Experiment 9: Binary Search

Aim:

To search a number using binary search.

Algorithm:

1. Start.
2. Input sorted array.
3. Read key.
4. Set low=0, high=n-1.
5. While low<=high:
   - mid=(low+high)/2.
   - If a[mid]==key, found.
   - Else adjust low/high.
6. Stop.

Code:

```
#include <stdio.h>


int main() {
    int a[100], n, i, key, low, high, mid, found = 0;
    printf("Enter number of elements: ");
    scanf("%d", &n);
    printf("Enter %d elements (sorted): ", n);
    for(i = 0; i < n; i++)
        scanf("%d", &a[i]);


    printf("Enter the element to search: ");
    scanf("%d", &key);
```

```
    low = 0;
    high = n - 1;
    while(low <= high) {
        mid = (low + high) / 2;
        if(a[mid] == key) {
            printf("Element found at position %d\n", mid + 1);
            found = 1;
            break;
        } else if(a[mid] > key)
            high = mid - 1;
        else
            low = mid + 1;
    }
    if(!found)
        printf("Element not found\n");
    return 0;
}
```

Sample Output:

```
Enter number of elements: 4
Enter 4 elements (sorted): 1 2 3 4
Enter the element to search: 2
Element found at position 2


=== Code Execution Successful ===
```

Result:

The program successfully implements binary search.