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Objective

Driven and analytical third-year Computer Science student with a strong foundation in software development, algorithm design, computer architecture and Finance. Passionate about leveraging mathematical optimisation and modern tech stacks to build efficient solutions, from user-level applications to hardware integrations.

Education

Amrita University

- Bachelor of Technology in Computer Science
- Expected Graduation: 2028
- Relevant Coursework: Data Structures & Algorithms, Operating Systems, Digital Logic Design, Computer Architecture, Mathematical Optimisation, Probability & Statistics.

Technical Skills

- Programming Languages: Java, C, Python, SQL, Shell Scripting, HTML/CSS, JavaScript
- Frameworks & Tools: React, Vite, Node.js, Express, FastAPI, MATLAB (CVX), Docker, eXpOS, Arduino IDE
- Core Competencies: Monte Carlo Simulations, Markov Chains, Object-Oriented Programming, Process Scheduling, Boolean Algebra, Stochastic Modelling

Technical Projects

STOCKPROB: AI-Powered Probability Engine / *React, Groq (LLaMA 3.3), Canvas API, Tailwind CSS*

- Developed a responsive, frontend-heavy stock probability engine using React and Vite, integrating the Twelve Data API to process live OHLCV time-series data.

- Engineered a Monte Carlo simulation engine executing up to 1,000 predictive paths, utilising Geometric Brownian Motion and a 3-state Markov chain transition matrix.
- Integrated the Groq API (LLaMA 3.3-70b) to synthesise contextual financial headlines and extract dynamic sentiment scores, directly adjusting drift and volatility multipliers.
- Designed custom data visualisations utilising the native HTML5 Canvas API to render intricate Monte Carlo price path fan charts and final probability distribution histograms.

Dynamic Stochastic Quantitative Trading Engine / *Pine Script, Statistical Modeling, LaTeX*

- Developed a real-time algorithmic trading engine in Pine Script, engineering a 1D K-Nearest Neighbours (KNN) algorithm to identify exact geometric price analogies.
- Designed strict mathematical risk management protocols by integrating a Markov Chain for volatility regime detection and a Poisson distribution formula to dynamically halt trading.
- Achieved a consistent 1.875 Profit Factor with a capped maximum equity drawdown of 0.44% during asset simulation testing by enforcing strict 20-bar time stops.
- Authoring an IEEE-formatted research paper detailing the system's computational complexity and built an interactive dashboard to visualise real-time Kelly sizing.

Minty: Conversational Expense Tracker / *React, Tailwind CSS, Recharts*

- Developed a responsive, single-page personal finance application featuring a modern glassmorphism UI and state-managed user authentication.
- Engineered a custom text-parsing algorithm to extract transaction amounts, specific categories, and descriptions directly from natural language chat inputs.
- Integrated the recharts library to render a real-time financial dashboard, processing user data to display 7-day spending line charts and dynamic budget progress rings.

Pet Dungeon Crawler Full-Stack Game / *JavaScript, Node.js, Express, SQLite, HTML5 Canvas*

- Developed a full-stack 2D web-based dungeon crawler game, implementing grid-based movement, collision detection, and dynamic room rendering using vanilla JavaScript.
- Engineered a RESTful Node.js and Express backend with an SQLite database to persist complex game states, including player stats, active status effects, and inventories.

- Integrated an interactive mini HTML5 Canvas game for earning in-game currency, alongside boss battle mechanics featuring timed enemy spawning and projectile physics.

Breathe Bengaluru: Hybrid Air Quality Monitor / *Python, FastAPI, Numpy*

- Optimised an air quality sensor network using Golden Ratio Search and Bounding Phase methods to efficiently allocate sensors under a strict budget proxy.

eXpOS Round Robin Scheduler / *C, Docker, Linux*

- Implemented a simple Round Robin process scheduler within the eXpOS (Experimental Operating System) architecture.
- Configured and deployed a barebones 32-bit Ubuntu hardware environment using Docker on macOS to successfully host and execute the OS simulation.

Leadership & Extracurriculars

- Academic Research: Currently authoring two technical papers for publication: one detailing optimisation modelling for urban air quality sensor networks (Breathe Bengaluru), and another outlining a stochastic probability engine for financial forecasting (Dynamic Stochastic Quantitative Trading Engine).
- Public Speaking & Presentations: Delivered clear, data-driven presentations on diverse academic topics, demonstrating the ability to synthesise complex information and effectively communicate it to varied audiences.
- Event Management: Successfully organised and managed a carnival stall, handling product pricing, marketing poster design, and real-time sales execution for specialty beverages.