Personal Site
Github
LinkedIn

Hamza Qayyum

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Surrey, BC, Canada

Technical Skills

Languages: *C, C++, Rust, LaTeX*

Tools & Libraries: *CMake, Make, Cargo, Bash/Zsh, SDL2, Git, GDB/LLDB debugging*

Areas: Systems programming, Graphics, Game engines, Unix/Linux/POSIX, FPGAs, Verilog

Personal Projects

Wolfenstein 3D Re-implementation
github.com/mhamzaqayyum/wolf3d-reimpl-rs

Jan 2023 - Present
Rust, SDL2, C++, CMake

- Wrote a custom game engine from scratch to re-implement the classic 1992 game, *Wolfenstein 3D*, initially in *C++*, before moving to Rust.
- Features implemented thus far: raycasting-powered renderer, texture mapping, doors, enemies, sprite animation, shooting, custom maps.
- Next features to implement: enemy AI, more weapons, parser for loading original game levels, minimap, and *(aspirationally)* networked multiplayer.

Raytracing in One Weekend++
github.com/mhamzaqayyum/rt-weekend

July-Sept 2022
C++, SDL2, CMake

- Built a raytracer following *Raytracing in One Weekend* in C++.
- Added custom features on top such as multithreaded rendering, live rendering into a window, video frames rendering (moving camera), render time measurement.

Curricular Projects

Simple Shell
github.com/mhamzaqayyum/simple-shell

CMPT 201: Systems Programming - Oct 2023
C, CMake

- Implemented a shell like bash or zsh for POSIX-complaint OS's that executes entered commands in a separate process by making system calls.
- Added support for internal commands such as `cd`, `pwd`, `help` and `exit`.
- `history` command displays up to last 10 entered commands and lets user run any one of them again.

Custom Memory Allocator
github.com/mhamzaqayyum/mem-alloc

CMPT 201: Systems Programming - Nov 2023
C, CMake

- Wrote a custom implementation of `malloc()` and `free()`.
- Used the `sbrk()` system call to request heap memory from OS, then managed it using a heap-embedded linked-list of free blocks.
- Free block could be found using first fit, best fit or worst fit algorithms.

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Extracurricular Experience

FIRST Robotics Competition - Team 6008   Jan-Apr 2017
github.com/mhamzaqayyum/FRC2017   *C++*

- Programmed different parts of a robot that loaded and released wiffleballs and climbed on a rope, to be controlled through an Xbox controller.
- Theorized and implemented a correction algorithm that used live data from a gyroscope sensor to make the robot drive perfectly straight, despite mechanical imperfections, for the autonomous portion of the challenge.

Semiahmoo Electronics Club   Sept-Dec 2017
Co-Founder   *South Surrey, BC*

- Started a club where students could come after school to build cool electronics projects using provided parts, tools, instructions, and help.
- Designed and led instructional sessions to build a:
  - Bluetooth speaker in the body of a pop can, powered by salvaged 18650 Li-ion cells from retired laptop batteries, a USB charging IC, a BT receiver and an amplifier.
  - USB power bank powered by the same salvaged 18650 cells.

Work Experience

Dorigo Systems   May-Aug 2021
Electro-Mechanical Assembler   *Burnaby, BC*

- Assembled and prepared products involving PCB's and casings in accordance with industry standards.
- Regularly interacted with manufacturing engineers to troubleshoot production issues.

Staples Canada   May-Sept 2019
Technology Sales Associate   *Coquitlam, BC*

- Helped customers find and select tech. products and furniture to suit their needs.
- Diagnosed issues with computers, monitors, and printers, and informed customers of relevant repair services.

Education

Simon Fraser University   May 2023 - Present
BSc Computing Science (2nd yr. standing)   *Burnaby, BC*

Capilano University   Sept 2018 - April 2019
First Year Engineering Certificate   *Coquitlam, BC*