Exercise 5

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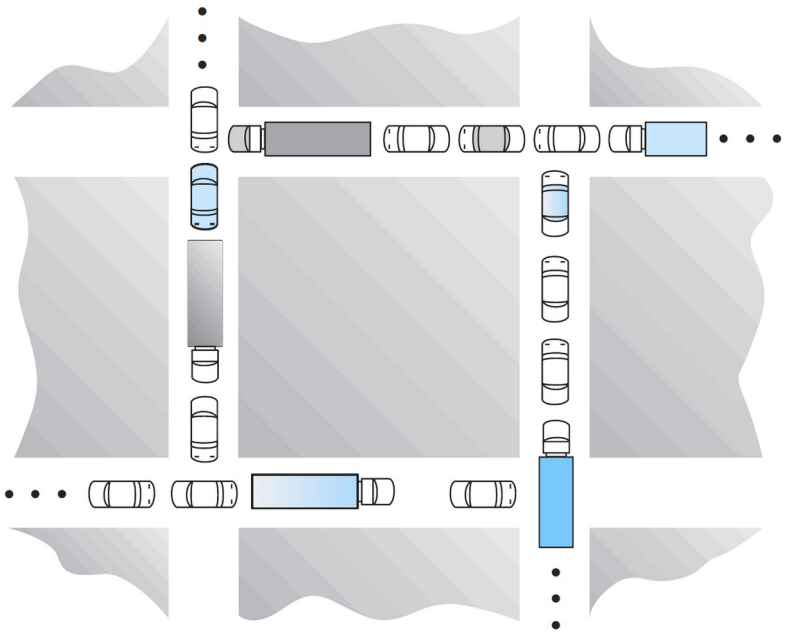
Ex.1

Answer following questions.

Consider the traffic deadlock depicted in the following figure:



a. Show that the **four** necessary conditions for deadlock indeed hold in this example.

Mutual exclusion. Only one car can move at a time.
Hold and wait: Cars wait for their next chance.
No preemption: Cars in the way cannot be eliminated.
Wait for circulation: Each car in a row waits for the car in front to start moving.

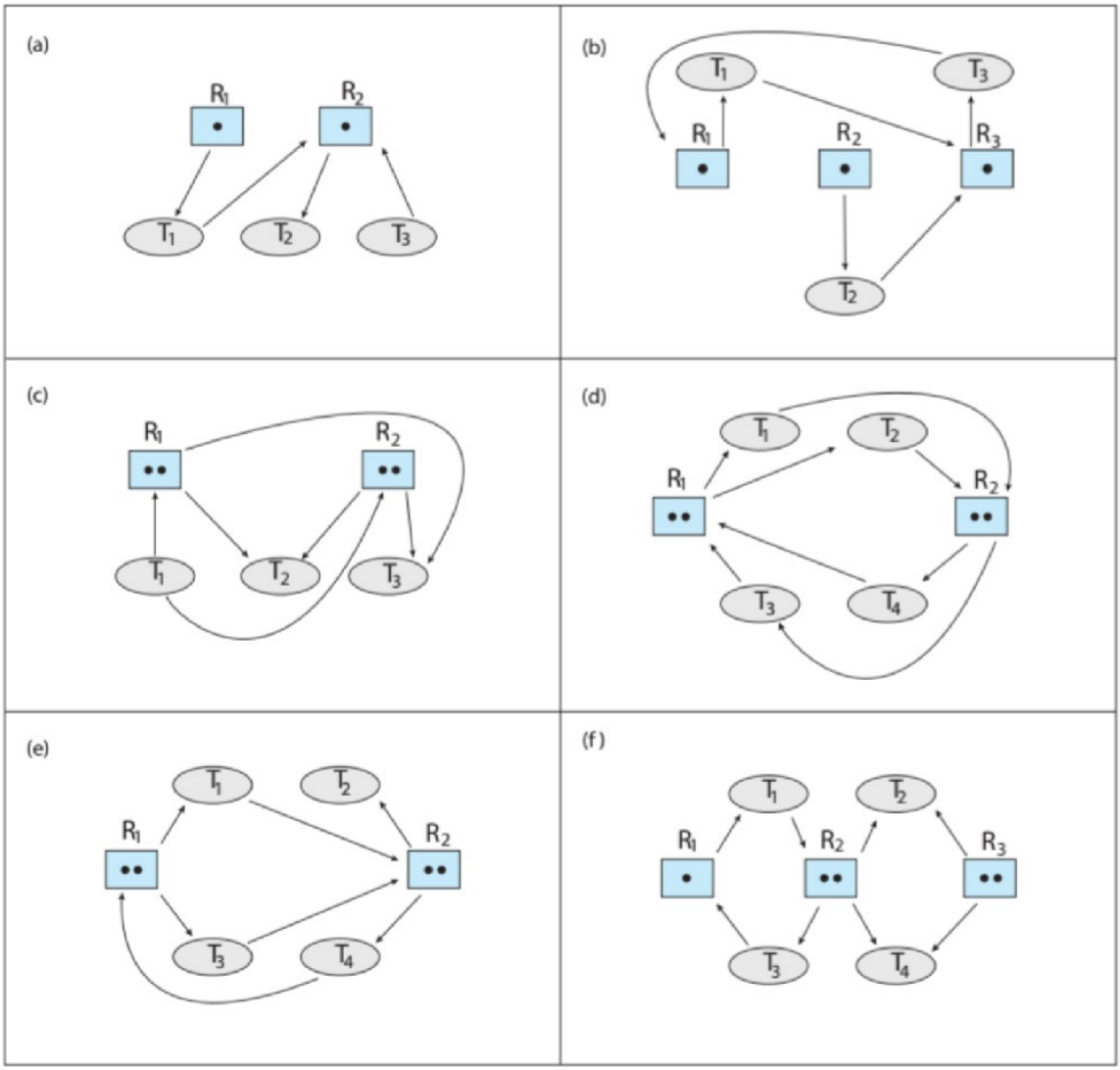
b. State a simple rule for avoiding deadlocks in this system.
(Hint: Avoid one of the necessary conditions, which you answered above, for deadlock.)

If it is accepted, the car can pass through the intersection, but if not, it must stop.

If it is not accepted, the car must stop.

Ex.2

Which of the six resource-allocation graphs (a)-(f) shown below illustrate deadlock? List the alphabetical letters of deadlocked graphs.



(b),(d),(e),(f)

Ex.3

Consider the following snapshot of a system:

	Available	**Allocation**	**Max**
	A B C D	A B C D	A B C D

	1 5 2 0		
P_0		0 0 1 2	0 0 2 2
P_1		1 0 0 0	1 7 5 0
P_2		0 0 1 4	0 6 5 6
P_3		1 3 5 4	2 3 5 6
P_4		0 6 3 2	0 6 5 2

Answer the following questions using the banker's algorithm:

a. What is the content of the matrix *Need*? Fill the following table.

	A B C D
P_0	0 0 1 0
P_1	0750
P_2	0642
P_3	1002
P_4	0020

b. Is the system in a safe state?

Yes it is

c. If a request from process P_1 arrives for (A, B, C, D) = (0, 4, 1, 0), can the request be granted immediately?

yes

d. If a request from process P_2 arrives for (A, B, C, D) = (0, 3, 2, 0), can the request be granted immediately?

yes