

Jonathan Allen

Mathematics and Software Development

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Objective

Obtain a position in which I am able to mentor and be mentored in order to expand skills in software development, software architecture and mathematics.

Related Experience

2016 – present **Senior Software Developer**, *RealTruck Inc.*, Fargo, ND.

Professional Software Development

- Enterprise systems design and architecture.
- Code review of both peer and junior developers.
- Author technical guidelines.
- Balancing technical considerations with quarterly and political constraints.
- Applying experience gained from open source development to proprietary systems.
- Quickly coming to grips with very large codebases.
- Apply mathematical experience to finding and fixing seemingly intractable software bugs.
- Engineer for failure and recovery, providing robust and highly resilient systems.

1985 – present **Software Developer**.

A lifetime of non-professional software development.

- Breadth of experience crossing many paradigms and technologies.
- Ability to quickly learn and become adept at any "new" technology.
- Ability to evaluate best fit technologies, regardless of political or quarterly constraints.
- Evaluating long term value of technical decisions.

2014 – 2015 **Teaching Assistant**, *North Dakota State University*, Fargo, ND.

Precalculus level algebra

- Prepare and present classroom material.
- Provide one-on-one assistance for my students.
- Grade homework, quizzes, exams, etc.

2002 – 2003 **Programmer**, *North Dakota Center for Persons with Disabilities*, Minot, ND.

Miscellaneous programming tasks

- Diverse technology stacks consisting of C++, Win32 API, MFC, ASP, MSSQL, Oracle.
- Create and maintain desktop and web applications with a focus on accessibility software.

Skills

Expertise C/C++ (and family), JavaScript, git, *nix

Current Focus Elm, Haskell, Rust, Atmel AVR

Education

2015 **North Dakota State University**, *Fargo, ND*.

Bachelor of Arts in Mathematics

- Elective credits in partial differential equations, combinatorics, graph theory and real analysis.
- Capstone explored numerical semigroups, Markov bases, and extensions of the natural numbers.

2001-2005 **Minot State University**, *Minot, ND*.

Computer Science, Mathematics, Physics coursework

- Exempted from basic programming (C++) coursework.
- Completed all data structures and algorithms coursework.
- Completed a concentration in physics.

Selected Technical Achievements

- 2017 **Sales tax system**, <https://www.realtruck.com>.
Hardcoded tax rates weren't scaling. Technical limitations of our platform forced me to write from scratch a custom SDK that integrated our platform with Avalara. Taxes are now calculated intelligently and dynamically.
- Languages: PHP
 - Technologies: JSON, HTTPS, REST
- 2017 **Implement gift card system**, <https://www.realtruck.com>.
Political and technical decisions left our platform with no ability to handle gift cards. I implemented gift card integration with Lightrail.com, restoring gift card capabilities to our platform.
- Languages: PHP
 - Technologies: JSON, HTTPS, ADTs
- 2016 **Complete redesign of ad feed system**, <https://www.realtruck.com>.
Refactored a system described as "the worst part of our codebase". Mistakes made modifying this system routinely caused the loss of tens of thousands of dollars. Maintaining, improving and testing this system while balancing time and priorities of other tasks, was described by management as a "master class in incremental improvement". The system can now be easily modified without risks of side effects or failure, and can be plugged into arbitrary web technologies for consumption by advertising partners.
- Languages: PHP
- 2016 **yotp**, <https://www.github.com/ylixir/yotp>.
Command line utility for generating one time passwords. Commonly called two factor authentication, this code could be used by a client or server to implement this technology.
- Languages: C#
 - Technologies: .net core, Mono, .NET, HOTP, TOTP, SHA1
- 2015 **diceware**, <https://www.github.com/ylixir/diceware>.
Utility for generating passphrases. These are very secure passwords, which are easy to remember.
- Languages: Lua
 - Technologies: diceware, /dev/urandom
- 2015 **frobmask**, <https://www.github.com/ylixir/frobmask>.
Automates computation of Frobenius numbers. Useful to mathematicians studying numerical semigroups.
- Languages: Lua 5.3
 - Technologies: Abstract Algebra
- 2015 **Lerna**, <https://www.github.com/ylixir/lerna>.
Web browser with lua scripting support.
- Languages: Vala, Lua
 - Technologies: GTK3, WebKit, liblua
- 2013 **ArchNexus**, <https://www.github.com/archnexus>.
Created Linux distribution for tablet computers.
- Languages: sh, C
 - Technologies: Linux, gcc, pacman
- 2010 – 2011 **Yaed**, <https://www.github.com/ylixir/yaed>.
Cross platform text editor. This was an interesting exercise in documentation first, code second, which worked out really well. This is the kind of thing I would love to see in a professional environment, but seems rare.
- Languages: C
 - Technologies: GTK-2, GTK-3, GtkSourceView
- 2008 – 2011 **yCurses**, <https://www.github.com/ylixir/ycurses>.
Created ncurses bindings for the D programming language. To be honest the thing I learned from this project is to not be stingy with my work, and to welcome collaborators. Unfortunately this project wound up forked because I did not welcome assistance from people with more bandwidth than me.
- Languages: C, D
 - Technologies: nCurses