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Branch - Computer Sc. and Engineering

Section - A

Q.1 Insertion Sort

```
#include <stdio.h>

int* insertionSort(int* arr, int len){
    for(int i=1; i<len; i++){
        int temp = arr[i];
        for(int j=i-1; j>=0; j--){
            if(arr[j]>temp){
                arr[j+1] = arr[j];
                arr[j] = temp;
            }
        }
    }
    return arr;
}

void main(){
    int array[] = {2, 4, 5, 1, 3};
    int * sortedArray = insertionSort(array, 5);
    for(int i=0; i<5; i++){
        printf("%d ", sortedArray[i]);
    }
    printf("\n");
}
```

Console

→ 1 2 3 4 5

Q.2 Selection Sort

```
#include <stdio.h>

int* selectionSort(int* arr, int len){
    for(int i=0; i<len; i++){
        int lowestIndex = i;
        int lowestItem = arr[i];
        for(int j=i+1; j<len; j++){
            if(arr[j] < lowestItem){
                lowestItem = arr[j];
                lowestIndex = j;
            }
        }
        if(lowestIndex != i){
            int temp = arr[i];
            arr[i] = arr[lowestIndex];
            arr[lowestIndex] = temp;
        }
    }
    return arr;
}

void main(){
    int array[] = {2,4,5,1,3};
    int *sortedArray = selectionSort(array,5);
    for(int i=0; i<5; i++)
        printf("%d ", sortedArray[i]);
}
```

Console

→ 1 2 3 4 5

Ans

8.3 Search

```
#include <stdio.h>

int linearSearch(int* arr, int len, int target){
    for(int i=0; i<len; i++){
        if(arr[i]==target){
            return 1;
        }
    }
    return 0;
}

int binarySearch(int* arr, int left, int right, int target){
    if(left>right){
        return 0;
    }else{
        int mid = (left+right)/2;
        if(arr[mid]==target){
            return 1;
        }else{
            if(arr[mid]>target){
                binarySearch(arr, left, mid-1, target);
            }else{
                binarySearch(arr, mid+1, right, target);
            }
        }
    }
}
```

```
void main(){
    int array[] = {1, 2, 3, 4, 5};
    if(linearSearch(array, 5, 5){
        printf("Found using linear search:\n");
    }else{
        printf("Not found using linear search.\n");
    }
    if(binarySearch(array, 0, 4, 1)){
        printf("Found using binary search.\n");
    }else{
        printf("Not found using binary search.\n");
    }
}
```

Console

→ Found using linear search.

→ Found using binary search.

Chinadeep Bania