



# TECHNICAL UNIVERSITY OF MOMBASA

## INSTITUTE OF COMPUTING AND INFORMATICS

### UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN INFORMATION COMMUNICATION

TECHNOLOGY/ BACHELOR OF SCIENCE IN INFORMATION

TECHNOLOGY

BTIT 4210 : OBJECT – ORIENTED ANALYSIS AND DESIGN

BIT 2214 : OBJECT – ORIENTED SYSTEM AND DESIGN

END OF SEMESTER EXAMINATION

**SERIES:** MAY 2016

**TIME:** 2 HOURS

**DATE:**

#### Instructions to Candidates

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

**Do not write on the question paper.**

#### **Question ONE**

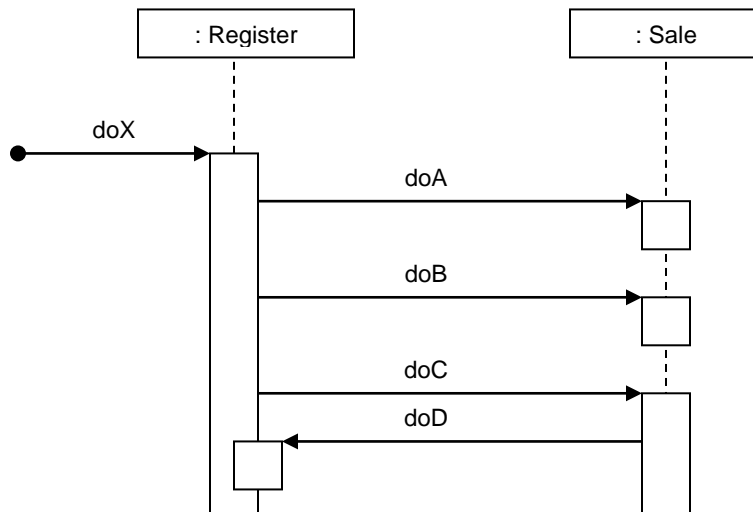
- (a.) (i.) Why do we need a state diagram in OO design?  
(ii.) With aid of a diagram, explain the basic elements that constitute a state diagram. (6 marks)
- (b.) (i.) The Unified Process (UP) is said to be an Iterative and Incremental methodology. What do we mean by Iterative and Incremental?  
(ii.) Outline the characteristics of UP. (6 marks)
- (c.) Briefly explain the major types of requirements. (4 marks)

- (d.) (i.) Outline how you would determine an aggregation relationship.
- (ii.) With aid of a practical example show how a composition relationship can be represented using UML notations. (4 marks)
  
- (e.) Differentiate between the each pair of the following terms:
  - (i.) event and an action.
  - (ii.) internal transition and self transition (4 marks)
  
- (f.) It is a fact that an object is a self-managing entity. How does an object achieve this fact? Discuss. (3 marks)
  
- (g.) Outline the three major components of a class. (3 marks)

**Question TWO**

- (a.) (i.) What is the objective of UML Interaction diagrams?
- (ii.) Give the UML Interaction diagrams you know.
- (iii.) Briefly explain the basic elements that constitute a sequence diagram. (7 marks)

(b.) Examine the following sequence diagram and answer the questions that follow:



- (i.) Briefly explain what is happening in the sequence diagram above. (5 marks)
  
- (ii.) Write a partial definition (in Java) of the class Register. (8 marks)

### Question THREE

- (a.) Briefly distinguish between the terms Object Oriented Analysis and Object Oriented Design. As you distinguish clearly bring out the emphasis of each activity. (4 marks)
- (b.) Distinguish between each of the following pairs of terms:  
(i.) Domain analysis and domain model.  
(ii.) Requirement and use case (4 marks)
- (c.) What should a software engineer do in projects where (s) he has been given pre-specified requirements? (2 marks)
- (d.) Why are use cases important in software development? (5 marks)
- (e.) How do we gather information during the domain analysis stage? (3 marks)
- (f.) Explain each of the following terms:  
(i.) Domain  
(ii.) Green-field development (2 marks)

### Question FOUR

- (a.) Define each of the following terms:  
(i.) analysis  
(ii.) design (2 marks)
- (b.) Outline the two artifacts that can be realized in each case:  
(i.) Object Oriented Analysis  
(ii.) Object Oriented Design (4 marks)
- (c.) What does the acronym UML stand for? Briefly explain the three perspectives of how UML is applied. (4 marks)
- (d.) How is the meaning of a class different in different perspectives?

(3 marks)

(e.) Briefly distinguish between use case analysis and use case model.

(4 marks)

(f.) Define each of the following terms:

(i.) Association class

(ii.) Abstract class

(iii.) Interface

(3 marks)

### Question FIVE

(a.) (i.) Briefly explain the dependency relationship in a class diagram.

(ii.) Give the different kinds of the dependency relationship that are common in class diagrams.

(7 marks)

(b.) Examine the following bank scenario and answer the questions that follow:

A bank contains many customer records. An account can be opened at the bank, and deposits or withdrawals can also be made. Customer records that the bank holds are about the account(s) customers have in the bank. Every account contains details such as customer name, account number and the current balance. There are two types of accounts that the bank can maintain namely: savings and current. A savings account has a minimum balance that a customer must maintain at any given time; whereas for a current account customers have an overdraft which also has a limit. A customer with a current account can withdraw up to the overdraft limit whereas a customer with a savings account can only be allowed to withdraw up to the minimum balance put by the bank for that account. Each account also maintains a series of transaction records which detail the type of transaction (i.e. debit or credit) and the amount being transacted.

From the above do the following tasks:

(i.) Identify the classes that evident in the description text above.

(3 marks)

(ii.) Identify the attributes and operations for the classes in (i.).

(4 marks)

(iii.) Identify the relationship instances that exists between these classes.

(3 marks)

(iv.) Draw a design class diagram for that will fit the above description.

(3 marks)