

Producer and Consumer

Consider the following two functions implementing a producer and consumer by using monitors:

```
void send(item) {
    lock.acquire();
    enqueue(item);
    printf("before signal()\n");
    dataready.signal(&lock);
    printf("after signal()\n");
    lock.release();
}

item = get() {
    lock.acquire();
    while (queue.isEmpty()) {
        printf("before wait()\n");
        dataready.wait(&lock);
        printf("after wait()\n");
    }
    item = dequeue();
    lock.release();
}
```

- a. Assume two threads T1 and T2, as follows:

```
T1          T2
send(item);  item = get();
```

What are the possible outputs if the monitor uses the Hoare implementation?

- b. Repeat question (a) for a Mesa implementation of the monitor.

- c. Now assume a third thread T3, i.e.,

```
T1          T2          T3
send(item);  item = get();  send(item);
```

What are the possible outputs if the monitor uses the Hoare implementation?
Please specify from which thread does an output come by specifying the thread id in front of the output line, e.g., [T1] before signal or [T2] after wait.