Project Management Experience and Knowledge Self-Assessment Manual

Project Management Institute

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Contents

Introduction

Project management is a dynamic profession. Like other emerging professions, project management is experiencing unprecedented growth and recognition. A consequence of this growth is increased marketplace reliance upon project management. As more companies adopt project management methodologies into their businesses, the demand for knowledgeable practitioners increases globally. A product of project management's continuous development is the expansion of the profession's body of knowledge.

This manual has been developed to assist individuals in their assessment of current levels of project management knowledge and related experience base. In addition to being a resource for individual assessments, the manual can also be used to develop individual preparation plans and to identify or verify education and/or training outcomes.

In 1999, the Project Management Institute (PMI®) completed a role delineation study for the Project Management Professional (PMP®) Certification Examination. A role delineation study identifies a profession's major performance domains (e.g., initiating the project or planning the project). It describes the tasks that are performed in each domain and identifies the knowledge and skill that are required to complete the task. The purpose of role delineation is to ensure that there is a link between the content of the certification examination and actual project management. This manual presents the role delineation task statements in a format that enables you to assess how your project management experiences and training/education knowledge levels prepare you to complete each of the task statements.

A Guide to the Project Management Body of Knowledge (*PMBOK*® Guide) is recognized as a global standard by the project management community. As a standard, it identifies and describes project management knowledge or practices that are applicable to most projects most of the time. The *PMBOK*® *Guide* provides a basic reference source for anyone interested in the project management profession and can be used to obtain additional information relating to the knowledge statements that are listed in Sections One and Four.

This Self-Assessment Manual is divided into four sections. Section One contains proficiency statements for each of the project management performance domains. Section Two contains task statements for each project management domain. Section One outlines the underlying knowledge associated with the tasks in Section Two. An individual may attain a higher rating in Section One than in Section Two due to a high degree of understanding about project management, but possess limited or narrowly focused experiences. Another individual may attain a higher rating in Section Two than in Section One due to a high skill level, but have minimal understanding of why the task is performed or why certain tools are needed.

Section Three provides an exercise intended to assess project management knowledge. Finally, Section Four contains an expanded version of the proficiency objectives contained in Section One. The objectives in this section can be used to identify and plan training programs.

This manual was developed to be an adjunct to the variety of professional preparation tools such as textbooks, educational seminars, and project management courses. Individuals may use all of these tools to enhance understanding and application of project management knowledge to satisfy personal and professional career objectives.

The self-assessment ratings should not be used to predict, guarantee, or infer success or failure by individuals in their project management career, examinations, or related activities.

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Section One:
Project Management Proficiency Statements

The statements in this section describe the knowledge and skills considered essential to the delivery of effective project management services. Using the scale in each table, rate your present level of knowledge for each statement based on the following:

Low: My current project management knowledge would limit my ability to complete this activity.

Medium: My current project management knowledge would enable me to complete this activity, but I may need assistance.

High: My current project management knowledge would enable me to complete this activity.

Each domain has a maximum number of available points to be used for rating purposes only. Therefore, the point value for statements varies among domains. A domain with lower point values should not be considered of lesser importance than a domain with higher point values.

	Proficiency Statements for Initiating the Project	Rating Scale Low	Medium	High
	Utilize project selection methods/decision models, including benefit measurement methods and constrained optimization methods			
2	Evaluate historical information for projects involving similar products and services			
3	Determine product/service characteristics using expert judgment as needed			
4	Identify/document constraints and assumptions			
	Utilize a project charter to formally document and link the project to the ongoing work of the organization			
6	Define the responsibilities of the project manager and other organizational managers			
7	Identify how project budget concerns and resource availability affect the project, and how to interface with the project sponsor or other organizational managers with resource responsibility			
8	Define project phases of the project life cycle			
9	Identify the primary components of the project charter			
10	Perform high-level assessment of the organizational resources for the project			
11	Perform high-level assessment of the technical and nontechnical requirements of the project			
	Total for Each Column			
	Score for Low Column = Column Total x .36			
	Score for Medium Column = Column Total x .72			
	Score for High Column = Column Total x 1.08			
	Total Column Scores for Domain Score			

	Proficiency Statements for Planning the Project	Rating Scale		
		Low	Medium	High
1	Identify and evaluate the project scope statement			
2	Determine the appropriate project or subproject level in which scope statement is needed			
3	Utilize a scope statement as the basis for future project decisions and for evaluating project tradeoffs			
4	Understand a scope statement as documentation of the agreement between the project team and customers or other stakeholders by focusing on key project deliverables and objectives			
5	Determine how and when to properly refine or modify the scope statement			
6	Develop a scope management plan			
7	Identify and evaluate the components of a scope management plan			
8	Identify and evaluate inputs to the scope management plan			
9	Identify and evaluate criteria for classifying and integrating project scope changes			
10	Communicate the difference between a project scope management plan and a project scope statement			
11	Develop a Work Breakdown Structure (WBS), including the proper use of decomposition techniques			
12	Communicate the differences between a WBS and other types of breakdown structures			
13	Determine the utility of WBS from similar past projects and standardized templates			
14	Determine the inputs of the project scope definition process			
15	Utilize the WBS to manage project phases			
16	Verify the correctness of the WBS			
17	Determine the appropriate level of decomposition detail for various WBSs and parts of a WBS			
18	Create an activity list using decomposition of work packages			
19	Identify the appropriate level of activity detail for the work package			
20	Determine the inputs to the project activity definition process			
21	Organize the activity list as an extension of the WBS			
22	Utilize activity lists to verify that all activities are within the project scope and that the WBS is correct			
23	Identify missing deliverables or deliverables requiring clarification, using the WBS as part of the verification process			
24	Determine interactivity dependencies			
25	Identify the relationships between project activities for activity sequencing			
26	Identify and document the types of interactivity dependencies within the project			
27	Construct a project network diagram			
28	Identify appropriate diagramming techniques			
29	Determine inputs to the activity sequencing process			
30	Complete activity lists and WBS updates as well as updates of related supporting documentation			
31	Define missing activities or activities requiring clarification in the activity list during the development of the project network diagram			
32	Identify physical resources available to the project, including contracted resources			
33	Evaluate historical resource information related to similar projects			
34	Comply with organizational policies regarding resource usage and selection			

	Proficiency Statements for Planning the Project (continued)	Rating Scale		
		Low	Medium	High
35	Determine and quantify resource needs using the WBS, scope statement, resource pool descriptions, historical information, and organizational polices			
36	Identify staff requirements/assignments through a process of defining the skill types required, defining the types of individuals/groups required, developing job/position descriptions, identifying training needs, and defining required time frames			
37	Develop staffing management plans for assessment and control of human-resource usage patterns			
38	Develop resource histograms			
39	Identify project material and equipment requirements			
40	Identify the completeness of a resource requirements document, and track individual resource requirements to WBS elements			
41	Develop a responsibility assignment matrix			
42	Utilize a resource requirements statement as a basis for acquiring resources and managing other cost activities, including cost budgeting			
43	Develop a resource management plan			
44	Develop activity duration estimates for project scheduling using various tools such as analogous estimation techniques			
45	Utilize simulations (i.e., results of Monte Carlo analysis)			
46	Estimate the number of work periods and possible work duration ranges			
47	Document the basis for activity duration estimates			
48	Develop a project schedule using activity duration estimates			
49	Develop project cost estimates at an appropriate level of detail			
50	Identify and evaluate inputs to the project cost-estimating process			
51	Communicate the differences between cost estimating and cost pricing			
52	Utilize a chart of accounts to associate quantitative cost assessments with related resource requirements			
53	Identify and document appropriate cost-estimating methods			
54	Evaluate inputs to the cost baseline development process			
55	Develop a cost baseline to determine cost performance			
56	Utilize multiple cost baselines to evaluate different aspects of project cost performance over time			
57	Verify that cost estimates are complete and associated with specific resource requirements			
58	Develop a cost management plan			
59	Develop a cost change control plan			
60	Identify performance measurement techniques			
61	Formulate project and resource calendars			
62	Identify task leads, lags, and constraints			
63	Determine inputs to the project schedule development process			
64	Select and perform appropriate mathematical analyses, i.e., critical path method			
65	Identify project Graphical Evaluation and Review Technique needs			
66	Identify Program Evaluation and Review Technique needs			
67	Communicate the advantages and disadvantages of the different types of project schedule formats			
68	Determine the completeness of a project schedule			

	Proficiency Statements for Planning the Project (continued)	Rating Scale Low	Medium	High
69	Develop a schedule management plan, including establishing a schedule baseline, documenting how schedule variances will be managed, identifying schedule change control systems procedures, and defining appropriate performance measures			
70	Identify the project stakeholders and **project/organization** responsibility relationships			
71	Determine the information requirements of the **project** stakeholders			
72	Document stakeholder logistic issues			
73	**Identify** external information needs			
74	Determine information format and updatelcorrection needs			
75	Determine the technologies or methods used to transmit information, as well as to identify the immediacy of the need			
76	Identify the project team experience in order to conduct communications **technology-**related training			
77	Identify the methods needed to transmit nonroutine communications			
78	Develop a communications management plan			
79	Determine the organization's quality policy			
80	Develop project quality policies			
81	Utilize standard project quality tools and techniques			
82	Utilize operational definitions (quality metrics) and performance checklists			
83	Develop a project quality management plan			
84	Evaluate project quality control, assurance, and improvement issues			
85	Communicate quality-related inputs of the project, the project's product, and the related effects on other project planning processes			
86	Complete stakeholder needs analyses and overall organizational planning processes as a guide to the project planning process			
87	Identify the organizational structure **(e.g.,** strong matrix and weak matrix) in order to determine project effects			
88	Identify specific organizational **role/responsibility** assignment processes			
89	Develop an organizational chart for project work			
	Describe project effects of organizational units, technical interfaces, and the presence of different technical disciplines			
	Utilize an organizational breakdown structure to evaluate unit responsibilities for specific work items on the project			
92	Identify and quantify potential project risk events			
93	Identify the sources of possible **internal/external** risk events			
94	Classify potential risk events, the ranges of possible outcomes, and risk interactions anticipated during various project phases			
95	Identify risk symptoms or triggers			
96	Document the manifestations of risk events			
97	Develop flowcharts to determine the causes and effects of risk			
98	Determine stakeholder risk tolerances			
99	Estimate risk event probability and frequency			
100	Estimate risk event value and related range of possible project costs			
101	Utilize simulation to analyze the behaviorlperformance of the project system			
102	Develop decision tree analyses to depict key interactions			

	Proficiency Statements for Planning the Project (continued)	Rating Scale Low	Medium	High
103	Communicate the limitations of risk quantification in order to avoid false impressions of risk assessment reliability			
104	Develop risk responses			
105	Determine procurement feasibility as a risk reduction tool			
106	Develop contingency plans, implementation criteria, and alternative strategies			
107	Determine insurance coverage needs			
108	Determine risk events warranting responses			
109	Identify other processes affected by risk planning iterations			
110	Develop a risk management plan			
111	Develop the process by which risk identification/quantification will be maintained			
112	Determine and document the appropriateness of specific risk event strategies			
113	Describe potential differences in risk event estimates depending on the project phase			
114	Utilize make-or-buy analysis to identify which project needs are best met by procuring products and/or services			
115	Communicate inputs to the procurement planning process			
116	Determine the contract types available for project procurement planning purposes			
117	Develop rating and scoring evaluation criteria for project procurement planning purposes			
118	Determine the different types of procurement documents			
119	Develop the procurement management plan			
120	Determine the project plan methodology			
121	Describe the difference between dynamically updating the project plan and preserving the project performance measurement baseline			
122	Develop a stakeholder management plan			
123	Define and utilize a Project Management Information System to assist in the gathering, integration, and dissemination of the inputs and outputs of all project processes			
124	Identify and develop an integrated project plan, including the project charter, documentation outlining the project management approach, the project execution plan, the scope statement, the WBS, budgets, schedules, responsibility assignments, performance measurement baselines, milestones, key staffing requirements, lists of key risks, risk response plans, management review plans, and other subsidiary management plans			
125	Determine the overall project management plan for use in managing and controlling project execution			
	Total for Each Column			
Score for Low Column = Column Total x .12				
Score for Medium Column = Column Total x .24				
Score for High Column = Column Total x .36				
Total Column Scores for Domain Score				

