rpractice

November 2, 2017

```
In [2]: qd <- read.table("queuedata.txt",header=T)
        qd
```

time	num
0	0
5	1
10	3
15	1
20	1
25	2
30	4
35	5
40	5
45	4
50	7
55	5
60	4
65	6
70	5
75	8
80	4
85	6
90	5
95	4
100	3
105	6
110	5
115	4
120	5

```
In [3]: summary(qd)
```

```
      time           num       
 Min.   :  0   Min.   :0.00  
 1st Qu.: 30   1st Qu.:3.00  
 Median : 60   Median :4.00  
 Mean   : 60   Mean   :4.12  
 3rd Qu.: 90   3rd Qu.:5.00  
```

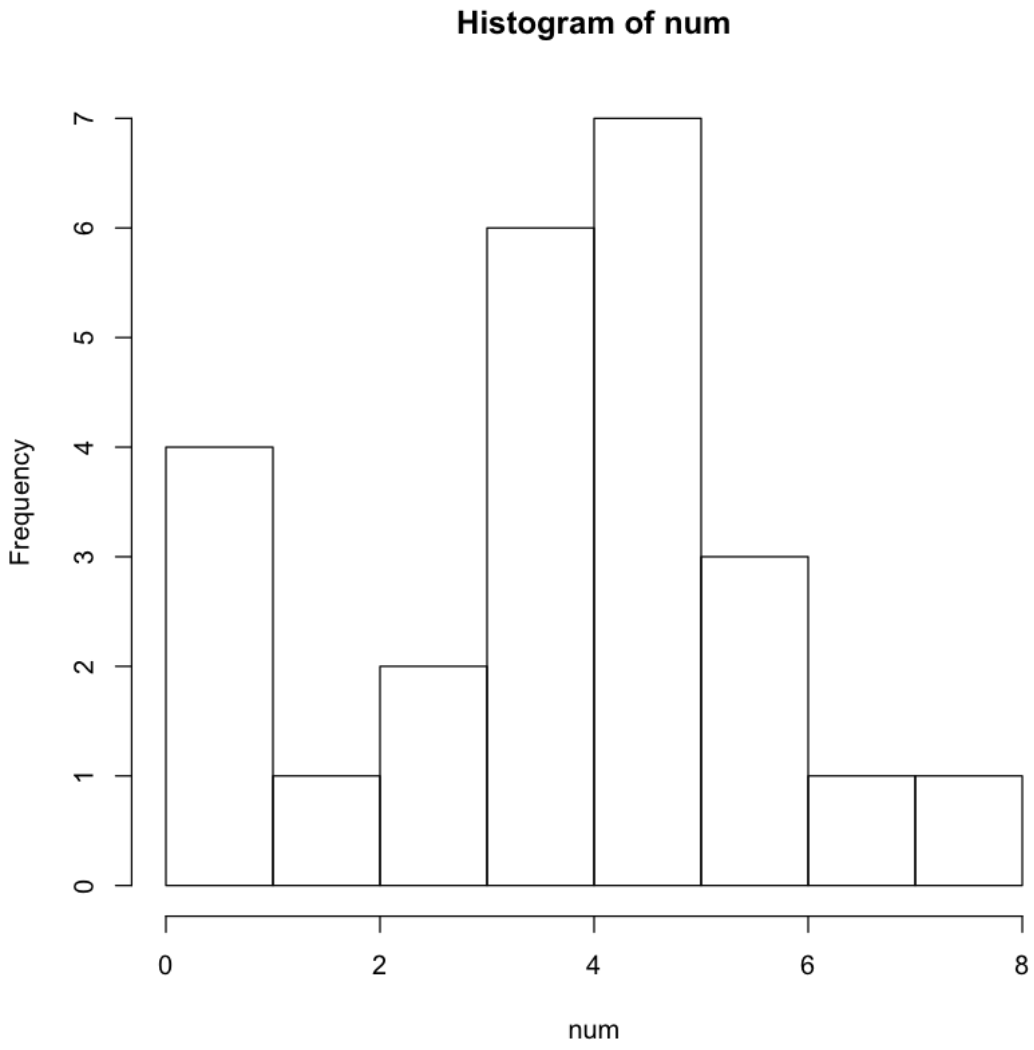
```
 Max.   :120    Max.   :8.00
```

```
In [4]: names(qd)
```

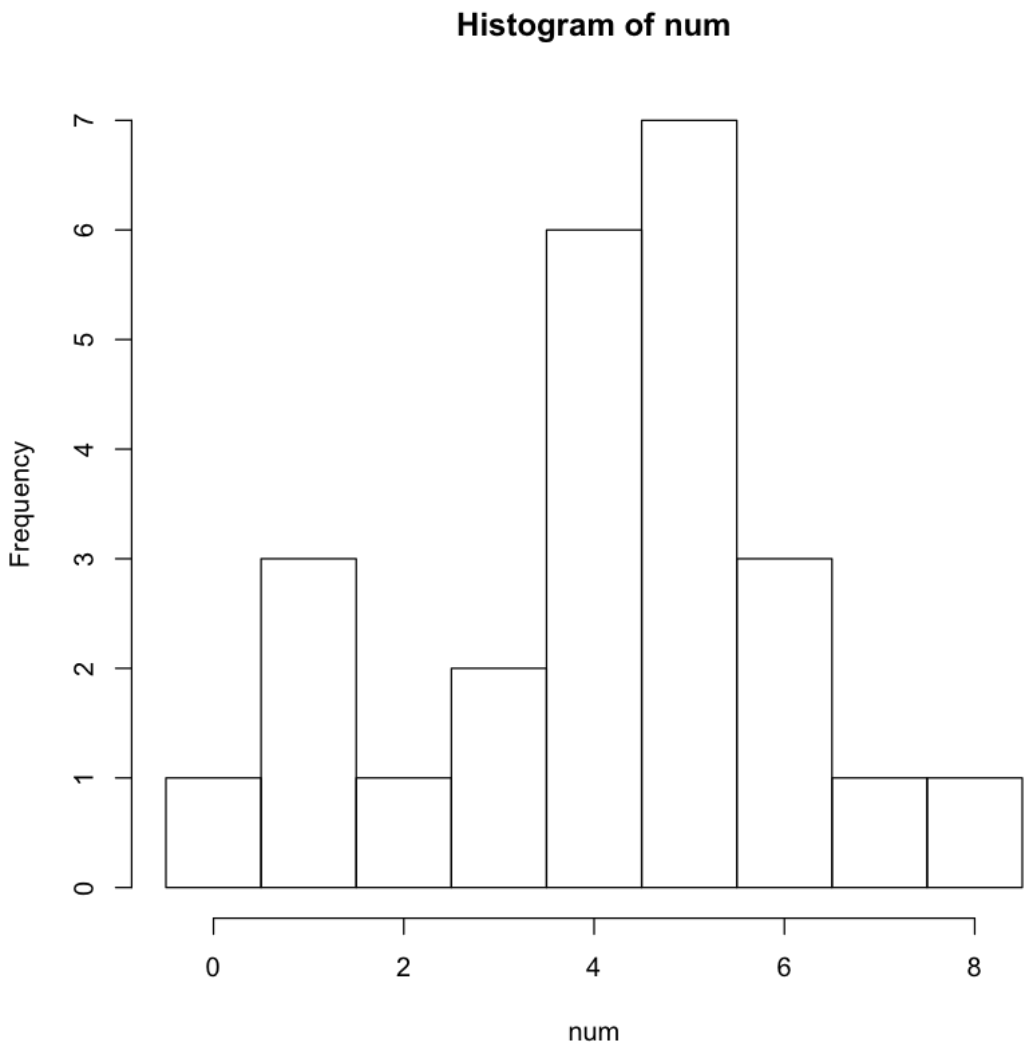
1. 'time' 2. 'num'

```
In [5]: attach(qd)
```

