

Assignment No: 1

CS-114 – Fundamental of Programming



NUST
NATIONAL UNIVERSITY
OF SCIENCES & TECHNOLOGY

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Section: 'C'

Submitted

to:

Muhamm

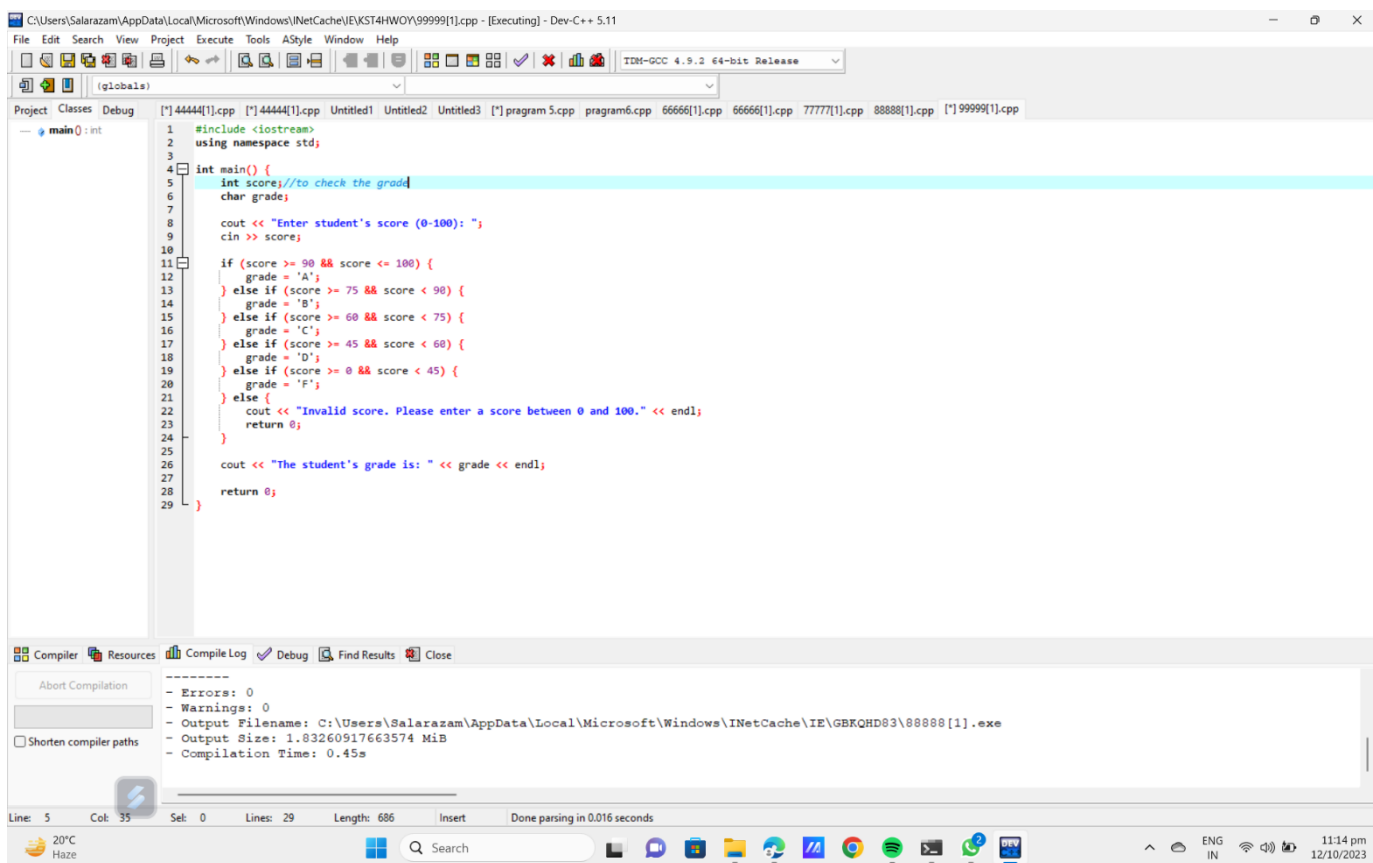
ad Affan

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Islamabad

Lab Task: 2

1. Write a program that determines if a person is eligible to vote based on their age (e.g., 18 years or older) using logical operators.



```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int score; // to check the grade
6     char grade;
7
8     cout << "Enter student's score (0-100): ";
9     cin >> score;
10
11     if (score >= 90 && score <= 100) {
12         grade = 'A';
13     } else if (score >= 75 && score < 90) {
14         grade = 'B';
15     } else if (score >= 60 && score < 75) {
16         grade = 'C';
17     } else if (score >= 45 && score < 60) {
18         grade = 'D';
19     } else if (score >= 0 && score < 45) {
20         grade = 'F';
21     } else {
22         cout << "Invalid score. Please enter a score between 0 and 100." << endl;
23         return 0;
24     }
25
26     cout << "The student's grade is: " << grade << endl;
27
28     return 0;
29 }
```

Compiler: g++ 4.9.2 64-bit Release

Compile Log:

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Salarazam\AppData\Local\Microsoft\Windows\INetCache\IE\GBEQHD83\88888[1].exe
- Output Size: 1.83260917663574 MiB
- Compilation Time: 0.45s

Line: 5 Col: 35 Sel: 0 Lines: 29 Length: 686 Insert Done parsing in 0.016 seconds

20°C Haze 11:14 pm 12/10/2023

```
C:\Users\Salarazam\AppData\Local\Microsoft\Windows\NetCache\E322WXV8X\66666[1].cpp - Dev-C++ 5.11
Enter score for exam 1: 40
Enter score for exam 2: 90
Enter score for exam 3: 100
The average score is: 76.6667
The average is above a passing grade.

-----
Process exited after 9.961 seconds with return value 0
Press any key to continue . . . |
```

2. Write a program that takes an integer as input and checks if it falls within the range [10, 50] using logical operators.

```
C:\Users\Salarazam\AppData\Local\Microsoft\Windows\NetCache\E322WXV8X\66666[1].cpp - Dev-C++ 5.11
File Edit Search View Project Execute Tools AStyle Window Help
TDM-GCC 4.9.2 64-bit Release
Project Classes Debug
main0: int
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int number;
6     //to check if it is between 20 and 50
7     cout << "Enter an integer: ";
8     cin >> number;
9
10    if (number >= 20 && number <= 50) {
11        cout << number << " is within the range [20, 50]." << endl;
12    } else {
13        cout << number << " is outside the range [20, 50]." << endl;
14    }
15
16    return 0;
17 }
```

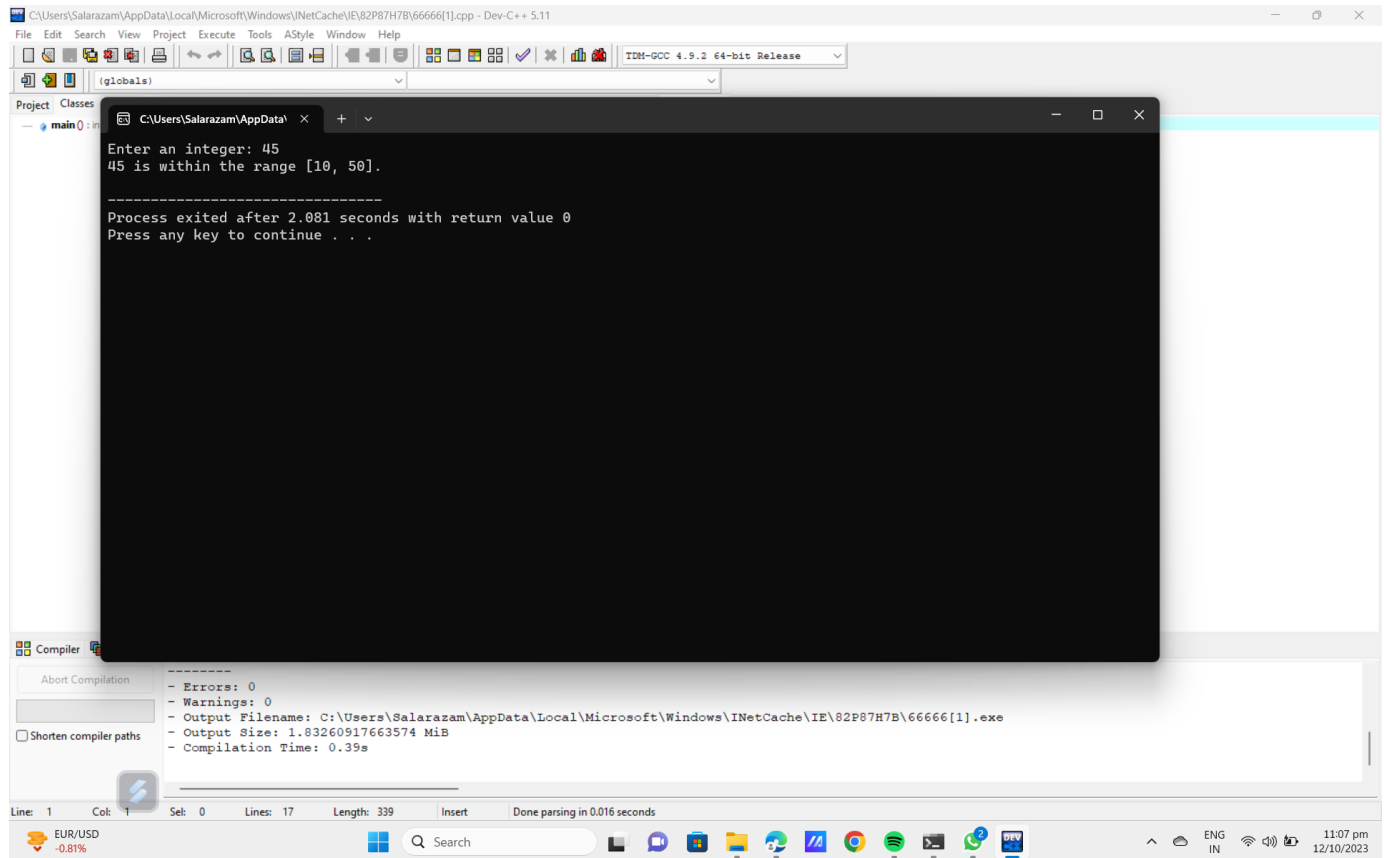
Compiler Resources Compile Log Debug Find Results Close

