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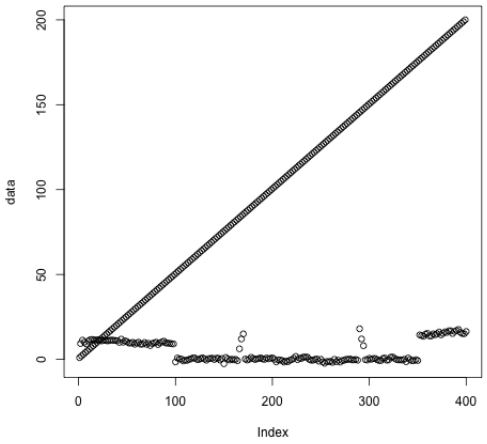
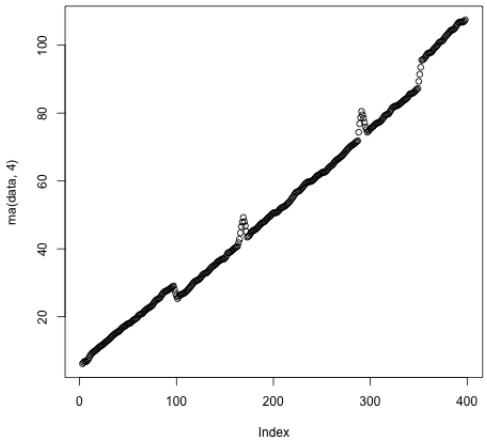
Homework 1

1. Dr. Martin has emailed you the data set, hmwk1.txt, which gives the time evolution of a certain quantity of interest to him. Using R, plot the original data. In addition, using Rs ma() function, plot a smoothed version of the data. What attribute of the original data is hidden by referring only to the smoothed data?

```
#!/usr/bin/RScript
if(require("forecast")){
    data <- scan("hmwk1.txt")          #read in the file
    png("01data_plot.png")             #plot to specified png
    plot(data)                         #plot data
    dev.off()
    png("01data_smoothed.png")         #plot to specified png
    plot(ma(data,4))                   #plot smoothed data
    dev.off()
}
```

The output of the above code is

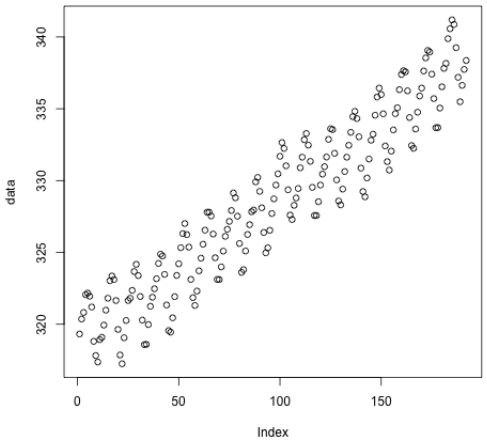


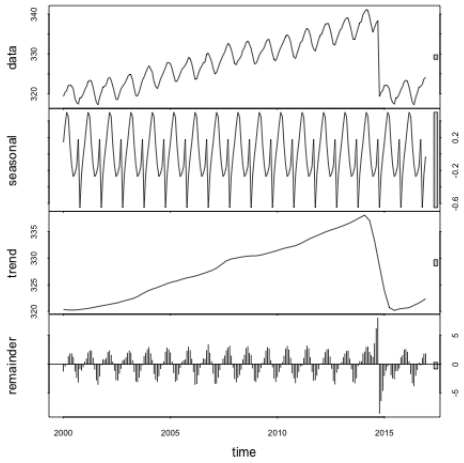


When the data is smoothed, the outlying points are lost.

2. Dr. Martin has emailed to you the data set, co2.txt. The data represents 16 years of collecting monthly CO_2 data on the island of Hawaii, with the first year of CO_2 starting in January of 1958. a) Using R, plot the data. b) Using Rs stl() command, plot the 1. trend, 2. seasonal, and 3. irregular components of the data.

```
#!/usr/bin/RScript
if(require("forecast")){
    data <- scan("co2.txt")
    png("02data_plot.png")
    plot(data)
    dev.off()
    series <- ts(data, start=c(2000,1), end=c(2016,13), frequency=13)
    png("02seasonal.png")
    seasonal <- stl(series, s.window="period")
    plot(seasonal)
    dev.off()
}
```





3.