# Bangladesh Open University

## School of Science & Technology

## Bachelor of Science in Computer Science and Engineering

# Assignment

Course Title: Data Structure Lab

Course Code: CSE21P6

Assignment No.: 01

Title of the Assignment: Fundamentals of C

***Submitted By***

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Dhaka Regional Center

***Submitted To***

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Lecturer (Computer Science)

School of Science and Technology

Bangladesh Open University

***Date of Submission***

04 September 2023

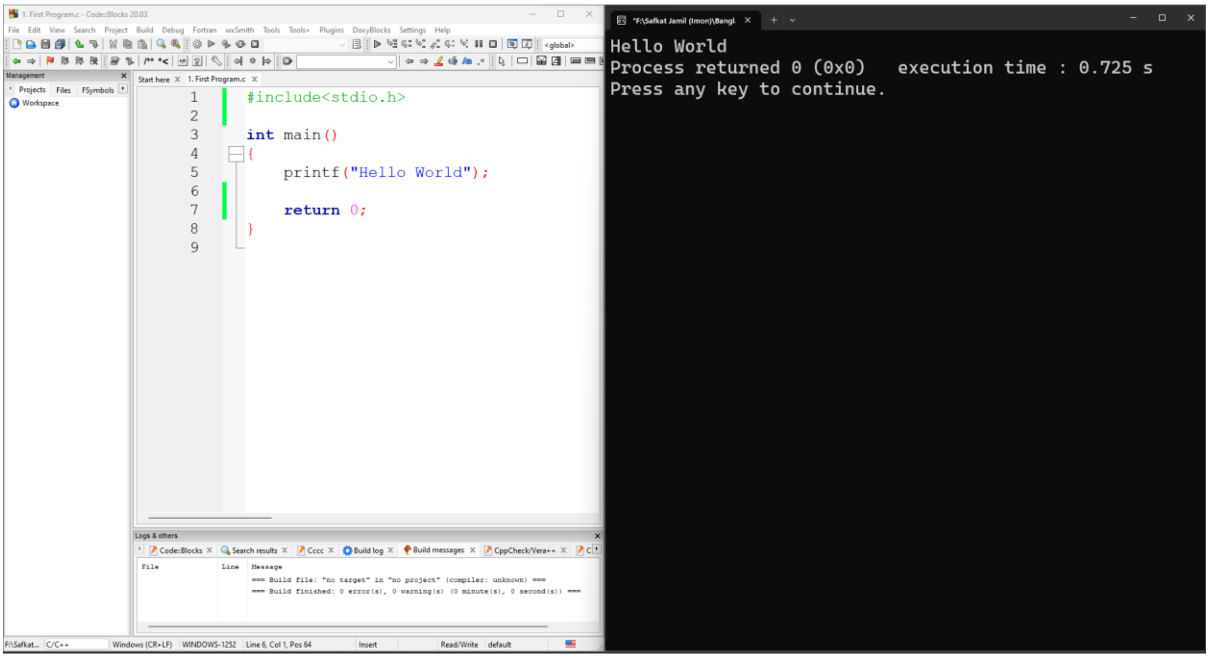
## 1. First Program

**Code**:

```
#include<stdio.h>

int main()
{
	printf("Hello World");
	return 0;
}
```

**Screenshot**:



```
#include<stdio.h>

int main()
{
    printf("Hello World");

    return 0;
}
```

```
File        Line    Message
                    === Build file: "no target" in "no project" (compiler: unknown) ===
                    === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

```
Hello World
Process returned 0 (0x0)   execution time : 0.725 s
Press any key to continue.
```

## 2. Variables & Data Types + Constants & Keywords

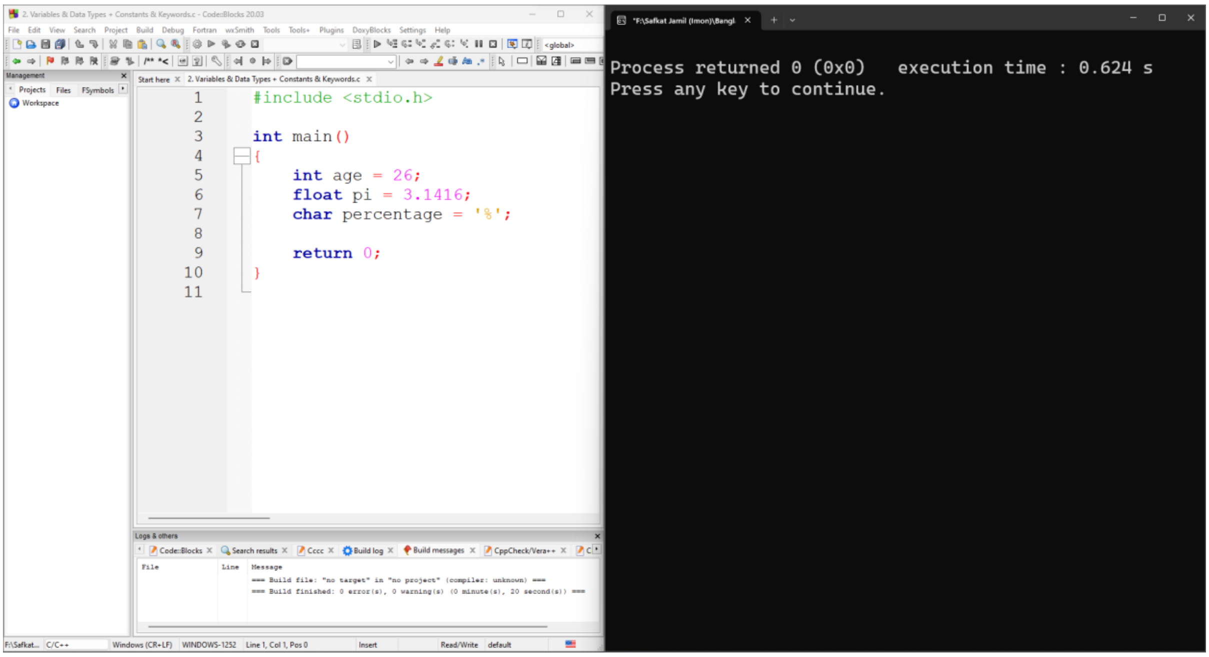
**Code**:

```
#include <stdio.h>

int main()
{
        int age = 26;
        float pi = 3.1416;
        char percentage = '%';

        return 0;
}
```

**Screenshot**:



2. Variables & Data Types + Constants & Keywords.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Management
Projects Files FSymbols
Workspace
Start here
2. Variables & Data Types + Constants & Keywords.c
Logs & others
Code::Blocks
Search results
Cccc
Build log
Build messages
CppCheck/Vera++
F:\Safkat...
C/C++
Windows (CR+LF)
WINDOWS-1252
Line 1, Col 1, Pos 0
Insert
Read/Write
default
"F:\Safkat Jamil (Imon)\Bangl

```
#include <stdio.h>

int main()
{
    int age = 26;
    float pi = 3.1416;
    char percentage = '%';

    return 0;
}
```

```
File    Line    Message
                === Build file: "no target" in "no project" (compiler: unknown) ===
                === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 20 second(s)) ===
```

```
Process returned 0 (0x0)   execution time : 0.624 s
Press any key to continue.
```

## 3. Comments

**Code**:

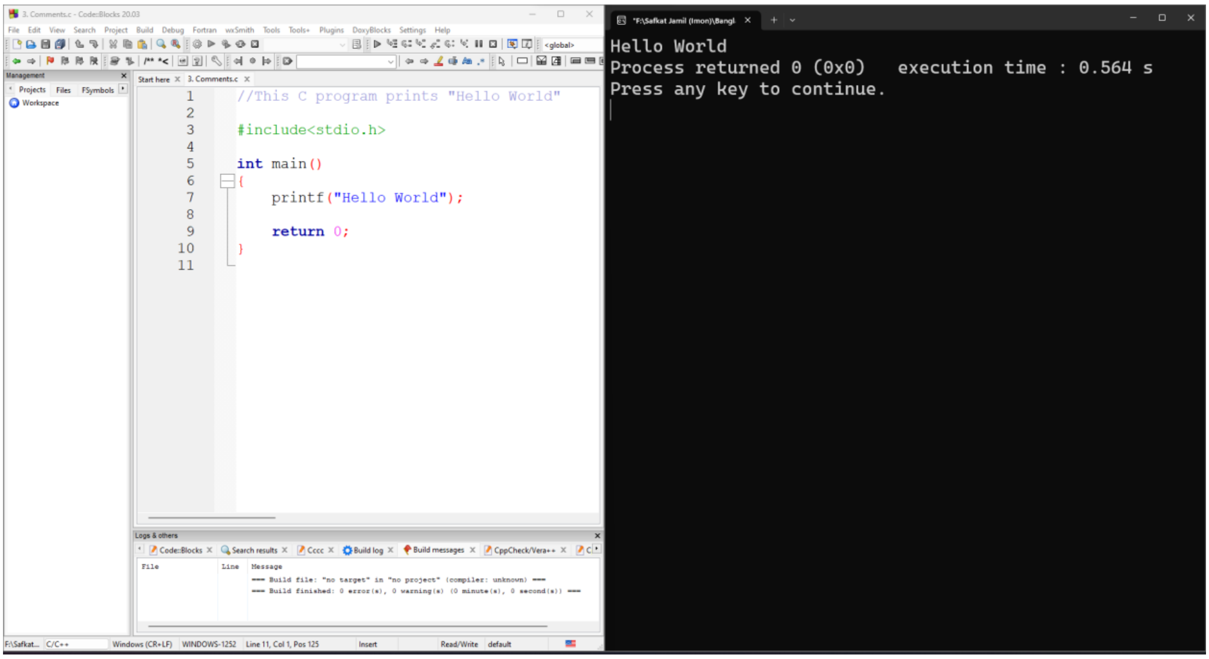
```
//This C program prints "Hello World"

#include<stdio.h>

int main()
{
	printf("Hello World");

	return 0;
}
```

**Screenshot**:



3. Comments.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Management
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Start here
3. Comments.c
Logs & others
Code::Blocks
Search results
Cccc
Build log
Build messages
CppCheck/Vera++
F:\Safkat... C/C++ Windows (CR+LF) WINDOWS-1252 Line 11, Col 1, Pos 125 Insert Read/Write default
F:\Safkat Jamil (Imon)\Bangl

```
//This C program prints "Hello World"

#include<stdio.h>

int main()
{
    printf("Hello World");

    return 0;
}
```

```
File          Line   Message
                     === Build file: "no target" in "no project" (compiler: unknown) ===
                     === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

```
Hello World
Process returned 0 (0x0)   execution time : 0.564 s
Press any key to continue.
```

### 4. Output

**Code**:

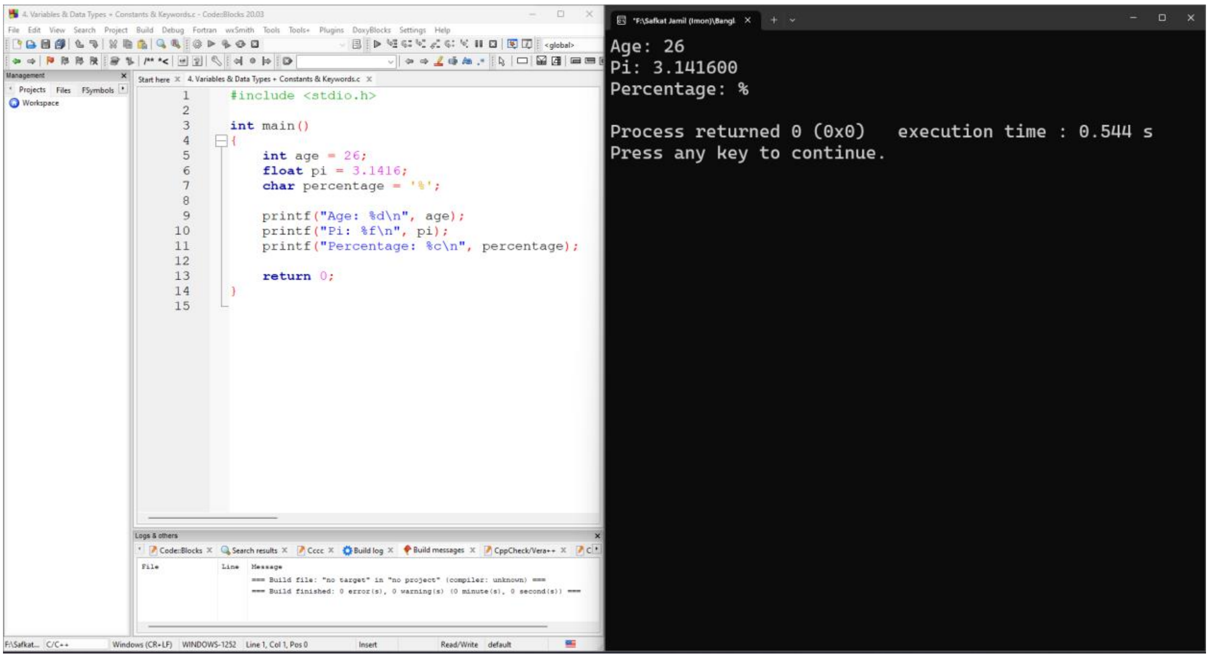
```
#include <stdio.h>

int main()
{
        int age = 26;
        float pi = 3.1416;
        char percentage = '%';

        printf("Age: %d\n", age);
        printf("Pi: %f\n", pi);
        printf("Percentage: %c\n", percentage);

        return 0;
}
```

**Screenshot**:



```
#include <stdio.h>

int main()
{
    int age = 26;
    float pi = 3.1416;
    char percentage = '%';

    printf("Age: %d\n", age);
    printf("Pi: %f\n", pi);
    printf("Percentage: %c\n", percentage);

    return 0;
}
```

```
File        Line    Message
                    === Build file: "no target" in "no project" (compiler: unknown) ===
                    === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

