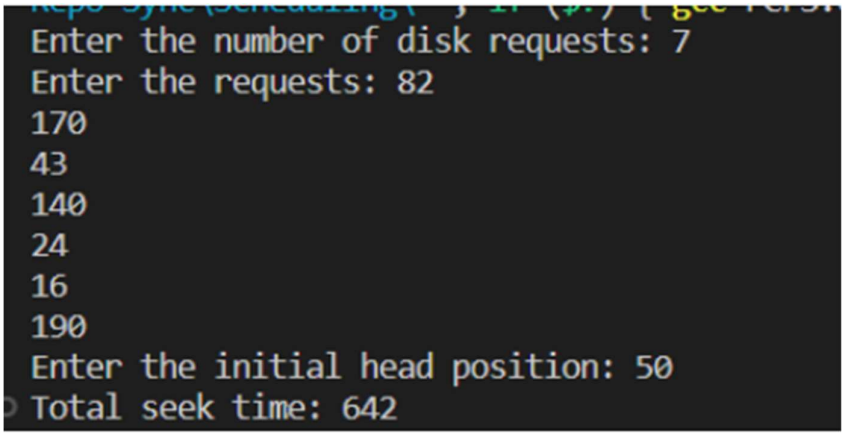
DISK SCHEDULING PROGRAMS

1. FCFS Disk Scheduling
2. SSTF (Shortest Seek Time First)
3. SCAN
4. LOOK
5. C-SCAN
6. C-LOOK

PROGRAMS 1: FCFCS DISK SCHEDULING

```java
import java.util.Scanner;

public class DiskScheduling {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the number of disk requests: ");
        int n = scanner.nextInt();
        int[] requests = new int[n];

        System.out.print("Enter the requests: ");
        for (int i = 0; i < n; i++) {
            requests[i] = scanner.nextInt();
        }

        System.out.print("Enter the initial head position: ");
        int head = scanner.nextInt();

        int totalSeekTime = Math.abs(head - requests[0]);
        for (int i = 1; i < n; i++) {
            totalSeekTime += Math.abs(requests[i] - requests[i - 1]);
        }

        System.out.println("Total seek time: " + totalSeekTime);
    }
}
```

OUTPUT:



PROGRAMS 2: SHORTEST SEEK TIME FIRST

```
import java.util.Scanner;

public class DiskScheduling {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the number of disk requests: ");
        int n = scanner.nextInt();
        int[] requests = new int[n];
        int[] visited = new int[n];

        System.out.print("Enter the requests: ");
        for (int i = 0; i < n; i++) {
            requests[i] = scanner.nextInt();
            visited[i] = 0; // initialize all requests as unvisited
        }

        System.out.print("Enter the initial head position: ");
        int head = scanner.nextInt();
        int totalSeekTime = 0;

        for (int i = 0; i < n; i++) {
            int minDistance = Integer.MAX_VALUE;
            int minIndex = -1;

            // find the request with the shortest seek time from the current
head position
            for (int j = 0; j < n; j++) {
                if (visited[j] == 0) {
                    int distance = Math.abs(head - requests[j]);
```

```
                    if (distance < minDistance) {
                        minDistance = distance;
                        minIndex = j;
                    }
                }
            }

            visited[minIndex] = 1; // mark the selected request as visited
            totalSeekTime += minDistance; // add the seek time to the total
            head = requests[minIndex]; // update the head position
        }

        System.out.println("Total seek time: " + totalSeekTime);
    }
}
```

OUTPUT:

```
Enter the number of disk requests: 7
Enter the requests: 82
170
43
140
24
16
190
Enter the initial head position: 50
Total seek time: 208
```

