

SIXTH SEMESTER EXAMINATION, 2008-09

SOFTWARE PROJECT MANAGEMENT

Time : 3 Hours

Total Marks : 100

Note: Attempt all questions.

1. Attempt any four parts of the following :

5 × 4 = 20

(a) What is scope of a project? Explain example.

Ans. Step : Identify project scope and objectives

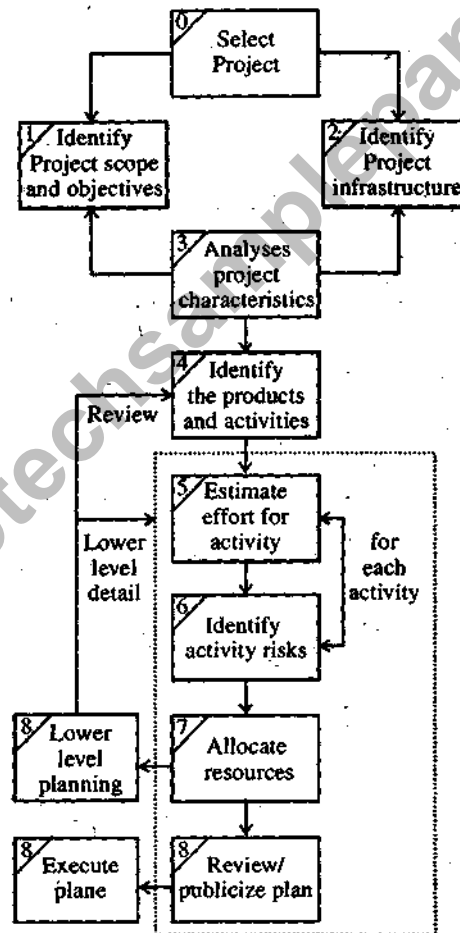


Fig.

The activities in this step ensure the all the parties to the project agree on the objectives and are committed to the success of the project. A danger to be avoided is overlooking people who affected by the project.

We discussed in chapter 1 and need for agreed objectives for a project and ways of measuring the success in achieving those objectives.

(b) Explain various activities covered by software project management.

Ans. Activities covered by software project management : A software project is not only concerned with the actual writing of software. In fact, where a software application is bought in off the shelf there may be no software writing as such this is still fundamentally a software project because so many of the other elements associated with this type of project are present.

Usually there are three successive project that bring a new system into being.

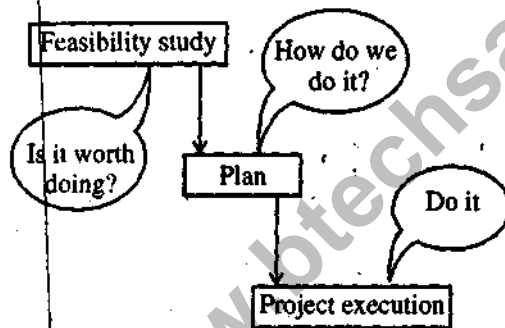


Fig. The feasibility study/plan/execution cycle

1. **The feasibility study** : This is an investigation into whether a prospective project is worth starting. Information is gathered about the requirements of the proposed application. The probable developmental and operational costs, along with the value of the benefits of the new system are estimated. With a large system,

the feasibility study could be treated as a project in its own right and have its own planning sub-phase. The study could be part of a strategic planning exercise examining and prioritizing a range of potential software developments. Sometimes an organization has a policy where a group of projects is planned as a *programme* of development.

2. **Planning** : If the feasibility study produces results which indicate that the prospective project appears viable planning of the project can take place. However, for a large project we would not do all our detailed planning right at the beginning. We would formulate an outline plan for the whole project and a detailed one for the first stage. More detailed planning of the later stages would be done as they approached. This is because we would have more detailed and accurate information upon which to base our plans nearer to the start of the later stages.

3. **Project execution** : The project can now be executed. The execution of a project often contains *design and implementation* sub-phases. Students new to project planning often find it difficult to separate planning and design and often the boundary between the two can be hazy. Essentially design is thinking and making decisions about the precise form of the *products* that the project is to create. In the case of software, this could relate to the external appearance of the site. In the case of software, this could relate to the external appearance of the software that is the user interface or the internal architecture.

(c) What is project schedule? Explain by giving a suitable example.

Ans. **Project Schedule** : Before start working the project mainly large project, the project must be developed to provide the following information:

- (i) To show the dates when each activity should start and finish.
- (ii) When the resources will be required?
- (iii) How much of the each resource will be required?