```
Age: 26
Pi: 3.141600
Percentage: %

Process returned 0 (0x0)   execution time : 0.544 s
Press any key to continue.
```

4. Variables & Data Types + Constants & Keywords.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
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Start here
4. Variables & Data Types + Constants & Keywords.c
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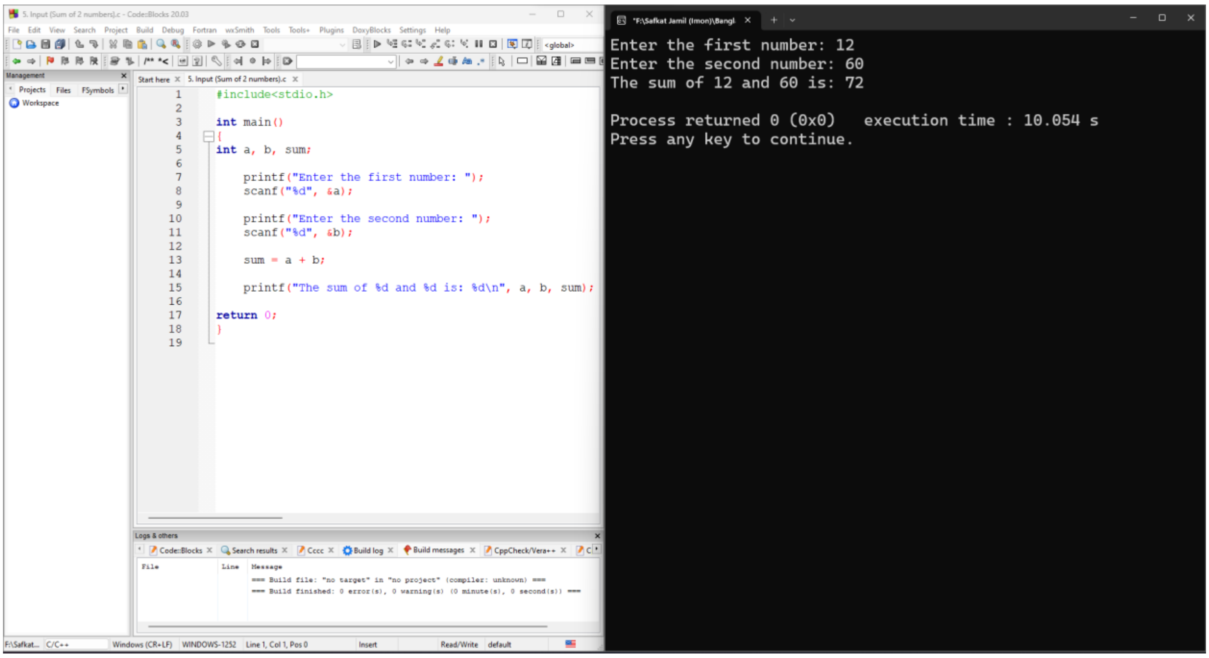
Windows (CR+LF)
WINDOWS-1252
Line 1, Col 1, Pos 0
Insert
Read/Write
default
"F:\Safkat Jamil (Imon)\Bangl

## 5. Sum of 2 numbers

**Code**:

```
#include<stdio.h>

int main()
{
int a, b, sum;

        printf("Enter the first number: ");
        scanf("%d", &a);

        printf("Enter the second number: ");
        scanf("%d", &b);

        sum = a + b;

        printf("The sum of %d and %d is: %d\n", a, b, sum);

return 0;
}
```

**Screenshot**:



5. Input (Sum of 2 numbers).c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
Management
Projects Files FSymbols
Workspace
Start here
5. Input (Sum of 2 numbers).c
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++
F:\Safkat... C/C++ Windows (CR+LF) WINDOWS-1252 Line 1, Col 1, Pos 0 Insert Read/Write default
"F:\Safkat Jamil (Imon)\Bangl

```
#include<stdio.h>

int main()
{
int a, b, sum;

    printf("Enter the first number: ");
    scanf("%d", &a);

    printf("Enter the second number: ");
    scanf("%d", &b);

    sum = a + b;

    printf("The sum of %d and %d is: %d\n", a, b, sum);

return 0;
}
```

```
File            Line    Message
                        === Build file: "no target" in "no project" (compiler: unknown) ===
                        === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

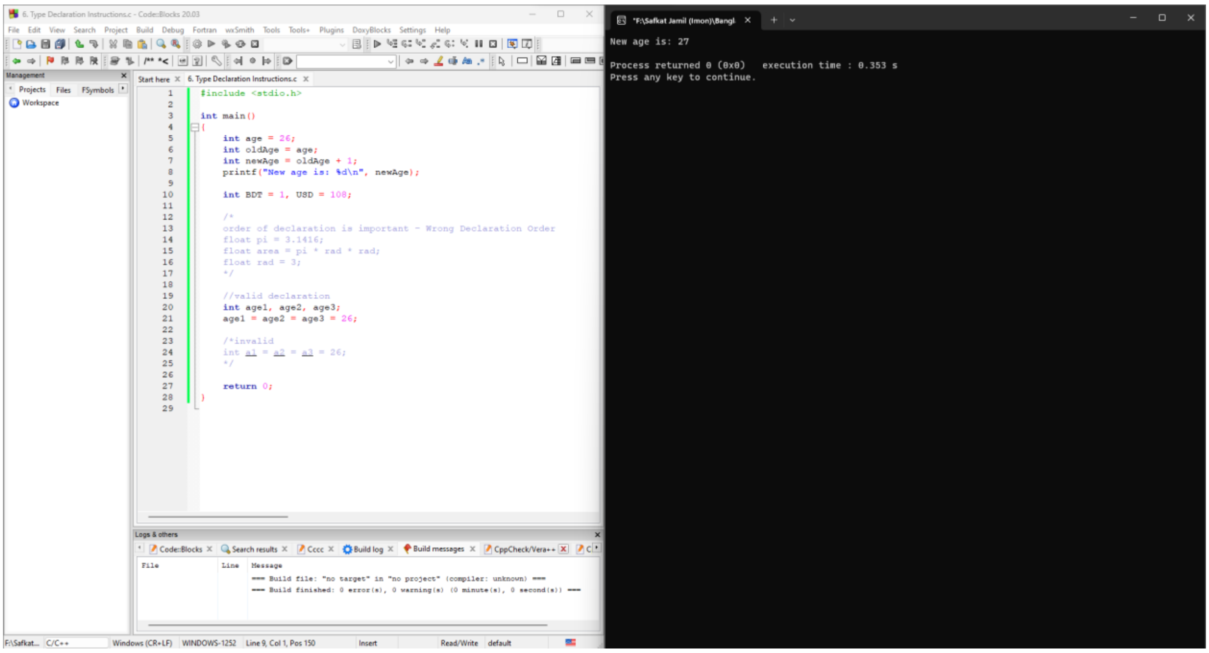
```
Enter the first number: 12
Enter the second number: 60
The sum of 12 and 60 is: 72

Process returned 0 (0x0)   execution time : 10.054 s
Press any key to continue.
```

## 6. Type Declaration Instructions

**Code**:

```
#include <stdio.h>

int main()
{
    int age = 26;
    int oldAge = age;
    int newAge = oldAge + 1;
    printf("New age is: %d\n", newAge);

    int BDT = 1, USD = 108;

    /*
    order of declaration is important - Wrong Declaration Order
    float pi = 3.1416;
    float area = pi * rad * rad;
    float rad = 3;
    */

    //valid declaration
    int age1, age2, age3;
    age1 = age2 = age3 = 26;

    /*invalid
    int a1 = a2 = a3 = 26;
    */

    return 0;
}
```

**Screenshot**:



6. Type Declaration Instructions.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Management
Projects Files FSymbols
Workspace
Start here
6. Type Declaration Instructions.c
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++
F:\Safkat... C/C++ Windows (CR+LF) WINDOWS-1252 Line 9, Col 1, Pos 150 Insert Read/Write default
"F:\Safkat Jamil (Imon)\Bangl.

```
#include <stdio.h>

int main()
{
    int age = 26;
    int oldAge = age;
    int newAge = oldAge + 1;
    printf("New age is: %d\n", newAge);

    int BDT = 1, USD = 108;

    /*
    order of declaration is important - Wrong Declaration Order
    float pi = 3.1416;
    float area = pi * rad * rad;
    float rad = 3;
    */

    //valid declaration
    int age1, age2, age3;
    age1 = age2 = age3 = 26;

    /*invalid
    int a1 = a2 = a3 = 26;
    */

    return 0;
}
```

```
File            Line   Message
                       === Build file: "no target" in "no project" (compiler: unknown) ===
                       === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

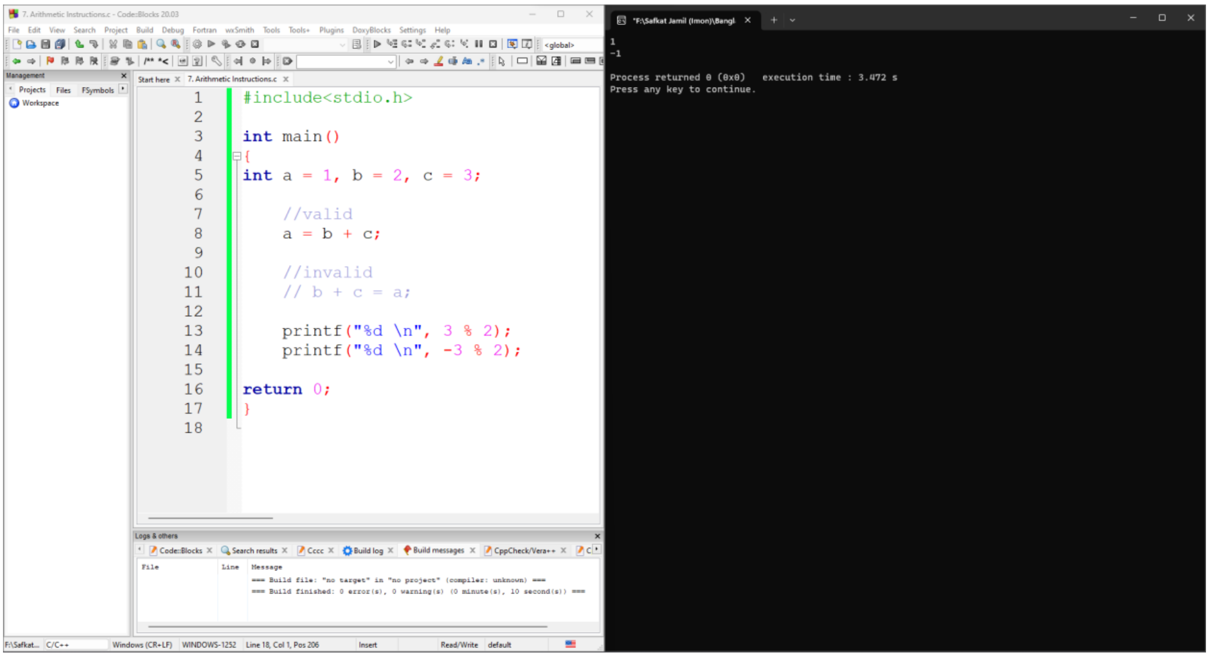
```
New age is: 27

Process returned 0 (0x0)   execution time : 0.353 s
Press any key to continue.
```

## 7. Arithmetic Instructions

**Code**:

```
#include<stdio.h>

int main()
{
        int a = 1, b = 2, c = 3;

        //valid
        a = b + c;

        //invalid
        // b + c = a;

        printf("%d \n", 3 % 2);
        printf("%d \n", -3 % 2);

return 0;
}
```

**Screenshot**:



```
#include<stdio.h>

int main()
{
int a = 1, b = 2, c = 3;

    //valid
    a = b + c;

    //invalid
    // b + c = a;

    printf("%d \n", 3 % 2);
    printf("%d \n", -3 % 2);

return 0;
}
```

```
File        Line    Message
                    === Build file: "no target" in "no project" (compiler: unknown) ===
                    === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 10 second(s)) ===
```

```
1
-1

Process returned 0 (0x0)   execution time : 3.472 s
Press any key to continue.
```

7. Arithmetic Instructions.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
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Workspace
Start here
7. Arithmetic Instructions.c
Logs & others
Code::Blocks
Search results
Cccc
Build log
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CppCheck/Vera++
Windows (CR+LF)
WINDOWS-1252
Line 18, Col 1, Pos 206
Insert
Read/Write
default
"F:\Safkat Jamil (Imon)\Bangl

## 7.1. Type Conversion

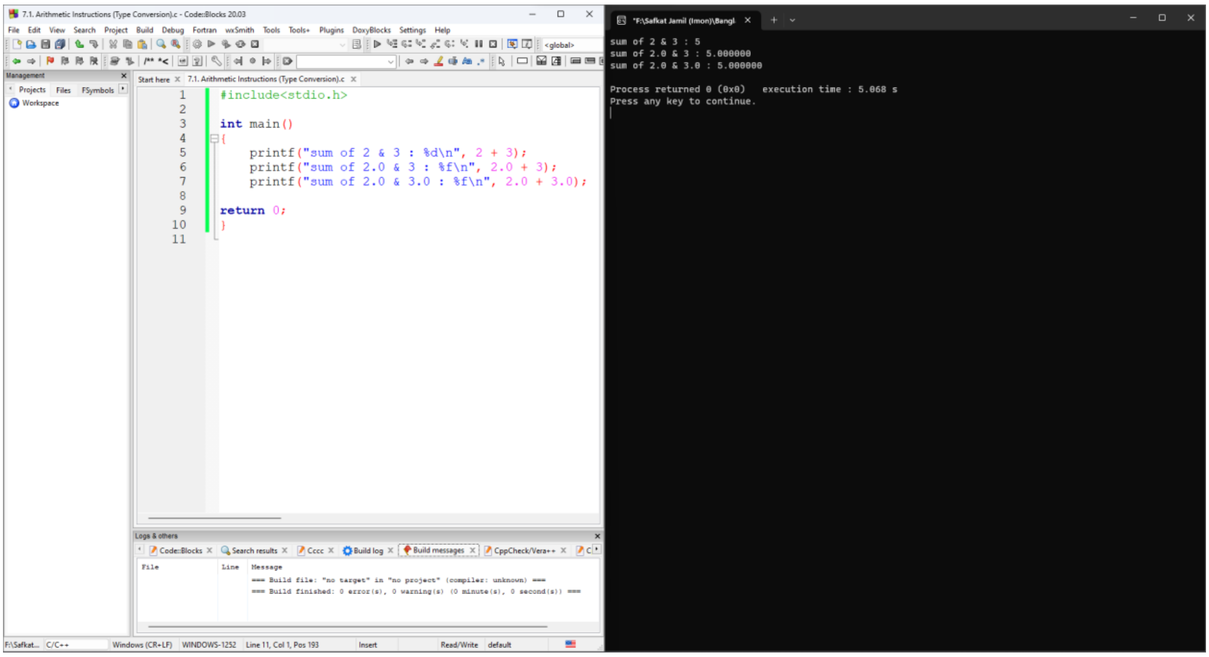
**Code**:

