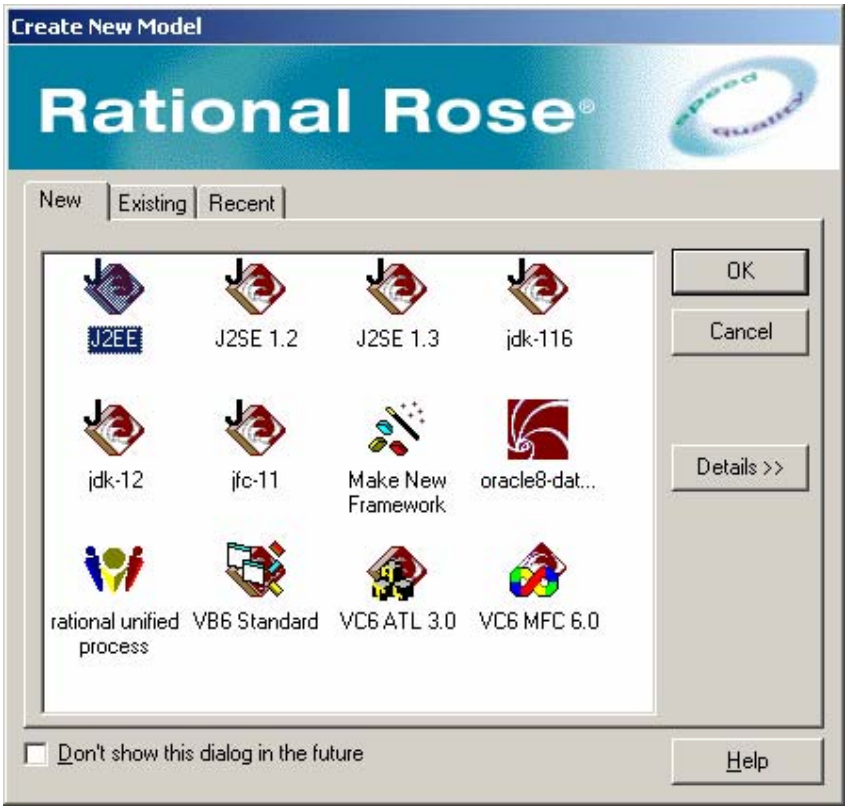
Rational Rose

1. Starting Rational Rose

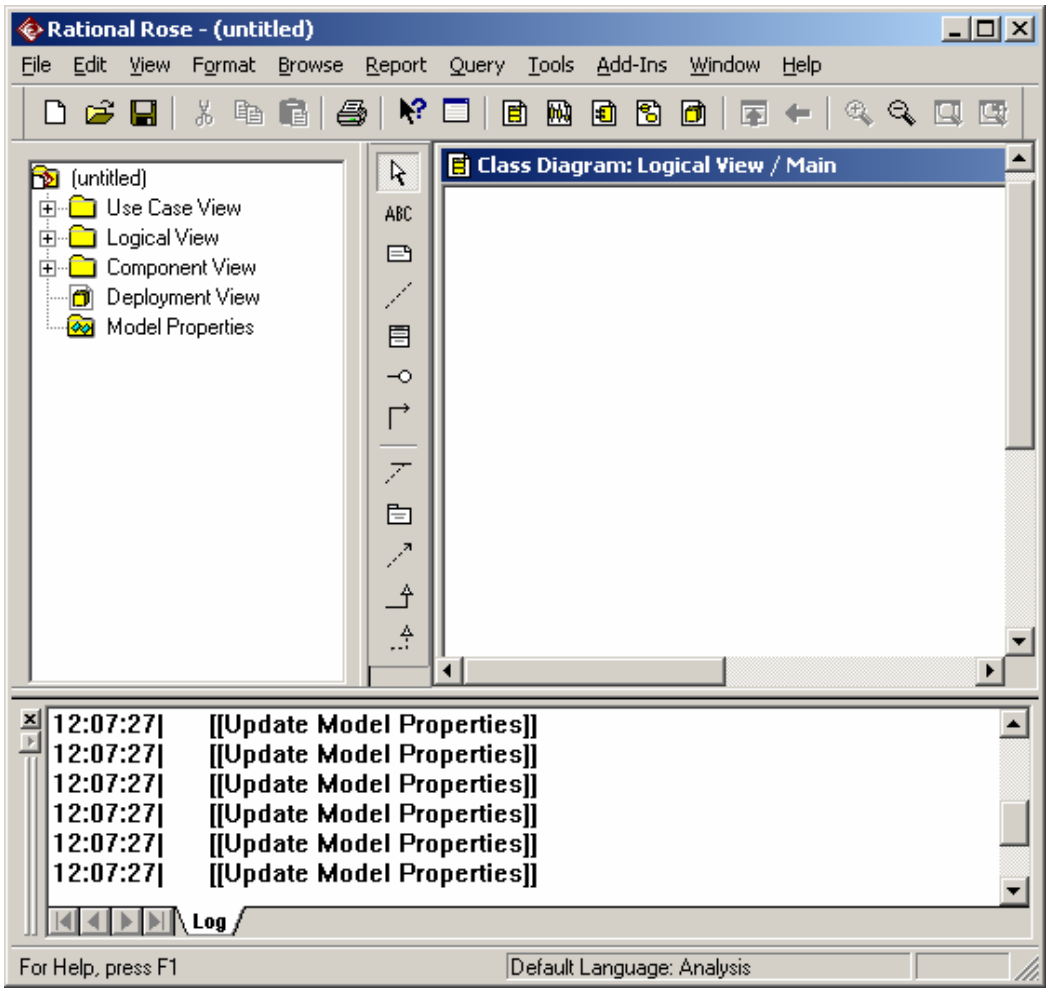
When Rational Rose starts up, the following screen is displayed.



Create a new model, using Rational Unified Process.

2. Creating a project Model in Rational Rose

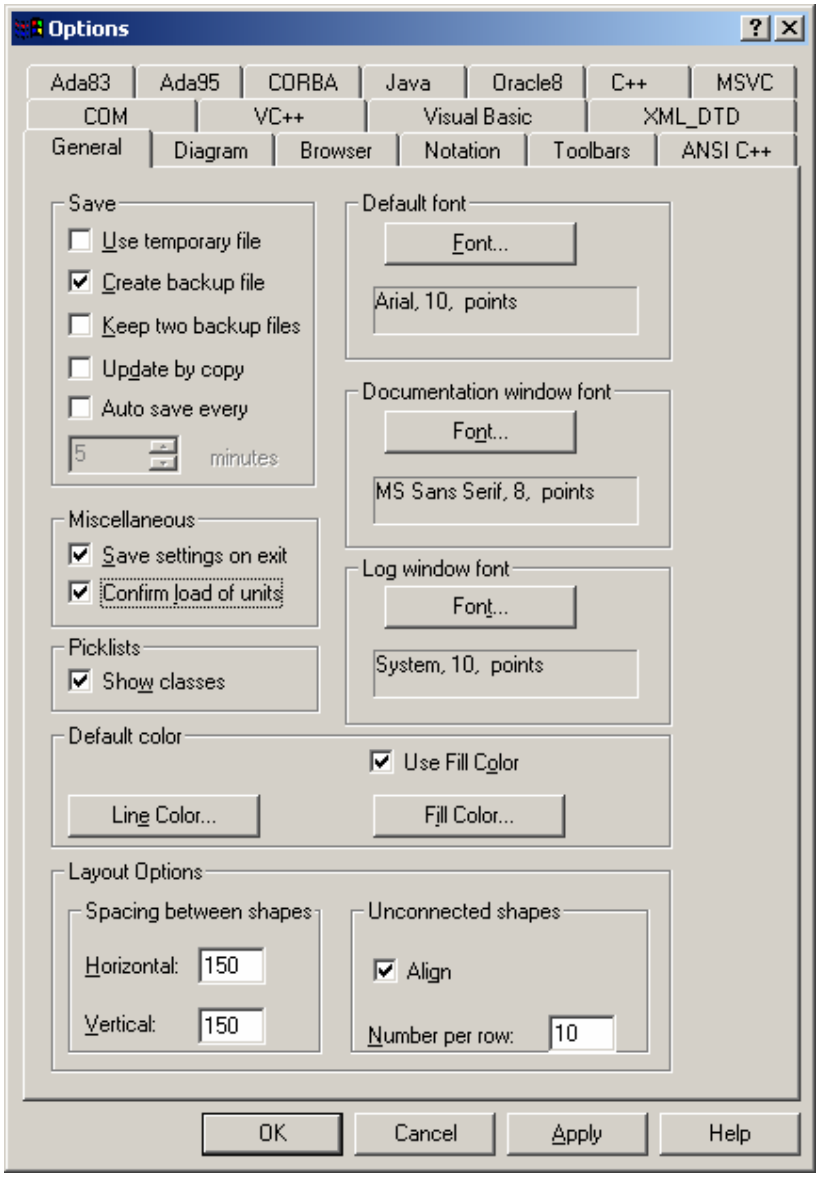
1. Start up Rational Rose Enterprise Edition.
2. Create a new model using the Rational Unified Process icon.
3. The window you will see will look something like this:



