



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN

ACTUARIAL SCIENCE

3RD YEAR 1ST SEMESTER 2017/2018 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: SCS 308

COURSE TITLE: OBJECT ORIENTED PROGRAMMING IN C++

EXAM VENUE : STREAM : Bsc Actuarial Science

DATE : Sept –Dec 2017 EXAM SESSION :

TIME: 2.00 HOURS

INSTRUCTIONS:

- 1. Answer Question 1 (Compulsory) and ANY other two questions**
- 2. Candidates are advised not to write on the question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE [30 MARKS]

- a) Explain the use of the following terms as used in OOP (4 Marks)
- i. Class
 - ii. Abstraction
 - iii. Inheritance
 - iv. Encapsulation
- b) Explain an inline function (2 Marks)
- c) What is a constructor? Demonstrate with a simple program how a constructor is declared and created. (4 Marks)
- d) Write a program in C++ to read the name, age, sex, height and weight of a student and display with proper heading for each variable. (4 Marks)
- e) Write a method `squareOfAsterisks` that displays a solid square (the same number of rows and columns) of asterisks, whose side is specified in integer parameter `side`. For example, if `side` is 4, the method should display (4 Marks)

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* * * *
* * *
* *
*
```

- f) Write a program that prompts the user to input three numbers. The program should then output the numbers in ascending order. (4 Marks)
- g) Write a C++ program that prints odd numbers within a given boundary using while loop. (4 Marks)
- h) Explain the following access specifier with respect to C++ Object oriented paradigm. (4 Marks)
- a) Public
 - b) Private

QUESTION TWO [20 MARKS]

- a) Write a program that a sign data to the data members of a class such as day, month, year and to display the contents of the class on the screen (4 Marks)
- b) Write an object oriented program to find the greatest number among the four variables a, b, c and d whose values are entered at run time. (4 marks)
- a) Explain using appropriate syntaxes state difference between while and do while control structures. (4 marks)
- c) Kenya Commercial Bank has introduction an incentive policy of giving bonus to all its deposits holders. The policy is as follows. A bonus of 2% of the balance held on 31st December is given to every one irrespective of their balances, and 5% is given to female account holder if their balance is more than Kshs 5000/=,Develop a logic structure using if else control structure and block diagram to illustrate the above statement (8 Marks)

QUESTION THREE [20 MARKS]

- b) Define a class named TaxWhiz that computes the sales tax for a purchase. It should store the current tax rate as an instance variable.. This class should have one public function, calcTax(double price), which returns a double, whose value is price times the tax rate. For example, if the tax rate is 4 percent, 0.04, and the price is Ksh.100, the calcTax() should return 4.0. (5 Marks)
- c) Explain any five applications of Object Oriented Programming (5 Marks)
- d) Define an array , the differentiate the initialization process of a one dimensional array with a two dimensional array with C ++ programs (6 Marks)
- e) Explain the following Predefined I/O Class Variables in C++ programming. (4 Marks)
- i. Cin
 - ii. Cout
 - iii. Cerr
 - iv. Clog

QUESTION FOUR [20 MARKS]

- a) What is meant by function overloading? (2 Marks)
- b) Explain the following operators in C++. (4 Marks)
- i. Logical operator
 - ii. Arithmetic operator
- c) Develop a C++ application that determines whether any of several department-store customers has exceeded the credit limit on a charge account. For each customer, the following facts are available:
- i. Account number
 - ii. Balance at the beginning of the month
 - iii. Total of all items charged by the customer this month
 - iv. Total of all credits applied to the customer's account this month
 - v. Allowed credit limit.

The program should input all these facts as integers, calculate the new balance (= *beginning balance + charges – credits*), display the new balance and determine whether the new balance exceeds the customer's credit limit. For those customers whose credit limit is exceeded, the program should display the message "Credit limit exceeded" (10 Marks)

- d) Write a program to sort a given set of 'N' numbers in descending order using array. (4 marks)

QUESTION FIVE [20 MARKS]

- a) Explain the concept of polymorphism in relation to object oriented paradigm (2 Marks)
- b) Write short notes on friend function (3 Marks)
- c) Define the `class` `bankAccount` to store a bank customer's account number and balance. Suppose that account number is of type `int`, and balance is of type `double`. Your class should, at least, provide the following operations: set the account number, retrieve the account number, retrieve the balance, deposit and withdraw money, and print account information. Add appropriate constructors (3 Marks)
- i. Every bank offers a checking account. Derive the `class` `checkingAccount` from the `class` `bankAccount` (designed in part (c)). This class inherits members to store the account number and the balance from the base class. A customer with a checking account typically receives interest, maintains a minimum balance, and pays service charges if the balance falls below the minimum balance. Add member variables to store this additional information. In addition to the operations inherited from the base class, this class should provide the following operations: set interest rate, retrieve interest rate, set minimum balance, retrieve minimum balance, set service charges, retrieve service charges, post interest, verify if the balance is less than the minimum balance, write a check, withdraw (override the method of the base class), and print account information. Add appropriate constructors. (4 Marks)
- ii. Every bank offers a savings account. Derive the `class` `savingsAccount` from the `class` `bankAccount` (designed in part (c)). This class inherits members to store the account number and the balance from the base class. A customer with a savings account typically receives interest, makes deposits, and withdraws money. In addition to the operations inherited from the base class, this class should provide the following operations: set interest rate, retrieve interest rate, post interest, withdraw (override the method of the base class), and print account information. Add appropriate constructors. (3 Marks)
- iii. Write a program to test your classes designed in parts (i) and (ii). (5 Marks)