```
#include<stdio.h>

int main()
{
    printf("sum of 2 & 3 : %d", 2 + 3);
    printf("sum of 2.0 & 3 : %f", 2.0 + 3);
    printf("sum of 2.0 & 3.0 : %f", 2.0 + 3.0);

return 0;
}
```

**Screenshot**:


7.1. Arithmetic Instructions (Type Conversion).c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
Management
Projects Files FSymbols
Workspace
Start here
7.1. Arithmetic Instructions (Type Conversion).c
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++
F:\Safkat... C/C++ Windows (CR+LF) WINDOWS-1252 Line 11, Col 1, Pos 193 Insert Read/Write default
"F:\Safkat Jamil (Imon)\Bangl

```
#include<stdio.h>

int main()
{
    printf("sum of 2 & 3 : %d\n", 2 + 3);
    printf("sum of 2.0 & 3 : %f\n", 2.0 + 3);
    printf("sum of 2.0 & 3.0 : %f\n", 2.0 + 3.0);

return 0;
}
```

```
File        Line    Message
                    === Build file: "no target" in "no project" (compiler: unknown) ===
                    === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

```
sum of 2 & 3 : 5
sum of 2.0 & 3 : 5.000000
sum of 2.0 & 3.0 : 5.000000

Process returned 0 (0x0)   execution time : 5.068 s
Press any key to continue.
```

## 7.2. Associativity

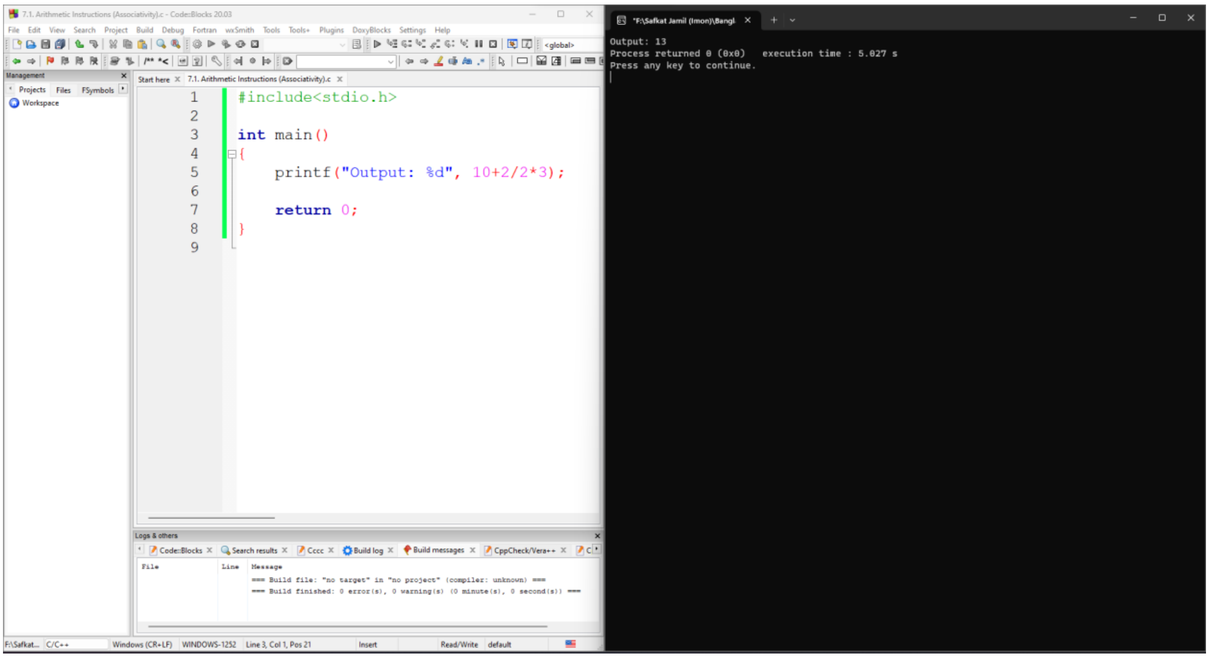
**Code**:

```
#include<stdio.h>

int main()
{
    printf("Output: %d", 10+2/2*3);

    return 0;
}
```

**Screenshot**:



7.1. Arithmetic Instructions (Associativity).c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Management
Projects Files FSymbols
Workspace
Start here
7.1. Arithmetic Instructions (Associativity).c
Logs & others
Code::Blocks
Search results
Cccc
Build log
Build messages
CppCheck/Vera++
"F:\Safkat Jamil (Imon)\Bangl
F:\Safkat... C/C++ Windows (CR+LF) WINDOWS-1252 Line 3, Col 1, Pos 21 Insert Read/Write default

```
#include<stdio.h>

int main()
{
    printf("Output: %d", 10+2/2*3);

    return 0;
}
```

```
File    Line    Message
                === Build file: "no target" in "no project" (compiler: unknown) ===
                === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

```
Output: 13
Process returned 0 (0x0)   execution time : 5.027 s
Press any key to continue.
```

## 8. Relational Operator

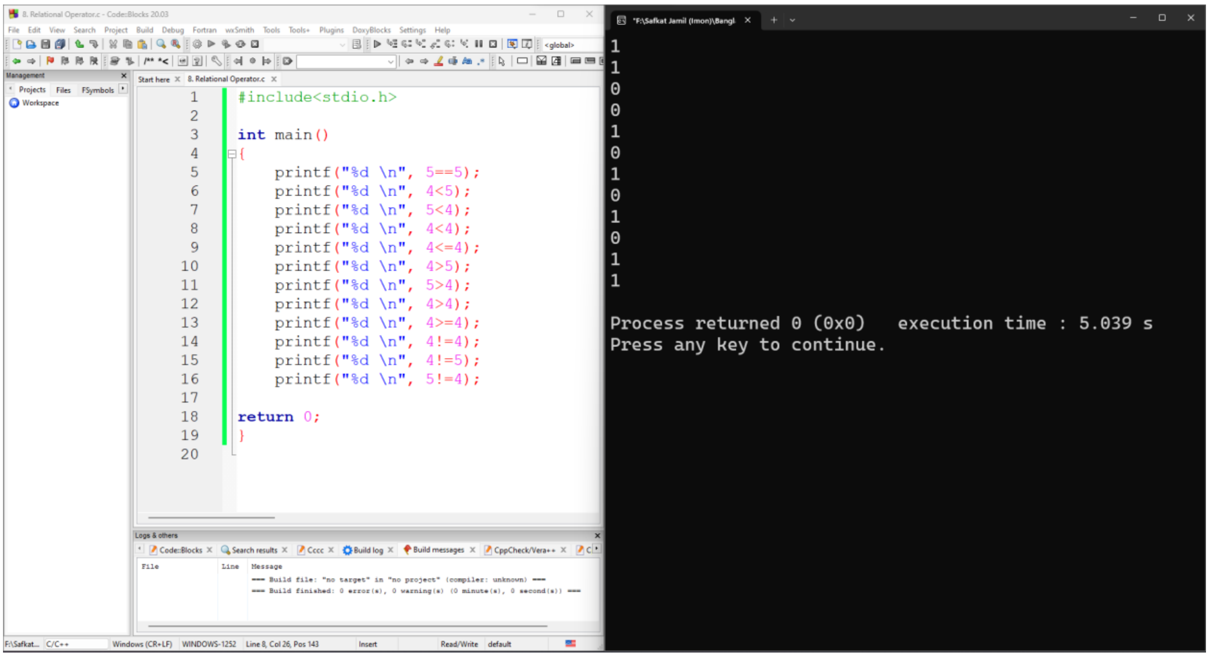
**Code**:

```
#include<stdio.h>

int main()
{
    printf("%d \n", 5==5);
    printf("%d \n", 4<5);
    printf("%d \n", 5<4);
    printf("%d \n", 4<4);
    printf("%d \n", 4<=4);
    printf("%d \n", 4>5);
    printf("%d \n", 5>4);
    printf("%d \n", 4>4);
    printf("%d \n", 4>=4);
    printf("%d \n", 4!=4);
    printf("%d \n", 4!=5);
    printf("%d \n", 5!=4);

return 0;
}
```

**Screenshot**:



```
#include<stdio.h>

int main()
{
    printf("%d \n", 5==5);
    printf("%d \n", 4<5);
    printf("%d \n", 5<4);
    printf("%d \n", 4<4);
    printf("%d \n", 4<=4);
    printf("%d \n", 4>5);
    printf("%d \n", 5>4);
    printf("%d \n", 4>4);
    printf("%d \n", 4>=4);
    printf("%d \n", 4!=4);
    printf("%d \n", 4!=5);
    printf("%d \n", 5!=4);

return 0;
}
```

```
File    Line    Message
                === Build file: "no target" in "no project" (compiler: unknown) ===
                === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

```
1
1
0
0
1
0
1
0
1
0
1
1

Process returned 0 (0x0)   execution time : 5.039 s
Press any key to continue.
```

8. Relational Operator.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
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8. Relational Operator.c
Logs & others
Code::Blocks
Search results
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CppCheck/Vera++
F:\Safkat... C/C++ Windows (CR+LF) WINDOWS-1252 Line 8, Col 26, Pos 143 Insert Read/Write default
"F:\Safkat Jamil (Imon)\Bangl

## 9. Logical Operator

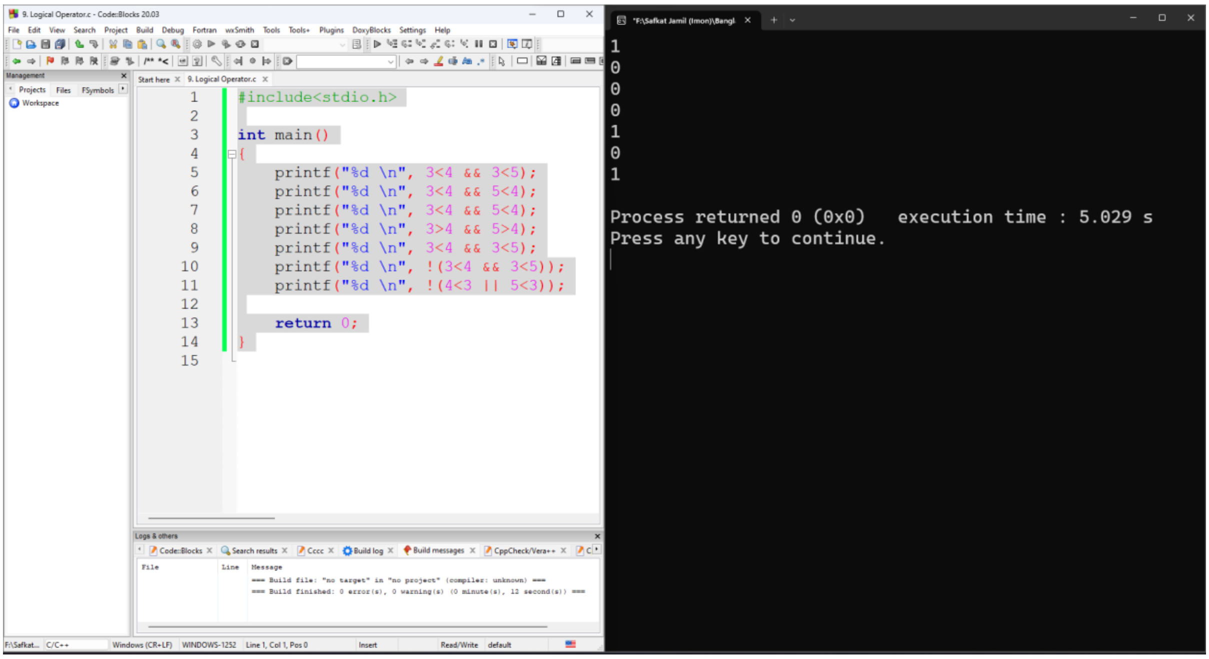
**Code**:

```
#include<stdio.h>

int main()
{
    printf("%d \n", 3<4 && 3<5);
    printf("%d \n", 3<4 && 5<4);
    printf("%d \n", 3<4 && 5<4);
    printf("%d \n", 3>4 && 5>4);
    printf("%d \n", 3<4 && 3<5);
    printf("%d \n", !(3<4 && 3<5));
    printf("%d \n", !(4<3 || 5<3));

    return 0;
}
```

**Screenshot**:



9. Logical Operator.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
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9. Logical Operator.c
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F:\Safkat... C/C++ Windows (CR+LF) WINDOWS-1252 Line 1, Col 1, Pos 0 Insert Read/Write default
"F:\Safkat Jamil (tmon)\Bangl

```
#include<stdio.h>

int main()
{
    printf("%d \n", 3<4 && 3<5);
    printf("%d \n", 3<4 && 5<4);
    printf("%d \n", 3<4 && 5<4);
    printf("%d \n", 3>4 && 5>4);
    printf("%d \n", 3<4 && 3<5);
    printf("%d \n", !(3<4 && 3<5));
    printf("%d \n", !(4<3 || 5<3));

    return 0;
}
```

```
File        Line   Message
                   === Build file: "no target" in "no project" (compiler: unknown) ===
                   === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 12 second(s)) ===
```

