



Capacity Management at Littlefield Technologies

Background

In early January, Littlefield Technologies (LT) opened its first and only factory to produce its newly developed Digital Satellite System (DSS) receivers. LT mainly sells to retailers and small manufacturers using the DSS's in more complex products. LT charges a premium and competes by promising to ship a receiver within 24 hours of receiving the order, or the customer will receive a rebate based on the delay.

The product lifetime of many high-tech electronic products is short, and the DSS receiver is no exception. After 268 days of operation, the plant will cease producing the DSS receiver, retool the factory, and sell any remaining inventories. In the initial months, demand is expected to grow at a roughly linear rate, stabilizing after about 5 months. After another month, demand should begin to decline at a roughly linear rate. Although orders arrive randomly to LT, management expects that, on average, demand will follow the trends outlined above.

Management's main concern is managing the capacity of the factory in response to the complex demand pattern predicted. Delays resulting from insufficient capacity would undermine LT's promised lead times and ultimately force LT to turn away orders.

Assignment

It is now late February, and LT has started to notice that a few of their receivers have been delivered after their due dates. In response, management has installed a high-powered operations team (you) to manage the factory's capacity. For the next 168 simulated days you must buy or sell machines to maximize the factory's overall cash position. Currently there is one board stuffing machine, one tester, and one tuning machine.

You may also change the way testing is scheduled. Currently, jobs at the tester are scheduled First-In-First-Out (FIFO), but you can give priority status either to the short initial tests or the long final tests.

When the assignment begins, there will already be 50 days of history available for your review, representing the period from early January to late February. The simulator will run at a rate of 1 simulated day per 1 real hour for the next week. After the assignment window ends, an additional 50 days of simulation will be executed at once. Thus, there will be a total of 268 days of simulation corresponding to a product life time of about 9 months. After this simulation is over, you can check the status of your factory, but the factory will no longer be running.