MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

FACULTY OF ENGINEERING, APPLIED SCIENCES AND TECHNOLOGY

DEPARTMENT: COMPUTER SCIENCE & INFORMATION SYSTEMS

MODULE: OBJECT ORIENTED METHODOLOGIES

CODE: BCOS223

SESSIONAL EXAMINATIONS
APRIL 2024

DURATION: 3 HOURS

EXAMINER: MR T.S MUWANI

INSTRUCTIONS

1. *Answer **ANY FIVE** Questions*
2. *Each question carries **20** marks*
3. *Start each question on fresh page*
4. *Total possible mark is 100*

Additional material(s): None

Question 1

Read the following description: "Customers of the garage can buy cars. Customers with bad credit should pay an extra down payment".

Draw a use-case diagram depicting the narration above. [5 marks]

a) Discuss the elicitation activities. [15 marks]

Question 2

Consider the following simplified description of a university where professors teach seminars in which students can enroll.

A professor has a name, address, phone number, email address, and salary. A student has also a name, etc., but no salary. A student, however, has an average mark (of the final marks seminars). A seminar has a name and a number. When a student is enrolled in a seminar, the marks for this enrollment are recorded and the current average as well as the final mark (if there is one) can be obtained from the enrollment. From a student one can obtain a list of seminars he or she is enrolled in. Professors teach seminars. Each seminar has at least one and at most three teachers. There are two types of seminars: bachelor and master. From a bachelor seminar student cannot withdraw where as a master seminar they can.

Draw a class diagram for this university. [20 marks]

Question 3

a) Identify the **actors** and the objects in the following scenario to register a patient in a hospital management system: [10 marks]

The administrator enters the patient's name, address, date of birth and emergency contact details into the system. If the patient has only public health insurance, the administrator enters the patient's medicare number, and the system verifies this with government health database. If the patient also has private health insurance, then the administrator enters also the patient's private health insurance details, and the system verifies these details with the private health insurance system. When these details are verified as correct, the system saves the patient's details and confirms the registration.

b) A security light system has a switch and a motion sensor attached. It can be either *armed* or *unarmed*. If the switch is in the *off* position the light is off and the system is unarmed. When the switch is turned on, the light stays off but the system is armed. If the system is armed and the motion sensor detects movement, the light comes on. If no movement is detected for 5 seconds, the light goes off. Illustrate the scenario using a state transition diagram.

[10 marks]

Question 4

a) Interpret the four limitations of object-oriented programming. [8 marks]

b) Outline the main goals of analysis. [12 marks]

Question 5

Examine the object-oriented system development stages. [20 marks]

Question 6

a) Describe UML as used in object-oriented methodologies. [10 marks]

b) Differentiate between a traditional approach and an object-oriented approach to system analysis and development. [10 marks]

Question 7

a) Explain three analysis techniques that are used in conjunction with each other for object-oriented analysis. [12 marks]

b) With the aid of two diagrams, describe the two diagrams for dynamic modeling. [8 marks]

END OF EXAMINATION!