

Project Management Final Exam Sample

Q1- Write short notes on the following:

- a) Define a project with help of example.

Project: A group of activities that have to be performed in a logical sequence to meet preset objectives outlined by the client
 PMI defines a project as “a temporary effort undertaken to accomplish a unique product or service”

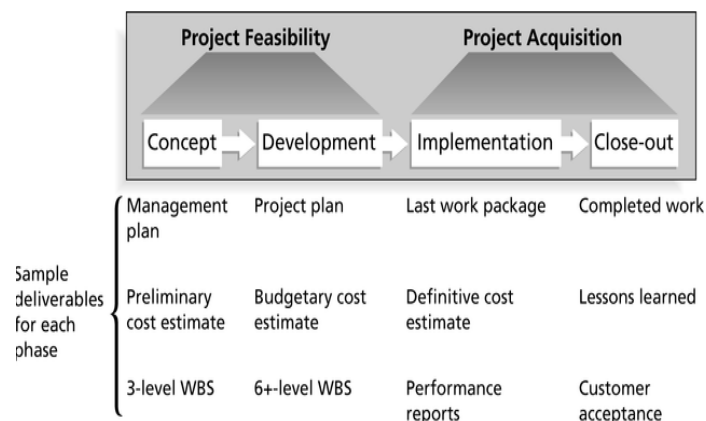
Example: is building a petrochemical plant worthy of 100 millions dollars at 30-month time frame.

- b) Explain briefly the Project Life Cycle and the phases involved with the help of an example

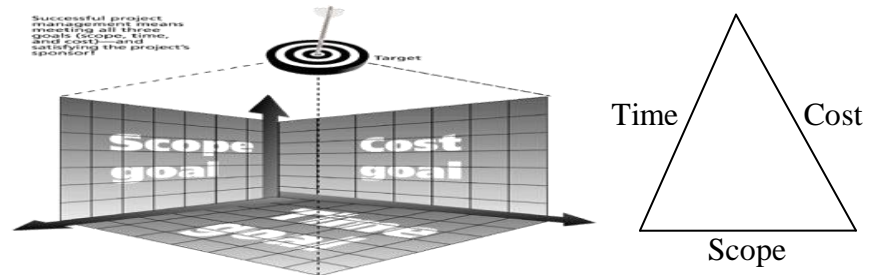
Projects are usually passed through a number of distinct phases or stages known collectively as the “Project Life Cycle phases ”as shown in the figure. The project life cycle includes project feasibility and acquisition. The feasibility stage includes (1)project conception where management plan, preliminary cost estimate and 3-level WBS need to be developed. (2) project development where project plan, budgetary cost estimate and 6+ level WBS need to be completed.

However, the acquisition stage includes implementation and close-out phases. During the implementation phase last work package will be executed, definitive cost estimate will be obtained and performance reports will be developed. For the Close out phase, the complete work must be executed, lessons learned are being captured and customer acceptance is obtained.

Building a high rise tower has to go thru the PLC of initiating the project such feasibility, engineering study, then planning and design, after that actual construction takes place, followed by the turn-over



- c) Explain with the help of a diagram the concept of the Triple constraint and its effect on a project.



The Triple constraint, scope-cost-time, is a key aspect of project management because each facet is critical and related to the other two. In fact changing one almost inevitably changes one or both of the others. If a decision is made to speed-up the schedule and complete project earlier than planned, this may require either reduction of project scope or assigning more resources. Assigning more resources will jack-up the cost very high.

