

# Bowen Dai

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## Skills

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- **Programming Languages:** C, C++, Python, Java, JavaScript, HTML, CSS
- **Technologies:** Git, Linux, L<sup>A</sup>T<sub>E</sub>X, VScode, Vim, IntelliJ, Pycharm, Excel, Unity, Microsoft

## Projects

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- **Online Portfolio | HTML, JavaScript, CSS** [🌐] [🔗] January 2025
  - Developed a **responsive** and **interactive** personal **website** to display my projects and allow visitors to leave messages and contact information
  - Deployed the portfolio using **GitHub Pages** to ensure high availability and fast loading times
- **Autonomous Robotic Chessboard | C, JavaScript, Foreign Function Interface (FFI)** [📺] [🔗] November 2024
  - Developed of a robot chessboard powered by a **Raspberry Pi**, enabling autonomous gameplay against humans
  - Programmed a **Hall effect sensor** matrix using **C** and **FFI** to scan the entire board within **66 microseconds**, enabling real-time tracking of chess piece positions
  - Designed a **CoreXY** gantry system in **C**, leveraging **FFI** to enable precise, magnet-driven chess piece movement
  - Optimized **Breadth-First Search** algorithm in **JavaScript** to calculate the optimal paths for moving pieces, including **obstacle management**
  - Created a **responsive web application** using **HTML**, **CSS**, and **JavaScript** to display live game updates
  - Programmed communication between hardware and software via **Socket.IO** and **FFI**, connecting C-based hardware controls with a web interface
- **RSA Encryption and Decryption | Python** [🔗] June 2024
  - Designed and implemented a **RSA** encryption system, including prime number generation, public/private key generation, and encryption/decryption algorithms
  - Implemented **text-to-UTF8** encoding and **block-based** encryption to handle large text inputs
  - Used **modular programming** techniques to ensure reusable and maintainable code for cryptographic operations
  - Generated key pairs of **varying lengths** based on user-defined input, ensuring **adaptability** for different encryption requirements
  - Created a user-friendly **menu interface** for operations such as encryption, decryption, and RSA setup, accommodating user input **validation** and **error handling**

## Work Experience

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- **Teaching Assistant: Programming in Science, Calculus 1** [🌐] August 2024 - present
  - Provided constructive and timely feedback to **60+** students each week, identifying areas for improvement and clarifying any misunderstandings.
- **Peer/Alumni Tutor for Calculus 1, 2 and Modern Physics** [🌐] August 2023 - Present
  - Led **1 hour** tutoring sessions each to **2 CEGEP students** per semester
  - Helped student to achieved **+90%** in the final exams

## Honors and Awards

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- **Ranked in top 25% in:**
  - Senior Canadian Computer Competition May 2024
  - Canadian Senior Mathematics Contest August 2024
- **3rd Place in business case competition organized by Queen's University** September 2023

## Education

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- **Bachelor of Applied Science: Software Engineering | Average: 96%** August 2024 - Present
  - President's Scholarship