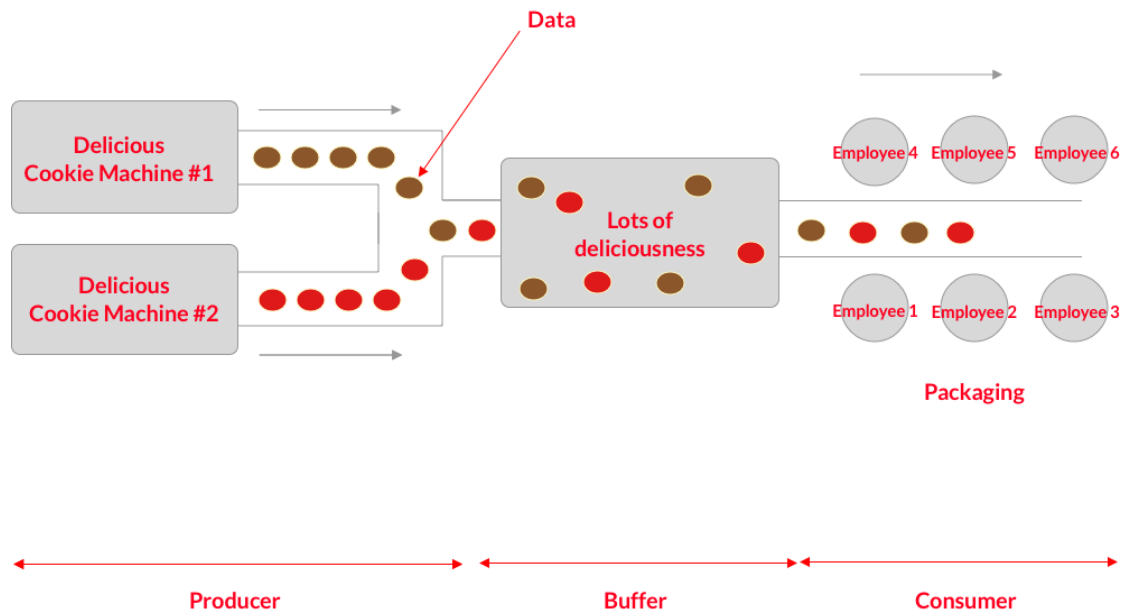# CSC369 Week 3 Notes

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1 Synchronization

- Producer and Consumer Problem

    - Is also known as **bound-and-buffer** problem
    - Achieves synchronization
    - Has two types of processes
        1. **Producer**
            * Produces data
            * Puts data into buffer
        2. **Consumer**
            * Consumes data
            * Removes data from buffer, one piece at a time
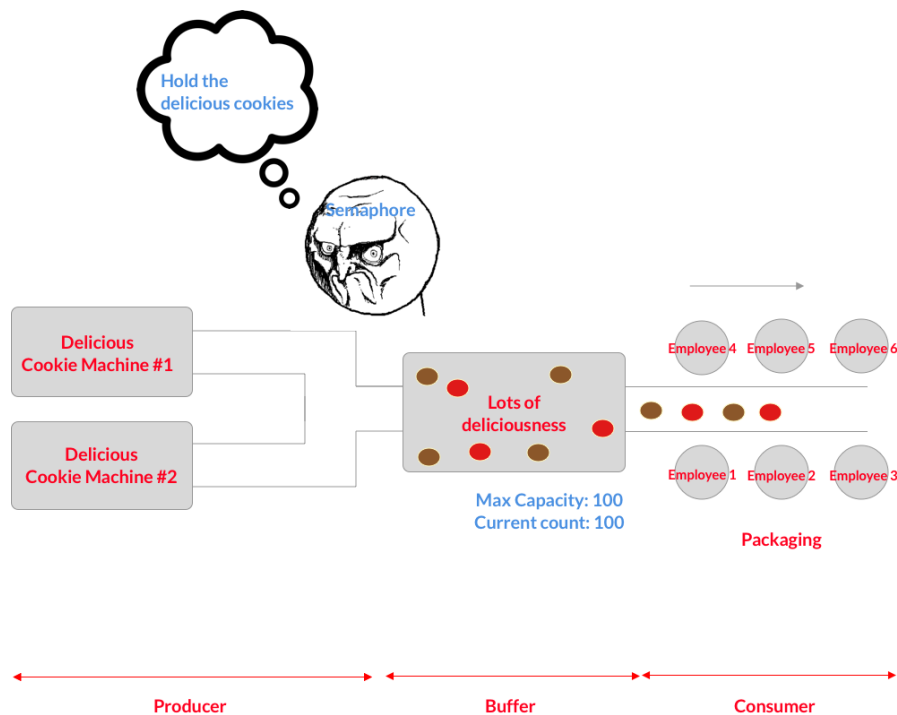   - It's like kimchi factory, or delicious cookie factory :)

- Semaphore

  - Developed by Dijkstra in 1962.
  - Provides synchronization
  - Works like a signal
    * Uses a non-negative integer variable that is shared between threads [*Note: Need to come back later*]
    * Has two "**atomic**" operations
      1. **Wait** (Also called P, or decrement)
      2. **Signal** (Also called V, or increment)

- Types of Semaphores

  1. Counting Semaphore
     - $count = N \Rightarrow$ Max number of resources
     - $count \uparrow$ when resource added
     - $count \downarrow$ when resource used
     - $count = 0 \Rightarrow$ No resources available $\Rightarrow$ **Wait** until $count > 0$

  2. Mutex Semaphore