THE UNIVERSITY OF TENNESSEE KNOXVILLE

CASE STUDY

Modeling and Simulation

Dr. Xueping Li

Case Study: Advanced Use of Agent Types & Parameters (Attributes)

Goal:: *To learn the following methods/techniques:*

- Define Agent (Entity) Type and attributes. Collect TIS through this method. Collect "exact" statistics for Time Average of WIP and Average TIS.
- Basic debugging techniques. `traceln()`
- Define functions
- Export/import data files via `file` module
- ResourcePool module

Problem Statement: Two types of customers, regular and VIP, arrive to a service station, following exponential interarrival times with mean 1 and 5 minutes, respectively. There is a single queue, in which the VIP customers will be served first. (Note that this is not FIFO, but "priority"-based.) The actual service station has two parallel desks. The service time for regular & VIP customers are `uniform(2,4)` and `uniform(1,2)`, respectively.

Find out the average cycle time for the two types of customers.

Build a model and run 160 hours (assuming 7/24/365).

Quick tips:

- Define a single "Customer" agent type. Add parameters "type" and "service_time". Use `agent.service_time` to differentiate them.
- Assign "agent.type = 1" and "agent.type = 5" for regular/VIP customers, respectively. At the "queue", choose "Advanced" / "Priority-based".
- The above method is preferred! The method below is for illustration purpose.
- Define "RegularCustomers" and "VIPCustomers" agent types.
- Define a function "fGetPriority(a Agent)" to find out the type. Such as:

```
int p=0;

//if regular
if (a instanceof RegularCustomers)
p = (int)(((RegularCustomers) a).pPriority);
//if VIP
if (a instanceof VIPCustomers)
```

```
p = (int)(((VIPCustomers) a).pPriority);

return p;
```

- Use `file.println()` method.
- Use `traceln(time() + "," + agent.something` to print out some attributes.

Handout Companion: Screencasts will be provided, along with "in-class models". ("AdvDiffTypes" & "Agent_Attributes").