① Considering a system with 5 process and 3 resources type A, B, C. Resource type A has 10 instances. B has 5 and C has 7.

Suppose at time 't₀' following snapshot of system has taken

Process	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P₀	0	1	0	7	5	3	3	3	2
P₁	2	0	0	3	2	2			
P₂	3	0	2	9	0	2			
P₃	2	1	1	2	2	2			
P₄	0	0	2	4	3	3			

i) What will be the context of Need Matrix

Answer:

The context of matrix Need is defined to be "Max - Allocation".

Need

	A	B	C							
P₀	7	4	3	⟹	7 5 3	-	0 1 0			
P₁	1	2	2	⟹	3 2 2	-	2 0 0			
P₂	6	0	0	⟹	9 0 2	-	3 0 2			
P₃	0	1	1	⟹	2 2 2	-	2 1 1			
P₄	4	3	1	⟹	4 3 3	-	0 0 2			

ii) Is the system is in safe state? If yes what
   is safe sequence

Answer :-

Apply the safety algorithm on given system.

$m = 3$, $n = 5$

Work = Available → work = 3 3 2

For process 0

Need = 7, 4, 3 , work = 3 3 2

Cannot allocate resources as Need > work.

So P_0 must wait.

for process 1

Need = 1, 2, 2   work = 3 3 2

⇒ Need < work

So P_1 is kept in safe sequence.

work = work + allocation

= 3, 3, 2 + 2, 0, 0

work = 5, 3, 2

for process 2

Need > work   Need = 6, 0, 0   work = 5, 3 2

So P_2 will wait.

⇒ The above procedure is repeated untill
all the process are included in safe sequence

Therefore the safe sequence
is

⟹ P_1, P_3, P_4, P_0, P_2

(iii) What will happen if P_1 request one additional of resource A and 2 instances of C?

<u>Answer</u> :- If process P_1 request one additional resource of type A and 2 instances of type C, then request sequence will be

$$
\begin{array}{ccc}
A & B & C \\
P_1= \quad 1 & 0 & 2
\end{array}
$$

To decide wheather the request is granded we use resource request algorithm.

New request = 1,0,2   Need = 1,2 2

Request < Need

also New request = 1,0,2

and available = 3,3,2

Request < available

$\Rightarrow$ Available = available - request,

$\Rightarrow$ Allocation$_1$ = Allocation$_1$ + request$_1$

$\rightarrow$ Need = Need - request,

$\Rightarrow$

P_1 Allocation	Need	Available
3, 0, 2	0,2,0	2,3, 0

By determining the safe sequence again after allocating new request then we get

Work = 2,3,0

for process 0

Need = 7, 4, 3

$\rightarrow$ Need > work, P_0 must wait.

$\Rightarrow$ for process P_1

Need = 0, 2, 0   work = 2, 3, 0

Need < work, so place in safe sequence.

$\Rightarrow$ for process P_2

Need = 6, 0, 0   work = 5, 3, 2

P_2 must wait.

$\rightarrow$ for process P_3

Need = 0, 1, 1   work = 5, 3, 2

place in sfe sequence.

$\Rightarrow$ for process P_4

Need = 4, 3, 1   work = 7, 4, 3

place in safe sequence

$\Rightarrow$ Again process P_0

Need = 7, 4, 3   Work = 7, 4, 5

place in safe sequence

Then safe sequence will be

P_1, P_3, P_4, P_0, P_2

② Explain in Detail about Disk Management

Answers :-

Disk Management is a utility built into different operating systems which can be used to create, delete, format positions assign drive letter and much more.

Disk Management can also be used for viewing the partitions and their formatted file system an hard drive.

The following are functions of disk management.

1. partition a drive

2. format a drive

3. change drive letter

4. Shrink partition

5. Extended partition

6. Delete partition

7. Change Drive file system

To use a disk to hold files, the operating system record with dada structure on the disk. The partition disk into one or more group of cylinders. The os treat each partition as a seperate disk.