

Question One [40 Marks]

a) In your opinion as a software engineer, what would be the best overall (or main) software process model you would apply for the following scenarios. [20 Marks]

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State your answer in the provided space.

- i. To develop a secure ATM sub-system to integrate with an existing banking system. The developed ATM sub-system will be deployed across a 376 ATM machines. It shall include an industry validated 99.9% accuracy money notes counting dispenser, and three-level security that uses a card reader, a pin code and a biometric reader.

=> Water Fall. ✓

- ii. To develop a human resources management system to be installed in three public hospitals. The system will provide complete employee management system in terms of recruitment, employment, training, and so forth. Estimated number of employees in terms of doctors, nurses, management, and services is about 1500 personnel.

=> Incremental Development. ✓

- iii. To develop an engaging mobile game for children aged 2-9 years old. The game should provide multi-level challenge puzzles and learning functions to teaching mathematical skills. The game should work on two mobile operating systems: Apple iOS and Android. It should also work on different screen sizes phone and iPad devices.

=> Water-fall with prototype. ✓

- iv. To develop a medical device to measure vital signs, of blood pressure, temperature, and oxygen saturation level. The device will be used in hospitals for real-time medical use and therefore shall provide less than 0.01% error in its accuracy and produce results in less than 5 seconds.

=> Water-Fall. ✓

b) Choose the most correct answer for the following questions. [20 Marks]

[20 Marks]

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Draw a clear circle on your chosen answer. Questions that have more one circle drawn will be given a ZERO mark.

- i. _____ is a software attribute that is concerned with building a trustworthy software that has the ability to evolve to meet the changing needs of customers.
- Dependability.
 - Maintainability.
 - Robustness.
 - Efficiency.

- ii. Which of the following software development process models is based on explicit risk management activities to manage and reduce risks?
- a. Boehm spiral model.
 - b. Waterfall.
 - c. Reuse-oriented.
 - d. Agile.
- iii. A _____ is a requirement elicitation technique system analysts observe users in their real working environment.
- a. Closed interviews.
 - b. Focus groups.
 - c. Scenarios.
 - d. Ethnography.
- iv. A _____ is an estimate made of whether the software product to be developed can be done within the time, budget, and current team experience.
- a. Software vision.
 - b. Feasibility study.
 - c. Development and testing plan.
 - d. None of above.
- v. Which of the following features is considered to be absent when working in Waterfall model?
- a. Detailed work plan.
 - b. Continuous customer involvement.
 - c. Integration testing.
 - d. Development team members can work on other projects at different phases.

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Question Two [36 Marks]

a) Answer the following questions:

[16 Marks]

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- i. List two advantages of the prototyping method. Write your answer in the space provided below.

=> Simple Communication way between Developers & clients, especially when using ~~Agile models~~ Plan-Driven models like Water Fall.

=> It helps the developers to test the ^{target} Design ~~with it~~ and the options, ~~and~~ so they can ~~change it~~ before implementation.
 make changes

- ii. From a management perspective, list two problems of the incremental (or evolutionary) model that would face a software project manager. Write your answer in the space provided below.

=> It maybe hard for the customer to be available during the all iterations.

=> More iterations may needed, related to the availability of the continuous change, which causes the software not to be ~~delivered~~ delivered ~~on time~~ on time.

b) Consider the following set of software requirements:

[20 Marks]

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R1.0: The system shall enable the inventory manager to search inventory items based on item number, item name, part of the item description, or category name.

R2.0: The search results of inventory items shall be displayed to the system user in no longer than 5 seconds.

R3.0: The system shall be easy to be operated by average users and shall not take a long time to train new users to use it

R4.0: The system should enable the inventory manager to generate and view inventory and financial reports.

Choose the most correct answer from the following.

Draw a clear circle on your chosen answer. Questions that have more one circle drawn will be given a ZERO mark.

- 1) The above requirements describe a set of:

- A. User requirements
 B. System requirements. X
 C. Both A and B
 D. None of above.

- 2) The functional requirements are:
- A. R1.0, R2.0
 - B. R1.0, R2.0, R4.0
 - C. R1.0, R4.0
 - D. None of above
- 3) The non-functional requirements are
- A. R1.0, R2.0
 - B. R2.0, R3.0
 - C. R1.0, R2.0, R4.0
 - D. None of above
- 4) The non-verifiable non- functional requirements are:
- A. R3.0
 - B. R2.0
 - C. R3.0
 - D. R4.0
- 5) The mandatory (must have) requirements are
- A. All of them.
 - B. R1.0, R2.0
 - C. R1.0, R2.0, R3.0
 - D. None of above.

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Question Three [24 Marks]

a) Describe two different techniques that are used to validate software requirements

[12 Marks]

①

=> Models ~~& Alternatives~~. like UML & class diagrams.

=> Use Case Diagrams which specify all the actions taken by the users, The functions that the software system support, basic and alternative flows for each event.

b) Name four output artefacts that are the result of the design phase?

[12 Marks]

①

=> prototypes.

=> Documents.

=> Diagrams.

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