Abort Compilation

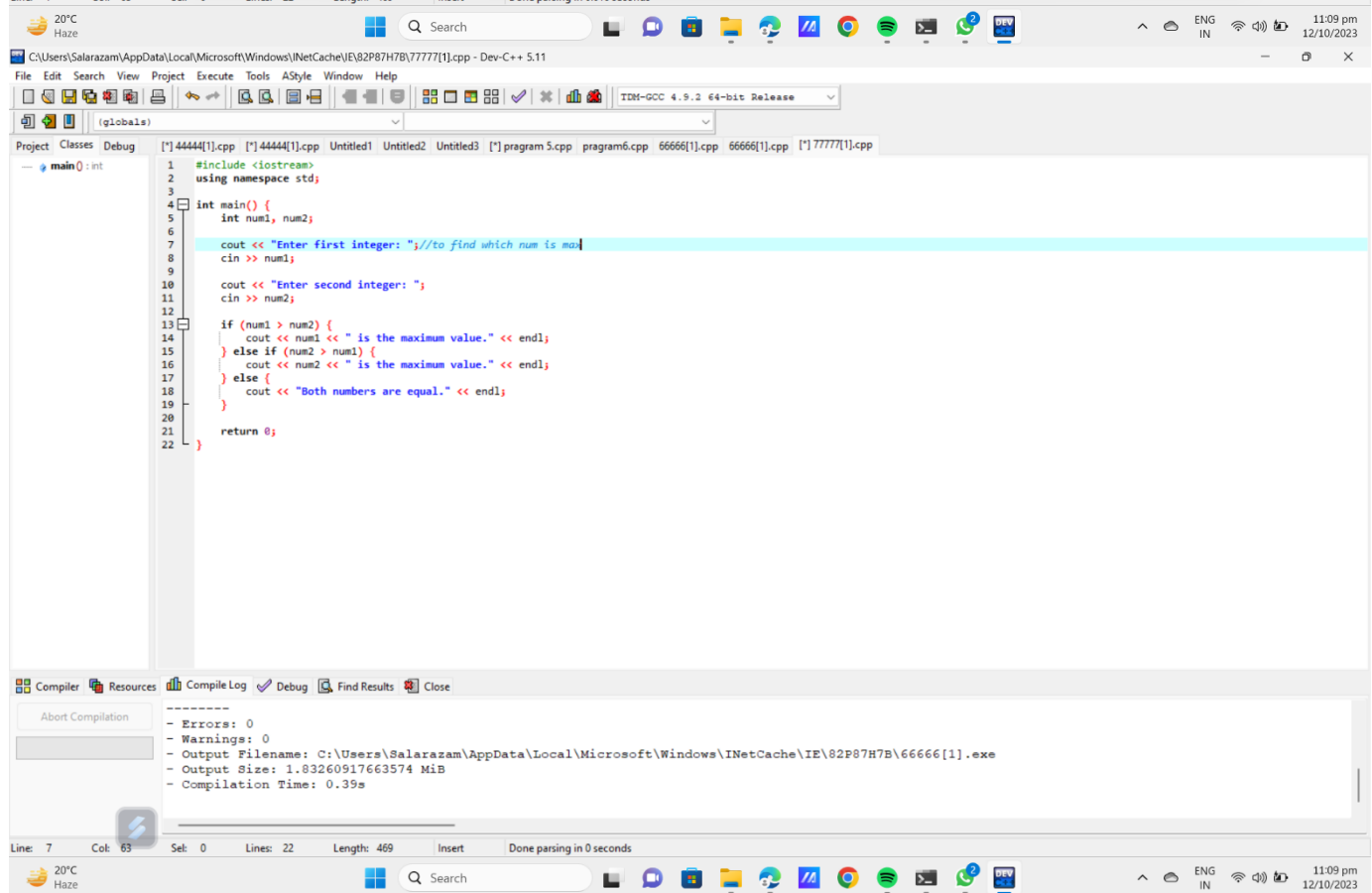
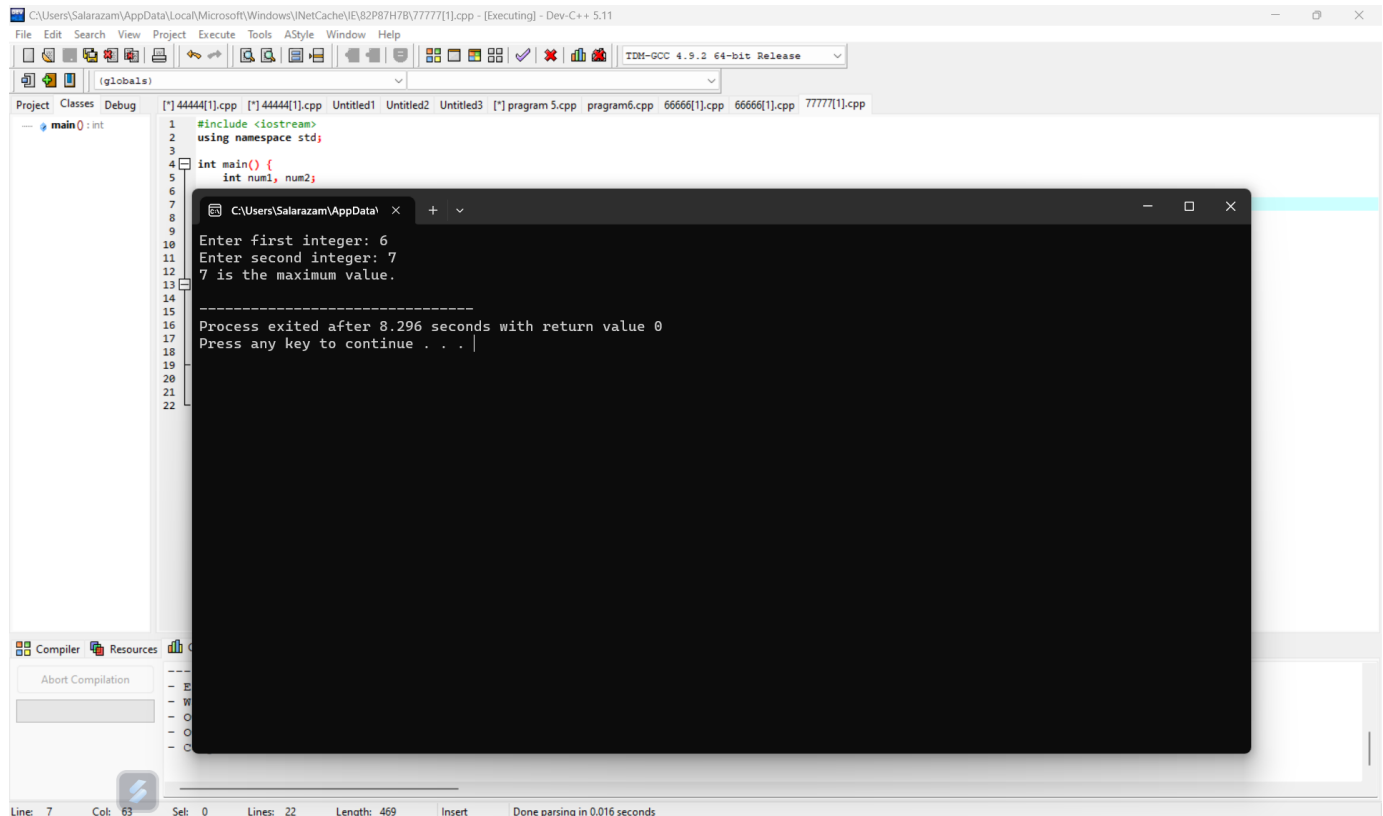
Shorten compiler paths

Errors: 0
Warnings: 0
Output Filename: C:\New folder\program 5.exe
Output Size: 1.83242321014404 MiB
Compilation Time: 0.42s

