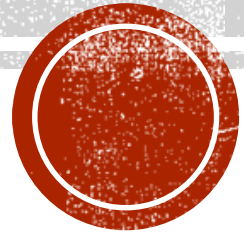
Lebanese University
Faculty of Information
Data Science

INTRODUCTION TO PROGRAMMING



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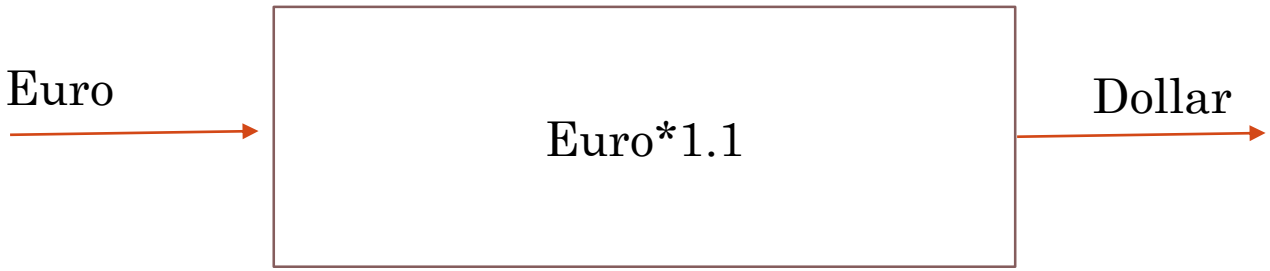
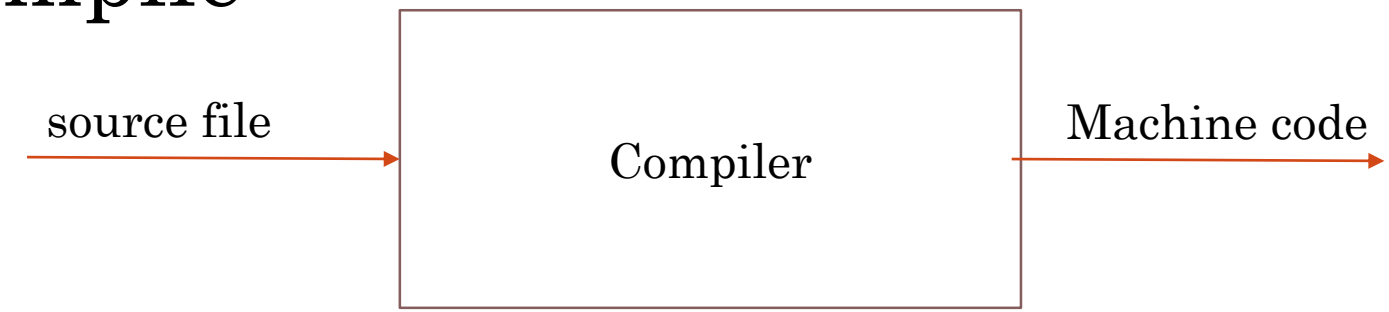
INTRODUCTION

- Algorithm: set of instructions to solve a problem
- It takes inputs and provides outputs



INTRODUCTION

- Algorithm: pseudocode. Similar to everyday english
- Programming language : C language
- .c, .cpp (file source)
- Compile



