

Blocking mechanism

Associated with each semaphore is a queue of waiting threads

➡ When $P()$ is called by a thread:

- If semaphore is open, thread continue
- If semaphore is closed, thread blocks on queue

➡ Then $V()$ opens the semaphore

- If a thread is waiting on the queue, the thread is unblocked
- If no threads are waiting on the queue, the signal is remembered for the next thread

(Bad) Producer Consumer **using a semaphore**

```
sem_init(&not_full, 0, n)
sem_init(&not_empty, 0, 0)
```

```
void producer () {
    while(1) {
        item := produce()
        sem_wait(&not_full)
        write(buffer, item)
        sem_signal(&not_empty)
    }
}
```

```
void consumer () {
    while(1) {
        sem_wait(&not_empty)
        item := read(buffer)
        sem_signal(&not_full)
        consume(item)
    }
}
```