"""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"""

def LinearSearch():

    for i in range(len(student\_list)):

        if key == student\_list[i]:

            print("The Student was present at Training program!! at position",i+1)

            break

    else:

        print("The student was Absent in Training Program")

def Binary\_search():

    low=0

    high=len(student\_list)-1

    Found=False

    while low<=high  and not Found:

        mid=(low+high)//2

        if key==student\_list[mid]:

            Found=True

        elif key>student\_list[mid]:

            low=mid+1

        else:

            high=mid-1

    if Found==True:

        print("The student was  present in Training Program!!! at position",mid+1)

    else:

        print("The student was  Absent in Training Program!!!")

def SelectionSort():

    for i in range(0,len(student\_list)-1):

        minIndex = i

        for j in range(i+1 ,len(student\_list) ):

            if(student\_list[j] < student\_list[minIndex]):

                minIndex = j

        if(minIndex != i):

            student\_list[i],student\_list[minIndex] = student\_list[minIndex],student\_list[i]

    print("The Sorted list is:",student\_list)

def fibonacci\_search():

    F=[]

    f0=0

    f1=1

    f2=1

    F.append(f0)

    F.append(f1)

    F.append(f2)

    while(f2<len(student\_list)):

        f0=f1

        f1=f2

        f2=f0+f1

        F.append(f2)

    print("Required Fibonacci series is: ",F)

    offset=-1

    k=len(F)

    while(f2>1 and k>=0):

        index=min(offset+F[k-2], n-1)

        if (key>student\_list[index]):

            k=k-1

            offset=index

        elif(key<student\_list[index]):

            k=k-2

        elif(key==student\_list[index]):

            print(key," Roll number was present for the program and found at position: ",index+1)

            return index

    else:

        print(key," Roll number was absent")

def Sentinel\_search():

    key=int(input("Enter the roll number of student to check his/her presence: "))

    for i in range(len(student\_list)-1):

        if(student\_list[i]==key):

            print(key, " Roll number was present for the program found at: ",i)

            break

    else:

        temp=0

        temp=student\_list[n-1]

        student\_list[n-1]=key

        print(key, " Roll number was replaced with last roll number ")

        print("Roll number list after replacing last roll number: ",student\_list)

        student\_list[n-1]=temp

n=int(input("Enter the no of Students in class:"))

global student\_list,key

student\_list=[]

print("Enter the Roll No. of students:")

for i in range(n):

    roll\_no=int(input())

    student\_list.append(roll\_no)

print(student\_list)

while(1):

    search=print(" 1.linear search\n 2.Binary search \n 3.Fibonacci Search \n 4.Sentinel Search \n 0.Exit")

    option=int(input("Enter your Choice:"))

    if(option==1):

        key=int(input("Enter the Roll No. you want to search:"))

        LinearSearch()

    elif(option==2):

        key=int(input("Enter the Roll No. you want to search:"))

        SelectionSort()

        Binary\_search()

    elif(option==3):

        key=int(input("Enter the Roll No. you want to search:"))

        SelectionSort()

        fibonacci\_search()

    elif(option==4):

        key=int(input("Enter the Roll No. you want to search:"))

        Sentinel\_search()

    elif(option==0):

        print("Exited!!")

        break

OUTPUT:-

Enter the no of Students in class:5

Enter the Roll No. of students:

25543

25541

25539

25537

25538

[25543, 25541, 25539, 25537, 25538]

1.linear search

2.Binary search

3.Fibonacci Search

4.Sentinel Search

0.Exit

Enter your Choice:1

Enter the Roll No. you want to search:25540

The student was Absent in Training Program

1.linear search

2.Binary search

3.Fibonacci Search

4.Sentinel Search

0.Exit

Enter your Choice:2

Enter the Roll No. you want to search:25541

The Sorted list is: [25537, 25538, 25539, 25541, 25543]

The student was present in Training Program!!! at position 4

1.linear search

2.Binary search

3.Fibonacci Search

4.Sentinel Search

0.Exit

Enter your Choice:3

Enter the Roll No. you want to search:25543

The Sorted list is: [25537, 25538, 25539, 25541, 25543]

Required Fibonacci series is: [0, 1, 1, 2, 3, 5]

25543 Roll number was present for the program and found at position: 5

1.linear search

2.Binary search

3.Fibonacci Search

4.Sentinel Search

0.Exit

Enter your Choice:4

Enter the Roll No. you want to search:25537

Enter the roll number of student to check his/her presence: 25537

25537 Roll number was present for the program found at: 0

1.linear search

2.Binary search

3.Fibonacci Search

4.Sentinel Search

0.Exit

Enter your Choice:0

Exited!!