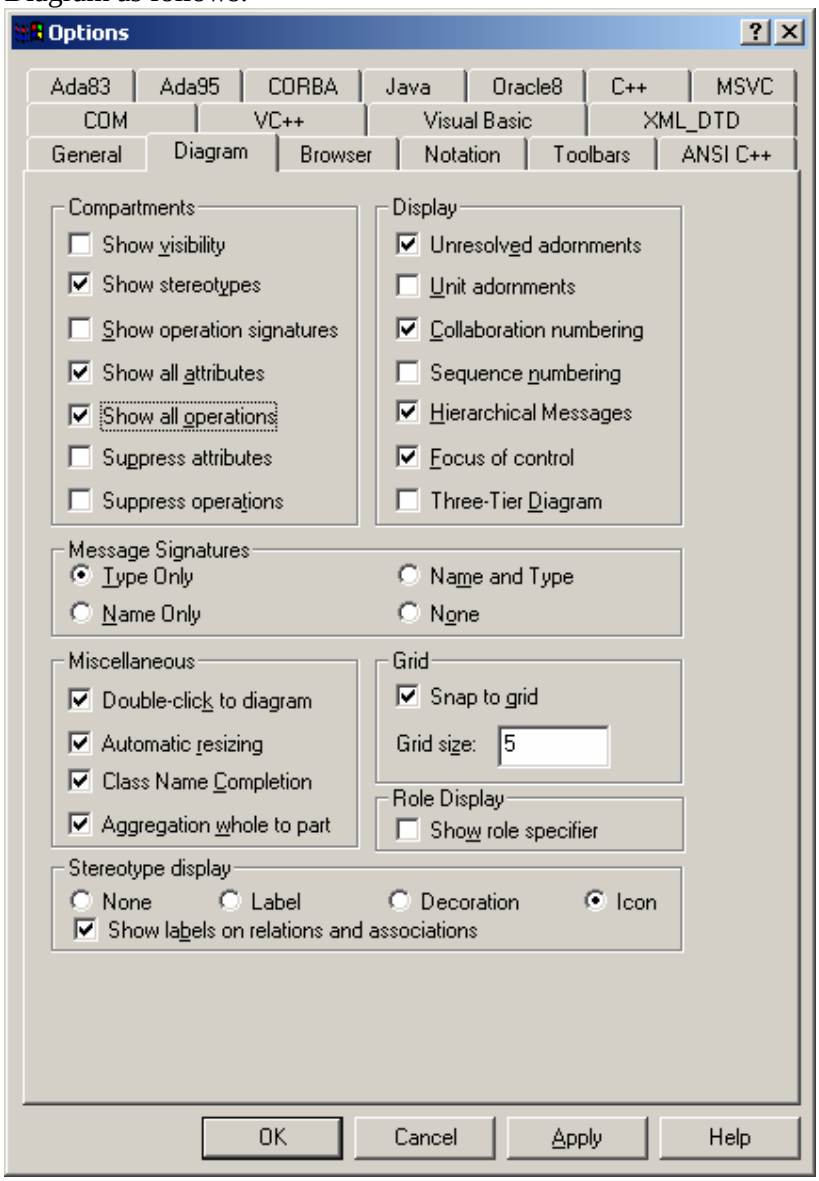
4. Using the View menu, turn off the log window. You will be left with the browser area on the left hand side, the application window, the standard toolbar and the diagram toolbox. This toolbox changes depending on which diagram you are drawing. The example shown is for a class diagram.

5. Configure the modelling tool, by double clicking Model Properties in the browser. Configure the tabs General, Diagram, Browser, Notation and Toolbars.

6. General, as follows

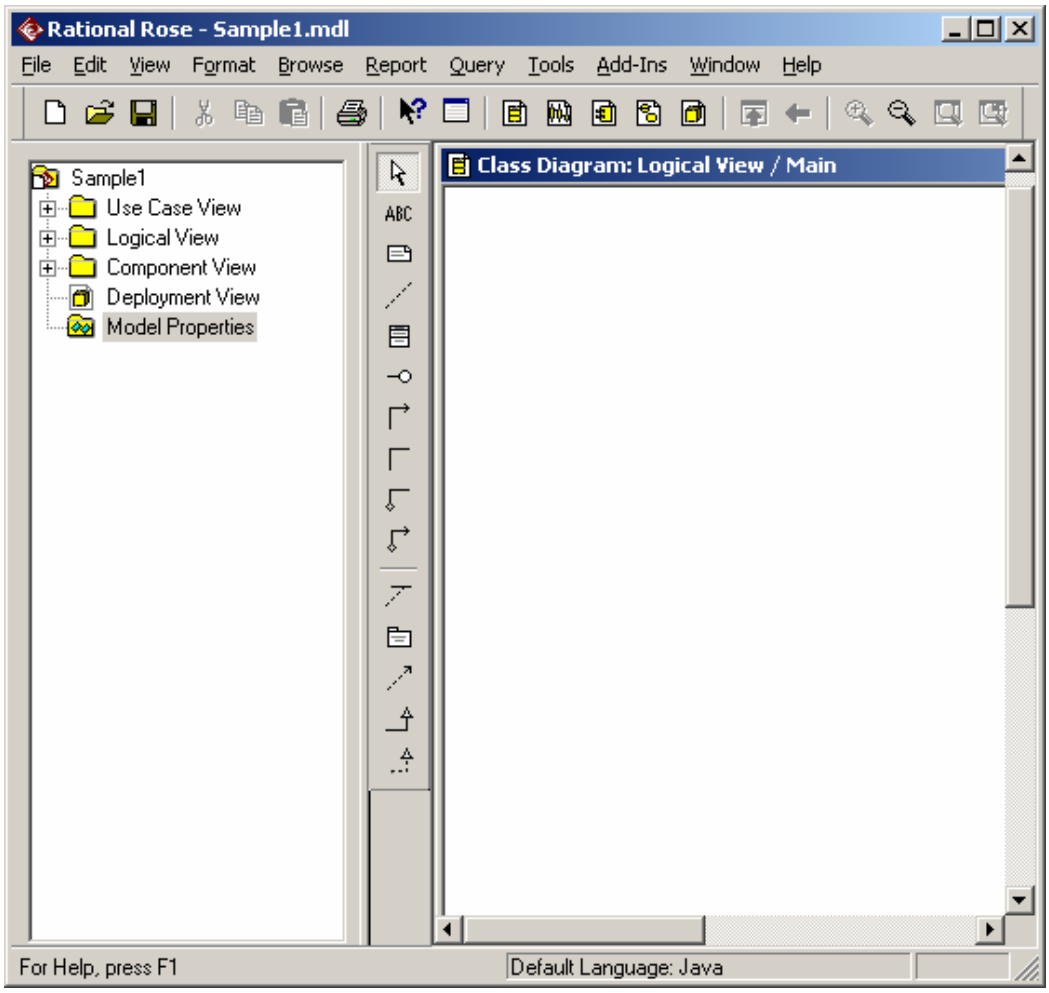


7. Diagram as follows:



8. Tick everything in the browser window and in the Notation window, use Unified notation, with a default language of Java. Leave other tick boxes blank.
9. In the toolbars tab, tick ‘Show standard toolbar’ and ‘Enable Docking’, ‘Show Diagram toolbar’ and ‘Enable docking’. Click the ‘…’ beside UML class diagram and add the following toolbar buttons to the current toolbar: ‘Creates an Association relationship’, ‘Creates an aggregation’ and ‘creates a unidirectional aggregation’. Click ‘close’ when all required buttons have been added.

10. Save your empty project model in a directory that is easily identifiable to you: e.g. F:/UML/Sample1. In future, this model will appear in the 'recent' tab when you go to open a model.



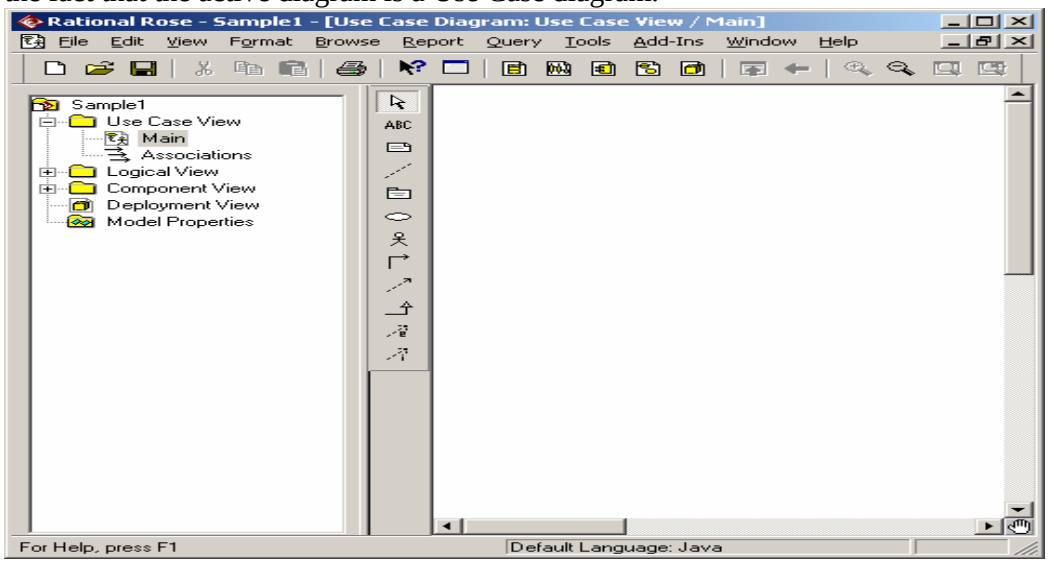
11. Close the model and the tool.

Top

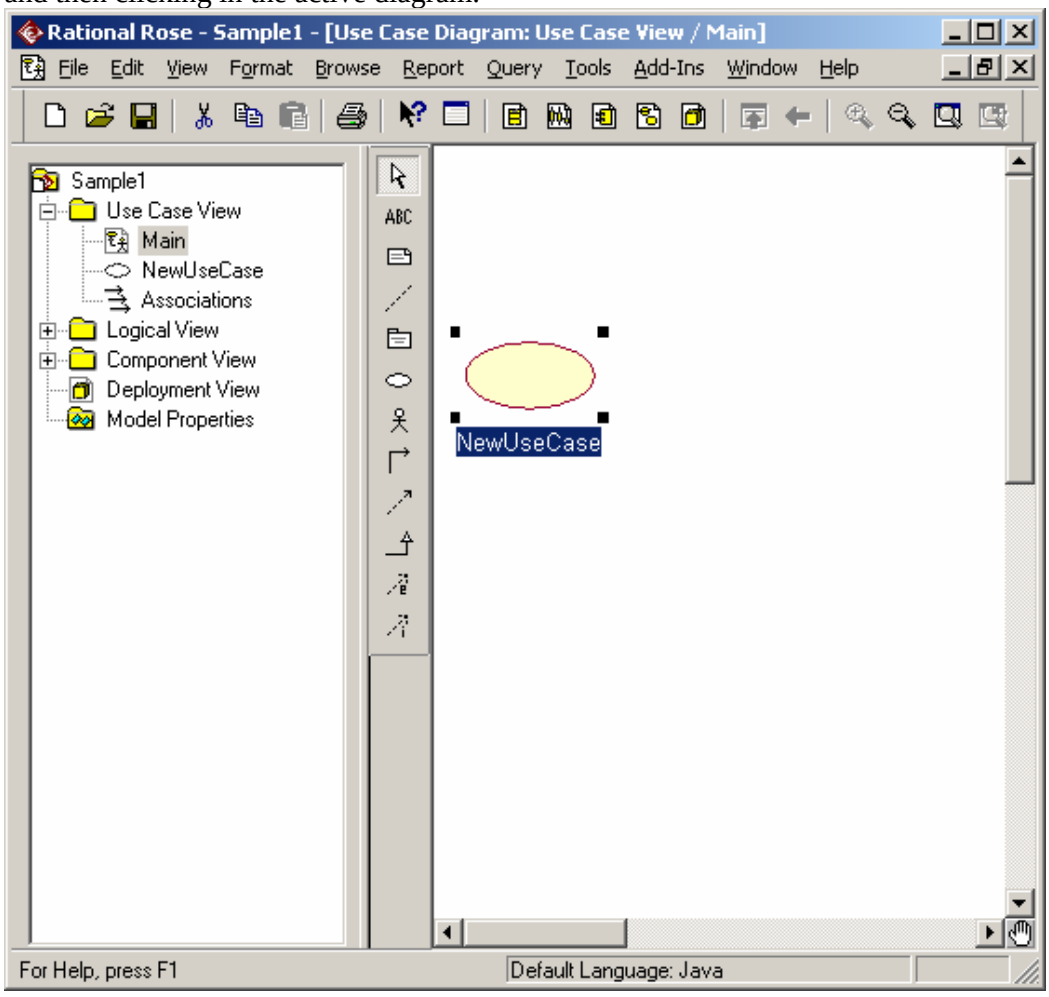
3. To set up a Use Case Diagram.

