



UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR **SECOND SEMESTER EXAMINATIONS**

SECOND YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE **(COMPUTER SCIENCE)**

CSC 224: SOFTWARE ENGINEERING

DATE: APRIL 10, 2018

TIME: 2:00 PM – 4:00 PM

INSTRUCTIONS:

Answer Question ONE and ANY other two Questions

QUESTION ONE (30 MARKS)

- a) Explain why it is not necessary for a program to be completely free of defects before it is delivered to its customers (1 mark)
- b) Identify an architecture for a system (such as iTunes) that is used to sell and distribute music on the internet. What architectural patterns are the basis for this architecture (2 marks)
- c) To help counter terrorism, many countries are planning or have developed computer systems that track large numbers of their citizens and their actions. Clearly this has privacy implications. Discuss the ethics of working on the development of this type of system. (3 marks)
- d) Explain why it is important to model the context of a system that is being developed. Give two examples of possible errors that could arise if software engineers do not understand the system context (4 marks)
- e) Discuss whether professional engineers should be certified in the same way as doctors or lawyers (4 marks)

- f) Explain why you would recommend against the use of an agile method for developing a software system (4 marks)
- g) Explain the range of tools used in a software development platform to provide support for software engineering processes. These may include: (5 marks)
- h) List plausible user requirements for the following function (7 marks)

An unattended petrol (gas) pump system that includes a credit card reader. The customer swipes the card through the reader then specifies the amount of fuel required. The fuel is delivered and the customer's account debited.

QUESTION TWO (20 MARKS)

- a) David owns a small medium enterprise and he want wants to automate his operations explain two reasons why it is important to hire a software engineer (4 marks)
- b) Identify the most appropriate generic software process model that might be used as a basis for managing the development of the following systems, and explain reasons for your answer based on the type of system being developed (8 marks)
- i) A system to control anti-lock braking in a car
 - ii) A virtual reality system to support software maintenance
 - iii) A university accounting system that replaces an existing system
 - iv) An interactive travel planning system that helps users plan journey with the lowest environment impact
- c) Like other engineering disciplines, software engineering is carried out within a social and legal framework that limits the freedom of people working in that area. Explain four areas where software engineering professional standards of acceptable behavior are not bound by laws but by the more tenuous notion of professional responsibility (8 marks)

QUESTION THREE (20 MARKS)

- a) List plausible user requirements for the following function (5 marks)

The spelling-check and correcting function in a word processor.

- b) Discover ambiguities or omissions in the following statement of requirements for part of a ticket-issuing systems (5 marks)

An automated ticket-issuing system sells rail tickets. Users select their destination and input a credit card and a personal identification number. The rail ticket is issued and their credit card account charged. When the user presses the start button, a menu display of potential destinations is activated, along with a message to the user to select a destination. Once a destination has been selected, users are requested to input their credit card. Its validity is checked and the user is then requested to input a personal identifier. When the credit transaction has been validated, the ticket is issued.

- c) A software engineer has been assigned a task to develop a library system and he has chosen the waterfall model approach for developing this software. Discuss the principal stages of the waterfall model which directly reflect the fundamental development activities (10 marks)

QUESTION FOUR (20 MARKS)

- a) Explain why it is unwise for managers to pressure developers to deliver throwaway prototypes, particularly when there are delays in delivering the final version of the software (4 marks)
- b) Discuss three general issues that affect many different types of software despite that they use different software engineering methods (6 marks)
- c) Develop a sequence diagram showing the interactions involved when a student registers a course in a university. Courses may have limited enrolment, so the registration process must include checks that places are available. Assume that the student accesses an electronic course catalog to find out about available courses (10 marks)

QUESTION FIVE (20 MARKS)

- d) Explain two factors that have led software failures (4 marks)
- e) Discuss activities in the design process for developing a real time system (6 marks)
- f) List plausible user requirements for the following function (10 marks)

The cash-dispensing function in a bank ATM.

--END--

