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

main.cpp

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main(){
double x1,x2,y1,y2,dist;

    cout << "enter x coordinate of point 1 followed by its y coordinate" << endl;
    cin>>x1;
    cin>>y1;
    cout << "enter x coordinate of point 2 followed by its y coordinate" << endl;
    cin>>x2;
    cin>>y2;
    dist=sqrt((x2-x1)*(x2-x1)+(y2-y1)*(y2-y1));
    cout << "your distance is="<<dist << endl;
    return 0;
}
```

```
C:\Users\LENOVO\Documents\pakistan\bin\Debug\pakistan.exe
enter x coordinate of point 1 followed by its y coordinate
5
5
enter x coordinate of point 2 followed by its y coordinate
4
4
your distance is=1.41421

Process returned 0 (0x0)   execution time : 10.125 s
Press any key to continue.
```

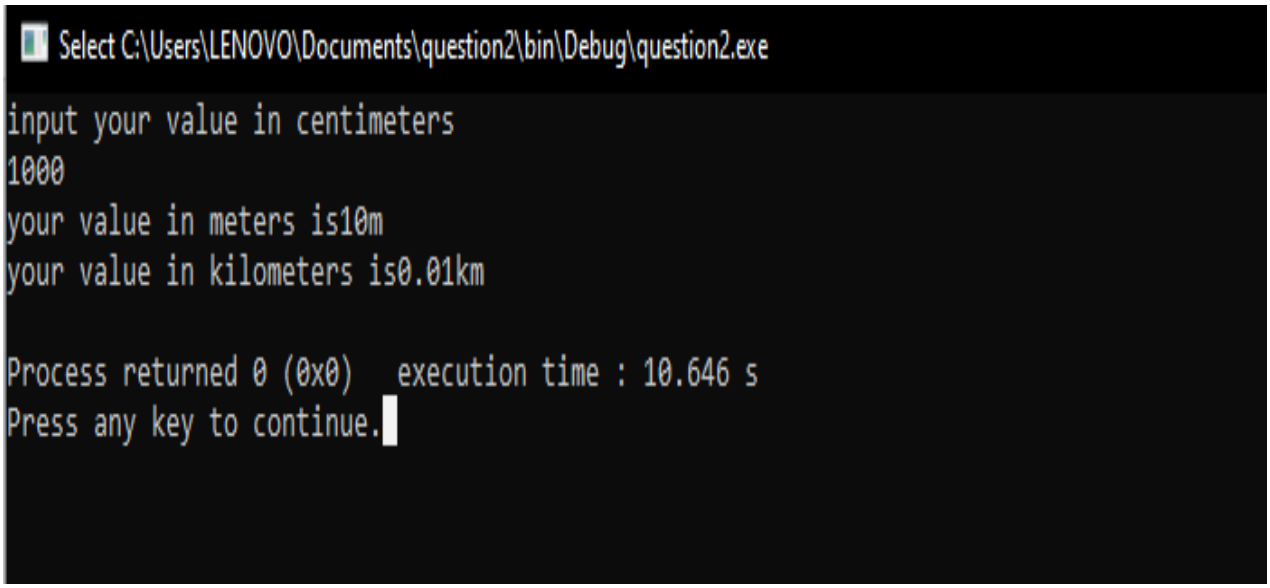
2. Write a code in C++ to take the length from the user in centimeters and convert it into meters and kilometers.

```cpp
#include <iostream>

using namespace std;

int main()
{
double centi,meter,kilo;

cout << "input your value in centimeters" << endl;
 cin>>centi;
 meter=centi/100;
 kilo=meter/1000;
 cout << "your value in meters is"<<meter<<"m" << endl;
 cout << "your value in kilometers is"<<kilo<<"km" << endl;
    return 0;
}
```



3. Write a code in C++ that takes values of a and b from the user and displays the result of polynomial a 2 + 2ab + b 2.

```
#include <iostream>

using namespace std;

int main()
{
int a,b,c;
cout<<"enter a followed by b"<<endl;
cin>>a;
cin>>b;
c=(a*a)+(b*b)+(2*a*b);
cout<<"your answer for(a+b)^2"<<endl;
cout<<c;
}
```

```
enter a followed by b
2
4
your answer for(a+b)^2
36
Process returned 0 (0x0)   execution time : 47.554 s
Press any key to continue.
```

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

main.cpp

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main()
{
float F,C;
cout<<"enter your values in fahrenheit"<<endl;
cin>>F;
C=(F-32)*5/9;
cout<<"value in celsius is"<<endl;
cout<<C;

return 0;
}
```

```
enter your values in fahrenheit
5100
value in celsius is
2815.56
Process returned 0 (0x0)   execution time : 3.719 s
Press any key to continue.
```

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.

```
#include <iostream>
#include <cmath>
using namespace std;

int main()
{int age;
 cout<<"enter your age"<<endl;
 cin>>age;
if(age>=18){
cout<<"you are eligible to vote"<<endl;}
else{ cout<<"you are not eligible to vote"<<endl;}

return 0;
}
```

```
enter your age
16
you are not eligible to vote

Process returned 0 (0x0)   execution time : 2.137 s
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.

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main()
{int num;
 cout<<"enter your number"<<endl;
 cin>>num;
if(num>=10 && num<=50){
cout<<"the number is within range"<<endl;}
else{ cout<<"you are out of range"<<endl;}

return 0;
}
```

```
enter your number
43
the number is within range

Process returned 0 (0x0)   execution time : 3.594 s
Press any key to continue.
```