	Proficiency Statements for Executing the Project	Rating Scale		
		Low	Medium	High
1	Identify and execute corrective actions or modifications to the project plan using a structured approach			
2	Utilize structured communication methods			
3	Utilize regularly scheduled project status reviews			
4	Utilize project information systems to provide project information			
5	Utilize negotiating strategies			
6	Apply problem-solving techniques in managing the project			
7	Determine both formal and informal organization activities			
8	Determine methods used to influence behavior and collective action			
9	Manage various project-related technical and/or organizational interfaces			
10	Utilize work authorization systems and procedures for approving project work to ensure proper work sequencing			
11	Know products and services and have ability to monitor/react to project changes initiated by the sponsor			
12	Document work results and quality outcomes, including completion of project deliverables			
13	Identify change requests during work processes, and determine potential project scope changes			
14	Participate in project inspections, reviews, audits, and walkthroughs			
15	Determine that work product/results are completed correctly			
16	Document product acceptance by stakeholders			
17	Perform project quality control testing and measurement			
18	Determine the benefits/costs of project quality efforts			
19	Document project quality outcomes in a format suitable for comparison and analysis			
20	Identify and implement actions needed to increase project effectiveness and efficiency			
21	Document lessons learned for improved performance			
22	Implement quality improvements using the project change control processes			
23	Utilize project team policies and procedures			
24	Perform team-building activities			
25	Recognize the benefits of collocation			
26	Implement programs that enhance project team performance, including use of conflict/stress reduction techniques			
27	Implement a project information distribution system			
28	Implement a project information retrieval system			
29	Respond to expected and unexpected information requests			
30	Maintain project records			
31	Define and utilize project payment/invoicing terms			
32	Determine project changes, delays, and implementation of termination clauses when appropriate			
33	Rely upon methods to identify project warranties, liabilities, indemnity, and insurance clause-related activities			
34	Manage task time frames, project schedules, deliverable completion dates, and other deadlines			
35	Quantify qualitative data as an aid in source selection			
36	Review contractor costs, schedules, and technical performance levels			

	Proficiency Statements for Executing the Project (continued)	Rating Scale Low	Medium	High
37	Complete payment reviews/approvals			
38	Implement a contract change control system			
39	Review contractors' change status reports and dissemination of contractual changes to appropriate parties			
40	Integrate contract administration within the broader context of the project plan, quality control processes, and the overall project performance reporting systems			
	Total for Each Column			
Score for Low Column = Column Total x .72				
Score for Medium Column = Column Total x 1.44				
Score for High Column = Column Total x 2.16				
Total Column Scores for Domain Score				

	Proficiency Statements for Controlling the Project	Rating Scale Low	Medium	High
1	Determine that a change is needed and that change request documentation has been properly completed			
2	Adhere to the steps by which official project documents may be changed			
3	Utilize the performing organization's change control system			
4	Utilize the powers and responsibilities of the change control board			
5	Document and implement procedures to process changes that may be accepted without prior change control board review			
6	Verify that a change has occurred			
7	Utilize configuration management procedures to integrate change across all areas of the project			
8	Determine whether variances from the plan require corrective action, need new or revised cost estimates, should result in a modification of activity sequences, or require the development of additional risk-response alternatives			
9	Complete project plan modifications, including integration with various project baselines			
10	Employ proactive, structured change management procedures to properly influence a variety of project stakeholders			
11	Document lessons learned from project integration, including causes of activities requiring corrective action, types of activities requiring corrective action, reasons for selecting certain corrective actions, and classification of changes for subsequent analysis			
12	Evaluate the degree to which changes would affect the project scope			
13	Implement a scope change control system			
14	Evaluate alternatives to scope modifications			
15	Implement approved changes, manage related work tasks, and integrate approved scope changes into other control processes			
16	Define the procedure by which the project schedule may be changed			
17	Implement a schedule change control system			
18	Integrate schedule activities with the overall change control system			
19	Determine the need for a schedule change			

	Proficiency Statements for Controlling the Project (continued)	Rating Scale		
		Low	Medium	High
20	Determine the magnitude of the schedule change and the need for rebaselining			
21	Determine overall plan adjustments resulting from schedule updates			
22	Determine the need for schedule fast tracking or crashing			
23	Initiate corrective actions to ensure that additional schedule changes are minimized			
24	Integrate approved schedule changes with other project control processes			
25	Document lessons learned, including causes of activities leading to schedule changes, types of schedule changes, reasons for selecting specific corrective actions, and classification of schedule change causes for further analysis			
26	Implement a cost change control system			
27	Integrate cost changes within the overall change control system			
28	Implement cost controls			
29	Define and evaluate factors that may potentially cause cost changes			
30	Revise cost estimates, and evaluate the degree to which the cost baseline has changed using performance techniques such as earned value analysis			
31	Integrate approved cost changes with other project control processes			
32	Determine modifications needed to estimates to completion			
33	Document lessons learned, including causes of activities leading to cost changes, types of cost changes, reasons for selecting specific corrective actions, and classification of cost changes for further analysis			
34	Determine responsibility for project quality control			
35	Monitor specific project results to ensure compliance with requirements (relevant quality standards) using appropriate checklists			
36	Perform inspections, reviews, and walkthroughs to ensure that items are properly documented as accepted, rejected, or identified for rework			
37	Utilize techniques, including Pareto analysis, cause/effect diagrams, trend analysis, and statistical sampling for inspections			
38	Implement process adjustments to ensure quality improvement efforts			
39	Complete all quality-related documentation			
40	Implement performance reviews			
41	Generate and disseminate status, progress, and forecast reports to appropriate stakeholders			
42	Create change requests based on performance reports			
43	Complete risk event updates as part of the project control process			
44	Quantify actual risk events (for comparison and evaluation with the risk plan)			
45	Execute the risk management plan in order to respond to risk events throughout the course of the project			
46	Implement workarounds for unplanned negative risk events			
47	Complete risk management plan updates, including adjustments to risk probabilities and risk values			
	Total for Each Column			
	Score for Low Column = Column Total x .33			
	Score for Medium Column = Column Total x .66			
	Score for High Column = Column Total x .99			
	Total Column Scores for Domain Score			

	Proficiency Statements for Closing the Project	Rating Scale		
		Low	Medium	High
1	Define and implement closure at the end phase of the project by collecting all project records, documenting the degree to which each project phase was properly closed after its completion, and verifying all project results in preparation for formal acceptance			
2	Document performance measures resulting from performance reviews and variance, trend, and earned value analyses			
	Document the final project scope by reviewing final specifications and analyzing project success and effectiveness			
4	Document lessons learned			
5	Formalize the **acceptance/signoff** of the product by the sponsor, client, or customer			
6	Perform final appraisal reviews of team members			
7	Document projects in archives			
8	Determine the quality and completeness of the contract file			
9	Incorporate administrative closeout into contract closeout process, including updating of records based upon final contract results, indexing and archiving of contract information, and identifying special case closeouts such as early terminations			
10	Verify contract documentation outlining the completion and quality of work results			
11	Obtain formal acceptance from seller regarding contract completion			
	Total for Each Column			
	Score for Low Column = Column Total x .36			
	Score for Medium Column = Column Total x .72			
	Score for High Column = Column Total x 1.08			
	Total Column Scores for Domain Score			

Rating Totals

Initiating the Project	_____
Planning the Project	_____
Executing the Project	_____
Controlling the Project	_____
Closing the Project	_____
TOTAL	_____

150 or above = Above Average

117 to 149 = Average

116 or below = Below Average

Section Two:
Project Management Task Statements

The following tables list project management performance domains and tasks. A performance domain is a major work area, and a task is a specific activity linked to that performance domain. The performance domains are initiating, planning, executing, controlling, and closing the project. Task statements describe the activity, how the activity will be completed, and why the activity should be completed.

Using the scale in each table, rate your present level of experience for each statement based on the following:

Low: My current project management experience would limit my ability to complete this activity.

Medium: My current project management experience would enable me to complete this activity, but I may need assistance.

High: My current project management experience would enable me to complete this activity.

Each domain has a maximum number of available points to be used for rating purposes only. Therefore, the point value for statements varies among domains. A domain with lower point values should not be considered of lesser importance than a domain with higher point values.

	Task Statements for Initiating the Project	Rating Scale		
		Low	Medium	High
1	Determine project goals by identifying and working with project stakeholders in order to meet their requirements, specifications, and/or expectations			
2	Determine product or service deliverables by reviewing or generating the scope of work, requirements, and/or specifications to meet stakeholder expectations			
3	Determine project management process outputs by applying appropriate practices, tools, and methodologies to ensure required product/service delivery			
4	Document project constraints through coordination with stakeholders and review of policies and procedures to ensure compliance			
5	Document assumptions by determining information that must be validated or situations to be controlled during the project process in order to facilitate the project planning process			
6	Define the project strategy by evaluating alternative approaches to meet stakeholder requirements, specifications, and/or expectations			
7	Identify performance criteria by referring to product/service specifications and process standards in order to ensure and/or support the quality assurance effort			
8	Determine key resource requirements by referring to deliverables in order to support planning and decision-making			
9	Define an appropriate project budget and schedule by determining time and cost estimates in order to support decision-making			
10	Provide comprehensive information by producing a formal document to obtain an approval decision from the stakeholders			
	Total for Each Column			
	Score for Low Column = Column Total x .4			
	Score for Medium Column = Column Total x .8			
	Score for High Column = Column Total x 1.2			
	Total Column Scores for Domain Score			

	Task Statements for Planning the Project	Rating Scale Low	Medium	High
1	Refine project requirements, assumptions, and constraints through communication with stakeholders and/or by reviewing project documents to baseline the scope of work and enable development of the execution plan			
2	Create the Work Breakdown Structure (WBS) using the scope of work, other project documents, and decomposition techniques to facilitate detailed project planning and the executing, controlling, and closing processes			
3	Develop the resource management plan (human resources, procurement, and so on) by identifying resource requirements and obtaining commitments from internal, external, and procured sources to complete all project activities			
4	Refine project time and cost estimates by applying estimating tools/techniques to all WBS tasks to determine and define project baseline, schedule, and budget			
5	Establish project controls by defining the required correct processes, measures, and controls to manage project change, communications, procurement, risk, quality, and human resources to facilitate project executing and controlling processes and to ensure compliance with generally accepted industry standards			
6	*Develop a formal and comprehensive project plan by integrating and documenting project* deliverables, acceptance criteria, processes, procedures, and tasks to facilitate project executing, controlling, and closing procedures			
7	Obtain project plan approval by reviewing the plan with the client and other required stakeholders to confirm project baselines prior to proceeding with project executing processes			
	Total for Each Column			
Score for Low Column = Column Total x 2.09				
Score for Medium Column = Column Total x 4.18				
Score for High Column = Column Total x 6.27				
Total Column Scores for Domain Score				

	Task Statements for Executing the Project	Rating Scale Low	Medium	High
1	Commit project resources in accordance with the project plan to ensure that all activities are performed			
2	Implement the project plan by authorizing the execution of project activities and tasks to produce project deliverables			
3	Manage project progress by ensuring that activities are executed as planned in order to achieve the project objectives			
4	Communicate project progress by producing project reports to provide timely and accurate project status and decision-support information to stakeholders			
5	Implement quality assurance procedures by performing project control activities to meet project objectives			
	Total for Each Column			
Score for Low Column = Column Total x 5.7				
Score for Medium Column = Column Total x 11.4				
Score for High Column = Column Total x 17.2				
Total Column Scores for Domain Score				

	Task Statements for Controlling the Project	Rating Scale Low	Medium	High
1	Measure project performance continually by comparing results to the baseline in order to identify project trends and variances			
2	Refine control limits on performance measures by applying established policy in order to identify needs for corrective action			
3	Take timely corrective action by addressing the root causes in the problem areas in order to eliminate or minimize negative impact			
4	Evaluate the effectiveness of the corrective actions by measuring subsequent performance in order to determine the need for further actions			
5	Ensure compliance with the change management plan by monitoring response to change initiatives in order to manage scope			
6	Reassess project control plans by scheduling periodic reviews in order to ensure their effectiveness and relevancy			
7	Respond to risk event triggers in accordance with the risk management plan in order to properly manage project outcomes			
8	Promote advocacy for prevention by conducting prevention awareness campaigns to strengthen public and organizational policy and norms			
	Total for Each Column			
	Score for Low Column = Column Total x 1.9			
	Score for Medium Column = Column Total x 3.8			
	Score for High Column = Column Total x 5.7			
	Total Column Scores for Domain Score			

	Task Statements for Closing the Project	Rating Scale Low	Medium	High
1	Obtain final acceptance of deliverables by obtaining formal approval from appropriate stakeholders to achieve closeout			
2	Document lessons learned by surveying project team members and other relevant stakeholders to use for the benefit of future projects			
3	Facilitate administrative and financial closure in accordance with the project plan in order to comply with organization and stakeholder requirements			
4	Preserve essential project records and required tools by archiving them for future use to adhere to legal and other requirements			
5	Release project resources by following appropriate organizational procedures in order to optimize resource utilization			
	Total for Each Column			
	Score for Low Column = Column Total x .8			
	Score for Medium Column = Column Total x 1.6			
	Score for High Column = Column Total x 2.4			
	Total Column Scores for Domain Score			

Rating Totals

Initiating the Project	_____
Planning the Project	_____
Executing the Project	_____
Controlling the Project	_____
Closing the Project	_____
TOTAL	_____

150 or above = Above Average

117 to 149 = Average

116 or below = Below Average

Section Three:
Self-Assessment Exercise

Exercise

You have been appointed to a team tasked with reviewing a recently completed project. Your job is to evaluate the project, document lessons learned, and propose possible new policies for project teams to follow in the future. You have just received the following memo describing the project that will be reviewed. Read the memo and prepare a series of questions to ask the project team members when you meet with them. Relate each of your possible questions to a specific learning objective from Section Two of this booklet. A list of possible questions to which you can compare your work follows the exercise.

Memo
To: Project Review Team
From: Alpha Project Manager
Regarding: The Postproject Review Session Scheduled for Next Tuesday

Background: The Alpha Project was completed last month. This was a software development project that provided specific inventory management software to Alpha Computer Company for use by their company consultants and for installation at their customers' sites. This memo is intended to provide you with some of the project events to help you better prepare for the upcoming review session.

