```
//Bubble Sort


let arr = [5,2,7,2,9,6,2,11,4];


const bubbleSort = (arr) => {

    let n = arr.length;

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


    }
}

bubbleSort(arr);
console.log(arr)

const InprovedbubbleSort = (arr) => {

    let n = arr.length;

    for(let i=0;i<n-1;i++){
              let isSwapped = false;

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

```
            }
        }
        if(isSwapped == false )
            break;
    }
}

//TC: O(n^2)
//Best Case TC: Omega (n) or O(n)
//SC: O(1)









//Insertion Sort
let arr = [5,2,7,2,9,6,2,11,4];

const  insertionSort = (arr) => {

    let n = arr.length;

    for(let i=1;i<n;i++){
        let key = arr[i];
        let j = i-1;


        while(j>=0 && arr[j]>key){
            arr[j+1] = arr[j];
            j--;
        }
        arr[j+1] = key;

    }
}

insertionSort(arr);
console.log(arr);
```

```
//TC: O(n^2)
//TC: Best TC : Omega (n) -> already sorted array
//SC: O(1)
```

```
//Quick Sort

 let arr = [5,2,7,2,9,6,2,11,4];

 const swap =(arr, left, right)=>{
     let temp = arr[left];
     arr[left] = arr[right];
     arr[right] = temp;
 }

 const partition =(arr, low, high) =>{

    pivot_element = arr[high];
    let i = low-1;

    for(let j = low;j<high;j++){

        if(pivot_element> arr[j]){

            i++;
            swap(arr,i,j);
        }
    }
    swap(arr,i+1, high);
    return i+1;
}

 const quickSort = (arr,low,high) => {
```

```
    if(low<high){
        let pivot_index =  partition(arr,low,high);
        quickSort(arr, low, pivot_index-1);
        quickSort(arr, pivot_index+1, high);
    }
}

quickSort(arr,0,8);

console.log(arr);
```