END3032 – SYSTEMS SIMULATION

Laboratory Practice #4

The Bombay Restaurant Problem

Assoc. Prof. Dr. Fatih Cavdur

PhD Student Asli Sebatli-Saglam

22.04.2020

Problem Definition

- Customers arrive at the Bombay Restaurant with a rate of 6 per hour according to the exponential distribution.
- First, they give their orders, then they go for the payment and finally they pick up their orders and leave the restaurant.
- Service times for these operations are given in Table 1.

Operation	Service Time (min)
Give the order	Normal (5, 1)
Pay for the order	Normal (7, 2)
Pick up the order	Normal (10, 2)

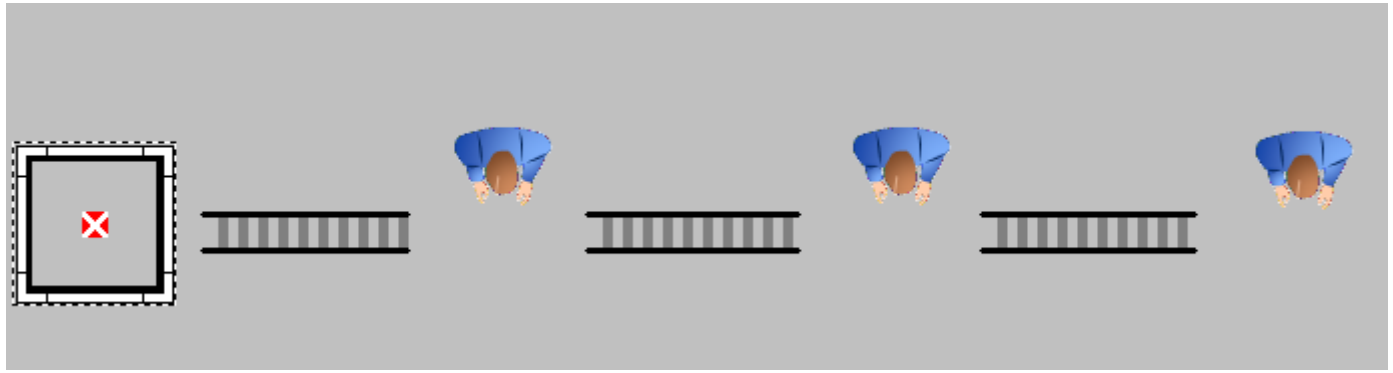
- On the other hand, when customers arrive, if there are at least six people waiting inside, customers leave the restaurant and go to another one.
- Make a simulation model and estimate the average number of customers served and lost per day. Run the simulation model for 100 days (800 hours).

Implementation on ProModel

- Define the locations

Locations

Icon	Name	Cap.	Units	DTs...	Stats	Rules...
	Arrive	INFINITE	1	None	Time Series	Oldest
	Order_Queue	INFINITE	1	None	Time Series	Oldest, FIFO
	Order_Station	1	1	None	Time Series	Oldest
	Payment_Queue	INFINITE	1	None	Time Series	Oldest, FIFO
	Payment_Station	1	1	None	Time Series	Oldest
	Pickup_Queue	INFINITE	1	None	Time Series	Oldest, FIFO
	Pickup_Station	1	1	None	Time Series	Oldest



Implementation on ProModel

- Define the entities

Entities

Icon	Name	Speed (fpm)	Stats
	Customer	150	Time Series

- Set entity arrivals

Arrivals

Entity...	Location...	Qty Each...	First Time...	Occurrences	Frequency
Customer	Arrive	1	0	INF	E (10) MIN