Major Points:

1. Project alpha was completed last month on schedule, but over budget by 25 percent. Since this project was a cost-plus fixed-fee contract with the Alpha Computer Company, we will be charging Alpha for the cost overruns. This performance level appears to be average when compared with our corporate track record of completing similar projects.

2. There is some dispute over the scope of what was delivered. Alpha end users asked us to modify the functionality of our deliverables about two months ago, resulting in an approximately 10 percent overrun (of the initial contract cost). The Alpha middle managers with project oversight responsibility now claim that they were never notified of this scope modification. Although this project has been closed out, our legal department is discussing these issues with Alpha.

3. There was initially some confusion when I replaced Tracey Knight as project manager. (As you probably remember, Tracey accepted a position with a company in California). Team development efforts seemed to suffer, since my expectation for individual team members was substantially different from Tracey's. Furthermore, it took two full months to sort out the exact status of the project. Finally, it was not until three months after I had been assigned to the project manager position that I found out that Alpha management had never been notified of the project leadership change.

4. Last month (prior to project completion) it was accidentally discovered that several minor functions of the software had not been developed. The heroic efforts of several team members resulted in the development of these modules without negatively affecting the schedule.

5. Due to unexpected delays by the programmers developing the FIFO inventory algorithms, several program testers were temporarily idle. This resulted in a 5 percent cost overrun.

6. Two key systems analysts were unexpectedly pulled off of the Alpha project and assigned to work on a major new proposal that our top management team decided to pursue. This happened four months ago and affected both the project schedule and costs.

7. We found that our junior programmers needed additional training, since the software language that we used on this project is relatively new. The result of this training appears to have resulted in a 20 percent reduction of category C programming errors over the last four months. (If you are interested, I will explain what category C errors are at the meeting next week.)

8. One of the team program testers notified me last week that there is probably a major programming flaw in one of the less frequently used inventory-leveling algorithm modules. This potential problem has not been verified. However, no action is currently being taken, since the customer has accepted the project (except for the dispute over functionality being addressed by the legal department). There is also the potential that this issue could further aggravate the situation with the customer.

9. By the way, since this project is already over budget, who is going to absorb the cost of next week's review meeting? We are going to have quite a few high-salary people in attendance, and I was just curious as to where they are going to charge their time.

Possible Response to the Exercise

The memo certainly raised a number of possible questions for the review meeting. Here are a few:

Point #1.

Certainly the fact that the schedule was met is a good sign. Since the customer bears the majority of the risk in cost-plus contracts, the cost overrun would appear to be less critical to the project team than if it was a fixed-cost project. On the other hand, it would probably be good to know why the cost overruns occurred and the customer's position regarding this overrun. An unhappy customer might result in less business in the future.

Possible related learning objectives:

- Identify and document project needs—Was the appropriate tradeoff between project cost and schedule managed according to the customer's needs?

  Activity duration estimating—Were duration compressio'nor crashing techniques used to maintain the project schedule? If so, what were the related cost effects of using these techniques?
- Cost estimating—Were the initial costs estimated correctly? Can the estimation process be improved?
- Project plan development—Were assumptions and constraints properly anticipated? Were there processes in place to update resource requirements and cost estimates as the project progressed?
- Project plan execution—Were corrective actions taken early in order to minimize the cost overruns? Was the project team successful in influencing its organization and the customer's organization in its attempts to control costs on the project?
- Information distribution—How often was the customer notified about the cost situation? Who specifically in the customer's organization was notified? How were they notified (formally, informally, during regularly scheduled review meeting, and so on)? Were adequate project records maintained?
- Cost control—Were cost overruns justified, and were efforts made to modify the contract and change the cost baseline? What specific cost controls were implemented? Were cost changes directly related to the project scope?

Point #2.

Scope creep is a common problem. The fact that it has become a major concern to the project sponsor (customer) and is currently being handled by the legal department is troubling. The implications with respect to overall project costs should also be evaluated further.

Possible related learning objectives:

- Scope planning—Was a scope statement created? Was a scope management plan developed, including a specific change management process for the project? Did the change management process contain a requirement for review and written approval of all scope changes? Was a customer representative included on the change management board?
- Project planning—Was a stakeholder management plan developed to guide the project team in dealing with the customer organization?
- Scope verification—Was compliance documented for all project deliverables?
- Team development—Are there project policies to direct team members who are faced with an end user requesting a scope change? Have team members been trained in how to respond to such requests professionally?
- Information distribution—Were project status meetings regularly conducted to keep the customer informed about the project? If so, why didn't the scope change issue come up in these meeting?
- Contract administration—Are team members aware of the legal implications of modifying the scope of project? Are they trained to respond correctly?
- Scope change control—Were specific change requests analyzed and documented in terms of the potential effects on project scope, including related cost implications?
- Cost control—How exact is the 10 percent cost overrun related to the scope change? Were controls in place to provide for the clear identification of potential work efforts that were outside of the approved cost baseline?
- Administrative closeout—How has the legal department's involvement in this project affected administrative closeout?

Point #3.

Most projects face a variety of changes. However, a change in project leadership can be particularly disruptive. It is very important that the project planning process include specific guidance on how to deal with these situations.

Possible related learning objectives:

- Project initiation/identification of project management responsibilities—Were specific project management responsibilities documented? Was there a formal project charter? Was the charter revised to identify the new project manager when the change took place? Was this revised charter distributed to appropriate project stakeholders?
- Resource planning—There seemed to be some confusion over the exact status of work efforts within the project. Was there an up-to-date responsibility assignment matrix for all work breakdown structure (WBS) tasks?
- Project plan execution—To what extent was the overall project being executed and controlled properly before the change in project leadership? What was the condition and completeness of related project documentation at that time? What policy improvements could contribute to a clearer understanding of the project status for all stakeholders, including team leaders? What leadership transfer processes were utilized?
- Team development—Was a team meeting conducted to introduce the new project manager? Was this meeting treated similarly to a kickoff meeting, in terms of identifying team development and team responsibility issues? Were team members notified of any new performance criteria or measurements?

Point #4.

Although it is not unusual for project success to depend on the heroic efforts of team members, some would argue that such efforts are not necessarily in the best long-term interests of the organization. An unbalanced approach to project work can cause team members to *burn out*. It is also troubling that the missing functionality was *accidentally* discovered. This further suggests the possibility of deficiencies in project planning, execution, and control.

Possible related learning objectives:

- Scope definition — Was a WBS developed and was it evaluated in the context of the project scope? Was the WBS detailed enough, particularly with regard to these missing functions? Were activities defined in appropriate detail?
- Resource planning — Was responsibility for the missing functions ever assigned to a team member?
- Communication planning — Were internal communications mechanisms in place to minimize these types of problems?
- Quality planning — Why didn't the quality assurance or control processes capture the missing functionality? Apparently the project had been completed and delivered last month. Would internal or customers reviews have led to the discovery of the missing functionality if it had not been *accidentally* discovered first?

  Scope verification — Were all work efforts traced back to the scope statement to ensure correct completion? Was the scope statement evaluated to ensure completion of all necessary work tasks?

Point #5.

This item suggests the possibility of poor project scheduling or inadequate risk planning. Although these types of problems frequently occur in projects, the 5 percent cost effect appear to be significant.

Possible related learning objectives:

- Activity sequencing — Was the relationship between program development tasks and program testing tasks accurately reflected during the schedule development stage?
- Activity duration estimating — How reliable were estimates for program development? What estimating techniques were used?
- Schedule development — Were any lags built into the schedule between development and testing? Was critical path analysis used on this project?
- Risk management planning — Were possible delays in programming identified as possible risk events? Were appropriate risk responses developed? Could the testers have been temporarily reassigned to other projects?
- Risk-response control — Did the risk-response control provide for the updating of risk events as part of the control process? Were the most appropriate workarounds implemented?

Point #6.

It is not uncommon for unexpected staffing changes to occur on projects, particularly large projects that span several months. Although this does not appear to be a problem, a few questions should explore how the project execution was affected by these events.

Possible related learning objectives:

- Initiation phase identification of project management responsibilities — What organizational authority (based upon corporate policy) does the project manager have over the control of project resources?
- Risk management planning — Were potential risk responses developed in advance? Were alternative resources, including external procurement, considered as a possible response? What were the cost/schedule effects?
- Project plan execution — Was the project manager able to influence the broader organization in an appropriate manner? What updates to various project plans occurred as a result of this unexpected event?

Point #7.

There is evidence of a strong quality management system. The system was able to measure and categorize errors, identify possible training needs, and generate resulting quality performance trends. This is particularly impressive because the programming language (the technology being used on the project) was relatively new. Lessons learned from this effort may be useful on future projects throughout the organization and should be documented.

Possible related learning objectives:

- Quality planning — What quality tools and techniques were used on the project? How did the quality system work? Could this system be used on other projects throughout the organization? Is there formal documentation of this system in the quality management plan?
- Quality assurance — Have you been able to assess the benefits versus the costs of your quality assurance processes? What quality assurance improvements are you considering? What formal mechanisms identify team development and training needs?
- Quality control — Who is responsible for quality control? How often are inspections and other types of reviews conducted?

Point #8.

This is an interesting situation. There is a potential, yet unconfirmed, problem with a deliverable that has been completed, delivered, and accepted by the customer. The project is closed, except for the resolution of a scope control issue being handled by the legal department. Yet, it doesn't seem quite right to just do nothing. At the very least, it would seem that the problem should be verified and the legal department notified. This situation probably spans all of the areas of professional responsibility. Personal and professional conduct, work-related conduct, and employee and client relations all seem to be issues. One could also think of situations where community responsibility would also be important. For example, if the inventory algorithm flaw resulted in the inappropriate storage of hazardous waste, there would certainly be community effects.

Point #9.

Even the postproject review meeting has project cost and organizational implications.

Section Four:
Detailed Learning Objectives

Initiating the Project

A. Identify and Document Project **Needs**. Suggested learning opportunities (experience and training) include the following:

1) Explain the need for the product or service

2) Document the need, including satisfaction of a market demand or business need, a specific customer request, a technological advance, or a legal requirement

3) Relate the need to the organization strategic plan, if applicable

B. Perform Feasibility Study and Analysis. Suggested learning opportunities (experience and training) include the following:

1) Utilize project selection methods/decision models, including benefit measurement methods and constrained optimization methods

2) Evaluate historical information for similar products and services

C. Develop Project-Related Product or Service Description. Suggested learning opportunities (experience and training) include the following:

1) Determine characteristics of the product/service, using expert judgment as needed

2) Justify the need for the product

3) Accumulate and evaluate historical information

4) Solicit expert judgment

5) Identify/document limiting constraints and assumptions

D. Identify Various Project-Related Management **Responsibilities**. Suggested learning opportunities (experience and training) include the following:

1) Understand the use of a project charter to formally document and link the project to the ongoing work of the organization

2) Understand the different responsibilities of the project manager and other organizational managers

3) Understand the degree to which budget concerns and resource availability affect the project and that they are the responsibility of managers within the organization

4) Understand the need to define project phases of the project life cycle

E. Draft Project Charter and **Letter** of Engagement. Suggested learning opportunities (experience and training) include the following:

1) Understand at what point a project is formally initiated

2) Identify a high-quality project charter and its primary components, including a concise statement of the business need that the project will address, a brief description of the project's product, the name of the project manager, and identification of the project sponsor

3) Document the project manager's authority to apply organizational resources

F. Understand Project Manager Selection **Process**. Suggested learning opportunities (experience and training) include the following:

1) Understand the criteria on which the project manager will be evaluated when running the project

2) Understand the appropriate levels of technical and nontechnical expertise needed for the project

Planning the Project

A. Scope **Planning**. Suggested learning opportunities (experience and training) include the following:

1) Develop a scope statement

a. Identify various parts of a scope statement, including project justification, project product analysis, objectives, deliverables, relevant cost/benefit analyses, and supporting detail

b. Assess inputs to the scope planning process, including product description, the project charter, constraints, assumptions, and needs for expert judgment

c. Understand the appropriate project or subproject level where a scope statement is needed

2) Use a scope statement as the basis for future project decisions and for assessing project tradeoffs

a. Document the agreement between the project team and customers or other stakeholders

b. Focus on key project deliverables and objectives

c. Know when/how to properly refine/modify the scope statement

3) Develop a scope management plan
   a. Identify the various parts of a scope management plan
   b. Assess inputs to the scope management planning process, including organizational policies, project charters, constraints, and assumptions
   c. Provide for the assessment of the stability of various projects
   d. Provide criteria for classifying and integrating scope changes
   e. Understand the difference between a scope management plan and a scope statement

B. Scope Definition. Suggested learning opportunities (experience and training) include the following:

1) Understand/construct a Work Breakdown Structure (WBS)
   a. Differentiate between a WBS and other kinds of breakdown structures such as an organizational breakdown structure
   b. Investigate the availability of WBSs from similar past projects or standardized templates
   c. Identify the various parts of a WBS, including the codes of accounts, levels, work packages, and the WBS dictionary
   d. Assess inputs to the scope definition process, including the scope statement, constraints, assumptions, other planning outputs, and historical information
   e. Utilize the WBS to manage the project phases and identify deliverables
   f. Verify the correctness of the WBS
   g. Construct the WBS for use in help to manage projects

