Ques 1:-

A :- Selection Sort

```cpp
#include<iostream>
using namespace std;
void selectionSort(int arr[], int n){
    for(int i = 0; i < n-1; i++){
        int minIndex = i;
        for(int j = i+1; j < n; j++){
            if(arr[j] < arr[minIndex]){
                minIndex = j;
            }
        }
        int temp = arr[i];
        arr[i] = arr[minIndex];
        arr[minIndex] = temp;
    }
}
int main(){
    int n;
    cout << "Enter size of array:" << endl;
    cin >> n;
    int arr[n];
    cout << "Enter elements:" << endl;
    for(int i=0; i<n; i++){
        cin >> arr[i];
    }
    selectionSort(arr, n);
    cout << "Sorted Array:" << endl;
    for(int i=0; i<n; i++){
        cout << arr[i] << " ";
    }
}

```

B:- Insertion Sort

```cpp
#include<iostream>
using namespace std;
void insertionSort(int arr[], int n){
    for(int i=1; i<n; i++){
        int temp = arr[i];
        int j = i-1;
        while(j >= 0 && arr[j] > temp){
            arr[j+1] = arr[j];
            j--;
        }
        arr[j+1] = temp;
    }
}
int main(){
    int n;
    cout << "Enter size of array:" << endl;
    cin >> n;
    int arr[n];
    cout << "Enter elements:" << endl;
    for(int i=0; i<n; i++){
        cin >> arr[i];
    }
    insertionSort(arr, n);
    cout << "Sorted Array:" << endl;
    for(int i=0; i<n; i++){
        cout << arr[i] << " ";
    }
}
```

C:- Bubble Sort:-

```cpp
#include<iostream>
using namespace std;
void bubbleSort(int arr[], int n){
    for(int i=0; i<n-1; i++){
        for(int j=0; j<n-i-1; j++){
            if(arr[j] > arr[j+1]){
                int temp = arr[j];
                arr[j] = arr[j+1];
                arr[j+1] = temp;
            }
        }
    }
}
int main(){
    int n;
    cout << "Enter size of array:" << endl;
    cin >> n;
    int arr[n];
    cout << "Enter elements:" << endl;
    for(int i=0; i<n; i++){
        cin >> arr[i];
    }
    bubbleSort(arr, n);
    cout << "Sorted Array:" << endl;
    for(int i=0; i<n; i++){
        cout << arr[i] << " ";
    }
}
```

D:- Merge Sort

```cpp
#include<iostream>
using namespace std;
void mergeArray(int arr[], int s, int mid, int e){
    int n1 = mid - s + 1;
    int n2 = e - mid;
    int a[n1];
    int b[n2];
    for(int i=0; i<n1; i++) a[i] = arr[s + i];
    for(int i=0; i<n2; i++) b[i] = arr[mid + 1 + i];
    int i=0, j=0, k=s;
    while(i < n1 && j < n2){
        if(a[i] < b[j]){
            arr[k++] = a[i++];
        } else {
            arr[k++] = b[j++];
        }
    }
    while(i < n1) arr[k++] = a[i++];
    while(j < n2) arr[k++] = b[j++];
}
void mergeSort(int arr[], int s, int e){
    if(s >= e) return;
    int mid = (s + e)/2;
    mergeSort(arr, s, mid);
    mergeSort(arr, mid+1, e);
    mergeArray(arr, s, mid, e);
}
int main(){
    int n;
    cout << "Enter size of array:" << endl;
    cin >> n;
    int arr[n];
    cout << "Enter elements:" << endl;
    for(int i=0; i<n; i++){
        cin >> arr[i];
    }
    mergeSort(arr, 0, n-1);
    cout << "Sorted Array:" << endl;
    for(int i=0; i<n; i++){
        cout << arr[i] << " ";
    }
}
```

E:- Quick Sort

```cpp
#include<iostream>
using namespace std;
int partitionFunc(int arr[], int s, int e){
    int pivot = arr[s];
    int count = 0;
    for(int i=s+1; i<=e; i++){
        if(arr[i] <= pivot) count++;
    }
    int pivotIndex = s + count;
    swap(arr[pivotIndex], arr[s]);
    int i = s, j = e;
    while(i < pivotIndex && j > pivotIndex){
        while(arr[i] <= pivot) i++;
        while(arr[j] > pivot) j--;
        if(i < pivotIndex && j > pivotIndex)
            swap(arr[i++], arr[j--]);
    }
    return pivotIndex;
}
void quickSort(int arr[], int s, int e){
    if(s >= e) return;
    int p = partitionFunc(arr, s, e);
    quickSort(arr, s, p-1);
    quickSort(arr, p+1, e);
}
int main(){
    int n;
    cout << "Enter size of array:" << endl;
    cin >> n;
    int arr[n];
    cout << "Enter elements:" << endl;
    for(int i=0; i<n; i++){
        cin >> arr[i];
    }
    quickSort(arr, 0, n-1);
    cout << "Sorted Array:" << endl;
    for(int i=0; i<n; i++){
        cout << arr[i] << " ";
    }
}
```

Ques 2:-

```cpp
#include<iostream>
using namespace std;
void improvedSelectionSort(int arr[], int n){
    int left = 0, right = n-1;
    while(left < right){
        int minIndex = left;
        int maxIndex = right;
        for(int i=left; i<=right; i++){
            if(arr[i] < arr[minIndex]) minIndex = i;
            if(arr[i] > arr[maxIndex]) maxIndex = i;
        }
        // swap min with left
        swap(arr[left], arr[minIndex]);
        // if max was at left, update its index after swap
        if(maxIndex == left) maxIndex = minIndex;
        // swap max with right
        swap(arr[right], arr[maxIndex]);
        left++;
        right--;
    }
}
int main(){
    int n;
    cout << "Enter size of array:" << endl;
    cin >> n;
    int arr[n];
    cout << "Enter elements:" << endl;
    for(int i=0; i<n; i++){
        cin >> arr[i];
    }
    improvedSelectionSort(arr, n);
    cout << "Sorted Array:" << endl;
    for(int i=0; i<n; i++){
        cout << arr[i] << " ";
    }
}
```