Operating Systems

Experiment 10

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Aim -

To implement Disk scheduling algorithm SSTF, SCAN.

Theory -

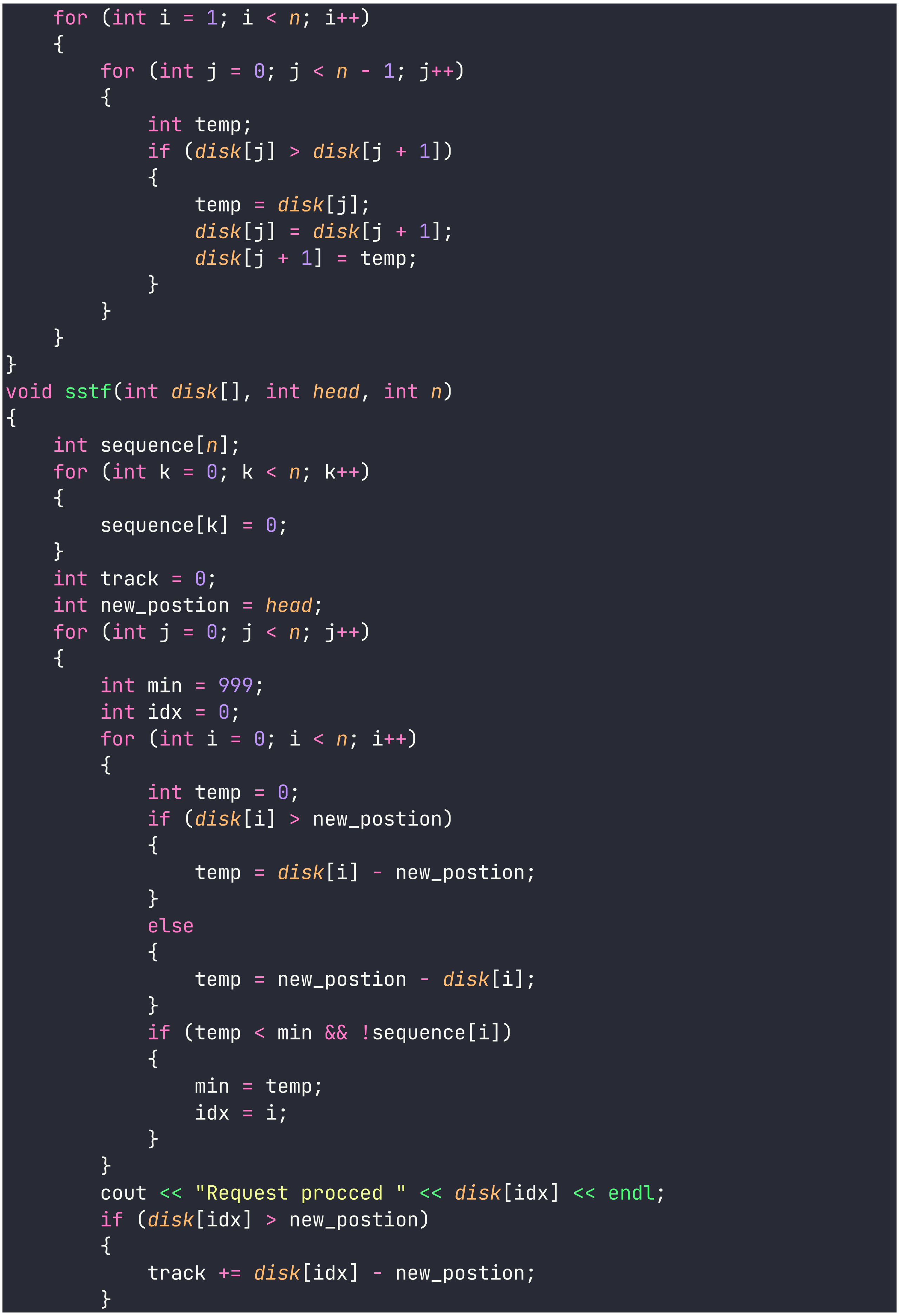
Disk Scheduling Algorithms are needed because a process can make multiple I/O requests and multiple processes run at the same time. The requests made by a process may be located at different sectors on different tracks. Due to this, the seek time may increase more. These algorithms help in minimizing the seek time by ordering the requests made by the processes.

Shortest Seek Time First (SSTF): In this algorithm, the shortest seek time is checked from the current position and those requests which have the shortest seek time is served first. In simple words, the closest request from the disk arm is served first.

SCAN: In this algorithm, the disk arm moves in a particular direction till the end and serves all the requests in its path, then it returns to the opposite direction and moves till the last request is found in that direction and serves all of them.

Code –

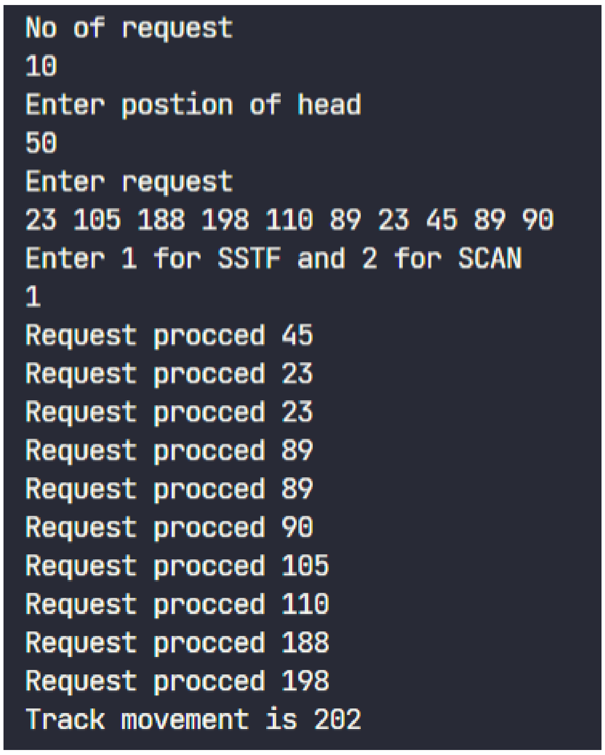
```
#include <iostream>
using namespace std;

void sort(int disk[], int n)
{
```