- run

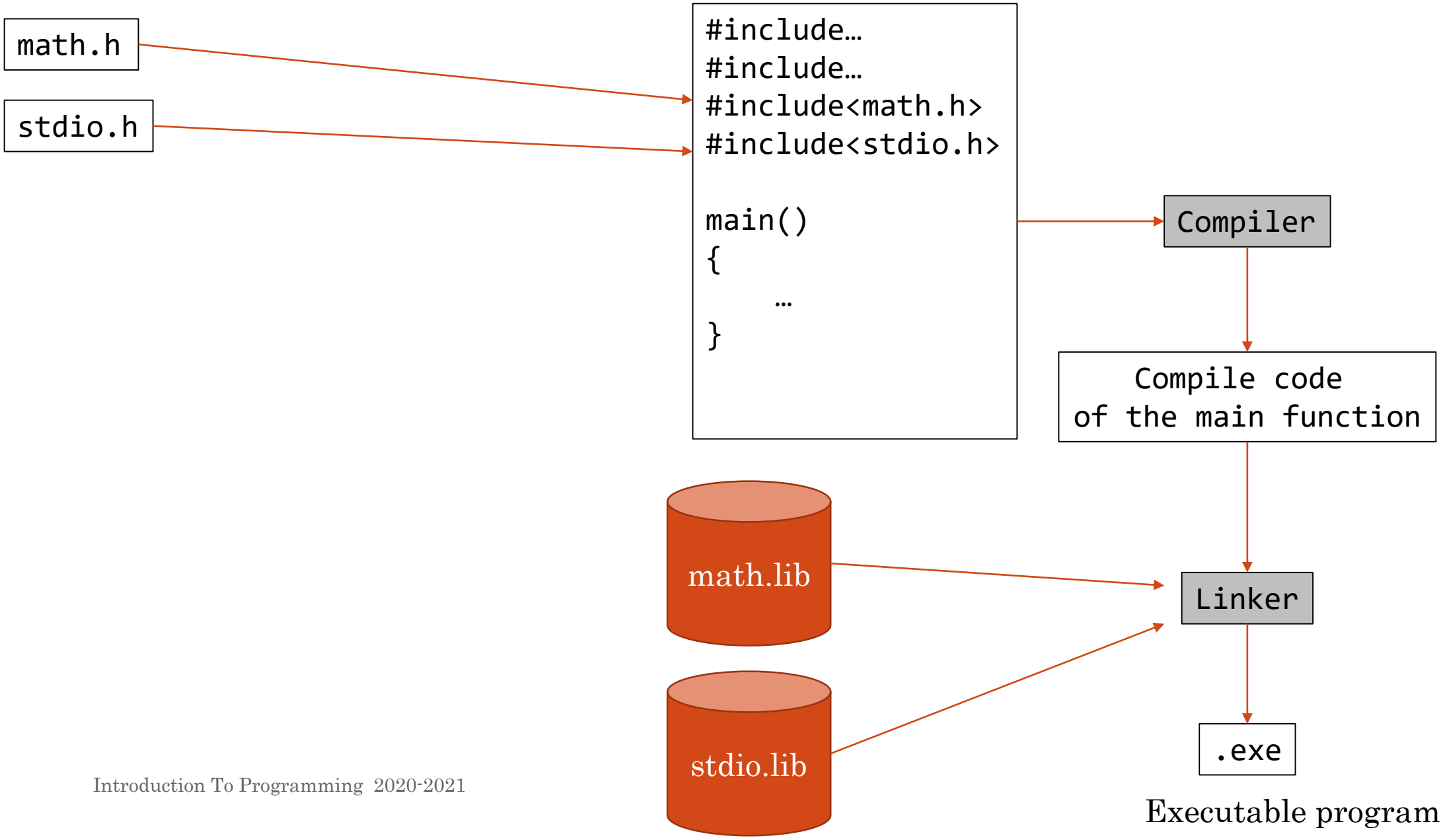
LIBRARIES: FILE IDENTIFICATION

- C / C ++ requires different types of files:

1. .C: C source file
2. .CPP: C ++ source file
3. .OBJ: compiled file
4. .EXE: compiled and linked files (executable versions)
5. .LIB: precompiled function libraries
6. .H: header files for using libraries in a program

Header files

Main program



Executable program

VARIABLES

- Location in memory where value can be stored
- The variable names are any identifiers.
- Types
  - **`int`** - integer numbers
  - **`char`** - characters
  - **float, `double`** - floating point numbers
  - .....

IDENTIFIERS

- The names of variables in C are composed of a series of letters and numbers.
  The first character must be a letter.
  The symbol '_' is also considered a letter.

- The set of usable symbols is: {0,1,2, ..., 9, A, B, ..., Z, _, a, b, ..., z}
- The first character must be a letter (or the symbol '_')
- C distinguishes upper and lower case letters, as follows:
  `Variable_name` is different from `variable_name`

IDENTIFIERS EXAMPLES

Correct identifiers	Incorrect identifiers
name1	1name
name_2	name.2
_name_3	-name-3
Variable_name	Variable name
Deuxieme_choix	Deuxième_choix

INPUT/OUTPUT

OUTPUT: PRINTF/COUT

- printf(" message ");
- C++: cout<<" message “;

PRINTF AND THE <STDIO.H> LIBRARY

- The `printf` function is part of the standard `<stdio.h>` function library that handles data inputs and outputs.

- The first line of the program: `#include <stdio.h>` instructs the compiler to include the header file 'STDIO.H' in the program text.

HELLO C++!

- HELLO.CPP program:

```
#include < iostream>
using namespace std;
int  main ( )
  /* Notre premier programme en C++*/
  {
  cout<< " hello , world ";
  return 0 ;
  }
```

Header files: manage the instructions of input and output

Starting point of a program
main function

A comment

Output instruction and part of stdio.h:
display on the screen:
hello , world

Indicate that a program is finished with success

INSTRUCTIONS

- In C, any simple instruction is terminated by a semicolon; (even if it is in the last position in a block of instructions).

