

Vicențiu-Alecsandru Duță

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Education

Polytechnic University of Bucharest
Faculty of Automatic Control and Computer Science, BS in Computer Science

Oct 2022 – June 2026
Bucharest, Romania

Projects

IMDB Application | Java

[view repo](#)

- Developed an IMDb-like application with browsing capabilities for movies, actors, and directors using OOP principles.
- Implemented user authentication, database queries, and rating systems with **inheritance** and **polymorphism**.
- Created a maintainable codebase using **encapsulation**, **interfaces**, and proper **design patterns**.

Router | C

[view repo](#)

- Implemented a router handling **IP packets** and **ARP protocol** with **ICMP** error generation.
- Designed routing table lookups using **Trie-based Route Lookup** for efficient next-hop determination.
- Created an ARP table management system tracking MAC-IP mappings with timeout handling and protocol processing.

Memory Allocator | C

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- Built a custom memory allocator managing dynamic memory with **malloc**, **free**, and **realloc** functionality.
- Implemented **block splitting**, **coalescing** of free blocks, and separate handling for small/large memory requests.
- Optimized speed and memory efficiency using efficient **data structures** for memory block tracking and lookup.

Dynamic UDP/TCP Messaging Server | C++

[view repo](#)

- Created a server handling **UDP/TCP protocols** with **non-blocking I/O** multiplexing for multiple connections.
- Implemented a **topic-based subscription** model with **store-and-forward** capability for offline message delivery.
- Developed message protocols with **serialization** for multiple data types ensuring reliable cross-platform communication.

Parallel Inverted Index Calculator | C++

[view repo](#)

- Developed a **Map-Reduce** program creating inverted indexes for text files with efficient word-document mapping.
- Implemented **dynamic load balancing** with **thread pools** and **synchronized data structures** for resource management.
- Utilized **Pthreads** with **barriers** and **mutex locks** for coordination between Map and Reduce processing phases.

Switch | Python

[view repo](#)

- Implemented an L2 switch with **MAC address learning**, frame forwarding, and efficient packet handling.
- Developed **VLAN tagging** for traffic isolation and network segmentation using **802.1Q protocol** implementation.
- Integrated **Spanning Tree Protocol** to prevent network loops while maintaining redundancy with **BPDUs** processing.

Technical Skills

Programming Languages: C, C++, Python, Java, Assembly, Racket, Haskell, Rust

Technologies & Tools: Git, Pthreads, MPI, Socket Programming, TCP/IP Stack, Linux, OpenGL, SQL

Concepts: Data Structures, Object-Oriented Programming, Algorithms, Network Protocols, Multithreading, Distributed Systems, Memory Management