Therefore it has four main stages :

First Stage : What activities and in what order activities need to be carried out called on ideal activity plan.

Second Stage : Then perform activity risk analysis to identify potential problems.

Third Stage : Perform resource allocation.

Fourth Stage : Final step is schedule production after those four stages we are in position to draw up and publish a project schedule.

(d) What is stepwise project planning? Explain.

Ans. Table. An outline of Step Wise planning activities.

Step Activities within step

- 0 Select project
- 1 Identify project scope and objectives
 - 1.1 Identify objectives and measures measures of effectiveness in meeting them
 - 1.2 Establish a project authority
 - 1.3 Identify stakeholders
 - 1.4 Modify objectives in the light of stakeholder analysis
 - 1.5 Establish methods of communications with all parties
- 2 Identify project infrastructure
 - 2.1 Established relationship between project and strategic planning
 - 2.2 Identify installation standards and procedures
 - 2.3 Identify project team organization

- 3 Analyses project characteristics
 - 3.1 Distinguish the project as either objective or product driven
 - 3.2 Analyses other project characteristics
 - 3.3 Identify high-level project risks
 - 3.4 Take into account user requirements concerning implementation
 - 3.5 Select general life cycle approach
 - 3.6 Review overall resource estimates
- 4 Identify project products and activities
 - 4.1 Identify and describe project products (including quality criteria)
 - 4.2 Document generic product flows
 - 4.3 Recognize product instances
 - 4.4 Produce ideal activity network
 - 4.5 Modify ideal to take into account need for stages and checkpoints
- 5 Estimate effort for each activity
 - 5.1 Carry out bottom-up estimates
 - 5.2 Revise plan to create controllable activities
- 6 Identify activity risks
 - 6.1 Identify and quantify activity based risks
 - 6.2 Plan risk reduction and contingency measures where appropriate
 - 6.3 Adjust plans and estimates to take account of risks
- 7 Allocate resources
 - 7.1 Identify and allocate resources
 - 7.2 Revise plans and estimates to take account for resource constraints
- 8 Review/publicize plan
 - 8.1 Review quality aspeds of project plan
 - 8.2 Document plans and obtain agreement
- 9/10 Execute plan/lower levels of planning
This may require the reiteration of the planning process at a lower level.

(e) Distinguish between information system and embedded system.

Ans. Information system and embedded system:

Information system	Embedded system
1. The system interacts with the organization.	1. The system interacts with the machine
2. Eg : A stock control system that controls when the organizations records stock.	2. Eg: System controlling the air conditioning equipment in a building

(f) Explain milestones and deliverable in reference to project planning.

Ans. Milestones : These are the key activities which represent the completion of important stages of the project of which the project manager would want take particular note. Checkpoints are useful milestones. They can be defined as the activities which draw together the products of the preceding activities to check that they are compatible.

Deliverables : The products produced as a result of the activities carried out and handed over to the client at the end of the project are called deliverable.

2. Attempt any four part of the following:

$$5 \times 4 = 20$$

(a) Explain any one cost-benefit evaluation technique with suitable example.

Ans. A cost benefit analysis is done to determine how well or how poorly a planned action will turn out. Although a cost benefit analysis can be used for almost anything it is most commonly done on financial question. Since the cost benefit analysis relies on the addition of factors and the subtraction of negative ones to determine a net result, it is also known as running the numbers.

Cost Benefit Analysis : A cost benefit analysis finds quantifies and adds all the positive factors. These are the benefits. Then it identifies

quantifies and subtracts all the negatives the costs.

The difference between the two indicated whether the planned action is advisable. The real trick to doing a cost benefit analysis well is making sure you include all the cost and all the costs and all the benefits and properly quantify them.

Should we hire a additional sales person or assign overtime? Is it a good idea to purchase the new stamping machine? Will we be better off putting our free cash flow into securities rather than investing in additional capital equipment? Each of these questions can be answered by doing a proper cost benefit analysis.

Net profit value it is money that is incurred as a profit. This value is termed as net profit value of the project. Pay Back period it is the time in which the project break outs first. That is it gives its first profit.

Discounted cash flow or net present value is better than as it takes into account the net profitability of a project and also the timing of the cash flows that are produced.

$$\text{Present Value} = (\text{value in year } t) / (1 + r)^t$$

The present value of a flow may be calculated by multiplying the cash flow by the appropriate discount factor.

Where in net profit only the project is seen from the point of view of the total profit incurred by the project. And in return on investment the total return on investment given by the project is calculated. Hence it's a nice technique.

(b) What is technical assessment? Explain how it is different from strategic assessment in detail.

