Muhammadbager Al-Ali

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Education

University of Washington Seattle, WA

Bachelor of Science in Computer Science, Minor in Business Administration *Expected Graduation: June 2026*

- Related Coursework: Algorithms, Machine Learning, Data Structures & Parallelism, Programming Languages, Software Design & Implementation

Projects

Java Application – MiniDesmos | *Java* Sept 2023 – Oct 2023

- Engineered a graphing calculator that dynamically visualizes and manipulates mathematical functions in real time using a modular Java design, demonstrating advanced GUI and algorithmic skills.

Python Application – UW Directory | *Python, PyQt5, Yelp API* Oct 2023 – Dec 2023

- Developed a mini-directory GUI using PyQt5 that leverages the Yelp Fusion API to dynamically fetch and display UW-area destination details with images, names, and categories in an interactive, real-time interface.

C Application – Dynamic Storage Allocator | *C* Nov 2024

- Implemented an explicit dynamic storage allocator in C that utilizes a doubly-linked free list with LIFO insertion, first-fit search, and immediate coalescing to efficiently manage memory allocation and deallocation.

Personal Project – Interactive Weather Map | *Python, PyQt5* Sept 2024 – Jan 2025

- Built a weather app that fetches real-time data from an external API, dynamically displaying temperatures, emoji icons, and detailed weather descriptions.

Android App – DubHacks | *Java, Android* Nov 2024

- Created an Android app featuring a drag-and-drop, MVC-designed interface to apply image effects such as sharpening and 8-bit style rendering on large data sets, with planned extensions for multiple photo filter support.

Machine Learning Project – K-Means Clustering | *Python, NumPy, Matplotlib* June 2025

- Tuned MLP and ConvNet on CIFAR-10 via grid search, surpassing 71.05% test accuracy and plotting train/validation curves.
- Vectorized Lloyd's k-means on MNIST to derive 10 digit-centroid images, optimizing centroid updates in NumPy for rapid convergence.

React/TypeScript App – CampusMaps Friends Feature | *React, TypeScript, Node.js* Mar 2025 – Jun 2025

- Implemented server-side friend management routes in TypeScript, enabling RESTful APIs for adding/removing friends and persisting user friend-lists.
- Designed and optimized spatial search utilities (`distanceMoreThan` and `closestInTree`) using LocTree in Node.js for performant nearest-neighbor queries without costly square–root operations.
- Developed a `FriendsEditor` React component and extended `MapViewer.tsx` to visualize nearby friends' paths with dynamic circles and legend labels.

Activities & Leadership

Second Lead Event Organizer — Al-Arabeen *2012 – Present*

- Leading negotiations to secure legal licensing for the march through the Tulalip Licensing Office.
- Built an easy-to-use attendance management program in Python to streamline event check-in.

Honors & Awards

Dean's List (2 quarters), Bill & Melinda Gates Foundation Scholarship, Coursera Certificate - Full-Stack Developer

Technical Skills

Languages (Proficient): Java, Python, C/C++/C#, JavaScript, TypeScript, R, ML, HTML, CSS
Libraries/Frameworks: React, NumPy, PyQt, Pytorch, Matplotlib, Blazor, Android
Developer Tools: Git, Bash, JUnit/GUI, LaTeX, ASP.NET, VS Code, Visual Studio, PyCharm, IntelliJ, Eclipse