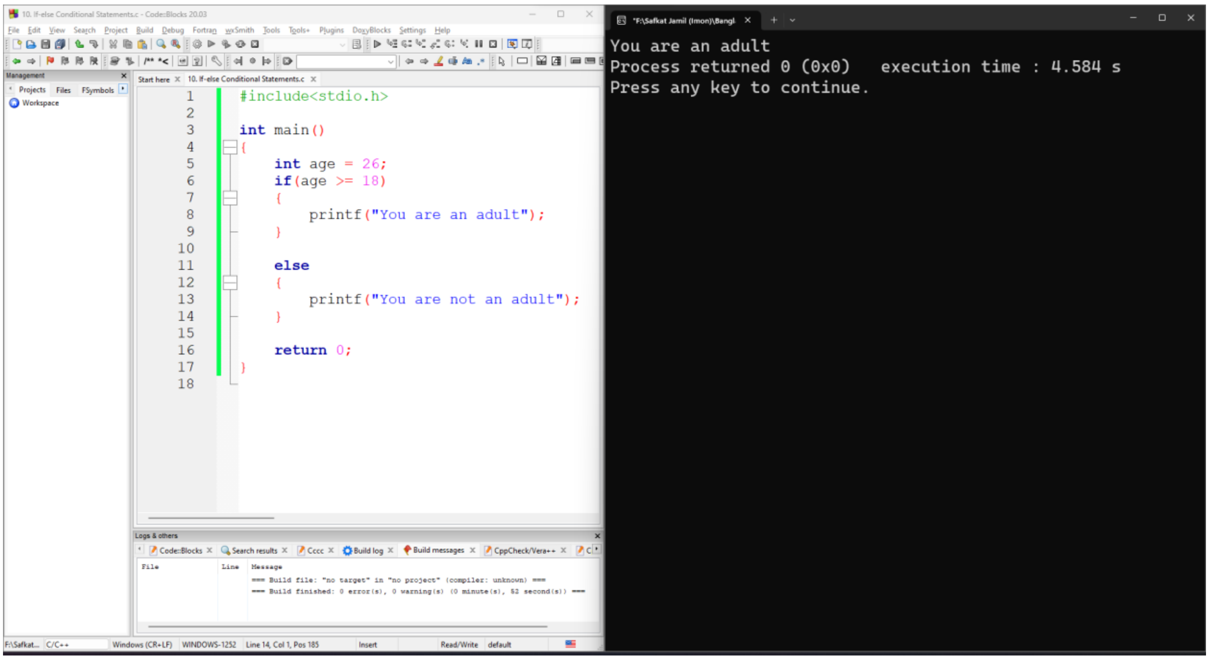
```
1
0
0
0
1
0
1

Process returned 0 (0x0)   execution time : 5.029 s
Press any key to continue.
```

## 10. If-else Conditional Statements

**Code**:

```
#include<stdio.h>

int main()
{
    int age = 26;
    if(age >= 18)
    {
        printf("You are an adult");
    }

    else
    {
        printf("You are not an adult");
    }

    return 0;
}
```

**Screenshot**:


10. If-else Conditional Statements.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Management
Projects Files FSymbols
Workspace
Start here
10. If-else Conditional Statements.c
Logs & others
Code::Blocks Search results Cccc Build log Build messages CppCheck/Vera++
Windows (CR+LF) WINDOWS-1252 Line 14, Col 1, Pos 185 Insert Read/Write default
F:\Safkat Jamil (Imon)\Bangl

```
#include<stdio.h>

int main()
{
    int age = 26;
    if(age >= 18)
    {
        printf("You are an adult");
    }

    else
    {
        printf("You are not an adult");
    }

    return 0;
}
```

```
File          Line   Message
                     === Build file: "no target" in "no project" (compiler: unknown) ===
                     === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 52 second(s)) ===
```

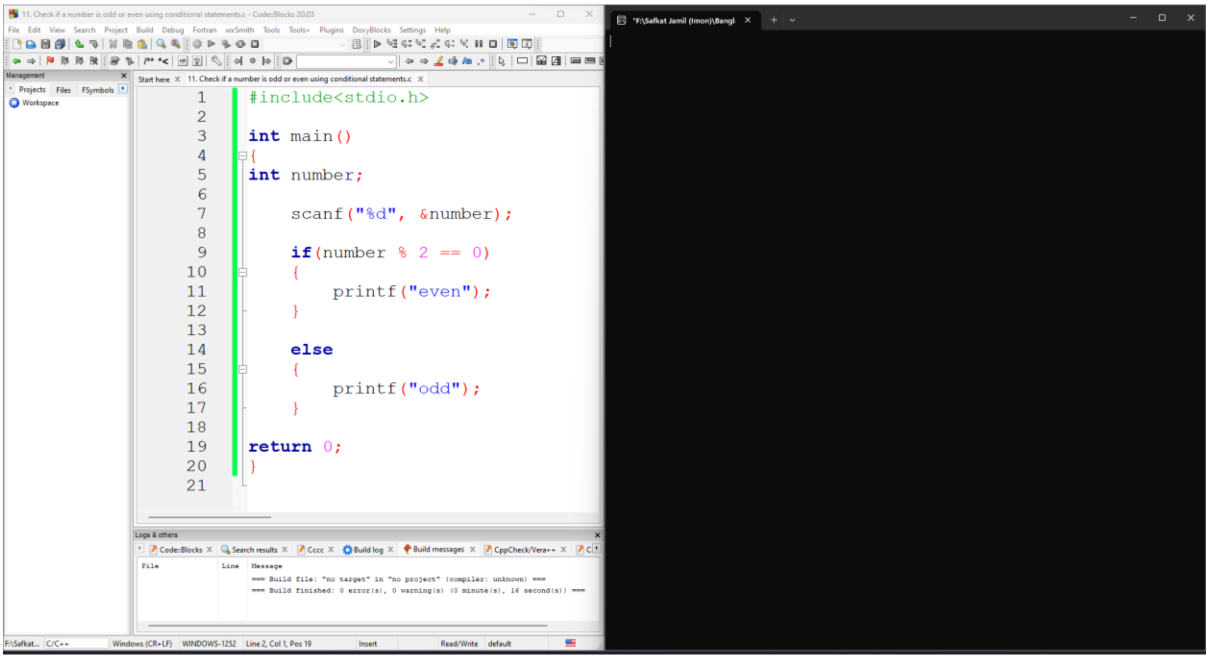
```
You are an adult
Process returned 0 (0x0)   execution time : 4.584 s
Press any key to continue.
```

## 11. Check if a number is odd or even using conditional statements

**Code**:

```
#include<stdio.h>

int main()
{
int number;

    scanf("%d", &number);

    if(number % 2 == 0)
    {
        printf("even");
    }

    else
    {
        printf("odd");
    }

return 0;
}
```

**Screenshot**:



11. Check if a number is odd or even using conditional statements.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
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Start here
11. Check if a number is odd or even using conditional statements.c
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Cccc
Build log
Build messages
CppCheck/Vera++
F:\Safkat... C/C++ Windows (CR+LF) WINDOWS-1252 Line 2, Col 1, Pos 19 Insert Read/Write default
*F:\Safkat Jamil (Imon)\Bangl

```
#include<stdio.h>

int main()
{
int number;

    scanf("%d", &number);

    if(number % 2 == 0)
    {
        printf("even");
    }

    else
    {
        printf("odd");
    }

return 0;
}
```

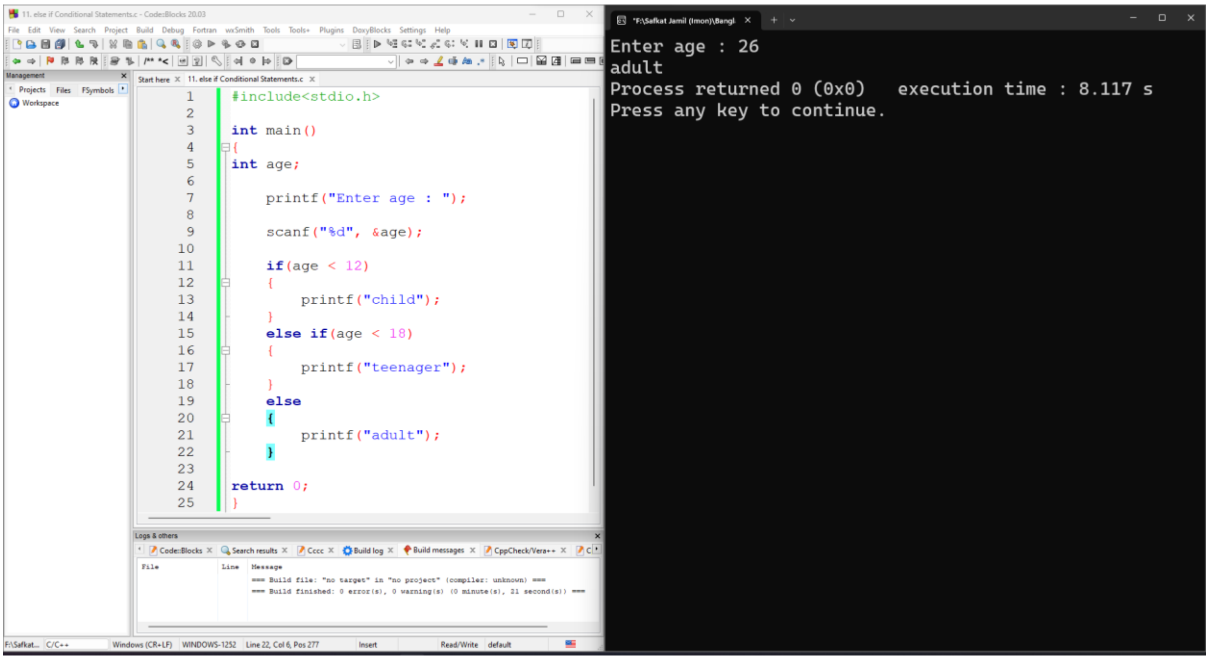
```
File        Line   Message
                   === Build file: "no target" in "no project" (compiler: unknown) ===
                   === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 16 second(s)) ===
```

## 12. else if Conditional Statements

**Code**:

```
#include<stdio.h>

int main()
{
int age;

    printf("Enter age : ");

    scanf("%d", &age);

    if(age < 12)
    {
        printf("child");
    }
    else if(age < 18)
    {
        printf("teenager");
    }
    else
    {
        printf("adult");
    }

return 0;
}
```

**Screenshot**:



```
#include<stdio.h>

int main()
{
int age;

    printf("Enter age : ");

    scanf("%d", &age);

    if(age < 12)
    {
        printf("child");
    }
    else if(age < 18)
    {
        printf("teenager");
    }
    else
    {
        printf("adult");
    }

return 0;
}
```

```
File                Line   Message
                           === Build file: "no target" in "no project" (compiler: unknown) ===
                           === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 21 second(s)) ===
```

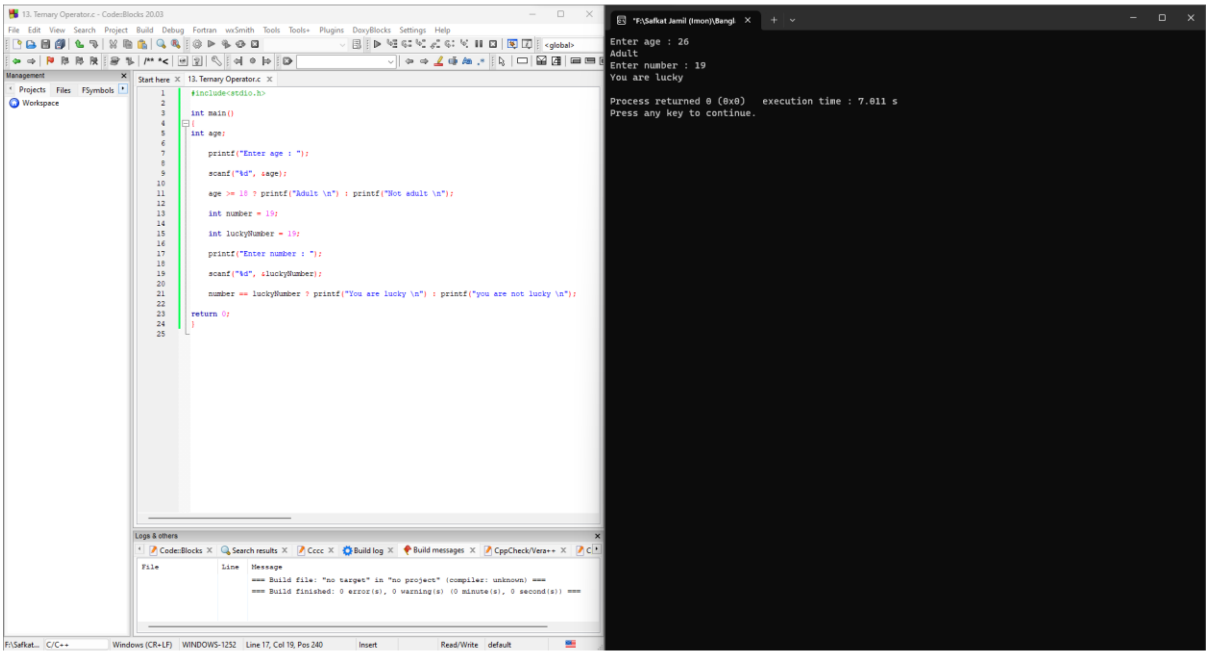
```
Enter age : 26
adult
Process returned 0 (0x0)   execution time : 8.117 s
Press any key to continue.
```

## 13. Ternary Operator

**Code**:

```
#include<stdio.h>

int main()
{
int age;

    printf("Enter age : ");

    scanf("%d", &age);

    age >= 18 ? printf("Adult \n") : printf("Not adult \n");

    int number = 19;

    int luckyNumber = 19;

    printf("Enter number : ");

    scanf("%d", &luckyNumber);

    number == luckyNumber ? printf("You are lucky \n") : printf("you are not lucky \n");

return 0;
}
```

**Screenshot**:



13. Ternary Operator.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
Management
Projects Files FSymbols
Workspace
Start here
13. Ternary Operator.c
Logs & others
Code::Blocks
Search results
Cccc
Build log
Build messages
CppCheck/Vera++
"F:\Safkat Jamil (Imon)\Bangl
F:\Safkat... C/C++
Windows (CR+LF) WINDOWS-1252 Line 17, Col 19, Pos 240 Insert Read/Write default

```
#include<stdio.h>

int main()
{
int age;

    printf("Enter age : ");

    scanf("%d", &age);

    age >= 18 ? printf("Adult \n") : printf("Not adult \n");

    int number = 19;

    int luckyNumber = 19;

    printf("Enter number : ");

    scanf("%d", &luckyNumber);

    number == luckyNumber ? printf("You are lucky \n") : printf("you are not lucky \n");

return 0;
}
```

```
File          Line   Message
                     === Build file: "no target" in "no project" (compiler: unknown) ===
                     === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s)) ===
```

