Sean Purcell

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github.com/iburinoc

Skills

- Interest Areas: Graphics, Server and Network Infrastructure, Algorithms, Databases
- Technologies: Go, C++, C, Python, Java, Rust, ASM, Vulkan, OpenGL, Linux, Bazel, MongoDB

Experience

2018
May – Aug.

Software Engineering Intern, *Google*, Waterloo, ON
Added various statistics and metrics to open-source GAPID Vulkan graphics API debugger in Go
- Created overdraw visualization feature that shows the number of fragment shader executions per pixel
- Analyzed Vulkan synchronization primitives to build GPU task dependency graph
- Statically parsed shader module call trees to determine what resources were used by the GPU pipeline
- Added tool showing GPU memory allocations for debugging memory usage and resource bindings

2017
Sep. – Dec.

3D Software Developer Intern, *Side Effects Software, Inc*, Toronto, ON.
Working on adding tools and features to Houdini, Side Effect's 3D visual FX software
- Implemented FABRIK full-body inverse kinematics algorithm for large-scale crowd animation
- Added support for 3D Optical Flow enabling visual effects to track motion in an existing video

2017
Jan. – Apr.

Software Engineering Intern, *Facebook, Inc.*, Menlo Park, CA
Worked on the Zstandard compression library development and integration in C
- Wrote Linux kernel patch adding support for Zstandard in SquashFS compressed filesystems
- Used SquashFS Zstandard support to optimize Facebook's static Python executables' size and speed
- Designed and implemented seekable compression format for parallelization with big data
- Created full-format custom fuzzer to verify implementations conform to the Zstandard specification

2016
May – Aug.

Software Engineering Intern, *Wish – ContextLogic*, San Francisco, CA
Worked on the Wish infrastructure in Python improving stability, monitoring, and efficiency
- Optimized most frequent endpoints, cutting latency by 60% and heavily reducing network usage
- Redesigned and migrated billion-row data collection to reduce MongoDB load and improve efficiency
- Developed exception monitoring platform, improving deployment safety and debugging efficacy

Projects

2018

gba-rs, iburinoc/gba-rs
Emulator for Nintendo GBA device written in Rust
- CPU module implements full ARM ISA as well as all functionality for GBA rendering unit

2016

GR Trace, iburinoc/gr_trace
Real-time black hole ray-tracer using Rust and OpenGL
- Traces photons in fragment shader using RK4 for stable integration of relativity metric

2015

AnonymEyes, *Winning Team, Hack the North*, devpost.com/software/anonymeyes
Location-based video streaming app for emergency response and evidence collection
- Designed and implemented custom video stream from Android to receiving server over UDP

2015

Flightsim, iburinoc/flightsim, iburinoc/flightsim-cardboard
3D flight simulator in C++, using OpenGL for rendering
- Ported to iOS for use as a Google Cardboard VR app

Education

2015–2020

Candidate for Bachelor of Software Engineering, *University of Waterloo*
- 3rd Place Team, ACM-ICPC, ECNA Regional
  - International algorithm and data structures competition written by 130 collegiate teams