FUNDAMENTAL OF PROGRAMMING

LAB REPORT 1

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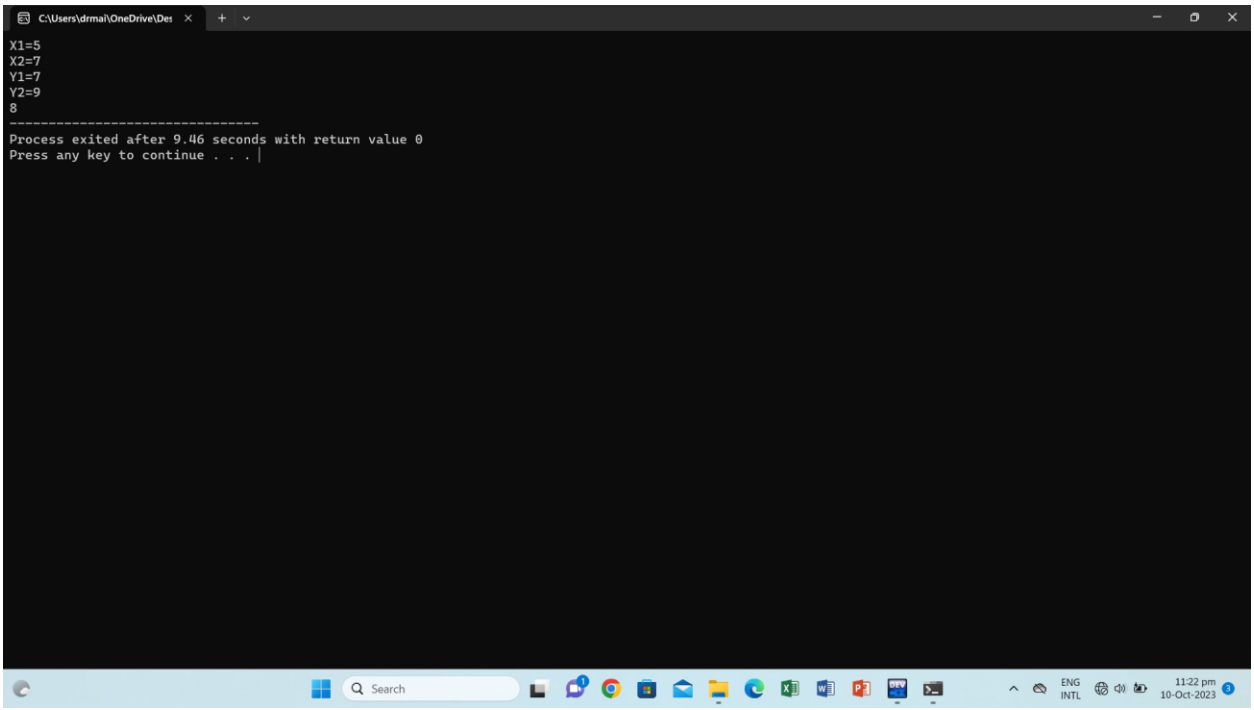
1. Write a C++ program to calculate distance between two points. The values of coordinates should be input by user.

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

INPUT:

```
#include<iostream>
using namespace std;
int main(){
    int x1,x2,y1,y2;  //Initialising four integers
    cout<<"X1=";
    cin>>x1;  //taking input from user for 1st int
    cout<<"X2=";
    cin>>x2;  //taking input from user for 2nd int
    cout<<"Y1=";
    cin>>y1;  //taking input from user for 3rd int
    cout<<"Y2=";
    cin>>y2;  //taking input from user for 4th int
    int subx=(x2-x1)*(x2-x1);
    int suby=(y2-y1)*(y2-y1);
    int d=subx+suby;
    cout<<d;
    return 0;        }
```

OUTPUT:

