Internship Presentation

A Deep Dive into Systems and Software

Oussema Ben Ameur

Supervised by Prof. Taha Ben Salah

July 31, 2025

Overview

- Problem-Solving, Memory Management, Dynamic Programming
- Java OOP and frameworks
- OS insight through openSUSE Tumbleweed

Problem Solving Growth

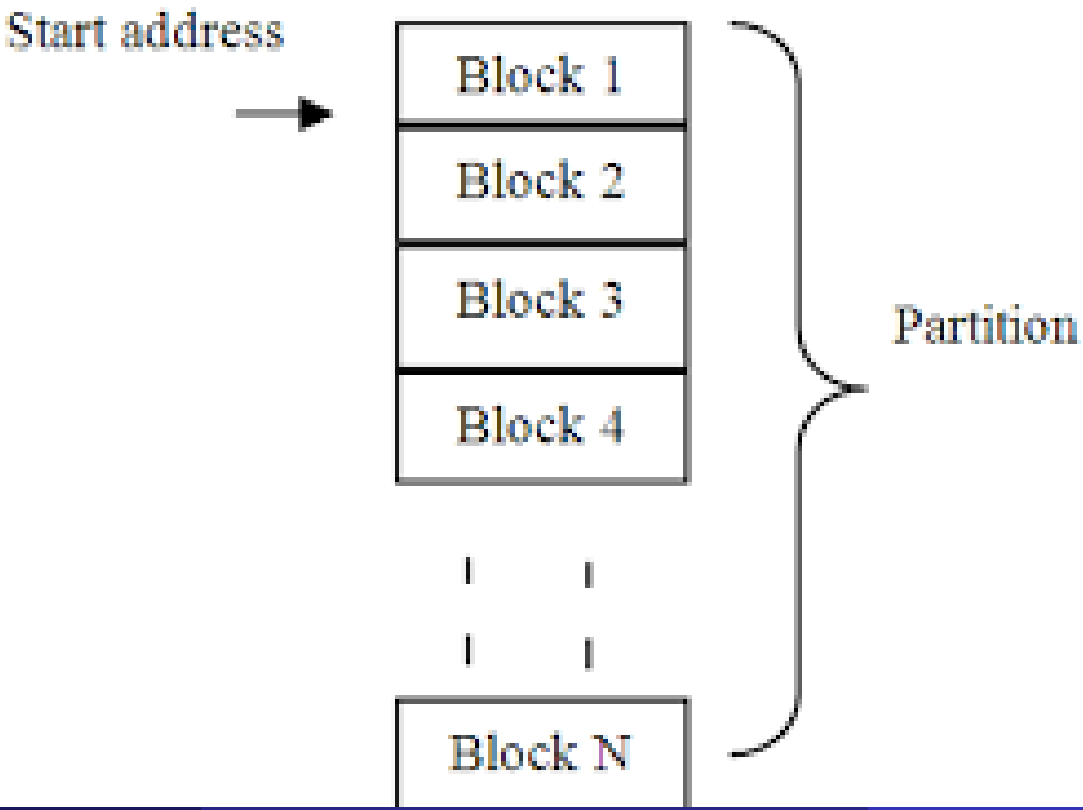
Skills Developed

- Decomposing complex problems
- Designing clean, modular solutions
- Debugging systematically

Memory Management in C

Custom malloc()/free() Simulation

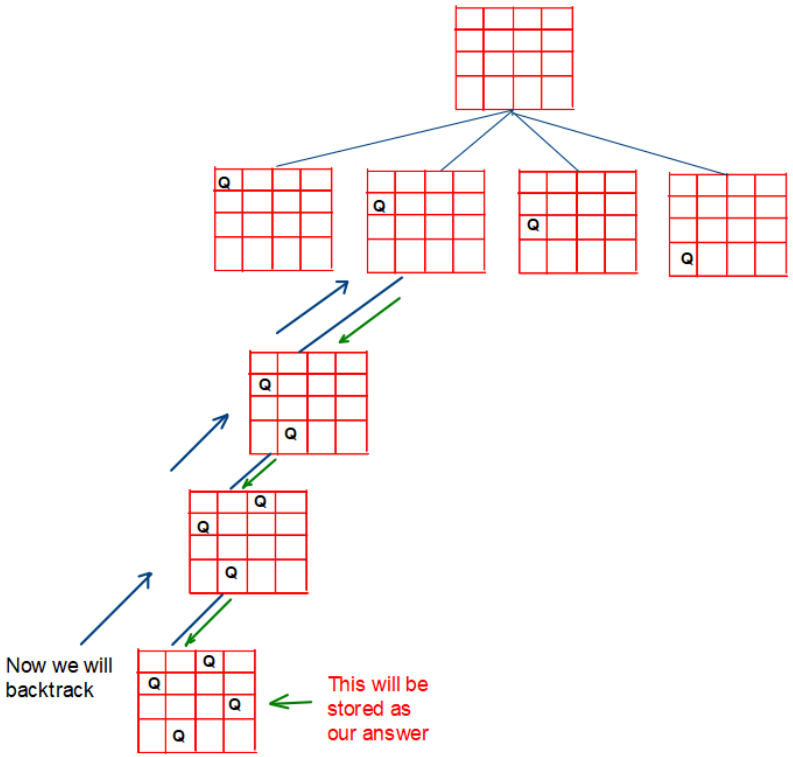
- Manual memory allocation/deallocation
- Internal memory structures
- Debugging low-level issues



