Operating System

HW#4, Deadlock detection, prevention, avoidance

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Problem set A: Short questions

Note: Refer slide set 11, page 3 for question: 1,2,3.

1. Which executes first, P1 or P2? Why?
2. In above, if P1 is in loop of counter 1-5, how many times S1 is executed?
3. In above, if P2 is in loop of 1-10, how many times S2 is executed?
4. What is an atomic operation?
5. Which semaphore behaves like mutex lock (binary/counting)?
6. How many processes can be there in counting semaphore?
7. How many processes can be there in binary semaphore?
8. Which of the wait or signal semaphore is used for entry into process?
9. When the value of a semaphore is zero, what it indicates? (all/no resources are used?)
10. When a process acquires a resource, which semaphore (wait/signal) is executed?
11. What is purpose of variable "list" in slide set 11, page 8?
12. Is there possibility of deadlock in batch type of OS?

Problem set B: Not too short answers

1. What is a semaphore? How a semaphore is busy-wait?
2. How semaphore can be modified so that it does not consume cpu cycles due to busy-waiting?
3. How a blocked process can be restarted from sleep?
4. What is deadlock? What is basic phenomena of occurrence of deadlock? How can you prevent the occurrence of a deadlock?
5. What is priority inversion? How it helps in removing deadlock?
6. What is starvation?
7. What is readers-writers problem? Why the deadlock occurs in the reader-writers problem?
8. Can there be more that two processes that can use rw_mutex?
9. What are the conditions of deadlock? Explain each one of them.
10. What is difference between prevention and avoidance of deadlock?
    Explain some possible mechanisms of deadlock avoidance?
11. What are the disadvantages of "aborting all deadlocked processes" for deadlock removal?