KARIM MOHAMED
C++ SOFTWARE ENGINEER

Riyadh, Saudi Arabia | +966573166308 | Email | Portfolio Website | GitHub Account | LinkedIn Account

SUMMARY

Accomplished C++ software engineer with a strong background in graphics programming, where mastering complex codebases and optimizing performance is paramount. Proficient in modern C++, multi-threading, and low-level systems, with a proven track record of designing high-performance, scalable solutions.

EXPERIENCE

Graphics Programmer, The Forge Interactive Inc. (Remote) — April 2024 - July 2024

- Maintained and optimized a cross-platform high-performance framework supporting PlayStation, Xbox, Switch, and other platforms.
- Refactored and modularized core systems, leveraging advanced C/C++ features to improve maintainability and performance.
- Optimized ray tracing by using GPU ray tracing cores reducing frametimes from 2.8ms to 0.7ms on an RTX 3080.
- Enhanced testing pipelines by implementing automated validation and debugging tools with C++.

Graphics Engineer, Sensor Foundries Inc. (Remote) — May 2022 - April 2024

- Refactored engine to ensure seamless integration between different graphics APIs, employing more modern C++ design principles.
- Optimized performance through multi-threading, efficient resource management, and extensive profiling with Intel VTune Profiler.
- Designed modular systems for resource handling and rendering workflows, improving scalability and maintainability.
- Used debugging and profiling tools to optimize performance and improve stability.

Graphics Engineer Contributor, Studio Cherno (Remote) — March 2021 - April 2022

- Improved rendering workflows by adopting modern C++ practices, enhancing modularity and performance.
- Implemented efficient algorithms for real-time rendering, improving the quality and performance of visual effects.
- Designed and implemented a shader pre-processor similar to C/C++'s preprocessors for better portability and less code duplication.

PERSONAL PROJECT

Beyond Engine, a private fork of The Cherno's Hazel Engine — October 2023 - Present

- Architected and optimized core subsystems with Vulkan API, focusing on scalability and efficiency in C++.
- Optimized CPU code using multiple techniques, including shader metadata caching and reading, reducing load times from 8s to 5s.
- Achieved significant memory and performance optimizations using custom allocators and efficient resource management.
- Optimized resource descriptor processing by implementing a bit-manipulated hashmap, reducing times from 1ms to 0.02ms.
- Optimized compilation times by reducing header parsing counts, cutting compilation time from 75s to 60s on an i5 13600KF.

SKILLS AND EXPERTISE

- **Programming Languages:** x86 Assembly, Python, Java, GLSL, HLSL, and JavaScript.
- **Graphics APIs and Tools:** Vulkan, OpenGL, Intel VTune Profiler, RenderDoc, and NVIDIA Nsight.
- **Development Tools and Compilers:** MSVC, Clang, GCC, Premake, CMake, and VCPKG.
- **Key Concepts:** Modern C++ idioms (RAII, C++20 concepts and ranges), multi-threading, SIMD.
- **Optimization:** Modular system design, cache-aware algorithms, memory management, bottleneck analysis.
- **Programming Design:** Object-oriented design, data-oriented design, cache coherency principles.
- **Data Structures and management:** Designing efficient data structures, including custom hashmaps and allocation techniques.
- **Computer architecture:** In-depth understanding of low-level system architecture, CPU/GPU internals, and memory hierarchies.

EDUCATION

Multimedia University in Malaysia — July 2018 - July 2021
Bachelor of Computer Science (Hons.) - Software Engineering Specialisation.
GPA: 3.11

CERTIFICATES

- Data Structures and Performance (Coursera): Certificate Link
- Object Oriented Programming in Java (Coursera): Certificate Link