1. Open the model previously created by starting up Rational Rose Enterprise Edition, choosing Create New Model and clicking the Existing tab and selecting the model by name. If a class diagram is open in the application window, close it.
2. In the Browser window, select Use Case View. Double click on Main. This opens the main Use Case. Note that the diagram toolbar has changed to reflect

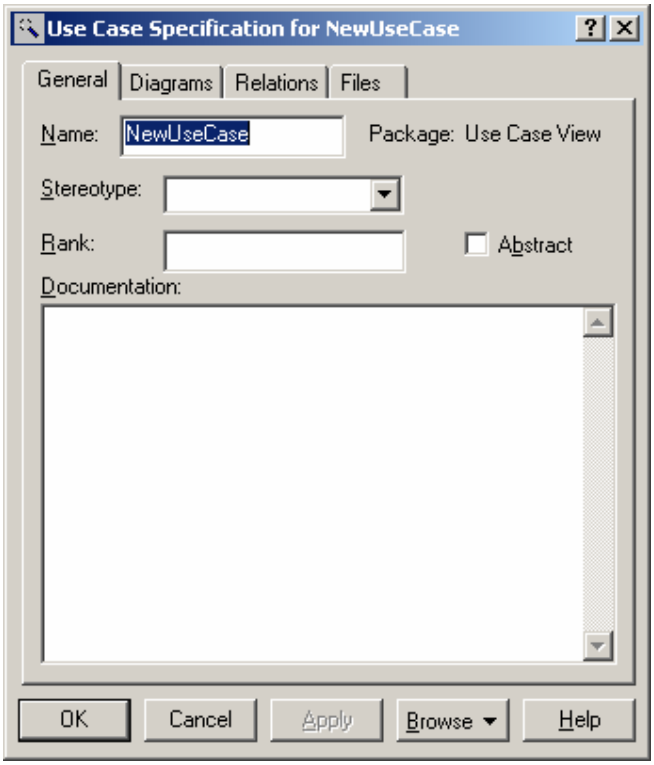
the fact that the active diagram is a Use Case diagram.



A Use Case can be added by clicking on the Use Case  icon on the toolbar and then clicking in the active diagram.



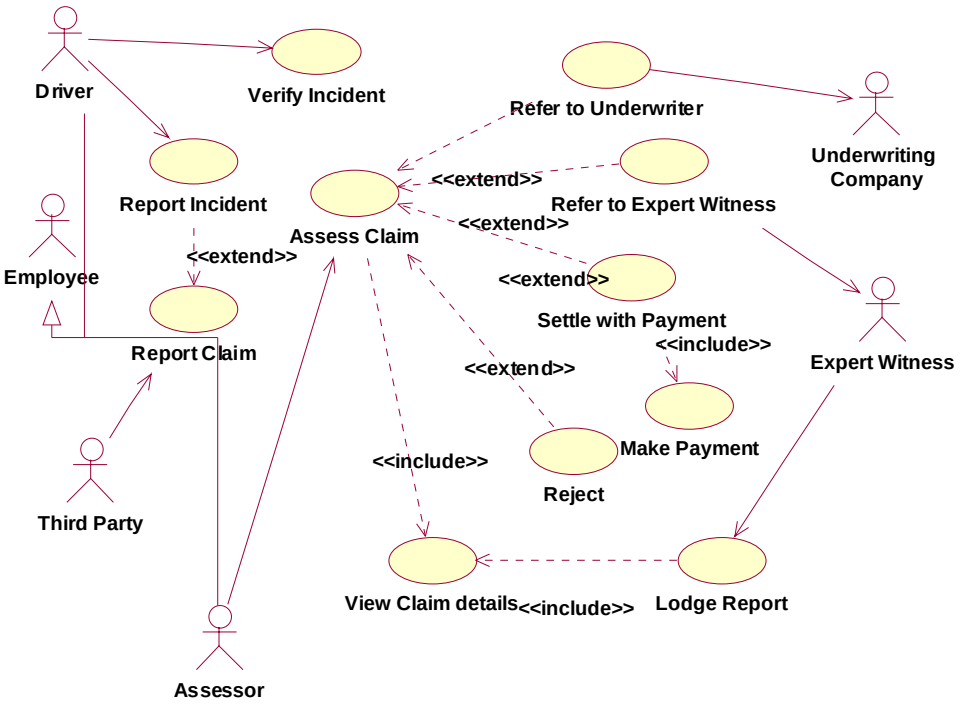
3. The Use Case can be renamed while it is highlighted in blue. To rename it later, right click the use case and choose the Specification from the menu:

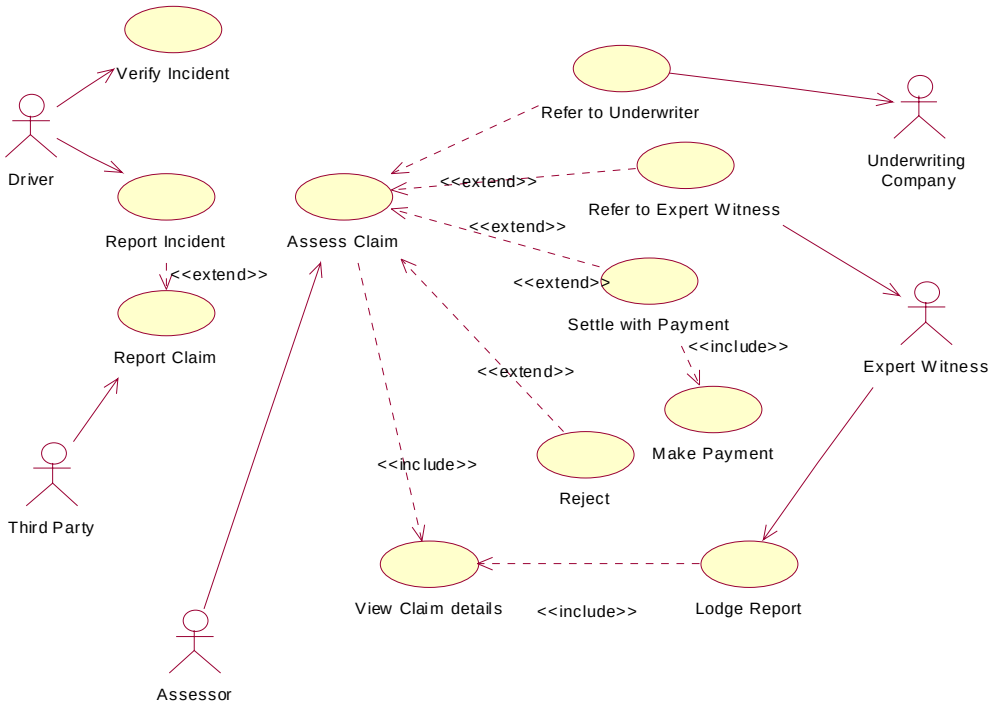


The use case can be renamed here.

4. Continue to add all necessary Use Cases to the diagram.
5. Add actors to the diagram by clicking on the Actor icon and clicking on the active diagram. As new actors are named, they appear in a list below any new actor that is represented on the diagram until such time as the new actor is named. This allows for the same actor to appear on a diagram twice. If the user decides to place the actor on the diagram twice, then (s)he will be prompted with the warning 'Newclass will be deleted from the model' Yes/No. WARNING: If you want to delete a duplicate icon from the model, be sure to use DEL – not Delete from Model. Delete from Model will remove all information on that actor / usecase/ class from the model.!!!
6. Use the 'Unidirectional Association' icon to draw the associations between actors and use cases.
7. Use the 'Extend Use Case' icon to extend a use case from another one**. If there is no button on the toolbar for this, right click on the toolbar and choose "customize…".** This will bring up the set of possible buttons. 'Extend Use Case' and 'Include Use Case' are about half way down the list. Add these to the toolbar and close the dialogue box.
8. Use the 'Include Use Case' to include the functionality of one use case in another.
9. Note that the items appear in the browser window when you insert them into the diagram.

10. If you wish to copy the diagram into Word, while the diagram is active, choose Edit from the standard toolbar and ‘Copy Active Diagram’. This will put the diagram into the paste buffer.
11. An actor can be a generalisation of another actor or actors.
12. The Font of the diagram can be changed by changing the ‘General’ tab in the model properties, or by using the ‘format’ menu from the toolbar.
13. If you want to name a Use Case and you have left it, you can select it, right click and choose ‘Open Specification’. Type over the current highlighted name.
14. When you ‘save’ it saves the entire model. If you want to add another diagram to this model, reopen the model.

