

COM S352
Assignment 6
Due: March 9, 2018

7.12 Assume a multithreaded application uses only reader–writer locks for synchronization. Applying the four necessary conditions for deadlock, is deadlock still possible if multiple reader–writer locks are used?

7.17 Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock free.

7.23 Consider the following snapshot of a system:

	<u>Allocation</u>	<u>Max</u>	<u>Available</u>
	<i>A B C D</i>	<i>A B C D</i>	<i>A B C D</i>
P_0	2 0 0 1	4 2 1 2	3 3 2 1
P_1	3 1 2 1	5 2 5 2	
P_2	2 1 0 3	2 3 1 6	
P_3	1 3 1 2	1 4 2 4	
P_4	1 4 3 2	3 6 6 5	

Answer the following questions using the banker’s algorithm:

- Illustrate that the system is in a safe state by demonstrating an order in which the processes may complete.
- If a request from process P_1 arrives for (1, 1, 0, 0), can the request be granted immediately?
- If a request from process P_4 arrives for (0, 0, 2, 0), can the request be granted immediately?

7.24 What is the optimistic assumption made in the deadlock-detection algorithm? How can this assumption be violated?

7.25 A single-lane bridge connects the two Vermont villages of North Tunbridge and South Tunbridge. Farmers in the two villages use this bridge to deliver their produce to the neighboring town. The bridge can become deadlocked if a northbound and a southbound farmer get on the bridge at the same time. (Vermont farmers are stubborn and are unable to back up.) Using monitor, design an algorithm in pseudocode that prevents deadlock. Design your algorithm in a way that it is starvation free.