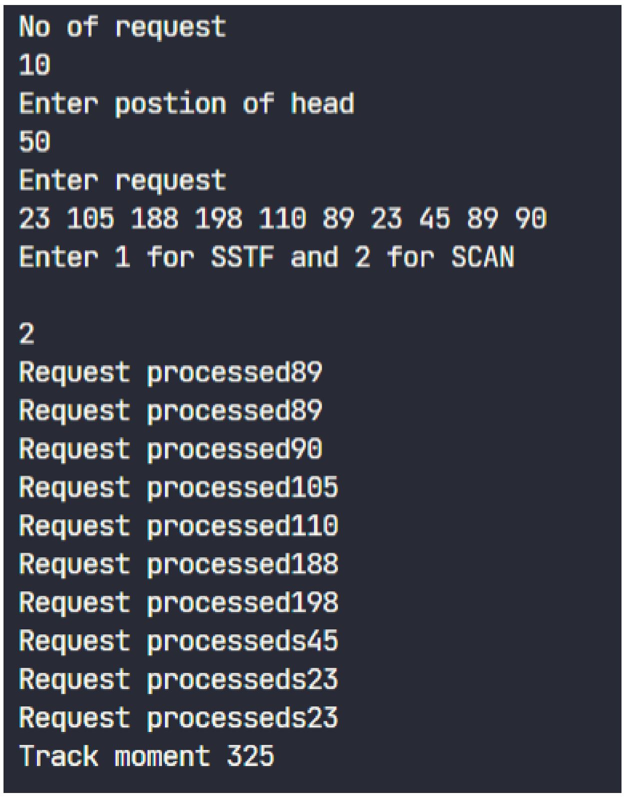
```
    for (int i = 1; i < n; i++)
    {
        for (int j = 0; j < n - 1; j++)
        {
            int temp;
            if (disk[j] > disk[j + 1])
            {
                temp = disk[j];
                disk[j] = disk[j + 1];
                disk[j + 1] = temp;
            }
        }
    }
}
void sstf(int disk[], int head, int n)
{
    int sequence[n];
    for (int k = 0; k < n; k++)
    {
        sequence[k] = 0;
    }
    int track = 0;
    int new_postion = head;
    for (int j = 0; j < n; j++)
    {
        int min = 999;
        int idx = 0;
        for (int i = 0; i < n; i++)
        {
            int temp = 0;
            if (disk[i] > new_postion)
            {
                temp = disk[i] - new_postion;
            }
            else
            {
                temp = new_postion - disk[i];
            }
            if (temp < min && !sequence[i])
            {
                min = temp;
                idx = i;
            }
        }
        cout << "Request procced " << disk[idx] << endl;
        if (disk[idx] > new_postion)
        {
            track += disk[idx] - new_postion;
        }
```

```cpp
        else
        {
            track += new_postion - disk[idx];
        }
        new_postion = disk[idx];
        sequence[idx] = 1;
    }
    cout << "Track movement is " << track << endl;
}
void scan(int disk[], int head, int n)
{
    int sequence[n];
    int pos = head;
    for (int i = 0; i < n; i++)
    {
        sequence[i] = 0;
    }
    int track = 0;
    sort(disk, n);
    for (int j = 0; j < n; j++)
    {
        if (disk[j] > 50 && !sequence[j] && pos != 199)
        {
            cout << "Request processed" << disk[j] << endl;
            sequence[j] = 1;
        }
    }
    if (pos != 199)
    {
        track = 199 - 50;
        pos = 199;
    }
    int new_postion = 199;
    for (int k = n - 1; k >= 0; k--)
    {
        int sum = 0;
        if (disk[k] < 199 && !sequence[k])
        {
            cout << "Request processeds" << disk[k] << endl;
            sequence[k] = 1;
            sum = new_postion - disk[k];
            track += sum;
            new_postion = disk[k];
        }
    }
    cout << "Track moment " << track << endl;
}
int main()
{
    int n;
    cout << "No of request" << endl;
    cin >> n;
    int disk[n];
    cout << "Enter postion of head" << endl;
    int head;
    cin >> head;
    cout << "Enter request" << endl;
    for (int i = 0; i < n; i++)
    {
        cin >> disk[i];
    }
    cout << "Enter 1 for SSTF and 2 for SCAN" << endl;
    int o;
    cin >> o;
    if (o == 1)
        sstf(disk, head, n);
    if (o == 2)
        scan(disk, head, n);
}
```

Output –



```
No of request
10
Enter postion of head
50
Enter request
23 105 188 198 110 89 23 45 89 90
Enter 1 for SSTF and 2 for SCAN
1
Request procced 45
Request procced 23
Request procced 23
Request procced 89
Request procced 89
Request procced 90
Request procced 105
Request procced 110
Request procced 188
Request procced 198
Track movement is 202
```



```
No of request
10
Enter postion of head
50
Enter request
23 105 188 198 110 89 23 45 89 90
Enter 1 for SSTF and 2 for SCAN

2
Request processed89
Request processed89
Request processed90
Request processed105
Request processed110
Request processed188
Request processed198
Request processeds45
Request processeds23
Request processeds23
Track moment 325
```

Conclusion

Disk Scheduling Algorithms like SSTF and SCAN are successfully executed.