

Kousik ND  
Roll No 31

	Allocation	Max	Available	Need (Max-Alloc)	
	A B C D	A B C D	A B C D	A B C D	
P <sub>0</sub>	2 0 0 1	4 2 12	3 3 2 1	2 2 1 1	4
P <sub>1</sub>	3 1 2 1	5 2 5 2	5 4 2 4	2 1 3 1	5
P <sub>2</sub>	2 1 0 3	2 3 16	6 7 3 6	0 2 1 3	1
P <sub>3</sub>	1 3 1 2	14 24	7 11 6 8	0 1 1 2	2
P <sub>4</sub>	1 4 3 2	3 6 6 5	9 11 6 9	2 2 3 3	3
			12 12 8 10		

(a) Yes the system is in safe state and the order of execution is safe state is P<sub>2</sub> → P<sub>3</sub> → P<sub>4</sub> → P<sub>0</sub> → P<sub>1</sub>

(b)

	Allocation	Available	Need	
	A B C D	A B C D	A B C D	
P <sub>0</sub>	2 0 0 1	3 3 2 1	2 2 1 1	5
P <sub>1</sub>	3 1 2 1	6 4 4 2	2 1 3 1	1
P <sub>2</sub>	2 1 0 3	8 5 4 5	0 2 1 3	2
P <sub>3</sub>	1 3 1 2	9 8 5 7	0 1 1 2	3
P <sub>4</sub>	1 4 3 2	10 12 8 9	2 2 3 3	4
		12 12 8 10		

P<sub>1</sub> arrives with (1, 1, 0, 0) ≤ (2, 1, 3, 1) i.e. Need  
Also (1, 1, 0, 0) ≤ Available (3, 3, 2, 1)  
So can be granted

Checking whether safe state or Not  
Yes it is in safe state with sequence

P<sub>1</sub> → P<sub>2</sub> → P<sub>3</sub> → P<sub>4</sub> → P<sub>0</sub>

So request can be immediately granted

Comment for video

	Allocation	Need	Available	
	A B C	A B C	A B C	
P <sub>0</sub>	0 1 0	7 4 3	2 3 0	2
P <sub>1</sub>	3 0 2	0 2 0	2 4 0	<del>2</del> 2
P <sub>2</sub>	3 0 2	6 0 0	5 4 2	3
P <sub>3</sub>	2 1 1	0 1 1	8 4 4	4
P <sub>4</sub>	0 0 2	4 3 1	10 5 7	

$P_0 \rightarrow (0, 2, 0) \leq \text{Need of } P_0$

Also  $(0, 2, 0) \leq \text{Available } (2, 3, 0)$

Next checking for safe state.

$P_0 \rightarrow P_1 \rightarrow P_2 \rightarrow P_3 \rightarrow P_4$  ~~exists~~ exists and hence can be granted.