1.1Bubble_Sort_13.cpp

Code:-

```cpp
#include<iostream>

using namespace std;

class nick

{

private:

int s, t, a[100], p,ch;

public:

void get()

{

cout<<"Enter array size: ";

cin>>s;

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

{

cout<<"Enter the numbers: "<<i+1<<" : ";

cin>>a[i];

}

cout<<"Pass 0: ";

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

{

cout<<a[i]<<" ";

}

cout<<endl;

}

void mytech()

{

p=0;

for(int i=0;i<s;i++)
```
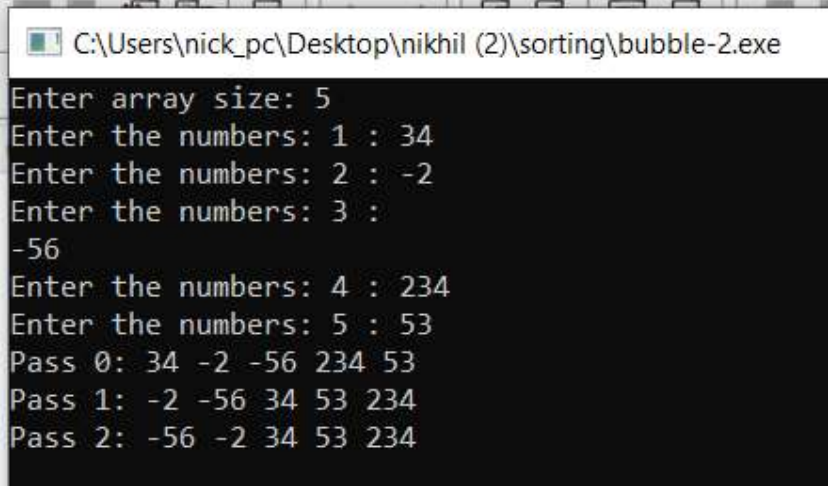
Sorting

```
{
ch=0;
for(int j=0;j<(s-i)-1;j++)
{
if(a[j]>a[j+1])
{
t=a[j];
a[j]=a[j+1];
a[j+1]=t;
p++;
ch=1;
}
}
if(p==0)
{
cout<<"Array is already sorted.";
break;
}
else if(ch==1)
{
cout<<"Pass "<<i+1<<": ";
for(int i=0;i<s;i++)
cout<<a[i] <<" ";
cout<<endl;
}
else
break;
}
cout<<endl;
```

Sorting

```
}

};

int main()

{

nick o;

o.get();

o.mytech();

}
```

Output:-


```
C:\Users\nick_pc\Desktop\nikhil (2)\sorting\bubble-2.exe

Enter array size: 5
Enter the numbers: 1 : 34
Enter the numbers: 2 : -2
Enter the numbers: 3 :
-56
Enter the numbers: 4 : 234
Enter the numbers: 5 : 53
Pass 0: 34 -2 -56 234 53
Pass 1: -2 -56 34 53 234
Pass 2: -56 -2 34 53 234
```

1.2Quick_Sort_13.cpp

code:-

```
#include<iostream>

using namespace std;

class nick

{

private:

int s, t, a[100], p, mid;

public:

void get()
```

Sorting

```
{
cout<<"enter array size:-";
cin>>s;
for(int i=0;i<s;i++)
{
cout<<"enter numbers:-"<<i+1<<" : ";
cin>>a[i];
}
p=-1;
cout<<endl;
dis();
mytech(0,s-1);
}
void dis()
{
cout<<"Pass "<<++p<<": ";
for(int i=0;i<s;i++)
{
cout<<a[i]<<" ";
}
cout << endl;
}
void mytech(int f,int l)
{
if(f<l)
{
mid=div(f,l);
mytech(f,mid-1);
mytech(mid+1,l);
```
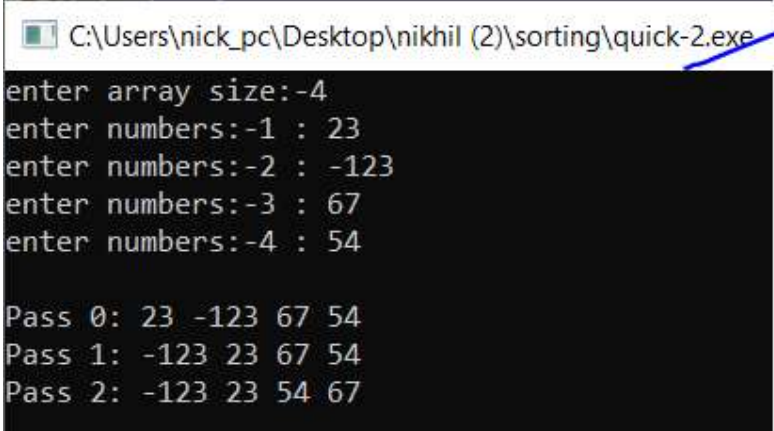
Sorting

```
}

}

int div(int f,int l)

{

int piv=a[f];

int i=f;

int j=l;

while(i<j)

{

while(a[i]<=piv)

i++;

while(a[j]>piv)

j--;

if(i<j)

{

t=a[i];

a[i]=a[j];

a[j]=t;

}

}

if(a[f]!=a[j])

{

t=a[f];

a[f]=a[j];

a[j]=t;

dis();

}

return j;

}
```

