MOHAMMAD ALAFSHATE

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EDUCATION

Honors Bachelor of Science + Co-op with a specialization in Computer Science & Business/Math Minor   **Toronto, ON**
University of Toronto   *September 2021 - April 2026 (Expected)*

Relevant Courses: Introduction to Software Engineering, Data Structures and Analysis, Algorithm Design, Analysis & Complexity, Introduction to Machine Learning, Software Design, Introduction to Artificial Intelligence, Introduction to Computer Programming, Introduction to Computer Science, Operating Systems, Software Tools and Systems Programming, Computer Organization, Computational Complexity and Computability.

SKILLS

Developer Tools: Jira, Selenium, GitHub, Microsoft Azure, .NET Core, MongoDB, Virtual Studio Code, CLion, IntelliJ, Linux, AWS, NumPy, Jira, Docker, MSBuild, JSON, psycopg2, Microsoft MakeCode, Hugging Face Transformers library, and OpenAi API.

Frameworks: React, Flask, JUnit, PyTest, JavaFX, Pygame, Vaadin, Django, .NET Core, Angular, Express.js, and Node.js.

Languages: Python, C, C++, C#, Java, PostgreSQL, SQL, RISC-V Assembly, JavaScript, HTML/CSS, Swift, and Bash.

Soft Skills: Communication, problem-solving, teamwork and cooperation, attention to detail, organization, and time management.

WORK EXPERIENCE

Math Project Canada   **Mississauga, ON**
Mathematics Tutor   *October 2022 - December 2022*
- Provided tailored tutoring in mathematics, boosting grades for over 50 students and helping 95% achieve target test scores through personalized lesson plans.
- Developed and implemented individualized learning strategies, effectively supporting students with ADHD and dyscalculia in reaching their academic goals.
- Taught all math concepts for grades 3-12 using engaging and interactive methods, resulting in enhanced student understanding and interest in mathematics.

PROJECTS

Uber for Services Web Application - Startup Project (www.swerv.ca)   **Software Developer**
Python, Flask, OpenAi API, PostgreSQL, OOP, Data Patterns, Software Design, Agile methodology   *March 2023 - Present*
- Contributed to a startup environment, leading to over 1000 user sign-ups.
- Fine-tuned a GPT-2 model using the Hugging Face Transformers library, resulting in an AI-powered search bar that improved search accuracy and relevance by 35%, enhancing user experience.
- Developed and deployed PostgreSQL database-driven applications using Flask and Python, hosted on Heroku, resulting in robust, scalable web applications with a 99% reliability.
- Addressed complex networking issues involving IP routing and database accessibility through firewalls and NAT, resulting in a 50% improvement in database connectivity and system reliability.
- Enhanced the UI/UX of the portal using React, resulting in a 25% increase in user efficiency, performance, and satisfaction.
- Conducted thorough code reviews to maintain high-quality standards and adherence to best documentation practices, resulting in a 20% reduction in code defects.
- Automated test cases, including UI testing and end-to-end testing, resulting in 30% faster development cycles and a 15% reduction in bugs.
- Simplified database models for user, review, and service models, resulting in a 25% increase in system versatility and easier scalability.

Team Task Manager Web Application   **Student Software Developer - University of Toronto**
Java, Vaadin, JavaFX, MongoDB, Object Oriented Programming (OOP), Agile methodology   *November 2022 - December 2022*
- Collaborated with a team of four to develop a full-stack web application using Vaadin and JavaFX, resulting in a functional and interactive front end.
- Performed in-depth code evaluations to ensure adherence to high-quality standards and best practices, resulting in a 30% reduction in code defects.
- Implemented scalable task and event models along with accessibility features, resulting in a 20% improvement in user interface and user experience.

Advanced Audio Processing Tool   **Student Software Developer - University of Toronto**
C, Bash   *January 2024 - March 2024*
- Collaborated with a team to develop a comprehensive audio-processing tool using C and Bash, resulting in enhanced functionality for audio file manipulation.
- Implemented command-line argument parsing to dynamically modify audio file parameters, resulting in flexible and user-friendly audio adjustments.
- Engineered a robust file handling mechanism to read from and write to audio files, ensuring data integrity and reliable error handling.
- Devised and applied complex audio processing algorithms to manipulate audio samples using C, including echo effects and volume adjustments, resulting in a 25% improvement in audio quality.
- Conducted thorough testing and validation of the tool with various audio datasets to guarantee accurate audio output and performance efficiency, resulting in a bug-free, user-friendly program.

School System DBMS   **Student Software Developer - University of Toronto**
PostgreSQL, psycopg2, Python   *October 2023 - December 2023*
- Collaborated with a team to build a comprehensive school system DBMS using PostgreSQL and Python, resulting in an efficient and scalable database solution.

- Created a novel schema written in SQL, resulting in a well-structured and optimized database design.
- Built complex queries and embedded SQL in a high-level language using psycopg2 and Python, resulting in thorough testing and robust data manipulation, improving data retrieval times by 20%.

Tetris Game   **Student Software Developer - University of Toronto**
RISC-V Assembly   *October 2023 - November 2023*
- Built a custom Tetris game with a multiplayer mode and additional features using RISC-V Assembly, resulting in an engaging and interactive game experience.
- Maintained detailed program documentation, resulting in clear and comprehensive project records.
- Documented and created a user manual, resulting in user-friendly guidance for game players, increasing user satisfaction by 15%.

Interactive Boggle Game   **Student Software Developer - University of Toronto**
Java, JavaFX, Data Structures   *November 2023 - January 2024*
- Created the core game logic enabling single-player gameplay against a computer, integrating user interactions through console input, resulting in a seamless gaming experience.
- Developed a dynamic game board capable of different sizes and randomized letter distributions using JavaFX, resulting in varied and engaging gameplay experiences.
- Applied comprehensive word search algorithms, including dictionary lookup and recursive algorithms, using maps and arrays, resulting in efficient word validation and scoring mechanisms.

Compression & Decompression Program   **Student Software Developer - University of Toronto**
Python, Huffman Trees, Object Oriented Programming (OOP)   *February 2022 - April 2022*
- Created a program to compress and decompress files using a Huffman tree algorithm, resulting in efficient file size reduction without data loss.
- Designed and implemented an algorithm that transitions between original file formats and .huff files, resulting in seamless and accurate data handling.
- Conducted extensive testing to validate the algorithm's performance, ensuring reliable compression and decompression processes, achieving a 50% reduction in file sizes on average.

Tiny Shell (tsh)   **Student Software Developer - University of Toronto**
C, Bash   *March 2024*
- Developed a parser to interpret user input, supporting external commands with arguments, input/output redirection (<, >), and pipelines (|), enhancing command-line functionality.
- Engineered a job control mechanism to manage multiple processes, allowing users to run jobs in the foreground or background, and to move jobs between these states using signals, resulting in a 40% increase in shell usability.
- Implemented custom signal handlers to manage job states, including handling SIGINT (Ctrl-C), SIGTSTP (Ctrl-Z), and SIGCHLD for gracefully managing process interruptions and terminations.
- Utilized Unix process control system calls (fork, exec, waitpid) to create child processes for executing commands, ensuring each child process runs in a unique process group to correctly handle signals.
- Enabled command-line I/O redirection and the creation of pipelines between commands, enhancing the shell's functionality for complex command executions, resulting in a 25% increase in command execution efficiency.

EXTRA/CO CURRICULAR

University of Toronto Software Engineering Club (USEC)   **Mississauga, ON**
Treasurer & General Executive   *September 2021 - June 2024*
- Maintained accurate financial records using Excel, resulting in streamlined budgeting and efficient allocation of club funds.
- Developed and launched the club's website using Java and React, enhancing online presence and member engagement.
- Coordinated with other executives to plan and execute events, resulting in increased member participation and satisfaction.

University of Toronto AI and Cognitive Science Club (AICS)   **Mississauga, ON**
Head of AI   *July 2024 - Present*
- Collaborated with team members to organize events for members using Notion, leading to well-structured and successful club activities.
- Educated executives on using AI technologies, such as the OpenAI API, to develop AI agents, resulting in increased technical proficiency within the club.
- Conducted workshops on AI and cognitive science tools, providing hands-on learning experiences that improved members' practical skills.

VOLUNTEER EXPERIENCE

Hawk Hacks   **Waterloo, ON**
Software Developer Mentor   *May 2024*
- Guided participants on frameworks and problem-solving resulting in their increased technical capabilities.
- Assisted with technical documentation, including the Vaadin framework for Java and other software tools resulting in my students' success in winning the competition.
- Conducted office hours using prior knowledge and quick research to answer all levels of beginner to expert questions.

SRHacks National (Science Rendezvous)   **Toronto, ON**
Software Developer Mentor   *April 2024*
- Mentored participants on Microsoft MakeCode software and basic engineering concepts for Micro programs.
- Guided project development phases, ensuring adherence to competition themes and technical requirements.
- Assisted with technical software project related questions resulting in my students' success in placing top 3 in the competition.

CERTIFICATIONS

AI Developer Professional Certificate - IBM   *June 2024*

Generative AI: Elevate your Software Development Career - IBM   *July 2024*