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Chandubhai S Patel Institute of Technology

Faculty of Technology and Engineering

Chandubhai S. Patel Institute of Technology

Department of Computer Science & Engineering

Date: 08/03/25

Practical 7

Academic Year	:	2023-24	Semester	:	4th
Course code	:	CSE208	Course name	:	Operating System

Perform Linux Commands for the following

Practical 7: Implementing Disk Scheduling Algorithms

You are a systems engineer and have to optimize disk I/O operations for a high-performance storage system. Your objective is to simulate and analyse the performance of two disk scheduling algorithms:

1. **SCAN (Elevator Algorithm)**
2. **C-LOOK (Circular LOOK)**

Project Scenario:

- A disk has **200 cylinders**, numbered from 0 to 199.
- The disk head starts at cylinder **50**, moving towards the higher-numbered cylinders.
- The following I/O requests arrive in this order: **82, 170, 43, 140, 24, 16, 190**.
- The goal is to schedule these requests efficiently, minimizing the total head movement.

```
23cs070@67da6ba712a7dc36e53df5c5:~$ python3 --version
Python 3.10.12
23cs070@67da6ba712a7dc36e53df5c5:~$ nano disk_scheduling.py
```

Terminal - 23cs070@67da6ba712a7dc36e53df5c5: ~

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GNU nano 6.2 disk_scheduling.py *

```
import sys

def scan_algorithm(requests, head, disk_size, direction):
    requests.sort()
    left = [r for r in requests if r < head]
    right = [r for r in requests if r >= head]

    if direction == "right":
        seek_sequence = right + left[::-1]
    else:
        seek_sequence = left[::-1] + right

    total_movement = sum(abs(seek_sequence[i] - seek_sequence[i - 1]) for i in >
    total_movement += abs(seek_sequence[0] - head)

    return seek_sequence, total_movement

def clook_algorithm(requests, head):
    requests.sort()
    right = [r for r in requests if r >= head]
```

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GNU nano 6.2 disk_scheduling.py *

```
    left = [r for r in requests if r < head]

    seek_sequence = right + left
    total_movement = sum(abs(seek_sequence[i] - seek_sequence[i - 1]) for i in >
    total_movement += abs(seek_sequence[0] - head)

    return seek_sequence, total_movement

if __name__ == "__main__":
    disk_size = 200
    head = 50
    direction = "right"  # SCAN moves to the right first
    requests = [82, 170, 43, 140, 24, 16, 190]

    print("\nSCAN Disk Scheduling Algorithm:")
    scan_seq, scan_moves = scan_algorithm(requests, head, disk_size, direction)
    print("Order of execution:", scan_seq)
    print("Total head movement:", scan_moves)

    print("\nC-LOOK Disk Scheduling Algorithm:")
```

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GNU nano 6.2 disk_scheduling.py *

```
    total_movement += abs(seek_sequence[0] - head)

    return seek_sequence, total_movement

if __name__ == "__main__":
    disk_size = 200
    head = 50
    direction = "right"  # SCAN moves to the right first
    requests = [82, 170, 43, 140, 24, 16, 190]

    print("\nSCAN Disk Scheduling Algorithm:")
    scan_seq, scan_moves = scan_algorithm(requests, head, disk_size, direction)
    print("Order of execution:", scan_seq)
    print("Total head movement:", scan_moves)

    print("\nC-LOOK Disk Scheduling Algorithm:")
    clook_seq, clook_moves = clook_algorithm(requests, head)
    print("Order of execution:", clook_seq)
    print("Total head movement:", clook_moves)
```

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^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line

```
23cs070@67da6ba712a7dc36e53df5c5:~$ python3 disk_scheduling.py

SCAN Disk Scheduling Algorithm:
Order of execution: [82, 140, 170, 190, 43, 24, 16]
Total head movement: 314

C-LOOK Disk Scheduling Algorithm:
Order of execution: [82, 140, 170, 190, 16, 24, 43]
Total head movement: 341
```