Design & Analysis Of Algorithm

Lab Experiment -5

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SUBJECT: DESIGN & ANALYSIS OF ALGORITHM

SUBJECT CODE: 19CSE302

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EX NO: 5

Binary search algorithm .

AIM:

To write an algorithm to implement Binary search algorithm.

ALGORITHM:

1) Input array size, array elements and the key element to be found.
2) In the b_search():
    a. Calculate the mid value = l +h/2If mid = key,
    b. then return the mid position If mid > key,
    c. search the key in the left subarray.
    d. If mid <key, search the key in the right sub array. If not found return -1.

CODE SCREEN:

```
n=int(input("Enter No.of Elements: "))
arr=[]
print("Enter the elements: ")
for i in range(n):
    arr.append(int(input()))

print("Array after sorting is: ")
for i in range(len(arr)):
    min_idx = i
    for j in range(i+1, len(arr)):
        if arr[min_idx] > arr[j]:
            min_idx = j
    arr[i], arr[min_idx] = arr[min_idx], arr[i]
print(arr)
k=int(input("Enter the value to search: "))
def bs(arr, l, r, x):
    if r >= l:
        mid = l + (r - l) // 2
        if arr[mid] == x:
            return mid
        elif arr[mid] > x:
            return bs(arr, l, mid-1, x)
        else:
```

```
            return bs(arr, mid + 1, r, x)
    else:
        return -1
ans = bs(arr, 0, len(arr)-1, k)
if ans!=-1:
    print("Element is at index % d" % ans)
else:
    print("Not in the array")
```

OUTPUT SCREEN :

```
PS D:\python> & C:/Users/HP/AppData/Local/Programs/Python/Python310/python.exe d:/python/DAA/binarySearch.py
Enter No.of Elements: 6
Enter the elements:
1
24
12
5
16
32
Array after sorting is:
[1, 5, 12, 16, 24, 32]
Enter the value to search: 16
Element is at index  3
PS D:\python>
```

TIME COMPLEXITY:

Best Case: O(1)

Average Case : O(log n)

Worst Case : O(log n)

RESULT:

I have studied and understood the binary search algorithm

in python language and executed the program successfully.

THANK YOU !!