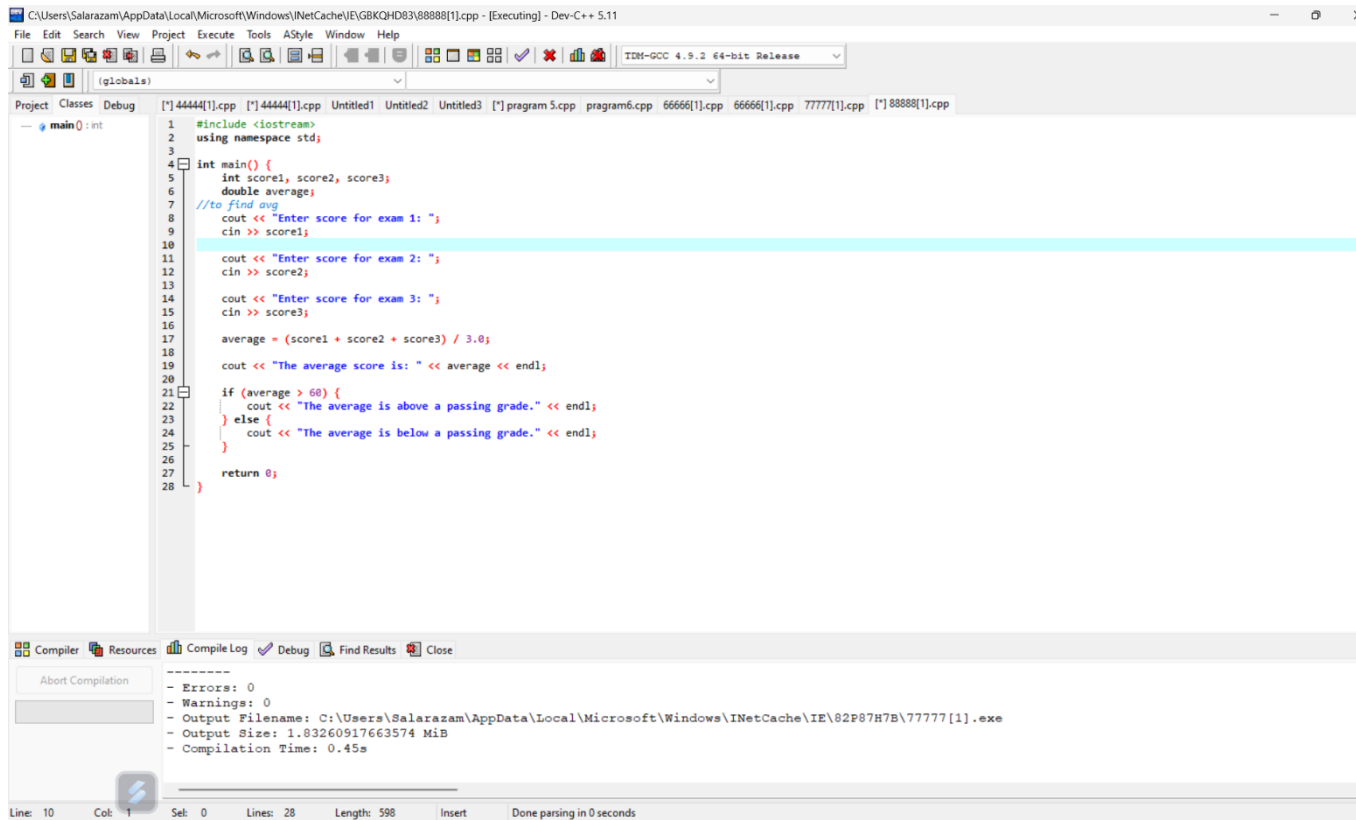
Line: 6 Col: 38 Sel: 0 Lines: 17 Length: 376 Insert Done parsing in 0 seconds



3. Write a C++ program to compare two integers and find the maximum value.



1. Write a C++ program to calculate the average of three exam scores and determine if it's above a passing grade (e.g., average ≥ 60).

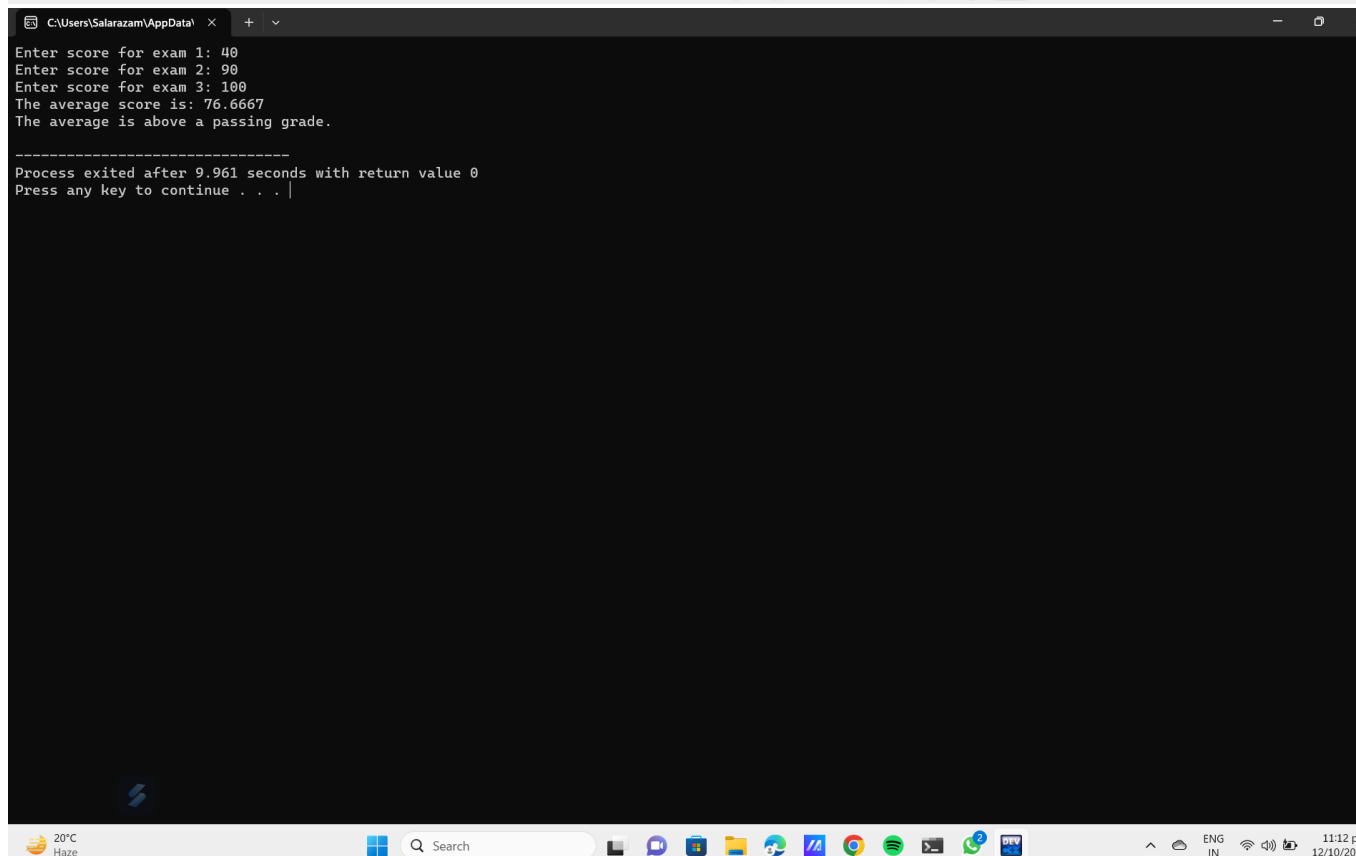


```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int score1, score2, score3;
6     double average;
7     //to find avg
8     cout << "Enter score for exam 1: ";
9     cin >> score1;
10
11     cout << "Enter score for exam 2: ";
12     cin >> score2;
13
14     cout << "Enter score for exam 3: ";
15     cin >> score3;
16
17     average = (score1 + score2 + score3) / 3.0;
18
19     cout << "The average score is: " << average << endl;
20
21     if (average > 60) {
22         cout << "The average is above a passing grade." << endl;
23     } else {
24         cout << "The average is below a passing grade." << endl;
25     }
26
27     return 0;
28 }
```

Compiler Output:

```
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Salarazam\AppData\Local\Microsoft\Windows\INetCache\IE\82P87H7B\77777[1].exe
- Output Size: 1.83260917663574 MiB
- Compilation Time: 0.45s
```

2.



```
Enter score for exam 1: 40
Enter score for exam 2: 90
Enter score for exam 3: 100
The average score is: 76.6667
The average is above a passing grade.

-----
Process exited after 9.961 seconds with return value 0
Press any key to continue . . . |
```

Home Task: 2

- 1) Create a program that takes a student's score as input and assigns a grade based on predefined criteria using logical operators (e.g., A, B, C, D, F).

A-Grade: 90-100 Marks, B-Grade: 75-90 Marks, C-Grade: 60-75 Marks, D-Grade: 45-60 Marks, F-Grade: 0-45 Marks

The screenshot displays a C++ program in the Dev-C++ IDE. The code defines a function `main()` that prompts the user to enter a score between 0 and 100. It then uses a series of `if-else` statements to assign a grade based on the score: A (90-100), B (75-90), C (60-75), D (45-60), and F (0-45). If the score is invalid, it displays an error message. The program also calculates the average of three scores and checks if it is above a passing grade.

