pages to the end of a document. The difference between these methods is that **AddPages** uses the default page size, while **AddPagesEx** uses a specified size.

Similarly, both the **Document.InsertPages** method and the **Document.InsertPagesEx** method insert the specified number of pages at the specified location in a document. The difference between these methods is that **InsertPages** uses the default page size, while **InsertPagesEx** uses a specified size.

As an example, the following VBA code uses the **AddPages** method to add three default-sized pages to the end of the document:

```
Public Function AddSomeSimplePages() as Page

    Set AddSomeSimplePages = ActiveDocument.AddPages(3)

End Function
```

The following VBA example uses the **AddPagesEx** method to add to the end of the document three pages that are 8.5 inches wide by 11 inches high:

```
Public Function AddSomeSpecifiedPages() as Page
```

```
    Dim doc as Document

    Set doc = ActiveDocument

    doc.Unit = cdrInch

    Set AddSomeSpecifiedPages = doc.AddPagesEx(3, 8.5, 11)

End Function
```

The preceding examples return the first page that was added; all other added pages follow this page. You can therefore reference any of the added pages by incrementing the **Index** property of the returned page:

```
Dim firstNewPage As Page, secondNewPage As Page

Set firstNewPage = AddSomeSimplePages

Set secondNewPage = ActiveDocument.Pages(firstNewPage.Index + 1)
```

If you want, you can use event handlers to respond to events that are triggered by creating a page:

- **Document.PageCreate**

Activating pages

Each page is a member of the **Document.Pages** collection for the document in which it appears. The pages in a **Document.Pages** collection appear in the order in which they appear in that document — for example, the fifth page in the active document is `ActiveDocument.Pages.Item(5)`. If pages are added, reordered, or deleted, the affected **Pages** collection is immediately updated to reflect the new page order of that document.

You can access the active page of the active document by using the **Application.ActivePage** property (or `ActiveDocument.ActivePage`, or simply `ActivePage`). A reference to the active page in the active document, of type **Page**, is returned.

```
Dim pg As Page

Set pg = ActivePage
```

You can access the active page of a document, regardless of whether that document is active, by using **ActivePage** property for that document:

```
Public Function getDocsActivePage(doc As Document) As Page

    Set getDocsActivePage = doc.ActivePage

End Function
```

You can switch pages by finding the desired page and then invoking its **Activate** method. The following VBA code activates page 3 in a document:

```
ActiveDocument.Pages(3).Activate
```

If you want, you can use event handlers to respond to events that are triggered by activating a page:

- **Document.PageActivate**

You can also use event handlers to respond to events that are triggered by deactivating a page:

- **Document.PageChange**

Reordering pages

A page can be moved to another location in a document by using its **MoveTo** method. The following VBA code moves page 2 to the position of page 4:

```
ActiveDocument.Pages(2).MoveTo 4
```

Activating a page in an inactive document does not activate that document. To activate a document, you must use its **Activate** method (see “Activating documents” on page 81).

Sizing pages

You can specify the size and orientation of pages, specifying the default page size, and use defined page sizes.

Specifying the size and orientation of pages

You can size a page by using its **SetSize** method, which applies two size values (width and height) to the page.

The following VBA code changes the size of the active page in the active document to A4:

```
ActiveDocument.Unit = cdrMillimeter

ActivePage.SetSize 210, 297

ActivePage.Orientation = cdrLandscape
```

For the **SetSize** method, the first number is always the page width and the second number is always the page height. Reversing the two numbers switches the orientation of the page.

Specifying the default page size

The default page size for a document is determined by the value of the item that has an index of **0** in the **Document.Pages** collection. You can specify the default page size by changing the value of this item:

```
Dim doc As Document

Set doc = ActiveDocument

doc.Unit = cdrMillimeter

doc.Pages(0).SetSize 297, 210
```

Alternatively, you can use the **Document.MasterPage** property to specify the default page size:

```
Dim doc As Document

Set doc = ActiveDocument

doc.Unit = cdrMillimeter
doc.MasterPage.SetSize 297, 210
```

Using defined page sizes

Page sizes can be defined by either the application or the user. All defined page sizes are stored in the **Application.PageSizes** collection, and the name of each **PageSize** object in that collection is defined by its **Name** property:

```
Dim pageSizeName As String

pageSizeName = Application.PageSizes(3).Name
```

Page sizes can be specified by name. For example, the following VBA code gets the **PageSize** object named "Business Card":

```
Dim thisSize As PageSize

Set thisSize = Application.PageSizes("Business Card")
```

You can get the actual dimensions of a **PageSize** object by using its **Width** and **Height** properties. The following VBA code retrieves the width and height (in millimeters) of the third **PageSize** object:

```
Dim pageWidth As Double, pageHeight As Double

Application.Unit = cdrMillimeter

pageWidth = Application.PageSizes(3).Width

pageHeight = Application.PageSizes(3).Height
```

Although each **PageSize** object provides a **Delete** method, this method can be used only on user-defined page sizes. You can determine whether a **PageSize** object is user-defined by testing its **BuiltIn** Boolean property:

```
Public Sub deletePageSize(thisSize As PageSize)

    If Not thisSize.BuiltIn Then thisSize.Delete

End Sub
```

You can specify a particular unit of measurement for a page size by setting the units for the document before getting its width and height.

Modifying pages

You can modify a page regardless of whether it is active.

Activating a page in an inactive document does not activate that document. To activate a document, you must use its **Activate** method (see "Activating documents" on page 81).

By explicitly referencing the page that you want to modify, you can make those changes without activating the page. The following VBA code deletes all shapes on page 3 of the active document without activating that page:

```
Public Sub DeleteShapesFromPage3()
```

```
    Dim doc As Document

    Set doc = ActiveDocument

    doc.Pages(3).Shapes.All.Delete

  End Sub
```

Deleting pages

You can delete a page by using its **Delete** method, as in the following VBA example:

```
ActivePage.Delete
```

The **Page.Delete** method deletes all shapes on that page, deletes the page from the **Pages** collection for that document, and then updates that collection to reflect the change.

If you want to delete more than one page, you must use the **Delete** method for each unwanted page. However, you cannot delete all pages in a document. You can avoid trying to delete the last remaining page in a document by using the following VBA code:

```
If ActiveDocument.Pages.Count > 1 Then ActivePage.Delete
```

If you want, you can use event handlers to respond to events that are triggered by deleting a page:

- **Document.PageDelete**

Working with layers

Layers are invisible planes that let you organize the objects on a page. You can group related objects into layers, and you can change the vertical order (or "stacking order") of those layers to change the appearance of the page. Master layers apply to all pages in a document, while local layers apply to a single page.

Each layer, or **Layer** object, is a member of the **Page.Layers** collection for the page on which it appears. The layers in a **Page.Layers** collection appear in the order in which they appear on that page — the first layer is the one at the top of the "stack," and the last layer is the one at the bottom. If layers are added, reordered, or deleted, the affected **Page.Layers** collection is immediately updated to reflect the new layer order of that page.

CorelDRAW provide a number of properties, methods, and events for working with layers, the most useful of which are listed in the following table.

Class	Member	Description
Document	**ActiveLayer** property	Provides direct access to the active layer for a document For more information, see "Activating layers" on page 99.
Document	**LayerActivate** event	Is triggered when a layer is activated For more information, see "Activating layers" on page 99.

Class	Member	Description
Document	**LayerChange** event	Is triggered when a layer is deactivated For more information, see “Activating layers” on page 99.
Document	**LayerCreate** event	Is triggered when a layer is created For more information, see “Creating layers” on page 99.
Document	**LayerDelete** event	Is triggered when a layer is deleted For more information, see “Deleting layers” on page 101.
Layer	**Activate** method	Activates a layer For more information, see “Activating layers” on page 99.
Layer	**Delete** method	Deletes a layer For more information, see “Deleting layers” on page 101.
Layer	**Editable** property	Controls whether a layer is editable For information, see “Locking and hiding layers” on page 99.
Layer	**Import** method or **ImportEx** method	Imports a file into a layer For information, see “Importing files into layers” on page 100.
Layer	**MoveAbove** method or **MoveBelow** method	Moves a layer For information, see “Reordering layers” on page 100.
Layer	**Name** property	Specifies the name of a layer For information, see “Renaming layers” on page 100.
Layer	**Visible** property	Controls whether the contents of a layer are visible For information, see “Locking and hiding layers” on page 99.
Page	**ActiveLayer** property	Provides direct access to the active layer for a page For more information, see “Activating layers” on page 99.
Page	**CreateLayer** method	Inserts a new layer at the top of the list of non-master layers For more information, see “Creating layers” on page 99.
Page	**Layers** property	Contains the collection of layers for a page For more information, see “Activating layers” on page 99.

For detailed information on any property, method, or event, see “Object Model Reference” section in the Macros Help file for the application.

In this topic

For more information on layer-related activities, see the following subtopics:

- “Creating layers” on page 99
- “Activating layers” on page 99
- “Locking and hiding layers” on page 99
- “Reordering layers” on page 100
- “Renaming layers” on page 100
- “Importing files into layers” on page 100
- “Deleting layers” on page 101

Creating layers

You can create a layer by using the **Page.CreateLayer** method. Creating a layer inserts a new layer at the top of the list of non-master layers.

The following VBA code creates a new layer called “My New Layer”:

```
ActivePage.CreateLayer "My New Layer"
```

If you want, you can use event handlers to respond to events that are triggered by activating a layer:

- **Document.LayerCreate**

Activating layers

Each layer is a member of the **Page.Layers** collection for the page on which it appears. The layers in a **Page.Layers** collection appear in the order in which they appear on that page — the first layer is the one at the top of the “stack,” and the last layer is the one at the bottom. If layers are added, reordered, or deleted, the affected **Page.Layers** collection is immediately updated to reflect the new layer order of that page.

The **Document.ActiveLayer** property provides direct access to the active layer for a document, while the **Page.ActiveLayer** property provides direct access to the active layer for a page.

You can activate a layer by using the **Layer.Activate** method:

```
ActivePage.Layers("Layer 1").Activate
```

Activating a locked layer does not unlock it. Similarly, activating a hidden layer does not make it visible. For information on unlocking and displaying layers, see “Locking and hiding layers” on page 99.

If you want, you can use event handlers to respond to events that are triggered by activating a layer:

- **Document.LayerActivate**

You can also use event handlers to respond to events that are triggered by deactivating a layer:

- **Document.LayerChange**

Locking and hiding layers

Layer objects feature the properties **Editable** and **Visible**, which control (respectively) whether the layer is editable and whether its contents are visible. Both properties are Boolean. By setting both the properties to **True**, you unlock and display the layer for editing. By setting either property to **False**, however, you lock the layer such that it cannot be edited.

The following sample VBA code locks, but displays, the layer on the active page:

```
ActivePage.Layers("Layer 1").Visible = True

ActivePage.Layers("Layer 1").Editable = False
```

The result of any changes to these properties is immediately displayed in the Object Manager.

The preceding example affects only the active page. You can access the layer settings for a given page by specifying a page from the **Document.Pages** collection, or by referencing the **Document.ActivePage** property. To make the changes to all pages in a document, use the **Document.MasterPage** property:

```
ActiveDocument.MasterPage.Layers("Layer 1").Visible = True
```

For more information on working with pages, see "Working with pages" on page 91.

Reordering layers

You can reorder layers by using the following two methods of the **Layer** class: **MoveAbove** and **MoveBelow**. Both methods move the specified layer above or below the layer that is referenced as a parameter.

The following VBA code moves the layer called "Layer 1" to immediately below the layer "Guides":

```
Dim pageLayers As Layers

Set pageLayers = ActivePage.Layers

pageLayers("Layer 1").MoveBelow pageLayers("Guides")
```

The change is immediately reflected in the Object Manager (although it may be apparent only in the Layer Manager).

Renaming layers

You can rename a layer by editing its **Name** property.

The following VBA code renames "Layer 1" as "Layer with a New Name":

```
ActivePage.Layers("Layer 1").Name = "Layer with a New Name"
```

Importing files into layers

Files of all supported formats can be imported.

Files are imported at the **Layer** level because each imported object is assigned to a specified layer on a specified page. However, files are exported at the **Document** level because the range of exported objects can extend over multiple layers and multiple pages (see "Exporting files from documents" on page 86).

