Single server simulation report

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Date

10/1/2024

Course title

Simulation

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We need to create a Queuing Simulation for a Single Server and extract all the important system parameters from it. This is considered the simplest application of the program and the material, and it is commonly found in the industry. Finally, the project will include delivering the file specific to AnyLogic.

Create model:

Design the Process Flowchart:

Drag and drop the following blocks from the Process Modeling Library onto the main canvas:

Source:

Represents customers arriving at the queue.

Queue:

Represents the waiting line for the server.

Delay:

the service time at the server.

Sink:

Represents customers exiting the system after service.

timeMeasureStart:

Marks the starting point in time for measuring a duration or time interval within an AnyLogic model.

timeMeasureEnd:

Marks the ending point in time for measuring a duration or time interval within an AnyLogic model

3. Connect the Blocks:

Connect the blocks in a logical sequence: Source → Queue → Delay → Sink.

4. Configure the Blocks:

Source:

Set the arrival rate Customer per minute.

Choose an appropriate distribution for the interarrival timesuniform_discr(1, 8).

Queue:

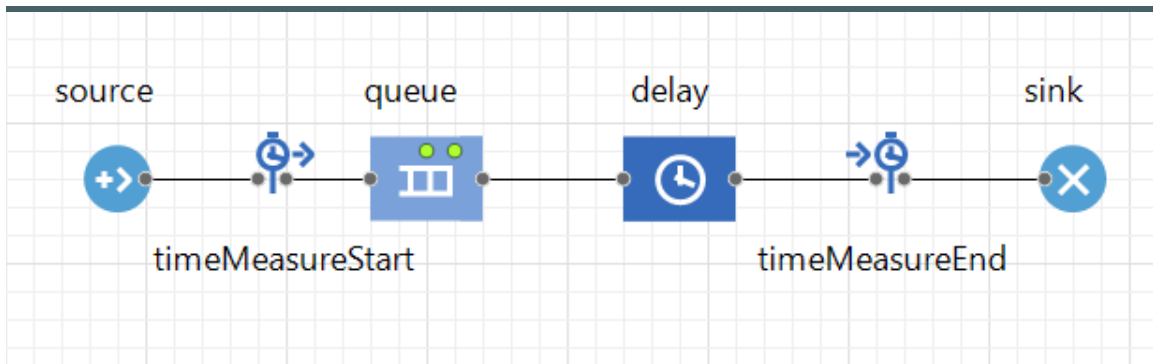Set the capacity of the queue (maximum number of customers allowed to wait = 15).

Delay:

Set the service time (e.g., average time per customer).

Choose an appropriate distribution for the service times (`exponential(1, 0)`).

5. Run the Simulation:

Click the "Run" button to start the simulation.

Observe the animation of customers flowing through the system.

Parmeter extraction

Point Node:

Point node usually defines a transit transportation node in a network or a space where a single agent can reside. You can use paths to connect nodes into a network

Path:

Graphically defines a movement path for agents.
Paths can be connected with nodes, composing a network. Path may contain linear and curved segments

Rectangle Node:

