

C211 – Operating Systems

Tutorial: Deadlocks

1. Suppose that there is a resource deadlock in a system. Give an example to show that the set of processes deadlocked can include processes that are not in the circular chain in the corresponding resource allocation graph.
2. Consider a system that uses the banker's algorithm to avoid deadlocks. At some time a process P requests a resource R, but is denied even though R is currently available. Does it mean that if the system allocated R to P, the system would deadlock?
3. Two processes, A and B, each need three records, 1, 2, and 3, in a database. If A asks for them in the order 1, 2, 3, and B asks for them in the same order, deadlock is not possible. However, if B asks for them in the order 3, 2, 1, then deadlock is possible. With three resources, there are $3! = 6$ possible combinations each process can request resources. What fraction of all combinations is guaranteed to be deadlock free?
4. Can a single-processor system have no processes ready and no process running? Is this a deadlocked system? Explain your answer.