Math 3070 § 1. **Aquifer Data:** Name: Example
Treibergs **Summary statistics and Boxplot.** August 5, 2010

Data File Used in this Analysis:

```
# Math 3070 - 1    Aquifer Data          Aug. 5, 2010
# treibergs
#
# From navidi, principles of Statistics for Engineers and Scientists
# Mcgraw hill 2010. taken from an article S Jeen, J. Kim et. al.,
# "Hydrochemical Characteristics of Groundwater in Mid-Western Coastal
# Aquifer System", Geosciences Journal, 2001. here are measurements of
# the electrical conductivity in microsiemens per centimeter of 23
# samples of an aquifer system in Korea.
#
Conductivity
2099
528
2030
1350
1018
384
1499
1265
375
424
789
810
522
513
488
200
215
486
257
557
260
461
500
```

R Session:

```
R version 2.10.1 (2009-12-14)
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ISBN 3-900051-07-0

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  Natural language support but running in an English locale
```

```
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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[R.app GUI 1.31 (5537) powerpc-apple-darwin9.8.0]

> tt <- read.table("M3073AquiferData.txt",header=TRUE)
> tt
   Conductivity
1          2099
2           528
3          2030
4          1350
5          1018
6           384
7          1499
8          1265
9           375
10          424
11          789
12          810
13          522
14          513
15          488
16          200
17          215
18          486
19          257
20          557
21          260
22          461
23          500
> attach(tt)

> # Compute summary statistics of Conductivity
> summary(Conductivity)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  200.0   404.0   513.0   740.4   914.0  2099.0
> mean(Conductivity)
[1] 740.4348
> sd(Conductivity)
[1] 549.8366
> sd(Conductivity)^2; var(Conductivity)
[1] 302320.3
[1] 302320.3
```
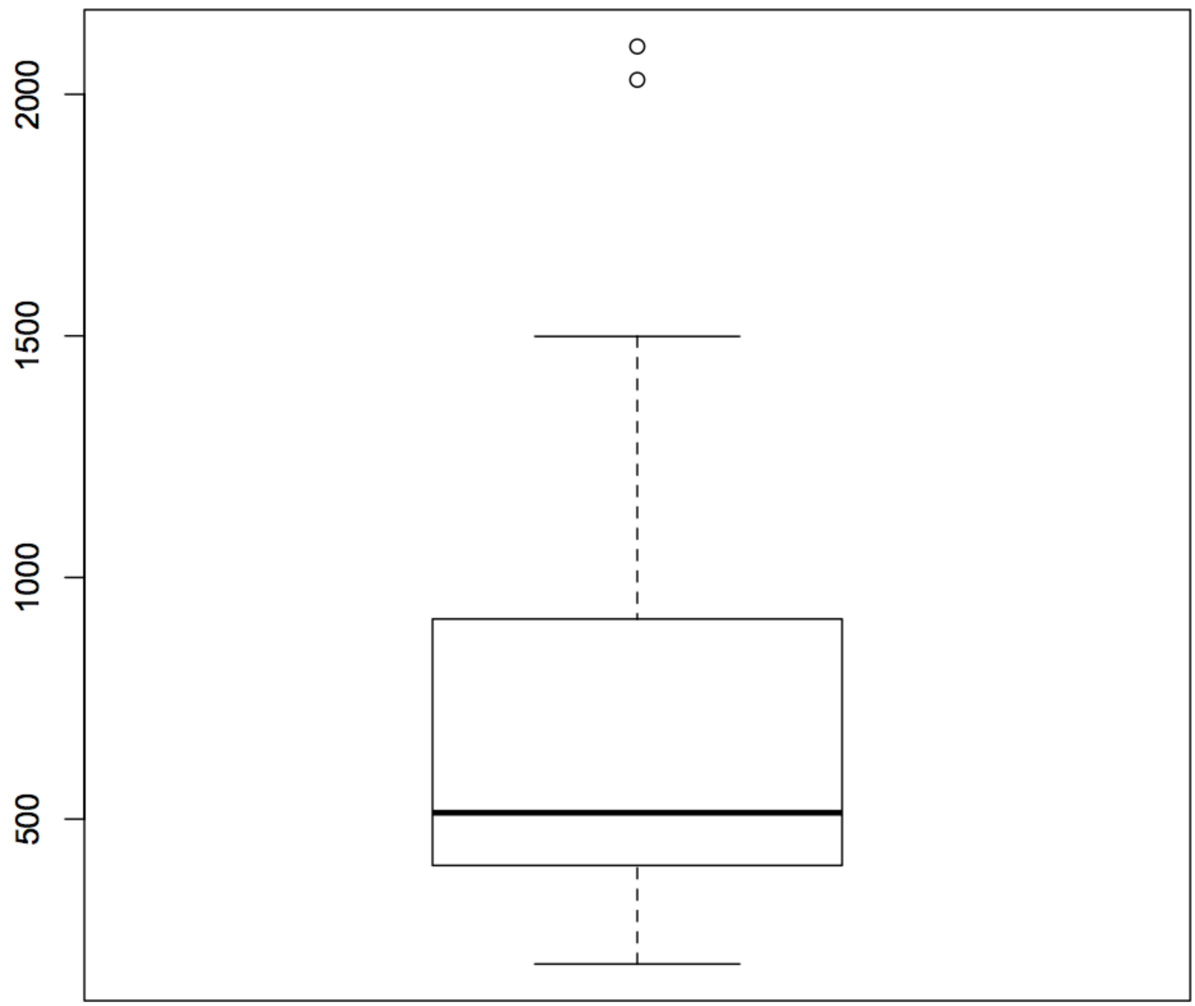
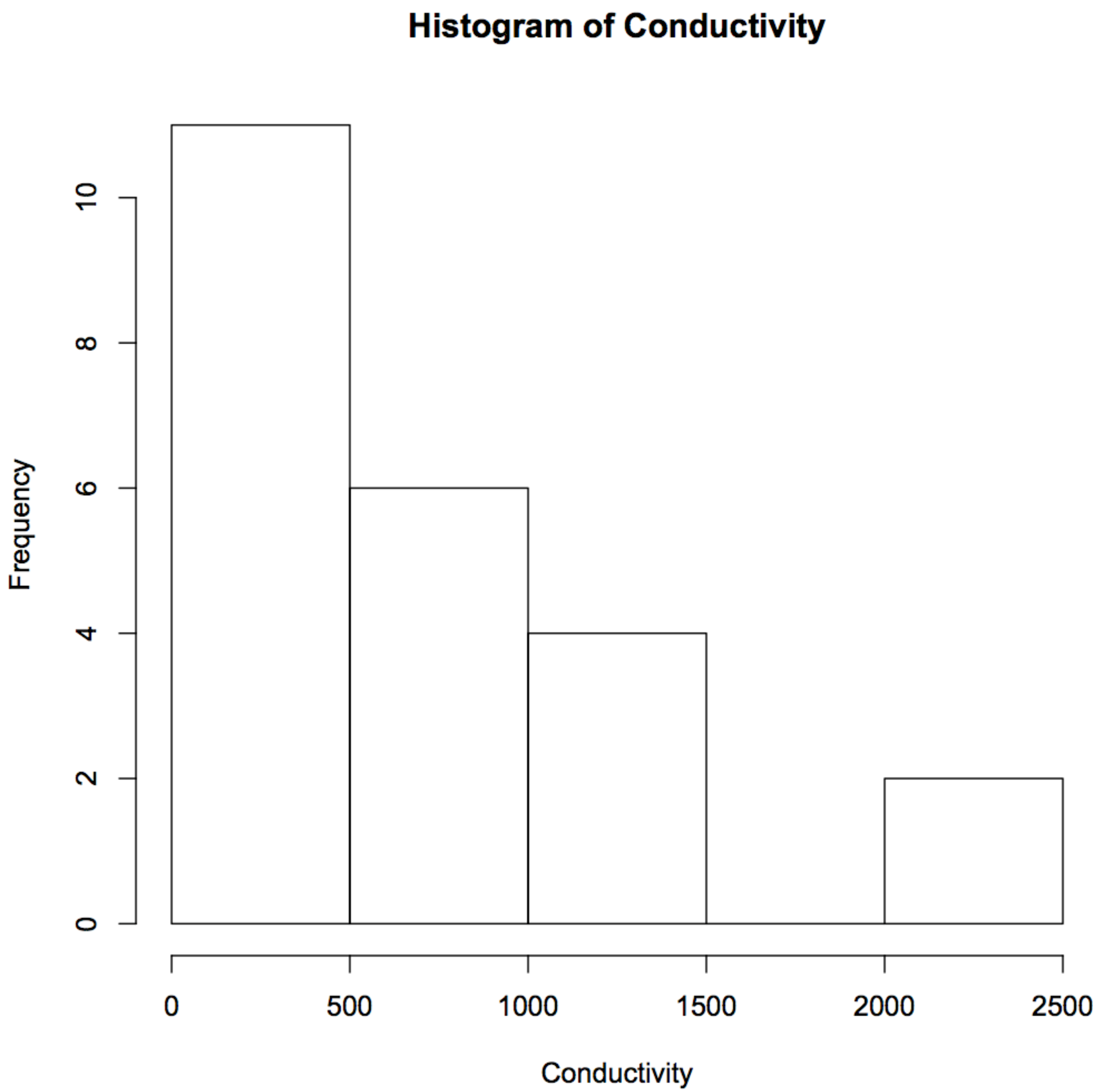
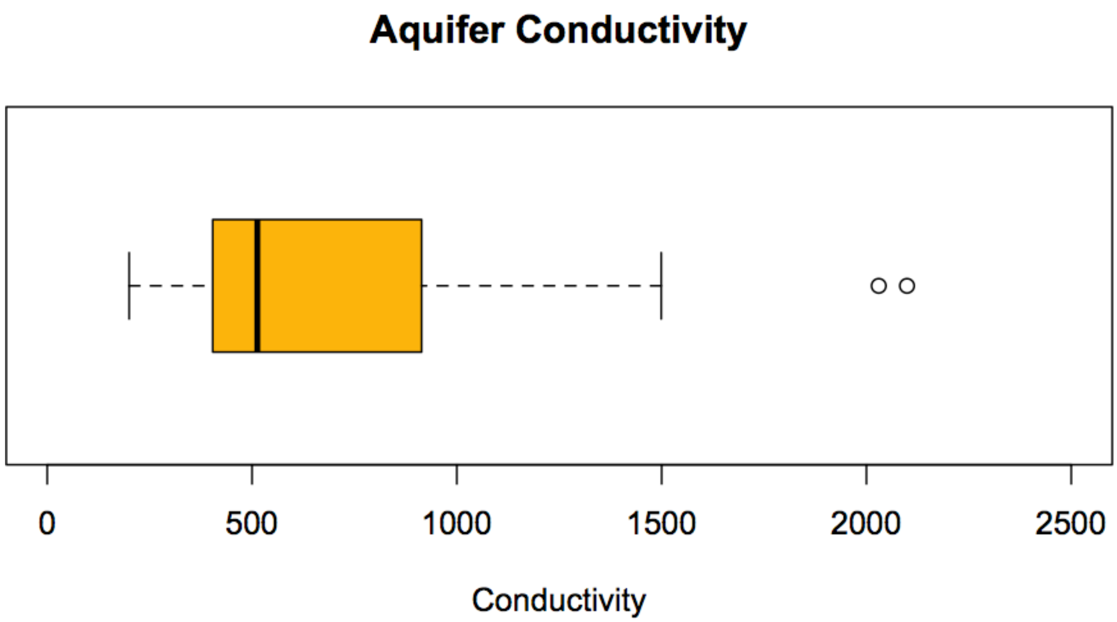

```
