

## LAB #02:

### Lab Objective:

Learning datatypes, variables, constants, arithmetic operators.

### Lab Description:

#### Data Types:

A variable provides us with named storage that our programs can manipulate. Each variable in C++ has a specific type, which determines the size and layout of the variable's memory, this type is known as data type of that variable.

The name of a variable can be composed of letters, digits, and the underscore character. It must begin with either a letter or an underscore. Upper and lowercase letters are distinct because C++ is case-sensitive.

Type	Description
char	Typically a single octet (one byte). This is an integer type.
int	The most natural size of integer for the machine.
float	A single-precision floating point value.
double	A double-precision floating point value.
void	Represents the absence of type.

Figure 1: Basic Data Types

### Variable Declaration in C++

A variable declaration provides assurance to the compiler that there is one variable existing with the given type and name so that compiler proceed for further compilation.

**int a;**

**char b;**

**float c;**

### Variable Initialization in C++

A variable can be initialized at the time of declaration or even after that. Basically initialization means storing some actual meaningful data inside the variable.

**int a=2;**

**char b='x';**

**float c=2.907;**

### Constants

Constants refer to fixed values that the program may not alter during its execution. These fixed values are also called **literals**.

### Defining Constants

There are two simple ways in C++ to define constants:  
Using **#define** preprocessor

Using **const** keyword

**#define LENGTH 10**

**#define WIDTH 5**

**const int LENGTH = 10;**

**const int WIDTH = 5;**

### Legal Identifiers:

Regardless of which style you adopt, be consistent and make your variable names as sensible as possible. Here are some specific rules that must be followed with all identifiers.

- The first character must be one of the letters a through z, A through Z, or an underscore character (\_).

- After the first character you may use the letters a through z or A through Z, the digits 0 through 9, or underscores.
- Uppercase and lowercase characters are distinct. This means ItemsOrdered is not the same as itemsordered.

### **Escape Sequence:**

```
cout << "\t";
```

**Table 2-2** Common Escape Sequences

Escape Sequence	Name	Description
\n	Newline	Causes the cursor to go to the next line for subsequent printing.
\t	Horizontal tab	Causes the cursor to skip over to the next tab stop.
\a	Alarm	Causes the computer to beep.
\b	Backspace	Causes the cursor to back up, or move left one position.
\r	Return	Causes the cursor to go to the beginning of the current line, not the next line.
\\	Backslash	Causes a backslash to be printed.
\'	Single quote	Causes a single quotation mark to be printed.
\"	Double quote	Causes a double quotation mark to be printed.

### **Fundamental Arithmetic Operators:**

**Table 2-9** Fundamental Arithmetic Operators

Operator	Meaning	Type	Example
+	Addition	Binary	total = cost + tax;
-	Subtraction	Binary	cost = total - tax;
*	Multiplication	Binary	tax = cost * rate;
/	Division	Binary	salePrice = original / 2;
%	Modulus	Binary	remainder = value % 3;

## **LAB**

### Task-1:

Type and save the following programs in Visual Studio. Run these programs and observe their output.

```
#include<iostream>
using namespace std;

int main()
{
    char letter;
    letter = 'A';
    cout << letter << '\n';
    letter = 'B';
    cout << letter << '\n';
    cin>>letter;

    return 0;
}
```

```
#include<iostream>
using namespace std;

int main()
{
    char letter;
    letter = 65;
    cout << letter << '\n';
    letter = 66;
    cout << letter << '\n';
    cin>>letter;

    return 0;
}
```

```
#include<iostream>
using namespace std;

int main()
{
    int letter;
    letter = 'A';
    cout << letter << '\n';
    letter = 'B';
    cout << letter << '\n';
    cin>>letter;

    return 0;
}
```

## Task2:

Take two integers as input from the user apply arithmetic operations on them(+,-,\*,/) as print them on screen.

## Task3:

Write the output of the following code

```
#include "stdafx.h"
#include<iostream>
using namespace std;

int main()
{
    int val1;
    int val2;
    int val3;
    cout << "Please enter your 3 numbers:";
    cin >> val1 >> val2 >> val3;

    cout << val1 << "\n" << val2 << "\n" << val3 << "\n";

    cout << val3 << "\n" << val2 << "\n" << val1 << "\n";
    system("PAUSE");
    return 0;
}
```

Output:

## Task 4:

Write a C++ program to calculate the distance between the two points.

Note: x1, y1, x2, y2 are all double values.

**Formula:**

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

### Task 5:

1. Calculate the Area of a Circle (area = PI \* r2)
2. Calculate the Area of a Rectangle (area = length \* width)
3. Calculate the Area of a Triangle (area = base \* height \* .5)

### Task 6:

Total Purchase A customer in a store is purchasing five items. The prices of the five items are:

Price of item 1 = \$12.95

Price of item 2 = \$24.95

Price of item 3 = \$6.95

Price of item 4 = \$14.95

Price of item 5 = \$3.95

Write a program that holds the prices of the five items in five variables. Display each items price, the subtotal of the sale, the amount of sales tax, and the total. Assume the sales tax is 6%.

### Bonus Task:

#### Break Number:

Write a program that inputs a five-digit integer, separates the integer into its individual digits and prints the digits separated from one another by three spaces each.

### Home Tasks:

#### Task 1:

Exchange Write a program that reads in two variables and swaps the value of these variables. For example if a variable 'var1' contains 10 and variable 'var2' contains 20, after the swap operation the variable 'var1' contains 20 (value of var2) and variable 'var2' contains 10 (value of var1).

#### Task 2:

Make Upper Write a program that prompts the user to enter an alphabet in small caps (a, b, c, ... .. z) and display the entered alphabet into its upper caps (A, B, C, ... .. Z).

(hint ASCII)

*"When you are not practicing, remember, someone somewhere is practicing, and when you meet him he will win"*