Ans. Technical Assessment :

1. Technical assessment for a proposed project consists of evaluating the required functionality against the hardware and software available.
2. It is done by a project manager.

(c) What is remain application development? Explain in detail.

Ans. RAD is linear sequential software development process model that exphasis an extremely short development cycle using a component based construction approach if the requirements are well understood and defines and the project scope is constraint the RAD process enables a development team to create a fully functional system with in very short time period.

RED model has the following phases:

1. **Business Modeling** : The information flow among business functions is defined by answering questions like what information drives the business process what information drives the business process what informations generated, it, where does the information go, who process it and so no.
2. **Data Modeling** : The information collected from business modeling is refined into a set of data objects (entities) that are needed to support the business. The attributes (character of each entity) are identified and the relation between these data objects (entities) is defined.
3. **Process Modeling** : The data object difined in the data modeling phase are transformed to achieve the information flow necessary to implement a business function.

Processing decreiptions are created for adding modifying deleting or retrieving a data object.

4. **Application Generation** : Automated tools are used to facilitate construction of the software; even they use the 4th GL techniques.
5. **Testing and Turn over** : Many of the programming components have already been tested since RAD emphasis reuse. This reduces overall testing time. But new components must be tested and all interfaces must be fully exercised.

(d) Explain V-process model in detail.

Ans. V-process model :

1. In this model verification and validation is carried out simultaneously.
2. Each and every phase is supplemented by a validation done by the corresponding testing phase.
3. Less-probability of some confusions being carried on to the project which would be revealed at the time of testing are there.
4. Can work on ambiguous and non clear and requirements as well up to some extent of accuracy.

(e) Compare the basic features of waterfall model and V-process model.

Ans.

V-process model	Waterfall model
1. In this model verification and validation is carried out simultaneously.	1. In this model only the verification is done and feedback from one phase to the privious phase is given
2. Each and every phase is supplemented by a validation done by the corresponding testing phase	2. There is no migration from one phase to the previous one only some minor changes can be done in the previous phase on the basis of feedback
3. Less probability of some confusions being	3. More probability of error is there.

carried on to the project which would be revealed at the time of testing are there.

4. Can work on ambiguous and non clear and requirements as well upto some extent of accuracy.
4. Cannot work on ambiguous requirements. needs all predefined and exact requirements.

(f) Explain cash flow forecasting in detail.

Ans. As important as estimating the overall costs and benefits of a project is the forecasting of the cash flows that will take place ad their timing. A case flow forecast will indicated when expenditure and income will take place Fig.

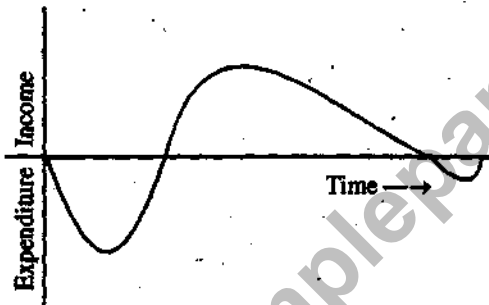


Fig. Typical product life cycle cash flow

We need to spend money such as staff wages during the development stages of a project. Such expenditure cannot be deferred until income is received (either)

Table. Four project cash flow projections-fig are one of year totals (E)

Year	project-1	project-2	project-3	project-4
0	-100,000	-1,000,000	-100,000	-120,000
1	10,000	200,000	30,000	30,000
2	10,000	200,000	30,000	30,000
3	10,000	200,000	30,000	30,000
4	20,000	200,000	30,000	30,000
5	100,000	300,000	30,000	75,000
Net profit	50,000	100,000	50,000	75,000

from using the software if it is being development expenditure either from important that we know that we can fund the development expenditure either form the company's own resources or by borrowing from the bank. In any event it is vital to have some forecaster when expenditure such

as the payment of salaries and bank interest will take place and when any income is to be expected such as payment on completion or possibly stage payments.

Accurate cash flow forecasting is not easy as it generally needs to be done early in the project's life cycle (at least before any significant expenditure is committed) and many items to be estimated (particularly the benefit of using software of decommissioning costs) method be some year in the future.

3. Attempt any two parts of the following :

10 × 2 = 20

(a) Explain function points Mark II method in detail:

Ans. Function Points Mark II :

1. This method is basically an improvement or refinement of Albrecht's FP Analysis.

In the assumption is made that for each transaction the Un Adjusted Function Points are calculate as-

Wi^* (number of input data element types)

+ Wi^* (number of inquiry type element types)

+ Wi^* (number of output data element types)

Here Wi , We , Wo , are weighing that may be derived by asking developers what proportion of effort has been spent in previous projects developing those parts of the software that deal with processing inputs accessing and modifying stored data and processing outputs.

