# ME 635: Modelling and Simulation

## Homework 2

Simulation models using Arena

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I pledge my honor that I have abided by the Stevens Honor System.

Submitted by,

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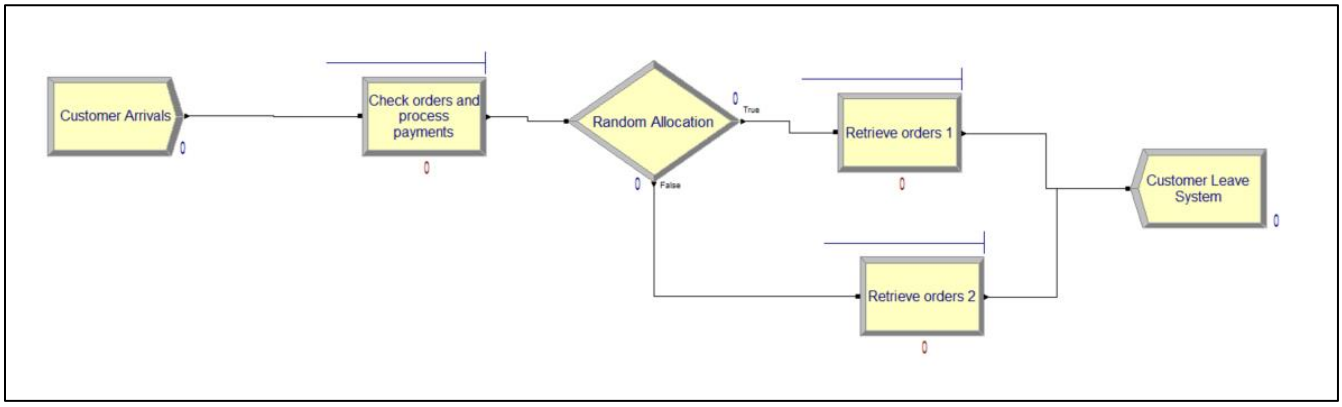
Q1.

**Problem 1**

Customers arrive at an order counter with exponential interarrivals with a mean of 10 minutes; the first customer arrives at time 0. A single clerk accepts and checks their orders and processes payments, taking UNIF(7.9, 10) minutes. Upon completion of this activity, orders are randomly assigned to one of two available stock persons (each stock person has a 50% chance of getting any individual assignment) who retrieve the orders for the customers, taking UNIF(16, 20) minutes. These stock persons only retrieve orders for customers who have been assigned specifically to them. Upon receiving their orders, the customers depart the system.

- Develop a model of this system and run the simulation for 5,000 minutes, observing the average and maximum customer time in system.

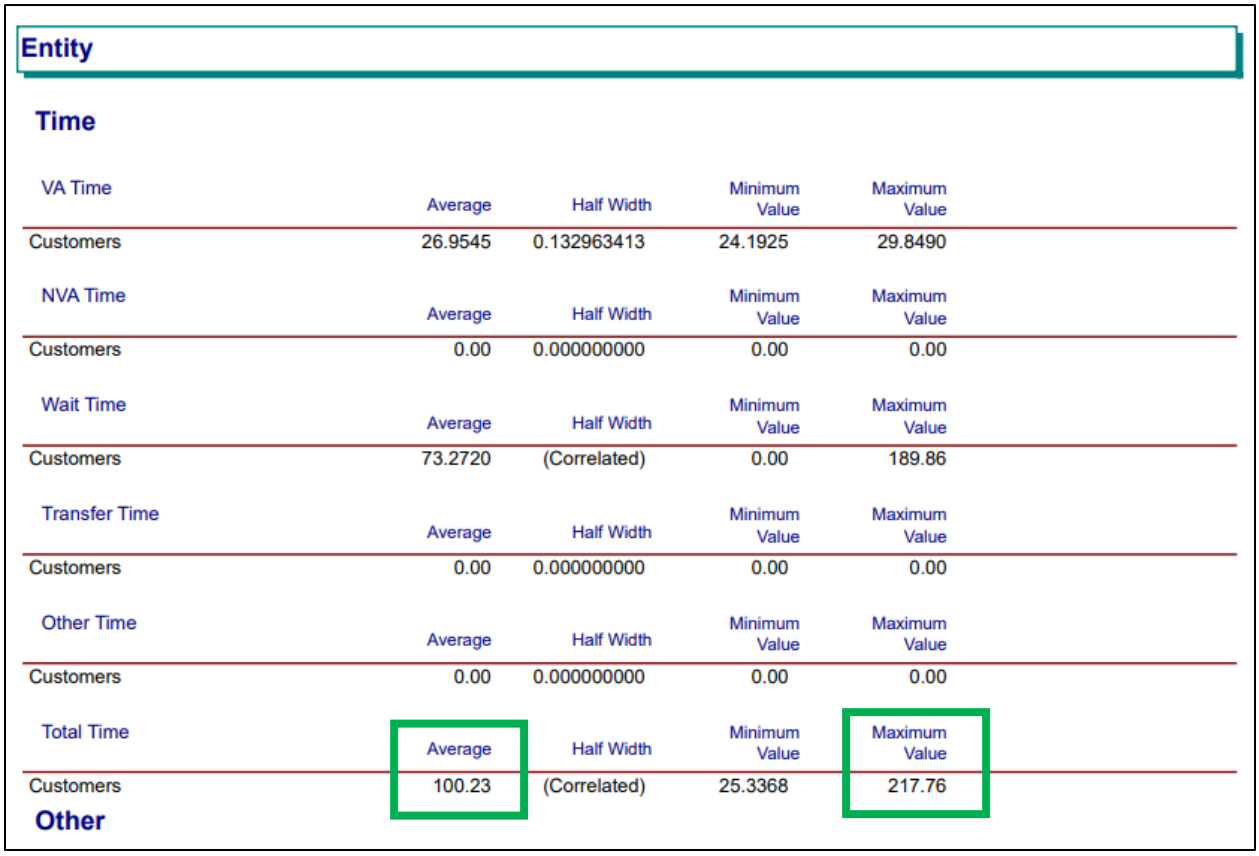
Model:




# Q1_ViralPanchal_zip file

*(The zip file has the arena models and pdf report generated.)*

Results:



**Entity**

**Time**

| VA Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Customers | 26.9545 | 0.132963413 | 24.1925 | 29.8490 |

| NVA Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Customers | 0.00 | 0.000000000 | 0.00 | 0.00 |

| Wait Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Customers | 73.2720 | (Correlated) | 0.00 | 189.86 |

| Transfer Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Customers | 0.00 | 0.000000000 | 0.00 | 0.00 |

| Other Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Customers | 0.00 | 0.000000000 | 0.00 | 0.00 |

| Total Time | Average | Half Width | Minimum Value | Maximum Value |
|---|---|---|---|---|
| Customers | 100.23 | (Correlated) | 25.3368 | 217.76 |

**Other**

Average customer time is 100.23 minutes

Maximum customer time is 217.76 minutes

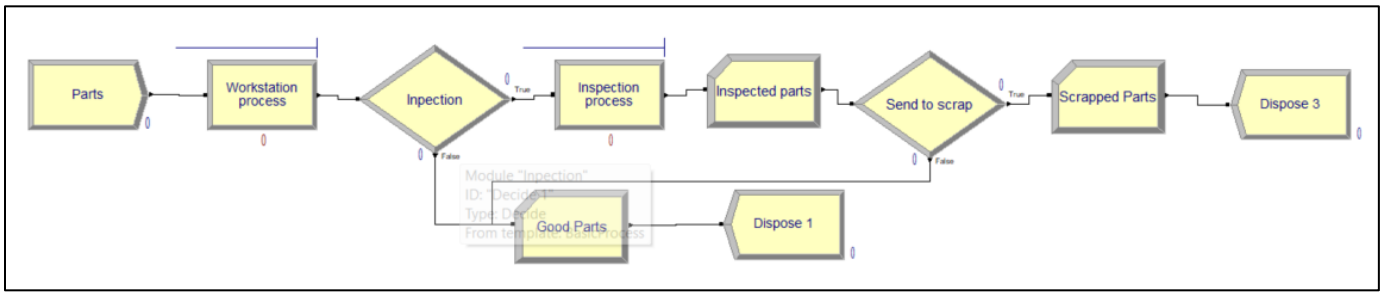
Q2.

**Problem 2**

Parts arrive at a single workstation system according to an exponential interarrival distribution with mean 21.5 seconds; the first arrival is at time 0. Upon arrival, the parts are initially processed. The processing-time distribution is TRIA(16, 19, 22) seconds. There are several easily identifiable visual characteristics that determine whether a part has a potential quality problem. These parts, about 10% (determined after the initial processing), are sent to a station where they undergo a thorough inspection. The remaining parts are considered good and are sent out of the system. The inspection-time distribution is 95 plus a WEIB(48.5, 4.04) random variable, in seconds. About 14% of these parts fail the inspection and are sent to scrap. The parts that pass the inspection are classified as good and are sent out of the system (so these parts didn't need the thorough inspection, but you know what they say about hindsight).

- Develop a model of this system and run the simulation for 10,000 seconds to observe the number of good parts that exit the system, the number of scrapped parts, and the number of parts that received the thorough inspection.

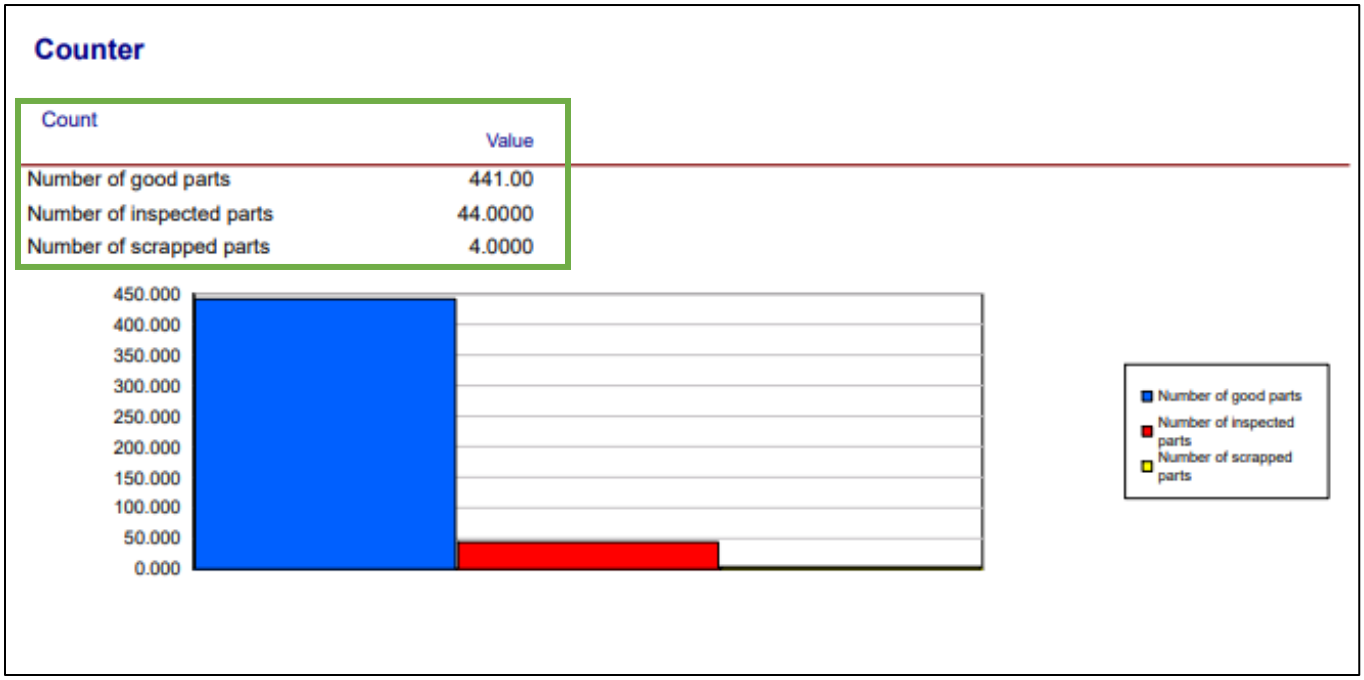
Model:




# Q2_ViralPanchal_zipfile

*( The zip file has the arena models and pdf report generated.)*

Result:




Number of good parts = 441

Number of inspected parts = 44

Number of scrapped parts = 4