SE

U - 2

(1) S/W Project Management : Boehm suggest an approach (W5HH) that add. project objectives, milestones & schedules responsibilities, management & tech. approaches, & req. resources.

QUESTION. ARE. Applicable regardless of SIZE or COMPLEXITY of S/W project

- WHY is sys. being developed &
- WHAT will be done &
- WHEN will be accomplished &
- WHO is responsible &
- WHERE are they org. located &
- HOW will job be done technically & managed &
- HOW MUCH of each resource is needed &.

(2) TERMINOLOGIES.

- Measures: It provides quantitive range, amount, dimension, capacity of some attribute of process or products
- Metrics: Degree (limit) to which a sys. component or process possesses a given attribute Eg: no. of errors
- Direct Metrics: Immediate measurable attribute Eg: LOC, Speed, etc.
- Indirect Metrics: Aspects that are not immediately quantifiable Eg: Quantity functionality
- Indicators: It's a metrics or combo of metrics that provides insight into S/W process, project or product. It enable project manager or S/W eng. to adjust process, project or product to make it better. Eg: Integrat" effort & test
- Faults: Errors - fault found by practioner during S/W dev. Defects - faults found by customer

Eg: no. of uncovered errors

(3) WHY Measure S/W &.

↳ To determine quality of product or process.
↳ To predict qualities of product or process.
↳ To improve quality of product or process.

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(4) 4 Ps

Process
Specifies activities related to production of s/w.
Specifies abstract set of activities that should be performed to go from user needs to final product.

Project
s/w dev. work in which a s/w process is used.
The actual act of executing activities for some specific user needs.

Product
The outcomes of s/w project.
All outputs that are produced while activities are being executed

People

(5) ** COME IN EXAM — Effort Estimations

Size oriented Metrics
1) Derived by normalizing quality or productivity measure by considering size of s/w produced.
2) KLOC is choose as normal value
3) Size-oriented metrics ⊗ universally accepted.
Eg: KLOC, Defects per KLOC, $ per KLOC.

Function oriented Metrics
1) Use a measure of functionality delivered by application as normalized value.
2) Most widely used metric of this type is function point.

FP = Count total * [0.65 + 0.01 * sum(value adjustment factor)]

3) FP values on past project are used compute, avg value of line of code per FP.

Adv. → Programming language independent
FP is Based on data that are more likely to be known on early stages.

Disadv. → Counts of info. domain can be diff. to collect
FP has ⊗ meaning, it's a no.

Object Oriented Metrics
1) Conventional s/w project metrics (FP or LOC) can be used to estimate OO s/w projects.
2) ⊗ provide enough details for schedule & efforts adjustment, which are req. as you iterate through an incremental process.
3) Set of metrics for OO projects
→ No. of scenario scripts
→ No. of support classes
→ No. of key classes.

Use-Case Oriented Metrics
1) Use FP used cases are defined early in s/w process, allow it use for estimation before significant modeling & construction activities are initiated
2) Use cases describe user-visible function & feature that are basic req. of sys.
3) Independent of programming language
4) Eg:- Effort expended / use cases.

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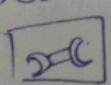
⑥ S/w Project Estimation :
- It can be transformed from one black art of a series of systematic steps that provide estimates with acceptable risks.
- Delay estimation until late in project (we can achieve 100% estimates after completion.)
- Base estimates on similar projects that are already completed
- Use relatively simple decomposition technique

⑦ Decomposition Techniques.
- S/w sizing : ① "fuzzy logic" sizing. ② Function point sizing ③ change sizing.
- Problem based estimation : ① Decompose s/w into problem functions that can each be estimated individually ② Computes LOC or FP values for each function.
- Estimation with used cases : ① Use cases are described using many diff. styles there's no standard form. ② Use case ⊗ add. complexity of function & features that are described.

50-50%.

PROCESS-BASED ESTIMATION : ⑧ Most commonly used technique.
② Identify the set of fⁿ that s/w needs to perform as obtained from project scope.
③ Identifies the series of framework activities are need to be performed for each function.
④ Estimate the effort that will be req. to accomplish each s/w process

⑧ S/w-Development project : ★★ COME IN EXAM.

MODEL	PROJECT SIZE	NATURE OF PROJECT.	Innovation	Dead line	Dev. env.
Organic 	2-50 KLOC	Small size project, Experienced developers in familiar env. Eg: Payroll inventory projects, etc.	little	Not Tight	familiar & In-house
Semi detached 	50-300 KLOC	Medium-size project, medium-size team, avg previous experience, Eg: Database sys.	Medium	medium	Medium
Embedded 	>300 KLOC	large project, Real-time sys. Complex interfaces very little previous experiences. Eg: ATMs Air traffic control	significant req.	Tight	Complex h/w & customer interfaces

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⑨ COCOMO MODEL : Constructive Cost Estimation Model

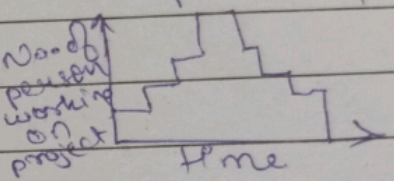
Effort : $a_1 * (KLOC)^{a_2}$ Per month

Dev. time : $b_1 * (Effort)^{b_2}$ Months

} formula

Project	a_1	a_2	b_1	b_2
Organic	2.4	1.05	2.5	0.38
Semi detached	3.0	1.12	2.5	0.35
Embedded	3.6	1.20	2.5	0.32

↑ Pre-defined value to input in formula



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SE COCOMO Model

Eg: Small Innovation, Assume (KLOC), calc. effort & development time.