2. It is basically a refinement over Albrecht's analysis it just has some parameter changes else its performing the same task as the former.

3. It gave 5 more factors apart from 14 factors.

(b) Explain Cocomo in detail.

Ans. COCOMO i.e. the constructive cost model was given by Barry Boehm. The basic model was built around the equation :

Effort = c (size)^k

Here effort is measured in person months size in kdsi

The values of c and k can be given after knowing the type of model-

There are basically three COCOMO system classifications :

- Organic – this would typically be the case when relatively small teams developed small softwares in a relatively familiar and in house environment. $c = 2.4$ and $k = 1.05$
- Embedded – this meant that the product being developed had to operate within very tight constraints and changes to the system were very costly.
 $c = 3.0$ and $k = 1.12$
- Semi – detached this combined elements of the organic and the embedded modes or had characteristics which came between the two.
 $c = 3.6$ and $k = 1.20$

COCOMO-I	COCOMO-II
1. Same as defined above	1. It compares of three stages <ul style="list-style-type: none"> • Application Composition external feature of the system that the users will experience are designed. • Early design fundamental software is designed. With larger systems where there will be large volumes of transactions and performance is important careful attention is needed to the architecture to be adopted. • Post architecture the software's structure undergo final construction, modification and tuning to create a system that will perform as required.
2. Formula used for FP is Effort = c (size) ^k	2. Formula used for FP is PM = A (size) ^{sf} * (em 1)(em n) sf = 1.01 + .01 (summation (Exponent Driver Rating))
3. This was the original model	3. This was a refinement over cocomo basic model.

(c) What are various software measurement amtracs? Explain any one of them in detail with example.

Ans. The basis for software estimating

The need of historical data : Nearly all estimating methods need information about how projects have been implemented in the past. However care needs to the taken in judging the application.

Counting slow is difficult when employing application building tools which often use tables or diagrams to record processing rules. Different measures of size are needed such as object or function points.

4. Attempt any tow parts of the following :

10 × 2 = 20

(a) Differentiate between known risk and predictable risks and then explain what is risk driver.

Ans. Known Risk : The risks which are at the time of project creation are known as Known Risk.

Predictable Risk : The risks which are calculated on the study of the some already worked project and may happy or not.

Risk Divisions :

1. Time is not calculated properly.
2. Cost factors cost is not evaluated.
3. Resource allocation is not done properly.
4. Activity planning is not done properly.
5. Effect estimation is not done properly.
6. Overestimation and Underestimation.

(b) Describe the following :

(i) Contract management

Ans. The Contract management is the management of contract so that the deal may not be controversial.

Types of contracts

On basis of service :

- Bespoke created specifically from scratch for an individual
- Off the shelf buy 'as is'
- Customized off the shelf-a bit customize-tion acc to customer is done of the off the shelf product.

On basis of payment :

- Fixed price contracts prices are fixed acc to the requirements :

Advantages :

1. Supplier motivation
2. Known customer expenditure

Disadvantages :

1. Difficulty in modifying requirements
2. Threat to system quality
3. Higher prices to allow for contingency

- Time and Material contracts customer is charged as fixed per unit effort :

Advantages :

1. Supplier motivation
1. Lack of price pressure
2. Customer liability
3. Ease of changing requirements

- Fixed price per unit delivered contracts

Advantages :

1. Customer understandability
2. Comparability
3. Life cycle range
4. Supplier efficiency

Disadvantages :

1. changing requirements
2. difficulties with software size measurement

On basis of contract selection

- Open tendering process
- Reserved tendering process
- Negotiated procedure.

(ii) **Human resource management**

Ans. Human Resource management : It is an management activity which maintain every organization. HRM works upon all three level of the management which are gives in below diagram

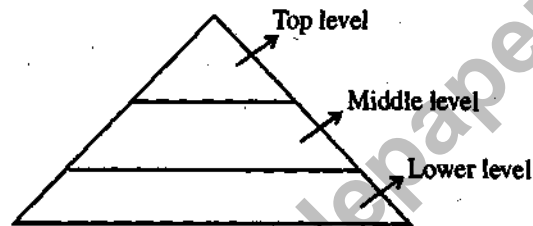


Fig. HRM- with all levels

It is mainly conserve with organization resources. All resources with in a organization is maintain by the HRM Deptt. The main activities which is preform by HRM are

1. Staffing
 2. Controllings
 3. Planning
 4. Motivation
 5. Organization
- etc.

(c) **Explain the term “scheduling resources” in detail.**

Ans. Scheduling Resources : After preparing the resource requirements the next stage is to convert this into the activity plan to convert this into the activity plan to :

- Assess the distribution of resources for the required duration.
For this the best method is to represent the activity plan as bar chart and then using this to produce resource histogram for each resource.
- Resource are to be allocated to a project on an activity by activity basis but this can be time consuming and difficult.
- The priority must always be to allocate resources to critical path activity.

