National University of Computer and Emerging Sciences

School of Computing **Fall 2018** **Islamabad Campus**

CS118
Programming Fundamentals

Wednesday, October 24, 2018

Course Instructor

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Serial No:

Mid Term

Total Time: 2 Hour
Total Marks: 75

_____
Signature of Invigilator

_____ _____ _____ _____
Student Name Roll No Section Signature

DO NOT OPEN THE QUESTION BOOK OR START UNTIL INSTRUCTED.

Instructions:

1. Attempt on question paper. Attempt all of them. Read the question carefully, understand the question, and then attempt it.
2. Please read the complete paper before attempting any question and manage your time intelligently.
3. Additional sheet are provided for rough work at the end.
4. If you need more space write on the back side of the paper and clearly mark question and part number etc.
5. After asked to commence the exam, please verify that you have twelve (**12**) different printed pages including this title page. There are total of **6** questions.
6. Use permanent ink pens only. Any part done using soft pencil will not be marked and cannot be claimed for rechecking.
7. Use **proper indentation** while writing code and make sure that your code is legible. Failing to do so can cost you marks.

	Q-1	Q-2	Q-3	Q-4	Q-5	Q-6	**Total**
Marks Obtained							
Total Marks	20	15	10	10	10	10	**75**

Vetted By: _____Vetter Signature: _____

Question I ..…… (20 Marks)

Write the output produced by executing the following code? Please write proper explanation of the bug where required, without proper explanation no marks will be awarded. **[2 marks each]**

Code	Output
`int main( ) {` `  int x = 8, y = 0, z ;` `  while ( x >= 0 && y <=5 )` `  {` `  if ( x == y )` `  break ;` `  else` `  cout<<x<<y ;` `  x-- ;` `  y+=2 ;` `  }` `  return 0;` `}`	
`int main(){` `  const int U = 8, L = 2;` `  int n1, n2, n3 = 12, n4 = 3;` `  n1 = n3 > n4 ? n4 > U ? n3 : L : L;` `  cout << n1 << endl;` `  return 0;` `}`	
`int main(){` `char alphabet= 'A';` `for(int i = ('F'-'A'+1);  i >= 1; --i)` `  {` `  for(int j = 1; j <= i; ++j)` `  {` `  cout << alphabet << " ";` `  }` `  ++alphabet;` `  cout << endl;` `  }` `return 0;` `}`	

```
int main (){

   int x, y;
   x = 5;
   y = ++x * ++x;
   cout << x << y;
   x = 5;
   y = x++ * ++x;
   cout << x << y;
   return 0;
}
```

```
int main (){

  int z=1;
  for(int i = 5 ;i >= 1; --i)
    {
        z=i ;
        for(int z = 1; z <= i; ++z)
        {
            cout << z << " ";
        }
        ++z;

        cout << i << z<< endl;
    }
  return 0;
}
```

```
int main(){

  int x = 1, y =2, n=50 ;
  while (y <=n )
  {
      if ( n%y == 0 )
      { n=n/y;
        x=x+1;  }
    else
      {  y=y+1;  }
  cout<<x<<y;
  }
  return 0;
}
```

`` int main() { int x = 6, y = 7, z ; while (x >= 0) { while (y >=0) { cout<< y-- ; } cout<< x<<”\n” ; y=x-- ; } return 0; } ```	
`` int main(){ int suite = 5 ; switch (suite) ; { case 0+5 ; cout<< "\nClub" ; case 1+5 ; cout<< "\nDiamond" ; } return 0; } ```	
`` int main() { int a = 0, b=36; float f=3.9; b+= (a = 50)*f/3*10-b%5; cout << a << "$" << b; return 0; } ```	
`` int main() { float x = -10; while (x) { x *= 10; x += 10; } cout << x << endl; return 0; } ```	

Question II ……..……. (15 Marks)

a) (5 marks) Write a C++ program using if-elseif-else to input basic salary and allowances of an employee and calculate its Gross salary according to following:

Basic Salary <= 10000: HA = 20% of Basic Salary
Basic Salary <= 20000: HA = 25% of Basic Salary
Basic Salary > 20000: HA = 30% of Basic Salary

Gross salary is the final salary computed after the additions of *HA (House Allowance) into the Basic Salary.*

b) (2 marks) Write an input validation loop that asks the user to enter a number in the range of 10 through 25.

a) (2 marks) Convert following code into if-elseif-else

```
char sport;
cin >> sport;
switch (sport)
{
   case 'c':
       cout << "You like Cricket";
   case 'f':
       cout << "You like Football";
       break;
   case 't':
   case 'H':
       cout << "You like Tennis";
       cout << "You like Hockey";
   case 'B':
       cout << "You like BasketBall";
       break;
}
```

b) (2 marks) Write a C++ program that find maximum value and the minimum value attained by f(x) =$x^2 + 3x + 2$ the interval [-9, 8].

c) (2 marks) Rewrite the following code in for loop?

```
int i = 3;
do {
       cout << "Hello World";
       i++;
       cout << i;
} while (i < 5 && i >= 2);
```

d) (2 marks) Point out the logical error in the following program and correct it.

```
int main()
{
   for (int i = 1; i <= 5; i++)
   {
        for (int j = 1; i <= 10; j++)
        {
            cout<<"*";
        }
     cout<<"\n";
    }
}
```

Question III …… (10 Marks)

Write a C++ program to check whether a triangle is a right angle triangle or not.

Note: In any right triangle, sum of square of two sides is always equal to the square of third side.

Question IV …… (10 Marks)

The value of a function F is defined by following infinite series:

$$F = \frac{1}{3} - \frac{x^2}{9} + \frac{x^4}{27} - \frac{x^6}{81} + \frac{x^8}{243} \ldots\ldots$$

Write a C++ code that take input N (number of terms) and x as arguments and calculates the function's value. In other words, calculate the sum of the series for first N terms. For example if N=5 and x=2 then it should display 0.744856.

Question V…… (10 Marks)

Write a program to print pyramid using numbers

For lines = 4

```
    1
  2 3 2
3 4 5 4 3
4 5 6 7 6 5 4
```

For lines = 5

```
      1
    2 3 2
  3 4 5 4 3
4 5 6 7 6 5 4
5 6 7 8 9 8 7 6 5
```

Question VI …… (10 Marks)

Write a C++ program that takes input of an amount from user and print the minimum number of notes (Rs. 500, 100, 50, 20, 10, and 5) required for the amount.

Input:
Input amount: 575

Output:

Total number of notes:
500: 1
100: 0
50: 1
20: 1
10: 0
5: 1
2: 0
1: 0