Learning from Order Book Data
The Task

- Implement an algorithm for **trading a single stock** based on the following ideas:

  1. At the end of each trading day, train a model of your choice that relies on historical limit order book data (limits and sizes of all 10 levels) to predict the next mid-price change of the stock.

  2. Implement a simple trading strategy that relies on the predictions of your model: If your model predicts that the mid price will increase (decrease), enter a long (short) position.

  3. Close your position, whenever you can (potentially) realize a profit.

  4. If you do not have the chance to make a profit, close your position after one hour.

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Split the Task into Sub-Tasks

1. **Data: Collect the features & target after each order book update.**
   - X – limits and sizes, level 1-10 , Y – mid price change
   - It may be useful to store the (raw) data

2. **Model training: Fit a model of your choice to the data.**
   - Consider class imbalance
   - Standardize the data
   - Use a test set to assess the performance (i.e. generalization) of a fully specified classifier

3. **Trading: Implement a trading strategy.**
   - Enter a long (short) position when model predicts mid-price goes up (down)
   - Close your position, when you see a profit-generating price in the order book.
   - Close your positon at the end of the day to avoid overnight risk.