- If the emphasis is on time, the completion date will be the dominant factor. For example, the refurbishment of a hotel would be time influenced if it had to meet the holiday season.
 - When cost is the main consideration, contracts are awarded to the lowest bidder. If the contractor trades cost in preference to schedule, this preference could be later reversed when time penalties rear their ugly head.
 - In high technology projects quality requirements often have priority over time and cost. The quality requirement is usually defined in the contract and therefore not negotiable without a scope change.
- d) Explain briefly the project manager's role and responsibilities. **(will be modified)**
 The Project Manager: beside managing the project effectively, he/she is expected to perform related roles by leading, negotiating, communicating, running interface, prioritizing, and so on. The professional responsibilities are:
 Professional conduct, integrity, responsibility for action of the team, self improvement, fairness, honesty, communication.
- e) Describe briefly how and why the projects originate.
 Some factors that might necessities project origination such as:
- Obsolescence (we have software that need updating)
 - Competitive forces (our competitors building a new superstore)
 - Client requirement (we bid on RFP and won)
 - Employees suggestion (an employee has an idea to produce better widgets)
 - Other sources (company owner has vision of robot that can scramble eggs)

Q2-What are the four quantitative factors that are used for project selection, which tend to focus on cost and explain each one of them with the help of an example.

The four quantitative factors are:

- a) Benefit-Cost Ratio (BCR)
- b) Present Value (PV)
- c) Net Present Value (NPV)
- d) Payback Period (PP)

a) BCR compares benefits to costs and determining $BCR = \text{Benefits} / \text{Cost}$. The higher the ratio, then the better the deal is. For example: you have 2 alternatives ways to perform a group of work packages worth of \$ 200,000 in progress payments from the client. Using company A will cost \$ 50,000, but Company B is willing to do the same work for \$ 40,000. In case company A, the BCR is 4:1 where as company B BCR is 5:1. Thus company B is the better deal since it has higher BCR.

b) Present Value: it is a simple process of calculating the value today of future cash flows. **$PV = (\text{future value}) / (1+i)^n = \text{the present value is future value discounted to special interest rate per the time measure.}$**

Example: if you have a deal with contractor to give you \$ 3,000 today or \$3,800 after 3 years. If the interest rate is 10%

Then the present value of \$3,800 = $3800 / (1+0.10)^3 = 2855$

Thus, the value of \$ 3,000 today is much better than having \$ 3,800 after three years because the value of \$ 3,800 will be only equal to \$ 2,855 today.

c) NPV: net present value is the real value of cash flow in a project is dependent on the dollar amounts and the timing for both revenue and cost. NPV logic looks at both the inflow and outflow of money over time.

$NPV = PV^{\text{revenue}} - PV^{\text{costs}}$ (both over the flow of time)

If you are buying software, then you might make a decision whether to buy from company A or B.

Company A asks for \$ 8,000 at year 0 and \$1,000 for year 1, 2 & 3.

Company B asks for \$ 0 at year 0 and \$ 4,000 at year 1,2 & 3 as mentioned in the below table. Which company would you choose if interest rate is 10% per year.

| Year | Company A | | Company B | |
|-------|-----------|--------|-----------|-------|
| 0 | 8,000 | 8,000 | 0 | 0 |
| 1 | 1,000 | 909 | 4,000 | 3,636 |
| 2 | 1,000 | 826 | 4,000 | 3,306 |
| 3 | 1,000 | 751 | 4,000 | 3,005 |
| Total | 11,000 | 10,486 | 12,000 | 9,947 |

From NPV calculation, company B looks more attractive where NPV= 9,947\$ whereas company A NPV= 10,486 \$

- d) Payback Period is approach that calculates how long it will take to earn or save money as much as you have invested. Example, if you invest \$ 4,000 in a new equipment, then receive zero benefits at year 1 &2 and then \$ 1,000 per year thereafter. The payback will occur at year 6.

Q3- Explain in detail the needs assessment (functional and technical) and formulating Good objectives using an example.

Needs assessment requires that needs exist on a variety of levels among the various project stakeholders. This is simply because everyone has different needs. For example, suppose a contractor has been awarded a contract to build a new bridge. The customer, owner, commuter, environmentalists, local politicians, and others all have needs associated with this project. Functional requirements are what the customer needs to have happen. Technical requirements are what the project team develops to meet the technical requirements.

