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Paper : **Software Project Management**

Q1) Explain Cost benefit analysis with an example solved

Answer: Cost-benefit Analysis:

A standard way to assess the economic benefits

Two steps:

1. Identify and estimate all the costs and benefits of carrying out the project
2. Express the costs and benefits in a common unit for easy comparison

Costs

1. Development costs
2. Setup costs
3. Operational costs

Benefits

1. Direct benefits
2. Assessable indirect benefits
3. Intangible benefits

Cost-benefit Evaluation Techniques Example:

Q2) What is FPA and OPA, Solve an example.

Answer: Function Point Analysis (FPA)

> Developed by A. Albrecht in IBM

> Aim: To estimate the LOC of a system (line of code)

> LOC of system= FP of system × LOC-per-FP of the language

> FPA is a top-down approach.

> Developed by Albrecht (1979) and later refined by Albrecht and Gaffney (1983)

> Used in development with 3GL (3rd Generation Language)

> LOC means Line of Code (programming statement)

> For COBOL, the LOC per FP is 91.

> For C, the LOC per FP is 128.

Idea: Software system consists of five major components (or, *external user types*)

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	20,000	200,000	30,000	30,000
4	20,000	200,000	20,000	25,000
5	100,000	350,000	20,000	50,000
Net Profit	60,000	150,000	30,000	45,000
Payback	5	5	4	4
ROI	12%	4%	6%	7.5%

- External input types
- External output types

- Logical internal file types
- External interface file types
- External inquiry types

Identify each instance of each external user type in the proposed system

Classify each instance as having high, medium or low complexity

Assign the FP of each instance

FP of the system = sum of FP of individual components

Function Point Analysis

Number of FPs	Complexity		
External user type	Low	Average	High
External input type	3	4	6
External output type	4	5	7
Logical internal file type	7	10	15
External interface file type	5	7	10
External inquiry type	3	4	6

Function Point Analysis – Example

A component of an inventory system consisting of 'Add a record', 'Delete a record', 'Display a record', 'Edit a record', and 'Print a record' will have

- 3 external input types
- 1 external output type
- 1 external inquiry type

Then, assign FPs based on the complexity of each type

Object Point Analysis

Similar to function point analysis

Used on 4GL development projects

Takes account of features that may be more readily identifiable if the system is built on high-level application building tools

Steps:

Identify the number of screens, reports and 3GL components

Classify each object as Simple, Medium and Difficult

Assign the weight accordingly

Calculate the total object points

Total OP = sum of individual OP × weighting

Deduct the reused objects (r% reused)

NOP = OP × (1 – r%)

Identify the productivity rate of both developer and CASE

Productivity rate = average of the two PRs

Calculate the effort

Effort = NOP / Productivity Rate

Object Point Analysis – Screens

Object Point Analysis – Reports

	Number and source of data tables		
Number of views contained	Total < 4 (<2 server, <2 client)	Total < 8 (2-3 server, 3-5 client)	Total 8+ (>3 server, >5 client)
< 3	Simple	Simple	Medium
3 – 7	Simple	Medium	Difficult
8+	Medium	Difficult	Difficult

	Number and source of data tables		
Number of sections contained	Total < 4 (<2 server, <2 client)	Total < 8 (2-3 server, 3-5 client)	Total 8+ (>3 server, >5 client)

< 2	Simple	Simple	Medium
2 or 3	Simple	Medium	Difficult
> 3	Medium	Difficult	Difficult

Q) Perform Cocomo 2 estimation on any scenario from google.

Answer: Suppose that a project was estimated to be 400 KLOC.

The effort and development time for each of the three modes i.e. organic, semidetached and embedded.

The basic COCOMO equation take the form:

$$E = a_b \, (KLO)^{bb}$$

$$D = c_b \, (E)^{db}$$

Estimated size of the project = 400 KLOC

1. Organic Mode
   $E = 2.4 \, (400)^{1.05} = 1295.31$ PM
   $D = 2.5 \, (1295.31)0.38 = 38.45$ M

2. Semidetached Mode

   $E = 3.0 \, (400)^{1.12} = 2462.79$ PM

   $D = 2.5 \, (2462.79)^{0.5} = 38.45$

3. Embedded Mode

   $E = 3.6 \, (400)^{1.20} = 4772.81$ PM

   $D = 2.5 \, (4772.82)^{0.32} = 37.59$ M