SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology
First Year, First Semester Examination – 2014
HNDIT 11034- Structured Programming

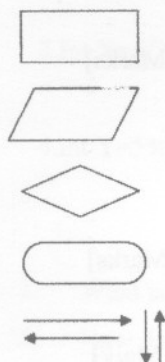|	
Instructions for Candidates:	No. of questions : 06
Answer only 5 questions	No. of pages : 07
	Time : 3 Hours

01.

a) Define the terms algorithm, flowchart and pseudo code.   [03 Marks]

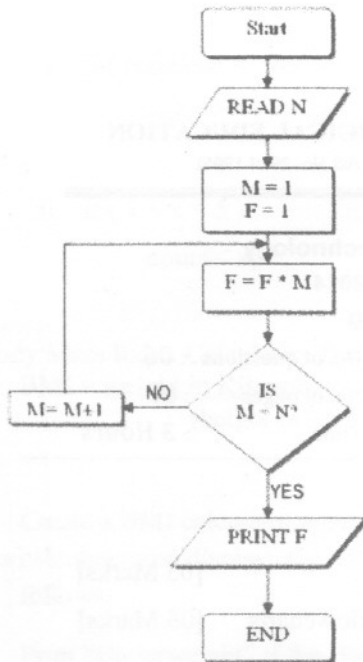b) Give the names and functions of the following basic symbols of flowcharts.   [05 Marks]

c) Draw flowcharts for the following constructs: [05 Marks]

    i.   The sequence construct

    ii.   The decision construct if ... then

    iii. The decision construct if ... then ... else

    iv. The repetition construct – repeat/until

    v.   The repetition construct – while

d) What is the output of the following flowchart if the input is 5? [03 Marks]

```
            ┌─────────┐
            │  Start  │
            └─────────┘
                 │
            ╱─────────╲
            │ READ N  │
            ╲─────────╱
                 │
            ┌─────────┐
            │  M = 1  │
            │  F = 1  │
            └─────────┘
                 │
            ┌─────────┐
      ┌────►│ F = F * M│
      │     └─────────┘
      │          │
 ┌─────────┐  NO ◇─────────◇
 │ M = M+1 │◄────│   IS    │
 └─────────┘     │  M = N? │
                 ◇─────────◇
                      │ YES
                 ╱─────────╲
                 │ PRINT F │
                 ╲─────────╱
                      │
                 ┌─────────┐
                 │   END   │
                 └─────────┘
```

e) Write pseudo code equivalent to the above flow chat (d). [04 Marks]

02.

a) List five primitive data types available in C++ [03 Marks]

b)

    I.   What is a variable? [01 Mark]

    II.   Declare variables with suitable data types to store the following data

            1.Name of the student

            2.Result of the Student

            3.Semester fee [06Marks]

c) Write a program to print following table using a single **"cout" statement**.

Year	Income
------	--------
2001	7580.00
2002	4785.50
2003	9871.00

[03Marks]

d) Evaluate the following expressions as C++ would :

1.int X=4 + 2*3

2.int X=(4 + 2)*5;

3.int X=5/3;

4.int Y=5%3;   [04 Marks]

e)

   I.   What is meant by a "Comment"   [01 Mark]

   II.   How do you write your comments in C++?   [02 Marks]

3.

a) State the purpose of default keyword in switch-case control structure.   [02 Marks]

b) What are the advantages of switch-case control structure over if-else control structure?

[04 Marks]

c) Identify and correct the error(s) in each of the code segments below.   [06 Marks]

     i. if (response = "yes" or "YES")

           cout<< "You said yes.";

     ii. if (1 < x < 5)

           cout<< x;

d) Body Mass Index Calculator (BMI calculator) formulas for calculating BMI is:

$$BMI = \frac{weight\ in\ Kilograms}{(height\ In\ Meters)^2}$$

Create a BMI calculator application that reads the user's weight and height, then calculates and displays the user's body mass index(BMI) with appropriate message as follows.

Print "Underweight" if the BMI result is less than 18.5

      Print "Normal" if the BMI result is between 18.5 and 24.9

      Print "Overweight" if the BMI result is between 25 and 29.9

      Print "Obese" if the BMI result is 30 or greater

[08Marks]

4.

a) Write the output of following code segment   [03 Marks]

```
int A=6;
Top:
A++;
if (A==7)
goto Top;
cout<<A;
```

b) What is the use of iterative structures in a programming language?　　　[02 Marks]

c) Draw the flow chat to generate the factorial of a given number　　　[05 Marks]

d) Write the C++ code to generate the factorial of a given number using **for** structure

　　[hint: factorial of 4 is 4x3x2x1=24]　　　[05 Marks]

e) Write a C++ code to print the following output using **while** loops.　　　[05 Marks]

　　　2*

　　　4**

　　　6***

5.

a) Write down the general format of a C++ function　　　[02 Marks]

b) What is the output of the following program?

```cpp
#include<iostream>
#include<conio>
void swap(int first, int second)
{
        int temp;
        temp=first;
        first=second;
        second=temp;
}
void main()
{
        int X=5;
        int Y=10;
        cout<<"Before Swap X="<<X<<"Y="<<Y<<endl;
        swap(X,Y);
        cout<<"After Swap X="<<X<<"Y="<<Y;
        getch();
}
```
　　　[05 Marks]

c) What is the difference between "pass by value" and "pass by reference" in a Function?

[04 Marks]

d) Briefly explain the role of the following C++ classes/Libraries in file handling.

      i. ofstream

     ii. ifstream

[04 Marks]

e) Explain the following program with output.

```
#include <iostream.h>
#include <fstream.h>
#include <conio.h>
int main ()
{
        ofstreammyfile;
        myfile.open ("example.txt");
        myfile<< "Writing this to a file.\n";
        myfile.open("save.txt");
        myfile.close();
        getch();
}
```

[05 Marks]

6.

a)

    i. What is pointer?   [2 Marks]

   ii. Declare an integer pointer 'ptr'. Diagrammatically explain this pointer.   [4 Marks]

iii. What will be the output of the following C++ program?   [6 Marks]

```cpp
#include <iostream.h>
void main()
{
    int x, y, z;
    int *a, *b, *c;
    x=5; y=10; z=15;
    a=&x; b=&y; c=&z;
    c=a; a=b; b=c;
    *c=*c+5;
    cout<<x<<", "<<y<<", "<<z;
}
```

b)

    I. Declare two arrays arr1, arr2 with the values {4, 7, 6, 2, 5, 1} and {5, 3, 6, 9, 8, 1}.
                                      [04 Marks]
   II. Declare another array arr3 to hold 6 integers and assign 0 or 1 in each location of arr3 based on the following criteria.

       If a particular location of both arr1 and arr2 contains equal numbers arr3 will contain 1 in that location, otherwise it will contain 0.

       In our case arr3 will contain {0, 0, 1, 0, 0, 1}.   [04 Marks]