```
/* Name: Shubham Sarang
   Roll no: 1345
   Unit 1: Sorting
   Program: Bubble sort*/

   #include<iostream>

   using namespace std;

   int main()
   {
       int arr[20],n,i,temp,j;

       cout<<"**Bubble sorting**"<<endl<< endl;

       cout<<"Enter size of array=";
       cin>>n;

       cout<<endl;

       cout<<"Enter number of elements=";

       for(i=0;i<n;i++)
       {
               cin>>arr[i];
               }

               cout<<endl;

               cout<<"Array before sorting=";

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

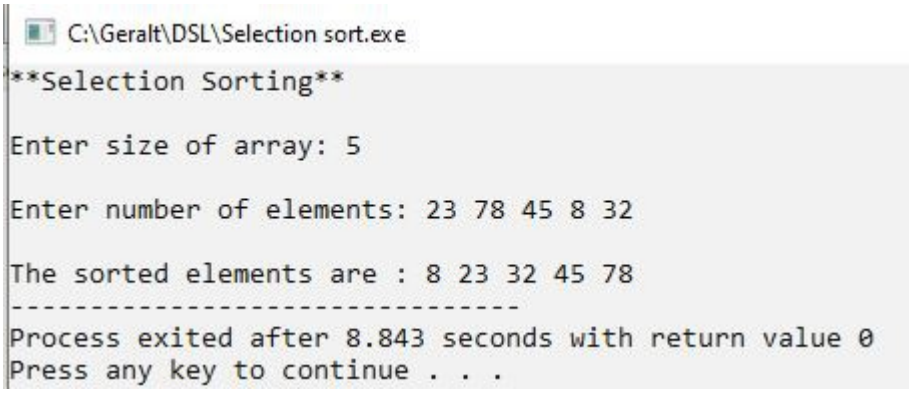
```
        //Swapping/sorting

for(i=0;i<n-1;i++)
{
        for(j=i+1;j<n;j++)
        {
                if(arr[i]>arr[j])
                {
                        temp=arr[j];
                    arr[j]=arr[i];
                    arr[i]=temp;
                        }
                }
        }

cout<<endl;

        cout<<"Array after sorting=";

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

}//end main
```

C:\DSL\Prac 1\Bubble sort.exe

```
**Bubble sorting**

Enter size of array=5

Enter number of elements=9 3 8 4 1

Array before sorting=9  3       8       4       1
Array after sorting=1   3       4       8       9
--------------------------------
Process exited after 11.83 seconds with return value 0
Press any key to continue . . .
```

```
/*Selection sort
Name: Shubham Sarang
ROll NO: 1345
Unit 1 Sorting
Program: Selection sort
*/
#include<iostream>
using namespace std;
int main()
{
	int n, arr[20];
	int i, min, loc, tmp, j;

	cout<<"**Selection Sorting**"<<endl<<endl;

	cout<<"Enter size of array: ";
	cin>>n;

	cout<<endl;

	cout<<"Enter number of elements: ";

	for(i=0; i<n; i++)
	{
	cin>>arr[i];
	}

	cout<<endl;
	//selection sort processing
	for(i=0; i<n; i++)
	{
		//Assume min value and its loc
		min= arr[i];
		loc= i;
		for(j=i+1; j<n; j++)
```

```
            {
                if(arr[j] < min)
                {
                    min = arr[j];
                    loc = j;
                }
            }
            //found the min value and loc
            //swap the value at i and loc
            tmp = arr[i];
            arr[i] = min;
            arr[loc] = tmp;
        }
        //Display sorted array
        cout<<"The sorted elements are : ";

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

}//end main
```




```
/*
Name: Shubham Sarang
ROll NO: 1345
```

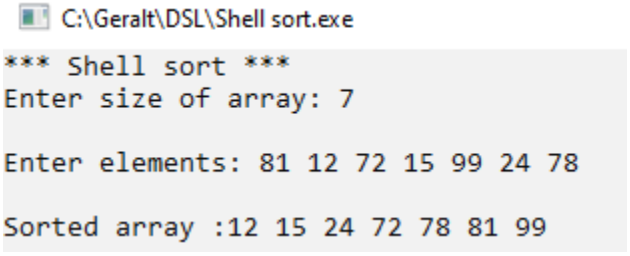
```
Unit 1 Sorting
Program: Insertion sort
*/
#include<iostream>
using namespace std;
int main()
{
	int n, arr[20], i;

	cout<<"**Insertion Sorting**"<<endl<<endl;

	cout<<"Enter size of array: ";
	cin>>n;

	cout<<endl;

	cout<<"Enter number of elements: ";

	for(i=0; i<n; i++)
	{
	cin>>arr[i];
	}

	cout<<endl;
//Insertion sort logic
	for(i=1; i<n; i++)
	{
		tmp = arr[i];
		loc = i-1;
		while(tmp < arr[loc] && loc>=0)
		{
			arr[loc+1] = arr[loc];
			loc--;
		}
		arr[loc+1] = tmp;
```

```
        }
                //Display sorted array
        cout<<"The sorted elements are : ";

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

}//End main
```

```
C:\Geralt\DSL\Insertion sort.exe
**Insertion Sorting**

Enter size of array: 5

Enter number of elements: 1 4 2 3 5

The sorted elements are : 1 2 3 4 5
--------------------------------
Process exited after 5.386 seconds with return value 0
Press any key to continue . . .
```

```
/*
Name: Shubham Sarang
ROll NO: 1345
Unit 1 Sorting
Program: Shell sort
*/
#include<iostream>
#include<math.h>
using namespace std;
int main()
{
        int n, extractData, arr[20], i, gap, loc;

        cout<<"*** Shell sort ***"<<endl;
        cout<<"Enter size of array: ";
        cin>>n;
```

```
	cout<<endl;
	cout<<"Enter elements: ";
	for(i=0;i<n;i++)
	{
		cin>>arr[i];
	}
	cout<<endl;

	gap=floor(n/2);

	while(gap>0)
	{
		for(i=0 ; i<n-gap ; i++)
		{
			extractData= arr[i+gap];
			loc = i+gap;

			while((loc-gap)>=0 && extractData < arr[loc-gap])
			{
				arr[loc] = arr[loc-gap];
				loc = loc - gap;
			}//end of inner while
			arr[loc] = extractData;
		}//end of for
		gap = floor(gap/2);
	}//end of while

	cout<<"Sorted array :";
	for(i=0;i<n;i++)
	{
		cout<<arr[i]<<" ";
	}
}//end main
```




```
/*Radix sort
Name: Shubham Sarang
ROll NO: 1345
Unit 1 Sorting
Program: Radix sort
*/
#include<iostream>
using namespace std;
int main()
{
	int n, arr[20], i, j, p, max, k, r, passes=0;
	int bucket[10][20], b_count[10], divisor=1;

	cout<<"**Radix Sorting**"<<endl<<endl;

	cout<<"Enter size of array: ";
	cin>>n;

	cout<<endl;

	cout<<"Enter number of elements: ";

	for(i=0; i<n; i++)
	{
	cin>>arr[i];
	}
```

```
//find largest number
max = arr[0];
for(i=1; i<n; i++)
{
        if(arr[i] > max)
        {
                max = arr[i];
        }
}

while(max>0)
{
        max=max/10;
        passes++;
}
//Logic
for(p=0; p<passes; p++)
{
        //initialize the b_count array to 0
        for(k=0; k<10; k++)
        {
                b_count[k] = 0;
        }//end of k

        //extract digit, place in bin, update b_count
        for(i=0; i<n; i++)
        {
                r = (arr[i]/divisor) % 10;
                bucket[r][b_count[r]] = arr[i];
                b_count[r]++;
        }//end of i
        i=0;
        //Collect the bins
        for(j=0; j<10; j++)
```

```
            {
                for(k=0; k<b_count[j]; k++)
                {
                    arr[i] = bucket[j][k];
                    i++;
                }
            }

        divisor = divisor * 10;
        }
        //Display array
        cout<<"The sorted elements are : ";

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

}//end main
```