Divide and conquer

Program – 3

Aim:

To find the floor of a given value xxx in a sorted array using a divide and conquer algorithm. The floor of xxx is the largest element in the array smaller than or equal to xxx.

Input:

- An integer nnn: size of the array.
- nnn integers: elements of the sorted array.
- An integer xxx: the value for which the floor is to be found.

Code:

```
#include <stdio.h>




int findFloor(int arr[], int low, int high, int x) {


   if (x < arr[0])

      return -1;




   if (x >= arr[high])

      return arr[high];




   while (low <= high) {

      int mid = (low + high) / 2;




      if (arr[mid] == x)
```

```
            return arr[mid];



        if (arr[mid] < x) {
            if (mid + 1 <= high && arr[mid + 1] > x) {
                return arr[mid];
            }
            low = mid + 1;
        } else {

            high = mid - 1;
        }
    }
    return arr[high];
}

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 floorValue = findFloor(arr, 0, n - 1, x);
    if (floorValue == -1) {
        printf("No floor exists\n");
    } else {
        printf("%d\n", floorValue);
    }

    return 0;
}
```

Output:

	Input	Expected	Got	
✔	6 1 2 8 10 12 19 5	2	2	✔