Ways of prioritizing activities

1. Total float priority
2. Ordered list priority-examine if this is Burman's priority list-
 - (a) Shortest critical activity
 - (b) Critical activities
 - (c) Shortest non critical activities
 - (d) Non activity activities with least float
 - (e) Non activity activities.
5. Attempt any two parts of the following : 10 × 2 = 20
 - (a) Explain software quality assurance and also discuss the various software quality assurance activities.

Ans. "Software Quality Assurance" : It is an umbrella Activity which is applied throughout software development life cycle. It covers all phases of SDLC. It starts from the Requirement Analysis and continues to maintain. SQA can be with following diagram

- Reusability
-
-

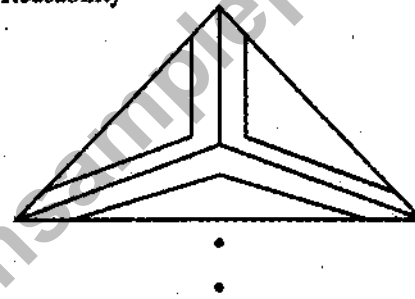


Fig. "SQA Activities"

- (b) Explain the following :

(i) Product quality management

Ans. Certain standards have been defined to categorize the products on the basis of their quality and decide and rank them according to their quality. They are like ISO 9126. The product quality factors like the following are taken into consideration while checking for a product's quality :

Correctness : the extent to which a program satisfies its specifications and fulfills the user's objectives.

Reliability : The extent to which a program can be expected to perform an intended function with required precision.

Efficiency : The amount of computer resources required.

Usability : The effort required to locate and fix errors in an operational program.

Testability : the efforts required to test a program to ensure it performs the intended function. etc.

Such factors are taken into consideration while manufacturing a product in order to deliver a good quality product to the user.

(ii) **ISO 9126 standard**

Ans. ISO 9126 : This standard was published in 1991 to tackle the problem of the definition of the software quality. It defines six software quality characteristics :

1. Functionality :

- Suitability
- **Compliance :** degree to which the software adheres to application related standards.
- **Interpretability :** ability of the software to interact with other systems.
- Security

2. Reliability

- **Maturity :** the frequency of failure due to faults in a software product.
- **Fault tolerance :** the ability of a project to tolerate the failure.
- **Recoverability :** the errors that appear must be recoverable.

3. Usability :

- **Understandability :** efforts for recognizing the logical concept and its applicability.
- **Learnability :** easy to learn
- **Operability :** must be easy to operate.

4. Efficiency :

- Time behavior
- Resource behavior

5. Maintainability :

- Unsalability
- Changeability
- Stability

6. Portability :

- Adaptability
- Insatiability
- Conference correlates to those standards that have a bearing on portability.
- **Replaceability :** the factors that give upwards compatibility between old and new software components.

(c) Discuss SEI process capability maturity model in detail.

Ans. SEI-CMM Model :

Level 1 : Initial - The procedures followed may be biohazard, some project might be successful by mainly depends on skills of particular individual may be project manager.

Level 2 : Repeatable - Follow basic project mgmt procedures in place.

Level 3 : Defined - There is a proper way of defining each task in SDLC.

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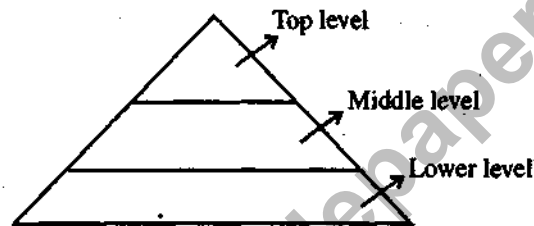


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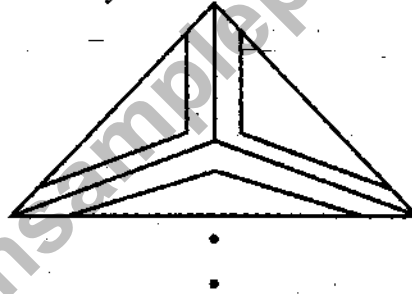


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