

Department of Computer Science and Engineering

**FACULTY OF ENGINEERING AND TECHNOLOGY
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CS-501

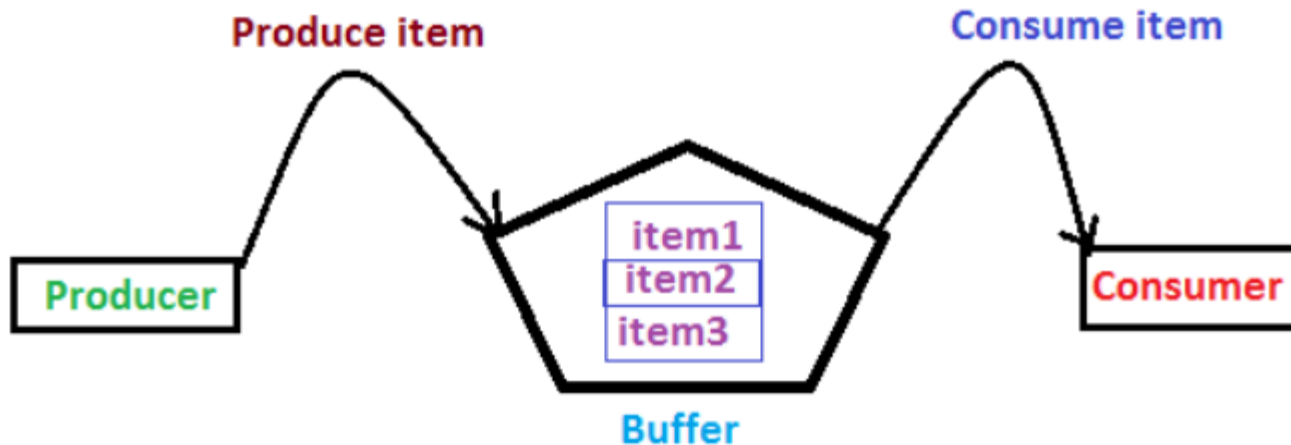
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CLASSICAL PROBLEMS OF SYNCHRONIZATION

(The Bounded-Buffer Problem)

The Bounded-Buffer Problem

- Producer-Consumer problem revisited with *bounded buffer* case.



- N *buffers*, each can hold one item
- *Semaphore mutex* initialized to the value 1
- *Semaphore full* initialized to the value 0
- *Semaphore empty* initialized to the value N.

Solution_{1/2}

- The structure of the ***producer*** process

```
while (true)
{
    //produce an item
    wait (empty);
    wait (mutex);
    //add the item to the buffer
    signal (mutex);
    signal (full);
}
```

Solution_{2/2}

- The structure of the *consumer* process

```
while (true)
{
    wait (full);
    wait (mutex);
    // remove an item from buffer
    signal (mutex);
    signal (empty);
    // consume the removed item
}
```

- Analysis/Working <Write here>

References

1. Silberschatz, Galvin and Gagne, “Operating Systems Concepts”, Wiley.
2. William Stallings, “Operating Systems: Internals and Design Principles”, 6th Edition, Pearson Education.
3. D M Dhamdhere, “Operating Systems: A Concept based Approach”, 2nd Edition, TMH.

Thank You.

