EXERCISE-9

9.Write a c program a number search using binary search.

AIM: To write a C program to search a number in a sorted array using the Binary Search method**.**

Algorithm:

1. Start the program.
2. Input the number of elements in the array.
3. Input the elements of the array in sorted order.
4. Input the number to search (key).
5. Set low = 0 and high = n - 1.
6. While low <= high:
    - Find mid = (low + high) / 2.
    - If arr[mid] == key, print found and exit.
    - If arr[mid] < key, set low = mid + 1.
    - Else, set high = mid - 1.
7. If key is not found, display not found.
8. End the program.

Program code:

```
#include <stdio.h>
int main() {
 int arr[100], n, key, low, high, mid, found = 0;
 printf("Enter number of elements: ");
 scanf("%d", &n);
```

```
    printf("Enter %d sorted elements: ", n);
    for (int i = 0; i < n; i++)
        scanf("%d", &arr[i]);
    printf("Enter number to search: ");
    scanf("%d", &key);
    low = 0;
    high = n - 1;
    while (low <= high) {
        mid = (low + high) / 2;
        if (arr[mid] == key) {
            printf("Element %d found at position %d (index %d)\n", key,
mid + 1, mid);
            found = 1;
            break;
        } else if (arr[mid] < key) {
            low = mid + 1;
        } else {
            high = mid - 1;
        }
    }
    if (!found) {
        printf("Element %d not found in the array.\n", key);
    }
```

```
    return 0;
}
```

Input and Output:

```
Enter number of elements: 6
Enter 6 sorted elements: 10 20 30 40 50  60
Enter number to search: 50
Element 50 found at position 5 (index 4)
```

Result:

The program correctly searches and finds a number in a sorted array using the Binary Search method