The **Layer** class has two file-import methods: **Import** and **ImportEx**.

The wide selection of supported file formats is due to the vast number of filters that are available to the application. Each filter lets you work with the files from another graphics application. To learn more about working with these filters, see "Working with import filters and export filters" on page 138.

Understanding the Layer.Import method

The **Layer.Import** method provides basic functionality for importing files.

The following VBA code imports the file **C:\logotype.gif** into the active layer at the center of the page:

```
ActiveLayer.Import "C:\logotype.gif"
```

Importing a file selects the contents of that file and deselects any other selected objects in the document. You can therefore reposition or resize the imported objects by getting the document selection:

```
ActiveDocument.Unit = cdrInch

ActiveSelection.SetSize 3, 2
```

Some file formats can be imported by using one of several filters, so it is important to understand the benefits of each available filter. For example, when importing an Encapsulated PostScript (EPS) file, you can choose between the EPS filter and the PDF filter. The EPS filter lets you do the following:

- import an EPS file as a placeable object that can be printed but not modified
- interpret the PostScript portion of the file, so that you can import the original artwork from within the file rather than its low-resolution header

To specify which filter to use, you can include the optional parameter **Filter**, as in the following VBA example:

```
ActiveLayer.Import "C:\map.eps", cdrPSInterpreted
```

Understanding the Layer.ImportEx method

The **Layer.ImportEx** method provides much better control over the import filter through its optional use of a **StructImportOptions** object. The following VBA code imports the specified file as a linked file:

```
Dim iFilt As ImportFilter

Dim importProps As New StructImportOptions

importProps.LinkBitmapExternally = True

Set iFilt = ActiveLayer.ImportEx("C:\world-map.epsf", cdrAutoSense, importProps)

iFilt.Finish
```

Deleting layers

As previously discussed, each layer is a member of the **Page.Layers** collection for the page on which it appears.

You can delete a layer by calling its **Delete** method. Deleting a layer removes that layer from the document, taking with it all shapes on that layer on all pages in the document.

The following VBA code deletes the layer called “Layer 1”:

```
ActivePage.Layers("Layer 1").Delete
```

If you want, you can use event handlers to respond to events that are triggered by deleting a layer:

- **Document.LayerDelete**

Working with shapes

Every document is made up of shapes, or **Shape** objects, which are created by using the drawing tools. Any changes that are made to the properties of a shape — such as by moving the shape, changing its size, or giving it a new fill — are immediately visible to the object model.

The shapes on a document page are stored on layers. Each shape is a member of the **Layer.Shapes** collection for the layer on which it appears. The shapes in a **Layer.Shapes** collection appear in the order in which they appear on that layer — the first shape is the one at the top of the "stack," and the last shape is the one at the bottom. If shapes are added, reordered, or deleted, the affected **Layer.Shapes** collection is immediately updated to reflect the new shape order of that layer.

In addition, each document page has a **Shapes** collection, which contains all **Layer.Shapes** collections for that page. The first shape in a **Page.Shapes** collection is the one at the very top of that page, and the last shape is the one at the very bottom.

CorelDRAW provide a number of properties, methods, and events for working with shapes, the most useful of which are listed in the following table.

Class	Member	Description
AddinHook	**ShapeCreated** event	Is triggered when a shape is created For more information, see "Creating shapes" on page 111.
Application	**CreateCurve** method	Creates a line or a curve "in memory" For more information, see "Creating lines and curves" on page 114.
Application	**SelectionChange** event	Is triggered when a selection is deactivated For more information, see "Deselecting shapes" on page 125.
Application	**SymbolLibraries** property	Contains the collection of all external symbol libraries for the application For more information, see "Creating symbols" on page 118.
Color	**CopyAssign** method	Copies a color from one shape fill or shape outline to another For more information, see "Working with color" on page 134.

Class	Member	Description
Color	**Type** method	Specifies the color model for a shape color For more information, see “Working with color” on page 134.
Curve	**CreateSubPath** method	Adds a subpath to a line or a curve For more information, see “Creating lines and curves” on page 114.
Document	**ClearSelection** method	Deselects all objects in a document For more information, see “Deselecting shapes” on page 125.
Document	**Selection** method	Returns, as a single **Shape** object, all selected objects in a document For more information, see “Accessing selections directly” on page 122.
Document	**SelectionChange** event	Is triggered when a selection is deactivated For more information, see “Deselecting shapes” on page 125.
Document	**SelectionRange** property	Returns, as a **ShapeRange** object, all selected objects in a document For more information, see “Accessing copies of selections” on page 123.
Document	**ShapeChange** event	Is triggered when a shape is deselected For more information, see “Deselecting shapes” on page 125.
Document	**ShapeCreate** event	Is triggered when a shape is created For more information, see “Creating shapes” on page 111.
Document	**ShapeDelete** event	Is triggered when a shape is deleted For more information, see “Deleting shapes” on page 138.
Document	**ShapeDistort** event	Is triggered when a shape is distorted For more information, see “Applying distortions” on page 137.
Document	**ShapeMove** event	Is triggered when a shape is positioned For more information, see “Positioning shapes” on page 129.

Class	Member	Description
Document	**ShapeTransform** event	Is triggered when a shape is transformed For more information, see “Transforming shapes” on page 125.
Document	**SymbolLibrary** property	Returns the internal symbol library for a document For more information, see “Creating symbols” on page 118.
Fill	**ApplyFountainFill** method	Applies a fountain fill to a shape For more information, see “Applying fountain fills” on page 131.
Fill	**ApplyHatchFill** method	Applies a hatch fill to a shape For more information, see “Applying hatch fills” on page 133.
Fill	**ApplyPatternFill** method	Applies a pattern fill to a shape For more information, see “Applying pattern fills” on page 132.
Fill	**ApplyPostScriptFill** method	Applies a PostScript fill to a shape For more information, see “Applying PostScript fills” on page 133.
Fill	**ApplyTextureFill** method	Applies a texture fill to a shape For more information, see “Applying texture fills” on page 132.
Fill	**ApplyUniformFill** method	Applies a uniform fill to a shape For more information, see “Applying uniform fills” on page 131.
Fill	**Fountain** property	Specifies the fountain-fill properties for a shape For more information, see “Applying fountain fills” on page 131.
Fill	**Hatch** property	Specifies the hatch-fill properties for a shape For more information, see “Applying hatch fills” on page 133.
Fill	**Pattern** property	Specifies the pattern-fill properties for a shape For more information, see “Applying pattern fills” on page 132.

Class	Member	Description
Fill	**PostScriptFill** property	Specifies the PostScript-fill properties for a shape For more information, see “Applying PostScript fills” on page 133.
Fill	**Texture** property	Specifies the texture-fill properties for a shape For more information, see “Applying texture fills” on page 132.
Fill	**Type** property	Specifies the type of fill that is applied to a shape For more information, see “Coloring shapes” on page 130.
Fill	**UniformColor** property	Specifies the uniform-fill properties for a shape For more information, see “Applying uniform fills” on page 131.
FountainColor	**Move** method	Moves a color in the fountain fill for a shape For more information, see “Applying fountain fills” on page 131.
FountainColors	**Add** method	Adds a color to the fountain fill for a shape For more information, see “Applying fountain fills” on page 131.
FountainColors	**Count** property	Counts the number of colors between the start color and end color in the fountain fill for a shape For more information, see “Applying fountain fills” on page 131.
GlobalMacroStorage	**SelectionChange** event	Is triggered when a selection is deactivated For more information, see “Deselecting shapes” on page 125.
Layer	**CreateArtisticText** method or **CreateArtisticTextWide** method	Creates an artistic-text object on the specified layer For more information, see “Creating text objects” on page 115.
Layer	**CreateCurve** method	Creates, on the specified layer, a line or a curve that is created “in memory” by using the **Application.CreateCurve** method For more information, see “Creating lines and curves” on page 114.
Layer	**CreateCurveSegment** method or **CreateCurveSegment2** method	Creates a basic curve on the specified layer For more information, see “Creating lines and curves” on page 114.

Class	Member	Description
Layer	**CreateEllipse** method, **CreateEllipse2** method, or **CreateEllipseRect** method	Creates an ellipse on the specified layer For more information, see "Creating ellipses" on page 113.
Layer	**CreateLineSegment** method	Creates a basic line on the specified layer For more information, see "Creating lines and curves" on page 114.
Layer	**CreateParagraphText** method or **CreateParagraphTextWide** method	Creates an paragraph-text object on the specified layer For more information, see "Creating text objects" on page 115.
Layer	**CreateRectangle** method, **CreateRectangle2** method, or **CreateRectangleRect** method	Creates a rectangle on the specified layer For more information, see "Creating rectangles" on page 111.
Layer	**Shapes** property	Contains the collection of shapes for a layer For more information, see "Selecting shapes" on page 121.
Outline	**Color** property	Specifies the color of the outline for a shape For more information, see "Applying outlines" on page 133.
Outline	**Style** property	Specifies the dash settings (that is, style properties) for the outline of a shape For more information, see "Applying outlines" on page 133.
Outline	**Type** property	Specifies whether an outline is applied to a shape For more information, see "Applying outlines" on page 133.
Outline	**Width** property	Specifies, in document units, the width of the outline for a shape For more information, see "Applying outlines" on page 133.
Segment	**AddNodeAt** method	Adds a node to a line segment or a curve segment For more information, see "Creating lines and curves" on page 114.
Shape	**CreateBlend** method	Applies a blend effect to a shape For more information, see "Applying blends" on page 136.

Class	Member	Description
Shape	**CreateContour** method	Applies a contour effect to a shape For more information, see “Applying contours” on page 136.
Shape	**CreateCustomDistortion** method	Applies a customized distortion effect to a shape For more information, see “Applying distortions” on page 137.
Shape	**CreateCustomEffect** method	Applies a customized effect to a shape For more information, see “Applying customized effects” on page 136.
Shape	**CreateDropShadow** method	Applies a drop-shadow effect to a shape For more information, see “Applying drop shadows” on page 137.
Shape	**CreateEnvelope** method, **CreateEnvelopeFromCurve** method, or **CreateEnvelopeFromShape** method	Applies an envelope effect to a shape For more information, see “Applying envelopes” on page 137.
Shape	**CreateExtrude** method	Applies an extrusion effect to a shape For more information, see “Applying extrusions” on page 137.
Shape	**CreateLens** method	Applies a lens effect to a shape For more information, see “Applying lenses” on page 137.
Shape	**CreatePerspective** method	Applies a perspective effect to a shape For more information, see “Applying perspective” on page 138.
Shape	**CreatePushPullDistortion** method	Applies a Push-and-pull distortion effect to a shape For more information, see “Applying distortions” on page 137.
Shape	**CreateSelection** method	Creates a selection from a single shape For more information, see “Selecting shapes” on page 121.
Shape	**CreateTwisterDistortion** method	Applies a Twister distortion effect to a shape For more information, see “Applying distortions” on page 137.

Class	Member	Description
Shape	**CreateZipperDistortion** method	Applies a Zipper distortion effect to a shape For more information, see “Applying distortions” on page 137.
Shape	**Duplicate** method	Duplicates a shape For more information, see “Duplicating shapes” on page 125.
Shape	**Evaluate** method	Returns the result of a given expression that evaluates the properties of the current shape For more information, see “Searching for shapes” on page 138.
Shape	**GetBoundingBox** method	Returns the size of a shape based on the size of its bounding box For more information, see “Sizing shapes” on page 126.
Shape	**GetPosition** method	Returns the horizontal and vertical position of a shape For more information, see “Positioning shapes” on page 129.
Shape	**GetSize** method	Returns the size of a shape For more information, see “Sizing shapes” on page 126.
Shape	**PlaceTextInside** method	Places the selected text inside the specified shape For more information, see “Creating text objects” on page 115.
Shape	**PositionX** property	Returns, or sets, the horizontal position of a shape For more information, see “Positioning shapes” on page 129.
Shape	**PositionY** property	Returns, or sets, the vertical position of a shape For more information, see “Positioning shapes” on page 129.
Shape	**Rotate** method or **RotateEx** method	Rotates a shape For more information, see “Rotating shapes” on page 129.
Shape	**Selected** method	Specifies whether a shape is selected For more information, see “Selecting shapes” on page 121.