2) Use decomposition techniques to construct a WBS
   a. Understand the conceptual importance of dividing the project deliverables into smaller, more manageable components
   b. Understand that different elements may have different levels of decomposition
   c. Utilize the four major steps of decomposition

C. Activity **Definition.** Suggested learning opportunities (experience and training) include the following:

1) Create an activity list, using decomposition of work packages
   a. Identify the appropriate activity detail
   b. Understand that activities can relate either to deliverables or action steps
   c. Assess inputs including the WBS, the scope statement, historical information, constraints, and assumptions
   d. Use activity list/definition templates as appropriate
   e. Organize the activity list as an extension to the WBS
   f. Verify that all activities are within the project scope and that the WBS is correct

2) Update the WBS
   a. Identify missing deliverables or deliverables requiring clarification in the WBS as part of the verification process
   b. Update related documentation (e.g., cost estimates), which have been identified as requiring modification during the preparation of the activity list

D. Activity Sequencing. Suggested learning opportunities (experience and training) include the following:

1) Determine interactivity dependencies
   a. Identify the logical relationships between the project's activities for accurately sequencing
   b. Understand the differences between mandatory, discretionary, and external dependencies in the context of activity sequencing
   c. Identify the appropriate type of interactivity dependency, such as finish-to-start, start-to-start, and so on

2) Construct a project network diagram
   a. Identify the appropriate diagramming technique
      1. Precedence diagramming method or activity-on-node
      2. Arrow diagramming method or activity-on-arrow
      3. Conditional diagramming methods
   b. Assess inputs to the activity sequencing process, including the activity list, product descriptions, documented dependencies, constraints, and assumptions
   c. Use network-diagramming templates as appropriate

3) Update the activity list and the WBS
   a. Identify missing activities or activities requiring clarification/correction in the activity list during the preparation of the project network diagram
   b. Properly update the activity list and all related documentation, such as the WBS, during the preparation of the project network diagram

E. Resource **Planning.** Suggested learning opportunities (experience and training) include the following:

1) Identify available physical resources, including contracted resources

2) Review historical information regarding what types of resources were required for similar projects

3) Review organizational policies regarding resource usage and selection

4) Solicit expert judgment

5) Determine/quantify resource requirements using the WBS, scope statement, resource pool descriptions, historical information, and organizational polices
   a. Identify staff requirements/assignments by defining the types of skills required, defining the types of individuals/groups required, developing job/position descriptions, identifying training needs, and defining required time frames while considering part-/full-time availability
   b. Develop staffing management plans for control of human resource usage
   c. Develop a project team directory of members/stakeholders

d. Develop a resource histogram

e. Identify material and equipment requirements

6) Identify the completeness of a resource-requirements document, and relate individual requirements to their respective elements of the WBS

7) Negotiate with functional managers to ensure assignment of the best people

8) Develop/document responsibility assignment matrix

a. Assess project team preferences and assignment expectations

b. Understand the effect of the organizational structure (e.g., strong versus weak matrix structure)

9) Use a resource-requirements statement as a basis for acquiring resources and to manage other cost activities, including cost budgeting

10) Develop/document a resource-management plan

F. Activity Duration Estimating. Suggested learning opportunities (experience and training) include the following:

1) Create/document duration estimates to aid in project scheduling

a. Assess inputs, including resource requirement, resource capabilities, expert judgment, and historical information (for similar activity durations)

b. Use analogous or top-down estimating

c. Interpret simulations (e.g., results from Monte Carlo analysis)

d. Estimate the number of work periods and possible work duration ranges by considering both expected work time and elapsed time

e. Document the basis of activity duration estimates

f. Properly use activity duration estimates to develop a project schedule

2) Update the activity list to include the documentation of missing activities or activities requiring clarification/correction

G. Cost **Estimating**. Suggested learning opportunities (experience and trainino) include the followinq:

1) Develop cost estimates at an appropriate level of detail/summary

a. Assess inputs to the cost estimating process, including the WBS, resource requirements, resource rates, activity duration estimates, the organization's chart of accounts, expert judgment, and historical resource cost information

b. Determine resource rates

1. Understand the difference between cost estimating and pricing
2. Associate quantitative cost assessments with related resource requirement, using the chart of accounts
3. Solicit expert judgment

c. Determine appropriate estimating method (e.g., analogous, parametric, bottom-up, or computer-generated scenarios)

2) Document cost estimates and the cost baseline

a. Allocate overall cost estimates to individual work items

b. Assess inputs to the cost baseline development process, including the individual cost estimates, the WBS, and the project schedule

c. Establish the cost baseline to monitor cost performance

d. Understand the use of multiple cost baselines to measure different aspects of project cost performance over time

3) Verify that cost estimates are complete and associated with specific resource requirements

4) Develop/document a cost management plan

a. Determine how cost variances will be managed and understand tradeoffs inherent in life-cycle costing

b. Develop a cost change control system (e.g., rebaselining)

c. Determine appropriate performance measurement techniques (e.g., earned value)

H. Schedule **Development**. Suggested learning opportunities (experience and training) include the following:

1) Formulate project and resource calendars

2) Identify task leads, lags, and constraints

3) Assess inputs to the project schedule development process, including project network diagrams, activity duration estimates, resource pool descriptions, and resource requirements

4) Update assumptions, resource requirements, and schedule reserves, as needed

5) Select and perform the appropriate mathematical analyses, including the possible use of:

a. Critical path method

b. Graphical evaluation and review technique

c. Program evaluation and review technique

d. Duration compression techniques (crashing and fast tracking)

e. Simulation analysis

f. Resource leveling heuristics

g. Computer project management software

6) Understand the advantages and disadvantages of the different types of formats when developing and documenting project schedules, e.g., project network diagrams with schedule dates, bar or Gantt charts, milestone charts, and time-scaled network diagrams

7) Assess the completeness of a project schedule and use it to manage the project

8) Develop a schedule management plan, including establishment of a schedule baseline, documentation of how schedule variances will be managed, identification of schedule change control systems procedures, and definition of appropriate performance measures

I. Communication **Planning**. Suggested learning opportunities (experience and training) include the following:

1) Determine the information requirements of the project stakeholders
   a. Identify stakeholders and project/organization responsibility relationships
   b. Identify disciplines, departments, and specialties involved in or affected by the project
   c. Assess stakeholder logistic issues/document individual locations
   d. Identify external information needs
   e. Identify needs regarding the type/format of information, as well as the needs for related updates/corrections
   f. Avoid wasting resources and technology on unnecessary information
2) Determine the technologies or methods used to transmit information
   a. Identify the immediacy of the need, the expected level of project staffing, and the length of the project
   b. Identify the availability and potential acquisition of technology
   c. Identify the experience/expertise of the team to assess the need for communications technology-related training
   d. Identify the methods needed to transmit nonroutine communications
3) Develop a communications management plan that communicates stakeholder needs
   a. Define the appropriate collection techniques and filing structures
   b. Define the appropriate distribution structures
   c. Define the information to be distributed
   d. Determine required reports (e.g., status, progress, or forecasting)
   e. Develop schedule for information distribution
   f. Define the method for updating and refining the communications management plan
   g. Understand the close linkage between communications planning and organizational planning

J. Quality **Planning**. Suggested learning opportunities (experience and training) include the following:

1) Evaluate the performing organization's quality policy
2) Develop project quality policies
3) Use standard quality tools and techniques
   a. Use benefit/cost analysis to quantitatively evaluate alternative quality requirements
   b. Use benchmarking to generate ideas for improvement
   c. Use flowcharting to show systems element dependencies
   d. Use design of experiments to identify variables that have the most influence on the overall outcome
   e. Identify and use operational definitions (metrics)
   f. Identify any application area-specific standards and regulations
   g. Identify performance checklists as they relate to quality planning
4) Develop/document quality management plan describing how quality will be managed
   a. Assess inputs to the quality management plan development process, including the organizational quality policy, the project scope statement, relevant standards and regulations, and detailed product descriptions
   b. Maintain a flexible style in order to handle the iterative nature of quality management planning
   c. Address quality control, quality assurance, and quality improvement issues
   d. Convert implied scope statement needs into clearly stated quality requirements
5) Understand and manage quality-related inputs during project implementation, related to both the project and the product (of the project) as they affect other project planning processes

K. Organizational **Planning**. Suggested learning opportunities (experience and training) include the following:

1) Identify the organization's culture and style
2) Perform stakeholder needs analysis as a guide to the organizational planning process
3) Identify the organizational structure, and understand how different structures (e.g., strong matrix and weak matrix) can affect the project
4) Identify relevant reporting relationships
   a. Use templates from similar projects
   b. Use the organization's existing human resource practices as guidelines
5) Identify organizational role/responsibility assignment processes
6) Understand potential organizational effects resulting from project resource needs
7) Develop an organizational chart for project work
   a. Understand organizational interfaces/organizational units
   b. Understand technical interfaces/different technical disciplines
   c. Understand interpersonal interfaces/different individuals
   d. Properly use an organizational breakdown structure to evaluate unit responsibilities for specific work items on the project

L. Risk Management Planning. Suggested learning opportunities (experience and training) include the following:

1) Identify potential risk events and create checklists
   a. Identify sources of possible internal/external risk events (e.g., poor estimates, design errors, or poorly defined roles)
   b. Identify and classify potential risk events, ranges of possible outcomes, and risk interactions during various project phases
      1. Discrete or continuous
      2. Controllable or uncontrollable

3. Potential positive or negative outcomes
4. Estimated time when it will affect the project
5. Potential magnitude of losses or gains to the project
6. Potential alternative outcomes

c. Identify risk symptoms or triggers (e.g., poor morale due to impending schedule delay)
1. Document manifestations of risk events
2. Develop flowcharts to assess the cause and effect of risk

2) Quantify potential risk events
a. Determine risk tolerances for stakeholders
b. Estimate risk event probability and frequency
c. Estimate the risk event value and related range of project costs
d. Perform/assess simulation to analyze behavior/performance of the project system (e.g., schedule, costs)
e. Develop decision tree analyses to depict key interactions
f. Understand the limitations of risk quantification and avoid false impressions of risk assessment reliability
g. Assess risk tradeoffs between stakeholders
h. Calculate a range of total project costs

3) Develop risk responses
a. Develop alternative strategies to prevent or avoid risk events
b. Determine the feasibility of procurement to reduce risks
c. Develop contingency plans, implementation criteria, and alternative strategies
d. Determine the need for insurance coverage
e. Determine the need for reserves (e.g., management, schedule, or contingency), and determine how they will be triggered
f. Determine which risk events warrant responses, and manage risk response-related inputs to other processes
g. Update other processes affected by risk planning iterations

4) Develop/document a risk management plan
a. Identify parties responsible for managing various areas of risk
b. Determine how risk identification/quantification processes will be maintained
c. Determine reserve allocation processes
d. Document and update the appropriateness of specific risk event strategies (i.e., avoidance, mitigation, or acceptance)
e. Document potential differences in risk event estimates depending on the project phase
f. Develop criteria to assess the quality/completeness of risk documentation

M. Procurement **Planning**. Suggested learning opportunities (experience and training) include the following:

1) Determine who is responsible for project procurement activities

2) Identify what project needs are best met by procuring products and services using make-or-buy analysis

3) Assess inputs to the procurement planning process, including the scope statement, the product description, procurement resources, market condition analyses, and other planning outputs (e.g., quality management plans, the WBS, identified risks, and planned staffing levels)

4) Determine contract types and potential providers

5) Develop rating and scoring evaluation criteria

6) Conduct solicitation planning
a. Generate forms, including standard contracts, standard descriptions of procurement items, and standardized sections of bid documents
b. Assess the need for expert judgment
c. Understand the different types of procurement documents (e.g., invitation for bid, request for proposal, or request for quotes)

7) Develop descriptions (statements of work) to describe procurement items for potential providers to ensure comparability of seller responses
a. Provide sufficient detail based upon the expected contract form and buyer needs (including collateral service requirements)
b. Determine the appropriateness of multiple product/service item procurements
c. Manage statement of work updates/refinements

8) Develop/update the procurement management plan, including:
a. Source selection/contract type criteria
b. Contract administration procedures
c. Contract closeout procedures
d. Appropriate format/level of plan detail

N. Project Plan **Development**. Suggested learning opportunities (experience and training) include the following:

1) Define limiting constraints
a. Properly document the tradeoffs and decisions relating to competing objectives
b. Support decisions with technical documents/standards information
c. Utilize historical information

2) Define assumptions

3) Determine and define the project plan methodology, ranging from simple use of standard forms and templates to use of complex simulations
a. Understand the difference between hard tools (e.g., project management software) and soft tools (facilitation of meetings)
b. Understand the need for a structured approach to project planning
c. Ensure plan consistency with organizational policies

4) Update resource requirements and cost estimates
a. Recognize the need for update iterations throughout project execution

b. Understand the difference between dynamically updating the project plan and preserving the project performance measurement baseline

5) Develop a stakeholder management plan
   a. Identify all project stakeholders, needs, expectations, and objectives
   b. Determine the various roles of project stakeholders
   c. Determine the existing skills/knowledge of project stakeholders
   d. Assess the overall impact of stakeholders upon the project
   e. Determine how stakeholders should be managed
   f. Identify and evaluate relevant organizational policies

