Title: Bottle Filling Simulation (D/D/1/K)

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Semester: Seventh

University: Far Western University

Subject: Simulation and Modeling

Faculty:BE Computer

Overview of D/D/1/K Model

D: Deterministic interarrival and service times.

1: Single server system.

K: Finite queue capacity (Conveyor belt size).

Entities

- Bottles (jobs to be processed).
- Conveyor belt (queue).
- Filling machine (server).

Parameters

- Arrival Rate (λ)
- Service Rate (μ)
- Initial Bottles
- Conveyor Belt Size (K)

Simulation Logic

- Initial State
- Arrival Logic
- Serving Logic
- End Conditions

Lets see the Simulation

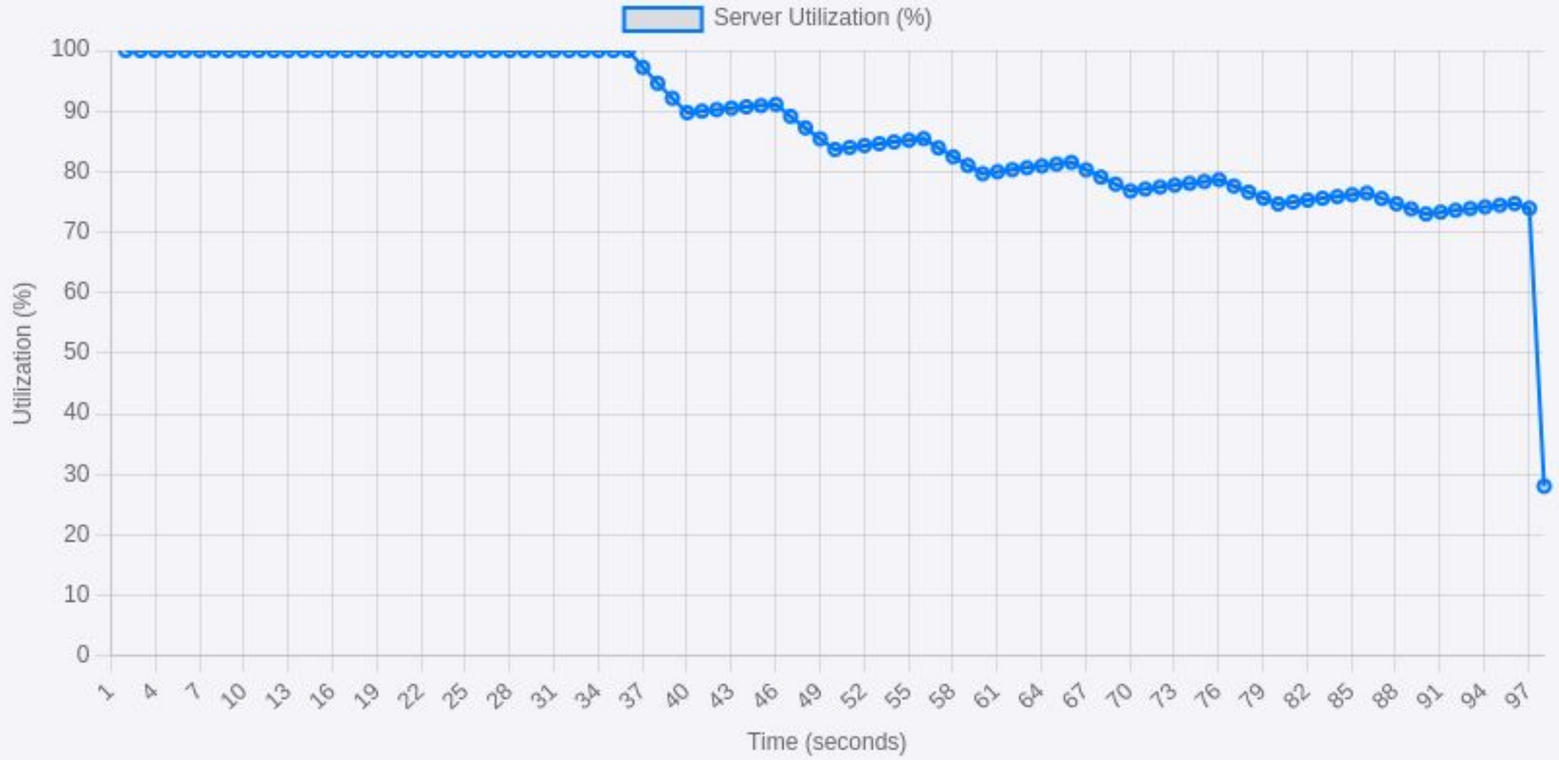
Conclusion

- Case 1: Server rate greater than arrival rate.
- Case 2: Server rate equal to arrival rate.
- Case 3: Server rate less than arrival rate.

Server rate > arrival rate

Metrics

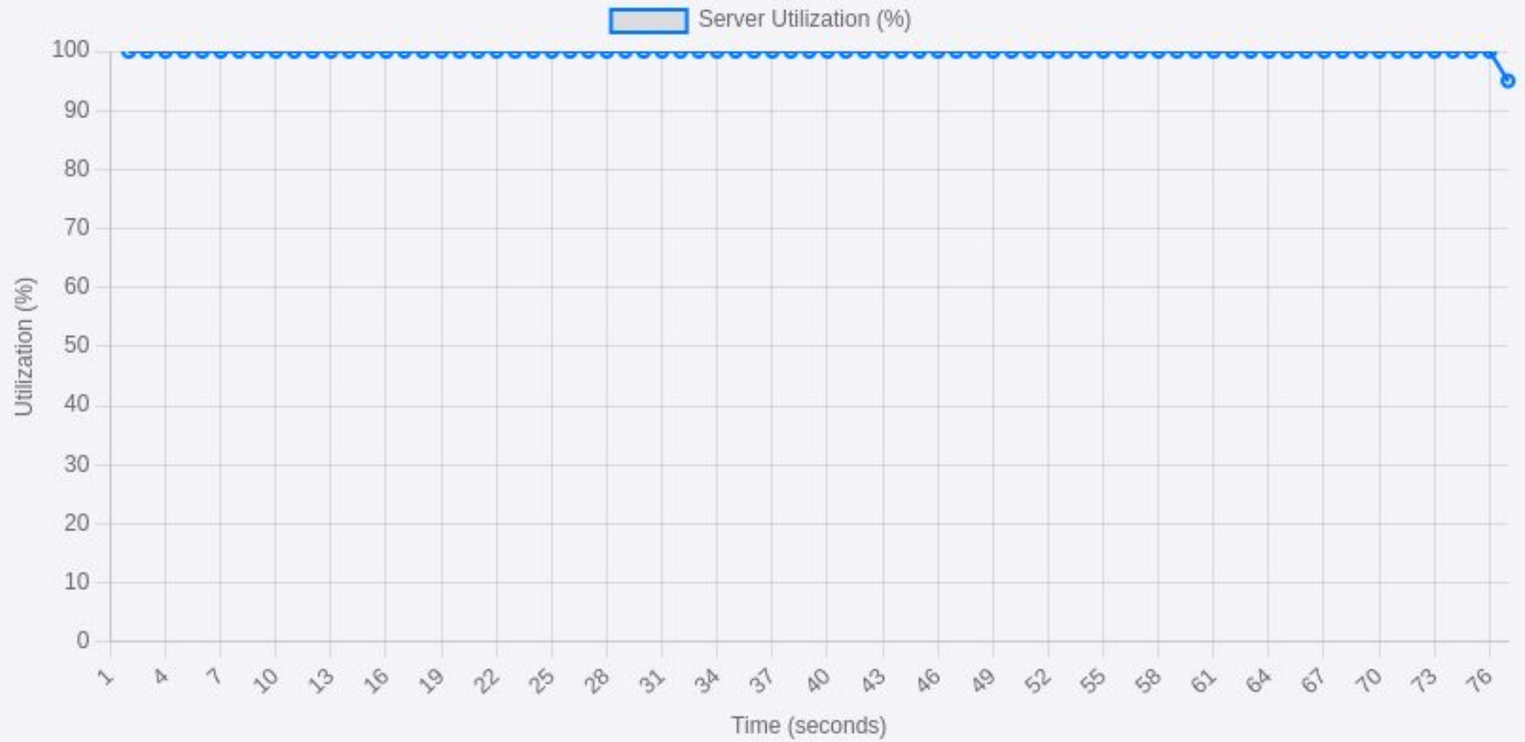
Time Elapsed: 97 seconds
Bottles Served: 13
Bottles on Conveyor: 0
Server Utilization: 73.20%



Server rate = arrival rate

Metrics

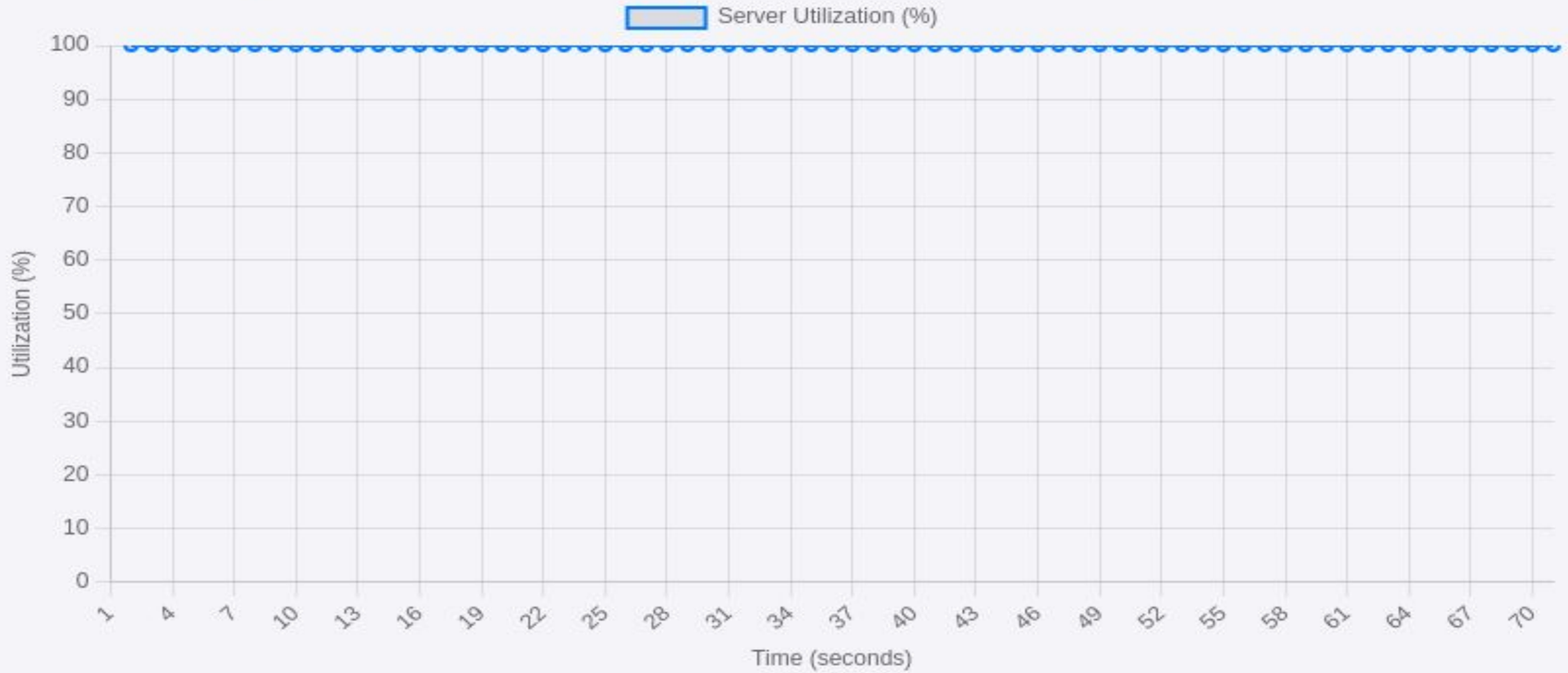
Time Elapsed: 76 seconds
Bottles Served: 16
Bottles on Conveyor: 3
Server Utilization: 100.00%



Server rate < arrival rate

Metrics

Time Elapsed: 70 seconds
Bottles Served: 7
Bottles on Conveyor: 10
Server Utilization: 100.00%



Overflow! Conveyor belt exceeded its limit.

The Choice is Yours!!