> # We view the boxplot and histogram. We set the ranges the same on both
> # and adjust the margins.
> boxplot(Conductivity)
> hist(Conductivity)
> xr <- c(0,2500)
> layout(matrix(1:2,ncol=1))
> par(mar=par("mar")*c(0.8,1,1,1))
> boxplot(Conductivity,ylim=xr,horizontal=TRUE,
  xlab="Conductivity", col="orange",main="Aquifer Conductivity")
> hist(Conductivity,xlim=xr,xlab="",ylab="",main="", axes=FALSE, col="yellow")
> axis(1)
>
>
>  # Compute summary statistics of log(Conductivity)
> lc <- log(Conductivity)
> summary(lc)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
  5.298   6.000   6.240   6.380   6.811   7.649
> mean(lc)
[1] 6.380078
> sd(lc)
[1] 0.6748329
> var(lc)
[1] 0.4553994

> # We view the histogram. We set the ranges the same on both and adjust the margins.
> hist(lc)
> lxr <- c(5,8)
> boxplot(lc,ylim=lxr,horizontal=TRUE, xlab="log(Conductivity)",
  col="lightblue",main="Aquifer Conductivity")
> hist(lc,xlim=lxr,xlab="",ylab="",main="", axes=FALSE, col="lightgreen")
> axis(1)
>
```

