Data Structures

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❖ **Department:**

BSAI (Section-M)

❖ **Semester:**

3rd

❖ **Project Idea:**

"Stocks Trend Analyzer"

Project Proposal

Abstract

The Stocks Trend Analyzer is a user-friendly desktop application that **helps users understand and analyze stock market trends**. By processing historical and current stock data, it identifies rising and falling patterns, calculates moving averages, and highlights potential profitable intervals.

With an interactive graphical interface and visual charts, the system makes complex stock information easier to understand. This project combines algorithms, data structures, and visualization to provide a practical and insightful tool with real-world relevance.

Objective

1. Build an efficient system to analyze stock price trends over time.
2. Present stock trends through clear and interactive visual charts.
3. Apply data structures and algorithms to solve real-world financial problems.
4. Develop a simple and intuitive interface for users to explore stock data easily.

Scope

1. Analyze stock performance for one or multiple companies.
2. Detect patterns like continuous rise/fall, local highs and lows, and calculate moving averages.
3. Identify best buy-sell intervals for maximum profit.
4. Visualize stock trends using interactive charts to make insights easy to interpret.
5. Potential extensions: real-time trend tracking, predictive analysis, or comparison of multiple stocks.
6. Useful for students, beginners in finance, and anyone interested in understanding stock behavior.

Tools

- **Programming Language:** Python
- **GUI:** Tkinter
- **Charts and Visualization:** Matplotlib

Timeline (6 Weeks)

Week	Activity
Week 1	Analyze requirements, collect sample datasets, set up tools
Week 2	Implement data structures for storing and managing stock data
Week 3	Develop algorithms for trend detection, moving averages, and max profit calculation
Week 4	Create a GUI using Tkinter for user interaction
Week 5	Add visual charts using Matplotlib to show trends clearly
Week 6	Test and debug the application, finalize documentation, and prepare for presentation

Expected Learning Outcomes

1. Gain hands-on experience with arrays, lists, stacks, queues, and maps for practical problem-solving.
2. Learn to analyze time-series data and extract meaningful patterns.
3. Understand GUI development and data visualization techniques.
4. Enhance algorithmic thinking and apply DSA concepts to real-world scenarios.

Conclusion

The Stocks Trend Analyzer is a practical and insightful project that blends algorithms, data structures, and visualization. It provides users with an interactive way to track and understand stock trends, making it both educational and applicable. The project is scalable, allowing for future enhancements like predictive analysis or multi-stock comparisons, making it an excellent choice for a 3rd-semester DSA project.