



MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY
P.O. Box 972-60200 – Meru-Kenya
Tel: +254(0) 799 529 958, +254(0) 799 529 959, + 254 (0) 712 524 293,
Website: info@must.ac.ke Email: info@must.ac.ke

University Examinations 2023/2024

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE COMPUTER SCIENCE

CCS 3250: OBJECT ORIENTED ANALYSIS AND DESIGN

DATE: APRIL 2024

TIME: 2 HOURS

INSTRUCTIONS: Answer question *one* and any other *two* questions

QUESTION ONE (30 MARKS)

- a) Discuss requirements gathering approach more suitable when upgrading a legacy system versus a completely new system. Give a thorough explanation for your answer. [3 marks]
- b) List three behavioral diagrams [3 marks]
- c) In a table format, compare and contrast Association, Aggregation and Composition relationship. [3 marks]
- d) Discuss the following concepts using example: [3 marks]
 - i. Behavioral modeling
 - ii. Structural modelling
 - iii. Dynamic modelling
- e) Explain the following OOAD terms using suitable examples:



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- i. Use case [3 marks]
 - ii. Behavioral View [3 marks]
 - iii. Sequence diagram [3 marks]
 - iv. Class diagram stereotypes [3 marks]
 - v. Multiplicities [3 marks]
- f) Describe the following using appropriate notations: [3 marks]
- i. Use case stereotypes
 - ii. Swimlane
 - iii. Package diagram

QUESTION TWO (20 MARKS)

- a) Given the Conference management system scenario, the process of the candidates is to login the conference system and submit the paper through online. Then the reviewer reviews the paper and sends the acknowledgement to the candidate either paper selected or rejected. This process of on conference management system are described sequentially through following steps: The candidate login to the conference management system. The paper title is submitted. The paper is being reviewed by the reviewer. The reviewer sends acknowledgement to the candidate. Based on the selection, the best candidate is selected. Finally, the candidate registers all details.
- i. Identify the actors. [3 marks]
 - ii. Sequence diagram for submitting paper [5 marks]
 - iii. Draw the component diagram of the components in this conference management system. [4 marks]
- b) Describes the use of patterns in design using ay three type of pattern. [4 marks]
- c) Explain challenges that necessitated the transition from structured analysis and designs to object orientation paradigm. [4 marks]



QUESTION THREE (20 MARKS)

- a) discuss any three question to identify the actors and three questions to identify use cases that appear in a use case diagram. [6 marks]
- b) covert the following to C++ code. [4 marks]

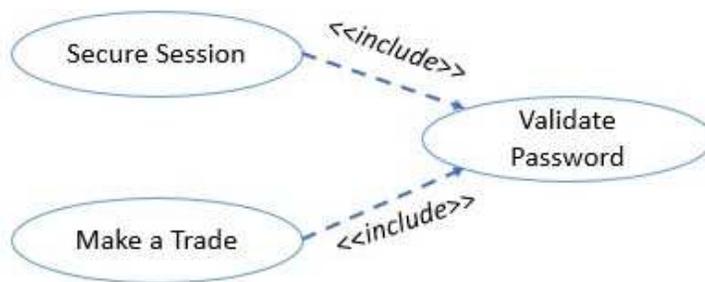
Course
name: String semester: SemesterType hours: float
getCredits(): int getLecturer(): Lecturer getGPA(): float

- c) A university consists of multiple faculties which are composed of various institutes. Each faculty and each institute has a name. An address is known for each institute. Each faculty is led by a dean, who is an employee of the university. The total number of employees is known. Employees have a social security number, a name, and an e-mail address. There is a distinction between research and administrative personnel. Research associates are assigned to at least one institute. The field of study of each research associate is known. Furthermore, research associates can be involved in projects for a certain number of hours, and the name, starting date, and end date of the projects are known. Some research associates teach courses. They are called lecturers. Courses have a unique number (ID), a name, and a weekly duration in hours.
- Identify the classes ad their attributes [3 marks]
 - Identify the relationships between classes [3 marks]
- d) Discuss the Four levels of Visibility. [4 marks]



QUESTION FOUR (20 MARKS)

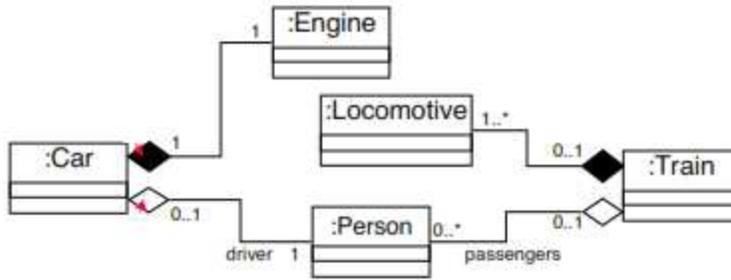
- a) Draw a state diagram to illustrate the behavior of an infant bank account: note that the account is empty to start with and money can then be deposited, to put the account in credit, deposit can be withdrawn as long as the account is not overdrawn. The account can only be closed when the balance is zero. Overdraft is not allowed. [4 marks]
- b) Explain the steps required in to construct a sequence diagram. [4 marks]
- c) Briefly explain the difference between the following pairs of terms. [6 marks]
 - i. Encapsulation and data hiding
 - ii. State machine and Flowchart
 - iii. OOA and OOD
- d) Illustrate and describe the collaboration diagram notations. [4 marks]
- e) Discuss the diagram below. [2 marks]



QUESTION FIVE (20 MARKS)

- a) Using your own example discuss the notations used in the activity diagram. [6 marks]
- b) Illustrate and explain the phases in the Rational Unified Process (RUP) approach to software development. [4 marks]
- c) Compare and contrast the UML views of system architecture [5 marks]
- d) Identify and explain the component of the UML diagram below. [5 marks]





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