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BSSE 7thsem

Software Project Management

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1. Explain Cost benefit analysis with an example solved.

Ans 1: 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:

<i>Year</i>	<i>Project 1</i>	<i>Project 2</i>	<i>Project 3</i>	<i>Project 4</i>
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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%

2. What is FPA and OPA, Solve an example .

Ans 2: 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*)

- 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

<i>Number of FPs</i>	<i>Complexity</i>		
	<i>Low</i>	<i>Average</i>	<i>High</i>
External user type			
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)

$NOP = OP \times (1 - r\%)$

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

Number of views contained	Number and source of data tables		
	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

Object Point Analysis –Reports

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 3 Perform Cocomo II estimation on any scenario from google .

Ans3:

Cocomo (Constructive cost model):

It is a parametric cost model in which important aspects of software projects are characterized by variables (or parameters). Once the value of the parameters are determined, the cost can be computed from an equation.

It recognizes different approaches to software development such as Prototyping, Incremental development etc.

History:

COCOMO originally proposed by Boehm in 1981, now called COCOMO81

Later evolved to *AdaCOCOMO* in 1989

In 1995, Boehm proposed COCOMOII

The basic model equation

Effort = Constant × (Size)^{scale factor} × Effort Multiplier

- Effort in terms of person-months
- Constant: 2.45 in 1998
- Size: Estimated Size in KSLOC
- Scale Factor: combined process factors

- Effort Multiplier (EM): combined effort factors

Example:

Suppose that a project was estimated to be 400 KLOC. Calculate the effort and development time for each of the three modes that is

1.Organic

2.Semidetached

3.Embedded

Solution: The basic COCOMO equation is

$$E = a_b(KLOC)^{bb}$$

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

Estimated size of the project = 400 KLOC

1.Organic Mode: $E = 2.4(400)^{1.05} = 1295.31$ PM

$$D = 2.5(1295.31)^{0.38} = 38.07$$
 M

2.Semi detached Mode: $E = 3.0(400)^{1.12} = 2462.79$ PM

$$D = 2.5(2462.79)^{0.35} = 38.54$$
 M

3.Embedded Mode: $E = 3.6(400)^{1.20} = 4772.81$ PM

$$D = 2.5(4772.81)^{0.32} = 37.59$$
 M

Advantages	Disadvantages
<p>Good improvement over COCOMO</p> <p>Good match for iterative development, modern technology, and management process</p>	<p>Still immature, diverse projects in database</p> <p>Hard to believe that it will be any more reliable than the original COCOMO model</p>