Matt DiGianfilippo

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Education

DePaul University Jan 2018 – June 2020
Chicago, IL

Master of Science — Game Programming

Graduated with Distinction

Cumulative GPA: 4.0

University of Arizona Aug 2008 – May 2013
Tucson, AZ

Bachelor of Arts — Studio Art

Minor — Italian

Cumulative GPA: 3.345

Technical Summary

- 4.0 GPA Master's student in Game Programming
- Experienced in multiple areas of game development
- Excellent C++ programming skills
- Demonstrated problem solving and troubleshooting skills
- Understanding of both the creative and technical aspects of development
- Positive team player and eager to gain a deeper knowledge and improve skillsets

Programming Languages: C++, C#, C, HLSL, GLSL, Java, Python
Frameworks and Libraries: DirectX11, DirectX12, OpenGL, XAudio2, Windows API
IDE: Visual Studio
Version Control: Perforce, Git

Related Development Projects

Software Architecture

C++ / C# / OpenGL / XAudio2 / Multithreading

Game Engine *C++ / OpenGL*
- Scene system support
- Input callback system supporting OnKeyDown/OnKeyUp/OnKeyPressed
- Object management using PCS Tree and DLink libraries

MT Audio System *C++ / XAudio2*
- Multi-threaded audio-system wrapping the Windows XAudio2 interface
- Simplified user API for ease of use
- Support for sound priority
- Protection against object deletion using handle protection system

FBX Converter *C++ / FBX SDK*
- Extract model mesh, skeletal, and animation data from FBX model files into an archival format to be read into game engine
- Command line interface with flags for features such as bulk, animations only, and more

Space Invaders Recreation *C#*
- Homage to the 1978 arcade version of Space Invaders
- Recreated using many Gang of Four design patterns
- Source code contains more than 10 different design patterns and over 200 different classes

Other Architecture Areas *C++ / C#*
- Networking — TCP/UDP
- Game Artificial Intelligence

Graphics Programming

C++ / DirectX11 / DirectX12 / OpenGL

Rendering Engine *C++ / DirectX11*
- Mutli-light system using phong algorithm
- Optional support for N-light shader with forward rendering
- Atmospheric fog
- Multiple texture per mesh support

Animation & Mesh Skinning *C++ / OpenGL*
- Animation system calculating per frame pose data on the GPU using compute shaders
- Mesh skinning support using bone influence and inverse pose matrices

Programmatic Primitive Models *C++*
- Dynamically create different primitive models based on number of slices requested

Texture Mapping *OpenGL / DirectX12*
- Implement diffuse, tangent-space normal, and specular texture mapping support in the rendering pipeline
- Using normal mapping, high poly models can be replaced with lower poly models and appear just as detailed

Deferred Rendering *C++ / DirectX12*
- Branched game engine to use DirectX12
- Unlimited light support using light volumes
- Support for post-process effects such as edge detection and depth of field
- Engine supports rendering both deferred and forward-rendered objects in the same scene

Library Development

C++

Memory Library *C++ / Windows API*
- Windows API for heap creation and allocation
- Per-Heap allocations for better memory management
- Memory leak tracking to ensure all allocations have been properly deleted

Math Library *C++*
- Built for 3D graphics rendering including vector, matrix, and quaternion classes and functions
- Optimized for speed using SIMD instruction set for many math operations

File Library *C++ / Windows API*
- Wrapped the Windows API library into a more familiar and user-friendly API similar to the C stdio library
- Directory iterator support for bulk file operations

PCS Tree Library *C++*
- Three-dimensional component-based library using parent, child, sibling structure
- Included iterators for forward and reverse iteration

DLink Library *C++*
- Doubly linked list API
- Manager class with realtime resource tracking
- Object pooling support with Pooled Manager
- Forward and reverse iterator support

Related Work Experience

Naughty Dog Nov 2020 – Present
Santa Monica, CA

Game Programmer

DePaul University Sept 2019 – June 2020
Chicago, IL

Graduate Assistant — CDM Tutor

Tutored and gave guidance to College of Computing and Digital Media students in C++ and C#. Also provided tutoring for software architecture, graphics programming (OpenGL / DirectX), and applied linear algebra.

Avanz Medical Oct 2015 – Dec 2017
Scottsdale, AZ

Software Quality Engineer

Developed and performed medical device verification and validation test protocols based upon defined product requirements