Sorting

```
};
int main()
{
nick o;
o.get();
}
```

Output:-

1.3Selection_Sort_13.cpp

Code:-

```
#include<iostream>
using namespace std;
class nick
{
public:
int s,a[100],x,t;
void get()
{
cout<<"Enter array size"<<endl;
cin>>s;
cout<<"Enter the numbers:"<<endl;
for(int i=0;i<s;i++)
```
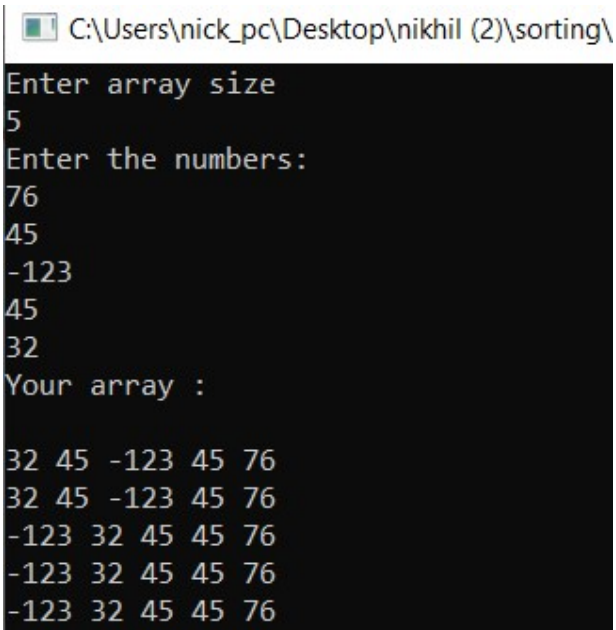
Sorting

```
{

cin>>a[i];

}

}

void dis()

{

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

{

cout<<a[i]<<" ";

}

}

void mytech()

//x=max value

{

t=0;

x=s;

while(x>0)

{

for(int i=0;i<x-1;i++)

{

if(a[i]>a[x-1])

{

t=a[i];

a[i]=a[x-1];

a[x-1]=t;

}

}

cout<<endl;

dis();
```

Sorting

```
x--;

}

}

};

int main()

{ nick o;

o.get();

cout<<"Your array : "<<endl;

o.mytech();

return 0;

}
```

Output:-

```
C:\Users\nick_pc\Desktop\nikhil (2)\sorting\
Enter array size
5
Enter the numbers:
76
45
-123
45
32
Your array :

32 45 -123 45 76
32 45 -123 45 76
-123 32 45 45 76
-123 32 45 45 76
-123 32 45 45 76
```

