



training day exercise

Scenario

A new financial regulation authority is about to be set up in order to monitor stock market transactions and find irregularities. The market consists of a number of financial instruments being made available for trading directly to institutional clients or through brokers to other clients. Brokers are said to be 'transparent' when they have no ability to manipulate the market. Financial instruments, brokers and clients are recognised by their names. Financial instruments also have a symbol that may change over time. Different brokers have different selections of instruments that they make available to clients. They revise these selections rather frequently.

1. Identify and list the different things that can be found in the scenario.
For example: *broker*.
These things will become anchors in your model.
2. Figure out how things are connected to each other.
For example: brokers *have a selection of* instruments.
These relationships will become ties in your model.
3. Create a model of anchors and ties based on your findings.
4. Look closer at the relationships in order to find their cardinality.
For example: can the *same* instrument be made available through *many* brokers?
Assign these cardinalities to the ties in your model.
5. Find relationships that can change over time.
For example: is the selection of instruments from a broker *static*?
Historize the appropriate ties in your model.
6. Find relationships that can expire.
For example: are instruments ever *removed* from a selection?
Knot the appropriate ties in your model and decide which states the knot should hold.
7. Find properties of things.
For example: brokers have *names*.
Add attributes to the anchors in your model.
8. Figure out if some properties can change (naturally progress) over time.
For example: do brokers have *static* names?
Historize the appropriate attributes in your model.
9. Check if any attributes have a small predefined set of possible values.
For example: can brokers be *classified*?
Knot the appropriate attributes in your model and decide which values the knot should have.

First extension

The actual trade (transaction) also has to be taken care of. A trade always involves a client and often through a broker buys or sells an amount of a financial instrument at a certain price. For example: Ms Lilac bought 200 Minishort Arabica Coffee for €10 each through the Supratrade broker, totalling €2000 at 2013-01-23 12:34.

1. Make it possible to keep track of transactions in your model.
2. Create the instrument named 'Minishort Arabica Coffee' with symbol 'SKC13' from 2013.
3. Create the transparent broker named 'Supratrade'.
4. Make the instrument available in the selection of the broker from 2013.
5. Create the client named 'Ms Lilac'.
6. Record the purchase of 200 SKC13 for €10 at 2013-01-23 12:34 with the involved parties.
7. Create a second client 'Mr Purple'.
8. Record the sale of 100 SKC13 for €15 by Mr Purple at 2014-02-04 23:45 without the involvement of a broker.
9. Change the symbol to 'SKC14' from 2014.

Second extension

All instruments are based on an underlying asset and some instruments provide a leverage on price changes in the asset. For example: If the price of the underlying asset increases by €1 the price of the instrument increases by €5. The instrument then have a 5 times leverage. In order to ensure that prices paid do not deviate from the expected price the underlying asset and its name and price needs to be kept track of, as well as the leverage of the instrument. The price changes frequently during a day.

1. Adapt your model to cope with the new requirements.
2. Let the leverage of SKC14 be 5.
3. Add the underlying asset 'Arabica Coffee'.
4. Add the prices for the asset as they were when the two trades took place.
5. Write a time-traveling query that checks if the clients paid the correct price.