Formulating good objectives: Objectives must be considered as an outgrowth of carefully considered needs. They should represent an understanding between those who need something and those who can provide it. Well developed objectives are characterized by the five elements of the SMART model.

Q4- Describe Project Charter and Project Requirement Documents and its relevance to Project Management. Construct a sample Project Charter and Project Requirement documents to explain your description.

Project charter is a written agreement among senior management, the project manager and functional managers. It is essentially a contract that gives the project manager the authority for the job that he or she is being asked to do.

Project Requirement Document: it is a document that outlines for the project manager what need to be accomplished. PRD contains information about the project background, objectives, deliverables, milestones, assumption, and so on. It is a written record of what has already been discussed and decided upon and serves as the roadmap to direct the project team.

Example: (use the one in the home work)

Q5- Elaborate the statement “deliverable-oriented grouping of project elements that organizes and defines the total work scope of the project. Each descending level represents an increasingly detailed definition of the project work”. Also list the various benefits and demonstrate your understanding by building a model.

PMI defines the WBS as deliverable-oriented of project elements that organizes and defines the total work scope of project. It does not mean that the WBS is defined only to the deliverable level. It means resources; budget or schedule can not be estimated with any accuracy unless the WBS is taken to the tasks or work package level. WBS is essentially the scope statement reduced to individual pieces of work.

Benefits and uses of WBS:

- 1) Identifies all work necessary to accomplish project's objectives.
- 2) Identifies specific work packages for estimating and assigning work
- 3) Provides structure for measuring success
- 4) Clarifies responsibilities

5) Forces detailed planning and documentation.

WBS Model: there are two common forms of WBS;

1) Indented format offers several advantages. Easier to include project details, easier to load to major software and easy to edit.

