1.1.1. Linear Search in an Array

Write a C program to check whether a given element is present in an array of elements using linear search. The program should prompt the user to enter the size of the array, the elements of the array, and the element to search for.

CODE:-

```
#include <stdio.h>
int main()
{
   int n, key, found = 0;
   scanf("%d", &n);
   int arr[n];
   for (int i = 0; i < n; i++)
   {
      scanf("%d", &arr[i]);
   }
   scanf("%d", &key);
   for (int i = 0; i < n; i++)
   {
      if (arr[i] == key)
      {
         printf("found at position %d\n", i);
         found = 1;
         break;
      }
   }
   if (!found)
```

```
    {
        printf("%d not found\n", key);
    }
    return 0;
}
```

1.1.2. Binary Search

Write a C program that performs a binary search to find the position of the given integer in the array.

CODE:-

```
#include <stdio.h>
int binarySearch(int arr[], int n, int key)
{
    int low = 0, high = n - 1, mid;
    while (low <= high)
    {
        mid = (low + high) / 2;
        if (arr[mid] == key)
            return mid;
        else if (arr[mid] < key)
            low = mid + 1;
        else
            high = mid - 1;
    }
    return -1;
}
int main()
```

```
{
    int n, key, index;
    scanf("%d", &n);
    int arr[n];
    for (int i = 0; i < n; i++)
    {
        scanf("%d", &arr[i]);
    }
    scanf("%d", &key);
    index = binarySearch(arr, n, key);
    if (index != -1)
        printf("Element found at index %d\n", index);
    else
        printf("Element not found\n");
    return 0;
}
```