COS40003 – Concurrent Programming

Correction Report: Question Test, Semester 2, 2025

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Question 9 (True/False Section)

Original Question:

"If a resource allocation graph contains a cycle, there will be a deadlock."

Correct Answer: False

Explanation:

A cycle in a resource allocation graph indicates the possibility of a deadlock, but not a certainty.

- If each resource type has only one instance, then a cycle does imply a deadlock.
- However, if there are multiple instances of a resource type, a cycle can exist without causing deadlock.

Therefore, the correct answer is False, because a cycle is a necessary but not sufficient condition for deadlock.

Question 3 (Short Answer Section)

Original Question:

In Java, if a class A has a static variable b, how can you ensure a thread can safely access the static variable?

Correct Answer:

- Method 1: Use synchronized (A.class) to lock on the class object so only one thread can access the static variable at a time.
- Method 2: Use a static ReentrantLock to explicitly control access and ensure thread safe operations on the static variable.

Explanation:

The static variable belongs to the class, meaning all threads share it. To prevent multiple threads from accessing or modifying it at the same time, synchronizing on the class object (A.class) ensures mutual exclusion so that only one thread can access it at a time. Alternatively, a static ReentrantLock provides fine grained control over lock acquisition and release, avoiding interference and ensuring thread safe access to the shared variable.