6) Define and use a project management information system to assist in the gathering, integration, and dissemination of the inputs and outputs of all project processes

7) Draft a project plan, including the project charter, documentation outlining the project management approach, the project execution plan, the scope statement, the WBS, budgets, schedules, responsibility assignments, performance measurement baselines, milestones, key staffing requirements, lists of key risks, risk-response plans, management review plans, and other subsidiary management plans

8) Use the project management plan to manage and control project execution

Executing the Project

A. Project Plan **Execution**. Suggested learning opportunities (experience and training) include the following:

1) Determine corrective actions and modify the current project plan, using a structured approach to project execution

2) Lead a project
   a. Create a vision for the project
   b. Develop strategies to achieve the vision
   c. Market the vision to align cooperation
   d. Formulate plans to motivate others and to implement change

3) Demonstrate communication skills
   a. Determine sender-receiver models (e.g., feedback loops and barriers)
   b. Determine choice of media (e.g., written/oral or formal/informal)
   c. Determine appropriate writing style (e.g., active or passive)
   d. Determine presentation techniques (e.g., use of body language or visual aids)
   e. Determine meeting techniques (e.g., use of agenda development or conflict resolution techniques)
   f. Use project information systems to provide project information
   g. Develop formats for and establish regularly scheduled project status reviews

4) Demonstrate negotiation skills and determine appropriate negotiating strategies (e.g., direct/assisted or mediation/arbitration)

5) Demonstrate problem-solving skills
   a. Define the causes/symptoms of the problem
   b. Analyze the problem
   c. Identify viable solutions
   d. Implement the decision

6) Demonstrate the ability to influence the broader organization
   a. Understand formal and informal organizational structures
   b. Utilize the power structure to influence behavior
   c. Utilize the political structure for collective action
   d. Coordinate/direct various technical/organizational interfaces
   e. Use appropriate organizational procedures in project work

7) Use appropriate work authorization systems/procedures for sanctioning project work and ensuring proper work sequencing

8) Assess needed skills/knowledge about the product, and monitor/react to project changes initiated from the sponsoring organizational unit

9) Identify and document work result outcomes, including completion of deliverables as well as work quality

10) Identify change requests, including project scope change

B. Scope **Verification**. Suggested learning opportunities (experience and training) include the following:

1) Conduct inspections, reviews, audits, and walkthroughs

2) Determine that work product results were completed correctly

3) Document the level and extent of deliverable completion, including any conditional acceptances

4) Document acceptance by stakeholders in a formally signed project scope acceptance statement

C. Quality **Assurance**. Suggested learning opportunities (experience and training) include the following:

1) Perform/assess quality control testing and measurement in a timely manner

2) Assess the benefits/costs of quality efforts

3) Record outcomes in a format for comparison and analysis

4) Determine appropriate actions needed to increase the project effectiveness and efficiency for the stakeholders

5) Identify/document lessons learned for improved performance

6) Implement quality improvements, using change control processes

D. Team **Development**. Suggested learning opportunities (experience and training) include the following:

1) Develop a cohesive project team
   a. Establish team policies and procedures
   b. Perform team-building activities
   c. Recognize the need for and implement collocation
   d. Foster a spirit of teamwork
   e. Encourage/obtain feedback
   f. Provide constructive advice
   g. Disseminate information among team members
   h. Reinforce words with actions
2) Measure team performance, and compare it with the project plan objectives
3) Define administer reward and recognition systems
4) Assess team members' strengths and weaknesses
   a. Identify areas/resources in need of training
   b. Identify and utilize internal or external training resources
   c. Schedule and implement team-member training
5) Assess individual or team performance improvements
6) Identify real and potential team conflicts/disputes
   a. Recognize stress
   b. Recognize the differences in personality traits and interests
   c. Recognize the effects of attitudes, emotions, and prejudices
   d. Recognize the differences among cultures
   e. Define processes to mediate and resolve conflicts/disputes
   f. Provide counseling to team members
   g. Balance members' dual accountability to functional managers and project managers
7) Provide input into individual performance appraisal
8) Rate/document employee performance
9) Conduct project team-review meetings
10) Enhance the individual and team skills of individual team members

E. Information **Distribution**. Suggested learning opportunities (experience and training) include the following:

1) Implement information distribution systems
2) Implement information retrieval systems
3) Respond to expected and unexpected information requests
4) Maintain project records
5) Distribute information to stakeholders in a timely manner, and ensure that clear communication has taken place

F. Source **Selection/Contract** Development. Suggested learning opportunities (experience and training) include the following:

1) Define the scope of services
2) Define terms of payrnent/invoicing requirements
3) Define changes, assignments, delays, and termination clauses
4) Define warranties, liabilities, indemnity, patent, and insurance clauses
5) Define time, schedule, completion dates, and other deadlines
6) Conduct bidder, contractor, vendor, and prebid conferences as appropriate
7) Assess the potential seller's ability and willingness to provide the requested products/services
8) Assess contract language for quality and completeness
9) Quantify qualitative data to aid in source selection

G. Contract Administration. Suggested learning opportunities (experience and training) include the following:

1) Recognize the legal implications of actions taken
2) Review contractor costs, schedules, and technical-performance levels
3) Determine appropriate reviews/approvals needed for payment
4) Compare submitted invoices against work performed/products delivered
5) Implement appropriate contract change control systems
6) Review contractor's change status reports
7) Disseminate contractual changes to appropriate parties
8) Determine/docurnent the achievement of contractual objectives
9) Maintain documentation of contractual correspondence
10) Integrate contract administration within the broader context of the project plan, quality control processes, and overall project performance-reporting systems
11) Monitor the payment system

Controlling the Project

A. Overall Change Control. Suggested learning opportunities (experience and training) include the following:

1) Determine that a change is needed and that change request documentation has been properly completed
2) Define the steps by which official project documents may be changed
   a. Identify the performing organization's change control system
   b. Define the powers/responsibilities of the change control board
   c. Define procedures to handle changes that may be approved without prior review

d. Define what constitutes *automatic* approval for selected defined categories of change

3) Determine that a change has occurred

4) Integrate project change across all areas of the project, using appropriate configuration management procedures

5) Assess whether variances from the plan require corrective action by:
   a. Identifying the need for new or revised cost estimates
   b. Modifying activity sequences
   c. Analyzing risk-response alternatives

6) Update/disseminate project plan modifications, including integration with various project baselines

7) Implement corrective action

8) Ensure that changes to the product scope are reflected in its definition

9) Employ proactive, structured change management procedures to properly influence a variety of project stakeholders

10) Document lessons learned from project integration, including:
   a. Causes of activities requiring corrective action
   b. Types of activities requiring corrective action
   c. Reasons for selecting certain corrective actions
   d. Classification of change types for subsequent analysis (e.g., external, errors and omission, or value-added change)

B. Scope Change **Control**. Suggested learning opportunities (experience and training) include the following:

1) Define the procedure by which the project scope may be changed

2) Assess the degree to which changes would affect the project scope

3) Implement a scope change control system

4) Determine any need for change in scope, and integrate related project events into the overall change control system

5) Log scope change characteristics

6) Identify and evaluate alternatives in/to scope modification

7) Implement approved changes, manage related work tasks, and integrate approved scope changes into other control processes (e.g., time, cost, or quality control processes)

8) Notify stakeholders affected by the scope change

9) Document lessons learned, including:
   a. Causes of activities leading to scope changes
   b. Types of scope changes
   c. Reasons for selecting specific corrective actions
   d. Classification of scope change types for further analysis

C. Schedule **Control**. Suggested learning opportunities (experience and training) include the following:

1) Define the procedure by which the project schedule may be changed

2) Implement a schedule change control system

3) Integrate schedule activities with overall change control system

4) Determine the need for a schedule change

5) Assess the magnitude of the schedule change and the potential need for rebaselining

6) Determine whether schedule updates require overall plan adjustments

7) Determine the need for schedule fast tracking or crashing

8) Influence the factors that can cause schedule change, and manage actual approved schedule changes when they occur

9) Initiate corrective actions to ensure that additional schedule changes are minimized

10) Integrate approved schedule changes with other project control processes

11) Notify all stakeholders affected by the schedule change

12) Document lessons learned, including:
   a. Causes of activities leading to schedule changes
   b. Types of schedule changes
   c. Reasons for selecting specific corrective actions
   d. Classification of schedule change causes for further analysis

D. Cost **Control**. Suggested learning opportunities (experience and training) include the following:

1) Define the procedure by which the cost baseline may be changed

2) Implement a cost change control system

3) Integrate cost changes with the overall change control system

4) Implement cost controls
   a. Monitor cost performance to detect variances from the plan
   b. Determine the reason for positive/negative variances
   c. Ensure that appropriate changes are correctly recorded in the cost baseline
   d. Prevent acceptance of incorrect, inappropriate, or unauthorized changes

5) Influence factors that can potentially cause cost changes

6) Revise cost estimates, and assess the degree to which the cost baseline has changed, using performance techniques such as earned value analysis

7) Issue budget updates to the approved cost baseline, and relate them to scope/schedule changes if applicable

8) Integrate approved cost changes with other project control processes

9) Assess estimates to completion for possible modification

10) Notify all stakeholders affected by cost changes

11) Document lessons learned, including:
   a. Causes of activities leading to cost change

b. Types of cost changes
c. Reasons for selecting specific corrective actions
d. Classification of cost-change causes for further analysis

E Quality **Control**. Suggested learning opportunities (experience and training) include the following:

1) Determine responsibility for quality control
2) Monitor specific project results, and ensure compliance with requirements (relevant quality standards), using appropriate checklists
3) Identify ways to eliminate causes of unsatisfactory results
   a. Implement immediate corrective actions when and where appropriate
   b. Determine preventative actions when and where appropriate
4) Conduct inspections, reviews, and walkthroughs and ensure that items are properly documented as accepted, rejected, or identified for rework
5) Determine if the process is in *control*, using control charts
6) Use appropriate techniques, including Pareto analysis, cause/effect diagrams, trend analysis, and statistical sampling, for inspections
7) Avoid rework-related project overruns
8) Implement process adjustments, and assess the success of quality-improvement efforts, using established change control processes
9) Ensure completion of all quality-related documentation

F. Performance Reporting. Suggested learning opportunities (experience and training) include the following:

1) Determine performance measurements and the appropriate format/level of detail for performance reporting
2) Conduct performance reviews
3) Generate and disseminate status, progress, and forecast reports to appropriate stakeholders
4) Implement change requests based upon performance reports
   a. Assess the completeness of change requests coming from the performance reporting process
   b. Utilize other change control processes as needed

G. Risk-Response **Control**. Suggested learning opportunities (experience and training) include the following:

1) Update risk events as part of the control process
2) Quantify actual risk events (for comparison with the risk plan)
3) Execute the risk management plan in order to respond to risk events throughout the course of the project
4) Implement workarounds for unplanned negative risk events
5) Develop additional risk responses if planned risk responses are inadequate
6) Evaluate the magnitude of actual risk events in order to assess the reliability of previous risk estimates
7) Update the risk management plan, including both adjustments to risk probabilities and to risk values

Closing the Project

A. Administrative **Closeout**. Suggested learning opportunities (experience and training) include the following:

1) Implement closure at the end phase of the project by:
   a. Collecting all project records
   b. Documenting the degree to which each project phase was properly closed after its completion
   c. Verifying all project results in preparation for formal acceptance
   d. Completing punch lists
2) Document performance measures resulting from performance reviews, variance, trend, and earned value analyses
3) Document the final project scope by reviewing final specifications and analyzing project success and effectiveness
4) Document lessons learned
5) Formalize acceptance/signoff of the product by the sponsor, client, or customer
6) Perform final appraisal reviews of team members
7) Archive project documentation for historical files

B Contract **Closeout**. Suggested learning opportunities (experience and training) include the following:

1) Assess the quality and completeness of the contract file
2) Verify product/service acceptance
3) Incorporate administrative closeout into contract closeout process, including:
   a. Updating records based upon final contract results
   b. Indexing and archiving contract information
   c. Identifying special case closeouts, such as early terminations
4) Provide contract documentation/verification of complete and satisfactory work results
5) Notify seller of contract completion, and obtain formal acceptance from seller
6) Conduct a structured review of the procurement process (e.g., a procurement audit)

Appendix A:
PMBOK® Guide Glossary

1. Inclusions and Exclusions

This glossary includes terms that are:

- Unique or nearly unique to project management (e.g., scope statement, work package, work breakdown structure, critical path method).
- Not unique to project management, but used differently or with a narrower meaning in project management than in general everyday usage (e.g., early start date, activity, task).

This glossary generally does not include:

- Application area-specific terms (e.g., project prospectus as a legal document—unique to real estate development).
- Terms whose use in project management do not differ in any material way from everyday use (e.g., contract).
- Compound terms whose meaning is clear from the combined meanings of the component parts.

  Variants when the meaning of the variant is clear from the base term (e.g., *exception* report is included, *exception* reporting is not).

