

# Object Oriented Simulation

## Running the Single-Server Models

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Spring, 2017

# The Simple Carwash Model

1. Extract the files in the `carwash.jar` archive file
2. Compile the `*.osl` classes
3. Compile the corresponding `*.java` classes
4. Start the `SimModel` (compiled) class, which is the top class of this model
5. Enter the input data in the GUIs

# First and Second GUIs of Carwash Model

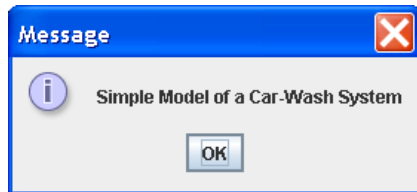


Figure: First GUI

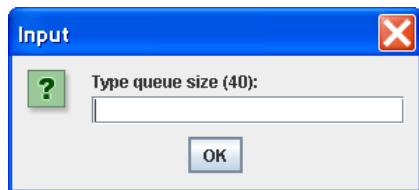
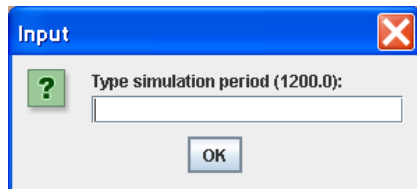


Figure: Second GUI

## Third and Fourth GUIs of Carwash Model



Input

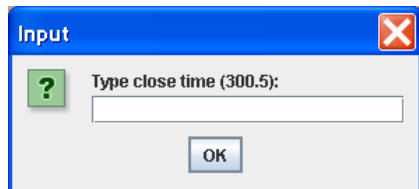
?

Type simulation period (1200.0):

OK

This is a standard Windows-style input dialog box. It has a blue title bar with the word 'Input' and a red close button. The main area has a light gray background. On the left is a green square with a white question mark. To its right is the text 'Type simulation period (1200.0):'. Below this text is a white text input field. At the bottom center is a blue 'OK' button.

Figure: Third GUI



Input

?

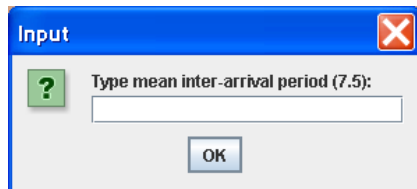
Type close time (300.5):

OK

This is a standard Windows-style input dialog box, similar to the one above. It has a blue title bar with the word 'Input' and a red close button. The main area has a light gray background. On the left is a green square with a white question mark. To its right is the text 'Type close time (300.5):'. Below this text is a white text input field. At the bottom center is a blue 'OK' button.

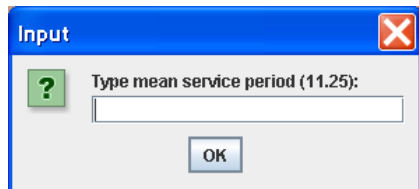
Figure: Fourth GUI

## Fifth and Sixth GUIs of Carwash Model



The Fifth GUI is a dialog box titled "Input" with a red close button in the top right corner. It features a green square icon with a white question mark on the left. The text "Type mean inter-arrival period (7.5):" is displayed. Below the text is a white text input field. At the bottom center is a blue "OK" button.

Figure: Fifth GUI



The Sixth GUI is a dialog box titled "Input" with a red close button in the top right corner. It features a green square icon with a white question mark on the left. The text "Type mean service period (11.25):" is displayed. Below the text is a white text input field. At the bottom center is a blue "OK" button.

Figure: Sixth GUI

# Seventh and Results GUIs of Carwash Model

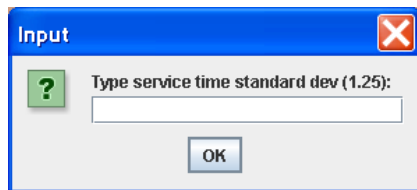


Figure: Seventh GUI

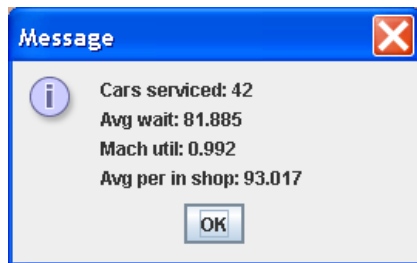


Figure: Results GUI

# The Results of a Simulation Run of the Carwash Model

- ▶ The basic output results are shown in the results GUI
- ▶ The trace output is stored in the `cwtrace.txt` text file
- ▶ The summary statistics output is stored in the `cwstatf.txt` text file

# The Barbershop Model

1. Extract the files in the `barber.jar` archive file
2. Compile the `*.osl` classes
3. Compile the corresponding `*.java` classes
4. Start the `BarberGUI` (compiled) class, which is the top class of this model
5. Enter the input data in the first GUI



# Input Data GUI in the Barbershop Model

The screenshot shows a software window titled "Single-Server Barbershop" with a blue title bar and standard Windows window controls. Below the title bar is a menu bar with "File", "Tools", and "Help". A toolbar contains a "Run" button and a file icon. A banner for "OOSimL Object Oriented Simulation Language" is displayed. The main area is titled "Single Server Barbershop Model" and contains three parameter groups:

- System Parameters:** Customer Queue Size: 50
- Simulation Parameters:** Close Arrival Period: 550.0, Sim Period: 725.0
- WorkLoad Parameters:** Mean Inter-Arrival Period: 0.5, Mean Service Period: 4.6

A progress bar at the bottom indicates 0% completion.

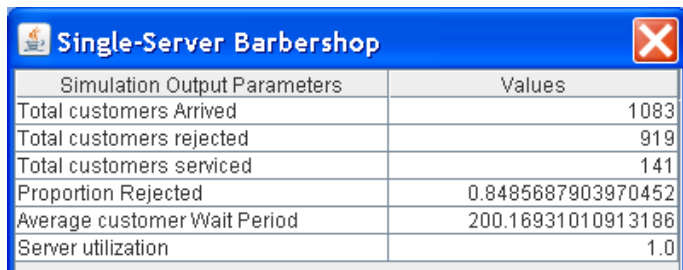
Parameter Group	Parameter Name	Value
System Parameters	Customer Queue Size	50
	Close Arrival Period	550.0
Simulation Parameters	Sim Period	725.0
	Mean Inter-Arrival Period	0.5
WorkLoad Parameters	Mean Service Period	4.6

Figure: Input GUI of Barbershop Model

# Executing The Barbershop Model

1. Enter the data for the system parameters
2. Enter the data for the workload parameters
3. Enter the data for the simulation parameters
4. Start the simulation by clicking the Run button in the GUI

# Results GUI in the Barbershop Model



Simulation Output Parameters	Values
Total customers Arrived	1083
Total customers rejected	919
Total customers serviced	141
Proportion Rejected	0.8485687903970452
Average customer Wait Period	200.16931010913186
Server utilization	1.0

Figure: Results of a simulation run of the Barbershop Model

# The Barbershop Model with Animation

- ▶ This model has additional graphical objects that change with simulation time.
- ▶ This helps illustrate the dynamic behavior of the system.
- ▶ The GUIs for input data and for results are the same.

1. Extract the files in the `barberanim.jar` archive file
2. Compile the `*.osl` classes
3. Compile the corresponding `*.java` classes
4. Start the `BarberGUI` (compiled) class, which is the top class of this model
5. Enter the input data in the first GUI

# Main Graphical Objects in the Barbershop Model

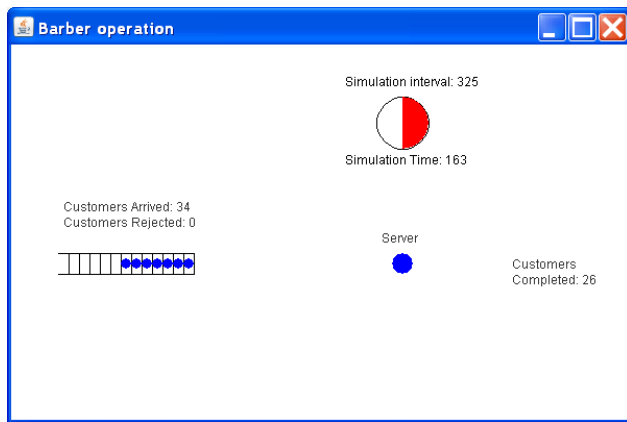


Figure: Graphical animation of the Barbershop Model

# The Animation

- ▶ This animation shows the customer arriving and joining the queue with simulation time.
- ▶ A server is shown in blue when busy.
- ▶ The simulation clock is also shown that advances with simulation time.

1. Extract the files in the `barberanim.jar` archive file
2. Compile the `*.osl` classes
3. Compile the corresponding `*.java` classes
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5. Enter the input data in the first GUI

# Queue Size in the Barbershop Model

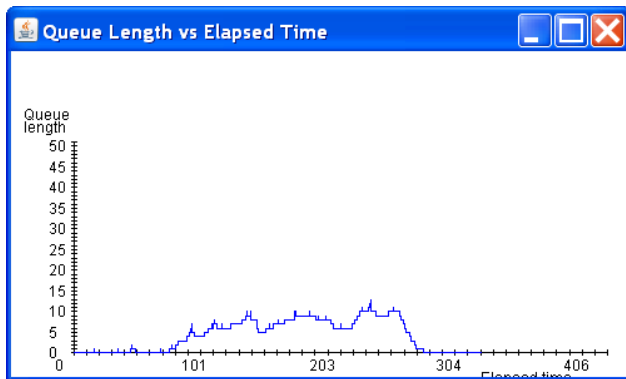


Figure: Queue size in the Barbershop Model