

Project 1: The Midville Mall Parking Garage

Instructions. Work on your own.

The planners of the new Midville Mall have asked you to assist in determining the amount of customer parking to provide. Midville Mall will have a customer parking garage with either 3, 4, 5, or 6 levels. Each level contains 600 spots. Through forecasts based on historical data, surveys, and malls in similar markets, the planners have made some estimates about customer traffic to the mall and the amount of time customers spend shopping. They have also gathered some relevant data and made some decisions about the mall hours and parking safety. In particular, on Saturdays, the busiest day of the week:

- Customers arrive at an average rate of 1000 per hour.
- Customers, on average, spend 3 hours at the mall.
- Customers require no time to park if there is an available spot. If there are no available spots, customers will drive around until there is a spot. However, there is a chance the customers renege. The planners have access to some historical data on how long customers will drive around before leaving. This data is contained in `renege-data.csv`. The values in this data are in minutes.
- Due to safety concerns, the planners will not allow more than 500 customers to drive around the parking garage waiting for spots. This will be accomplished through an electronic barrier system at the garage entrance.
- The mall will be open from 9 am to 9 pm on Saturdays.

The planners have two seemingly contradictory goals with their parking garage. They do not want customers to have to wait for a parking space, but they also wish for the garage to be full, as this projects the image that the mall is popular. Conduct a simulation study to analyze the parking situation at the mall and help make a recommendation regarding the number of levels the planners should build in the parking garage. Write a report with your findings. In your recommendations, be sure to discuss the positives and negatives with the two contradictory goals in mind. Be sure to address the number of customers that renege and balk in your report as well. Use 1000 replications for each number of parking levels.

You can find the data for this project here:

<https://github.com/sa421-usna/project-01/zipball/master>

Your report should be in R Markdown. Follow the guidelines from Lesson 7 to structure your report. Your `.Rmd` file must call `JaamSim` directly 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.