As a result of the above inclusions and exclusions, this glossary includes:

- A preponderance of terms related to Project Scope Management and Project Time Management, since many of the terms used in these two knowledge areas are unique or nearly unique to project management.
- Many terms from Project Quality Management, since these terms are used more narrowly than in their everyday usage.
- Relatively few terms related to Project Human Resource Management, Project Risk Management, and Project Communications Management, since most of the terms used in these knowledge areas do not differ significantly from everyday usage.
- Relatively few terms related to Project Cost Management and Project Procurement Management, since many of the terms used in these knowledge areas have narrow meanings that are unique to a particular application area.

2. Common Acronyms

ACWP	Actual Cost of Work Performed
AD	Activity Description
ADM	Arrow Diagramming Method
AF	Actual Finish date
AOA	Activity-On-Arrow
AON	Activity-On-Node
AS	Actual Start date
BAC	Budget At Completion
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
CCB	Change Control Board
CPFF	Cost Plus Fixed Fee
CPIF	Cost Plus Incentive Fee
CPI	Cost Performance Index
CPM	Critical Path Method
CV	Cost Variance
DD	Data Date
DU	Duration
EAC	Estimate At Completion
EF	Early Finish date
ES	Early Start date
ETC	Estimate (or Estimated) To Complete (or Completion)
EV	Earned Value
FF	Free Float or Finish-to-Finish
FFP	Firm Fixed Price
FPIF	Fixed Price Incentive Fee
FS	Finish-to-Start
GERT	Graphical Evaluation and Review Technique
IFB	Invitation For Bid
LF	Late Finish date
LOE	Level Of Effort
LS	Late Start date
MPM	Modern Project Management
OBS	Organization(al) Breakdown Structure
PC	Percent Complete
PDM	Precedence Diagramming Method
PERT	Program Evaluation and Review Technique
PF	Planned Finish date
PM	Project Management or Project Manager
PMBOK	Project Management Body of Knowledge
PMP	Project Management Professional
PS	Planned Start date
QA	Quality Assurance
QC	Quality Control
RAM	Responsibility Assignment Matrix

RDU	Remaining Duration
RFP	Request For Proposal
RFQ	Request For Quotation
SF	Scheduled Finish date or Start-to-Finish
SOW	Statement Of Work
SPI	Schedule Performance Index
SS	Scheduled Start date or Start-to-Start
SV	Schedule Variance
TC	Target Completion date
TF	Total Float or Target Finish date
TS	Target Start date
TQM	Total Quality Management
WBS	Work Breakdown Structure

3. Definitions

Many of the words defined here have broader, and in some cases different, dictionary definitions.

The definitions use the following conventions:

- Terms used as part of the definitions, and are defined in the glossary, are shown in italics.
- When synonyms are included, no definition is given and the reader is directed to the preferred term (ie., see *preferred* term).

Related terms that are not synonyms are cross-referenced at the end of the definition (ie., see also related term).

Accountability Matrix. See *responsibility* assignment matrix.

Activity. An element of work performed during the course of a project. An activity normally has an expected duration, an expected cost, and expected resource requirements. Activities are often subdivided into tasks.

Activity Definition. Identifying the specific activities that must be performed in order to produce the various project deliverables.

Activity Description (AD). A short phrase or label used in a project network diagram. The activity description normally describes the scope of work of the activity.

Activity Duration Estimating. Estimating the number of work periods which will be needed to complete individual activities.

Activity-On-Arrow (AOA). See arrow diagramming method.

Activity-On-Node (AON). See precedence diagramming method.

Actual Cost of Work Performed (ACWP). Total costs incurred (direct and indirect) in accomplishing work during a given time period. See also earned value.

Actual Finish Date (AF). The point in time that work actually ended on an activity. (Note: in some application areas, the activity is considered "finished" when work is "substantially complete.")

Actual Start Date (AS). The point in time that work actually started on an activity.

Administrative Closure. Generating, gathering, and disseminating information to formalize project completion.

Application Area. A category of projects that have common elements not present in all projects. Application areas are usually defined in terms of either the product of the project (i.e., by similar technologies or industry sectors) or the type of customer (e.g., internal vs. external, government vs. commercial). Application areas often overlap.

Arrow. The graphic presentation of an activity. See also arrow diagramming method.

Arrow Diagramming Method (ADM). A network diagramming technique in which activities are represented by arrows. The tail of the arrow represents the start and the head represents the finish of the activity (the length of the arrow does not represent the expected duration of the activity). Activities are connected at points called nodes (usually drawn as small circles) to illustrate the sequence in which the activities are expected to be performed. See also precedence diagramming method.

As-of Date. See data date.

Backward Pass. The calculation of late finish dates and late start dates for the uncompleted portions of all network activities. Determined by working backwards through the network logic from the project's end date. The end date may be calculated in a *forward pass* or set by the customer or sponsor. See also *network analysis*.

Bar Chart. A graphic display of schedule-related information. In the typical bar chart, activities or other project elements are listed down the left side of the chart, dates are shown across the top, and activity durations are shown as date-placed horizontal bars. Also called a Gantt chart.

Baseline. The original plan (for a project, a work package, or an activity), plus or minus approved changes. Usually used with a modifier (e.g., cost baseline, schedule baseline, performance measurement baseline).

Baseline Finish Date. See scheduled finish date.

Baseline Start Date. See scheduled start date.

Budget At Completion (BAC). The estimated total cost of the project when done.

Budget Estimate. See estimate.

Budgeted Cost of Work Performed (BCWP). The sum of the approved cost estimates (including any overhead allocation) for activities (or portions of activities) completed during a given period (usually project-to-date). See also earned value.

Budgeted Cost of Work Scheduled (BCWS). The sum of the approved cost estimates (including any overhead allocation) for activities (or portions of activities) scheduled to be performed during a given period (usually project-to-date). See also earned value.

Calendar Unit. The smallest unit of time used in scheduling the project. Calendar units are generally in hours, days, or weeks, but can also be in shifts or even in minutes. Used primarily in relation to project management software.

Change Control Board (CCB). A formally constituted group of stakeholders responsible for approving or rejecting changes to the project baselines.

Change in Scope. See scope change.

Chart of Accounts. Any numbering system used to monitor project costs by category (e.g., labor, supplies, materials). The project chart of accounts is usually based upon the corporate chart of accounts of the primary performing organization. See also code of accounts.

Charter. See project charter.

Code of Accounts. Any numbering system used to uniquely identify each element of the work breakdown *structure*. See also chart of accounts.

Communications Planning. Determining the information and communications needs of the project stakeholders.

Concurrent Engineering. An approach to project staffing that, in its most general form, calls for implementors to be involved in the design phase. Sometimes confused with fast tracking.

Contingencies. See reserve and contingency planning.

Contingency Allowance. See reserve.

Contingency **Planning.** The development of a management plan that identifies alternative strategies to be used to ensure project success if specified risk events occur.

Contingency Reserve. A separately planned quantity used to allow for future situations which may be planned for only in part (sometimes called "known unknowns"). For example, rework is certain, the amount of rework is not. Contingency reserves may involve cost, schedule, or both. Contingency reserves are intended to reduce the impact of missing cost or schedule objectives. Contingency reserves are normally included in the project's cost and schedule baselines.

Contract. A contract is a mutually binding agreement which obligates the seller to provide the specified product and obligates the buyer to pay for it. Contracts generally fall into one of three broad categories:

- Fixed price or lump sum contracts — this category of contract involves a fixed total price for a well-defined product. Fixed price contracts may also include incentives for meeting or exceeding selected project objectives such as schedule targets.
- Cost reimbursable contracts — this category of contract involves payment (reimbursement) to the contractor for its actual costs. Costs are usually classified as direct costs (costs incurred directly by the project, such as wages for members of the project team) and indirect costs (costs allocated to the project by the performing organization as a cost of doing business, such as salaries for corporate executives). Indirect costs are usually calculated as a percentage of direct costs. Cost reimbursable contracts often include incentives for meeting or exceeding selected project objectives such as schedule targets or total cost.
- Unit price contracts — the contractor is paid a preset amount per unit of service (e.g., $70 per hour for professional services or $1.08 per cubic yard of earth removed) and the total value of the contract is a function of the quantities needed to complete the work.

Contract Administration. Managing the relationship with the seller.

Contract Close-out. Completion and settlement of the contract, including resolution of all outstanding items.

Control. The process of comparing actual performance with planned performance, analyzing variances, evaluating possible alternatives, and taking appropriate corrective action as needed.

Control Charts. Control charts are a graphic display of the results, over time and against established control limits, of a process. They are used to determine if the process is "in control" or in need of adjustment.

Corrective Action. Changes made to bring expected future performance of the project into line with the plan.

Cost Budgeting. Allocating the cost estimates to individual project components.

Cost Control. Controlling changes to the project budget.

Cost Estimating. Estimating the cost of the resources needed to complete project activities.

Cost of **Quality.** The costs incurred to ensure quality. The cost of quality includes quality planning, quality control, quality assurance, and rework.

Cost Performance Index **(CPI).** The ratio of budgeted costs to actual costs (BCWP/ACWP). CPI is often used to predict the magnitude of a possible cost overrun using the following formula: original cost estimate/CPI = projected cost at completion. See also earned value.

Cost Plus **Fixed Fee (CPFF)** Contract. A type of contract where the buyer reimburses the seller for the seller's allowable costs (allowable costs are defined by the contract) plus a fixed amount of profit (fee).

Cost Plus Incentive Fee **(CPIF) Contract.** A type of contract where the buyer reimburses the seller for the seller's allowable costs (allowable costs are defined by the contract), and the seller earns its profit if it meets defined performance criteria.

Cost Variance **(CV).** (1) Any difference between the estimated cost of an activity and the actual cost of that activity. (2) In earned value, BCWP less ACWP.

Crashing. Taking action to decrease the total project duration after analyzing a number of alternatives to determine how to get the maximum duration compression for the least cost.

Critical Activity. Any activity on a *critical path*. Most commonly determined by using the *critical path method*. Although some activities are "critical" in the dictionary sense without being on the critical path, this meaning is seldom used in the project context.

Critical Path. In a *project network diagram*, the series of activities which determines the earliest completion of the project. The critical path will generally change from time to time as activities are completed ahead of or behind schedule. Although normally calculated for the entire project, the critical path can also be determined for a milestone or *subproject*. The critical path is usually defined as those activities with float less than or equal to a specified value, often zero. See critical path method.

Critical Path Method **(CPM).** A *network analysis* technique used to predict project duration by analyzing which sequence of activities (which path) has the least amount of scheduling flexibility (the least amount of float). Early dates are calculated by means of a *forward pass* using a specified start date. Late dates are calculated by means of a backward pass starting from a specified completion date (usually the forward pass's calculated project early finish date).

Current Finish **Date.** The current estimate of the point in time when an activity will be completed.

Current Start **Date.** The current estimate of the point in time when an activity will begin.

Data Date **(DD).** The point in time that separates actual (historical) data from future (scheduled) data. Also called as-of date.

Definitive Estimate. See estimate.

Deliverable. Any measurable, tangible, verifiable outcome, result, or item that must be produced to complete a project or part of a project. Often used more narrowly in reference to an *external deliverable*, which is a deliverable that is subject to approval by the project sponsor or customer.

Dependency. See logical relationship.

Dummy Activity. An activity of zero duration used to show a logical relationship in the arrow diagramming method. Dummy activities are used when logical relationships cannot be completely or correctly described

with regular activity arrows. Dummies are shown graphically as a dashed line headed by an arrow.

Duration **(DU).** The number of work periods (not including holidays or other non-working periods) required to complete an activity or other project element. Usually expressed as workdays or workweeks. Sometimes incorrectly equated with elapsed time. See also effort.

Duration **Compression.** Shortening the project schedule without reducing the project scope. Duration compression is not always possible and often requires an increase in project cost.

Early Finish Date **(EF).** In the critical path *method,* the earliest possible point in time on which the uncompleted portions of an activity (or the project) can finish based on the network logic and any schedule constraints. Early finish dates can change as the project progresses and changes are made to the project plan.

Early Start Date **(ES).** In the critical path *method,* the earliest possible point in time on which the uncompleted portions of an activity (or the project) can start, based on the network logic and any schedule constraints. Early start dates can change as the project progresses and changes are made to the project plan.

Earned Value (EV). (1) A method for measuring project performance. It compares the amount of work that was planned with what was actually accomplished to determine if cost and schedule performance is as planned. See also actual cost of work performed, budgeted cost of work scheduled, budgeted cost of work performed, cost variance, cost performance index, schedule variance, and schedule performance index. (2) The budgeted cost of work performed for an activity or group of activities.

Earned Value Analysis. See definition (1) under earned value.

Effort. The number of labor units required to complete an activity or other project element. Usually expressed as staff hours, staff days, or staff weeks. Should not be confused with duration.

Estimate. An assessment of the likely quantitative result. Usually applied to project costs and durations and should always include some indication of accuracy (e.g., ± x percent). Usually used with a modifier (e.g., preliminary, conceptual, feasibility). Some application areas have specific modifiers that imply particular accuracy ranges (e.g., order-of-magnitude estimate, budget estimate, and definitive estimate in engineering and construction projects).

Estimate At Completion **(EAC).** The expected total cost of an activity, a group of activities, or of the project when the defined scope of work has been completed. Most techniques for forecasting EAC include some adjustment of the original cost estimate based on project performance to date. Also shown as "estimated at completion." Often shown as EAC = Actuals-to-date + ETC. See also earned value and estimate to complete.

