RAJALAKSHMI ENGINEERING COLLEGE

PRANAV SHANMUGAM 2024-CSE

P2

Started on	Friday, 3 October 2025, 1:32 PM
State	Finished
Completed on	Friday, 3 October 2025, 1:35 PM
Time taken	2 mins 58 secs
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 %)

```c
#include <stdio.h>

int findFirstZero(int arr[], int low, int high) {
    if (high >= low) {
        int mid = (low + high) / 2;
        if ((mid == 0 || arr[mid - 1] == 1) && arr[mid] == 0)
            return mid;
        if (arr[mid] == 1)
            return findFirstZero(arr, mid + 1, high);
        else
            return findFirstZero(arr, low, mid - 1);
    }
    return -1;
}

int main() {
    int m;
    scanf("%d", &m);
    int arr[m];
    for (int i = 0; i < m; i++) scanf("%d", &arr[i]);
    int firstZeroIndex = findFirstZero(arr, 0, m - 1);
    int count = (firstZeroIndex == -1) ? 0 : m - firstZeroIndex;
    printf("%d\n", count);
    return 0;
}

```

	Input	Expected	Got	
✔	5 1 1 1 0 0	2	2	✔
✔	10 1 1 1 1 1 1 1 1 1 1	0	0	✔

	Input	Expected	Got	
✔	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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P2

Started on	Friday, 3 October 2025, 1:36 PM
State	Finished
Completed on	Friday, 3 October 2025, 1:37 PM
Time taken	56 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 %)

```c
#include <stdio.h>

int majorityElement(int* nums, int n) {
    int count = 0, candidate = 0;
    for (int i = 0; i < n; i++) {
        if (count == 0) candidate = nums[i];
        if (nums[i] == candidate) count++;
        else count--;
    }
    return candidate;
}

int main() {
    int n;
    scanf("%d", &n);
    int nums[n];
    for (int i = 0; i < n; i++) scanf("%d", &nums[i]);
    printf("%d\n", majorityElement(nums, n));
    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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Started on	Friday, 3 October 2025, 1:38 PM
State	Finished
Completed on	Friday, 3 October 2025, 1:38 PM
Time taken	26 secs
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>

int findFloor(int arr[], int low, int high, int x) {
    if (low > high) return -1;
    if (x >= arr[high]) return arr[high];
    int mid = (low + high) / 2;
    if (arr[mid] == x) return arr[mid];
    if (mid > 0 && arr[mid - 1] <= x && x < arr[mid]) return arr[mid - 1];
    if (x < arr[mid]) return findFloor(arr, low, mid - 1, x);
    return findFloor(arr, mid + 1, high, x);
}

int main() {
    int n, x;
    scanf("%d", &n);
    int arr[n];
    for (int i = 0; i < n; i++) scanf("%d", &arr[i]);
    scanf("%d", &x);
    int result = findFloor(arr, 0, n - 1, x);
    printf("%d\n", result);
    return 0;
}

```

	Input	Expected	Got	
✔	6 1 2 8 10 12 19 5	2	2	✔
✔	5 10 22 85 108 129 100	85	85	✔

	Input	Expected	Got	
✔	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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Time taken	32 secs
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 findPair(int arr[], int l, int r, int x, int *a, int *b) {
    if (l >= r) return 0;
    int sum = arr[l] + arr[r];
    if (sum == x) {
        *a = arr[l];
        *b = arr[r];
        return 1;
    }
    if (sum > x) return findPair(arr, l, r - 1, x, a, b);
    return findPair(arr, l + 1, r, x, a, b);
}

int main() {
    int n, x;
    scanf("%d", &n);
    int arr[n];
    for (int i = 0; i < n; i++) scanf("%d", &arr[i]);
    scanf("%d", &x);
    int a, b;
    if (findPair(arr, 0, n - 1, x, &a, &b)) {
        printf("%d\n%d\n", a, b);
    } else {
        printf("No\n");
    }
    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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Started on	Friday, 3 October 2025, 1:40 PM
State	Finished
Completed on	Friday, 3 October 2025, 1:40 PM
Time taken	23 secs
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; 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]);
    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	✔

	Input	Expected	Got	
✔	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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