A producer/consumer Bounded Buffer is the basis for Unix pipes. BoundedBuffer has two primitives: Read(n) and Write(n). The Write procedure produces n bytes at the tail of the buffer; Read consumes n bytes from the front of the buffer. The BoundedBuffer has a maximum size of N bytes. Read blocks if the buffer is empty, and Write blocks if the buffer is full.

Notes:

A Read or Write with n > N is legal, but it will always block the caller at least once.

Ordinarily these calls would transfer n bytes of data out of or into the buffer, but we ignore that to simplify the problem: the point here is to focus on the synchronization.

However, your solution should preserve the atomicity of reads and writes: write(n) should produce n contiguous bytes, and read(n) should consume n contiguous bytes. In other words, writes execute in a strict order, and reads execute in a strict order.