

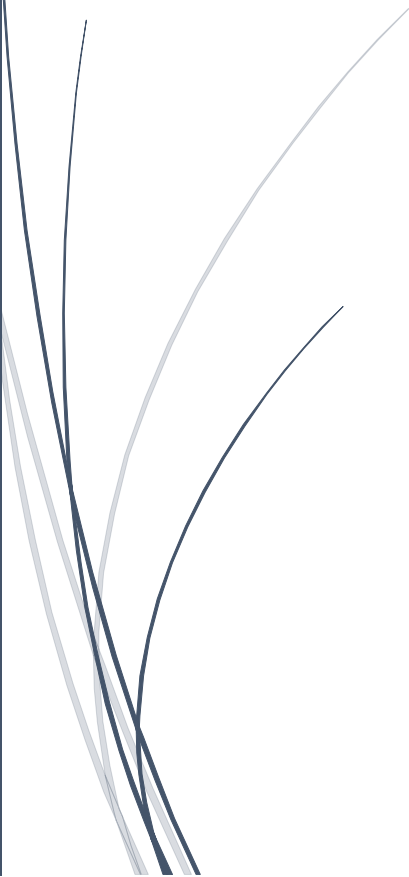


# FUNDAMENTAL OF PROGRAMMING

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.

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

## 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);

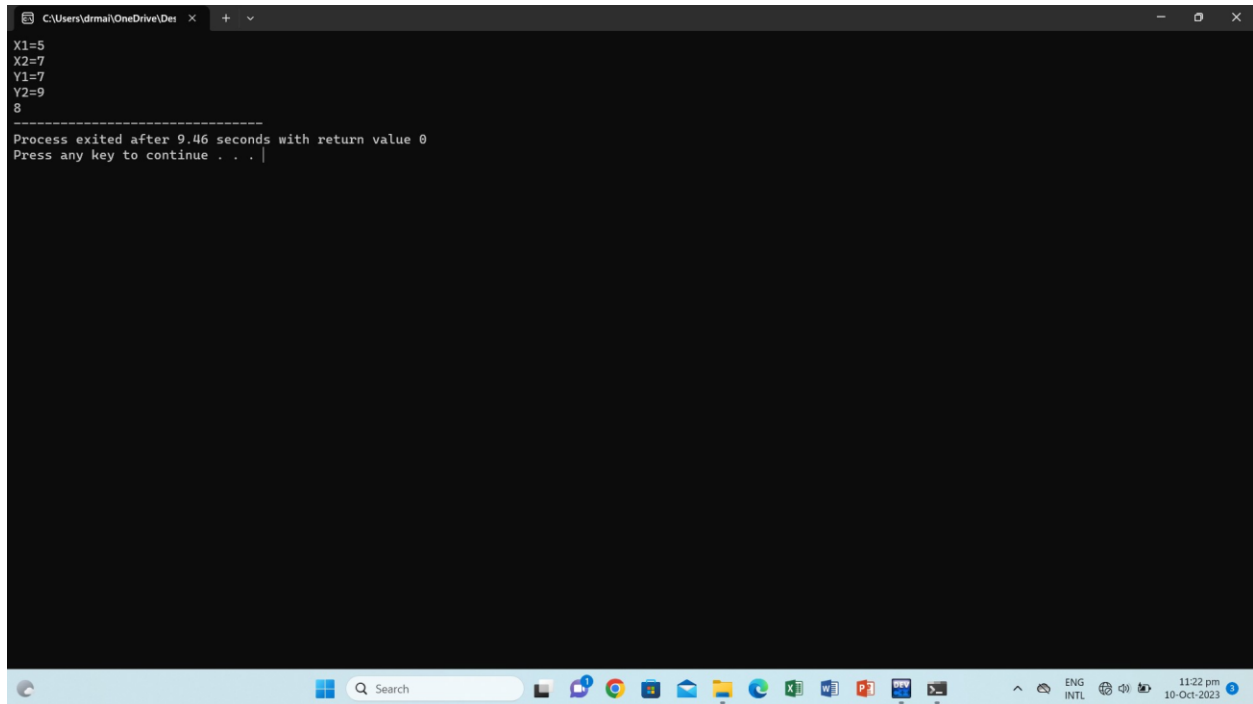
    int suby=(y2-y1)*(y2-y1);

    int d=subx+suby;

    cout<<d;

    return 0;    }
```

## OUTPUT:

A screenshot of a Windows command prompt window. The title bar shows the path 'C:\Users\drmai\OneDrive\Des'. The output text is: 'X1=5', 'X2=7', 'Y1=7', 'Y2=9', '8', followed by a dashed line '-----', 'Process exited after 9.46 seconds with return value 0', and 'Press any key to continue . . .'. The Windows taskbar is visible at the bottom with various application icons and a system clock showing 11:22 pm on 10-Oct-2023.

```
C:\Users\drmai\OneDrive\Des
X1=5
X2=7
Y1=7
Y2=9
8
-----
Process exited after 9.46 seconds with return value 0
Press any key to continue . . .
```

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
```

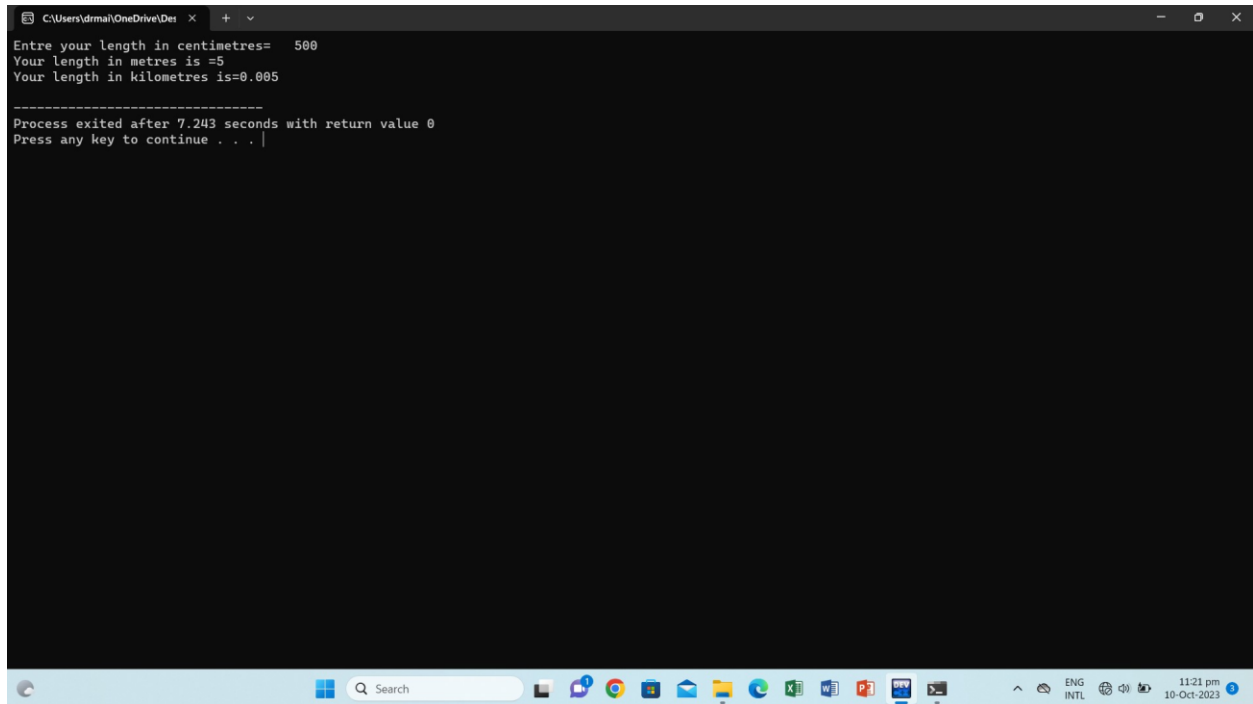
```
    metres=centimeter/100; //cm to meter conversion formula
```

```
    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:



```
C:\Users\drmai\OneDrive\Des x + v
Entre your length in centimetres= 500
Your length in metres is =5
Your length in kilometres is=0.005

-----
Process exited after 7.243 seconds with return value 0
Press any key to continue . . .
```

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= ";

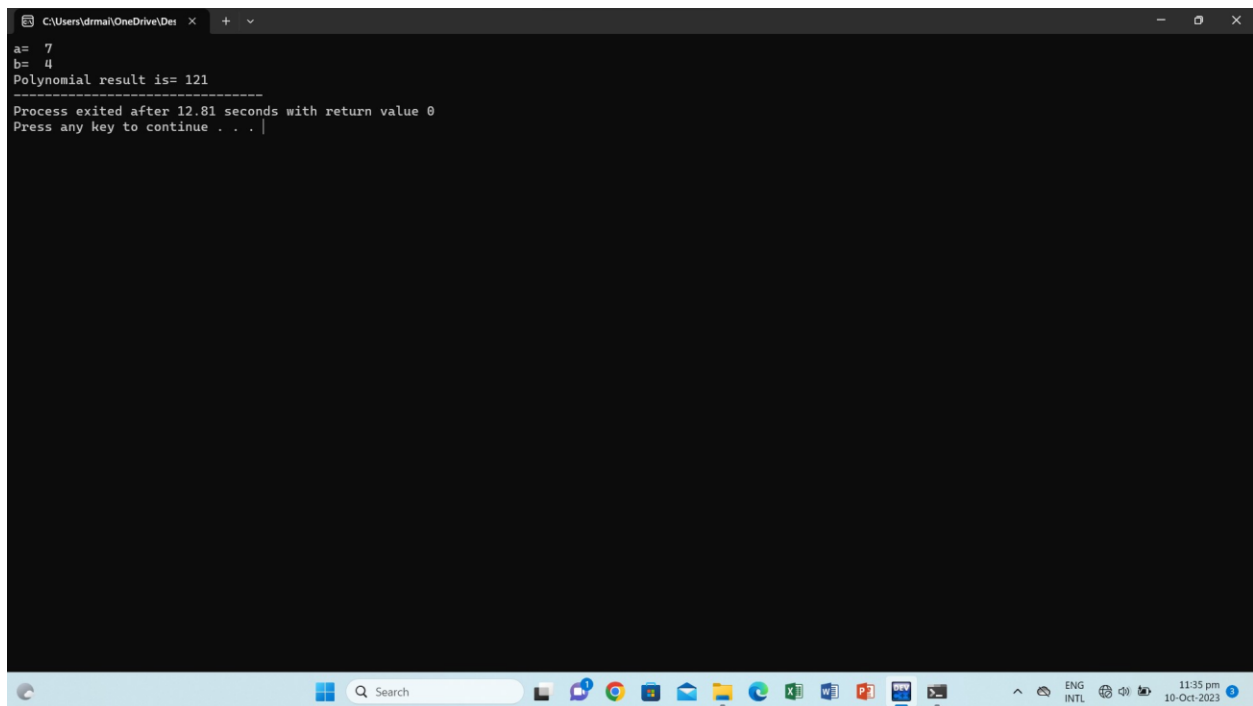
cin>>a; //taking input value for 1st int

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:



```
C:\Users\drmal\OneDrive\Desktop>
a= 7
b= 4
Polynomial result is= 121
-----
Process exited after 12.81 seconds with return value 0
Press any key to continue . . .
```

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;

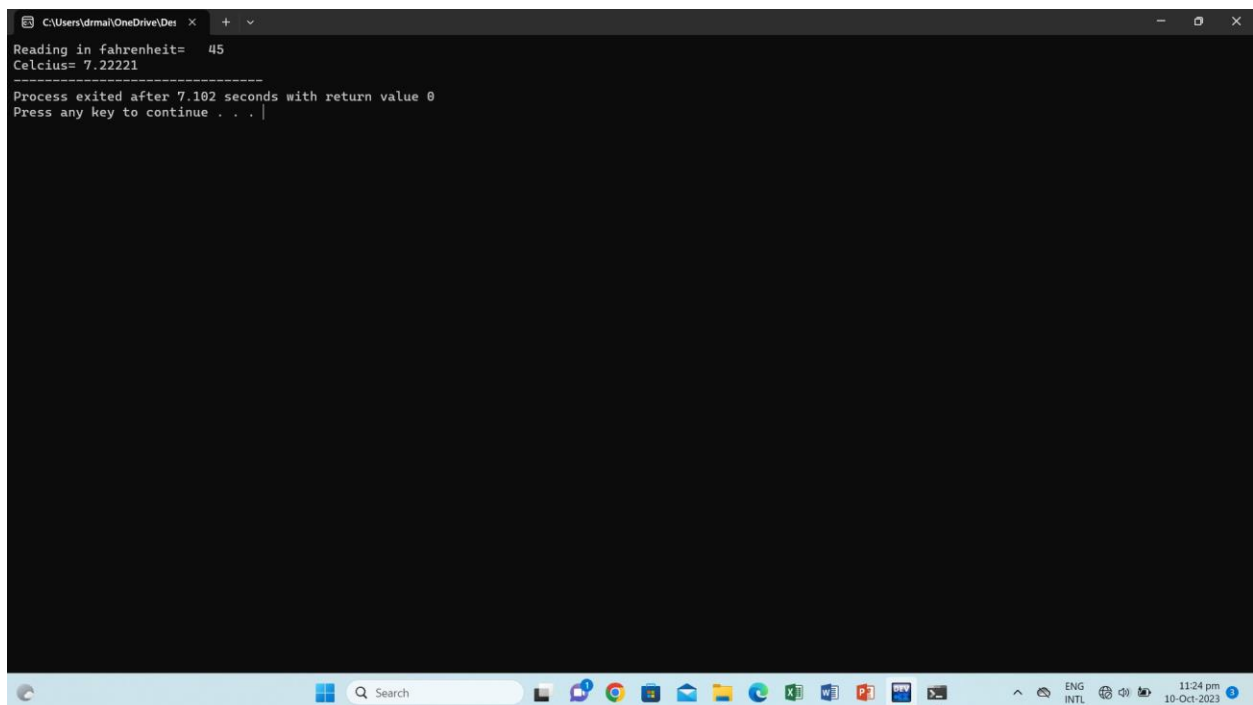
    float y=0.555555;

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

    cout<<"Celcius= ";

    cout<<Z;}
```

## OUTPUT:



```
C:\Users\drmal\OneDrive\Desktop
Reading in fahrenheit= 45
Celcius= 7.22221
Process exited after 7.102 seconds with return value 0
Press any key to continue . . .
```

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

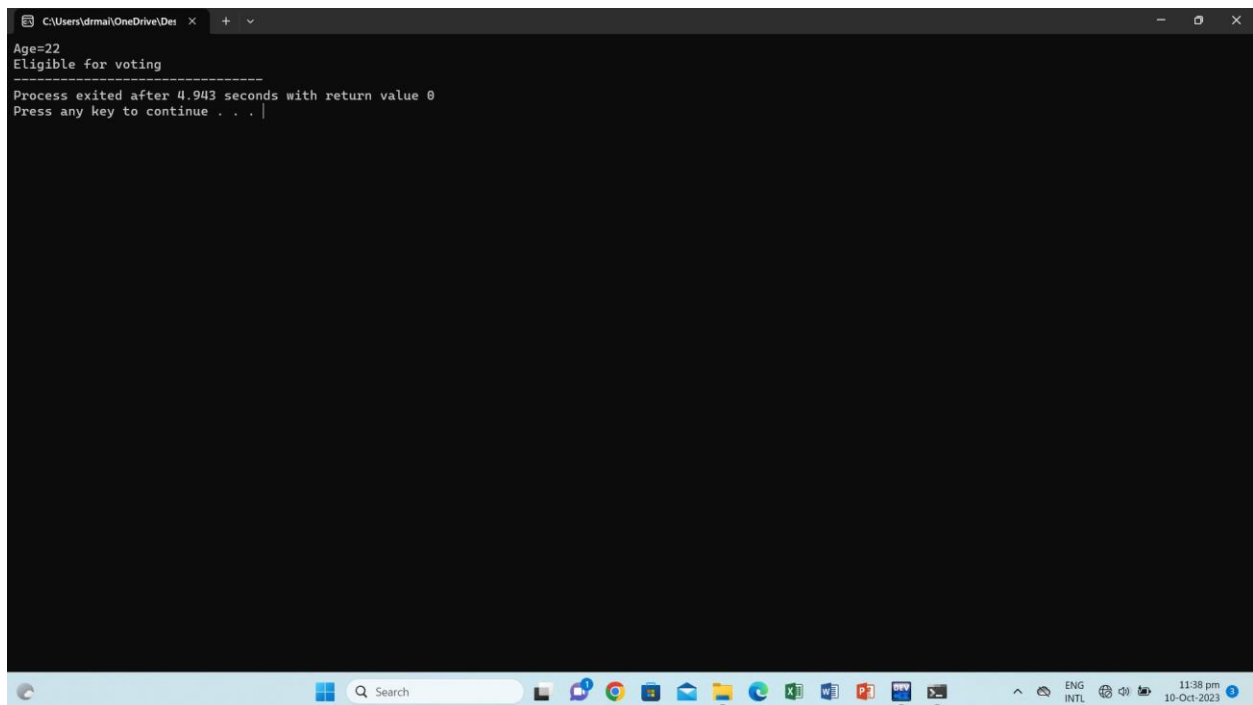
    if(age>=18){ //condition as a person is eligible to vote

        cout<<"Eligible for voting";}

    else{

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

## OUTPUT:



```
C:\Users\drmal\OneDrive\Des
Age=22
Eligible for voting
-----
Process exited after 4.943 seconds with return value 0
Press any key to continue . . .
```

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

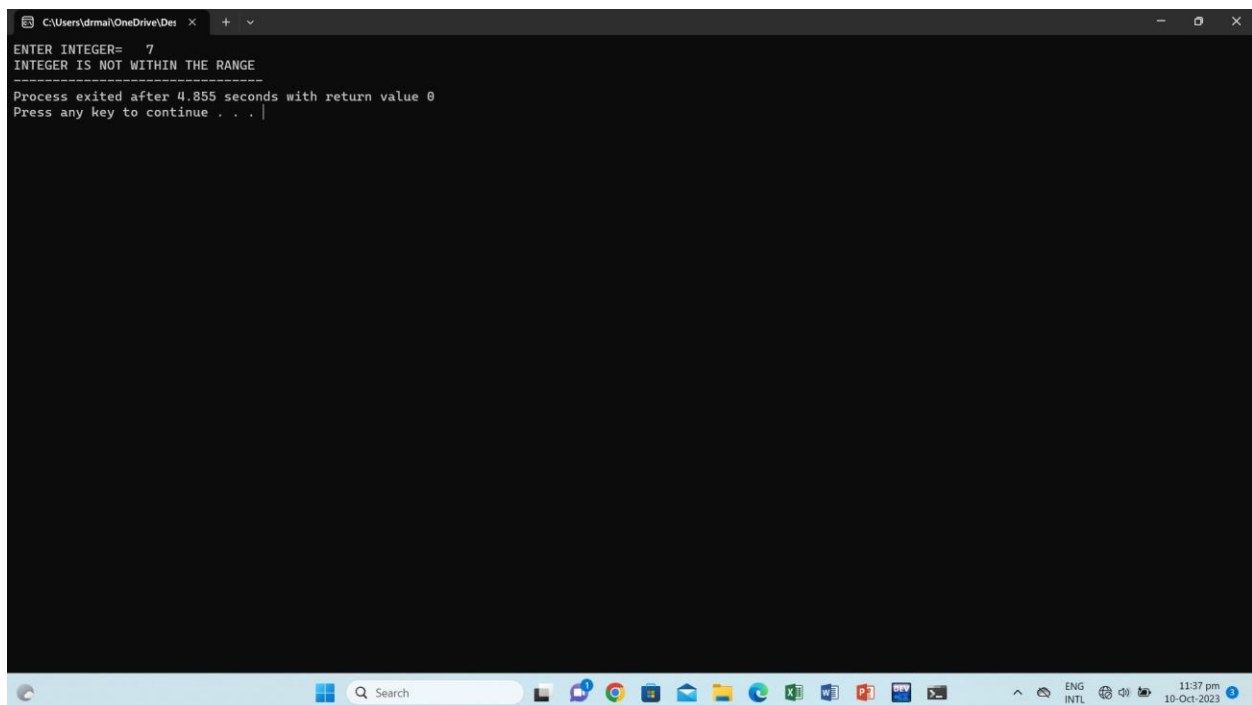
        cout<<"INTEGER IS WITHIN THE GIVEN RANGE";}

    else{

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

}
```

## OUTPUT:



```
C:\Users\drmal\OneDrive\Des x + v
ENTER INTEGER= 7
INTEGER IS NOT WITHIN THE RANGE
-----
Process exited after 4.855 seconds with return value 0
Press any key to continue . . .
```



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= ";

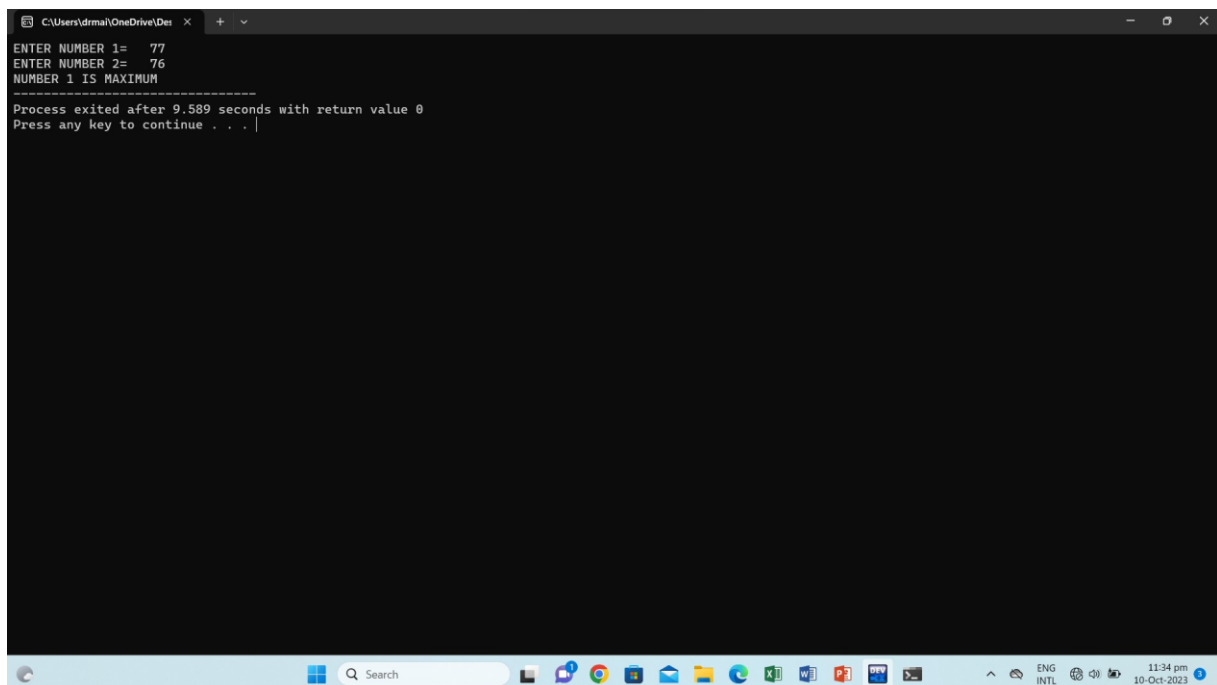
    cin>>y; //taking input from user for 2nd no

    if(x>y){cout<<"NUMBER 1 IS MAXIMUM";}

    else if(x<y){cout<<"NUMBER 2 IS MAXIMUM";}

    else{cout<<"BOTH ARE EQUAL";}}
```

## OUTPUT:



```
C:\Users\idrmah\OneDrive\Des x + v
ENTER NUMBER 1= 77
ENTER NUMBER 2= 76
NUMBER 1 IS MAXIMUM
=====
Process exited after 9.589 seconds with return value 0
Press any key to continue . . .
```

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  $\geq 60$ ).

## 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 x + v
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 . . .
```

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).

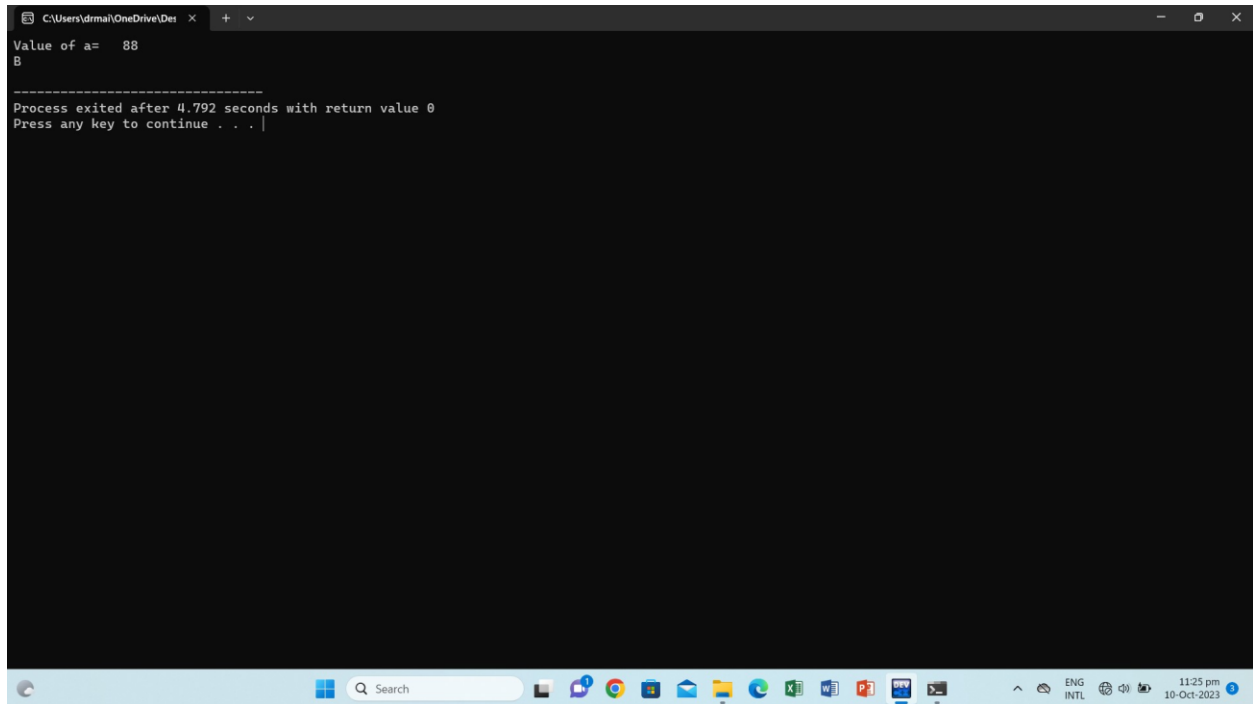
- a. A-Grade: 90-100 Marks
- b. B-Grade: 75-90 Marks
- c. C-Grade: 60-75 Marks
- d. D-Grade: 45-60 Marks
- e. F-Grade: 0-45 Marks

## 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 x + v
Value of a= 88
B
-----
Process exited after 4.792 seconds with return value 0
Press any key to continue . . .
```

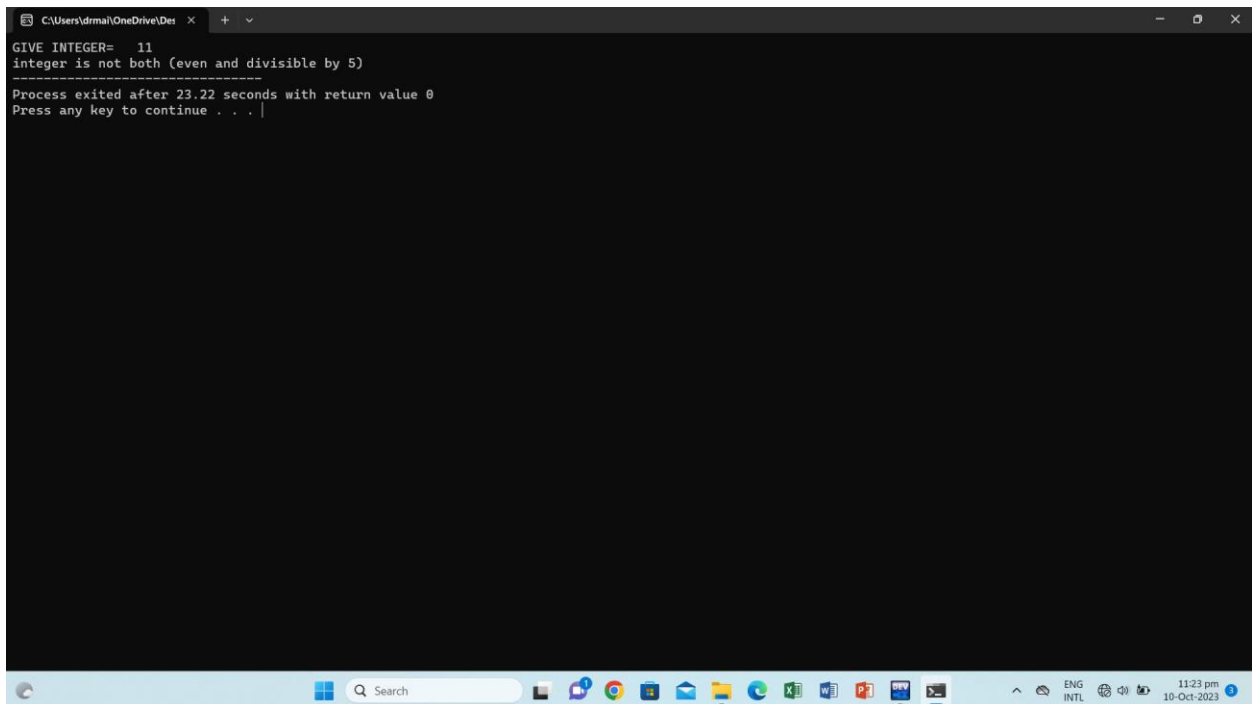
A screenshot of a Windows command prompt window. The title bar shows the file path 'C:\Users\drmai\OneDrive\Des' and standard window controls. The command prompt displays the output of a program: 'Value of a= 88', 'B', a separator line of dashes, and a message indicating the process exited after 4.792 seconds with a return value of 0. Below this, it prompts the user to 'Press any key to continue'. The Windows taskbar is visible at the bottom, showing the Start button, a search bar, and various application icons including File Explorer, Edge, Word, and PowerPoint. The system clock in the bottom right corner shows the time as 11:25 pm on 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:



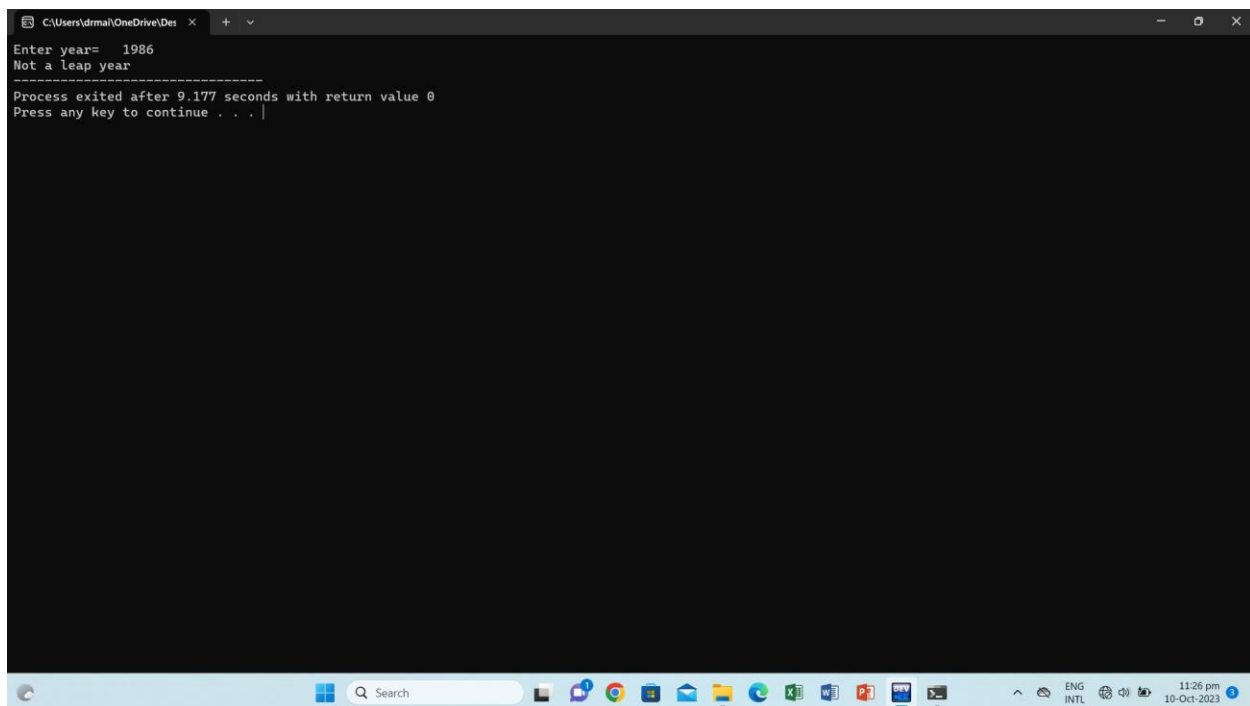
```
C:\Users\drmai\OneDrive\Des
GIVE INTEGER= 11
integer is not both (even and divisible by 5)
Process exited after 23.22 seconds with return value 0
Press any key to continue . . .
```

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:



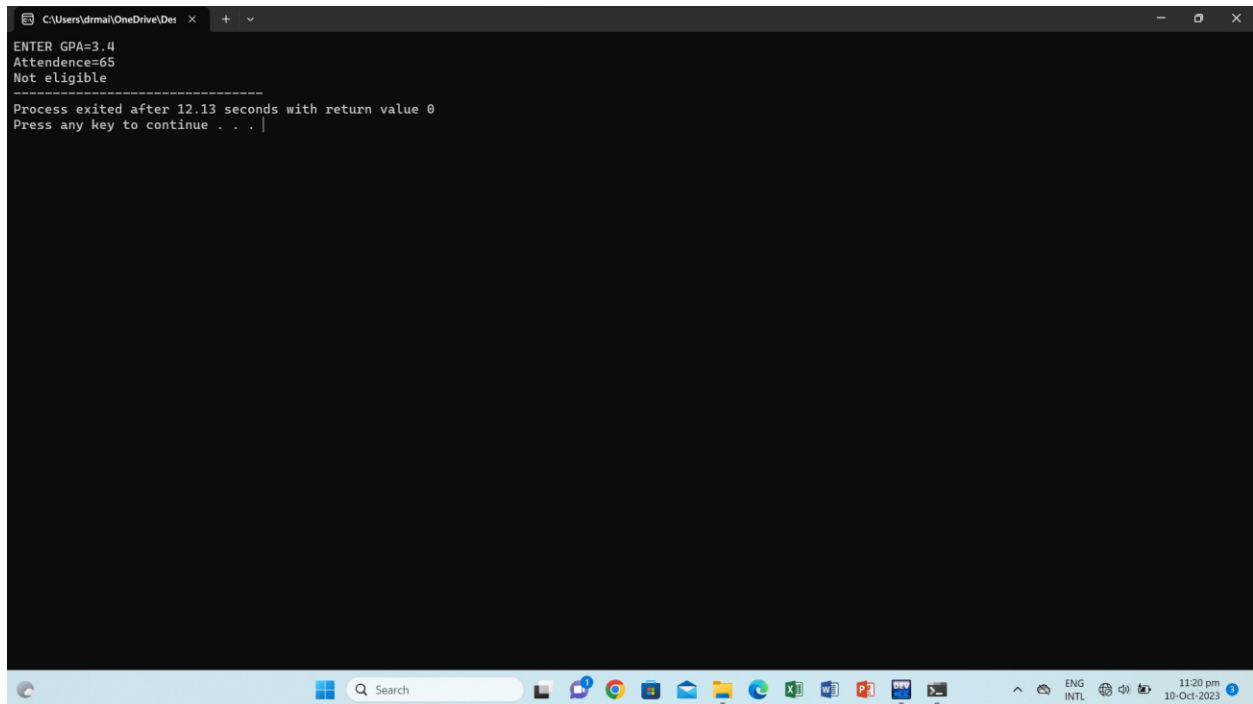
```
C:\Users\drrah\OneDrive\Des
Enter year= 1986
Not a leap year
-----
Process exited after 9.177 seconds with return value 0
Press any key to continue . . .
```

Create a C++ program that determines if a student is eligible for a scholarship based on their GPA (must have GPA  $\geq 3.5$ ) 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 attendance;
cout<<"Attendance="; //initialising a 2nd float
cin>>attendance; //taking input from user for 2nd float
if(GPA>=3.5&&attendance>=80){
    cout<<"Eligible for scholarship";
}
else{
    cout<<"Not eligible";}}
```

## OUTPUT:



```
C:\Users\idmal\OneDrive\Desktop >
ENTER GPA=3.4
Attendance=65
Not eligible
-----
Process exited after 12.13 seconds with return value 0
Press any key to continue . . .
```



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

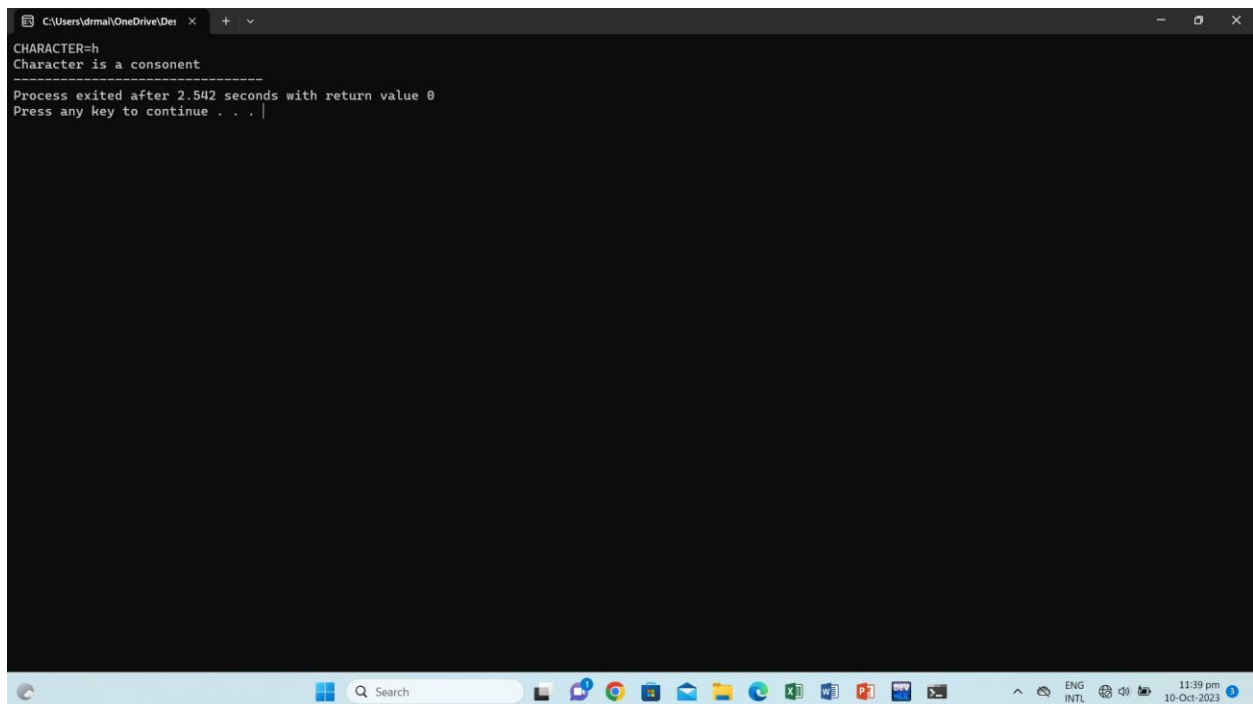
    if(X=='a'||X=='e'||X=='i'||X=='o'||X=='u'){ //conditions in which given value of X is a
vowel

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

    else{

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

## OUTPUT:



```
C:\Users\drmal\OneDrive\Des x + v
CHARACTER=h
Character is a consonent
-----
Process exited after 2.542 seconds with return value 0
Press any key to continue . . .
```