Due Date: April 27 (campus class) and April 28 (weekend class)
Note: Unless specifically assigned, all tests are based on the 5% significance level. All data are on the course web. Also, you should write down the fitted time series model for each question.

1. Consider the monthly simple returns of CRSP Decile 1, 2, 5, 9 and 10 portfolios based on the market capitalization of NYSE/AMEX/NASDAQ. The data span is from January 1961 to September 2011.
   (a) For the return series of Decile 2 and Decile 10, test the null hypothesis that the first 12 lags of autocorrelations are zero at the 5% level. Draw your conclusion.
   (b) Build an ARMA model for the return series of Decile 2. Perform model checking and write down the fitted model.
   (c) Use the fitted ARMA model to produce 1 to 12-step ahead forecasts of the series and the associated standard errors of forecasts.

2. Consider the monthly yields of Moody’s Aaa & Baa seasoned bonds from January 1919 to November, 2011. The data are obtained from FRED of Federal Reserve Bank of St. Louis. Consider the log series of monthly Aaa bond yields. Build a time series model for the series, including model checking.

3. Consider again the monthly log series of Moody’s Aaa bound yield. Using the exponential smoothing method to produce 1- to 12-step ahead out of sample forecasts at the forecast origin November 2010.

4. Consider the two bond yield series of the previous exercise. What is the relationship between the two series? To answer this question, take the log transformation of the data to build a time series model for the Aaa yields using Baa yields as an explanatory variable. Write down the fitted model, including model checking.

5. Consider the quarterly earnings per share of the Johnson & Johnson from the first quarter of 1992 to the second quarter of 2011. The data are in the file q-jnj-earns-9211.txt and are obtained from the First Call Historical Database of Thomson Reuters. Take log transformation of the data if necessary. Build a time series model for the data. Perform model checking to assess the adequacy of the fitted model. Write down the model. Re-fit the model using data from 1992 to 2008. Perform 1-step to 10-step ahead forecasts of the quarterly earnings and obtain a forecast plot.