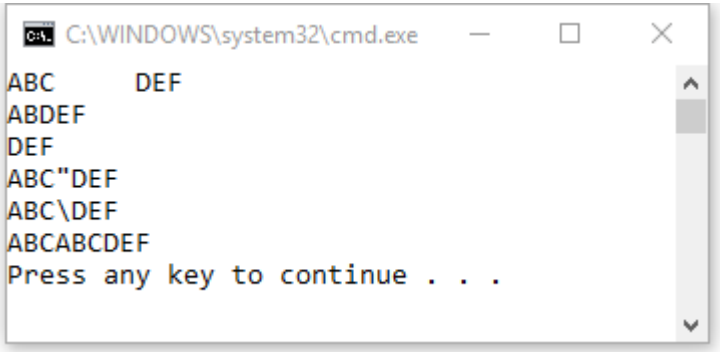
EXERCISE

- Change the hello world program to get the same result on the screen by using the `printf` function several times.

EXERCISE

- Experiment with the escape sequences you find in the table below and fill in the blank columns.

```c
#include <stdio.h>
void main()
// My first program in C
{
    printf("ABC\tDEF\n");
    printf("ABC\bDEF\n");
    printf("ABC\rDEF\n");
    printf("ABC\"DEF\n");
    printf("ABC\\DEF\n");
    printf("ABC\0DEF\n");
    printf("ABC\aDEF\n");
}
```



EXERCISE

- Experiment with the escape sequences you find in the table below and fill in the blank columns.

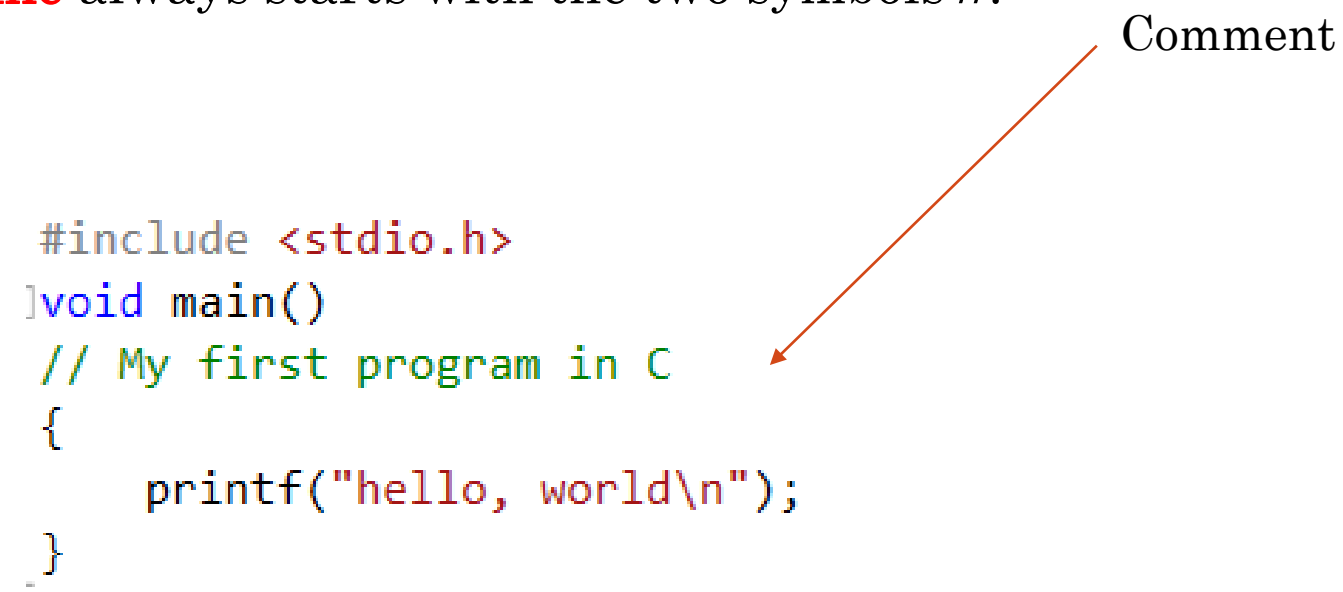
Escape sequences	Description
\n	new line
\t	tabulator
\b	back
\r	return
\”	quotation marks
\\	back-slash
\0	NUL - end of string
\a	attention (bell)

COMMENTS

- A comment on **one or multiple lines** always starts with the two symbols /* and ends with the symbols */. It is forbidden to use nested comments.

