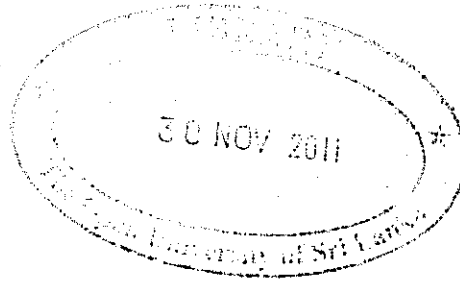THE OPEN UNIVERSITY OF SRI LANKA
B.SC. DEGREE PROGRAMME: LEVEL 05
OPEN BOOK TEST: 2011
CSU 3279: OBJECT ORIENTED PROGRAMMING
DURATION: ONE AND HALF HOURS (1 ½ HOURS)

Answer ALL questions.

Date: 02nd September 2011                                          Time: 4.00pm - 5.30pm

1)

a) State whether the following statements are **TRUE** or **FALSE** and briefly explain how you obtained your conclusion.

   i) _empNid is an invalid C++ variable name.

   ii) The C++ statement **cout<<"\n Hellow world";** displays the message **\nHellow world** on the screen.

   iii) The statement **int numAverage = (1+2+3+4+5+6+7+8+9+10)/10** stores 5.5 in the variable **numAverage.**

   iv) The **continue** statement and **break** statement perform in a similar way during the execution of a C++ program.

   v) In C++ an array can hold data elements of different data type.

b) What are the most suitable data types/data structure (in C++) to represent the following items? Briefly explain reason to select that particular data type/data structure for each item.

   i) Name of a person.

   ii) Average temperature of a city during a month.

   iii) Diameter of a galaxy (in kilometres).

   iv) Number of students in a school.

   v) National identity card number.

c) Write C++ functions for the followings.

   i) Display all the integers from 0 to 100 in **descending** order.

   ii) Get three integer numbers as inputs and display the **minimum** number.

   iii) Read a line of text as user inputs and display it.

   iv) Calculate and display the average of first 10,000 positive integers.

   v) Get the age of a person as the input and display a message "You are an adult" if his age is greater than or equal to 18, otherwise display "You are not an adult".

2)

a) Each month of a year has categorized into four seasons as follows.

| Month Number | season |
|---|---|
| 12, 1, 2 | Winter |
| 3, 4, 5 | Spring |
| 6, 7, 8 | Summer |
| 9, 10, 11 | Autumn |

Write a **complete** C++ program to display the corresponding season when the user inputs a number 1 to 12. Otherwise it should display another message "Incorrect Month".

Hint: - use *switch* statement.

b) Briefly explain **recursion** and **base case** of a recursive function.

The **factorial** of a non-negative integer $n$, denoted by $n!$, is the product of all positive integers less than or equal to $n$. For example, $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$ and the value of $0!$ is 1.

i) Write a **recursive function** to find the factorial of a given non-negative integer n.

ii) Write a function using **for loop** to find the factorial of a non negative integer n.

3)

a) Briefly explain the following terms related to programming languages.
   i) Syntax errors.
   ii) Logical errors.
   iii) Runtime errors.

b) Read the following description and write a complete C++ program.

**Program description**

The acceleration (a) of an object sliding down a hill is given by a = g sin ө, where ө is the slope of the hill, and the gravity acceleration $g = 9.8$ ms$^{-2}$. The program should read slope and the height of a hill as inputs and calculates and display how long it takes to slide down the hill. After displaying the result, the program should ask "**Do you want to continue...? (Y/N)**" and if user provide "**Y**" as input, program should continue to the next calculation. Otherwise it should exit.

Hint: time $t = \sqrt{\dfrac{2h}{g \sin ө}}$ where h is the height of the hill.