IE 415/515: WINTER 2015

LAB 7

More Arena Modeling Concepts

1. Introduction

In this laboratory you will be introduced and shown several new Arena modeling features.

- Sub-models
- Seize, Delay, Release modules
- Batch/Separate modules
- Match module
- Remove module

2. Arena Models

The TAs will review the new modeling features by leading the lab through the development of some simple Arena models.

3. Lab Assignment

System Description
The system modeled is the processing of customers after a ski resort just opens. For this system the interest is on the total time a group of customer spends getting lift tickets, waiting for others in a group, and waiting for a shuttle. Once on the shuttle, a customer has left the system. The system will be simplified to make the simulation more straightforward.

Customers arrive to a ski resort in groups of two. The number of groups that arrive before the resort opens is 100. The simulation will focus on the processing of these 100 groups. After the resort opens the customers walk through a gate to buy lift tickets individually from one of two different ticket counters (each with their own line). It takes a random amount of time for a group to walk to the ticket lines (triangular(.5,1,1.5) minutes). When buying tickets the two people in a group split and go to the line that is the shortest. Each ticket counter has a single server

and the time to process a customer is exponentially distributed. One server has a mean time equal to 0.5 minutes, and the other has a mean service time equal to 0.75 minutes. After purchasing the tickets the first member of a group waits for the other person in their group. After both members are together they wait (as a single unit) in a single line for a shuttle. Shuttles are dispatched every two minutes after the resort opens. The shuttle holds 4 people and leaves right after arrival if there is at least one group waiting.

Hints: (these are suggestions – there are multiple ways to model the same system)

1. Represent a group of two as a single entity that can be assigned a group identifier attribute.
2. Use a separate module to create individuals in a group that can each be given a group member number attribute.
3. Use a Hold module for the groups waiting for a shuttle.
4. Model the arrival of shuttles separately from the ticket purchasing process, and use a Remove module to tie the shuttle arrivals to the ticket purchase process.

Create an Arena simulation of this system that collects data on the average time a group is in the system. Run the simulation until 100 shuttles have been dispatched. The simulation will run until no more entities are moving in the system so a run time is not needed. Run 10 replicates of the simulation and report on:

1. The average time it takes a group to get on a shuttle after the resort opens.
2. The number of shuttles needed to transport all groups.

What to turn in

- E-mail your completed models (*.doe file) with your names in the program model window to the TAs (ie415.ie515lab@gmail.com) (File Name: Last Name-Last Name-Lab#).

- Names of team members if you work in pairs.