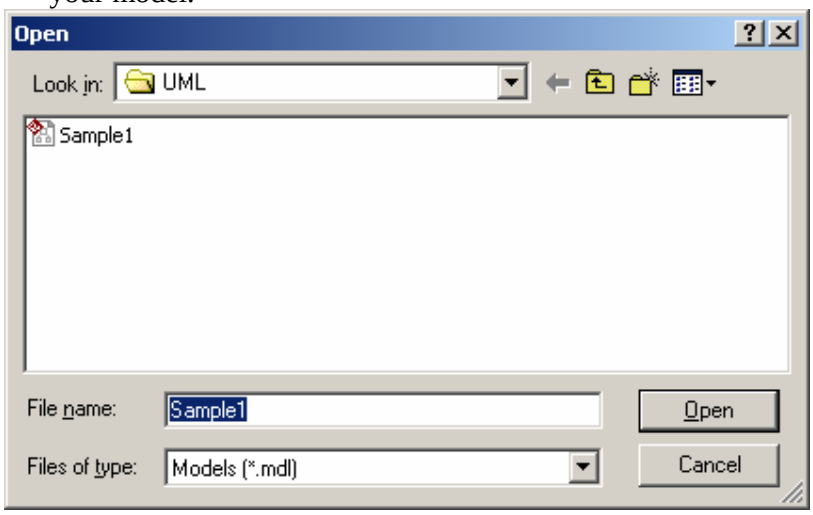




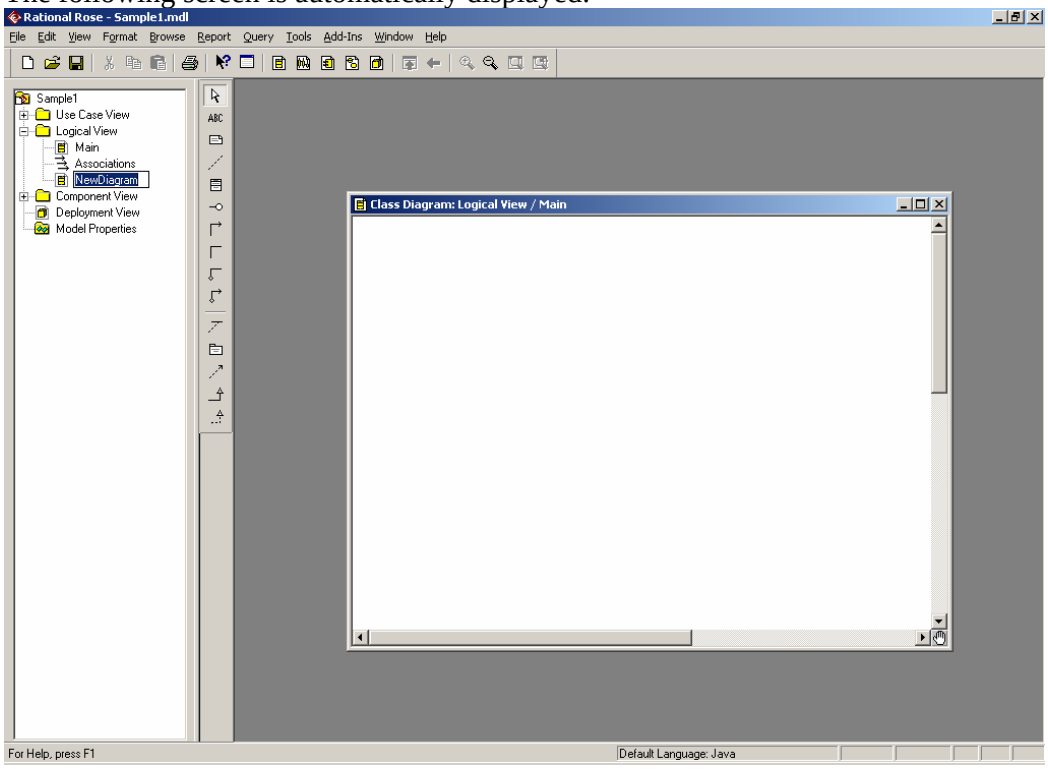
Top of the Document Use Case Diagram ActivityDiagram SequenceDiagram

4. Draw a Class Diagram in Rational Rose

1. Start up Rational Rose using the Start Menu, Rational Suite Development Studio and Rational Rose Enterprise Edition (with red diamond beside it).
2. Using the Create New Model dialogue box, click on the Recent tab. Your project may be there. Alternately, click on the existing tab and browse to find your model.



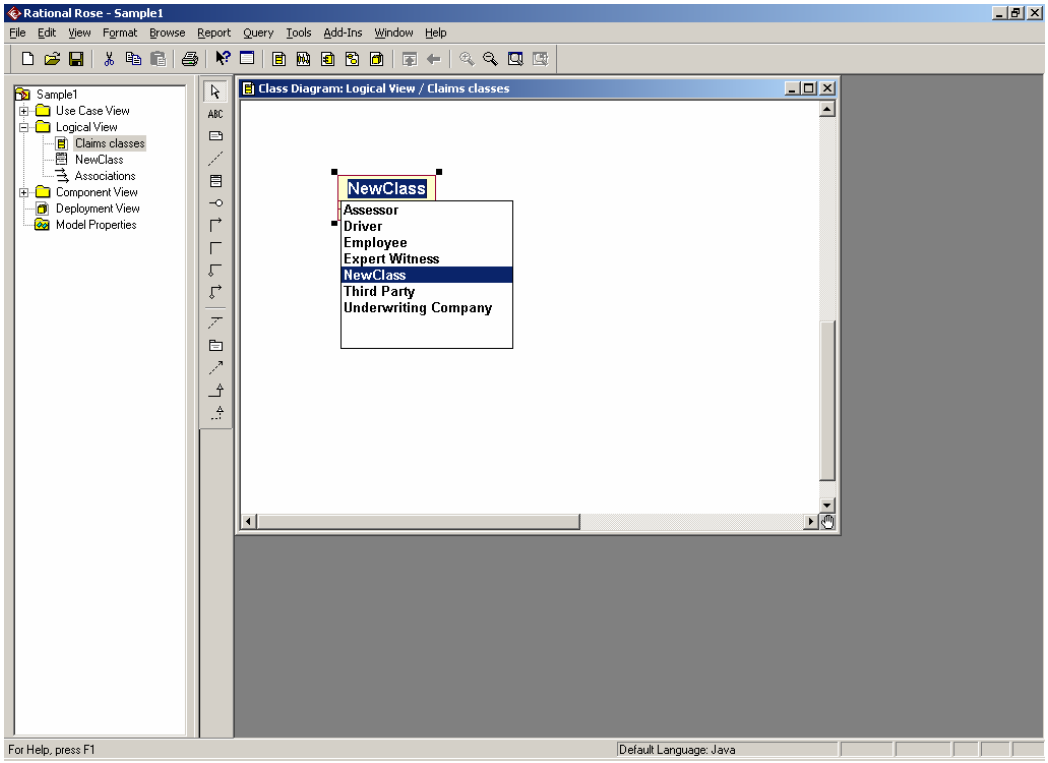
The following screen is automatically displayed:



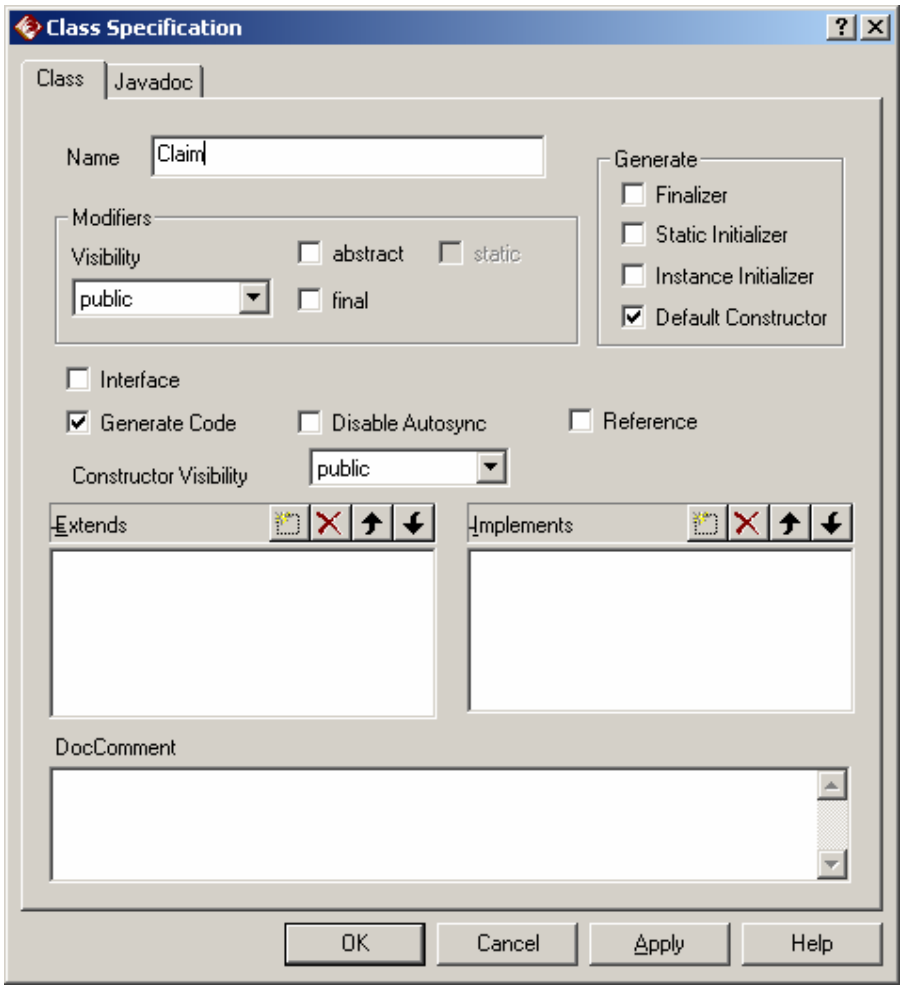
3. In the browser window, Click on the 'Logical View' folder, right click, click 'New' and 'Class Diagram' to create a new class diagram, naming it appropriately.

4. Open the new diagram by double-clicking its icon in the browser window.

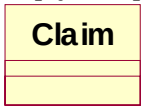
5. Move the cursor over the icons on the Diagram Toolbox area to see what their functions are. Use the class icon to create and place a class in the diagram.



