Problem Statement : Write C++ program to store roll numbers of student in array who attended training program in random order. Write function for-

- Searching whether particular student attended training program or not using linear search and sentinel search.
- Searching whether particular student attended training program or not using binary search and Fibonacci search.

```
#include <iostream>
using namespace std;

class Search{
   int n;
   int roll[];
public:
   Search()
        {
      cout<<"Enter the number of students who attended the training program :
";
      cin>>n;
      //roll = new int[n+1];
   }
   void getRoll()
        {
      cout<<"Enter the roll numbers of the students who attended the training
program -"<<endl;
      for(int i=0; i<n; i++)
                {
         cout<<"Enter roll number of student "<<i+1<<" : ";
         cin>>roll[i];
      }
   }
   void linearSearch(int key)
        {
      int flag = 0;
      for(int i=0; i<n; i++)
      {
```

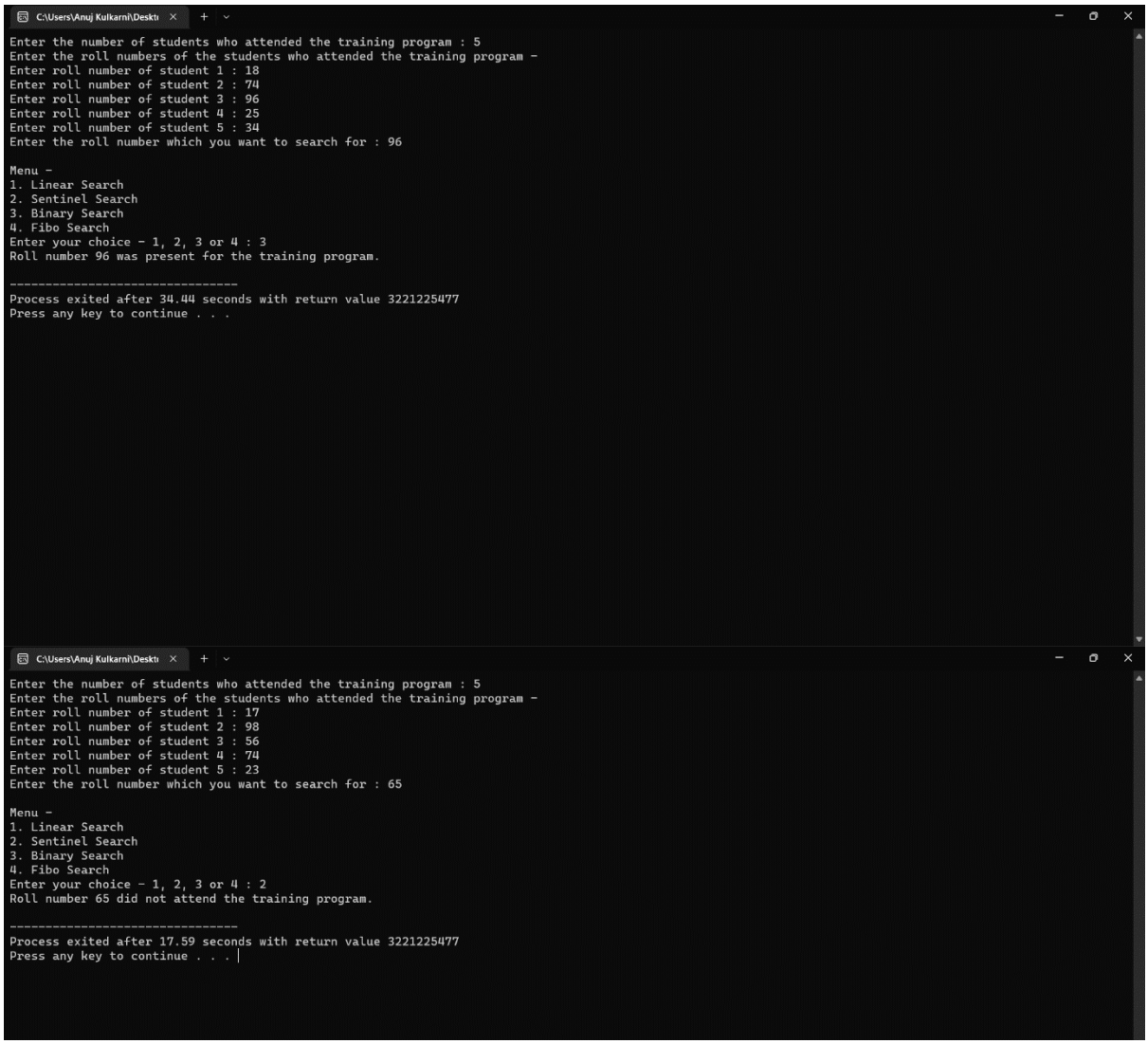
```
        if(roll[i] == key)
        {
            flag = 1;
            break;
        }
    }
    if(flag == 1)
        cout<<"Roll number "<<key<<" was present for the training
program."<<endl;
    else
        cout<<"Roll number "<<key<<" did not attend the training
program."<<endl;
  }
  void sentinelSearch(int key)
  {
    roll[n] = key;
    int i = 0;
    while(roll[i]!=key)
    {
        i++;
    }
    if(i<n)
        cout<<"Roll number "<<key<<" was present for the training
program."<<endl;
    else
        cout<<"Roll number "<<key<<" did not attend the training
program."<<endl;
  }
  void binarySearch(int key)
  {
    int low = 0;
    int high = n-1;
    int mid, flag = 0;
    while(low <= high)
    {
        mid = (low+high)/2;
```

```
        if(roll[mid] == key)
        {
           flag = 1;
           break;
        }
        else if(roll[mid] < key)
           low = mid+1;
        else
           high = mid-1;
     }
     if(flag == 1)
        cout<<"Roll number "<<key<<" was present for the training
program."<<endl;
     else
        cout<<"Roll number "<<key<<" did not attend the training
program."<<endl;
  }
  int fibo(int j)
  {
       if(j==0)
       {
              return 0;
              }
              if(j==1)
              {
                     return 1;
              }
              else
              {
                     return((fibo(j-1))+(fibo(j-2)));
              }
       }
       bool fibosearch(int key)
       {
              int f1,f2,j,mid;
              j=1;
```

```
while(fibo(j)<=n)
{
        j++;
}
f1=fibo(j-2);
f2=fibo(j-3);
mid=n-f1+1;
while(key!=roll[mid])
{
        if(key>roll[mid])
        {
                if(f1==1)
                {
                        break;
                        mid=mid+f2;
                           f1=f1-f2;
                           f2=f2-f1;
                }
                else
                {
                        if(f2==0)
                        {
                                break;
                                mid=mid-f2;
                                int temp=f1-f2;
                                f1=f2;
                                f2=temp;
                        }
                  }
        }
}
if(roll[mid]==key)
{
        cout<<"roll number "<<key<<" was present "<<endl;
}
else
```

```
                {
                        cout<<"roll number "<<key<<" was not present "<<endl;
                }
        }
};
int main()
{
   Search ob;
   ob.getRoll();
   int key, ch;
   cout<<"Enter the roll number which you want to search for : ";
   cin>>key;
   cout<<"\nMenu -\n1. Linear Search\n2. Sentinel Search\n3. Binary
Search\n4. Fibo Search"<<endl;
   cout<<"Enter your choice - 1, 2, 3 or 4 : ";
   cin>>ch;
   switch(ch){
   case 1:
      ob.linearSearch(key);
      break;
   case 2:
      ob.sentinelSearch(key);
      break;
   case 3:
      ob.binarySearch(key);
      break;
   case 4:
         ob.fibosearch(key);
         break;
   default:
      cout<<"Please enter valid choice next time.";
   }
   return 0;
}
```

