Started on	Sunday, 21 September 2025, 9:37 PM
State	Finished
Completed on	Monday, 22 September 2025, 2:10 PM
Time taken	16 hours 32 mins
Marks	1.00/1.00
Grade	**10.00** out of 10.00 (**100**%)

Question 1 | Correct Mark 1.00 out of 1.00

Problem Statement

Given an array of 1s and 0s this has all 1s first followed by all 0s. Aim is to find the number of 0s. Write a program using Divide and Conquer to Count the number of zeroes in the given array.

Input Format

First Line Contains Integer m – Size of array

Next m lines Contains m numbers – Elements of an array

Output Format

First Line Contains Integer – Number of zeroes present in the given array.

Answer: (penalty regime: 0 %)

```
#include<stdio.h>
int cz(int arr[],int h,int l){
    if(h>=l){
        int mid=l+(h-l)/2;
        if(arr[mid]==0&&(mid==0||arr[mid-1]==1)){
            return mid;
        }
        if(arr[mid]==1){
            return cz(arr,h,mid+1);
        }
        else{
            return cz(arr,mid-1,l);
        }
    }
    return -1;
}
int main(){
    int m;
    scanf("%d",&m);
    int arr[m];
    for(int i=0;i<m;i++){
        scanf("%d",&arr[i]);
    }
    int ans=cz(arr,m-1,0);
    if(ans==-1){
        printf("0\n");
    }
    else{
        printf("%d",m-ans);
    }
    return 0;
}
```

	Input	Expected	Got	
✓	5 1 1 1 0 0	2	2	✓

	Input	Expected	Got	
✓	10 1 1 1 1 1 1 1 1 1 1	0	0	✓
✓	8 0 0 0 0 0 0 0 0	8	8	✓
✓	17 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0	2	2	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

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RAJALAKSHMI ENGINEERING COLLEGE

7 ASHVANTHAN S R 2024-CSE A2

Started on	Monday, 22 September 2025, 2:12 PM
State	Finished
Completed on	Monday, 22 September 2025, 2:49 PM
Time taken	37 mins 29 secs
Marks	1.00/1.00
Grade	**10.00** out of 10.00 (**100**%)

Question 1 | Correct Mark 1.00 out of 1.00

Given an array `nums` of size `n`, return *the majority element*.

The majority element is the element that appears more than `⌊n / 2⌋` times. You may assume that the majority element always exists in the array.

Example 1:

```
Input: nums = [3,2,3]
Output: 3
```

Example 2:

```
Input: nums = [2,2,1,1,1,2,2]
Output: 2
```

Constraints:

- `n == nums.length`
- $1 <= n <= 5 * 10^4$
- $-2^{31} <= nums[i] <= 2^{31} - 1$

For example:

Input	Result
3 3 2 3	3
7 2 2 1 1 1 2 2	2

Answer: (penalty regime: 0 %)

```
#include<stdio.h>
int co(int nums[], int lo, int hi, int n) {
    int count = 0;
    for (int i = lo; i <= hi; i++) {
        if (nums[i] == n) count++;
    }
    return count;
}
int res(int arr[],int l,int h){
    if(h==l) return arr[h];
    int mid=(h+l)/2;
    int leftMajor  = res(arr, l, mid);
    int rightMajor = res(arr, mid + 1, h);
    if (leftMajor == rightMajor) return leftMajor;
    int leftCount  = co(arr, l, h, leftMajor);
    int rightCount = co(arr, l, h, rightMajor);
    return (leftCount > rightCount) ? leftMajor : rightMajor;

}
int main(){
    int n;
    scanf("%d",&n);
    int arr[n];
    for(int i=0;i<n;i++){
        scanf("%d",&arr[i]);
    }
    int r=res(arr,0,n-1);
    printf("%d",r);
    return 0;
}
```

	Input	Expected	Got	
✓	3 3 2 3	3	3	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

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RAJALAKSHMI ENGINEERING COLLEGE

7 ASHVANTHAN S R 2024-CSE A2

Started on	Wednesday, 24 September 2025, 10:21 PM
State	Finished
Completed on	Thursday, 25 September 2025, 1:13 AM
Time taken	2 hours 52 mins
Marks	1.00/1.00
Grade	**10.00** out of 10.00 (**100**%)

Question 1 | Correct Mark 1.00 out of 1.00

Problem Statement:

Given a sorted array and a value x, the floor of x is the largest element in array smaller than or equal to x. Write divide and conquer algorithm to find floor of x.

Input Format

First Line Contains Integer n – Size of array

Next n lines Contains n numbers – Elements of an array

Last Line Contains Integer x – Value for x

Output Format

First Line Contains Integer – Floor value for x

Answer: (penalty regime: 0 %)

```c
#include <stdio.h>
#include <stdlib.h>
int findFloor(int arr[], int low, int high, int x);
int main() {
    int n;
    scanf("%d", &n);

    if (n <= 0) {
        printf("-1\n");
        return 0;
    }
    int* arr = (int*)malloc(n * sizeof(int));
    if (arr == NULL) {
        printf("Memory allocation failed\n");
        return 1;
    }
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    int x;
    scanf("%d", &x);
    int result = findFloor(arr, 0, n - 1, x);
    printf("%d\n", result);
    free(arr);
    return 0;
}
int findFloor(int arr[], int low, int high, int x) {
    if (low > high) {
        return -1;
    }

    if (x < arr[low]) {
        return -1;
    }

    int mid = low + (high - low) / 2;

    if (arr[mid] > x) {
        return findFloor(arr, low, mid - 1, x);
    } else {
        int potentialFloor = findFloor(arr, mid + 1, high, x);

        if (potentialFloor != -1) {
            return potentialFloor;
        } else {
            return arr[mid];
        }
    }
}

