Delta College

CST 283
Programming Assignment 8

Winter 2023
Instructor: T. Klingler

Objective

This program will provide an opportunity to solve a problem related to queuing simulations.

Overview & Instructions

Write a computer simulation to analyze the wait time for a roller coaster ride at an amusement park. The goal is to model the time riders wait in the queue before they get on the coaster. Variables and constraints include:

- One roller coaster will be in operation. Each coaster can hold an number of 12-rider cars. Operators can add up to five cars at the start of the day. Therefore, the capacity of a ride can vary from 12, 24, …, 60 cars.
- The coaster ride time is 240 seconds.
- When a ride is over, the coaster requires 20 seconds to unload a set of riders and then 30 seconds to load each new rider.
- Average frequency of riders arriving at the end of the queue to rider the coaster could vary every 10 seconds (VERY busy day) to 600 seconds (very few at park).

Utilize a GUI “front-end” driver. Your GUI should include at least the following:

- A slider to vary rider arrival frequency
- A radio button group to allow setting then number of cars to add to the coaster at the start of the day.
- A text area or labels to clearly show the simulation results.
- A button to launch the simulation with given parameters

The simulation timer should be seconds. Consider all events that could occur during one second of the scope of a 16 hour day.

Important: Be sure to include the randomness of the scenario. For example, if the average arrival of a rider into the queue is set to "one every 8 seconds", you cannot simply enqueue a rider every 8 seconds. Instead, you must add a feature that calculates a "1 chance out of 8" chance a person enqueues during each second "tick" of the simulation clock.

Your simulation output should include the following:

- Summary of all simulation settings (arrival frequency, etc. from your interface)
- Average rider wait time before they load onto the coaster

Note: The *dynamic* queue class constructed as part of the course is recommended for this exercise.

Deliverables

Deliver the following to the online course management system **dropbox** as your final product:

- **Upload** your **source code** (.java) file(s). Multiple file submissions preferably zipped.

Notice

This is an individual assignment. You must complete this assignment on your own. You may not discuss your work in detail with anyone except the instructor. You may not acquire, from any source (e.g., another student or an internet site), a partial or complete solution to a problem or project that has been assigned. You may not show another student your solution to an assignment. You may not have another person (current student, former student, tutor, friend, anyone) "walk you through" how to solve the assignment.