# Core

## SQL

## Final Project - Part 1

## Data Model Enhancement

In Part 1, your task is to enhance the trading platform ERD from Lesson 7b. The enhancements will allow tracking of shareholders, the trades made by the shareholders, as well as track how many shares each company has authorized for its stock.

# 1 Shares, Trades and Ownership

The value of stock is that it represents ownership in a company, and it entitles the stockholder to a portion of the corporation's assets and earnings. A company can sell shares in order to raise capital. Shares can also be given to employees as part of their compensation package.

## 1.1 Authorized Shares

Before a company can sell or give any stock, it must declare the total number of shares which can be issued later. This is the amount of **authorized shares**.

> Definition of *Authorized Stock*:
>
> The maximum number of shares that a corporation is legally permitted to issue, as specified in its articles of incorporation.
> Authorized Shares are also known as Authorized Capital Stock.

Because a company is legally bound to issue no more than this number, the authorized amount must be recorded in the database. A company can change its articles of incorporation and increase the number of authorized shares. Please keep the history of authorized shares in the database.

## 1.2 Issuing Shares

Once a company is authorized to issue shares, it can sell shares to an investment bank in order to raise capital. This is known as trade for cash. A company can also provide shares to company insiders, known as trade for services provided. Trades such as these occur on what is called the **primary market**. The primary market is also known as the **new issue market, or NIM** because shares change from being unissued to issued when such trades are made. Please keep track of these trades in your database. Such trades will have a buyer and a seller, the company itself, and a total price. Total prices on the new issue market will be recorded in the currency chosen by the company. Such trades do not occur at stock markets and there are no brokers involved. Typically a company will sell a large block of shares to an investment bank in order to raise capital. Many of the authorized shares will remain **unissued shares**.

The investment bank then sells their shares on the **secondary markets** such as the New York or Toronto stock exchange. These shares can be freely traded among shareholders on the public markets and are called the **public float, share float** or simply **float**. You need to record these trades on the secondary markets in the database as well. Such trades will have a buyer and a broker for the buyer, a seller and a broker for the seller. Price totals for secondary market trades will be recorded in the currency used by the particular stock exchange.

The shares that the company gives to company insiders might have certain restrictions. These are known as **restricted shares**. For example, the shareholder might not be allowed to sell the shares for several years. However, restrictions will not be tracked in the database. Therefore, you will not be able to distinguish between restricted shares and the public float.

> Shares Authorized = Unissued shares + Issued Shares
>
> Shares Issued = Shares Outstanding = Restricted Shares + Public Float

The percentage of issued shares held by a shareholder determines the percentage of the company the shareholder controls. For example, if the corporation has a total of 1,000,000 shares outstanding, and a shareholder owns 20,000 of these, that shareholder is said to have 2% company ownership, calculated as 20,000 / 1,000,000.

Follow-on offering

A follow-on offering is an issuance of additional stock after an initial public offering. A follow-on offering can be either of two types, or a mixture of both: dilutive and non-dilutive.

### Dilutive

In the case of the dilutive offering, the company's board of directors agrees to increase the share float. Shares that were unissued are sold to an investment bank on the primary market.

### Non-Dilutive

The non-dilutive type of follow-on offering is when privately held shares are offered for sale to the public on secondary markets by company directors or other insiders. Because no new shares are created, the offering is not dilutive to existing shareholders.

## 1.3 Market Capitalization

Investopedia defines market capitalization as:

> The total dollar market value of all of a company's outstanding shares. Market capitalization is calculated by multiplying the number of outstanding shares by the current price per share.
>
> Market capitalization is frequently referred to as *market cap*.

## 1.4 Stock Splits and Reverse Splits

A company can decide to increase or decrease the number of shares issued by splitting or merging respectively. When a company decides to split, the number of shares held by all shareholders could double, triple, or quadruple etc. depending on the split factor. For example, in 2014 Apple (AAPL) split their stock by a factor of 7. If a shareholder owned 1 share before the split, they would have 7 shares after the split. It is also possible for the split to be 3 for 2. If a shareholder has 2 shares before a stock split, they will have 3 shares after the split.

When a reverse split, also known as a stock merge, occurs, the number of shares held by each shareholder is reduced by some factor.

The database must be able to handle stock splits and merges, but all existing trade data must remain unchanged for historic purposes. To handle a stock split, the number of shares for each shareholder must be adjusted. To make these upward adjustments, entries should be made for each current shareholder to add the additional shares to which the shareholder is entitled. To handle a reverse split, the number of shares for each shareholder must also be adjusted. For these downward adjustments, entries should be made for each current shareholder to subtract shares.

Splits or reverse splits must not affect total market capitalization. Therefore, when a split occurs, the market price must be reduced by an equal factor, so the total market capitalization remains the same.

## 1.5 Share Buy-Back

A company can reduce the size of the share float by purchasing its own shares back from its shareholders. The shares that are bought back are called **treasury shares**. Laws regarding repurchases can vary from country to country and state to state.

> Definition of *Treasury Stock*:
>
> The portion of shares that a company keeps in their own treasury. Treasury stock may have come from a repurchase or buyback from shareholders; or it may have never been issued to the public in the first place. These shares don't pay dividends, have no voting rights, and should not be included in shares outstanding calculations.

# 2 Shareholders

Please keep track of two types of shareholders: institutional holders, or companies, and individual people, or direct holders. If a shareholder is a direct holder, you need to track the first and last name. If a shareholder is a company, please track the company name, and the location of the company's headquarters. A company may have a stock ID and may be traded at stock exchanges.

## 3 Stock Prices

When a company issues stock, a starting price in the company's currency will be determined. You need to record the starting price in the database. After trading starts, stock prices change based on what shareholders are willing to pay throughout the trading day. The database must to be able to record these price changes. Model your data so that queries can retrieve the price that is active at a point in time without using subqueries.

## Data Model Submission

Draw by hand the necessary additions on your stock market ERD. Drawing tools such as Visio can also be used, but hand drawn additions are fine as long as they are neat and legible.

After submitting the completed Entity Relationship Diagram, you will receive part 2 of the project.