INF1002 Programming Fundamentals
Project Proposal

Project Title:
Stock Market Trend Analysis

Lab ID: P2-2

Team Members:

- **Lee Jia Shin** (2503254, 2503254@sit.singaporetech.edu.sg)

- **Phen Jian Xuan** (2500598, 2500598@sit.singaporetech.edu.sg)

- **Gan Wei Yang** (2501043, 2501043@sit.singaporetech.edu.sg)

- **Pham Anh Bao Khang** (2503012, 2503012@sit.singaporetech.edu.sg)

Short Description

This project aims to analyse stock market data to extract insights into market behaviour and trading patterns. Using Python, our system will implement core functionalities such as calculating the Simple Moving Average (SMA), detecting upward and downward streaks (including the longest run), computing daily returns, and determining the maximum profit using the "Best Time to Buy and Sell Stock II" algorithm.

Visualizations such as price charts with SMA overlays and highlighted streaks will enhance interpretability. To ensure accuracy, results (e.g., SMA, daily returns) will be validated against trusted or manual calculations. This project allows us to apply programming fundamentals to real-world financial problems, strengthening our skills in problem-solving, modular design, algorithms, and teamwork while creating a functional system.

Objectives

- Develop a Python-based system to analyse and visualize stock market trends.

- Strengthen programming fundamentals through modular, reusable code.

- Apply algorithmic methods to solve real-world financial problems.

- Produce clear visualizations to support data interpretation.

- Validate results against manual or trusted test cases to ensure accuracy.

- Implement a user-friendly web interface for easier interaction

(Stretch Goal: Allow users to dynamically select stocks and generate summary reports comparing multiple stocks.)

Dataset

We will use publicly available stock market data sourced via the Yahoo Finance API using the **'yfinance'** Python library. The dataset will cover 1–3 years of historical daily stock prices (e.g., Apple, Microsoft, or Tesla) with the following fields:

- Date

- Open, High, Low, Close

- Volume

This dataset is widely used in financial analysis, reliable, and lightweight, making it well-suited for both numerical computation and graph visualization.

Initial Task Allocation

Member	Role	Key Tasks
Pham Anh Bao Khang	Data Preparation	Collect dataset via yfinance, preprocess data (handle missing values, date formatting, feature engineering)
Gan Wei Yang	Core Algorithms	Implement SMA calculation, compute daily returns, detect upward/downward streaks
Phen Jian Xuan	Profit Optimization	Develop and test "Best Time to Buy and Sell Stock II" algorithm, validate results
Lee Jia Shin	Visualization & Web Interface	Create visualizations (price plots, SMA overlays, streak highlights), implement web interface
All Members	Collaboration	Dataset selection, testing, debugging, GitHub updates, peer reviews, documentations, final demo video & presentation

Team Coordination

- **Meetings:** Weekly check-ins to track progress, resolve challenges, and adjust tasks as needed.

- **Collaboration Tools:** GitHub for code/documentation, Telegram and Discord for communication.

- **Work Distribution:** Tasks assigned by role, with members supporting each other when necessary.

- **Learning Integration**: Pair programming and code walkthroughs to ensure all members contribute meaningfully.