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Assignment no. 4. b)

Write a python program to store roll numbers of student in array who attended

training program in sorted order. Write function for searching whether particular

student attended training program or not, using Binary search and Fibonacci search

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def take\_input(array):

number = int(input("Enter the total no. of student: "))

print("Note: Input Sorted data!")

for i in range(number): # accepting student's roll no. till the range number

x = int(input(f"Enter the Roll no. of student {i + 1}: "))

array.append(x)

# information accepted successfully

return number

def display\_output(array, num):

if num == 0:

print("NO records found in the database.")

else:

print("Students Array: ", end=' ')

for i in range(num):

print(f"{array[i]}", end=' ')

print()

def binary\_search\_recursive(array, low, high, key):

if low <= high:

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

if array[mid] == key:

return mid # element found

else:

if key < array[mid]:

return binary\_search\_recursive(array, low, mid - 1, key)

else:

return binary\_search\_recursive(array, mid + 1, high, key)

return -1 # not found

def binary\_search\_iterative(array, num, key):

low = 0

high = num - 1

while high <= low:

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

if array[mid] == key:

return mid

else:

if key < arr[mid]:

high = mid - 1

else:

low = mid + 1

return -1 # not found

def fibonacci\_search(arr, n, key):

f1 = 0

f2 = 1

f3 = f1 + f2

offset = -1

while f3 < n:

f1 = f2

f2 = f3

f3 = f1 + f2

while f3 > 1:

i = min(offset + f1, n - 1)

if arr[i] == key:

return i

else:

if key < arr[i]:

f3 = f1

f2 = f2 - f1

f1 = f3 - f2

else:

f3 = f2

f2 = f1

f1 = f3 - f2

offset = i

if f2 == 1 and (offset + 1) < n and arr[offset + 1] == key:

return offset + 1

return -1

# main program

print("""

1. Recursive Binary search.

2. Iterative Binary search.

3. Fibonacci Search.

note: press any other no. exit""")

print()

a = int(input("Which operation you want to perform: "))

if a == 1:

arr = []

n = take\_input(arr)

key = int(input("Enter the Roll no. to be searched: "))

print("=========== Using Binary Recursive Search =============")

flag = binary\_search\_recursive(arr, 0, n - 1, key)

if flag == -1:

print("Searched Roll no. not found.")

# print("Searched Roll no. found at location: ", (flag + 1))

else:

# print("Searched Roll no. not found.")

print("Searched Roll no. found at location: ", (flag + 1))

elif a == 2:

arr = []

n = take\_input(arr)

key = int(input("Enter the Roll no. to be searched: "))

print("=========== Using Binary Iterative Search =============")

flag = binary\_search\_iterative(arr, n, key)

if flag == -1:

print("Searched Roll no. not found.")

else:

print("Searched Roll no. found at location: ", (flag + 1))

elif a == 3:

arr = []

n = take\_input(arr)

display\_output(arr, n)

key = int(input('enter the number to be searched: '))

print("=========== Using Fibonacci Search =============")

flag = fibonacci\_search(arr, n, key)

if flag == -1:

print('Roll Number not found')

else:

print(f"Roll Number found at location {(flag + 1)}")