ISyE 2030 – Fall 2005

Lab #5 — Arena

The purpose of this lab is just to get familiarized with the discrete-event simulation language Arena. So here are some easy exercises just to get you going. By the way, a good reference for Arena is

> Kelton, W. D., Sadowski, D. A., and Sturrock, D., *Simulation with Arena*, 3rd edition, McGraw-Hill, 2004.

1. Let's start off with a simple single-server queueing system. Customers arrive (use a `CREATE` block) at a single-server bank according to a Poisson process with a rate of 10 arrivals per hour, i.e., the average time between exponential interarrivals is 6 minutes. They wait in a first-in-first-out line until the single teller is ready for them, whereupon they use him for time that is exponential with a mean of 4 minutes. So do a `SEIZE-DELAY-RELEASE` sequence within a `PROCESS block`. Then the customer leaves (use a `DISPOSE` block). Set up and run this system for a bit.

2. Now we'll extend our example. Go to the `QUEUE` spreadsheet on the Basic Process panel. Change your waiting line from first-in-first-out to *last*-in-first-out. Does anything interesting happen? (You may not notice much — maybe a little less variability of the waiting times.)

3. Let's play with a `DECIDE` block. After a customer gets served by the teller, let's suppose that he needs to go back to the teller with probability 0.05.

4. What happens if the arrival rate doubles? Better hire another teller? To do so, go to the `RESOURCES` spreadsheet and change the capacity to 2.

5. Play around a little with the graphics. Go the `ENTITY` spreadsheet and change the "Initial Picture" to whatever you find pleasant.

6. Change and fool around with other stuff to your heart's desire!

7. Turn in a *small* write-up that addresses the above points in a nice, succinct way.