Aarnawa Koirala

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Education

University of Texas Austin, TX
Bachelor of Science in Computer Science, Minor in Business *Aug. 2023 – May 2027*
GPA: 3.98 / 4.00

Projects

PintOS | *C, Concurrency, Kernel code* March 2025

- Designed and implemented priority scheduling to ensure high-priority threads received CPU time, preventing starvation through priority donation.
- Developed system calls (e.g., file operations, process management) to enable user programs to interact with the kernel safely and efficiently.
- Refactored the timer system to support precise thread sleeping using a no busy waiting approach, reducing CPU waste.
- Debugged concurrency issues by analyzing race conditions and implementing robust synchronization techniques with semaphores and locks.

Critters | *Java, OOP, Git* November 2023

- Developed a Java-based AI simulation, implementing OOP principles like inheritance, polymorphism, and encapsulation.
- Designed and implemented unique critter behaviors, including movement, combat, and resource consumption.
- Created a custom critter with optimized movement, attack selection, and survival strategies, relying on dynamic decision making
- Refactored class hierarchies to improve code maintainability and reduce redundancy.

Memory Allocator | *C, SSH, Git* September 2024

- Implemented a custom malloc/free using explicit free lists, coalescing, and 16-byte alignment for efficient memory management.
- Optimized heap allocation and fragmentation handling, improving memory utilization and allocation speed.
- Designed a heap consistency checker to detect memory corruption, alignment issues, and invalid free operations.
- Reached an average utilization of 85% and throughput of 1750 requests per second.

Huffman Coding | *Java, OOP, File Manipulation* March 2024

- Implemented a priority queue-based Huffman tree to efficiently encode character frequencies.
- Enhanced debugging and error handling by integrating validation mechanisms to detect corruption and ensure data integrity during compression and decompression.
- Implemented efficient bit-level I/O operations to ensure seamless encoding and decoding, minimizing unnecessary overhead and maximizing throughput.

Technical Skills

Languages: Java, C, ARMv8 Assembly, HTML/CSS, JavaScript
Frameworks: Spring, React
Developer Tools: Git, VS Code, SSH
Libraries: Apache POI

Experience

Store Associate May 2024 - September 2024
Sugarphoria - DFW Airport *Dallas, TX*

- Leveraged Java's Apache POI API to automate sales trend analysis (e.g., identifying under-performing products, seasonal demand), streamlining informal inventory reports for management.
- Operated the store, often independently, during record-breaking airport traffic (e.g., 1.5M passengers July 4th weekend), handling 200+ daily transactions and maintaining stock accuracy.
- Processed an average of $9,200 per week in net sales through efficient service and strategic up-selling

Relevant Coursework

Data Structures, Computer Architecture, Linear Algebra, Calculus I & II, AI Literacy & Ethics