

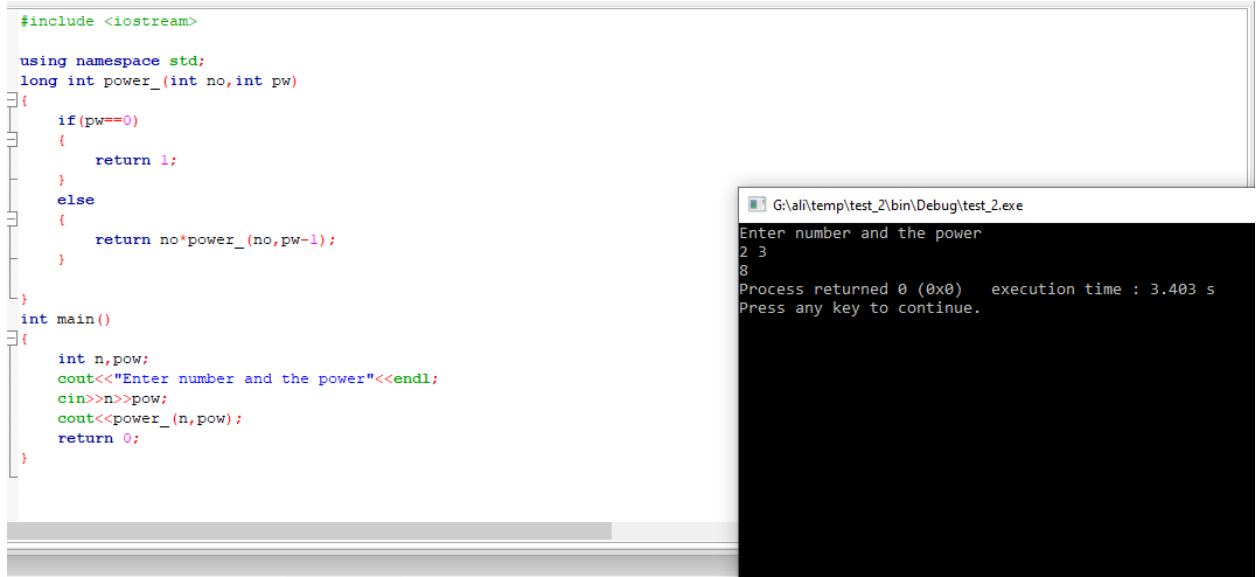
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1)

Write a program to find power of any number using recursion

```
#include <iostream>
#include<cstring>
using namespace std;
long int power(int n,int pw)//function takes 2 parameters one is the no and other is
the power
{
    if(pw==0)
    {
        return 1;
    }
    else
    {
        return n*_power(n,pw-1);
    }
}
int main()
{
    int n,power;
    cout<<"Enter the number and the power : ";
    cin>>n>>power;
    cout<<n<<" power of "<<power<<" is "<<_power(n,power);

}
```



The image shows a screenshot of a C++ program and its execution. On the left, a code editor displays the source code for a recursive power function. The code includes headers for `<iostream>` and `<cstring>`, uses the `std` namespace, and defines a `long int power(int n, int pw)` function. The function uses a base case of `pw == 0` to return 1, and a recursive case to return `n * power(n, pw - 1)`. The `main` function prompts the user for a number and power, reads the input, and prints the result using the `power` function.

On the right, a terminal window shows the execution of the program. The prompt "Enter number and the power" is displayed, followed by the user input "2 3". The program outputs "8", indicating that 2 to the power of 3 is 8. Below the output, the terminal shows "Process returned 0 (0x0) execution time : 3.403 s" and "Press any key to continue."

