

National Examinations - May 2019

04-Soft-A7, Software Process

3 hours duration

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit, with the answer paper, a clear statement of any assumptions made.
2. This is a CLOSED BOOK EXAM with TWO (2) aid sheets allowed written on both sides. Approved Casio or Sharp calculator permitted.
3. Eight (8) questions constitutes the exam paper. Answer FIVE (5) of the Eight (8) questions. The first FIVE (5) questions as they appear in the answer book will be marked.
4. Each question is of equal value, and each sub-question in each question is of equal value.
5. Most questions require answers in essay format. Clarity and organization of the answers are important.

Question 1

- a. There are five major phases in software process: requirements, design, implementation, test, and maintenance. Briefly describe activities for each of the above phases.
- b. What are software metrics and how software metrics are used in software process?
- c. Briefly describe the iterative and incremental process model. Identify a situation in which the iterative and incremental process is likely to be used. Identify pros and cons of the iterative and incremental process.

Question 2

- a. Briefly describe major tasks in project planning and artifacts created from project planning.
- b. What are differences between agile software development methodology and conventional document-driven process models such as waterfall process model?
- c. As both agile development methodology and non-agile iterative-incremental process model support iterative and incremental development, what are differences between the two?

Question 3

Assume that you are asked to develop a personal address book application to support a user to add, delete, edit, save, and load personal contact information. Assume the project duration is estimated as 4 weeks. Draw a brief Gantt diagram (timeline chart) using the following three software process models. The project schedule must include managerial, development, and quality assurance activities. You do not need a grid paper; indicate the duration of each stage in days approximately.

- a. Waterfall process model
- b. Agile development methodology with 1-week sprints

Question 4

Assume you are managing development of a patient registration system for a hospital. Using the system hospital clerks can receive and register outpatients and dispatch them to visit doctors and/or hospital facilities according to their appointments, as well as receive and register new inpatients, arrange/allocate hospital beds for them, and dispatch them to relevant inpatient departments in the hospital.

- a. Draw a UML use case diagram modeling the system. Define entry and exit conditions, and quality requirements.
- b. Draw a UML class diagram for the use cases.
- c. If agile development is used, would you change software specifications or just focus on implementation? Explain your answer.

Question 5

To estimate the cost of the project in the question 4 using the Function-Point approach, define counts:

	Simple	Average	Complex	Total
External Inputs				
External Outputs				
External Inquiries				
Internal Logical Files				
External Interface Files				
Count total				

- Assign weights for Simple, Average and Complex arbitrarily, but reasonably.
- Chose five adjustment factors and assign values to them.

Question 6

- a. A major activity in software testing is test case design. What are test cases? What are tasks in test case design? What are input to test case design and what are output from test case design?
- b. What are differences between the following software testing purposes: unit test, component test, integration test, system test, and acceptance test?
- c. In component or integration tests, why are stubs and/or drives needed? What are typical functionalities of stubs and drivers?
- d. What are differences between system testing and acceptance testing? Who are involved in each of them?

Question 7

- a. What is configuration management in software project management? What are major tasks in configuration management?
- b. What is version control in configuration management? Briefly describe how version control is used to develop configurable software systems. Briefly describe how version control is used for team-based development.
- c. Briefly describe relationships between configuration management and change management in software development process.

Question 8

- a. What is the difference between software development process and software life cycle?
- b. List and briefly describe 3 or more major tasks in software maintenance.
- c. What is the difference between software evolution and maintenance? What are tasks in software evolution which are not included in maintenance?
- d. In re-engineering a software system, in what situation is reverse engineering of the existing system is need? In what situation is reverse engineering of the existing system is not needed.