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Cassette Costen

Personal Summary

I'm fascinated by computer graphics, rendering techniques and the technical side of art. This extends to videogame development and image processing. I'm comfortable developing using both low and high level programming/scripting languages, and I have a solid understanding of mathematical principles, and geometry. My investigative attitude to learning allows me to get to grips with complex systems easily and to produce novel solutions/concepts. I have a strong artistic side and competent drawing skills, which help me to visualise ideas. My organisational and communicationskills allow me to work effectively in a team and collaborate on projects with others. In my free time I pursue digital art as well as many, many other personal projects, and I'm a lover of space, surrealism, and retro styles.

Projects

Custom Kernel
One of my ongoing projects is a from-scratch kernel, which I plan to build my own 3D renderer inside. This project has challenged me in C++ as well as forced me to learn assembly. I've learned a lot about debugging, encountering problems relating to memory corruption, error handling, and more. So far I've implemented output over serial, basic memory allocation, a simple GUI, hardware interrupt handling, and keyboard input, and my next task will be communicating with onboard timing systems. The project can be found here: https://github.com/oculometric/novos

3D Game 'A Lonely Greenhouse'
A recent personal project was this single-player puzzle game about exploring a surreal abandoned greenhouse on a tower. The game is made in Unity; models, textures, materials, lighting, level design, and code created by me. It features a smooth interaction system where the player can pan around, pick up and place down objects, and use tools to progress. The ivy is created using a custom procedural generation tool I wrote for the Unity editor.

DirectX Graphics Engine
For a university module, I built a graphics engine in DX11, including resource management, JSON-based scene loading, normal mapping, stylised post-processing, simple shadow mapping, and screen-space ambient occlusion. In order to write shaders, I also learned HLSL during the project. I built a demo scene using Blender in order to showcase all of the features of the engine.

'Corrupted Transmission' Artwork
I designed a complex post-processing workflow to create a heavily stylised artwork with the premise of being some sort of transmission from space, combining 3D modelling/texturing in Blender with 2D graphic design in Inkscape. I made use of blue-noise dithering, colour mixing, and procedural textures to create a retro effect.

Education

- **GCSEs (Hampton School, 2020):** I achieved top grades across all my subjects (Maths, English Language & Literature, Physics, Chemistry, Biology, Latin, Music, German, Design Technology, and Computer Science). The last of these I taught myself outside school, only taking the exam in school.
- **A Levels (Hampton School, 2022):** I received an A* in Computer Science, A in Psychology, and distinctions in Pre-U Maths and Further Maths. These subjects provided me with an excellent foundation in maths, programming, and research skills.
- **Foundation Drawing (OCA Online, 2023):** during my gap year I studied a foundation drawing course, which provided me with useful visualisation and artistic abilities I've found extremely useful for prototyping art projects, graphical thinking, and conveying ideas to others.
- **Computer Games Programming Bsc (Staffordshire University, ongoing):** I completed my first and second years with top grades in all modules, and I'm enjoying my third year so far as I specialise further into computer graphics. My final year project is looking at isosurface extraction using regularised marching tetrahedra.

Key Skills

- **Programming**: C/C++, C#, Python, use of debugging tools, best practices for efficient & readable code
- **Computer graphics**: GLSL & HLSL, understanding of advanced maths (linear algebra, differentiation, integration, statistical methods), rendering techniques
- **Technical art**: shaders, post processing effects, engine/import pipelines
- **Teamwork**: friendly attitude, effective communication, knowledge of collaboration tools and source control
- **Familiarity with tools**: Unreal Engine 4/5, Unity, Godot, Blender, DirectX 11, Vulkan

Work Experience

1UP Scheme (Summer 2024)
An internship program run by Staffordshire University where I spent 6 weeks working with a select group of students from different levels and staff to build two videogames. I enjoyed closely collaborating with others to organise tasks and implement features, and being part of the tech team taught me a great deal about Unreal Engine's blueprint and AI behaviour tree systems. I found myself challenged to understand the pre-existing prototype in order to properly integrate new/refactored systems with the existing codebase. For example, I wrote a system which allowed players to stop playing or even disconnect their controllers, and would swap in an AI player to play for them until they picked up their controller again.

Movement Detroit Commission (Early 2024)
I was commissioned by the Movement Detroit music festival to produce a short video to advertise the upcoming summer event. For this I created custom 3D models, including a sci-fi hard-surface DJ stand with screens on which videos could be played, and stylised wireframe models of icons of Detroit which were associated with the festival. I then used these to create animations which I combined with previous event footage to produce a fast-paced video set to music specified by the organisers. This experience both improved my video editing skills, and demonstrated my ability to work with a client and iterate on a product with their input and specifications.