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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATIONS, 2024/2025 ACADEMIC YEAR
FIRST YEAR, FIRST SEMESTER EXAMINATION
FOR THE DIPLOMA IN SOFTWARE ENGINEERING

DSE 1004 SOFTWARE DEVELOPMENT LIFE CYCLE MODELS

Date: 12TH AUGUST, 2024
Time: 2:30 PM – 4:30 PM

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE: COMPULSORY (30 MARKS)

- a) Define the following terms:
 - i) Software engineering (1 Mark)
 - ii) Software methodology (1 Mark)
- b) Describe three reasons that justify the need of having a project scope. (3 Marks)
- c) Change is inevitable for any real-world software system. Explain three reasons why a software system must change with time or become progressively less useful. (6 Marks)
- d) Achieving a high level of reuse is arguably the hardest goal to accomplish in developing a software system. Discuss the benefits and difficulties of software reuse. You should provide a clear justification for each of your stated benefits/ difficulties. (6 Marks)
- e) Software project management is the process of planning, organizing, staffing, directing and controlling the production of software. It is the art of planning, organizing, directing and controlling of resources for a finite period of time to complete specific goals and objectives. Discuss three activities that must be undertaken for the success of a software project. (6 Marks)
- f) A company needs to develop digital signal processing software for one of its newest inventions. The software is expected to have 200000 lines of code. The company needs to determine the effort in person-months needed to develop this software using the basic COCOMO model. The multiplicative (a) factor for this model is given as 3.6 for the software development on embedded systems; the exponentiation (b) factor is given as 1.20. Use $c = 2.5$ and $d = 0.32$.
 - i) Calculate the estimated effort in person-months. (3 Marks)
 - ii) The number of people required to complete the complete (2 Marks)
 - iii) Determine how long the project will take to be completed. (2 Marks)

QUESTION TWO (20 MARKS)

- a) Describe the following:
 - i) CASE tools (1 Mark)
 - ii) Software reuse (1 Mark)
 - iii) Software evolution (1 Mark)
 - iv) Software risk management (1 Mark)
- b) Software project management is a key area in software engineering. Explain three reasons for the importance of software project management (6 Marks)

- c) Explain the size oriented and functional oriented metrics in context of software development productivity estimation (4 Marks)
- d) Well-engineered and crafted software should be transitional. Discuss how you implement the following factors to ensure that this aspect of the software is met.
 - i) Portability (2 Marks)
 - ii) Interoperability (2 Marks)
 - iii) Reusability (2 Marks)

QUESTION THREE (20 MARKS)

- a) Compare and contrast the Empirical estimation techniques and Heuristic techniques as applied in software project management. (4 Marks)
- b) Software implementation allows the users to take over its operation for use and evaluation. It involves training the users to handle the system and plan for a smooth conversion. The personnel in the system must know in detail what their roles will be, how they can use the system, and what the system will or will not do. The success or failure of well-designed and technically elegant systems can depend on the way they are operated and used.
 - i) Discuss two training methods that can be adopted. (4 Marks)
 - ii) Highlight four training guidelines that need to be followed during the training process. (4 Marks)
- c) You have been invited by ScanPro Ltd to help them choose a model to use in one of their software development projects. They have thought of Waterfall model and V-model. Recommend the best model for the company to use by performing a comparison between the two models in the following aspects
 - i) Requirements specification (2 Marks)
 - ii) Risk factor (2 Marks)
 - iii) Success rate (2 Marks)
 - iv) User involvement (2 Marks)

QUESTION FOUR (20 MARKS)

- a) Discuss four requirements elicitation techniques, highlighting an advantage and a disadvantage for each technique. (8 Marks)
- b) Describe each of the stages of the Waterfall model of software development processes. (6 Marks)
- c) You have been contracted by Bidco as a lead consultant during the development of software required to manage their fleet of vehicles that the company uses to distribute their products. In your consultancy capacity, discuss how you would carry out the following for the Company:
 - i) Feasibility study (2 Marks)
 - ii) Software testing (2 Marks)
 - iii) Software operation and maintenance (2 Marks)

QUESTION FIVE (20 MARKS)

- a) Describe the prototyping model of a software development process and state the type of development project to which this is most suited. (6 Marks)
- b) Software conversion is the process of migrating from the old system to the new one. It provides understandable and structured approach to improve the communication between management and project team. A conversion plan contains description of all the activities that must occur during implementation of the new system and put it into operation. Discuss three methods that can be adopted during this process. (6 Marks)
- c) Explain two disadvantages in following a prototyping model in a software development project. (2 Marks)
- c) Discuss the following types of prototyping:
 - i) Rapid Throwaway Prototyping (2 Marks)
 - ii) Incremental Prototyping (2 Marks)
 - iii) Extreme Prototyping (2 Marks)