1.4Radix_Sort_13.cpp

Code:-

```
#include<iostream>

using namespace std;


class arrays{


Sorting
```

```cpp
    private:
        int size, temp, arr[100], pass, max;
        bool swap;
    public:
        void getdata(){
            cout <<"Enter the size of array: ";
            cin >> size;


            for(int i = 0; i < size; i++){
                cout << "Enter element no. " << i+1 << " : ";
                cin >> arr[i];
            }
            pass = -1;
            cout << endl;
            display();
        }
        void display(){
            cout << "Pass " << ++pass << ": ";
            for(int i = 0; i < size; i++){
                cout << arr[i] << " ";
            }
            cout << endl;
        }
        int get_max(){
            max = arr[0];
            for(int i = 1; i < size; i++){
                if (max < arr[i])
                    max = arr[i];
            }
```
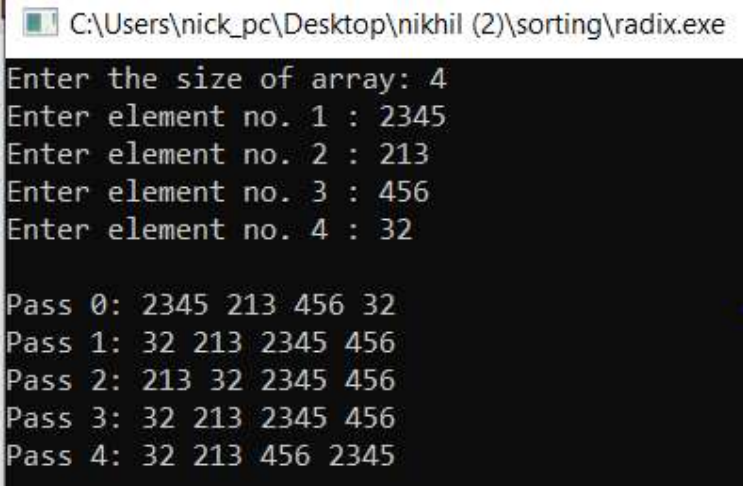
Sorting

```cpp
    }
    void radix_sort(){
     get_max();
     for(int pos = 1; max/pos>0; pos*=10){
      count_sort(pos);
     }
    }
    void count_sort(int pos){
     int temp_arr[size];
     int freq[10] = {0};
     for(int i = 0; i < size; i++)
       ++freq[(arr[i]/pos)%10];


     for(int i = 1; i <= 9; i++)
      freq[i] += freq[i-1];


     for(int i = size - 1; i >= 0; i--)
       temp_arr[--freq[(arr[i]/pos)%10]] = arr[i];


     for(int i = 0; i < size; i++)
      arr[i] = temp_arr[i];


     display();
    }
};


int main(){
   arrays ob;
   ob.getdata();


Sorting
```

```
  ob.radix_sort();
}
```

Output:-

1.5Insertion_Sort_13.cpp

Code:-

```cpp
#include<iostream>

using namespace std;

class nick

{

private:

int s,t,a[100],p;

int ch;

public:

void get()

{

cout<<"Enter array size: ";

cin>>s;

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

{

cout<<"Enter numbers"<<i+1<<" : ";
```
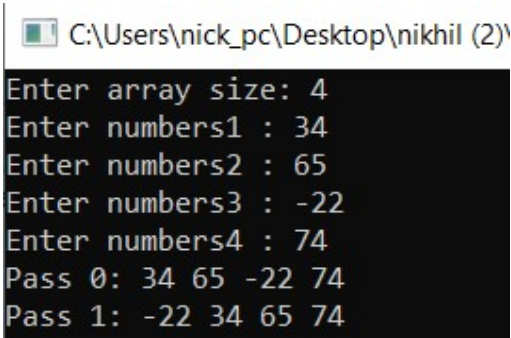
Sorting

```
cin>>a[i];

}

cout<<"Pass 0: ";

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

{

cout<<a[i]<<" ";

}

cout<<endl;

p=0;

}

void mytech(){

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

{

ch=0;

t=a[i];

int j=i-1;

while(j>=0 && a[j]>t)

{

a[j+1]=a[j];

j--;

ch=1;

}

if(ch==1)

{

a[j+1]=t;

cout<<"Pass "<<++p<< ": ";

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

cout<<a[i] << " ";

cout<<endl;
```

Sorting

```
}
}
cout<<endl;
}
};
int main()
{
nick o;
o.get();
o.mytech();
}
```

Output:-


```
C:\Users\nick_pc\Desktop\nikhil (2)\
Enter array size: 4
Enter numbers1 : 34
Enter numbers2 : 65
Enter numbers3 : -22
Enter numbers4 : 74
Pass 0: 34 65 -22 74
Pass 1: -22 34 65 74
```

1.6Shell_Sort_13.cpp

Code:-

```cpp
#include<iostream>
using namespace std;
class nick{
    private:
        int s, t, a[100], p,ch;


    public:
        void get(){
            cout <<"Enter array size: ";
```

Sorting

```cpp
        cin >> s;


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

            cout << "Enter element no. " << i+1 << " : ";

            cin >> a[i];

        }

        p = -1;

        cout << endl;

        dis();

    }

    void dis(){

      cout << "Pass " << ++p << ": ";

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

          cout << a[i] << " ";

      }

      cout << endl;

    }

    void mytech(){

      get();

      //inc is increment

      for(int inc = s/2; inc > 0; inc /= 2){

        for(int j = inc; j < s; j++){

          ch = 0;

          for(int k = j - inc; k >= 0; k -= inc){

            if(a[k+inc] > a[k]){

              break;

            }

            else{

              t = a[k+inc];
```

Sorting

```
            a[k+inc] = a[k];

            a[k] = t;

            ch = 1;

          }

         }

        }

      if(ch == 1){

      dis();

      }

     }

    }

};


int main(){

   nick o;

   o.mytech();

}
```

Output:-

Sorting