MATH 5075 R Project 12

Your Name Here

March 15, 2017

Remember: I expect to see commentary either in the text, in the code with comments created using #, or (preferably) both! **Failing to do so may result in lost points!**

Since this assignment involves simulation, I set the seed to the following in order to get the same results:

```
set.seed(3132017)
```

Problem 1

*The following code uses the **quantmod** package to get data for Apple (ticker symbol AAPL) stock:*

```
library(quantmod)
AAPL <- getSymbols("AAPL", from = as.Date("2016-01-01"), to = as.Date("2016-12-31"),
    env = NULL, return.class = "ts")[, "AAPL.Adjusted"]
```

1. *After fitting a $GARCH(1,1)$ process to the first log differences of the data, estimate the one-day 5% value at risk for the next trading day; that is, find the quantity such that the probability of the next trading day's return is below this quantity (which would be a loss) is 5%.*

```
# Your code here
```

Problem 2

1. *Simulate three data sets of size 100, one following a standard Normal distribution, and two folowing t distributions with two and four degrees of freedom, respectively. Perform the Shapiro-Wilks Normality test and the Jarque-Bera test to determine whether each of these data sets are Normally distributed.*

```
# Your code here
```

2. *Generate 100 observations of an AR(1) with autoregressive parameter $\rho = 0.5$, with the error term following a standard Normal distribution. Repeat both tests.*

```
# Your code here
```