Class	Member	Description
Shape	**SetBoundingBox** method	Sets the size of a shape based on the size of its bounding box For more information, see “Sizing shapes” on page 126.
Shape	**SetPosition** method or **SetPositionEx** method	Sets the position of a shape For more information, see “Positioning shapes” on page 129.
Shape	**SetSize** method or **SetSizeEx** method	Sets the size of a shape For more information, see “Sizing shapes” on page 126.
Shape	**SizeHeight** property	Returns, or sets, the height of a shape For more information, see “Sizing shapes” on page 126.
Shape	**SizeWidth** property	Returns, or sets, the width of a shape For more information, see “Sizing shapes” on page 126.
Shape	**Skew** method or **SkewEx** method	Skews a shape For more information, see “Skewing shapes” on page 128.
Shape	**Stretch** method or **StretchEx** method	Stretches (or scales) a shape For more information, see “Stretching shapes” on page 128.
Shape	**Type** property	Returns the type for a shape For more information, see “Determining shape type” on page 121.
ShapeRange	**CreateSelection** method	Creates a selection from a range of shapes For more information, see “Selecting shapes” on page 121.
ShapeRange	**Duplicate** method	Duplicates a range of shapes For more information, see “Duplicating shapes” on page 125.
Shapes	**All** method	Returns all shapes from the specified collection of shapes For more information, see “Selecting shapes” on page 121.
Shapes	**FindShape** method	Returns a single shape that has the specified properties For more information, see “Searching for shapes” on page 138.

Class	Member	Description
Shapes	**FindShapes** method	Returns, as a shape range, all shapes that have the specified properties For more information, see "Searching for shapes" on page 138.
SubPath	**AppendCurveSegment** method or **AppendCurveSegment2** method	Adds a curve-type segment to a subpath For more information, see "Creating lines and curves" on page 114.
SubPath	**AppendLineSegment** method	Adds a line-type segment to a subpath For more information, see "Creating lines and curves" on page 114.
Symbol	**Definition** property	Returns the definition of a symbol For more information, see "Creating symbols" on page 118.
SymbolDefinition	**NestedSymbols** property	Contains the collection of all nested symbols for a symbol definition For more information, see "Creating symbols" on page 118.
SymbolLibrary	**Symbols** property	Contains the collection of all symbol definitions for a symbol library For more information, see "Creating symbols" on page 118.
Text	**FitTextToPath** method	Attaches the specified artistic text to the outline of a shape For more information, see "Creating text objects" on page 115.
Text	**Frames** property	Represents a series of text frames (or **TextFrame** objects), each of which has its own text range (or **TextRange** object) For more information, see "Creating text objects" on page 115.
Text	**Story** property	Represents a text range (or **TextRange** object) that includes all text in a series of text frames (or **TextFrame** objects) For more information, see "Creating text objects" on page 115.

For detailed information on any property, method, or event, see "Object Model Reference" section in the Macros Help file for the application.

In this topic

For more information on shape-related activities, see the following subtopics:

- "Creating shapes" on page 111
- "Determining shape type" on page 121
- "Selecting shapes" on page 121
- "Duplicating shapes" on page 125
- "Transforming shapes" on page 125
- "Coloring shapes" on page 130
- "Applying effects to shapes" on page 135
- "Searching for shapes" on page 138
- "Deleting shapes" on page 138

Creating shapes

Every document is made up of shapes, or **Shape** objects, which are created by using the drawing tools. The shapes on a document page are stored on layers, so the various shape-creation methods belong to the **Layer** class.

For information on creating specific types of shapes, see the following subtopics:

- "Creating rectangles" on page 111
- "Creating ellipses" on page 113
- "Creating lines and curves" on page 114
- "Creating text objects" on page 115
- "Creating symbols" on page 118

Supported shapes not discussed in this section include polygons (or **Polygon** objects) and customized shapes (or **CustomShape** objects).

Customized shapes that are supported include tables (or **TableShape** objects).

Shapes are measured in document units. You can specify the unit of measurement for a document by using the **Document.Unit** property (see "Setting document properties" on page 82).

If you want, you can use event handlers to respond to events that are triggered by creating a shape:

- **AddinHook.ShapeCreated**
- **Document.ShapeCreate**

Creating rectangles

You can add rectangles (or **Rectangle** objects) to your documents by using one of the following methods:

- **Layer.CreateRectangle**
- **Layer.CreateRectangle2**
- **Layer.CreateRectangleRect**

These methods return a reference to the new **Shape** object. They differ only in the parameters that they take, so you can choose the method that best suits your macro solution.

You can also use these rectangle-creation methods to create squares.

The **CreateRectangle** method creates a rectangle by using four parameters that specify the following:

- the distance between the left, top, right, and bottom sides of the rectangle (in that order)
- the corresponding edges of the page frame

The following VBA example uses the **CreateRectangle** method to create a 2" × 1" rectangle that is positioned 6" up from the bottom of the page frame and 3" in from the left side of the page frame:

```
Dim sh As Shape

ActiveDocument.Unit = cdrInch

Set sh = ActiveLayer.CreateRectangle(3, 7, 6, 5)
```

The **CreateRectangle2** method creates a rectangle based on the coordinates of its lower-left corner, its width, and its height.

The following VBA example uses the **CreateRectangle2** method to create the same rectangle as the previous example:

```
Dim sh As Shape

ActiveDocument.Unit = cdrInch

Set sh = ActiveLayer.CreateRectangle2(3, 6, 2, 1)
```

Finally, the **CreateRectangleRect** method creates a rectangle based on its bounding box (or **Rect** object).

These three rectangle-creation methods provide optional parameters for specifying corner roundness.

The **CreateRectangle** method specifies corner roundness by using parameters for the upper-left, upper-right, lower-left, and lower-right corners (in that order). These parameters take integer values (which range from the default **0** to **100**) that define the radius of the four corners as a whole-number percentage of half of the length of the shortest side.

The following VBA example re-creates the 2" × 1" rectangle from the previous examples. However, this time, the four corner radii are set to 100%, 75%, 50%, and 0% of half of the length of the shortest side (that is, to 0.5", 0.375", 0.25", and a cusp):

```
Dim sh As Shape

ActiveDocument.Unit = cdrInch

Set sh = ActiveLayer.CreateRectangle(3, 7, 6, 5, 100, 75, 50, 0)
```

The **CreateRectangle2** method and the **CreateRectangleRect** method define the corner radii in the same order as the **CreateRectangle** method (that is, upper-left, upper-right, lower-left, and lower-right). However, **CreateRectangle2** and **CreateRectangleRect** take double (floating-point) values that measure the corner radii in document units.

When using **CreateRectangle2** or **CreateRectangleRect**, you must limit the size of the corner radii to less than half of the length of the shortest side of the rectangle.

The following VBA example uses the **CreateRectangle2** method to create the same round-cornered rectangle as the previous example:

```
Dim sh As Shape

ActiveDocument.Unit = cdrInch

ActiveDocument.ReferencePoint = cdrBottomLeft

Set sh = ActiveLayer.CreateRectangle2(3, 6, 2, 1, 0.5, 0.375, 0.25, _

0)
```

Creating ellipses

You can add ellipses (or **Ellipse** objects) to your documents by using one of the following methods:

- **Layer.CreateEllipse**
- **Layer.CreateEllipse2**
- **Layer.CreateEllipseRect**

These methods return a reference to the new **Shape** object. They differ only in the parameters that they take, so you can choose the method that best suits your macro solution.

You can also use the ellipse-creation methods to create circles, arcs, and pie shapes.

The **CreateEllipse** method creates an ellipse by using four parameters that specify the following:

- the distance between the left, top, right, and bottom sides of the ellipse (in that order)
- the corresponding edges of the page frame

The following VBA example creates a 50-millimeter circle:

```
Dim sh As Shape

ActiveDocument.Unit = cdrMillimeter

Set sh = ActiveLayer.CreateEllipse(75, 150, 125, 100)
```

The **CreateEllipse2** method creates an ellipse based on its center point, its horizontal radius, and its vertical radius. (If only one radius is given, a circle is created.)

The following VBA example uses the **CreateEllipse2** method to create an ellipse:

```
Dim sh As Shape

ActiveDocument.Unit = cdrMillimeter

Set sh = ActiveLayer.CreateEllipse2(100, 125, 50, 25)
```

The following VBA example uses the **CreateEllipse2** method to create the same 50-millimeter circle as the **CreateEllipse** example:

```
Dim sh As Shape

ActiveDocument.Unit = cdrMillimeter

Set sh = ActiveLayer.CreateEllipse2(100, 125, 25)
```

Finally, the **CreateEllipseRect** method creates an ellipse based on its bounding box (or **Rect** object).

These three ellipse-creation methods provide three optional parameters for creating an arc or a pie shape. The **StartAngle** and **EndAngle** parameters — which are double values that are measured with zero being horizontally right on the page and with positive values being degrees from zero and moving counterclockwise — are used to define the start angle and end angle of the shape (respectively). In addition, the **Pie** parameter — which is a Boolean value — defines whether the shape is an arc (**False**) or a pie shape (**True**).

The following VBA code uses the **CreateEllipse** method to create a "C" shape:

```
Dim sh As Shape

ActiveDocument.Unit = cdrMillimeter

Set sh = ActiveLayer.CreateEllipse(75, 150, 125, 100, 60, 290, False)
```

Creating lines and curves

You can add lines and curves (or **Curve** objects) to your documents. To create a line or a curve, you must first create a **Curve** object "in memory" by using the **Application.CreateCurve** method.

Each **Curve** object has at least one subpath (or **SubPath** object). You can add a subpath to a line or a curve by using the **Curve.CreateSubPath** method.

Each **SubPath** object has at least one segment (or **Segment** object), which can be line-type or curve-type. You can add a line-type segment to the end of a subpath by using the **SubPath.AppendLineSegment** method; you can add a curve-type segment by using the **SubPath.AppendCurveSegment** method or the **SubPath.AppendCurveSegment2** method.

The **SubPath.AppendLineSegment** method requires one set of Cartesian coordinates, which defines the end of the new segment.

The **SubPath.AppendCurveSegment** method requires one set of Cartesian coordinates, which defines the end of the new segment. Optionally, you can specify two sets of polar coordinates if you want to define the lengths and angles of the starting and ending control handles for the segment.

The **SubPath.AppendCurveSegment2** method requires three sets of Cartesian coordinates: one to define the end of the new segment, and two to define the positions of the starting and ending control handles for the segment.

You can add a segment to the beginning of a subpath by setting the **AppendAtBeginning** parameter for the segment-creation method to **True**.

Finally, each **Segment** object has at least one node (or **Node** object). You can add a node to a segment by using the **Segment.AddNodeAt** method.

You can close a **Curve** object by setting its **Closed** property to **True**.

After creating a curve “in memory,” you can apply it to a layer by using the **Layer.CreateCurve** method. A reference to the new **Shape** object is returned.

The following VBA code creates a D-shaped curve that is closed:

```
Dim sh As Shape, spath As SubPath, crv As Curve

ActiveDocument.Unit = cdrCentimeter

Set crv = Application.CreateCurve(ActiveDocument)

'Create Curve object

Set spath = crv.CreateSubPath(6, 6) ' Create a SubPath

spath.AppendLineSegment 6, 3 ' Add the short vertical segment

spath.AppendCurveSegment 3, 0, 2, 270, 2, 0 ' Lower curve

spath.AppendLineSegment 0, 0 ' Bottom straight edge

spath.AppendLineSegment 0, 9 ' Left straight edge

spath.AppendLineSegment 3, 9 ' Top straight edge

spath.AppendCurveSegment 6, 6, 2, 0, 2, 90 ' Upper curve

spath.Closed = True ' Close the curve

Set sh = ActiveLayer.CreateCurve(crv) ' Create curve shape
```

The **Layer** class provides three additional methods that act as shortcuts for creating a basic line or basic curve that has a single segment on a single subpath:

- **Layer.CreateLineSegment** — creates a basic line based on the given starting point and ending point
- **Layer.CreateCurveSegment** — creates a basic curve based on the given starting point and ending point and, optionally, on the lengths and angles of the starting and ending control handles for the curve
- **Layer.CreateCurveSegment2** — creates a basic curve based on the given starting point and ending point and on the given positions of the starting and ending control handles for the curve

These three methods return a reference to the new **Shape** object.

