Karim Sayed

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Experience

Independent Graphics Programmer **July 2024 – Present**

Beyond Engine: Custom fork of Hazel Engine with an advanced renderer

- Architected and optimized core subsystems with Vulkan and modern C++17/20
- Reduced load times from 8s to 5s with shader metadata caching and preprocessing
- Enhanced memory and performance via custom allocators and optimized resource management
- Cut descriptor processing time from 1ms to 0.02ms using a high-performance bitwise hashmap
- Reduced compilation time by 20% by optimizing header parsing and reducing dependencies

CUDA Path Tracer

- Built a CUDA path tracer achieving sub-9ms frame times on RTX 3080 and 350ms on i5-13600KF
- Minimized VRAM usage by fitting data into L1 cache via SoA layouts, yielding 99% L1 hit rate
- Removed virtual calls with data-oriented design achieving 92% branch efficiency
- Tuned SM occupancy and register pressure maintaining high SM throughput and low latency
- Authored a detailed technical article on the implementation

The Forge Interactive Inc. | Graphics Programmer | (Remote) **April 2024 - July 2024**

- Maintained and optimized a cross-platform framework for PlayStation, Xbox, Switch, and others
- Refactored core systems using advanced C/C++ techniques, improving maintainability
- Reduced ray tracing frametimes from 2.8ms to 0.7ms on RTX 3080 by utilizing GPU RT cores
- Improved validation/debugging by building automated tools in C++ and Python

Sensor Foundries Inc. | Graphics Programmer (Remote) **May 2022 - April 2024**

- Transitioned rendering features from Vulkan-based engine to OpenGL, maintaining performance
- Restructured core rendering and asset management systems improving maintainability
- Improved rendering pipeline by optimizing shaders and reducing draw calls
- Played a key role in optimizing animation rendering to ensure smooth real-time playback

Studio Cherno | Rendering Engineer Contributor (Remote) **March 2021 - April 2022**

- Modernized rendering workflow with modern C++ for cleaner, maintainable code
- Developed efficient real-time rendering algorithms for improved visuals and performance
- Built a shader pre-processor to reduce duplication and improve portability

Skills and Expertise

Languages: C, C++, CUDA, GLSL, HLSL, Slang, Intel x86 Assembly, Python, Java, JavaScript
Graphics & Compute: Vulkan, OpenGL, CUDA, RenderDoc, Nsight, VTune
Build Tools: Premake, CMake, Git, Jenkins, MSVC, Clang, GCC, VCPKG
Concepts: Modern C++20/23 features, Multi-threading, SIMD/SIMT, DOD/OOP
Optimization: Cache-aware algorithms, memory management, bottleneck analysis, profiling tools

EDUCATION

Bachelor of Computer Science (Hons.) | Multimedia University, Malaysia July 2018 – July 2021
Specialization: Software Engineering / CGPA: 3.11 / 4.00

Certificates

Data Structures and Performance | Coursera – Certificate Link
Object Oriented Programming in Java | Coursera – Certificate Link