MATH 5075/6820 Project 1

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For the first part of the class project, we ask you to download the data sets stock (contains stock prices for mortgage and banks) and house (house price index). Below we read these data sets in for you directly:

```
stock <- read.table("http://www.math.utah.edu/~rice/stock.txt")
house <- read.table("http://www.math.utah.edu/~rice/house.txt")

# A preview of the data
head(stock)
```

```
##        Date  Open  High   Low Close   Volume Adj.Close
## 1  9/4/2013 47.61 48.56 47.54 48.29  9894600     48.29
## 2  9/3/2013 47.10 48.15 47.04 47.67 12953200     47.67
## 3 8/30/2013 46.64 46.71 46.19 46.46  6442200     46.46
## 4 8/29/2013 46.31 47.15 46.17 46.58  7150000     46.58
## 5 8/28/2013 46.12 46.88 45.94 46.41  7172300     46.41
## 6 8/27/2013 46.69 46.78 46.11 46.16 10262900     46.16
```

```
head(house)
```

```
##       Date     SA
## 1 1/1/1991 100.00
## 2 2/1/1991 100.56
## 3 3/1/1991 100.57
## 4 4/1/1991 100.40
## 5 5/1/1991 100.48
## 6 6/1/1991 100.59
```

When you explore these data sets, you should notice immediately that they do not cover the same time frames, and one data set has greater resolution than the other (the stock data is daily, for every trading day, while the house price index is computed monthly). You will need to somehow account for this.

Consider the charts in the handouts containing a modified version of these data sets, available here and here. We would like for you to recreate these charts, but instead of using the raw data values, compute and plot the log differences:

$$r_t = \log(x_t) - \log(x_{t-1})$$

In econometrics, the log differences are interpreted as the rate of change at time t (so $100 \times r_t$ is interpreted as the percentage change from day $t-1$ to day t). This is a very common econometric transformation, done in the hope that the resulting data r_t represents a stationary, well-behaved process and leads to economically interpretable results.

Compute this rate of change for both data sets, and plot it. (For the stock data, use the adjusted closing price.)

```
# Your code here
```