Estimate To Complete **(ETC).** The expected additional cost needed to complete an activity, a group of activities, or the project. Most techniques for forecasting ETC include some adjustment to the original estimate based on project performance to date. Also called "estimated to complete." See also earned value and estimate at completion.

Event-on-Node. A network diagramming technique in which events are represented by boxes (or nodes) connected by arrows to show the sequence in which the events are to occur. Used in the original Program Evaluation and Review Technique.

Exception Report. Document that includes only major variations from plan (rather than all variations).

Expected Monetary **Value.** The product of an event's probability of occurrence and the gain or loss that will result. For example, if there is a 50 percent probability that it will rain, and rain will result in a $100 loss, the expected monetary value of the rain event is $50 (.5 x $100).

Fast Tracking. Compressing the project schedule by overlapping activities that would normally be done in sequence, such as design and construction. Sometimes confused with concurrent engineering.

Finish Date. A point in time associated with an activity's completion. Usually qualified by one of the following: actual, planned, estimated, scheduled, early, late, baseline, target or current.

Finish-to-Finish **(FF).** See logical relationship.

Finish-to-Start **(FS).** See logical relationship.

Firm Fixed Price **(FFP) Contract.** A type of contract where the buyer pays the seller a set amount (as defined by the contract) regardless of the seller's costs.

Fixed Price Contract. See *firm* fixed price contract.

Fixed Price Incentive Fee **(FPIF)** Contract. A type of contract where the buyer pays) the seller a set amount (as defined by the contract), and the seller can earn an additional amount if it meets defined performance criteria.

Float. The amount of time that an activity may be delayed from its early start without delaying the project finish date. Float is a mathematical calculation and can change as the project progresses and changes are made to the project plan. Also called slack, total float, and path float. See also free float.

Forecast Final Cost. See estimate at completion.

Forward **Pass.** The calculation of the early start and early finish dates for the uncompleted portions of all network activities. See also network analysis and backward pass.

Fragnet. See *subnet.*

Free Float **(FF).** The amount of time an activity can be delayed without delaying the early start of any immediately following activities. See also float.

Functional Manager. A manager responsible for activities in a specialized department or function (e.g., engineering, manufacturing, marketing).

Functional Organization. An organization structure in which staff are grouped hierarchically by specialty (e.g., production, marketing, engineering, and accounting at the top level; with engineering, further divided into mechanical, electrical, and others).

Gantt Chart. See bar chart.

Grade. A category or rank used to distinguish items that have the same functional use (e.g., "hammer") but do not share the same requirements for quality (e.g., different hammers may need to withstand different amounts of force).

Graphical Evaluation and Review Technique (GERT). A network analysis technique that allows for conditional and probabilistic treatment of logical relationships (i.e., some activities may not be performed).

Hammock. An aggregate or summary activity (a group of related activities is shown as one and reported at a summary level). A hammock may or may not have an internal sequence. See also subproject and *subnet.*

Hanger. An unintended break in a *network path.* Hangers are usually caused by missing *activities* or missing *logical relotionships.*

Information Distribution. Making needed information available to project stakeholders in a timely manner.

Initiation. Committing the organization to begin a project phase.

Integrated **Cost/Schedule** Reporting. See *eamed value.*

Invitation for Bid **(IFB).** Generally, this term is equivalent to *request for proposal.* However, in some application areas it may have a narrower or more specific meaning.

Key Event Schedule. See *masterschedule.*

Lag. A modification of a *logical relationship* which directs a delay in the successor task. For example, in a finish-to-start dependency with a 10-day lag, the successor activity cannot start until 10 days after the predecessor has finished. See also *lead.*

Late Finish Date **(LF).** In the *critical path method,* the latest possible point in time that an activity may be completed without delaying a specified milestone (usually the project finish date).

Late Start Date **(LS).** In the *critical path method,* the latest possible point in time that an activity may begin without delaying a specified milestone (usually the project finish date).

Lead. A modification of a *logical relationship* which allows an acceleration of the successor task. For example, in a finish-to-start dependency with a 10-day lead, the successor activity can start 10 days before the predecessor has finished. See also *lag.*

Level of Effort (LOE). Support-type activity (e.g., vendor or customer liaison) that does not readily lend itself to measurement of discrete accomplishment. It is generally characterized by a uniform rate of activity over a specific period of time.

Leveling. See *resource leveling.*

Life-cycle **Costing.** The concept of including acquisition, operating, and disposal costs when evaluating various alternatives.

Line Manager. (1) *The* manager of any group that actually makes a product or performs a service. (2) A *functional manages*

Link. See *logical relationship.*

Logic. See *network logic.*

Logic Diagram. See *project network diagram.*

Logical Relationship. A dependency between two project activities, or between a project activity and a milestone. See also *precedence relationship.* The four possible types of logical relationships are:

- Finish-to-start—the "from" activity must finish before the "to" activity can start.
- Finish-to-finish—the "from" activity must finish before the "to" activity can finish.
- Start-to-start—the "from" activity must start before the "to" activity can start.
- Start-to-finish—the "from" activity must start before the "to" activity can finish.

Loop. A *network path* that passes the same node twice. Loops cannot be analyzed using traditional *network analysis* techniques such as *CPM* and *PERT.* Loops are allowed in *GERT.*

Management Reserve. A separately planned quantity used to allow for future situations which are impossible to predict (sometimes called "unknown unknowns"). Management reserves may involve cost or schedule. Management reserves are intended to reduce the risk of missing cost or schedule objectives. Use of management reserve requires a change to the project's cost baseline.

Master **Schedule.** A *summary-level schedule* which identifies the major activities and key milestones. See also *milestone schedule.*

Mathematical Analysis. See *network analysis.*

Matrix **Organization.** Any organizational structure in which the project manager shares responsibility with the functional managers for assigning priorities and for directing the work of individuals assigned to the project.

Milestone. A significant event in the project, usually completion of a major deliverable.

Milestone Schedule. A summary-level schedule which identifies the major milestones. See also *master schedule.*

Mitigation. Taking steps to lessen risk by lowering the probability of a risk event's occurrence or reducing its effect should it occur.

Modern Project Management **(MPM).** A term used to distinguish the current broad range of project management (scope, cost, time, quality, risk, etc.) from narrower, traditional use that focused on cost and time.

Monitoring. The capture, analysis, and reporting of project performance, usually as compared to plan.

Monte **Carlo Analysis.** A schedule risk assessment technique that performs a project simulation many times in order to calculate a distribution of likely results.

Near-Critical Activity. An *activity that* has low total *float.*

Network. See *project network diagram.*

Network **Analysis.** The process of identifying early and late start and finish dates for the uncompleted portions of project activities. See also *Critical Path Method, Program Evaluation and Review Technique,* and *Graphical Evaluation and Review Technique.*

Network **Logic.** The collection of activity dependencies that make up a *project network diagram.*

Network Path. Any continuous series of connected activities in a *project network diagram.*

Node. One of the defining points of a network; a junction point joined to some or all of the other dependency lines. See also *arrow diagramming method* and *precedence diagramming method.*

Order of Magnitude Estimate. See *estimate.*

Organizational Breakdown Structure **(OBS).** A depiction of the project organization arranged so as to relate *work packages* to organizational units.

Organizational Planning. Identifying, documenting, and assigning project roles, responsibilities, and reporting relationships.

Overall Change **Control.** Coordinating changes across the entire project.

Overlap. See *lead.*

Parametric Estimating. An estimating technique that uses a statistical relationship between historical data and other variables (e.g., square footage in construction, lines of code in software development) to calculate an estimate.

Pareto Diagram. A histogram, ordered by frequency of occurrence, that shows how many results were generated by each identified cause.

Path. A set of sequentially connected activities in a *project network diagrom.*

Path Convergence. In mathematical analysis, the tendency of parallel paths of approximately equal duration to delay the completion of the milestone where they meet.

Path Float. See *float.*

Percent Complete (PC). An estimate, expressed as a percent, of the amount of work which has been completed on an activity or group of activities.

Performance Reporting. Collecting and disseminating information about project performance to help ensure project progress.

Performing **Organization.** The enterprise whose employees are most directly involved in doing the work of the project.

PERT Chart. A specific type of *project network diagram.* See *Program Evaluation and Review Technique.*

Phase. See *project phase.*

Planned Finish Date **(PF).** See *scheduled finish date.*

Planned Start Date **(PS).** See *scheduled start date.*

Precedence Diagramming Method **(PDM).** A network diagramming technique in which activities are represented by boxes (or nodes). Activities are linked by *precedence relationships* to show the sequence in which the activities are to be performed.

Precedence **Relationship.** The term used in the *precedence diagramming method* for a *logical relationship.* In current usage, however, precedence relationship, logical relationship, and dependency are widely used interchangeably regardless of the diagramming method in use.

Predecessor Activity. (1) In the *arrow diogrammingmethod,* the activity which enters a *node.* (2) In the *precedence diagramming method,* the "from" activity.

Procurement Planning. Determining what to procure and when.

Program. A group of related projects managed in a coordinated way. Programs usually include an element of ongoing activity.

Program Evaluation and Review Technique (PERT). An event-oriented *network analysis* technique used to estimate project duration when there is a high degree of uncertainty with the individual activity duration estimates. PERT applies the *critical path method* to a weighted average duration estimate. Also given as *Program Evaluation and Review Technique.*

Project. A temporary endeavor undertaken to create a unique product or service.

Project Charter. A document issued by senior management that provides the project manager with the authority to apply organizational resources to project activities.

Project Communications Management. A subset of project management that includes the processes required to ensure proper collection and dissemination of project information. It consists of *communications planning, information distribution, performance reporting,* and *administrative closure.*

Project Cost Management. A subset of project management that includes the processes required to ensure that the project is completed within the approved budget. It consists of *resource planning, cost estimating, cost budgeting,* and *cost control.*

Project Human Resource Management. A subset of project management that includes the processes required to make the most effective use of the people involved with the project. It consists of *organizational planning, staff acquisition,* and *team development.*

Project Integration Management. A subset of project management that includes the processes required to ensure that the various elements of the project are properly coordinated. It consists of *project plan development, project plan execution,* and *overall change control.*

Project Life **Cycle.** A collection of generally sequential *project phases* whose name and number are determined by the control needs of the organization or organizations involved in the project.

Project Management **(PM).** The application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project.

Project Management Body of Knowledge (PMBOK). An inclusive term that describes the sum of knowledge within the profession of project management. As with other professions such as law, medicine, and accounting, the body of knowledge rests with the practitioners and academics who apply and advance it. The PMBOK includes proven, traditional practices which are widely applied as well as innovative and advanced ones which have seen more limited use.

Project Management Professional **(PMP).** An individual certified as such by the Project Management Institute.

Project Management **Software.** A class of computer applications specifically designed to aid with planning and controlling project costs and schedules.

Project Management **Team.** The members of the project team who are directly involved in project management activities. On some smaller projects, the project management team may include virtually all of the *project team members.*

Project Manager **(PM).** The individual responsible for managing a project.

Project Network Diagram. Any schematic display of the logical relationships of project activities. Always drawn from left to right to reflect project chronology. Often incorrectly referred to as a "PERT chart."

Project Phase. A collection of logically related project activities, usually culminating in the completion of a major *deliverable.*

Project **Plan.** A formal, approved document used to guide both project execution and project control. The primary uses of the project plan are to document planning assumptions and decisions, to facilitate communication among stakeholders, and to document approved scope, cost, and schedule baselines. A project plan may be summary or detailed.

Project Plan **Development.** Taking the results of other planning processes and putting them into a consistent, coherent document.

Project Plan Execution. Carrying out the project plan by performing the activities included therein.

Project **Planning.** The development and maintenance of the *project plan.*

Project Procurement Management. A subset of project management that includes the processes required to acquire goods and services from outside the performing organization. It consists of *procurement planning, solicitation planning, solicitation, source selection, contract administration,* and *contract close-out.*

Project Quality Management. A subset of project management that includes the processes required to ensure that the project will satisfy the needs for which it was undertaken. It consists of *quality planning, quality assurance,* and *quality control.*

Project Risk Management. A subset of project management that includes the processes concerned with identifying, analyzing, and responding to project risk. It consists of *risk identification, risk quantification, risk response development,* and *risk response control.*

Project Schedule. The planned dates for performing activities and the planned dates for meeting milestones.

Project Scope Management. A subset of project management that includes the processes required to ensure that the project includes all of the work required, and only the work required, to complete the project successfully. It consists of *initiation, scope planning, scope definition, scope verification,* and *scope change control.*

Project Team Members. The people who report either directly or indirectly to the project manager.

Project Time Management. A subset of project management that includes the processes required to ensure timely completion of the project. It consists of *activity definition, activity sequencing, activity duration estimating, schedule development,* and *schedule control.*

Projectized Organization. Any organizational structure in which the project manager has full authority to assign priorities and to direct the work of individuals assigned to the project.

Quality Assurance (QA). (1) The process of evaluating overall project performance on a regular basis to provide confidence that the project will satisfy the relevant quality standards. (2) The organizational unit that is assigned responsibility for quality assurance.

Quality Control (QC). (1) The process of monitoring specific project results to determine if they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory performance. (2) The organizational unit that is assigned responsibility for quality control.

Quality Planning. Identifying which quality standards are relevant to the project and determining how to satisfy them.