Creating text objects

You can add text (or **Text** objects) to your documents. Two types of text are supported: artistic text and paragraph text. An artistic-text object is a short line of text to which you can apply graphical effects. In contrast, a paragraph-text object is a large block of text — stored in a rectangular container called a “frame” — to which you can apply more complex formatting.

To create an artistic-text object, you can use one of the following methods:

- **Layer.CreateArtisticText** — creates basic artistic text
- **Layer.CreateArtisticTextWide** — creates artistic text that is in Unicode format

Both of these methods require you to specify the position and content of the artistic-text object. Optionally, both of these methods let you set such text attributes as font style, font size, formatting, and alignment. In addition, both of these methods return a reference to the new **Shape** object.

The following VBA code uses the **CreateArtisticText** method to create a basic artistic-text object that places the words "Hello World" at the specified position:

```
Dim sh As Shape

ActiveDocument.Unit = cdrInch

Set sh = ActiveLayer.CreateArtisticText(1, 4, "Hello World")
```

You can fit artistic text to a path by using the **Text.FitTextToPath** method, which simply attaches the text to the outline of a shape such that the text flows along the path of that shape.

The following VBA code creates a new artistic-text object and attaches it to the selected shape:

```
Dim sh As Shape, sPath As Shape

ActiveDocument.Unit = cdrInch

Set sPath = ActiveShape

Set sh = ActiveLayer.CreateArtisticText(1, 4, "Hello World")

sh.Text.FitToPath sPath
```

To create a paragraph-text object, you can use one of the following methods:

- **Layer.CreateParagraphText** — creates basic paragraph text
- **Layer.CreateParagraphTextWide** — creates paragraph text that is in Unicode format

Both of these methods require you to specify the size of the paragraph-text frame by setting its position from the left, top, right, and bottom sides of the page frame (in that order). Optionally, both of these methods let you specify the desired text and set such text attributes as font style, font size, formatting, and alignment. In addition, both of these methods return a reference to the new **Shape** object.

The following VBA code uses the **CreateParagraphText** method to create a basic paragraph-text object that centers the words "Hi There" in a frame of the specified size:

```
Dim sh As Shape

ActiveDocument.Unit = cdrInch

Set sh = ActiveLayer.CreateParagraphText(1, 4, 5, 2, "Hi There", _

  Alignment := cdrCenterAlignment)
```

You can format existing paragraph text by using text ranges (or **TextRange** objects). Text ranges are handled in two ways, both of which involve frames (or **TextFrame** objects):

- "frames" method — The **Text.Frames** property represents a series of text frames, each of which has its own text range.
- "story" method — The **Text.Story** property represents a text range that includes all text in a series of text frames.

A text range can be treated as a single block of text, such that any changes to text properties (such as font style and font size) are applied to all text in that text range. Alternatively, a text range can be broken down into the following smaller text ranges:

- columns (or **TextColumns** objects)
- paragraphs (or **TextParagraphs** objects)
- lines (or **TextLines** objects)
- words (or **TextWords** objects)
- characters (or **TextCharacters** objects)

The object model supports all paragraph-formatting options and character-formatting options that are offered by the application.

The following VBA code formats the specified text range by using the **Text.Story** property. The first paragraph of the story is changed to a heading style and the second and third paragraphs into a body-text style:

```
Dim txt As TextRange

' Format the first paragraph

  Set txt = ActiveShape.Text.Story.Paragraphs(1)

  txt.ChangeCase cdrTextUpperCase

  txt.Font = "Verdana"

  txt.Size = 18

  txt.Bold = True

' Format the second and third paragraphs

  Set txt = ActiveShape.Text.Story.Paragraphs(2, 2)

  txt.Font = "Times New Roman"

  txt.Size = 12

  txt.Style = cdrNormalFontStyle
```

You can place selected text inside closed shapes by using the **Shape.PlaceTextInside** method.

The following VBA code creates a 5" × 2" ellipse and places the selected text inside it:

```
Dim txt As Shape, sh As Shape

ActiveDocument.Unit = cdrInch

Set txt = ActiveShape

Set sh = ActiveLayer.CreateEllipse(0, 2, 5, 0)

sh.PlaceTextInside txt
```

Creating symbols

A symbol (or **Symbol** object) is a reusable graphic element that is defined in a symbol library. Using symbols in your documents provides the following benefits:

- lower file-size — Each symbol is defined only once, regardless of how many actual instances of that symbol appear in the document.
- increased productivity — Any changes made to a symbol definition are automatically propagated to all instances of that symbol in the document.
- improved workflow — Symbol libraries are a convenient way to store and reuse common graphic elements.

Symbol libraries come in two varieties: external and internal.

External symbol libraries use the filename extension CSL and contain symbol definitions that must be manually added to the workspace at the application level. You cannot modify a symbol that is defined in an external library unless you open the associated external library (CSL) file; simply importing the file as a library does not let you modify its contents.

External symbol libraries must be published to a location that all users can access. A common mapped drive is a good solution, but a corporate intranet is a better one. However, if the security of the symbols is not important, the best solution is a corporate Internet site.

Internal symbol libraries exist at the document level. Defining a new symbol in a document — or adding an instance of an external-library symbol to a document — automatically adds that symbol to the internal library for that document. For this reason, each document has its own unique internal symbol library.

Inserting an instance of a symbol from an external symbol library creates a link to the definition for that symbol in that external symbol library. If, at any point, the document cannot access the external symbol library, the symbol definition in the internal symbol library for that document is used instead.

The **Application.SymbolLibraries** property contains the collection of all external symbol libraries (or **SymbolLibrary** objects) that are available to the application; the **Document.SymbolLibrary** property returns just the internal symbol library for that document. The **SymbolLibrary.Symbols** property contains the collection of all symbol definitions (or **SymbolDefinition** objects) in that symbol library. A **SymbolDefinition** object is also returned by the **Symbol.Defintion** property; therefore, you can modify the defintion of a symbol by using the various properties and methods of the **SymbolDefinition** class.

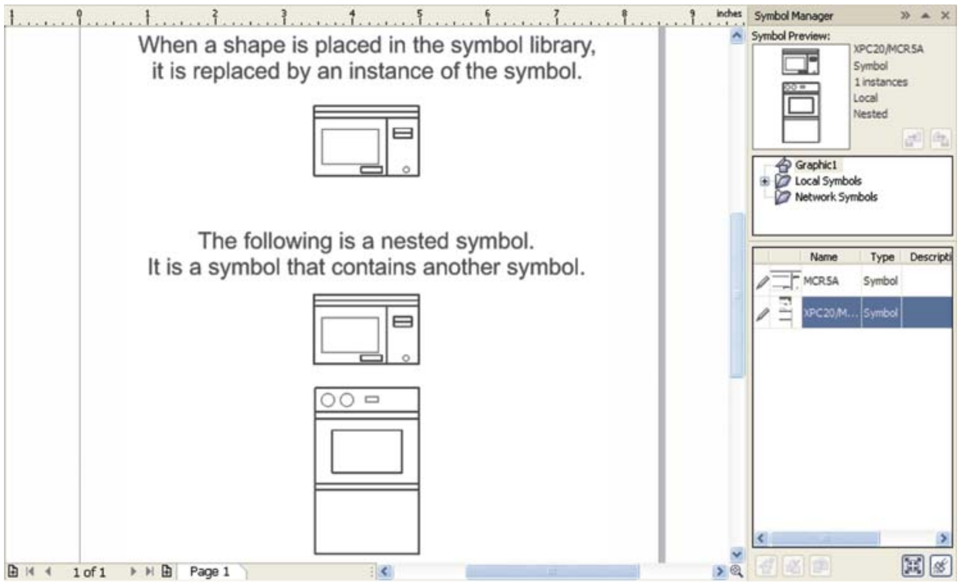
To remove a symbol definition from the internal symbol library for a document, you must delete all instances of the symbol from the document and then run the **SymbolLibrary.PurgeUnusedSymbols** method. Simply removing all instances of a symbol from a document does not automatically remove its symbol definition from the internal symbol library for that document.

The following VBA code demonstrates the basics of using symbols:

```
Sub AddRemoveSymbols()
    Dim objSymLibSwitchA As SymbolLibrary
    Dim shpSymBreaker2 As Shape, shpSymBreaker2A As Shape
    ActiveDocument.Unit = cdrMillimeter
    'Add the switchesA external symbol library to the global
    'workspace.
      Set objSymLibSwitchA = SymbolLibraries.Add _
        ("C:\libs\switches\switchesA.csl")
    'Add the breaker2 symbol to the active layer.
    'NOTE: This automatically adds the symbol definition to the
    'internal symbol library for the document.
      Set shpSymBreaker2 = ActiveLayer.CreateSymbol(15, 20, _
        "breaker2", SymbolLibraries("switchesA"))
    'Add another instance of the breaker2 symbol, this time from the
    'internal symbol library. NOTE: We did not specify a library, so
    'the library for the local document is used by default.
      Set shpSymBreaker2A = ActiveLayer.CreateSymbol(30, 20, _
        "breaker2")
    'Remove the switchesA library from the global workspace.
      SymbolLibraries("switchesA").Delete
    'Delete the two breaker2 symbols.
      shpSymBreaker2.Delete
      shpSymBreaker2A.Delete
    'At this point, the internal symbol library for the document
    'still has the definition of breaker2 stored. To remove this
    'definition, we must purge the unused symbols from the library.
    'The definition is unused because there are no instances that
```

```
        'reference it.

          ActiveDocument.SymbolLibrary.PurgeUnusedSymbols

    End Sub
```

A symbol can contain (or "nest") other symbols. A top-level symbol can contain symbols, and each of those symbols can contain a symbol, and so forth. In the object model, the **SymbolDefinition.NestedSymbols** property returns (as a **SymbolDefinitions** object) the collection of nested symbols for a symbol definition. While there is no restriction on how many nesting levels can be created, the symbol cannot be rendered without access to its symbol definition (whether external or internal). In addition, even if the first and second nesting layers of a symbol are rendered correctly, a symbol on the third nesting layer may not be rendered correctly without access to its required symbol definition.


When a shape is placed in the symbol library, it is replaced by an instance of the symbol.
The following is a nested symbol. It is a symbol that contains another symbol.
Symbol Manager
Symbol Preview:
XPC20/MCR5A
Symbol
1 instances
Local
Nested
Graphic1
Local Symbols
Network Symbols
Name
Type
MCR5A
Symbol
XPC20/M...
Symbol
1 of 1
Page 1

Symbols and nested symbols

The following VBA code demonstrates the basics of using nested symbols:

```
    Sub MakeNestedSymbol()

        Dim shp1 As Shape, shp2 As Shape, shp3 As Shape, shpSym As Shape

        Dim shpRng As New ShapeRange

        'Create a pair of rectangles and a circle.

          Set shp1 = ActiveLayer.CreateRectangle2(0, 0, 10, 20)

          Set shp2 = ActiveLayer.CreateRectangle2(50, 50, 20 ,10)

          Set shp3 = ActiveLayer.CreateEllipse(10, 10, 20)

        'Make a symbol out of the circle. NOTE: This circle is

        'automatically added to the internal symbol library for the
        'document.
          Set shpSym = shp3.ConvertToSymbol("circle")
        'Add the rectangles and the circle symbol to a shape range.
          shpRng.Add shp1
          shpRng.Add shp2
          shpRng.Add shpSym
        'Convert the shape range into a symbol. NOTE: This symbol is
        'added to the internal symbol library for the document. It is
        'also is a nested symbol because it contains the symbol circle.
          shpRng.ConvertToSymbol "shapes"
    End Sub
```

Determining shape type

Each **Shape** object has a read-only **Type** property, which returns the shape type (for example, rectangle, ellipse, curve, text, or group). The properties and methods that are available to a shape vary with shape type; therefore, it's a good idea to determine the shape type before applying any properties or methods to that shape.

The following sample VBA code determines whether a shape is text. If the shape is text, the code determines whether it is artistic text or paragraph text. If the shape is artistic text, it is rotated by 10 degrees.

```
Dim sh As Shape
Set sh = ActiveShape
If sh.Type = cdrTextShape Then
  If sh.Text.IsArtisticText = True Then
    sh.Rotate 10
  End If
End If
```

Selecting shapes

Each shape is a member of the **Layer.Shapes** collection for the layer on which it appears. The shapes in a **Layer.Shapes** collection appear in the order in which they appear on that layer — the first shape is the one at the top of the "stack," and the last shape is the one at the bottom. If shapes are added, reordered, or deleted, the affected **Layer.Shapes** collection is immediately updated to reflect the new shape order of that layer.

