**Project Management**

**Knowledge Check**

**Weekly Learning Objectives**

* Define the major activities associated with selecting, organizing, planning, monitoring, and controlling projects.
* Identify the sequence of critical activities that determines the duration of a project.
* Diagram the network of interrelated activities in a project.
* Calculate the probability of completing a project on time.
* Understand how to plan, monitor, and control projects with the use of PERT and CPM.
* Determine earliest start, earliest finish, latest start, latest finish, and slack times for each activity, along with the total project completion time.
* Understand how to reduce total project time at the least total cost by crashing the network.

**Key Concepts**

* Project management can be used to manage complex projects.
* PERT is probabilistic, whereas CPM is deterministic.
* The critical path is important because activities on the critical path can delay the entire project.
* The first step is to define the project and all project activities.
* Immediate predecessors are determined in the second step.
* Activities and events are drawn and connected in the third step.

**Key Definitions:**

**1. Activity:** The smallest unit of work effort consuming both time and resources that the project manager can schedule and control.

**2. Activity time estimates:** Three time estimates that are used in determining the expected completion time and variance for an activity in a PERT network.

**3. Backward pass:** A procedure that moves from the end of the network to the beginning of the network. It is used in determining the latest finish and start times.

**4. Beta Probability distribution:** A probability distribution that is often used in computing the expected activity completion times and variances in network.

**5. CPM:** Critical path method. The deterministic network planning technique that is similar to PERT but allows for project crashing.

**6. Crashing:** The process of reducing the total time that it takes to complete a project by expending additional resources.

**7. Critical path:** The series of activities that have zero slack. A delay for any activity that is on the critical path will delay the completion of the entire project.

**8. Critical path analysis:** An analysis that determines the total project completion time, the critical path for the project, slack, ES, EF, LS, and LF for every activity.

**9. Earliest finish time (EF):** The earliest time that an activity can be finished without violation of precedence requirements.

**10. Earliest start time (ES):** The earliest time that an activity can start without violation of precedence requirements.

**11. Event:** A point in time that marks the beginning or ending of an activity.

**12. Expected activity time:** The average time that it should take to complete an activity, t=(a+4m+b)/6

**13. Forward pass:** A procedure that moves from the beginning of a network to the end of the network. It is used in determining earliest activity start time and earliest finish time.

**14. Gantt chart:** A bar chart indicating when the activities (represented by bars) in a project will be performed. A project schedule created by the project manager.

**15. Immediate predecessor:** An activity that must be completed before another activity can be started.

**16. Latest finish time (LF):** The latest time that an activity can be finished without delaying the entire project.

**17. Latest start time (LS):** The latest time that an activity can be started without delaying the entire project.

**18. Milestone:** A major event in a project.

**20. Most likely time (m):** The amount of time that you would expect it would take to complete the activity.

**21. Network diagram:** A graphical display of a project that contains both activities and events. A network planning method, designed to depict the relationship between activities, that consists of nodes and arcs.

**22. Optimistic time (a):** The shortest amount of time that could be required to complete an activity.

**23. PERT:** Program Evaluation and Review technique. A network technique that allows three time estimates for each activity in a project. A network planning method created for the U.S. Navy’s Polaris missile project in the 1950s, which involved 3,000 separate contractors and suppliers.

**24. PERT/Cost:** A technique that allows a decision maker to plan, schedule, monitor, and control project cost as well as project time.

**25. Pessimistic time (b):** The longest amount of time that could be required to complete the activity.

**26. Resource leveling:** The process of smoothing out the utilization of resources in a project.

**27. Slack time:** The amount of time that an activity can be delayed without delaying the entire project. Slack is equal to the latest start time minus the earliest start time, or the latest finish time minus the earliest finish time.

**28. Variance of activity completion time:** A measure of dispersion of the activity completion tome. Variance = ((b-a)/6)^2.

**29. Standard deviation:** is the positive square root of variance.

**30 Work breakdown structure:** A list of activities that must be performed in a project.

**31. Project management:** A systemized, phased approach to defining, organizing, planning, monitoring, and controlling projects.

**32. Program:** An independent set of projects that have a common strategic purpose.

**33. Precedence:** A relationship that determines a sequence for undertaking activities. It specifies that one activity cannot start until a preceding activity has been completed.

**34. Minimum-cost schedule:** A schedule determined by starting with the normal time schedule and crashing activities along the critical path, in such a way that the cost of crashing do not exceeds the savings in indirect and penalty costs.

**35. Risk-management plan:** A plan that identifies the key risks to a project’s success and prescribes ways tom circumvent them.

**36. Close out:** An activity that includes writing final reports, completing remaining deliverables, and compiling the team’s recommendations for improving the project process.