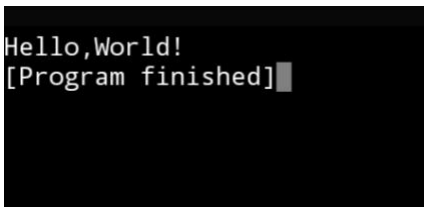
Worksheet-1

C++ "Hello, World!" Program

```
#include<iostream.h>
#include<conio.h>
void main()
{ clrscr();
cout<<"Hello,World!";
getch()
}
```

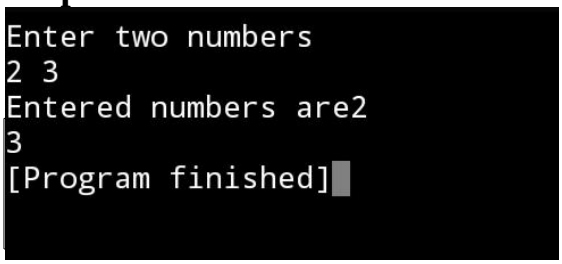
Output:



C++ Program to Print Number Entered by User

```
#include<iostream.h>
#include<conio.h>
void main()
{
int a,b;
clrscr();

cout<<"Enter two numbers";
cin>>a>>b;
cout<<"Entered numbers are"<<a<<endl;
cout<<b;
getch();
}
```

Output:



C++ Program to Add Two Numbers

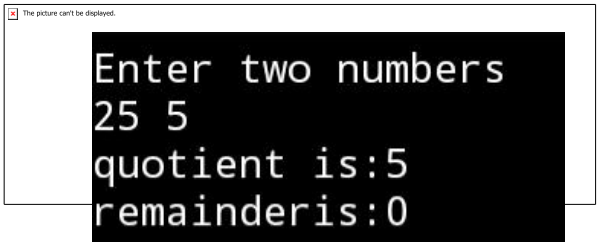
```
#include<iostream.h>
#include<conio.h>
void main()
{
int a,b,add;
clrscr();

cout<<"Enter two numbers";
cin>>a>>b;
add=a+b;
cout<<"addition of two number is:"<<add<<endl;

getch();
}
```

Output:

```
Enter two numbers

2 3
addition of two number is:5

[Program finished]
```

C++ Program to Find Quotient and Remainder

```
#include<iostream.h>
#include<conio.h>
void main()
{
int a,b,q,r;
clrscr();
cout<<"Enter two numbers";
cin>>a>>b;
q=a/b;
r=a%b;
cout<<"quotient is:"<<q<<endl;
cout<<"remainderis:"<<r<<endl;
getch();
}
```

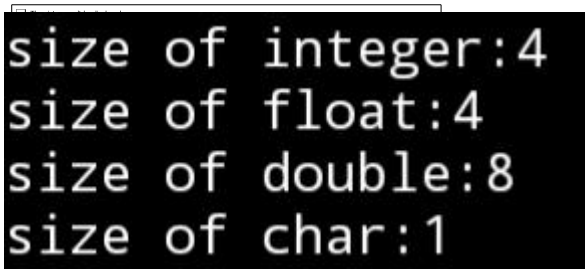


Output:

C++ Program to Find Size of int, float, double and char in Your System

```
#include<iostream.h>
#include<conio.h>
void main()
{       clrscr();

 cout<<"size of integer:"<<sizeof(int)<<endl;
 cout<<"size of float:"<<sizeof(float)<<endl;
 cout<<"size of double:"<<sizeof(double)<<endl;
 cout<<"size of char:"<<sizeof(char)<<endl;
 getch();

 }
```

Output:



C++ Program to Swap Two Numbers

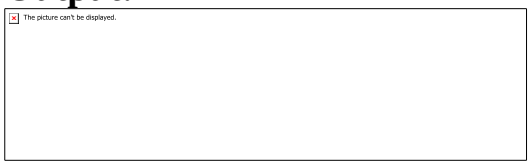
```
#include<iostream.h>
#include<conio.h>
void main()
{
int a,b,temp;
clrscr();
cout<<"Enter two numbers to swap";
cin>>a>>b;
```

```
temp=a;
a=b;
b=temp;
cout<<"after swapping:"<<a<<endl;
cout<<b;
getch();
```

```
Enter two numbers to swap
5 6
after swapping:6
5
```

}

Output:



C++ Program to Check Whether Number is Even or Odd

```
#include<iostream.h>
#include<conio.h>
void main()
{ int a;
 clrscr();
 cout<<"enter number:";
 cin>>a;
 if(a%2==0)
 cout<<"Number is even";
 else
 cout<<"Number is odd";
  getch(); }
```

Output:

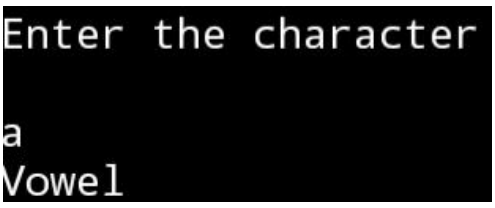
```
enter number:3
Number is odd
```

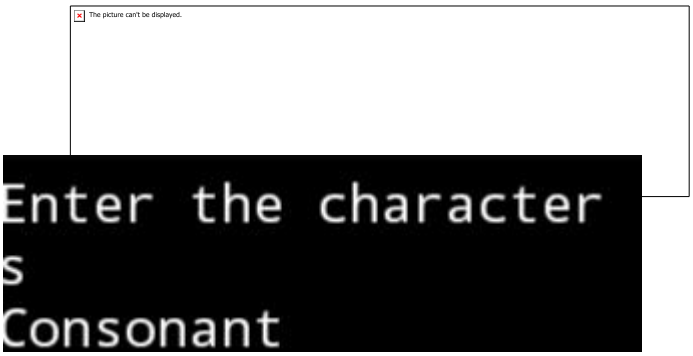
```
enter number:2
Number is even
```

C++ Program to Check Whether a character is Vowel or Consonant.

```
#include<iostream.h>
#include<conio.h>
void main()
{char nnn;
```

```
clrscr();
cout<<"Enter the character  ";
cin>>nnn;
if(nnn=='a'||nnn=='e'||nnn=='i'||nnn=='o'||nnn=='u')
cout<<"Vowel";
else
cout<<"Consonant";
getch();}
```





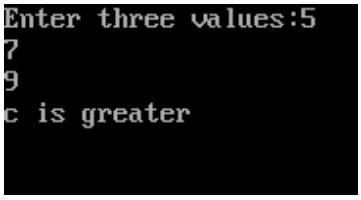
Output:

C++ Program to Find Largest Number Among Three Numbers

```
#include<iostream.h>
#include<conio.h>
class great
{
inta,b,c;
public:
voidcheck()
{
cout<<"Enter three values:";
cin>>a>>b>>c;
if(a>b && a>c)
{
cout<<"a is greater";
}
elseif(b>a && b>c)

{
cout<<"b is greater";
}
elseif(c>a && c>b)
 {
cout<<"c is greater";
```

```
  }
else
   {
cout<<"They are equal";
    }
    }
    };
voidmain()
{
clrscr();
great g1;
g1.check();
getch();}
```

Output:



C++ Program to Find All Roots of a Quadratic Equation

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

int main() {

    float a, b, c, x1, x2, discriminant, realPart, imaginaryPart;
    cout << "Enter coefficients a, b and c: ";
    cin >> a >> b >> c;
    discriminant = b*b - 4*a*c;

    if (discriminant > 0) {
        x1 = (-b + sqrt(discriminant)) / (2*a);
        x2 = (-b - sqrt(discriminant)) / (2*a);
        cout << "Roots are real and different." << endl;
        cout << "x1 = " << x1 << endl;
        cout << "x2 = " << x2 << endl;
    }
```