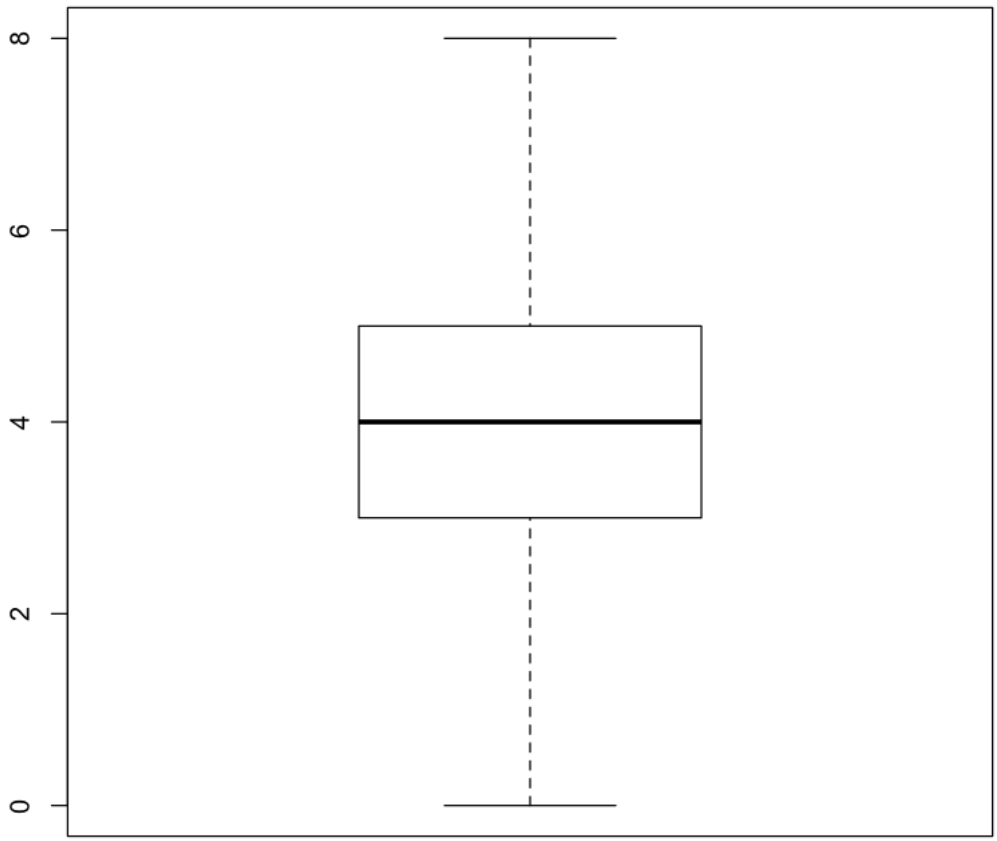
```
In [6]: hist(num)
```



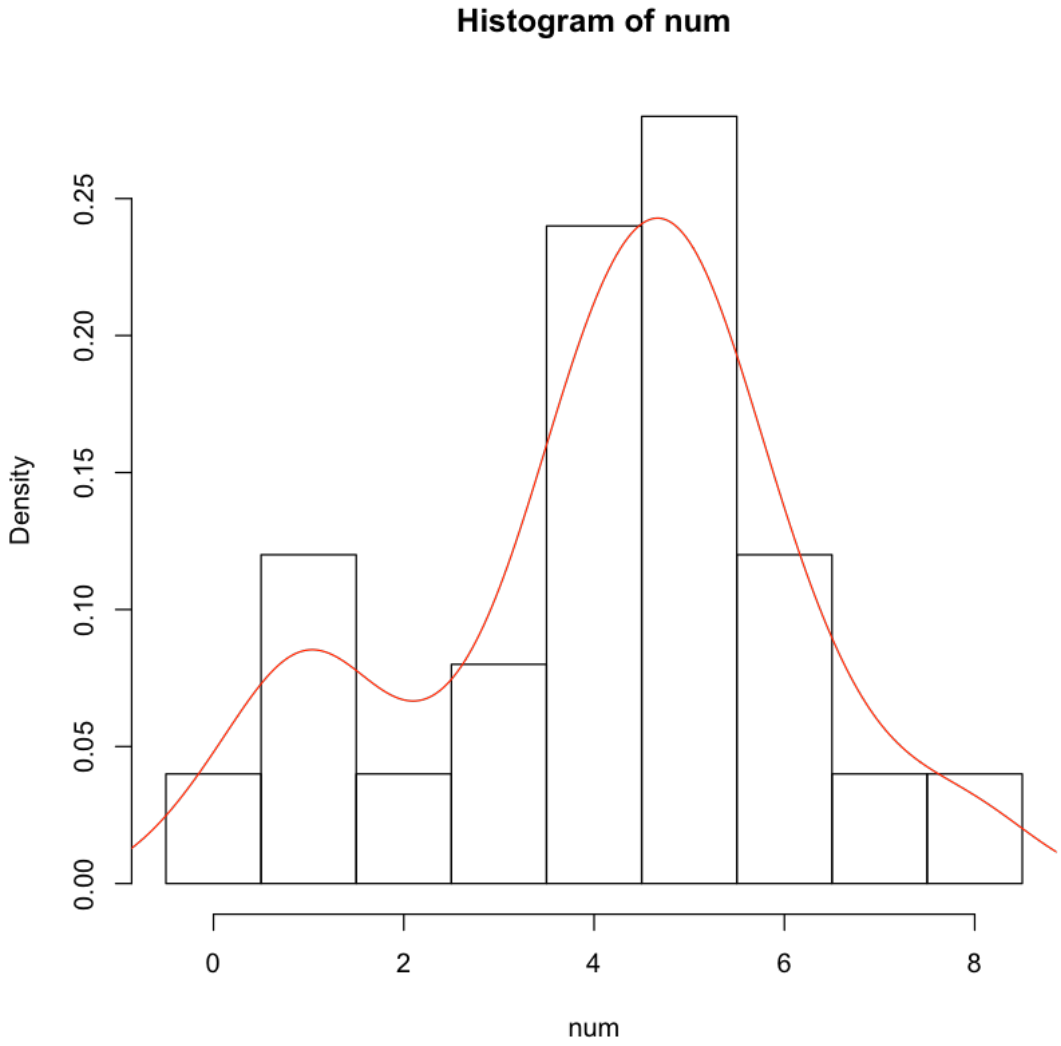

```
In [7]: hist( num, breaks = -0.5 + (0:9) )
```



