(Total − Allocation)

→ Available (current work)

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ASSIGNMENT - 3

Q. NO. 1 ⇒.

Process	Allocation			Request			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	0	0	0	0	0	0
P_1	2	0	0	2	0	2			
P_2	3	0	3	0	0	0			
P_3	2	1	1	1	0	0			
P_4	0	0	2	0	0	2			

Here, Need Matrix is the Request.

Now

No of Processes (n) = 5

No of resources (m) = 3.

Since, Need of Resources for P_0 is less than Available Resources. P_0 can be successfully execut

So after completion of P_0, New available matrix becomes as follows:

Work Matrix.

A	B	C
0	0	0
+ 0	1	0
0	1	0

Now, P_1 can't be executed since Need matrix of P_1 is higher than available ~~matrix~~ Resource

But P_2 can be Executed since Need matrix of P_2 is less than Available matrix. after completion of P_2 New work matrix becomes.

Work matrix

A	B	C
0	1	0
+ 3	0	3
3	1	3.

P_3 can be Executed since Need Matrix of P_3 is less than that of available Matrix. So after completion of P_3, New available Matrix becomes

Work matrix

A	B	C
3	1	3
2	1	1
5	2	4.

P_4 can be Executed since Need matrix of P_4 is less than Available matrix. So after completion of P_4. New work matrix becomes as follows.

Work Matrix.

A	B	C
5	2	4
0	0	2
5	2	6

Now, P_1 can be executed since Need matrix of P_1 is less than mat of available matrix. Therefore, New ne work matrix after completion of P_1 becomes.

Work Matrix.

5	2	6
2	0	0
7	2	6

Since all processes are successfully executed with sequence P_0, P_2, P_3, P_4, P_1 hence it is in Safe state.

b). If P_2 makes additional Request (0, 0, 1). after execution of P_0, no other process could be executed resulting in dead lock state, since there wont be enough available resources in order to execute them. #

Q.No. 2 ⇒

Process	Allocated Current Loan A	B	C	D
1	1	0	2	0
2	0	3	1	2
3	2	4	5	1
4	3	0	0	6
5	4	2	1	3

Maximum Need A	B	C	D	Need Current Claim A	B	C	D
3	2	4	2	2	2	2	2
3	5	1	2	3	2	0	0
2	7	7	5	0	3	2	4
5	5	0	8	2	5	0	2
6	2	1	4	2	0	0	1

Work Matrix. Available.

A	B	C	D
3	4	0	1

Total Resource.

A	B	C	D
13	13	9	13.

Ans //

1. can't be executed. Since Need matrix of 1 is greater than allocated matrix

2 can be Executed since Need Matrix of 2 is less than available Resource. So after completion of 2 New matrix becomes.

New work Matrix

8	4	0	1
0	3	1	2
8	7	1	3

3 can't be executed since Need matrix of 3 is greater than available Resource

4 can be executed since Need matrix of 4 is ~~greater~~ less than allocated matrix.

After execution of 4 New allocated matrix will be.

3	7	1	3
3	0	0	6
6	7	1	9

~~So, after completion of '4', we~~

'5' can be executed since Need matrix of for 5 is less than available matrix.

So, after completion of 5 New work matrix becomes.

New work matrix

A	B	C	D.
6	7	1	9
+ 4	2	1	3
10	9	2	12

Again '1' can be executed, since Need matrix for '1' < available resources, so after execution of '1', new work matrix becomes.

New work matrix

A	B	C	D.
10	9	2	12
+ 1	0	2	2
11	9	4	12

Similarly 3 can be executed since Need matrix for '3' is less than available resource So, after completion of '3' new work matrix becomes

New work matrix

A	B	C	D.
11	9	4	12
+ 2	4	5	1
13	13	9	13

Since, all the parameters are successfully executed with the sequence '2', '4', '5', '1' and '3'. Hence it is in safe state.

Q. No. 3 ⇒.

Soln:

	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	R3
P0	8	2	1	1
P1	1	2	0	2
P2	1	1	2	0
P3	8	2	1	0
P4	2	1	0	1

Solution:

Here available Matrix is not given so at first we need to calculate available Matrix. So the available matrix will be

Available matrix = Total Resources − Total Allocated Resources.

Available:

R0	R1	R2	R3
1	1	2	0

New Need Matrix [n x m] = Maximum Required [n x m] - Allocation [n x m].

Process	Need matrix			
	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, P0 connot be executed,
Since Need Matrix (P0) > Available matrix

Again
P1 connot be executed
Need Matrix (P1) > Available Resources.

P3 can be executed
Need Resources (P3) < Available Resources

Thus,
New work Matrix

work Matrix			
R0	R1	R2	R3
1	1	2	0
1	1	0	0
2	2	2	0

Since, Need of Resources for P_3 is less than Available Resources.

P_3 can be successfully executed.

New work matrix is.

Work matrix			
R_0	R_1	R_2	R_3
2	1	2	0
1	0	1	0
3	2	3	0

P_4 can't be Executed.

Need Resources (P_4) $\not<$ Available Resources

Thus

New work Matrix is.

Work Matrix.			
R_0	R_1	R_2	R_3
3	2	3	0
0	1	0	1
3	3	3	1

P_0 can be Executed.

Need Resources (P_0) < Available Resources.

thus.

New work matrix is,

New Available

R0	R1	R2	R3
3	3	3	1
2	0	1	1
5	3	4	2

Now.
P1 can be Executed
Need Resources (P_1) < Available Resources.
Thus.
New work Matrix.

Work Matrix

R0	R1	R2	R3
5	3	4	2
1	1	0	0
6	4	4	2

Since, all the processes are successfully Executed with Sequence P2, P3, P4, P0, P
Hence it is in safe State.