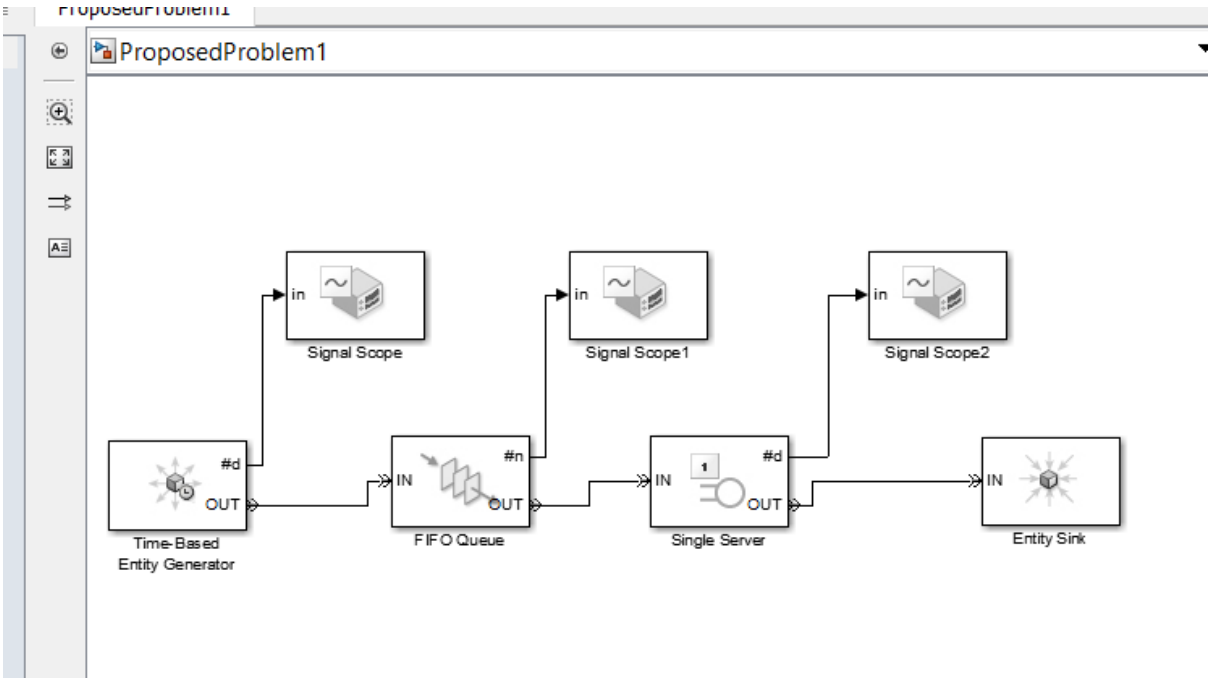
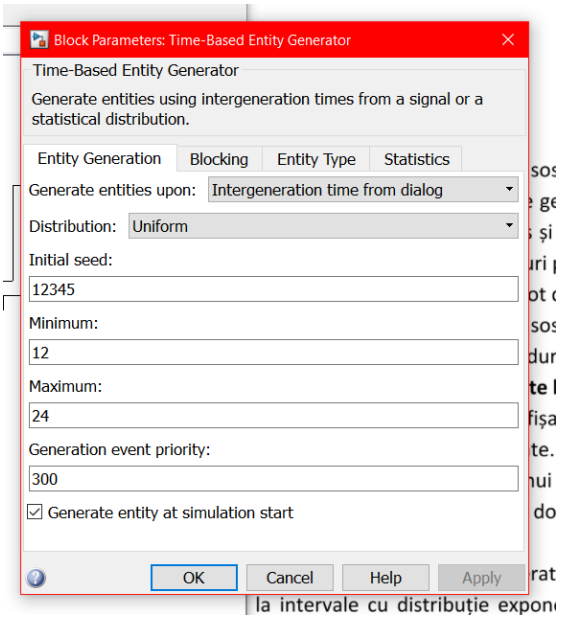
Laboratory 2 MS

Problem 1:

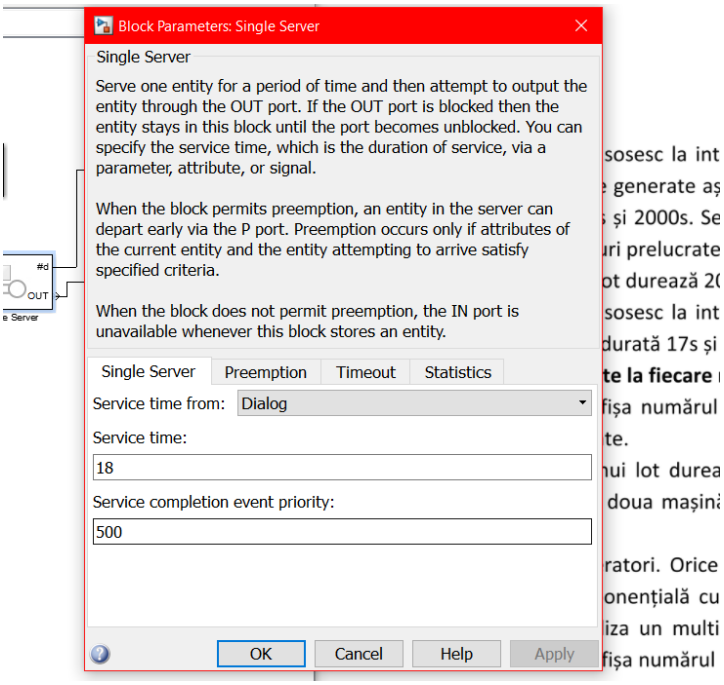
We are using the following schema:



