

S. P. M

Chapter - 3

B Selection of Appropriate Tech

Factors:-

- Project Req Analysis (Perf., Scalability, security)
- Tech Tech Assessment
- Team Skills
- Community & Support
- Scalability & flexibility
- Compatibility
- Cost & Licensing
- Market Trends
- Risk Analysis

A Choice of Process Model

It is an abstraction of software development process

Model will define - Task to be performed

- I/O
- Pre & Post Condition for each task
- Flow & sequence of each task

Models - Waterfall, Iterative, Prototype, Spiral, Incremental, RAD, V, Agile

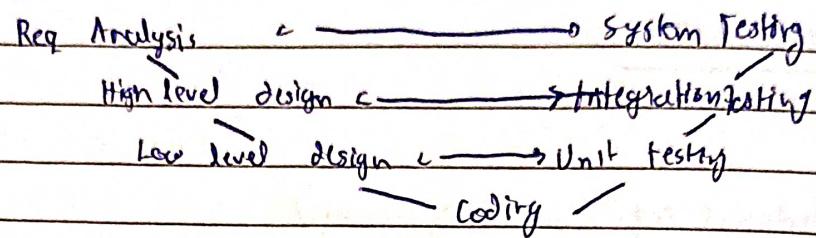
Factors - Project (size, req, complexity), cost of delay, customer involvement, resources, organizational culture.

V Model

Extension of waterfall.

Req gathered at start & not changed

For every phase in dev cycle. Involves feasibility prop



Agile

↳ Incremental & Iterative development

↳ Self organize & continuously improve

↳ suited for project w/ changing req & rapid delivery

* Delivery Model are same but also DevOps Delivery Model (CI/CD)

Delivery Models focus more on how final product is delivered.
have approach for releasing, deploying & maintaining software.

Basis for Software Estimation

- Scope & Reqs
- Size & Complexity
- Dev. approach
- Available Approach Resources
- Constraints
- Risk & Uncertainty
- Communication & Stakeholder Engagement

The overall goal of project planning is establish programme strategy for controlling, tracking & monitoring complex technical project.

Project Planning Process

- Establish Project Scope
- Determine Feasibility
- Analyze risk
- Define Req'd Resources
 - ↳ HR
 - ↳ Reusable S/w
 - ↳ Env. Res.
- Estimate cost & effort
- Develop Project Schedule
 - Estimation of resource cost & schedule for s/c effort e.g.
 - Emp
 - Access to metrics
 - Courage

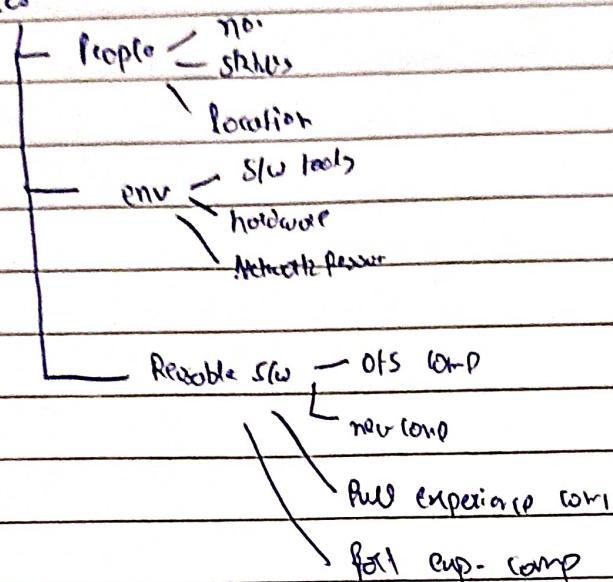
To understand scope understand - customer needs, business context, customer motivation, likely paths for change, project boundaries

S/C scope describes

- Functions & features to be delivered to end user
- I/O data
- content to be presented
- Defn, constraints, interface etc that bound system

Scope definition - narrative desc of scope developed after comm with stakeholders

- set of use-cases developed by (br) users

ResourcesProject estimation

- ↳ Scope must be understood
- ↳ Elaboration necessary
- ↳ Metrics helpful
- ↳ 2 diff. technique be used
- ↳ Uncertainty inherent

A Estimation Techniques → Expert Judgment

- ↳ Analogous (top down) (using historical data)
- ↳ parametric (LOC, FP, etc.)
- ↳ Bottom UP (Breaking in manageable task)
- ↳ Empirical Method
- ↳ Automated tools

Predicting on - degree to which planned estimated size of product

- able to forecast size estim. in human effort, time, etc.
- degree to which project plan reflects abilities of the
- stability of product reqs.