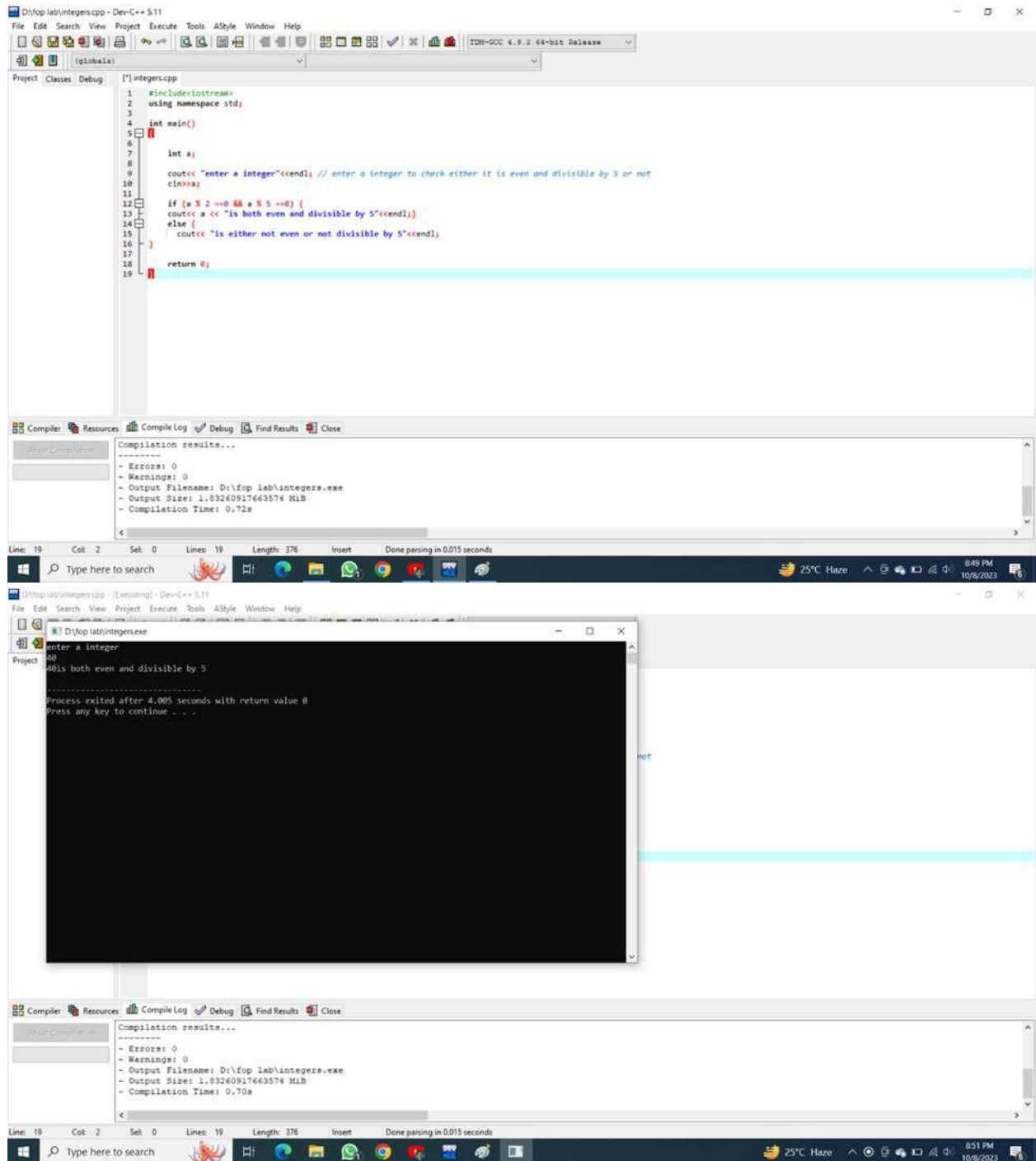
```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int score; // to check the grade
6     char grade;
7
8     cout << "Enter student's score (0-100): ";
9     cin >> score;
10
11     if (score >= 90 && score <= 100) {
12         grade = 'A';
13     } else if (score >= 75 && score < 90) {
14         grade = 'B';
15     } else if (score >= 60 && score < 75) {
16         grade = 'C';
17     } else if (score >= 45 && score < 60) {
18         grade = 'D';
19     } else if (score >= 0 && score < 45) {
20         grade = 'F';
21     } else {
22         cout << "Invalid score. Please enter a score between 0 and 100." << endl;
23         return 0;
24     }
25
26     cout << "The student's grade is: " << grade << endl;
27
28     return 0;
29 }
```

The output window shows the program's execution. It prompts the user to enter scores for three exams (40, 90, 100), calculates the average (76.6667), and determines that the average is above a passing grade. The process exits after 9.961 seconds with a return value of 0.

```
Enter score for exam 1: 40
Enter score for exam 2: 90
Enter score for exam 3: 100
The average score is: 76.6667
The average is above a passing grade.

-----
Process exited after 9.961 seconds with return value 0
Press any key to continue . . .
```

2)rite a program that takes an integer as input and determines if it is both even and divisible by 5



```
1 #include<iostream>
2 using namespace std;
3
4 int main()
5 {
6     int a;
7
8     cout<< "enter a integer<<endl; // enter a integer to check either it is even and divisible by 5 or not
9     cin>>a;
10
11     if (a % 2 == 0 && a % 5 == 0) {
12         cout<< a << " is both even and divisible by 5"<<endl;
13     }
14     else {
15         cout<< " is either not even or not divisible by 5"<<endl;
16     }
17
18     return 0;
19 }
```

Compilation results...

- Errors: 0
- Warnings: 0
- Output Filename: D:\fop lab\integers.exe
- Output Size: 1.03260917663574 MiB
- Compilation Time: 0.72s

Line: 19 Col: 2 Sel: 0 Lines: 19 Length: 376 Insert Done parsing in 0.015 seconds

Type here to search

25°C Haze 8:49 PM 10/6/2023

D:\fop lab\integers.exe

enter a integer

60

60 is both even and divisible by 5

Process exited after 4.005 seconds with return value 0

Press any key to continue . . .

not

Compilation results...

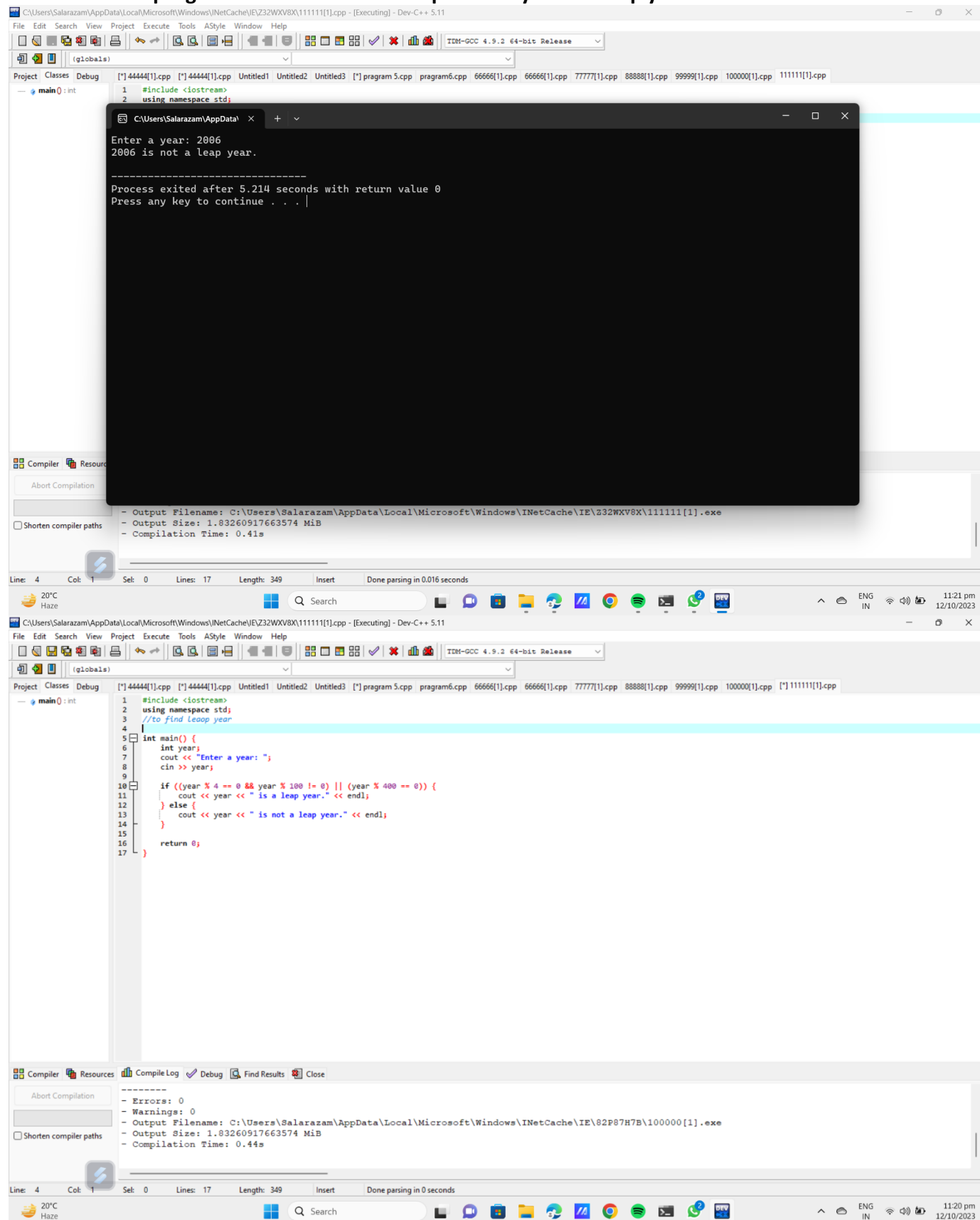
- Errors: 0
- Warnings: 0
- Output Filename: D:\fop lab\integers.exe
- Output Size: 1.03260917663574 MiB
- Compilation Time: 0.70s

