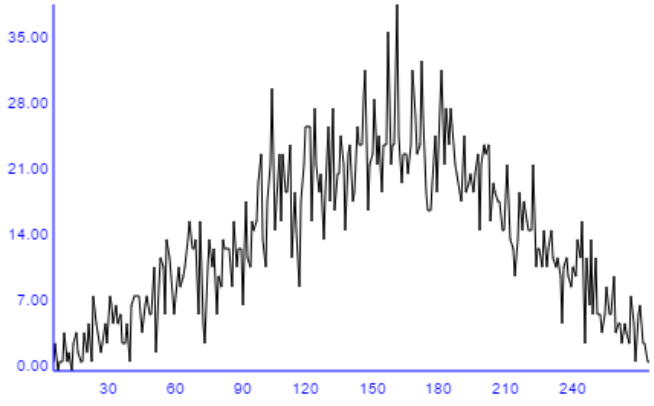
1. Explain your strategy of buying and selling machines. In retrospect, do you think this strategy worked well? Why or why not?

Answer: At the beginning of the game, we were provided with 2 machines of type 1 and one machine each of type 2 and 3. These many numbers of machines were sufficient to complete jobs with full profit till the demand was low in the initial stage of the game (from day 1 before day 50).

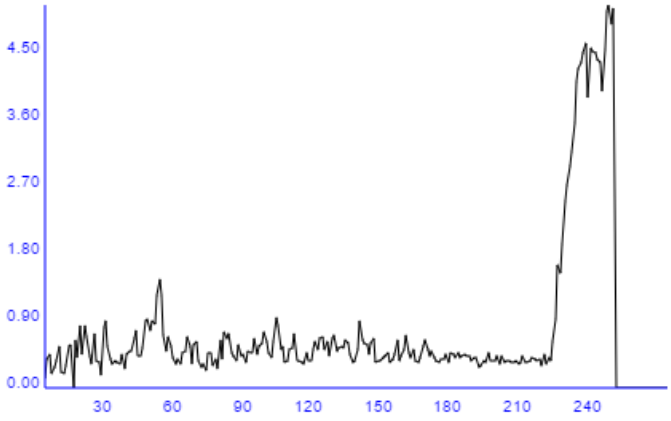
Transaction History:

Day	Parameter	Value
50	station 3 machine count	2
50	station 2 machine count	2
50	station 1 machine count	3
50	Reorder quantity (kits)	4200
50	Reorder point (kits)	2880
50	station 2 scheduling rule	pri4
50	Reorder quantity (kits)	9840
56	Reorder point (kits)	4800
80	station 3 machine count	3
96	Reorder point (kits)	7200
100	station 2 machine count	3
103	station 1 machine count	4
136	station 1 machine count	5
136	station 3 machine count	4
140	station 2 machine count	4
141	Reorder point (kits)	8400
188	Reorder point (kits)	7200
188	Reorder point (kits)	6000
211	Reorder point (kits)	4800
211	Reorder quantity (kits)	12000
211	Reorder point (kits)	3600
212	Reorder quantity (kits)	9600
212	Reorder point (kits)	7200
212	Reorder quantity (kits)	0
216	Reorder point (kits)	2400
217	Reorder quantity (kits)	3600
217	Reorder point (kits)	12000
217	Reorder point (kits)	0
217	Reorder point (kits)	600
217	Reorder quantity (kits)	600
217	Reorder point (kits)	0
217	Reorder quantity (kits)	0
217	station 3 machine count	1
217	station 2 machine count	1
217	station 1 machine count	2

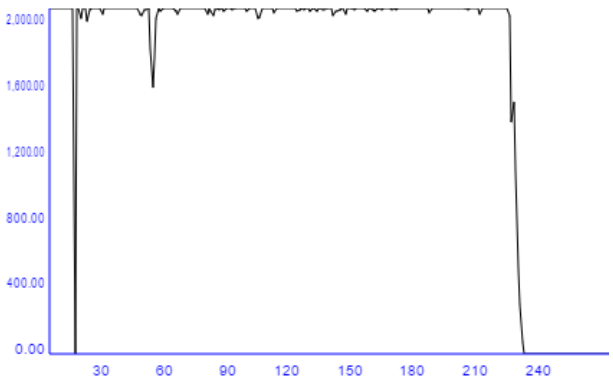
Plot of number of jobs accepted each day