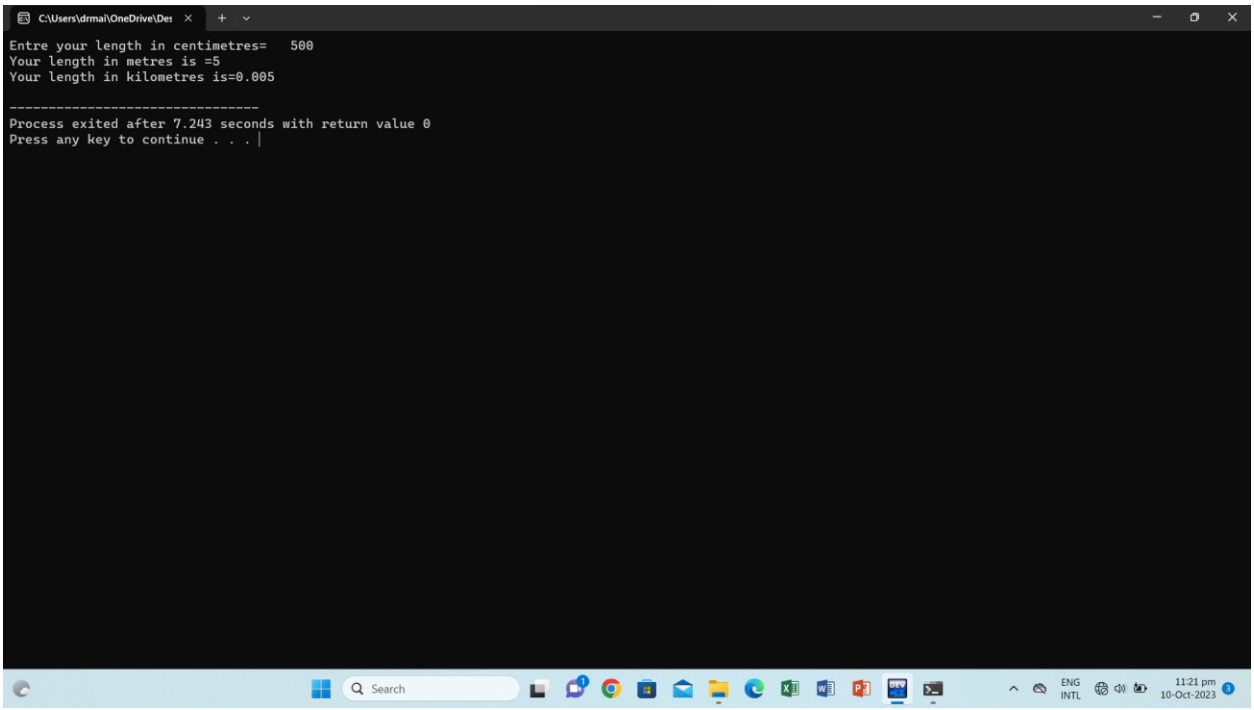


2. Write a code in C++ to take length from user in centimeter and convert it into meter and kilometer.

INPUT:

```
#include<iostream>
using namespace std;
int main(){
        float centimeter,metres,kilometres;  //Initialising cm, m and km as floats
        cout<<"Entre your length in centimetres=   ";
    cin>>centimeter;  //Taking input from user for value of cm
         metres=centimeter/100;  //cm to meter conversion formula
        kilometres=centimeter/100000;  //cm to km conversion formula
        cout<<"Your length in metres is ="<<metres<<endl;
        cout<<"Your length in kilometres is=" <<kilometres<<endl;}
```

OUTPUT:



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

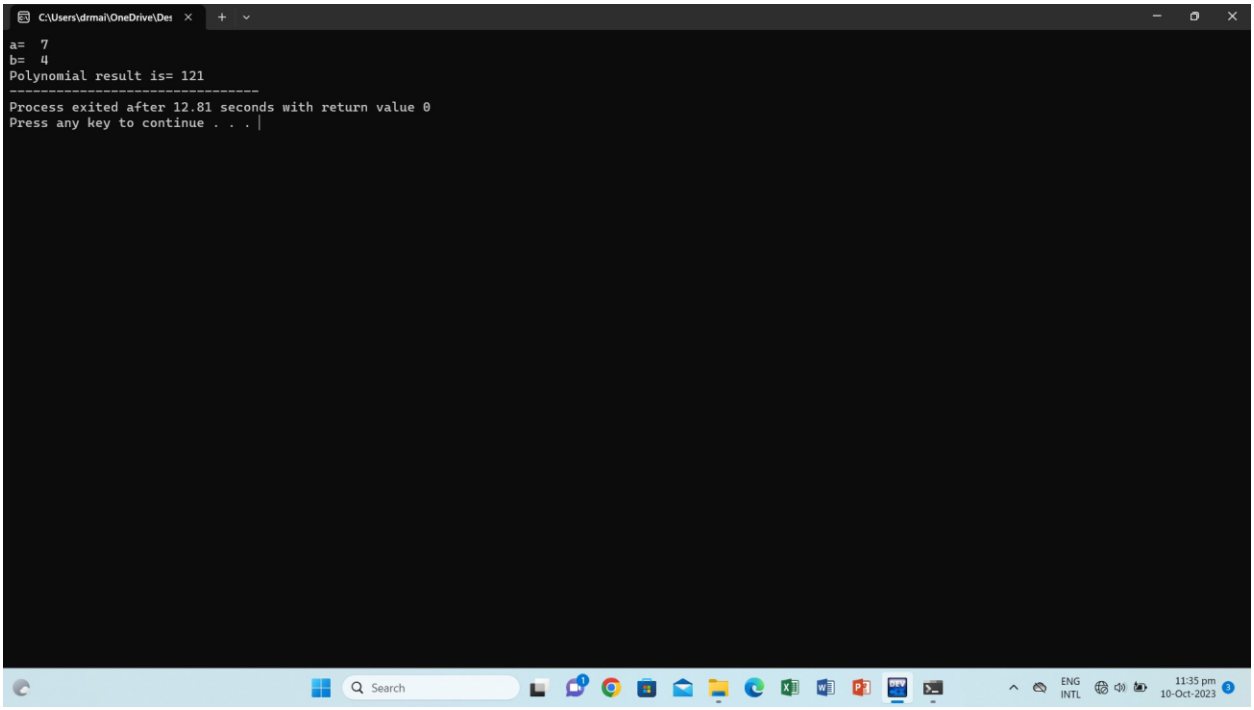
$$a^2 + b^2 + 2ab$$

INPUT:

```
#include<iostream>

using namespace std;

int main(){

int a,b;  //initialising 2 int

cout<<"a=  ";

cin>>a;  //taking input value for 1st int

cout<<"b=  ";

cin>>b;  //taking input value for 2nd int
```

```
int x=a*a;  //square of a
int y=2*(a*b);  //2 (ab)
int z=b*b;  //square of b
int polynomial=x+y+z;  //polynomial formula
cout<<"Polynomial result is= ";
cout<<polynomial;
return 0;  }
```

OUTPUT:

