FR. CONCEICAO RODRIGUES COLLEGE OF ENGG.

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SEMESTER / BRANCH: V/COMPUTER Engineering

SUBJECT: Software Engineering **(CSC502)/ First Assignment**

Date: 19-08-23   Due Date : 25-08-23

CSC502.1: Recognize software requirements and various process models. (Understanding)
CSC502.2: Develop project Plan, schedule and track the progress of the given project (Applying)

Questions :

1. What is the significance of recognizing software requirements in the software engineering process?
2. Describe the main characteristics of different process models used in software development.
3. How does the Capability Maturity Model (CMM) contribute to improving software development processes?
4. Explain the differences between prescriptive process models and evolutionary process models.
5. Provide examples of situations where using a specific process model would be more suitable.
6. Compare and contrast the Waterfall model and Agile methodologies in terms of project planning and progress tracking.
7. Apply process metrics to evaluate the efficiency and effectiveness of Waterfall , Agile (both Scrum & Kanban) methodologies, considering factors such as development speed, adaptability to change and customer satisfaction.
8. Justify the relevancy of the fallowing comparison for software development models.

Features	Water fall Model	Incremental Model	Prototyping Model	Spiral Model
Requirement Specification	Beginning	Beginning	Frequently Changed	Beginning
Understanding Requirements	Well Understood	Not Well Understood	Not Well Understood	Well Understood
Cost	Low	Low	High	Expensive
Availability of reusable component	No	Yes	Yes	Yes
Complexity of System	Simple	Simple	Complex	Complex
Risk Analysis	Only at beginning	No risk analysis	No risk analysis	Yes
User involvement in all phases of SDLC	Only at beginning	Intermediate	High	High
Guarantee of Success	Less	High	Good	High

Overlapping Phases	Absent	Absent	Present	Present
Implementation Time	Long	Less	Less	Depends on Project
Flexibility	Rigid	Less flexible	Highly flexible	Flexible
Changes Incorporated	Difficult	Easy	Easy	Easy
Expertise Required	High	High	Medium	High
Cost Control	Yes	No	No	Yes
Resource Control	Yes	Yes	No	Yes

Rubrics :

Indicator	Average	Good	Excellent	Marks
Organization (2)	Readable with some mistakes and structured (1)	Readable with some mistakes and structured (1)	Very well written and structured (2)	
Level of content(4)	Minimal topics are covered with limited information (2)	Limited major topics with minor details are presented(3)	All major topics with minor details are covered (4)	
Depth and breadth of discussion(4)	Minimal points with missing information (1)	Relatively more points with information (2)	All points with in depth information(4)	
Total Marks(10)				

1] What is significance of recognizing software requirement in the software engineering process?

→ As, the technology changes, the user requirements & environment on which software is working also changes so every organization is ranked based on the software engineering engineering principles used by that organization

Implementing & managing large size of software programmer require a specific method modularize the tasks so that size of software cant harm the software quality.

Software engineering provides methodology for implementing complex software system with high quality.

Extending the previous software to add new functionality require more cost in terms of time to develop & effort taken by people as compare to the process of developing new software to provide that functionality.

Software engineering provides a way in which software sys can be able to scale as needed in future.

2] Describe the main characteristic of different process models used in software development.

→ * Waterfall model - Sequential & linear approach. Each phase must be completed before moving to the next one -
- Clean & structured, suitable for projects with well-defined requirement, minimal changes & stable scope.
- Limited flexibility for changes, difficult to adopt to enduring requirement, potential for late-stge errors discovery.

* V-model & (Validition & Verification model):- Parallel developmet & testing approch. Each development phase is followed by a corresponding testing phase.
- Strong emphasis on validation & verification clear documentation reduce risk by identifying issues early.
- limited adaptibility to changing requirement potential for miscommunication between development & testing phases.

* Incremental model - Similar to interactive models, but the software is built in increments, each delivering specific functionity
- Early delivery of functional modules, reduce time to markety, allows for better integration testing.
- Require careful planning to define incrementas, possible integration challenges.

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3.] How does the capability maturity model (cmm) contribute to improving software development process?