Plot of daily average job lead time



Plot of daily average revenue per job



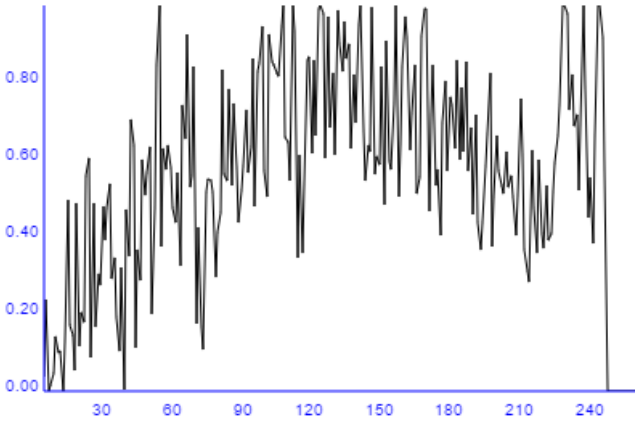
As we can see in the above graphs, the demand (number of jobs accepted per day) started increasing. With the increasing demand, the lead times of the completed jobs started increasing, as the jobs started to queue in for machines of type 1, 2 and 3. This can be seen in the plot of daily average job lead time below.
As a result, the machines of all types reached their maximum utilization capacity (1.0(100%), in the plot of machine utilization below). As the lead times of completed jobs increased, there was a dip in the overall revenue. Due to this, we bought one machine of each type on day 50 itself to account for the over utilization of machines.
A total of 3 machines of type 1, 2 each of type 2 and 3 were sufficient to cater for the demand till day 80, without the machines being over utilized, the revenue remaining constant and lead times fluctuating but not much. At around day 80, the utilization of type 3 machine increased above 100% as machine 3 was the bottle-neck of the chain. Hence, we bought 1 more machine of type 3.

As the game progressed from day 100, the demand kept on increasing as predicted, and the machines already reaching their saturation level with the utilizations soaring above 100% (see graphs).
In order to cater for the increasing demand, we bought one each of all types of machines.
After that we realized that the demand would be increasing even more and would be reaching its peak point, because of which the utilizations of machines were almost about a 100%. Hence we bought 1 more machine of each type accounting to a total of 5 machines of type 1, and 4 machines each of type 2 and 3.

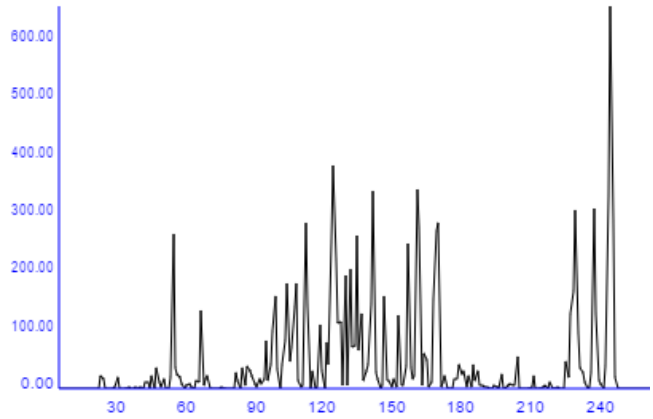
We estimated that the trend of decrease in demand and utilization of machines would be the same as for when the demand was increasing. And hence, we decided to keep the count of machines the same as while catering to the demands at the respective day as estimated after the peak was reached.
Therefore, we decided to keep 2 machines of type 1 and 1 each of type 2 and 3 before the game ended on day 217, as they were available at the beginning of the game, and sold away the rest of the machines bought. We estimated that as the demand level would decrease in the same trend or even more rapidly than it increased, the previous number of machines would be sufficient to meet the demands without giving a major loss in revenue.

