Fall 2018
FRE-GY 6883 Financial Computing
Course Team Projects

General Requirement

You are required to do class projects in groups of 5 members. You should elect one member of your group to be the team leader. Groups once formed cannot be changed midway through the project. The team lead is responsible to facilitate the planning of the project, and the entire team will plan the project under the guidance of your team leader. Planning involves identifying what should be done (tasks), who should do it (resources), when tasks should be done (time frames) and how tasks are best sequenced (dependencies).

Each team will submit PowerPoint slides and all the project files including source codes and executables tar/zipped to our course Web site one week before the presentation day. The project reports should include the Excel sheet about your research on Russell 1000 stocks for their earnings, a drawing of project design, class declaration and data structures, program outputs and your PowerPoint slides. All the teams are requested to present and demonstrate their projects. Each team can resubmit one time on the presentation day. Your project will be judged by program efficiency, complexity and the success of your presentation.

Project Description
Evaluate the impact of earning report on stock price

Programming Requirements:

- Use liburl to retrieve historical price data from Yahoo Finance: A function retrieves the adjusted close prices for selected Russell 1000 stocks and iShares Russell 100 (IWB) into memory.
- Parse the retrieved prices and store them in STL vector for each stock and IWB.
- Create a set of classes such as class for stock to handle EPS Estimate and price information.
- Use member functions or independent functions for all calculation. Overload a few arithmetic operators for vector/matrix.
- The stocks and their corresponding price information for each group should be stored in a STL map, with stock symbol as its keys.
- The AAR and CAAR for 3 groups are presented in a matrix. The row of the matrix is the group#, matrix columns are for AAR and CAAR.
- Use Excel Driver (strongly suggested, but gnuplot could be an alternative for Apple computers) to show the CAAR from all 3 groups in one graph.
- Your program should be able to:

- Retrieve historical price data for all selected stocks and parse the retrieved data using STL vector.
- Calculate AAR and CAAR for each group
- Populate the stock maps and AAR/CAAR matrix.
- Show an Excel graph with CAAR for all 3 groups.

- Your program should have a menu of 5 options:
  - Retrieve historical price data for all stocks.
  - Pull information for one stock from one group.
  - Show AAR or CAAR for one group.
  - Show the Excel graph with CAAR for all 3 groups.
  - Exit your program.

Calculation Details:

1. From Bloomberg terminal, sort all the stocks from Russell 1000 into 3 categories according to their 2ndrd quarter 2017 earnings releases into 3 group:
   a. 1st group of stocks beat EPS Estimate, such as 5% to 10% above the estimate.
   b. 2nd group of stocks meet EPS Estimate, such as 5%-10% around the estimate.
   c. 3rd group of stock miss EPS Estimate, such as 5% to10% below the estimate.

2. Define as day "zero" for a stock the day the earning is released.

3. Implement Bootstrapping:

   a. Sampling the stocks by randomly selecting 100 stocks from each group, total 300 stocks.

   b. Use libcurl lib to retrieve 241 days of historical prices for each stock and IWB around the date of earning release (You could enhance our class example for this purpose).

   c. For each stock calculate the daily returns R_{it} for 120 days before the day "zero" and 120 days after : t = -120, -119,…-1, 0, 1,…, 119, 120:

      $R_{it} = (Price_t – Price_{t-1})/ Price_{t-1}$

   d. Calculate the corresponding daily return R_{mt} for IWB for the same days.

   e. Define abnormal returns as the difference $AR_{it}= R_{it}–R_{mt.}$

   f. Calculate average daily abnormal returns for each group of stocks for all 240 reference days:

$$\mathrm{AARt} = \frac{1}{\mathrm{N}} \sum_{\mathrm{i}=1}^{\mathrm{N}} \mathrm{ARit}$$

g. Cumulate the returns on the first T days to CAAR:

$$\mathrm{CAAR} = \sum_{\mathrm{t}=-120}^{\mathrm{T}} \mathrm{ARRt}$$

h. Repeat steps a to g 5 times and calculate the average CAAR for 3 samplings:

4. Generate an Excel chart show the averaged CAAR of all three groups, and discuss the impact the earning releases on their stock prices. Is there any conclusion you could draw from your project?

Project Tasks:

Task 1: Earning research: sort stocks from Russell 1000 into 3 groups based on their earnings and EPS Estimate from Bloomberg terminal.

Task 2: Project Design:

a) Create classes and data structure such as vectors, matrix and maps.
b) Figure out how to handle historical price retrieval from Yahoo Finance for so many stocks and parse the retrieved data?
c) Figure out how to implement your Bootstrap algorithm?

Task 3: Divide the project into modules and assign team members working on each module.

Task 5: Module Integration and Testing

Task 6: Presentation Preparation.