Sasha Avreline

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PROJECTS.

Distributed Key-Value Store. Distributed systems graduate course individual project. 2020.

- Designed and implemented in Golang three different variants of a replicated, multi-primary key-value store that achieves eventual consistency via conflict-free replicated data types (CRDTs). The underlying database is MongoDB, all inter-replica communication is via RPC.
- Compared the performance of the different variants by subjecting them to various loads while deployed on ten geographically distributed Azure VMs. One of the variants achieved a sub-second latency under a throughput of 10 000 operations per second and out-performed MongoDB's built-in replication service under this test.
- While working on the project, contributed a new feature and repaired a bug in GoVector, a UBC distributed system research group's open source Golang library.

Full-Stack Trivia Game. Personal Project. 2020-2021.

- A MERN stack single page web application where players earn points based on how well they are able to guess the years in which various world history events took place. Correctness of a player's guess relative to other player's guesses is shown on a D3.js chart. Communication with the database is via a server-side API.
- The project is deployed on an AWS EC2 instance running Ubuntu 18 and Apache2 web server and on MongoDB Atlas. Deployed version can be viewed at: whatyear.savreline.com.

Operating System Mini-Kernel. Advanced operating systems course project, done in pairs. 2019.

- Implemented in C and X86-32 assembly an operating system mini-kernel consisting of memory management, process scheduling, process communication and a keyboard device driver.

Mini-Java Compiler. Introduction to compilers course project, done in groups of three. 2019.

- Implemented in Java and X86-64 assembly a compiler for a subset of the Java PL consisting of a parser, type checker, translator to intermediate representation, instruction selector and a register allocator.

WORK EXPERIENCE.

BCS Program Teaching Assistant. University of British Columbia, Vancouver, BC, 2019-2020.

- Developed and delivered review lectures on discrete math, OO design, low-level programming, asynchronous programming, data structures and algorithms. Increased review lecture's attendance 5-fold.
- Debugged student's code during office hours, provided course selection advice and emotional support to students in difficult situations. Achieved the undergraduate teaching assistant award.

Full-time Research Associate. University of Waterloo, Waterloo, ON, 2010-2011.

- Developed a MATLAB model of growth factor delivery to stem cells based on 3D reaction-diffusion equations. Optimal solutions formed a significant contribution to a research fellow's Ph.D. thesis.

Previously self-employed providing mathematical modelling and CAD mechanical design services to a US engineering physics company (2016, 2020). Six internships in chemical engineering and physics at TRIUMF, pharmaceutical companies, an automotive paint processing plant and an ultrafast fiber laser lab (2006-2008, 2016).

EDUCATION.

- **Bachelor of Computer Science (BCS)** [GPA: 90.0%]   2017–2020
  University of British Columbia, Vancouver, BC
- **Course Work in Advanced Mathematics** [GPA: 82.9%]   2013–2014
  University of British Columbia, Vancouver, BC
- **Bachelor of Applied Science (BASc)**   2005–2011
  Chemical Engineering with Mathematics Option
  University of Waterloo, Waterloo, ON
  Sandford Fleming Foundation John Fisher Award for Leadership awarded at graduation

TECHNICAL SKILLS.

- **Languages:** Java, Javascipt, C, Go, Julia, MATLAB, HTML5, LaTeX
- **Tools and Frameworks:** Git, Vim, Node.js, React.js, Bootstrap, AWS, Azure, Apache2
- **Databases:** MongoDB

INTERESTS. Automotive restoration and repair, restoration of antique equipment, reading, skiing.