



EASTERN UNIVERSITY, SRI LANKA

DEPARTMENT OF MATHEMATICS

FIRST EXAMINATION IN SCIENCE (2010/2011)

FIRST SEMESTER (Nov/Dec, 2012)

**CS 103 – INTRODUCTION TO PROGRAMME DESIGN &
PROGRAMMING**

ANSWER ALL QUESTIONS

TIME: TWO HOURS

Q1)

- a. State the following computer terms:
 - i. Program;
 - ii. Programming;
 - iii. Programmer.
- b. Describe the objectives in programming.
- c. What are the differences between flowchart and Pseudocode?
- d. Draw the flow chart for the following control structures:
 - i. If – else;
 - ii. For loop;
 - iii. While loop;
 - iv. Do – while.
- e. If the ages of Ajay, Babu and Chandra are input by a user, draw a flowchart to determine the youngest of the three.
- f. Write C++ programs to display the following patterns:

```
1
212
32123
4321234
543212345
```

(i)

```
A B C D E F G H
A B C D E F G
A B C D E F
A B C D E
A B C D
A B C
A B
A
```

(ii)

Q2)

- a. List six types of C++ operators.
- b. Consider the following code segment.

```
#include<iostream>
#include<conio>
int main
{
    clrscr();
    int n,t,r,p=0

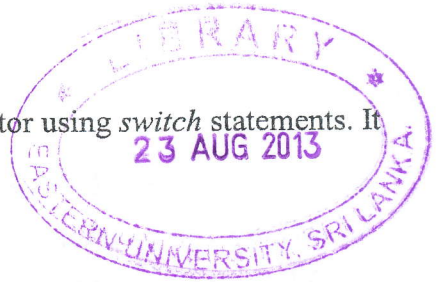
    cout<<"Enter the number;
    cin>>n.
    t=n;

    while(t > 0)
    {
        r = t%10;
        t = t/10
        p = p*10 + r;
    };

    cout<<"Output of "<<n<<" is "<<p
    getch();
    return 0;
```

- i. This code segment has 10 syntactical errors. Write the above code segment without any errors.
- ii. Write output for the following input values:
(Show the appropriate steps)
 - a) 82;
 - b) 103;
 - c) 1234.
- iii. Modify the above code segment to calculate the digits sum of given input number.
Hint: digits sum of 143 is 8. (i.e. $1+4+3=8$).

- c. Write a C++ program that simulates a simple calculator using *switch* statements. It reads two integers and a character.
If the character is a '+', the sum is printed;
if it is a '-', the difference is printed;
if it is a '*', the product is printed;
if it is a '/', the quotient is printed;
and if it is a '%', the remainder is printed.



Q3)

- a. Write the following function to reverse the first n elements of an array a:
- ```
void reverse(int a[],int n);
```
- For example, the call *reverse(a,5)* would transform the array {22,33,44,55,66,77,88,99} into {66,55,44,33,22,77,88,99}.
- b. Write the following function such that it returns true if and only if the array obtained by reversing the first n elements is the same as the original array:
- ```
bool isSymmetric(int a[],int n);
```
- For example, if a is {22, 33, 44, 55, 44, 33, 22} then the call *isSymmetric(a,7)* would return **true**, but the call *isSymmetric(a,4)* would return **false**.
- c. Write a C++ program to find the sum and average of an one dimensional integer array.
- d. Write the following function to find the length of a string:
- ```
int length(char S[]).
```
- e. Write the following function to count the number of words in a string:
- ```
void count(char S[ ]).
```
- f. Write the function to concatenate the contents of string S2 to S1:
- ```
void concat(char S1[], char S2[]).
```

Q4)

- a. What is meant by a *pointer* in C++?
- b. Write a C++ program to swap two numbers using *pointers*.
- c. Write the output of the following code segment:

```
void pointerTest()
{
int a=1, b=2, c=3, *p, *q;
p = &a;
q = &b;
c = *p;
p = q;
a = ++*q;
c = ++*p + *q;
cout<<"a= "<<a<<endl;
cout<<"b= "<<b<<endl;
cout<<"c= "<<c<<endl;
cout<<"*p= "<<*p<<endl;
cout<<"*q= "<<*q<<endl;
}
```

- d. Briefly explain the term *structure* in C++.
- e. Declare a structure for an employer's record consisting of the following fields:  
Name, Sex, Address, Basic salary, Allowance and Total salary.

Allowance will be calculated by 10% of Basic salary.

Total salary = Basic salary + Allowance.

Write a C++ program to keep records for 10 employers to do the following tasks:

- i. Read the Name, Sex, Address and Basic salary;
- ii. Calculate the Allowance and Total salary of each employer;
- iii. Display the Name, Sex, Address, Basic salary, Allowance and Total salary of each employer.

\*\*\*\*\* End \*\*\*\*\*