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Assignment - 4

Q.1 Explain any three disk scheduling algorithm with numerical examples.

Ans. 1. FCFS (First come first serve) :- It is the simplest of all the disk scheduling algorithm.

* In this, the request are addressed in the order they arrived in the disk queue.

2.

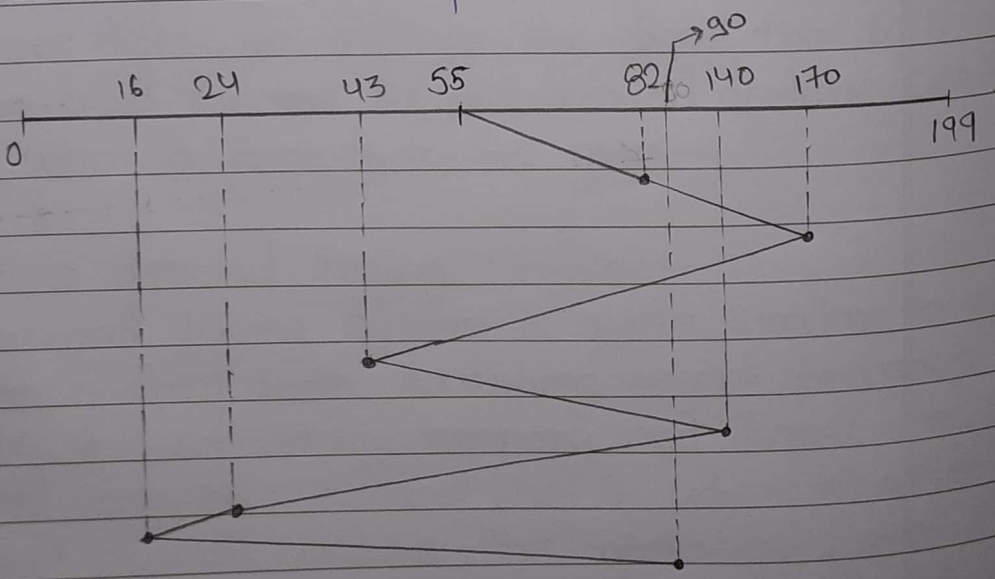
Advantages :-

* Every request gets a fare chance.
* No indefine postponement.

Dis-advantages :-

* Does not try to optimise seek time.
* May not provide the best possible service.

E.g :- Disk contain 200 tracks (0-199)
request queue : 82, 170, 43, 140, 24, 16, 90
current position : 55
calculate total no. of track movement.



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$= (170-55) + (170-43) + (140-43) + (140-16) + (90-16)$

$= 115 + 127 + 97 + 124 + 74$

$= 537$

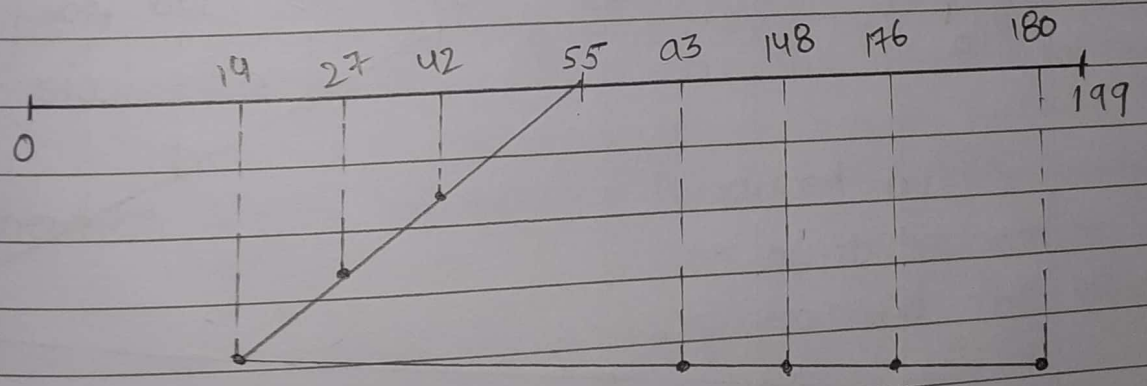
2. SSTF (Shortest Seek time first):- In SSTF request having shortest seek time or executed first. So the seek time of every request is calculated in advanced in queue & schedule according to their seek time.

Advantages:

* Average response time decreases
* Throughput increases

Dis-advantages:

* Overhead to calculate the seek time in advance.
* Causes starvation.



$= (55-14) + (180-14)$

$= 207$

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3- SCAN Scheduling :- It moves into a particular direction & services the request coming in its path & after reaching the end of the disk it reverse its direction & again services the request arriving in its path.

Advantages :

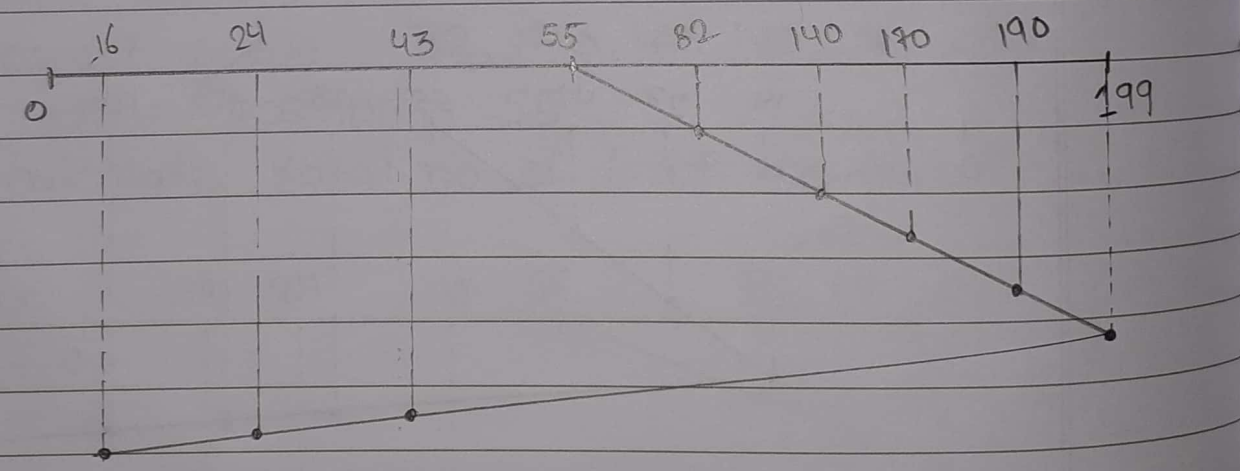
* High throughput
* Low variance of response time.
* Average response time.

Dis-advantages

* Long waiting time for request for location just visited by disk arm.

eg:- 82, 170, 43, 140, 24, 16, 190

current position = 50.



= (199-50) + (199-16)

= 332 Ans.

Q.2 Explain the difference between logical and physical address.

Ans.

	Logical address	Physical address.
1.	An address at which an item such as memory cell, storage element appears to reside from the perspective of an executing program.	A memory address that allows accessing a particular storage cell in the main memory.
2.	Logical address space is the set of all the logical addresses generated for a program.	Physical address space is the set of all physical address of a program.
3.	Helps to obtain the physical address	Helps to identify a location in the main memory.
4.	Generates logical addresses	Produced by the combination of the relocation register and the logical address.

Q.3 What is thrashing?

Ans. Thrashing is computer activity that makes little or no progress, usually because memory or other resource have become exhausted or too limited to perform needed operation. It is busy in

swapping pages in & out is called thrashing.

Q.4. Explain different file allocation method in detail.

Ans. There are 3 types of file allocation methods :-

1. Contiguous Allocation :- In this scheme, each file occupies a contiguous set of blocks on the disk. For eg:- if a file requires n blocks & is given a block b as the starting location, then the blocks assigned to the file will be b, b+1, b+2 ..... b+n-1. This means that given the starting block address and the length of the file.

Advantages :-

* Both the Sequential and Direct Accesses are supported by this.
* This is extremely fast since the number of seeks are minimal because of contiguous allocation of file blocks.

Dis-advantages :-

* This method suffers from both internal & external fragmentation.
* Increasing file size is difficult because it depends on the availability of contiguous memory at a particular instance.

2. Linked List Allocation :- In this scheme, each file is a linked list of disk blocks which need not be contiguous. The disk blocks can be scattered

anywhere on the disk. The directory entry contains a pointer to the starting and the ending file block. Each block contains a pointer to the next block occupied by the file.

Advantages :-

* This is very flexible in terms of file size. File size can be increased easily since the system does not have to look for a contiguous chunk of memory.
* This method does not suffer from external fragmentation.

Disadvantages :-

* It does not support random or direct access. We cannot directly access the block of a file.
* Pointers required in the linked allocation incur some extra overhead.

3. Indexed Allocation : In this scheme, a special block known as the Indexed block contains the pointer to all the blocks occupied by a file. Each file has its own index block. The directory entry contains the address of the index block.

Advantages :-

* This supports direct access to the blocks occupied by the file and therefore provide fast access to the file blocks.
* It overcomes the problem of external fragmentation.

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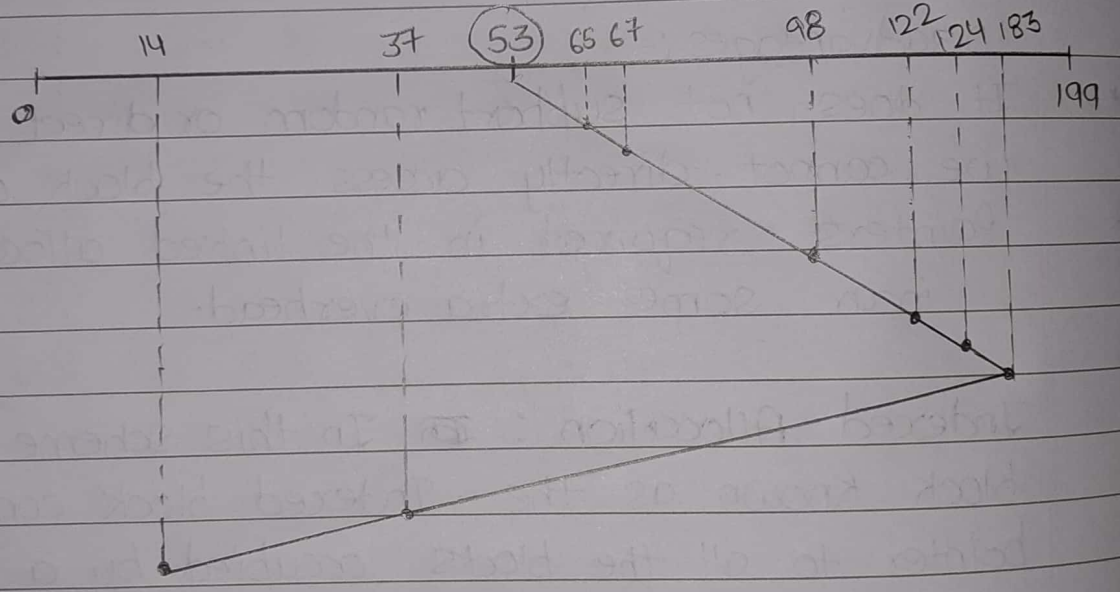
Dis-advantages:-

* The pointer overhead for indexed allocation is greater than linked allocation.
* For every small files, say files that expand only 2-3 blocks, the indexed allocation would keep one entire block for the pointer which is inefficient in terms of memory utilization.

8.5 Using SSTF disk scheduling algorithm calculate total head movement when head start at 53, for the following string 98, 183, 37, 122, 14, 124, 65, 67

Ans.



⇒ (183-53) + (183-14)
= 130 + 169
= 299 total head movement.