Line: 19 Col: 2 Sel: 0 Lines: 19 Length: 376 Insert Done parsing in 0.015 seconds

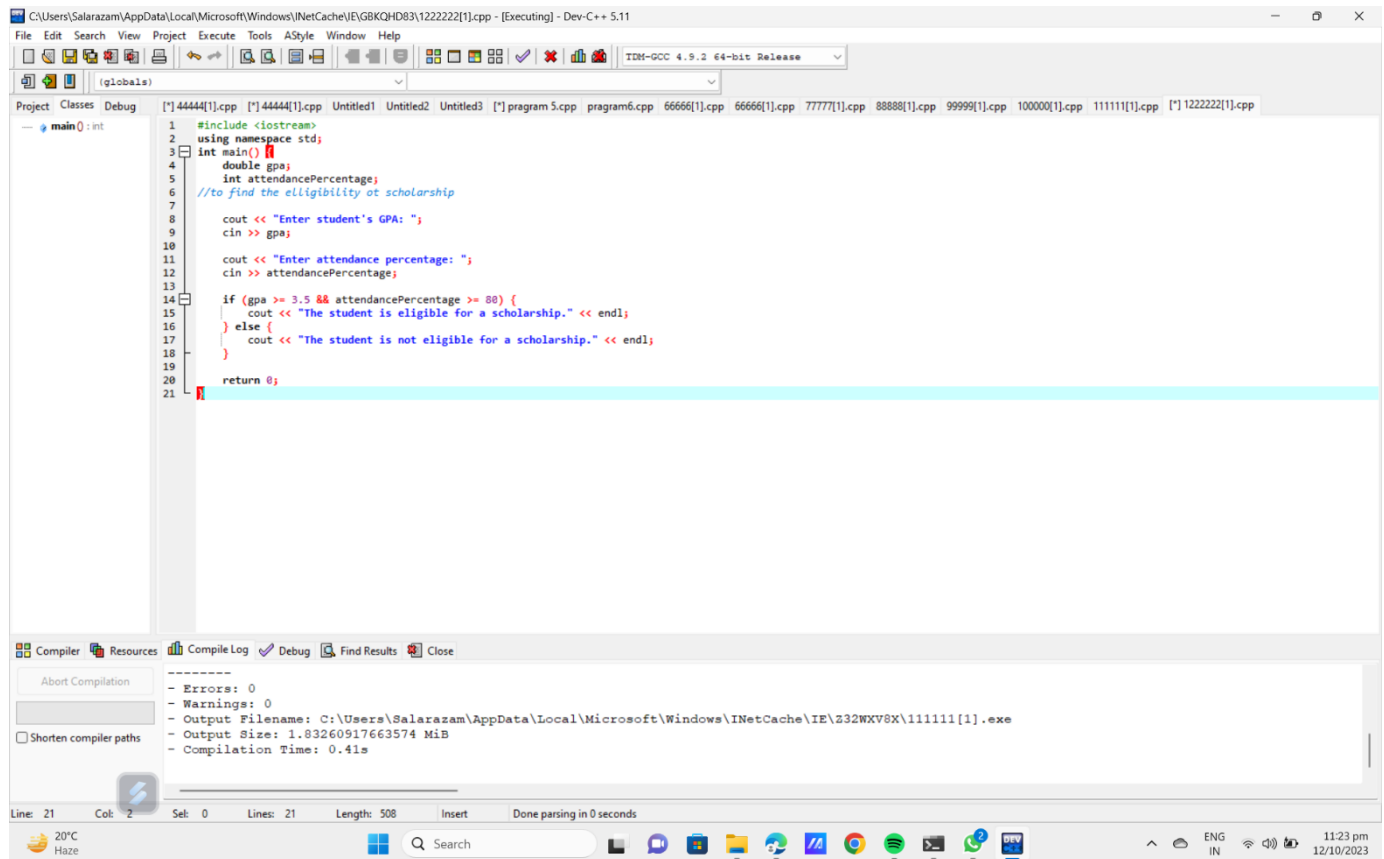
Type here to search

25°C Haze 8:51 PM 10/6/2023

3. Create a C++ program that checks if a user-provided year is a leap year.



4) Create a C++ program that determines if a student is eligible for a scholarship based on their GPA (must have GPA ≥ 3.5) and attendance (must have attended at least 80% of classes)

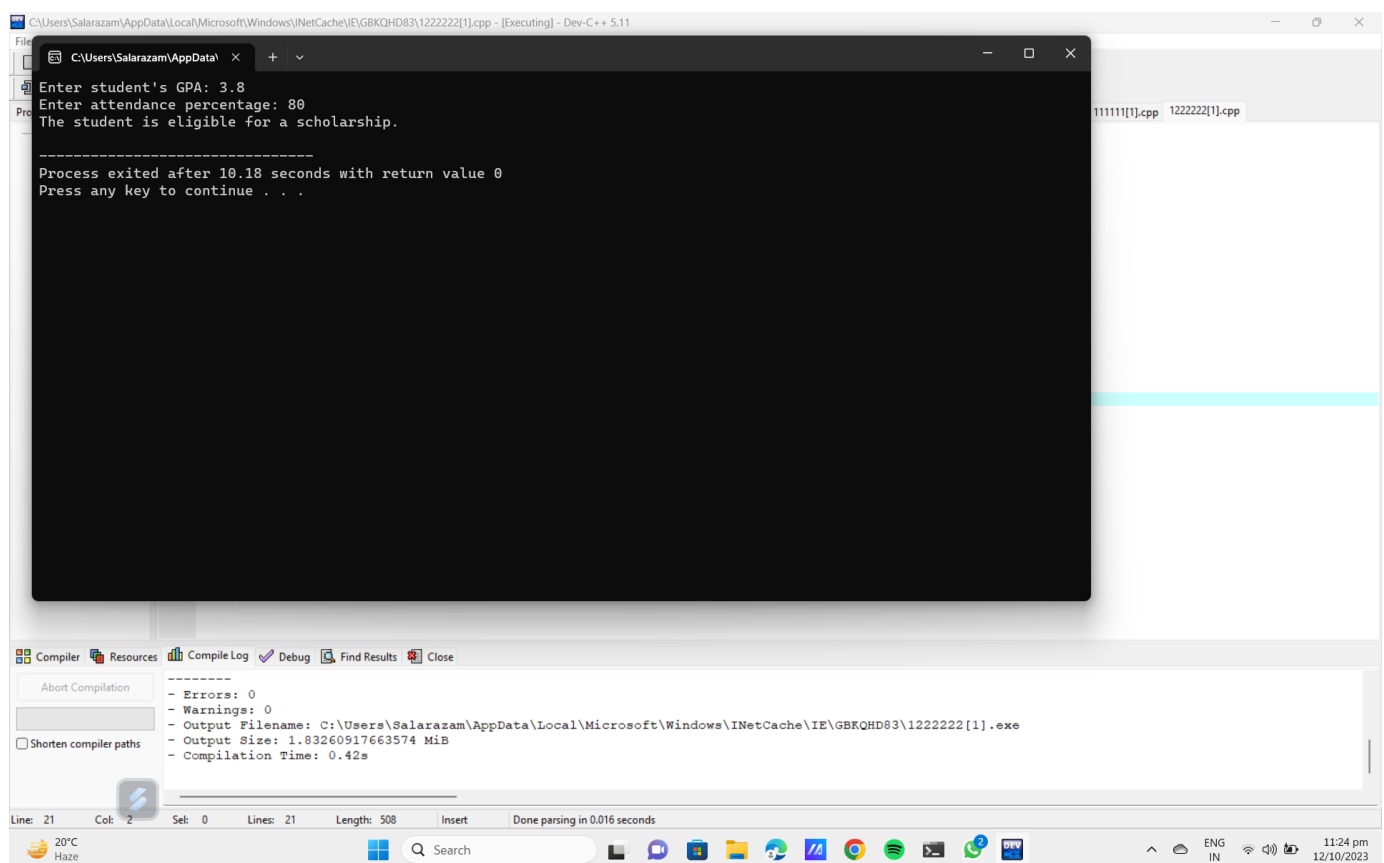


The screenshot shows the Dev-C++ IDE with a C++ program open. The program is designed to check if a student is eligible for a scholarship based on their GPA and attendance. The code is as follows:

```
1 #include <iostream>
2 using namespace std;
3 int main()
4 {
5     double gpa;
6     int attendancePercentage;
7     //to find the eligibility of scholarship
8     cout << "Enter student's GPA: ";
9     cin >> gpa;
10
11     cout << "Enter attendance percentage: ";
12     cin >> attendancePercentage;
13
14     if (gpa >= 3.5 && attendancePercentage >= 80) {
15         cout << "The student is eligible for a scholarship." << endl;
16     } else {
17         cout << "The student is not eligible for a scholarship." << endl;
18     }
19
20     return 0;
21 }
```

