

# Zachary Hoffman

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## Education

**Liberty University: B.S. Computer Science, Mathematics Minor**

Lynchburg, VA

**GPA: 4.0**

Aug. 2022-May 2026

*Relevant classes:* Data Structures and Algorithms, Advanced C++, Discrete Math, Calculus III, Matrix and Linear Algebra, Database Design and Management

## Projects

**Machine Learning Racing Simulation**

Oct. 2024

*Repo: Machine\_Learning\_Racing\_Simulation*

- Engineered a **machine learning** model using NEAT (NeuroEvolution of Augmenting Topologies) to optimize vehicle behavior, achieving 96% of the fastest lap time in under 25 generations
- Built a robust **custom physics engine** that models 10 key vehicle dynamics (e.g., wheelbase, traction, downforce) to accurately simulate real-world driving conditions and improve race performance
- Developed an interactive simulation using Pygame and Tkinter, enabling real-time track creation, vehicle adjustments, and live **AI performance visualization** to showcase dynamic optimization results

**Personal Portfolio Website**

Sept. 2024

*Repo: zthoffman.com*

- Designed and built a responsive personal website from the ground up using HTML, CSS, and JavaScript, ensuring cross-device compatibility and high performance
- Deployed using Cloudflare, optimizing for fast loading times, and achieved a perfect 100/100 score for SEO and performance on multiple key pages

**Pawn's Revenge (Object-Oriented Game Development)**

April 2023

*Repo: Pawns-Revenge-Python*

- Developed a modular, event-driven system implementing advanced object-oriented programming to manage 10+ interacting game entities, showcasing responsive input handling and system design
- Designed **custom physics** and **AI behaviors** for game entities, demonstrating complex problem-solving in dynamic systems

## Experience

**Liberty University**

Lynchburg, VA

*Competitive Programming Club*

Aug. 2022- Present

- Placed **2nd** in the **2023 ACM ICPC Div. II Mid-Atlantic Region**, utilizing algorithms such as dynamic programming, greedy algorithms, and graph traversal (DFS/BFS)
- Collaborated in a team environment to solve advanced algorithmic challenges under timed conditions

**French Creek Golf Club**

Elverson, PA

*Bagroom Attendant*

Aug. 2020- Aug. 2024

- Led a team of **5** employees, utilizing **communication** and **leadership** skills to maintain smooth daily operations, delivering high-quality **customer service** to 100+ golfers daily, ensuring prompt assistance and issue resolution

**Languages:** Python, C++, Java, SQL, JavaScript, CSS, HTML, 6502 Assembly

**Frameworks/Tools:** NEAT-Python, Git, Docker, MongoDB, Azure, Arduino

**Software:** Linux, SQL Server Management Studio, Mathematica, Autodesk Fusion, ER Assistant