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

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main()
{int num1,num2;
 cout<<"enter number 1 followed by number 2"<<endl;
 cin>>num1;
 cin>>num2;
if(num1>num2 ){
cout<<"num1 is greater"<<endl;}
else if(num1<num2){ cout<<"num2 is greater"<<endl;}
else{cout<<"both numbers are equal"<<endl;}

return 0;
}
```

```
enter number 1 followed by number 2
9
5
num1 is greater

Process returned 0 (0x0)   execution time : 5.730 s
Press any key to continue.
```

4. 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).

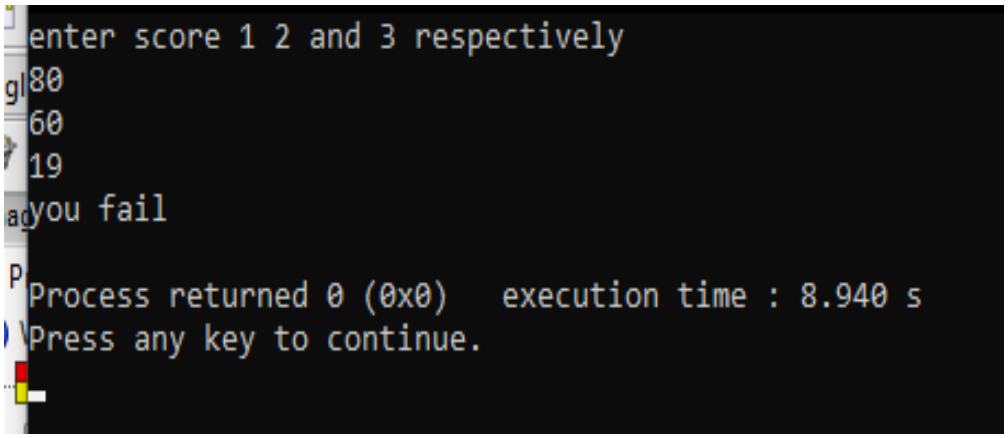
```
#include <iostream>
#include <cmath>
using namespace std;

int main()
{float score1,score2,score3;
 cout<<"enter score 1 2 and 3 respectively"<<endl;
 cin>>score1;
 cin>>score2;
 cin>>
float                                    core3)/3;

if (avg>=60) {cout<<"you pass"<<endl;}
else{cout<<"you fail"<<endl;}


return 0;
}
```

```
cin > > main::score2
float main::score2
```



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

```
#include <iostream>
#include <cmath>
using namespace std;

int main()
{float score;
 cout<<"enter your score"<<endl;
 cin>>score;

if(score>=90 && score<=100 ){
cout<<"A grade"<<endl;}
else if(score<=90 && score>=75){ cout<<"B grade"<<endl;}
else if(score<=75 && score>=60){ cout<<"C grade"<<endl;}
else if(score<=60 && score>=45){ cout<<"D grade"<<endl;}
else if(score<=45 && score>=0){ cout<<"F grade"<<endl;}
else{cout<<"score is incorrect"<<endl;}

return 0;
}
```

```
enter your score
76
B grade

Process returned 0 (0x0)   execution time : 6.502 s
Press any key to continue.
```

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

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main()
{int value;
cout<<"enter your value"<<endl;
cin>>value;
if(value%2==0 && value>=2){
    cout<<"your value is even"<<endl;
}
else{cout<<"your value is odd"<<endl;}
cout<<"And"<<endl;
if(value%5==0 && value>=5){
    cout<<"your value is divisible by 5"<<endl;
}
else{cout<<"your value is not divisible by 5"<<endl;}



}
```

```
enter your value
15
your value is odd
And
your value is divisible by 5

Process returned 0 (0x0)   execution time : 2.696 s
Press any key to continue.
```

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

```cpp
#include <iostream>
#include <cmath>
using namespace std;

int main()
{int year;
cout<<"enter your year"<<endl;
cin>>year;
if(year%4==0 && year%100!=0 || year%400==0){
    cout<<"it was a leap year"<<endl;
}
else{cout<<"it was not a leap year"<<endl;}
}
```

```
enter your year
1908
it was a leap year

Process returned 0 (0x0)   execution time : 7.817 s
Press any key to continue.
```

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).

```
#include <iostream>
#include <cmath>
using namespace std;

int main()
{float gpa,attendance;
float total,attended;
cout<<"enter your gpa"<<endl;
cin>>gpa;
cout<<"enter total classes"<<endl;
cin>>total;
cout<<"enter classes you have attended"<<endl;
cin>>attended;
float x=attended/total;
attendance=x*100;
if(gpa>=3.5 || attendance>=75){
    cout<<"you are eligible for the scholarship"<<endl;
}
else{cout<<"you are not eligible for the scholarship"<<endl;}



}
```

```
enter your gpa
3.7
enter total classes
10
enter classes you have attended
8
you are eligible for the scholarship

Process returned 0 (0x0)   execution time : 7.465 s
Press any key to continue.
```

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

```
#include <iostream>
#include <cmath>
using namespace std;

int main()
{string letter;
cout<<"enter your letter"<<endl;
cin>>letter;
if(letter=="a"||letter=="e"||letter=="i"||letter=="o"||letter=="u"||letter=="A"||letter=="E"||letter=="I"||letter=="O"||
   letter=="U"){
    cout<<"your letter is a vowel "<<endl;
}
else{cout<<"your letter is a consonant"<<endl;}



}
```

```
enter your letter
s
your letter is a consonant

Process returned 0 (0x0)   execution time : 2.287 s
Press any key to continue.
```