Activity: two locations by hand

Chapter 10, Multi-Echelon Systems with Batch Ordering

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Work in pairs. 25 minutes.

Names: _____

The system. The fuse cutout again, at a hub and one storeroom, as in the chapter's ledger, but with a thinner hub.

- **Hub:** $(r_0, Q_0) = (0, 3)$. It orders 3 whenever its position falls to 0, its supplier takes $L_0 = 2$ weeks, and it starts with 3 on the shelf.
- **Storeroom:** base stock $S_j = 2$, one week from the hub ($O_j = 1$), starting with 2 on the shelf. Every failure sends a request for one cutout to the hub.
- **Failures** at the storeroom in weeks 1, 3, 4, 4, 5, 5, 6 and 7: two in each of weeks 4 and 5.
- Both levels backorder, first come first served.

The rules of the ledger. One row per event, at the week it occurs, with the state recorded after posting. When events share a week, post the hub's receipts first, then the storeroom's, then the failures in order. A failure, its request to the hub, and any hub order it triggers share one row.

Part A. Predict

Before posting anything: which of the eight requests will wait at the hub? Give their weeks.

Part B. The ledger

Post every event until nothing is outstanding. *The check on every row:* $IP_0 = I_0 + \text{on order} - B_0$ at the hub, and at the storeroom $IP_j = I_j - B_j + \text{in transit} + B_0$, which must stay at 2.

Week	Event	I_j	B_j	IP_j	In transit	I_0	B_0	On order	IP_0
0	start	2	0	2	0	3	0	0	3

Part C. The waits

1. For each of the eight requests, give the week it was sent, the week the hub shipped it, and its wait. Compute the mean wait.
2. Compute the mean wait a second way, from the hub's backorders: the unit-weeks of B_0 over the eight requests.
3. How many crew-weeks did crews wait at the storeroom? Which hub event caused each crew's wait?

Part D, if you have time. One more cutout, but where?

Each partner reruns the ledger through week 8 with one change: one partner gives the hub a reorder point of $r_0 = 1$, the other gives the storeroom a base stock of $S_j = 3$ (and 3 on its shelf at the start). Compare the mean request wait and the crew-weeks.

Exit ticket (tear off and hand in)

Name: _____

1. The storeroom's position never left 2. Why did its crews wait anyway?

2. True or false, and why: the hub's delivery in week 6 ended the waits of three requests, so those were three independent waits.