```

	Input	Expected	Got	
✓	6 1 2 8 10 12 19 5	2	2	✓
✓	5 10 22 85 108 129 100	85	85	✓
✓	7 3 5 7 9 11 13 15 10	9	9	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

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RAJALAKSHMI ENGINEERING COLLEGE

7 ASHVANTHAN S R 2024-CSE A2

Started on	Wednesday, 24 September 2025, 10:21 PM
State	Finished
Completed on	Thursday, 25 September 2025, 1:10 AM
Time taken	2 hours 49 mins
Marks	1.00/1.00
Grade	**10.00** out of 10.00 (**100**%)

Question 1 | Correct Mark 1.00 out of 1.00

Problem Statement:

Given a sorted array of integers say arr[] and a number x. Write a recursive program using divide and conquer strategy to check if there exist two elements in the array whose sum = x. If there exist such two elements then return the numbers, otherwise print as "No".

Note: Write a Divide and Conquer Solution

Input Format

First Line Contains Integer n – Size of array

Next n lines Contains n numbers – Elements of an array

Last Line Contains Integer x – Sum Value

Output Format

First Line Contains Integer – Element1

Second Line Contains Integer – Element2 (Element 1 and Elements 2 together sums to value "x")

Answer: (penalty regime: 0 %)

```c
#include <stdio.h>
int recursiveBinarySearch(int arr[], int low, int high, int target) {
    if (low <= high) {
        int mid = low + (high - low) / 2;
        if (arr[mid] == target) {
            return mid;
        }
        if (arr[mid] > target) {
            return recursiveBinarySearch(arr, low, mid - 1, target);
        }
        return recursiveBinarySearch(arr, mid + 1, high, target);
    }
    return -1;
}
void findPair(int arr[], int n, int x) {
    int found = 0;
    for (int i = 0; i < n - 1; i++) {
        int complement = x - arr[i];
        int complement_index = recursiveBinarySearch(arr, i + 1, n - 1, complement);
        if (complement_index != -1) {
            printf("%d\n", arr[i]);
            printf("%d\n", arr[complement_index]);
            found = 1;
            break;
        }
    }
    if (found == 0) {
        printf("No\n");
    }
}
int main() {
    int n;
    scanf("%d", &n);
    int arr[n];
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }
    int x;
    scanf("%d", &x);
    findPair(arr, n, x);
    return 0;
}

```

	Input	Expected	Got	
✓	4 2 4 8 10 14	4 10	4 10	✓
✓	5 2 4 6 8 10 100	No	No	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

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RAJALAKSHMI ENGINEERING COLLEGE

7 ASHVANTHAN S R 2024-CSE A2

Started on	Wednesday, 24 September 2025, 10:21 PM
State	Finished
Completed on	Thursday, 25 September 2025, 1:14 AM
Time taken	2 hours 53 mins
Marks	1.00/1.00
Grade	**10.00** out of 10.00 (**100**%)

Question 1 | Correct Mark 1.00 out of 1.00

Write a Program to Implement the Quick Sort Algorithm

Input Format:

The first line contains the no of elements in the list-n

The next n lines contain the elements.

Output:

Sorted list of elements

For example:

Input	Result
5 67 34 12 98 78	12 34 67 78 98

Answer:

```c
#include <stdio.h>

void swap(int* a, int* b) {
    int t = *a;
    *a = *b;
    *b = t;
}

int partition(int arr[], int low, int high) {
    int pivot = arr[high];
    int i = (low - 1);

    for (int j = low; j <= high - 1; j++) {
        if (arr[j] <= pivot) {
            i++;
            swap(&arr[i], &arr[j]);
        }
    }
    swap(&arr[i + 1], &arr[high]);
    return (i + 1);
}

void quickSort(int arr[], int low, int high) {
    if (low < high) {
        int pi = partition(arr, low, high);
        quickSort(arr, low, pi - 1);
        quickSort(arr, pi + 1, high);
    }
}

int main() {
    int n;
    scanf("%d", &n);
    int arr[n];
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr[i]);
    }

    quickSort(arr, 0, n - 1);

    for (int i = 0; i < n; i++) {
        printf("%d ", arr[i]);
    }
    printf("\n");

    return 0;
}
```

	Input	Expected	Got	
✓	5 67 34 12 98 78	12 34 67 78 98	12 34 67 78 98	✓
✓	10 1 56 78 90 32 56 11 10 90 114	1 10 11 32 56 56 78 90 90 114	1 10 11 32 56 56 78 90 90 114	✓
✓	12 9 8 7 6 5 4 3 2 1 10 11 90	1 2 3 4 5 6 7 8 9 10 11 90	1 2 3 4 5 6 7 8 9 10 11 90	✓

Passed all tests! ✓

Correct

Marks for this submission: 1.00/1.00.

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