TAKE HOME EXAM

PhD in Business Economics
Professor: Hedibert Freitas Lopes

Course: Econometrics III
Due date: June 12th, 2018.

Problem 1:   The data below is the index (average 2012=100) of the monthly Brazilian production meat products from January 2002 to March 2018 ($n = 195$ observations). The data was collected from IBGE's SIDRA system (`https://sidra.ibge.gov.br/tabela/3650`). Fit your *best* time series model to the data up to (and including) March 2017 with the goal of producing point and interval forecasts for the months of April 2017 to March 2018. In other words, your goal is to selected the model that best fit out of the sample.. Possible models include AR, MA, ARMA, ARIMA models and seasonal extensions of these models. Report your model search strategy and findings in details along with your `R` code.

```
# Tabela 3650 - Producao Fisica Industrial, por grupos e classes industriais
# selecionados.
# Variavel - Indice de base fixa sem ajuste sazonal (Base: media de 2012 = 100)
# 10.1 Abate e fabricacao de produtos de carne


y = c(91.4,83.2,84.6,90.7,92.6,90,98,95.9,92.6,98.5,91.3,88.9,94,88.5,90.7,88.3,
94.2,86.8,91.7,87,91.6,97.6,87.9,87.3,90.6,88,100.4,94,100.6,102.8,103.6,103.3,
101.9,101.3,97.9,100.3,99.6,92.4,103.5,100.6,103.4,107.4,103.5,108.6,102.6,97,
100,102.8,103.1,92.6,108.3,86.4,101.8,99.8,103,106.6,99.9,105.8,100.8,101.8,
109.5,100.4,115.2,104.5,111.7,102.3,106.3,109,99.6,109.3,104.2,99.1,111.1,100.6,
103,108.7,110.4,107.5,114.3,108.1,109.6,112.7,99.1,101.5,101.9,95.2,106,99.3,
106.9,107.7,113.1,108.3,106.9,108.7,102.3,104.8,99.6,93.5,114.1,104.6,110.1,
106.9,114.6,109.4,106.6,105.3,102.3,104.1,103.1,101.3,112.3,99.2,108,101.2,
106.1,110.9,103.7,98.4,100,101.7,95.8,92.3,101.4,92.5,106.7,98.1,104.8,109.1,
96.1,106.4,103.1,93.8,104.1,94,97.5,107,105,98.7,107.6,108,102.1,108,100.1,
97.8,104.1,95.7,95.9,98.5,105.9,97.3,111.1,98.6,101.8,105.9,96.2,97.5,97,
90.5,101,97.6,99.3,100.1,104.2,100.3,101,104.2,99.8,99.8,97.9,96.6,100.8,99.3,
102.5,103.4,100.3,104.6,97.3,96.8,95.9,100.3,99.9,95.8,105.7,87.6,105.3,100.7,
105.1,110.5,98.4,102.4,99.8,98.4,104.9,94.4,104.5)
```

Problem 2:   Download data on the Brazilian ibovespa starting around 2010 and finishing as close to today as possible. Your task is to fit the GARCH(1,1) model and its various versions presented in class to ibovespa log returns. If t_n is the last day of your analysis, produce variance forecasts for the following 10 days, i.e. $t_{n+1}, \ldots, t_{n+10}$.