MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 309: OBJECT ORIENTED DESIGN

DATE: 10/11/2020   **TIME: 2.00-4.00 PM**

INSTRUCTIONS

Answer question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

a)   Briefly explain the difference between the following pairs of terms. You should include small examples to illustrate your answers   (12 marks)

     i.   Class / object

     ii.   Attribute / operation

     iii.   Association / multiplicity

     iv.   Subclass / superclass

     v.   Message / Method

     vi.   Encapsulation /data hiding

b)   Draw a class diagram, including class attributes, to represent the information given in the paragraph below.   (5 marks)

A dental surgery keeps information about its patients, who may be either private or Public health service provider. For each patient the surgery records the name, address, phone number, date of birth and either the health service number or the payment method.

c)   A hospital admission system records the details of the admission, treatment and discharge of all patients. It also provides a number of official reports to satisfy the requirements of external authorities. Admission consists of the following tasks: Administration staff enters the patient's personal details from a completed hospital admission form and sometimes helping them to complete the form. Next they allocate appropriate hospital accommodation

if one or more nights stay is required. Following this they assign a doctor to attend for an initial examination, and check (in the case that private medical care is required) that the patient has valid medical insurance. Doctors and nurses use the system to record medical care given to patient during their stay. (This medical care consists of treatments given and drugs administered). Only a doctor may prescribe drugs to a patient, and this information is also recorded in the system. Both doctors and nurses may administer drugs and doses are similarly recorded. Only doctors have the authority to discharge a patient, and this information is, again, recorded within the system.

From the above narrative

i.   Identify the use cases and actors of the hospital admissions system.   (8 marks)

ii.   Develop a possible use case diagram for the above narrative   (5 marks)

QUESTION TWO (20 MARKS)

a)   Visibility is used to specify which attributes and operations can be seen by the class objects. Discuss the Four levels of Visibility   (4 marks)

b)   State advantages of object-oriented methodology   (4 marks)

c)   Explain different views in UML   (4 marks)

d)   Draw a sequence diagram for the warehouseOnFire scenario. Include the objects bob, Alice, john, FRIEND, and instances of other classes you may need. Draw only the first five message sends.   (8 marks)

QUESTION THREE (20 MARKS)

a)   Draw a class diagram representing a book defined by the following statement: "A book is composed of a number of parts, which in turn are composed of a number of chapters. Chapters are composed of sections." Focus only on classes and relationships.   (5 marks)

b)   Add multiplicity to the class diagram you produced in (a) above.   (4 marks)

c)   Draw an object diagram representing the first part of this book (i.e., Part I, Getting Started). Make sure that the object diagram you draw is consistent with the class diagram of (a) above. .   (6 marks)

d)   Extend the class diagram of (a) above to include the following attributes: .   (6 marks)

•a book includes a publisher, publication date, and an ISBN

•a part includes a title and a number

•a chapter includes a title, a number, and an abstract

•a section includes a title and a number

QUESTION FOUR (20 MARKS)

a) Consider the process of ordering a chapati over the phone. Draw an activity diagram representing each step of the process, from the moment you pick up the phone to the point where you start eating the chapati. Do not represent any exceptions. Include activities that others need to perform.   (12 marks)

b) Explain different types of events within the UML   (8 marks)

QUESTION FIVE (20 MARKS)

a) Draw a state chart diagram to illustrate the behavior of a child's bank account, where no Overdraft is allowed. The account is empty to start with. Money can then be deposited, to put the account in credit, and taken out as long as the account does not become overdrawn. The account can only be closed when the balance is Zero.   (12 marks)

b) Explain different types of messages as used in sequence diagrams   (8 marks)