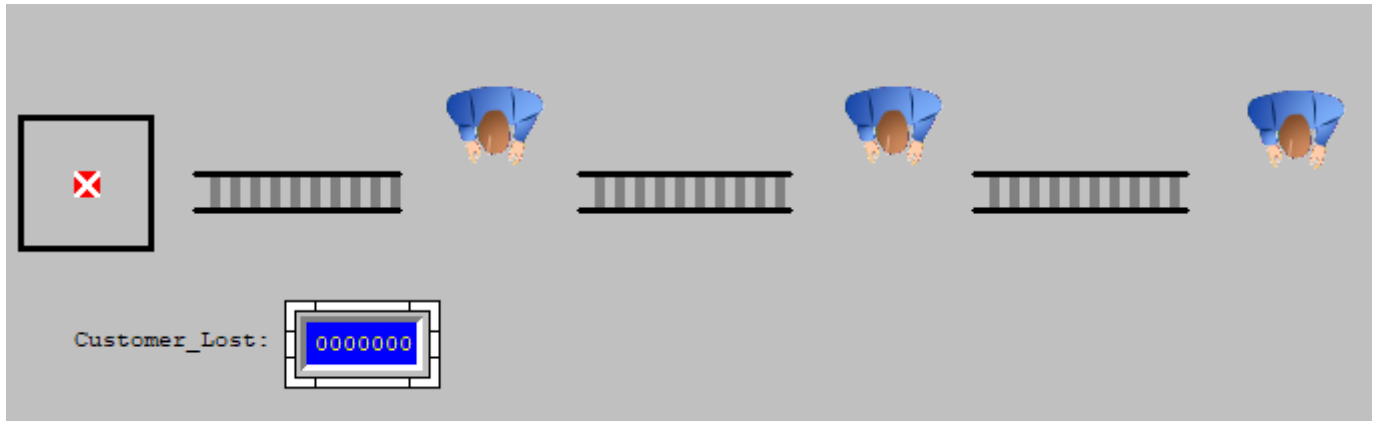
Implementation on ProModel

- Define variable in order to count the number of customers lost

Variables (global)

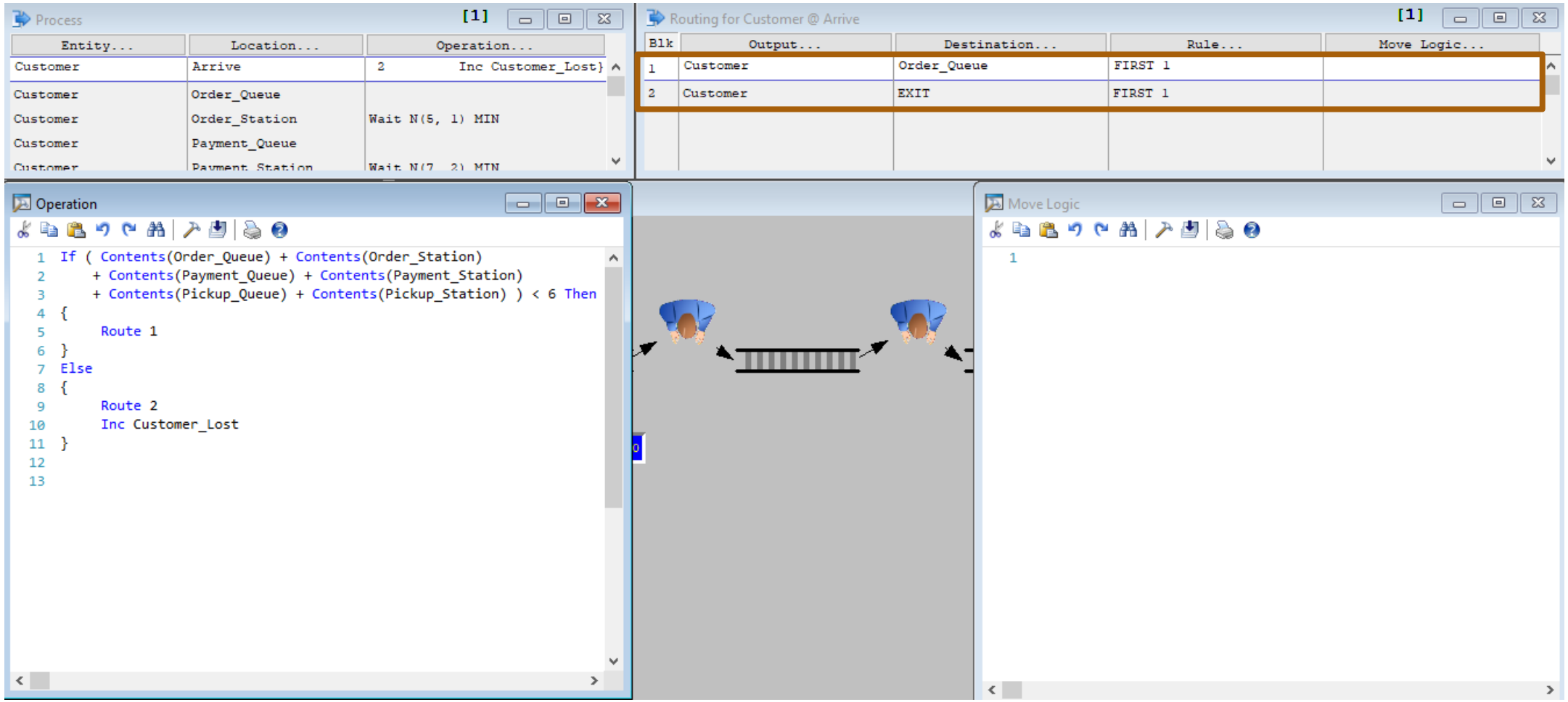
Icon	ID	Type	Initial value
Yes	Customer_Lost	Integer	0

- Put an icon on the layout for the corresponding variable



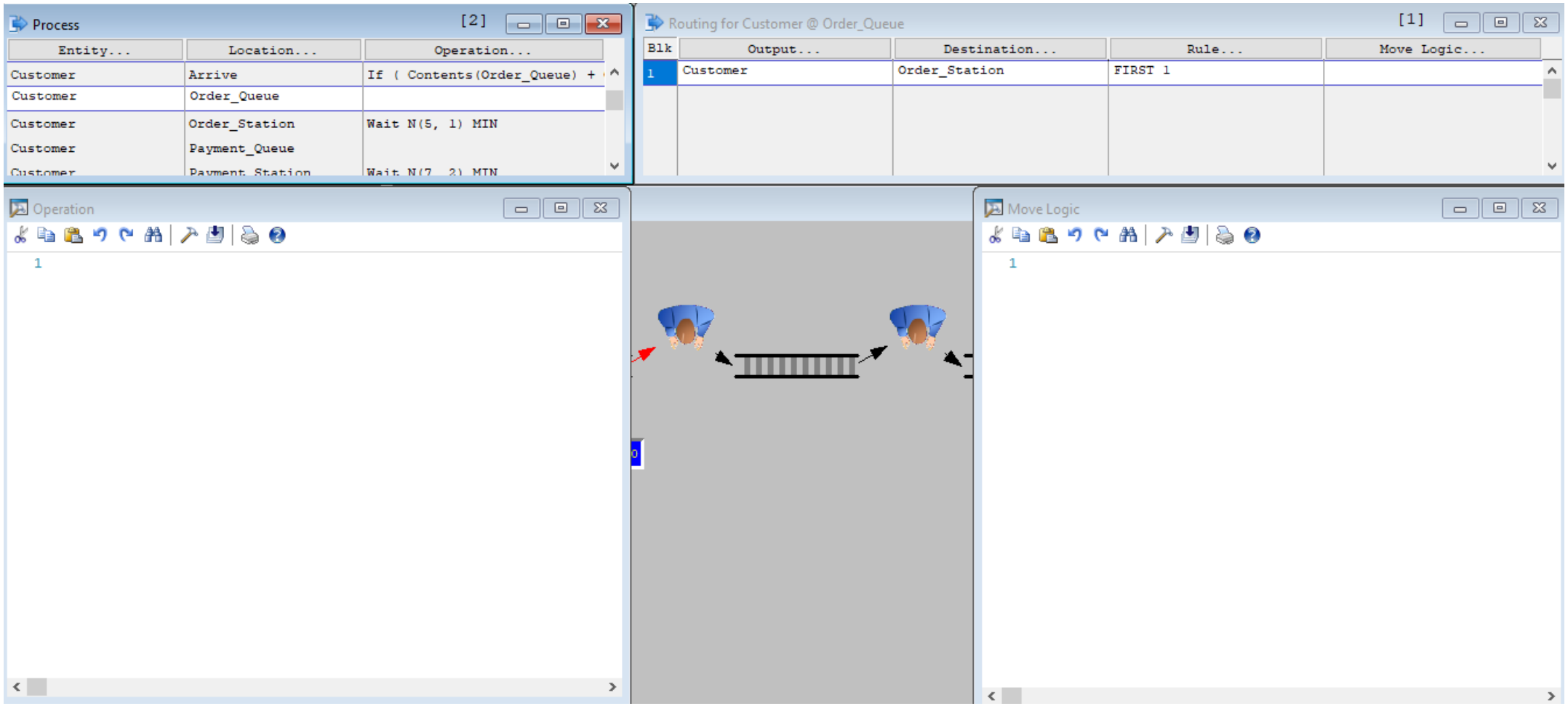
Implementation on ProModel

- Processing: Arrive→ Order_Queue / EXIT



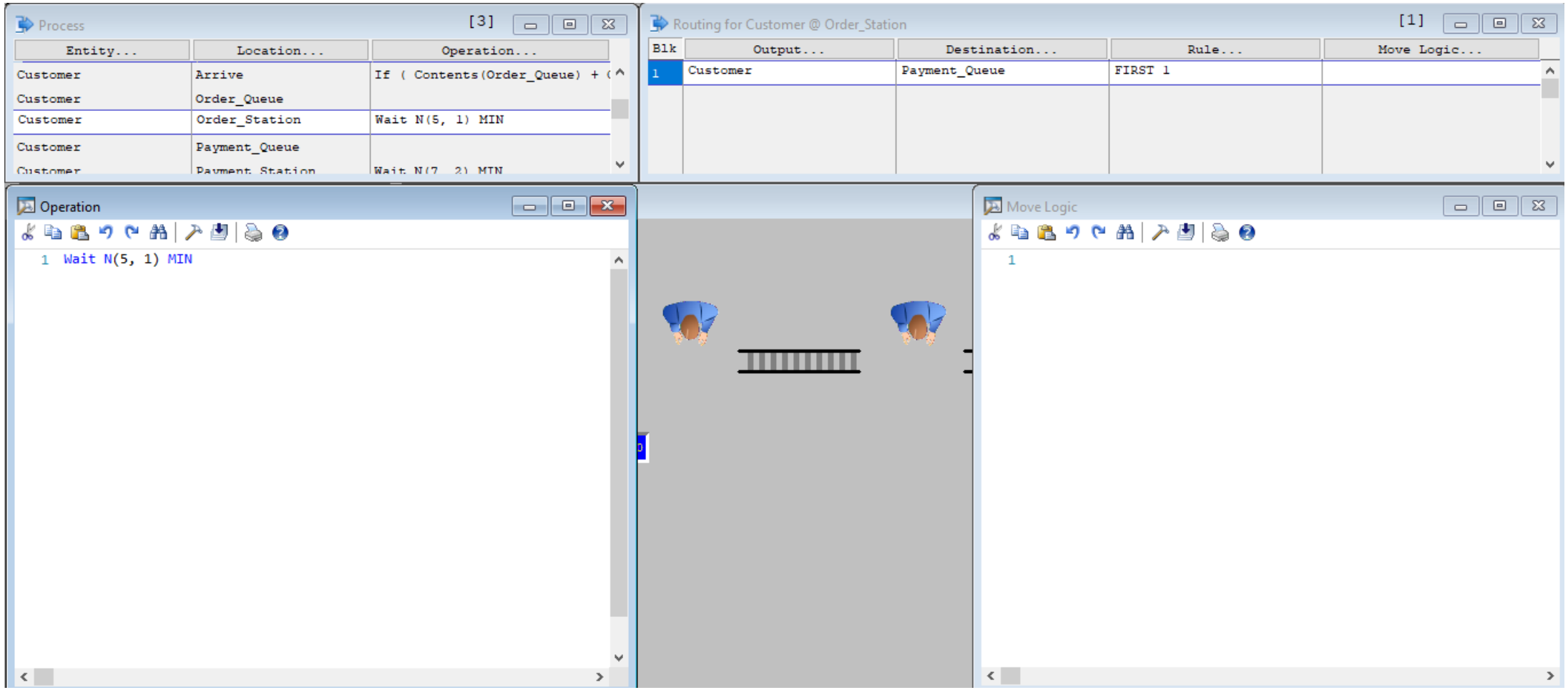
Implementation on ProModel

- Processing: Order_Queue → Order_Station



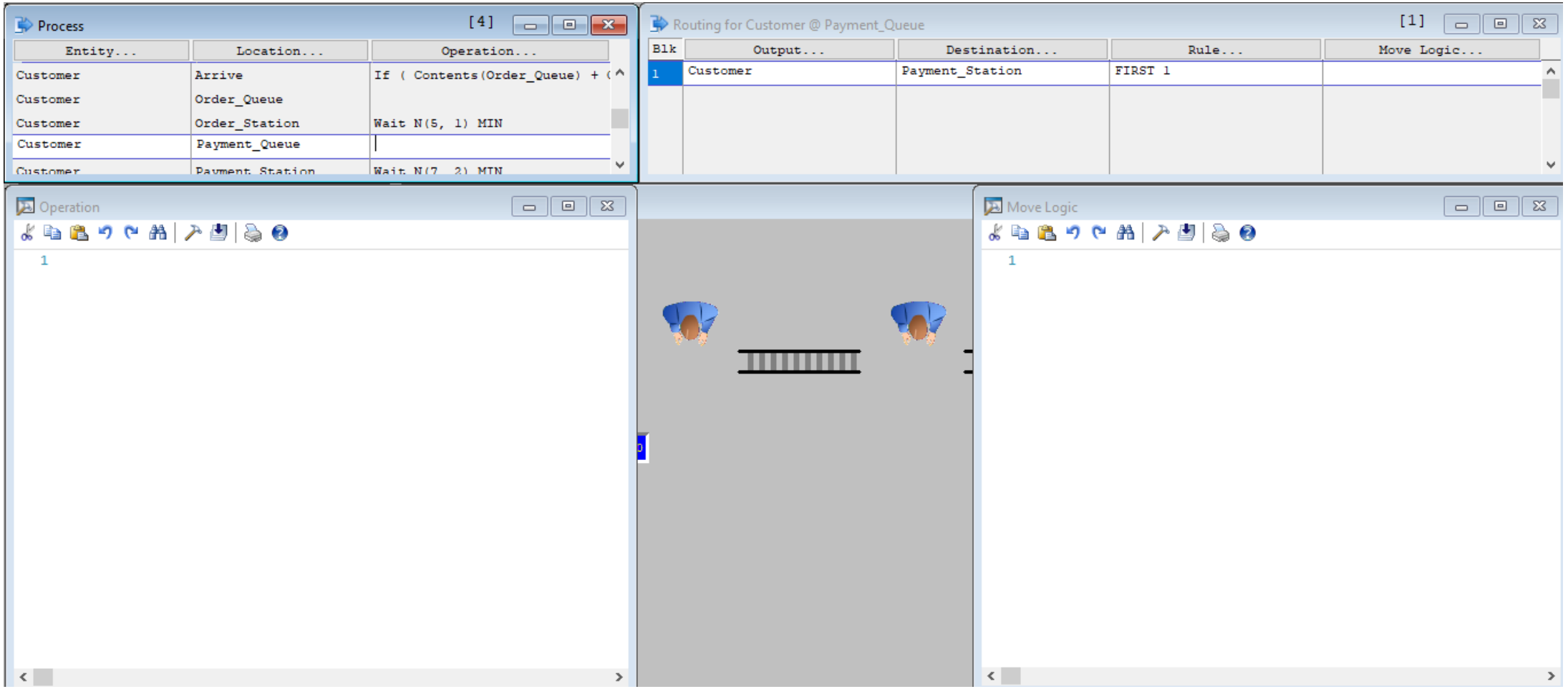
Implementation on ProModel

- Processing: Order_Station → Payment_Queue



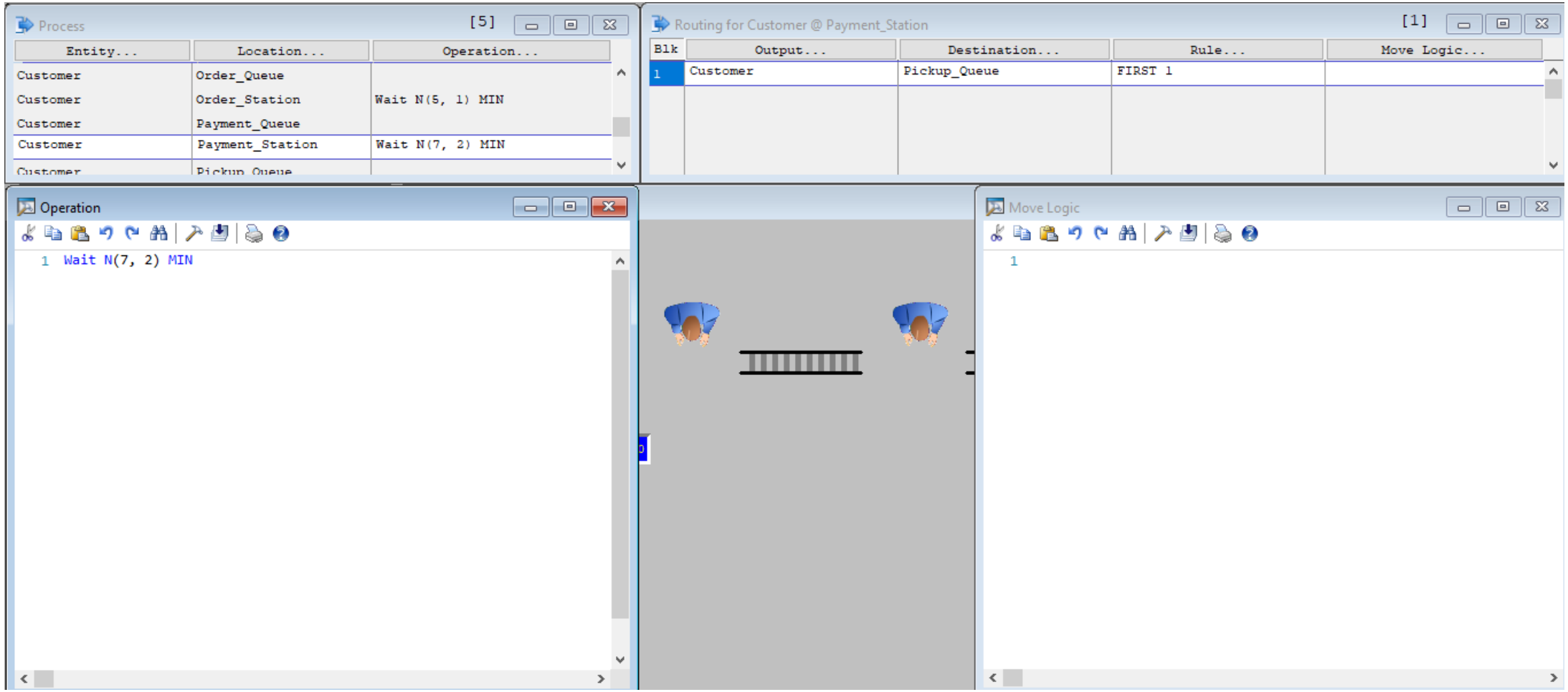
Implementation on ProModel

- Processing: Payment_Queue → Payment_Station



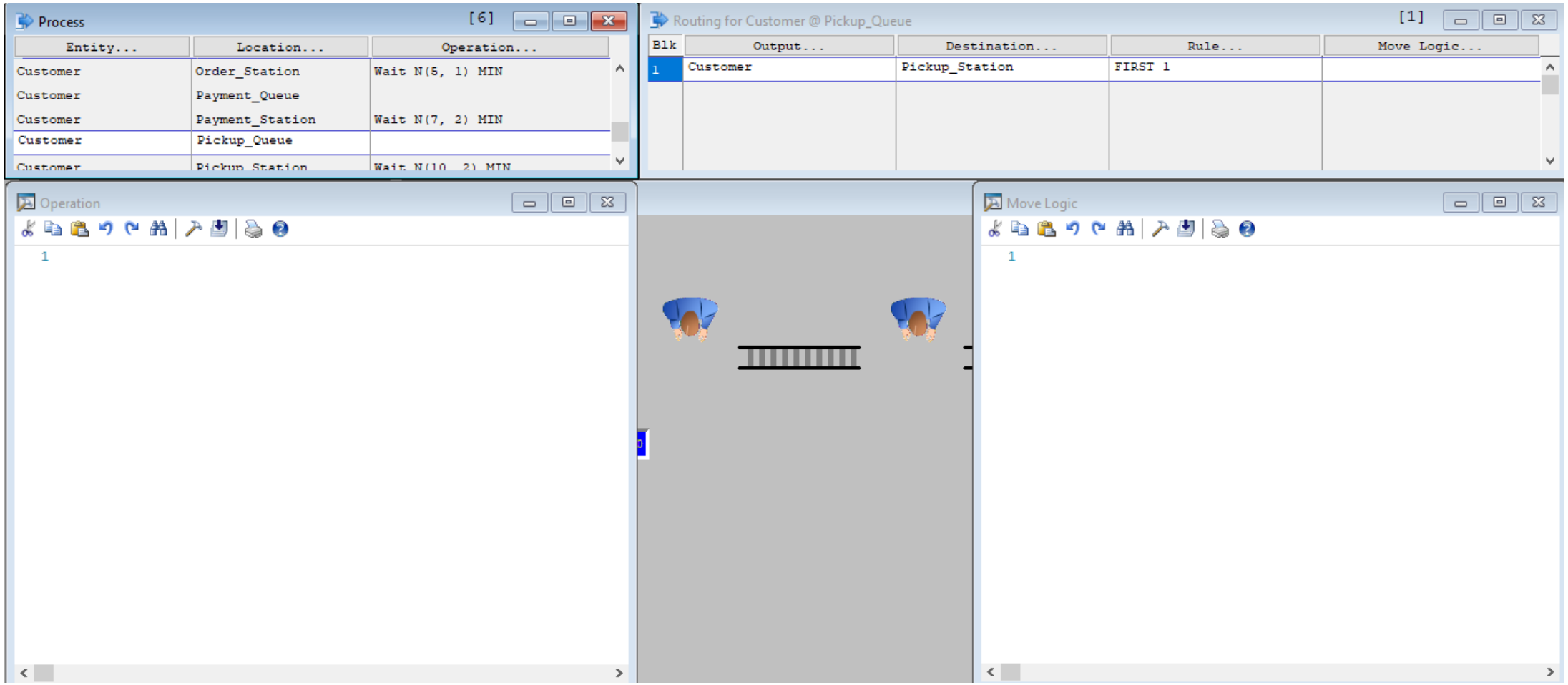
Implementation on ProModel

- Processing: Payment_Station →Pickup_Queue



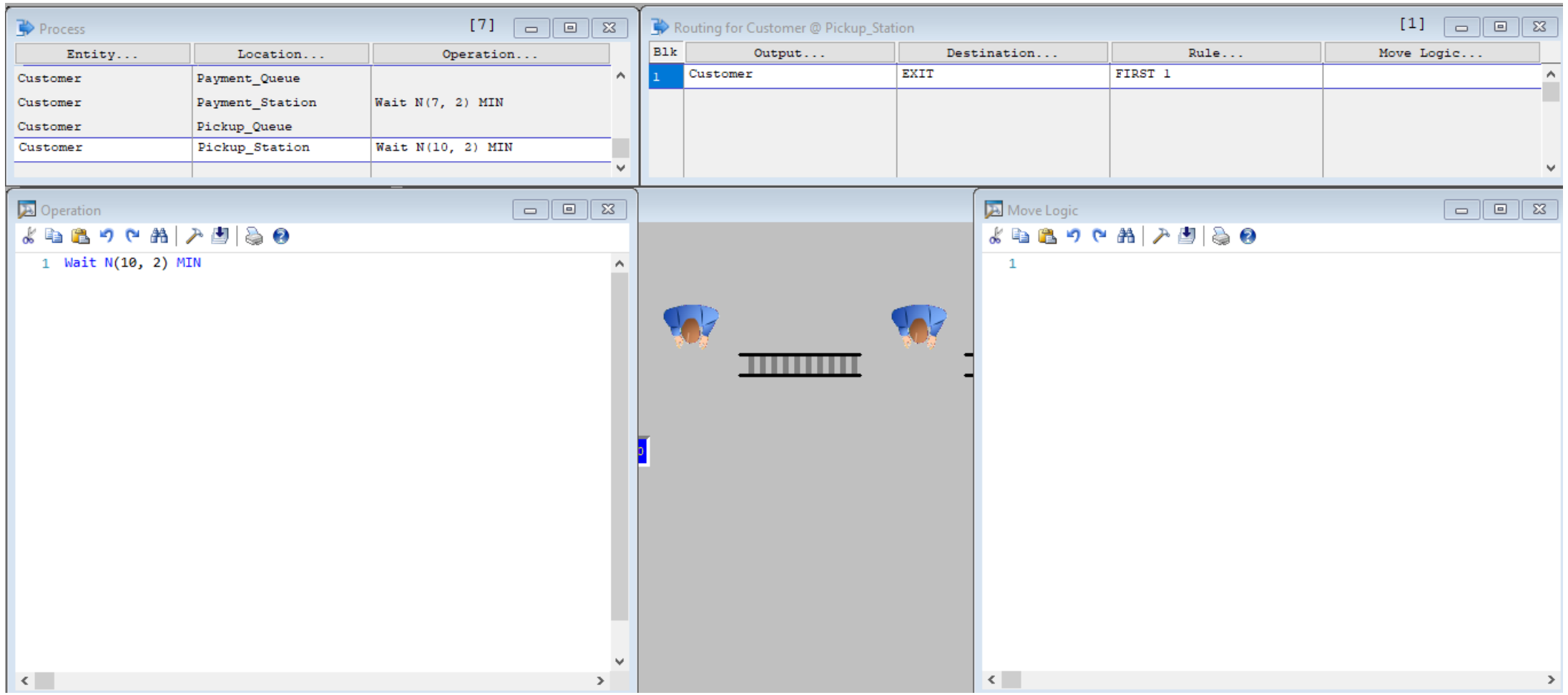
Implementation on ProModel

- Processing: Pickup_Queue → Pickup_Station



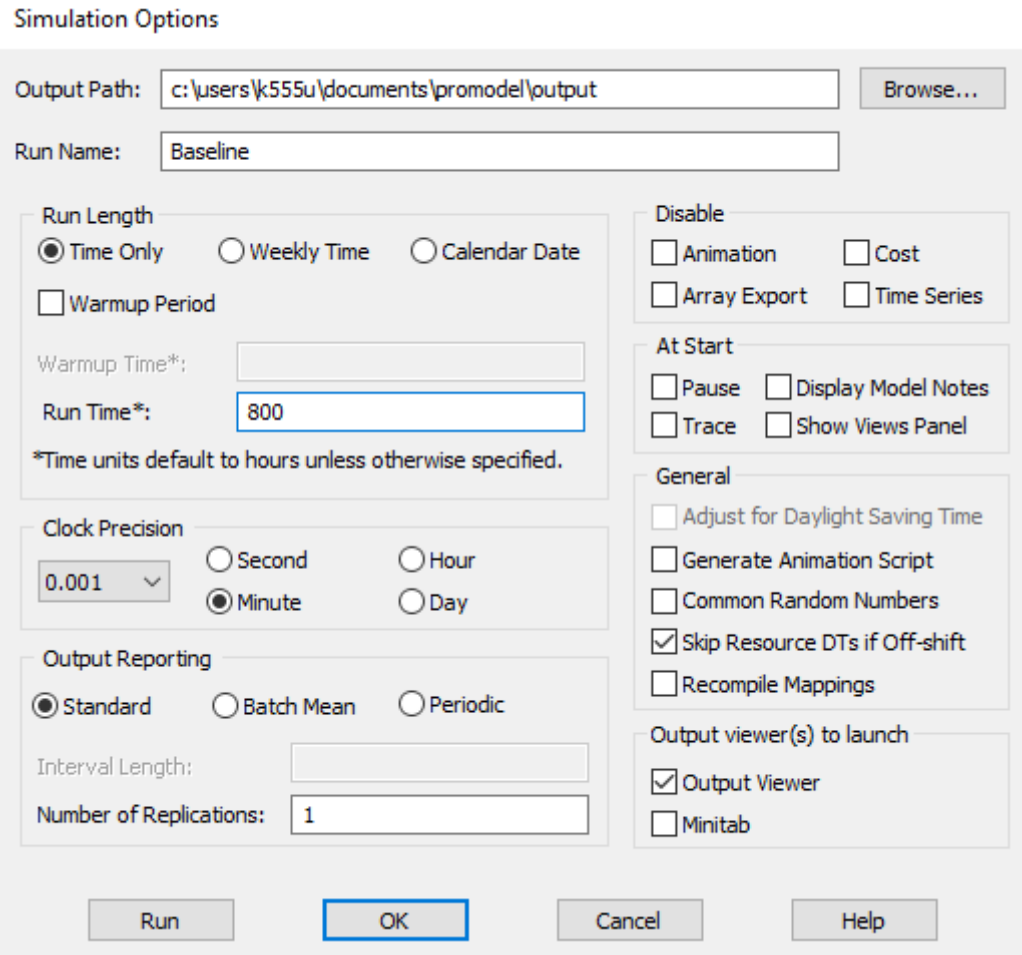
Implementation on ProModel

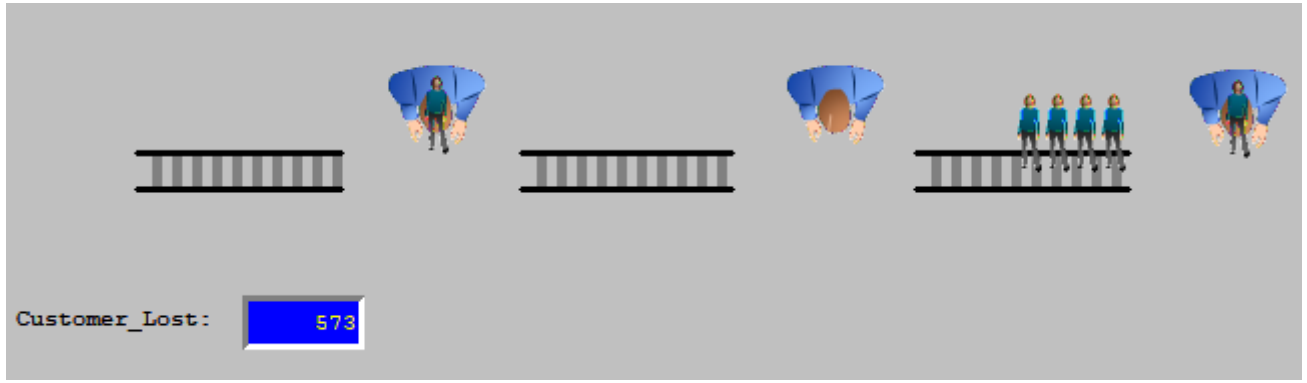
- Processing: Pickup_Station →EXIT



Implementation on ProModel

- Run the simulation for 800 hours and get the results





Thanks!...

Questions?

fatihcavdur@uludag.edu.tr / aslisebatli@gmail.com