Thinking in Dynamic Programming

Key Example

- N-Queens problem
- Optimal substructure and memoization



OOP with Java

Core Ideas

- Java program structure
- Encapsulation, Abstraction, Inheritance, and Polymorphism
- Importance of SOLID principles

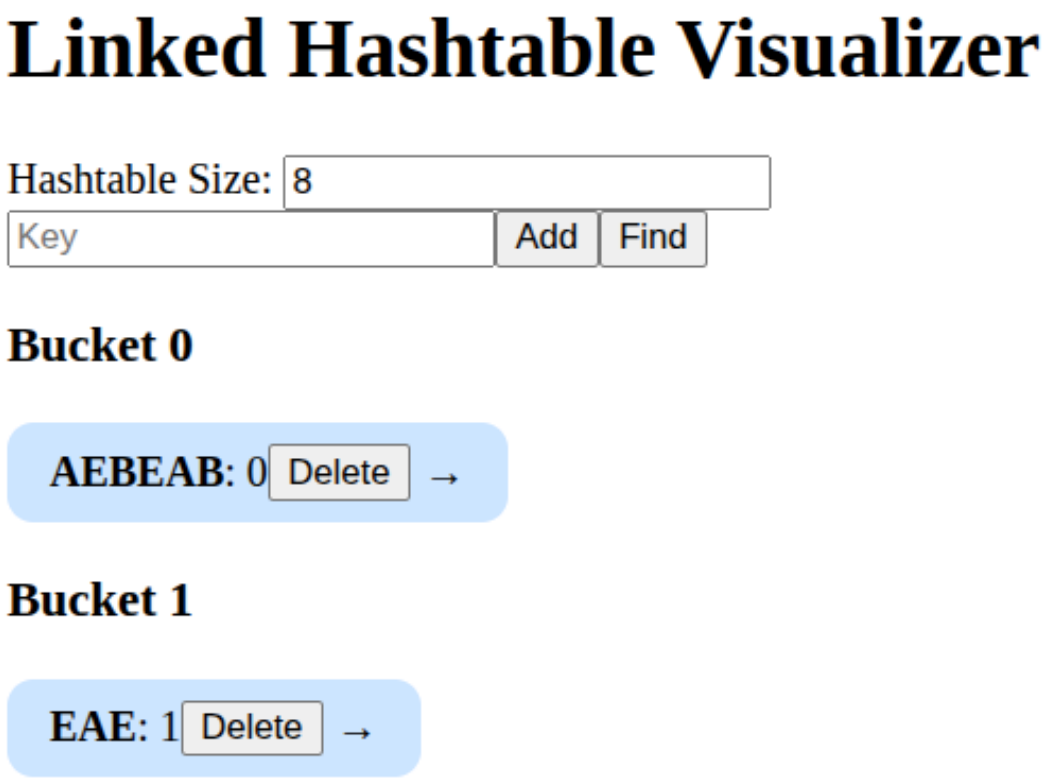
Tools and Frameworks Used

- **Nuts** – modular Java components
- **Swing** – GUI development
- **Angular** – front-end logic
- **Spring Boot** – backend logic

Linked Hashtable Visualizer

Fullstack Development Experience

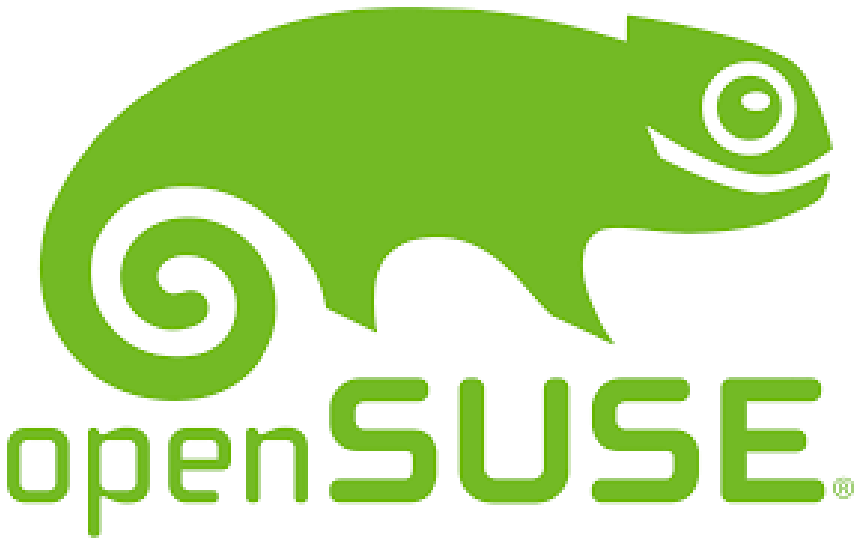
- Backend: Java + Spring Boot
- Frontend: Angular + Canvas animations
- Key Focus: Data structure visualization



Linux Systems Insight

Using openSUSE Tumbleweed

- Package management (zypper)
- System processes & memory
- Configuring development environments



Key Takeaways

- Systems-level understanding is crucial
- OOP principles improve long-term maintainability
- OS familiarity empowers debugging and development

Thank You!

Questions?

Contact: oussemabenameur9@gmail.com