Merit-Quality-Excellence

Khairpur Campus of Sukkur IBA University

Introduction to Computer Programming (Fall 2019)

LAB No: 02

Instructor: Marina Gul **Date: 05/09/2019**

Objective of Lab No. 2:

After performing lab1, students will be able to:

- Use escape sequence in their programs
- Use the countable datatypes
- Use the measurable datatypes

Practice Task No. 1:

Write a C++ program to print numbers from 1 to *N* (where N is the number of characters in your first name) on the same line with each pair of adjacent numbers separated by space in the following ways:

Suppose your full name is Ahsan Nazeer hence, your first name is Ahsan which contains five characters.

1 2 3 4 5

Write a program to achieve the aforementioned task in following three ways.

a. Using one statement with one stream insertion operator.

b. Using N statements

c. Using one statement with N stream insertion operators.

Solution (a)

```
// Suppose name is Ahsan Nazeer
#include <iostream>
using namespace std;
int main ()
{
        cout<<"1 2 \t 3 4 \t 5 \n" ;
        system("pause");
        return 0;
}
```

Solution (b)

```
// Suppose name is Ahsan Nazeer
```

```
#include <iostream>
using namespace std;
int main ()
{
  cout<<"1" ;
  cout<<"  2" ;
  cout <<"\t 3" ;
  cout<<"  4" ;
  cout<<"\t 5 \n" ;
  system("pause");
  return 0;
}
```

Solution (c)

```
// Suppose name is Ahsan Nazeer
#include <iostream>
#include <stdlib.h>
using namespace std;
int main ()
{
  cout<<"1"  <<"  2"  <<"\t 3"  <<"  4"  <<"\t 5 \n" ;
  system ("PAUSE") ;
  return 0;
}
```

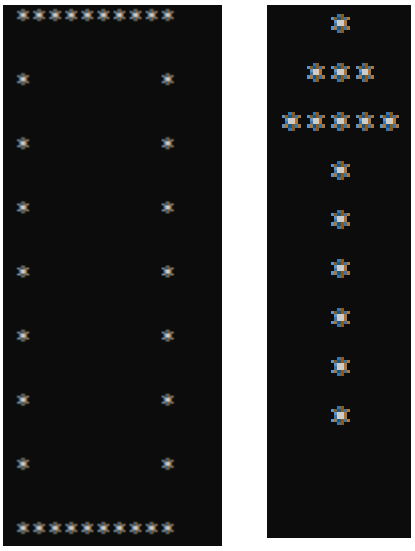
Practice Task No. 2:

Write a program that displays your favorite poem.

Solution:

```
#include <iostream>
using namespace std;
int main ()
{
  cout<<"\t \t \t \t \t  poem \n" ;
  cout<<"\t \t \t I wandered lonely as a cloud \n" ;
  cout<<"\t \t \t That floats on high o'er vales and hills \n" ;
  cout<<"\t \t \t When all at once I saw a crowd \n" ;
  cout<<"\t \t \t A host, of golden daffodils \n" ;
  cout<<"\t \t \t Beside the lake, beneath the trees \n" ;
  cout<<"\t \t \t Fluttering and dancing in the breeze \n\n\n\n\n\n\n\n\n\n\n" ;
  system ("PAUSE") ;
  return 0;
}
```

Practice Task No. 3:
Write a program to print a box, an arrow of asterisks using escape sequences:



Solution (box)

```
#include <iostream>
using namespace std;
int main ()
{
	cout<<" **********\n" ;
	cout<<"\n *\t  * \n" ;
	cout<<"\n *\t  * \n" ;
	cout<<"\n *\t  * \n" ;
	cout<<"\n *\t  * \n" ;
	cout<<"\n *\t  * \n" ;
	cout<<"\n *\t  * \n" ;
	cout<<"\n *\t  * \n" ;
	cout<<"\n **********\n" ;
	system("pause");
	return 0;
}
```

Solution (Arrow)

```
#include <iostream>
using namespace std;
int main ()
{
```

```
        cout<<" \t\t*" ;
        cout<<"\n\t      ***" ;
        cout<<"\n\t     *****" ;
        cout<<"\n \t\t*" ;
        cout<<"\n \t\t*" ;
        cout<<"\n \t\t*" ;
        cout<<"\n \t\t*" ;
        cout<<"\n \t\t*" ;
        cout<<"\n \t\t*" ;
        cout<<"\n\n\n\n\n\n\n\n" ;
        system("pause");
        return 0;
}
```

Practice Task No. 4:

Write a program in which you declare and initialize all the countable and measurable datatypes provided by dev-C++ compiler. Moreover, you are required to print the minimum and maximum range of values that can be stored in those variables along with the space occupied by those variables in the memory.

