

# Emilien Breton

## PROJECTS

### Atto-8 Microcomputer

- A MINIMALIST 8-BIT MICROCOMPUTER WITH STACK-BASED MICROPROCESSOR *Rust • C • Assembly*
- Designed ecosystem of hardware and software from logic gates upward, including instruction set architecture, from-scratch assembler and cross-platform emulator, totaling over **15 000 SLOC** and **500 hours** of work.
  - Wrote various demos in Assembly running natively on microcomputer — memory monitor • sprite editor • Tetris clone • self-assembling native assembler • postfix notation calculator.
  - Built microcomputer in hardware using discrete 74HC-series logic chips on breadboards.

### Atto-8 C Compiler

- A RUDIMENTARY C99 COMPILER FOR THE ATTO-8 MICROARCHITECTURE *Rust • C • Assembly*
- Building C99 compiler from scratch in Rust targeting Atto-8 Assembly language.
  - Developed extensive C standard library, including heap allocator supporting **malloc and free** and string handling functions such as **strlen and memcpy**.
  - Hand-wrote printf implementation in Assembly which supports conversion specifiers %d, %u, %x, %c, %s and %p to increase debugging efficiency and convenience.

### DBLess Password Manager

- A HASH-BASED, DATABASE-LESS PASSWORD MANAGER *C • Python*
- Devised custom cryptographic procedure based on SHA-256 in Python which deterministically generates passwords on demand without requiring encryption or password storage.
  - Reimplemented password generation algorithm in C for use as interactive CLI tool.

### Personal Website

- A PORTFOLIO FOR SHARING VARIOUS PROJECTS *Markdown • Next.js*
- Designed and implemented appealing UI and optimized UX using Google Search Console resulting in over **15 000 unique visitors** to portfolio website a month.
  - Leveraged Cloudflare caching system and optimized site-wide accessibility resulting in Lighthouse score consistently over **95%**.

## VOLUNTEERING

### Hack the Hill Hackathon

- DEVELOPMENT MANAGER — DEVELOPMENT TEAM *Ottawa | November 2022 — Present*
- Leading development of open-source participant tracker built with Next.js and Prisma, used by over **1000 hackers** and **50 organizers** throughout hackathon.
  - Built and maintained internal sponsorship payment portal powered by Stripe and React.js in collaboration with infrastructure and sponsorship teams, enabling processing of over **20 000\$**.

### uOttawa Computer Science Club

- CLUB EXECUTIVE *University of Ottawa | June 2022 — Present*
- Building community of **over 1000** computer science students at the University of Ottawa.
  - Collaborated with both other executives to brainstorm, organize and schedule a dozen events by designing marketing material using Figma and organizing workshops for over **100 students**.

## EXPERIENCE

### Zeptile Software

- SOFTWARE ENGINEER — WEB3 *Remote | October 2022 — Present*
- Implemented various smart contracts in Solidity as per specification and ensured **100% test coverage** through Chai and Hardhat.

## EDUCATION

### University of Ottawa

- BSC WITH HONOURS IN COMPUTER SCIENCE *September 2021 — Present*  
*November 2020*
- Admission scholarship — 95%+ average.

## SKILLS

### Languages

Rust • C • Python • JavaScript

### Development Tools

NixOS • Neovim • Fish Shell • Git

### Other Technologies

React • Node.js • HTML • CSS • JSON • YAML • Markdown • LaTeX • Lua • x86 Assembly • C++ • Bash • GDB • Linux • Arduino • VS Code • Figma • Notion • Docker • Cloudflare • GitHub

### Spoken Languages

• French *Native*  
• English *Native*  
• Spanish *Intermediate*  
• Russian *Elementary*

### Other Interests

Electronics • Robotics • CAD • 3D Printing • Finance • Mathematics • Drone Building • Music • Boulderling

## CONTACT

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