COMMENTS

- A comment on **one line** always starts with the two symbols //.

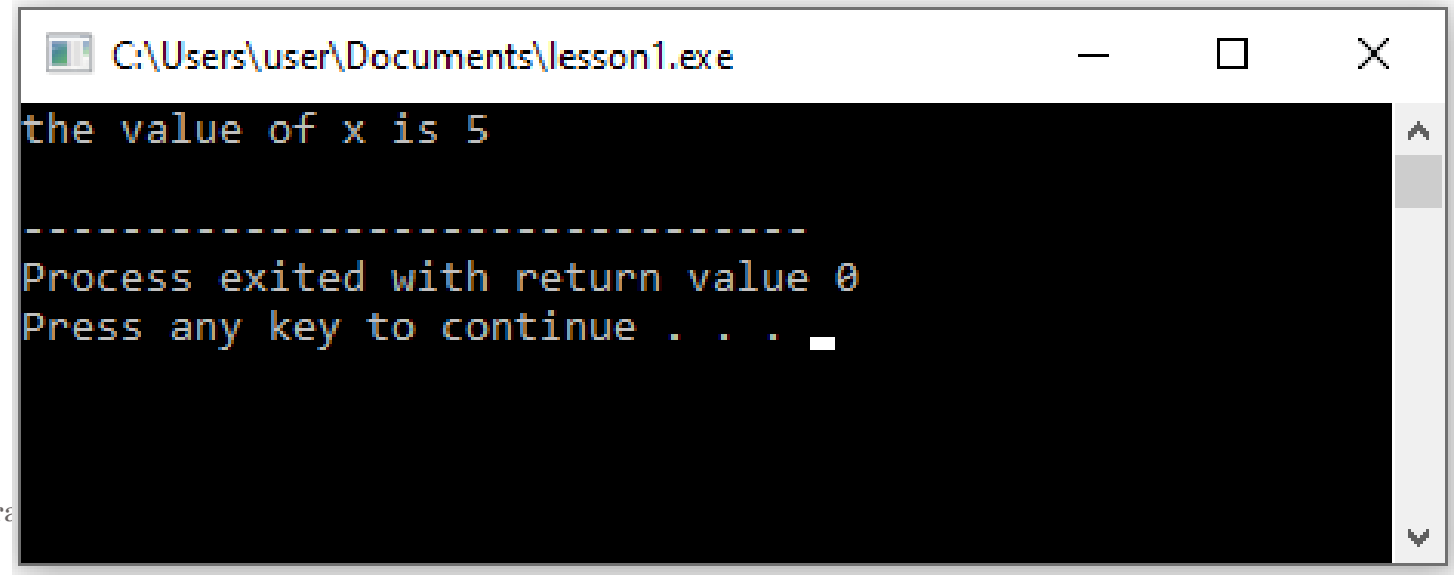


PRINTF : TO DISPLAY A VALUE

- To display the value of a variable:
  - %d integer
  - %c char
  - %f float
  - %lf double

PRINTF

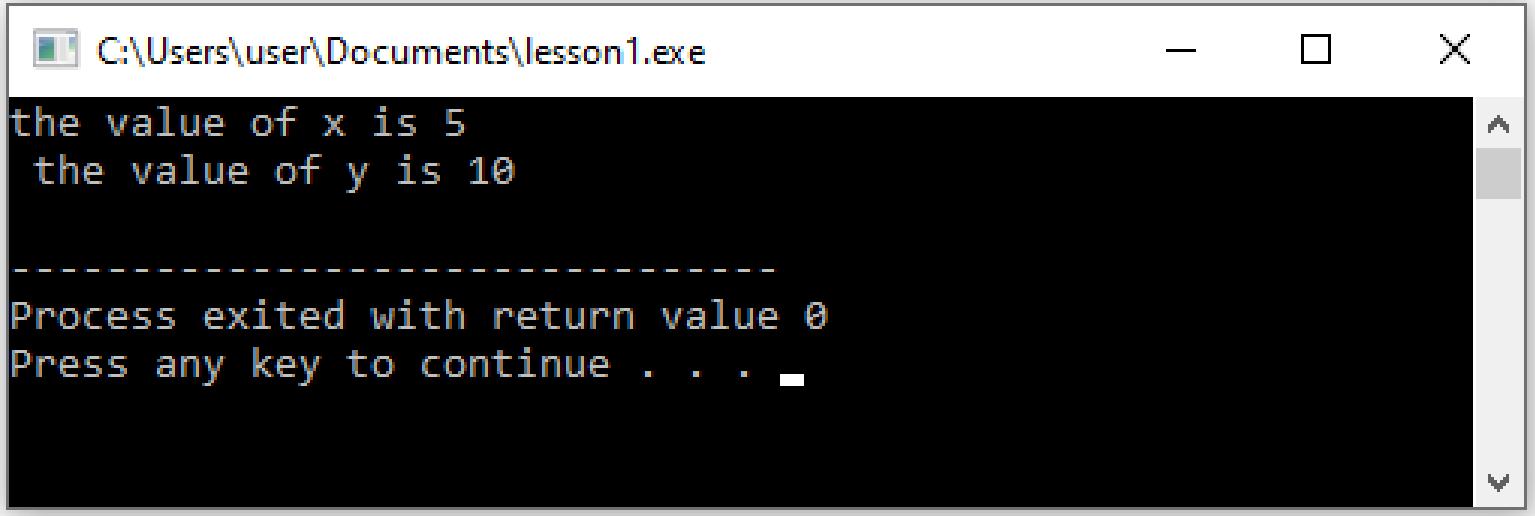
```c
#include<stdio.h>

void main(){
    int x;
    x=5;
    printf("the value of x is %d \n",x);
}
```



