Marcus Hedlund

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EDUCATION

University of Pennsylvania — Philadelphia, PA
Bachelor of Science in Engineering in Artificial Intelligence; GPA: 4.00/4.00 — *May 2027*
Master of Science in Engineering in Computer and Information Science; GPA: 4.00/4.00 — *May 2027*

The Blake School — Minneapolis, MN
High School Diploma; GPA: 3.98/4.00; ACT: 36 — *June 2023*
- Sarah Armfield-Hill Award in Mathematics; Cum Laude Society; U.S. Presidential Scholar Candidate

RELEVANT COURSEWORK

Computer Science Foundations: Programming Languages and Techniques II, Introduction to Algorithms, Interactive Computer Graphics, Signal and Information Processing, Automata, Computation, and Complexity
Artificial Intelligence: Artificial Intelligence, Machine Learning, Algorithmic Game Theory, Judgment and Decisions
Systems: Database and Information Systems, Internet and Web Systems, Operating Systems
Mathematics: Mathematical Foundations of Computer Science, Calculus Part III (Multivariable Calculus), Probability

PROJECTS

Cloud-based Search Engine | *CIS 5550 Final Project; Java* — Nov. 2024 – Dec. 2024
- Collaborated in a 4-person team to develop a distributed search engine processing 150,000+ web pages. Process included designing a web server, web crawler, distributed kvs, analytics engine, ranker, and frontend.
- Designed sophisticated database architecture with reverse indexing, PageRank calculation, and word frequency and meta data tracking stored using AWS Dynamo DB and S3 for improved scalability and latency.
- Implemented optimization techniques to enhance search quality and performance including Porter stemming, domain deduplication, intelligent caching strategies, and multi-factor ranking.
- Engineered URL filtering to crawl only high-quality HTTPS pages with strict latency and length constraints.

Music Exploration Web Application | *CIS 5500 Final Project; JavaScript* — Sept. 2024 – Dec. 2024
- Developed a full-stack music analytics platform in a 4-person team using React, Node.js, and PostgreSQL, integrating Spotify, Billboard, and Kaggle datasets to provide comprehensive music industry insights.
- Optimized complex database queries, reducing query runtimes from up to a minute to under a second through strategic indexing, caching, and query restructuring.
- Created advanced analytics capabilities, including visualizations of audio feature evolution, chart performance tracking, artist similarity recommendations, and curated lists of trending songs, rising artists, and top charters.

LEADERSHIP EXPERIENCE

Developer — Philadelphia, PA
UPGRADE — *Sept. 2023 – Present*
- Collaborated in various small teams to develop game elements such as interactive UI/UX for a game's management system and a 2D boss-fight platformer with interactive objects, parallax effects, and custom animations.
- Hosted game jams and speaker events with professors and industry leaders, including Mobius Digital.

Member — Philadelphia, PA
SIGGRAPH — *Sept. 2023 – Present*
- Conducted weekly project showcases, providing constructive technical feedback to improve members' skills.
- Evaluated hands-on workshops exploring the graphics pipeline including texturing, lighting, and shaders.

TECHNICAL SKILLS

Languages: Java, Python, C, C++, C#, OCaml, SQL (PostgreSQL), JavaScript, HTML/CSS
Frameworks: React, Node.js, PyTorch, Unity
Developer Tools: Git, AWS, LaTeX
Libraries: NumPy, pandas, Matplotlib

ADDITIONAL INFORMATION

Dual Citizenship: Swedish and American
Swiss Semester: Skied, wet-gorged, ice-climbed, and studied abroad in Zermatt, Switzerland
Other: Avid hockey player, high school varsity soccer captain, and dedicated pianist