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Eastern University, Sri Lanka
First Year in Science 2003/2004
First Semester (Nov./Dec.-2004) (Proper)
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 $N! = 1 * 2 * 3 * \dots * N$.

(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)

What do you mean by the words **function**, **prototype function** and **void function**?

- (i) Explain the difference between **pass by value** and **pass by reference**.
- (ii) Write a program that asks the user to input two numbers then calls one function that adds the numbers and another function that subtracts them.

(iii) Calculate the quotient and modulus in one function using pass by reference.

(iv) The program concludes by displaying all calculating values.

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.