# Alan Liu

Computer Science Portfolio, October 2022

# About Me

Hi! I am Alan Liu, a Computer Science Major at the University of Maryland, College Park.

Here, you can see some of my projects and relevant coursework I have related to computer science and programming.

The source code for the projects can be found on my GitHub: github.com/alanliu2009

For any other inquiries, feel free to email me: alanliu2009@gmail.com

**Languages:**

Java, C++, R, JavaScript, MATLAB, LaTeX

# Related Coursework

- CMSC132 - Object Oriented Programming II (Algorithms and Data Structures)
    - This Java-based class teaches the primary data structures of all languages
- CMSC131 - Object Oriented Programming I
- HGLO101 - Globalization
    - This class uses R to visualize large datasets surrounding global issues
- MATH240 - Linear Algebra
- MATH241H - Differential Equations

# “JARVA”

## Survival Shooter Game - May 2022

# Project Overview: JARVA

JARVA is a game I created in Java using the Slick-2D graphics engine alongside 3 classmates.

This game is a time-based arena shooter, similar to bullet hell games like Enter the Gungeon.

There are a variety of enemies, attacks, and conditions, along with your own guns as a defense mechanism.

# Primary Role: Backend Programmer

As the backend programmer for the development of this game, I:

- Optimized and limited accessibility on hundreds of moving objects to allow the game to run smoothly.
- Created collision detection between the player, ground objects, and projectiles.
- Developed an expandable set of conditions and projectiles that create nuanced difficulty for the player.

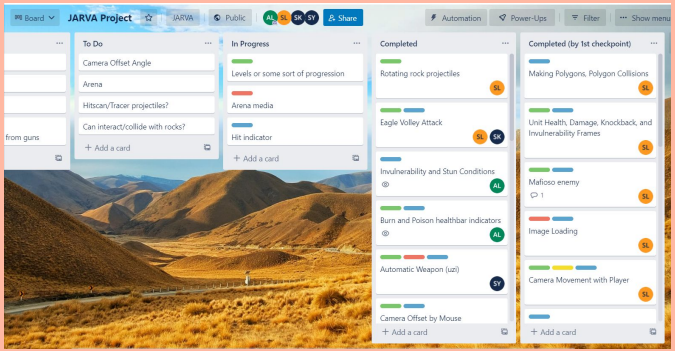
Here, I developed much of the behind-the-scenes program which allows for a clean user experience.

# Secondary Role: Project Manager

As the project manager for JARVA, I:

- Accounted for scalability within the project, allowing enemy spawning and difficulty conditions to be easily adjusted while allowing all parts of the user interface to scale for various resolutions.
- Organized goals and divvied tasks among group members.

Altogether, I helped the team resolve conflicts between different parts of the program while keeping the project easily testable for a smooth transition between various project parts.




This Trello board for objective organization can be found at

https://trello.com/b/4UIVTUaC/jarva-project

# “JARVIS”

## Terraria Replica

## 2-D Sandbox Game - January 2022

# Project Overview: JARVIS

JARVIS is a game I created in Java using the Slick-2D graphics engine alongside 3 classmates.

In this game,  a procedurally generated world is created with both enemies and objects that can be manipulated by the player.

The game is also a survival game with a variety of enemies and respective biomes, managed through a tiled grid of block objects.

# Primary Role: Backend Programmer

As the backend programmer for the development of this game, I:

- Developed the formation of object (block) tiles in a 2-D grid.
- Constructed the primary physics engine for movement used throughout the project.
- Created collision detection between the player, ground objects, and projectiles.

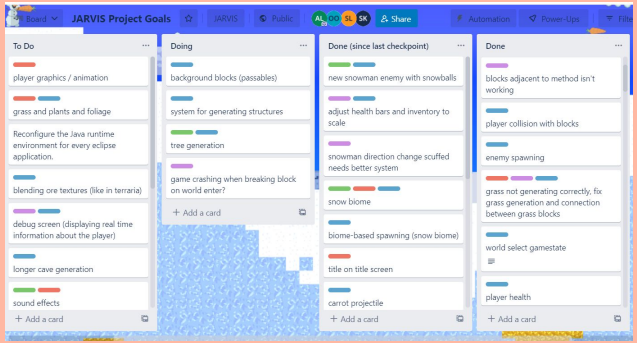
Overall, I developed the backend structure fundamental to gameplay, world design, and setup for the front-end.

# Secondary Role: Project Manager

As the project manager for JARVIS, I:

- Accounted for scalability within the project, allowing for tiles and objects to be easily reproduced from single tileset images while allowing all parts of the user interface to scale for various resolutions.
- Organized goals and actions necessary among a 4-member team for efficient program development.

Here, I led the team in organizing and assigning objectives between team members while resolving conflicts between separate parts of the program.




This Trello board for objective organization can be found at

https://trello.com/b/8E4D5Nip/jarvis-project-goals

# “Train Trouble”

## Puzzle Game - March 2021

# Project Overview: Train Trouble

Train Trouble is a time-based puzzle game based around moving train tracks to lead trains into a target location.

Only some tracks can be rotated and they can only be moved when a train has not yet reached the track.

Score is calculated based on the time taken to solve each level.

# My Role: Full Stack Developer

As the full stack developer for the development of this game, I:

- Created a tile system to display the position of each track for multiple levels.
- Designed an interactive interface to allow for selection between levels and different menus.
- Implemented user input for adjusting tracks and a leaderboard to keep track of score.

For this program, I contributed to almost all elements from the primary game engine to the highlighted visuals and backgrounds.