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Section 1
hw3p2

A). Exercise 7.11 page 308

Discuss how the 4 necessary conditions for deadlock hold in dining philosophers.

Mutual Exclusion: the nonsharable resource are the chopsticks. The chopsticks can be used only by one diner at a time.

Hold and Wait: Philosophers can pick up chop sticks one at a time. the philosopher on their left may be thinking and the one on the right may be eating. So the philosopher is capable of picking up the chopstick on the left waiting for the chopstick on the right.

No Preemption: A philosopher can't take a chopstick from another philosopher who is currently eating.

Circular wait: It is possible for the dining philosophers to each pick up one chop stick leaving them all waiting for another. As their are the same number of chop sticks as there are philosophers.

Discuss how deadlocks could be avoided by eliminating any of the 4.

If there was no mutual exclusion the philosophers could share the chop sticks meaning no mutual exclusion.

No hold and wait meants that a philosopher won't hold on to half of the resources necessary to eat. And will only pick up the chopsticks if both are available.

No preemption would mean that philosophers are capable of taking their neighbors chop stick. Pretty much preventing deadlock but may lead to "arguments" between philosophers.

No circular waiting implies processes aren't waiting on each other for resources. Meaning that the philosophers may eat freely.

B). Exercise 7.15 page 309

4 resources.
3 processes.
At most 2 resources per.

The only way a process waits is if at least 2 of the 3 require 2 resources.

There are 3 scenarios where waiting may occur.

1. The first 2 processes require 2 resources. 3rd process can't get a handle on any resource. Hold and wait doesn't apply.

2. The first process requires 2 and the second process requires 1, or vice versa. and the 3rd resource requires 2. In this scenarion hold and wait may exist but circular wait doesn't. as the two other processes have what they need to run to completion.

3. All 3 require 2 and they all initially grab 1. meaning that 3 are still needed and only of the 3 processes can grab the 1 remaining resource. In this situation, circular waiting doesn't apply as one of the 3 will be able to obtain the resource it needs to complete. Upon completion the resources necessary for the other two will be available.

C). Exercise 7.17 Page 310

You can only pick up the chopstick in pairs. This prevents hold and wait. To do this you have to check whether or not anyone beside you is eating. If either is eating you must wait.

D). Exercise 7.20 Page 310

need = max - allocation

a) Need

	a	b	c	d
p0	0	0	0	0
p1	0	7	5	0
p2	1	0	0	2
p3	0	0	2	0
p4	0	6	4	2

b) no, p1 need > available.

c)Yes, available is 1 5 2 0 after request will be 1 0 0 0.