**PROGRAM:**

#include<iostream>

#include<math.h>

using namespace std;

int a[100];

int size;

int element;

class search

{

public:

void linear();

int sentinel();

void binary(int);

int fibonacci();

int recursive(int,int,int);

};

void search::linear()

{

int i,flag=0;

for(i=0;i<size;i++)

{

if(a[i]==element)

flag=1;

}

if(flag==1)

cout<<"\nstudent was present at the program"<<endl;

else

cout<<"\nstudent was absent\n";

}

int search::sentinel()

{

int i=0;

a[size]=element;

while(element!=a[i])

{

i=i+1;

}

if(i<size)

cout<<"\nstudent was present at the program\n";

else

cout<<"\nstudent was absent\n";

}

void search::binary(int k)

{

int item=k;

int first,last,mid;

first=0;

last=size-1;

while(first<=last)

{

mid=(first+last)/2;

if(a[mid]==item)

{

cout<<"\nstudent was present at the program\n ";

// cout<<"\nHis/Her Name Is Present At Position No : "<<mid+1<<" In The List";

break;

}

else if(item>a[mid])

first=mid+1;

else if(item<a[mid])

last=mid-1;

else

first=last+1;

}

if(first>last)

cout<<"\nstudent was absent\n";

}

int search:: recursive(int low,int high,int element)

{

int mid;

if(low<=high)

{

mid=(low+high)/2;

if(a[mid]==element)

return mid;

else if(element<a[mid])

return recursive(low,mid-1,element);

else

return recursive(mid+1,high,element);

}

return -1;

}

int search::fibonacci()

{

int fib2 = 0;

int fib1 = 1;

int fibM = fib2 + fib1;

while (fibM < size)

{

fib2 = fib1;

fib1 = fibM;

fibM = fib2 + fib1;

}

int offset = -1;

while (fibM > 1)

{

int i = min(offset+fib2, size-1);

if (a[i] < element)

{

fibM = fib1;

fib1 = fib2;

fib2 = fibM - fib1;

offset = i;

}

else if (a[i] > element)

{

fibM = fib2;

fib1 = fib1 - fib2;

fib2 = fibM - fib1;

}

else

return i;

}

if(fib1 && a[offset+1]==element)

return offset+1;

return -1;

}

int main()

{

search obj;

int i,n;

char ans,anss;

cout<<"\nenter the total number of students that attended the training program\n";

cin>>size;

cout<<"\nenter the roll numbers of the students\n";

for(i=0;i<size;i++)

cin>>a[i];

do

{

cout<<"\nenter the roll no.of the student you want to search\n";

cin>>element;

do

{

cout<<"\nenter 1 for linear search\nenter 2 for sentinel search\nenter 3 for binary search\nenter 4 for fibonacci search\n";

cin>>n;

switch(n)

{

case 1:{

cout<<"\nusing linear search\n";

obj.linear();

break;

}

case 2:{

cout<<"\nusing sentinel search\n";

obj.sentinel();

break;

}

case 3:{

int b;

cout<<"\nwhich type of binary search do you want to try\npress 1 for non recursive \npress 2 for recursive\n";

cin>>b;

if(b==1)

{

obj.binary(element);

}

else if(b==2)

{

if(obj.recursive(0,size-1,element)!=-1)

cout<<"\nstudent was present at the program\n";

else

cout<<"\nstudent was absent\n";

}

else

cout<<"\ninvalid choice\n";

break;

}

case 4:{

cout<<"\nusing fibonacci search\n";

if(obj.fibonacci()!=-1)

cout<<"\nstudent was present at the program\n";

else

cout<<"\nstudent was absent\n";

break;

}

default:cout<<"\ninvalid choice ....try again....\n";

}

cout<<"\ndo you want to try a new type of searching algorithm?(y/n)\n";

cin>>ans;

}while(ans=='y' || ans=='Y');

cout<<"\ndo you want to continue?(y/n)\n";

cin>>anss;

}while(anss=='y' || anss=='Y');

}

**OUTPUT:**

enter the total number of students that attended the training program

9

enter the roll numbers of the students

11

62

54

33

88

11

1

8

2

enter the roll no.of the student you want to search

6

enter 1 for linear search

enter 2 for sentinel search

enter 3 for binary search

enter 4 for fibonacci search

1

using linear search

student was absent

do you want to try a new type of searching algorithm?(y/n)

y

enter 1 for linear search

enter 2 for sentinel search

enter 3 for binary search

enter 4 for fibonacci search

2

using sentinel search

student was absent

do you want to try a new type of searching algorithm?(y/n)

y

enter 1 for linear search

enter 2 for sentinel search

enter 3 for binary search

enter 4 for fibonacci search

3

which type of binary search do you want to try

press 1 for non recursive

press 2 for recursive

1

student was absent

do you want to try a new type of searching algorithm?(y/n)

y

enter 1 for linear search

enter 2 for sentinel search

enter 3 for binary search

enter 4 for fibonacci search

4

using fibonacci search

student was absent

do you want to try a new type of searching algorithm?(y/n)

n

do you want to continue?(y/n)

y

enter the roll no.of the student you want to search

1

enter 1 for linear search

enter 2 for sentinel search

enter 3 for binary search

enter 4 for fibonacci search

1

using linear search

student was present at the program

do you want to try a new type of searching algorithm?(y/n)

y

enter 1 for linear search

enter 2 for sentinel search

enter 3 for binary search

enter 4 for fibonacci search

2

using sentinel search

student was present at the program

do you want to try a new type of searching algorithm?(y/n)

y

enter 1 for linear search

enter 2 for sentinel search

enter 3 for binary search

enter 4 for fibonacci search

3

which type of binary search do you want to try

press 1 for non recursive

press 2 for recursive

2

student was absent

do you want to try a new type of searching algorithm?(y/n)

y

enter 1 for linear search

enter 2 for sentinel search

enter 3 for binary search

enter 4 for fibonacci search

4

using fibonacci search

student was absent

do you want to try a new type of searching algorithm?(y/n)

n

do you want to continue?(y/n)

n