Remaining Duration (RDU). The time needed to complete an activity.

Request for Proposal (RFP). A type of bid document used to solicit proposals from prospective sellers of products or services. In some application areas it may have a narrower or more specific meaning.

Request for Quotation (RFQ). Generally, this term is equivalent to *request for proposal.* However, in some application areas it may have a narrower or more specific meaning.

Reserve. A provision in the project plan to mitigate cost and/or schedule risk. Often used with a modifier (e.g., *management reserve, contingency reserve*) to provide further detail on what types of risk are meant to be mitigated. The specific meaning of the modified term varies by *application area.*

Resource Leveling. Any form of *network analysis* in which scheduling decisions (start and finish dates) are driven by resource management concerns (e.g., limited resource availability or difficult-to-manage changes in resource levels).

Resource-Limited Schedule. A project schedule whose start and finish dates reflect expected resource availability. The final project schedule should always be resource-limited.

Resource Planning. Determining what resources (people, equipment, materials) are needed in what quantities to perform project activities.

Responsibility Assignment Matrix (RAM). A structure which relates the project organization structure to the *work breakdown structure* to help ensure that each element of the project's scope of work is assigned to a responsible individual.

Responsibility Chart. See *responsibility assignment matrix.*

Responsibility Matrix. See *responsibility assignment matrix.*

Retainage. A portion of a contract payment that is held until contract completion in order to ensure full performance of the contract terms.

Risk Event. A discrete occurrence that may affect the project for better or worse.

Risk Identification. Determining which risk events are likely to affect the project.

Risk Quantification. Evaluating the probability of risk event occurrence and effect.

Risk Response Control. Responding to changes in risk over the course of the project.

Risk Response Development. Defining enhancement steps for opportunities and mitigation steps for threats.

S-Curve. Graphic display of cumulative costs, labor hours, or other quantities, plotted against time. The name derives from the S-like shape of the curve (flatter at the beginning and end, steeper in the middle) produced on a project that starts slowly, accelerates, and then tails off.

Schedule. See *project schedule.*

Schedule Analysis. See *network analysis.*

Schedule Compression. See *duration compression.*

Schedule Control. Controlling changes to the project schedule.

Schedule Development. Analyzing activity sequences, activity durations, and resource requirements to create the project schedule.

Schedule Performance Index (SPI). The ratio of work performed to work scheduled (BCWP/BCWS). See *earned value.*

Schedule Variance (SV). (1) Any difference between the scheduled completion of an activity and the actual completion of that activity. (2) In *earned value,* BCWP less BCWS.

Scheduled Finish Date (SF). The point in time work was scheduled to finish on an activity. The scheduled finish date is normally within the range of dates delimited by the *early finish date* and the *late finish date.*

Scheduled Start Date (SS). The point in time work was scheduled to start on an activity. The scheduled start date is normally within the range of dates delimited by the *early start date* and the *late start date.*

Scope. The sum of the products and services to be provided as a project.

Scope Baseline. See *baseline.*

Scope Change. Any change to the project scope. A scope change almost always requires an adjustment to the project cost or schedule.

Scope Change Control. Controlling changes to project scope.

Scope Definition. Decomposing the major deliverables into smaller, more manageable components to provide better control.

Scope Planning. Developing a written scope statement that includes the project justification, the major deliverables, and the project objectives.

Scope Verification. Ensuring that all identified project deliverables have been completed satisfactorily.

Should-Cost Estimates. An *estimate* of the cost of a product or service used to provide an assessment of the reasonableness of a prospective contractor's proposed cost.

Slack. Term used in *PERT* for *float*.

Solicitation. Obtaining quotations, bids, offers, or proposals as appropriate.

Solicitation Planning. Documenting product requirements and identifying potential sources.

Source Selection. Choosing from among potential contractors.

Staff Acquisition. Getting the human resources needed assigned to and working on the project.

Stakeholder. Individuals and organizations who are involved in or may be affected by project activities.

Start Date. A point in time associated with an activity's start, usually qualified by one of the following: actual, planned, estimated, scheduled, early, late, target, baseline, or current.

Start-to-Finish. See *logical relationship.*

Start-to-Start. See *logical relationship.*

Statement of Work (SOW). A narrative description of products or services to be supplied under contract.

Subnet. A subdivision of a *project network diagram* usually representing some form of subproject.

Subnetwork. See *subnet.*

Successor Activity. (1) In the *arrow diagramming method,* the activity which departs a node. *(2)* In the *precedence diagramming method,* the "to" activity.

Target Completion Date (TC). An imposed date which constrains or otherwise modifies the *network analysis*.

Target Schedule. See *baseline.*

Task. See *activity.*

Team Development. Developing individual and group skills to enhance project performance.

Team Members. See *project team members.*

Time-Scaled Network Diagram. Any *project network diagram* drawn in such a way that the positioning and length of the activity represents its duration. Essentially, it is a bar chart that includes *network logic.*

Target Finish Date (TF). The date work is planned (targeted) to finish on an activity.

Target Start Date (TS). The date work is planned (targeted) to start on an activity.

Total Float (TF). See *float.*

Total Quality Management (TQM). A common approach to implementing a quality improvement program within an organization.

Workaround. A response to a negative risk event. Distinguished from *conringency plan* in that a workaround is not planned in advance of the occurrence of the risk event.

Work Breakdown Structure (WBS). A deliverable-oriented grouping of project elements which organizes and defines the total scope of the project. Each descending level represents an increasingly detailed definition of a project component. Project components may be products or services.

Work Item. See *activity.*

Work Package. A deliverable at the lowest level of the *work breakdown structure.* A work package may be divided into activities.

Appendix B:
Additional Resources

The following publications are additional resources that certification candidates can use to gain information on project management theory, principles, techniques, and procedures. The PMP® Resource Package-Lite contains the seven Project Management Institute (PMI®) published books, while the full package also contains four books from commercial publishers.

PMP Resource Package

- ***Earned Value Project Management*** by Quentin W. Fleming and Joel M. Koppelman

What did we get for the dollars we spent? Project owners ask project managers this key question. In Earned Value *Project Management,* Fleming and Koppelman present an old management tool in a new guise to help the manager answer the question and answer it accurately. Earned value calculations can provide the manager and the owner with an "early warning" signal of impending cost problems in time for the project manager to react.

The authors discuss both positive and negative aspects of earned value and argue for a more user-friendly approach that avoids mind-boggling terminology.

1996,141 pages, 7"×10", paperback, ISBN: 1880410389, $26.35 members, $32.95 nonmembers

- ***Effective Project Management: How to Plan, Manage, and Deliver Projects on Time and Within Budget*** by Robert K. Wysocki, et al.

This unique interactive tutorial gives you an opportunity to learn "firsthand" all the ins and outs of project management. The second edition book and CD-ROM software provide novices with a complete introduction to the principles of sound project management, and offers experienced project managers an opportunity to fine tune their skills. The authors describe all of the proven management tools and techniques that you need to stay on schedule and within budget without compromising quality. The book adheres to PMI's curriculum outline (*PMBOK®* Guide) and follows the necessary course requirements for professional certification.

2000,352 pages, paperback, ISBN: 0471360287, $47.49 members, $49.99 nonmembers

CD-ROM 2000, $47.49 members, $49.99 nonmembers

- ***A Guide to the Project Management Body of Knowledge*** by the PMI Standards Committee

A Guide to the *Project* Management Body of Knowledge *(PMBOK®* Guide) is the basic management reference for everyone who works on projects. It serves as a tool for learning about the generally accepted knowledge and practices of the profession — information you need to know to manage your projects successfully. And as "management by projects" becomes more and more a recommended business practice worldwide, the *PMBOK® Guide* becomes an essential source of information that should be on every manager's bookshelf. The *PMBOK®* Guide is approved by the American National Standards Institute (ANSI) as an American National Standard.

The knowledge and practices presented in the *PMBOK®* Guide are proven and can be applied to all types of projects. They are the fundamental tenets of project management that help everyone who manages projects, works on project teams, or teaches project management to achieve project success.

Now available on CD-ROM in multimedia format, the Interactive *PMBOK®* Guide makes it easy for you to access the valuable information in this document from your PC. The Interactive *PMBOK® Guide* features hypertext links for easy reference — simply click on underlined words in the text, and the software will take you to the particular section in the *PMBOK®* Guide to which it refers. Minimum system requirements: 486 PC; 8 MB RAM; 10MB free disk space; CD-ROM drive; mouse or other pointing device; Windows 3.1 or greater.

Paperback 1996,176 pages, 8½"×11", ISBN: 1880410125, $26.35 members, $32.95 nonmembers

Hardcover 1996,176 pages, 8½"×11", ISBN: 1880410133, $35.95 members, $44.95 nonmembers

CD-ROM 1997 (IBM and compatibles), ISBN: PMBOKCD, $35.95 members, $44.95 nonmembers

- ***Human Resource Skills for the Project Manager*** by Vijay K. Verma

People are the backbone of projects and the most important resource in a project. This book offers practical guidelines that can be used to develop and implement the human skills appropriate to project management: communication, motivation, negotiation, conflict resolution, conflict and stress management, and leadership.

1996,268 pages, 6"×9", paperback, ISBN: 1880410419, $26.35 members, $32.95 nonmembers

- ***The New Project Management*** by J. Davidson Frame

Examines the new realities of project management: managing risk; maintaining quality of goods and services; outsourcing; satisfying customers; and communicating effectively with managers, customers, vendors, and staff.

1994,352 pages, hardcover, ISBN: 155542662X, $31.30 members, $32.95 nonmembers

- ***Organizing Projects for Success*** by Vijay K. Verma

In Organizing Projects *for Success*, Vijay Verma shows that understanding the issues of authority, accountability, reliability, and responsibility—as well as knowing how to gain the commitment of project participants and how to delegate effectively—are all critical to good project management,

1995,201 pages, 6"×9", paperback, ISBN: 1880410400, $26.35 members, $32.95 nonmembers

- ***Principles of Project Management*** by John Adams, et al.

Principles *of Project* Management features eight handbooks, published previously by PMI®, that have had significant impact on the project management profession and continue to have enduring value for today's project manager. These handbooks are collected in one economical volume that belongs on every project manager's bookshelf.

Contents

Conflict Management for Project Managers
Nicki S. Kirchof and John R. Adams, 1982

Contract Administration for the Project Manager
M. Dean Martin, C. Claude Teagarden, and Charles F. Lambreth, 1983

Negotiating and Contracting for Project Management
Penny Cavendish and M. Dean Martin, 1982

An Organization Development Approach to Project Management
John R. Adams, C. Richard Bilbro, and Timothy C. Stockert, 1986

Organizing for Project Management
Dwayne Cable and John R. Adams, 1982

The Project Manager's Work Environment: Coping With Time and Stress
Paul C. Dinsmore, M. Dean Martin, and Gary T. Huettel, 1985

Roles and Responsibilities of the Project Manager
John R. Adams and Bryan W. Campbell, 1982

Team Building for Project Managers
Linn C. Stuckenbruck and David Marshall, 1985

1997,307 pages, 6"×9", paperback, ISBN: 1880410303, $47.95 members, $59.95 nonmembers

- ***Project & Program Risk Management*** edited by R. Max Wideman

Brevity and ease of reference make this handbook a useful introduction to risk in the project or program environment. The book provides a simplified understanding of the nature of project risk and opportunity and a systematic approach to risk reduction. It offers useful insights into the process of project risk management, whether you're working on a small administrative project, a large capital works project, or anything in between.

Concepts, tools, and techniques covered include: risk identification, risk assessment goals and methodology, computer applications, risk response and documentation, the management of contingency allowances, managing the risks of the project's environment, and dealing with risks in contracts.

R. Max Wideman is principal of AEW Services and a Fellow of the Project Management Institute.

1991,120 pages, 8½"×11", paperback, ISBN: 1880410060, $26.35 members, $32.95 nonmembers

- ***Project Management Casebook*** edited by David I. Cleland, et al.

Project Management Casebook offers fifty case studies that represent the breadth and importance of project management and its impact on the everyday management of projects. Each of the cases provides new and unique challenges that have been mastered by the practice of project management. Readers will be able to apply the knowledge learned from the use of this casebook in their work.

The cases enable the reader to see how and why projects are used in a wide variety of organizational settings in contemporary life. The reader is exposed to both successful and not so successful project management practices. The case approach encourages participation and active learning from the reader, and provides the opportunity to learn something of the "real world" of project management.

1998,626 pages, 7"×10", paperback, ISBN: 1880410451, $55.95 members, $69.95 nonmembers

- ***Project Management: A Managerial Approach, Fourth Edition*** by Jack R. Meredith and Samuel J. Mantel Jr.

This fourth edition presents applied examples and case studies, covers the top project management software, negotiation, project manager selection, and project auditing and terminating.

1999,784 pages, hardcover, ISBN: 0471298298, $94.00 members, 598.95 nonmembers

- ***Project Management: A Systems Approach to Planning, Scheduling, and Controlling, Sixth Edition*** by Harold Kerzner

Updates theory and techniques within the context of today's changing marketplace. You'll also learn how to merge total quality management methods with effective project planning, master conflict resolution, and predict project success.

1997,1200 pages, hardcover, ISBN: 0471288357, $61.75 members, $65.00 nonmembers

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