Congratulations on earning a 2nd round interview for the Kellogg Research Fellows!

Please answer the questions below by submitting code that we can run to generate the same results as you. For our convenience, write your program such that it will run from a directory that contains three data files:

stocks\_Jan-Nov2023.csv

trades.csv

footnotes.csv

You may use any programming language that you like for the exercise, and we strongly encourage you to read the questions carefully before choosing which language you want to use. Most applicants will find that Python or R are wise choices.

There is no deadline for you to turn in your work; however, **you must submit your solutions to** [**rs@kellogg.northwestern.edu**](mailto:rs@kellogg.northwestern.edu) **at least 48 hours before your 2nd round interview.** Good luck!

**Question 1.** Using the trades.csv file, create a new table that shows the net insider trades for each company over the period January 1 – April 30, 2023.

The resulting table should contain: TICKER and NET\_SHARES, defined as:

NET\_SHARES (shares acquired – shares disposed)

Can you think of another, better way to measure insider buying and selling activity over this period? If so, describe how you would measure it, and include that variable in the table too.

**Question 2.** Use the stocks\_Jan-Nov2023.csv file to visualize cumulative returns for the company Pfizer (TICKER = PFE) over the period February 1 – August 31, 2023. Specifically, produce a line chart showing the value of an investment in Pfizer at the end of each day; assume you started with $10,000 worth of stock bought at the February 1 closing price, and that any dividends are reinvested. Give your chart the title “Value of $10,000 worth of PFE stock over time.”

**Bonus:** Write your program in a way that would make it easy for you to create a similar chart for a different company, time period, or starting dollar amount.

**Question 3.** Using the stocks\_Jan-Nov2023.csv file, calculate the cumulative returns for each company over the period May 1 – November 30, 2023. Again, assume any dividends paid are reinvested.

Describe the steps you took to test whether these results are accurate.

**Question 4.** A 10b5-1 plan allows insiders to trade company stock according to a predetermined schedule, which is a way for the executive to show that they were not trading based on insider knowledge. Therefore, some argue that 10b5-1 transactions do not predict future returns.

Using the footnotes.csv file, create a dummy variable for each transaction found in trades.csv that equals 1 if and only if the transaction was pursuant to a 10(b)5-1 plan.

How many 10(b)5-1 transactions did you find during January 1 - April 30, 2023? Please describe any steps you took to check your work for accuracy.

**Data Descriptions**

In this directory are three data files:

* stocks\_Jan-Nov2023.csv (containing daily prices for US common stocks)
* trades.csv (information about stock trades made by company insiders)
* footnotes.csv (text explanations that accompany those insider trades)

stocks\_Jan-Nov2023.csv: comma-delimited text with one row per TICKER per day

date date in mm/dd/yyyy format

ticker trading symbol for the company

comnam company name

prc closing price that day

vol # of shares traded that day, in thousands

ret decimal return adjusted for dividends and stock splits;

.02 is a 2% increase; -.01 is a 1% decrease

shrout total # of shares outstanding for that company

trades.csv: comma-delimited text with one row per insider transaction

accession\_num identifies the SEC filing where the info came from

order integer identifying which trade on the filing is being referenced (one filing could include multiple trades)

transdate date of the transaction in mm/dd/yyyy format

trans\_type "A” means shares were acquired; “D” means shares were sold

price price at which shares were traded

shares # of shares that were traded

shares\_owned total # of shares owned by trader after the trade

CIK Central Index Key, an identifier for the stock traded

name name of company whose stock was traded

ticker trading symbol for the company whose stock was traded

footnotes.csv: comma-delimited text footnotes that accompany some trades

filename name of the file submitted to the SEC

accession\_num identifies the SEC filing the info came from

footnote identifies the footnote on the SEC filing

index can be used to link footnotes to a corresponding trade; concatenates trade type (e.g., “NonDerivTrans”) to a

corresponding trade from trades.csv;

field identifies the field on SEC Form 4 that was footnoted

text long string, includes the full text of the footnote