Capacity Management at Littlefield Labs

Background

In early January, Littlefield Laboratories (LL) opened its first and only lab for blood testing purposes. LL charges a premium and competes by promising to ship the results of a sample within 24 hours of receiving the order, or the customer will receive a rebate based on the delay.

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 LL, management expects that, on average, demand will follow the trends outlined above.

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

Assignment

It is now late February, and LL has started to notice that a few of their test results have been delivered after their due dates. In response, management has installed a high-powered health operations management team (you) to manage the lab's capacity. For the next 168 simulated days you must buy or sell machines to maximize the lab's overall cash position. Currently there is one sample preparing machine, one testing machine, and one centrifuge.

You may also change the way testing is scheduled. Currently, samples at the testing station are scheduled First-In-First-Out (FIFO), but you can give priority status either to the short basic test or the long additional test.

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 life time of about 9 months. After this simulation is over, you can check the status of your lab, but the lab will no longer be running. Once the assignment ends, any remaining machines will have zero value.

Your team should turn in one two-page summary of what actions you took during the week you had access to the lab, why you took those actions, and in retrospect whether you think you did the right thing. Show analysis to justify your conclusions. Your team's grade will be partially based on your performance, but mainly based on your summary. The summary cannot exceed 2 pages in length, and no appendices are allowed.