

HW 4 Written: Rose Whitt

1.1 HJ Isolated Constructs vs. Java Atomic Variables

1)

Yes.

In IsolatedPRNG, because the retVal is isolated, nextInt is blocked until it is available and able to give a different and correct nextSeed.

In AtomicPRNG, the while(true) loop acts as an artificial blocker that does not return the retVal until the different and correct nextSeed is found.

2)

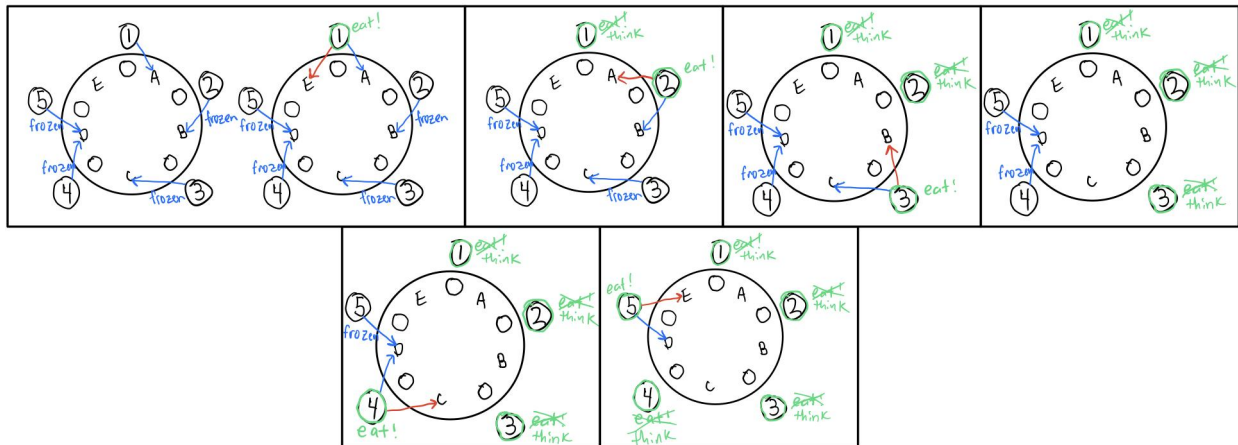
The while loop is necessary for the AtomicPRNG to return a different value each time. The while loop will continue looping until compareAndSet is true, thus finding a different value than before. If the while loop is removed then two threads running in parallel will possibly get the same result, which would then fail the equal comparison to IsolatedPRNG.

1.2 Dining Philosophers Problem

1)

In the unmodified Solution 1, there is no livelock but there is a deadlock because on the first iteration all of the philosophers are holding their left chopstick and can't pick up the right, so they just sit there forever.

However, in the modified Solution 1, one philosopher will be able to eat (have access to both the left and right chopsticks) at all times and therefore there is no deadlock.



2)

In the unmodified Solution 2, there is no deadlock but there is a livelock because all of the philosophers pick up the left chopstick, try to pick up the right chopstick, give up and set it down, and repeat.

However, based on the definition of livelock given in the question, no livelock occurs in the modified Solution 2 because a philosopher is able to eat at all times and therefore not all philosophers starve.

