

Hyungchan JOO

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PROFILE

Computer Science undergraduate at POSTECH and undergraduate research intern at CAOS Lab, interested in **computer architecture** and **HW/SW co-design** for next-generation AI systems. My current interests focus on **Domain-Specific Architectures (DSA)**, **memory systems**, and **near-storage processing** techniques to reduce data movement and inference-time bottlenecks in large-scale AI workloads.

EDUCATION

POSTECH <i>B.Sc. in Computer Science, GPA: 4.02/4.30 Major GPA: 4.03/4.30</i>	Pohang, Gyeongsangbuk-do, S. Korea <i>Feb 2024 – Present</i>
Busan Il Science High School <i>High School Diploma</i>	Busan, S. Korea <i>Mar 2021 – Feb 2024</i>

RELEVANT COURSEWORK

Major Coursework: Computer Architecture, Data Structures, Artificial Intelligence, Operating Systems, Algorithms, Digital System Design, Computer SW Systems, Principles of Software Construction, Automata and Formal Languages
Mathematics and Foundations: Applied Linear Algebra, Optimization, Probability and Statistics, Calculus

SKILLS

Languages: C/C++, Java, Python, MATLAB, R, Verilog RTL
Technologies: Git, Linux (Ubuntu), Slurm, OpenCV, PyTorch, TensorFlow
Interests: Computer Architecture, DSA, Memory Systems, HW/SW Co-Design, Near-Storage Processing

EXPERIENCE

CAOS Lab, POSTECH <i>Undergraduate Research Intern</i>	Pohang, S. Korea <i>Mar 2026 – Present</i>
- Studying computer architecture and HW/SW co-design techniques for large-scale AI systems. - Exploring Domain-Specific Architectures (DSA), memory systems, and near-storage processing to reduce data movement and LLM inference bottlenecks.	
MIP Lab, POSTECH <i>Undergraduate Researcher (Freshman Research Program)</i>	Pohang, S. Korea <i>Sep 2025 – Dec 2025</i>
- Analyzed graph connectivity using GNNs (GCN, GAT) for large-scale medical datasets. - Managed and executed deep learning workloads on the university's HPC cluster using Slurm, gaining experience in resource-constrained computing environments.	

AWARDS ACHIEVEMENTS

National Science and Engineering Scholarship <i>Korea Student Aid Foundation (KOSAF)</i>	May 2026 – Present
Selected for academic excellence in STEM and awarded full tuition support for the remaining regular semesters.	
The 13th Unhae Scholarship <i>Unhae Scholarship Foundation</i>	Feb 2026 – Present
- Awarded 8,000,000 KRW annually for academic excellence (GPA 3.82+/4.3) and high potential in STEM. - Selected as a recipient with a university president's recommendation.	
Excellence Award: 2021 Science-Gifted Program Presentation Contest, awarded by the Korea Foundation for Creativity & Science (KOSAC). (Jan 2022)	

5-Stage Pipelined RISC-V CPU with Cache | *CSED311: Computer Architecture, POSTECH* Spring 2026

- Designed and implemented a five-stage **RV32I pipelined CPU** in **Verilog RTL**, covering IF, ID, EX, MEM, and WB stages.
- Implemented forwarding and hazard detection logic for data hazards, including load-use stalls and store-data forwarding.
- Extended the processor with control-flow handling using an **Always-Not-Taken** baseline and pipeline flushing for taken branches and jumps.
- Integrated a blocking **N-way set-associative cache** with write-back/write-allocate policy and round-robin replacement.

Search-Based Multi-Agent Pac-Man AI | *CSED342: Artificial Intelligence, POSTECH* Spring 2026

- Implemented multi-agent search agents including **Minimax**, **Expectimax**, **Expectiminimax**, and **Alpha-Beta pruning**.
- Designed a high-performing evaluation function for autonomous Pac-Man gameplay under stochastic and adversarial ghost policies.
- Achieved top-ranked leaderboard performance in the course evaluation through feature-based state evaluation and decision optimization.

Pintos (Educational Operating System) 🐛 | *CSED312: Operating Systems, POSTECH* Sep 2025 – Dec 2025

- Implemented core kernel subsystems: **Priority Scheduling**, **MLFQS**, and **System Calls** (exec, fork, wait) from scratch in C.
- Designed a **Virtual Memory** system supporting demand paging and supplemental page tables to manage physical memory limits.
- Optimized file system I/O performance through the implementation of a **Buffer Cache**, reducing disk access latency.

Nitrogen Archive | *Interactive Policy Review Game* Spring 2026

- Built a browser-based document investigation game translating policy formation concepts into an interactive evidence-review experience.
- Designed branching reports, archival documents, and multiple endings around scientific innovation, state policy, and social consequences.

AI for Snake Game — *Busan Il Science High School*

- Implemented a **Genetic Algorithm (GA)** to train a **Neural Network (NN)** controller that autonomously plays the Snake game, inspired by NEAT.
- Developed the simulation, game logic, and AI framework **from scratch in C++** using Visual Studio.