

SE Assignment-1

Name: Joshua Lewis

9617

SE Comps B

Q-1 What is the significance of recognizing software requirements in the software engineering process?

- As the technology changes, the user requirements and environment on which software is working also changes. So every organisation is ranked based on the software engineering principles used by the organisation.

Implementing and managing large size of software programmes requires a specific method modularize the tasks so that size of software can't harm the software quality.

Software engineering provides methodologies for implementing for implementing complex software systems with high quality.

- Extending the previous software to add new functionality requires more cost in terms of time to develop and efforts taken by people.

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

Q. 2

- 1) Software processes are the activities for designing, implementing and testing a software system.
- 2) A software process model is an abstract representation of the development process.

a) Prescriptive Process Models

- i) The name 'prescriptive' is given since the model prescribes set of activities, action, task and change control mechanism for every project.
- ii) Whatever process model is chosen by the organization but it should encompass the following framework.
 - 1) Communication
 - 2) Planning
 - 3) modelling
 - 4) Construction
 - 5) Deployment
- iii) Ex, Waterfall model, Incremental process models, Evolutionary process model

⑥ Agile Process Models

- ① It includes the concept of development along with a set of guidelines necessary for the development process.
 - ② The development guidelines emphasize on analysis and design activities and continuous communication between developers and customers.
 - ③ An agile team quickly responds to change. As a result, agile development process must be adaptable.
- c) Iterative model - Similar to agile, but with more structured and defined phases. Each iteration may include a subset of the software functionality. Allows for iterations, refined features, and early feedback, suitable for projects with evolving requirements.

CMM model

- developed by Software Engineering Institute
- It defines a process or methodology used to establish/develop and refine an organization's software development process.
- presents 2 types of meta models:
 - As a Continuous model
 - As a Staged model

CMM provides the different levels based on the standards a company acquires,

New company - Level 1

CMM provides total 5 levels:

- 1) Initial
- 2) Repeatable
- 3) Defined
- 4) Managed
- 5) Optimizing

Level 1 - Characterized as a ad hoc
few process are define,
success on individual efforts.

Level 2 - Basic project management process are established to track cost, schedule, and functionality

Level 3 - At this level, processes for both management and development activities are defined and documented.

Level 4 - At this level, focus is on silo metrics.

Level 5 -

At this stage, processes and product metrics have been collected.

Level 5 - Continuous process improvement is enabled by quantitative feedback from the process, and from piloting innovative ideas and technologies.

Prescriptive process

- i to bring order and structure
- ii Define a distinct set of activities, actions, tasks, milestones
- iii more popular
- iv provides complete and full developed systems.
- v Example: Water fall model
Incremental model

Evolutionary process

- i do not establish the maximum speed of the evolution. development process becomes slow.
- ii Evolutionary process models lacks flexibility, extensibility and high quality
- iii less popular
- iv Time does not allow a full and complete system to be developed
- v Ex : Prototyping, Spiral

- ① Waterfall method -
 - ① requirements are well defined
 - ② projects with a clear and stable scope
 - ③ Developing a microwave oven with fixed set of features and requirements.
- ② Agile Model -
 - ① requirements likely to evolve and change during process
 - ② require flexibility and rapid iteration
 - ③ Mobile app based on feedback.
- ③ Spiral Model -
 - ① high level of risk assessment and management
 - ② continuous refinement, early prototypes
 - ③ Ex complex medical device; extensive testing and validation
- ④ Incremental -
 - ① divided into smaller, manageable parts
 - ② delivered separately
 - ③ Ex E-commerce website
- ⑤ Cmm -
 - ① improving and optimizing the development and management process with an organization.
Ex - large financial institution that handles sensitive customer data, high level of security
- ⑥ RAD - videogame prototype to demonstrate game play mechanics
- ⑦ V-Model -
 - ① Software for safety-critical system like an airplane avionics

Q.7 1. Waterfall

Development speed:

Waterfall is linear and sequential methodology where each phase must be completed before moving on the next. This can lead to longer development cycles.

Metrics: Time taken for each phase

Adaptability to change:

Waterfall is less adaptable to changes in requirement due to its rigid structure.

Metrics: Number of change requests, impact analysis time and delays caused by change requests

Customer satisfaction: Waterfall may have limited customer involvement throughout the end, which could affect satisfaction.

Metric: Customer feedback at the end of the project

2. Agile: Development speed:

- Agile methodologies emphasize incremental development allowing for quicker delivery of working features

Metric: Number of user stories completed per sprint or cycle time, velocity

Adaptability to change: Agile methodologies are highly adaptable to changing requirements due to regular iterations and flexibility

Customer satisfaction:

Agile methodologies involve continuous customer feedback and collaboration, leading to improved satisfaction

①-8

Features	Waterfall model	Incremental model	Prototyping Model	Spiral Model
Requirement specification	Well understood	Not well understood	Not well understood	Well understood
Understanding requirements	Well understood	Not well understood	Not well understood	Well understood
Availability of reusable components	No	Yes	Yes	Yes
Risk analysis	Only at the beginning	No risk analysis	No risk analysis	Yes
User involvement	Long	less	less	Depends on project
Flexibility	Rigid	Less	High	Flexible
Expertise required	high	high	medium	high
Cost control	Yes	No	No	Yes
Resource control	Yes	Yes	No	Yes