**Practical 4 (B)**

Write a python program to store roll numbers of student 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

Program:-

def accept\_array(A):

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

print("Input roll numbers in sorted order")

for i in range(n):

x = int(input("Enter the roll no of student %d : "%(i+1)))

A.append(x)

print("Student Info accepted successfully\n\n")

return n

def display\_array(A,n):

if(n == 0) :

print("\nNo records in the database")

else :

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

for i in range(n) :

print("%d "%A[i],end=' ')

print("\n");

def Recursive\_Binary\_Search(A,s,l,X) :

if(s <= l ) :

mid = int((s + l) / 2)

if(A[mid] == X) :

return mid # Found

else :

if(X < A[mid] ) :

return Recursive\_Binary\_Search(A,s,mid-1,X)

else :

return Recursive\_Binary\_Search(A,mid+1,l,X)

return -1 # NOT FOUND

def Iterative\_Binary\_Search(A,n,X) :

s = 0

l = n-1

while(s <= l ) :

mid = int((s + l) / 2)

if(A[mid] == X) :

return mid # Found

else :

if (X < A[mid] ) :

l = mid-1

else :

s = mid+1

return -1; #NOT FOUND

#Returns index of x if present, else returns -1

def Fibonacci\_Search(A,n,X) :

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(A[i] == X) :

return i #Found

else :

if (X < A[i] ) : # left substudent (66 % or 2/3 student)

f3 = f1

f2 = f2 - f1

f1 = f3 - f2

else : # right substudent ( 33 % or 1/3 student)

f3 = f2

f2 = f1

f1 = f3 - f2

offset = i

if(f2 == 1 and (offset+1) < n and A[offset + 1] == X) :

return offset+1 # Found

return -1 #NOT FOUND

def Main() :

A = []

while True :

print ("\t1 : Accept & Display Students info ")

print ("\t2 : Recursive Binary Search")

print ("\t3 : Iterative Binary Search")

print ("\t4 : Fibonacci Search")

print ("\t5 : Exit")

ch = int(input("Enter your choice : "))

if (ch == 5):

print ("End of Program")

quit()

elif (ch==1):

A = []

n = accept\_array(A)

display\_array(A,n)

elif (ch==2):

X = int(input("Enter the roll\_no to be searched : "))

flag = Recursive\_Binary\_Search(A,0,n-1,X)

if(flag == -1) :

print("\tRoll no to be Searched not Found\n")

else :

print("\tRoll no found at location %d"%(flag + 1))

elif (ch==3):

X = int(input("Enter the roll\_no to be searched : "))

flag = Iterative\_Binary\_Search(A,n,X)

if(flag == -1) :

print("\tRoll no to be Searched not Found\n")

elif (ch==4):

X = int(input("Enter the roll\_no to be searched : "))

flag = Fibonacci\_Search(A,n,X)

if(flag == -1) :

print("\tRoll no to be Searched not Found\n")

else :

print("\tRoll no found at location %d"%(flag + 1))

else :

print ("Wrong choice entered !! Try again")

Main()

Output:

1 : Accept & Display Students info

2 : Recursive Binary Search

3 : Iterative Binary Search

4 : Fibonacci Search

5 : Exit

Enter your choice : 1

Enter the total no. of student : 4

Input roll numbers in sorted order

Enter the roll no of student 1 : 1

Enter the roll no of student 2 : 2

Enter the roll no of student 3 : 3

Enter the roll no of student 4 : 4

Student Info accepted successfully

Students Array : 1 2 3 4

1 : Accept & Display Students info

2 : Recursive Binary Search

3 : Iterative Binary Search

4 : Fibonacci Search

5 : Exit

Enter your choice : 2

Enter the roll\_no to be searched : 3

Roll no found at location 3

1 : Accept & Display Students info

2 : Recursive Binary Search

3 : Iterative Binary Search

4 : Fibonacci Search

5 : Exit

Enter your choice : 3

Enter the roll\_no to be searched : 2

1 : Accept & Display Students info

2 : Recursive Binary Search

3 : Iterative Binary Search

4 : Fibonacci Search

5 : Exit

Enter your choice : 4

Enter the roll\_no to be searched : 1

Roll no found at location 1

1 : Accept & Display Students info

2 : Recursive Binary Search

3 : Iterative Binary Search

4 : Fibonacci Search

5 : Exit

Enter your choice :