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CSCI 114

March 15, 2023

2.) The reason solution 2 to the too much milk solution is safe to run without the worry of deadlock is because of how each path is constructed. Firstly since path b has no loops in its code thread b will eventually execute its action and signal noteB to equal 0 for pathA to be able to run and and check if there's a note left to buy milk and if no note is left to leave a note to buy milk regardless milk will be bought making the solution safe.

3.) The set of outcomes that can occur when executing the code one set of outcomes that could happen when executing is that it will insert 50 items into the queue and then remove 20 items from said queue leaving 30 items. Another outcome is similar to the first but instead the queue initiates twice removing 40 items from the queue.

10.) Since only one writer can write at a time the program doesn't want to broadcast to all writers because then it would cause a bunch of conflicting writes happening at the same time so instead by using signal it only notifies the next waiting writer to prevent conflicts.