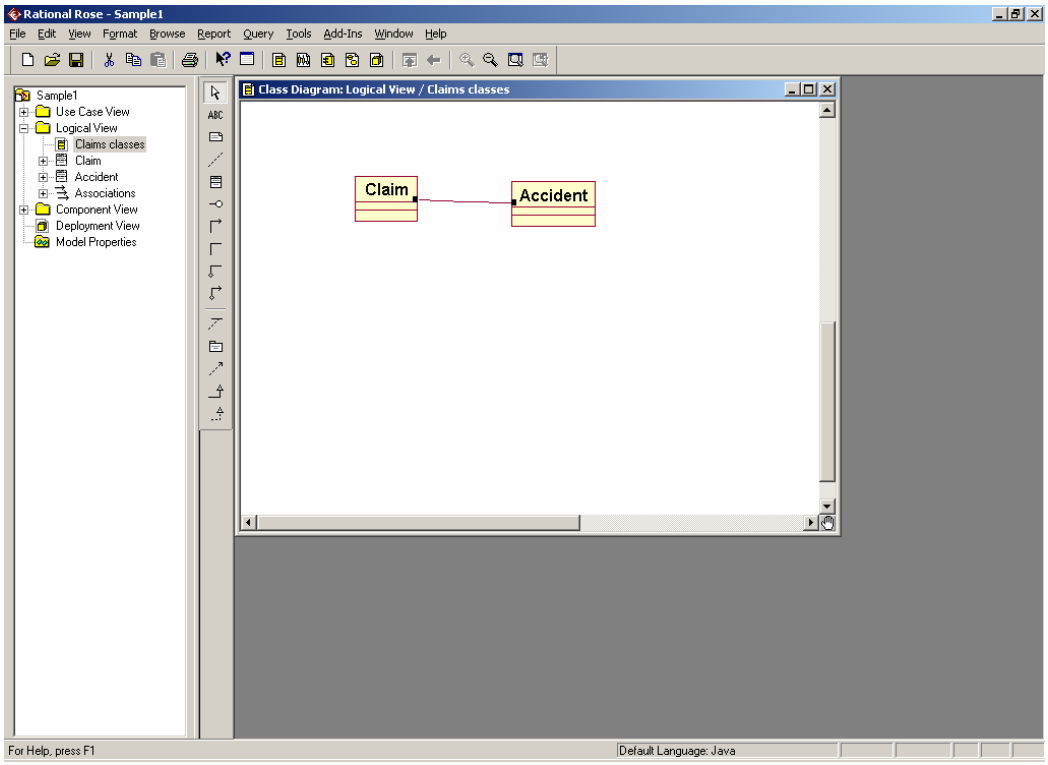
Note that the actors are included as possible labels for the class. Ignore these and replace the name NewClass with the name you want to put on the class. If you have omitted this step, you can rename it at any time by right-clicking on the class and choosing 'Open Specification' as follows:



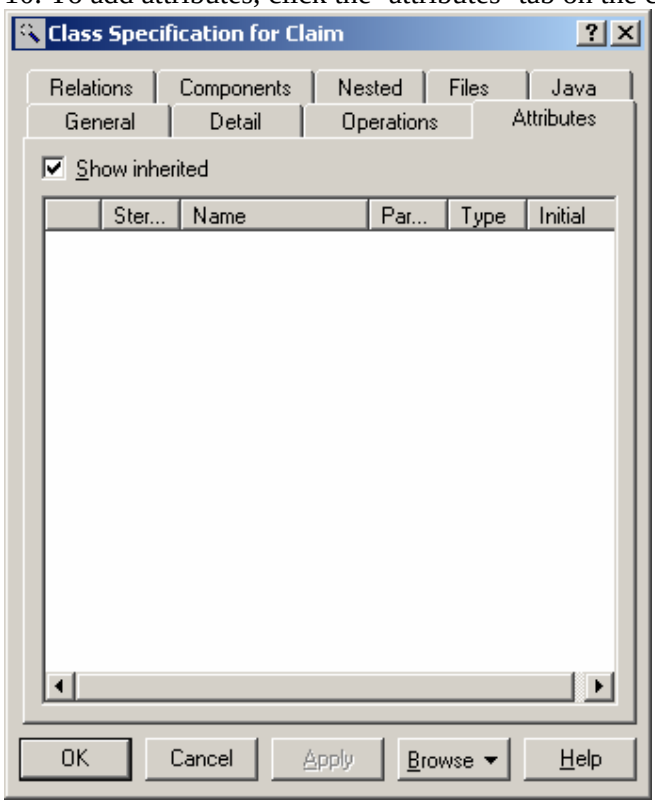
Leave all other boxes as they are for now. The class will be labelled, with two empty compartments below it:



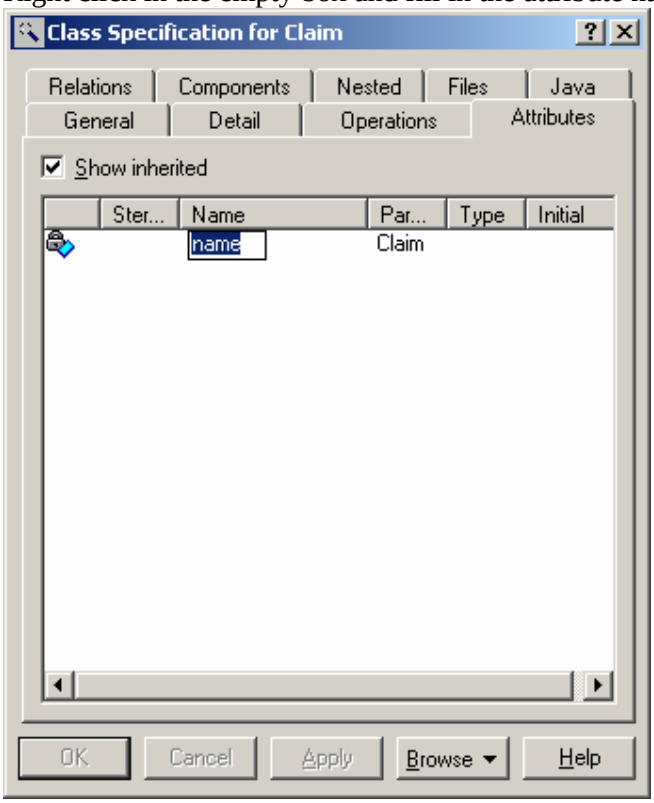
6. Create the rest of the classes from the diagram you have developed in tutorials.
7. You can modify the display format to display or suppress attributes or operations, or to show the signature of an operation.
8. When the classes are put in, you can add associations, using either the uni-directional  association or the bi-directional  association.



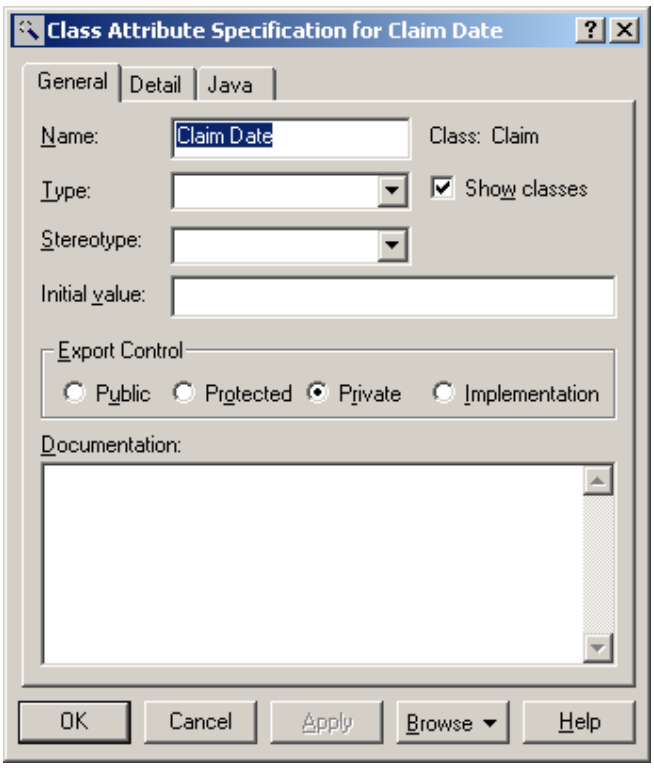
9. Right click on the association and ensure that ‘Stereotype label’, ‘Public’ and ‘Navigable’ are ticked. To specify the association further ‘Open standard specification’. You can add multiplicity and roles.
10. To add attributes, click the ‘attributes’ tab on the class specification.



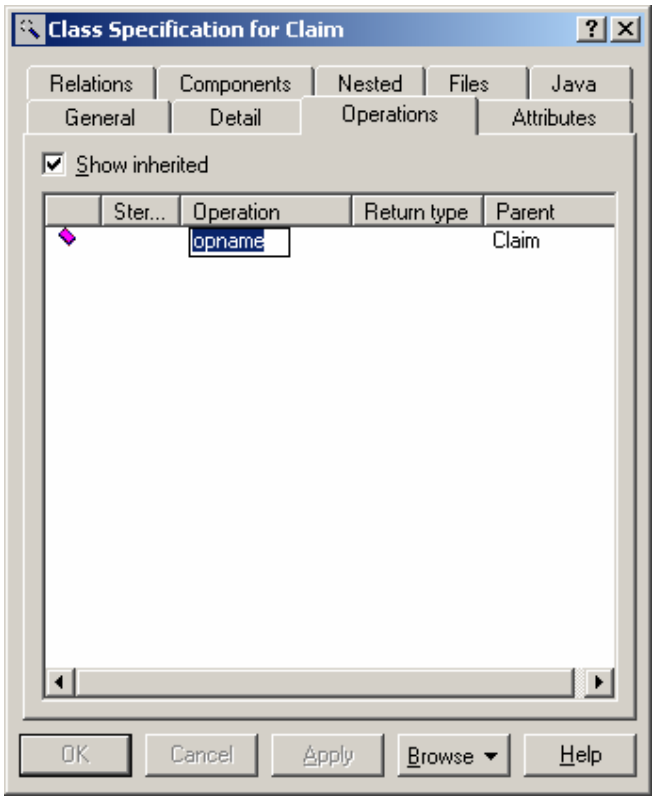
Right click in the empty box and fill in the attribute name



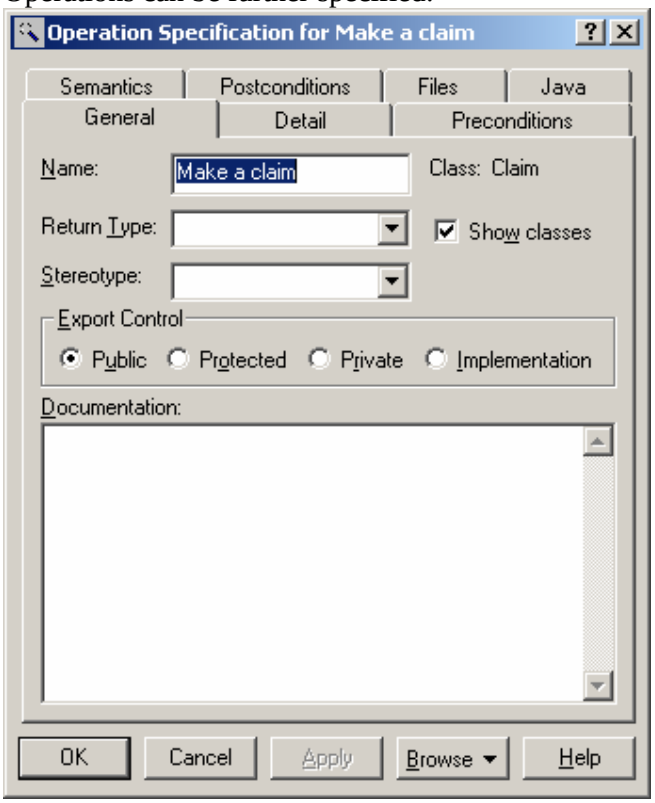
Double click on the attribute to add more detail:



Operations are added using the operations tab:



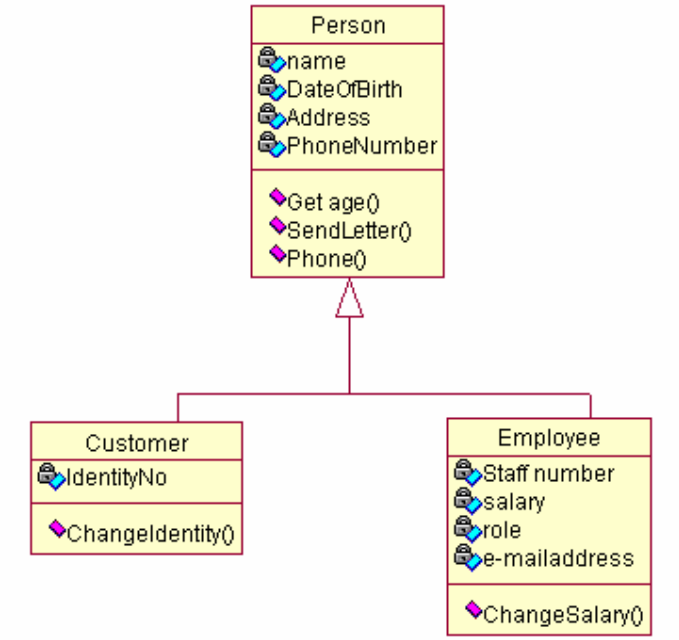
Operations can be further specified:



Adding other associations

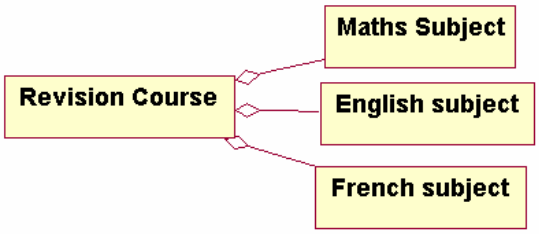
Generalisation

To add a generalisation, click on the Generalisation icon  . Start from the specialised class and draw towards the general class.



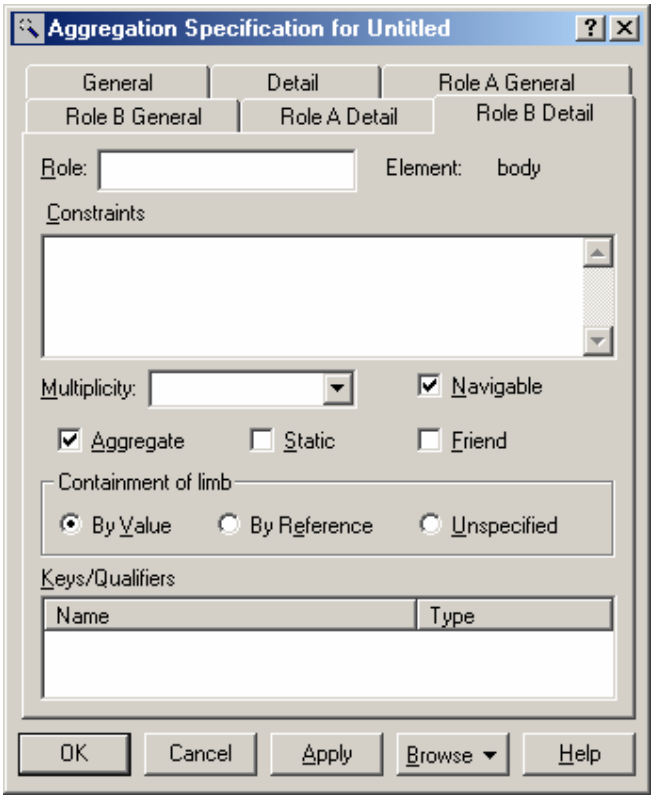
Aggregation

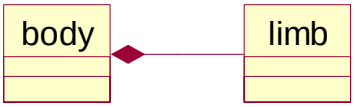
To create an aggregate relationship, either use the Aggregation icon  or right click on an association and click the aggregate tick box. Start at class A, where A is the containing class. Draw to class B, where B is the part class.



Composition

To create a composition relationship, add an aggregation. Open the Specification of the aggregation and choose Role B detail (If the aggregate tick box is not ticked, then choose Role A detail instead). Tick the 'containment' radio button to fill in the aggregate diamond.





11. When the model is saved, the diagram will be saved along with it.

Top of the Document Use Case Diagram ClassDiagram

5. Activity Diagram

If you are not already running Rational Rose, start it using the Start menu, Program Files, Rational Rose Enterprise Edition. Open the model from where you previously saved it. If you have not saved a model previously, read section 1.

Right click on the Use Case View and choose New and Activity diagram. The tools in the toolbar that you will need are:

 This is the start state, which signifies the start of the workflow.

 This is the end state, which signifies the end of the workflow.

 This is the transition between activities, activity and state, activity and decision, decision and activity or state and activity.

 This is the decision diamond.

 This is the activity.

 This is the state.

Use the lecture to explain how to draw the diagrams.

Top of the Document Use Case Diagram ClassDiagram ActivityDiagram

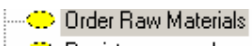
6. Sequence Diagram

When drawing a Sequence diagram, it is assumed that you have previously:-

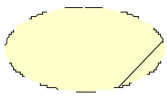
- Drawn a Use Case diagram in the Use Case View and populated it with actors and use cases.
- Set up (business) entity classes in the Logical View complete with attributes and operations.
- Set up boundary classes in the Logical View, complete with attributes and operations and any inherited classes.

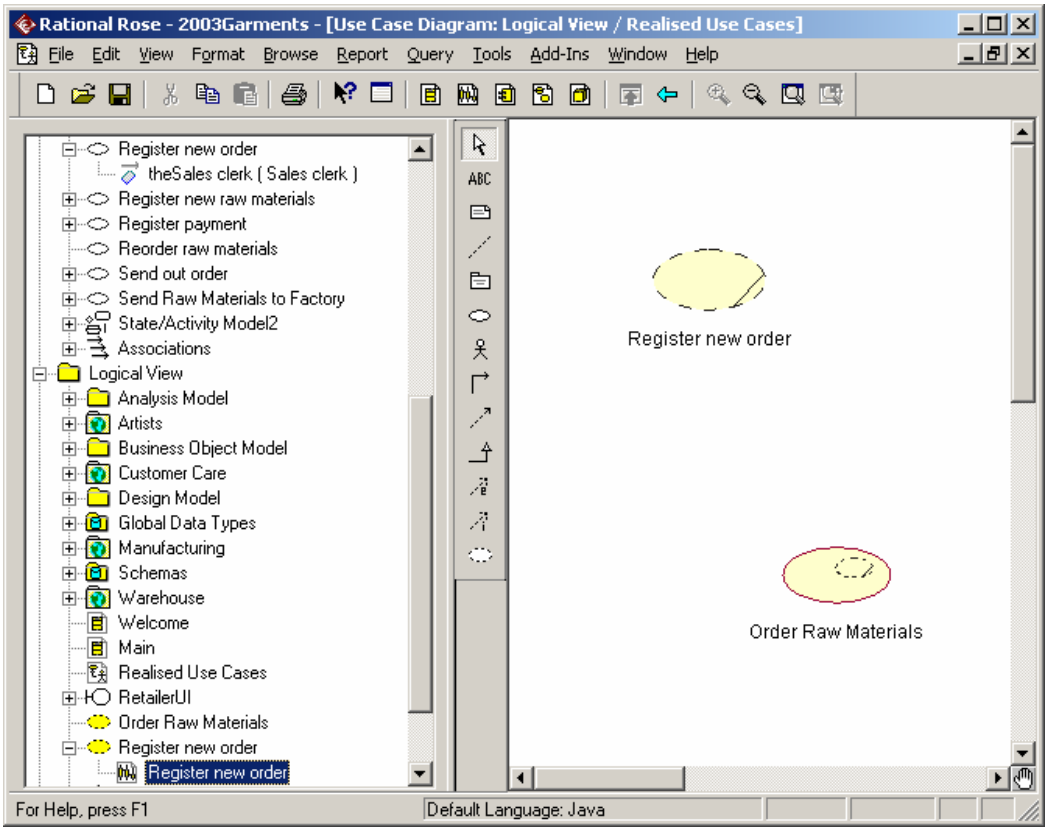
Before you draw a sequence diagram, you must have a realisation of the Use Case that you are representing. To create this, right click on Logical view in the browser and pick New Use Case Diagram

Call it 'Use Case Realisation'

Populate the new Use Case diagram with one Use case for each one from the Use Case view.  **USE THE ICON FROM THE TOOLBAR TO DO THIS**. If necessary, customise the toolbar to add this icon. It is called 'Creates a Use Case realisation'. Open the specification on the Use case, give it the same name as the one in the Use Case view and give it a stereotype of 'Use Case Realisation'. When this has been done, the realisations will come up in the diagram and in the logical view ***browser*** as dotted ovals. 

Right click on the dotted oval ***in the browser*** and choose 'New Sequence Diagram'. Give it the same name as the Use Case.