- 1) Write a program to find sum of elements of array using recursion.(elements and size of array should be entered by user)

```
#include <iostream>
#include<cstring>
using namespace std;
long int sumArray(int arr[],int s)
{
    if(s>0)
    {
        return arr[s]+sumArray(arr,s-1);
    }
}
int main()
{
    int n;
    cout<<"Enter size of array";
    cin>>n;
    int arr[n];
    for(int i=1;i<=n;i++)
    {
        cin>>arr[i];
    }
    cout<<"Sum of array is : "<<sumArray(arr,n);
}
```

3)

Write a program to find all prime numbers between given interval using functions

```
#include <iostream>
using namespace std;
void findPrimeNumber(int start,int _end)
```

```

{
    //prime number is the number that divide only by 1 or itself
    int c,temp;
    for(int i=start;i<=_end;i++)
    {
        temp=i;
        c=0;
        for(int j=2;j<=temp;j++)
        {
            if(temp%j==0)
            {
                c++;
            }
        }
        if(c==1)
        {
            cout<<i<<"\t";
        }
    }
}
int main()
{
    int s,e;
    cout<<"Enter the start and the end of the loop"<<endl;
    cin>>s>>e;
    findPrimeNumber(s,e);
}

```

The screenshot shows a terminal window with the following output:

```

Enter the start and the end of the loop
1 100
2      3      5      7      11     13     17     19     23     29     31     37     41     43     47
53     59     61     67     71     73     79     83     89     97
Process returned 0 (0x0)   execution time : 3.192 s
Press any key to continue.

```

4)

Write a program to check whether a number is prime, Armstrong or perfect number using functions

```

#include <iostream>
#include<cstring>
using namespace std;
void checkNumber(int c)
{
    int counter=0,sum=0;

```

```

//check for prime
for(int i=2;i<=c;i++)
{
    if(c%i==0)
    {
        counter++;
    }
}
if(counter==1)
{
    cout<<"Number is prime"<<endl;
}
else
{
    cout<<"Number is not prime"<<endl;
}
//check for perfect

for(int j=1;j<c;j++)
{
    if(c%j==0)
    {
        sum+=j;
    }
}
if(sum==c)
{
    cout<<"Number is perfect"<<endl;
}
else
{
    cout<<"number is not perfect"<<endl;
}
//check for Armstrong number
int rem,summ=0,temp;
temp=c;
while(temp>0)
{
    rem=temp%10;
    summ+=rem*rem*rem;
    temp/=10;
}
if(summ==c)
{
    cout<<"number is Armstrong"<<endl;
}
else
{
    cout<<"number is not Armstrong"<<endl;
}

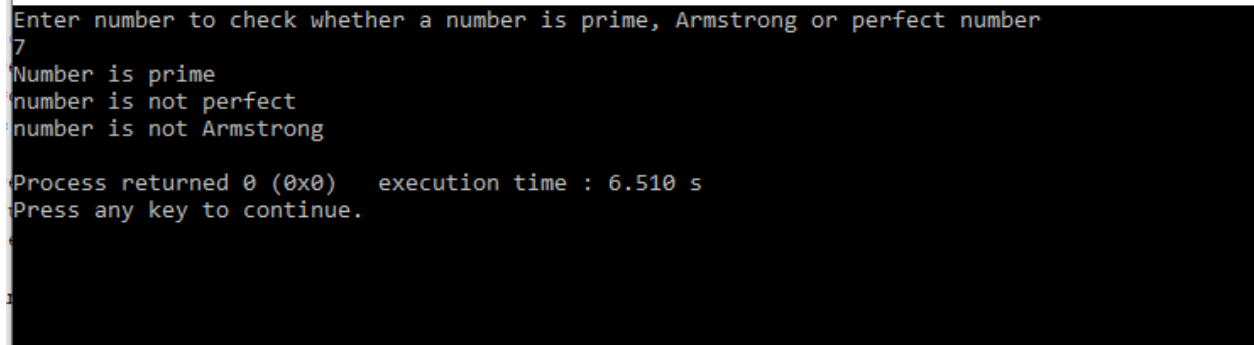
}
int main()
{
    int n;

```

```

cout<<"Enter number to check whether a number is prime, Armstrong or perfect number
"<<endl;
cin>>n;
checkNumber(n);
}

```



```

Enter number to check whether a number is prime, Armstrong or perfect number
7
Number is prime
number is not perfect
number is not Armstrong

Process returned 0 (0x0)   execution time : 6.510 s
Press any key to continue.