This strategy did not work well for us as the demand did not decrease rapidly or even at the same level as it increased. Those numbers of machines were insufficient to meet the incoming number of jobs, leading to increase in lead times initially, increase in queue size for the machines and later in complete loss of revenue because of missed orders.

Plot of utilization of station 1, averaged over each day

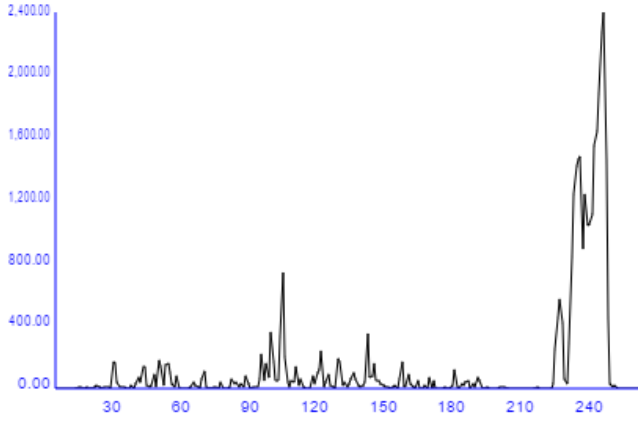


Plot of daily average number of kits queued for station 1

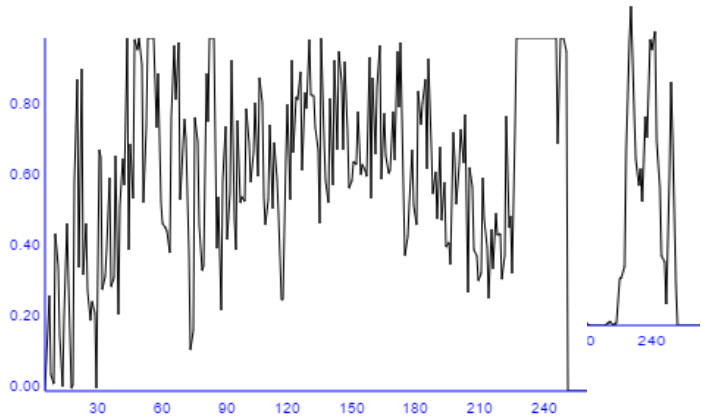


Plot of utilization of station 2, averaged over each day

Plot of daily average number of kits queued for station 2



Plot of daily average number of kits queued for station 3
Plot of utilization of station 3, averaged over each day



Conclusion: From the loss of revenue due to missed order in the end part of the game, we concluded that the selling out of machines to generate revenue from them was an incorrect decision and we could have generated greater revenue had we not missed out on the orders due to insufficient number of machines.

3. Explain your sequencing policy strategy. In retrospect, do you think this strategy worked well? Why or why not? You must change the sequencing policy at least once while you play the game.

At the beginning of the game, all of the jobs on all 3 types of machines were sequenced according to "First in First out" policy which was the default setting of the game.

As we know that Station 1 is the Board Stuffing Station, Station 2 is the Testing Station and Station 3 is the Tuning Station.

The incoming jobs were sequenced according to the following steps:
Step 1: Mounting and soldering electronic components onto PC boards at the board stuffing station (Station 1).
Step 2: The second step collects test data on each Receiver (Machines at Station 2) that is transmitted to tuning for the third step.
Step 3: The third step tunes the DSS units to receive satellite signals at the tuning station (Station 3).
Step 4: The final step returns boards to the testing station to for a final burn-in and certification required by customers.

At the start of the game, after the completion of Step 2, priority was given to Step 3, i.e jobs completed after tuning rather than Step 4.
We decided to give priority to Step 4 instead of Step 3. This means, the jobs which are waiting to be sent to the customers after the final burn-in and certification will receive priority, thus, reducing the lead time for the customers.

Hence, taking the decision of changing the sequencing policy by giving priority to Step 4 rather than Step 3 at station 2 helped us to reduce lead time, hence avoid revenue losses due to delayed delivery of demand.