Day 5

Student Name: Sweta singh **UID: 22BCS10664**

Branch: CSE 3rdyear **Section/Group:** KPIT-901 A

Q1. **Searching a Number**

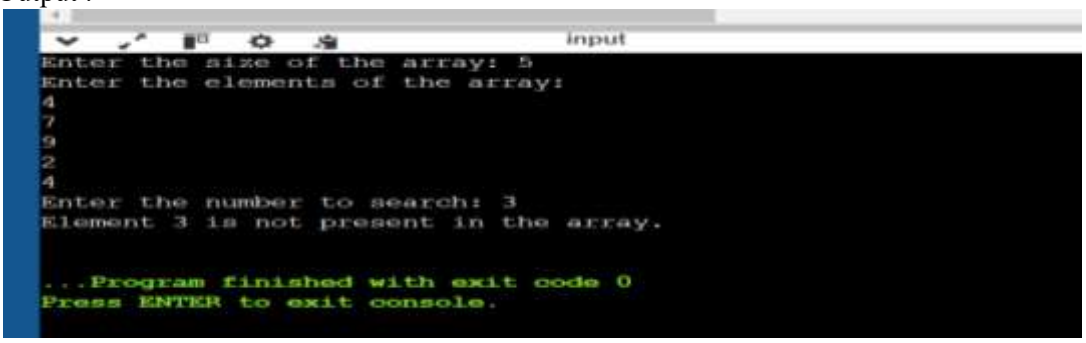
Given an integer k and array arr. Your task is to return the position of the first occurrence of k in the given array and if element k is not present in the array then return -1.

Code :

```
#include <stdio.h>

int searchNumber(int arr[], int size, int k) {
    for (int i = 0; i < size; i++) {
        if (arr[i] == k) {
            return i;
        }
    }
    return -1;
}

int main() {
    int n, k;
    printf("Enter the size of the array: ");
    scanf("%d", &n);
   int arr[n];
   printf("Enter the elements of the array:\n");
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
  printf("Enter the number to search: ");
    scanf("%d", &k);
   int position = searchNumber(arr, n, k);
```

```
if (position != -1) {
    printf("The first occurrence of %d is at position: %d\n", k, position);
} else {
    printf("Element %d is not present in the array.\n", k);
}

return 0;
}
```

Output :



Q2. **Sorted array Search.**

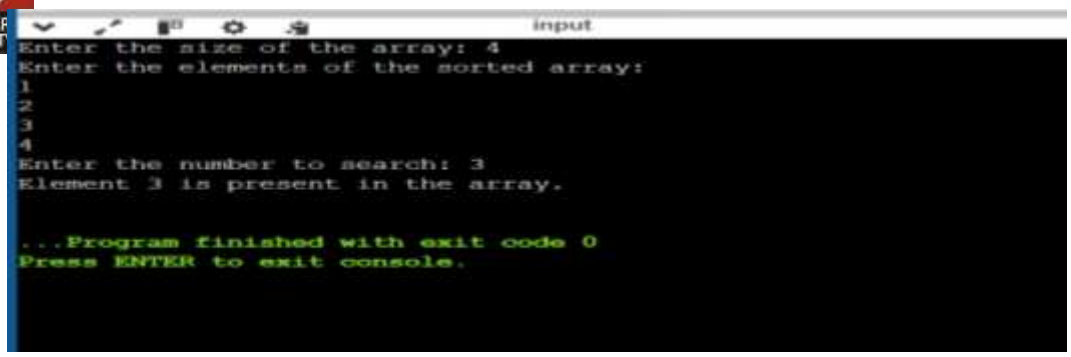
Given an array, arr[] sorted in ascending order and an integer k. Return true if k is present in the array, otherwise, false.

Code:

```
#include <stdio.h>
#include <stdbool.h>
bool binarySearch(int arr[], int size, int k) {
    int left = 0, right = size - 1;

    while (left <= right) {
        int mid = left + (right - left) / 2;

        if (arr[mid] == k) {
            return true;
        }
        if (arr[mid] < k) {
            left = mid + 1;
```

```
        } else {
            right = mid - 1;
        }
    }
    return false;
}

int main() {
    int n, k;
    printf("Enter the size of the array: ");
    scanf("%d", &n);

    int arr[n];
    printf("Enter the elements of the sorted array:\n");
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    printf("Enter the number to search: ");
    scanf("%d", &k);
    if (binarySearch(arr, n, k)) {
        printf("Element %d is present in the array.\n", k);
    } else {
        printf("Element %d is not present in the array.\n", k);
    }

    return 0;
}
```

Output:



Q3. **Find Target Indices After Sorting Array.**

You are given a 0-indexed integer array nums and a target element target.

A target index is an index i such that nums[i] == target.

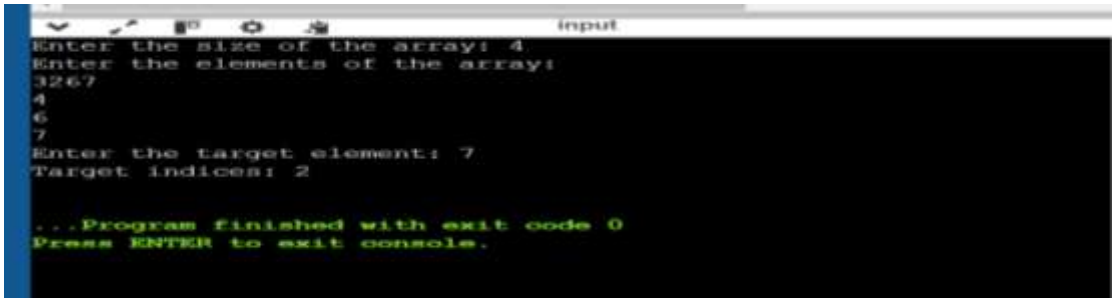
Return a list of the target indices of nums after sorting nums in non-decreasing order. If there are no target indices, return an empty list. The returned list must be sorted in increasing order.

Code:

```
#include <stdio.h>
#include <stdlib.h>
int compare(const void *a, const void *b) {
    return (*(int *)a - *(int *)b);
}
void findTargetIndices(int nums[], int size, int target) {

    qsort(nums, size, sizeof(int), compare);
    int found = 0;
    printf("Target indices: ");
    for (int i = 0; i < size; i++) {
        if (nums[i] == target) {
            printf("%d ", i);
            found = 1;
        }
    }
  if (!found) {
        printf("No target indices found.");
```

```
    printf("\n");
}

int main() {
    int n, target;

  printf("Enter the size of the array: ");
    scanf("%d", &n);

    int nums[n];
    printf("Enter the elements of the array:\n");
    for (int i = 0; i < n; i++) {
        scanf("%d", &nums[i]);
    }
    printf("Enter the target element: ");
    scanf("%d", &target);
    findTargetIndices(nums, n, target);

    return 0;
}
```

Output:



Q4. . **Search Insert Position.**

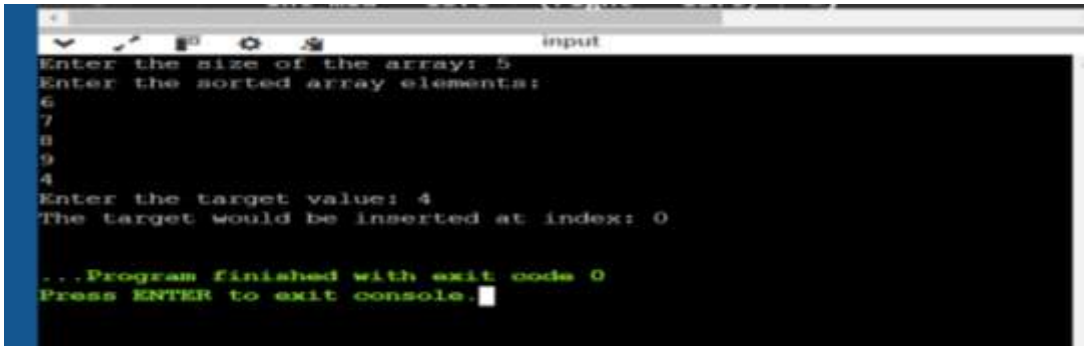
Given a sorted array of distinct integers and a target value, return the index if the target is found. If not, return the index where it would be if it were inserted in order.You must write an algorithm with O(log n) runtime complexity.

Code:

```
#include <stdio.h>
int searchInsertPosition(int arr[], int size, int target) {
    int left = 0, right = size - 1;

    while (left <= right) {
        int mid = left + (right - left) / 2;

        if (arr[mid] == target) {
            return mid;
        } else if (arr[mid] < target) {
            left = mid + 1;
        } else {
            right = mid - 1;
        }
    }
return left;
}

int main() {
    int n, target;
   printf("Enter the size of the array: ");
    scanf("%d", &n);
    int arr[n];
    printf("Enter the sorted array elements:\n");
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
```

```
    printf("Enter the target value: ");
    scanf("%d", &target);
   int position = searchInsertPosition(arr, n, target);
    printf("The target would be inserted at index: %d\n", position);
    return 0;
}
```

Output :



Q5. Relative Sort Array.

Given two arrays arr1 and arr2 the element of arr2 are distinct elements in arr2 are also in arr1.

Sort the Element of arr1 such that the relative ordering of iitem are the same as in arr2. Element that do not appear in arr2 should be placed at the end of arr1 in ascending order.

Code:

```
#include <stdio.h>
#include <stdlib.h>
int compare(const void *a, const void *b) {
    return (*(int *)a - *(int *)b);
}
void relativeSortArray(int arr1[], int n1, int arr2[], int n2) {
    int output[n1], visited[n1], index = 0;
   for (int i = 0; i < n1; i++) {
        visited[i] = 0;
```

```
    }
    for (int i = 0; i < n2; i++) {
        for (int j = 0; j < n1; j++) {
            if (!visited[j] && arr1[j] == arr2[i]) {
                output[index++] = arr1[j];
                visited[j] = 1;
            }
        }
    }
    for (int i = 0; i < n1; i++) {
        if (!visited[i]) {
            output[index++] = arr1[i];
        }
    }
  qsort(output + index - (n1 - index), n1 - index, sizeof(int), compare);
    for (int i = 0; i < n1; i++) {
        arr1[i] = output[i];
    }
}
int main() {
    int n1, n2;
    printf("Enter the size of arr1: ");
    scanf("%d", &n1);
    int arr1[n1];
    printf("Enter the elements of arr1:\n");
    for (int i = 0; i < n1; i++) {
        scanf("%d", &arr1[i]);
    }
    printf("Enter the size of arr2: ");
    scanf("%d", &n2);
    int arr2[n2];
    printf("Enter the elements of arr2:\n");
```

```
    for (int i = 0; i < n2; i++) {
        scanf("%d", &arr2[i]);
    }

    relativeSortArray(arr1, n1, arr2, n2);
    printf("The sorted array is:\n");
    for (int i = 0; i < n1; i++) {
        printf("%d ", arr1[i]);

}
    printf("\n");

    return 0;
}
```

Output :