Hw 4:

The ABA problem stems from when a variable is changed from one value to another, then back all before the CAS operation is called. This means the variable can call other threads and operations without alerting the CAS operation. This can create a memory issue, where the CAS operation incorrectly assumes the code hasn't changed addresses or data, even though the address and data were changed.

The thread that is being shared in the class work code is the queue's tail pointer. Specifically, when Q->tail->next is NULL, this is the "A" case. But if a second thread sets the Q->tail->next node to a new value B and then moves the tail forward so Q->tail = B and deletes the Q->tail->next node value so that it equals NULL again. This sets the Q->tail->next node back to the "A" case, but instead with a Q->tail value of B, rather than the original value. This doesn't set off the CAS operation but still changes the memory of the code.

Sources:

1. Wikipedia contributors. (2025, June 24). *ABA problem*. In *Wikipedia, The Free Encyclopedia*. Retrieved October 22, 2025, from https://en.wikipedia.org/wiki/ABA_problem
    a. This source explains how the ABA problem works, while also showing example codes, and workarounds to the problem. The source is written on a credible website, written about a common problem, which makes it harder to add false information to the wiki.
2. Baeldung. (2024, March 18). *The ABA problem in concurrency*. Baeldung on Computer Science. Retrieved October 22, 2025, from https://www.baeldung.com/cs/aba-concurrency
    a. This source is similar to the first, having explained how CAS operations work, and how the ABA problem works. The website uses example java code to show where the ABA problem occurs. This website is credible because the main website is Baeldung, which is made for developers to help learn java code, and applications. This is credible since the website is well known for being a useful resource for coders. Also the article is reviewed by Josh Cummings, who is a Software engineer for 15 years.
3. Anh Trần Tuấn (2024, December 5). *Techniques for handling ABA problems in CAS with Java*. Medium. Retrieved October 22, 2025, from https://medium.com/tuanhdotnet/techniques-for-handling-aba-problems-in-cas-with-java-648fb79f1eb3

a. This source explains how CAS operations and ABA problems work, with graphics to help explain the points better. This website is credible because there is an author with 6 years of web java experience, along with 300 followers that show that he has connections, and isn't some unqualified person writing an article. This article was also uploaded onto the Medium, which is a rather large company that has to proofread their stories, and uphold a reputation. So it would be unlikely that this article could be written by someone unqualified or by someone who is lying.