

IE 324 SIMULATION

SPRING 2023 HOMEWORK 3

Procedure:

- **Due date: April 17 at 10:00 (SHARP) on Moodle. Submit .doe file and the pdf of the report.**
- You should use Arena version 14.5
- Feel free to ask the TA about any part you did not understand.
- This homework assignment will be graded based on effort.

A SIMPLER CALL CENTER

This question is based on the Model 5.1 of Kelton et al. You may get help from your book as you build it.

Consider a call center where calls arrive with an exponential distribution with mean 0.857 minutes to one of our infinitely many phone trunk lines. (We have more than enough phone lines to handle the maximum possible calls at a time.)

When a call arrives, the customer listens to an automated recording that takes Uniform (0.1, 0.6) minutes. This automated recording determines whether this call is a “Tech Support”, “Sales” or “Order Status” call. Historically 76% of the calls is for “Tech Support”, 16% is for “Sales” and 8% is for “Order Status”.

If the call is for “Tech Support”:

- The customer will listen to another automated recording that takes Uniform (0.1, 0.5) minutes, after which the specific product the customers calls for is determined. Historically 25% of the Tech Support calls is for Product 1, 34% is for Product 2 and the remaining 41% is for Product 3.
- Once the product type is determined, the customer will be connected to one of the Tech Support representatives specialized in that Product. There are 2, 3, 3 representatives available for Product 1, Product 2, and Product 3, respectively. If the representatives for the product that the customer calls for are all busy, the customer will wait until one representative becomes available.
- The tech calls, regardless of the product types, will last for Triangular (3, 6, 18) minutes. Upon completion, the customer will hang up.

If the call is for “Sales”:

- The customer will be connected to one of the 4 sales representatives. If all are busy, the customer will wait until one becomes available.
- Sales calls will take Triangular (4, 15, 45) minutes. Upon completion, the customer will hang up.

If the call is for “Order Status”:

- The customer will listen to another automated recording that takes Triangular (2, 3, 4) minutes, after which the customers will have the option to speak with a sales representative. Otherwise, the customer will hang up.
- Historically, 15% of the customers opt to speak with a sales representative. These customers will join a queue (a separate queue than the sales calls) of such other order status customers wishing to speak with a sales representative.
- This call with the sales representative takes Triangular (2, 3, 4) minutes, after which the customer will hang up.

Simulate this system for 10 hours and submit the doe file and pdf of the report containing the average total time per call type.