

Describe 4 ways to test the correctness of your event-driven simulator. Each way should have this basic structure:

- **make a simple change to your simulator (for example, double the number of servers)**
- **predict the effect on one or more statistics printed at the end of the simulation run (you may want to print additional statistics to support this)**
- **check if the prediction was correct. If yes, then your confidence in your code should increase slightly. If no, then either your prediction or your code is wrong and this needs to be investigated.**

Some of the simplest ways to test the bank simulator's correctness would be to increase/decrease the number of servers, as well as increase/decrease the number of customers (basically increase and decrease how frequently one arrives).

The expectation is that if you increase the number of customers or decrease the number of tellers, that the time at least one server is idle will go down, and that the number of customers that get served within the time frame decreases. Conversely, if you increase the number of tellers or decrease the number of customers, the time that at least one teller is idle should go up.

Here's the data for the bank simulation. As the number of tellers went down or as the frequency of customers arriving went up, the amount of time that a teller was idle went up, and as the number of tellers went down, or the frequency of customers arriving went up, the teller idle time went down. Both of these results were as expected. Also, as expected, as the number of tellers decreased, or as the frequency of customers arriving increased, fewer customers were served overall.

ORIGINAL SIMULATION

BANK SIMULATOR — 10 Servers, customers arriving every 32 seconds

Number of Customers served: 312488

Average customer service time: 542

Time at least one teller spent idle: 9%

BANK SIMULATOR — 20 servers, customers arriving every 32 seconds

Number of Customers served: 312489

Average customer service time: 314

Time at least one teller spent idle: 100%

BANK SIMULATOR — 5 servers, customers arriving every 32 seconds

Number of Customers served: 158653

Average customer service time: 2459039

Time at least one teller spent idle: 0%

BANK SIMULATOR — 10 servers, customers arriving every 64 seconds

Number of Customers served: 156246

Average customer service time: 314

Time at least one teller spent idle: 99%

BANK SIMULATOR — 10 servers, customers arriving every 16 seconds

Number of Customers served: 317597

Average customer service time: 2461930

Time at least one teller spent idle: 0%