

## Assignment 4 Solutions- Yash Awasthi(102109029)

Q1: Sorting from min to max using selection sort.

```
main.cpp
1  #include <bits/stdc++.h>
2  using namespace std;
3
4  void swap(int *xp, int *yp)
5  {
6      int temp = *xp;
7      *xp = *yp;
8      *yp = temp;
9  }
10 void selectionSort(int arr[], int n)
11 {
12     int i, j, min_idx;
13     for (i = 0; i < n-1; i++)
14     {
15         min_idx = i;
16         for (j = i+1; j < n; j++)
17             if (arr[j] < arr[min_idx])
18                 min_idx = j;
19         if(min_idx!=i)
20             swap(&arr[min_idx], &arr[i]);
21     }
22 }
23
24 void printArray(int arr[], int size)
25 {
26     int i;
27     for (i=0; i < size; i++)
28         cout << arr[i] << " ";
29     cout << endl;
30 }
31
32 int main()
33 {
34     int arr[] = {6, 2, 7, 5, 9};
35     int n = sizeof(arr)/sizeof(arr[0]);
36     selectionSort(arr, n);
37     cout << "Sorted array: \n";
38     printArray(arr, n);
39     return 0;
40 }
```

### Output

/tmp/KiThceIuDl.o

Sorted array:

2 5 6 7 9

Q2: Sorting from max to min using selection sort.

main.cpp

```
1  #include <bits/stdc++.h>
2  using namespace std;
3
4  void swap(int *xp, int *yp)
5  {
6      int temp = *xp;
7      *xp = *yp;
8      *yp = temp;
9  }
10 void selectionSort(int arr[], int n)
11 {
12     int i, j, min_idx;
13     for (i = 0; i < n-1; i++)
14     {
15         min_idx = i;
16         for (j = i+1; j < n; j++)
17             if (arr[j] > arr[min_idx])
18                 min_idx = j;
19         if(min_idx!=i)
20             swap(&arr[min_idx], &arr[i]);
21     }
22 }
23
24 void printArray(int arr[], int size)
25 {
26     int i;
27     for (i=0; i < size; i++)
28         cout << arr[i] << " ";
29     cout << endl;
30 }
31
32 int main()
33 {
34     int arr[] = {6, 2, 7, 5, 9};
35     int n = sizeof(arr)/sizeof(arr[0]);
36     selectionSort(arr, n);
37     cout << "Sorted array: \n";
38     printArray(arr, n);
39     return 0;
40 }
```

Output

/tmp/KiThceIuDI.o

Sorted array:

9 7 6 5 2

Q3: Implementing Insertion Sort to sort an array in ascending order.

```
1  #include <bits/stdc++.h>
2  using namespace std;
3
4  void InsertionSort(int arr[], int n){
5      for(int i=2;i<n;i++){
6          int key=arr[i];
7          int j=i-1;
8          while((j>0)&&(arr[j]>key)){
9              arr[j+1]=arr[j];
10             j=j-1;
11         }
12         arr[j+1]=key;
13     }
14     for(int i=0;i<n;i++){
15         cout<<arr[i]<<" ";
16     }
17 }
18
19 int main() {
20     int arr[7]={1,5,7,6,4,7,3};
21     InsertionSort(arr, 7);
22     return 0;
23 }
```

```
> make -s
```

```
> ./main
```

```
1 3 4 5 6 7 7 >
```