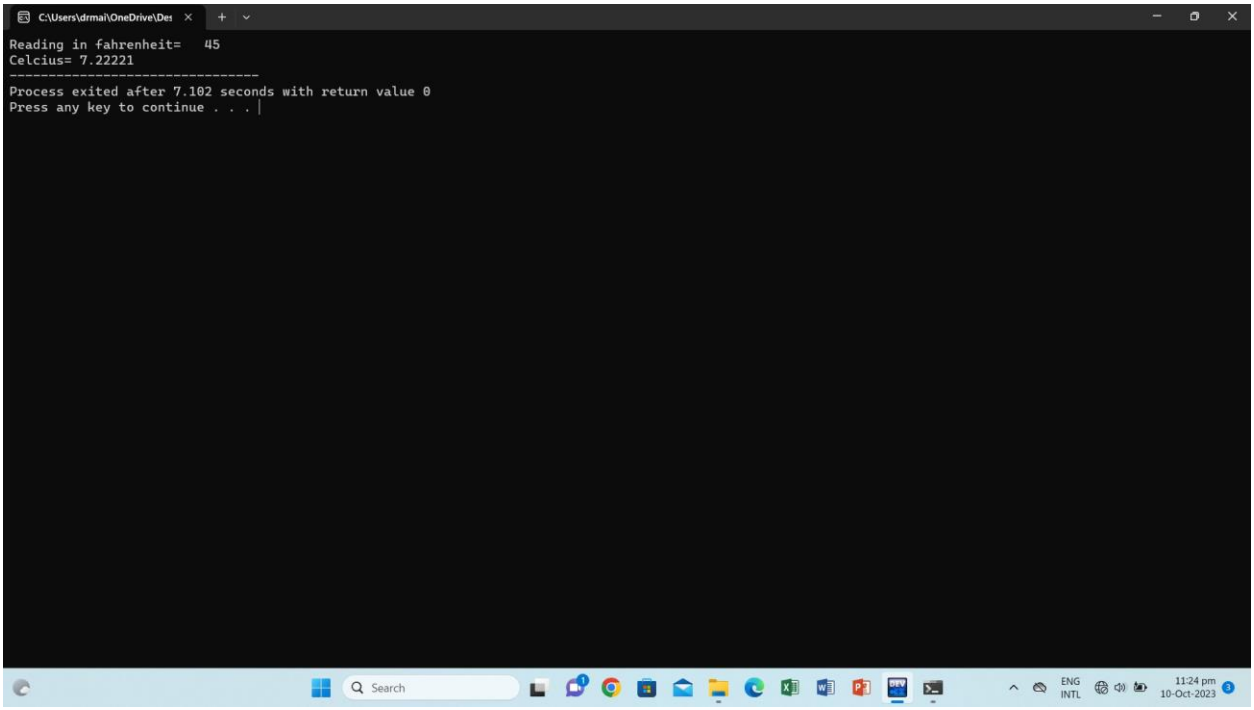


4. Write a program in C++ to convert temperature in Fahrenheit to Celsius.

INPUT:

```
#include<iostream>

using namespace std;

int main(){

        float f;  //initialising float

        cout<<"Reading in fahrenheit=   ";

        cin>>f;  //taking input from user

                float x=f-32;

                float y=0.555555;

                float Z=x*y; //fahrenheit to celcius convertion formula

        cout<<"Celcius= ";

    cout<<Z;}
```

OUTPUT:

