THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Faculty of Engineering & Technology

DEPARTMENT COMPUTER SCIENCE & INFORMATION TECHNOLOGY

BACHELOR OF TECHNOLOGY IN INFORMATION COMMUNICATION TECHNOLOGY

B.Tech ICT11M

EIT 4108: FUNDAMENTALS OF OBJECT ORIENTED PROGRAMMING

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: FEBRUARY/MARCH 2012
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consist of **FIVE** questions in **TWO** sections **A** & **B**
Answer question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

Question 1 (30 marks)

(a.) Is encapsulation, information hiding? If yes, explain how, otherwise distinguish between these terms. As you discuss give the constructs in Java that are used to implement each. (6 marks)

(b.) Outline the three properties that characterize any software object. (3 marks)

(c.) (i.) What does the acronym API stand for? Give. (1 mark)

(ii.) In which Java API are all standard stream objects defined? Give. (1 mark)

(iii.) In which Java API is the JFrame class defined? Give.

(1 mark)

(d.) (i.) Which operating system environment variable do we set to be able to use the Java SDK? Give. (1 mark)

(ii.) What value do we assign to the system environment variable in (i.)? Give (assume a default installation). (1 mark)

(e.) (i.) What is a method? (1 mark)

(ii.) As you explain in (i), give the general syntax of a method definition and describe the syntax elements that constitute the method header. (5 marks)

(iii.) Write a method definition within an application class, that accepts as its arguments; an array of integers values and the size of the array. The function should scan the array and determine the position (note: not the index) of the element in the array having the smallest value. The function should return the position of the element that has the smallest value. (10 marks)

SECTION B (Attempt any TWO questions)

Question 2 (15 marks)

(a.) Briefly distinguish between an accessor and a mutator method. As you distinguish give the general syntax of a prototype for each type of method. (4 marks)

(b.) Distinguish between the two terms a class method and instance method. (2 marks)

(c.) The following code excerpt of a Product class

```
public class Product
{
      //attributes
      private String serialNo;
      private String description;
      private float sellingPrice;
      ...
}
```

(i.) Write a constructor which will accept three parameters and whose values will be used to assign the corresponding instance variables of the Product class.

(ii.) Write an accessor and mutator method for each of the instance variable of the Product class above. (9 marks)

Question 3 (15 marks)

(a.) With the aid of a diagram, describe the hierarchy of Swing components. (5 marks)

(b.) Outline the steps that we can use to create a simple GUI desktop application. (6 marks)

(c.) Write a Java application class that creates a frame with the title "This is an Exam . . .". (4 marks)

Question 4 (15 marks)

(c.) (i.) Define the term inheritance.

(ii.) Distinguish between the terms generalization and specialization as used in inheritance. (5 marks)

(d.) (i.) There are two ways we can inherit properties from a parent class to a child class namely; privately or publicly. Briefly explain how these two ways of inheriting properties from parent class work.

(ii.) How do we call the parent class constructor in a child class constructor? Outline. As you outline give the general syntax of the expression. (6 marks)

(e.) Explain the meaning for each of the following terms:

(i.) method overriding

(ii.) method overloading (4 marks)

Question 5 (15 marks)

(a.) (i.) What is a class? Explain.

(ii.) Briefly describe the components that make up a class.

(iii.) Give the general syntax for a class definition. (6 marks)

(b.) (i.) How would you create an object? Give the general syntax.

(ii.) The following are the declarations of two constructors of a class called Car:

```
Car(String regno, String make, float engCap);

Car(String regno, String make);
```

Show how you would instantiate a ford car which has registration number N155MRG and an engine capacity of 1.6 litre. Which constructor would be invoked implicitly and why? Explain.

(iii.) Outline the syntax for invoking a member method of an object. (7 marks)

(c.) Why is the main method in an application class defined with a scope modifier static? Explain.

(2 marks)