

KENYA METHODIST UNIVERSITY

FIRST TRIMESTER EXAMINATIONS, APRIL 2007

FACULTY : **SCIENCES**
DEPARTMENT : **MATHEMATICS AND COMPUTER SCIENCE**
COURSE TITLE : **OBJECT ORIENTED SYSTEMS**
COURSE CODE : **COMP 442**
TIME : **2 HOURS**

Answer Question I and any other two questions

Question I (30 marks)

- a) Distinguish clearly between the following:
- (i) Class and object
 - (ii) Concrete class and abstract class
 - (iii) Composition and aggregation
- (6 marks)
- b) Name and explain the two major problems, associated with software system development, that characterize the software 'crisis'.
- (5 marks)
- c) Explain five characteristics of object oriented database systems (OODBMS).
- (5 marks)
- d) The need to develop easy to extend and change large scale software systems has motivated the interest in new approaches to software development. Explain why O-O programming is a promising approach for building such software.
- (5 marks)
- e) The motivating factor of O-O paradigm is *to salvage some of the flaws encountered in the procedural approach*. Explain.
- (4 marks)
- f) Explain why object oriented design phase is important in O-O system development.
- (5 marks)

Question II (20 marks)

- a) Compare the following giving the benefits of each concept to object oriented technology:
- (i) Encapsulation and Information hiding
 - (ii) Inheritance and Polymorphism

(iii) Abstraction and Instantiation

(iv) Use case and Actor

(v) Overriding and Overloading

(10 marks)

b) The central task of O-O software development construction is to develop quality software. Briefly explain the five external quality factors

(5 marks)

c) Object oriented design patterns document recurring solutions to recurring problems in object oriented software design.

(i) Differentiate between observer and decorator design patterns

(1 mark)

(ii) Outline four main benefits of design patterns.

(4 marks)

Question III (20 marks)

a) The unified modeling language (UML) is a recent initiative to become a standard language or culture of software engineer.

(i) Explain what UML is

(1 mark)

(ii) What were the main goals of creating UML

(3 marks)

b) Describe the object modeling technique (OMT) as an O-O methodology

(6 marks)

c) Customized Fabricator is a manufacturing company that fabricates many different kinds of products for the local energy industry. These products are made from parts that are stored and managed in an inventory. A part may be supplied by more than one supplier, and a given supplier may supply more than one part. Every time a part is supplied, information such as the date, amount supplied and unit cost is recorded.

Required: draw a class diagram showing:

- Relevant classes
- Attributes and operations
- Relationship between the classes
- Declare the c++/Java class implementation

(10 marks)

Question IV (20 marks)

- a) Explain the shortcomings of relational database systems highlighting how object oriented database systems have been able to overcome these limitations. (5 marks)
- b) Discuss the five steps involved in the design of object oriented database systems. (5 marks)
- c) Give two OODBMS products currently available in the market. (2 marks)
- d) Assume that a customer, who can either a personal or corporate customer, placing an order with a sales company follows the following steps
- Browse catalog and select items.
 - Call sales representative.
 - Supply shipping information
 - Supply payment information
 - Receive conformation number from salesperson
- (i) Draw the Object diagram showing a set of objects and their relationships at a specific point in time. (4 marks)
- (ii) Draw the Activity Diagram showing operation passed among objects. (4 marks)