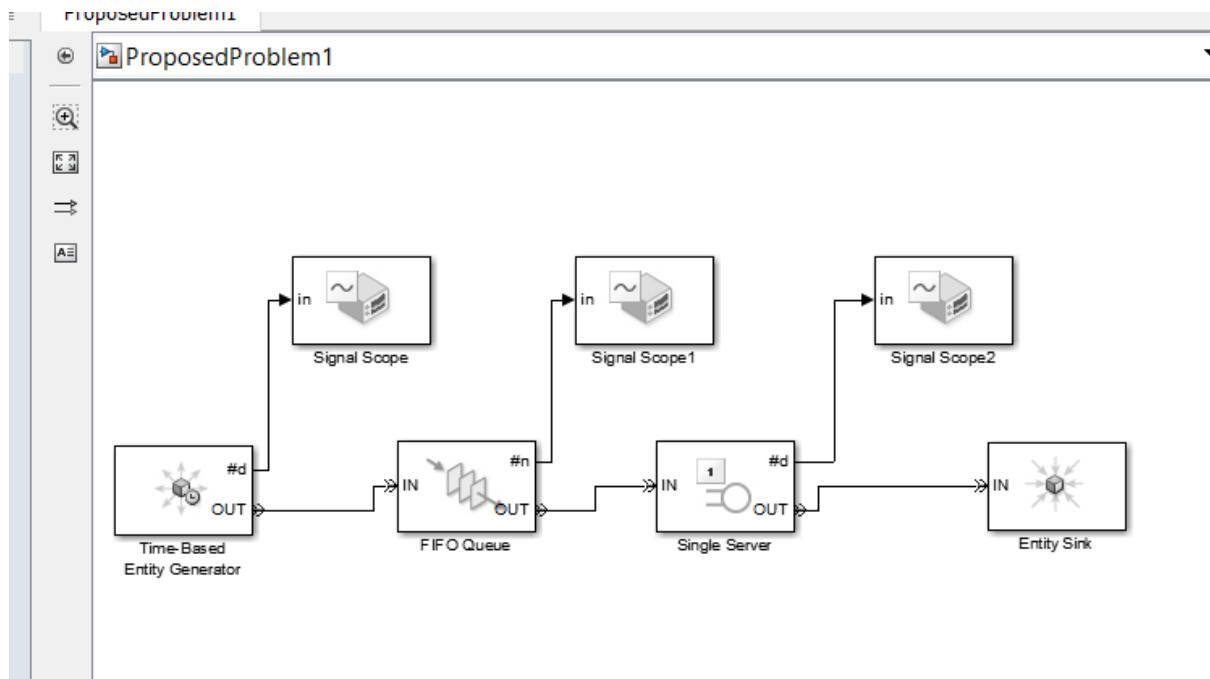


# Laboratory 2 MS

## Problem 1:

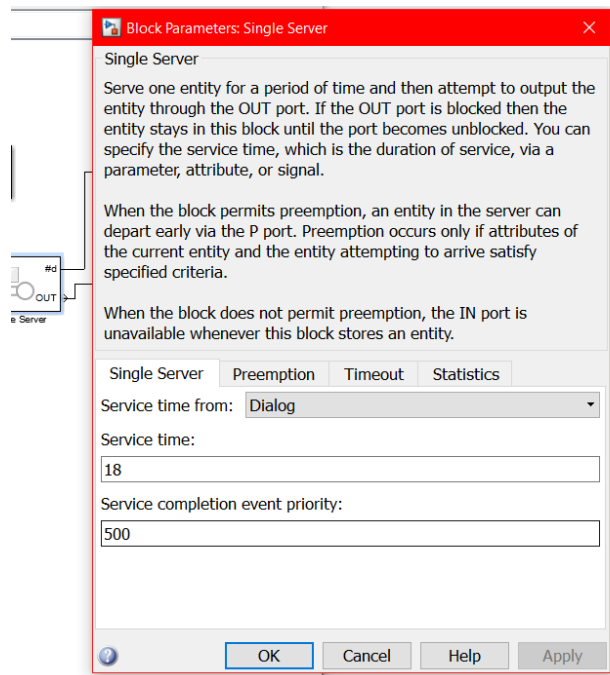
We are using the following schema:



Arrival time of  $18 \pm 6$  seconds translates to the following Entity generator:

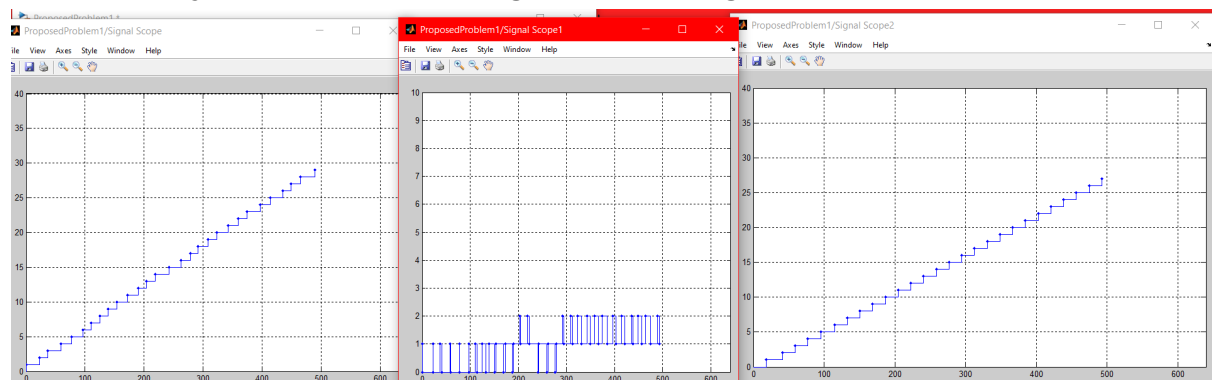
The screenshot shows the 'Block Parameters: Time-Based Entity Generator' dialog box. The 'Entity Generation' tab is selected. The 'Generate entities upon:' dropdown is set to 'Intergeneration time from dialog'. The 'Distribution:' dropdown is set to 'Uniform'. The 'Initial seed:' field contains the value '12345'. The 'Minimum:' field contains the value '12'. The 'Maximum:' field contains the value '24'. The 'Generation event priority:' field contains the value '300'. The checkbox 'Generate entity at simulation start' is checked. The dialog box has 'OK', 'Cancel', 'Help', and 'Apply' buttons at the bottom.

The processing time is set in the single server:



sosesc la int  
e generate aş  
şi 2000s. Se  
uri prelucrate  
ot durează 20  
sosesc la int  
durată 17s şi  
te la fiecare  
fişa numărul  
te.  
nu i lot durezza  
doua maşini  
ratori. Orice  
onţială cu  
iza un multi  
fişa numărul

