

## Quiz 5

Course: Operating Systems  
Section: BCS-4F  
Name:

Course Code: CS 2006  
Total Marks:10  
RollNo:

### 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	

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 P1 requests one additional instance of resource type A and one instance of resource type C? By using Bankers Algorithm, this request should be approved or not? Show complete working? **(4 marks)**

## Quiz 4 Solution.

a)  $A = 3 + 4 + 1 + 1 + 0 + 0 = 9$

$B = 2 + 1 + 2 + 6 + 2 = 13$

$C = 1 + 5 + 3 + 1 = 10$

$D = 1 + 1 + 4 + 3 + 2 = 11$

(9, 13, 10, 11)

b)	max	Allocation	Need	Available
	A B C D	A B C D	A B C D	A B C D
P <sub>0</sub>	6 0 12	4 0 0 1	2 0 1 1	3 2 1 1 + P <sub>0</sub>
P <sub>1</sub>	2 7 5 0	1 1 0 0	1 6 5 0	7 2 1 2 + P <sub>2</sub>
P <sub>2</sub>	2 3 5 6	1 2 5 4	1 1 0 2	8 4 6 6 + P <sub>3</sub>
P <sub>3</sub>	1 6 5 3	0 6 3 3	1 0 2 0	8 10 9 9 + P <sub>4</sub>
P <sub>4</sub>	1 6 5 6	0 2 1 2	1 4 4 4	8 12 10 11 + P <sub>1</sub>
				9 13 10 11

System is in safe state because safe sequence exists.

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

c) Request P<sub>1</sub> (1, 0, 1, 0)

Check:

1) Request<sub>1</sub> ≤ Need<sub>1</sub>      1 0 1 0 ≤ 1 6 5 0

2) Request<sub>1</sub> ≤ Available      1 0 1 0 ≤ 3 2 1 1

new state	Allocation	Need	Available
	A B C D	A B C D	A B C D
P <sub>0</sub>	4 0 0 1	2 0 1 1	2 2 0 1
P <sub>1</sub>	2 1 1 0	0 6 4 0	
P <sub>2</sub>	1 2 5 4	1 1 0 2	
P <sub>3</sub>	0 6 3 3	1 0 2 0	
P <sub>4</sub>	0 2 1 2	1 4 4 4	

⇒ No safe sequence exists,  
hence we can not  
grant the request.

new need P <sub>1</sub>	new allocation P <sub>1</sub>	new available
1 6 5 0	1 1 0 0	3 2 1 1
- 1 0 1 0	+ 1 0 1 0	- 1 0 1 0
0 6 4 0	2 1 1 0	2 2 0 1