Andrew Knowles

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EDUCATION

B.S., Mathematical Sciences, Discrete Math and Logic Concentration — Graduating May 2024
Carnegie Mellon University, Pittsburgh, PA
Minor in Game Design
Relevant coursework: Computer Game Programming, Computer Graphics, Intro to Computer Systems, Linear Algebra,
Data Structures and Algorithms, Principals of Functional Programming, Advanced Game Studio

TECHNICAL SKILLS

Programming: C, C++, C#, Java, Python, OpenGL   **Game Engines:** Unity, Unreal, Godot
Mathematics: Discrete Math, Linear Algebra, Multidimensional Calculus
Additional Experience: 3D Modeling (Blender), Web Dev (HTML, CSS), Video Editing (Davinci Resolve)

WORK EXPERIENCE

Mixed Reality Research Assistant — June 2023 - December 2023
Embodied Computations Lab, Carnegie Mellon School of Design
- Developed custom application for in situ welding training and guidance in Unity, C# for use with Meta Quest Pro, Quest 3
- Collaborated with Design graduate students to design and construct custom welding helmets with VR headset mounts
- Wrote custom shaders to integrate UI assets for overlay visuals, enabling fast iteration on designs via parameters
- Integrated Java plugin to collect additional sensor data through headset USB-C port
- Conducted workshops with on-site demos for local industrial design students, incorporating feedback in new iterations

PROJECT EXPERIENCE

C++ Programmer, Graphics Programmer (OpenGL), Game Designer — Fall 2023
CMU 15-466 Computer Game Programming
- Created 6 small games in 6 weeks, and 1 large game in 2 months, programming gameplay, graphics using C++, OpenGL
- Developed custom asset pipelines, Blender add-ons in Python, facilitating level iteration and scripting for interactables
- Programmed custom 3D physics engine supporting sphere and box collisions in mini-golf game
- Designed and implemented custom recursive stencil buffer-based portal system for non-Euclidean puzzle game

Unity Game Programmer, Game Designer — June 2023 - March 2024
Independent Work
- Individually created unique camera-based puzzle game for Ludum Dare 54, placing 72nd overall, 16th in innovation category
- Collaborated with 10+ teammates in-person and online to develop first person puzzle narrative game for GMTK Jam 2023
- Expanded on previous dialogue and progression system, adding support for voice clips, subtitles, and character portraits
- Co-designed mixed reality experience for Quest 3 with fellow student for independent study; programmed FPS mechanics

3D Graphics Engineer — Spring 2023, Spring 2024
CMU 15-462, 15-472 Computer Graphics
- Completed algorithms in rasterization and raytracing pipelines in CMU's educational graphics package using C++
- Programmed mesh editing algorithms, and skeletal animations via forward and inverse kinematics
- Prototyped Vulkan scene viewer in C++ using custom vector math library and Win32 API for new real-time graphics course

Unreal Game Developer, Lead Programmer — August 2022 - March 2024
CMU Game Creation Society
- Developed "Panarctica", a linear first-person shooter game on frozen airships using Unreal Engine, Blueprints and C++
- Programmed full and semi-automatic hitscan weapons, with animations for firing and reloading
- Designed and programmed enemy AI for detecting player, moving, and firing weapons
- Currently leading team of 15 students to develop multiplayer third-person horde shooter, teaching Unreal to new programmers

Android AR Software Developer — Spring 2023
CMU 53-472 Advanced Game Studio
- Developed "Cyber Sleuth", a geospatial AR game for Android with Niantic's Lightship ARDK using Unity and C#
- Utilized Lightship Visual Positioning System to place characters and objects in real-world locations at CMU
- Prototyped flexible dialogue system and tool for designers to place story and background objects via AR app