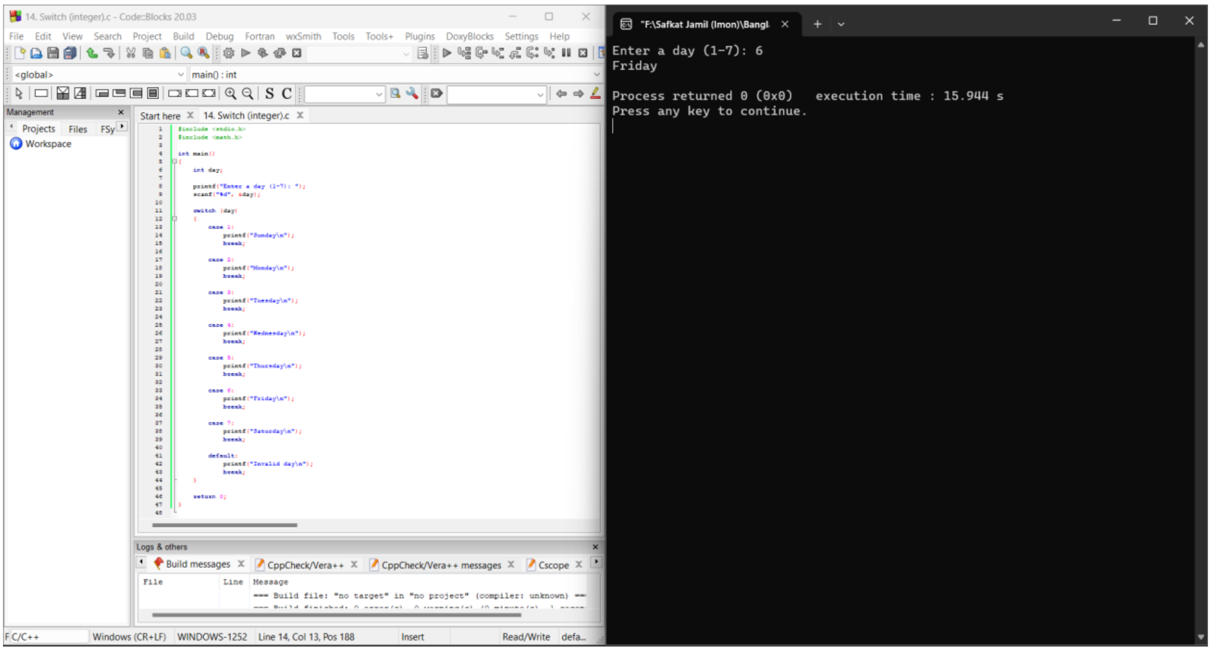
```
Enter age : 26
Adult
Enter number : 19
You are lucky

Process returned 0 (0x0)   execution time : 7.011 s
Press any key to continue.
```

**14. Switch (integer)**

**Code**:

```
#include <stdio.h>
#include <math.h>

int main()
{
   int day;

   printf("Enter a day (1-7): ");
   scanf("%d", &day);

   switch (day)
   {
      case 1:
         printf("Monday\n");
         break;

      case 2:
         printf("Tuesday\n");
         break;

      case 3:
         printf("Wednesday\n");
         break;

      case 4:
         printf("Thursday\n");
         break;

      case 5:
         printf("Friday\n");
         break;

      case 6:
         printf("Saturday\n");
         break;

      case 7:
         printf("Sunday\n");
         break;

      default:
         printf("Invalid day\n");
         break;
   }

   return 0;
}
```

# Screenshot:



```c
#include <stdio.h>
#include <math.h>

int main()
{
    int day;

    printf("Enter a day (1-7): ");
    scanf("%d", &day);

    switch (day)
    {
        case 1:
            printf("Sunday\n");
            break;

        case 2:
            printf("Monday\n");
            break;

        case 3:
            printf("Tuesday\n");
            break;

        case 4:
            printf("Wednesday\n");
            break;

        case 5:
            printf("Thursday\n");
            break;

        case 6:
            printf("Friday\n");
            break;

        case 7:
            printf("Saturday\n");
            break;

        default:
            printf("Invalid day\n");
            break;
    }

    return 0;
}
```

```
File          Line  Message
                    === Build file: "no target" in "no project" (compiler: unknown) ===
```

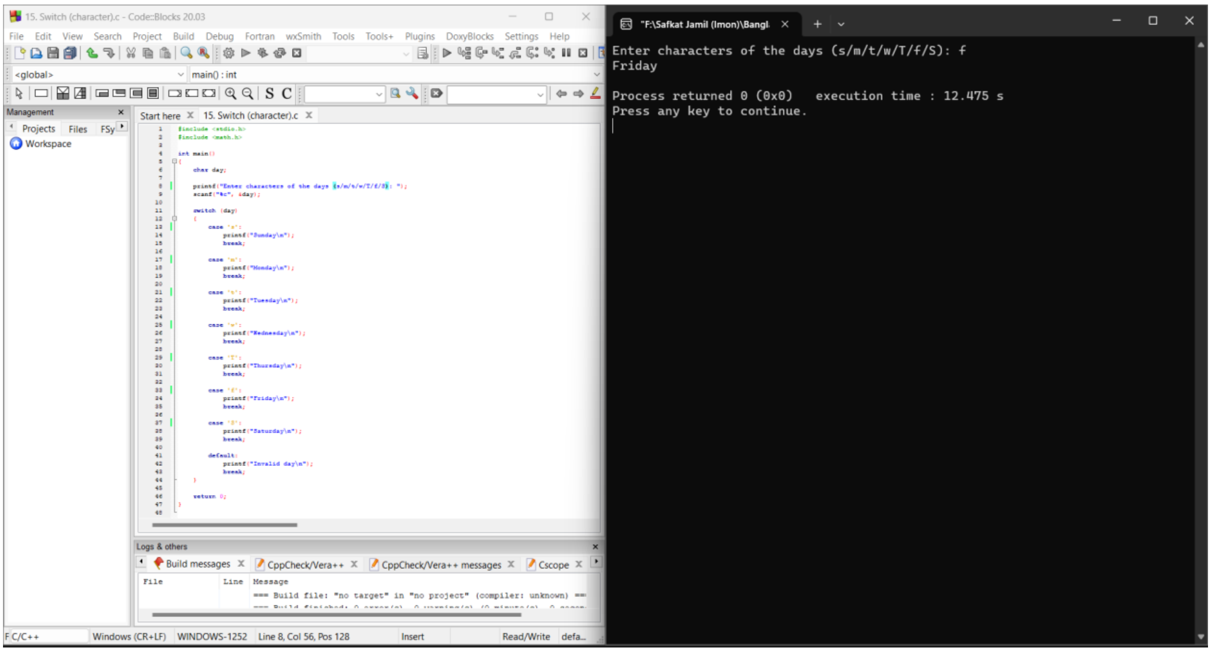
```
Enter a day (1-7): 6
Friday

Process returned 0 (0x0)   execution time : 15.944 s
Press any key to continue.
```

**15. Switch (character)**

**Code**:

```
#include <stdio.h>
#include <math.h>

int main()
{
   char day;

   printf("Enter characters of the days (s/m/t/w/T/f/S): ");
   scanf("%c", &day);

   switch (day)
   {
      case 's':
         printf("Sunday\n");
         break;

      case 'm':
         printf("Monday\n");
         break;

      case 't':
         printf("Tuesday\n");
         break;

      case 'w':
         printf("Wednesday\n");
         break;

      case 'T':
         printf("Thursday\n");
         break;

      case 'f':
         printf("Friday\n");
         break;

      case 'S':
         printf("Saturday\n");
         break;

      default:
         printf("Invalid day\n");
         break;
   }

   return 0;
}
```

# Screenshot:



15. Switch (character).c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Management
Projects Files FSy
Workspace
Start here
15. Switch (character).c
Logs & others
Build messages
CppCheck/Vera++
CppCheck/Vera++ messages
Cscope
"F:\Safkat Jamil (Imon)\Bangl.

```c
#include <stdio.h>
#include <math.h>

int main()
{
    char day;

    printf("Enter characters of the days (s/m/t/w/T/f/S): ");
    scanf("%c", &day);

    switch (day)
    {
        case 's':
            printf("Sunday\n");
            break;

        case 'm':
            printf("Monday\n");
            break;

        case 't':
            printf("Tuesday\n");
            break;

        case 'w':
            printf("Wednesday\n");
            break;

        case 'T':
            printf("Thursday\n");
            break;

        case 'f':
            printf("Friday\n");
            break;

        case 'S':
            printf("Saturday\n");
            break;

        default:
            printf("Invalid day\n");
            break;
    }

    return 0;
}
```

```
File            Line  Message
                      === Build file: "no target" in "no project" (compiler: unknown) ===
                      === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 secon
```

```
F:C/C++   Windows (CR+LF)   WINDOWS-1252   Line 8, Col 56, Pos 128   Insert   Read/Write   defa...
```

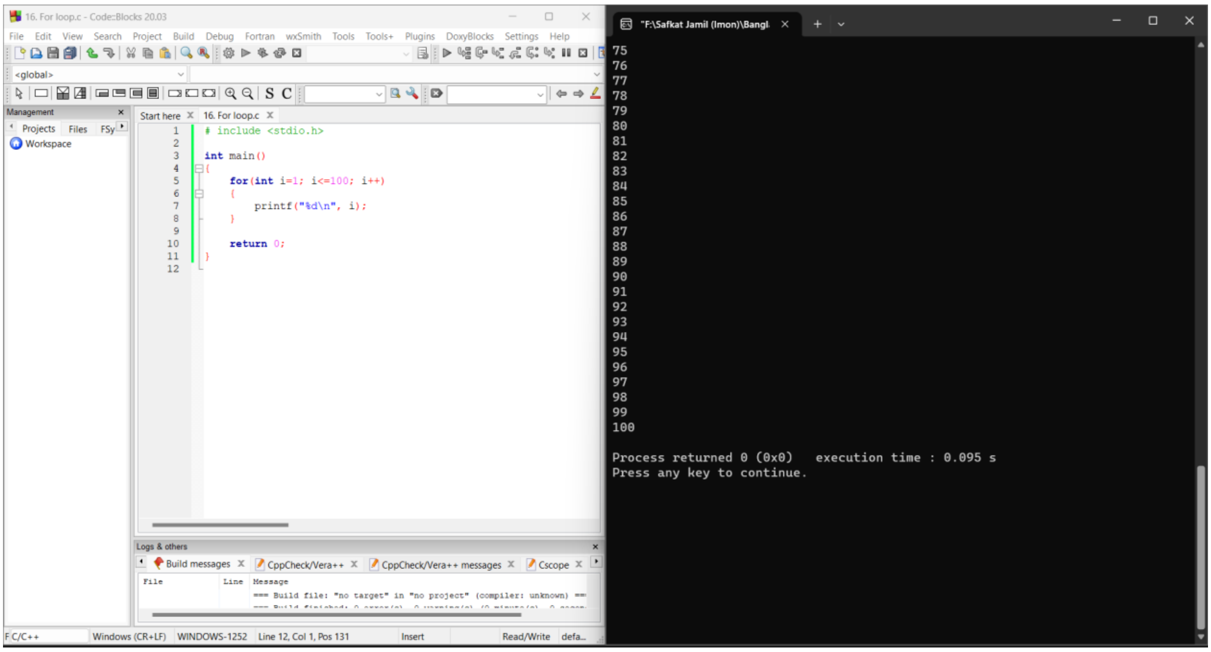
```
Enter characters of the days (s/m/t/w/T/f/S): f
Friday

Process returned 0 (0x0)   execution time : 12.475 s
Press any key to continue.
```

## 16. For loop

**Code**:

```
# include <stdio.h>

int main()
{
    for(int i=1; i<=100; i++)
    {
        printf("%d\n", i);
    }

    return 0;
}
```

**Screenshot**:



```
# include <stdio.h>

int main()
{
    for(int i=1; i<=100; i++)
    {
        printf("%d\n", i);
    }

    return 0;
}
```

```
File        Line  Message
                  === Build file: "no target" in "no project" (compiler: unknown) ===
                  === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 secon
```

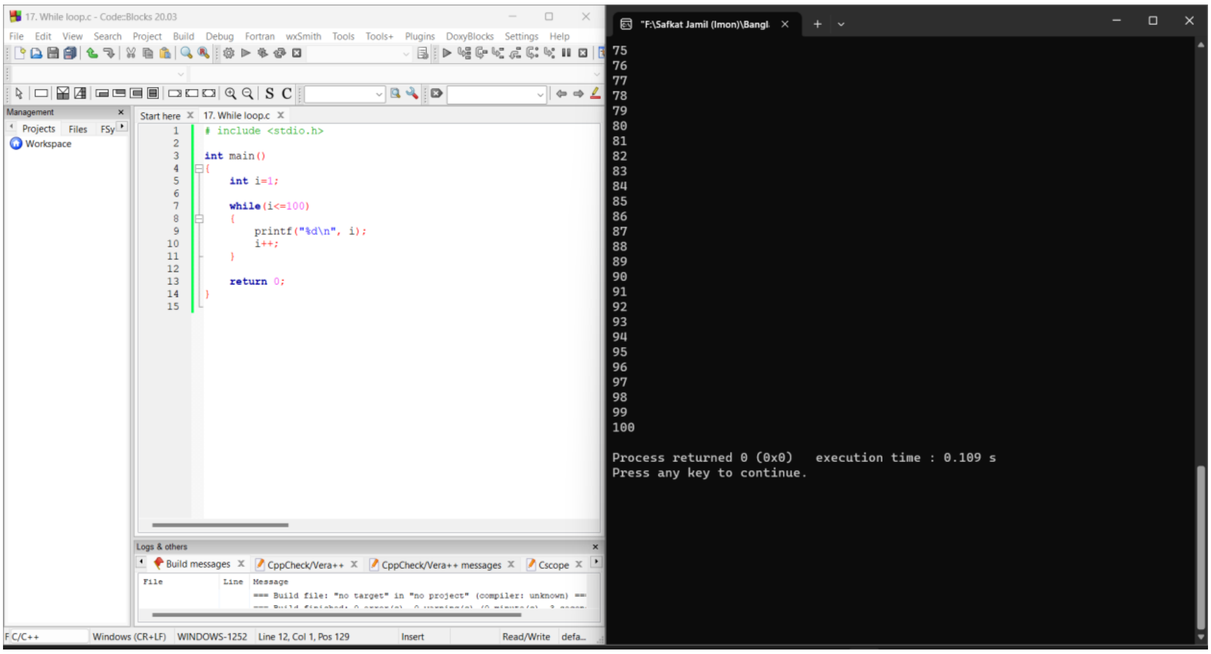
```
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

Process returned 0 (0x0)   execution time : 0.095 s
Press any key to continue.
```

## 17. While loop

**Code**:

```
# include <stdio.h>

int main()
{
        int i=1;
        while(i<=100)
        {
                printf("%d\n", i);
                i++;
        }

        return 0;
}
```

