KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY

Kasarani Campus
Off Thika Road
Tel. 2042692 / 3
P. O. Box 49274, 00100
NAIROBI
Westlands Campus
Pamstech House
Woodvale Grove
Tel. 4442212
Fax: 4444175

KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR
SECOND YEAR, FIRSTSEMESTER EXAMINATION
FOR THE BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
KIT 2203 – SOFTWARE ENGINEERING I

Date: 10TH December 2024
Time: 2:30PM – 4:30PM

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) Discuss why a software system that is used in a real-world environment must change or become progressively less useful. (5 Marks)
b) Describe five components of a design method (5 Marks)
c) Give five reasons as to why IT professionals should have a good understanding of software engineering concepts. (5 Marks)
d) Distinguish between generic software product development and custom software development (2 Marks)
e) Explain, with examples, why different application types require specialized software engineering techniques to support their design and development. (5 Marks)
f) Discuss four important attributes which all software products should have (8 Marks)

QUESTION TWO (20 MARKS)

a) Distinguish between a software process model and a software process? (3 Marks)
b) Give two ways in which a software process model might be helpful in identifying possible process improvements. (2 Marks)
c) Based on your experience with a bank ATM, draw a data-flow diagram modelling the data processing involved when a customer withdraws cash from the machine. (5 Marks)
d) Draw a context model for a patient information system in a hospital. You may make any reasonable assumptions about the other hospital systems that are available, but your model must include a patient admissions system and an image storage system for X-rays, as well as other diagnostic records. (5 Marks)
e) Discover ambiguities or omissions in the following statement of requirements for part of a ticket-issuing system.

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.

(5 Marks)

QUESTION THREE (20 MARKS)

a) Giving reasons for your answer, suggest an appropriate structural model for the following systems:
   i) An automated ticket-issuing system used by passengers at a railway station (2 Marks)
   ii) A computer-controlled video conferencing system that allows video, audio and computer data to be visible to several participants at the same time (2 Marks)
   iii) A robot floor-cleaner that is intended to clean relatively clear spaces such as corridors. The cleaner must be able to sense walls and other obstructions. (2 Marks)

b) Explain why it may be necessary to design the system architecture before the specifications are written. (4 Marks)

c) Discuss an example of a type of system where social and political factors might strongly influence the system requirements. (5 Marks)

d) A library system has to include support for cataloguing new documents where the system catalog may be distributed across several machines. What are likely to be the most important types of non-functional requirements associated with the cataloguing facilities? (5 Marks)

QUESTION FOUR (20 MARKS)

a) Describe the main processes in a modern software development environment, and the tools used to support them. (5 Marks)

b) If software is safety-critical, such as the control software for a car's anti-lock braking system (ABS), which other processes might be added in the modern software development environment in (a) above? (5 Marks)

c) Describe the waterfall model for software development and list three of its advantages for software development. (5 Marks)

d) Give five stakeholders in a university student records system. (5 Marks)

QUESTION FIVE (20 MARKS)

a) A car manufacturer wishes to save weight and improve reliability by replacing most of the vehicle's wiring harness with a local area network. Systems such as engine management, anti-lock braking, traction control and stability control will thus share common platform components. Your task is to ensure that the safety of these systems, and of the vehicle electronics overall, is not impaired by this upgrade.
   (i) Describe the methodology you would adopt for the project, and justify your choice. (10 Marks)
   (ii) How would you then ensure that subsequent development of these subsystems – which you should assume are supplied by different subcontractors – does not compromise vehicle safety? (10 Marks)