PROGRAMS 3: SCAN

```
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        int queue[] = new int[20], n, head, i, j, k, seek = 0, max, diff,
temp, queue1[] = new int[20];
        int queue2[] = new int[20], temp1 = 0, temp2 = 0;
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter the max range of disk");
        max = scanner.nextInt();
        System.out.println("Enter the initial head position");
        head = scanner.nextInt();
        System.out.println("Enter the size of queue request");
        n = scanner.nextInt();
        System.out.println("Enter the queue of disk positions to be read");
        for (i = 1; i <= n; i++) {
            temp = scanner.nextInt();
            if (temp >= head) {
                queue1[temp1] = temp;
                temp1++;
            } else {
                queue2[temp2] = temp;
                temp2++;
            }
        }
        for (i = 0; i < temp1 - 1; i++) {
            for (j = i + 1; j < temp1; j++) {
                if (queue1[i] > queue1[j]) {
                    temp = queue1[i];
                    queue1[i] = queue1[j];
                    queue1[j] = temp;
                }
            }
        }
        for (i = 0; i < temp2 - 1; i++) {
            for (j = i + 1; j < temp2; j++) {
                if (queue2[i] < queue2[j]) {
                    temp = queue2[i];
                    queue2[i] = queue2[j];
                    queue2[j] = temp;
                }
            }
        }
        for (i = 1, j = 0; j < temp1; i++, j++) {
            queue[i] = queue1[j];
            queue[i] = max;
        }
```

```
        for (i = temp1 + 2, j = 0; j < temp2; i++, j++)
            queue[i] = queue2[j];
        queue[i] = 0;
        queue[0] = head;
        for (j = 0; j <= n ; j++) {
            diff = Math.abs(queue[j + 1] - queue[j]);
            seek += diff;
            System.out.printf("Disk head moves from %d to %d with seek %d\n",
queue[j], queue[j + 1], diff);
        }
        System.out.println("Total seek time is " + seek);
    }
}
```

OUTPUT:

```
Enter the max range of disk
199
Enter the initial head position
50
Enter the size of queue request
7
Enter the queue of disk positions to be read
82
170
43
140
24
16
190
Disk head moves from 50 to 199 with seek 149
Disk head moves from 199 to 199 with seek 0
Disk head moves from 199 to 199 with seek 0
Disk head moves from 199 to 199 with seek 0
Disk head moves from 199 to 0 with seek 199
Disk head moves from 0 to 43 with seek 43
Disk head moves from 43 to 24 with seek 19
Disk head moves from 24 to 16 with seek 8
Total seek time is 418
```

PROGRAMS 4: LOOK

```java
import java.util.Arrays;
import java.util.Scanner;

public class DiskScheduling {
    public static void main(String[] args) {
        int n, head, total_seek_time = 0;
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of disk requests: ");
        n = scanner.nextInt();
        int[] requests = new int[n];
        System.out.print("Enter the requests: ");
        for(int i = 0; i < n; i++) {
            requests[i] = scanner.nextInt();
        }
        System.out.print("Enter the initial head position: ");
        head = scanner.nextInt();
        // sort the requests in ascending order
        Arrays.sort(requests);
        // find the index of the initial head position in the sorted list
        int initial_index = 0;
        for(int i = 0; i < n; i++) {
            if(requests[i] == head) {
                initial_index = i;
                break;
            }
        }
        // handle the requests to the right of the initial head position
        for(int i = initial_index; i < n; i++) {
            total_seek_time += Math.abs(requests[i] - head);
            head = requests[i];
        }
        // handle the requests to the left of the initial head position
        for(int i = initial_index-1; i >= 0; i--) {
            total_seek_time += Math.abs(requests[i] - head);
            head = requests[i];
        }
        System.out.println("Total seek time: " + total_seek_time);
    }
}
```

OUTPUT:

```
Enter the number of disk requests: 7
Enter the requests: 82
170
43
140
24
16
190
Enter the initial head position: 50
Total seek time: 208
```

