Assignment 4 Solutions- Yash Awasthi(102109029)

Q1: Sorting from min to max using selection sort.

main.cpp

```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:
2 5 6 7 9
```

Q2: Sorting from max to min using selection sort.

```cpp
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.

```cpp
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 ➤ ▮
```