FINQ Senior Algorithm Engineer for Investments - Home Exercise

This document outlines the home exercise for candidates applying for the Senior Algorithm Engineer for Investments position at FINQ.

Exercise Overview

Predict whether a given stock from S&P 500 will **outperform the S&P 500** over the next 5 trading days using historical OHLCV data. Build a lightweight end-to-end ML pipeline that includes feature generation, modeling, evaluation, and a simple model-serving API.

Dataset

Use free data from Yahoo Finance.

Tasks

Deliverables

1. **Jupyter Notebook or Script:**
    a. Feature engineering from OHLCV data (on a per-stock basis).
    b. Train/test split without lookahead bias.
    c. ML Classification model training (if the stock will outperform S&P 500 in next 5 days).
2. **API (e.g., FastAPI or Flask):**
    a. Accepts stock id + date
    b. Returns prediction (with certainty)
3. **Codebase structure:**
    a. Modular code (separate feature code, training code, inference code).
    b. Cleaned-up `README.md` with setup instructions.
4. **Plan for MLOps / Infra Layer** (Text file of plan only, no need to develop)
    a. Plan how to use `Docker`, `MLflow` or `Weights & Biases`
    b. Plan a mock pipeline (Airflow, Dagster, or Python script chain) to simulate E2E.

Submission Guidelines

Please submit your work as a report and any code you used to complete the exercise.
Submit as a git repository.
Ensure your code is well-documented and easy to understand.

Evaluation Criteria

You may use Vibe coding (AI) in this assignment. Yet you need to provide a good quality code and explain it.
Your submission will be evaluated based on the following criteria:

Category	What to Evaluate
Modeling	Feature logic, overfitting avoidance, clear labeling strategy
Engineering	Code structure, modularity, reusability, testing
API Design	Clean REST API, validation, performance awareness
Domain Fit	Financial awareness, understanding of lookahead risk
MLOps (Plan)	Use of logging, artifacts, environment management
Clarity	Clear instructions, comments, README, and presentation of results

Follow-Up

In the interview following this exercise, we'll ask you to:

- Walk through design decisions
- Discuss tradeoffs (e.g., model choice, performance vs interpretability)
- Suggest how to scale and productionize your solution

Estimated Work

We estimate the work on this exercise as 3 days