Eastern University, Sri Lanka
First Year in Science 2003/2004
First Semester (Nov./Dec.-2004) (Repeat)
CS 103-Introduction to Program Design And Programming

Answer all questions

Time: 2 hours

Q1)

  (A)

    a. Briefly describe the terms algorithm and **Pseudo code**.

    b. Describe **Flowchart** and give guidelines for drawing a flowchart.

    c. Draw a flowchart for computing factorial N (N!); where $N! = 1*2*3*\ldots N$.

  (B)

    Using suitable examples explain the basic structured program concepts **selection** and **looping**.

    (a) Write a program that reads numbers by the user(until the user enters a negative number) and returns the largest number that was entered by the user.

    (b) Write a program that given an integer between 0 and 6, prints the corresponding day of the week. Assume that the first day of the week (0) is Sun day.

Q2)

  (a) What do you mean by **type casting** in C++. Explain using examples.

  (b) Briefly explain the **increment** and **decrement** operators in C++.

  (c) Write statements in C++ to do each of the following:

    (i)   To set **dseq** to $\sqrt{b^2 - 4ac}$.

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(ii) To check whether **dseq** is non-negative and if so set x to

$$\left(\frac{-b + \sqrt{b^2 - 4ac}}{2a}\right)$$

otherwise set x to -9999.

(iii) To return the number of days in a month.

(iv) To print the first 50 odd numbers.

(d) Write a program to read a set of positive numbers into an array of size 200. Data is terminated by -1 and number of numbers in the set is unknown before hand.

(i) Find and print the largest.

(ii) Arrange the numbers in ascending order.

Q3)

Explain the concept of **Top-Down Design, arrays** and **Dynamic arrays.**

Write a program which contains the following functions:

- A function "**InputArray**" which allows to input values for the first n elements of the array a.
- A function "**displayArray**" which displays the values of the first n elements of the array a on the screen.
- A function "**copyArray**" which copies the first n elements of a2 to the respective first n elements in a1.
- A function "**average**" which returns the average of the first n elements of a.

Function calling statements in your main program should have the proper parameters.

Q4)

Declare and define the following:

a) A pointer variables pi pointing to an integer.

b) A pointer variable ppi pointing to a pointer to an integer.

To demonstrate the concept of the pointers:

1. Write a program that adds two numbers using pointers.
2. Write a swap function that swap two numbers using pointers.
3. Given the following declaration and definition

   int num[20];

using only pointer notation, write **a for loop** to read integer values from the keyboard to fill the array.