```
    else if (discriminant == 0) {
        cout << "Roots are real and same." << endl;
        x1 = (-b + sqrt(discriminant)) / (2*a);
        cout << "x1 = x2 =" << x1 << endl;
    }

    else {
        realPart = -b/(2*a);
        imaginaryPart =sqrt(-discriminant)/(2*a);
        cout << "Roots are complex and different."  << endl;
        cout << "x1 = " << realPart << "+" << imaginaryPart << "i" << endl;
        cout << "x2 = " << realPart << "-" << imaginaryPart << "i" << endl;
                                                    }

    return 0;
}
```

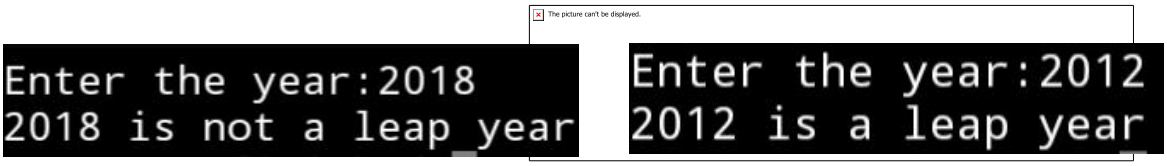
```
Enter coefficients a, b and c: 3 4 5
Roots are complex and different.
x1 = -0.666667+1.10554i
x2 = -0.666667-1.10554i
```

Output:

C++ Program to Check Leap Year

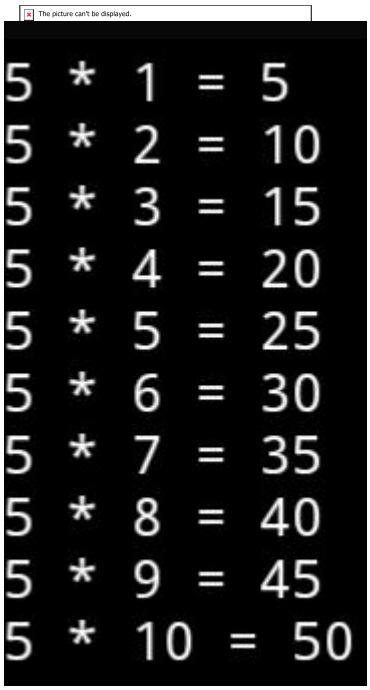
```
#include <iostream>
using namespace std;
int main() {
  int year;
  cout<<"Enter the year:";
  cin>>year;
  if (year % 4 == 0) {
    if (year % 100 == 0) {
      if (year % 400 == 0)
        cout << year << " is a leap year";
      else
        cout << year << " is not a leap year";
    } else
      cout << year << " is a leap year";
  } else
    cout << year << " is not a leap year";
  return 0;
}
```

Output:



C++ Program to Find Factorial

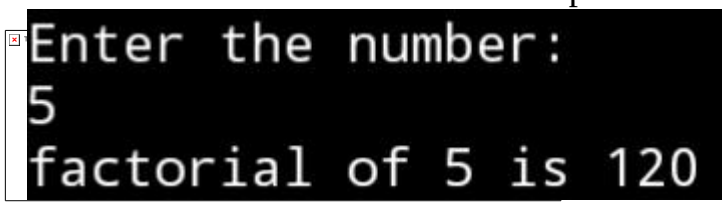
```
#include<iostream>
using namespace std;
int main()
{
        int no,i,fact=1;
        cout<<"Enter the number:"<<endl;
        cin>>no;
        for(i=1;i<=no;i++)
        fact=fact*i;
        cout<<"factorial of "<<no<<" is "<<fact<<endl;
        return 0;
}
```



Output:

C++ Program to Generate Multiplication Table

```
#include<iostream>
using namespace std;
int main()

{
int no;
cout<<"Enter Number To Find Multiplication table ";
cin>>no;
for(int a=1;a<=10;a++)
{
cout<<no<<" * "<<a<<" =
"<<no*a<<endl;
  }
return 0;
}
```



Output:

Worksheet-2

C++ Program to Display Fibonacci Series

```
#include <iostream>
using namespace std;
int main()
{
   int n, t1 = 0, t2 = 1, nextTerm = 0;
```

```
    cout << "Enter the number of terms: ";
    cin >> n;

    cout << "Fibonacci Series: ";

    for (int i = 1; i <= n; ++i)
    {
        // Prints the first two terms.
        if(i == 1)
        {
            cout << " " << t1;
            continue;
        }
        if(i == 2)
        {
```

```
Enter the number of terms: 7
Fibonacci Series:  0 1 1 2 3 5 8
[Program finished]
```

```
            cout << t2 << " ";

            continue;
        }
        nextTerm = t1 + t2;
        t1 = t2;
        t2 = nextTerm;

        cout << nextTerm << " ";
    }
    return 0;
}
```

Output:

C++ **Program to Find GCD**

```
#include<iostream>
using namespace std;
int main()
{
int n1,n2;
cout<<"Enter Two Values:";
cin>>n1>>n2;
```

```
int x=n1;
int y=n2;
while(n1%n2!=0)
{
  if(n1>n2)
  {
  n1=n1%n2;
```

```
Enter Two Values:25 5
gcd is5
```

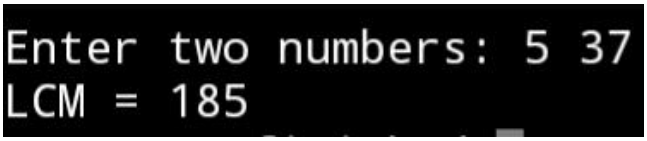
```
  }
  else
  {
  n2=n2%n1;

  }
  }
  cout<<"gcd is"<<n2<<endl; return 0;

  }
```

Output:

C++ Program to Find LCM

```
#include<iostream.h>
#include<conio.h>
int main()
{
   int n1, n2, max;
   int x=1;
   clrscr();
   cout << "Enter two numbers: ";
   cin >> n1 >> n2;
   max = (n1 > n2) ? n1 : n2;
 while(x)
   {
        if (max % n1 == 0 && max % n2 == 0)
        {
           cout << "LCM = " << max;
           x= 0;
           break;}
        else
           ++max;
   }
   getch();
   return 0;}
```

Output:

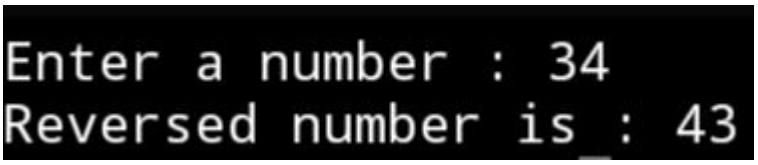


C++ Program to Reverse a Number

```
#include<iostream.h>
#include<conio.h>
void main()

{
clrscr();
```

```
int a,r=0,re;
cout<<"Enter a number : ";
cin>>a;
while(a!=0)
{
re=a%10;
r=r*10+re;
a=a/10;
}
cout<<"Reversed number is : "<<r;
getch();
}
```

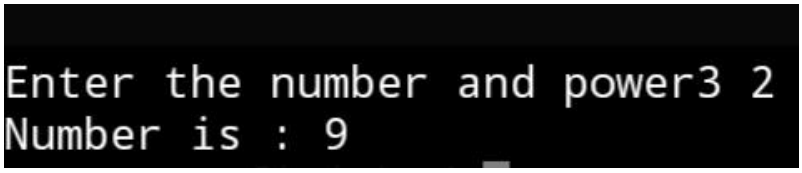
Output:



C++ Program to Calculate Power of a Number

```
#include<iostream.h>
#include<conio.h>
#include<math.h>
void main()
{
clrscr();
int number,power,res;
cout<<"Enter the number and power";
cin>>number>>power;
res=pow(number,power);
cout<<"Number is : "<<res;
getch();
```

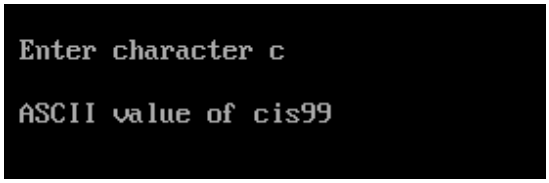
}
Output:



C++ Program to Find ASCII Value of a Character

```
#include<iostream.h>
#include<conio.h>
voidmain(){
char c;
clrscr();
cout<<"\n Enter character";
cin>>c;
cout<<"\n ASCII value of "<<c<<"is"<<int(c);
getch();
}
```

Output:

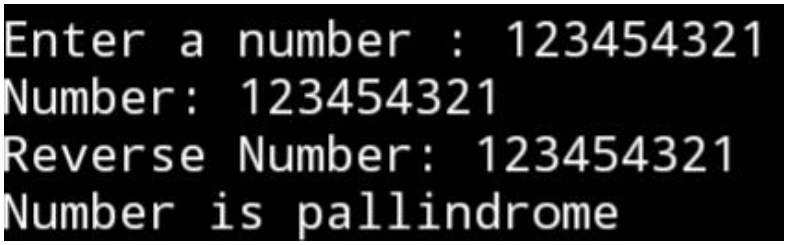


C++ Program to Check Whether a Number is Palindrome or Not

```
#include<iostream.h>
#include<conio.h>
void main()
{
clrscr();
int d,a,r=0,re;
cout<<"Enter a number : ";
cin>>a;
d=a;
while(a!=0)
{
```

```
re=a%10;
r=r*10+re;
a=a/10;}
cout<<"Number: "<<d<<endl;
cout<<"Reverse Number: "<<r<<endl;
if(r==d)
cout<<"Number is pallindrome";
else
cout<<"Number is not a pallindrome";

getch();}
```

Output:

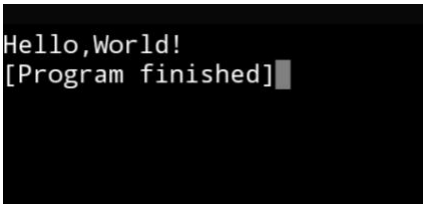


Programmes using Classes

C++ "Hello, World!" Program

```
#include<iostream>
using namespace std;
class world
{public:
void myfun()
{
cout<<"Hello,World!";
}
};
int main()
{ world obj;
        obj.myfun();
        return 0;}
```

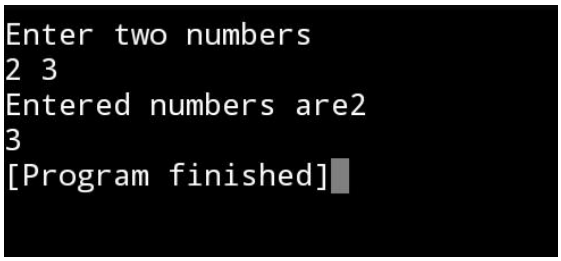
Output:



C++ Program to Print Number Entered by User

```
#include<iostream>
using namespace std;
class myclass
{public:
 void myfun()
 { int a,b;
  cout<<"Enter two numbers"<<endl;
  cin>>a>>b;
  cout<<"Entered numbers are"<<a<<endl;
  cout<<b;

 } };

   int main()
 {

  myclass obj;

  obj.myfun();
  return 0;}
```

Output:

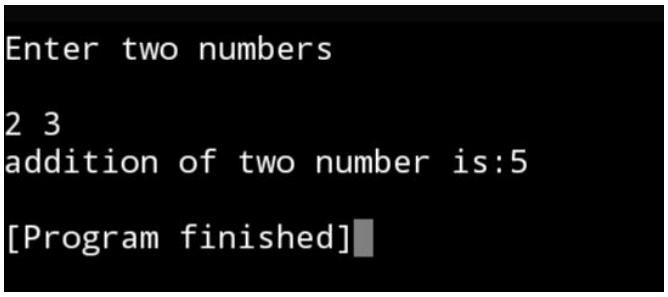


C++ Program to Add Two Numbers

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

```
class myclass
{
        public:

 void myfun()
 {
        int a,b,add;
        cout<<"Enter two numbers"<<endl;
        cin>>a>>b;
        add=a+b;
        cout<<"addition of two number is:"<<add<<endl;
 }
} ;
   int main()
   { myclass obj;
        obj.myfun();
        return 0;
   }
```

Output:



C++ Program to Find Quotient and Remainder

```
#include<iostream>
using namespace std;
class myclass
{ public:
 void myfun()
 {
 int a,b,q,r;
 cout<<"Enter two numbers"<<endl;
 cin>>a>>b;
 q=a/b;
 r=a%b;
```

```
 cout<<"quotient is:"<<q<<endl;
 cout<<"remainderis:"<<r<<endl;
 }
};
  int main()
    {
        myclass obj;
        obj.myfun();
        return 0;
    }
```

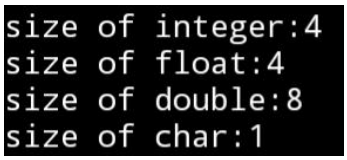
Output:

```
Enter two numbers
25 5
quotient is:5
remainderis:0
```

C++ Program to Find Size of int, float, double and char in Your System

```
#include<iostream>
using namespace std;
class myclass
{ public:
 void myfun()
 {
 cout<<"size of integer:"<<sizeof(int)<<endl;
 cout<<"size of float:"<<sizeof(float)<<endl;
 cout<<"size of double:"<<sizeof(double)<<endl;
 cout<<"size of char:"<<sizeof(char)<<endl;
 }
};
  int main()
    {
        myclass obj;
        obj.myfun();
        return 0;
    }
```

Output:

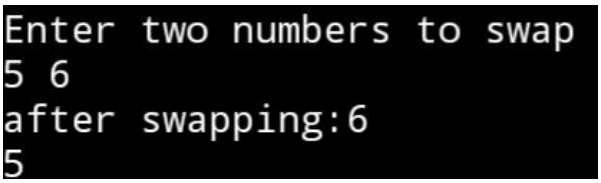


C++ Program to Swap Two Numbers

```
#include<iostream>
using namespace std;
class myclass
{ public:
 void myfun()
 {
 int a,b,temp;
clrscr();
cout<<"Enter two numbers to swap"<<endl;
cin>>a>>b;
temp=a;
a=b;
```

```
b=temp;
cout<<"after swapping:"<<a<<endl;
cout<<b;
 }
};
  int main()
    {
        myclass obj;
        obj.myfun();
        return 0;
    }
```

Output:

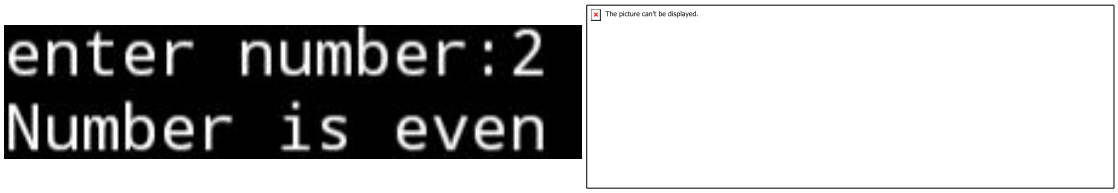


C++ Program to Check Whether Number is Even or Odd

```
#include<iostream.h>
#include<conio.h>
class myclass
{ public:
 void myfun()
{ int a;
 clrscr();
 cout<<"enter number:";
```

```
 cin>>a;
 if(a%2==0)
 cout<<"Number is even";
 else
 cout<<"Number is odd";
}};
  int main()
     {
          myclass obj;
          obj.myfun();
          return 0;
     }
```

Output:

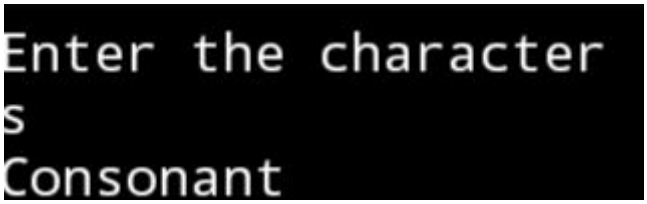


C++ Program to Check Whether a character is Vowel or Consonant.

```
#include<iostream>
using namespace std;
class myclass
{ public:
 void myfun()
 {
  char nnn;
  cout<<"Enter the character"<<endl;
  cin>>nnn;
  if(nnn=='a'||nnn=='e'||nnn=='i'||nnn=='o'||nnn=='u')
  cout<<"Vowel";
  else
  cout<<"Consonant";

 }
};
  int main()
     {
```

```
        myclass obj;
        obj.myfun();
        return 0;
    }
```

Output:

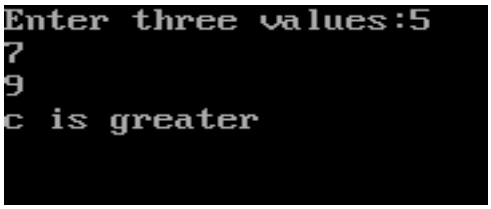


C++ Program to Find Largest Number Among Three Numbers

```
 #include<iostream.h>
#include<conio.h>
class great
{
inta,b,c;
public:
voidcheck()
{
cout<<"Enter three values:";
cin>>a>>b>>c;
if(a>b && a>c)
{
cout<<"a is greater";
}
elseif(b>a && b>c)

{
cout<<"b is greater";
}
elseif(c>a && c>b)
 {
cout<<"c is greater";
  }
else
   {
cout<<"They are equal";
    }
    }
    };
voidmain()
{
clrscr();
```

```
great g1;
g1.check();
getch();}
```

Output:



C++ Program to Find All Roots of a Quadratic Equation

```
#include <iostream>
#include <cmath>
using namespace std;
class roots
{ public:
  void fun()
  {

    float a, b, c, x1, x2, discriminant, realPart, imaginaryPart;
    cout << "Enter coefficients a, b and c: ";
    cin >> a >> b >> c;
    discriminant = b*b - 4*a*c;

    if (discriminant > 0) {
        x1 = (-b + sqrt(discriminant)) / (2*a);
        x2 = (-b - sqrt(discriminant)) / (2*a);
        cout << "Roots are real and different." << endl;
        cout << "x1 = " << x1 << endl;
        cout << "x2 = " << x2 << endl;
    }

    else if (discriminant == 0) {
        cout << "Roots are real and same." << endl;
        x1 = (-b + sqrt(discriminant)) / (2*a);
        cout << "x1 = x2 =" << x1 << endl;
    }

    else {
        realPart = -b/(2*a);
```

```
        imaginaryPart =sqrt(-discriminant)/(2*a);
        cout << "Roots are complex and different."  << endl;
        cout << "x1 = " << realPart << "+" << imaginaryPart << "i" << endl;
        cout << "x2 = " << realPart << "-" << imaginaryPart << "i" << endl;
    }
  }
};
int main()
{
         roots obj;
         obj.fun();
         return 0;}
```

Output:

```
Enter coefficients a, b and c: 3 4 5
Roots are complex and different.
x1 = -0.666667+1.10554i
x2 = -0.666667-1.10554i
```

C++ Program to Calculate Sum of Natural Numbers

```
#include<iostream>
using namespace std;
 class nat_no
{
  public:

  void natural()
    {

    int no,a, sum = 0;

    cout << "Enter the number : ";
    cin >> no;
    a = no;
    while (a != 0)
    {
        sum = sum + a % 10;
        a = a / 10;
    }
    cout << "The sum of the digits of "
         << no << " is " << sum;
```

```
    }
};
int main()
{
        nat_no obj;
        obj.natural();
        return 0;
}
```

Output:

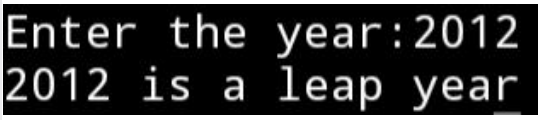
```
Enter the number : 23
The sum of the digits of 23 is 5
```

C++ Program to Check Leap Year

```
#include <iostream>
using namespace std;
 class leap
{ public:
        void lpy()
        {


  int year;
  cout<<"Enter the year:";
  cin>>year;
  if (year % 4 == 0) {
    if (year % 100 == 0) {
      if (year % 400 == 0)
        cout << year << " is a leap year";
      else
        cout << year << " is not a leap year";
    } else
      cout << year << " is a leap year";
  } else
    cout << year << " is not a leap year";

  }
};
int main()
{
        leap obj;
```

```
        obj.lpy();
        return 0;}
```

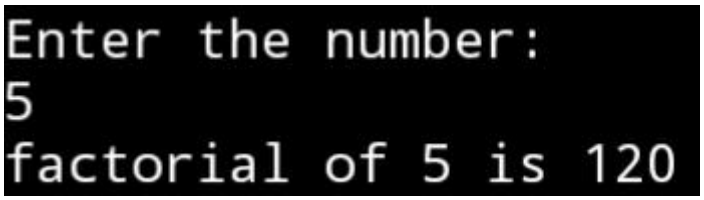
Output:



C++ Program to Find Factorial

```
#include<iostream>
using namespace std;
 class factorial
{
        public:
        void fact()
                {
        int no,i,fact=1;
        cout<<"Enter the number:"<<endl;
        cin>>no;
        for(i=1;i<=no;i++)
        fact=fact*i;
        cout<<"factorial of "<<no<<" is "<<fact<<endl;
       }
};
  int main()
   {
        factorial obj;
        obj.fact();
        return 0;
   }
```

Output:



C++ Program to Generate Multiplication Table

```
#include<iostream>
```

```
using namespace std;
class table
{ public:
  int no;
  void setno(int i)
    {
     no=i;
    }
 void display()
 {
  int a;

    for(int a=1;a<=10;a++)
 {
 cout<<no<<" * "<<a<<" = "<<no*a<<endl;
 }
}
};
int main()
{
        table obj;
        obj.setno(5);
        obj.display();
        return 0;
}
```

Output:

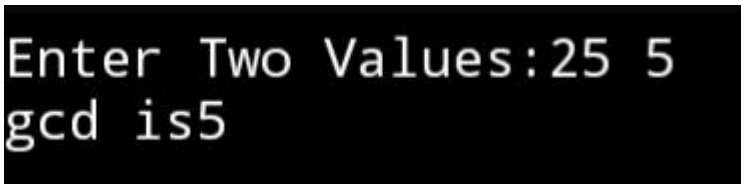
```
5 * 1 = 5
5 * 2 = 10
5 * 3 = 15
5 * 4 = 20
5 * 5 = 25
5 * 6 = 30
5 * 7 = 35
5 * 8 = 40
5 * 9 = 45
5 * 10 = 50
```

C++ Program to Find GCD

```
#include<iostream>
using namespace std;
class gcd
{ void myfun()
{
int n1,n2;
cout<<"Enter Two Values:";
cin>>n1>>n2;
int x=n1;
int y=n2;
while(n1%n2!=0)
{
  if(n1>n2)
  {
  n1=n1%n2;

  }
  else
  {
  n2=n2%n1;
  }
  }
  cout<<"gcd is"<<n2<<endl;
 } };
int main()
{
```

```
    gcd obj;
    obj.myfun();
    return 0;
}
```

Output:



C++ Program to Display Fibonacci series

```
#include <iostream>
using namespace std;
class fibonacci
{public:
     void series()
{
    int n, t1 = 0, t2 = 1, nextTerm = 0;

    cout << "Enter the number of terms: ";
    cin >> n;

    cout << "Fibonacci Series: ";

    for (int i = 1; i <= n; ++i)
    {
        // Prints the first two terms.
        if(i == 1)
```

```
        {
            cout << " " << t1;
            continue;
        }
        if(i == 2)
        {
            cout << t2 << " ";
            continue;
        }
        nextTerm = t1 + t2;
        t1 = t2;
        t2 = nextTerm;

        cout << nextTerm << " ";
    }

}
};
int main()
  {
      fibonacci obj;
      obj.series();
      return 0;
 }
```

Output:

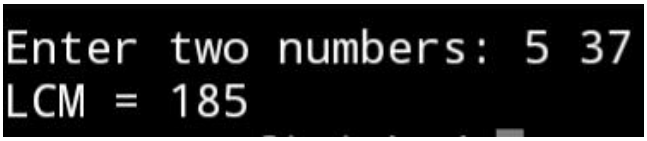
```
Enter the number of terms: 7
Fibonacci Series:  01 1 2 3 5 8
[Program finished]
```

C++ Program to Find LCM

```
#include<iostream>
using namespace std;
class numbers
{ public:
  void lcm()
{
    int n1, n2, max;
    int x=1;
    cout << "Enter two numbers: ";
    cin >> n1 >> n2;
    max = (n1 > n2) ? n1 : n2;
 while(x)
    {
        if (max % n1 == 0 && max % n2 == 0)
        {
            cout << "LCM = " << max;
            x= 0;
            break;}
        else
            ++max;
    }
   }
   };
   int main()
    {
```

```
    numbers obj;
    obj.lcm();
    return 0;
  }
```

Output:



C++ Program to Reverse a Number

```
#include<iostream>
using namespace std;
class reverse
{
 public:
    void myfun()
    {

    int a,r=0,re;
    cout<<"Enter a number : ";
    cin>>a;
    while(a!=0)
      {
    re=a%10;
    r=r*10+re;
    a=a/10;
      }
cout<<"Reversed number is : "<<r;

    }
};
int main()
 {
    reverse obj;
    obj.myfun();
    return 0;
 }
```

Output:

```
Enter a number : 34
Reversed number is : 43
```

C++ Program to Calculate Power of a Number

```
#include<iostream>
using namespace std;
#include<math.h>

 class number
{ public:
  void power()
  {
   int number,power,res;
   cout<<"Enter the number and power";
   cin>>number>>power;
   res=pow(number,power);
   cout<<"Number is : "<<res;

  }
};
int main()
{
    number obj;
    obj.power();
    return 0;
}
```

Output:

```
Enter the number and power3 2
Number is : 9
```

Worksheet-3

C++ Program to Check Prime Number By Creating a Function

```
#include<iostream.h>
#include<conio.h>

intprime(int no)
{
int count = 0;
for(inti = 1;i<=no;i++)
  {
if(no%i==0)
      {
       count++;
      }
  }
return(count);
}

voidmain()
{
clrscr();
int no;
cout<<"Enter no::" ;
cin>>no;
int x = prime(no);
if(x>2)
{  cout<<"\nNumber is not prime no";
}
else
cout<<"\n PRIME" ;
getch();
}
```

Output:

```
Enter no::18

Number is not prime no_
```

C++ Program to Display Factors of a Number

```
#include<iostream.h>
#include<conio.h>
class factors
{
public:
inti,n;
factors()
{
cout<<"enter an integer";
cin>>n;
cout<<"factors of "<<n<<"are"<<endl;
for(i=1;i<=n;i++)
{
if(n%i==0)
{
cout<<i<<endl;
}
}
}
};
voidmain()
{
clrscr();
factors f1;
getch();
}
```

Output:

```
enter an integer12
factors of 12are
1
2
3
4
6
12
```

C++ Programs To Create Pyramid and Pattern

```
#include<iostream.h>
#include<conio.h>

voidmain()
{
inti,j,k,space=5;
clrscr();
for (i=0;i<=5;i++)
{
for (int k=0;k<space;k++)
{
cout<<" ";
}
for (int j=0;j<2*i-1;j++)
{
cout<<"*";
}
  space--;
cout<<endl;
}
getch();}
```

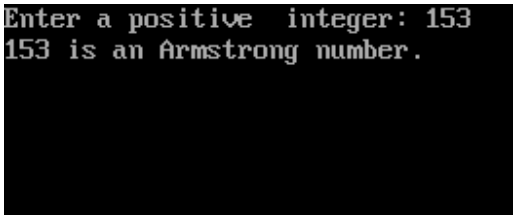
Output:

C++ Program to Check Armstrong Number

```
#include<iostream.h>
#include<conio.h>

class number
{
intorignum,num,sum,rem;
public:
```

```
number()
{
cout<<"Enter a positive  integer: ";
cin>>orignum;
  sum=0;

  num = orignum;

while(num != 0)
  {
     rem = num % 10;
     sum=sum+ rem * rem * rem;
     num =num/ 10;
  }

if(sum == orignum)
cout<<orignum<<" is an Armstrong number.";
else
cout<<orignum<<" is not an Armstrong number.";
    }
    };
voidmain()
    {
clrscr();
   number n1;
getch();
}
```

Output:

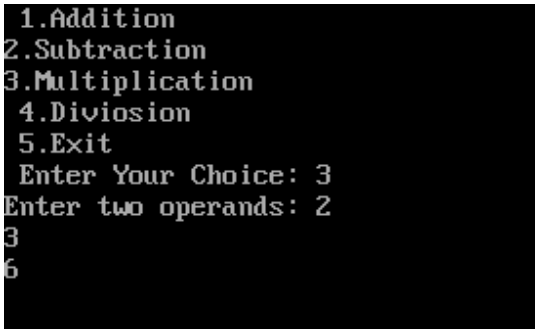


C++ Program to Make a Simple Calculator to Add, Subtract, Multiply or Divide Using switch...case

```
# include<iostream.h>
#include<conio.h>
#include<stdlib.h>
```

```
voidmain()
{
char c;
inta,b;
clrscr();
cout<<" 1.Addition\n2.Subtraction\n3.Multiplication\n 4.Diviosion\n 5.Exit\n
Enter Your Choice: ";
cin>> c;

cout<<"Enter two operands: ";
cin>> a >> b;

switch(c)
   {
        case'1':
        cout<<a+b;
        break;

        case'2':
        cout<< a-b;
        break;

        case'3':
        cout<< a*b;
        break;

        case'4':
        cout<< a/b;
        break;

        default:

        exit(0);
        break;
   }

getch();
}
```

Output:



C++ Program to Check Whether a Number is Prime or Not

```
#include<iostream.h>
#include<conio.h>
voidmain()
{
	clrscr();
	intnum,i,count=0;
	cout<<"Enter a number:";
	cin>>num;
	for(i=2;i<num;i++)
	{
		if(num%i==0)
		{
			count++;
			break;
		}
	}
	if(count==0)
	{
		cout<<"This is a prime number";
	}
	else
	{
		cout<<"This is not a prime number";
	}
	getch();
}
```

Output:

```
Enter a number: 4
This is not a prime number
```

7. C++ program to Find Sum of Natural Numbers using Recursion

```
#include<iostream.h>
#include<conio.h>

intadd(int n);

voidmain()
{
int n;
clrscr();

cout<<"Enter a positive integer: ";
cin>> n;

cout<<"Sum =  "<< add(n);

getch();
}

intadd(int n)
{
if(n != 0)
        return n + add(n - 1);

}
```

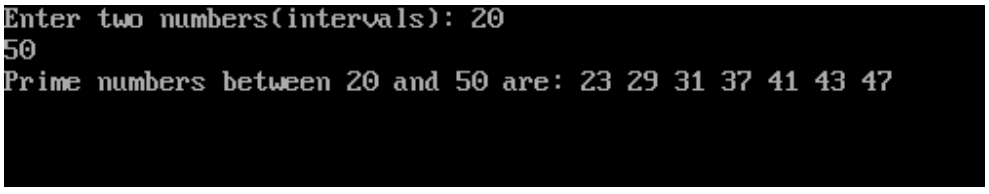
Output:

```
Enter a positive integer: 10
Sum =  55_
```

C++ Program to Display Prime Numbers Between Two Intervals

```
#include<iostream.h>
#include<conio.h>
voidmain()
{
int low, high, i, flag;
clrscr();
        cout<<"Enter two numbers(intervals): ";
cin>> low >> high;
cout<<"Prime numbers between "<< low <<" and "<< high <<" are: ";
while (low < high)
   {
      flag = 0;
for(i = 2; i<= low/2; ++i)
      {
if(low % i == 0)
         {
            flag = 1;
break;
         }
      }
if (flag == 0)
cout<< low <<" ";
      ++low;
   }
getch();
}
```

Output:



Worksheet 5

C++ Program to Add Two Matrix Using Multi-dimensional Arrays

```
#include<iostream>
```

```
using namespace std;
class matrix {

	int a[3][3], b[3][3], ans[3][3];

	public:
		matrix() {
			cout << "Enter data for first array:" << endl;
			for(int i = 0; i < 3; i++)
				for(int j = 0; j < 3; j++)
					cin >> a[i][j];
			cout << "Enter data for second array:" << endl;
			for(int i = 0; i < 3; i++)
				for(int j = 0; j < 3; j++)
					cin >> b[i][j];
		}

		void addition() {
			cout << "After matrix addition" << endl;
			for(int i = 0; i < 3; i++) {
				for (int j = 0; j < 3; j++) {
					ans[i][j]= a[i][j] + b[i][j];
					cout << ans[i][j] << "\t";
				}
				cout << endl;
			}
		}
};

int main() {
	cout << "Program for calculation of Matrix Addition" << endl;
	matrix mtAdd = matrix();
	mtAdd.addition();
	return 0;}
```

Output:

```
Program for calculation of Matrix Addition
Enter data for first array:
1 2 3 4 5 6 7 8 9
Enter data for second array:
2 4 6 8 1 3 5 7 9
After matrix addition
3       6       9
12      6       9
12      15      18
```

C++ Program to Find Transpose of a Matrix

```
#include <iostream>
using namespace std;
int main()
{
   int a[10][10], trans[10][10], r, c, i, j;
   cout << "Enter rows and columns of matrix: ";
   cin >> r >> c;
   // Storing element of matrix entered by user in array a[][].
   cout << endl << "Enter elements of matrix: " << endl;
   for(i = 0; i < r; ++i)
   for(j = 0; j < c; ++j)
   {
      cout << "Enter elements a" << i + 1 << j + 1 << ": ";
      cin >> a[i][j];
   }
   // Displaying the matrix a[][]
   cout << endl << "Entered Matrix: " << endl;
   for(i = 0; i < r; ++i)
      for(j = 0; j < c; ++j)
      {
         cout << " " << a[i][j];
         if(j == c - 1)
            cout << endl << endl;
      }
   // Finding transpose of matrix a[][] and storing it in array trans[][].
   for(i = 0; i < r; ++i)
      for(j = 0; j < c; ++j)
      {
         trans[j][i]=a[i][j];
      }
   // Displaying the transpose,i.e, Displaying array trans[][].
```

```
    cout << endl << "Transpose of Matrix: " << endl;
    for(i = 0; i < c; ++i)
        for(j = 0; j < r; ++j)
        {
            cout << " " << trans[i][j];
            if(j == r - 1)
                cout << endl << endl;
        }
    return 0;
}
```

Output:

```
Enter rows and columns of matrix: 2 2

Enter elements of matrix:
Enter elements a11: 1 2 3 4
Enter elements a12: Enter elements a21: Enter elements a22:
Entered Matrix:
 1 2

 3 4


Transpose of Matrix:
 1 3

 2 4
```

C++ Program to Multiply two Matrices by Passing Matrix to Function

```
#include <iostream>
using namespace std;
void enterData(int firstMatrix[][10], int secondMatrix[][10], int rowFirst, int
columnFirst, int rowSecond, int columnSecond);
void multiplyMatrices(int firstMatrix[][10], int secondMatrix[][10], int
multResult[][10], int rowFirst, int columnFirst, int rowSecond, int
columnSecond);
void display(int mult[][10], int rowFirst, int columnSecond);
int main()
{
        int firstMatrix[10][10], secondMatrix[10][10], mult[10][10], rowFirst,
columnFirst, rowSecond, columnSecond, i, j, k;
        cout << "Enter rows and column for first matrix: ";
```

```
        cin >> rowFirst >> columnFirst;
        cout << "Enter rows and column for second matrix: ";
        cin >> rowSecond >> columnSecond;
        // If colum of first matrix in not equal to row of second matrix, asking
user to enter the size of matrix again.
        while (columnFirst != rowSecond)
        {
                cout << "Error! column of first matrix not equal to row of second."
<< endl;
                cout << "Enter rows and column for first matrix: ";
                cin >> rowFirst >> columnFirst;
                cout << "Enter rows and column for second matrix: ";
                cin >> rowSecond >> columnSecond;
        }
        // Function to take matrices data
       enterData(firstMatrix, secondMatrix, rowFirst, columnFirst, rowSecond,
columnSecond);
       // Function to multiply two matrices.
       multiplyMatrices(firstMatrix, secondMatrix, mult, rowFirst, columnFirst,
rowSecond, columnSecond);
       // Function to display resultant matrix after multiplication.
       display(mult, rowFirst, columnSecond);
         return 0;
}
void enterData(int firstMatrix[][10], int secondMatrix[][10], int rowFirst, int
columnFirst, int rowSecond, int columnSecond)
{
        int i, j;
        cout << endl << "Enter elements of matrix 1:" << endl;
        for(i = 0; i < rowFirst; ++i)
        {
                for(j = 0; j < columnFirst; ++j)
                {
                        cout << "Enter elements a"<< i + 1 << j + 1 << ": ";
                        cin >> firstMatrix[i][j];
                }
        }
        cout << endl << "Enter elements of matrix 2:" << endl;
        for(i = 0; i < rowSecond; ++i)
        {
                for(j = 0; j < columnSecond; ++j)
                {
                        cout << "Enter elements b" << i + 1 << j + 1 << ": ";
```

```
                cin >> secondMatrix[i][j];
            }
        }
}
void multiplyMatrices(int firstMatrix[][10], int secondMatrix[][10], int
mult[][10], int rowFirst, int columnFirst, int rowSecond, int columnSecond)
{
        int i, j, k;
        // Initializing elements of matrix mult to 0.
        for(i = 0; i < rowFirst; ++i)
        {
            for(j = 0; j < columnSecond; ++j)
            {
                mult[i][j] = 0;
            }
        }
        // Multiplying matrix firstMatrix and secondMatrix and storing in array
mult.
        for(i = 0; i < rowFirst; ++i)
        {
            for(j = 0; j < columnSecond; ++j)
            {
                for(k=0; k<columnFirst; ++k)
                {
                    mult[i][j] += firstMatrix[i][k] * secondMatrix[k][j];
                }
            }
        }
}
void display(int mult[][10], int rowFirst, int columnSecond)
{
        int i, j;
        cout << "Output Matrix:" << endl;
        for(i = 0; i < rowFirst; ++i)
        {
            for(j = 0; j < columnSecond; ++j)
            {
                cout << mult[i][j] << " ";
                if(j == columnSecond - 1)
                    cout << endl << endl;
            }
        }
}
```

Output:

```
Enter rows and column for first matrix: 2 2
Enter rows and column for second matrix: 2 2

Enter elements of matrix 1:
Enter elements a11: 1 2 3 4
Enter elements a12: Enter elements a21: Enter elements a22:
Enter elements of matrix 2:
Enter elements b11: 4 3 2 1
Enter elements b12: Enter elements b21: Enter elements b22: Output Matrix:
8 5