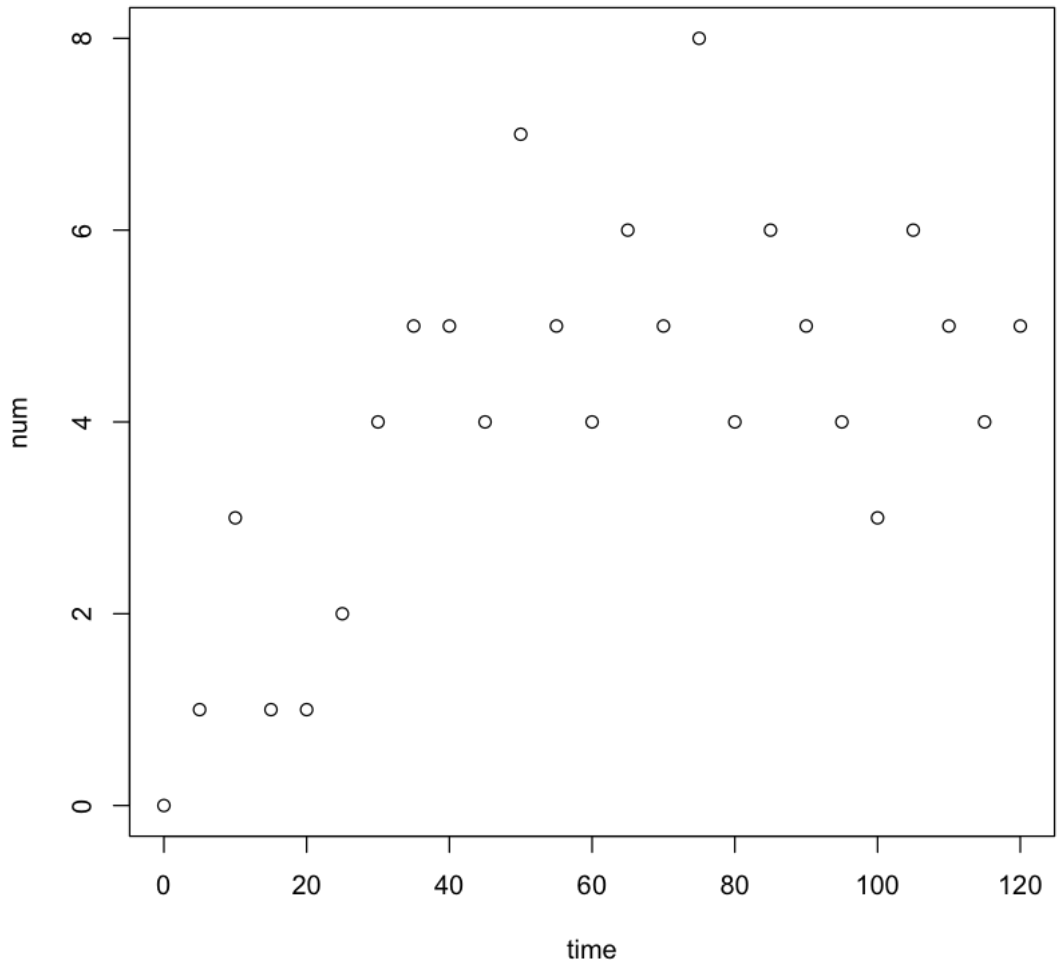

```
In [8]: boxplot(num)
```



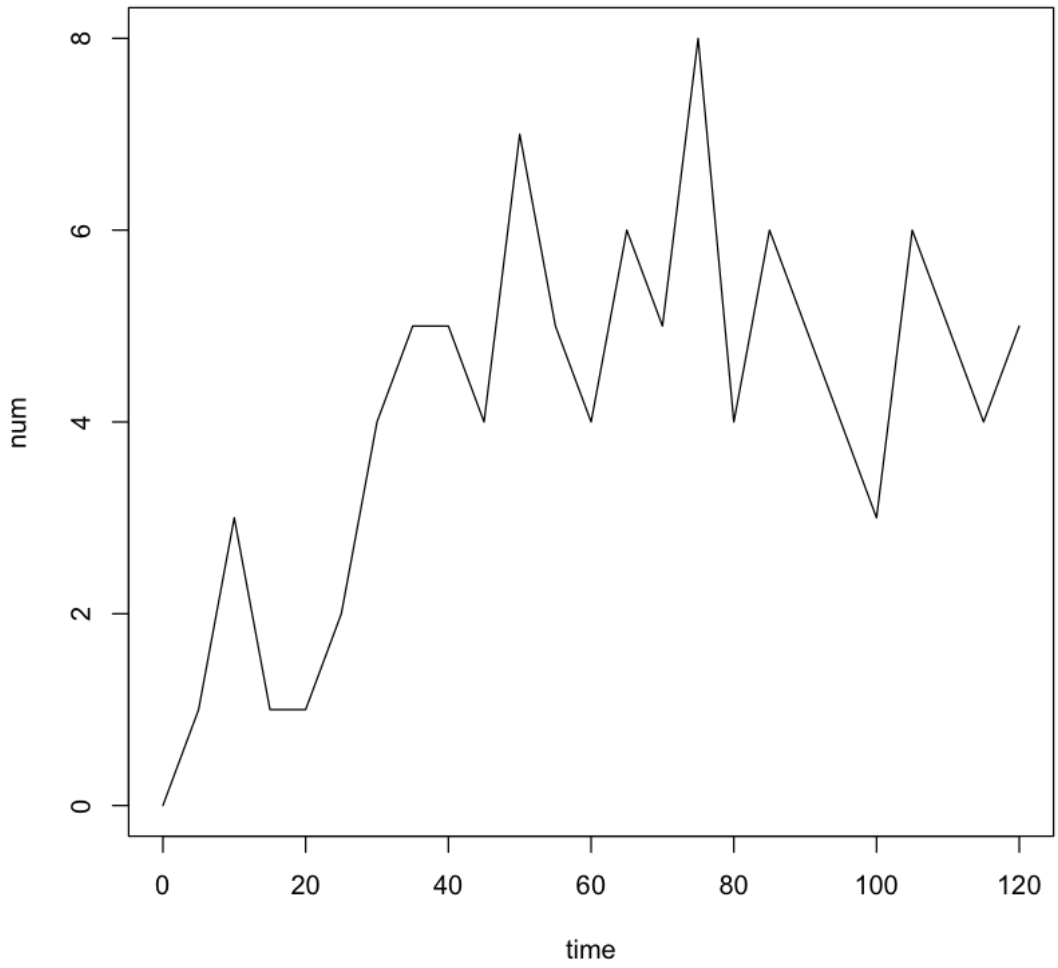

```
In [9]: hist( num, breaks = -0.5 + (0:9), probability=T )
        lines( density ( num ), col="red" )
```



