Vikram Bala

vikrambala2002@gmail.com | www.vikrambala.com | linkedin.com/in/vikram-bala/ | (973)-477-4495

Education

The University of Pennsylvania, Philadelphia, PA — August 2020 – May 2024

- *GPA: 4.0/4.0* | *ACT 36/36* | *BSE in Computer Engineering* | *Minor in Mathematics*
- **Relevant Coursework:** Data Structures & Algorithms (A), Computer Architecture (A+), Discrete Math (A), Embedded Systems (A+), Big Data Analytics (A) | *Awards:* IEEE HKN Engineering Honor Society — Top 12.5% of Class of 2024

Technical Skills

Languages: Java, C, C++, C#, Python, JavaScript, OCaml, HTML & CSS, SQL, Arduino IDE, LaTeX
Other Skills: AWS, Express.js, Node.js, MongoDB, AVR & STM microcontrollers, Python Flask, Swing, Linux, Git, CMake

Professional Experience

Susquehanna International Group (SIG) | Philadelphia, PA — June 2022 – August 2022
Software Engineering Intern – Electronic Options Trading, Quoting Team

- Ensured accuracy of quote streams by developing a stream processor in C# that provided live metrics and issue isolation.
- Wrote a Cron Job in Python to alert team of anomalies in quote computation preventing quotes from being sent to market.

Johns Hopkins Applied Physics Laboratory (APL) | Laurel, MD — June 2021 – August 2021
Software Engineering Intern – Force Projection Sector

- Engineered an anomaly detection & behavior prediction system for flight data with C++ & Google Protocol Buffers.
- Supported front-end visualization of flight data using ReactJS and TypeScript, and generated testing data with MATLAB.
- Led onboarding for new full-time employees to continue work on my software system due to its success in testing.

Brainwaive LLC | Huntsville, Alabama — September 2020 – March 2021
Software Engineering Intern - Ethar Augmented Reality

- Developed an augmented reality (AR) app content management/delivery system with C#, Unity, and Immersal AR SDK.
- Integrated REST API with app to allow for online AR content, and developed a touch-based object manipulation interface.

Penn Electric Racing | Philadelphia, PA | www.pennelectricracing.com — January 2021 - Present
Software & Electrical Engineer (We build an electric racecar to compete in the Formula SAE International competition)

- Led embedded software (C++) and electrical design of a battery management PCB employing STM32 microcontrollers.
- Spearheaded onboarding program for 20 rookies with series of interactive presentations, projects, & performance reviews.

Teaching Assistant – CIS120 | Philadelphia, PA — September 2021 - Present
Programming Languages and Techniques I

- Led weekly recitations for 20+ students, graded assignments, facilitated code reviews, and held weekly office hours.
- Taught concepts such as functional & object-oriented programming in OCaml & Java, GUI programming, and algorithms.

Projects

Projectile Locating and Tracking System — March 2022 – April 2022
C, C++, Python, OpenCV, AVR Microcontrollers, ESP8266 Microcontroller, JavaScript | GitHub Repository | YouTube Video

- Created a projectile tracking system to locate a moving projectile, point a laser at it, and display location on "radar" LCD.
- Wrote custom UART serial communication, Servo Motor control, and LCD graphics libraries for the ATmega328p MCU.
- Designed a computer vision-based method using a two-camera stereo vision algorithm in OpenCV to locate projectiles.

Jazz Improvisation Bot — May 2022 – June 2022
Node.js & JavaScript, Express.js, MongoDB, AWS Lambda & EC2, HTML, CSS, Bootstrap | Website Link | GitHub Repository

- Built a website that allows users to create chord progressions, which a bot can then play novel jazz improvisations over.
- Devised an improvisation algorithm written in Node.js and running on AWS Lambda, providing users with numerous parameters to change improvisations generated. Created a JavaScript audio player and visualizer for the improvisations.
- Wrote a backend server in Express.js to manage encrypted account information and save user compositions in MongoDB.

Connect-4 AI and TCP Multithreaded Login Server — December 2020 – January 2021
Java, Java Swing, Java Socket Programming | GitHub Repository

- Engineered an AI for Connect-4 with the minimax algorithm and implemented a GUI for the game using Java Swing.
- Designed a multithreaded backend server for accounts validation and information storage using the TCP protocol.