

TECHNICAL UNIVERSITY OF KENYA

FACULTY OF APPLIED SCIENCES AND TECHNOLOGY

SCHOOL OF COMPUTING & INFORMATION TECHNOLOGY

END OF SEMESTER EXAMINATION SERIES

SECOND SEMESTER EXAMINATIONS 2017/2018

SECOND YEAR EXAMINATIONS FOR THE DEGREE OF

BACHELOR OF TECHNOLOGY IN INFORMATION TECHNOLOGY

**ECII 2207 OBJECT-ORIENTED SYSTEMS ANALYSIS AND DESIGN**

TIME: 2 Hours

**Instructions to candidates:**

This paper consists of FIVE Questions.

Answer Question ONE [30 Marks] and any other TWO Questions [20 Marks Each].

Write your college number on the answer sheet.

This paper consists of 3 printed pages

**Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

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**QUESTION ONE (30 MARKS) COMPULSORY**

1. Using examples differentiate between
   * 1. activity diagram
     2. sequence diagram
     3. state chart diagram 8 Marks
2. Describe **FIVE** elements of a use case diagram 5 Marks
3. Distinguish between functional and non-functional requirements 4 Marks
4. Describe the stages of software development life cycle(SDLC) 6 Marks
5. Explain the relationship between Classes and Objects as used in Object Oriented Analysis and Design: 3 Marks
6. Describe the SBI of an object 4 Marks

**QUESTION TWO (20 MARKS)**

1. i)Explain what is meant by visibility of an attribute in class diagrams

2 Marks

ii) Explain three (3) forms of visibility 6 Marks

1. Distinguish between publicly derived inheritance and privately derived inheritance 4 Marks
2. Rono owns a Library in the city. He lends out books to members. He plans to introduce two types of loans: long loans (for books to be taken out) and short loans (for books to be read on premises in a small reading room). The following data should be stored about each long loan: Loan code, Borrower no., Loan date, Return date, Book condition on return. The attributes of each short loan are: Loan code, Borrower No, Loan date, Loan time, Return time, Book condition on return. An object of class Book consists of an Introduction, a number of Chapters, an Index”

Explain the following relationships between classes using examples from Rono’s system to illustrate your answers:

* + 1. Association
    2. Aggregation
    3. Composition
    4. Generalisation. 8 Marks

**QUESTION THREE (20 MARKS)**

1. Compare structured and object oriented approach to software development

6 marks

1. Discuss the following terms and how they are achieved in programming
   * 1. Polymorphism **3** Marks

## Data hiding 3 Marks

1. Suppose we want to develop software for an alarm clock. The clock shows the time of day. Using buttons, the user can set the hours and minutes fields individually, and choose between 12 and 24-hour display. It is possible to set one or two alarms. When an alarm fires, it will sound some noise. The user can turn it off, or choose to ’snooze’. If the user does not respond at all, the alarm will turn off itself after 2 minutes. ’Snoozing’ means to turn off the sound, but the alarm will fire again after some minutes of delay. This ’snoozing time’ is pre-adjustable.

Identify the top-level functional requirement for the clock, and model it with a use case diagram. 8 Marks

**QUESTION FOUR (20 MARKS)**

1. Explain the term Unified Modeling Language(UML) 2 Marks
2. Give two examples of information about a problem domain that can be captured in UML Activity Diagrams, and two ways in which these diagrams can be useful for Requirements Analysis. 5 Marks
3. Joe uploads a file into a portal, this portal transfers the file to our server where it is checked for errors. In case of an error the server sends a message to the portal where Joe can see this (if he is still logged in or on his next visit) and upload his file again (hopefully without the errors this time). In case of success the server will also notify the portal but Joe doesn't have to take any action so we are not interested in the result. As the file is okay the system now wait for Sarah who has to start the processing of the file manually after which the process completes. Draw an activity diagram for the system 7 Marks
4. Draw a sample Uml state chart diagram of an object Book in a library system 6 Marks

**QUESTION FIVE (20 MARKS)**

1. Distinguish between a methodology, a method and a model, giving suitable example in each case 6 Marks
2. With the aid of a diagram, discuss the phases of RUP 7Marks
3. Draw a UML Class Diagram representing the following elements from the problem domain for a hockey league.

A hockey league is made up of at least four hockey teams. Each hockey team is composed of six to twelve players, and one player captains the team. A team has a name and a record. Players have a number and a position. Hockey teams play games against each other. Each game has a score and a location. Teams are sometimes lead by a coach. A coach has a level of accreditation and a number of years of experience, and can coach multiple teams. Coaches and players are people, and people have names and addresses. Draw a class diagram for this information, and be sure to label all associations with appropriate multiplicities. Notes: captain could alternatively be represented as a second, named association between player and team. Assumptions: each player only plays on one team, each captain only captains one team, each team only plays in one league. 7 marks