SA421 – Simulation Modeling Fall 2017
Assoc. Profs. D. Phillips and N. Uhan

Project 0: A Final NCB Analysis

Instructions. Work in teams with at most two members.

For this project, you will use your work from previous assignments to conduct a final analysis of the Nimitz Coffee Bar.

After reviewing the results from the previous analyses, the manager at NCB has decided that at least two baristas are required. However, she is still unsure about whether to have 2, 3, or 4 baristas. She wishes to understand how overall customer experience is affected. Also, because of new barista union rules, there is no longer a coffee dispenser. Finally, she wants the predictions from your simulation study to be more reliable.

Conduct a simulation study of the Nimitz Coffee Bar and write a report describing your process and your findings. Assume the following:

1. The manager is only interested in the morning rush period that lasts from 0700 to 1000.
2. The interarrival times in this time period are accurately modeled with a uniform distribution between 1 and 5 seconds.
3. The cashier time and service time distributions are based on the input data you analyzed in Assignment 4.

Remember from Lesson 7 that your report should contain the following: (i) problem statement, (ii) input data analysis, (iii) description of simulation model and experimental setup, (iv) output data analysis, (v) conclusion.

Some detailed guidance:

1. Start from your Assignment 4 `.Rmd` file for this project as the input data analysis is identical.
   (a) Create a new folder for all of your project data and code.
   (b) Copy your Assignment 4 `.Rmd` file into this new folder and give it a new name, `lastname.p00.Rmd`. So our files would be called `uhan.p00.Rmd` and `phillips.p00.Rmd`.
   (c) Delete your code that analyzes the earnings data.
   (d) Copy the Excel data file into your project folder. Do not rename it.
2. Download the partially completed JaamSim model file found below into the same folder:

   `https://github.com/sa421-usna/project-00/zipball/master`

3. Modify the JaamSim model file as necessary. In addition, modify it to compute the *sojourn time*, which is the total time a customer spends in system. This is one way of measuring "overall customer experience." To measure this, an attribute assignment is required.
4. Run 1000 simulations for each number of baristas. Note that this amount of calculation takes a long time. Therefore, before you use that many runs, thoroughly test your code with a smaller amount of runs!!!
5. Follow the instructions from Lesson 7 to write the rest of your `.Rmd` file. As in Assignment 3, your `.Rmd` file must call JaamSim to run your simulation, and must run in RStudio from top to bottom without any user intervention or errors. Make sure to hide any unnecessary code or output from your report.
6. In your conclusion, give a recommendation for the number of baristas based on (i) average delay at the barista queue and (ii) the average sojourn time. Be sure to caveat this recommendation as outlined in Lesson 7 and support your arguments with evidence.