**Screenshot**:



```
# include <stdio.h>

int main()
{
    int i=1;

    while(i<=100)
    {
        printf("%d\n", i);
        i++;
    }

    return 0;
}
```

```
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

Process returned 0 (0x0)   execution time : 0.109 s
Press any key to continue.
```

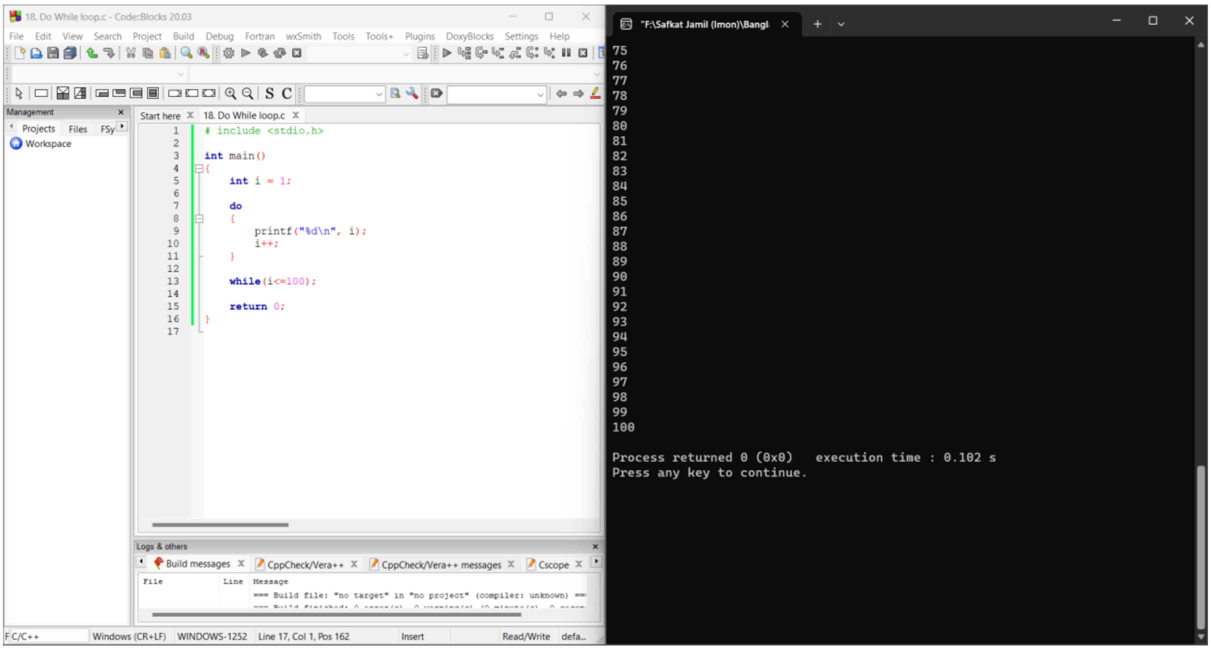
```
File            Line  Message
                      === Build file: "no target" in "no project" (compiler: unknown) ==
                      === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 3 secon
```

## 18. Do While Loop

**Code**:

```
# include <stdio.h>

int main()
{
    int i = 1;

    do
    {
        printf("%d\n", i);
        i++;
    }

    while(i<=100);

    return 0;
}
```

**Screenshot**:



```
# include <stdio.h>

int main()
{
    int i = 1;

    do
    {
        printf("%d\n", i);
        i++;
    }

    while(i<=100);

    return 0;
}
```

```
File          Line  Message
                    === Build file: "no target" in "no project" (compiler: unknown) ==
                    === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 secon
```

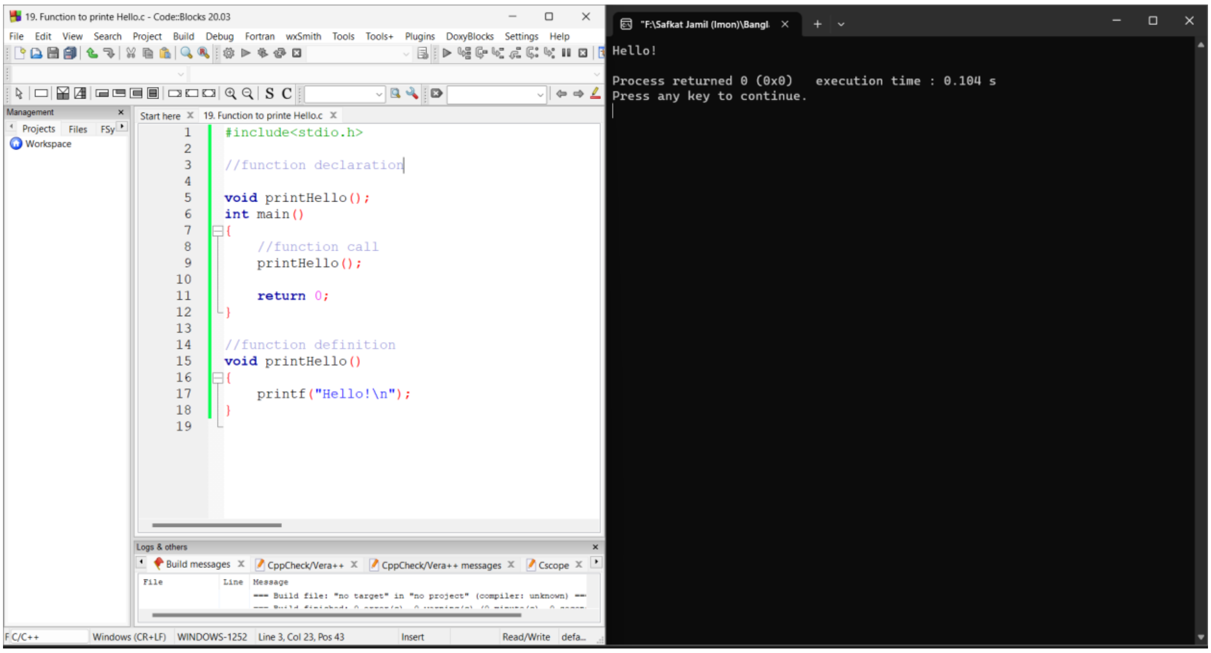
```
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

Process returned 0 (0x0)   execution time : 0.102 s
Press any key to continue.
```

**19. Function to print Hello**

**Code**:

```
#include<stdio.h>

//function declaration

void printHello();
int main()
{
    //function call
    printHello();

    return 0;
}

//function definition
void printHello()
{
    printf("Hello!\n");
}
```

**Screenshot**:



```
#include<stdio.h>

//function declaration

void printHello();
int main()
{
    //function call
    printHello();

    return 0;
}

//function definition
void printHello()
{
    printf("Hello!\n");
}
```

```
File         Line  Message
                   === Build file: "no target" in "no project" (compiler: unknown) ===
                   === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second
```

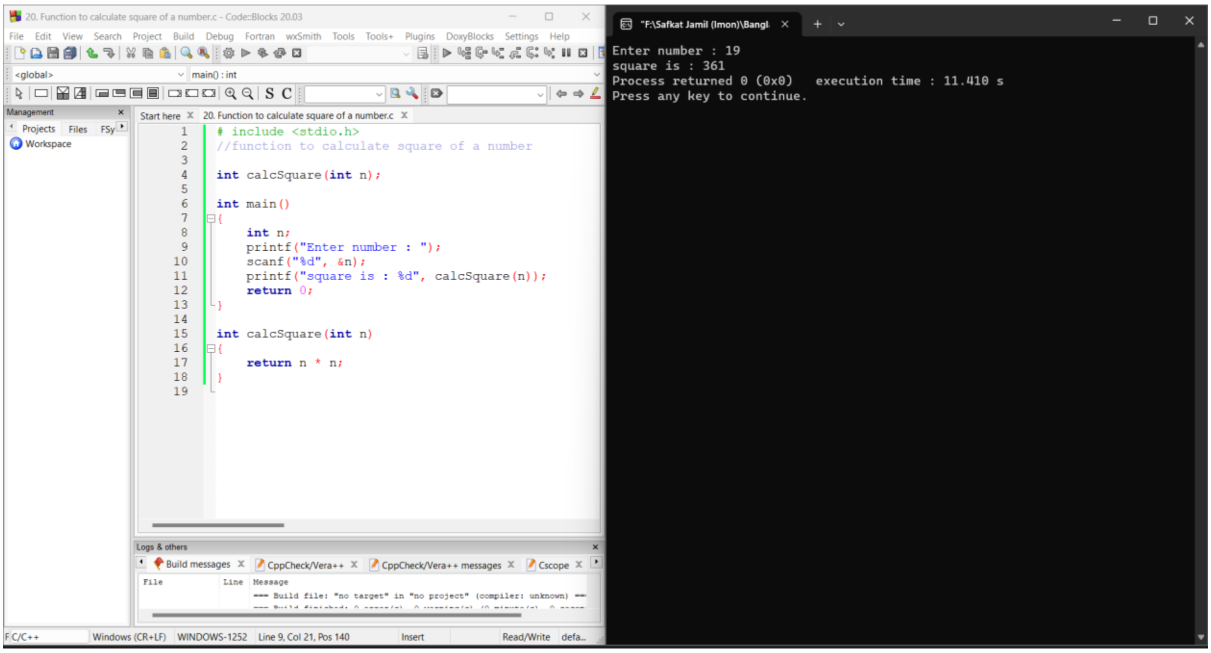
```
Hello!

Process returned 0 (0x0)   execution time : 0.104 s
Press any key to continue.
```

## 20. Function to calculate square of a number

**Code**:

```
# include <stdio.h>
//function to calculate square of a number

int calcSquare(int n);

int main()
{
    int n;
    printf("Enter number : ");
    scanf("%d", &n);
    printf("square is : %d", calcSquare(n));
    return 0;
}

int calcSquare(int n)
{
    return n * n;
}
```

**Screenshot**:



20. Function to calculate square of a number.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Management
Projects Files FSy
Workspace
Start here
20. Function to calculate square of a number.c
Logs & others
Build messages
CppCheck/Vera++
CppCheck/Vera++ messages
Cscope
F C/C++
Windows (CR+LF)
WINDOWS-1252
Line 9, Col 21, Pos 140
Insert
Read/Write
defa...
"F:\Safkat Jamil (Imon)\Bangl

```
# include <stdio.h>
//function to calculate square of a number

int calcSquare(int n);

int main()
{
    int n;
    printf("Enter number : ");
    scanf("%d", &n);
    printf("square is : %d", calcSquare(n));
    return 0;
}

int calcSquare(int n)
{
    return n * n;
}
```

```
File            Line  Message
                      === Build file: "no target" in "no project" (compiler: unknown) ==
```

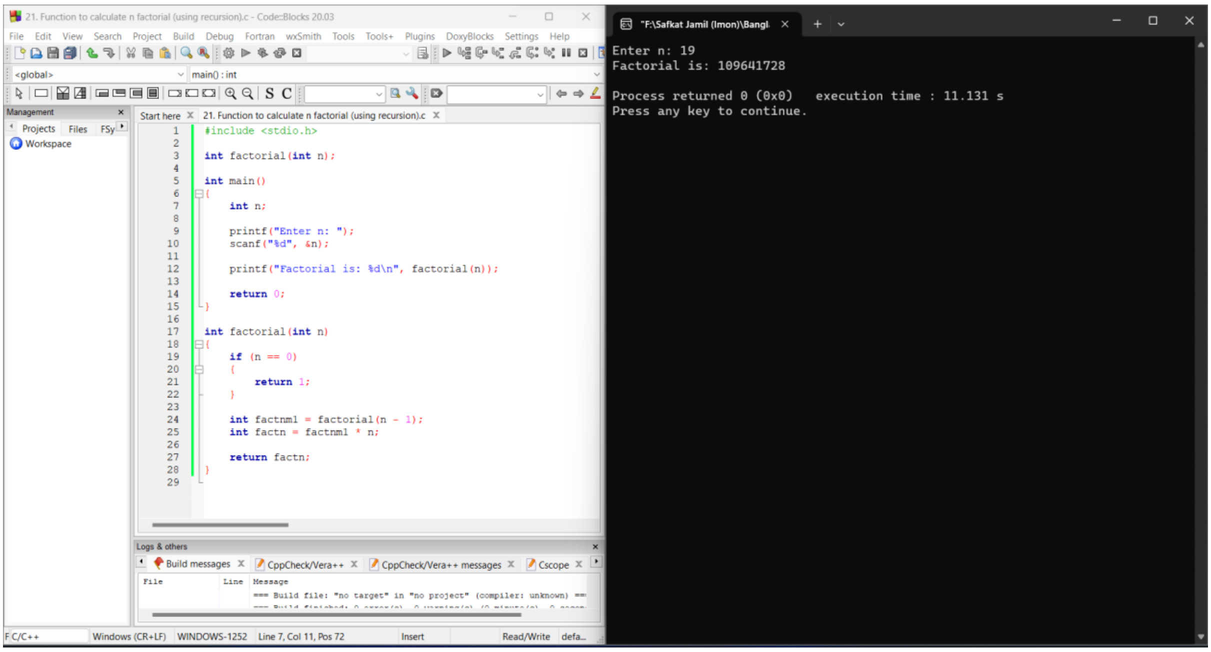
```
Enter number : 19
square is : 361
Process returned 0 (0x0)   execution time : 11.410 s
Press any key to continue.
```

## 21. Function to calculate n factorial (using recursion)

**Code**:

```
#include <stdio.h>

int factorial(int n);

int main()
{
    int n;

    printf("Enter n: ");
    scanf("%d", &n);

    printf("Factorial is: %d\n", factorial(n));

    return 0;
}

int factorial(int n)
{
    if (n == 0)
    {
        return 1;
    }

    int factnm1 = factorial(n - 1);
    int factn = factnm1 * n;

    return factn;
}
```

**Screenshot**:


21. Function to calculate n factorial (using recursion).c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Management
Projects Files FSy
Workspace
Start here
21. Function to calculate n factorial (using recursion).c
Logs & others
Build messages
CppCheck/Vera++
CppCheck/Vera++ messages
Cscope
F C/C++
Windows (CR+LF)
WINDOWS-1252
Line 7, Col 11, Pos 72
Insert
Read/Write
defa...
"F:\Safkat Jamil (Imon)\Bangl

```
#include <stdio.h>

int factorial(int n);

int main()
{
    int n;

    printf("Enter n: ");
    scanf("%d", &n);

    printf("Factorial is: %d\n", factorial(n));

    return 0;
}

int factorial(int n)
{
    if (n == 0)
    {
        return 1;
    }

    int factnml = factorial(n - 1);
    int factn = factnml * n;

    return factn;
}
```

```
File        Line  Message
                  === Build file: "no target" in "no project" (compiler: unknown) ===
```

