**[[1]](#footnote-1)**

**Revenue Management at Littlefield Labs**

**Background**

Littlefield Labs (LL) opened a new, highly automated lab to test blood samples. LL receives samples from local hospitals and clinics and processes those samples with disposable test kits. After 210 days of operation the lab will cease operations and shut down. Neither capacity nor inventory will have salvage value after the lab shuts down.

Test results are promised within 24 hours of receiving a sample.

Marketing expects that long term market demand remains stable. Management’s main concern is capacity planning with regards to product pricing. Delays resulting from insufficient capacity could undermine LL’s promised lead times and lower revenue.

**Operations at Littlefield Labs**

LL uses a fresh test kit with each new blood sample. After matching samples with kits, orders travel through the reentrant four step process described in Getting Started. The purchase price of any machine is $25,000. The retirement price of any machine is $10,000. It takes time for new capacity to be ordered and installed. New machines become operational 5 days after they are paid for. Sold machines are retired as soon as they finish any work in process. Management has not performed stopwatch studies of the process times, but one quickly notices they are variable.

LL purchases inventory using an automated policy of periodic review. Inventory is replenished to 40 kits every simulated day. Fresh test kits cost $600 each. A reliable supplier delivers the exact quantity daily at midnight. You will not be able to change their inventory policy.

Littlefield decides whether to take new orders based on how many orders have been accepted but not yet completed—which is the work-in-process (WIP) inventory of orders. Currently Littlefield only accepts orders when it’s WIP is less than 100. That means new orders only arrive when WIP is less than 100 orders. You may change this WIP limit anytime. If you lower WIP below the current total in the system, no new orders will be accepted until the current total drops below the WIP limit. Setting a WIP limit of zero will prevent all new orders from arriving.

Management promises turnaround times of less than 24 hours. Orders filled within the quoted lead time earn full revenue. Orders taking more than one day to complete incur penalties. Specifically, revenue for delayed orders will decrease at a constant rate from the quoted price under one day down to zero at three days. All orders taking longer than three days are delivered for free.

For example, consider an order with a quoted price $1,000 delivered to the customer 30 simulated hours after being placed, the penalty would be:

…and that order would earn revenue.

Contract prices are determined for each order when it arrives. An intern, double majoring in marketing and economics, has completed a study which claims lower prices will increase total revenue. New prices may be assigned to future orders by clicking the Edit Data button of your Customer Order pop-up window, and selecting from a menu. Management currently quotes $1200 per order. You can reduce that price in increments of $150, but you cannot charge less than $900 per order. Compared to demand at $1200, demand at $1050 is three times as high and demand at $900 is five times higher.

Production began with $1,000,000 in operating cash and 40 fresh test kits. Revenue earned from filled orders increase overall cash balance while capital investments and inventory purchases reduce cash balance. Additional machinery cannot be purchased if the resulting cash balance would prevent inventory replenishment. Cash held earns interest at an annual rate of 10%. There are no taxes, payrolls, nor fixed overhead costs to consider.

**Assignment**

You begin managing the laboratory on Day 30. Historic data is available for review. For the next 180 simulated days you can: buy or sell machines, prioritize queueing, limit the work accepted, and adjust contract prices to maximize Littlefield’s final cash position.

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

After the simulation ends you may review Littlefield’s history and download data, but the laboratory will no longer be active. **The only winning condition is having the most cash at game’s end.**

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