Yichen Nie

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Education

School of Computer Science, Nanjing University — Nanjing, China
Bachelor of Science in Computer Science and Technology — Sept.2021– Jun.2025*(expected)*

Advanced Computer Science Courses

Elements of Cryptography
90/100 instructor: Prof. Yuan Zhang — fall 2023

Combinatorics
86/100 instructor: Prof. Yitong Yin — spring 2024

Computational Complexity
91/100 instructor: Prof. Penghui yao — spring 2024

- The final assessment for this course is a essay about a frontier paper. My essay can be found on my homepage

Projects Experiences

C language implementation of a full system simulator for CISC
Introduction to Computer Systems, Independent project — fall 2022

- Implementing the various modules of a CISC system in C, including the ALU, i386 instruction set, cache, and I/O.
- Develop generic instruction decoding and addressing functions to handle a large number of instructions efficiently. By leveraging these generic functions, I implement the decoding and addressing of a vast array of instructions through function calls, ensuring consistency and reducing redundancy in the code.
- Utilizing inline functions and parameters to create the execution module.

Implementing an operating system in C
Operating Systems, Independent project — fall 2023

- Implementing part of an operating system in C, including modules for BIOS, process switching, and process synchronization.
- Create P and V operations for semaphores, using these operations to control access to critical sections. Addressed the dining philosophers problem, ensuring coordination and synchronization among multiple processes.

Implementing components in a network using Python
Foundations of Computer Networks, Independent project — fall 2023

- Implemente learning switch, IPv4 router, and reliable transmission.
- Incorporated two timeout mechanisms in learning switch: Least Recently Used (LRU) and Least Traffic.
- sending and storage of ARP packets,packet forwarding with a timeout mechanism.
- ICMP packet handling
- simulated packet loss by generating random numbers and established sliding windows on both the sender and receiver sides to manage the transmission process.

Big data processing:music visualization system
Big data processing, 4-person team — fall 2023

- implement front-end and back-end interaction using Spring Boot: file downloads on a webpage,calls a backend program, ···
- Coordinating front-end and back-end content and progress

Research Experiences

Research on Strong Subadditivity of Quantum Information
supervisor: Prof. Penghui Yao fall 2023- *(in progress)*

- Analyze Lieb's proof and Lin et al.[1]'s proof of quantum strong subadditivity. Compare the similarities and differences between these proof approaches.
- Explore the properties of the quantum Markov state obtained when equality holds in the new inequality given by Lin et al.
- Give characteristic of the quantum state when equality holds in the new inequality given by Lin et al.
- A research defense held by the **NJU theory group**

Internships

CITIC Group | Beijing, China summer 2024

- Learn and understand the functions and work of different departments.
- Give reports and presentations about AI's impact on financial markets

Skills

Languages: Chinese, English.

Programming: Python, C++ (STL: vector, string, map, queue,list, ...)

References

[1] Lin, TC., Kim, I.H. & Hsieh, MH. A new operator extension of strong subadditivity of quantum entropy. Lett Math Phys 113, 68 (2023). https://doi.org/10.1007/s11005-023-01688-6