```

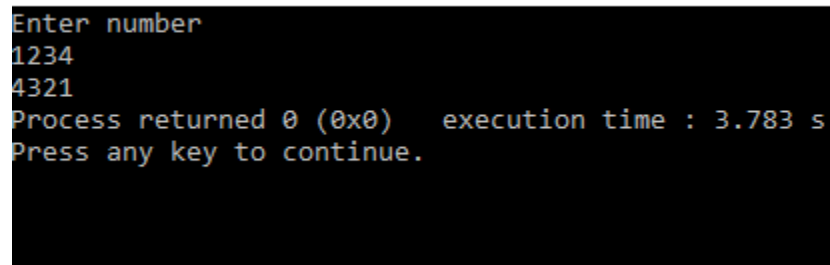
5) Write a program to reverse the element of number of n using recursion.

```

#include <iostream>
#include<cstring>
using namespace std;
int reversNumber(int r)
{
    int rem;
    if(r>10)
    {
        rem=r%10;
        cout<<rem;
        return reversNumber(r/10);
    }
}
int main()
{
    int n;
    cout<<"Enter number "<<endl;
    cin>>n;
    cout<<reversNumber(n);
}

```

 G:\ali\temp\test_2\bin\Debug\test_2.exe



```

Enter number
1234
4321
Process returned 0 (0x0)   execution time : 3.783 s
Press any key to continue.

```

6)Write a program to merge two array to third array(merge them in ascending order).(elements and size of array 1 and 2 should be entered by user)

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

int main()
{
    int s1,s2;
    cout<<"Enter size of arr1 and arr2 "<<endl;
    cin>>s1>>s2;
    int arr1[s1],arr2[s2],arr3[s1+s2];
    cout<<"Enter array 1 elements "<<endl;
    for(int j=0;j<s1;j++)
    {
        cin>>arr1[j];
    }
    cout<<"Enter array 2 elements "<<endl;
    for(int j=0;j<s2;j++)
    {
        cin>>arr2[j];
    }
    int c=0;
    for(int i=0;i<s1;i++)
    {
        arr3[i]=arr1[i];
        c++;
    }
    for(int i=0;i<s2;i++)
    {
        arr3[c]=arr2[i];
        c++;
    }
    cout<<"Array 3 elements after merging 1 and 2 "<<endl;
    for(int i=0;i<s1+s2;i++)
    {
        cout<<arr3[i];
    }
}
```

```

C:\an\temp\test_2\bin\Debug\test_2.exe
Enter size of arr1 and arr2
2 2
Enter array 1 elements
3 4
Enter array 2 elements
5 6
Array 3 elements after merging 1 and 2
3456
Process returned 0 (0x0)   execution time : 5.069 s
Press any key to continue.

```

7)

Write a program to delete all duplicate elements from an array.(elements and size of array should be entered by user).

```

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

int main()
{
    int s1;
    cout<<"Enter size of array"<<endl;
    cin>>s1;
    int arr[s1];
    for(int i=0;i<s1;i++)
    {
        cin>>arr[i];
    }
    for (int i = 0; i < s1; i++)
    {
        for (int j = i + 1; j < s1;)
        {
            if (arr[j] == arr[i])
            {
                for (int k = j; k < s1; k++)
                {
                    arr[k] = arr[k + 1];
                }
                s1--;
            }
            else
                j++;
        }
    }
}

```

```

for(int i=0;i<s1;i++)
{
    cout<<arr[i];
}
}

```

```

G:\all\temp\test_2\bin\Debug\test_2.exe
Enter size of array
5
1 2 1 4 2
124
Process returned 0 (0x0) execution time : 6.317 s
Press any key to continue.

```

8) Write a program to find sum of each row and column of a matrix.(elements and size of 2d array should not be entered by user).

```

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

int main()
{
    int arr[3][3]={{1,2,3},
                  {4,5,6},
                  {7,8,9}};
    for(int i=0;i<3;i++)
    {
        int sum=0,sum1=0;

        for(int j=0;j<3;j++)
        {
            sum+=arr[i][j];
            sum1+=arr[j][i];
        }
        cout<<"sum of row "<<i+1<<" is "<<sum<<endl;
        cout<<"sum of col "<<i+1<<" is "<<sum1<<endl;
    }
}

```

```

G:\all\temp\test_2\bin\Debug\test_2.exe
sum of row 1 is 6
sum of col 1 is 12
sum of row 2 is 15
sum of col 2 is 15
sum of row 3 is 24
sum of col 3 is 18