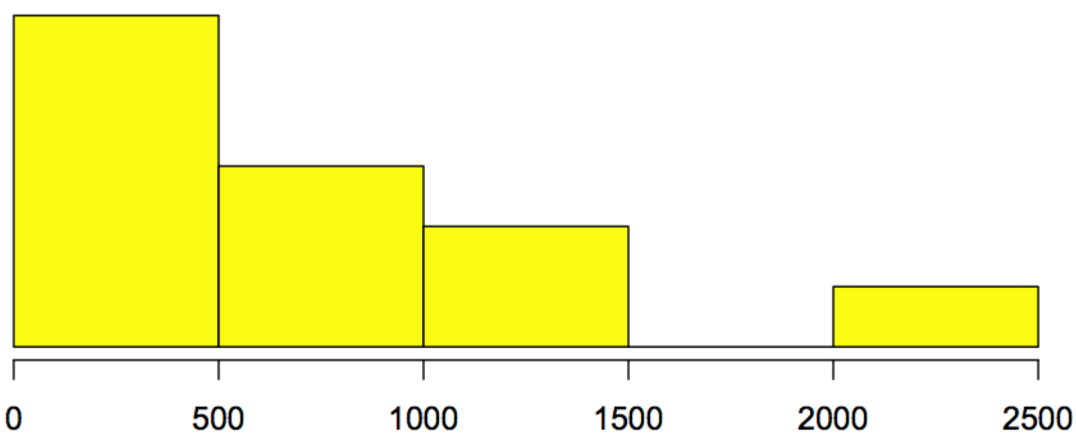


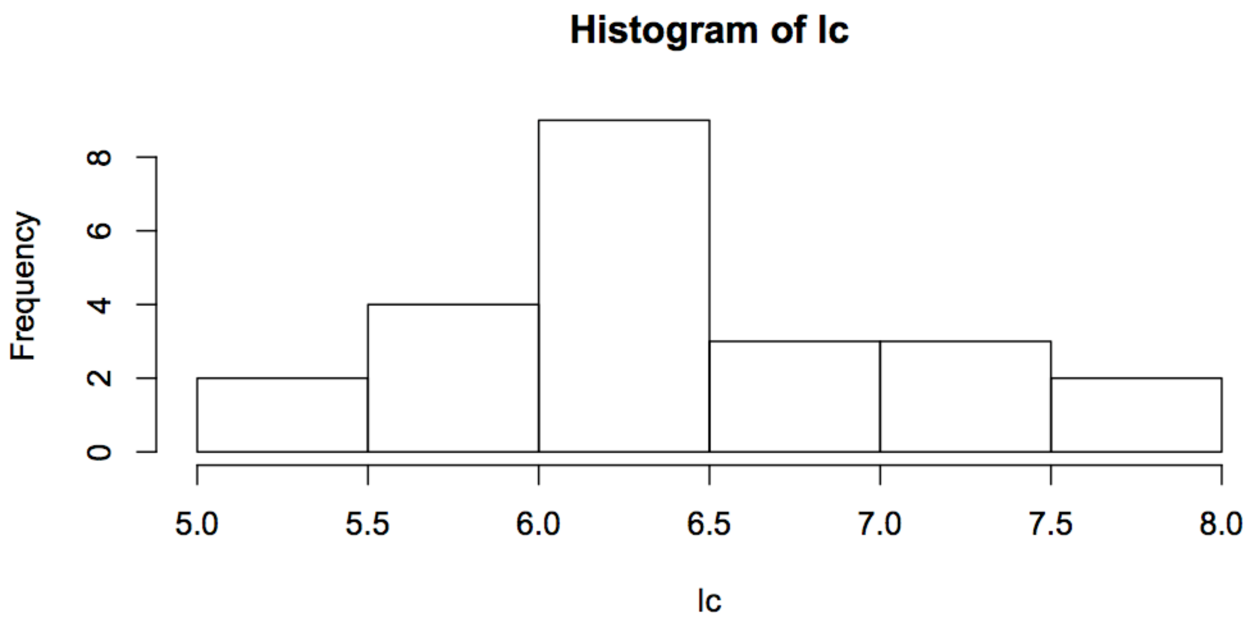
2000
1500
1000
500

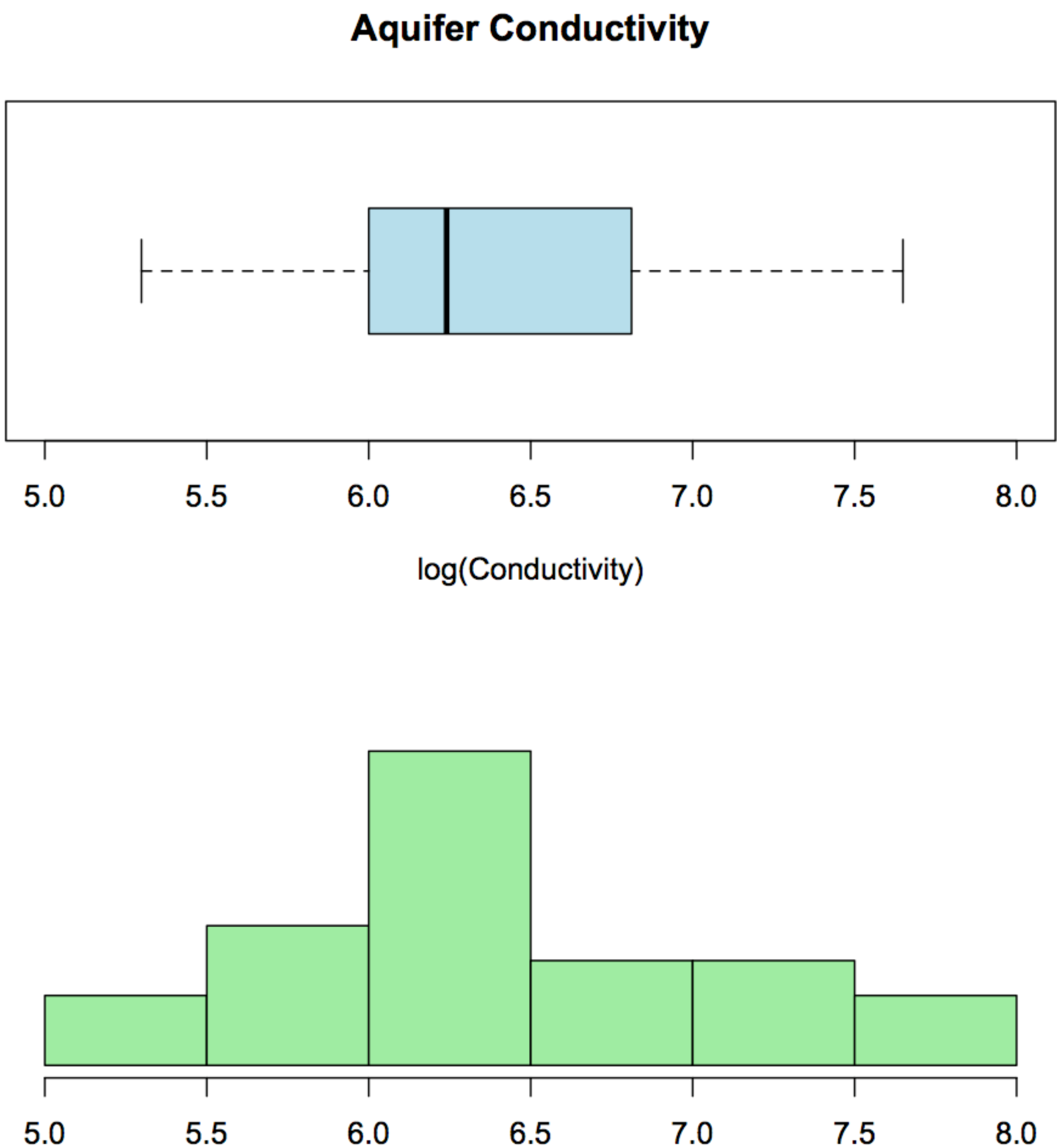


Histogram of Conductivity
Frequency
0
2
4
6
8
10
0
500
1000
1500
2000
2500
Conductivity


Aquifer Conductivity
0
500
1000
1500
2000
2500
Conductivity


0
500
1000
1500
2000
2500


Histogram of lc
Frequency
0
2
4
6
8
5.0
5.5
6.0
6.5
7.0
7.5
8.0
lc


Aquifer Conductivity
5.0
5.5
6.0
6.5
7.0
7.5
8.0
log(Conductivity)
5.0
5.5
6.0
6.5
7.0
7.5
8.0