INTERNATIONAL UNIVERSITY OF EAST AFRICA

'Learning to Succeed'

FACULTY OF SCIENCE AND TECHNOLOGY

END OF SEMESTER EXAMINATIONS - APRIL 2025

PROGRAMME: BIT

YEAR/SEM: YEAR 3/SEMESTER 1

COURSE CODE: BIT3107

NAME: PRINCIPLES OF SOFTWARE ENGINEERING

DATE: 2025-04-14

TIME: 2:00-5:00PM

INSTRUCTIONS TO CANDIDATES:

1. Read the instructions very carefully
2. The time allowed for this examination is STRICTLY three hours
3. Read each question carefully before you attempt and allocate your time equally between all the Sections
4. Write clearly and legibly. Illegible handwriting cannot be marked
5. Number the questions you have attempted
6. Use of appropriate workplace examples to illustrate your answers will earn you bonus marks
7. Any examination malpractice detected will lead to automatic disqualification.

DO NOT WRITE ANYTHING ON THE QUESTION PAPER

Section A This Section is Compulsory

Question 1:

You are developing the specification for the patient information system for mental healthcare. This system is intended to manage information about patients attending mental health clinics and the treatments that have been prescribed. In developing the specification for this system, you have to decide whether the system should focus exclusively on collecting information about consultations (using other systems to collect personal information about patients) or whether it should also collect personal patient information.

a. Identify and explain two key functional requirements for the Patient Information System. (8 Marks)
b. Discuss the advantages and disadvantages of designing the system to only collect consultation information versus also collecting personal patient information. (12 Marks)
c. What ethical and legal considerations should be taken into account when deciding whether to store personal patient information? (12 Marks)
d. Propose a data security strategy to ensure patient confidentiality if the system includes personal patient information. (8Marks)

Section B Answer any three questions

Question 1:

a. Define project scheduling and explain its importance in software project management. (4 Marks)
b. Describe the key steps involved in project scheduling. (6 Marks)
c. Explain the role of the following scheduling techniques in software project management: (2marks each)
i) Gantt Charts
ii) Critical Path Method (CPM)
iii) Program Evaluation and Review Technique (PERT)
d. Discuss two challenges faced in project scheduling and suggest possible solutions. (4 Marks)

Question 2:

a. Discuss how different software process models influence project outcomes. Illustrate scenarios in which one model might outperform the others, highlighting both advantages and challenges. (8 marks)
b. Analyze the role of continuous integration and continuous delivery practices in modern software development. Explain how these practices contribute to rapid feedback, improved collaboration, and higher quality software. (6 marks)
c. EvaluateÂ how modular design and the use of design patterns can enhance the scalability and maintainability of a software system. Provide examples of techniques that have been particularly effective in large-scale projects. (6 marks)

Question 3:

a. Define the term software process and explain its importance in software development. (5 Marks)
b. Describe the four fundamental activities of a software process. Provide examples where applicable. (8 Marks)

c. Compare and contrast the incremental model and the rapid prototyping in software development. Discuss their advantages and disadvantages. (7 Marks)

Question 4:

a. Define the Build and Fix Model in software development. (4 Marks)
b. Explain the steps involved in the Build and Fix Model and how it differs from other software process models. (6 Marks)
c. Discuss the advantages and disadvantages of using the Build and Fix Model in software development. (6 Marks)
d. In what types of projects is the Build and Fix Model most suitable? Justify your answer with examples. (4 Marks)

Question 5:

a) Outline the stages of the *waterfall* process model. (10 marks)
b) Discuss the major problems associated with the water fall model (6marks)
c) Is the *waterfall* process model suitable for any type of software development? Discuss(4marks).

Question 6:

a. What are the fundamental concepts that should be considered in software design? (4marks)
b. Describe functional and nonfunctional requirements. (3 marks)
c. What should be contained in a design specification? Why are these parts important? (5marks)
d. What are the objectives of software project planning (3 marks)
e. How can software developer overcome risks in software projects (5 marks)