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University Examinations 2013/2014

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
BUSINESS INFORMATION TECHNOLOGY
AND
FIRST YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN COMPUTER SCIENCE

ICS 2104: OBJECT ORIENTED PROGRAMMING I

DATE: DECEMBER 2013   **TIME: 2 HOURS**

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE – 30 MARKS

a. Discuss the three access modifiers used in Object Oriented Programming.   (3 Marks)

b. Discuss in detail citing examples the following concepts as used in Object Oriented Programming:

   i.   Function overloading   (2 Marks)
   ii.   Function overriding   (2 Mark)
   iii. Inheritance   (2 Marks)

c. Write a program in C++ that accepts two user input numbers: number1 and number 2, the program
    then compares the two numbers and outputs: number 1 equals number 2 or number 1 is less than
    number 2 or number 1 is greater than number 2 depending on the outcome.   (4 Marks)

d. Write the syntax and explain the parts that make up a for loop.   (4 Marks)

e. Write a program C++ that accepts a user input number and checks if the number is even or odd; the
    program then outputs the appropriate message.   (3 Marks)

f. Define the term array, discuss how array elements are accessed and write a statement that declares
    and initializes an array to store the marks of five students.   (4 Marks)

g. Differentiate between the following flow control statements, citing an example usage of each:
                                                                                  (4 Marks)
   •   Exit and break

h. Using examples differentiate between iteration and recursion as used in programming. (2 Marks)

QUESTION TWO – 20 MARKS

a. Write an object program in C++ that awards students grades on the following guidelines A=70-100, B=60-69, C=50-59, D=40-49, F=0-39. The program should request the user to input the mark attained by the student and should return "an invalid input" error in case the user tries to input any value that is not in the range 0-100.   (6 Marks)

b. Write an object oriented program in C++ that accepts an stores the CAT marks of ten students in an array, the program then calculates the outputs the: lowest, highest, sum and average CAT marks.
                                                                                                        (8 Marks)

c. Using an appropriate example state and discuss the phases of an object life cycle.   (6 Marks)

QUESTION THREE – 20 MARKS

a. Write an object oriented program in C++ that allows a user to key in a number between 1 and 7; the program then outputs the respective day of the week using the SWITCH/SELECT CASE statement.
                                                                                                        (5 Marks)

b. Discuss the role of the following concepts in C++ giving a code snippet to support your explanation:
                                                                                                        (4 Marks)

  i.   Namespace
  ii. Scope resolution operator

c. Write a recursive program that accepts a user input number and calculates the factorial of the number.   (5 Marks)

d. Write a code to declare a function that calculates the area of a rectangle and discuss the parts that make up the function.   (4 Marks)

e. Discuss what you understand by function invoking and write a code snippet to invoke the function declared in 3(d) above.   (2 Marks)

QUESTION FOUR – 20 MARKS

a. Write an object oriented program in C++ that allows a user to key in the quantity and the cost of each item a customer has bought; the program should then display the unit cost, the quantity and the total cost for each item bought. The program should have two functions; one for input and the other for display. It should create a class called items and two objects namely bread and milk.
                                                                                                        (6 Marks)

b. Discuss the role of a constructor and state any two properties of a constructor.   (3 Marks)

c. Discuss in detail using appropriate diagrams any three forms of inheritance.   (6 Marks)

d. Write an object oriented program in C++ that outputs all the numbers between 100 and 300 that are divisible by 3 and the count of those numbers.   (5 Marks)

QUESTION FIVE – 20 MARKS

a. Briefly explain any five benefits of object oriented programming. (5 Marks)

b. Write an object oriented programme in C++ that requests the user for two input numbers a and b; the program should divide the two numbers and display the result if the denominator is not zero, if the denominator is zero it should throw an exception. (5 Marks)

c. Write a program in C++ that makes use of three classes namely:

Student – stores student name and registration number
Mark – stores the test scores obtained in two subjects
Result – inherits student details from student and test scores from mark and displays the student details and the total of the test scores.

The program should create one object called graduate (10 Marks)