Assignment . 5

(A)

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def linear\_search(arr, target):

for i in range(len(arr)):

if arr[i] == target:

return True

return False

def sentinel\_search(arr, target):

n = len(arr)

last = arr[-1]

arr[-1] = target

i = 0

while arr[i] != target:

i += 1

arr[-1] = last

if i < n - 1 or arr[-1] == target:

return True

return False

n = int(input("Enter number of students: "))

roll\_numbers = [int(input(f"Enter roll number for student {i+1}: ")) for i in range(n)]

target = int(input("Enter roll number to search: "))

print("Using Linear Search:", linear\_search(roll\_numbers, target))

print("Using Sentinel Search:", sentinel\_search(roll\_numbers.copy(), target))

(B)

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def binary\_search(arr, target):

low, high = 0, len(arr) - 1

while low <= high:

mid = (low + high) // 2

if arr[mid] == target:

return True

elif arr[mid] < target:

low = mid + 1

else:

high = mid - 1

return False

def fibonacci\_search(arr, target):

n = len(arr)

fib2, fib1 = 0, 1

fibM = fib2 + fib1

while fibM < n:

fib2, fib1 = fib1, fibM

fibM = fib2 + fib1

offset = -1

while fibM > 1:

i = min(offset + fib2, n-1)

if arr[i] < target:

fibM = fib1

fib1 = fib2

fib2 = fibM - fib1

offset = i

elif arr[i] > target:

fibM = fib2

fib1 = fib1 - fib2

fib2 = fibM - fib1

else:

return True

if fib1 and arr[offset + 1] == target:

return True

return False

n = int(input("Enter number of students: "))

roll\_numbers\_sorted = sorted([int(input(f"Enter roll number for student {i+1}: ")) for i in range(n)])

target = int(input("Enter roll number to search: "))

print("Using Binary Search:", binary\_search(roll\_numbers\_sorted, target))

print("Using Fibonacci Search:", fibonacci\_search(roll\_numbers\_sorted, target))

Enter number of students: 5

Enter roll number for student 1: 101

Enter roll number for student 2: 102

Enter roll number for student 3: 103

Enter roll number for student 4: 104

Enter roll number for student 5: 105

Enter roll number to search: 103

Using Linear Search: True

Using Sentinel Search: True

Enter number of students: 5

Enter roll number for student 1: 105

Enter roll number for student 2: 102

Enter roll number for student 3: 103

Enter roll number for student 4: 101

Enter roll number for student 5: 104

Enter roll number to search: 102

Using Binary Search: True

Using Fibonacci Search: True