Arrival time of 18+-6 seconds translates to the following Entity generator:



The processing time is set in the single server:



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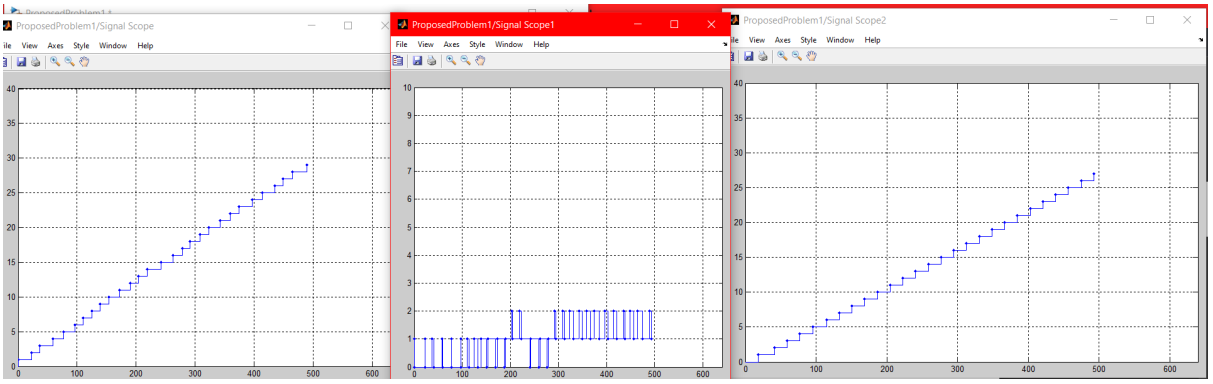
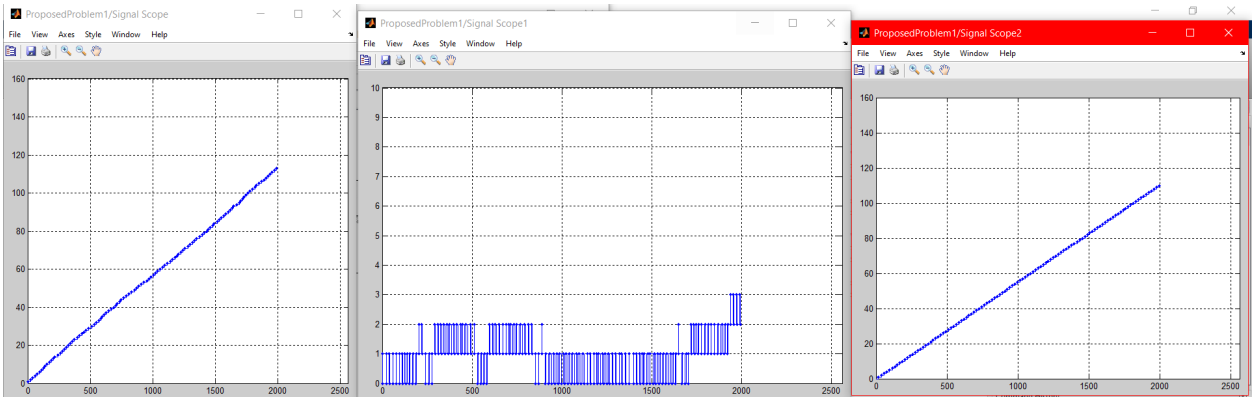
fișa numărul

If we let the system run for 500s we get the following output:



LEFT: generated lots
MIDDLE: lots in queue
RIGHT: lots processed

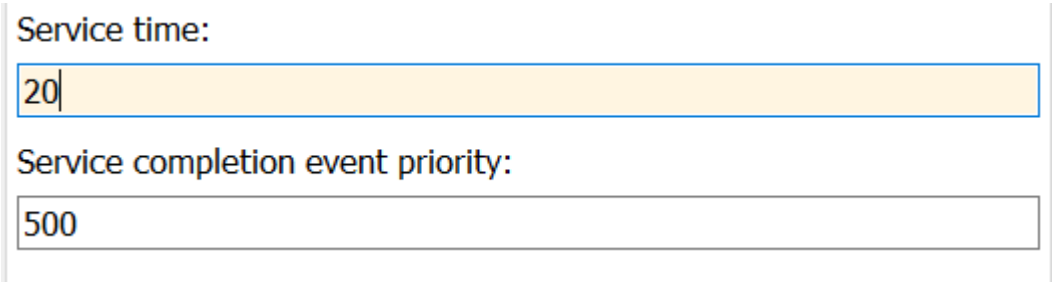
If we let the system run for 2000s we get the following output:



LEFT: generated lots
MIDDLE: lots in queue
RIGHT: lots processed

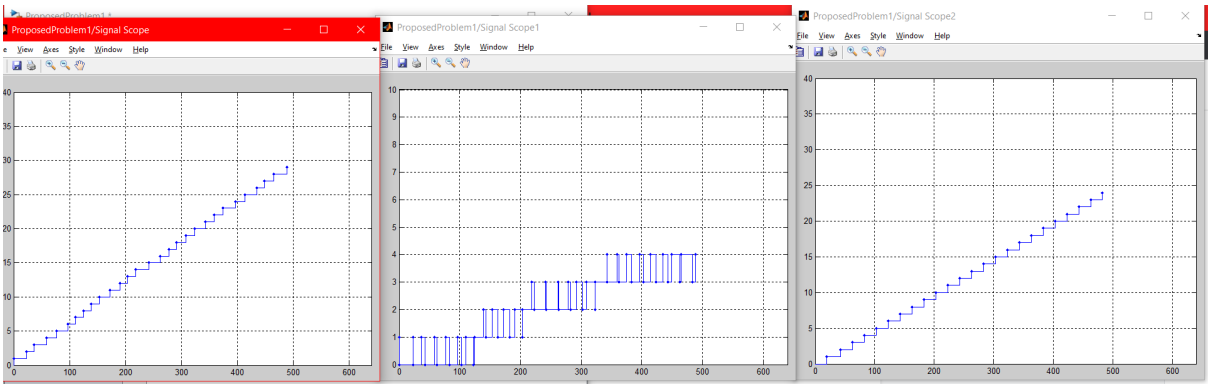
Problem 2:

We changed the service time here:



This problem has the same base as the last one so we will only do the simulation

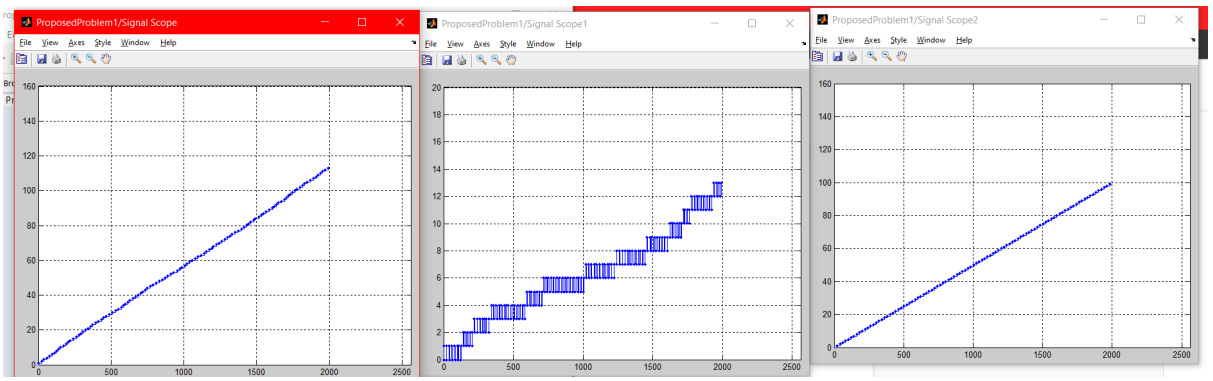
If we run the simulation for 500 seconds we get:



As you can see, since the service time is longer, entities get stuck up in the queue

LEFT: generated lots
MIDDLE: lots in queue
RIGHT: lots processed

If we run the simulation for 2000 seconds we get:

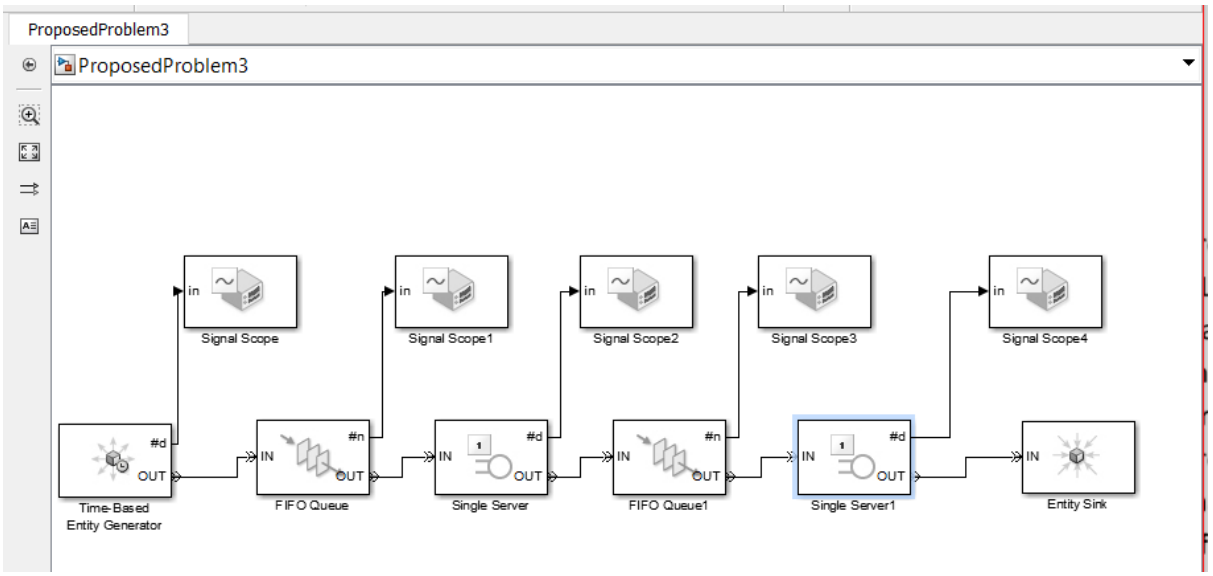


Now it's even more clear that due to the service time, entities get stuck in the queue

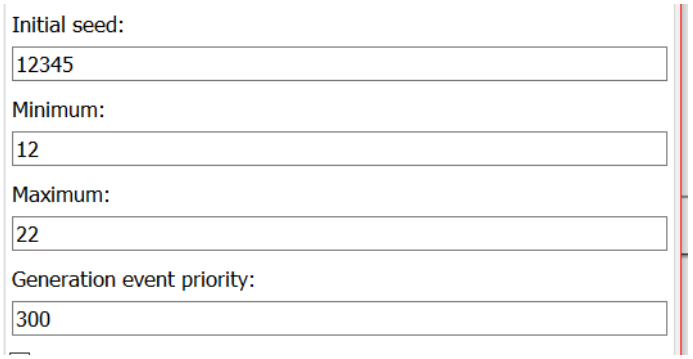
LEFT: generated lots
MIDDLE: lots in queue
RIGHT: lots processed

Problem 3:

We are using the following schema:



Arrival time is 17 +- 5 seconds so that translates to the following entity generator:



First service:

Service time:

17

Service completion event priority:

500

Second service:

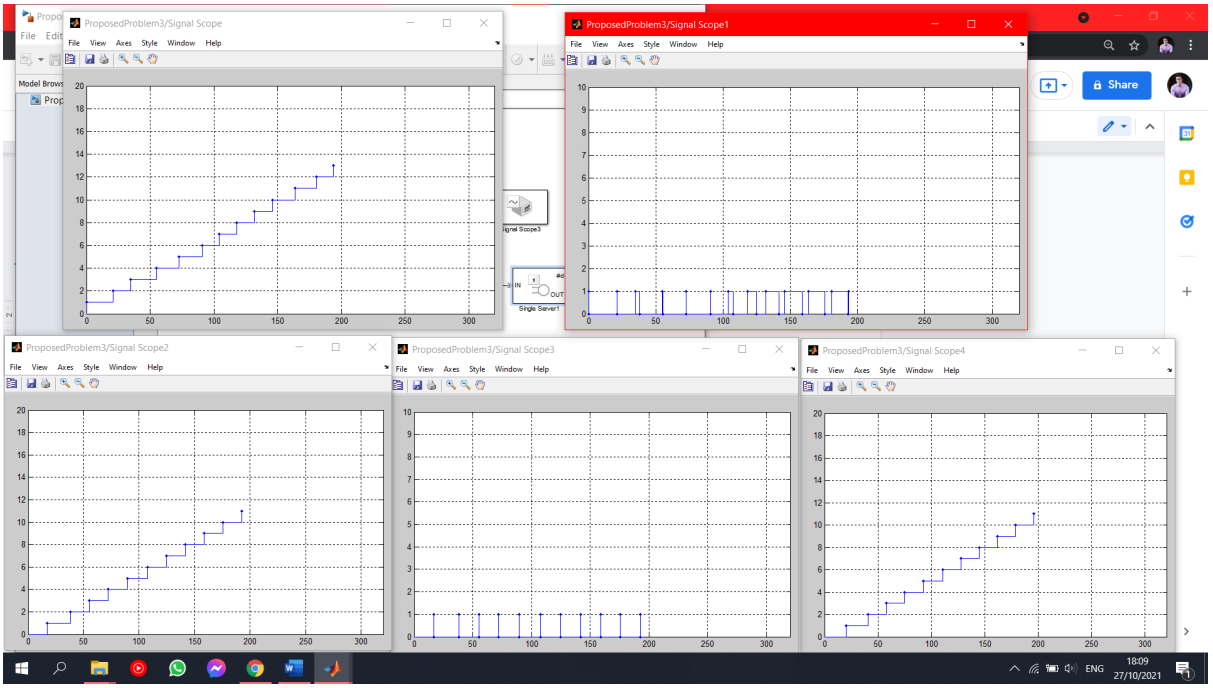
Service time:

3

Service completion event priority:

500

Now we are going to simulate the model for 200s:

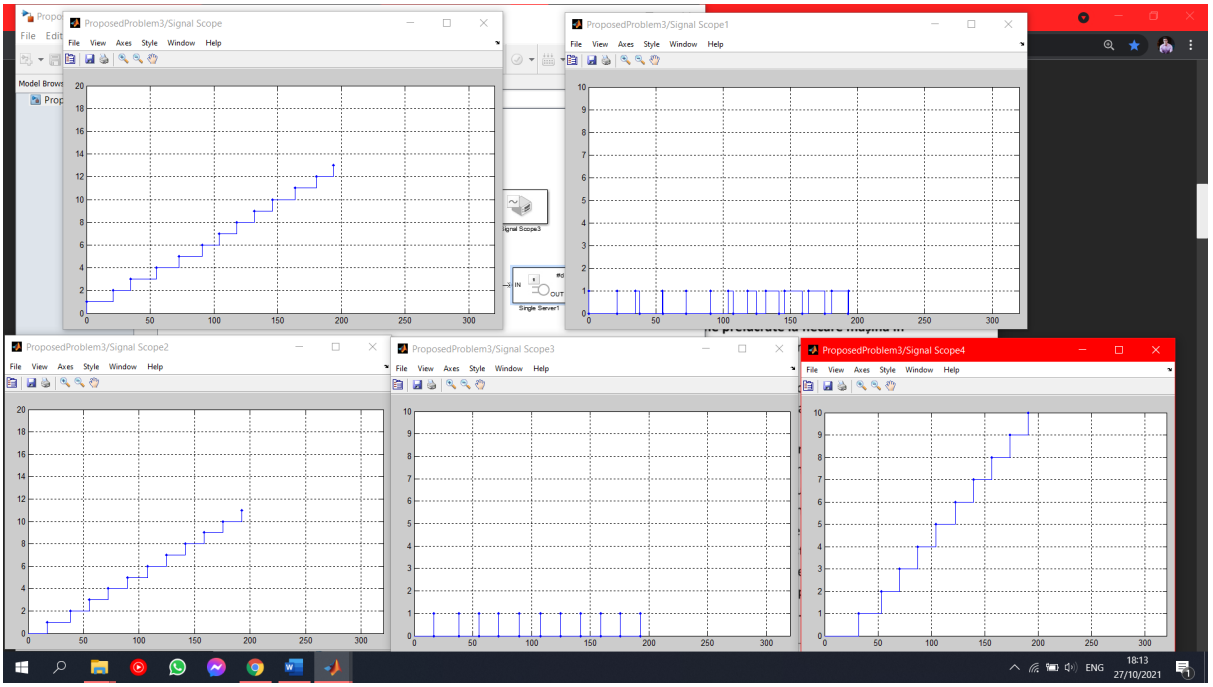


UP_LEFT entities generated
UP_RIGHT entities in first queue

DOWN_LEFT entities that went past the first service
DOWN_MIDDLE entities in the second queue
DOWN_RIGNT entities that went past the second service

Problem 4:

We updated the second service time to 15 seconds and we ran the simulation again



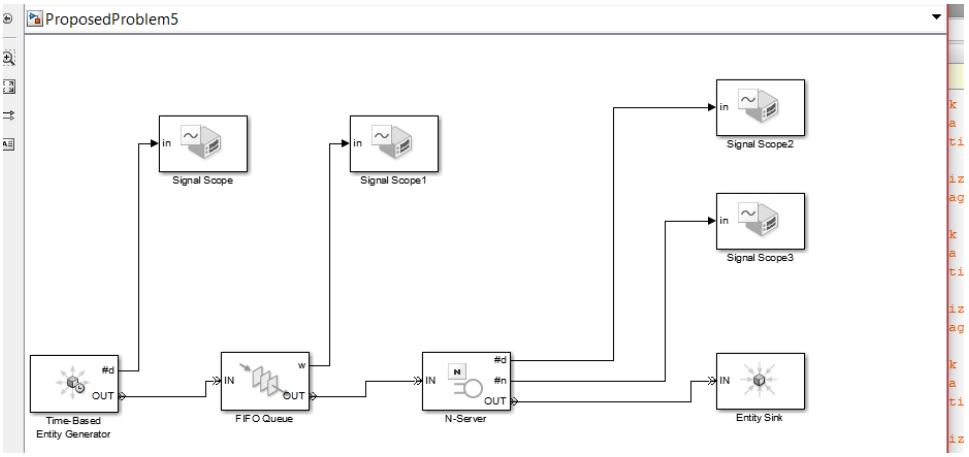
UP_LEFT entities generated
UP_RIGHT entities in first queue

DOWN_LEFT entities that went past the first service
DOWN_MIDDLE entities in the second queue
DOWN_RIGNT entities that went past the second service

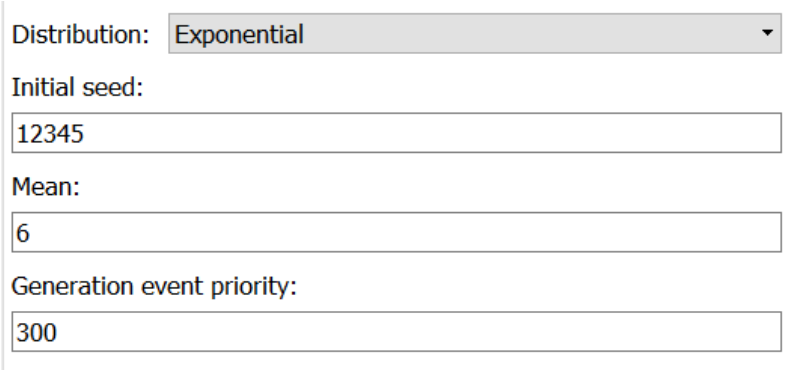
In the second queue we only ever have one entity because the first service always processes entities slower than the second one so they can pass directly. In fact in this scenario there isn't even a need for a second queue.

Problem 5:

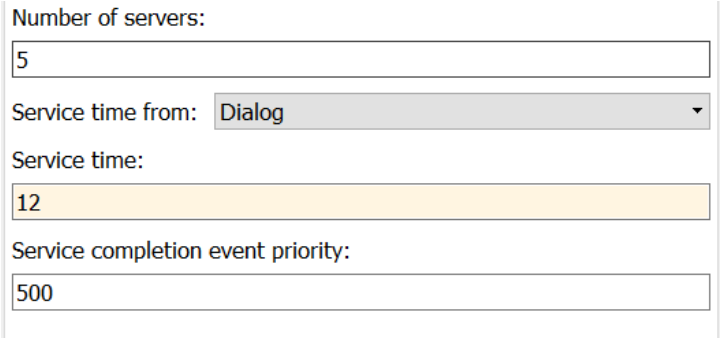
We use the following schema:



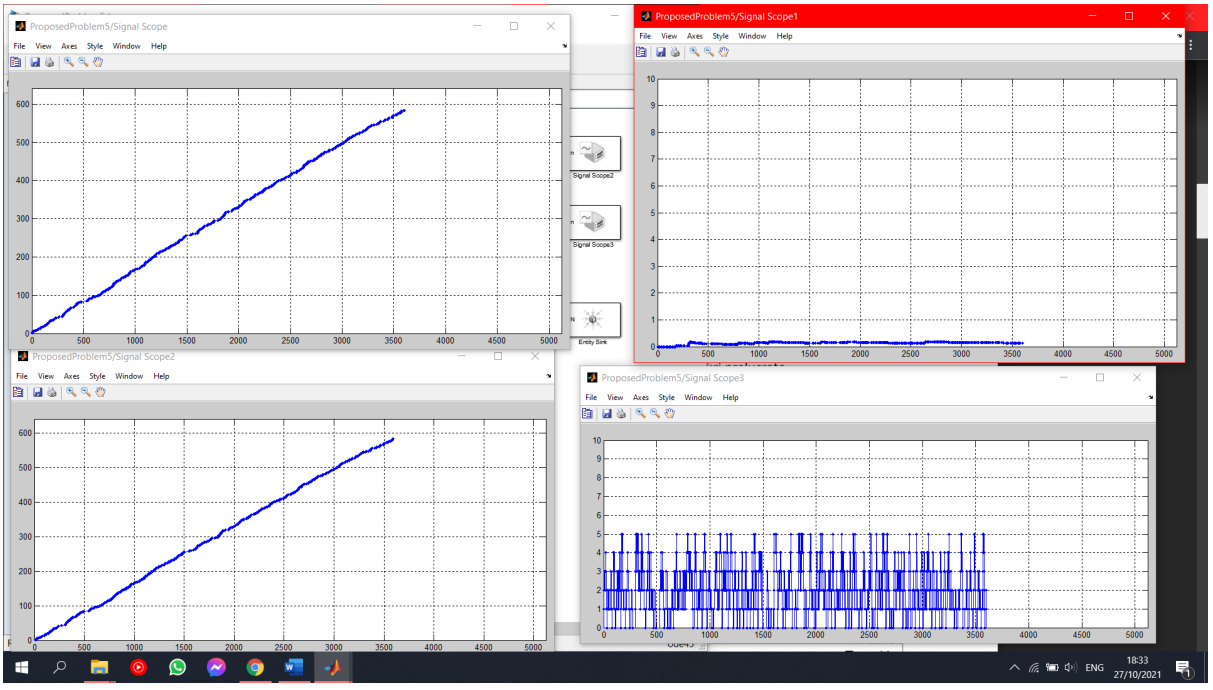
We set the entity generator to exponential and the interval to 6s = 0.1m



We set the serving capacity of the n-server to 5 as required and the serving time to 12s = 0.2m:



We simulate the following scheme for 1h = 3600s

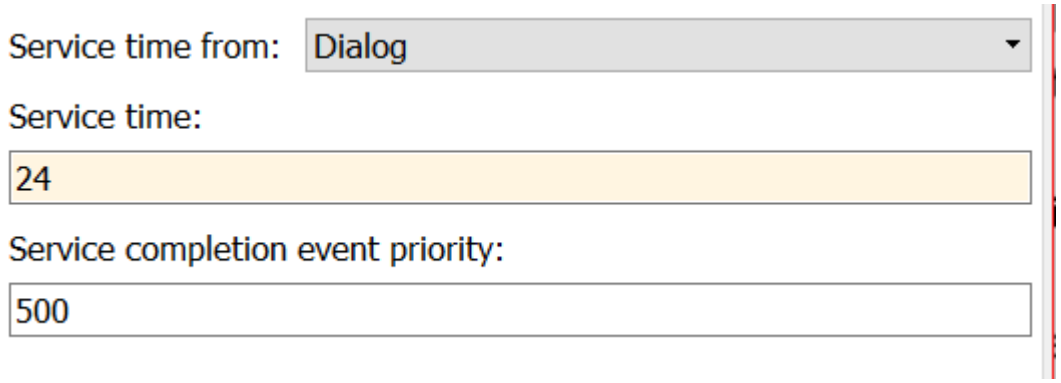


UP_LEFT entities generated
UP_RIGHT the time of waiting in queue

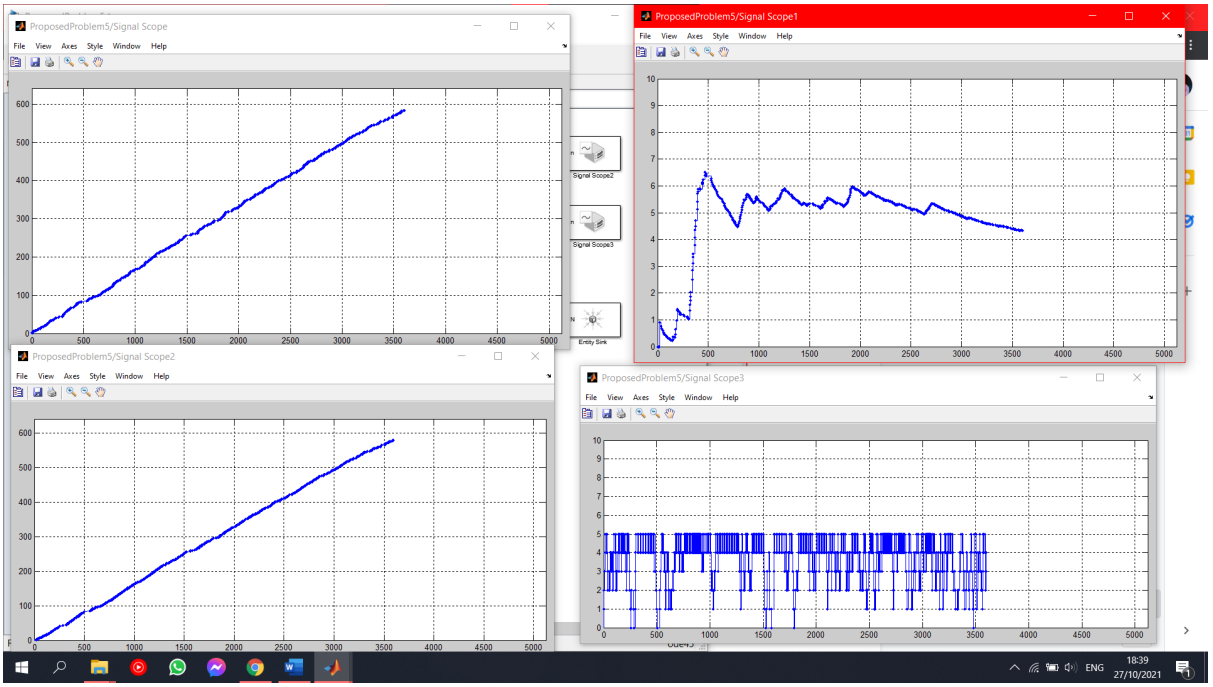
DOWN_LEFT entities that went past the service
DOWN_RIGNT entities that are being served simultaneously

Problem 6:

We changed the serving time to 0.4 minutes



Now we run the simulation again:

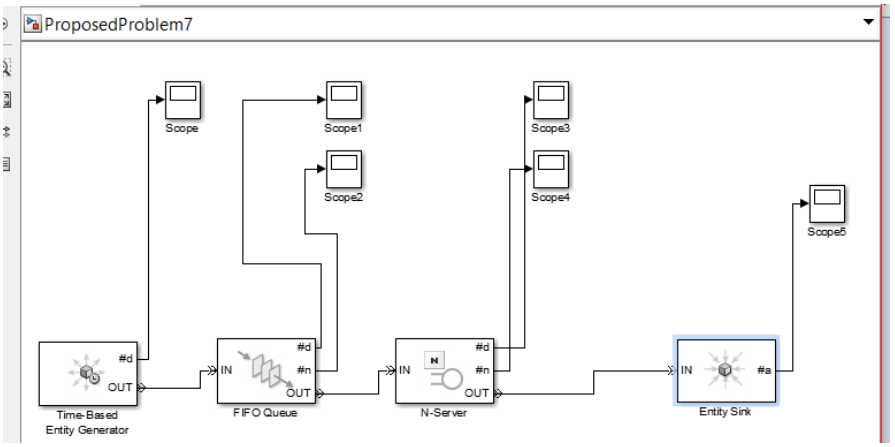


UP_LEFT entities generated
UP_RIGHT the time of waiting in queue

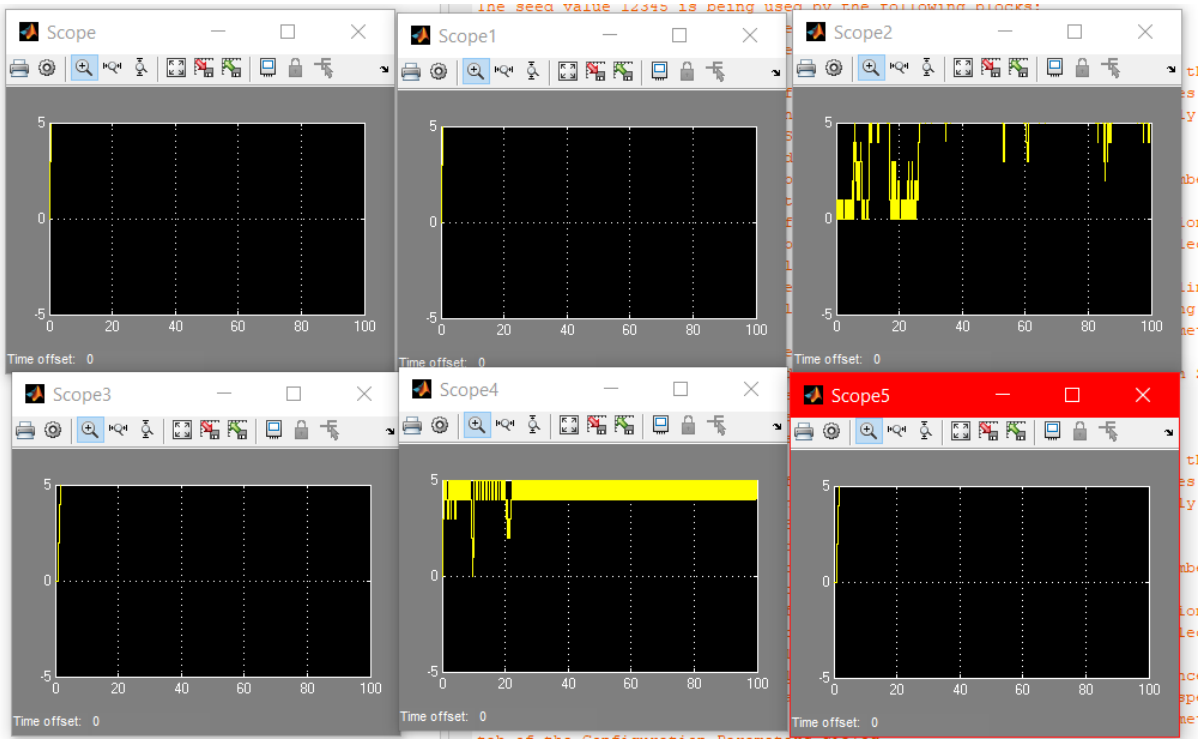
DOWN_LEFT entities that went past the service
DOWN_RIGNT entities that are being served simultaneously

Problem 7:

We have the following schema:

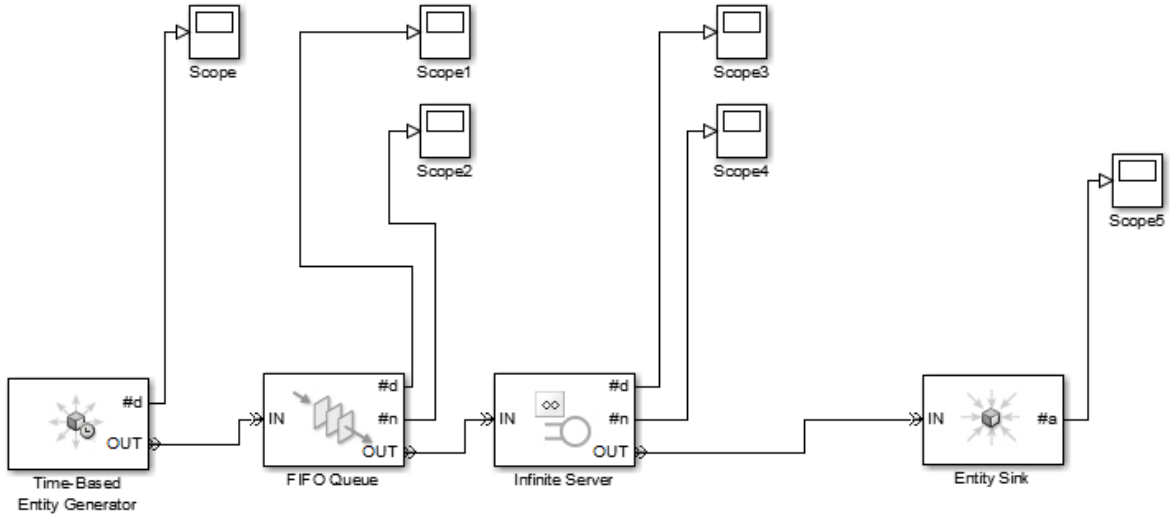


We have the following result:



Problem 8:

We have the following schema:



We have the following result: