

# C157 Orderbook Project 2108

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## Build an Orderbook

### Overview

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In the financial industry, an **orderbook** is an application that allows users to purchase and sell stock shares. A standard orderbook allows the following operations:

- Buyers can submit a **buy order** for a number of shares for a specific stock and specify the price they are willing to pay for those shares.
- Sellers can submit a **sell order** for shares they are ready to sell, along with the asking price.
- The orderbook matches transactions and if the buyer has enough funds to complete the purchase, the application automatically buys and shares stocks when the prices meet the requests.

For example, Haythem may submit buy order for 100 shares of YZX stock at a price of \$25 per share. Elizabeth submits a sell order for 50 shares of YZX stock for \$20 per share. Because Elizabeth's price is less than Haythem price, the orderbook application will check that Haythem has enough funds in his account and if so, automatically purchase all of Elizabeth's stock and deduct Haythem's ask by 50 shares.

The application manages a database that tracks each user's portfolio and updates portfolio data as transactions are completed. This data includes:

- Information about each user, including name and financial account balance
- A list of stocks bought and sold on the market
- How much of each stock any given user owns
- Buy requests: which user wants which stock and at what price
- Sell requests: which user wants to sell which stock and at what price
- Completed transactions, including when the transaction took place, how many shares were sold, and the total price for those shares.

When a transaction takes place, the application should transfer the amount of money exchanged from the buyer's account to the seller's account.

### Requirements

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A user must be able to retrieve the following information from the database:

- A user's portfolio, including the user's name and what stocks they own (e.g., Elizabeth owns 100 shares of AAPL or Jack owns 150 shares of ETC)
- A history of transactions, including who purchased what from whom and when the transaction took place

The user should also be able to submit both buy and sell orders.

- Buy orders must include:
  - The client's name
  - The stock symbol
  - How many shares they want to buy

- Maximum price
- Sell orders must include:
  - The client's name
  - The stock symbol
  - How many shares they want to sell
  - Asking price

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