PROGRAMS 5: C-SCAN

```java
import java.util.Scanner;

public class Main {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        int[] queue = new int[20];
        int n, head, i, j, k, seek = 0, max, diff, temp, temp1 = 0, temp2 = 0;
        float avg;
        System.out.println("Enter the max range of disk");
        max = input.nextInt();
        System.out.println("Enter the initial head position");
        head = input.nextInt();
        System.out.println("Enter the size of queue request");
        n = input.nextInt();
        int[] queue1 = new int[20];
        int[] queue2 = new int[20];
        System.out.println("Enter the queue of disk positions to be read");
        for (i = 1; i <= n; i++) {
            temp = input.nextInt();
            if (temp >= head) {
                queue1[temp1] = temp;
                temp1++;
            } else {
                queue2[temp2] = temp;
                temp2++;
            }
        }
        for (i = 0; i < temp1 - 1; i++) {
            for (j = i + 1; j < temp1; j++) {
                if (queue1[i] > queue1[j]) {
                    temp = queue1[i];
                    queue1[i] = queue1[j];
                    queue1[j] = temp;
```

```
                }
            }
        }
        for (i = 0; i < temp2 - 1; i++) {
            for (j = i + 1; j < temp2; j++) {
                if (queue2[i] > queue2[j]) {
                    temp = queue2[i];
                    queue2[i] = queue2[j];
                    queue2[j] = temp;
                }
            }
        }
        for (i = 1, j = 0; j < temp1; i++, j++)
            queue[i] = queue1[j];
        queue[i] = max;
        queue[i + 1] = 0;
        for (i = temp1 + 3, j = 0; j < temp2; i++, j++)
            queue[i] = queue2[j];
        queue[0] = head;
        for (j = 0; j <= n + 1; j++) {
            diff = Math.abs(queue[j + 1] - queue[j]);
            seek += diff;
            System.out.println("Disk head moves from " + queue[j] + " to " +
queue[j + 1] + " with seek " + diff);
        }
        System.out.println("Total seek time is " + seek);
    }
}
```

OUTPUT:

```
Enter the max range of disk
199
Enter the initial head position
50
Enter the size of queue request
7
Enter the queue of disk positions to be read
82
170
43
140
2
16
190
Disk head moves from 50 to 82 with seek 32
Disk head moves from 82 to 140 with seek 58
Disk head moves from 140 to 170 with seek 30
Disk head moves from 170 to 190 with seek 20
Disk head moves from 190 to 199 with seek 9
Disk head moves from 199 to 0 with seek 199
Disk head moves from 0 to 2 with seek 2
Disk head moves from 2 to 16 with seek 14
Disk head moves from 16 to 43 with seek 27
Total seek time is 391
```

PROGRAMS 6: C-LOOK

```java
import java.util.Scanner;

public class DiskScheduling {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int n, i, j, head, seektime = 0;
        int[] item = new int[20];
        int[] dst = new int[20];
        System.out.println("Enter no. of locations:");
        n = scanner.nextInt();
        System.out.println("Enter position of head:");
        head = scanner.nextInt();
        System.out.println("Enter elements of disk queue:");
        for (i = 0; i < n; i++) {
            item[i] = scanner.nextInt();
            dst[i] = head - item[i];
        }
        // Selection Sort
        for (i = 0; i < n - 1; i++) {
            for (j = i + 1; j < n; j++) {
                if (dst[j] > dst[i]) {
                    int temp = dst[j];
                    dst[j] = dst[i];
                    dst[i] = temp;
                    temp = item[i];
                    item[i] = item[j];
                    item[j] = temp;
                }
            }
        }
        for (i = 0; i < n; i++) {
            if (item[i] >= head) {
                j = i;
                break;
            }
        }
        System.out.println("j=" + j);
        System.out.println("\nOrder of disk allocation is as follows:");
        for (i = j; i < n; i++) {
            System.out.print(" -> " + item[i]);
            seektime += Math.abs(head - item[i]);
            head = item[i];
        }
        for (i = 0; i < j; i++) {
            System.out.print(" -> " + item[i]);
            seektime += Math.abs(head - item[i]);
            head = item[i];
```

```
        }
        System.out.println("\n\nSeek Time: " + seektime + "\n\n");
    }
}
```

OUTPUT:

```
Enter no. of locations:8
Enter position of head:80
Enter elements of disk queue:185
15
195
65
155
85
170
90
j=2

Order of disk allocation is as follows:
 -> 85 -> 90 -> 155 -> 170 -> 185 -> 195 -> 15 -> 65

Seek Time: 345
```