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 – 2017

HNDIT 1103 – Structured Programming

Instructions for Candidates:
Answer five (05) questions only
Marking Scheme

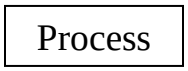
No. of questions : 06
No. of pages : 10
Time : 03 hours

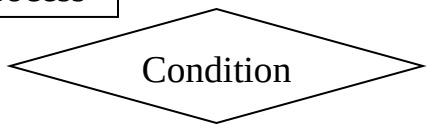
Question 01

I. Flow Chart - is a pictorial representation of an algorithm or logical steps. (1 mark)
Pseudo Code – is one of the textual representation of algorithm (1 mark)

II.

a) Input 

b) Process 

c) Decision 

(3 marks)

III.

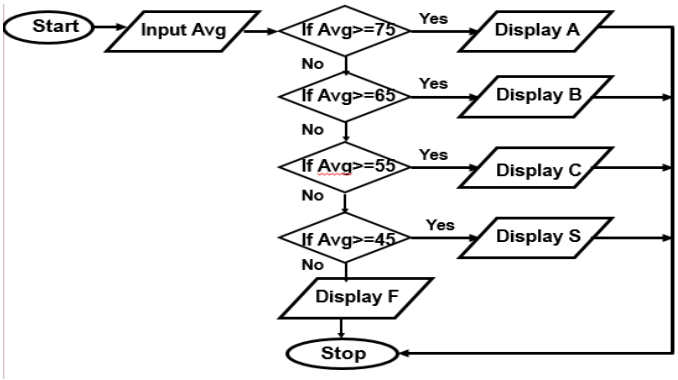
a) 10
b) 30
c) 2
d) 2

(4 marks)

IV.

a) True
b) False
c) True
d) False
e) True (5 marks)

V.



(6 marks)

Question 02

I. Whenever a C++ program is executed, execution of the program starts and ends at main(). The main is the driver function of the program. If it is not present in a program, no execution can take place. (2 marks)

II.

a) ✓
b) ×
c) ×
d) ×
e) ✓
f) ✓ (3 marks)

III.

a) Syntax error
b) Logical Error
c) Run time Error
d) Syntax error (4 marks)

IV.

a) float num1=87.988;
b) char ch='A';
c) int num2=67;
d) double num3=6.897865;
e) char name[10]={"SLIATE"}; or char* name="SLIATE"; (5 marks)

V.

```
void main()
{
const float PI=22/7;
int r;
float vol, area;
cout<<"Enter the radius:";
cin>>r;
vol=(4/3)*PI*r*r*r;
area=4*PI*r*r;
cout<<"The volume is"<<vol<<endl;
cout<<"The area is"<<area<<endl;
}
```

(5 marks)

Question 03

I. "if-else" statement

```
If(boolean_expr)
{
  statements;
}
else
{
  Statements;
}
```
(1 mark)

"switch" statement.

```
switch(expression)
{
case constant1: group of statements 1;
        break;
case constant2: group of statements 2;
        break;
        ……
default: default group of statements;
}
```
(1 mark)

II. Yes (1 mark)

Switch is generally faster than a long list of ifs because the compiler can generate a jump table. The longer the list, the better a switch statement is over a series of if statements. (2 mark)

III.

```
char ch;        //chr was not declared
cout<< "Enter a Character\n";        //missing semicolon
cin>>ch;        //outout operator was wrong   and missing semicolon
switch(chr)     //s must be in lower case
{
case 'O': cout<< "Opened"; //char value cannot be written within double quotation
break;
case 'C': cout<< "Closed"; break;
default:  cout<< "Incorrect Input";
}
```
At least 4 errors (out of 5) should be corrected. (4 Marks)

IV.

a) 2 (2 marks)

b) a is 3 or 4 (3 marks)

V.

```
int main(){
float x,y,t;
x=1;
cout<<"Enter the value for y:";
cin>>y;
if ((y>=0) && (y<=35))
{ x=x+1;}
else if ((y>=36) && (y<=55))
{ x=x+2;}
else if ((y>=56) && (y<=75))
{ x=x+3;}
else if ((y>=76) && (y<=100))
{ x=x+4;}
else{
x=1;
}
t=2*x*x+ y;
cout<<"t value is: "<<t<<endl;
return 0;
}
```
(6 marks)

Question 04

I. "Pre test Loop" -a loop where the control condition (Boolean expression) is tested BEFORE the loop. If the condition is true, the loop is executed. If the condition is false the loop is not executed (1 mark)

"Post test Loop" - a loop where the control condition (Boolean expression) is tested AFTER the loop has been executed. If the condition is true, the loop is executed again. If the condition is false the loop is not executed again.Therefore, this type of loop will always be executed at least once. (1 mark)

II. For loop

for(<initialization expression>**;** <termination or control conditon>**;** <update or step expression>)
{
    <statements>
} (1 mark)

While Loop

while (<Boolean expression>)
{
<statement 1>
.
<statement n>
}

(1 mark)

Do while Loop

do
{
<statement 1>
….
<statement n>
} while (<Boolean expression>); (1 mark)

III. An infinite loop (or endless loop) is a sequence of instructions in a computer program which loops endlessly, either due to the loop having no terminating condition, having one that can never be met, or one that causes the loop to start over. (1 mark)

Any suitable examples (3 marks)

IV. A loop inside another loop is called a nested loop. (1 marks)

a) HNDIT
HNDIT
HNDIT (2 marks)

b) 01 (2 marks)

V.