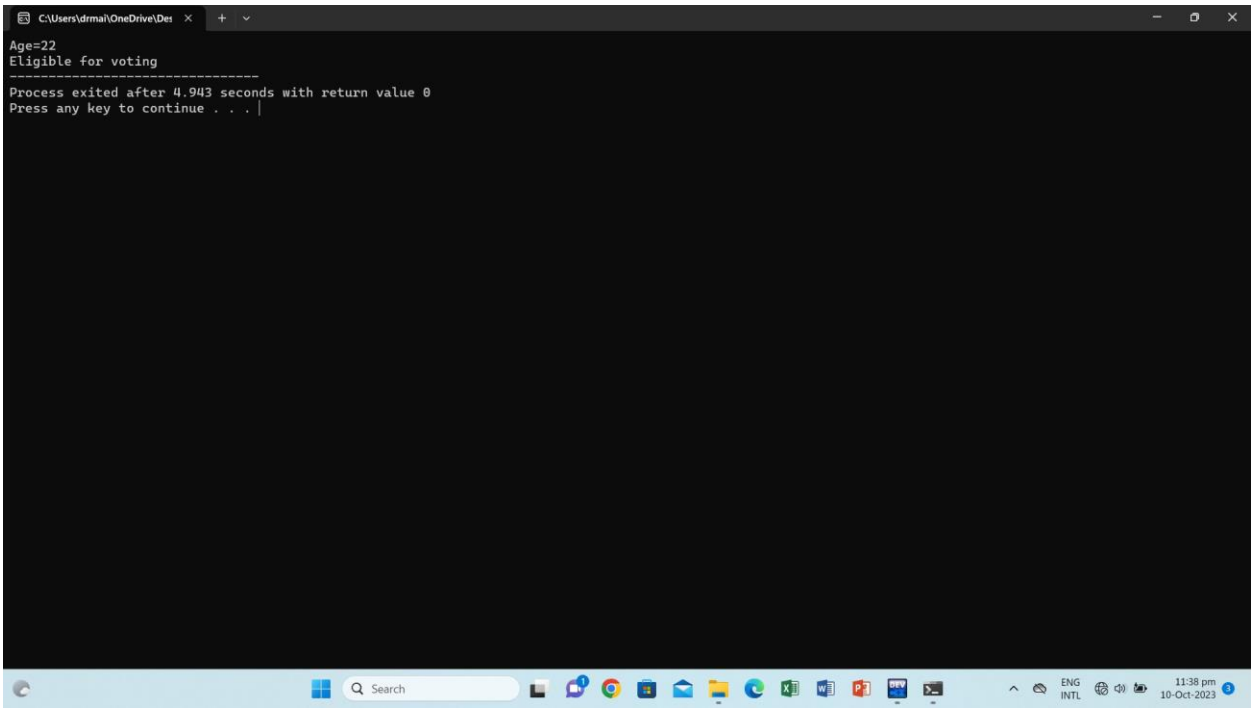


5. Write a program that determines if a person is eligible to vote based on their age (e.g., 18 years or older) using logical operators.

INPUT:

```
#include<iostream>

using namespace std;

int main(){

        int age;  //initialising age as int

        cout<<"Age=";

        cin>>age;  //taking input from user

        if(age>=18){  //condition as a person is eligible to vote

                cout<<"Eligible for voting";}

        else{

                cout<<"Not eligible for voting";}        }
```

OUTPUT:

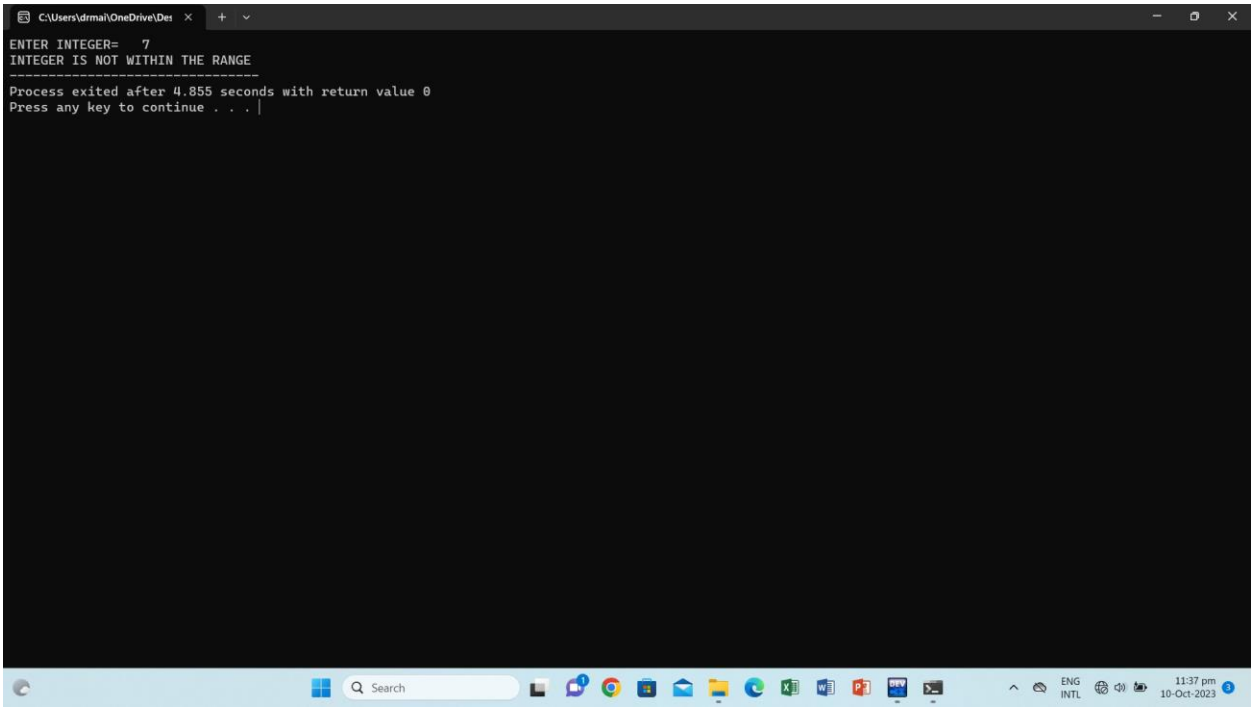


6. Write a program that takes an integer as input and checks if it falls within the range [10, 50] using logical operators.

INPUT:

```
#include<iostream>

using namespace std;

int main(){

        int x;  //initialising an int x

        cout<<"ENTER INTEGER=   ";

        cin>>x;  //taking input value for x

        if(x>=10&&x<=40){  //condition for integers within the given range

                cout<<"INTEGER IS WITHIN THE GIVEN RANGE";}

        else{

                cout<<"INTEGER IS NOT WITHIN THE RANGE";}

}
```

OUTPUT:

