

# IE551 SIMULATION AND STOCHASTIC MODELS (Spring 2010)

## Assignment 5: Simulation Output Analysis

(20 points. Due date: Tue. 4/27 – submit to TA)

1. Law and Kelton: Problem 9.7.

2. Law and Kelton: Problem 9.8.

3. Resource **Schedule** and **Failure** modules in Arena.

a. Build an Arena model for the following system. A machine center has two identical machines. Their processing times are EXPO(1.2) min. During the first shift (8am to 4pm), both machines are in operation. However, the company runs the second shift (4pm to 12 midnight) in a reduced capacity by having only one machine running (it does not matter which one, as the two are the same) at the same speed. During the first shift, raw materials arrive individually following an EXPO(0.75) min. In the second shift, the arrival process slows to the arrival intervals following an EXPO(1.5) – which is half of the first-shift as there is only half the resource. We are interested in obtaining the daily throughput of the machine center (that is the 16-hour day). Run 5 independent replications for this part.

b. The two machines will fail following a frequency represented as a distribution of UN(25,35) min. That is the time between failures, e.g. “Uptime.” For each failure, it takes EXPO(1) min. to fix the machine, e.g., “Downtime.” Now include this in your Arena model and run 5 independent replications.

NOTE: For both **Schedule** and **Failure**, use the “Ignore” mode (to be discussed in class).

### Presentation of Project Progress

Tue. 4/20 and Thur. 4/22 will be used for project presentation and group discussion of the work remaining. Each group is expected to give a 15-min presentation using PowerPoint, then some time for Q&A and further discussion. We will go by the Group Numbers.

- Groups 1 – 3 will be on Tue. 4/20 and
- Groups 4 – 6 will be on Thur. 4/22.