

# CS2351 DATA STRUCTURES

## Binary Search

### Recursive Version of Binary Search

```
#include <stdio.h>
#define TRUE 1
#define FALSE 0

int bsearch(int *A, int start, int end, int target) {
    int mid = (start + end)/2;
    if (start > end) return FALSE;
    else if (A[mid] == target) return TRUE;
    else if (A[mid] > target) return bsearch(A, start, mid-1, target);
    else return bsearch(A, mid+1, end, target);
}

int main() {
    int B[8] = { 1, 3, 5, 8, 12, 17, 18, 20 }, answer, target = 5;

    answer = bsearch(B, 0, 7, target);
    if (answer == TRUE) printf("The target value is found!\n");
    else printf("The target value is NOT found!\n");
}
```

### Iterative Version of Binary Search

```
#include <stdio.h>
#define TRUE 1
#define FALSE 0

int main() {
    int B[8] = { 1, 3, 5, 8, 12, 17, 18, 20 };
    int answer = FALSE, start = 0, end = 7, mid, target = 5;

    while (start <= end) {
        mid = (start + end)/2;
        if (B[mid] == target) { answer = TRUE; break; }
        else if (B[mid] > target) end = mid-1;
        else start = mid+1;
    }
    if (answer == TRUE) printf("The target value is found!\n");
    else printf("The target value is NOT found!\n");
}
```