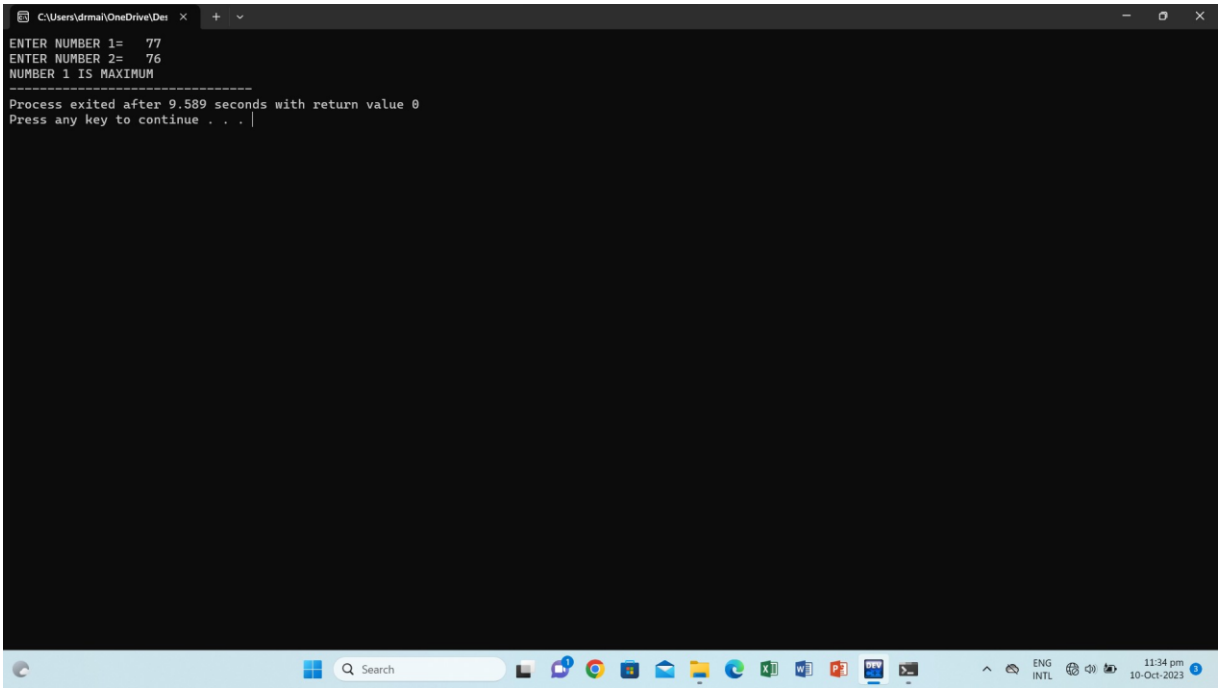


7. Write a C++ program to compare two integers to find max value.

INPUT:

```
#include<iostream>
using namespace std;
int main(){
        int x;  //initialising 1st no
        cout<<"ENTER NUMBER 1=   ";
        cin>>x;  //taking input  from user for no 1
        int y;  //initialising 2nd no
        cout<<"ENTER NUMBER 2=   ";
        cin>>y;  //taking input from user for 2nd no
        if(x>y){cout<<"NUMBER 1 IS MAXIMUM";}
        else if(x<y){cout<<"NUMBER 2 IS MAXIMUM";}
        else{cout<<"BOTH ARE EQUAL";}}
```

OUTPUT:

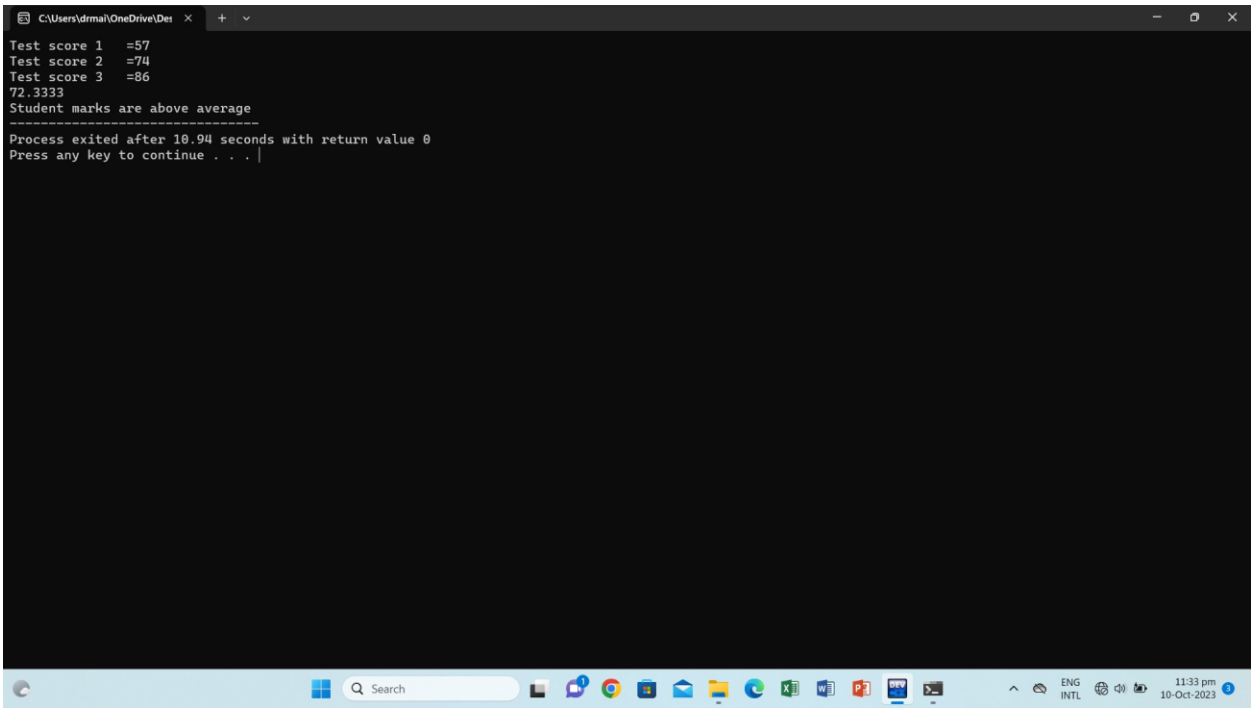


8. Write a C++ program to calculate the average of three exam scores and determine if it's above a passing grade (e.g., average >= 60).

