Karim Sayed

Riyadh, Saudi Arabia | +966 57 316 6308 | karimsayedre@gmail.com | Portfolio | GitHub | LinkedIn

EXPERIENCE

Independent Graphics Programmer   **July 2024 – Present**

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

- Engineered a physically-based hardware accelerated path tracer in Vulkan for real-time ray tracing
- Built a Vulkan renderer supporting DLSS, RTXGI, and a real-time hardware path tracer
- Cut descriptor handling time from 1ms to 0.02ms using bindless descriptors
- Optimized CPU performance via shader metadata caching, reducing load times by 40%

CUDA Path Tracer

- Built a CUDA path tracer achieving sub-9ms on RTX 3080 using SAH BVH acceleration
- Minimized VRAM usage by fitting data into L1 cache via SoA layouts, yielding 99% L1 hit rate
- Reduced register pressure, minimized warp divergence, and applied math intrinsics for kernel-level optimization
- Eliminated virtual function calls using data-oriented design, achieving 92% branch efficiency
- Authored a detailed technical article on the implementation

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

- Maintained cross-platform framework for PlayStation, Xbox, Switch and other gaming platforms
- Upgraded software ray-traced shadows to hardware-accelerated ray-traced shadows
- Worked with platform-specific graphics debuggers and improved testability and stability

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

- Transitioned multiple rendering features from Vulkan-based Hazel to OpenGL engine
- Implemented Planar Reflections and LTC area lights, enhancing realism in reflections and lighting
- Integrated WB-OIT transparency and Atlas-Based Shadow Maps to improve rendering efficiency
- Restructured core rendering and asset management systems, improving performance and maintainability

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

- Developed tiled renderer enhancing lighting performance with depth prepass to reduce overdraw
- Implemented screen-space techniques including SSR with cone tracing, GTAO, and HBAO
- Integrated PCSS for point and spot lights, improving shadow softness and quality

SKILLS

Languages: C, C++, CUDA, GLSL, HLSL, Slang, intel x86 Assembly, Python, Java, JavaScript
Graphics & Compute: Vulkan, OpenGL, DX12, CUDA
Game Engines & Frameworks: Unreal, Unity, Godot, Hazel, The Forge
Profiling & Debugging Tools: RenderDoc, Nsight Graphics, Nsight Compute, PIX, Intel VTune
Build & DevOps: Premake, CMake, Git, Jenkins, VCPKG
3D Tools: Blender, Autodesk Maya
Expertise: Real-time rendering, ray tracing, shader development, GPU optimization, SIMD, multi-threading

EDUCATION

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