FIX Client Simulation

Simulation for FIX Client Initiator.
The following are the objectives of this simulation:

- Send 1,000 randomized BUY, SELL, SHORT orders for "MSFT", "BAC" and "AAPL" within 5 minutes.
- Within the same timeframe, initiate random cancel order requests.
- Calculate the following metrics:
  - Total Trading Volume (USD).
  - Profit and Loss (PNL) from the session.
  - Volume Weighted Average Price (VWAP) for fills of each instrument.

Summary of the simulation:

- `client.main` will initiate `SocketInitiator`
- execute `application.fix_pricing.run`. Simulation steps are detailed accordingly under the `run` function for object `fix_pricing`.
- save Market Data under `Results.market_data_<timestamp>.csv` and close initiator.
- process statistics and produce summary file under `Results.summary_<timestamp>.csv`.

Installation

Requirements:

- Python 3.8 or above. Default = Python 3.8.16
- pipenv or any other virtualenv control.

Initiate virtualenv by venv or pipenv.

```
# venv
cd your_project_directory
python -m venv venv
source venv/bin/activate

# pipenv
pipenv shell
```

Install necessary packages.

```
# venv
pip install -r requirements.txt

# pipenv
pipenv install -r requirements.txt
```

Create a `config.cfg` file from config-sample.cfg and fill in the following details:

```
SocketConnectHost=
SocketConnectPort=
SenderCompID=
TargetCompID=
```

Usage

Edit following configurations in `config.cfg` as needed.
Run the simulation using the following command:

```
python client.py
```

FIX message logs will be compiled in `<timestamp>.log` under `Log` folder, and raw data to be compiled in CSV format `market_data_<timestamp>.csv` under `Results` folder.

Once completed, a summary file `summary_<timestamp>.log` should be generated under `Results` folder after each execution.

Example

Sample outputs can be found under `sample` folder.
Below is a sample output under `summary_<timestamp>.log` .

```
Generating Report for Session <SessionID> - 20231022110744
Total Order Counts:
     NewOrder - AAPL_BUY  : 119
     NewOrder - AAPL_SELL : 102
     NewOrder - AAPL_SHORT: 105
     NewOrder - BAC _BUY  : 141
     NewOrder - BAC _SELL : 110
     NewOrder - BAC _SHORT: 100
     NewOrder - MSFT_BUY  : 137
     NewOrder - MSFT_SELL : 100
```

```
        NewOrder - MSFT_SHORT: 86
        Total NewOrder    : 1,000
        Total CancelOrder : 53
   Total Trading Volume:
        AAPL : $222,904,884.01
        BAC  : $54,792,688.15
        MSFT : $367,738,501.28
        Total: $645,436,073.44
   Profit and Loss (PNL) (diff(Buy/Sell_LastPx - MktPx)):
        AAPL : $567,271.97
        BAC  : $123,640.21
        MSFT : $125,822.18
        Total: $816,734.36
   Volume Weighted Average Price (VWAP):
        AAPL : $151.46
        BAC  : $32.53
        MSFT : $239.93
```

Sources

FIX Protocol Documentation by ONIXS
FIX GitHub sample by darwinex
Python Quickfix GitHub Library
Quickfix Engine Documentation