Junwoo Seo

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EDUCATION

DigiPen Institute of Technology (GPA 3.79/4.0) Redmond, WA | 08/2022 - 04/2024

Bachelor of Science in Computer Science in Real-Time Interactive Simulation (Dual Degree Program)

Dean's Honor List: Fall 2022, Spring 2023, Fall 2023

Keimyung University (GPA 4.14/4.5) Daegu, South Korea | 03/2017 - 08/2024

Bachelor of Science in Computer Science (Dual Degree Program)

Dean's Honor List: Spring 2017, Spring 2018, Fall 2018

SKILLS

Programming Language: C, C++, C#, Python, Javascript, CSS, HTML, GLSL, Lua, MySQL, Assembly
Framework & Library: OpenGL, DirectX 12, Docker, GLFW, EnTT, ImGui, Three.js
Engine & Tools: Unity, Visual Studio, git, svn, doxygen, cmake, premake, make, Blender, x64dbg
Math: Linear Algebra, Geometry, Calculus & Analytic Geometry, Vector Calculus, Discrete Mathematics
Language: English, Korean, Japanese

EXPERIENCE

Sergeant | Service Support Corp

Yongin, South Korea | 05/2019 - 12/2020

Ground Operations Command - Republic of Korea Army | Compulsory military service

- **Developed and deployed a custom software application** using **Python** and **Visual Basic** to manage the reward and leave system for soldiers, automating manual processes and reducing processing time.
- **Created a border operations order management system** utilizing **topological sorting** to automatically prioritize and schedule tasks based on their dependencies, ensuring efficient and logical execution of operations.

PROJECTS

Graphics & Physics Engines (with C++ / OpenGL / DirectX 12 / JS)

03/2017 - In progress

Developed 3D graphics rendering techniques and physics simulations. (personal project)

- **Implemented dynamic pose and animation systems** using inverse kinematics and path following.
- **Integrated spatial acceleration techniques**, including BVH and PCA Sphere, to optimize collision detection.
- **Created real-time rigid body, cloth, and soft body simulations** using XPBD and rigid body dynamics for realistic behavior, with interactive capabilities accessible via a web browser.
- **Designed procedural mesh generation** features for dynamic 3D model creation.
- **Engineered advanced shading techniques** such as Fresnel Effect, Refraction, Reflection, Dynamic Environment Mapping, Deferred Shading, Shadow, Toon Shading, PBR, Fog, and Grass Generation.

Hostile Engine (with C++ / DirectX 12 / C#)

09/2023 - 04/2024

Developed a sophisticated 3D game engine from the ground up. (Team of 5 | role: Engine & Physics Programmer)

- **Led the development and implementation of the scripting engine,** including the design and integration of C# script hot-swapping for real-time updates without restarting the engine.
- **Designed and implemented the API for game functions,** ensuring that core engine functionality could be easily accessed and extended via C# scripts.
- **Implemented matrix transformations for the graphics and developed collision detection calculations for the physics,** ensuring accurate visual rendering and realistic physical interactions.

Notepad Calculator (with C++ / Assembly)

04/2024 - 06/2024

Implemented API hooking techniques to intercept and modify system calls, allowing Notepad to process and compute mathematical expressions (personal project)

- **Leveraged reverse engineering techniques** to extend the functionality of a basic text editor, gaining deeper insights into **Windows API functions(in kernel32.dll)** and learning how to safely and effectively manipulate system-level operations without disrupting the host application.