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EASTERN UNIVERSITY, SRI LANKA  
EXTERNAL DEGREE IN SCIENCE  
FIRST EXAMINATION IN SCIENCE 2002/03  
FIRST SEMESTER (June/July, 2004)

EXCS 103 Introduction to Program Design & Programming

Answer all Questions

Time allowed: 02 hour

Q1

- (a) List and explain the functions of all arithmetic operators, the relational operators and the logical operators available in C++.

What would be the output of the following C++ coding?

```
#include<math.h>
int main()
{
    int p=2, q=10, r=25;
    cout<<"p"<<--p<<endl;
    cout<<"p"<<p<<endl;
    cout<<"q"<<q++<<endl;
    cout<<"q"<<q<<endl;
    r%=q;
    cout<<"r"<<r<<endl;
    cout<<"p^q"<<pow(p,q)<<endl;
    return 0;
}
```

- (b) Using suitable examples, explain the following control structures in C++:

- (i). **if.....else.....** constructs
- (ii). **switch.....case** constructs

Write a program to read marks of a subject and print the given marks with their corresponding grade. The grade is obtained as follows:

Grade	
F	$0 \leq \text{marks} \leq 39$
D	$40 \leq \text{marks} \leq 49$
C	$50 \leq \text{marks} \leq 59$
B	$60 \leq \text{marks} \leq 69$
A	$70 \leq \text{marks} \leq 100$

Q2

- (a) Describe, with aid of the examples, the functionality of each of the following repetition constructs:
- while** loop
  - do-while** loop
  - for** loop
- (b) Explain the terms *one-dimensional* array and *two-dimensional* array.
- (c) Write a program to store 15 integers in an array and sort them in ascending order.
- (d) Write a program to store characters in a (5X4) array and search for a specific character. Your program should output the location of the first occurrence when doing the search row by row.

Q3

- (a) Describe the parameter passing mechanism of C++ functions.
- (b) Write a function to swap values of two **float** type variables.
- (c) Write a function
- ```
void Decimalln(int & n);
```
- that reads a base 10 (decimal) number and assigns it to n.
- Use *Decimalln* in a main program that reads a set of decimal numbers and prints the binary equivalent.
- (d) What do you mean by a recursive function?
- Write a recursive function to calculate factorial of a given integer number.

Q4

- (a) (i) What is meant by a *pointer*?
- (ii) How would you create a pointer variable?
- (iii) Briefly explain the *pointer arithmetic* in C++.
- Write a program to read a name and display the reverse of that name. For example, if the given input is *sitha* then output will be *ahits*.
- (b) Define the keyword *struct* and *union* in C++.
- Write a program to read name, sex, city, date of birth and salary of some employees, and then display employees' details in a tabular format.