Program 13:

(a) Write a program to implement the FCFS elevator disk scheduling algorithm. The program should give detail about each disk movement from starting head position (input from the user) and calculate average head movement.

(b) Write a program to implement the SSTF elevator disk scheduling algorithm. The program should give detail about each disk movement from starting head position (input from the user) and calculate average head movement.

Answer:

a) Source code:

```cpp
#include <iostream>
#include <vector>
#include <cmath>
using namespace std;
int algo(vector<int> programs,int pos){
    cout<<"Disk Movement:-"<<endl;
    cout<<"From\tto\tDisk Movement"<<endl;
    int sum=0,diff;
    for (int i=0; i<(int)programs.size();i++){
        diff=abs(pos-programs[i]);
        sum+=diff;
        cout<<pos<<"\t"<<programs[i]<<"\t"<<diff<<endl;
        pos=programs[i];
    }
```

```cpp
        return sum;

}

int main()

{

    int n,pos;

    cout << "Enter number of programs and Initial position of Head"<<endl;

    cin>>n>>pos;

    vector<int> programs(n);

    cout<<"Enter programs"<<endl;

    for (int i=0; i<n;i++){

        cin>>programs[i];

    }

    int total_movements=algo(programs,pos);

    total_movements=(float)total_movements;

    cout<<"Average disk movement: "<<total_movements/(float)n<<endl;

    return 0;

}
```

Output:

D:\os lab\Tanmay-Vig19BCS061_p13a.exe

```
Enter number of programs and Initial position of Head
8 41
Enter programs
60 20 99 71 54 23 44 85
Disk Movement:-
From     to      Disk Movement
41       60       19
60       20       40
20       99       79
99       71       28
71       54       17
54       23       31
23       44       21
44       85       41
Average disk movement: 34.5


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Process exited after 54.52 seconds with return value 0
Press any key to continue . . . _
```

b) Source Code:

```cpp
#include <iostream>
#include <vector>
#include <cmath>

using namespace std;
int algo(vector<int> programs, int pos){
    int total_movement=0, diff,next;

    cout<<"Disk Movement:-"<<endl;
    cout<<"From\tto\tDisk Movement"<<endl;
    while(!programs.empty()){
        next=0;
        for (int i=0; i!=(int)programs.size(); i++){
            if(abs(programs[i]-pos)<abs(programs[next]-pos)){
                next=i;
            }
        }
        diff=abs(programs[next]-pos);
        total_movement+=diff;
        cout<<pos<<"\t"<<programs[next]<<"\t"<<diff<<endl;
        pos=programs[next];
        programs.erase(programs.begin()+next);
    }
    return total_movement;
}
int main()
{
    int n,pos;
    cout << "Enter number of programs and Initial position of Head"<<endl;
    cin>>n>>pos;
    vector<int> programs(n);
    cout<<"Enter programs"<<endl;
    for (int i=0; i<n;i++){
        cin>>programs[i];
    }
    int total_movements=algo(programs,pos);
    total_movements=(float)total_movements;
    cout<<"Average disk movement: "<<total_movements/(float)n<<endl;
    return 0;
}
```

Output:

```
Enter number of programs and Initial position of Head
8 41
Enter programs
60 20 99 71 54 23 44 85
Disk Movement:-
From      to        Disk Movement
41        44        3
44        54        10
54        60        6
60        71        11
71        85        14
85        99        14
99        23        76
23        20        3
Average disk movement: 17.125


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Process exited after 8.025 seconds with return value 0
Press any key to continue . . .
```