In addition, each document page has a **Shapes** collection, which contains all **Layer.Shapes** collections for that page. The first shape in a **Page.Shapes** collection is the one at the very top of that page, and the last shape is the one at the very bottom.

If you want to access individual shapes, you can select them. When you select shapes, you create a "selection" that contains only those shapes.

The **Shape.Selected** property takes a Boolean value that indicates whether a shape is selected: **True** if the shape is selected, **False** otherwise. You can select a shape by changing the value of its **Selected** property to **True**; this technique adds the shape to the current selection — that is, rather than creating a new selection that contains only that shape.

If you want to create a new selection from a shape — that is, by selecting a specified shape and deselecting any other selected shapes — you can use the **Shape.CreateSelection** method, as in the following VBA example:

```
Dim sh As Shape

Set sh = ActivePage.Shapes(1)

If sh.Selected = False Then sh.CreateSelection
```

You can select multiple shapes by using the **ShapeRange.CreateSelection** method. The following VBA code uses this method — in combination with the **Shapes.All** method — to select all shapes on the active page (except those on locked or hidden layers):

```
ActivePage.Shapes.All.CreateSelection
```

You can access a selection in one of two ways:

- Use the **Document.Selection** method to return a special **Shape** object that contains the actual selection. This **Shape** object is automatically refreshed when the selection is updated.
- Use the **Document.SelectionRange** property to return a **ShapeRange** object that contains a copy of the selection. This **ShapeRange** object represents a "snapshot" of the selection (at the time when the **ShapeRange** object was created), so it is not automatically refreshed when the selection is updated.

To summarize, you can access a selection directly, or you can access a copy of that selection; alternatively, you can access a subset of the shapes in a selection. You can also reorder the shapes in a selection. When you no longer require a selection, you can deselect one or all of its shapes.

For more information on selecting shapes, see the following subtopics:

- "Accessing selections directly" on page 122
- "Accessing copies of selections" on page 123
- "Accessing the shapes in a selection" on page 124
- "Reordering the shapes in a selection" on page 125
- "Deselecting shapes" on page 125

Accessing selections directly

As previously discussed, you can use the **Document.Selection** method to access the contents of a selection directly. A **Shape** object is returned, and this **Shape** object is updated to reflect any changes made to the selection.

The following VBA code returns the selection for the active document:

```
Dim sel As Shape

Set sel = ActiveDocument.Selection
```

The shortcut for `ActiveDocument.Selection` is `ActiveSelection`, which returns a **Shape** object of subtype **cdrSelectionShape**. The **Shape** subtype has a member collection called **Shapes**, which represents a collection of all the selected shapes in the document. The shapes in the `ActiveSelection.Shapes` collection can be accessed as in the following VBA example:

```
Dim sh As Shape, shs As Shapes

Set shs = ActiveSelection.Shapes

For Each sh In shs

  sh.Rotate 15 'Rotate each shape by 15 degrees counterclockwise

Next sh
```

After you use the `ActiveSelection` command to select shapes, you cannot subsequently use the command to access those shapes. Instead, you must create a copy of the selection by using one of the following methods:

- Recreate the selection as an array of **Shape** objects.
- Recreate the selection as a **Shapes** collection.
- Create a "snapshot" of the selection as a **ShapeRange** object (see "Accessing copies of selections" on page 123).

Accessing copies of selections

As previously discussed, you can use the **Document.SelectionRange** property to make a copy of the shapes in a selection. However, the returned **ShapeRange** object is not refreshed when the selection is updated because it represents a "snapshot" of the selection at the moment when that **ShapeRange** object was created.

The following VBA code returns a copy of the selection for the active document:

```
Dim selRange As ShapeRange

Set selRange = ActiveDocument.SelectionRange
```

The shortcut for the `ActiveDocument.SelectionRange` command is `ActiveSelectionRange`, which returns a **ShapeRange** object. This object contains a collection of references to the shapes that were selected at the moment when the property was invoked. The shapes in the `ActiveSelectionRange` collection can be accessed as in the following VBA example:

```
Dim sh As Shape, shRange As ShapeRange

Set shRange = ActiveSelectionRange

For Each sh In shRange
```

```
  sh.Skew 15 ' Skew each shape thru 15° counterclockwise
Next sh
```

After you use the `ActiveSelectionRange` command to create a copy of the current document selection, you can subsequently access the returned **ShapeRange** object to access any of its shapes. You can even add shapes to or remove shapes from the returned **ShapeRange** object. You can then use the **ShapeRange.CreateSelection** method if you want to replace the current selection with the modified **ShapeRange** object.

The following VBA code creates a **ShapeRange** object from the current document selection, removes the first and second shapes from that shape range, and then replaces the original selection with this modified **ShapeRange** object:

```
Dim shRange As ShapeRange
Set shRange = ActiveSelectionRange
shRange.Remove 1
shRange.Remove 2
shRange.CreateSelection
```

If you want to add a specified **ShapeRange** object to the current selection (rather than use it to replace the current selection), you can use the **ShapeRange.AddToSelection** method.

Accessing the shapes in a selection

You can use a similar process for accessing the shapes in a selection as you can for accessing the shapes in a selection range.

Here is a a VBA code sample for accessing the shapes in a selection:

```
Dim shs As Shapes, sh As Shape
Set shs = ActiveSelection.Shapes
For Each sh In shs
  ' Do something with the shape, sh
Next sh
```

Here is a VBA code sample for accessing the shapes in a selection range:

```
Dim sRange As ShapeRange, sh As Shape
Set sRange = ActiveSelectionRange
For Each sh In sRange
  ' Do something with the shape, sh
Next sh
```

Remember that the `ActiveSelection.Shapes` command provides direct access to the current selection, while the `ActiveSelectionRange` command provides a copy of the current selection. Use `ActiveSelection.Shapes` if you want to access the current selection; use `ActiveSelectionRange` if you want to create a "snapshot" of the current selection that you can access later.

Reordering the shapes in a selection

The `ActiveSelection.Shapes` command and the `ActiveSelectionRange` command return shapes in the reverse order from which they were selected: the first shape is the last one selected, and the last shape is the first one selected. Please keep this fact in mind when reordering the shapes in a selection.

Deselecting shapes

You can deselect any shape by changing the value of its **Shape.Selected** property to **False**.

You can deselect all shapes by using the **Document.ClearSelection** method. The following VBA code uses the ClearSelection method to deselect all shapes in the active document:

```
ActiveDocument.ClearSelection
```

If you want, you can use event handlers to respond to events that are triggered by deseleting a shape:

- **Document.ShapeChange**

You can also use event handlers to respond to events that are triggered by deactivating a selection:

- **Application.SelectionChange**
- **Document.SelectionChange**
- **GlobalMacroStorage.SelectionChange**

Duplicating shapes

You can use the **Shape.Duplicate** method to duplicate a shape, and you can use the **ShapeRange.Duplicate** method to duplicate a range of shapes.

```
ActiveSelection.Duplicate
```

The **Duplicate** method provides two optional parameters, **OffsetX** and **OffsetY**, which offset the duplicate from the original (horizontally and vertically, respectively). The following VBA code positions the duplicate two inches to the right and one inch above the original:

```
ActiveDocument.Unit = cdrInch

ActiveSelection.Duplicate 2, 1
```

Transforming shapes

You can transform shapes in various ways, as explained in the following topics:

- "Sizing shapes" on page 126
- "Stretching shapes" on page 128
- "Skewing shapes" on page 128
- "Rotating shapes" on page 129

- “Positioning shapes” on page 129

If you want, you can use event handlers to respond to events that are triggered by transforming a shape:

- **Document.ShapeTransform**

Sizing shapes

You can return the width and height of a shape (in document units) by using the **Shape.SizeWidth** and **Shape.SizeHeight** properties, as in the following VBA example:

```
Dim width As Double, height As Double

ActiveDocument.Unit = cdrMillimeter

width = ActiveShape.SizeWidth

height = ActiveShape.SizeHeight
```

You can also use the **Shape.SizeWidth** and **Shape.SizeHeight** properties to resize an existing shape by specifying new values for those properties. The following VBA example uses these properties to set the size of the active shape to a width of 50 millimeters and a height of 70 millimeters:

```
ActiveDocument.Unit = cdrMillimeter

ActiveShape.SizeWidth = 50

ActiveShape.SizeHeight = 70
```

You can return both the width and the height of a shape (in document units) by using the **Shape.GetSize** method, as in the following VBA example:

```
Dim width As Double, height As Double

ActiveDocument.Unit = cdrMillimeter

ActiveShape.GetSize width, height
```

You can resize a shape by using the **Shape.SetSize** method to specify a new width and new height for it, as in the following VBA example:

```
ActiveDocument.Unit = cdrMillimeter

ActiveShape.SetSize 50, 70
```

You can also resize a shape by using the **Shape.SetSizeEx** method. Besides the new width and new height for the shape, this method takes a reference point for the resize (instead of using the center point of the shape). The following VBA code uses the **SetSizeEx** method to resize the current selection to 10 inches wide by 8 inches high about the reference point (6, 5) in the document:

```
ActiveDocument.Unit = cdrInch

ActiveSelection.SetSizeEx 6, 5, 10, 8
```

If you want to take the outline of a shape into account when returning the size of that shape, you must use the **Shape.GetBoundingBox** method. The bounding box for a shape surrounds both the shape and its outline; however, the actual dimensions of a shape specify its width and height irrespective of the size of its outline. The following VBA example uses the **GetBoundingBox** method to return the size of the active shape:

```
Dim width As Double, height As Double

Dim posX As Double, posY As Double

ActiveDocument.Unit = cdrInch

ActiveDocument.ReferencePoint = cdrBottomLeft

ActiveShape.GetBoundingBox posX, posY, width, height, True
```

The **Shape.GetBoundingBox** method takes parameters that specify the position of the lower-left corner of the shape, the width of the shape, and the height of the shape. The final parameter is a Boolean value that indicates whether to include (**True**) or exclude (**False**) the outline of the shape. The **Shape.SetBoundingBox** method lets you set the size of a shape by specifying the size of its bounding box; however, this method lacks the parameter for specifying whether to include the outline in the new size. If you want to calculate the size and position of the bounding box of a shape without including its outline, you can use the **GetBoundingBox** method twice (once including the outline and once excluding it), as in the following VBA example:

```
Public Sub SetBoundingBoxEx(X As Double, Y As Double, _

    Width As Double, Height As Double)

  Dim sh As Shape

  Dim nowX As Double, nowY As Double

  Dim nowWidth As Double, nowHeight As Double

  Dim nowXol As Double, nowYol As Double

  Dim nowWidthol As Double, nowHeightol As Double

  Dim newX As Double, newY As Double

  Dim newWidth As Double, newHeight As Double

  Dim ratioWidth As Double, ratioHeight As Double

  Set sh = ActiveSelection

  sh.GetBoundingBox nowX, nowY, nowWidth, nowHeight, False

  sh.GetBoundingBox nowXol, nowYol, nowWidthol, nowHeightol, True

  ratioWidth = Width / nowWidthol

  ratioHeight = Height / nowHeightol
```

```
    newWidth = nowWidth * ratioWidth
    newHeight = nowHeight * ratioHeight
    newX = X + (nowX - nowXol)
    newY = Y + (nowY - nowYol)
    sh.SetBoundingBox newX, newY, newWidth, newHeight, False, _
      cdrBottomLeft
  End Sub
```

Stretching shapes

You can stretch a shape (or scale it by stretching is proportionately) by using the **Shape.Stretch** method or the **Shape.StretchEx** method. Both methods take a decimal value for the stretch, where 1 is 100% (or no change); you cannot use zero, so you must use a very small value instead.

