Assignment 1 - Systems Simulation

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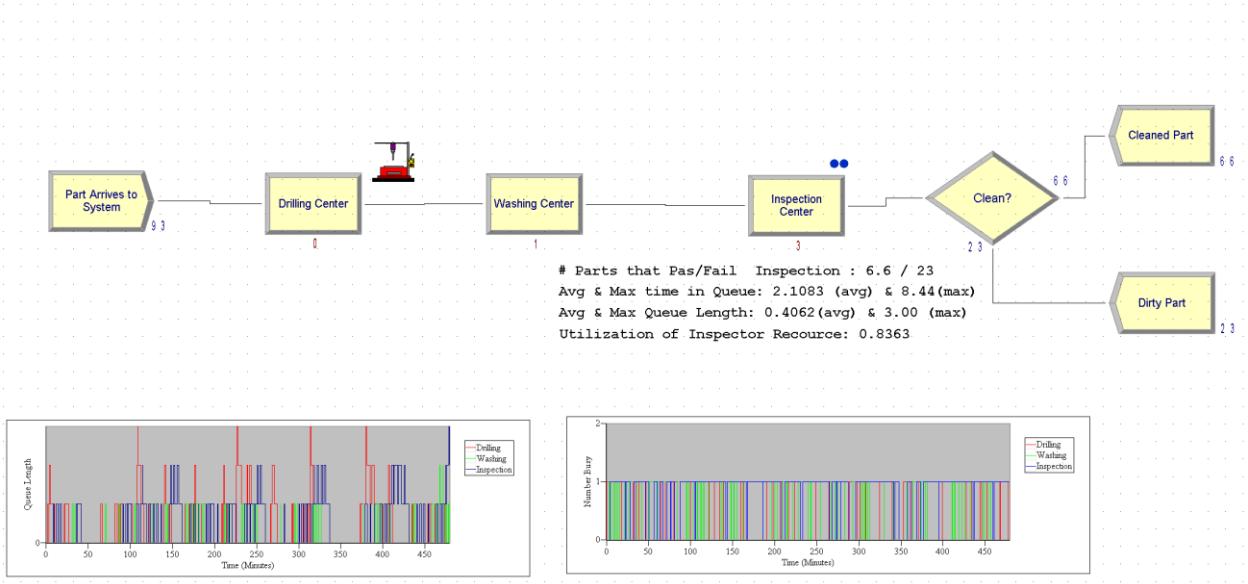
3-6)




3-7)

Exercise 3-7

Effective arrival rate( Inspection center): $1/5 + 0.25(1/5) + 0.25^2(1/5) + 0.25^3(1/5) + \ldots = 0.267$

Service rate (Inspection center): $1/4.5 = 0.22$

Effective arrival rate ( Washing Center): $\frac{1}{5} + 0.25(\frac{1}{5}) + 0.25^2(\frac{1}{5}) + 0.25^3(\frac{1}{5}) + \ldots = 0.267$

Service rate (Washing Center): $1/[(1+3+6)/3] = 0.30$

- At the Inspection Center the service rate (0.22) is less than the arrival rate of 0.267. Therefore, the inspector will not be able to keep up with the number of parts in the long run.
- At the washing Center the service rate of 0.3 is larger than the arrival rate of 0.267. This means that the service center can work on the part fast enough to prevent a long queue from forming such as in the case of the Inspection Center.

3-8)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# Parts that Pass Inspection based on condtion : 66 (cleaned) & 16 (dirty)
Avg & Max time in Queue: 8.25 (avg) & 27.22(max)
# Parts in Queue Length: 1.64 (avg) & 7.00 (max)
Utilization of Inspector Recource: 0.89
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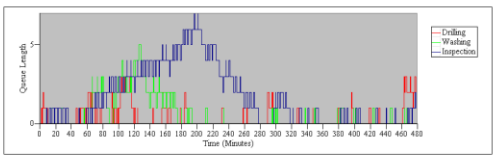
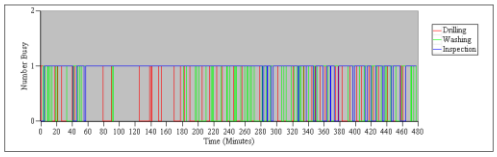
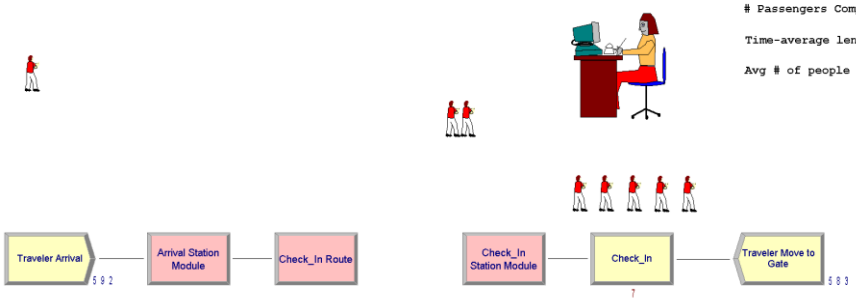



4-1)

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Avg time traveler is in system : 12.5 min
# Passengers Completed Check-in : 583
Time-average length of Check-in queue : 3.2263 min
Avg # of people in Check-in queue : 2
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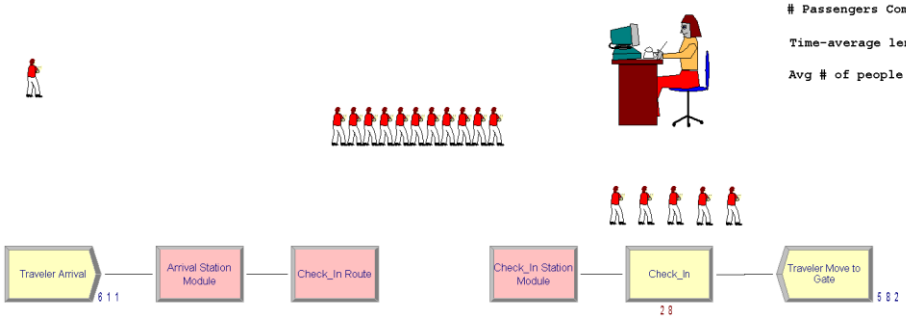
4-3)

**This break schedule model has longer queue wait times (about 3 times longer than the previous model). The total time the travelers are in the system also about doubled to 27 min. When thinking about customer satisfaction this will become an issue as people do not want to wait that long to get through a check-in process. Interestingly though this agent-break model produces almost the exact same number of people through check-in even though it more than doubled the avg traveler wait time.**

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Avg time traveler is in system : 27 min
# Passengers Completed Check-in : 582
Time-average length of Check-in queue : 17.57 min
Avg # of people in Check-in queue : 11.06
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