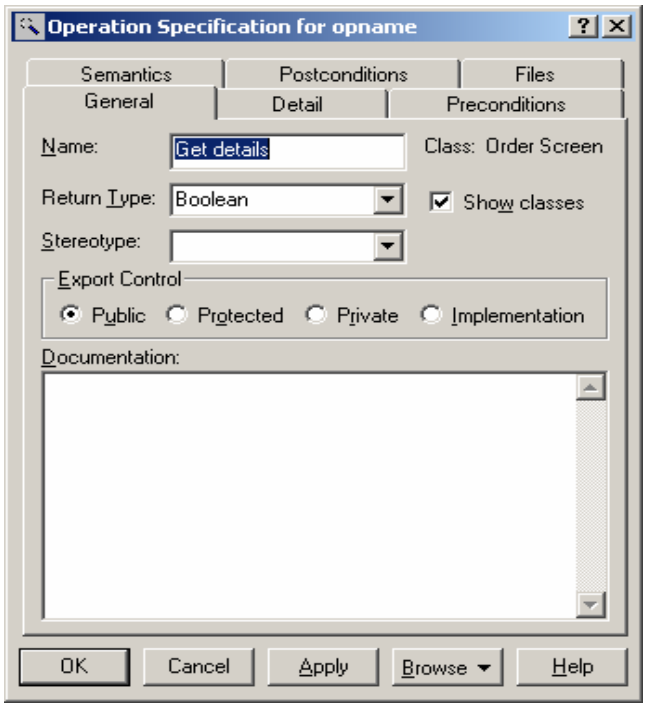


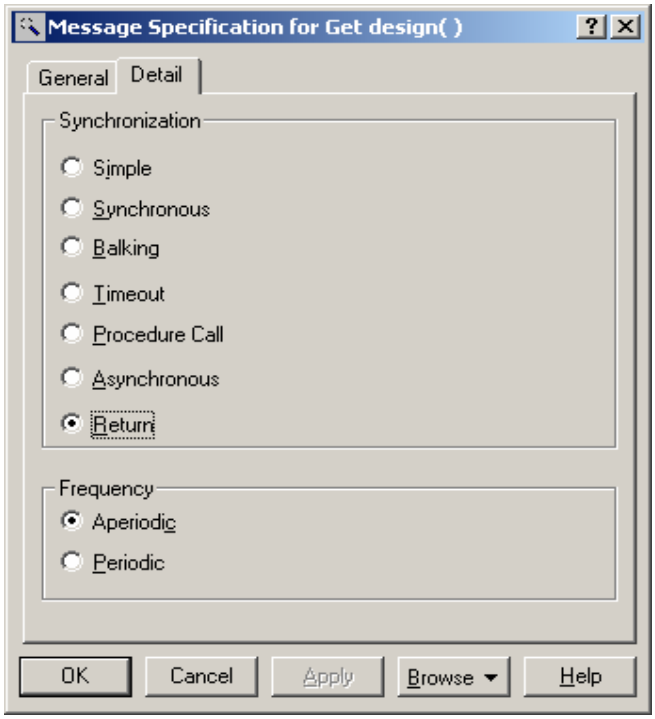
Pick required actors and classes from the browser and drag them onto the diagram. Depending on the options you have on the view, they may all be shown as rectangles, or may use the icon representing their stereotype.

To add an event / signal / message between classes; use the straight arrow icon → from the toolbar. Start at the originating class and drag it to the receiving class. Right click on the event and pick the operation from the list shown. If the operation is not in the class already, add it.

The message can be edited and its specification altered to make it synchronous or to make sure there is a significant return value:

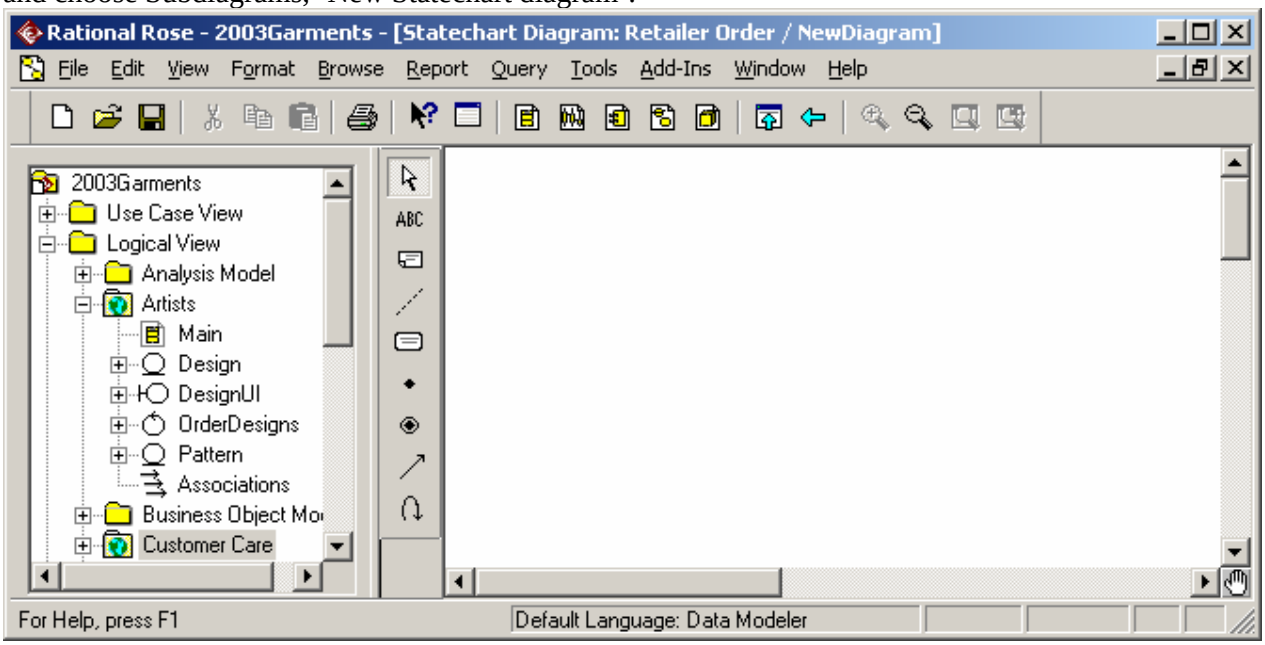
To add a new sequence diagram (e.g. for another use case), develop the other sequence diagram (e.g. DiagramB) add a note to the original diagram (e.g. Diagram A). Drag DiagramB from the browser into the note on Diagram A. To end an object's lifeline in the Use Case, use the × icon on its lifeline.





7. Drawing a State Diagram

Select the persistent class for which you wish to draw a state diagram. Right click and choose Subdiagrams, 'New Statechart diagram'.

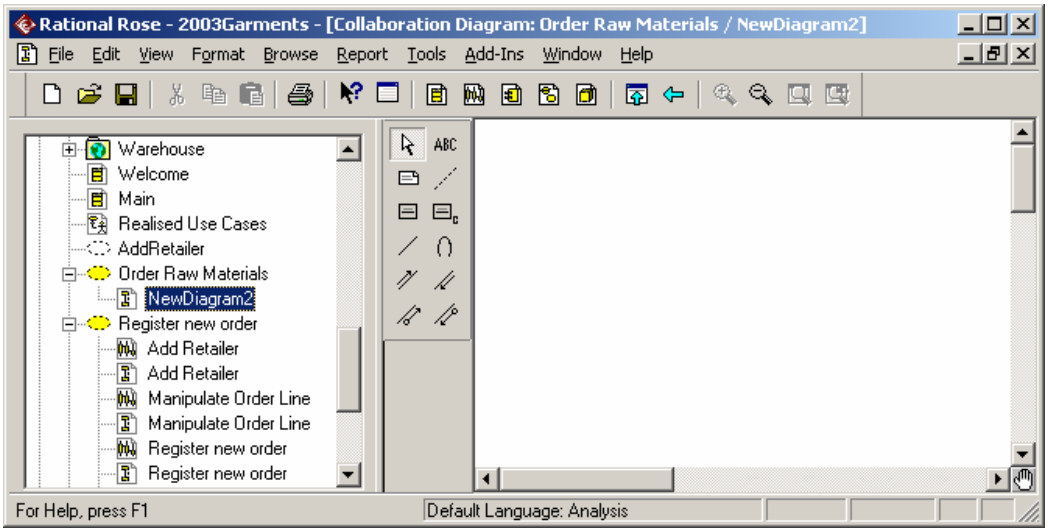


Using the icons on offer, draw the diagram.

Go to top Use Case Diagram Class Diagram Sequence Diagram Collaboration

8. Collaboration Diagrams

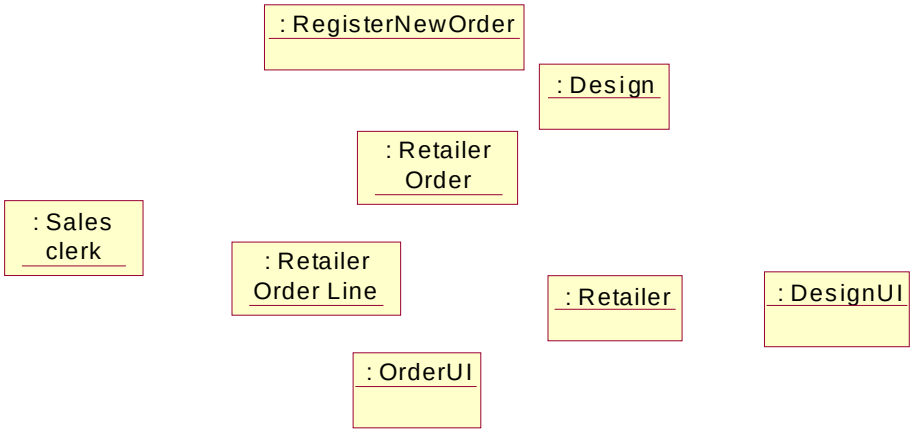
To create a collaboration diagram in Rational Rose, ensure first that the Use Case that you want to illustrate is present and that all classes have been set up, complete with their stereotypes.



Right click on the Use Case in the browser and choose 'New' and 'Collaboration Diagram'. Give the diagram the same name as the Use Case and double click on it to open it. Note the toolbar should look as above.

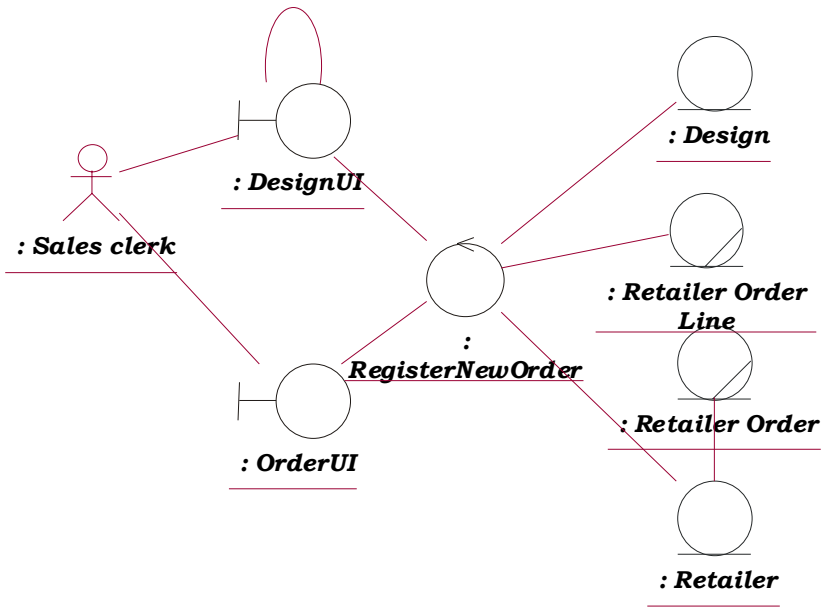
A Collaboration diagram has classes, links and messages. The links show how the classes communicate, while the messages travel on the links. Any two classes that communicate must be joined by links. Two classes may only be joined by one link , but there can be many messages passing between them. The messages are directional, so use either or .

