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)				

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SE Assignment 1 TE COMPS B

1. What is significance of recognizing software requirements in software engineering process?

→ 1) As technology changes, the user requirements and environment on which software is working also changes. So every organization is ranked based on software engineering principles used by that organization

2) Implementing and managing large size of software, programmers requires a specific method modularize the tasks so that size of software can't learn the software quality.

3) Without any standard method or management, it is difficult to address defects in the product and correct it as early as possible. Software engineering provides this functionality.

4) Extending the previous software to add new functionality requires more cost in terms of time to develop and efforts taken by people, as compare to the process of developing new software to provide that functionality.

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

2. Describe main characteristics of ~~direct~~ different process models used in software development.

1) Waterfall model: a) Sequential and linear approach. Each phase must be completed before moving onto next one.

b) Clear and structured, structured suitable for projects with well defined requirements, minimal changes and stable scope.
c) Limited flexibility for changes, difficult to adapt to evolving requirements, potential for late stage errors discovery.

2) V-model (validation and verification model):- a) Parallel development and testing approach. Each development phase is followed by a corresponding testing phase.
b) Strong emphasis on validation and verification, clear documentation reduces risk by identifying issues early.
c) Limited adaptability to changing requirements, potential for miscommunication between development and testing phases.

3) Incremental model:- a) Similar to iterative models, but software is built in increments, each delivering specific functionality.
b) Early delivery of functional modules, reduced time to market allows for better integration testing.
c) Requires careful planning to define increments, possible integration challenges.

4) Iterative model: a) Similar to agile, but with more structured and defined phases. Each iteration may include a subset of softwares functionality.
b) Allows for iterations, refined features, early feedback, suitable for projects with evolving requirements
c) Requires clear planning and coordination between iterations, potential for scope creep

Q 3

→ The CMM models application in software development has sometimes been problematic. Applying multiple models that are not integrated within and across an organization could be costly in training appraisal and improvement activities.

The capability maturity model integration (CMMI) project was formed to sort out the problem of using multiple models for software development processes. Thus the CMMI model has superseded the CMM model though the CMM model continues to be a general theoretical process capability model used in public domain.

CMMI framework consists of a collection of computer programs based on knowledge, engineering, software engineering, integrated product and process development and provider sourcing. CMMI framework has 3 groups :-

1) CMMI for development (CMMI - DEV)
2) CMMI for service (CMMI - SVC)
3) CMMI for acquisition (CMMI - ACQ)

4. Explain differences between prescriptive process models and evolutionary process models.

	Prescriptive process model	Evolutionary process model
1.	Developed to bring order & structure to software development process	Stages consists of growing increments of an operational software product with evolution.
2.	It can accomodate changing requirements	Improvement is required in product.
3.	More popular	Less popular
4.	Waterfall models and incremental model are few examples of prescriptive process model	Spiral and prototyping model as well as RAD model.

