

IE 306.02 Assignment 1

Due: April 5 2019

In this Assignment you are going to work on a call center simulation.

- The inter-arrival times of calls are exponentially distributed with mean 14.3 min.
- Incoming calls are first processed by the unskilled front-desk operator who records the personal details of the caller and the nature of the caller's request. When the operator is busy the customers are put on hold (they wait in a FCFS queue).
- The time it takes to collect and record the details of a caller is assumed to be LogNormal distributed with mean 7.2 and standard deviation of 2.7 minutes.
- Once this process is completed, the caller is directed to the expert operator, who tries to help the caller with his/her problem. As in the previous case, if the expert is busy the customers are put on hold (they wait in a FCFS queue).
- Every customer that joins the queue leaves the queue without getting service following an independent exponentially distributed time with mean 60 minutes. (reneging).
- The service time of the expert is Exponentially distributed with mean 10.2 minutes.
- The expert operator takes 3-min breaks randomly through out the day. When the operator decides to take a break, he/she waits until completing all the customers already waiting for her/him. If new customers arrive during operators break, they wait in the FCFS queue until the operator serves them. The operator resumes service after the break.
- The number of breaks the expert operator wishes to take during an 8-hour shift is known to be distributed according to a Poisson distribution with a mean of 8 breaks per shift.
- Simulate this system for 1000 and 5000 answered calls separately.
- You should base your code on the SimPy pseudocode provided in the jupyter notebook.
- Collect and report statistics on:
 - Utilization of the front-desk operator
 - Utilization of the expert operators,
 - Average Total Waiting Time
 - Maximum *Total Waiting Time* to *Total System Time* Ratio, and
 - Average number of people waiting to be served by the expert operator.

Clarification:

Total Waiting Time: Total time a caller waits for both operators

Total System Time: The total time a caller spends in the system

Requirements for your program are:

- You should submit a single zipped file that contains:
 - A well written report about your definition of events, simulation logic, simulation outputs, your observations and interpretation of results (pdf files only),
 - Your well documented SimPy code. (Alternatively you can submit a jupyter file that contains your code and your documentation.)
- The file should not be larger than 1 Mb, it must be submitted through the moodle website (e-mails and other means will be disregarded) and it should be named as “IE306-Asn-1-Lastname1-Lastname2-Lastname3.zip” with names in alphabetical order.