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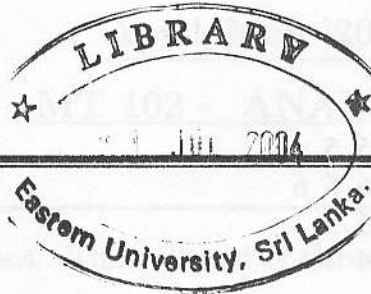
FIRST EXAMINATION IN SCIENCE 2002/03 & 2002/03(A) (Repeat)

SECOND SEMESTER (April/May, 2004)

CS 103 -- Introduction to Program Design & Programming

Answer All Questions Time Allowed: 02 Hours

Q1

(a) Explain the functions of ten arithmetic operators in C++.

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

```cpp
# include<math.h>
int main()
{
        int p=10, q=24, r=15;
        cout<<"p="<<p<<endl;
        cout<<"p="<<--p<<endl;
        cout<<"q="<<q++<<endl;
        cout<<"p="<<p<<endl;
        r%=q;
        cout<<"r="<<r<<endl;
        cout<<"p="<<++p<<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 that receives name, sex and age of a person from the user, and outputs whether she/he is major or not according to the following rules:

    A male is considered as *major* if he is over 21 years old.

    A female is considered as *major* if she is over 18 years old.

Q2

(a) Explain the functionality of each of the following repetition constructs:
   i.   *while* loop
   ii. *do-while* loop
   iii. *for* loop

(b) Write a program to output the following pattern using each of the above loop constructs.

```
        1
       2 2
      3 3 3
     4 4 4 4
    5 5 5 5 5
   6 6 6 6 6 6
    5 5 5 5 5
     4 4 4 4
      3 3 3
       2 2
        1
```

(c) Briefly explain the *pointer arithmetic* in C++.

Write a program to read a name and display the reverse of it. For example, the given input is *kanthan*. The output will be *nahtnak.*

Q3

(a) Explain *one-dimensional* array and *two-dimensional* array.

(b) Write a program to store 15 integers in an array and sort them in ascending order.

(c) Write a program to store characters in a (5X6) array and search for a specific character. Your program should output the location of the first occurrence.

Q4

"In C++, strings can be implemented using arrays and pointers". Explain this statement using suitable illustrations.

(a).   Write a function to return a pointer to a string of N characters using *new* operator where N is an integer passed as parameter.

(b).   Write a function to return the length of a string where the pointer to the string is passed as a parameter.

(c).   Write a function to copy a string *str1* to another string *str2* with the following prototype:

Void strcopy(*char* * str1, *char** str2)