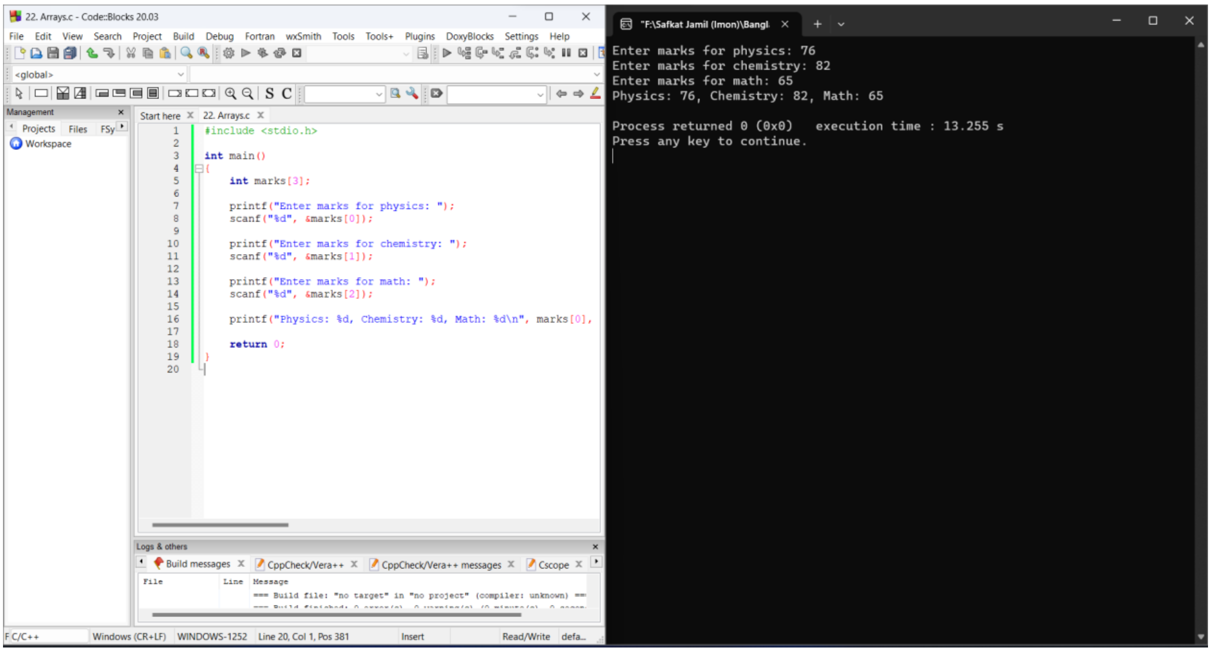
```
Enter n: 19
Factorial is: 109641728

Process returned 0 (0x0)   execution time : 11.131 s
Press any key to continue.
```

## 22. Arrays

**Code**:

```
#include <stdio.h>

int main()
{
    int marks[3];

    printf("Enter marks for physics: ");
    scanf("%d", &marks[0]);

    printf("Enter marks for chemistry: ");
    scanf("%d", &marks[1]);

    printf("Enter marks for math: ");
    scanf("%d", &marks[2]);

    printf("Physics: %d, Chemistry: %d, Math: %d\n", marks[0], marks[1], marks[2]);

    return 0;
}
```

**Screenshot**:



```
#include <stdio.h>

int main()
{
    int marks[3];

    printf("Enter marks for physics: ");
    scanf("%d", &marks[0]);

    printf("Enter marks for chemistry: ");
    scanf("%d", &marks[1]);

    printf("Enter marks for math: ");
    scanf("%d", &marks[2]);

    printf("Physics: %d, Chemistry: %d, Math: %d\n", marks[0],

    return 0;
}
```

```
File        Line   Message
                   === Build file: "no target" in "no project" (compiler: unknown) ==
```

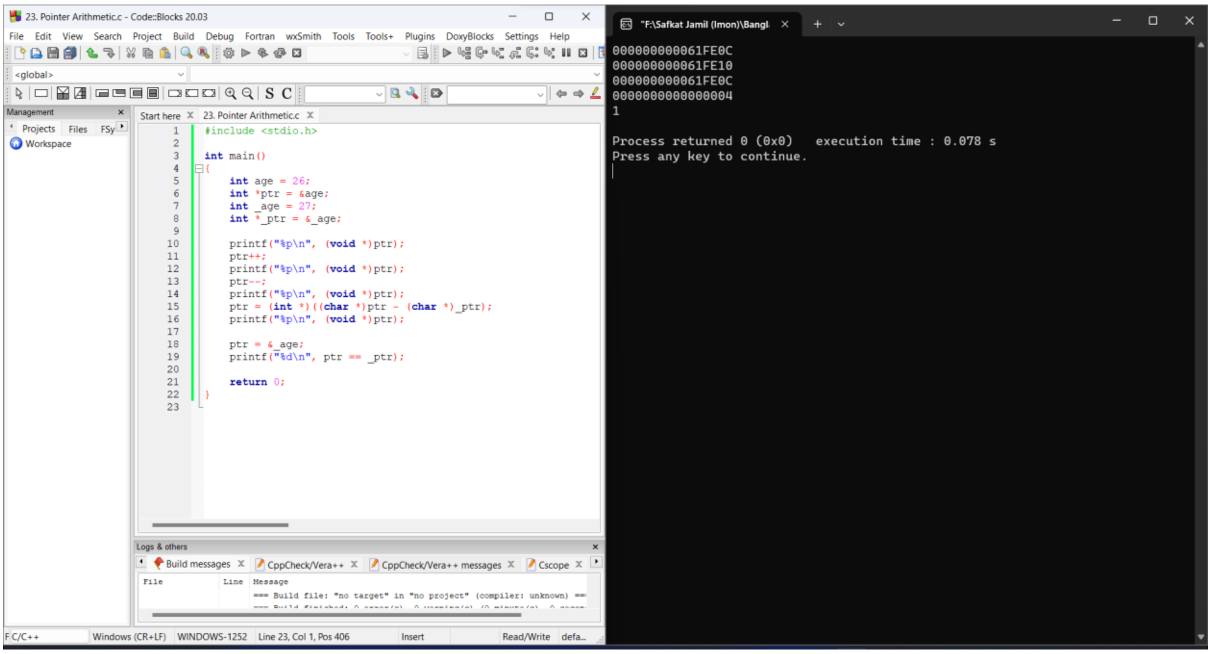
```
Enter marks for physics: 76
Enter marks for chemistry: 82
Enter marks for math: 65
Physics: 76, Chemistry: 82, Math: 65

Process returned 0 (0x0)   execution time : 13.255 s
Press any key to continue.
```

## 23. Pointer Arithmetic

**Code**:

```
#include <stdio.h>

int main()
{
    int age = 22;
    int *ptr = &age;
    int _age = 25;
    int *_ptr = &_age;

    printf("%p\n", (void *)ptr);
    ptr++;
    printf("%p\n", (void *)ptr);
    ptr--;
    printf("%p\n", (void *)ptr);
    ptr = (int *)((char *)ptr - (char *)_ptr);
    printf("%p\n", (void *)ptr);

    ptr = &_age;
    printf("%d\n", ptr == _ptr);

    return 0;
}
```

**Screenshot**:



```
#include <stdio.h>

int main()
{
    int age = 26;
    int *ptr = &age;
    int _age = 27;
    int *_ptr = &_age;

    printf("%p\n", (void *)ptr);
    ptr++;
    printf("%p\n", (void *)ptr);
    ptr--;
    printf("%p\n", (void *)ptr);
    ptr = (int *)((char *)ptr - (char *)_ptr);
    printf("%p\n", (void *)ptr);

    ptr = &_age;
    printf("%d\n", ptr == _ptr);

    return 0;
}
```

```
File          Line   Message
                     === Build file: "no target" in "no project" (compiler: unknown) ==
```

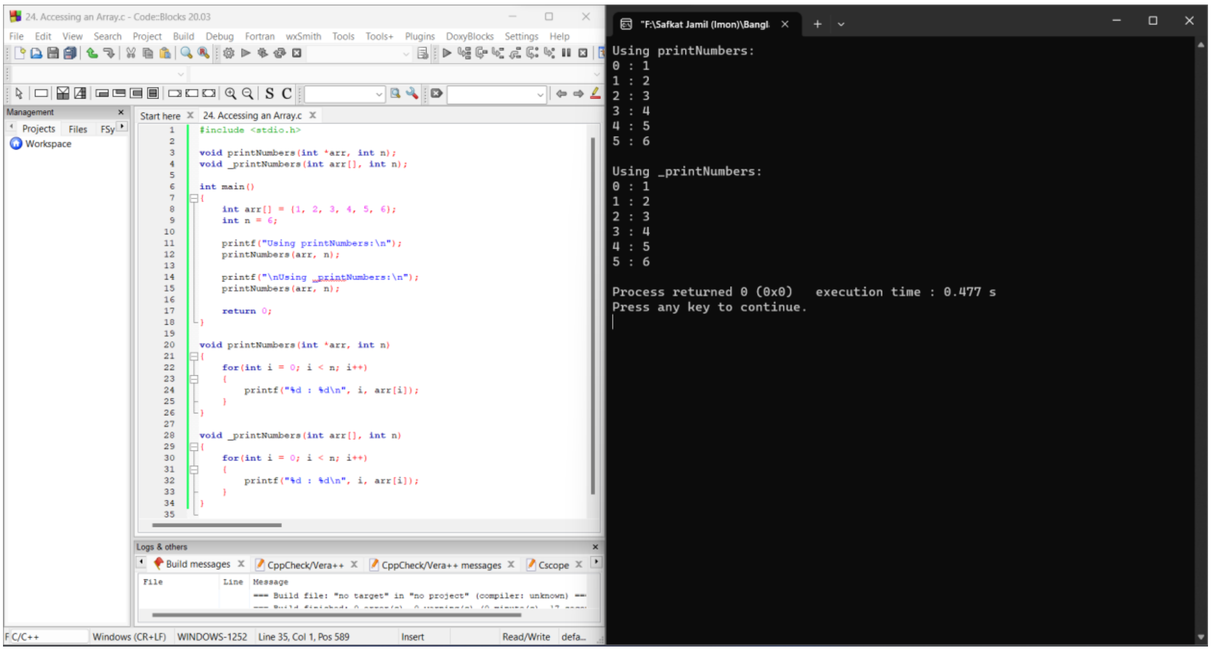
```
000000000061FE0C
000000000061FE10
000000000061FE0C
0000000000000004
1

Process returned 0 (0x0)   execution time : 0.078 s
Press any key to continue.
```

## 24. Accessing an Array

**Code**:

```
#include <stdio.h>

void printNumbers(int *arr, int n);
void _printNumbers(int arr[], int n);

int main()
{
    int arr[] = {1, 2, 3, 4, 5, 6};
    int n = 6;

    printf("Using printNumbers:\n");
    printNumbers(arr, n);

    printf("\nUsing _printNumbers:\n");
    printNumbers(arr, n);

    return 0;
}

void printNumbers(int *arr, int n)
{
    for(int i = 0; i < n; i++)
    {
        printf("%d : %d\n", i, arr[i]);
    }
}

void _printNumbers(int arr[], int n)
{
    for(int i = 0; i < n; i++)
    {
        printf("%d : %d\n", i, arr[i]);
    }
}
```

# Screenshot:



```c
#include <stdio.h>

void printNumbers(int *arr, int n);
void _printNumbers(int arr[], int n);

int main()
{
    int arr[] = {1, 2, 3, 4, 5, 6};
    int n = 6;

    printf("Using printNumbers:\n");
    printNumbers(arr, n);

    printf("\nUsing _printNumbers:\n");
    printNumbers(arr, n);

    return 0;
}

void printNumbers(int *arr, int n)
{
    for(int i = 0; i < n; i++)
    {
        printf("%d : %d\n", i, arr[i]);
    }
}

void _printNumbers(int arr[], int n)
{
    for(int i = 0; i < n; i++)
    {
        printf("%d : %d\n", i, arr[i]);
    }
}
```

```
File        Line  Message
                  === Build file: "no target" in "no project" (compiler: unknown) ==
```

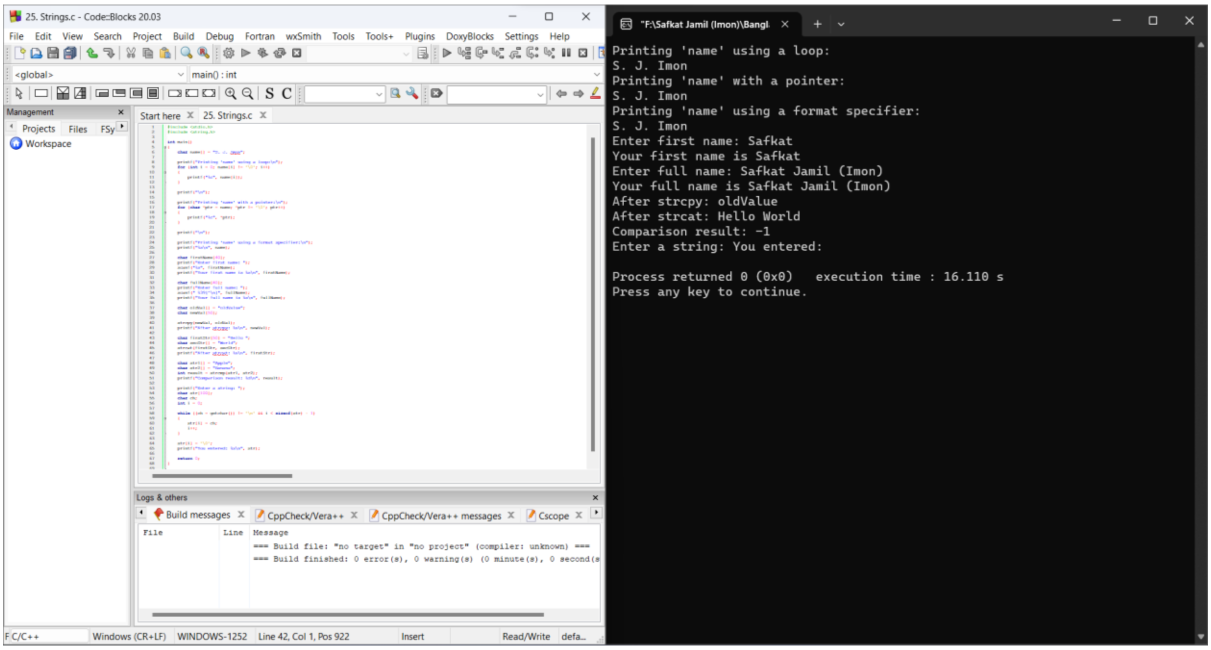
```
Using printNumbers:
0 : 1
1 : 2
2 : 3
3 : 4
4 : 5
5 : 6

Using _printNumbers:
0 : 1
1 : 2
2 : 3
3 : 4
4 : 5
5 : 6

Process returned 0 (0x0)   execution time : 0.477 s
Press any key to continue.
```

