Assignment

Problem Statement : Analyze **1-minute interval NIFTY 50 data** to develop a robust **long-short trading strategy** with a **maximum holding period of 5 days**. You are encouraged to explore multiple data sources beyond the one provided below.

The final performance evaluation will be conducted on the **out-of-sample period from January 1, 2024, to January 1, 2025**. The **sampling frequency** for your strategy is flexible (ranging from **1 minute to 1 day**) and should be chosen based on your analysis. Clearly document and justify your choice in the final report.

Some starting points :

To structure your research effectively, consider the following aspects:

- **Trade Execution:**
    - How do you define trade entry and exit conditions based on predictive signals?
    - What indicators, signals, or models can improve trade timing?

- **Portfolio Management:**
    - How do you allocate capital across trades?
    - Do you incorporate position sizing techniques?

- **Risk Management:**
    - What measures help control downside risk?
    - Do you implement stop-loss, drawdown limits, or volatility-based adjustments?

- **Performance Evaluation:**
    - What metrics (e.g., Sharpe ratio, Sortino ratio, CAGR, max drawdown) effectively measure strategy effectiveness?
- **Data Visualization & Insights:**
    - Utilize charts, statistical plots, and other visualizations to support findings.

- Look for trends, anomalies, and predictive relationships within the data.

Deliverables :

1) **Code Implementation**
    a) A well-documented Python script implementing the strategy.
    b) Clear comments and structured functions for readability.

2) **Research Report**
    a) A comprehensive write-up covering:
        i) Data exploration and preprocessing
        ii) Strategy development and rationale
        iii) Performance analysis with key metrics
        iv) Risk management techniques
        v) Visualizations and insights

Evaluation Criteria :

Your work will be assessed based on the following:

- **Depth of Research:** How many sources were explored?
- **Analytical Rigor:** How well did you dissect the problem and test hypotheses?
- **Beyond the Scope:** Any novel insights or alternative perspectives?
- **Out-of-Sample Performance:** Evaluated on the **2024 data** (handled externally).
- **Report Structure & Clarity:** How well-organized and articulated is your research?

Data :

Primary Dataset

- **1-minute NIFTY 50 data (Jan 1, 2015 – Dec 31, 2023):** Download Here

Supporting Material

- Zerodha Varsity – Technical Analysis
- **Al Brooks – Encyclopedia of Chart Patterns**
- Oxford Strat Trading Resources