1. **Summary of Results:**

**Average Customer Time in the System (W):**

* + Use =AVERAGE(G2:G21) to find the average time in the system.

**Proportion of Time the Server is Idle (1-ρ):**

* + the total idle time  =SUM(H2:H21).
  + the total simulation time (3 hours = 180 minutes).
  + We use =SUM(H2:H21) / 180 to find the proportion of idle time.

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1. **Methodology:**

* **Interarrival Time (B2):** =RANDBETWEEN(1, 15)
* **Service Time (D2):** =RANDBETWEEN(1, 8)
* **Arrival Time (C3):** =C2 + B3
* **Service Start Time (E3):** =MAX(C3, F2)
* **Service End Time (F2):** =E2 + D2
* **Time in System (G2):** =F2 - C2
* **Idle Time (H3):** =E3 - F2

**Average Customer Time in the System (W):**

* + Use =AVERAGE(G2:G51) to find the average time in the system(50 replications)

**Proportion of Time the Server is Idle (1-ρ):(50 replications)**

* + the total idle time  =SUM(H2:H51).
  + the total simulation time (3 hours = 180 minutes).
  + We use =SUM(H2:H51) / 180 to find the proportion of idle time.

Youtube link: https://youtu.be/Q6OqTPRvzo4

* The simulation provides insights into the performance of the checkout process. These insights can be used to improve the efficiency of the system, such as adding another server or optimizing service times.
* Remember to use the F9 key to refresh the random numbers and recalculate the simulation results. This allows you to run the simulation multiple times to get an average of the performance measures.

This Excel spreadsheet simulation provides a basic framework for understanding the performance of an e-commerce checkout process. By using this method and adjusting the parameters, you can further analyze and improve the efficiency of your online store.