Rectangular node defines a rectangular space where agents can reside. You can use paths to connect nodes into a network and define specific waiting points inside nodes using attractors
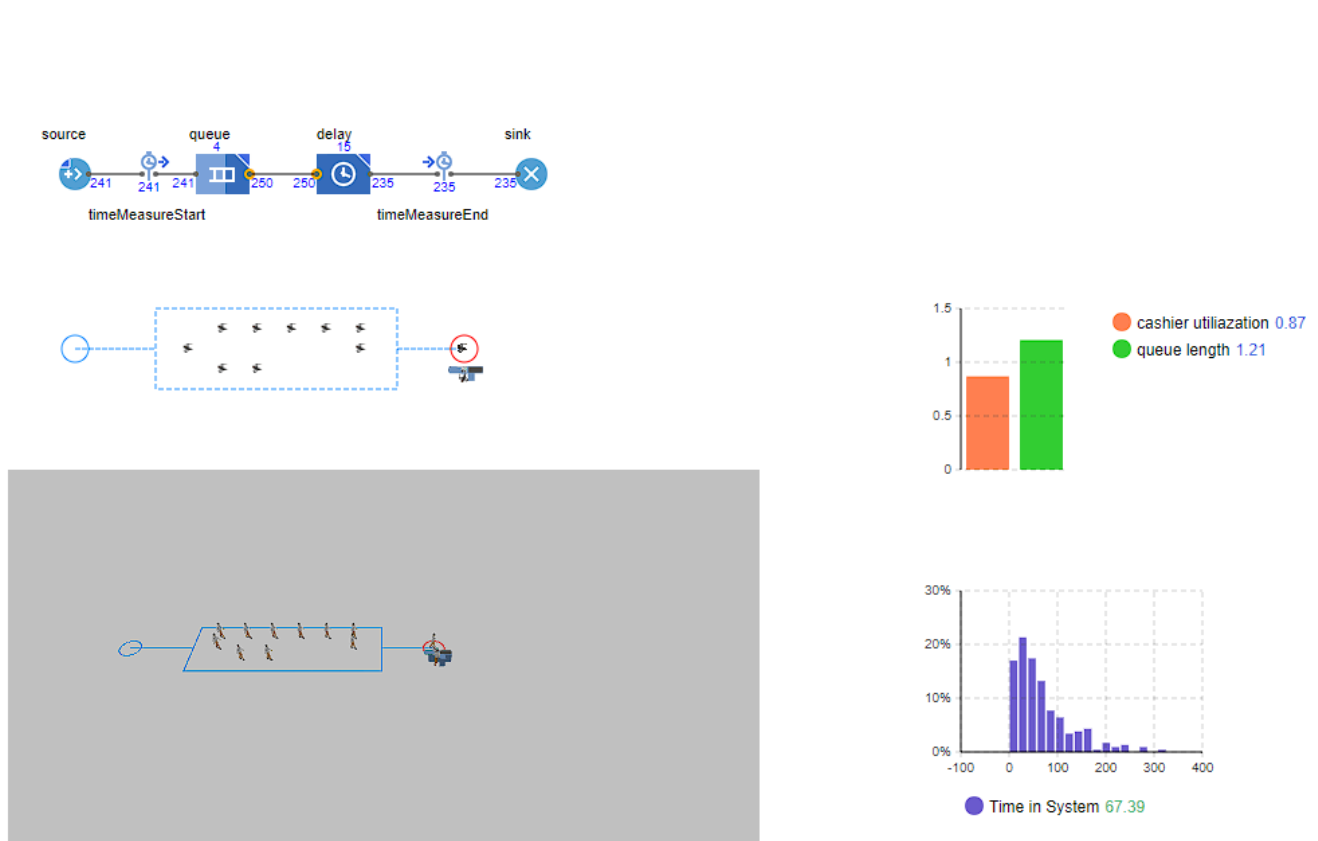
Bar Char:

Bar charts are commonly used to compare and display discrete categories of data

Histogram:

Histograms are particularly useful for visualizing the shape and spread of a dataset.

3D Window:

shows the visualization in 3D

Entrance:

type(Point Node),

Use(represent the customer)

WaitingRoom:

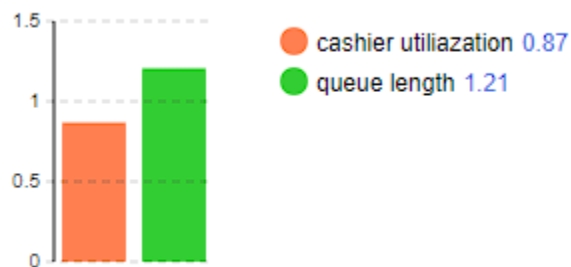type(Rectangle Node), Use (represent the queue)

Service point:

type(Point Node), Use(represent the delay)

Bar Chart:

orange bar represent the cashier utilization using the value from this function (`delay.statsUtilization.mean()`) as it's input

The green bar represent the queue length using the value from the function (`queue.statsSize.mean()`) as it's input.

Histogram:

represent the time spent in the system using the value from the function (`timeMeasureEnd.distribution`).