The compiler output window at the bottom shows the following details:

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Salarazam\AppData\Local\Microsoft\Windows\INetCache\IE\232WV8X\111111[1].exe
- Output Size: 1.83260917663574 MiB
- Compilation Time: 0.41s



The screenshot shows the Dev-C++ IDE with the program executed. The output window displays the following text:

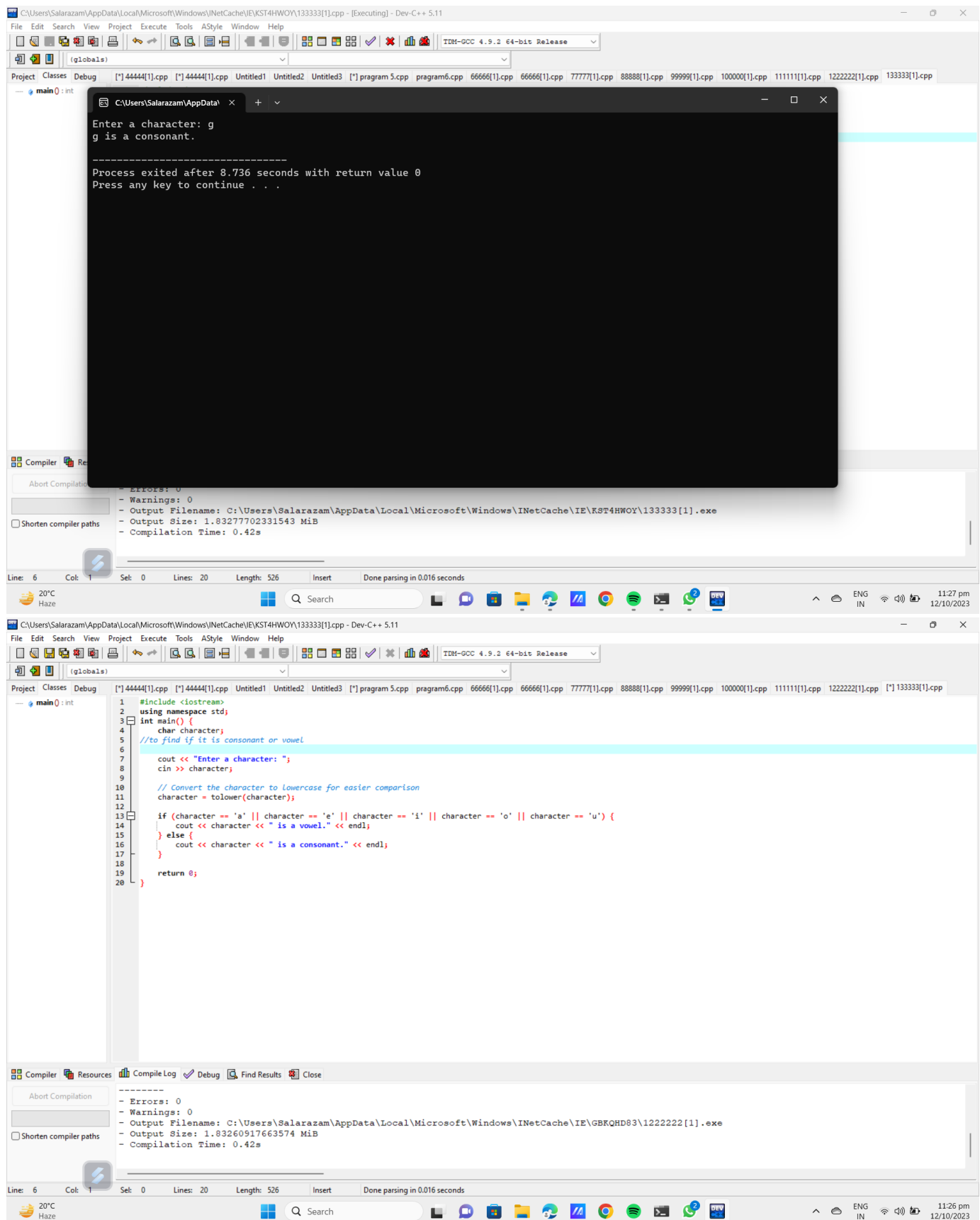
```
Enter student's GPA: 3.8
Enter attendance percentage: 80
The student is eligible for a scholarship.

Process exited after 10.18 seconds with return value 0
Press any key to continue . . .
```

The compiler output window at the bottom shows the following details:

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Salarazam\AppData\Local\Microsoft\Windows\INetCache\IE\GBKQHD83\1222222[1].exe
- Output Size: 1.83260917663574 MiB
- Compilation Time: 0.42s

3. Write a program that checks if a given character is a vowel (a, e, i, o, u) or a consonant using logical operators.



The screenshot displays a C++ IDE with a project named "133333[1].cpp". The code in the editor is as follows:

```
1 #include <iostream>
2 using namespace std;
3 int main() {
4     char character;
5     //to find if it is consonant or vowel
6
7     cout << "Enter a character: ";
8     cin >> character;
9
10    // Convert the character to lowercase for easier comparison
11    character = tolower(character);
12
13    if (character == 'a' || character == 'e' || character == 'i' || character == 'o' || character == 'u') {
14        cout << character << " is a vowel." << endl;
15    } else {
16        cout << character << " is a consonant." << endl;
17    }
18
19    return 0;
20 }
```

The IDE shows the program has been compiled successfully with no errors or warnings. The output window displays the following text:

```
Enter a character: g
g is a consonant.

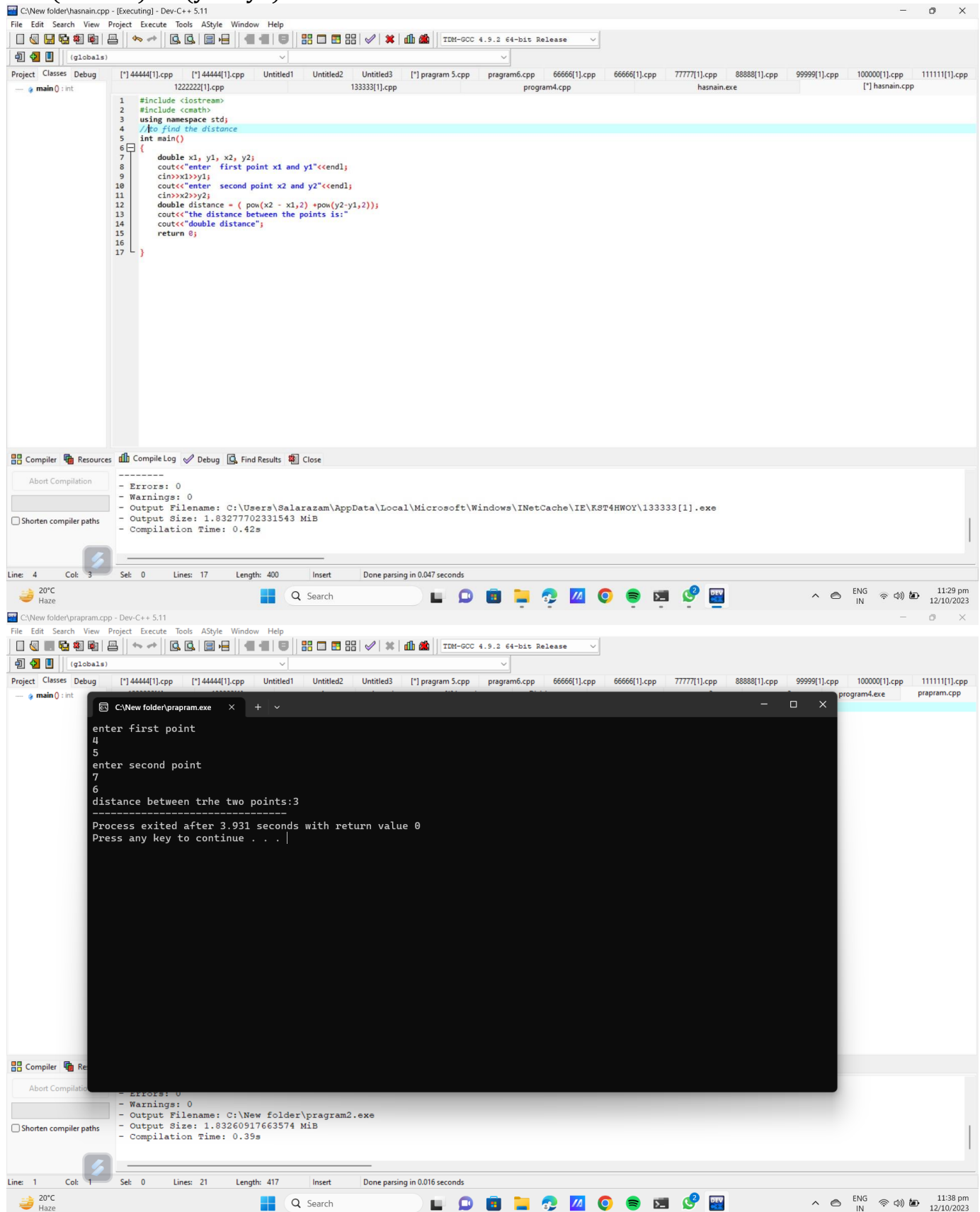
Process exited after 8.736 seconds with return value 0
Press any key to continue . . .
```

The status bar at the bottom indicates the file is "133333[1].cpp" and the compilation time was 0.42s.