5. Provide examples of situations where using a specific process model would be suitable

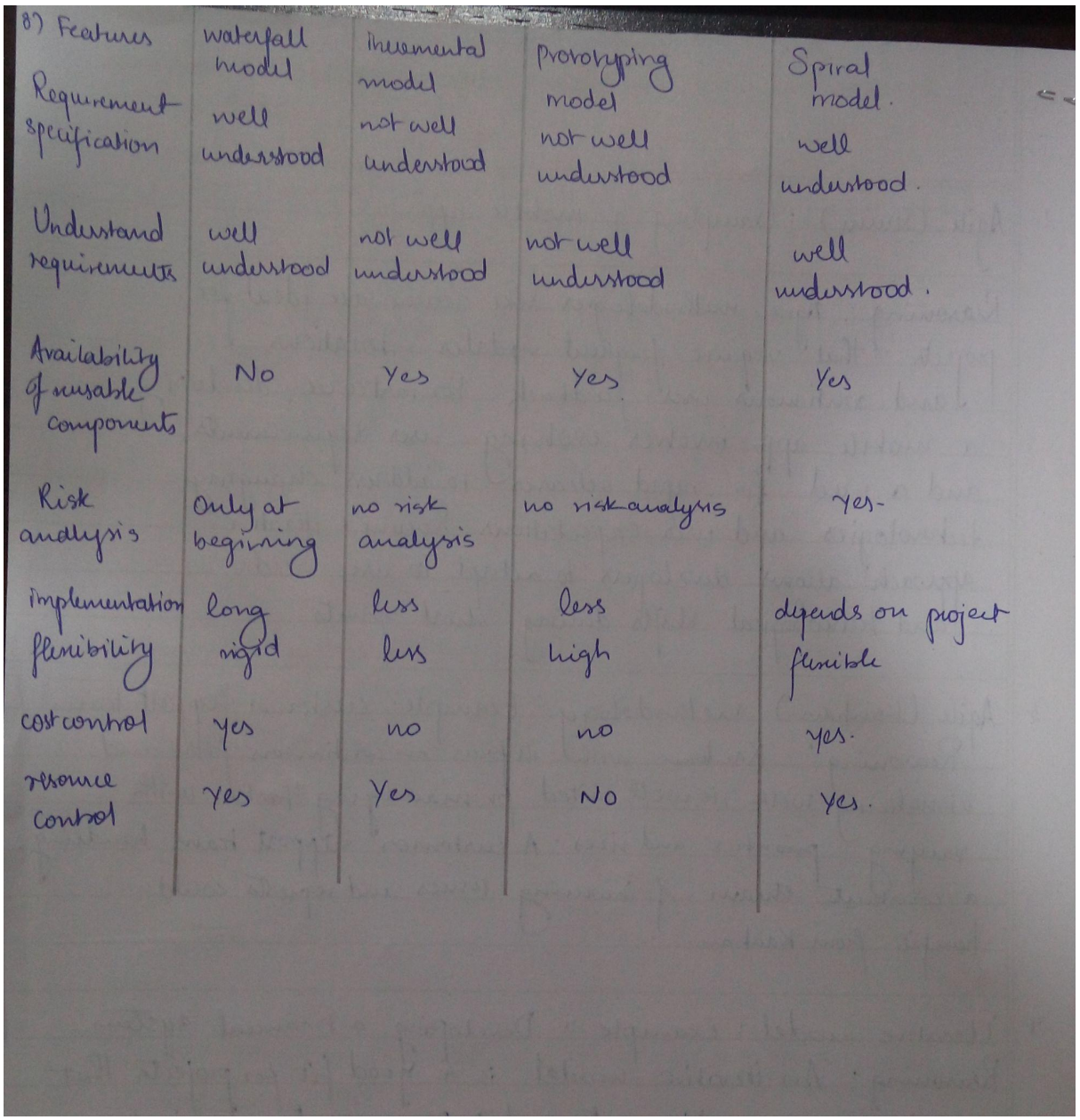
1. Waterfall model : Example - Developing a Satellite system
Reasoning : For projects where requirements are stable and well defined from the start such as building a satellite system waterfall model is suitable. The project path is linear through phases like requirements gathering, system design, component

Agile (Scrum) : Examples a mobile app

Reasoning : Agile methodologies like Scrum are ideal for projects that require frequent updates, iterations and continuous user feedback. For instance, developing a mobile app involves evolving user requirements and a need for rapid releases to address changing technologies and user expectations. Scrum's iterative approach allows developers to adapt to user needs and technological shifts during short sprints.

Agile (Kanban) methodology : Example : customer support teams
Reasoning : Kanban with its focus on continuous flow and visualizing work, is well suited for managing tasks with varying priorities and sizes. A customer support team handling a constant stream of incoming issues and requests could benefit from Kanban.

Iterative model : Example : Developing a Financial system.
Reasoning : An iterative model is a good fit for projects that requie ongoing refinement and improvement. For instance, developing a financial system involves complex calculations, regulatory compliance changes, evolving market trends.



8) Features	waterfall model	Incremental model	Prototyping model	Spiral model.
Requirement specification	well understood	not well understood	not well understood	well understood.
Understand requirements	well understood	not well understood	not well understood	well understood.
Availability of reusable components	No	Yes	Yes	Yes
Risk analysis	Only at beginning	no risk analysis	no risk analysis	Yes.
Implementation	long	less	less	depends on project
flexibility	rigid	less	high	flexible
cost control	yes	no	no	yes.
resource control	yes	Yes	No	yes.