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Objective:

Entry-level full-time position as a Software Engineer

Education:

May 2023 — Worcester Polytechnic Institute (WPI), Worcester, MA
Bachelor/Master of Science in Computer Science (4.0/4.0 cumulative GPA)

May 2019 — United World College in Mostar (UWCiM), Mostar, Bosnia and Herzegovina
Final IB Score: 42/45 (7 in Mathematics and Physics Higher Level)

Professional Experience:

Software Engineering Intern, Avidyne Corporation, Summer 2022
Developed an RSA encryption handshake scheme for establishing encrypted communication between client and server via AES and integrated it within the operating system of one of the products. Developed a tool application used in testing robustness of a packet transmission protocol developed to operate in an unreliable wireless medium. Development was done in C/C++ in Visual Studio for Windows, Linux and iOS systems. Source version control managed with Perforce.

Grader for Graduate Level Operating Systems Course, WPI, Spring 2022
Primary focus was grading homework coding assignments, spotting academic dishonesty and exceptional works. Secondary focus was holding office hours and one-on-one study sessions to help struggling students with their assignments. All coding assignments are in C programming language.

Hard Skills: Full-stack development, Computer Networking, Algorithms, Android App Development, Machine Learning, Encryption, Authentication, Multi-threading, Java, C, C++, Python, JavaScript, Node.js, Express.js, React.js, Socket.io, MongoDB, Go, Relational Databases, SQL, MySQL, Android Studio, AWS, GitHub, SwaggerHub, WordPress

Coursework and Projects:

Systems Programming Concepts Course, WPI, February 2020
Introductory course to both C and C++. Learned reading/writing to files, random number generation, array and linked-list traversal, enums, structs class instantiation/destruction, test-driven development, sequence diagrams etc. Final project included recreating the game of battleships in C++.

Algorithms Course, WPI, April 2020
Learned concepts such data structures and types, binary array search, performance analysis of algorithms, sorting algorithms, hash tables, BSTs, graphs and graph traversals. Final project included working in a group of 4 students to implement a 2-dimensional KD tree GUI using Java, for the purpose of demonstrating nearest-neighbor search queries.

Database Systems Course, WPI, February 2021
Learned the Entity Relationship (ER) model, structures and constraints of a relational model and how to represent them using SQL DDL; algorithms for translating the ER model to a relational model; understanding defects in the relational design and rectifying them using normalization theory; relational algebra for operations on a relational model; SQL DML; DB application development concepts such as stored procedures (PL/SQL), JDBC; triggers and constraints, and views, as well as an overview of indexes, transactions, logging and security were also be covered.

Operating Systems Course, WPI, February 2021
Learned low-level intricacies of operating systems. Projects included process creation/destruction, multithreading, manual memory allocation and management and implementation of one's own processor scheduling policies. Learned about virtual memory, caching and paging systems, I/O and file systems etc.

Computer Network Course, WPI, September 2020
Learned low-level computer network principles in C. Created a low-level HTTP Client and Server over TCP/IP using Unix Socket commands; implemented a reliable data transfer protocol similar to TCP; and implemented a distance-vector routing protocol. Labs included using Wireshark for capturing and analyzing HTTP packets, DNS request/response pairs and Ethernet frames.

Graduate-Level Artificial Intelligence Course, WPI, February 2022
Learned concepts such as A* search, genetic algorithms, hill climbing with simulated annealing, feature manufacturing and heuristic generation using machine learning, as well as reinforcement learning paradigms such as SARSA and Q-learning. Used Python 3.0 and worked in groups of 3 to 5 team members.

Distributed Systems Course, WPI, April 2021
Learned principles and theories of resource allocation, file systems, protection schemes, and performance evaluation as they relate to distributed and advanced computer systems. Project work included implementation of a file system in C, as well as the MapReduce library in Go.

Assembly Language and Machine Organization Course, WPI, November 2020
Learned the structure and behavior of modern digital computers and the way they execute programs. Learned the Von Neumann model of execution, the memory hierarchy, pipelining, representations of numbers in computers, basic instruction sets, the functions of compilers, assemblers, linkers, and loaders, and how code and data structures of higher-level languages are mapped into the assembly language. Programming projects were carried out in C and the assembly language of a modern processor.

Machine Learning Course, WPI, November 2021
Learned machine learning algorithms for regression, classification, dimensionality reduction, clustering, and density estimation. Specific topics included neural networks, principal component analysis, k-means clustering, decision trees, random forests, support vector machines, and kernel methods. For the final project I worked in a group of 3 to analyze an online housing dataset to predict housing prices. Programming was done in Python 3.0 using numpy, pandas and matplotlib packages.

Compilers Course, WPI, September 2022
Studied the process and tools for implementing a compiler for a recursive programming language. Learned concepts and implementation of lexical analysis, syntax analysis, symbol tables, semantic analysis, intermediate code representations and code generation. Tools used include ANTLR4 for front-end, C++ and LLVM for back-end.

Graduate-Level Algorithms Course, WPI, Fall 2022
Focused on design, analysis and proof of correctness of algorithms. Learned analysis techniques such as asymptotic worst case and average case, as well as amortized analysis. Learned development of a probability model for average case analysis. Learned techniques for proving lower bounds on complexity along with NP-completeness.

Graduate-level Cryptography and Data Security Course, WPI, Fall 2022
Learned concepts such as perfect secrecy, private and public key cryptography, symmetric and asymmetric encryption algorithms etc.. Specific schemes such as DES and AES, RSA, ElGamal, and systems based on elliptic curves were developed. Learned about signature algorithms, hash functions, key distribution and identification schemes as well as advanced mathematical algorithms for attacking cryptographic schemes.

Interactive Qualifying Project "Quantum Games", WPI 2021-2022
Worked in a team of 2 and under the guidance of professor P. K. Aravind from the physics department, to create digital simulations of quantum physics phenomena and experiments as well as video games which would be used in demonstrations, mainly for high schoolers, to spark the youth's interest in quantum physics. The games and simulations are created using HTML, JavaScript, SCSS and SVG, and would be part of a website as the final product.

Webware Course Group Project, WPI, October 2021
Worked in a group of 5 to create an online workout tracker. Used Node.js for running the server, Express.js for back-end development, React.js for front-end development and MongoDB for persistent storage of workout and user data. Used Heroku for hosting the website.

Bluetooth Detective Group Project, WPI, April 2022
Worked in a team of 3 to design a user-friendly prototype for a type of Bluetooth X-ray device which would display detected Bluetooth devices inside the camera view of a user's phone. The device uses 4 ESP modules programmed using C++ for signal detection. The phone app is developed in Java using Android Studio.

Software Engineering Course Group Project, WPI, November 2020
Worked in a group of 4 to create a website which helps a group of people decide on one alternative among many when faced with a choice. Used AWS for hosting, MySQL for defining the database structure, Swaggerhub for API definition, Java for back-end development and JavaScript for front-end development

"Prelepa Sedmica" Personal Project, Worcester, December 2021
Created a digital recreation of a multiplayer card game traditionally played in the Balkan region. Used Node.js for running the server, Express.js for back-end development, React.js for front-end development and Socket.io for communication among players. Used Heroku for hosting the website.

MiMAttack Personal Project, Bosnia and Herzegovina, January 2022
Individual project exploring the idea of Man-In-The-Middle attacks. The aim of the project was to see whether packets could be successfully tampered with so that a target device plays YouTube videos which are dictated by an attacker. The project achieved a high level of fidelity, however was in the end abandoned due to YouTube using its own "QUIC" protocol for encryption, which was not very well documented. Project was developed in C using the libpcap library and Wireshark for packet analysis.

Activities/Awards:

WPI	4x WPI's Dean's List, 4.0 Cumulative GPA
Powerlifting	2020 83kg Junior National Champion of Croatia
Elementary/High School	Multiple Time Winner or Contestor of various Regional Math, Physics Competitions and IT competitions