→ The cmm models application in software development has sometimes been problematic. Applying multiple model that are not integrated within & across an organization could be costly in training appraus and improvent activities.

The capability maturity model integration (cmmi) project was to sort out the problem of using multiple model for software development process, they re cmmi model has superseded the cmm model, though the cmm model continues to be a general theoritical process capability model used in the public domain.

cmmi framework consist of a collection of computer programs based on knowledge, engineering, software engineering, integrated product & process development & provide sourcing.

- cmmi framework has three groups as:
1. cmmi for development (cmmi-DEV)
2. cmmi for service (cmmi-SVC)
3. cmmi for acquisation (cmmi-ACQ)

4] Explain the difference between prespective process models & evolutionary process models.

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Prespective process model	Evolutionary process model
• Developed to bring order & structure to the software development process	Stage consists of growing increment of an operational software product, with evolution.
• It can accomodate changing requirement.	Improvement is required in the product
• It is more popular.	It is less popular
• Waterfall model & incremental models are a few examples of prespective	Eg: Spiral & prototyping model as well as RAD model.

5] Provide Examples of situation where using a specific process model would be more suitable.

→. Incremental model - When a project can be diviided into smaller fuctional increments, allowing certain modules to be developed & delvied independently with ensuring integration & tysing along the way

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RAD model : When there is a need to quickly produce a working prototype to gather user feedback & make requirements before proceeding with full development.

- Waterfall model - When requirements are stable & changes are minimal, making it possible to plan & execute the project in a linear sequence of phases.

- Agile model (Scrum) - When flexibility & adaptability are crucial & the project can be divided into smaller increment with frequent interaction, allowing for continuous feedback & changes "

6] Compare & contrast the waterfall model & agile methodologies in terms of project planning & progress tracking.

→ Waterfall model is the first approach used in software development process.

- It is also called as classical life cycle model or linear sequential model any phase of development process begins only if previous phase is completed.

- A cycle software development describes an approach to software development under which requirement & solution evolve through the collaborative efforts of self-organizing & cross functional teams & their continuous

4] It adequets adaptive planing, evolutionary development early delivery & continual improvement & it engourouys rapid & flexible responses to change.

- The term agile was popularized in the context & by the manifesto for agile software development.

7] Apply process metrics to evaluate the efficiency & effectives of waterfall, agile (both scrum & 'Kanbad methodologies, considering factors such as development speed, adaptability to change & customer satisfaction.

→ 1. Waterfall :- Development Speed :-
Waterfall is a linear & sequential methodology where each phase must be completed before moving to the next. This can lead to longer development cycles.

- Matrics : Time taken for each phase (requirement design, development, testing, deployment)

Adaptability to Change :-
Waterfall is less adaptable to changes in requirement due to its rigid structure.
. Matrics : Number of change requests, impact analysis time & delays caused by change requirement.

- Agite (Scrum & Kanban):

Development Speed:
- Agile methodology emphasize incremental development allowing for quicker delivery of working features
- Matrics: Number of user stories completed per sprint or cycle time, velocity

Adaptability to Change:
Agile methodologies are highly adaptable to changing requirement due to regular iteration & flexibility.
Matrices: No. of changes incorporated per sprint/cycle & time taken to respond to change requests.

Customer Satisfaction:
- Agile methodologies involve continuous customer feedback & collaboration, leading to improved satisfaction
- Matrics: Regular customer feedback scores, frequency of customer involvement.

8] Justify the relevancy of the following comparisons for software development models.

Feautures	Waterfall Model	Inaenetal Model	Puototyping model	Spiral Model
Requirement Specification	Well Understood	Not Well Understood	Not well understood	Well Understood
Understanding Requirement	Well understood	Not well Understood	Not well understood	Well understood
Availability of reusable Components	No	Yes	Yes	Yes
Risk Analysis	Only at the begining	No risk analysis	No risk Analysis	Yes
User involvement	Only at the beginning	Intermediate	High	High
Implementation time	Long	less	less	Depend on Project
Experties require	High	High	Medium	High
Cost control	Yes	No	No	Yes
Resource Control	Yes	Yes	No	Yes