Name: ------------------------------------

1. What is the formal definition of the deadlock?
2. What are the four requirements for a deadlock?
3. Suppose that a resource allocation graph contains a cycle. Does this mean there is a deadlock?
4. Suppose that a resource allocation graph does not contain a cycle. Does this mean there is no deadlock?
5. Consider a system with processes P1 and P2 and resources R1, R2, R3 (where each resource has a single instance). Draw a resource allocation graph for each of the following steps in the sequence and answer the following questions:
   1. Process P2 requests resource R1
   2. Process P1 is granted access to R1
   3. Processes both P1 and P2 claim both resources R2 and R3
6. Consider a three process system in which processes may request any of 12 drives. Suppose the allocation state given below. Show that the allocation state is unsafe. Will this system deadlock?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Allocation | Max | Need | Available |
| P0 | 5 | 10 | 5 | 12 |
| P1 | 2 | 4 | 2 |  |
| P2 | 3 | 9 | 6 |  |