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

**Managing a Short Product Life Cycle  
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.

Marketing has sketched the demand trend shown in Figure 1. Although marketing is confident of the rough shape of demand, there is not enough marketing data to predict peak demand, it will depend on how fast demand starts to grow after day 60.

*Figure 1*

Management’s main concern is managing the capacity of the lab in response to the predicted demand pattern. Delays resulting from insufficient inventory could undermine LL’s promised lead times and even force LL to turn away work.

# **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 $30,000. The retirement price of any machine is $10,000. It takes time for new capacity to be ordered and installed. New machines become operational 10 days after they are paid for. Sold machines are retired as soon as they finish any work in process.

Management has performed a stopwatch study of the process times for each step. Their results follow:

* Step 1, exactly 2 hours per sample
* Step 2, exactly 1/2 hour per sample
* Step 3, exactly 4 hours per sample
* Step 4, exactly 1 hour per sample

LL purchases inventory using an automated policy of periodic review. Inventory is replenished to 100 kits every simulated day. Fresh test kits cost $200 each. A reliable supplier delivers the exact quantity daily at midnight. You will not be able to change their inventory policy.

Littlefield promises results within a specific time frame. LL earns $400 for all test results delivered in less than 24 hours. Rebates begin to kick in when an order’s actual lead time exceeds 24 hours. Revenues decrease lin­early from $400, when the actual lead time is less than 24 hours, down to $0, if it takes longer than 7 days to deliver those test results. A test kit is consumed with every accepted order, so LL begins to lose money on any tests requiring more than 96 hours total waiting and process time.

Production began with $1,000,000 in operating cash and 100 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 must buy or sell machines in order to maximize the lab’s overall cash position. There is one preparer, one tester, and one centrifuge already in the laboratory.

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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