**Set Mapping**

You need to implement an algorithm that handles input lines of the form:

A:5

B:7

G:2

A:6

D:2

And synonyms of the form:

A:G

D:B

G:A

You need to implement the following method:

public Map<String, Set<Integer>> getSets(List<String> lines,

List<String> synonyms) {

    // todo

}

The method should return a map between letters and their respective aggregated sets of digits.

The "synonyms" define which pairs should be treated the same, but only if both directions appear in the map. In the example above, A and G are synonyms, but D and B are not. Synonyms are transitive, so if A and G are synonyms and G and F are synonyms, then A and F are also synonyms.

The output of the example above is a map with the following mappings:

A → {5, 6, 2}

B → {7}

G → {5, 6, 2}

D → {2}

You can assume that:

* The "lines" list can only contain strings in the format above: <letter>:<digit>
* The "synonyms" list can only contain strings in the format above: <letter>:<letter>
* There are no nulls in "lines" and "synonyms" inputs.

**Investment Account Transactions**

This question is about transactions in an investment account (חשבון השקעות).

Investment accounts usually have stocks that the account owner is holding. The owner is holding a certain quantity of each stock. This is referred to as a “holding”.

Each stock has a price that changes daily and the amount that the owner is holding in each stock is determined by multiplying the quantity of the stock by the price.

Transactions are used to buy and sell stocks.

Example:

On March 23rd 2020 John Doe was holding the following stocks:

10 stocks of AAPL (Apple Inc.)

15 stocks of FB (Facebook, Inc.)

On April 17th John sold 5 AAPL stocks and bought 2 FB stocks, therefor he has:

5 stocks of AAPL

17 stocks of FB

You need to write a method that accepts a list of holdings at a certain date, a list of transactions and a final date.

The method should calculate the balance of the account at the final date.

The sources of the holdings and transactions may be different so the code should perform validations to make sure that the data is valid.

You can use the PriceService class to get the price of a stock on a given date.

Note:

When you sell a stock, the money you receive is transferred to your checking account (עו”ש) and when you buy a stock, the money is taken from your checking account. This part is not relevant to this question - you do not need to deal with the money transfers to/from the checking account, only with the investments account.

public double getFinalBalance(List<Holding> initialHoldings,

Date initialDate,

List<Transaction> transactions,

Date finalDate) throws Exception {

// todo

}

public class Holding {

private String stockSymbol;

private double quantity;

// getters

}

public class Transaction {

private Date date;

private String stockSymbol;

private double quantity;

private TransactionType type;

// getters

}

public enum TransactionType { BUY, SELL };

public class PriceService {

public static double getPrice(String symbol, Date date) {

// omitted

}

}