To draw the diagram, drag the objects from the browser.



When you do this, they may appear as boxes. When you have all of the objects on the diagram, do the following:

Select all from the edit menu. Go to Format menu and set stereotype to icon. At format menu, disable 'use fill colour' (if you wish!)At format menu, choose font and change the font to something that will distinguish the objects from the message names. (I chose bold italic 12 point bookman old style). Connect with links all objects that send messages to each other.



Go to top Use Case Diagram Class Diagram Sequence Diagram Collaboration

9. Generating tables from classes

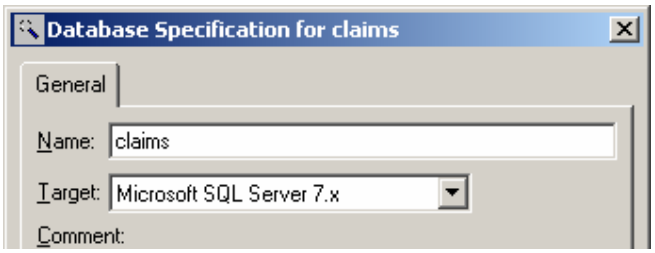
Converting classes to tables

Remember:

- You can only generate tables from PERSISTENT classes.
- To generate tables, there must be a defined schema.
- The schema must be associated with a database in the component view.

In the component view:

Set up a database (*Right click on logical view, choose data modeler, new, database).*



Open the specification for the database and associate it with whichever implementation route suits (e.g. SQL Server 7)

In the logical view:

(a) **Classify the classes**, using a 3-tier system. (To do this, t*ick the 'Three-tier diagram' box in the tools - options menu in Rational Rose.)*

Move all persistent classes into one package.

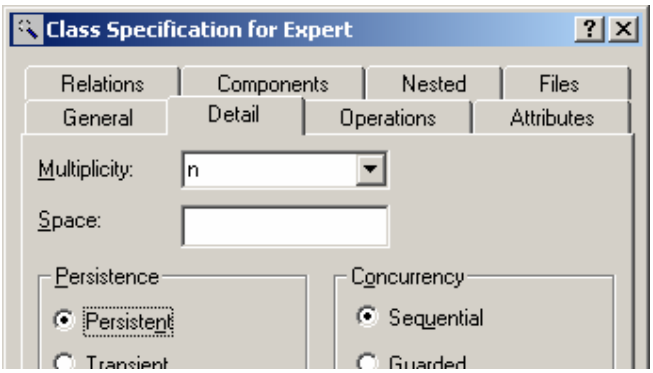
For each persistent class:

Open the standard specification

Select the 'detail' tab

Turn on the 'persistent' radio button.

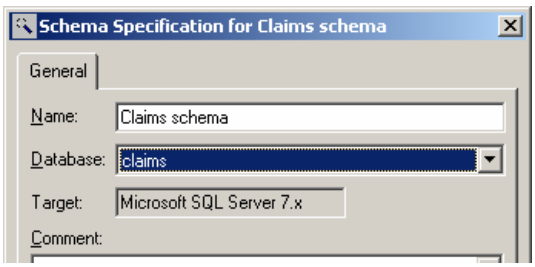
If you have not already given the attributes data types, do so now.



(b) **Set up a new schema** (Right click on logical view, choose data modeler, new, schema.)

Open the schema specification.

Associate it with the database you have created.



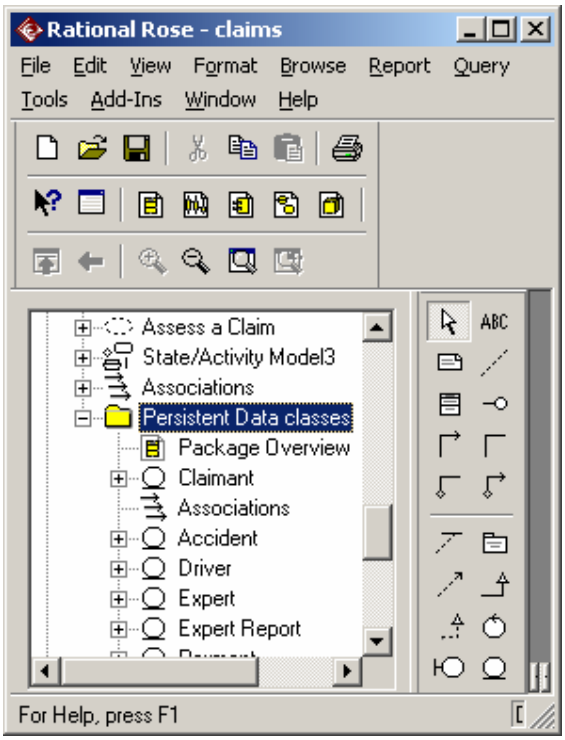
(c) **Transform the objects to data**. Right click on the package that holds the classes in the Logical view.

Choose data modeler

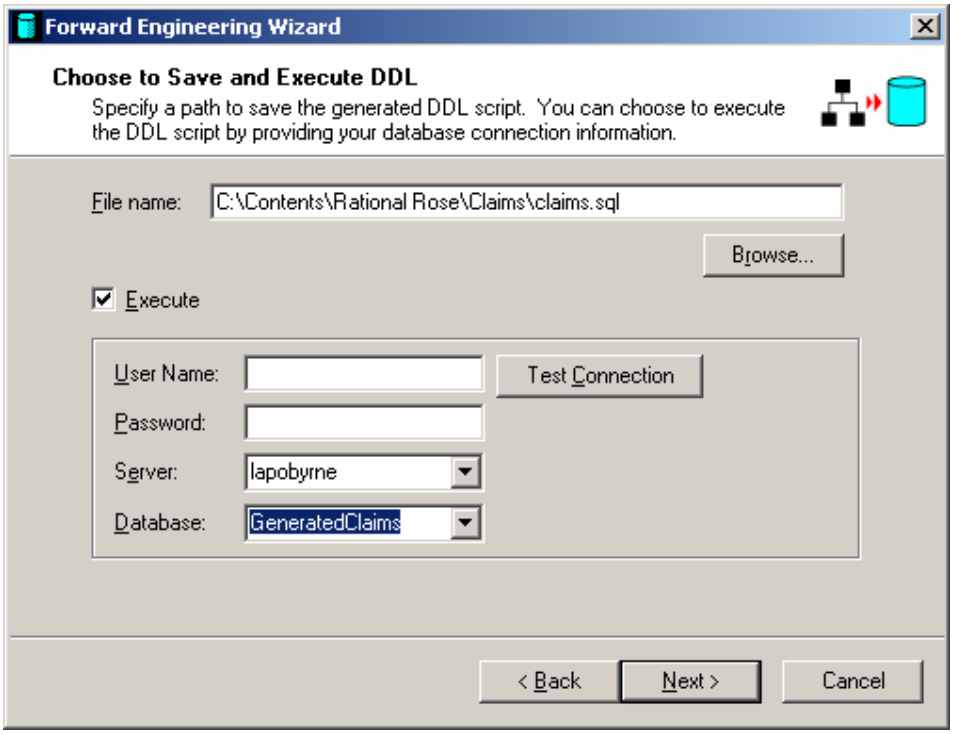
Choose 'Transform to data model'

Fill in destination schema and target database that you have set up. Execute the transformation. *(To see your tables, expand the schema. If they aren't there, maybe you didn't make them persistent?).*

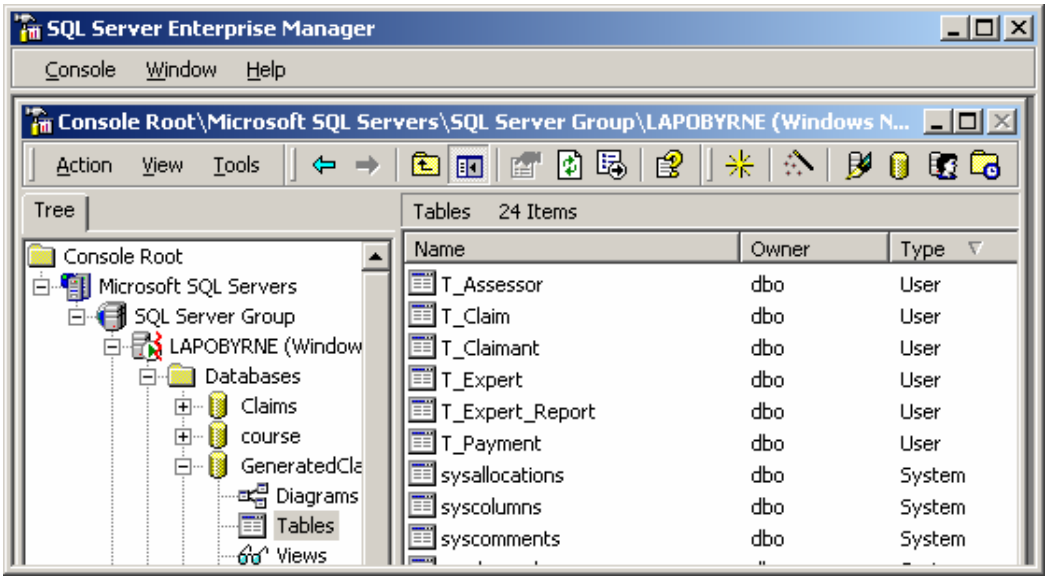
To see your data model, right click on the schema, choose data modeller, new, data model diagram)



(d) **Generate (and optionally execute) SQL.** Right click on the schema, choose data modeller, forward engineer…



This results in your tables being generated into your database.



Open a new data model diagram

Populate it with tables

Result

This creates a set of tables in the database.

You can view them by setting up a new data model diagram.

Right click on schema

Choose data modeler

Choose new

Choose data model diagram

Go to top Use Case Diagram Class Diagram Sequence Diagram Collaboration

10. Generating SQL

- ***Right click on the database***
- ***Choose Data modeler***
- ***Forward Engineer…***

What if??

1) I add a business class that has the same name as an actor and the drawing tool shows me the actor:

   Before naming the class, open its specification. Change the stereotype to business entity, and then rename it to the actor name. You will be warned that the name appears in multiple domains, but that is OK.

2) When I add my class, it doesn't look like the one in the sample.

   When you add a class, the stereotype may default to none. This will give the normal 3-compartment box display. When you change the stereotype, this can change the way in which the class is displayed. To change the display, right click on the class and choose stereotype. If you want the 3-box compartment, choose 'none'.