3.5 Lecture Summary

3.5 Producer-Consumer Problem with Bounded Buffer

Lecture Summary: A major simplification made in the previous lecture was to assume that the shared buffer used by producer and consumer tasks can be unbounded in size. However, in practice, it is also important to consider a more realistic version of the the *producer-consumer* problem in which the buffer has a *bounded size*. In fact, the classical producer-consumer problem statement usually assumes a bounded buffer by default. In this lecture, we studied how the actor-based solution to the unbounded buffer case can be extended to support a bounded buffer.

The main new challenge with bounding the size of the shared buffer is to ensure that producer tasks are not permitted to send items to the buffer when the buffer is full. Thus, the buffer actor needs to play a *master* role in the protocol by informing producer actors when they are permitted to send data. This is akin to the role played by the buffer/master actor with respect to consumer actors, even in the unbounded buffer case (in which the consumer actor informed the buffer actor when it is ready to consume an item). Now, the producer actor will only send data when requested to do so by the buffer actor. Though, this actor-based solution appears to be quite simple, it actually solves a classical problem that has been studied in advanced operating system classes for decades.

Optional Reading:

1. Wikipedia article on the Producer-Consumer problem

Mark as completed