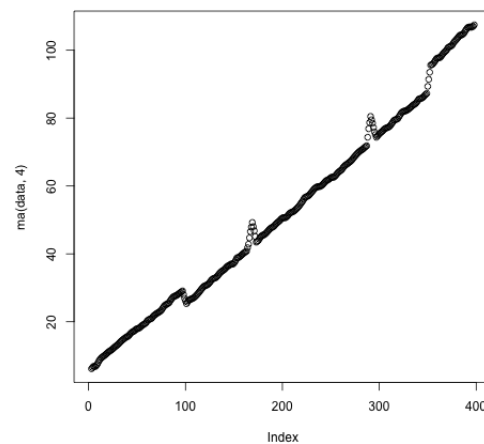
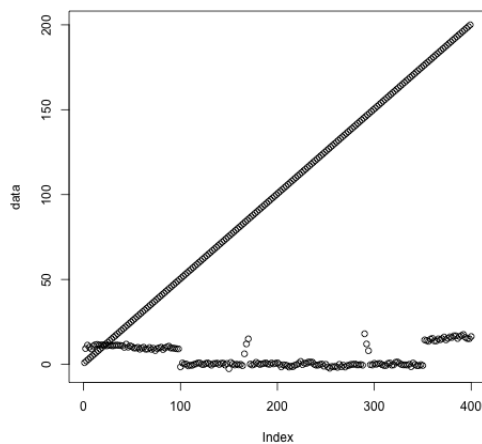


Steven Rosendahl  
Homework 1

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 R's `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 R's 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()
}
```