Example; summer vacation

Summer Vacation

Destination Plans

Theme Park day

Water Park day

Family Visit

Baseball game

Travel Plans

Obtain motor club road map

Reserve en route hotel

Plan for kid's in-car activities

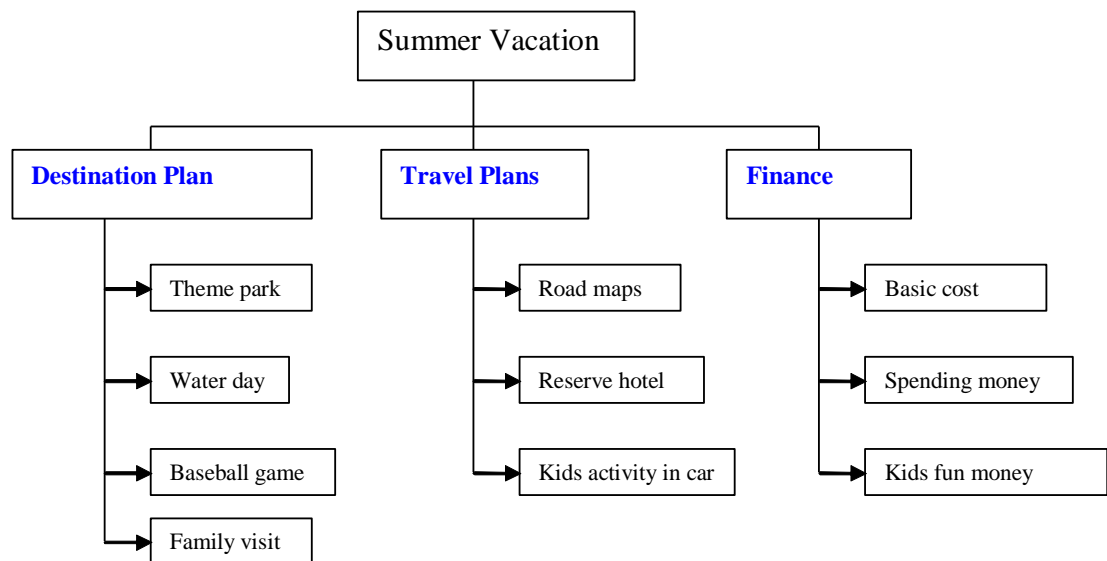
Finances

Basic cost

Spending money

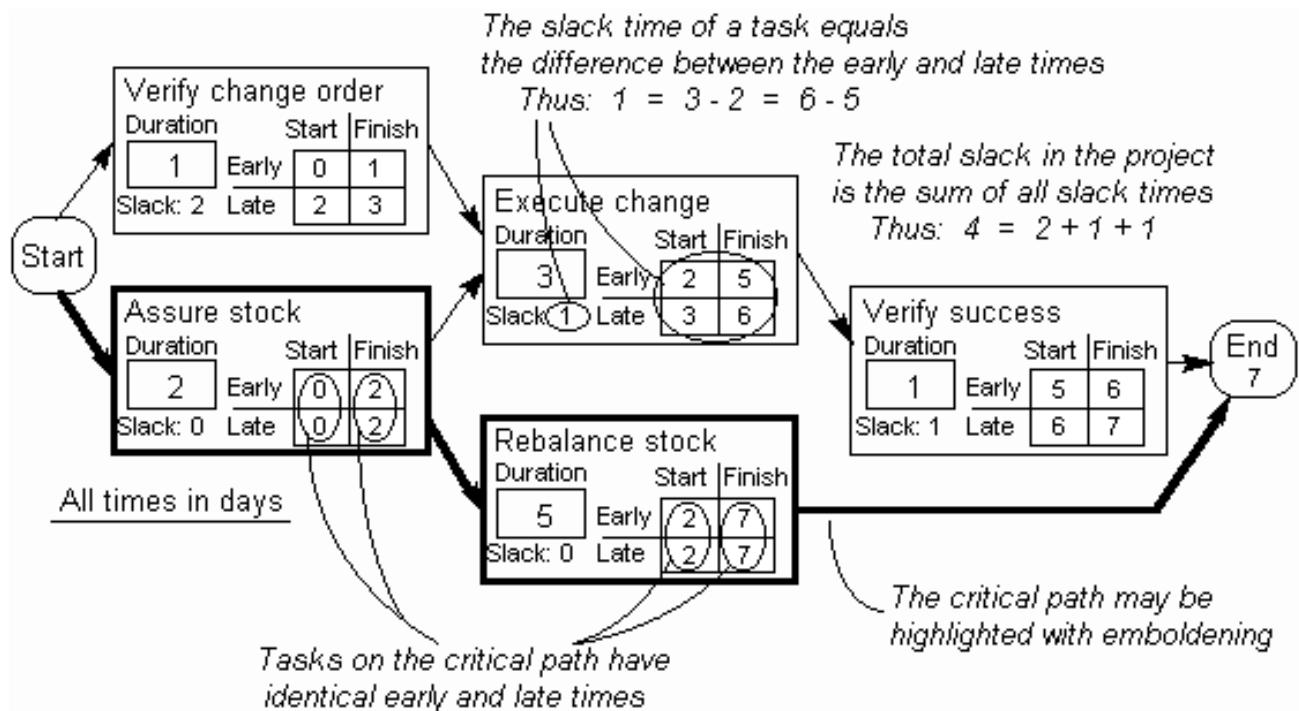
Kid's fun money

2) Graphic format is good for showing the relatives level of the work and how smaller components of the project roll up into larger ones



Q6- Explain in detail the Critical Path with the help of an example and demonstrate ways of speeding up the schedule whilst defining the term “Crashing”.

Critical Path is the longest uninterrupted chain of activities through a project. It therefore determines the duration of the project and shows tasks that must happen on time in order to complete the project without any delays. Example; if you have a project with chain activities having zero float time, then the project will flow through activities A, B, C, D & E. this is what it is called critical path. Project manager needs to understand the project’s critical path, so he can improve decisions about resource allocations.



There are 2 ways to speed-up schedule. 1) Crashing, 2) Fast tracking

Crashing: taking action to decrease the total project duration after analyzing alternatives for the least cost without reducing project scope by adding resources.

Fast Tracking: Compression of the project schedule by overlapping activities that would normally be done in sequence, such as design and construction. The draw back of FT is the increased risk incurred through overlapping

Q7- Good cost planning requires a basic understanding of how organizations account for cost”. Explain the characterization of cost components and the two approaches to estimating project costs.

The two fundamental cost components are:

Direct cost; are cost attributed to the project such labor, materials, and equipment.

Indirect cost; are costs for organizational support not directly attributed to the project, such as overhead, office electricity and heating.

The two approaches to the top estimating project costs are

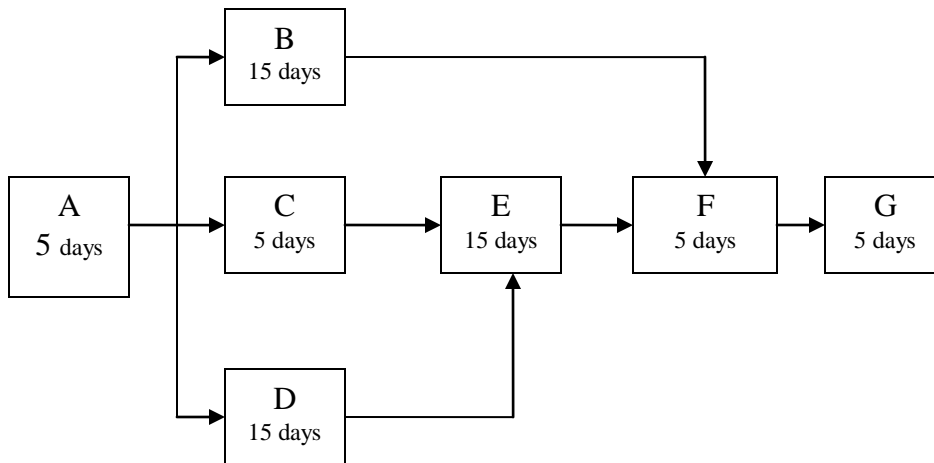
Top-down estimating: it is used for early cost approximations using broad categories of work. Example; estimate of building hotel based on historic data regarding costs per square foot. These estimates suffer from variances of 25 to 50 %.

Bottom-up estimating; it can be accomplished only after completion of WBS to the work package level. The process is to fully develop the WBS, calculate cost estimates at the work package and finish by totaling all estimates to arrive to the cost estimate for the entire project. The cost estimate within 5 to 10% variance.

Q8-Describe briefly how you transform a WBS into a Network Diagram and draw a network diagram for the following set of activities

| Activity | Predecessors | Duration in working days |
|----------|--------------------|--------------------------|
| A | Start None Project | 5 |
| B | A | 15 |
| C | A | 5 |
| D | A | 10 |
| E | C and D | 15 |
| F | B and E | 5 |
| G | F | 5 |

To create a network diagram for a project, you start with the work package level of the WBS. The work packages will become the network activities. The higher levels of the WBS are not schedule because they comprise the work packages and the work packages were determined to be the WBS level at which work could be assigned and monitored most effectively. Two characteristics must be identified for each network activity. One is the duration of the activity; the other is the activity’s logical relationship to other activities in the schedule. Determining logical relationship means identifying predecessor activities and successor activities



Q9-Explain the following with examples:

- b. Resource/responsibility matrix
- c. Resource loading histograms
- d. Resource leveling techniques
- e. Resource leveling techniques

a) A responsibility matrix is a way of showing resource (person) is responsible for each task or group of tasks. It is simply a grid with people identified along on axis and tasks along the other. Each person's role in relation to a particular task may then be highlighted as in the following example:

| Phase | Project mngr | Project team | Software vendor | Payroll |
|----------------|--------------|--------------|-----------------|---------|
| Develop req'mt | P | P | | P |
| Develop plan | P | P | R | |
| Select vendor | A | P | | A |
| Install system | A | R | P | |
| Test system | A | P | | A |

Timesheet Automation Project (P=perform, R=review, A=approve)

b) Resource loading histogram is based on WBS. It requires assignment of resources to each work package. Normally the resources assigned are personnel, but his tool can also be used for planning equipment. The end result is a vertical bar chart that shows resources allocation over the life of the project. Each vertical bar represents the quantity required for each time period based on some standard unit. The quantities are calculated based on the resources requirement, together with start and finish dates that have been developed for each work package.

- c) Resource leveling is a technique that addresses the kinds of scheduling and resource adjustment. For example; i) Limited Resource Availability and ii) difficult to manage changes in resource levels. i) in this case (LRA) the problem that you don't have enough people to do all activities on their schedule performance dates. ii) in this case, you are trying to avoid the inefficiencies and resulting cost increases with swins in the number of resources involved in the work. Resource leveling may be accomplished without extending the project schedule in some cases by taking advantage of float time

Q10- Explain earned value and variance with the help of an example and summarize Project Evaluation.

Earned value analysis is a tool that effectively pulls all the three sides of the triple constrain into a single monitoring formula. It does this by correlating three pieces of data- planned work, actual cost and value of the work done- to assess how the project is performing.

PV=planned value is that portion of the approved cost estimate planned to be spent on the activity during given period. Example; \$1,000 task that evaluated at the 30% complete period would expect to have spent \$300

AC=Actual Cost is the total costs incurred in accomplishing work on the activity during the given period

EV=earned value is the value of work actually completed during a given period. It is calculated by $EV = (\% \text{ complete} * \text{total PV for the activity})$

Variances are simply the differences between what you have accomplished and what you had planned to accomplish. When you know the three basic EV elements, it is easy to determine variances in cost CV and schedule variance. The formula for calculating these two figures are:

$$CV=EV-AC \text{ and } SV=EV-PV$$

In both formula, positive values indicate good performance (a cost saving or being ahead of schedule). Negative value indicates poor performance

Project evaluation is a periodic process that may be done every month, quarter, or whenever it is most appropriate. It gives a chance to step back and figure out how your

project is performing. In evaluating the project you should focus on the big picture issues and trends.

You may choose among various courses of action as the result of an evaluating

- If things are going well and no new risks are on the horizon, then stick to plan
- If they are not on the plan, then you may need minor or major adjustment.
- If you have failed project, you may decide to terminate the project

Sunk cost: are what you have spent and you can not recover

Q11- What is Risk Planning? Describe Risk identification, Risk Probability& effect, and Risk Response strategy.

Risk planning is the process of deciding how to approach and plan the risk management activities for a project. It is an integral part of planning for major projects.

Risk identification; a risk is “uncertain event or condition that if occurs, has a positive or negative effect on projects’ objectives. As you plan, you are not necessarily planning for the very worst possible scenario, but you do not want to ignore some of the bad things that might happen such as delayed permits, bad weather, loss of key team members, and so on.

Risk probability & effect; there are 2 key questions to analyze for each risk you identify

- What is the probability of the risk actually happening?
- What would be the impact of the risk on the project if it did happen?

Based on an assessment of the probability and effect of each identified risk, the project team should prioritize the risks. Prioritization is an essential step because you are not likely to have the resources to prepare for everything and because some potential events are too low in priority to be worth planning for.

Risk Response Strategies; after you have identified the risks that worth planning for, then you can actually choose from at least four strategies:

1. **Avoidance**: this strategy requires changing the project plan to eliminate the risk or condition to protect the project objectives.
2. **Transference**; transference means shifting the risk to a third party
3. **Mitigation**; risk mitigation means reducing the probability of an adverse risk to an acceptable threshold.

Acceptance; some time accepting the risk to avoid changing the project plan is the most sensible approach of all because any other response has cost that exceeds benefits.