10 Good

Quiz 5

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Question 1: [10 Marks]

Process	Max	Allocation	Available
	A, B, C, D	A, B, C, D	A, B, C, D
P0	6 0 1 2	4 0 0 1	3 2 1 1
P1	2 7 5 0	1 1 0 0	
P2	2 3 5 6	1 2 5 4	
P3	1 6 5 3	0 6 3 3	
P4	1 6 5 6	0 2 1 2	

12, 22, 21, 17 6, 11, 9, 10

Using Banker's algorithm, answer the following questions:-

- How many total resources of type A, B, C, D are there? **(2 marks)**
- Find if the system is currently in a safe state? If it is, find the safe sequence.**(4 marks)**
- Process P4 requests one additional instance of resource type A and one instance of resource type D? By using Bankers Algorithm, this request should be approved or not? Show complete working? **(4 marks)**

a) Total Allocation + Available ⇒ a = 6+3 = 9, b = 11+2 = 13, c = 9+1 = 10
d = 10+1 = 11 ✓

b)

Process	Allocation				Max need				Available				Remaining need				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
P_0	4	0	0	1	6	0	1	2	3	2	1	1	2	0	1	1	✓ (1)
P_1	1	1	0	0	2	7	5	0	7	2	1	2	1	6	5	0	✓ (5)
P_2	1	2	5	4	2	3	5	6	8	4	6	6	1	1	0	2	✓ (2)
P_3	0	6	3	3	1	6	5	3	8	10	9	9	1	0	2	0	✓ (3)
P_4	0	2	1	2	1	6	5	6	8	12	10	11	1	4	4	4	✓ (4)
									9	13	10	11					

$P_0 \rightarrow P_2 \rightarrow P_3 \rightarrow P_4 \rightarrow P_1$

Remaing = max − Allocated

Safe sequence is

$P_0 \rightarrow P_2 \rightarrow P_3 \rightarrow P_4 \rightarrow P_1$

c) if less than remaining need (1, 0, 0, 1)

Process	Allocation				max need				Available				Remaining need			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
P_0	4	0	0	1	6	0	1	2	2	2	1	0	2	0	1	1
P_1	1	1	0	0	2	7	5	0					1	6	5	0
P_2	1	2	5	4	2	3	5	6					1	1	0	2
P_3	0	6	3	3	1	6	5	3					1	0	2	0
P_4	1	2	1	3	1	6	5	6					0	4	4	3

Here is deadlock as no resource can be allocated after that

Hence no safe sequence.