Alden Wu

+1 (408) 832-8816 | aldenwu18@gmail.com | linkedin.com/in/aldenwu0 | github.com/goodtrailer

Education

University of California, San Diego — San Diego, CA
Computer Science B.S., GPA 3.991 — *September 2022 – June 2025*

Relevant Coursework

CSE Advanced Data Structures, Object-Oriented Design, Software Tools, Algorithms and Systems, Computer Systems and Architecture, Theory of Computation, Optimization and Machine Learning, Computer Vision, Computer Graphics, Parallel Computing, Discrete Differential Geometry

Math Linear Algebra, Vector Calculus, Probability and Statistics, Graph Theory, Combinatorics, Numerical Analysis, Real Analysis

Technical Skills

Languages C#, Java, C++, C, Python, JavaScript/TypeScript, HTML/CSS, PHP, SQL (PostgreSQL), NoSQL (MongoDB), MATLAB, ARM Assembly, Powershell/Bash, CMake, Make

Frameworks Unreal Engine, Unity, React.js, Express.js, Win32 API, WinForms, JUnit, GoogleTest, doctest, NUnit

Developer Tools git, ssh, gdb, Amazon Web Services, Oracle Cloud, NVIDIA Nsight, RenderDoc, vcpkg, NuGet, Apache Maven, Docker, Visual Studio, Jupyter Notebook, vim, UNIX/POSIX, Ubuntu Linux, Blender

Libraries/etc. .NET, OpenGL, DirectX, Node.js, Passport.js, CUDA, PyTorch, OpenCV, NumPy, SciPy, Eigen

Projects

Study website – "rote" | *TypeScript, HTML/CSS, PostgreSQL, Node.js, Passport.js, React, Oracle Cloud* — August 2023 – Present

- Built a full-stack web application for creating, studying, and sharing flashcards
- Implemented a React front-end communicating with a Node.js/Express.js back-end via REST API
- Strengthened authentication security using password hashing, HTTPS (SSL/TLS) encrypted cookies, and CORS
- Designed a scalable database schema in PostgreSQL
- Improved reliability by deploying the backend on Oracle Cloud with a load balancer

Wallpaper automation tool – "Daily Desktop" | *C#, .NET, WinForms, Win32 API, NUnit, GitHub Actions* — April 2021 – Present

- Programmed an async GUI app for automating tasks
- Implemented a modular and extensible interface (over 10 plugins) using OOP design patterns
- Increased reliability by unit testing code and using GitHub Actions for CI/CD
- Published release builds, gaining over 1.2K downloads

Audio capture tool – "obs-app-audio" | *C++, Win32 API, CMake/Make, gdb, Audacity* — December 2020 – October 2021

- Wrote a tool for capturing audio from selected processes
- Facilitated low latency (~50µs) IPC by coding a lightweight library for Win32 pipes
- Performed real-time audio processing from concurrent sources using relevant data structures (e.g. ring buffer)
- Created a DLL module injector to hook application APIs and intercept audio data

Strategy game – "Paper" | *C++, Unreal Engine, Blueprints, NVIDIA NSight, Blender* — November 2019 – February 2021

- Developed an online turn-based strategy game with 3D graphics using Unreal Engine
- Supported online play with over 3000 pieces and 6 players simultaneously using UE4's replication API
- Boosted performance by implementing efficient algorithms (e.g. A* pathfinding, Bresenham line drawing)
- Handled all areas of game development, e.g. modeling, texturing, animating, and scripting

Open-Source Contributions

Rhythm game – "osu!" | *C#, OpenGL, SDL, NUnit, RenderDoc, .NET* — July 2022 – February 2023
github.com/ppy/osu, github.com/ppy/osu-framework — *13 PRs merged, 74 commits*

- Contributed to a large open-source project
- Implemented various real-time graphical effects, e.g. interactive "smoke trails" and more accurate animations
- Collaborated on fixing bugs, e.g. pixel gaps; optimized performance by reducing polygon counts by ~15% for certain objects
- Improved test coverage in several areas, including GUI and gameplay logic