Date of Performance:

Date of Submission:

Aim: Use of Metrics to estimate the cost

Software Used: Ms-Word

Software Cost Estimation

For any new software project, it is necessary to know how much it will cost to develop and how much development time will it take. These estimates are needed before development is initiated, but how is this done? Several estimation procedures have been developed and are having the following attributes in common.

1. Project scope must be established in advanced.

2. Software metrics are used as a support from which evaluation is made.

3. The project is broken into small PCs which are estimated individually.
   To achieve true cost & schedule estimate, several option arise.

4. Delay estimation

5. Used symbol decomposition techniques to generate project cost and schedule estimates.

6. Acquire one or more automated estimation tools.

Uses of Cost Estimation

1. During the planning stage, one needs to choose how many engineers are required for the project and to develop a schedule.

2. In monitoring the project's progress, one needs to access whether the project is progressing according to the procedure and takes corrective action, if necessary.

3. Estimation is the process of finding an estimate, or approximation, which is a value that can be used for some purpose even if input data may be incomplete, uncertain, or unstable.

4. Estimation determines how much money, effort, resources, and time it will take to build a specific system or product.

   Loc-based Cost Estimation

The LOC (Line of Code) is a product size metric in software engineering. Here, the number of lines in the code are counted and based on the number of lines the cost is calculated.

   LOC-based Estimation
   • Different languages lead to different lengths of code
   • It is not clear how to count lines of code
   • A report, screen, or GUI generator, can generate thousands of lines of code in minutes
   • Depending on the application, the complexity of code is different

Function Points: FP

Function Points is used in 2 contexts:

- **Past:** To develop **metrics** from historical data
- **Future:** Use of available metrics to size the s/w of a new project

FP-based Estimation

- Based on FP metric for the size of a product
- Based on the number of inputs (Inp), outputs (Out), inquiries (Inq), master files (Maf), interfaces (Inf)
- Classify each component of the product (Inp, Out, Inq, Maf, Inf) as simple, average, or complex (next slide)

LOC-based Cost Estimation:

Component	Estimated LOC
Processing	500 LOC
Translation Engine	1500 LOC
User Interface (UI)	800 LOC
API Integration	400 LOC
Error Handling and Logging	300 LOC
Security Features	400 LOC

Average productivity based on historical data: 320 LOC/person-month

Average Salary: 8000 per-month/pp

1. Total Estimated LOC = 500 + 1500 + 800 + 400 + 300 + 400 = **3900 LOC**
2. Cost per LOC = 8000/320 = Rs. 25/LOC
3. Total Estimated Project Cost = 3900*25 = Rs. 97500
4. Estimated Efforts = 97500/8000 = 13 person-month

FP-Based Estimation:

Parameters	Estimated Count	Weight (Average Complexity)	Total
Number of user inputs	2	4	8
Number of user outputs	2	5	10
Number of user enquiries	1	4	4
Number of user files	2	10	20
Number of user external interfaces	1	7	7

Total Count = 8+10+4+20+7= 49

$\sum F_i = 42$

Function Point = Total Count $*$ [0.65+0.01*$\sum F_i$]

$\qquad\qquad$ = 49*[0.65+0.01*42]

$\qquad\qquad$ = 49*1.07

Function Point = 52.43

Conclusion:

Hence we have used metrics for cost estimation successfully.

Sign and Remark:

R1	R2	R3	Total Marks	Signature
(5)	(5)	(5)	(15)	