**INPUT CODE(a) :**

def accept\_array(A):

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

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 Linear\_Search(A, n, X):

for i in range(n):

if A[i] == X:

return i # found so returning the position i.e index

return -1 # Not found

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

last = A[n - 1]

i = 0

A[n - 1] = X # Here X is the roll\_no to be searched.

while A[i] != X:

i = i + 1

A[n - 1] = last

if (i < n - 1) or (X == A[n - 1]):

return i # roll\_no found at location i

else:

return -1 # roll\_no not found

def Main():

A = []

while True:

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

print("\t2 : Linear Search")

print("\t3 : Sentinel Search")

print("\t4 : Exit")

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

if ch == 4:

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 = Linear\_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))

elif ch == 3:

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

flag = Sentinel\_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()

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Output(a) :

Enter the total no. of student : 3

Enter the roll no of student 1 : 10

Enter the roll no of student 2 : 20

Enter the roll no of student 3 : 30

Student Info accepted successfully

Students Array : 10 20 30

Linear Search :

Enter the roll\_no to be searched : 20

Roll no found at location 2

Sentinal Search :

Enter the roll\_no to be searched : 30

Roll no found at location 3

--------------------------------------------------------------------------------------------------------------------------------------INPUT(b) :

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

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 subarray

f3 = f1

f2 = f2 - f1

f1 = f3 - f2

else: # Right subarray

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, len(A) - 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, len(A), 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 == 4:

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

flag = Fibonacci\_Search(A, len(A), 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(b) :

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 : 5

Input roll numbers in sorted order

Enter the roll no of student 1 : 101

Enter the roll no of student 2 : 102

Enter the roll no of student 3 : 103

Enter the roll no of student 4 : 104

Enter the roll no of student 5 : 105

Student Info accepted successfully

Students Array : 101 102 103 104 105

Enter your choice : 2

Enter the roll\_no to be searched : 103

Roll no found at location 3