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Cameron Hu

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Technical Skills

Programming Languages
- C, C++, C#, Python, Java, JavaScript, Scheme, Haskell, Prolog, Lua, Go, Racket, Assembly

Software
- Unity, Godot, Git, PostgreSQL, R, MATLAB

Web Development
- WebGL, HTML, CSS

Technical Projects

Booga's Clubhouse – Richmond, BC, Canada — Oct 2019 - Present

3D multiplayer board games and card games to play online with friends, made with Godot.
- Experimented with Godot's high-level multiplayer API, testing a simple UDP socket server and client, making REST web service requests, and creating an ENet based client and server.
- Implemented ray-casting to obtain world coordinates from the mouse position to allow draggable checker pieces.
- Modeled Checker pieces in Maya 2019, creating a UV shell to easily put custom textures on the model.

Avalon Discord Bot - Richmond, BC, Canada — July 2019 - Present

A Discord bot which moderates "The Resistance: Avalon" games in a Discord channel coded in JavaScript.
- Self-taught discord.js and node.js to set up a local server to run and to test the Discord bot.
- Programmed the bot with emphasis on object-oriented programming by implementing each feature as a class to easily add, remove, or adjust any custom command, role, or game mode in the future.
- Partnered with a friend and clearly communicated what each of our jobs are, using GitHub as our source control.

Forward Kinematics – Richmond, BC, Canada — Sept 2019

Computed the local and global quaternion to obtain the global position from motion data (.bvh) using OpenGL.
- Solved how to convert a joint's current rotation angle to Euler angles, then calculating the local quaternion.
- Identified the global quaternion by multiplying the current joint's parent's global quaternion by its own local quaternion to calculate the joint's global position to animate the 3D skeleton motion data.

Charging Up! – BC Game Jam 2019, BCIT, Burnaby, BC, Canada — Feb 2019

A 2-player cooperative/competitive minigames using Godot created at a hackathon.
- Coordinated with 4 peers to each create 1 minigame to combine into a final version of the game and peer reviewed each minigame to ensure user experience and gameplay are smooth and free of glitches.
- Lectured teammates to design a better object-orientated environment by saving an object as its own scene, allowing any modification to the object apply anywhere it is used.
- Utilized Godot's AnimationPlayer class to create animations for the sprites and backgrounds drawn with Aseprite.

Booga's Welcome of Fate – Richmond, BC, Canada — Jan 2019 - Present

An action role-playing 2D game created uniquely with multiple game engines.
- Created a turn-based RPG using PyGame that includes 2 characters with unique skills and playstyles, an inventory system, a dungeon with multiple levels, and a full-fledged stat system.
- Redesigned the game's theme to a real-time RPG using Unity and used Unity's Animator Controller to create 2D skeleton animations and designed User Interfaces for the inventory, skill, and quest panels.
- Ported the game to Godot and implemented a farming system with a day-night cycle that includes an interactable world, allowing the user to place objects anywhere onto the world, interactable NPCs, a quest system, a drag-and-drop inventory, and a combat system with an in-depth skill tree.

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Interactive Robot Arm – Richmond, BC, Canada Jan 2019 – Apr 2019

A 3D robot arm that can be moved with interactive sliders and has a custom animation using WebGL.

- Studied hierarchical modeling to understand each part of the robot has their own coordinate systems and implemented inverse kinematics to move the arm towards the user's mouse position.
- Modeled a simple scene containing the robot arm, a table, and a wall using 3D rectangles and programmed lighting to the scene using the Modified Phong Model.
- Animated a simple animation of the robot arm picking up a small object and swaying its arm around by implementing keyframes to easily animate the arm.

Ping-pong game – Hangzhou, Zhejiang, China Sept 2017 – Feb 2018

A FPGA ping-pong game that can be controlled using buttons.

- Investigated and studied the use of Zhejiang University's SWORD4.0 board to understand how to use Xilinx, load the game, send VGA signals, and use the buttons for the game.
- Designed ping-pong logic using Verilog by creating boundaries for the screen, the paddle, and the ball and bouncing the ball to another direction when the ball collides with another boundary.
- Engineered buttons to move the paddle left or right, change paddle color, and speed up or slow down the ball.

Super Smash Bros. Melee Modifications – Richmond, BC, Canada July 2016

Modifications to Super Smash Bros. Melee for the Nintendo GameCube to create custom abilities for characters.

- Researched the game's hitbox, GFX, and SFX machine code instructions to know how to create custom abilities.
- Analyzed the game's machine code using Hex Editor to locate the addresses that is needed to be modified.
- Experimented with synchronous and asynchronous timing effects to freely design custom and unique abilities.

Work Experience

YSA Camp – White Rock, BC, Canada Sept 2019 - Present

Coding Instructor

- Taught Python, Java, and C++ basics, algorithms, and object-oriented programming to students.
- Organized and managed 2-hour classes to prepare students for the University of Waterloo's Canadian Computing Competition's (CCC) junior and senior problems.
- Responsibly led 2-hour classes and attentively mentored and guided students by making sure they understand the lecture material step by step.

McDonald's – Richmond, BC, Canada July 2018 - Present

Crew Member

- Obtained the Employee of the Month Award by consistently working hard and having a positive attitude.
- Communicated clearly with customers to obtain loyal patronage by talking politely and efficiently.

Extra-curricular Activities

SFU Cheerleading Club – Burnaby, BC, Canada July 2018 - Present

Red Team Member

- Committed to 3-hour practices twice a week and balanced academic work and part-time jobs with practices.

Education

Computing Science Dual Degree Program (DDP) Sept 2015 - Apr 2021

- Simon Fraser University, Burnaby, BC, Canada - **Bachelor of Science**
- Zhejiang University, Hangzhou, Zhejiang, China - **Bachelor of Engineering** May 2016 - July 2018