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03

Q.NO.1 ⇒

FIFO

1, 2, 3, 4, 1, 2, 1, 5, 6, 2, 1, 2, 3, 6, 3, 2, 1, 2, 3, 6.

~~FIFO~~

5 frames.

1	1	1	1	1	1	1	6	6	6	6	6	6	6
-	2	2	2	2	2	2	2	2	1	1	1	1	1
-	-	3	3	3	3	3	3	3	3	2	2	2	2
-	-	-	4	4	4	4	4	4	4	4	3	3	3
-	-	-	-	-	-	5	5	5	5	5	5	7	7
				✓	✓			✓					✓

6	6	6	6
1	1	1	1
2	2	2	2
3	3	3	3
7	7	7	7
✓	✓	✓	✓

Total Page hit = 10

Total page fault = 10

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OS

b) Optimal Algorithm

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
-	2	2	2	2	2	2	2	2	2	2	2	2	2	2
-	-	3	3	3	3	3	3	3	3	3	3	3	3	3
-	-	-	4	4	4	4	4	4	4	4	4	7	7	7
-	-	-	-	-	-	5	6	6	6	6	6	6	6	6
				✓	✓			✓	✓	✓	✓		✓	✓

1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
7	7	7	7	7
6	6	6	6	6
✓	✓	✓	✓	✓

Total page hit = 13
Total page fault = 7.

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Q. NO

b) LRU Algorithm

1, 2, 8, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

1	1	1	1	1	1	1	1	1	1	1	1	1	1
-	2	2	2	2	2	2	2	2	2	2	2	2	2
-	-	3	3	3	3	3	6	6	6	6	6	6	6
-	-	-	4	4	4	4	4	4	4	4	3	3	3
-	-	-	-	-	-	5	5	5	5	5	5	7	7
				✓	✓			✓	✓	✓			✓

1	1	1	1	1	1
2	2	2	2	2	2
6	6	6	6	6	6
3	3	3	3	3	3
7	7	7	7	7	7
✓	✓	✓	✓	✓	✓

Total page hit = 12

Total page fault = 8.

Steps to translate logical to physical:

Step1: Find index from segment sector and use the index to field locate the segment descriptor for segment in GDT

Step2: Test and access limit the field of description to make sure segment is accessible and offset is within limit of segment

Step3: Base address will be obtained from segment descriptor. Then base address of segment will be added to offset to determine linear address

Q.NO.3 =>

Condition for deadlock

1) Mutual Exclusion condition
2) Hold & wait condition
3) NO preemtion condition
4) Circular wait condition

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Given,

	R0	R1	R2	R3
P0	2	0	1	1
P1	1	1	0	0
P2	1	1	0	0
P3	1	0	1	0
P4	0	1	0	1

	R0	R1	R2	R
P0	3	2	1	
P1	1	2	0	
P2	1	1	2	
P3	3	2	1	
P4	2	1	0	

Ans,

Need matrix [n x m] = Maximum Required [n x m] - Allocated [n x m].

Need Table.

	R0	R1	R2	R3
P0	1	2	0	0
P1	0	1	0	2
P2	0	0	2	0
P3	2	2	0	0
P4.	2	0	0	0.

Here available matrix is not given so at first we need to calculate available matri

Available Matrix = Total Resources - Total available Resource

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Thus,
Available is

Available			
R_0	R_1	R_2	R_3
1	1	2	0

Here, P_0 can't be executed since need matrix of P_0 > Available Resource.

Again,
Need Matrix of P_1 > Available Resource.
∴ P_1 can't be executed.

For P_2,
Need of Resources for P_2 < Available matiix.
∴ P_2 cank be successfully executed.

New work matrix after P_2 Execution is

Work Matrix			
R_0	R_1	R_2	R_3
1	1	2	0
1	1	0	0
2	2	2	0

for P3

Need Matrix of P3 < Available Resources
P3 can be successfully executed.

→ After completion of P3, work Matrix is.

Work Matrix.

R0	R1	R2	R3
2	2	2	0
1	0	1	0.
3	2	3	0

And,
for P4.
P4 can be successfully executed, Thus.
New work Matrix is.

R0	R1	R2	R3
3	2	3	0.
0	1	0	1
3	3	3	1

Similarly,
P0 can be successfully Executed.
New work Matrix is,

Work Matrix.

R_0	R_1	R_2	R_3
3	3	3	1
2	0	1	1
5	3	4	2.

Similarly,
Need Matrix of P_1 < Available Resources.
P_1 can be successfully executed.
Thus.
New work Matrix after completion of P_1 is.

Work Matrix

R_0	R_1	R_2	R_3
5	3	4	2
1	1	0	0
6	4	4	2.

Since, all Processes are successfully executed in the sequence P_2, P_3, P_4, P_0, P_1.

