



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATION 2009/2010
INSTITUTIONAL SCHOOL BASED PROGRAMME (IBP)
EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
(COMPUTER)

SCT 105: OBJECT ORIENTED PROGRAMMING

DATE: Wednesday 28th February 2010 TIME: 2.00p.m – 4.00p.m

INSTRUCTIONS: Attempt Question One and any other two questions

QUESTION 1

- a) Explain the meaning of the following object-oriented programming concepts
(5 Marks)
- i. Object
 - ii. Class Inheritance
 - iii. Polymorphism
 - iv. Abstraction
- b) List down and explain the role of each keyword used to implement access restrictions to a class's members in C++. (6 Marks)
- c) Explain the role of abstract classes in object-oriented programming. Using an appropriate code example illustrate how an abstract class can be utilized in a program. (6 Marks)
- d) Explain the meaning of the term abstract data type (ADT). How are ADTs defined in programming languages. (3 Marks)
- e) Using appropriate code snippets explain the concept of multiple inheritance. (6 Marks)

- f) Briefly explain the inheritance process as regards the constructor of a derived class in relation to the constructor of the base class. (4 Marks)

QUESTION 2

- a) Consider the two class specifications below (only the attributes have been shown). Using generalization create an inheritance hierarchy in C++ so that both of them inherit from a parent class called Publication.
Class Book: members are :- title, author, publisher and ISBN.
Class Magazine: members are: - title, editor and publisher. (6 Marks)
- b) Explain the concept of operator overloading. (2 Marks)
- c) Write a program that uses a class called MyClass that contains a single integer variable, a constructor that takes a parameter for the instance variable and a method show() that displays the value of the instance variable. The class overloads the addition (+) operator so that when objects of the class are added, the values of their respective variable are added. (12 Marks)

QUESTION 3

- a) Explain the role of virtual function in the C++ programming language. (4 Marks)
- b) Explain in brief the significance of using polymorphism in a program. (4 Marks)
- c) Write a program that defines a virtual base class named Shape that contains a single method called calcArea that can be used to calculate and return the area of an appropriate shape object. Create a derived class called Circle and another one called Rectangle and use these three classes to demonstrate the use of run-time polymorphism. (12 Marks)

QUESTION 4

- a) Function arguments may be passed either by value or by reference. Explain the implications of using either method. (4 Marks)
- b) Write a program that accepts a student's mark in a test and displays the appropriate grade. The program prompts the user to enter the student's mark from the keyboard then it displays the correct grade on the screen as per the following grading system. The program should use a function called getGrade

to determine the grade; the function receives the mark as parameter and returns the grade.

Mark	Grade
70 or more	A
60 or more	B
50 or more	C
40 or more	D
Below 40	F

(10 Marks)

- c) Explain the importance of program documentation. (6 Marks)

QUESTION 5

- a) Briefly explain how a compiler distinguishes overload methods at compile-time. (4 Marks)
- b) Write a program that uses a class named Person with attributes of year of birth and height. Include methods/functions to set the two attributes. Include a constructor that takes two parameters for year of birth and height. Include a method that returns a person's age and one that returns the distance a person should jump if the jump twice their height.
- The program should have a main method within your program to create one object of the class and use appropriate methods to display the age distance to jump. (10 Marks)
- c) Explain the role of constructor and destructor functions. (6 Marks)