INPUT:

```
#include<iostream>
using namespace std;
int main(){
	float x;  //initialising 1st float
	cout<<"Test score 1   =";
	cin>>x;  //taking input from user for 1st float
	float y;  //initialising 2nd float
	cout<<"Test score 2   =";
	cin>>y;  //taking input from user for 2nd float
	float z;  //initialising 3rd float
	cout<<"Test score 3   =";
	cin>>z;  //taking input from user for 3rd float
	float AVERAGE=(x+y+z)/3;  //average formula
	cout<<AVERAGE<<endl;
	if(AVERAGE>=60.00){
		cout<<"Student marks are above average";}
	else{
		cout<<"Student marks are below average";}
}
```

OUTPUT:


C:\Users\drmai\OneDrive\Des
Test score 1 =57
Test score 2 =74
Test score 3 =86
72.3333
Student marks are above average
Process exited after 10.94 seconds with return value 0
Press any key to continue . . .
Search
ENG
INTL
11:33 pm
10-Oct-2023

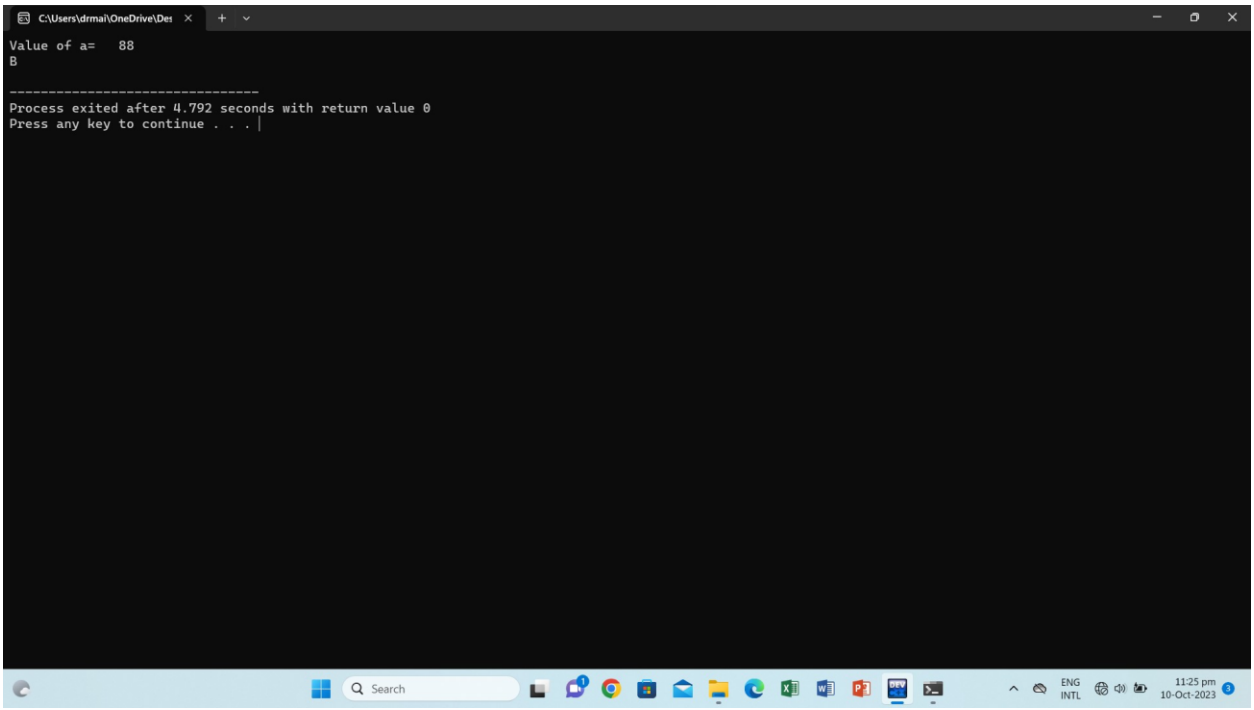
Create a program that takes a student's score as input and assigns a grade based on predefined criteria using logical operators (e.g., A, B, C, D, F).

a. A-Grade: 90-100 Marks
b. B-Grade: 75-90 Marks
c. C-Grade: 60-75 Marks
d. D-Grade: 45-60 Marks
e. F-Grade: 0-45 Marks

INPUT:

```
#include<iostream>
using namespace std;
int main(){
	int a;  //initialising int
	cout<<"Value of a=   ";
	cin>>a;  //taking input from user
	if(a>=91&&a<=100){  //condition for A grade
		cout<<"A"<<endl;
		}
		else if(a>=76&&a<=90){  //condition for B grade
			cout<<"B"<<endl;
			}
		else if(a>=61&&a<=75){  //condition for C grade
			cout<<"C"<<endl;
			}
	else if(a>=46&&a<=60){  //condition for D grade
		cout<<"D"<<endl;
		}
		else{		//all others are F grade
			cout<<"F"<<endl;
			}
			return 0;
		}
```

OUTPUT:


C:\Users\drmai\OneDrive\Des
Value of a= 88
B

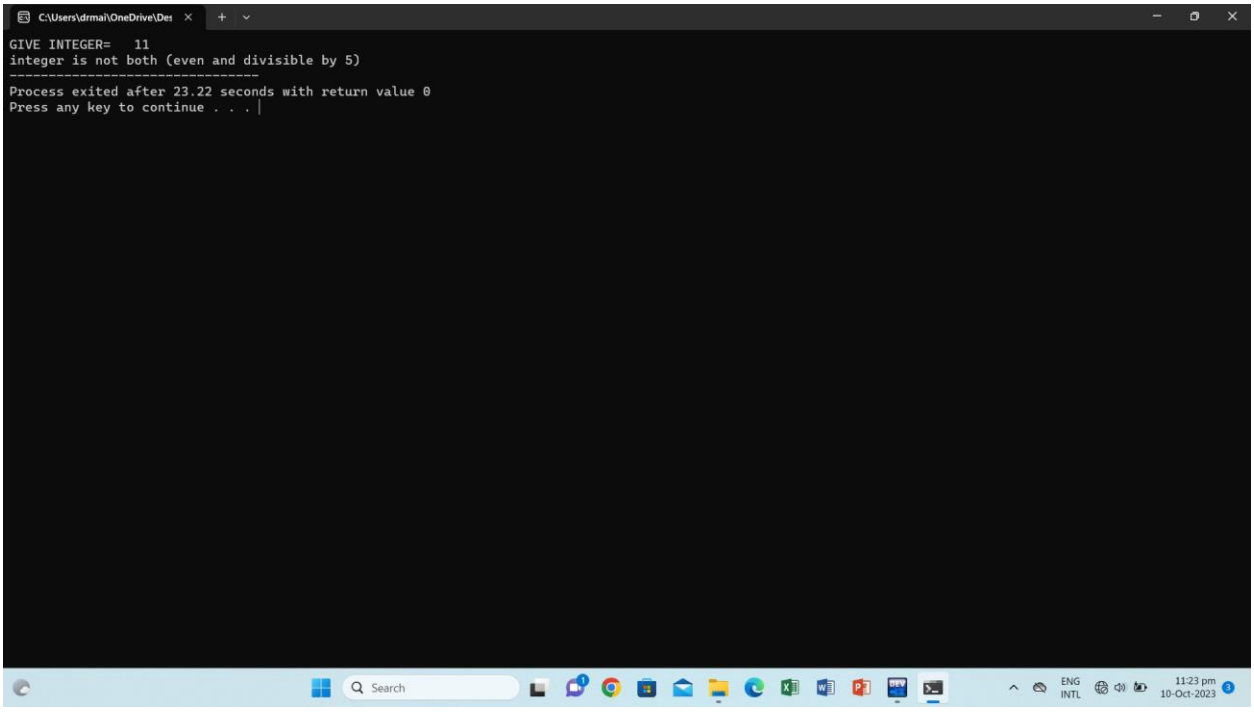
Process exited after 4.792 seconds with return value 0
Press any key to continue . . .
Search
ENG
INTL
11:25 pm
10-Oct-2023

9. Write a program that takes an integer as input and determines if it is both even and divisible by 5.

INPUT:

```
#include<iostream>
using namespace std;
int main(){
	int x;  //initialising int
	cout<<"GIVE INTEGER=   ";
	cin>>x;  //taking input from user
	if(x%2==0&&x%5==0){
		cout<<"INTEGER IS EVEN AND DIVISIBLE BY 5";
	}
	else{
		cout<<"integer is not both (even and divisible by 5)";
	}
}.
```

OUTPUT:

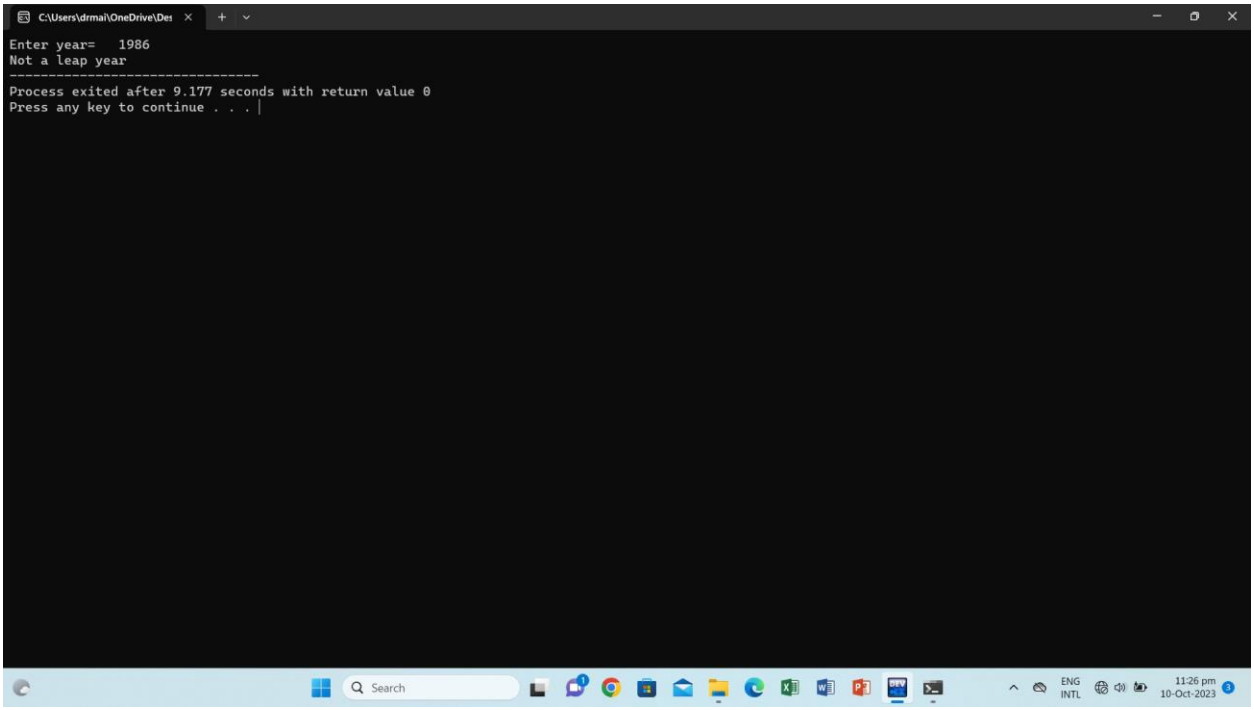


Create a C++ program that checks if a user-provided year is a leap year.

INPUT:

```
#include<iostream>
using namespace std;
int main(){
int a;  //initialising int
cout<<"Enter year=   ";
cin>>a;  //taking input from user
if(a%4==0){  //condition for leap year
        cout<<"It's a leap year";
}
else{
        cout<<"Not a leap year";
}
```

OUTPUT:

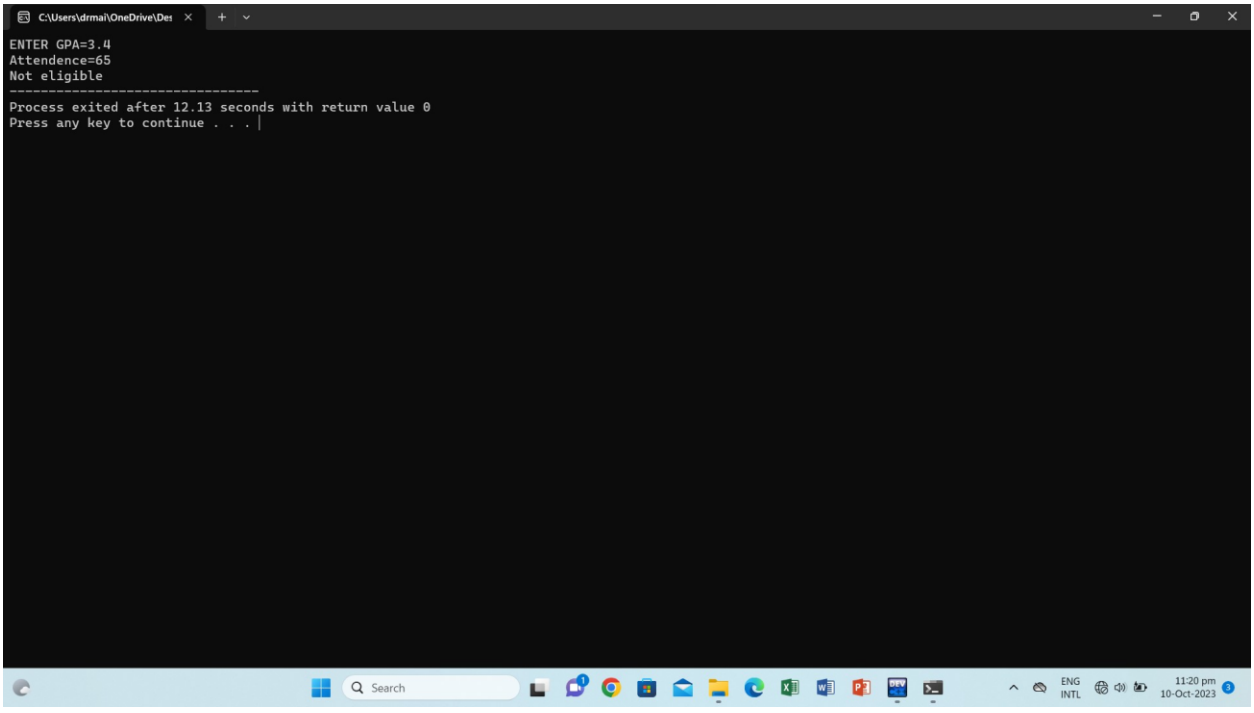


Create a C++ program that determines if a student is eligible for a scholarship based on their GPA (must have GPA >= 3.5) and attendance (must have attended at least 80% of classes).

INPUT:

```
#include<iostream>
using namespace std;
int main(){
float GPA;  //Initializing a float
cout<<"ENTER GPA=";
cin>>GPA;  //Taking input from user
float attendence;
cout<<"Attendence=";  //initialising a 2nd float
cin>>attendence;  //taking input from user for 2nd float
if(GPA>=3.5&&attendence>=80){
        cout<<"Eligible for scholarship";
}
else{
        cout<<"Not eligible";}}
```

OUTPUT:



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

INPUT:

```
#include<iostream>

using namespace std;

int main(){

        char X;  //initialising a char X

        cout<<"CHARACTER=";

        cin>>X;  //taking input value from user for X

        if(X=='a'||X=='e'||X=='i'||X=='o'||X=='u'){  //conditions in which given value of X is a vowel

                cout<<"Character ia a vowel\n";}

        else{

                cout<<"Character is a consonent";}}
```

OUTPUT: