Isaac Dcruz

646-438-1423
idcruz@seas.upenn.edu

EDUCATION

UNIVERSITY OF PENNSYLVANIA **Philadelphia, PA**

B.S. Computer Science and Mathematics *Anticipated Graduation: May 2027*

- **GPA**: 4.0
- **Relevant Coursework**: Discrete Mathematics, Programming Languages and Techniques, Honors Multivariable Calculus, Honors Linear Algebra and Differential Equations, Data Structures and Algorithms, Theory of Computation (Automata, Computability, and Complexity)

GREENWICH HIGH SCHOOL **Greenwich, CT**

High Honor Roll, AP Scholar with Distinction *August 2020 – June 2024*

- **GPA**: 5.0
- **Relevant Coursework**: 5s on AP Calculus BC, AP Statistics, AP Computer Science A, AP Physics C: Mechanics, and AP Physics C: Electricity & Magnetism; received As in Calculus III, Linear Algebra, Differential Equations, and Data Structures and Algorithms

WORK EXPERIENCE

Kumon Learning Center Math Instructor *(August 2020 – June 2024)* **Stamford, CT**

- Tutored students in math in topics ranging up through Calculus III and statistics
- Graded student work and managed inventory

PROJECTS

Chess Game | *Java, Swing*

- Efficiently implemented chess from scratch using bitboards and bit shifting for move generation, including complex game logic, such as castling, checks/checkmate, en passant, etc.
- Developed an interactive GUI using Java Swing that displays legal moves and facilitates gameplay

Social Media App Full-Stack Development | *JavaScript, HTML, CSS, Node.js, MongoDB, mongoose*

- Developed full-stack for a social media app geared towards creating and joining community cleanup events
- Implemented user authentication and secure database storage for account information
- Prototype placed 3rd in the Congressional App Challenge, recognized by Rep. Jim Himes

Fluid Dynamics Simulation | *JavaScript, HTML, CSS*

- Self-studied fluid dynamics, including concepts like divergence, curl, the Poisson pressure equations, Navier-Stokes equations, etc, as well as CFD and how to implement these physical concepts through code (e.g. Jacobi iteration)
- Created an Eulerian grid-based fluid dynamics simulation
- Modeled the relative velocity and pressure fields under varying starting conditions

Text Prediction and Generation | *Python*

- Used Python to train machine learning models on compiled news article training dataset
- Implemented next word prediction based on input text string context
- Modified the program for text generation, allowing for generation of texts that mimic news article features

Double Pendulum Simulation | *Python, Numpy*

- Self-studied fundamentals of chaotic motion, especially how the initial conditions impact double pendulum motion
- Used numpy to model pendulum motion through the Runge-Kutta approximation method

TECHNICAL SKILLS/QUALIFICATIONS

- **Programming Languages:** Java, Python, JavaScript, HTML, CSS, OCaml
- **Frameworks/Tools:** Node.js, MongoDB, Swing, LaTeX, Numpy
- **Certifications:** Applied Data Science Lab (SQL/NoSQL, APIs, Machine Learning)

HONORS

- Columbia University Science Honors Program: Took courses in Complex Analysis and Quantum Computing Devices
- Rensselaer Medal Scholarship Recipient
- American Invitational Mathematics Examination Qualifier (AIME) x3
- Connecticut State Math Team member for the American Regions Math League (2021-2024)