OUTPUT :-


C:\Users\Anuj Kulkarni\Deskt
Enter the number of students who attended the training program : 5
Enter the roll numbers of the students who attended the training program -
Enter roll number of student 1 : 18
Enter roll number of student 2 : 74
Enter roll number of student 3 : 96
Enter roll number of student 4 : 25
Enter roll number of student 5 : 34
Enter the roll number which you want to search for : 96
Menu -
1. Linear Search
2. Sentinel Search
3. Binary Search
4. Fibo Search
Enter your choice - 1, 2, 3 or 4 : 3
Roll number 96 was present for the training program.
Process exited after 34.44 seconds with return value 3221225477
Press any key to continue . . .
C:\Users\Anuj Kulkarni\Deskt
Enter the number of students who attended the training program : 5
Enter the roll numbers of the students who attended the training program -
Enter roll number of student 1 : 17
Enter roll number of student 2 : 98
Enter roll number of student 3 : 56
Enter roll number of student 4 : 74
Enter roll number of student 5 : 23
Enter the roll number which you want to search for : 65
Menu -
1. Linear Search
2. Sentinel Search
3. Binary Search
4. Fibo Search
Enter your choice - 1, 2, 3 or 4 : 2
Roll number 65 did not attend the training program.
Process exited after 17.59 seconds with return value 3221225477
Press any key to continue . . .