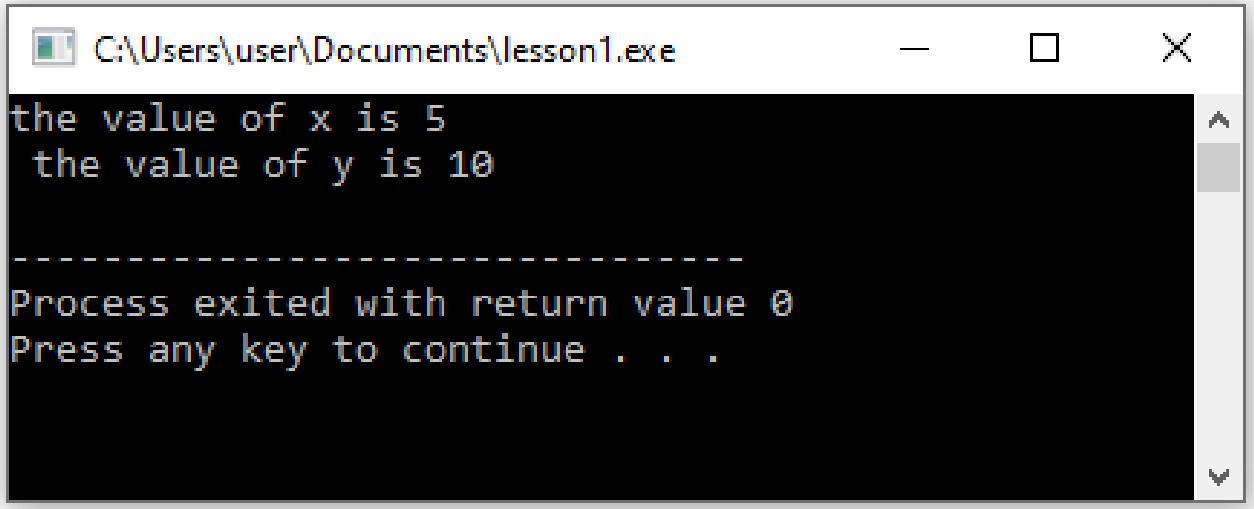
COUT

```
#include<iostream>
using namespace std;
void main(){
    int x;
    x=5;
    cout<<"the value of x is "<<x<<"\n";
}
```

```c
#include<stdio.h>
void main(){
    int x,y;
    x=5;
    y=10;
    printf("the value of x is %d \n the value of y is %d \n",x,y);
}
```



```
#include<iostream>
using namespace std;
void main(){
    int x,y;
    x=5;
    y=10;
    cout<<"the value of x is "<<x<<"\n the value of y is "<<y<<"\n";
}
```



INPUT: SCANF, CIN

- To assign a value for a variable entered by the user from the keyboard
- Examlpe:

```
int x;
scanf("%d",&x);
```

```
int x;
float y;
scanf("%d%f“,&x,&y);
```

CIN

```
int x;
    cin>>x;

   int x;
   float y;
    cin>>x>>y;
```

```c
#include<stdio.h>
 void main(){
    int x;
    printf("enter the value of x\n");
    scanf("%d",&x);
    printf("the value of x = %d",x);
}
```