Home Task 1

1) Write a C++ program to calculate distance between two points. The values of coordinates should be input by user.

$$d = (x_2 - x_1)^2 + (y_2 - y_1)^2$$



```
#include <iostream>
#include <cmath>
using namespace std;
//to find the distance
int main()
{
    double x1, y1, x2, y2;
    cout<<"enter first point x1 and y1"<<endl;
    cin>>x1>>y1;
    cout<<"enter second point x2 and y2"<<endl;
    cin>>x2>>y2;
    double distance = ( pow(x2 - x1,2) + pow(y2-y1,2));
    cout<<"the distance between the points is:"<<endl;
    cout<<"double distance";
    return 0;
}
```

Compiler Output:

```
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Salarazam\AppData\Local\Microsoft\Windows\INetCache\IE\KST4HW0X\133333[1].exe
- Output Size: 1.83277702331543 MiB
- Compilation Time: 0.42s
```

Program Execution:

```
enter first point
4
5
enter second point
7
6
distance between the two points:3
Process exited after 3.931 seconds with return value 0
Press any key to continue . . .
```

Second Compiler Output:

```
- Errors: 0
- Warnings: 0
- Output Filename: C:\New folder\program2.exe
- Output Size: 1.83260917663574 MiB
- Compilation Time: 0.39s
```

Write a code in C + to take length from user in centimeter and convert it into meter and kilometer

The image shows a C++ IDE with the following code in `program2.cpp`:

```
1
2
3 #include<iostream>
4 using namespace std;
5 int main()
6 {
7     //program to convert cm into meters
8     //and kilo meters
9
10
11     float cm,m,km;
12     cout<<"enter length in centimeter:";//given length
13     cin>>cm;
14     m = cm/100;
15     km = cm/1000;
16     cout<<"length in meter: "<<m;
17     cout<<"length in kilo meter: "<<km;
18     cout<<endl;
19     return 0;
20 }
```

The compiler output shows the program was compiled successfully with no errors or warnings. The output file is `C:\Users\Salarazam\AppData\Local\Microsoft\Windows\INetCache\IE\KST4HWOY\133333[1].exe`.

The terminal window shows the program's execution:

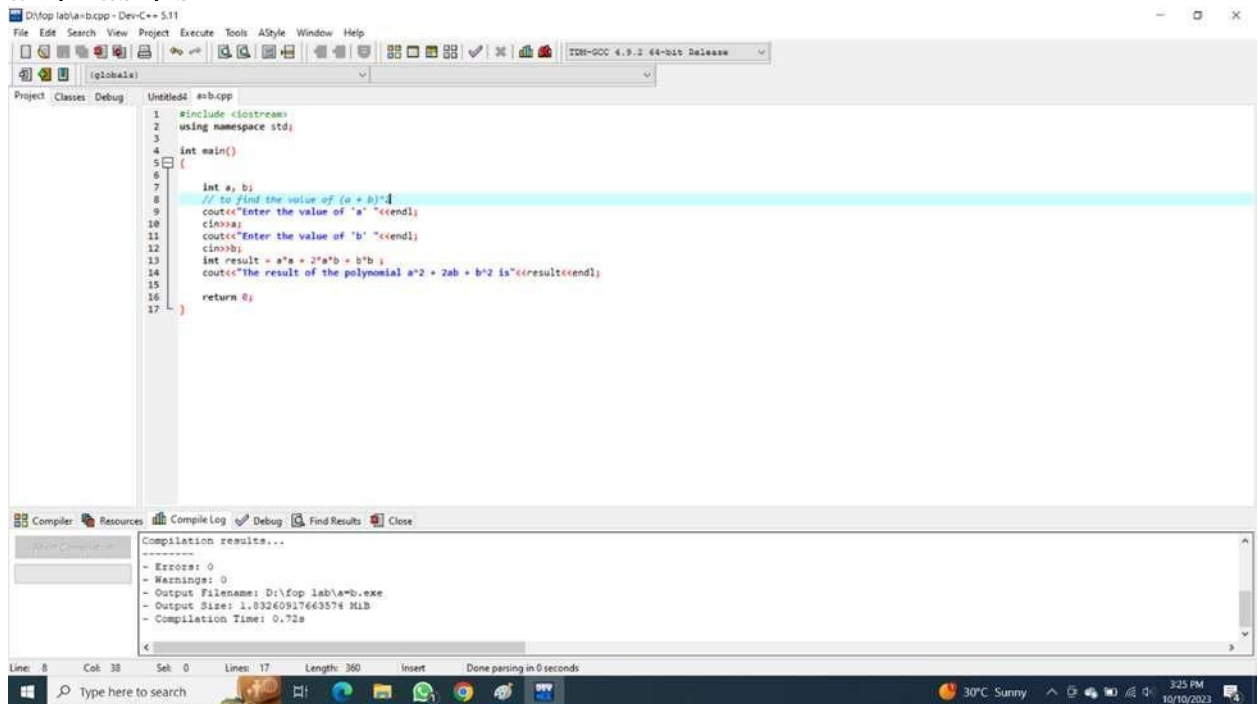
```
C:\New folder\program2.exe
enter length in centimeter:10000
length in meter: 100length in kilo meter: 1

Process exited after 3.74 seconds with return value 0
Press any key to continue . . .
```

The compiler output for the execution shows the program was compiled successfully with no errors or warnings. The output file is `C:\New folder\program2.exe`.

1) Write a code in C++ that takes values of a and b from the user and displays result of polynomial

$$a^2 + 2ab + b^2$$

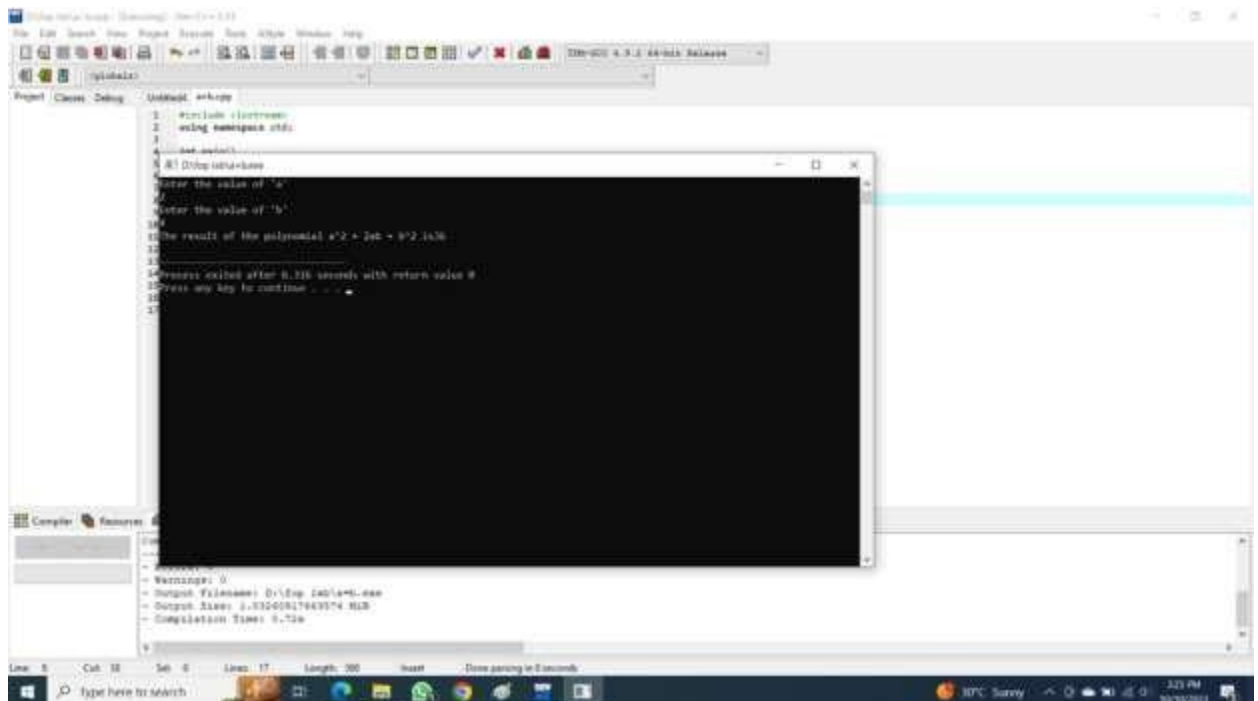


The screenshot shows a C++ IDE with the following code in a file named `lab1a-b.cpp`:

```
1 #include <iostream>
2 using namespace std;
3
4 int main()
5 {
6     int a, b;
7     // to find the value of (a + b)^2
8     cout << "Enter the value of 'a' " << endl;
9     cin >> a;
10    cout << "Enter the value of 'b' " << endl;
11    cin >> b;
12    int result = a*a + 2*a*b + b*b;
13    cout << "The result of the polynomial a^2 + 2ab + b^2 is " << result << endl;
14
15    return 0;
16 }
```

