Group 3: Chomper Studios

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Part II (Task 4) – Create an Excel Simulation of the Queue Subsystem

What is the probability that the server is idle?

The probability that the server is idle (p_0):

p_0 = 1 - ρ

= **0.07**

What is the average number of "customers" waiting in line for service?

The average number of customers in the queue (L_q):

L_q = ρ^2 / (1 - ρ)

= (0.93)^2 / 0.07

= **12.36 customers**

What is the time a "customer" spends in the premises (including the serving time)?

Time a Customer Spends in the Premises (W):

W = 1 / (μ - λ)

= 1/ (34 - 32)

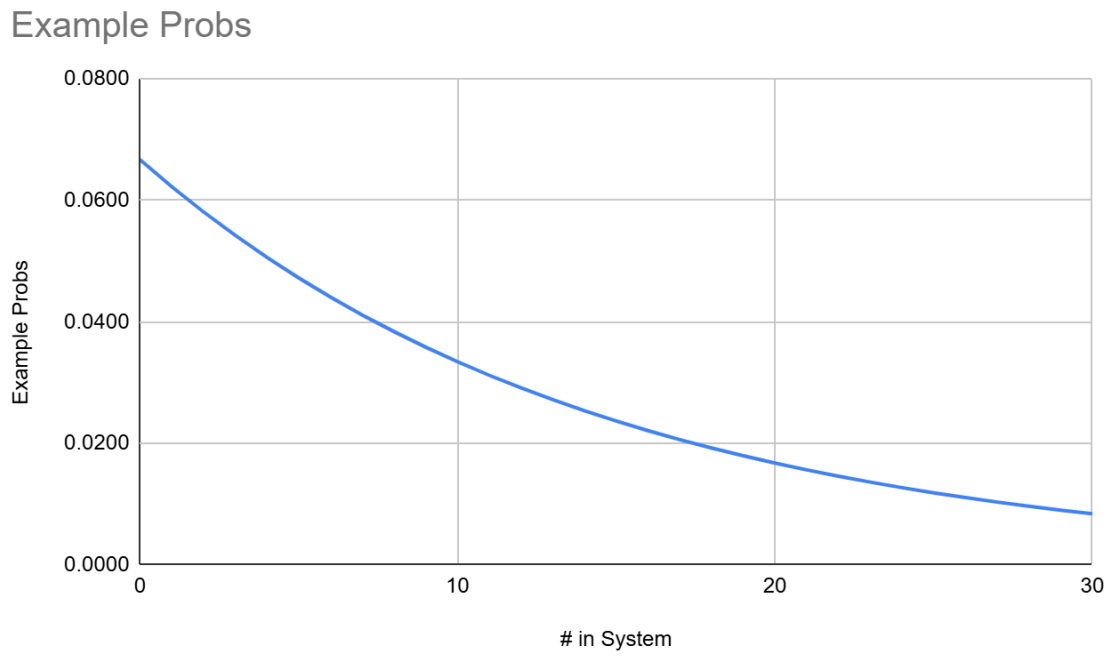
= 0.5 hours

= **30 minutes**

How many "customers" per hour will be "served" by this service?

μ = **34 customers/ hour**

Create a graph with probabilities that there are n "customers" in the queue for n from 0 to 30.



Part II (Task 5) – Create a Unity Game/Simulation that uses the data from above for its Queue core subsystem

It is a simulation of Tim Hortons with opening hours from 08:00 to 16:00, where 6 hours are simulated in 1 minute.

Clock

Displays the simulation time in the game.

Notice

Displays the total number of customers who have visited the store.

Menu

Shows each customer's arrival time, waiting time in line, and service time.

Pause (button)

Pauses the simulation; click again to resume.

Esc (button)

Exit the simulation.

Show Data (button)

Displays all simulation data on the screen.

Show Tag (button)
Displays individual customer details, including ID, arrival time, waiting time in line, and service time.

Today's Customer
Displays the total number of customers for the simulation