END3032 – SYSTEMS SIMULATION

Laboratory Practice #5

The SoCal Casting Problem

Assoc. Prof. Dr. Fatih Cavdur

PhD Student Asli Sebatli-Saglam

22.04.2020

Problem Definition

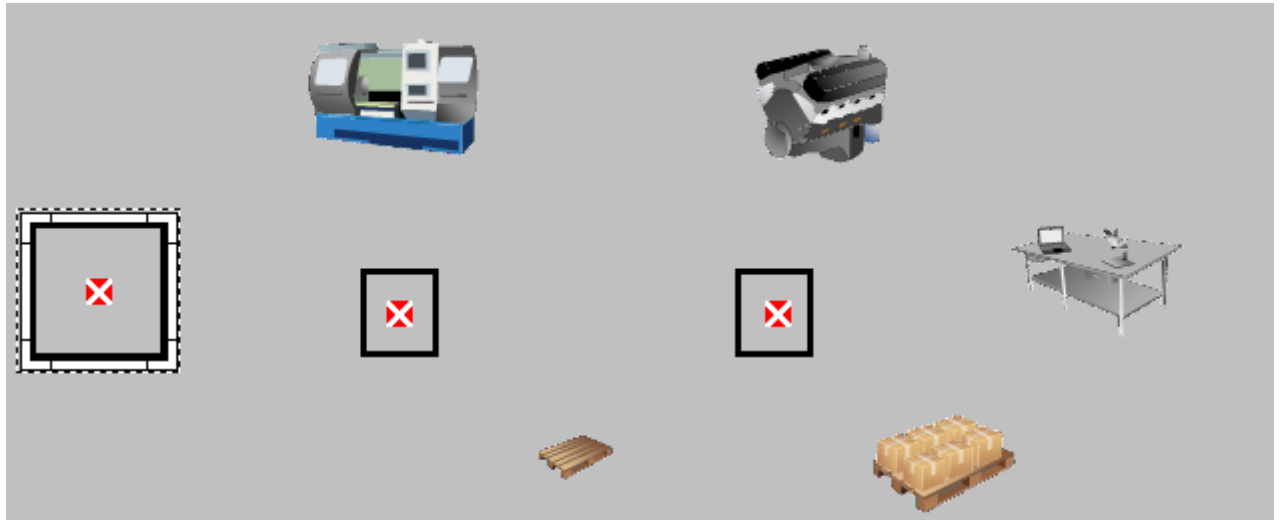
- In the SoCal Casting machine shop, castings arrive in the batches of 4 per hour.
- From the receiving dock they are sent to the mill and the milling operation time is normally distributed with a mean of 3 minutes and a standard deviation of 1 minute.
- The milled castings are sent to the grinder, where they are ground for uniformly (5, 1) minutes, in other words minimum four and maximum six minutes.
- After grinder, they are sent to the inspection station and the inspection takes minimum 4, mode of 5, and maximum of 6 minutes according to a triangular distribution.
- After inspection, 30 percent of the castings are sent back to the mill for rework, 10 percent are sent back to the grinder for rework, and 5 percent are scrapped. The remaining, 55 percent, pass the inspection and go on to the finished parts store.
- Consider a material handling time of 1 minute between each process and the process times for rework are the same as their standard process times.
- Make a simulation model and determine the number of parts reworked at mill and grinder. Also, calculate the number of scrapped and produced parts, likewise the work-in-process (WIP).
- Run the simulation model for 100 hours.

Implementation on ProModel

- Define the locations

Locations

Icon	Name	Cap.	Units	DTs...	Stats	Rules...
	Receiving_Dock	INF	1	None	Time Series	Oldest
	Mill	1	1	None	Time Series	Oldest
	Grinder	1	1	None	Time Series	Oldest
	Inspect	INF	1	None	Time Series	Oldest
	Mill_Rework	INF	1	None	Time Series	Oldest
	Grind_Rework	INF	1	None	Time Series	Oldest
	Finished_Part_Store	1	1	None	Time Series	Oldest
	Scraped_Parts	1	1	None	Time Series	Oldest



Implementation on ProModel

- Define the entities

Entities

Icon	Name	Speed (fpm)	Stats
	Casting	150	Time Series

- Set entity arrivals

Arrivals

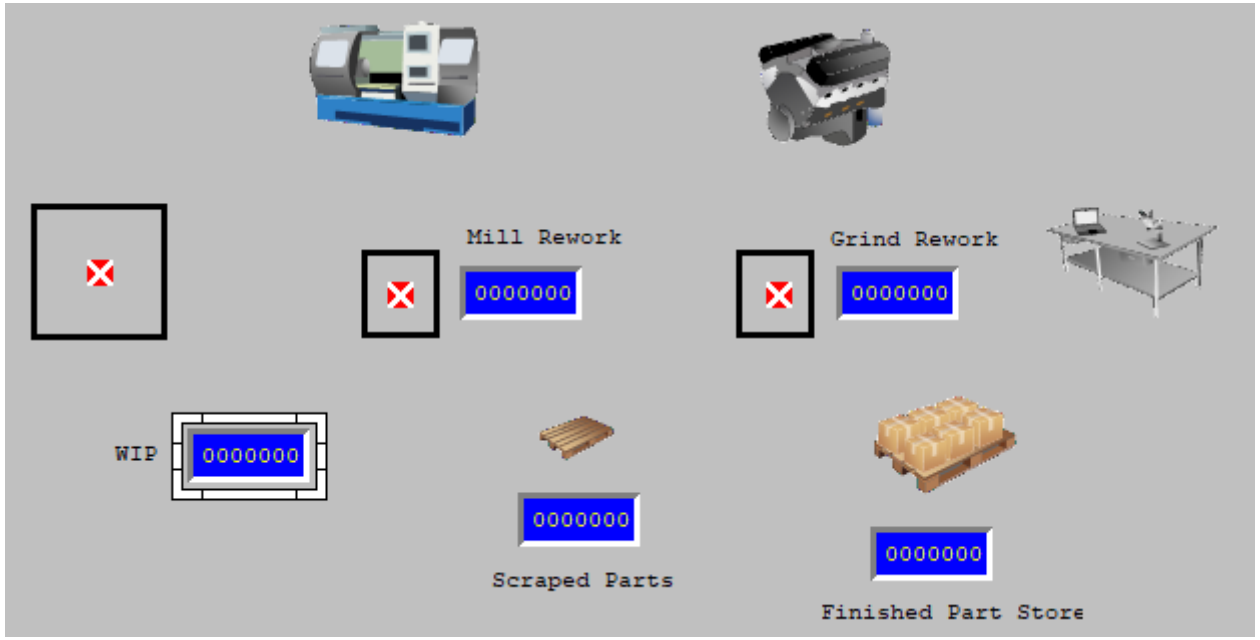
Entity...	Location...	Qty Each...	First Time...	Occurrences	Frequency
Casting	Receiving_Dock	4	0	INF	60 MIN

Implementation on ProModel

- Define variables and put icons on the layout for the corresponding variables

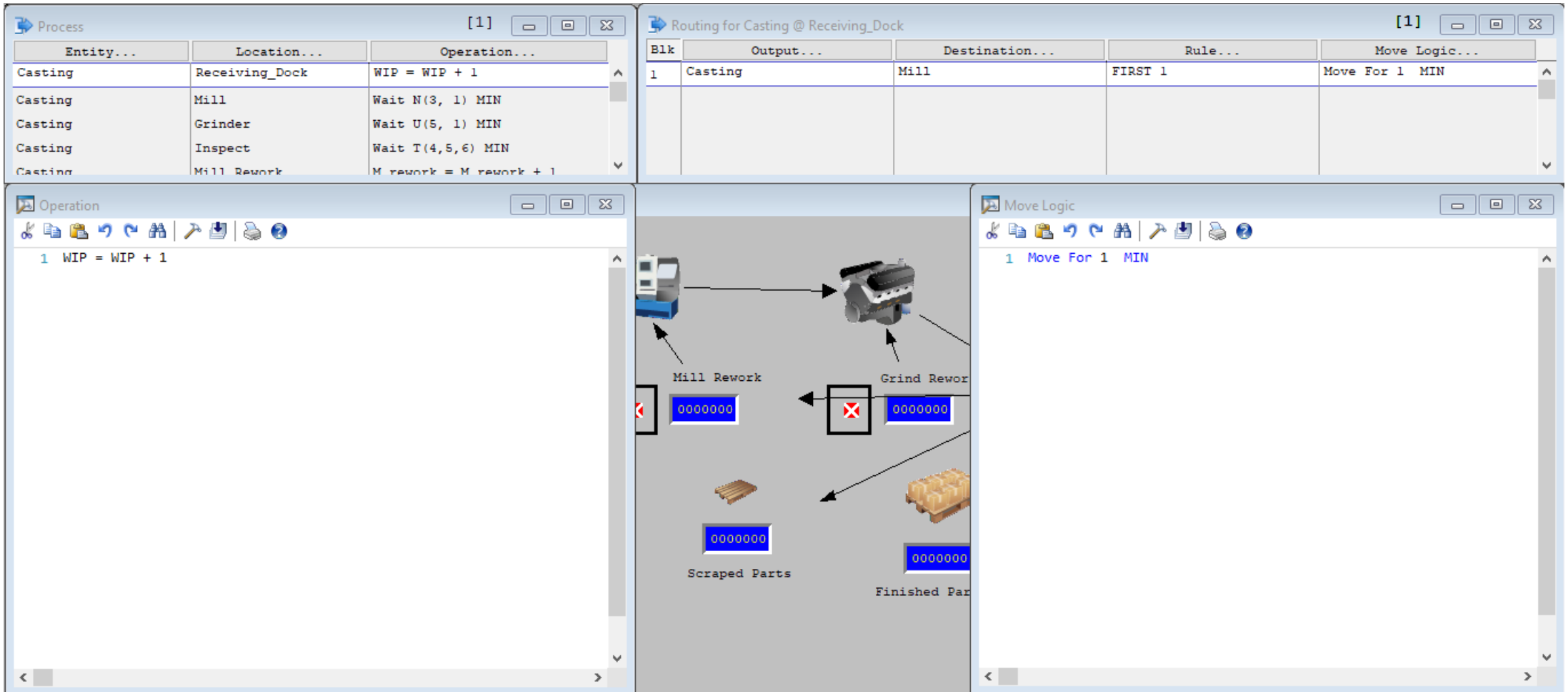
Variables (global)

Icon	ID	Type	Initial value
Yes	WIP	Integer	0
Yes	Production	Integer	0
Yes	Scrap	Integer	0
Yes	M_rework	Integer	0
Yes	G_rework	Integer	0



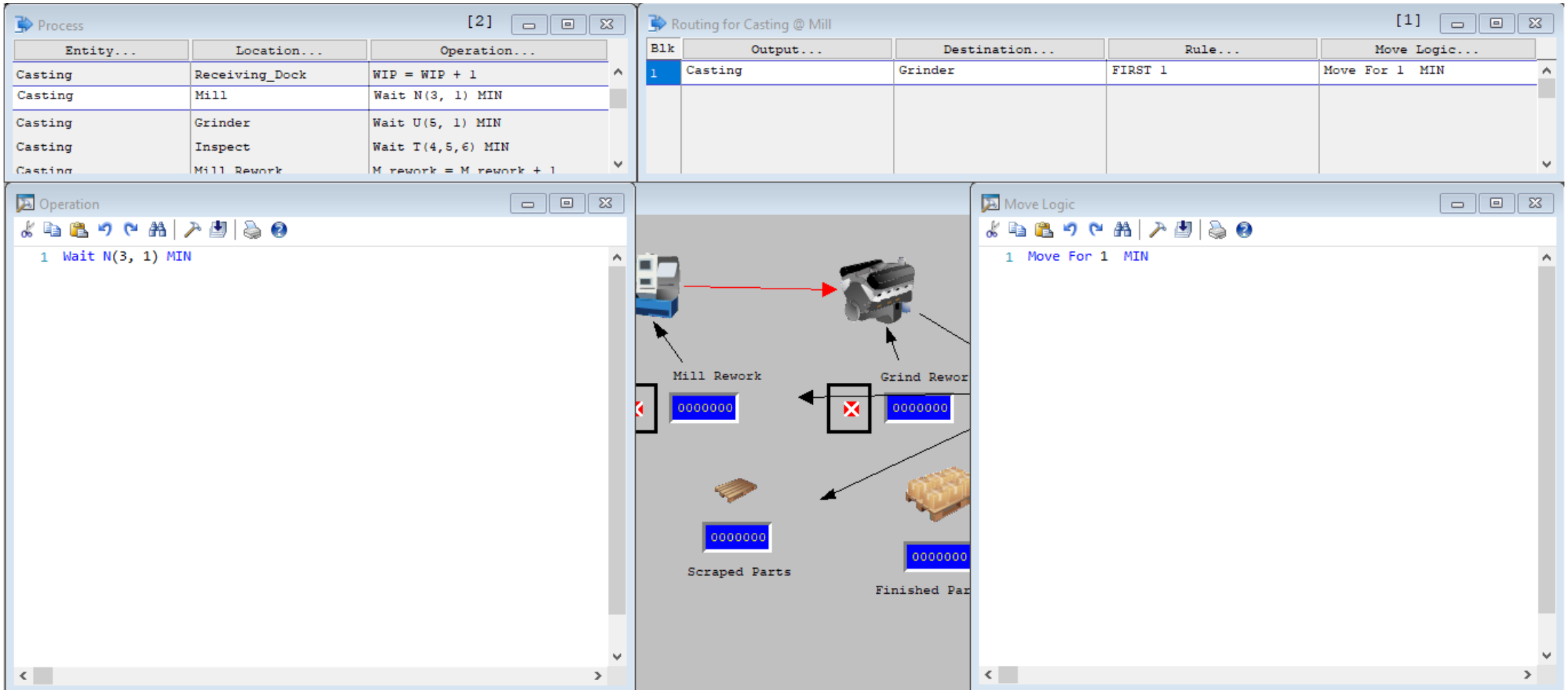
Implementation on ProModel

- Processing: Receiving Dock → Mill



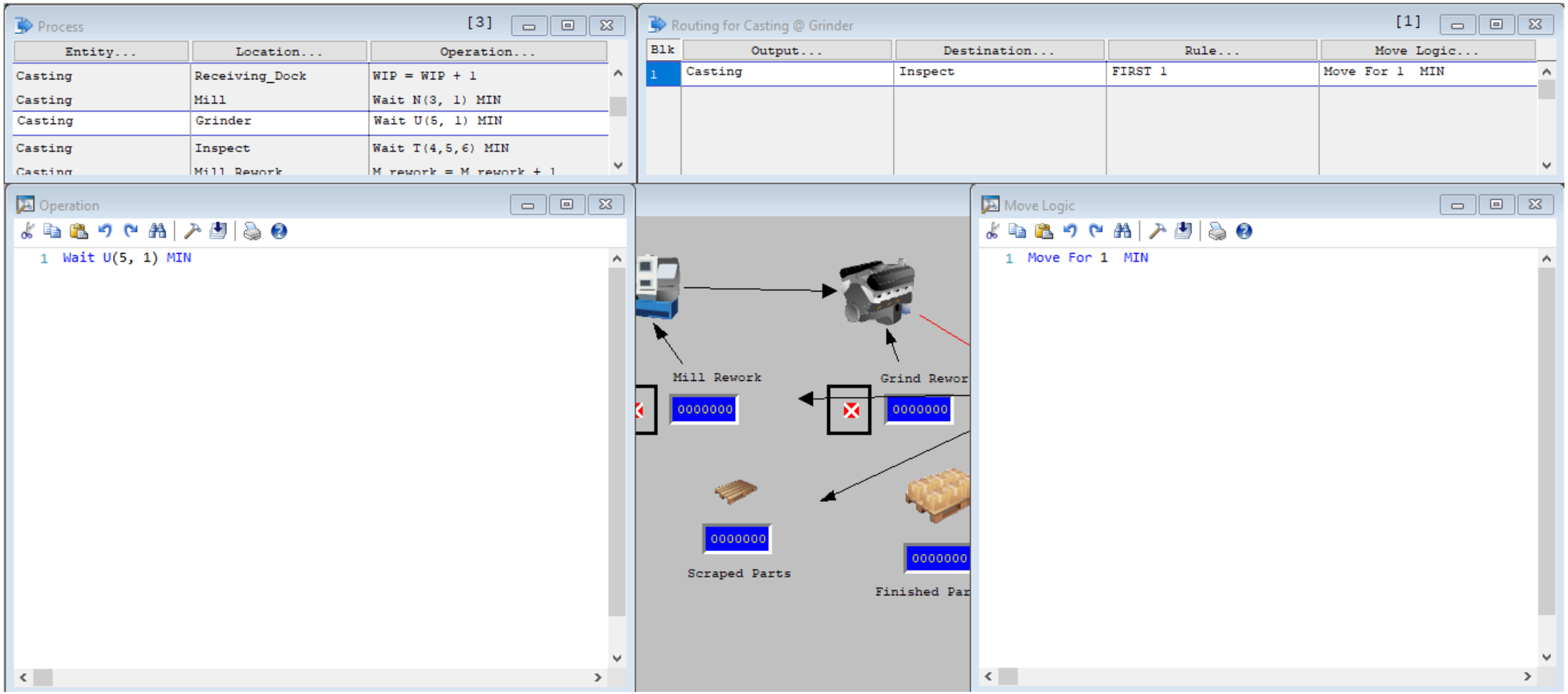
Implementation on ProModel

- Processing: Mill → Grinder



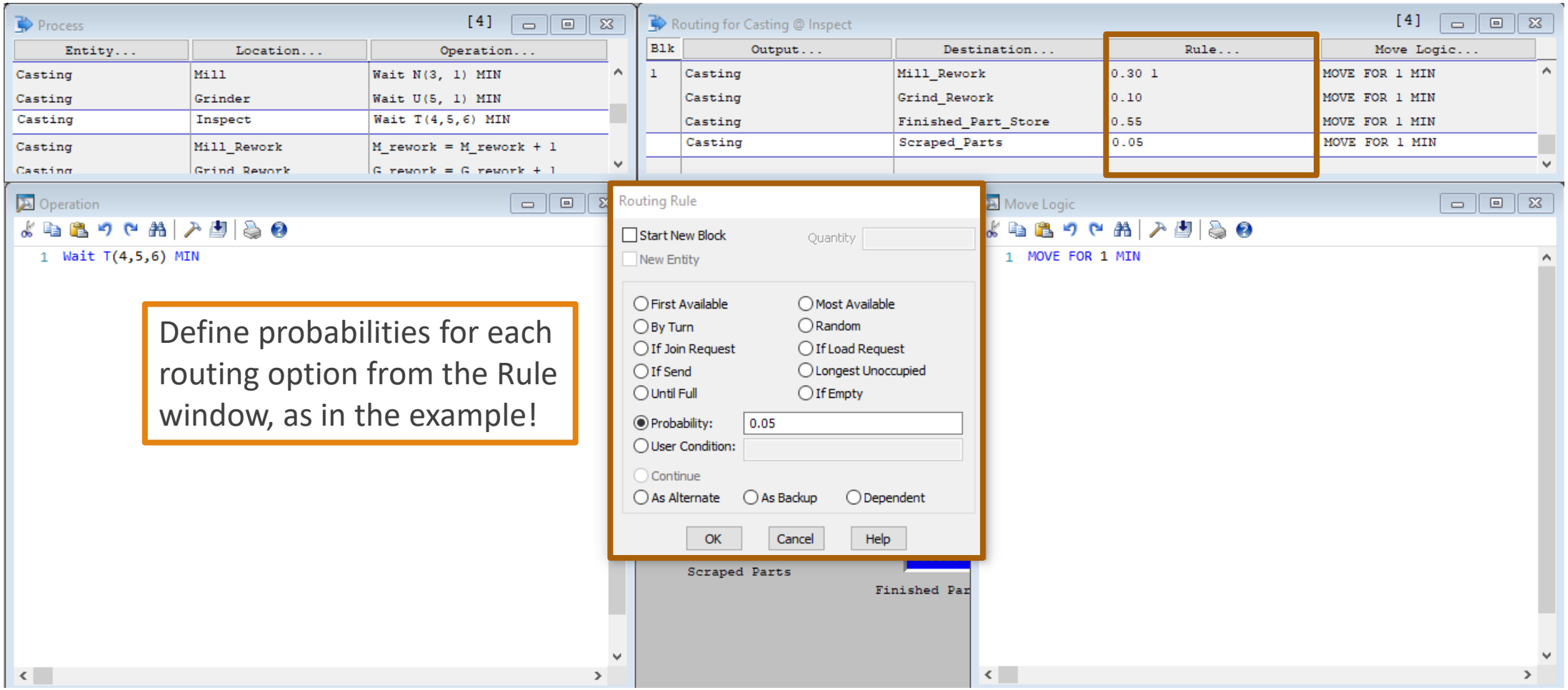
Implementation on ProModel

- Processing: Grinder→ Inspection



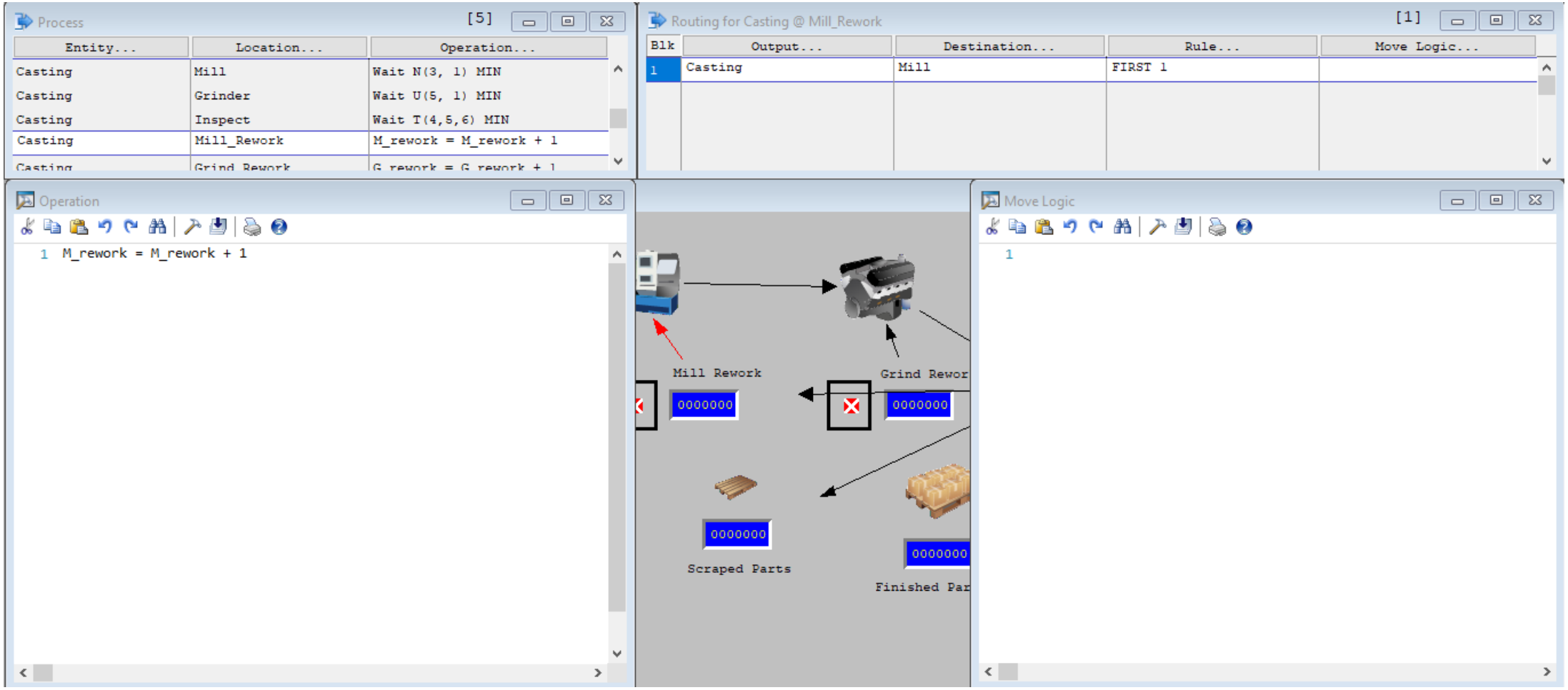
Implementation on ProModel

- Processing: Inspection → Mill_Rework / Grind_Rework / Finished_Part_Store / Scraped_Parts



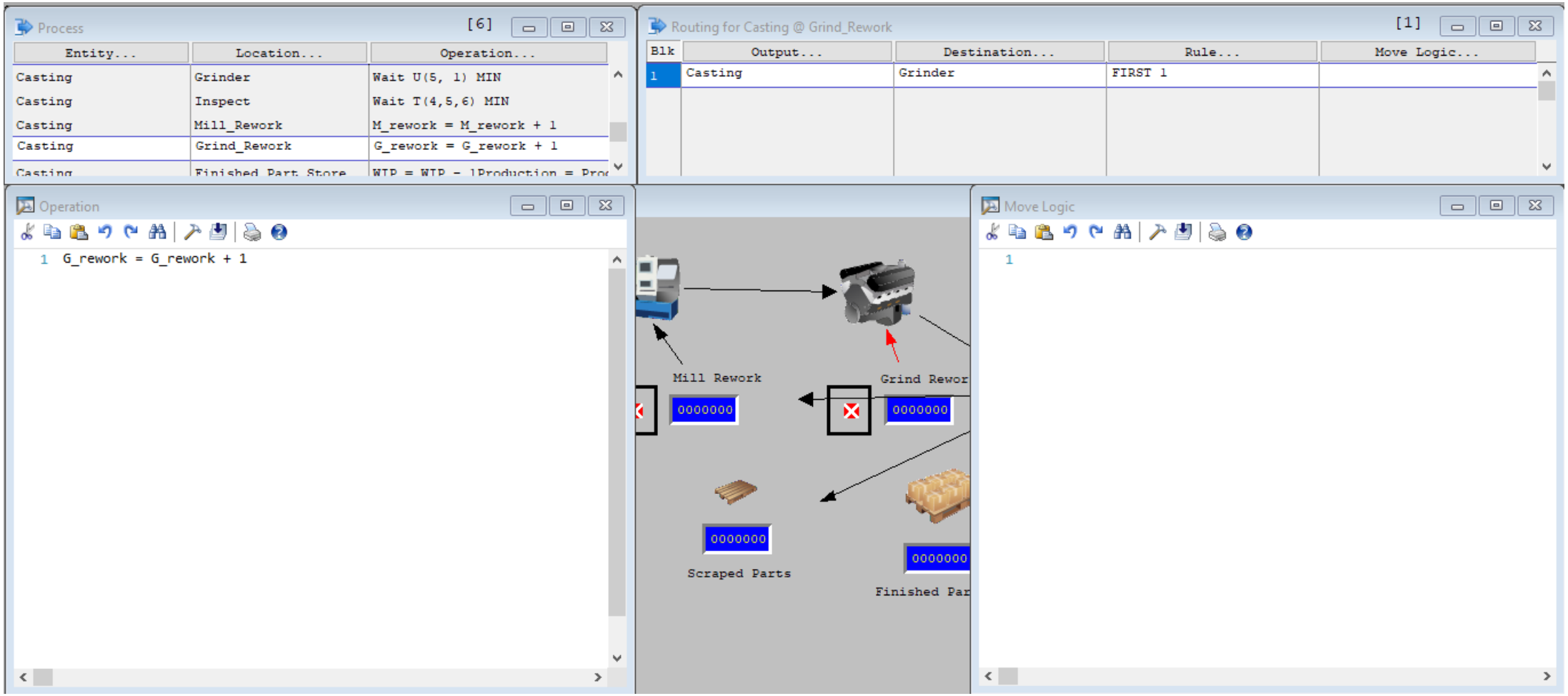
Implementation on ProModel

- Processing: Rework at Mill



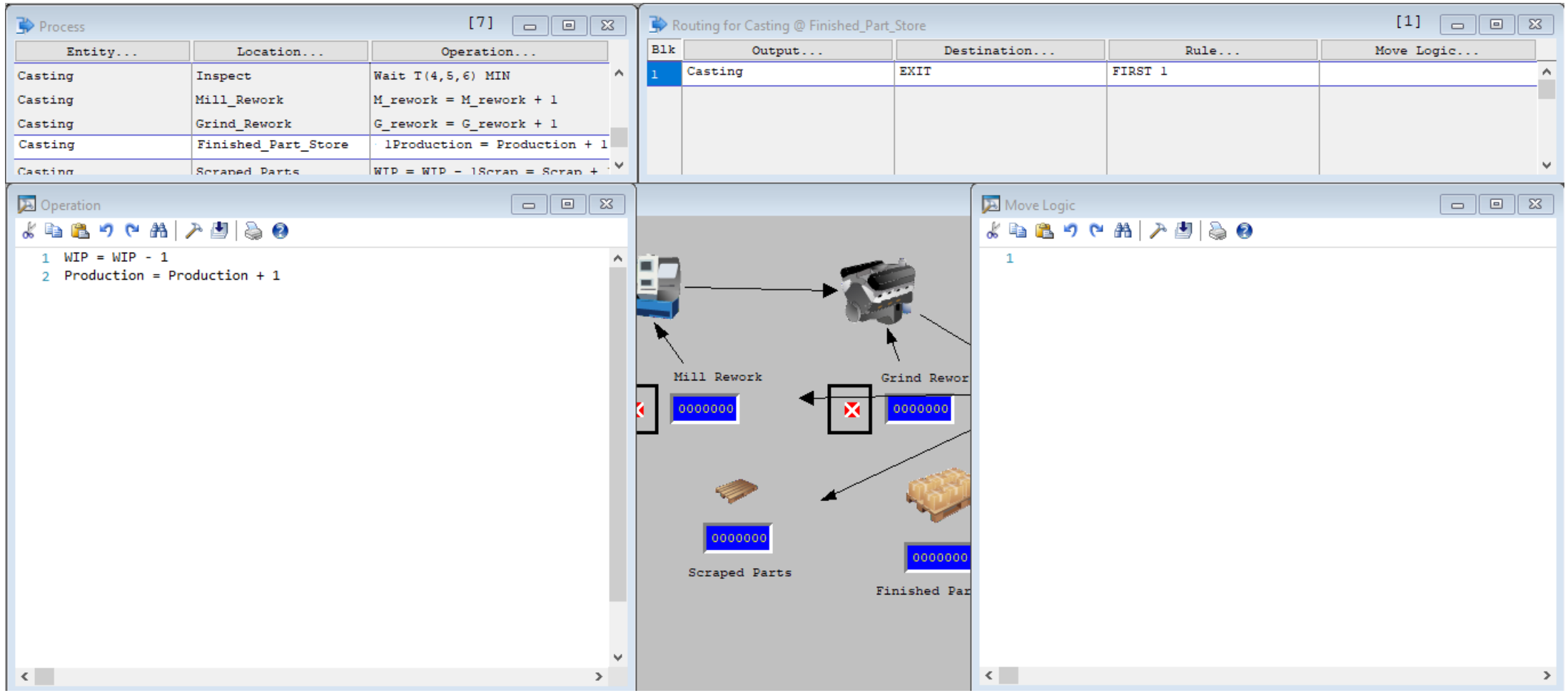
Implementation on ProModel

- Processing: Rework at Grinder



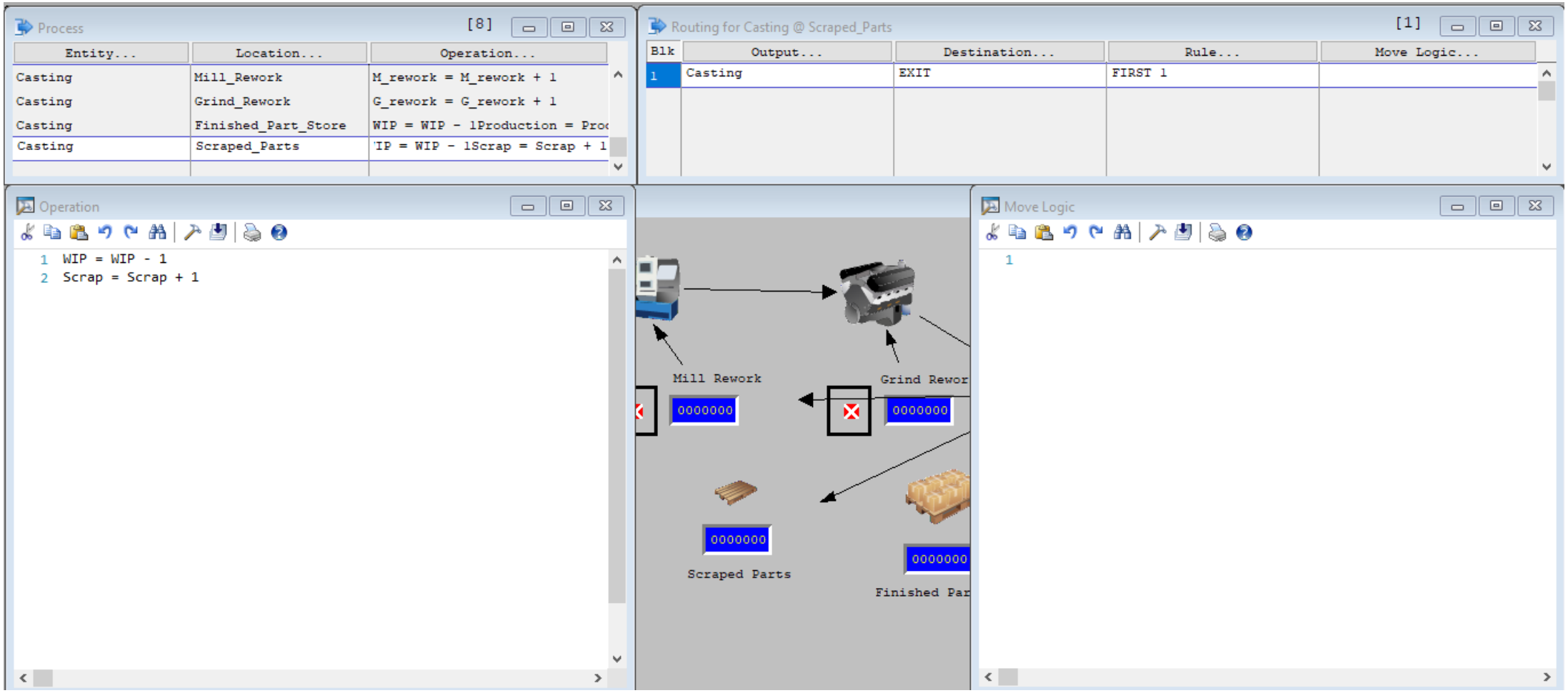
Implementation on ProModel

- Processing: Calculate produced parts



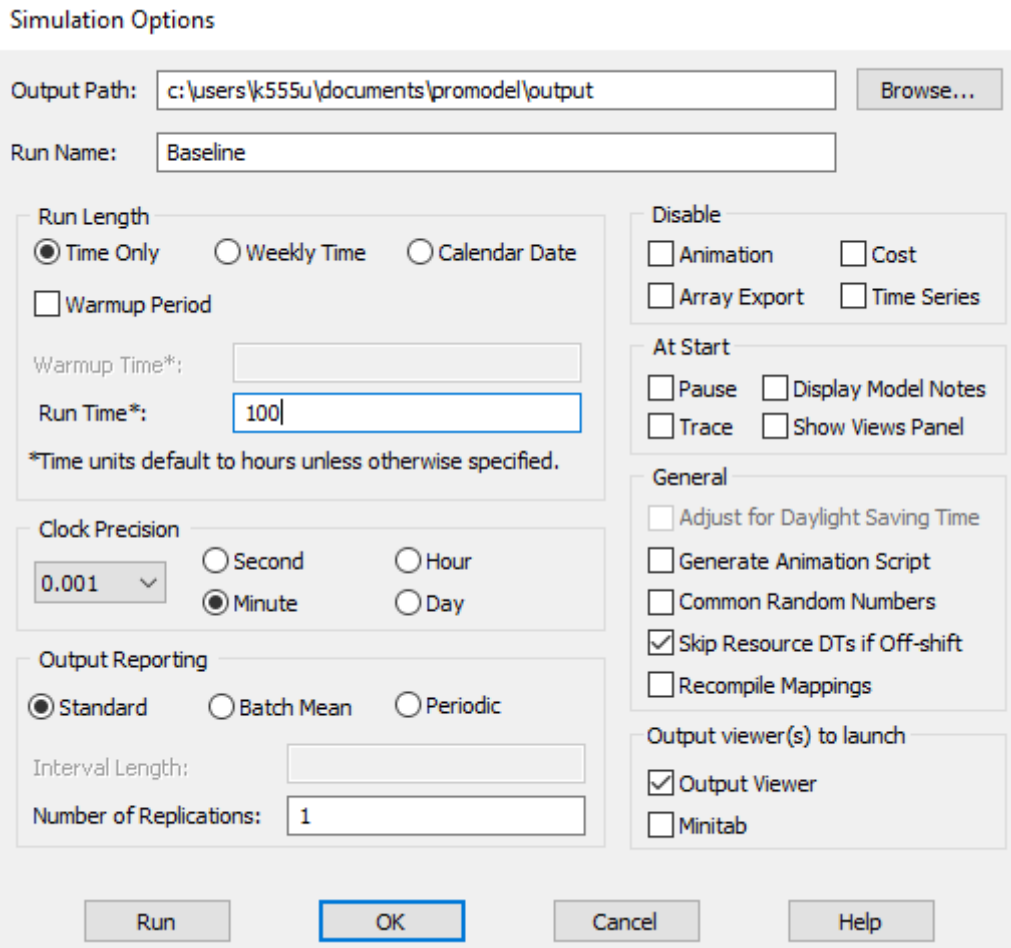
Implementation on ProModel

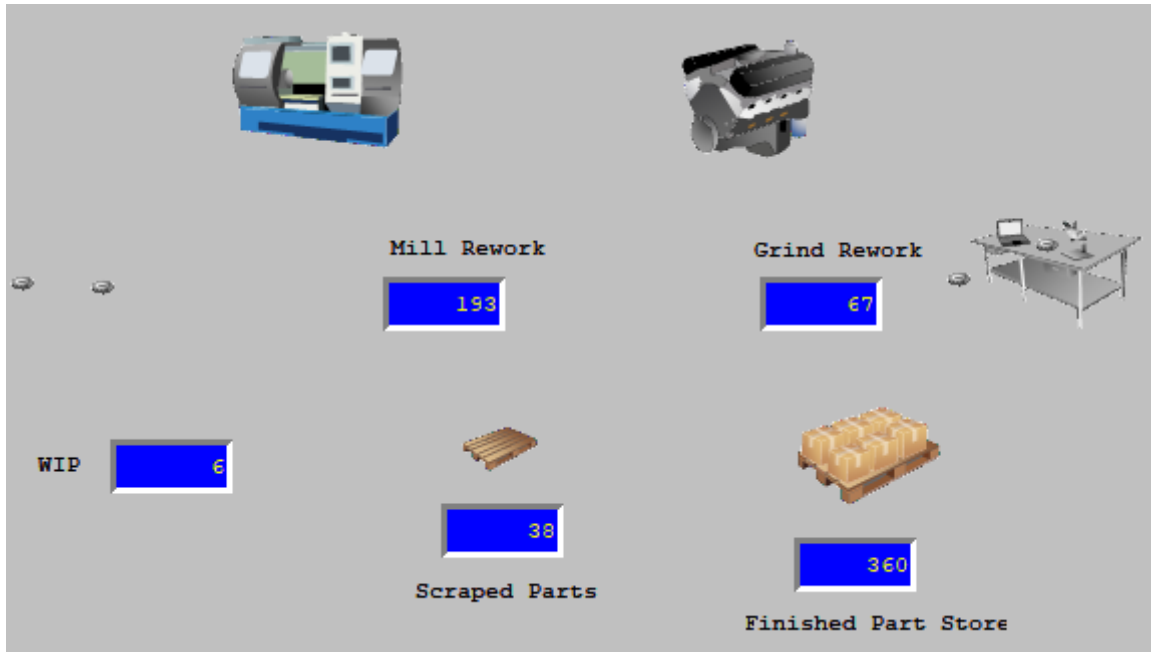
- Processing: Calculate scraps



Implementation on ProModel

- Run the simulation for 800 hours and get the results





Thanks!...

Questions?

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