## 25. Strings

**Code**:

```
#include <stdio.h>
#include <string.h>

int main()
{
    char name[] = "S. J. Imon";

    printf("Printing 'name' using a loop:\n");
    for (int i = 0; name[i] != '\0'; i++)
    {
        printf("%c", name[i]);
    }

    printf("\n");

    printf("Printing 'name' with a pointer:\n");
    for (char *ptr = name; *ptr != '\0'; ptr++)
    {
        printf("%c", *ptr);
    }

    printf("\n");

    printf("Printing 'name' using a format specifier:\n");
    printf("%s\n", name);

    char firstName[40];
    printf("Enter first name: ");
    scanf("%s", firstName);
    printf("Your first name is %s\n", firstName);

    char fullName[40];
    printf("Enter full name: ");
    scanf(" %39[^\n]", fullName);
    printf("Your full name is %s\n", fullName);

    char oldVal[] = "oldValue";
    char newVal[50];

    strcpy(newVal, oldVal);
    printf("After strcpy: %s\n", newVal);

    char firstStr[50] = "Hello ";
    char secStr[] = "World";
    strcat(firstStr, secStr);
    printf("After strcat: %s\n", firstStr);
    char str1[] = "Apple";
    char str2[] = "Banana";
    int result = strcmp(str1, str2);
    printf("Comparison result: %d\n", result);

    printf("Enter a string: ");
    char str[100];
    char ch;
    int i = 0;

    while ((ch = getchar()) != '\n' && i < sizeof(str) - 1)
    {
        str[i] = ch;
        i++;
    }

    str[i] = '\0';
    printf("You entered: %s\n", str);

    return 0;
}
```

**Screenshot**:



```
File          Line   Message
                     === Build file: "no target" in "no project" (compiler: unknown) ===
                     === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s
```

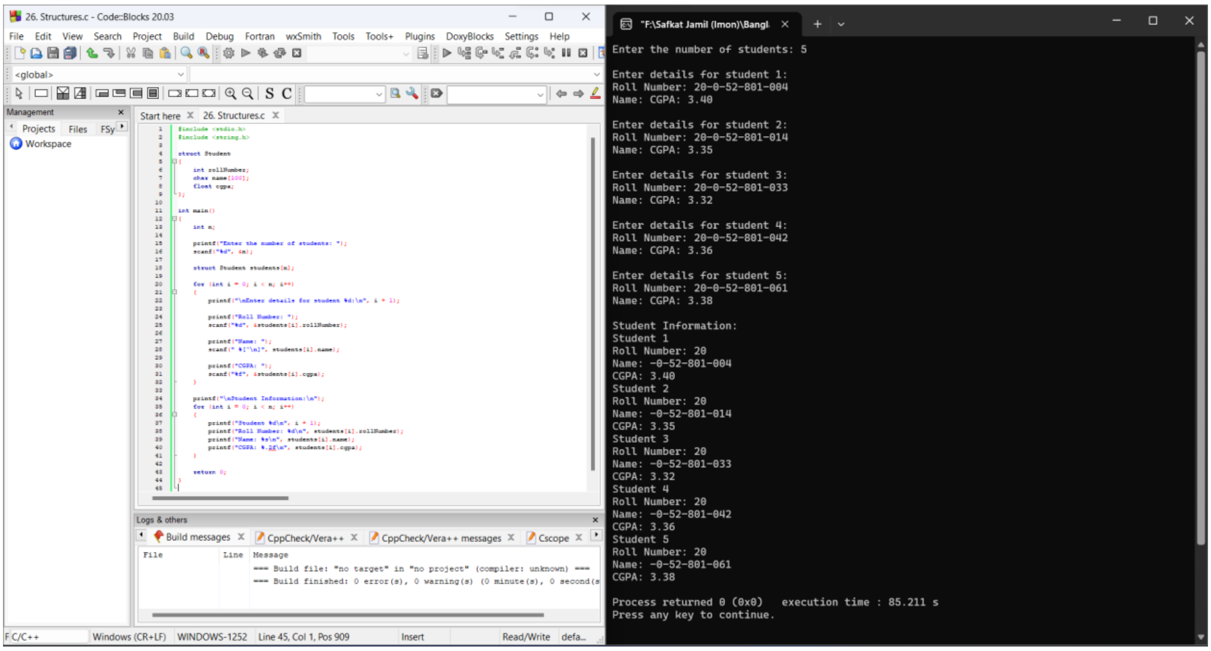
```
Printing 'name' using a loop:
S. J. Imon
Printing 'name' with a pointer:
S. J. Imon
Printing 'name' using a format specifier:
S. J. Imon
Enter first name: Safkat
Your first name is Safkat
Enter full name: Safkat Jamil (Imon)
Your full name is Safkat Jamil (Imon)
After strcpy: oldValue
After strcat: Hello World
Comparison result: -1
Enter a string: You entered:

Process returned 0 (0x0)   execution time : 16.110 s
Press any key to continue.
```

## 26. Structures

**Code**:

```
#include <stdio.h>
#include <string.h>

struct Student
{
   int rollNumber;
   char name[100];
   float cgpa;
};

int main()
{
   int n;

   printf("Enter the number of students: ");
   scanf("%d", &n);

   struct Student students[n];

   for (int i = 0; i < n; i++)
   {
      printf("\nEnter details for student %d:\n", i + 1);

      printf("Roll Number: ");
      scanf("%d", &students[i].rollNumber);

      printf("Name: ");
      scanf(" %[^\n]", students[i].name);

      printf("CGPA: ");
      scanf("%f", &students[i].cgpa);
   }

   printf("\nStudent Information:\n");
   for (int i = 0; i < n; i++)
   {
      printf("Student %d\n", i + 1);
      printf("Roll Number: %d\n", students[i].rollNumber);
      printf("Name: %s\n", students[i].name);
      printf("CGPA: %.2f\n", students[i].cgpa);
   }

   return 0;
}
```

# Screenshot:



```c
#include <stdio.h>
#include <string.h>

struct Student
{
    int rollNumber;
    char name[100];
    float cgpa;
};

int main()
{
    int n;

    printf("Enter the number of students: ");
    scanf("%d", &n);

    struct Student students[n];

    for (int i = 0; i < n; i++)
    {
        printf("\nEnter details for student %d:\n", i + 1);

        printf("Roll Number: ");
        scanf("%d", &students[i].rollNumber);

        printf("Name: ");
        scanf(" %[^\n]", students[i].name);

        printf("CGPA: ");
        scanf("%f", &students[i].cgpa);
    }

    printf("\nStudent Information:\n");
    for (int i = 0; i < n; i++)
    {
        printf("Student %d\n", i + 1);
        printf("Roll Number: %d\n", students[i].rollNumber);
        printf("Name: %s\n", students[i].name);
        printf("CGPA: %.2f\n", students[i].cgpa);
    }

    return 0;
}
```

```
File      Line  Message
                === Build file: "no target" in "no project" (compiler: unknown) ===
                === Build finished: 0 error(s), 0 warning(s) (0 minute(s), 0 second(s
```

26. Structures.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
Management
Projects Files FSy
Workspace
Start here
26. Structures.c
Logs & others
Build messages
CppCheck/Vera++
CppCheck/Vera++ messages
Cscope
F:C/C++ Windows (CR+LF) WINDOWS-1252 Line 45, Col 1, Pos 909 Insert Read/Write defa...
"F:\Safkat Jamil (Imon)\Bangl

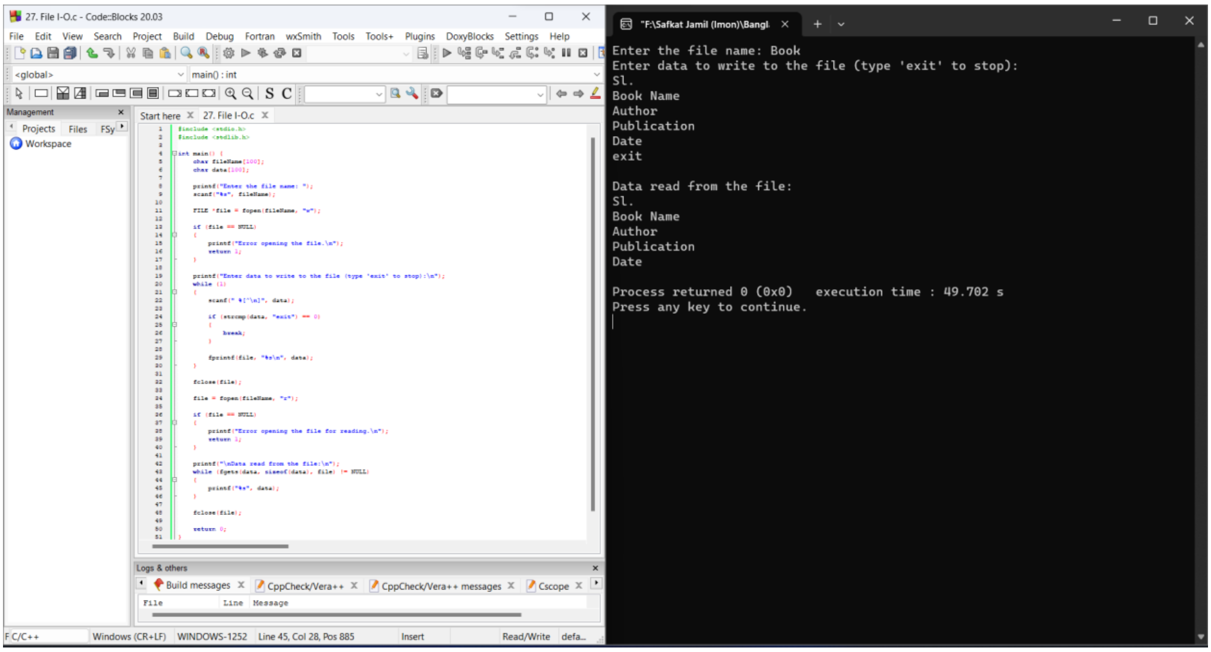
```
Enter the number of students: 5

Enter details for student 1:
Roll Number: 20-0-52-801-004
Name: CGPA: 3.40

Enter details for student 2:
Roll Number: 20-0-52-801-014
Name: CGPA: 3.35

Enter details for student 3:
Roll Number: 20-0-52-801-033
Name: CGPA: 3.32

Enter details for student 4:
Roll Number: 20-0-52-801-042
Name: CGPA: 3.36

Enter details for student 5:
Roll Number: 20-0-52-801-061
Name: CGPA: 3.38

Student Information:
Student 1
Roll Number: 20
Name: -0-52-801-004
CGPA: 3.40
Student 2
Roll Number: 20
Name: -0-52-801-014
CGPA: 3.35
Student 3
Roll Number: 20
Name: -0-52-801-033
CGPA: 3.32
Student 4
Roll Number: 20
Name: -0-52-801-042
CGPA: 3.36
Student 5
Roll Number: 20
Name: -0-52-801-061
CGPA: 3.38

Process returned 0 (0x0)   execution time : 85.211 s
Press any key to continue.
```

**27. File I/O**

**Code**:

```
#include <stdio.h>
#include <stdlib.h>

int main() {
    char fileName[100];
    char data[100];

    printf("Enter the file name: ");
    scanf("%s", fileName);

    FILE *file = fopen(fileName, "w");

    if (file == NULL)
    {
        printf("Error opening the file.\n");
        return 1;
    }

    printf("Enter data to write to the file (type 'exit' to stop):\n");
    while (1)
    {
        scanf(" %[^\n]", data);

        if (strcmp(data, "exit") == 0)
        {
            break;
        }

        fprintf(file, "%s\n", data);
    }

    fclose(file);

    file = fopen(fileName, "r");

    if (file == NULL)
    {
        printf("Error opening the file for reading.\n");
        return 1;
    }

    printf("\nData read from the file:\n");
    while (fgets(data, sizeof(data), file) != NULL)
    {
        printf("%s", data);
    }

    fclose(file);

    return 0;
}
```

# Screenshot:



```c
#include <stdio.h>
#include <stdlib.h>

int main() {
    char fileName[100];
    char data[100];

    printf("Enter the file name: ");
    scanf("%s", fileName);

    FILE *file = fopen(fileName, "w");

    if (file == NULL)
    {
        printf("Error opening the file.\n");
        return 1;
    }

    printf("Enter data to write to the file (type 'exit' to stop):\n");
    while (1)
    {
        scanf(" %[^\n]", data);

        if (strcmp(data, "exit") == 0)
        {
            break;
        }

        fprintf(file, "%s\n", data);
    }

    fclose(file);

    file = fopen(fileName, "r");

    if (file == NULL)
    {
        printf("Error opening the file for reading.\n");
        return 1;
    }

    printf("\nData read from the file:\n");
    while (fgets(data, sizeof(data), file) != NULL)
    {
        printf("%s", data);
    }

    fclose(file);

    return 0;
}
```

```
Enter the file name: Book
Enter data to write to the file (type 'exit' to stop):
Sl.
Book Name
Author
Publication
Date
exit

Data read from the file:
Sl.
Book Name
Author
Publication
Date

Process returned 0 (0x0)   execution time : 49.702 s
Press any key to continue.
```

27. File I-O.c - Code::Blocks 20.03
File Edit View Search Project Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help
<global>
main() : int
Management
Projects Files FSy
Workspace
Start here
27. File I-O.c
Logs & others
Build messages
CppCheck/Vera++
CppCheck/Vera++ messages
Cscope
File Line Message
F:C/C++ Windows (CR+LF) WINDOWS-1252 Line 45, Col 28, Pos 885 Insert Read/Write defa...
"F:\Safkat Jamil (Imon)\Bangl