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

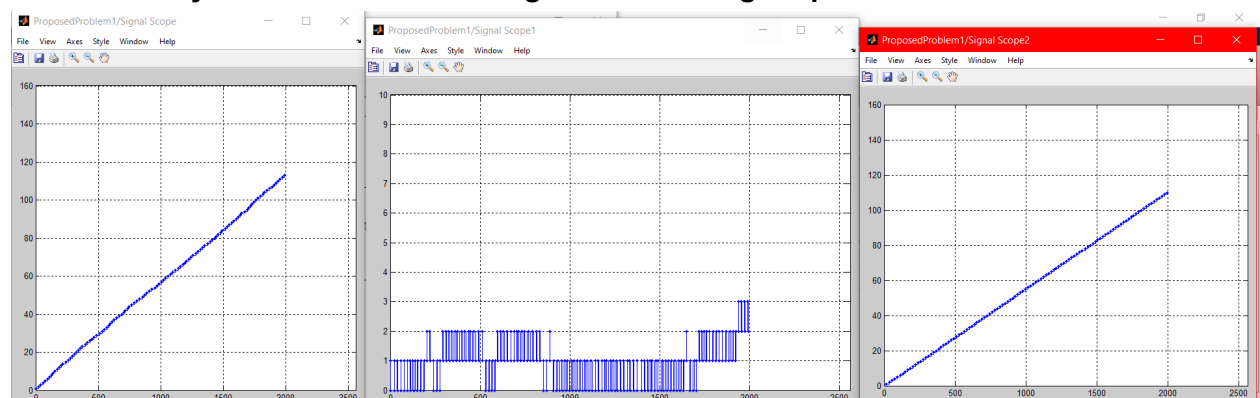


**LEFT: generated lots**

**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:

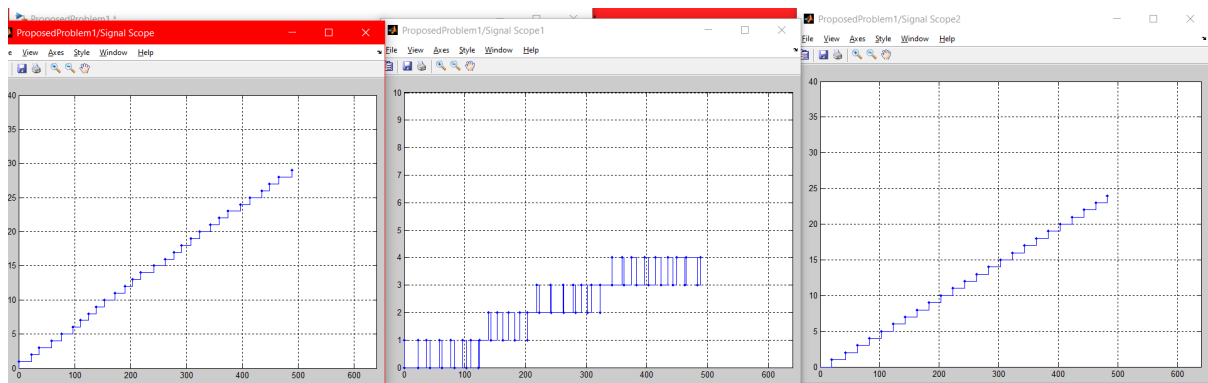
We changed the service time here:

Service time:

Service completion event priority:

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

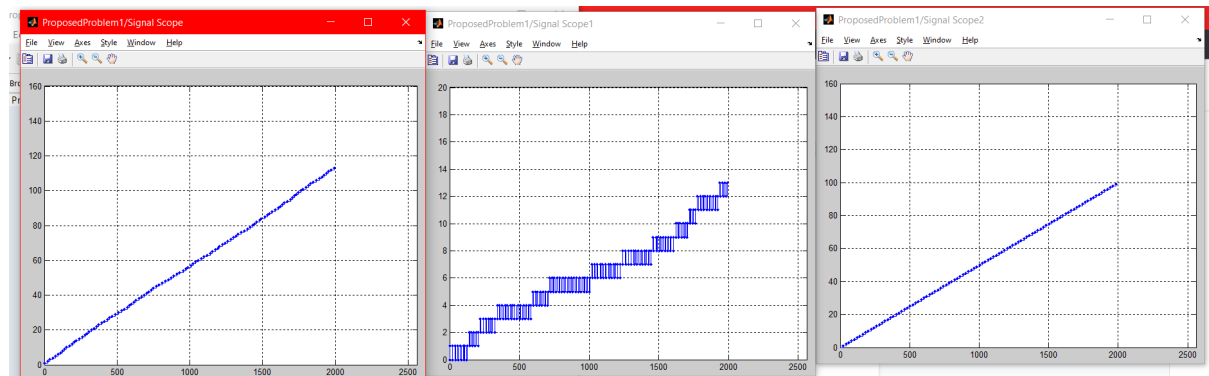
If we run the simulation for 500 seconds we get:



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

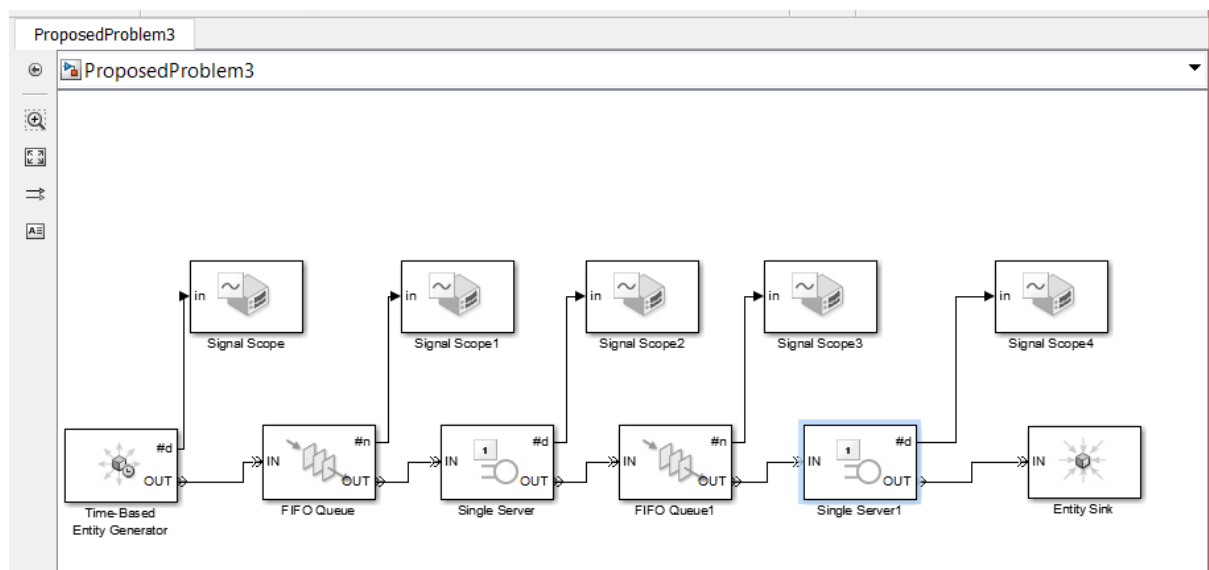
**LEFT: generated lots**

**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:

Initial seed:

Minimum:

Maximum:

Generation event priority:

### First service:

Service time:

17

Service completion event priority:

500

### Second service:

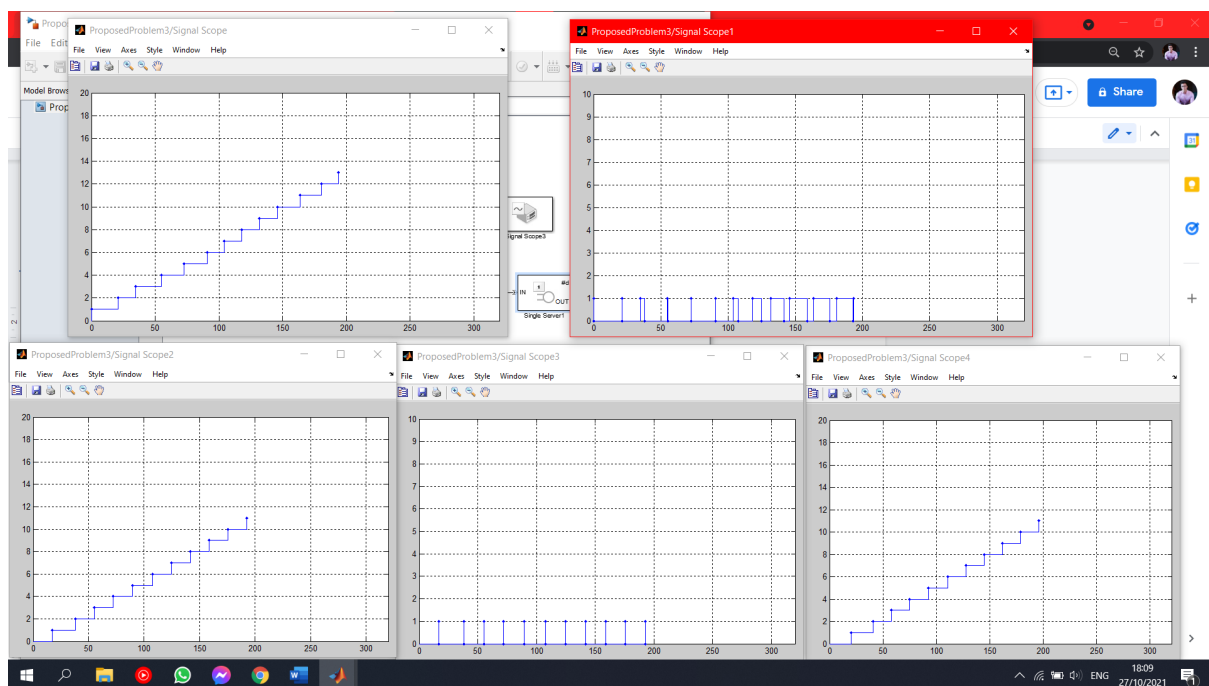
Service time:

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

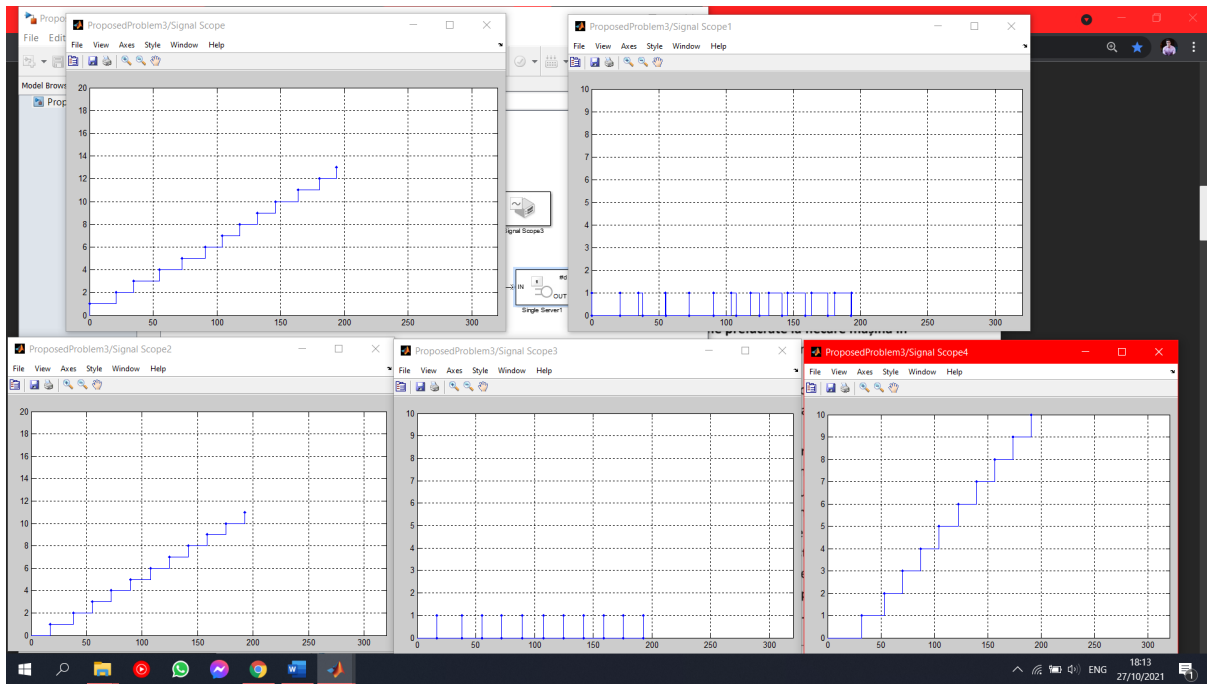
DOWN\_LEFT entities that went past the first service

DOWN\_MIDDLE entities in the second queue

DOWN\_RIGHT entities that went past the second service

### Problem 4:

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



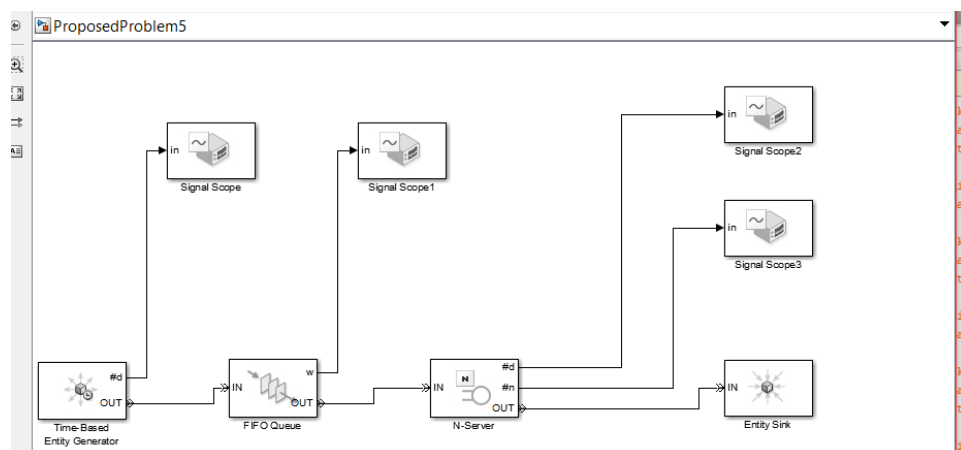
**UP\_LEFT** entities generated  
**UP\_RIGHT** entities in first queue

**DOWN\_LEFT** entities that went past the first service  
**DOWN\_MIDDLE** entities in the second queue  
**DOWN\_RIGHT** 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  $6s = 0.1m$

Distribution:

Initial seed:

Mean:

Generation event priority:

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

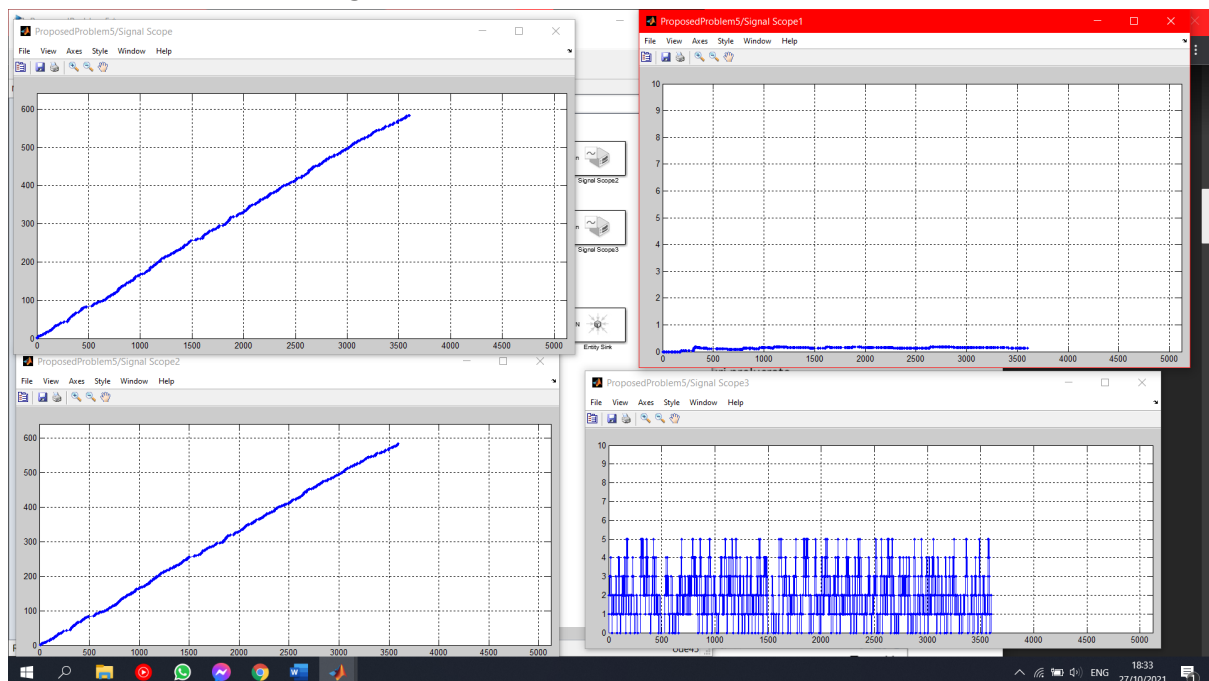
Number of servers:

Service time from:

Service time:

Service completion event priority:

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:

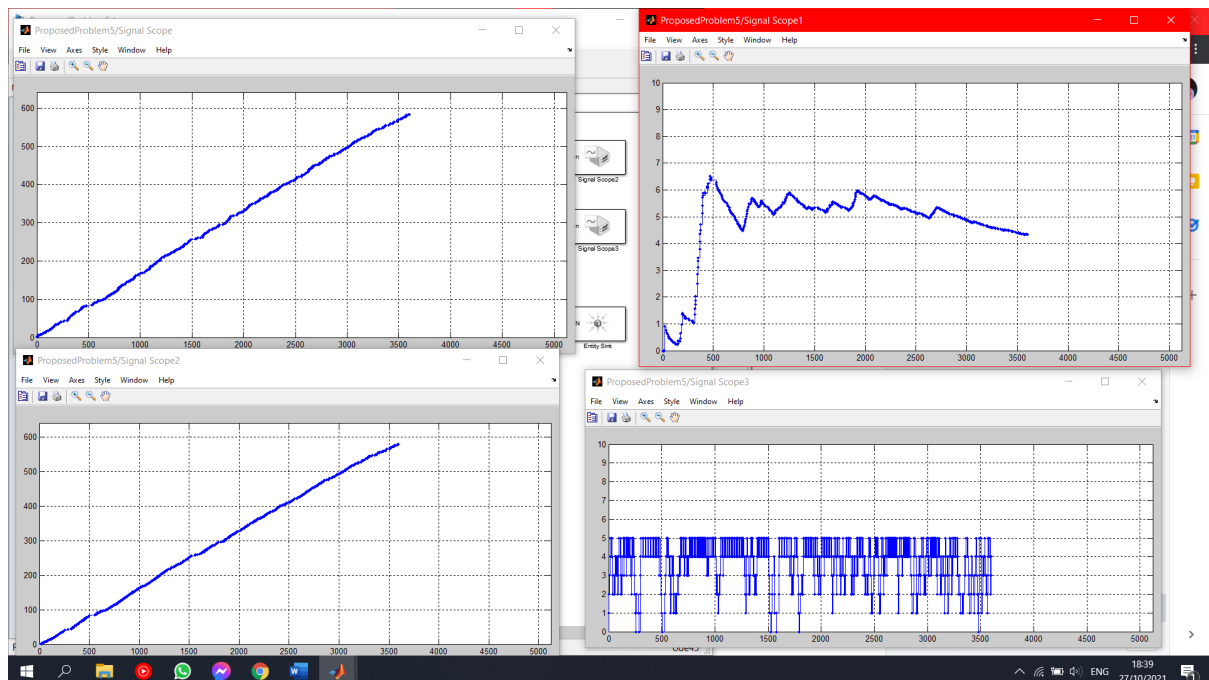
We changed the serving time to 0.4 minutes

Service time from:

Service time:

Service completion event priority:

Now we run the simulation again:



UP\_LEFT entities generated

UP\_RIGHT the time of waiting in queue

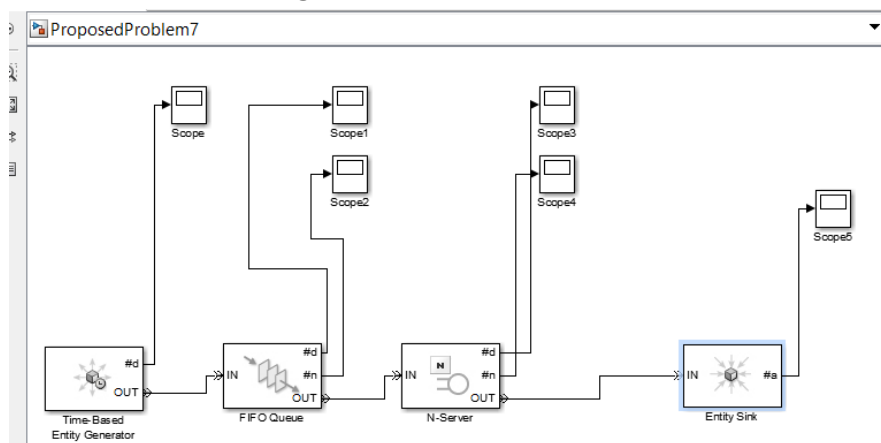
DOWN\_LEFT entities that went past the service

DOWN\_RIGHT entities that are being served simultaneously

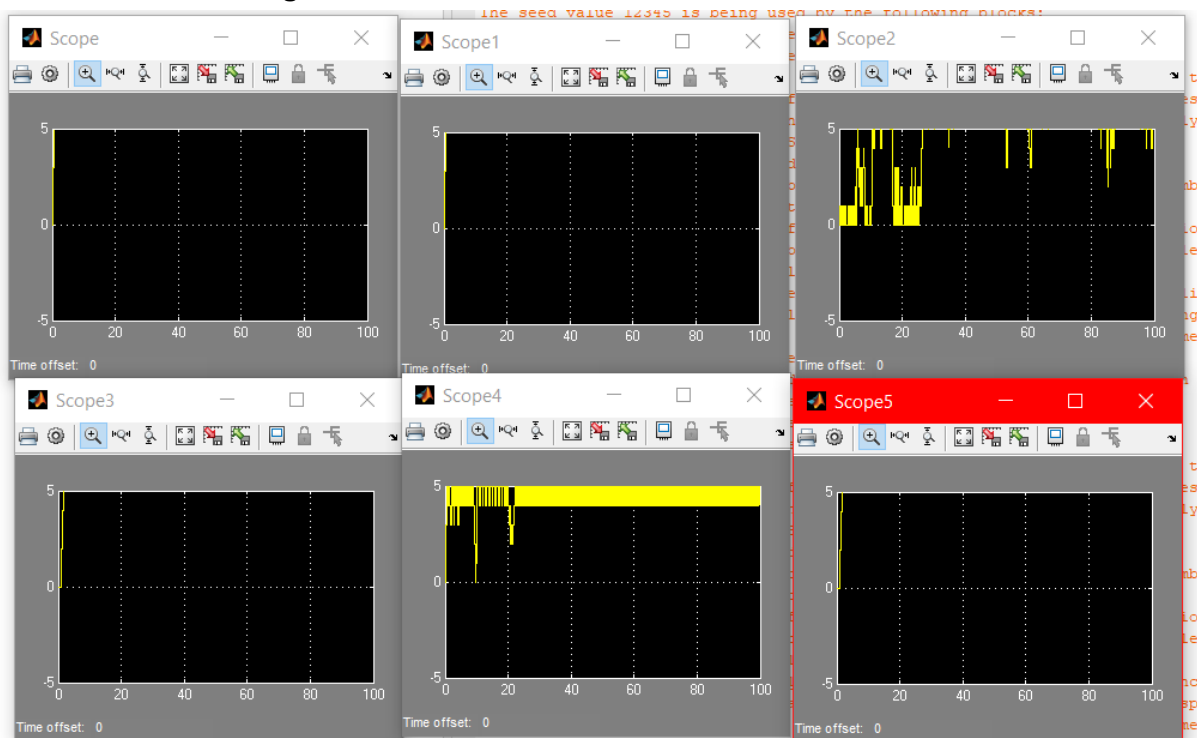


## Problem 7:

We have the following schema:

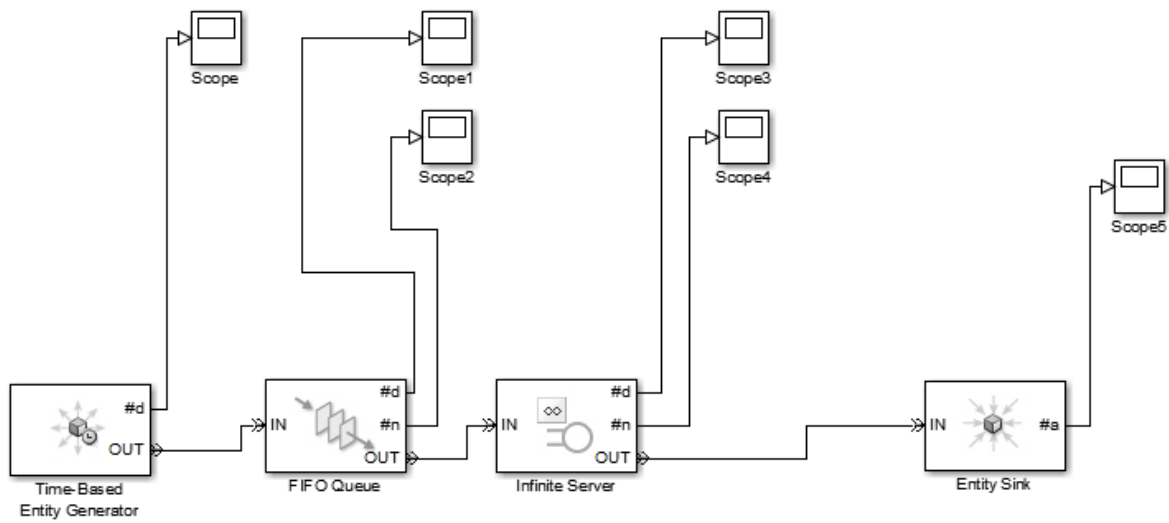


We have the following result:



## Problem 8:

We have the following schema:



We have the following result:

