

```
1 //
2 // Created by hfwei on 2023/10/11.
3 //
4
5 #include <stdio.h>
6
7 #define LEN 10
8
9 // dictionary: out of any functions; global variables
10 // life time: program start to end
11 // scope: from this point on until the end of the file (file scope)
12 // int dictionary[LEN] = { 1, 1, 2, 3, 5, 8, 13, 21, 34, 55 };
13
14 /**
15  * @brief Search for the key in the dict using the binary search
16  * algorithm.
17  * @param key the key to search for
18  * @param dict the dictionary to search
19  * @param len the length of the dictionary
20  * @return the index of the key in the dictionary; -1 if not found
21  */
22 int BinarySearch(int key, const int dict[100], int len);
23
24 int main(void) {
25     const int dictionary[LEN] = { 1, 1, 2, 3, 5, 8, 13, 21, 34, 55 };
26
27     int key = 0;
28     scanf("%d", &key);
29
30     int index = BinarySearch(key, dictionary, LEN);
31
32     if (index == -1) {
33         printf("Not found!\n");
34     } else {
35         printf("The index of %d is %d.\n", key, index);
36     }
37
38     return 0;
39 }
40
41 int BinarySearch(int key, const int dict[], int len) {
42     int low = 0;
43     int high = len - 1;
44
45     while (low <= high) {
46         int mid = (low + high) / 2;
47
48         if (key > dict[mid]) {
49             low = mid + 1;
50         } else if (key < dict[mid]) {
51             high = mid - 1;
52         } else { // key == dict[mid]
53             return mid;
54         }
55     }
56 }
```

File - D:\cpl\2023-cpl-coding-0\5-function\binary-search.c

```
53     }  
54 }  
55  
56 return -1;  
57 }
```