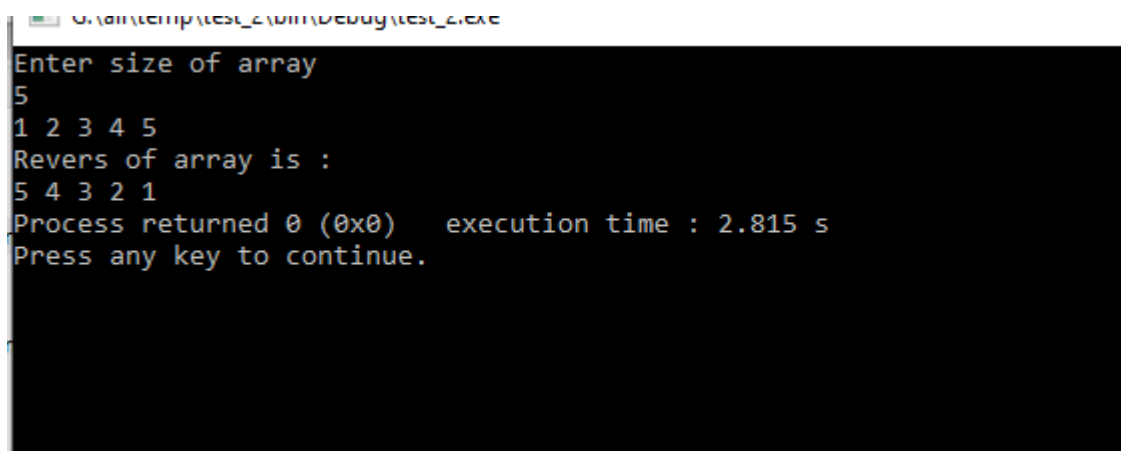
```


9)

Write a program to find reverse of an array.(using swap).

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

int main()
{
    int n;
    cout<<"Enter size of array "<<endl;
    cin>>n;
    int arr[n];
    for(int i=0;i<n;i++)
    {
        cin>>arr[i];
    }
    int temp,c=n-1;
    cout<<"Revers of array is : "<<endl;
    for(int j=0;j<n/2;j++)
    {
        temp=arr[j];
        arr[j]=arr[c];
        arr[c]=temp;
        c--;
    }
    for(int i=0;i<n;i++)
    {
        cout<<arr[i]<<" ";
    }
}
```

A screenshot of a Windows command prompt window showing the execution of a C++ program. The title bar reads 'G:\an\temp\test_2\bin\Debug\test_2.exe'. The program prompts the user to 'Enter size of array', and the user enters '5'. The program then displays the input array '1 2 3 4 5'. It then prompts for the reversed array, displaying '5 4 3 2 1'. The output concludes with 'Process returned 0 (0x0) execution time : 2.815 s' and 'Press any key to continue.'.

```
G:\an\temp\test_2\bin\Debug\test_2.exe
Enter size of array
5
1 2 3 4 5
Revers of array is :
5 4 3 2 1
Process returned 0 (0x0)   execution time : 2.815 s
Press any key to continue.
```

10)

Write a program to sort even and odd elements of array separately.(elements and size of array should be entered by user)

```


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

int main()
{
    int n;
    cout<<"Enter size of array "<<endl;
    cin>>n;
    int arr[n];
    for(int i=0;i<n;i++)
    {
        cin>>arr[i];
    }
    int e=0,o=n-1,temp;
    for(int i=0;i<n;i++)
    {
        if(arr[e]%2==0)
        {
            e++;
        }
        if(arr[o]%2!=0)
        {
            o--;
        }

        if(e<o)
        {
            int temp=arr[e];
            arr[e]=arr[o];
            arr[o]=temp;
        }
    }

    for(int i=0;i<n;i++)
    {
        cout<<" "<<arr[i];
    }
}

```

 G:\ali\temp\test_2\bin\Debug\test_2.exe

```

Enter size of array
10
1 2 3 4 5 6 7 8 9 10
10 2 8 4 6 5 7 3 9 1
Process returned 0 (0x0)   execution time : 8.498 s
Press any key to continue.

```