OS Ch7 Quiz

1. Does a cyclic dependency in the resource allocation graph always lead to deadlock? Why or why not?

   Sol: No. If multiple equivalent resources exist, then a cycle could exist that is not a deadlock. The reason is that some thread that is not part of the cycle could release a resource needed by a thread in the cycle, thereby breaking the cycle.

2. Assume we have resources A(3 instances), B(14 instances), C(11 instances) for four processes P0, P1, P2, P3. Given the **Max**, **Allocation** and **Request** matrix as follows. Please answer whether each of the requests can be granted or not (Hint: using Banker's algorithm.) Explain each of your answer no matter the requests can or cannot be granted.

	Max			**Allocation**			**Request**		
	A	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
P0	2	3	6	1	3	5	0	1	1
P1	0	6	5	0	6	3	0	1	3
P2	0	0	2	0	0	1	0	0	1
P4	1	7	5	1	0	0	0	5	2

Sol:

P0: cannot be granted because allo(1 3 5) + req(0 1 1) = (1 4 6) > max (2 3 5)

P1: cannot be granted because the request (0 1 3) cannot be met by available (1 5 2)

P2 (0 0 1)→Yes : P0 (P1, P2, P3 can be any order) or P2, (P0, P1), P3, or …..

P3: No, cannot find a safe sequence

3. Consider a system with five processes P0~P4, three resource types A, B, and C. Assume the system snapshot at time T0 is as below. Is the system in a deadlock state at T0? Please explain your answer (If not in deadlock, please provide the safe execution sequence. If it is in deadlock, please list the processes that are involved in the deadlock circle.)

	Allocation			**Request**			**Available**		
	A	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**C**
P0	2	1	1	1	0	0			
P1	2	0	0	2	0	2			
P2	0	0	0	0	1	2			
P3	3	0	3	0	0	1			
P4	0	1	0	0	0	0			

			0 0 0

Sol: The system is in deadlock, the processes included are P0, P1, P3.