Solution:

```
#include <iostream>
#include <climits>    //This header defines constants with the limits of fundamental integral types for
//the specific system and compiler implementation used.
#include <cfloat>
using namespace std ;
int main ()
{
short s1 = 10 ;
signed short s2 = 20 ;
unsigned short s3 = 30 ;
int i1 = 10 ;
signed int i2 = 20 ;
unsigned int i3 = 30 ;
long l1 = 10 ;
signed long l2 = 20 ;
unsigned long l3 = 30 ;
long long ll1 = 10 ;
signed long long ll2 = 20 ;
unsigned long long ll3 = 30 ;
float f = 9.123456789 ;
double d = 9.123456789000000 ;
long double ld = 9.1234567890000000000 ;

cout << "\n\n Check the upper and lower limits of countable datatypes :\n";
cout << "-------------------------------------------------\n";
cout << " The maximum limit of int data type :                " << INT_MAX << endl;
cout << " The minimum limit of int data type :                " << INT_MIN << endl;
cout << " The maximum limit of unsigned int data type :       " << UINT_MAX << endl;
```

```
cout << " The maximum limit of long long data type :           " << LLONG_MAX << endl;
cout << " The minimum limit of long long data type :           " << LLONG_MIN << endl;
cout << " The maximum limit of unsigned long long data type :   " << ULLONG_MAX << endl;
cout << " The minimum limit of short data type :               " << SHRT_MIN << endl;
cout << " The maximum limit of short data type :               " << SHRT_MAX << endl;
cout << " The maximum limit of unsigned short data type :      " << USHRT_MAX << endl;
cout << " The minimum limit of float data type :               " << FLT_MIN << endl;
cout << " The maximum limit of float data type :               " << FLT_MAX << endl;
cout << " The minimum limit of double data type :              " << DBL_MIN << endl;
cout << " The maximum limit of double data type :              " << DBL_MAX << endl;
cout << " The minimum limit of long double data type :         " << LDBL_MIN << endl;
cout << " The maximum limit of long double data type :         " << LDBL_MAX << endl;
cout << endl;
cout << "\n\n Check the space of memory occupied by countable datatypes :\n";
cout <<"The s1 size in memory = " <<sizeof (s1) <<endl;
cout <<"The s2 size in memory = " <<sizeof (s2) <<endl;
cout <<"The s3 size in memory = " <<sizeof (s3) <<endl;
cout <<"The i1 size in memory = " <<sizeof (i1) <<endl;
cout <<"The i2 size in memory = " <<sizeof (i2) <<endl;
cout <<"The i3 size in memory = " <<sizeof (i3) <<endl;
cout <<"The l1 size in memory = " <<sizeof (l1) <<endl;
cout <<"The l2 size in memory = " <<sizeof (l2) <<endl;
cout <<"The l3 size in memory = " <<sizeof (l3) <<endl;
cout <<"The ll1 size in memory = " <<sizeof (ll1) <<endl;
cout <<"The ll2 size in memory = " <<sizeof (ll2) <<endl;
cout <<"The ll3 size in memory = " <<sizeof (ll3) <<endl;
cout <<"The f size in memory = " <<sizeof (f) <<endl;
cout <<"The d size in memory = " <<sizeof (d) <<endl;
cout <<"The ld size in memory = " <<sizeof (ld) <<endl;
return 0 ;
}
```

Question 1:
Write a program to print a diamond, and triangle using escape sequences:

Question 2:
Write a program, in which you create three float variables to set the price of 199.9999 for apple juice, orange juice, and banana shake. Your task is to print the prices of abovementioned items in following format.

NOTE: After decimal points, your program must print two digits.

WELCOME TO ICE-COOL

Apple Juice	:	199.99
Orange Juice	:	199.99
Banana Shake	:	199.99

Question 3:
Write a program, in which you create three variables to set the marks (out of 100) for English, Math and ICT subjects for Ahsan. Afterwards, your program should calculate his obtained marks in all three subjects, average marks, and percentage. The sample output is shown below.

WELCOME TO SAND BOX UNIVERSITY

Ahmad Math Score out of 100	:	50.60
Ahmad English Score out of 100	:	59.40
Ahmad ICT Score out of 100	:	70.00
Obtained Marks out of 300	:	180.00
Average Marks	:	60.00
Percentage	:	60.00%