20 13
```

C++ Program to Access Elements of an Array Using Pointer

```
#include <iostream>
using namespace std;
class pointerac
{
   private:
   int data[5];
   public:
   void pointerFun();
   void display();
};
void pointerac:: pointerFun()
{

    cout << "Enter elements: ";
  for(int i = 0; i < 5; ++i)
     cin >> data[i];
}

void pointerac:: display()
{
    cout << "You entered: ";
  for(int i = 0; i < 5; ++i)
     cout << endl << *(data + i);
}

int main()
```

```
{
pointerac p;
p.pointerFun();
p.display();
}
```

Output:

```
Enter elements: 3 2 1 4 6
You entered:
3
2
1
4
```

C++ Program to Swap Numbers in Cyclic Order Using Call by Reference

```
#include<iostream>
using namespace std;
void cyclicSwap(int *a, int *b, int *c);
int main()
{
   int a, b, c;
   cout << "Enter value of a, b and c respectively: ";
   cin >> a >> b >> c;
   cout << "Value before swapping: " << endl;
   cout << "a, b and c respectively are: " << a << ", " << b << ", " << c << endl;
   cyclicSwap(&a, &b, &c);
   cout << "Value after swapping numbers in cycle: " << endl;
   cout << "a, b and c respectively are: " << a << ", " << b << ", " << c << endl;
   return 0;
}
void cyclicSwap(int *a, int *b, int *c)
{
   int temp;
   temp = *b;
   *b = *a;
   *a = *c;
   *c = temp;
}
```

Output:

```
Enter value of a, b and c respectively: 3 4 5
Value before swapping:
a, b and c respectively are: 3, 4, 5
Value after swapping numbers in cycle:
a, b and c respectively are: 5, 3, 4
```

PROGRAM 7:
C++ Program to Find the Frequency of Characters in a String

PROGRAM 8:
C++ Program to Find the Number of Vowels, Consonants, Digits and White Spaces in a String

PROGRAM 9:
C++ Program to Remove all Characters in a String Except Alphabets.

PROGRAM 10:
C++ Program to Find the Length of a String

Worksheet 6

C++ Program to Concatenate Two Strings

```
#include <stdio.h>

#include <string.h>

#include<iostream.h>

int main()

{

  char a[1000], b[1000];

  cout<<”Enter the first string\n”;

  gets(a);
```

```
  cout<<"Enter the second string\n";
  gets(b);
  strcat(a, b);
  cout<<"String obtained on concatenation:\n"<< a;
  return 0;
}
```

Output:

```
Enter the first string
hello
Enter the second string
world
String obtained on concatenation: helloworld

Process returned 0 (0x0)   execution time : 19.707 s
Press any key to continue.
```

C++ Program to Copy Strings

```
#include <iostream>
using namespace std;
int main() {
   char str1[100] = "Magic";
   char str2[100];
   int i;
   for(i = 0; str1[i] != '\0'; i++)
      str2[i] = str1[i];
   str2[i] = '\0';
   cout<<"The contents of str1 are:"<<str1;
   cout<<"\n After copying";
   cout<<"\nThe contents of str2 are: "<<str2;
   return 0;
}
```

Output:

```
The contents of str1 are:Magic
 After copying
The contents of str2 are: Magic
```

C++ Program to Sort Elements in Lexicographical Order (Dictionary Order)

```
#include <iostream>

using namespace std;

int main()

{string str[10], temp;

    cout << "Enter 10 words: " << endl;

    for(int i = 0; i < 10; ++i)  {

   getline(cin, str[i]);   }

    for(int i = 0; i < 9; ++i)

       for( int j = i+1; j < 10; ++j)

       {          if(str[i] > str[j])

{

            temp = str[i];

            str[i] = str[j];

            str[j] = temp;

          }  }

    cout << "In lexicographical order: " << endl;

    for(int i = 0; i < 10; ++i)

    {

       cout << str[i] << endl;

    }

    return 0;

}
```

Output:

```
january
february
march
april
may
june
july
august
sep
oct
In lexicographical order:
april
august
february
january
july
june
march
may
oct
sep
```

C++ Program to Store Information of a Student in a Structure

```
#include <iostream>

using namespace std;

struct student

{

    char name[50];

    int roll;

    float marks;

} s[10];

int main()

{

    cout << "Enter information of students: " << endl;
```

```
    // storing information
    for(int i = 0; i < 10; ++i)
    {
        s[i].roll = i+1;
        cout << "For roll number" << s[i].roll << "," << endl;
        cout << "Enter name: ";
        cin >> s[i].name;
        cout << "Enter marks: ";
        cin >> s[i].marks;
        cout << endl;
    }
    cout << "Displaying Information: " << endl;
    // Displaying information
    for(int i = 0; i < 10; ++i)
    {
        cout << "\nRoll number: " << i+1 << endl;
        cout << "Name: " << s[i].name << endl;
        cout << "Marks: " << s[i].marks << endl;
    }
    return 0;
}
```

Output:

```
Enter information of students:
For roll number1,
Enter name: ambani
Enter marks: 98

For roll number2,
Enter name: steeve
Enter marks: 99

Displaying Information:

Roll number: 1
Name: ambani
Marks: 98

Roll number: 2
Name: steeve
Marks: 99
```

C++ Program to Add Two Distances (in inch-feet) System Using Structures

```
#include <iostream>

using namespace std;

struct Distance{

    int feet;

    float inch;

}d1 , d2, sum;

int main()

{

    cout << "Enter 1st distance," << endl;

    cout << "Enter feet: ";

    cin >> d1.feet;

    cout << "Enter inch: ";

    cin >> d1.inch;

    cout << "\nEnter information for 2nd distance" << endl;

    cout << "Enter feet: ";

    cin >> d2.feet;

    cout << "Enter inch: ";

    cin >> d2.inch;
```

```
    sum.feet = d1.feet+d2.feet;
    sum.inch = d1.inch+d2.inch;
    // changing to feet if inch is greater than 12
    if(sum.inch > 12)
    {
        ++ sum.feet;
        sum.inch -= 12;
    }
    cout << endl << "Sum of distances = " << sum.feet << " feet  " <<
sum.inch << " inches";
    return 0;
}
```

Output:

```
Enter 1st distance,
Enter feet: 5
Enter inch: 6

Enter information for 2nd distance
Enter feet: 6
Enter inch: 3

Sum of distances = 11 feet  9 inches
```

C++ Program to Add Complex Numbers by Passing Structure to a Function

```
#include <iostream>
using namespace std;
typedef struct complex
{
    float real;
    float imag;
```

```
} complexNumber;
complexNumber addComplexNumbers(complex, complex);
int main()
{
    complexNumber n1, n2, temporaryNumber;
    char signOfImag;
    cout << "For 1st complex number," << endl;
    cout << "Enter real and imaginary parts respectively:" << endl;
    cin >> n1.real >> n1.imag;
    cout << endl << "For 2nd complex number," << endl;
    cout << "Enter real and imaginary parts respectively:" << endl;
    cin >> n2.real >> n2.imag;
    signOfImag = (temporaryNumber.imag > 0) ? '+' : '-';
    temporaryNumber.imag = (temporaryNumber.imag > 0) ?
temporaryNumber.imag : -temporaryNumber.imag;
    temporaryNumber = addComplexNumbers(n1, n2);
    cout << "Sum = "  << temporaryNumber.real << temporaryNumber.imag <<
"i";
    return 0;
}
complexNumber addComplexNumbers(complex n1,complex n2)
{
      complex temp;
      temp.real = n1.real+n2.real;
      temp.imag = n1.imag+n2.imag;
      return(temp);
}
```

Output:

```
For 1st complex number,
Enter real and imaginary parts respectively:
5 3

For 2nd complex number,
Enter real and imaginary parts respectively:
2 5
Sum = 78i
```

C++ Program to Calculate Difference Between Two Time Period

```
#include <iostream>
using namespace std;
struct TIME
{
  int seconds;
  int minutes;
  int hours;
};
void computeTimeDifference(struct TIME, struct TIME, struct TIME *);
int main()
{
    struct TIME t1, t2, difference;
    cout << "Enter start time." << endl;
    cout << "Enter hours, minutes and seconds respectively: ";
    cin >> t1.hours >> t1.minutes >> t1.seconds;
    cout << "Enter stop time." << endl;
    cout << "Enter hours, minutes and seconds respectively: ";
    cin >> t2.hours >> t2.minutes >> t2.seconds;
    computeTimeDifference(t1, t2, &difference);
```

```
    cout << endl << "TIME DIFFERENCE: " << t1.hours << ":" << t1.minutes <<
":" << t1.seconds;

    cout << " - " << t2.hours << ":" << t2.minutes << ":" << t2.seconds;

    cout << " = " << difference.hours << ":" << difference.minutes << ":"
<< difference.seconds;

    return 0;

}

void computeTimeDifference(struct TIME t1, struct TIME t2, struct TIME
*difference){


    if(t2.seconds > t1.seconds)

    {

        --t1.minutes;

        t1.seconds += 60;

    }

    difference->seconds = t1.seconds - t2.seconds;

    if(t2.minutes > t1.minutes)

    {

        --t1.hours;

        t1.minutes += 60;

    }

    difference->minutes = t1.minutes-t2.minutes;

    difference->hours = t1.hours-t2.hours;

}
```

Output:

```
Enter start time.
Enter hours, minutes and seconds respectively: 5 6 3
Enter stop time.
Enter hours, minutes and seconds respectively: 3 8 21

TIME DIFFERENCE: 5:6:3 - 3:8:21 = 1:57:42
```

C++ Program to Store and Display Information Using Structure

```
#include <iostream>
using namespace std;
struct student
{
    char name[50];
    int roll;
    float marks;
};
int main()
{
    student s;
    cout << "Enter information," << endl;
    cout << "Enter name: ";
    cin >> s.name;
    cout << "Enter roll number: ";
    cin >> s.roll;
    cout << "Enter marks: ";
    cin >> s.marks;
    cout << "\nDisplaying Information," << endl;
    cout << "Name: " << s.name << endl;
    cout << "Roll: " << s.roll << endl;
    cout << "Marks: " << s.marks << endl;
    return 0;
}
```

Output:

```
Enter information,
Enter name: zunaid
Enter roll number: 1089
Enter marks: 99

Displaying Information,
Name: zunaid
Roll: 1089
Marks: 99
```

Python

Python program to print Hello World!

print('Hello, world!')

Output:

```
$python main.py
Hello World!
```

Python Program to Add Two Numbers

number1 = input("First number: ")

number2 = input("\nSecond number: ")

sum = float(number1) + float(number2)

print("The sum of {0} and {1} is {2}" .format(number1, number2, sum))

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
Enter first number: 11.5
Enter second number: 45.9
The sum of 11.5 and 45.9 is 57.4
>
```

Python Program for factorial of a number

```
def factorial(n):
return 1 if (n==1 or n==0) else n * factorial(n - 1)
num = 5
print ("Factorial of",num,"is",
factorial(num))
```

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
The factorial of 5 is 120
>
```

Python Program for simple interest

```
P = 1
R = 1
T = 1
SI = (P * R * T) / 100
print("simple interest is", SI)
```

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
simple interest is 0.01
>
```

Python Program for compound interest

```
def compound_interest(principle, rate, time):
CI = principle * (pow((1 + rate / 100), time))
print("Compound interest is", CI)
compound_interest(10000, 10.25, 5)
```

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
Compound interest is 16288.946267774416
>
```

Python Program for Program to find area of a circle

```
def findArea(r):
PI = 3.142
return PI * (r*r);
print("Area is %.6f" % findArea(5));
```

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
Area is 78.550000
>
```

Python program to print all Prime numbers in an Interval

```
start = 11
end = 25
for val in range(start, end + 1):
if val > 1:
for n in range(2, val):
if (val % n) == 0:
break
else:
print(val)
```

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
25
>
```

Python program to check whether a number is Prime or not

```
num = int(input("enter a number: "))
for i in range(2, num):
if num % i  == 0:
print("not prime number")
break
else:
print("prime number")
```

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
enter a number: 6
not prime number
>
```

Program to print ASCII Value of a character

```
c = 'g'
print("The ASCII value of '" + c + "' is", ord(c))
```

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
The ASCII value of 'g' is 103
>
```

Python Program for Sum of squares of first n natural numbers

```
def squaresum(n) :
sm = 0
for i in range(1, n+1) :
sm = sm + (i * i)
return sm
n = 4
print(squaresum(n))
```

Output:

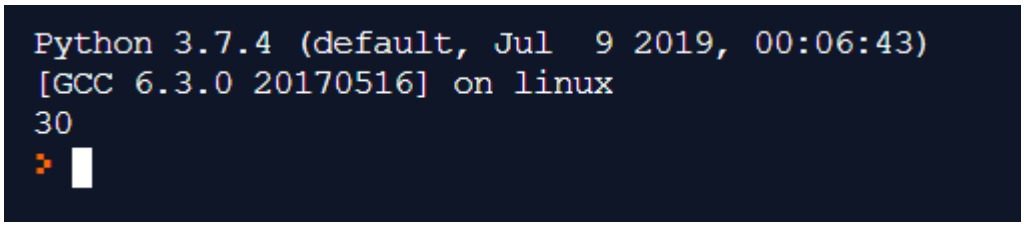
```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
30
>
```

Python Program for cube sum of first n natural numbers

```
def sumOfSeries(n):
sum = 0
for i in range(1, n+1):
```

```
sum +=i*i*i
return sum
n = 5
print(sumOfSeries(n))
```

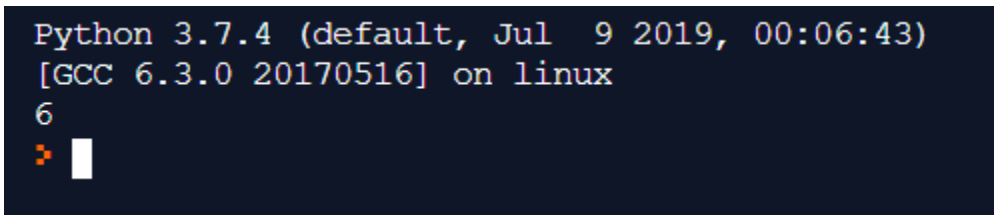
Output:



Python Program for Common Divisors of Two Numbers

```
a = 12
b = 24
n = 0
for i in range(1, min(a, b)+1):
if a%i==b%i==0:
n+=1
print(n)
```

Output:



Python Program to Swap Two Numbers

```
a = 10
b = 20
print("before swapping\na=", a, " b=", b)
```

```
temp = a
a = b
b = temp
print("\nafter swapping\na=", a, " b=", b)
```

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
before swapping
a= 10  b= 20

after swapping
a= 20  b= 10
```

Python Program to Check Leap Year

```
year = int(input("enter a year: "))
if(year%4==0 and (year%100!=0 or year%400==0)):
print("leap year")
else:
print("not leap year")
```

Output:

```
Python 3.7.4 (default, Jul  9 2019, 00:06:43)
[GCC 6.3.0 20170516] on linux
enter a year: 2018
not leap year
```

Python Program to Check Palindrome Number

```
num = int(input("enter a number: "))
temp = num
```

```
rev = 0
while temp != 0:
    rev = (rev * 10) + (temp % 10)
    temp = temp // 10
    if num == rev:
    print("number is palindrome")
    else:
    print("number is not palindrome")
```

Output: