MINI PROJECT REVIEW

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Project 19.
Simulate an M/M/1/B queue using your favorite programming tool, compare the blocking probability and delay observed with the analytical results. Extend this observation to cases where the service process follows a general distribution. Guided by the simulations, can you derive analytical results for the M/G/1/B queueing system.

Tasks:

Getting the Analytical Result:
1. Finding the discrete chain markovian process states and state transition probabilities
2. Finding the global balance equation
3. Finding p_B which is blocking probability.
4. Finding W_Q and T_{sys} and hence finding the expected delay observed by packets.

Simulating The Queuing System:
1. Using **simjs** we can simulate multiple M/M/1/B systems with different parameters and show how blocking probability is dependent on μ, λ and B.
2. How expected waiting time and server utilization is dependent on μ, λ and B.

Comparing Analytical results and Simulation results.

Simulating The Queuing System:
1. Using **AnyLogic** we can simulate M/G/1/B system and see how average waiting time, packet drop probability, utilization etc. are dependent on λ, B and mean(X) and mean(X^2) of General Distribution.

Getting mathematical model for the following quantities for M/G/1/B system:
1. Finding packet dropping probability (blocking probability).
2. Finding W_Q and T_{sys} and hence finding the expected delay observed by packets.

Comparing analytical results and Simulation results.