

(a)

① Thread A: about to CAS head from
a to b

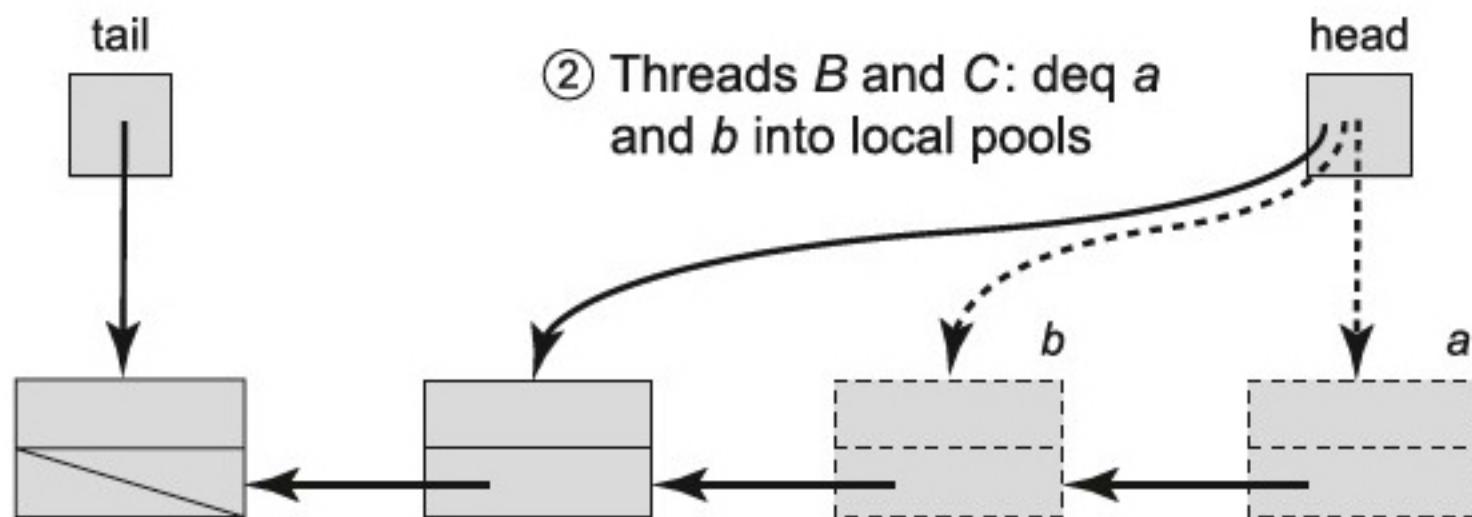


FIGURE 10.15A An ABA scenario: Assume that we use local pools of recycled nodes in our lock-free queue algorithm. In part (a), the dequeuer thread A observes that the sentinel node is a, and next node is b. (Step 1) It then prepares to update head by applying a compareAndSet() with old value a and new value b. (Step 2) Suppose, however, that before it takes another step, other threads dequeue b, then its successor, placing both a and b in the free pool. In part (b), (Step 3) node a is reused, and eventually reappears as the sentinel node in the queue. (Step 4) Thread A now wakes up, calls compareAndSet(), and succeeds in setting head to b, since the old value of head is indeed a. Now, head is incorrectly set to a recycled node.