Ans: efforts = $a_1 * (KLOC)^{a_2}$ PM → (Per month)

$2.4 * (10)^{1.05}$

$2.4 * 11.22 \Rightarrow 13.62$ Months

development time = $b_1 \times (effort)^{b_2}$

$= 2.5 \times (13.62)^{0.38}$

$= 2.5 \times 2.69 \Rightarrow 6.72$

(2) In your project, LOC = 2,00,000 calc.

Ans: effort = $a_1 * (KLOC)^{a_2}$

$= 3 * (2,00,000)^{1.12}$

$= 3 + 377.70 \Rightarrow 380.7$

development time = $b_1 \times (effort)^{b_2}$

$= 2.5 \times (380.7)^{0.35}$

$= 20$ Months.

0-50 small

50-300 medium

>300 large

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(3) The Module is having Lithly coupled sys. assume small. LOC. calc. development time

5000 = (5).

(A) Effort = $a_1 * (KLOC)^{a_2}$.
= $2.4 * (5)^{1.05}$
= $2.4 * 5.41$ ⇒ 7.81

Development time = $b_1 \times (Effort)^{b_2}$
= $2.5 \times (7.81)^{0.38}$
= 2.5×2.18 ⇒ 5.45

(4) KLOC ⇒ 500.

(1) Medium Effort = $a_1 * (KLOC)^{a_2}$
= $2.4 * (500)^{1.05}$
= $2.4 * 682.2$ ⇒ 684.6

Development = $2.5 \times (684.6)^{0.38}$.
= 2.5×11.95 = 29.87.

(2). E ⇒ $3 * (500)^{1.12}$
= ~~3 + 6822 ⇒ 6850.2~~
= $3 * 1054.01$ ⇒ 1057.01.

(1) ⇒ $2.5 \times (1057.01)^{0.35}$
2.5×11.44 ⇒ 28.6

Neem 29/01/25

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Hey Hey

(3) E ⇒ 3.6 * (500)^1.02

⇒ 3.6 * 1732.86 ⇒ 1736.46.

D ⇒ 2.5 X (500)^0.32

2.5 X 10.88 ⇒ 27.21

(*) Importance of team management : (3) m (5) adv.

(A) 1) New innovation in diff. minds are involved.

2) Time is disturbed hence the task is completed ~~in~~

3) As there's a team ~~many~~ One host person can concentrate towards its task instead of multitasking.

4) Mixture all field knowledge among individuals leads to betterment of project.

5) ~~For eg: if there's~~ Better communication & lead to self-development & confidence.

Ayu

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50-50%

(10) Project Scheduling & Tracking: Actions that distributes estimated effort across the planned project duration, by allocating effort to specific s/w eng. tasks.

Scheduling Principles: Interdependency | Time Allocation | Compartmentalization | Define Responsibilities | Define Outcomes | Effort Validation | Define Milestones

- GANTT CHART. (Draw) ↓.

(11) Risk Analysis & Management: A risk is a potential problem that might occur/not.

Conceptual definition of risk
- Concern future happenings.
- Involves change in mind, options
- Involves choices.

Characteristics
- Uncertainty: Happen 100% proper
- Loss: unwanted loss creation

Approach (1) → Risk Categorization
1. Project risk
2. Technical risk
3. Business risk → Market, strategies, sales.

Risks Strategies
- Reactive: Don't worry I'll do something
- Proactive: steps for risk management.

Approach (2) →
1. Known risk
2. Predictable risk
3. Unpredictable risk

STEPS OF RISK MANAGEMENT
1. Identify possible risk & recognize what go wrong.
2. Analyse each risk to estimate probability that will occur & impact
3. Rank the risk by probability & impact
4. Develop a contingency plan to manage those risk

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(A) STEPS OF RISK IDENTIFICATION.

(1) Systematic attempt to specify threats to plan project.

(2) By identifying risk project manager can take further steps.

- Generic risk: that are potential threat to every s/w.
- Product-specific risk: Risk that can be identified only by clear understanding.

(A) **Predictable risk** → Product size, Business impact, Customer characteristic, Process definition, Dev. env., etc.

(A) **Risk Estimation**: Attempt to rate each risks in 2 ways
- Probability that risk is real
- Consequences of problem associated with risk

STEPS:
- Establish a scale (probability of risk scale).
- Explain risk consequences.
- Impact of risk on project & product
- Overall accuracy ✓ / ✗ misunderstanding.

(A) **RMMM**: Mitigation, Monitoring, Management.
*** COME IN EXAM. avoidance acts, track acts, contigency plans. (And just explain them brief) →

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