**Finvestor (Proposed)**

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**Project Proposal**

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**Abstract**

Finvestor is an interactive web application that teaches investing through simulation. Users maintain watchlists, manage paper portfolios, view stock charts with technical indicators, and analyze performance using measures such as returns, volatility, and various risk/return indicators. The platform makes financial markets approachable for students and beginners.

**Project Summary and Significance**

**Finvestor** is an interactive web application that tackles a common hurdle for college students and beginning investors: financial sites that are complex, noisy, and hard to navigate. By providing a safe, simulated environment, the platform lets users explore how stock trading and portfolio management work—without financial risk. The intended audience includes students, new investors, and educators who want practical tools for teaching market concepts.

At its core, Finvestor supports creating and managing simulated portfolios of major U.S. equities (NYSE/NASDAQ). Users can keep a personal watchlist, search tickers and chart historical performance, view basic fundamentals and ratios (e.g., earnings, EV-based metrics), and execute paper trades. Portfolio dashboards show cumulative and annualized returns, volatility, max drawdown, and comparisons across time horizons. Core functionality also includes technical indicators—moving averages, exponential moving averages, and RSI—to reinforce risk-return thinking and encourage ways of active management.

Beyond these features, Finvestor offers deeper analysis: Sharpe Ratio using a published risk-free rate, time-period comparisons, and intraday value charts for the last seven days. Future enhancements—options and derivatives simulation and broader intraday coverage—are documented for later development. For implementation: a Python FastAPI service with data from yfinance/FRED, a PostgreSQL database for watchlists, trades, and history, and a React 18 + React Router interface styled with Tailwind and charted with ECharts.

**Open and Resolved Technical Decisions**

Resolved Decisions:

* (Resolved) Watchlist + Search: Users will be able to add/remove tickers, run a quick search, and open a ticker’s page directly from the list.
* (Resolved) Stock Performance Page: Users will be able to view a historical price chart with MA/EMA/RSI overlays and see simple fundamentals (e.g., earnings, EV-based ratios).
* (Resolved) Paper Trading: Users will be able to place mock buy/sell orders; fills will be recorded, and positions, cash, and cost basis will update.
* (Resolved) Portfolio Dashboard: Users will be able to see cumulative & annualized return (CAGR), volatility, max drawdown, and Sharpe (using a published risk-free series).
* (Resolved) Portfolio Comparison: Users will be able to select 2–3 portfolios and view side-by-side metrics with time-range comparisons.
* (Resolved) Intraday View (Last 7 Days): Users will be able to open a 1-minute chart for recent activity and watch price tiles update on a short interval.
* (Resolved) Methods Page: Users will be able to read a clear summary of data sources, formulas, assumptions, and limits for transparency.
* (Resolved) Baseline App: Users will be able to use a responsive single-page interface backed by a FastAPI (Python) service and PostgreSQL, with data from yfinance (prices) and FRED (risk-free).

Open Decisions:

* **(Open) Realtime Push:** Users may be able to receive **live quotes** and **smoother intraday chart updates** via server-pushed **WebSockets/SSE** instead of periodic refresh.
* **(Open) Advanced Features:** The website might incorporate advanced indicators like VaR (Value at Risk), enable **short selling/margin**, trade basic **options/futures**, perform **stress tests** (e.g., −20% shock/high-vol regimes), and access **deeper historical intraday** data from an archive provider.

**Checkpoints**

Checkpoint 1 (Sept 25):

* Users can create a new profile. Landing homepage shows a right-hand list of all S&P 500 tickers; clicking any ticker fills the main chart area with that stock’s basic price chart (no fundamentals yet). The site navigator links to (empty) pages: Portfolios, Watchlists, Compare, Methods, etc.
* Demo**:** I’ll do this by starting at Home, clicking two different S&P 500 tickers to swap the main chart, and using the nav to open Portfolios, Watchlists, Compare, and Methods.

Checkpoint 2 (Oct 9):

* Users can create a Watchlist (add/remove tickers) and create a Portfolio with a fixed inception date
* Stock pages retrieve historical daily OHLCV up to the close of the last business day and display a multi-year chart with key fields (Open, High, Low, Close, Volume, Avg Volume) plus simple fundamentals (e.g., P/E when available).
* Demo: I’ll do this by creating a watchlist and a portfolio (with a fixed inception date), then opening a ticker page to show the multi-year chart and OHLC/volume fields through

Checkpoint 3 (Oct 30):

* Paper trading is enabled: mock buy/sell orders record fills; positions update on the Portfolio page.
* Portfolio analytics include cumulative & annualized return (CAGR), volatility, max drawdown; Stock pages support SMA/EMA/RSI overlays; index benchmarks added(e.g., SPY, QQQ, DIA) for context
* Demo: I’ll do this by placing a buy trade in a portfolio, showing updated positions/cash/cost basis and the metric tiles (CAGR, volatility, max drawdown, Sharpe), then toggling SMA/EMA/RSI and opening a benchmark like SPY.

Checkpoint 4 (Nov 20):

* Portfolio risk views add **Value at Risk (VaR)**, **Sharpe Ratio**; a **Methods** page explains data sources (yfinance/FRED), assumptions, and formulas (returns, volatility, drawdown, Sharpe, VaR).
* **Intraday charts** (~1-minute bars for the **past 7 days**) with periodic refresh; tiles show latest price and change.
* **Demo:** I’ll do this by opening the portfolio risk view to display Sharpe + VaR, then opening a ticker’s intraday page to show the 1-minute chart updating on its refresh interval and briefly pointing to the Methods page.

**Out of Scope Future Enhancements**

* **Deeper intraday history:** Integrate a commercial market-data provider to unlock months/years of intraday bars (1m/5m/1s), with corporate-action adjustments.
* **Options & derivatives studio:** Add option chains, multi-leg strategies (verticals, covered calls, iron condors), Greeks/IV surfaces, and scenario P&L to teach risk and payoff shaping.
* **Quant research & optimization suite:** Include factor libraries (CAPM/FF3/Carhart), rolling regressions, a portfolio optimizer (mean-variance / Black-Litterman), and Monte Carlo stress scenarios for institutional-style analysis.

**Personal Significance & Qualifications**

I’m proposing Finvestor because it lets me bring my two lanes—finance and computer science—back together. Turning data like returns, volatility, drawdowns, and Sharpe into working code and clear visuals will not only help make these concepts concrete in my mind but also build towards quicker interpretation of their effects with practice.

For preparation, I’ve taken **Data Structures** and **Object-Oriented Programming**, which will tremendously help in modeling watchlists, portfolios, trades, and time-series logic. As a summer research assistant, I **helped build** a chemistry e-book website using **Vue/HTML/CSS**, so I’m comfortable wiring up a front end. In internships, I’ve used **Excel VBA** briefly, but the more important pattern is that I learn unfamiliar systems fast—I picked up **Oracle Cloud Financials (OCF), Anaplan, Power BI, Hyperion SmartView** and more in under 2 weeks at my last internship @ ABM. I also briefly used SQL to extract historical vendor-invoice records from our ERP database and built a Power BI report from the results—good practice for querying a backend and shaping data for dashboards.

Knowing that my last year leaned more towards pure finance than CS, especially with Finance being my professional focus, this is me stepping back in with a clear plan. I’m already spinning up on the tools I’ll need (FastAPI, ECharts, Tailwind). Other than the end-product, this project will generate invaluable returns for me as I work on (and improve at) understanding & implementing investment-analysis concepts, building a strong foundation for quant finance & for developing more advanced, risk-return analysis models in the future.