Fall 2015
FRE-GY 6883 Financial Computing
Course Team Projects

General Requirement

You are required to do class projects in groups of 4 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 by one week before the presentation day. The project reports should include the Excel sheet about your research on S& P 500 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 is allowed to 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 which could retrieve the adjusted close prices for selected S & P 500 stocks and SPY into memory.
- Create STL containers to manage the stock prices and earning information: Parse the retrieved prices and store them in arrays or STL vectors.
- Create a set of classes 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 map of matrix. The row of the matrix is the group#, associated with a corresponding vector holding AAR or CAAR for each group. The keys of the map are the industry sectors you pick.

- Use Excel Driver (strongly suggested) to show the CAAR from all 3 groups for one industry in one Excel graph, with one graph for each industry.
- Your program should be able to:
    - Retrieve historical price data for all selected stocks.
    - Populate the stock map(s) and AAR/CAAR map/matrix/vector
    - Calculate AAR and CAAR for each group.
    - Show an Excel graph with CAAR for all 3 groups for each industry sector.

Project Details:

1. From Bloomberg terminal, select 3 industry sectors such as Financials, Healthcare and Information Technology (en.wikipedia.org/wiki/List_of_S%26P_500_companies). Select 90 stocks from each industry sector and sort 90 stocks from S & P 500 into 3 groups according to 1st earning releases of this year, 30 stocks/group:
    a. 1st group of stocks beat EPS Estimate,
    b. 2nd group of stocks meet EPS Estimate,
    c. 3rd group of stock miss EPS Estimate.

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

3. Use libcurl lib to retrieve 61 days of historical prices for each stock and SPY around the date of earning release (You could enhance our class example for this purpose).

4. For each stock calculate the daily returns R_{it} for 30 days before the day "zero" and 30 days after : t = -30, -29,…-1, 0, 1,…, 29, 30:
$$R_{it} = (Price_t – Price_{t-1})/ Price_{t-1}$$

5. Calculate the corresponding daily return R_{mt} for SPY for the same days.

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

7. Calculate average daily abnormal returns for each group of stocks for all 60 reference days:
$$\mathrm{AARt} = \frac{1}{\mathrm{N}}\sum_{\mathrm{i=1}}^{\mathrm{N}} \mathrm{ARit}$$

8. Cumulate the returns on the first T days to CAAR:
$$\mathrm{CAAR} = \sum_{\mathrm{t=-30}}^{\mathrm{T}} \mathrm{ARRt}$$

9. Generate an Excel chart show the CAAR of all three groups for each industry, and discuss the impact the earning releases on their stock prices.

Project Tasks:

Task 1: Earning research: select stocks from S & P 500 based on their earnings and EPS Estimate from Bloomberg terminal.

Task 2: Retrieve historical price data from Yahoo Finance.

Task 3: Project Design: create classes and data structure such as vectors, matrixes and maps.

Task 4: Divide the project into modules and assign team members working on each module.

Task 5: Module Integration and Testing

Task 6: Presentation Preparation.