



MACHAKOS UNIVERSITY

University Examinations for 2017/2018

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

**SECOND YEAR FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE
(COMPUTER SCIENCE)**

SCO208: OBJECT-ORIENTED ANALYSIS DESIGN

DATE: 14/12/2017

TIME: 8.30-10.30 AM

INSTRUCTIONS: Answer Question ONE and any other TWO Questions

QUESTION ONE (30 MARKS)

- a) Describe the following: (6 marks)
 - i. Object-Oriented Analysis
 - ii. Object-Oriented Design
 - iii. Object-Oriented Programming
- b) Using an illustration distinguish between generalization and specialization. (4 marks)
- c) With the help of an example explain the role of Inheritance and Polymorphism. (4 marks)
- d) Describe the significance of Object Model in Object-Oriented Analysis Design. (3 marks)
- e) Describe the three major phases of software development using object-oriented methodology. (6 marks)
- f) The conceptual framework of object-oriented systems is based upon the object model. Explain the two categories of elements in an object-oriented system: (7 marks)

QUESTION TWO (20 MARKS)

- a) Discuss the three analysis techniques that are used in conjunction with each other for object-oriented analysis and highlight the process of each technique and the steps on how it can be visualized. (9 marks)

- b) Discuss the Relationship between Object, Dynamic, and Functional Models in Object-Oriented Analysis Design. (11 marks)

QUESTION THREE (20 MARKS)

- a) Business value is delivered incrementally in a time boxed cross-discipline iterations in iterative development. Describe using diagram illustrating how the relative emphasis of different disciplines changes over the course of the project. (8 marks)
- b) Discuss the four phases of unified process of software development process framework. (12 marks)

QUESTION FOUR (20 MARKS)

Library Management System

Problem Statement:

The Library Management System is library management software for the purpose of monitoring and controlling the transactions in a library. This case study on the library management system gives us the complete information about the library and the daily transactions done in a Library. We need to maintain the record of new s and retrieve the details of books available in the library which mainly focuses on basic operations in a library like adding new member, new books, and up new information, searching books and members and facility to borrow and return books. It features a familiar and well thought-out, an attractive user interface, combined with strong searching, insertion and reporting capabilities. The report generation facility of library system helps to get a good idea of which are then borrowed by the members, makes users possible to generate hard copy.

The following are the brief description on the functions achieved through this case study:

End-Users:

- Librarian: To maintain and update the records and also to cater the needs of the users.
- Reader: Need books to read and also places various requests to the librarian.
- Vendor: To provide and meet the requirement of the prescribed books.

- a) Using the above case study analyse and design the following components of Unified Modelling Language: (20 marks)

- i. Class Diagram showing objects and methods
- ii. Use-case Diagram
- iii. Sequence Diagram
- iv. Collaboration Diagram
- v. Activity Diagram
- vi. State Chart Diagram
- vii. Component Diagram

QUESTION FIVE (20 MARKS)

Online Mobile Recharge

Problem Statement:

The 'Online Mobile Recharge' gives us the information about all the mobile service providers. This application provides us the complete information regarding any mobile service provider in terms of their plans, options, benefits, etc. Suppose, any Airtel customer wants to have the information of all the schemes and services provided by the company, he/she can have the information and according to his convenience he can recharge the mobile from the same application. The major advantage of this proposed system is to have the recharging facility of any service provider under same roof.

End users:

Service Provider:

Service Provider is the one who is nothing but the mobile service provider like all the companies who are giving the mobile connections come under this module. Functionality of this module is to make the mobile recharging of their company basing on the availability of balance in the admin account. Request comes from the user and it is going to be verified at the admin for the availability of balance and then the request is forwarded to the service provided to make the mobile recharge.

Third party System Administrator:

Administrator is the one who monitors all users and user transactions. Admin also monitors all the Service Providers, all the user accounts, and amounts paid by the user and amounts paid to Service providers. When the request given by the user admin checks the available balance in the user account then request is forwarded to the Service Provider from there user request gets processed. Admin has the complete information related to user and all the information related to the schemes and other information of different recharge coupons provided by the Service Providers. All the data is maintained at the Admin level. Admin is having the rights to restrict any user.

User:

There are two categories in the user Module:

- Registered User and
- Visitor

Any person who wants to utilize the services of Online Mobile Recharge at anytime from anywhere they should get registered in this application. After getting registered user can recharge the mobile at any time and from anywhere. Visitor is the one who visits the Online Mobile Recharge

application and have the complete information related to the Service Providers and can make the mobile recharge by entering the bank details or by giving the credit card details.

Using the above case study analyse and design the following components of Unified Modelling Language: (20 marks)

- a) Class Diagram showing objects and methods
- b) Use-case Diagram
- c) Sequence Diagram
- d) Collaboration Diagram
- e) Activity Diagram
- f) State Chart Diagram
- g) Component Diagram
- h) Deployment Diagram