a)
```
int i,j;
for(i=1; i<=4; i++)
{
    for(j=1; j<=i; j++)
            cout<<j;
    cout<<endl;
}
```
(2 marks)

b)
```
int i,j;
for(i=1; i<=4; i++)
{
    for(j=1; j<=4-i; j++)
            cout<<'*';
    for(j=1; j<=i; j++)
            cout<<i;
    cout<<endl;
}
```
(2 marks)

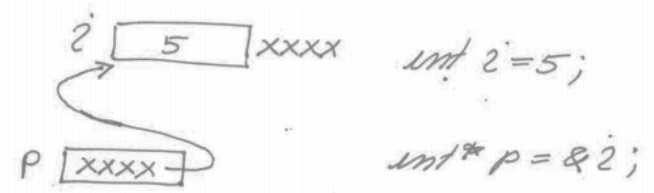
c)
```
int i,j,f;
for(i=1; i<=4; i++)
{
    cout<<"factorial of "<<i<<" is ";
    f=1;
    for(j=1; j<=i; j++)
            f=f*j;
    cout<<f<<endl;
}
```
(2 marks)

Question 05

I.

a)

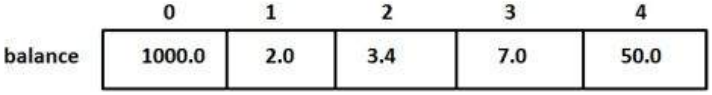
Ordinary variables hold values of their type. Pointer variables always hold addresses of another variables.



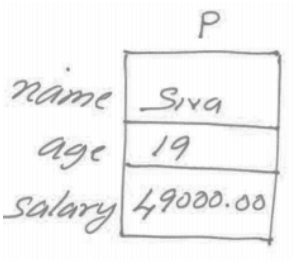
Here i is an ordinary variable and p is a pointer variable. (1 mark)

b)

An array stores a fixed-size sequential collection of elements of the same type. A structure is composed of fields or members that can have different types.



	0	1	2	3	4
balance	1000.0	2.0	3.4	7.0	50.0



Here balance is an array and p is a structure. (1 mark)

II.

a) True
b) True
c) True (3 marks)

III.

a) int p = 10;
b) int* q = &p;
c) int numMatrix[2][5]={{3,5,7,9,11},{2,4,6,8,10}};
d) struct Employee
```
{
   char name[50];
   int age;
   float salary;
} e;
```
(4 marks)

IV.

a) 7 5 3 (2 marks)
b) 0x7fff4bd38704
20
0x7fff4bd38704
20 (3 marks)

V.

```
#include<iostream.h>
void main()
{
int i,big,num[5];
int* bigAddr;
for (i=0;i<5;i++)
    cin>>num[i];
big=num[0];
bigAddr=&num[0];
for(i=1;i<5;i++)
    if (big<num[i])
    {
            big=num[i];
            bigAddr=&num[i];
    }
cout<<"Big number: "<<big<<" Address: "<<bigAddr;
}
```

(6 marks)

Question 06

I. Doing specific tasks
Making the program to run faster
Reducing the number of lines of code (any two reasons) (2 marks)

II.

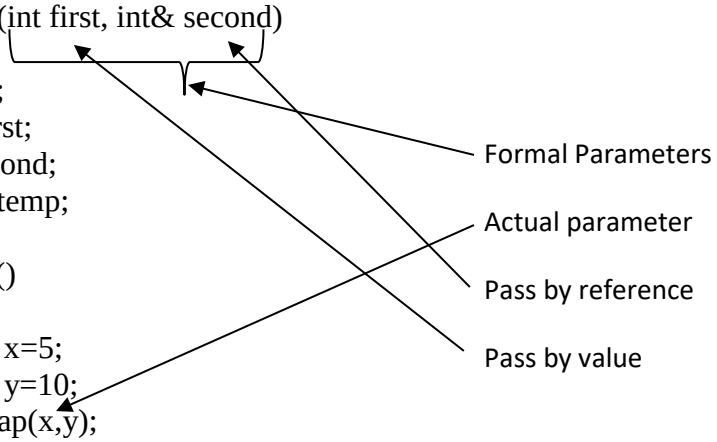
a) False
b) True
c) True (3 marks)

III.

a) Formal Parameter (or simply parameter) is often used to refer to the variable as found in the function definition.
b) Actual Parameter (or argument) refers to the actual input passed.
c) The values of the formal parameters affect the values of actual parameters in the calling function, when the arguments are passed using call by reference method. This happens since the formal parameters are not allocated any memory, but they refer to the memory locations of their corresponding actual parameters.
d) The value of the actual parameters in the calling function do not get affected when the arguments are passed using call by value method, since actual and formal parameters have different memory locations. (4 marks)

IV.

```
#include <iostream.h>
void swap(int first, int& second)
{
  int temp;
  temp=first;
  first=second;
  second=temp;
}
void main()
{
        int x=5;
        int y=10;
        swap(x,y);
        cout<<"x = "<<x<<"   y = "<<y;
}
```



(4 marks)

Output: x=5 y=5 (1 mark)

V.

```
void cal_floats(float a, float b)
{
float tot,avg;
tot=a+b;
avg=tot/2;
cout<<"total is: "<<tot<<endl;
cout<<"average is: "<<avg<<endl;
}
int main()
{
float x,y;
cout<<"enter values for x"<<endl;
```

```
cin>>x;
cout<<"enter values for y"<<endl;
cin>>y;
cal_floats(x, y);
return 0;
}
```

(6 marks)