Conventional Method

LOC, FP, historical data

e.g. total LOC = 33,200 KLOC

Avg. Prod. = 620 LOC/pm

Labor rate = \$8000 / m

Cost / Code = \$13

Total Prod. = $33200 \times 620 = \$431K$

& Effort = 54 person months

FP estimator \rightarrow count Total $\times (0.65 + 0.01 \times S(\text{FPI}))$

B) Process Based Estimation

obtained from process framework

e.g. Design - effort = 30 Person Days

Impl. -

Testing

Dep -

Maint.

C) Empirical Estimation Model

Effort = Country coefficient \times size exponent \rightarrow Empirically derived

derived from

PM of effort

constant or

LOC but can be FP

derived based

on code

complexity

A) COCOMO-II

Has hierarchy of estimation models that address following areas.

- Application Composition Model:

Used during early stages of SE, when prototyping of UI, considerations of SW & Sys. Interaction, Assessment of perf & evaluation of maturity are paramount

- Early Design Stage Model

Used once req. stabilized & basic SW architecture estab.

- Post Architecture stage model

Used during construction of SW

$$E = \left(\log \frac{B^{0.333}}{P} \right)^3 \times \left(\frac{1}{t^4} \right)$$

E = Effort in PM or Person Years

G = project duration in month / years

B = Special skills factor

P = Prod. Factor

B) Estimation for OO Projects

- Develop estimates using effort decom., PP analysis, or any other method approach

- Use OO req. modelling, develop use cases & determine count

- From analysis model, determine no. of req. classes

- Categorize

Interface Spec

No Gui

Text based

GUI

Complex

Multipl.

2

2.25

2.5

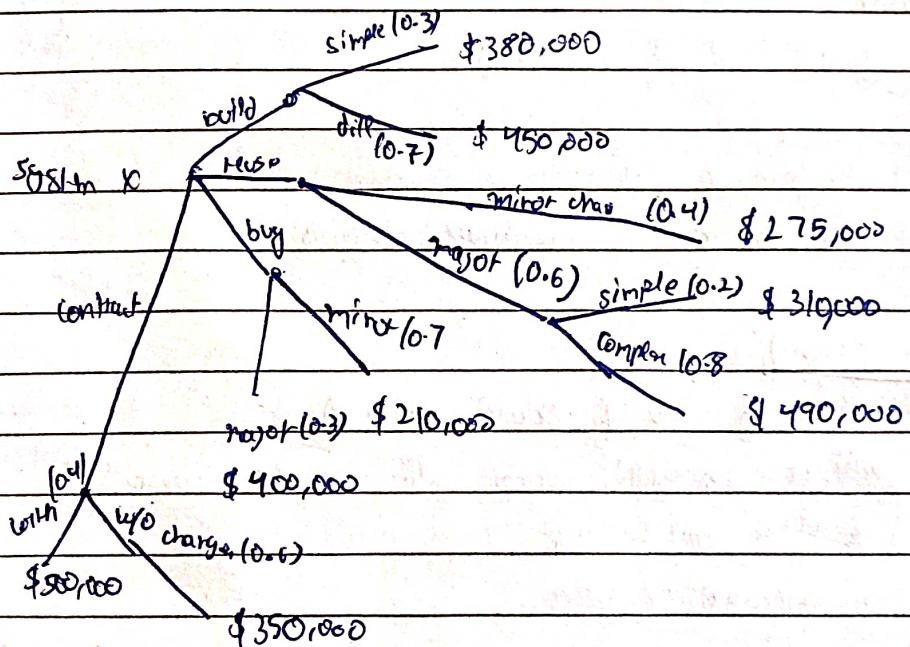
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M	T	W	T	F	S	S
Project Name:		Start Date:		End Date:		(Initial)

- Multiply no of Reg classes by multip. to estimate no of support classes
- Multip. total classes (Reg + support) by avg no of work units / class
- Cross check class based estimation by multiplying by avg no of work units per usecase

A Estimation for Agile Projects

- + Each use scenario considered separately
- Scenario decomposed in set of SE tasks
- + Each task estimated separately
 - ↳ volume can be estimated in LOC, FP or other (use case count)
- Estimate for each task are summed
 - ↳ volume is translated in effort using historical data
- Effort estimates for all scenarios are implemented for given S/W development summed to develop Effort estimates for inc.



$$\text{Expected cost} = \sum (\text{Path prob})_i \times (\text{estimated path cost})_i$$

$$\text{Expected cost}_{\text{build}} = 0.30 (\$380) + 0.70 (\$450) \\ \sim \$429 \text{ K}$$

(by others)