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Subject: Teletraffic Theory.

HOMEWORK 1

Example of a System Model with a Single Server

For the creation of the example I used the programming language R.

The system model was proposed with the next vector that contains 15 random values:

```
load_vector <- c(0,1,4,2,0,4,7,0,2,7,3,2,4,0,1)
```

Image 1 – System Load vector.

For this System Load vector the calculations were as follows:

$$L_{Srv} = \frac{11}{15} \ , \ L_q = \frac{26}{15} \ , \ L_{Sys} = \frac{37}{15}$$


```
>
> #1. Average Server Utility(load) in the given time interval.
> avarage_su
[1] 0.7333333
>
> #2. The Average Queue Length.
> avarage_ql
[1] 1.733333
>
> #3. The Average Number of Jobs in the System.
> avarage_nj
[1] 2.466667
```

Image 2 – System Model Calculations

For the plot of the System model I used the following code:


```
plot(load_vector, xlim = c(0,15), type="S",
     xlab= "Time", ylab= "Jobs in the System")
grid(lty = "dotted")
```
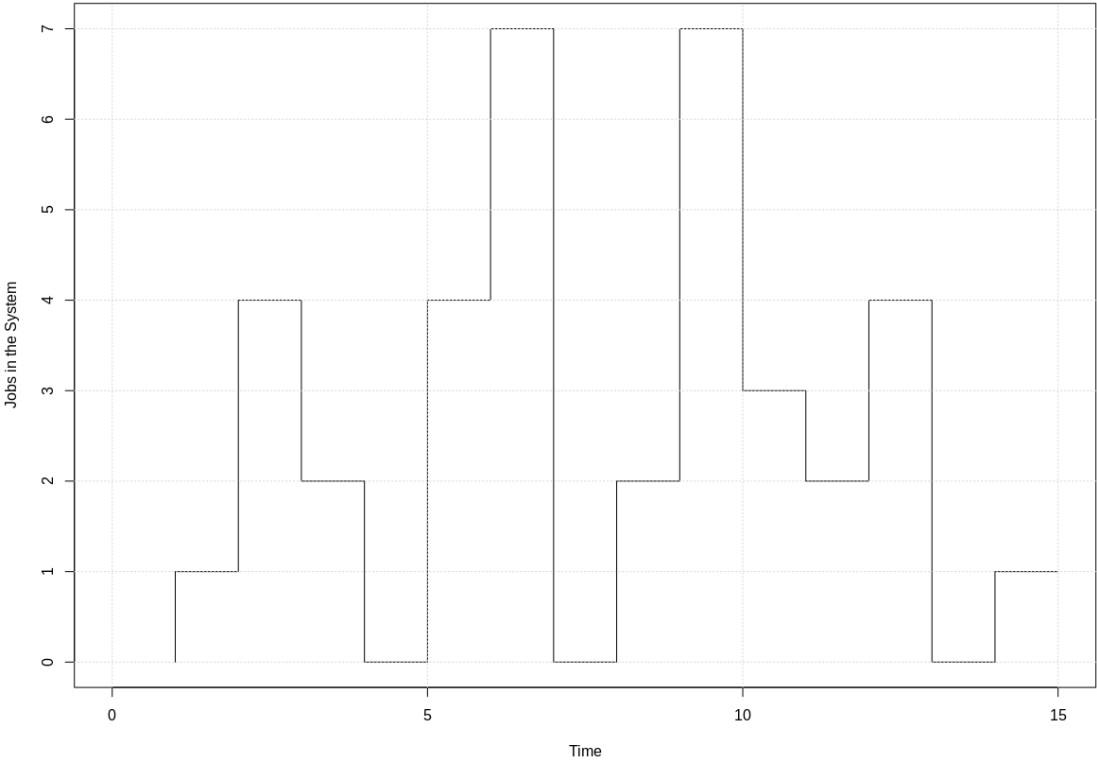
Finally, the graph result in the following way:

Image 3 –System Load Plot.