Hence it is in safe state.

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Q.NO.2

The various file allocation methods are.

1) contiguous Allocation
2) linked list Allocation
3) linked list Allocation using an index
4) Inodes (index nodes)

1) contiguous allocation

→ Simplest allocation technique is to store each files as a contiguous run of disc block.

→ Thus on a disk with 1Kb block, a 50 Kb file would be allocated in 50 consecutive blocks.

Advantage

→ Simple to implement
→ improve performance
→ widely used on CD ROM

(4 block) 5block 8block 1 block
file A 5 files3 (file c) file D.

Contiguous Allocation

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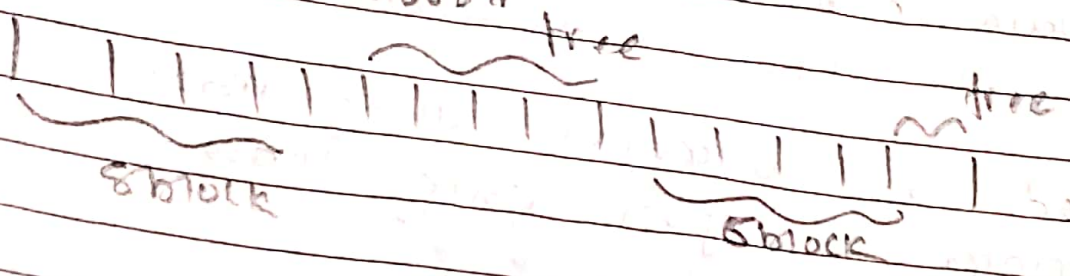
After file Removed

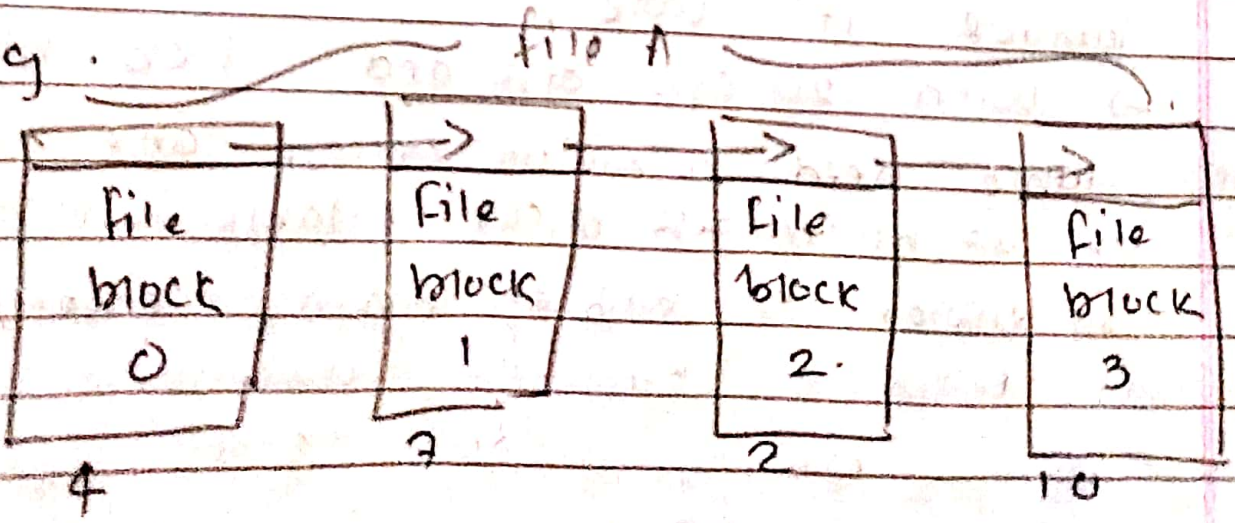


Disadvantage
→ File size may not be known in advance
→ Disk fragmentation - can be partially solved by compaction

) linked list Allocation
files kept in linked list of disk blocks.
First word of each block is used as a pointer to next one, the rest of block is for data.

Advantage
: No disk fragmentation

fig:



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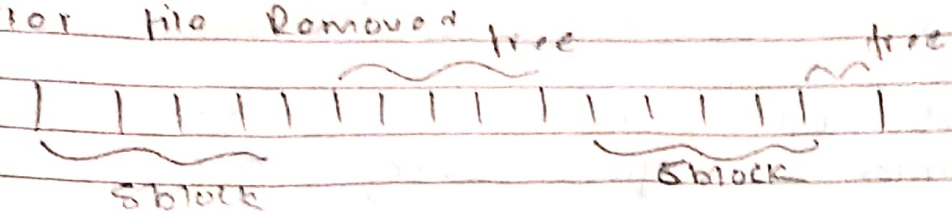
After file Removed

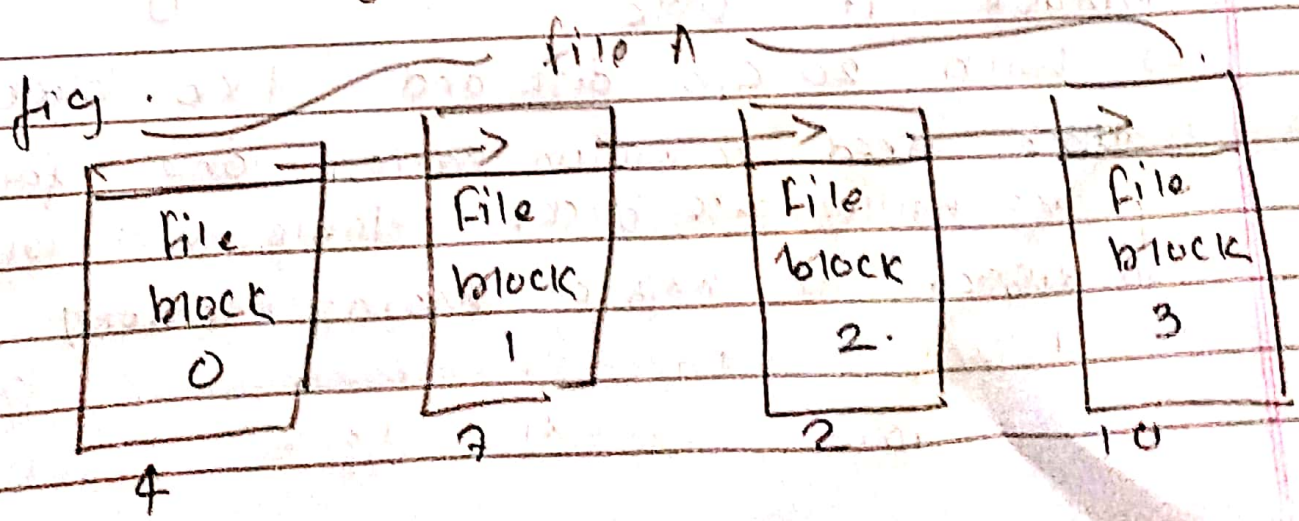


Disadvantage
→ file size may not be known in advance
→ Disk fragmentation - can be partially solved by compaction

e) linked list Allocation
files kept in linked list of disk blocks.
First word of each block is used as a pointer to next one, the rest of block is for data.

Advantage
: No disk fragmentation

fig:



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Disadvantage
→ Slow Random access
→ Data in block is not power of 2

3) linked list allocation using index
Pointer is given using index.

Advantage
1) Both disadvantage of linked list allocation can be eliminated by taking pointer word from each disc block.

→ Random access is easier because the chain must still be followed to find without making disc reference

→ large file easy access

disadvantage.
→ Entire table must be in memory all the time to make it work.
→ With 20 GB disk and 1KB block size, table need 20 milion entries, one for each of 20 million disc blocks. Table will take upto 60 MB or 80 MB of main memory

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index nodes

In this allocation, each file is associated with data structure known as i-node.

-) it specifies file contain around 10 seperate pieces of info.

Advantage

→ much smaller space occupied in main memory
→ inode table in always in same position

Disadvantage of inode

-) Access of data require long seek when initial accessed
-) low performance in search directories

free disk management with example

Disk management is an extention of ms management console.

Following methods are used

1) Bit vector.

known as bit map, widely used to keep track of free blocks on a disk. To track all free and used blocks.

01100111010 11 → Allocated block (0 bit
01100011100 11
00011100110 01 → free block 1 bit
00111000100 10

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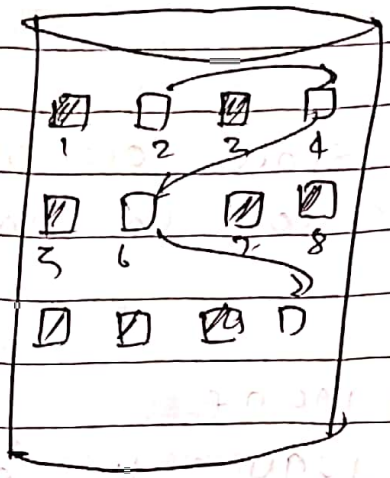
2) linked list
entry of free space mgmt create a linked list of all free blocks on disk. Pointer is kept on special location.



3) Grouping.
it is modification of free-list approach sence instead of having pointer on each free block to next block.
Advantage:
Address of many free disc can be found with only one disc access

4) Counting.
when contiguous or clustering approach is used, creating or deleting a file allocates or deallocates multiple contiguous block. Instead of having address of all free disk.

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Have pointer to ~~the~~ 1st block and count free block that follow.