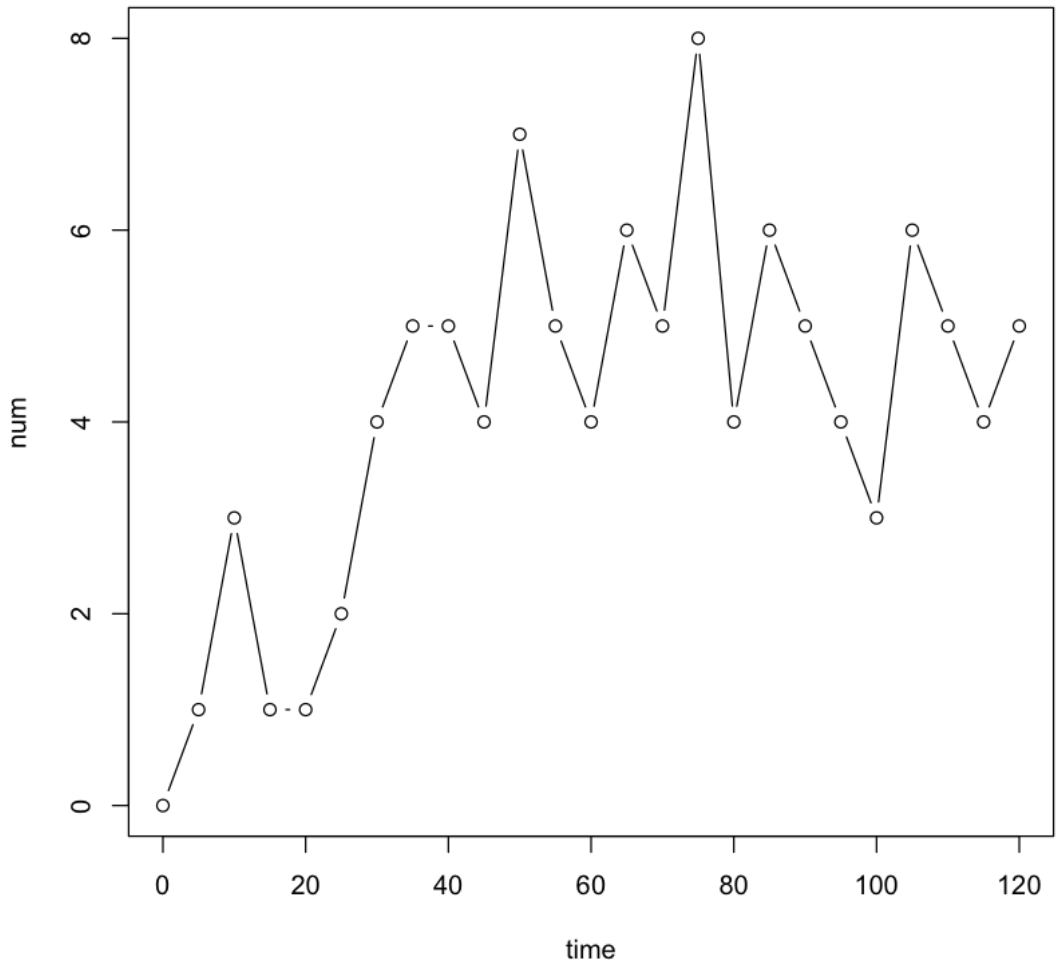

```
In [10]: plot( num ~ time )
```



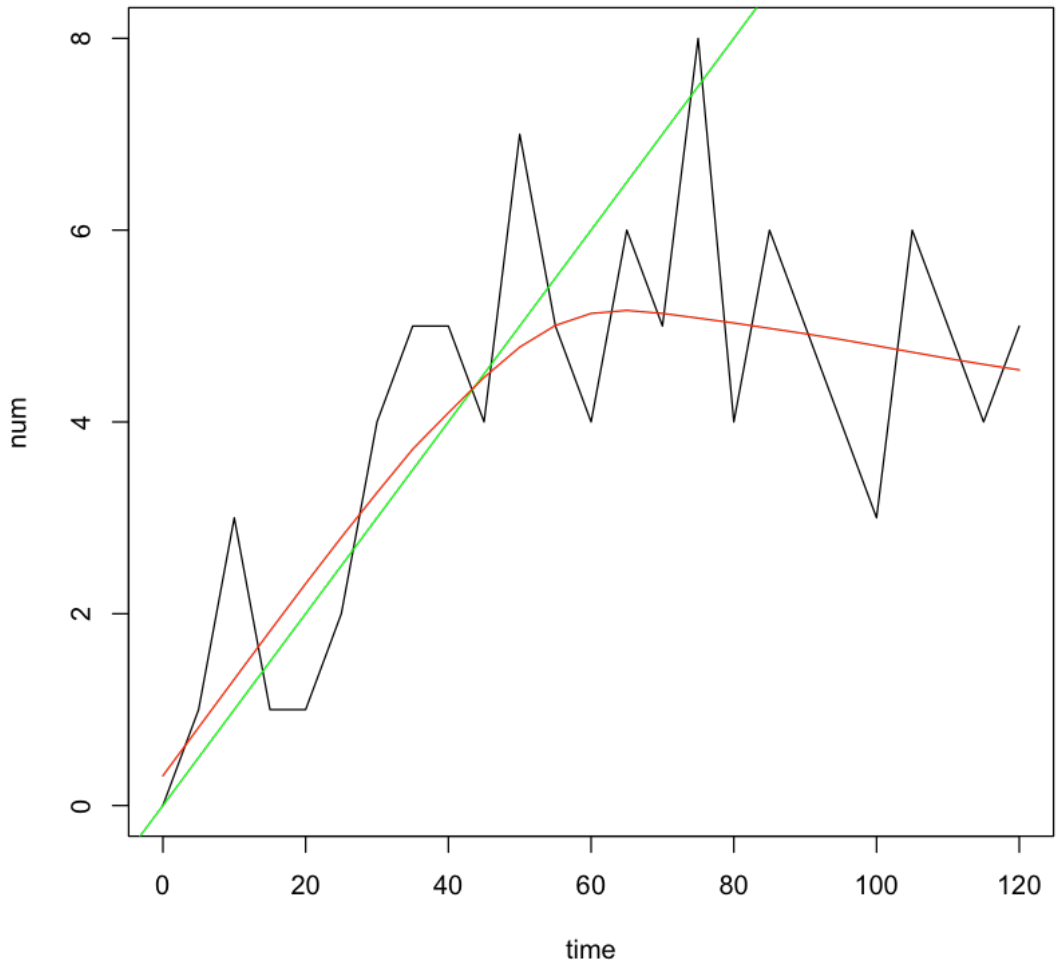

```
In [11]: plot( num ~ time, type="l" )
```



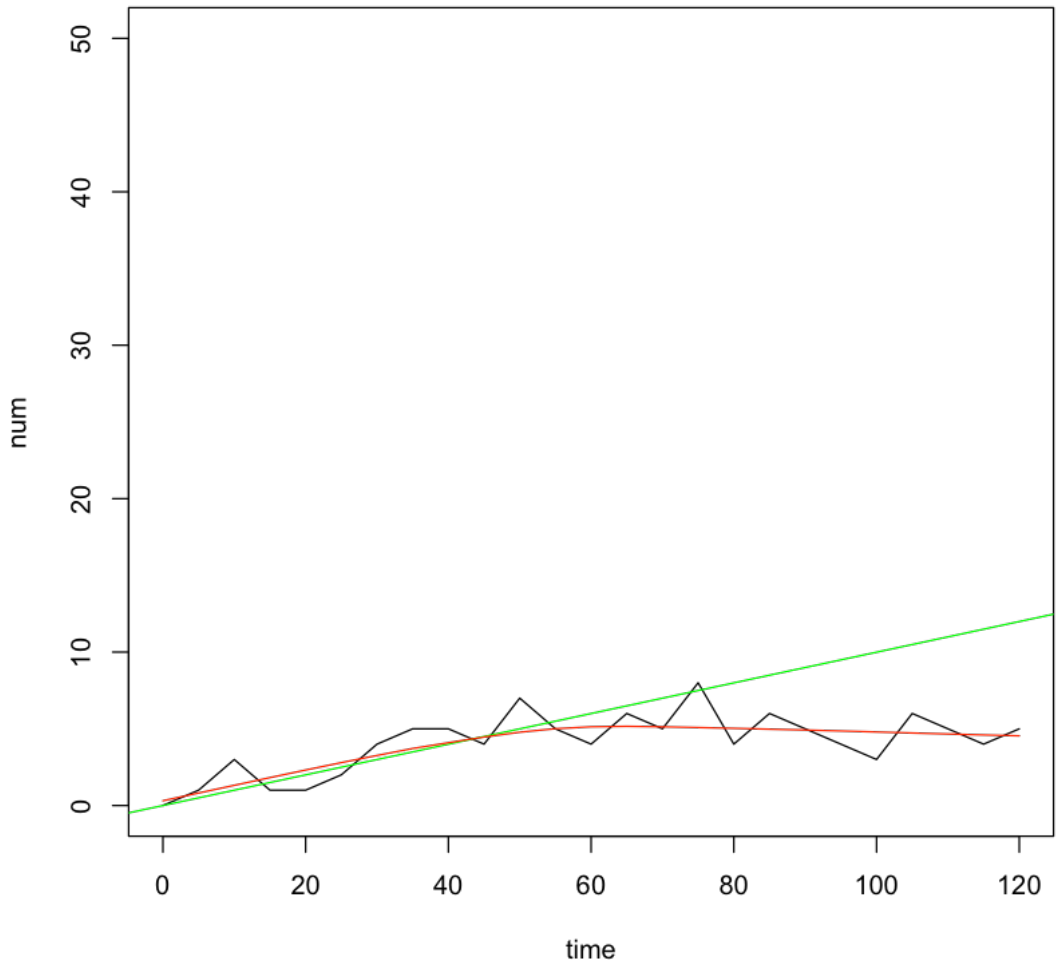

```
In [12]: plot( num ~ time, type="b" )
```