The following VBA code uses the **Shape.Stretch** method to stretch the selection to half its current height and twice its width, about the midpoint of the bottom edge of its bounding box:

```
ActiveDocument.ReferencePoint = cdrBottomMiddle
ActiveSelection.Stretch 2, 0.5
```

If you want to specify the reference point about which to perform a stretch, you can use the **Shape.StretchEx** method. The following VBA code performs the same stretch as the previous code, but it performs that stretch about the point (4, 5) on the page (in inches):

```
ActiveDocument.Unit = cdrInch
ActiveSelection.StretchEx 4, 5, 2, 0.5
```

The **Shape.Stretch** and **Shape.StretchEx** methods provide an optional Boolean parameter that determines how to stretch paragraph text. A value of **True** stretches the characters, while **False** stretches the bounding box and re-flows the text within it.

Skewing shapes

You can skew a shape by using the **Shape.Skew** method or the **Shape.SkewEx** method. These methods let you specify the horizontal-skew angle (in degrees, where positive values move the top edge to the left and the bottom edge to the right) and the vertical-skew angle (in degrees, where positive values move the right edge upwards and the left edge downwards).

Skews of angles close to or greater than 90° are not allowed.

The horizontal skew is applied before the vertical skew.

The difference between the **Shape.Skew** and **Shape.SkewEx** methods is the point about which the skew is performed: **Skew** uses the center of rotation for the shape, while **SkewEx** uses the specified reference point.

You can determine the center of rotation for a shape by returning the values of its **Shape.RotationCenterX** and **Shape.RotationCenterY** properties. Changing these values moves the center of rotation for that shape.

The following VBA code uses the **Shape.Skew** method to skew the selection (about its center of rotation) by 30° horizontally and by 15° vertically:

```
ActiveSelection.Skew 30, 15
```

Rotating shapes

You can rotate a shape by using the **Shape.Rotate** method or the **Shape.RotateEx** method. These methods rotate the shape by the given angle (in degrees). However, the difference between these methods is the point about which they perform the rotation: **Rotate** uses the center of rotation for the shape, while **RotateEx** uses the specified reference point.

You can determine the center of rotation for a shape by returning the values of its **Shape.RotationCenterX** and **Shape.RotationCenterY** properties. Changing these values moves the center of rotation for that shape.

The following VBA code uses the **Shape.Rotate** method to rotate the selection (about its center of rotation) by 30°:

```
ActiveSelection.Rotate 30
```

The following VBA code uses the **Shape.RotateEx** method to rotate each selected shape by 15° clockwise about its lower-right corner:

```
Dim sh As Shape

ActiveDocument.ReferencePoint = cdrBottomRight

For Each sh In ActiveSelection.Shapes

  sh.RotateEx -15, sh.PositionX, sh.PositionY

Next sh
```

Positioning shapes

You can return the horizontal and vertical position of a shape by using the **Shape.PositionX** and **Shape.PositionY** properties (respectively). Alternatively, you can use the **Shape.GetPosition** method to return both the horizontal position and the vertical position of a shape.

You can use the **Shape.GetBoundingBox** method if you want to return the position of a shape, including its outline. For more information on this method, see “Sizing shapes” on page 126.

The following VBA code uses the **Shape.GetPosition** method to return the position of the selection relative to the current reference point of the active document, which the code explicitly sets to the lower-left corner:

```
Dim posX As Double, posY As Double

ActiveDocument.ReferencePoint = cdrBottomLeft
```

```
ActiveSelection.GetPosition posX, posY
```

You can also use the **Shape.PositionX** and **Shape.PositionY** properties to set the horizontal and vertical position of a shape (respectively), thereby moving that shape to the specified position. Alternatively, you can use the **Shape.SetPosition** method to move a shape to specified horizontal and vertical position, or you can use the **Shape.SetPositionEx** method to move the shape to a specified point.

You can also use the **Shape.SetSizeEx** and **Shape.SetBoundingBox** methods to set the position of a shape. For more information on these methods, see "Sizing shapes" on page 126.

The following VBA code uses the **Shape.SetPosition** method to set the position of the lower-right corner of each selected shape in the active document to (3, 2) in inches:

```
Dim sh As Shape

ActiveDocument.Unit = cdrInch

ActiveDocument.ReferencePoint = cdrBottomRight

For Each sh In ActiveSelection.Shapes

  sh.SetPosition 3, 2

Next sh
```

If you want, you can use event handlers to respond to events that are triggered by positioning a shape:
- **Document.ShapeMove**

Coloring shapes

You can add color to a shape by applying a fill (or **Fill** object) to it. The fill type for a shape is recorded by the **Fill.Type** property as one of the following constants for the **cdrFillType** enumeration:
- **cdrUniformFill** — uniform fill
- **cdrFountainFill** — fountain fill
- **cdrPatternFill** — pattern fill
- **cdrTextureFill** — texture fill
- **cdrPostScriptFill** — PostScript fill
- **cdrHatchFill** — hatch fill
- **cdrNoFill** — no fill

The following VBA code returns the type of fill that is applied to the active shape:

```
Dim fillType As cdrFillType

fillType = ActiveShape.Fill.Type
```

You cannot change the fill type for a shape by modifying its **Fill.Type** property. Instead, you must use the appropriate **Fill.Apply...Fill** method, as described in the subsections that follow.

You can also add color to a shape by applying an outline (or **Outline** object) to it.

In addition, the object model provides a variety of properties and methods for working with the colors (or **Color** objects) that you apply to shapes.

For information on applying fills and outlines and on working with colors, see the following subtopics:

- “Applying uniform fills” on page 131
- “Applying fountain fills” on page 131
- “Applying pattern fills” on page 132
- “Applying texture fills” on page 132
- “Applying PostScript fills” on page 133
- “Applying hatch fills” on page 133
- “Applying outlines” on page 133
- “Working with color” on page 134

In your macros, you can include queries that search for shapes that have specific fill properties, outline properties, or color properties. For information, see “Including queries in macros” in the Macros Help file for the application.

Applying uniform fills

Uniform fills consist of a single, solid color. A uniform fill is represented by the **Fill.UniformColor** property as a **Color** object.

You can apply a uniform fill to a shape by using the **Fill.ApplyUniformFill** method. The following VBA example applies a red uniform fill to the active shape:

```
ActiveShape.Fill.ApplyUniformFill CreateRGBColor(255, 0, 0)
```

You can change the color of a uniform fill by modifying its **Fill.UniformColor** property. The following VBA example changes the uniform fill of the active shape to deep navy blue:

```
ActiveShape.Fill.UniformColor.RGBAssign 0, 0, 102
```

You can remove the uniform fill from a shape by using the **Fill.ApplyNoFill** method.

Applying fountain fills

Fountain fills display a progression between two colors. A fountain fill is represented by the **Fill.Fountain** property as a **FountainFill** object, which specifies the various properties for the fountain fill: start color, end color, angle, blend type, and so on. The colors in a fountain fill are represented by a **FountainColors** collection.

You can apply a fountain fill to a shape by using the **Fill.ApplyFountainFill** method. This method provides optional parameters for various fountain-fill settings, such as the midpoint and offset of the blend. The following VBA example creates a simple linear fountain fill, from red to yellow, at 30 degrees to the horizontal:

```
Dim startCol As New Color, endCol As New Color

startCol.RGBAssign 255, 0, 0

endCol.RGBAssign 255, 255, 0

ActiveShape.Fill.ApplyFountainFill startCol, endCol, cdrLinearFountainFill, 30
```

You can add a color to a fountain fill by using the **FountainColors.Add** method. Color positions are integer values in percent, where 0% is the start-color position and 100% is the end-color position. The following VBA example adds a green color to the fountain fill at a position about one-third (33%) of the way from the existing red color:

```
Dim fFill As FountainFill

Set fFill = ActiveShape.Fill.Fountain

fFill.Colors.Add CreateRGBColor(0, 102, 0), 33
```

You can move a color in a fountain fill by using the **FountainColor.Move** method. The following VBA code moves the green color from the previous example to a position that is 60% of the way from the red (that is, more towards the yellow):

```
ActiveShape.Fill.Fountain.Colors(1).Move 60
```

You can use the **FountainColors.Count** property to determine the number of colors between the start color and end color of a fountain fill. (For the preceding example, this value is 1.) The first color in the collection is that start color, and its index number is **0**; this color cannot be moved, but its color can be changed. The last color in the collection is the end color, and its index number is **(Count + 1)**; this color cannot be moved, but its color can be changed. The following VBA code changes the end color from yellow to blue:

```
Dim cols As FountainColors

Set cols = ActiveShape.Fill.Fountain.Colors

cols(cols.Count + 1).Color.RGBAssign 0, 0, 102
```

You can remove the fountain fill from a shape by using the **Fill.ApplyNoFill** method.

Applying pattern fills

Pattern fills display a series of repeating vector objects or bitmap images. A pattern fill is represented by the **Fill.Pattern** property as a **PatternFill** object, which specifies the various properties for the pattern fill: foreground color, background color, tile offset, and so on.

The collection of available pattern fills is stored in the **PatternCanvases** collection.

You can apply a pattern fill to a shape by using the **Fill.ApplyPatternFill** method.

You can remove the pattern fill from a shape by using the **Fill.ApplyNoFill** method.

Applying texture fills

Texture fills are fractally generated and fill a shape with one image rather than a series of repeating images. A texture fill is represented by the **Fill.Texture** property as a **TextureFill** object, which specifies the various properties for the texture fill: origin, resolution, tile offset, and so on.

The properties for a texture fill are stored in a **TextureFillProperties** collection.

You can apply a texture fill to a shape by using the **Fill.ApplyTextureFill** method.

You can remove the texture fill from a shape by using the **Fill.ApplyNoFill** method.

Applying PostScript fills

PostScript fills are texture fills that are designed by using the PostScript language. A PostScript fill is represented by the **Fill.PostScript** property as a **PostScriptFill** object, which specifies the various properties for the PostScript fill.

You can apply a PostScript fill to a shape by using the **Fill.ApplyPostScriptFill** method.

You can remove the PostScript fill from a shape by using the **Fill.ApplyNoFill** method.

Applying hatch fills

Hatch fills are composed of vector-based lines and can be used to clearly distinguish the materials or object relationships in a drawing. A hatch fill is represented by the **Fill.Hatch** property as a **HatchFill** object, which specifies the various properties for the hatch fill.

The collection of available hatch-fill patterns is stored in the **HatchPatterns** collection, and each document stores its own library of hatch-fill patterns in a **HatchLibraries** collection.

You can apply a hatch fill to a shape by using the **Fill.ApplyHatchFill** method.

You can remove the hatch fill from a shape by using the **Fill.ApplyNoFill** method.

Applying outlines

You can use the various properties and methods of the **Outline** class to define the outline of a shape.

The **Outline.Type** property uses the following constants of the **cdrOutlineType** enumeration to record whether the specified shape has an outline:

- **cdrOutline** — indicates that the shape has an outline
- **cdrNoOutline** — indicates that the shape does not have an outline

If a shape has no outline, setting its **Outline.Type** property to **cdrOutline** applies the document-default outline style.

If a shape has an outline, setting its **Outline.Type** property to **cdrNoOutline** removes that outline.

The **Outline.Width** property for an outline sets its width in document units. In the following VBA example, the outline of the selected shapes is set to 1 millimeter:

```
ActiveDocument.Unit = cdrMillimeter

ActiveSelection.Outline.Width = 1
```

If a shape does not have an outline, its **Outline.Width** value is **0**. Changing this value applies an outline and automatically changes the value for the **Outline.Type** property from **cdrNoOutline** to **cdrOutline**.

Similarly, if a shape has an outline, its **Outline.Width** value is greater than **0**. Changing this value to **0** removes the outline and automatically changes the value for the **Outline.Type** property from **cdrOutline** to **cdrNoOutline**.

The **Outline.Color** property for an outline defines its color, as in the following VBA example:

```
ActiveSelection.Outline.Color.GrayAssign 0 ' Set to black
```

Setting the color of an outline automatically sets the **Outline.Type** property of that outline to **cdrOutline** and applies the default outline width.

The **Outline.Style** property for an outline specifies the dash settings of that outline. These dash settings are defined by the following properties of the **OutlineStyle** class:

- **DashCount** — represents the number of pairs of dashes and gaps in an outline. This value ranges from **1** to **5**.
- **DashLength** — represents the length of each dash in an outline. This value is calculated as a multiple of the outline width, which is measured in document units. For example, if `DashLength(1)` is **5** and the outline is 0.2" wide, the length of the dash is 1"; however, if the width of the line is changed to 0.1", the length of the dash becomes 0.5".
- **GapLength** — represents the length ofeach gap in an outline. This value is calculated as a multiple of the outline width, which is measured in document units.
- **Index** — represents the index number of a predefined outline style in the **OutlineStyles** collection for the application. The **OutlineStyles** collection is customizable, so the index number that is associated with each outline style in the collection may vary from user to user; however, the expression `OutlineStyles.Item(0)` always specifies a solid line.

Outline objects have many other properties, including the following:

- **StartArrow** and **EndArrow** — specify the arrowhead on each end of an open curve
- **LineCaps** and **LineJoin** — respectively, specify the type of line caps (butt, round, or square) and line joins (bevel, miter, or round)
- **NibAngle** and **NibStretch** — specify the shape of the nib used to draw the outline
- **BehindFill** and **ScaleWithShape** — respectively, draw the outline behind the fill and scale the outline with the shape

Outline objects also have methods, including the following:

- **ConvertToObject** — converts the outline to an object
- **SetProperties** — sets most of the available outline properties in a single call

Working with color

The **Color** class defines the fill colors and outline colors that you apply to shapes. This class provides a number of properties and methods for working with color.

You can determine the color model of a color by accessing its **Color.Type** property, as in the following VBA example:

```
Dim colType As cdrColorType

colType = ActiveShape.Outline.Color.Type
```

The **Color.Type** property is defined by the **cdrColorType** enumeration, which provides the following constants (among many others) for supported color models:

- **cdrColorCMYK** — specifies the CMYK color model
- **cdrColorRGB** — specifies the RGB color model
- **cdrColorGray** — specifies the grayscale color model

The color components for each supported color model are defined by additional properties of the **Color** class, as demostrated by the following VBA examples:

- CMYK color model — is defined by the **Color.CMYKCyan**, **Color.CMYKMagenta**, **Color.CMYKYellow**, and **Color.CMYKBlack** properties
- RGB color model — is defined by the **Color.RGBRed**, **Color.RGBGreen**, and **Color.RGBBlue** properties
- grayscale color model — is defined by the **Color.Gray** property

The range of values that is supported by a color component depends on the color model for that component.

To create a color, you can use the automation keyword **New**, as in `Dim col As New Color`.

To assign a color model to a new color, you can use the desired **...Assign** method (such as **Color.CMYKAssign**, **Color.RGBAssign**, or **Color.GrayAssign**). Each of these methods provides one parameter for each color component in its respective color model. For example, `col.RGBAssign 0, 0, 102` assigns a deep-blue RGB color to the new color that was created in the previous tip.

To use the application's color-management settings to change the color model that is assigned to a color, you can use the desired **ConvertTo...** method (such as **Color.ConvertToCMYK**, **Color.ConvertToRGB**, or **Color.ConvertToGray**). For example, `ActiveShape.Fill.UniformColor.ConvertToRGB` converts the fill of the active shape to the RGB color model.

You can copy the properties of one color to another color by using the **Color.CopyAssign** method, as in the following VBA example:

```
Dim sh As Shape

Set sh = ActiveShape

sh.Outline.Color.CopyAssign sh.Fill.UniformColor
```

The color "none" does not exist. To set a fill color or outline color to "none," you must instead set the fill type or outline type to "none."

Applying effects to shapes

The object model provides a number of methods for applying effects to shapes. For information on these methods, see the following subtopics:

- "Applying blends" on page 136
- "Applying contours" on page 136
- "Applying customized effects" on page 136
- "Applying distortions" on page 137

- “Applying drop shadows” on page 137
- “Applying envelopes” on page 137
- “Applying extrusions” on page 137
- “Applying lenses” on page 137
- “Applying perspective” on page 138

Applying an effect returns an **Effect** object, which lets you access various properties and methods for the created effect. For example, you can use the **Effect.Separate** method to separate the shapes that are generated by an effect from the shape to which that effect is applied. In addition, you can use the **Effect.Clear** method to remove an effect from a shape.

Applying blends

The **Shape.CreateBlend** method creates a blend between the current shape and the shape that is specified as a parameter. This method provides optional parameters for various blend settings, such as the acceleration of the blend and the path along which the blend is created.

The following VBA code creates a basic ten-step blend:

```
Dim sh As Shapes, eff As Effect

Set sh = ActiveSelection.Shapes

Set eff = sh(1).CreateBlend(sh(2), 10)
```

In the preceding example, the number of shapes in the blend is twelve: the start and end shapes, plus the ten blend steps that are created.

The **Shape.CreateBlend** method returns an **Effect** object, the **Effect.Blend** property for which you can use to modify the created blend.

Applying contours

The **Shape.CreateContour** method applies a contour to a shape. This method provides optional parameters for various contour settings, such as the colors and acceleration of the contour.

The following VBA code creates a three-step contour at a five-millimeter spacing:

```
Dim eff As Effect

ActiveDocument.Unit = cdrMillimeter

Set eff = ActiveShape.CreateContour(cdrContourOutside, 5, 3)
```

The **Shape.CreateContour** method returns an **Effect** object, the **Effect.Contour** property for which you can use to modify the created contour.

Applying customized effects

The **Shape.CreateCustomEffect** method applies a customized effect to a shape. This method provides parameters for various effect settings.

The **Shape.CreateCustomEffect** method returns an **Effect** object, the **Effect.Custom** property for which you can use to modify the created effect.

Applying distortions

The following methods apply a distortion to a shape:

- **Shape.CreatePushPullDistortion** — applies a Push-and-pull distortion
- **Shape.CreateTwisterDistortion** — applies a Twister distortion
- **Shape.CreateZipperDistortion** — applies a Zipper distortion
- **Shape.CreateCustomDistortion** — applies a customized distortion

These methods provide parameters for various distortion settings.

The distortion-creation methods return an **Effect** object, the **Effect.Distortion** property for which you can use to modify the created distortion.

If you want, you can use event handlers to respond to events that are triggered by distorting a shape:

- **Document.ShapeDistort**

Applying drop shadows

The **Shape.CreateDropShadow** method applies a drop shadow to a shape. This method provides optional parameters for various drop-shadow settings, such as the feathering and offset of the drop shadow.

The **Shape.CreateDropShadow** method returns an **Effect** object, the **Effect.DropShadow** property for which you can use to modify the created drop shadow.

Applying envelopes

The following methods apply an envelope to a shape:

- **Shape.CreateEnvelope** — applies a basic envelope
- **Shape.CreateEnvelopeFromCurve** — applies an envelope by using the specified curve as a template
- **Shape.CreateEnvelopeFromShape** — applies an envelope by using the specified shape as a template

These methods provide parameters for various envelope settings.

The envelope-creation methods return an **Effect** object, the **Effect.Envelope** property for which you can use to modify the created envelope.

Applying extrusions

The **Shape.CreateExtrude** method applies an extrusion to a shape. This method provides optional parameters for various extrusion settings, such as the angle and color of the extrusion.

The **Shape.CreateExtrude** method returns an **Effect** object, the **Effect.Extrude** property for which you can use to modify the created extrusion.

Applying lenses

The **Shape.CreateLens** method applies a lens to a shape. This method provides optional parameters for various lens settings, such as the color and magnitude of the lens.

The **Shape.CreateLens** method returns an **Effect** object, the **Effect.Lens** property for which you can use to modify the created lens.

Applying perspective

The **Shape.CreatePerspective** method applies perspective to a shape. This method provides optional parameters for specifying horizontal and vertical vanishing points.

The **Shape.CreatePerspective** method returns an **Effect** object, the **Effect.Perspective** property for which you can use to modify the created perspective effect.

Searching for shapes

In your macros, you can include queries that search for shapes that have specific shape properties, fill properties, outline properties, or color properties. To do this, you use Corel Query Language (CQL) in conjunction with one of the following methods:

- **Shape.Evaluate** — returns the result of a given expression that evaluates the properties of the current shape
- **Shapes.FindShape** — returns a single shape that has the specified properties
- **Shapes.FindShapes** — returns, as a shape range, all shapes that have the specified properties

You can specify the shape properties for which to search. For example, the expression `ActiveShape.Evaluate("@name")` searches searches the **Name** property of all selected shapes.

Consider the following VBA code sample, in which the **Type** property and the **Width** property are used to select all rectangles that are wider than two inches:

```
ActivePage.Shapes.FindShapes(Query := "@type = 'rectangle' and _

@width > {2 in}").CreateSelection
```

For comprehensive information on using CQL, see “Including queries in macros” in the Macros Help file for the application.

Deleting shapes

If you want, you can use event handlers to respond to events that are triggered by deleting a shape:

- **Document.ShapeDelete**

Working with import filters and export filters

As previously discussed, methods are available for importing files (see “Importing files into layers” on page 100) and exporting files (see “Exporting files from documents” on page 86).

These file-import and file-export methods can also be used for performing batch conversions or modifying file repositories.

The wide selection of supported file formats is due to the vast number of filters that are available to the application. Each filter lets you work with the files from another graphics application.

In this topic

To learn more about working with filters, see the following subtopics:

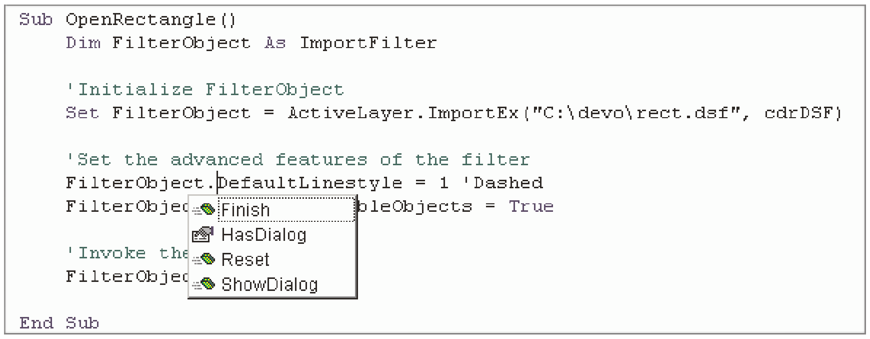
- "Working with import filters" on page 139
- "Working with export filters" on page 141

Working with import filters

To ensure the portability of a file-import script, you must use the default **ImportFilter** object (rather than the filter-specific object **DSFImport**), as in the following VBA example:

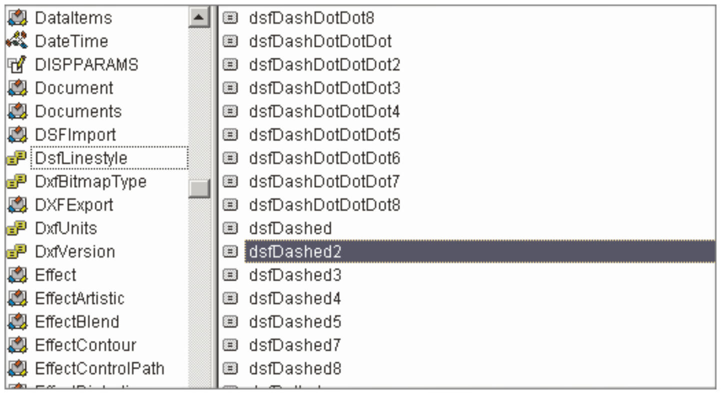
```
Sub OpenRectangle()

    Dim FilterObject As ImportFilter

    'Initialize FilterObject

    Set FilterObject = ActiveLayer.ImportEx("C:\devo\rect.dsf", _

cdrDSF)

    'Set the advanced features of the filter

    FilterObject.DefaultLinestyle = 1 'Dashed

    FilterObject.DeleteInvisibleObjects = True

    'Invoke the filter

    FilterObject.Finish

End Sub
```

For best results, use the filter-specific object **DSFImport** only to learn the specific interfaces that are supported by a filter. For example, the following screenshot demonstrates that the **ImportFilter** object exposes only generic interfaces in Microsoft® IntelliSense® because the **ImportFilter** interface is generic (and not filter-specific). The **ImportFilter** object does not contain the **DefaultLinestyle** and **DeleteInvisibleObjects** properties; however, you can still set these properties in the **ImportFilter** interface if they are supported by the specified import filter.



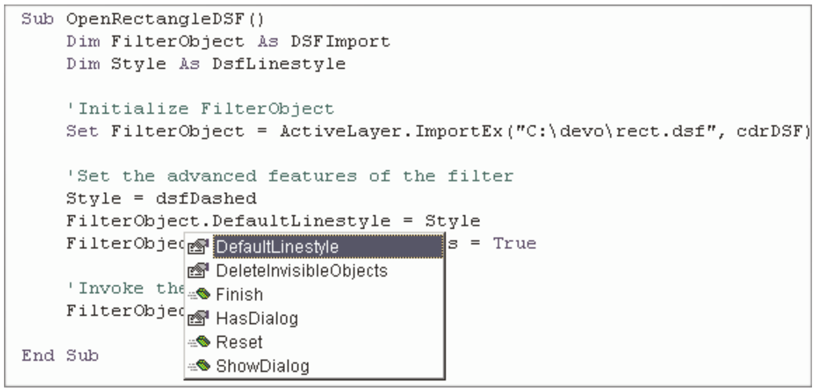
```
Sub OpenRectangle()
    Dim FilterObject As ImportFilter

    'Initialize FilterObject
    Set FilterObject = ActiveLayer.ImportEx("C:\devo\rect.dsf", cdrDSF)

    'Set the advanced features of the filter
    FilterObject.DefaultLinestyle = 1 'Dashed
    FilterObjec          bleObjects = True

    'Invoke the
    FilterObjec

End Sub
```

As previously discussed, using the **ImportFilter** object (rather than the filter-specific object **DSFImport**) ensures that a file-import script can be used on any other workstation running the same version of the application. To reference the properties, methods, and enumerations for a specific filter, locate that filter in the Object Browser. For example, the following screenshot demonstrates that the line-style **dsfDashed2** can be specified by assigning a value of 7 to the **DefaultLinestyle** property.



To access the object model for a filter, click **Tools ▸ References** from within the Macro Editor. In the **References** dialog box that appears, click **Browse**, and navigate to the **Filters** folder of the installed software. Select the dynamic-link library (DLL) file for the desired filter, and then click **OK**. When the **References** dialog box reappears, enable the checkbox that corresponds to the desired filter, and then click **OK**. You can now access the object model for the filter, as in the following VBA example:

```
Sub OpenRectangleDSF()

    Dim FilterObject As DSFImport

    Dim Style As DsfLinestyle

    'Initialize FilterObject

    Set FilterObject = ActiveLayer.ImportEx("C:\devo\rect.dsf", _

cdrDSF)

    'Set the advanced features of the filter

    Style = dsfDashed

    FilterObject.DefaultLinestyle = Style

    FilterObject.DeleteInvisibleObjects = True

    'Invoke the filter

    FilterObject.Finish

End Sub
```



```
Sub OpenRectangleDSF()
    Dim FilterObject As DSFImport
    Dim Style As DsfLinestyle

    'Initialize FilterObject
    Set FilterObject = ActiveLayer.ImportEx("C:\devo\rect.dsf", cdrDSF)

    'Set the advanced features of the filter
    Style = dsfDashed
    FilterObject.DefaultLinestyle = Style
    FilterObjec                        s = True

    'Invoke the
    FilterObjec

End Sub
```

Working with an import filter is made much easier by having the script access the object model for that filter; however, as discussed, this technique reduces the portability of the script. When used at another workstation, the script must first be updated with the correct location of the DLL file for the filter.

Working with export filters

The following VBA example demonstrates how to save a document as an AutoCAD DXF file by using an export filter:

```
Sub SaveRectangleDXF()

    Dim FilterObject As DXFExport

    Dim BitmapType As DxfBitmapType

    Dim TextAsCurves As Boolean

    Dim Units As DxfUnits

    Dim Version As DxfVersion

    'Initialize FilterObject

    Set FilterObject = ActiveDocument.ExportEx("C:\devo\rect.dxf", _

cdrDXF)

    'Set the advanced features of the filter

    BitmapType = dxfBitmapGIF

    FilterObject.BitmapType = BitmapType

    Units = dxfInches

    FilterObject.Units = Units

    TextAsCurves = False

    FilterObject.TextAsCurves = TextAsCurves
```

```
        Version = dxfVersion2000

        FilterObject.Version = Version

        'Invoke the filter

        FilterObject.Finish

    End Sub
```

In the preceding example, a call is made to **ActiveDocument.ExportEx** method, and the interface for the export filter (**DXFExport**) is invoked. However, you can use the generic export interface (**ExportFilter**) rather than the filter-specific interface (**DXFExport**), as in the following VBA example:

```
    Sub SaveRectangle()

        Dim FilterObject As ExportFilter

        'Initialize FilterObject

        Set FilterObject = ActiveDocument.ExportEx("C:\devo\rect.dxf", cdrDXF)

        'Set the advanced features of the filter

        FilterObject.BitmapType = 1 'GIF

        FilterObject.Units = 0 'Inches

        FilterObject.TextAsCurves = False

        FilterObject.Version = 1 'AutoCAD 2000

        'Invoke the filter

        FilterObject.Finish

    End Sub
```

The following VBA example demonstrates how to invoke the **Export** dialog box:

```
    Sub ShowExportDialog()

      Dim FilterObject As ExportFilter

      Dim vntReturn As Variant

      'Initialize FilterObject

      Set FilterObject = ActiveDocument.ExportEx("C:\devo\rect.dxf", cdrDXF)

      'If FilterObject supports a dialog, invoke it

      If (FilterObject.HasDialog = True) Then
```

```
        vntReturn = FilterObject.ShowDialog
        'Verify that the user clicked "OK" and not "Cancel"
        If (vntReturn = True) Then
          'Invoke the filter
          FilterObject.Finish
        End If
      End If
    End Sub
```

The preceding example requires you to check the return value of the dialog box, and to invoke the **Finish** method for when the user clicks **OK**.

Glossary

argument

See “**parameter**.”

array

A set of sequentially indexed **objects** of the same data type (or “array elements”)

Each array element has the same data type (although elements can have different values), and the entire array is stored contiguously in memory (with no gaps between elements). For example, you could have an array of integers or an array of characters or an array of anything that has a defined data type.

By default, array indexes are zero-based.

Arrays can have more than one dimension. A one-dimensional array is called a “vector,” while a two-dimensional array is called a “matrix.”

automation

The process of recording or scripting a **macro**

class

The definition of each **property**, **method**, and **event** that applies to a type of **object** in the application

class module

A type of **module** that contains the definition of an object-oriented Visual Basic **class**, including the definitions of the **properties** and **methods** for that class

collection

A group of **objects** that have similar characteristics and similar actions but that are uniquely identified by index names or **index numbers**

Collections are always plural. For example, **Documents** is a collection of **Document** objects.

constant

A value in an automation-programming structure that remains fixed while the **macro** is being executed

Unlike a **variable**, which temporarily stores a changing data value in a code procedure or code function, constant values do not change.

A constant is an instance of an **enumeration**.

dithering

The process of simulating **color** by putting dots of another color very close together

The Windows operating system uses dithering to display colors that the graphics adapter cannot display.

enumeration

Also called an “enumerated type,” a data type that lists all possible values for the **variables** that use it

Unlike a variable, which temporarily stores a changing data value, an enumeration stores fixed values.

A **constant** is an instance of an enumeration.

enumerated type

See “**enumeration**.”

event

An action that takes place in an **object** and that is recognized by a **form** or control

Each object within an **object model** is defined by a **property**, **method**, event, or a combination of each. An event is triggered by an action — such as a click, key press, or system timer — and you can write code that causes an object to respond to that event.

event-driven programming

A style of programming, unlike traditional procedural programming (in which the program starts at line 1 and executes line by line), that executes code in response to **events**

Visual Basic for Applications is an event-driven programming language. Most of the code you create is written to respond to an event.

Compare with “**object-oriented programming**.”

event handler

A **subroutine** that is programmed to cause the application to respond to a specific **event**

form

A type of **module** that is used for customized dialog boxes and user interfaces, and that includes the code to control them

function

A procedure that performs a given task in a **macro** and that can be used to return a value

A function procedure begins with a `Function` statement and ends with an `End Function` statement. In VBA and VSTA, functions do not need to be declared before being used, nor before being defined.

gap

A space between **dashes** in an outline style

global value

A value that applies to a given project in its entirety

GMS file

Also called a “project file” (and short for “Global Macro Storage file”), the location to which the Macro Editor stores all **modules** for a project

index number

A reference to an **object** in a **collection** that contains more than one object

An index number is used to identify each object in a collection. The index number can range from 1 to the number of available objects within the collection.

macro

A recorded or scripted set of tasks that can be repeatedly invoked within an application

A macro is a symbol, name, or key that represents a list of commands.

method

An operation that an **object** can have performed on itself

modal dialog box

A dialog box thatlocks the application and must be acted upon (that is, either submitted or cancelled) before the **macro** can be resumed

Most built-in dialog boxes that can be controlled by automation coding are modal.

modeless dialog box

A dialog box that does not lock the application and can be left open while the user continues working in the application

Modeless dialog boxes behave like dockers.

module

A container that is used by a **GMS file** for storing project components

Generic modules are used for general code and for **macros**. Other types of modules include **forms** and **class modules**.

object

When referring to an **object model**, an instance of a **class**

object model

A high-level structure of the relationship between the parent **objects** and child objects in an application

For example, the **Application** object represents the beginning of the object hierarchy. From the **Application** object, you can “drill down” and navigate through the object model until you find the desired object. To reference an object with Visual Basic code, you separate each level of the object hierarchy with the dot operator (**.**).

object-oriented programming

A style of programming that places emphasis on creating and using **objects**

Compare with "**event-driven programming**."

parameter

Synonymous with "argument," a value that is passed to a routine and that defines a characteristic of an **object** in the Visual Basic programming environment

Parameters are attributes that appear after a recorded command in the **Recorder** docker. For example, dialog-box options are not recorded as separate commands in the **Recorder** docker; they are recorded as attributes of the command that initially invoked the dialog box.

passing by reference

The act of passing an **argument** to a **function** or **subroutine** by using a reference to the original

By default, function **parameters** and subroutine parameters are passed by reference. To explicity indicate that you want to pass an argument by reference, prefix the argument with `ByRef`.

passing by value

The act of passing an **argument** to a **function** or **subroutine** by using a copy of the original

To explicity indicate that you want to pass an argument by value, prefix the argument with `ByVal`.

property

A characteristic of a **class**

Properties can be returned or set. In addition, properties can be designated as read-only (to indicate that they are fixed by the design of the class).

range

A series of similar **objects**

scope

The visibility of a data type, procedure, or **object**

shortcut object

A syntactic replacement for the longhand version of an **object**

String

A data type consisting of a sequence of contiguous characters that represent the characters themselves rather than their numeric values

A string can include letters, numbers, spaces, and punctuation. The `String` data type can store fixed-length strings ranging in length from 0 to approximately 63K characters and dynamic strings ranging in length from 0 to approximately 2 billion characters. The dollar sign (**$**) type-declaration character represents a string in Visual Basic.

sub

See “**subroutine**.”

subroutine

Sometimes called a “sub,” a procedure that performs a given task in a **macro** but cannot be used to return a value

A subroutine procedure begins with a `Sub` statement and ends with an `End Sub` statement. In VBA and VSTA, subroutines do not need to be declared before being used, nor before being defined.

variable

An item that can be created (or “declared”) for the purposes of storing data

The built-in data types are `Boolean`, `Double`, `Integer`, `Long`, `Single`, **String**, **Variant**, and several other less-used types including `Date`, `Decimal`, and `Object`. If a variable is not declared before being used, the compiler interprets it as a `Variant`.

Variant

The data type for all **variables** that are not declared as another type, such as `Dim`, `Private`, `Public`, or `Static`

The `Variant` data type has no type-declaration character.

VBA

A built-in programming language that can automate repetitive functions and create intelligent solutions in a software application

VBA is a subset of the Microsoft Visual Basic (VB) object-driven programming environment, but it is considered “for applications” because it is most often integrated into another application to customize the functionality of that application.

Visual Basic for Applications

See “**VBA**.”

Visual Studio Tools for Applications

See “**VSTA**.”

VSTA

The successor to **VBA**

VSTA is based on Microsoft Visual Studio 2008. The integrated development environment (IDE) for VSTA can be used to support two additional programming languages (Visual Basic .NET and C#) and to take advantage of the .NET framework natively.

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CorelDRAW® Graphics Suite X6 Macro Programming Guide

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