**For/while loops**

1. Write a program in C++ to display n terms of natural number and their sum.

#include <iostream>

#include <climits> // integer limits in header file

using namespace std;

int main()

{

int n,sum=0;

cout<<"Enter how many terms:";

cin>>n;

for (int i=1;i<=n;i++)

{

cout<<i<<endl;

sum+=i;

}

cout<<"The sum is:"<<sum;

return 0;

}

**Enter how many terms:**10

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**The sum is:55Program ended with exit code: 0**

1. WAP to print the first even numbers till n.

#include <iostream>

#include <climits> // integer limits in header file

using namespace std;

int main()

{

int n,sum=0;

cout<<"Enter how many terms:";

cin>>n;

for (int i=2;i<=n;i=i+2)

{

cout<<i<<endl;

sum+=i;

}

cout<<"The sum is:"<<sum;

return 0;

}

OR

#include <iostream>

using namespace std;

int main()

{

int n,i=1;

cout<<"Enter till which no:";

cin>>n;

for (i=1;i<=n;i++)

{

if (i%2==0)

cout<<i<<endl;

}

return 0;

}

**Enter till which no:**10

**2**

**4**

**6**

**8**

**10**

**Program ended with exit code: 0**

1. WAP to print the first n even numbers.

#include <iostream>

using namespace std;

int main()

{

int n,i=1;

cout<<"Enter how many terms:";

cin>>n;

int num=1;

while (i<=n)

{

if (num%2==0)

{

cout<<num<<endl;

i++;

}

num++;

}

return 0;

}

**Enter how many terms:**5

**2**

**4**

**6**

**8**

**10**

**Program ended with exit code: 0**

1. WAP to check if a number is prime or not.

#include <iostream>

//Check if num is prime or not

using namespace std;

int main()

{

int num,temp=1,i;

cout<<"Enter number:";

cin>>num;

for (i=2;i<num;i++)

{

if (num%i==0)

{

temp=0;

break;

}

}

if (temp==0)

cout<<num<<" is not prime.\n";

else

cout<<num<<" is prime.\n";

return 0;

}

**Enter number:**23

**23 is prime.**

**Program ended with exit code: 0**

1. Write a program in C++ to find prime number within a range.

#include <iostream>

//Check if num is prime or not

using namespace std;

int main()

{

int num,temp,n1,n2,i;

cout<<"starting range";

cin>>n1;

cout<<"ending range";

cin>>n2;

for (i=n1;i<=n2;i++)

{

temp=1;

for(int j=2;j<i;j++)

{

if(i%j==0)

{

temp=0;

break;

}

}

if (temp==1)

cout<<i<<endl;

else

continue;

}

return 0;

}

**starting range**2

**ending range**25

**2**

**3**

**5**

**7**

**11**

**13**

**17**

**19**

**23**

**Program ended with exit code: 0**

1. Write a program in C++ to find the last prime number occur before the entered number.

#include <iostream>

//Last prime number

using namespace std;

int main()

{

int num,temp,n,i;

cout<<"number:";

cin>>n;

for (i=1;i<n;i++)

{

temp=1;

for(int j=2;j<i;j++)

{

if(i%j==0)

{

temp=0;

break;

}

}

if (temp==1)

num=i;

else

continue;

}

cout<<num<<endl;

return 0;

}

This is more rigorous and uses more memory, so here is a better way of doing it:

#include <iostream>

//Last prime number

using namespace std;

int main()

{

int num,temp,n,i;

cout<<"number:";

cin>>n;

i=n-1;

while (i<n)

{

temp=1;

for(int j=2;j<i;j++)

{

if(i%j==0)

{

temp=0;

break;

}

}

if (temp==1){

num=i;

break;

}

i--;

}

cout<<num<<endl;

return 0;

}

**number:**22

**19**

**Program ended with exit code: 0**

1. WAP to find factorial of a number.

#include <iostream>

using namespace std;

int main()

{

int num1,factorial=1;

cout << " Input a number: ";

cin>> num1;

for(int a=1;a<=num1;a++)

{

factorial=factorial\*a;

}

cout<<" The factorial of the given number is: "<<factorial<<endl;

return 0;

}

1. Write a program in C++ to find the Greatest Common Divisor (GCD) of two numbers.

#include <iostream>

//gcd

using namespace std;

int main()

{

int a, b, small, gcd=1;

cin >> a >> b;

if (a < b)

small = a;

else

small = b;

for (int i = 2; i <= small; i++)

{

if ((a%i == 0) && (b%i == 0))

gcd = i;

}

if (gcd != 1)

{

cout << gcd << endl;

}

else

{

cout << "gcd does'nt exist" << endl;

}

return 0;

}

8 9

gcd does'nt exist

Press any key to continue . . .

