B. If the mutex variable is left out, there might be race conditions or otherwise where buffer[in] overwrites an item, or buffer[out] reads something that hasn't been fully inserted yet. The semaphores in the current state prevent overlapping critical sections through both methods via the shared mutex, instead of two individual critical sections that can both run at the same time.

mutex: A Semaphore object (Semaphore.java, not native java) – a simple counting semaphore implemented with synchronized

buffer[]: An array containing data (indices to read/write from/to are tracked via semaphore and modifying the offset runs in a critical section)