The bottom panel shows the compilation results:

```
-----
- Errors: 0
- Warnings: 0
- Output Filename: D:\fop lab1a-b.exe
- Output Size: 1,032,091,766,3574 KiB
- Compilation Time: 0.72s
```



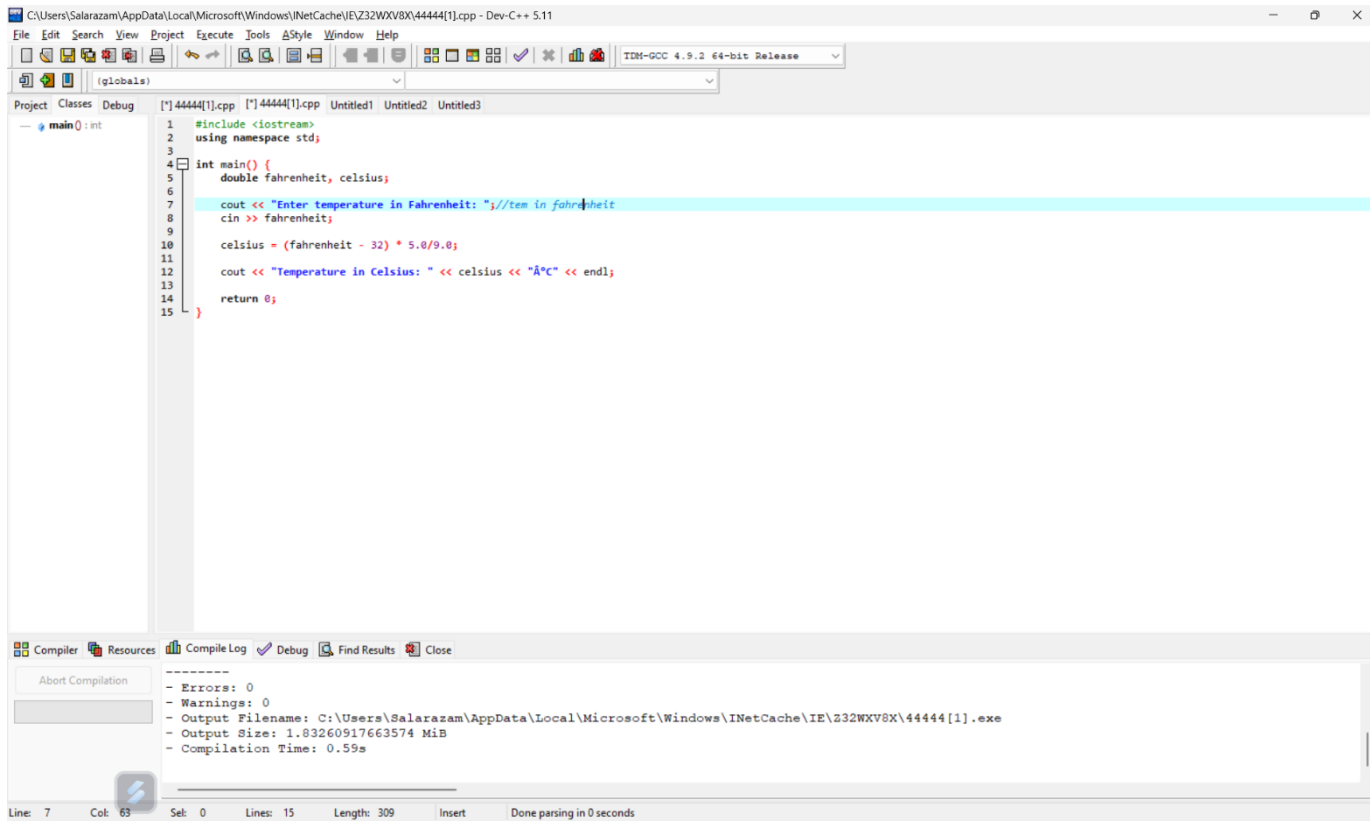
The screenshot shows the same C++ IDE with the program's execution output displayed in a console window. The output is as follows:

```
Enter the value of 'a'
Enter the value of 'b'
The result of the polynomial a^2 + 2ab + b^2 is 36
Press any key to continue . . .
```

The bottom panel shows the compilation results, which are identical to the first screenshot:

```
-----
- Warnings: 0
- Output Filename: D:\fop lab1a-b.exe
- Output Size: 1,032,091,766,3574 KiB
- Compilation Time: 0.72s
```

1) Write a program in C++ to convert temperature in Fahrenheit to Celsius.



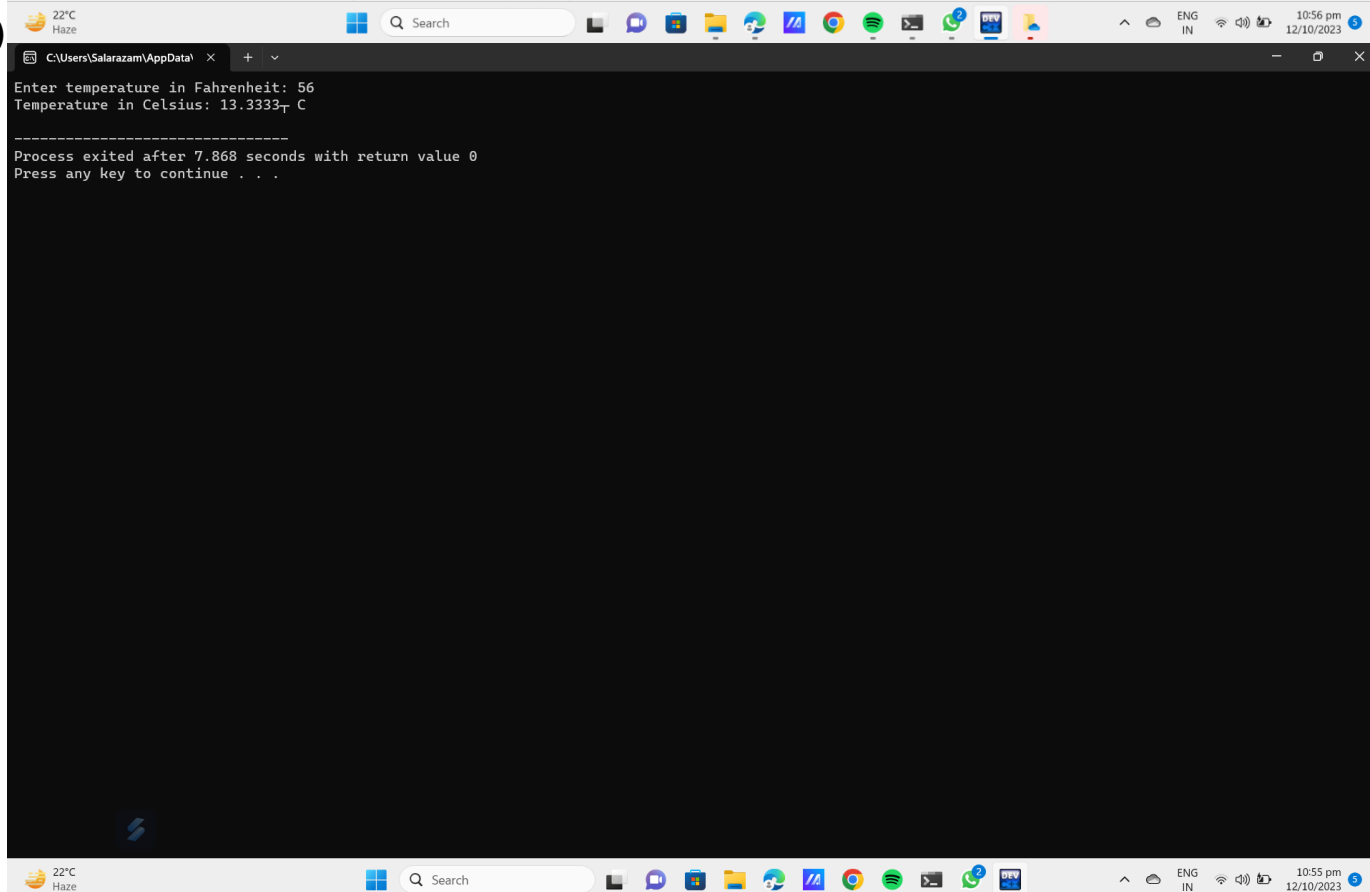
The screenshot shows a C++ IDE with the following code in the main function:

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     double fahrenheit, celsius;
6
7     cout << "Enter temperature in Fahrenheit: "; //tem in fahrenheit
8     cin >> fahrenheit;
9
10    celsius = (fahrenheit - 32) * 5.0/9.0;
11
12    cout << "Temperature in Celsius: " << celsius << "°C" << endl;
13
14    return 0;
15 }
```

The compiler output at the bottom shows:

```
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Salarazam\AppData\Local\Microsoft\Windows\INetCache\IE\232WXV8X\44444[1].exe
- Output Size: 1.83260917663574 MiB
- Compilation Time: 0.59s
```

2)



The screenshot shows a terminal window with the following output:

```
Enter temperature in Fahrenheit: 56
Temperature in Celsius: 13.3333 C

-----
Process exited after 7.868 seconds with return value 0
Press any key to continue . . .
```