35 150

5

Press any key to continue . . .

1. WAP for the 23 game. (credits- [www.aus.edu](http://www.aus.edu) for the question, my own code)

#include <iostream>

#include <string>

using namespace std;

int main()

{

int no\_sticks, no\_h = 0, no\_c = 0, flag = 1;

string result;

no\_sticks = 23;

while (no\_sticks >= 1)

{

if (flag == 1)

{

cout << "How many sticks do you wanna remove?";

cin >> no\_h;

if ((no\_h < 0) || (no\_h > 3))

{

cout << "Invalid entry! Try again. Only 1-3 sticks can be removed at a time!\n";

}

else if (no\_sticks == 1)

{

result = "lost!";

no\_sticks=0;

}

else if (no\_sticks-no\_h <= 0)

{

cout << "That's too many sticks ! Try Again!\n";

}

else

{

flag = 0;

no\_sticks -= no\_h;

}

}

else

{

if (no\_sticks > 4)

{

no\_c = 4 - no\_h;

no\_sticks -= no\_c;

flag = 1;

}

else if (no\_sticks == 1)

{

result = "won!";

no\_c=1;

no\_sticks=0;

flag=1;

}

else if ((no\_sticks >= 2) && (no\_sticks <= 4))

{

no\_c = no\_sticks - 1;

no\_sticks -= no\_c;

flag = 1;

}

cout<<"The computer removes "<< no\_c<<" sticks. Number left:"<<no\_sticks<<" Your turn!\n";

}

}

cout << "\nYou " << result << endl;

return 0;

}

**Outputs**

**How many sticks do you wanna remove?**3

**The computer removes 1 sticks. Number left:19 Your turn!**

**How many sticks do you wanna remove?**2

**The computer removes 2 sticks. Number left:15 Your turn!**

**How many sticks do you wanna remove?**1

**The computer removes 3 sticks. Number left:11 Your turn!**

**How many sticks do you wanna remove?**3

**The computer removes 1 sticks. Number left:7 Your turn!**

**How many sticks do you wanna remove?**2

**The computer removes 2 sticks. Number left:3 Your turn!**

**How many sticks do you wanna remove?**2

**The computer removes 1 sticks. Number left:0 Your turn!**

**You won!**

**Program ended with exit code: 0**

**How many sticks do you wanna remove?**3

**The computer removes 1 sticks. Number left:19 Your turn!**

**How many sticks do you wanna remove?**2

**The computer removes 2 sticks. Number left:15 Your turn!**

**How many sticks do you wanna remove?**1

**The computer removes 3 sticks. Number left:11 Your turn!**

**How many sticks do you wanna remove?**3

**The computer removes 1 sticks. Number left:7 Your turn!**

**How many sticks do you wanna remove?**2

**The computer removes 2 sticks. Number left:3 Your turn!**

**How many sticks do you wanna remove?**1

**The computer removes 1 sticks. Number left:1 Your turn!**

**How many sticks do you wanna remove?**1

**You lost!**

**Program ended with exit code: 0**

1. WAP to play the rock-paper-scissors game. (2 users play)

#include <iostream>

using namespace std;

int main()

{

int p=1,p1=0,p2=0;

char play1=' ', play2=' ';

while (p==1)

{

cout<<"It is player 1's turn.\n";

cout<<"Enter P, R and S:";

cin>>play1;

cout<<"It's player 2's turn.\n";

cin>>play2;

if (play1=='P')

{

if (play2=='R')

p1++;

else if (play2=='S')

p2++;

}

else if (play1=='R')

{

if (play2=='P')

p2++;

else if (play2=='S')

p1++;

}

else if (play1=='S')

{

if (play2=='P')

p1++;

else if (play2=='R')

p2++;

}

cout<<"To play again, press 1. To exit, press anything else.";

cin>>p;

}

cout<<"Scores are: Player 1:"<<p1<<" Player 2:"<<p2;

if (p1>p2)

cout<< "\nWinner is Player 1!\n Congrats!\n";

else if (p2>p1)

cout<<"\nWinner is Player 2!\n Congrats!\n";

else

cout<<"\nIt is a draw!\n";

return 0;

}

**It is player 1's turn.**

**Enter P, R and S:**P

**It's player 2's turn.**

S

**To play again, press 1. To exit, press anything else.**1

**It is player 1's turn.**

**Enter P, R and S:**R

**It's player 2's turn.**

P

**To play again, press 1. To exit, press anything else.**j

**Scores are: Player 1:0 Player 2:2**

**Winner is Player 2!**

**Congrats!**

**Program ended with exit code: 0**

1. WAP to find roots of a quadratic equation.

#include <iostream>

#include <math.h>

using namespace std;

int main()

{

double a, b, c, d, x1, x2;

cout << "Enter a nonzero value of a, coefficient of x^2:";

cin >> a;

cout << "Enter a value of b, coefficient of x:";

cin >> b;

cout << "Enter a value of c, constant term:";

cin >> c;

d = b \* b - 4 \* a\*c;

if (a == 0)

cout << "The quadratic equation does not have any roots as a is zero\n ";

else if (d > 0)

{

x1 = ((0 - b) + sqrt(d)) / (2 \* a);

x2 = ((0 - b) - sqrt(d)) / (2 \* a);

cout << "The roots are: " << x1 << " and " << x2 << endl;

}

else if (d == 0)

{

x1 = ((0 - b)) / (2 \* a);

x2 = 0 - x1;

cout << "The roots are: " << x1 << " and " << x2 << endl;

}

else if (d < 0)

cout << "No roots as the discriminator is negative\n";

system("pause");

return 0;

}

1. WAP to find the sum of digits of a number.

#include <iostream>

using namespace std;

int main()

{

int num,n,rem,sum=0,no\_digits=0;

cout<<"Enter the number:";

cin>>num;

n=num;

while(n!=0)

{

rem=n%10;

sum+=rem;

no\_digits++;

n/=10;

}

cout<<"NO of digits:"<<no\_digits<<endl;

cout<<"Sum of digits:"<<sum<<endl;

return 0;

}

1. Write a program in C++ to find the sum of the series 1 + 1/2^2 + 1/3^3 + ..+ 1/n^n

#include <iostream>

#include <cmath>

using namespace std;

//1 + 1/2^2 + 1/3^3 + ..+ 1/n^n

int main()

{

int n;

double sum=0,i;

cout<<"Enter number of terms:";

cin>>n;

for (i=1;i<=n; i++)

{

sum+=(1/pow(i,i));

}

cout<<"The sum is:"<<sum<<endl;

return 0;

}

Output

**Enter number of terms:**5

**The sum is:1.29126**

**Program ended with exit code: 0**

1. Write a program in C++ to calculate the sum of the series (1\*1) + (2\*2) + (3\*3) + (4\*4) + (5\*5) + ... + (n\*n).

#include <iostream>

#include <cmath>

using namespace std;

//(1\*1) + (2\*2) + (3\*3) + (4\*4) + (5\*5) + ... + (n\*n).

int main()

{

int n;

double sum=0,i;

cout<<"Enter number of terms:";

cin>>n;

for (i=1;i<=n; i++)

{

sum+=i\*i;

}

cout<<"The sum is:"<<sum<<endl;

return 0;

}

Output

**Enter number of terms:**5

**The sum is:55**

**Program ended with exit code: 0**

1. Write a program in C++ to calculate the series (1) + (1+2) + (1+2+3) + (1+2+3+4) + ... + (1+2+3+4+...+n).

#include <iostream>

#include <cmath>

using namespace std;

//(1) + (1+2) + (1+2+3) + (1+2+3+4) + ... + (1+2+3+4+...+n).

int main()

{

int n;

double sum=0,i,j;

cout<<"Enter number of terms:";

cin>>n;

for (i=1;i<=n; i++)

{

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

{

sum+=j;

}

}

cout<<"The sum is:"<<sum<<endl;

return 0;

}

Output

**Enter number of terms:**5

**The sum is:35**

**Program ended with exit code: 0**

1. Write a program in C++ to find the sum of series 1 - X^2/2! + X^4/4!-.... upto nth term.

#include <iostream>

#include <cmath>

using namespace std;

//1 - X^2/2! + X^4/4!-....

int main()

{

int n,x,fact=1;

double sum=0,i,j,sign=1;

cout<<"Enter the value of x:";

cin>>x;

cout<<"Enter number of terms:";

cin>>n;

for (i=1;i<=n; i++)

{

fact=1;

for (j=1; j<=2\*i-2; j++)

{

fact\*=j;

}

sum+=(sign\* (pow(x,2\*i-2)/fact));

sign\*=-1;

}

cout<<"The sum is:"<<sum<<endl;

return 0;

}

Output

**Enter the value of x:**3

**Enter number of terms:**4

**The sum is:-1.1375**

**Program ended with exit code: 0**

1. Write a program in C++ to asked user to input positive integers to process count, maximum, minimum, and average or terminate the process with -1