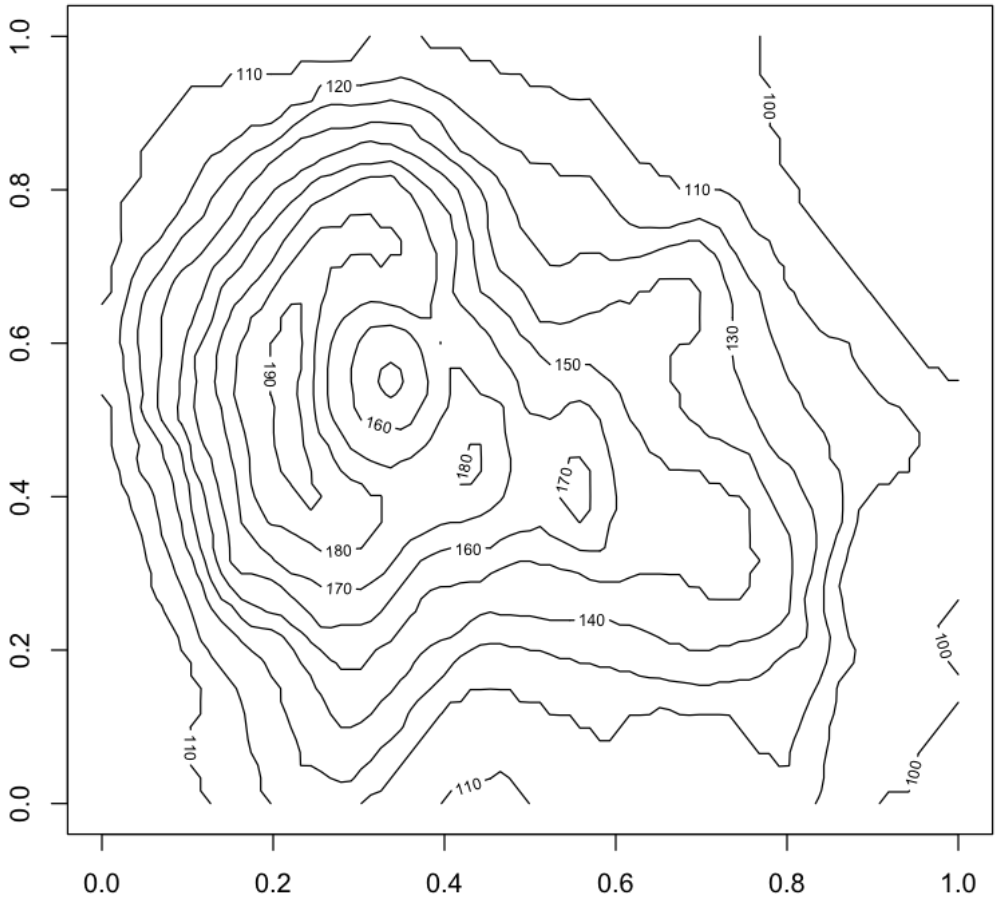

```
In [13]: plot( num ~ time, type="l" )
         abline( 0, 0.1, col="green" )
         lines( lowess( num ~ time ), col="red" )
```

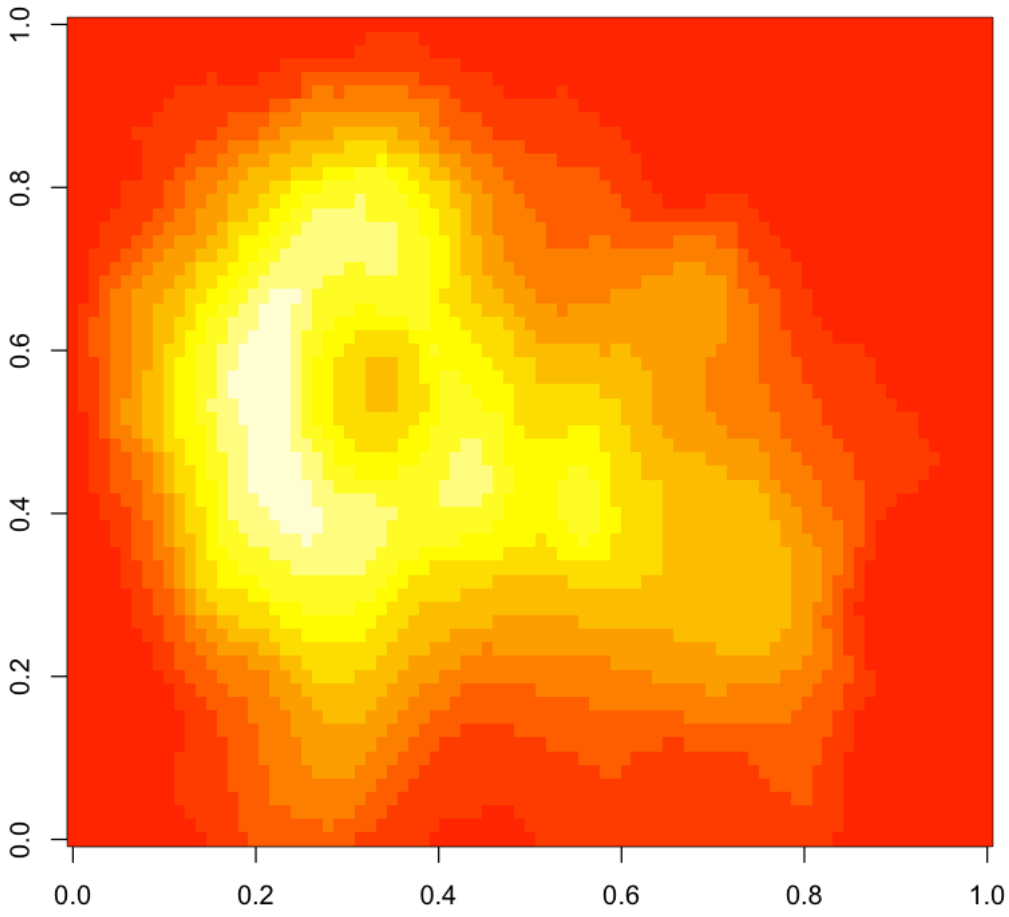


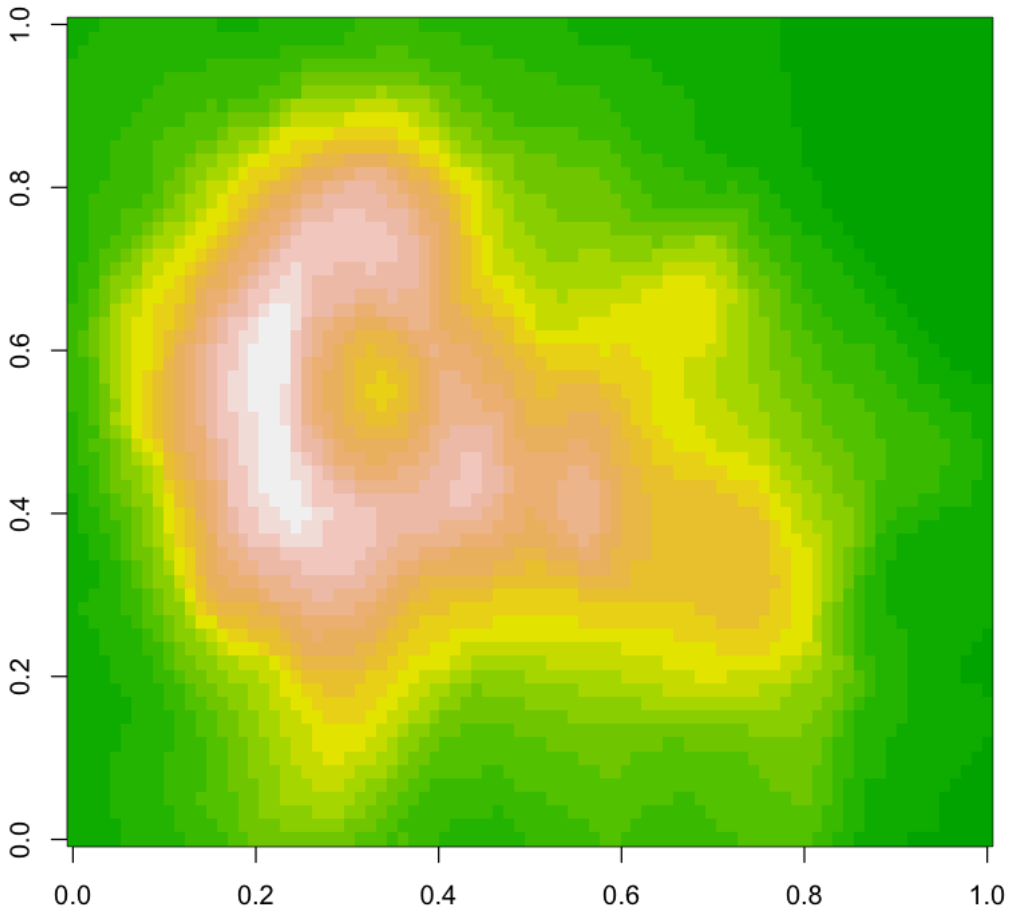

```
In [14]: plot ( num ~ time, type="l", ylim=range(0:50) )
         abline( 0, 0.1, col="green" )
         lines( lowess( num ~ time ), col="red" )
```

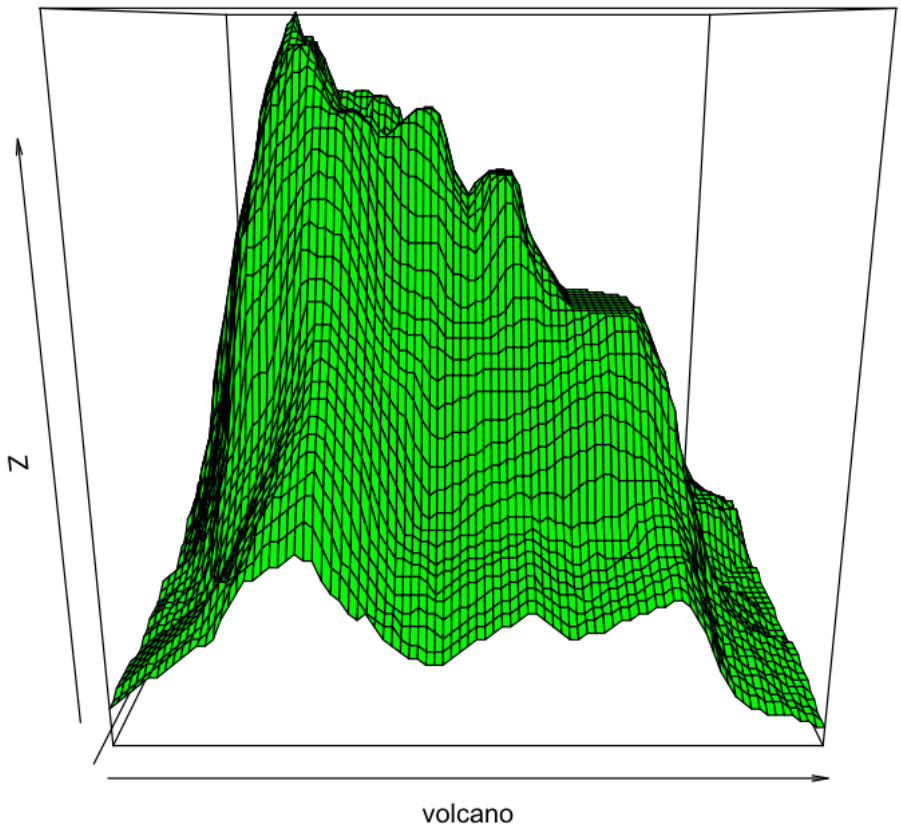


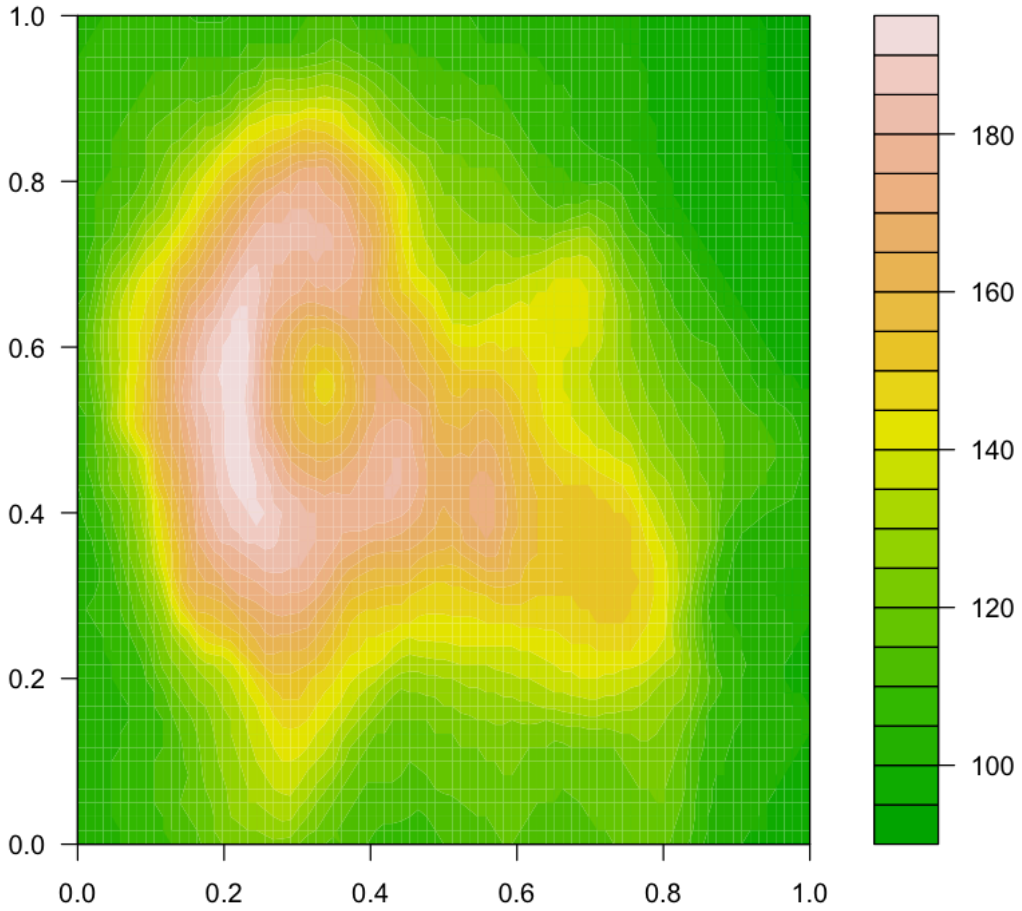

```
In [15]: data(volcano)
         contour(volcano)
         image(volcano)
         image(volcano, col=terrain.colors(20) )
         persp(volcano, col="green" )
         filled.contour ( volcano, col=terrain.colors(22) )
```


1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
110
120
100
110
130
150
190
160
180
170
180
160
170
140
100
110
110
100

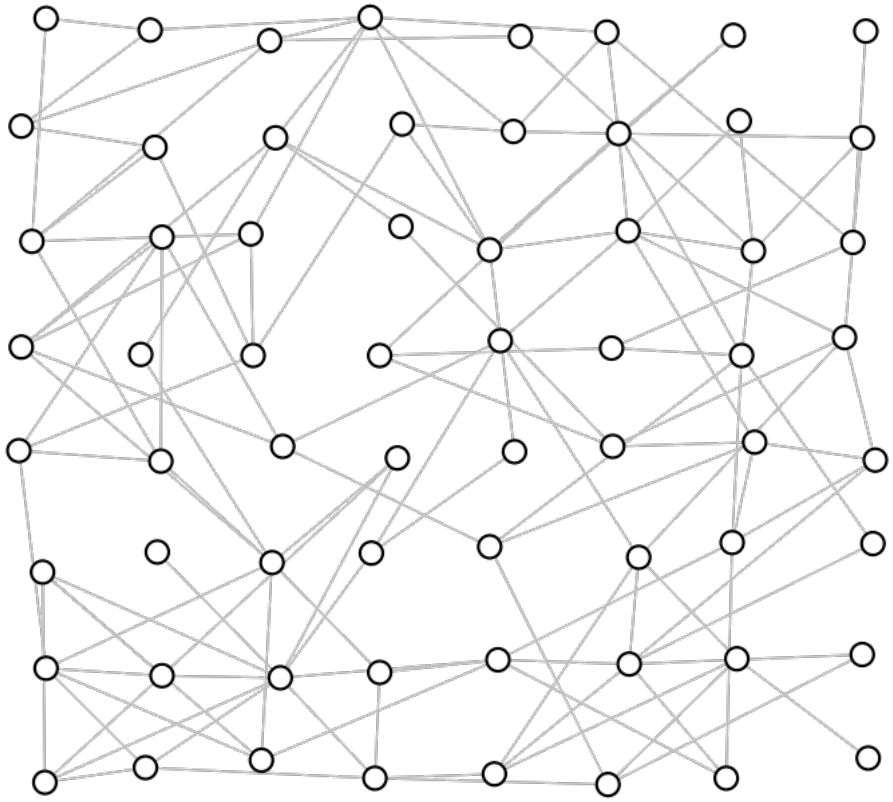

1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0


1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0


z
volcano




```
In [16]: source ( "script.txt" )
```



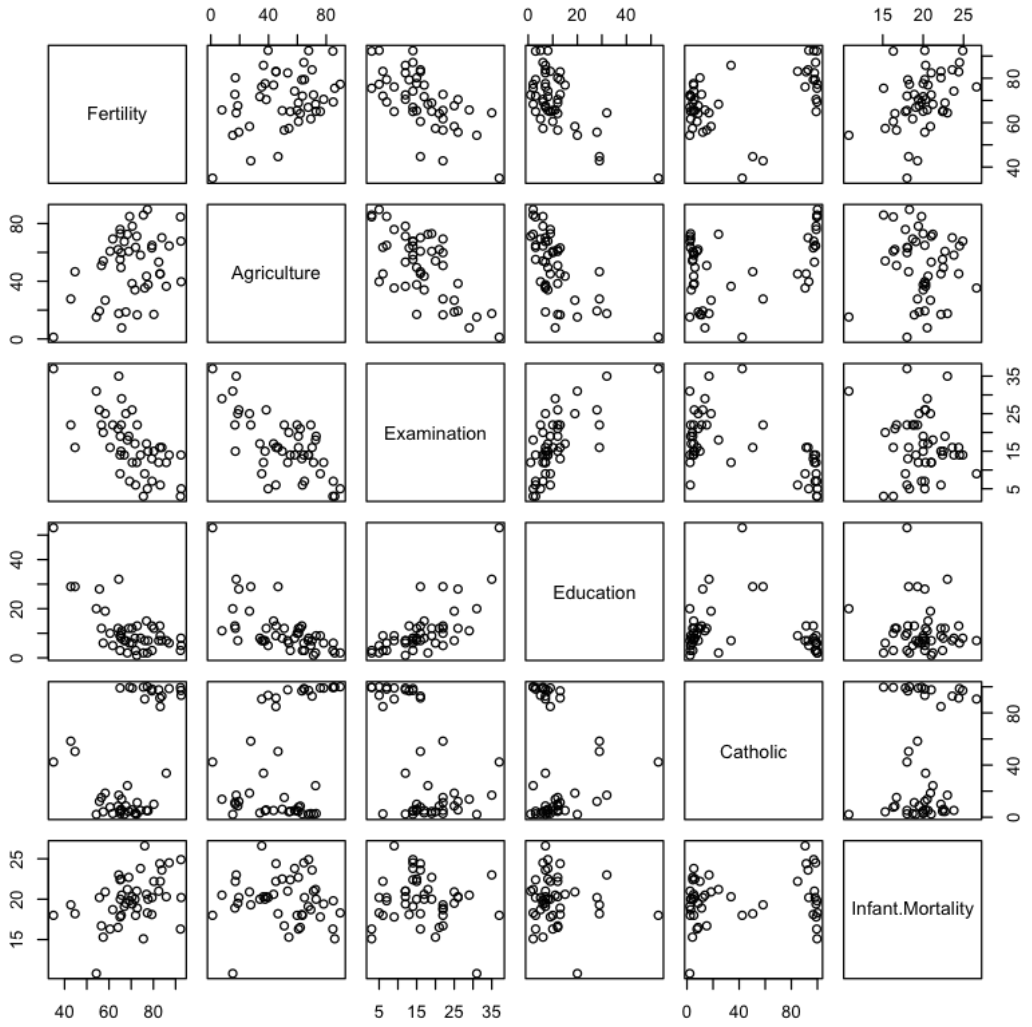
```
In [17]: cor( qd )
```

	time	num
time	1.0000000	0.5878401
num	0.5878401	1.0000000

```
In [18]: data(swiss)

In [19]: cor(swiss)
```

	Fertility	Agriculture	Examination	Education	Catholic	Infant.Mortality
Fertility	1.0000000	0.35307918	-0.6458827	-0.66378886	0.4636847	0.41655603
Agriculture	0.3530792	1.00000000	-0.6865422	-0.63952252	0.4010951	-0.06085861
Examination	-0.6458827	-0.68654221	1.0000000	0.69841530	-0.5727418	-0.11402160
Education	-0.6637889	-0.63952252	0.6984153	1.00000000	-0.1538589	-0.09932185
Catholic	0.4636847	0.40109505	-0.5727418	-0.15385892	1.0000000	0.17549591
Infant.Mortality	0.4165560	-0.06085861	-0.1140216	-0.09932185	0.1754959	1.00000000

```
In [20]: pairs(swiss)
```




```
In [21]: fd <- read.table("factory.data.txt", header=T)
         attach( fd )
         summary( fd )
```

```
     output       setup
 Min.   :27.20   A:10
 1st Qu.:30.43   B:10
 Median :32.05
 Mean   :32.34
 3rd Qu.:34.02
 Max.   :38.30
```

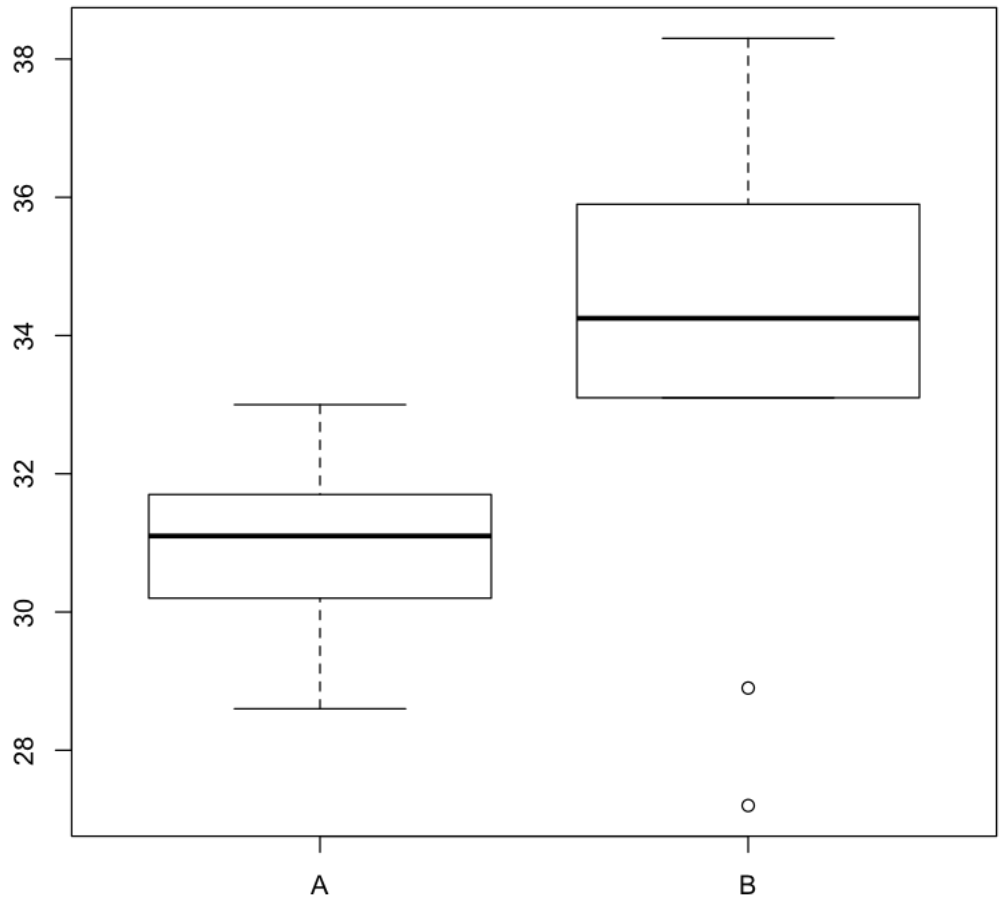
```
In [22]: table(setup)
```

```
setup
 A  B
10 10
```

```
In [23]: tapply( output, setup, summary)
```

```
$A
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  28.60   30.27   31.10   31.01   31.70   33.00

$B
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  27.20   33.12   34.25   33.66   35.70   38.30
```

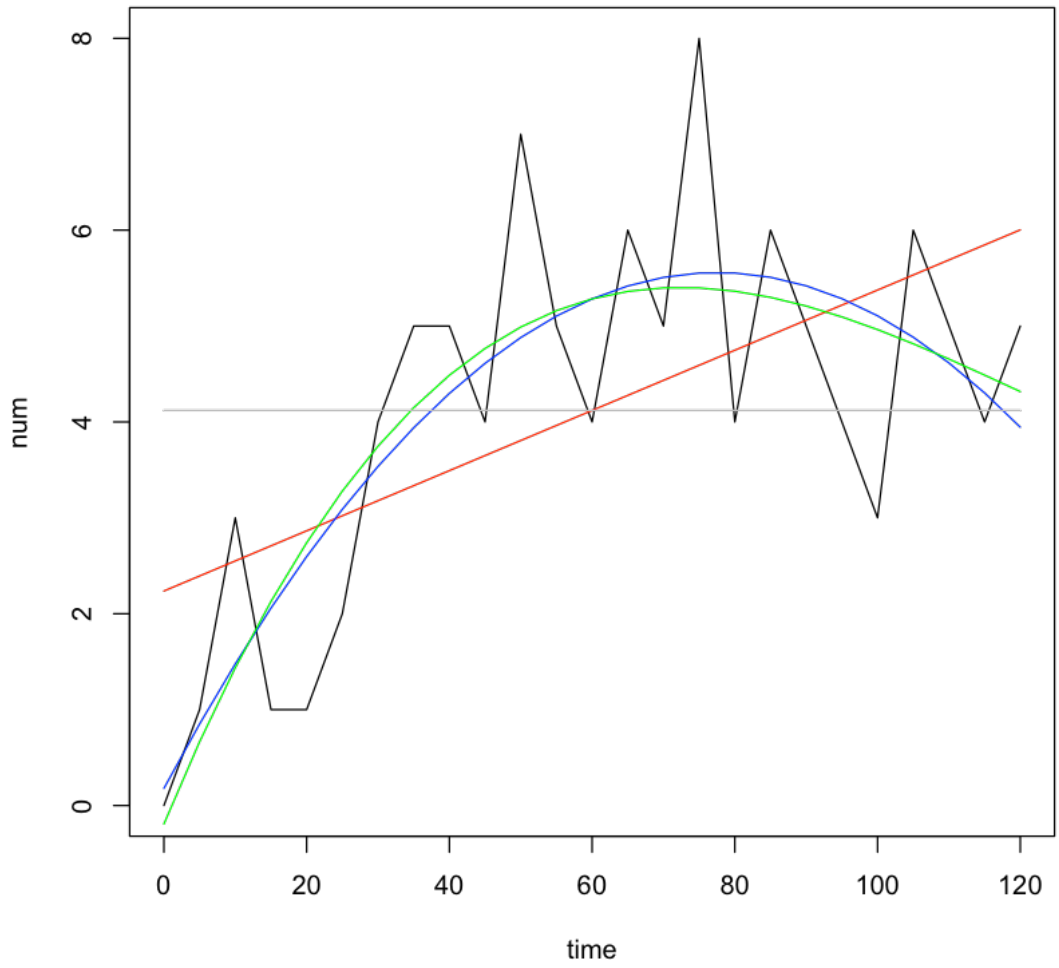
```
In [24]: boxplot( output ~ setup )
```




```
In [25]: qdlm1 <- lm( num ~ time )
         summary( qdlm1 )


Call:
lm(formula = num ~ time)

Residuals:
    Min      1Q  Median      3Q     Max
-2.3754 -1.2185 -0.0615  1.0369  3.4092

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
```

```
(Intercept) 2.236923   0.630417   3.548  0.00171 **
time        0.031385   0.009006   3.485  0.00200 **
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1   1

Residual standard error: 1.624 on 23 degrees of freedom
Multiple R-squared:  0.3456,Adjusted R-squared:  0.3171
F-statistic: 12.14 on 1 and 23 DF,  p-value: 0.002
```

```
In [36]: plot( num ~ time, type="l" )
         lines( predict(qdlm1) ~ time , col="red" )
         qdlm2 <- lm ( num ~ poly( time, 2) )
         lines( predict(qdlm2) ~ time , col="blue" )
         qdlm3 <- lm ( num ~ poly( time, 3) )
         lines( predict(qdlm3) ~ time , col="green" )
         qdlm0 <- lm ( num ~ 1 )
         lines( predict(qdlm0) ~ time , col="gray" )
```




```
In [37]: AIC( qdlm0, qdlm1, qdlm2, qdlm3 )
```

	df	AIC
qdlm0	2	107.69306
qdlm1	3	99.09382
qdlm2	4	86.40741
qdlm3	5	87.80793

```
In [40]: fdlm1 <- lm ( output ~ setup )
         fdlm0 <- lm ( output ~ 1 )
         summary(fdlm1)
```

```
Call:
lm(formula = output ~ setup)

Residuals:
    Min      1Q  Median      3Q     Max
-6.4600 -0.6225  0.2650  1.4025  4.6400

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  31.0100     0.8075  38.402   <2e-16 ***
setupB        2.6500     1.1420   2.321   0.0323 *
---
Signif. codes:  0 *** 0.001 ** 0.01 * 0.05 . 0.1   1

Residual standard error: 2.554 on 18 degrees of freedom
Multiple R-squared:  0.2303,Adjusted R-squared:  0.1875
F-statistic: 5.385 on 1 and 18 DF,  p-value: 0.03226
```

```
In [41]: AIC( fdlm0, fdlm1 )
```

	df	AIC
fdlm0	2	101.38429
fdlm1	3	98.15003

```
In [43]: early <- qd[time < 60, c(1:2)]
         early <- qd[time < 60, ]
         qthree <- qd[num == 3, c(names(qd))]
         early
```

time	num
0	0
5	1
10	3
15	1
20	1
25	2
30	4
35	5
40	5
45	4
50	7
55	5

```
In [44]: ls()
```

1. 'early' 2. 'fd' 3. 'fdlm0' 4. 'fdlm1' 5. 'net' 6. 'qd' 7. 'qdlm0' 8. 'qdlm1' 9. 'qdlm2' 10. 'qdlm3' 11. 'rawx' 12. 'rawy' 13. 'swiss' 14. 'volcano'

```
In [46]: temp <- c(100,110,120,130)
         temp
```

1. 100 2. 110 3. 120 4. 130