Basic Operating System with Process and Memory Management

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FAST NUCES KARACHI.

BASIC OPERATING SYSTEM WITH PROCESS AND MEMORY MANAGEMENT

What is an Operating System?

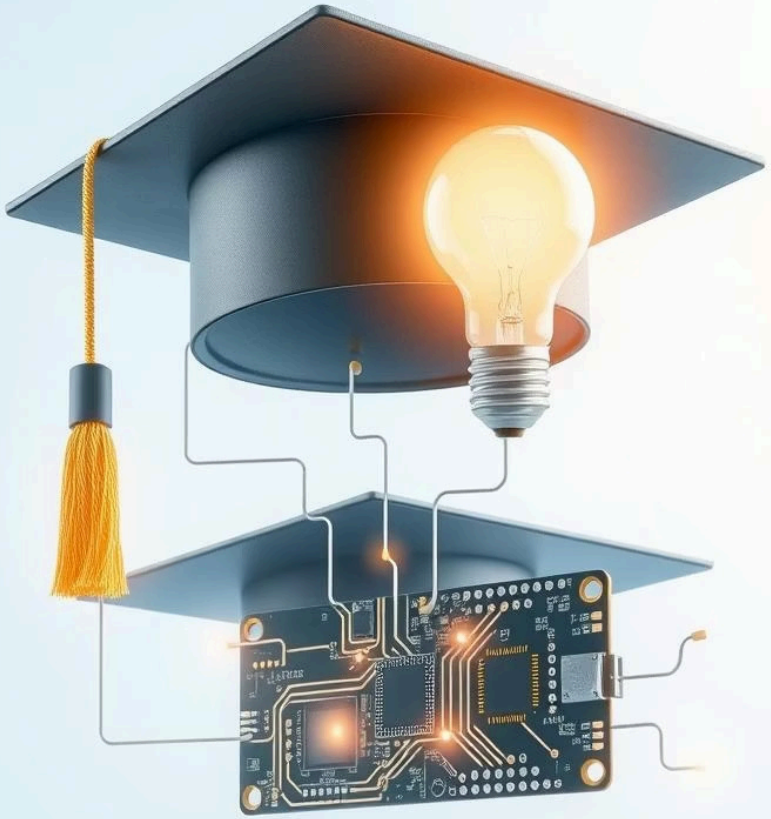
Software that manages hardware and software resources.

Handles resource allocation, process scheduling, and I/O.

Why Study OS?

Foundation for advanced computer science concepts.

Open-source development fosters innovation and learning.



Problem Statement: SDGs 4 & 9

SDG 4 - Quality Education

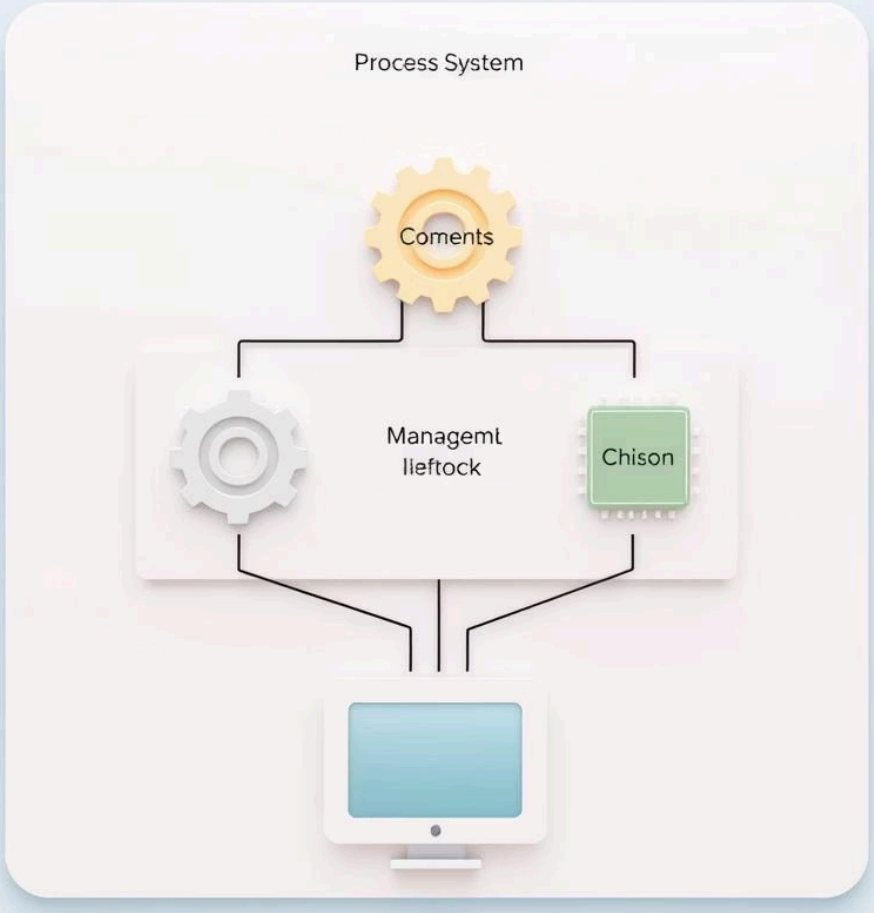
OS knowledge is limited, impacting CS education quality.

SDG 9 - Innovation

Lack of OS skills restricts industry innovation and infrastructure.

Our Goal

Create accessible, practical OS tools for hands-on learning.



Proposed Solution: OS Features

Process Management

Create, schedule, and terminate processes effectively.

Memory Management

Allocate and deallocate memory with virtual memory support.

Command Line Interface

Interactive user commands for system control.

Modular Design

Expandable and maintainable OS architecture.

Methodology: Development Stack

C++ Language

System-level programming for performance and control.

Linux Terminal

Robust development environment for OS components.

Modular Development

Organized code structure enabling flexibility and updates.

Dynamic Memory

Efficient resource use via malloc and free functions.

Games and utilities enhance interaction and testing.

Game and Utility Development

Tower of Hanoi

A classic puzzle challenging your problem-solving skills with recursive moves.

Tic Tac Toe

Simple yet strategic grid game for two players aiming for a winning line.

Hangman

Guess the hidden word before the stick figure is fully drawn!

Number Guessing

Test your luck and logic by guessing the secret number in few attempts.

Calculator

Perform basic arithmetic operations easily and quickly.

Calendar

Organize your days and plan events with an interactive date tracker.

Clock

Keep track of time with a simple and accurate digital clock display.

Notepad

A handy utility to jot down notes, ideas, and reminders anytime.

Results Achieved: Core Functionality

Process Control

Implemented process creation and termination using fork() and exit().

Command Support

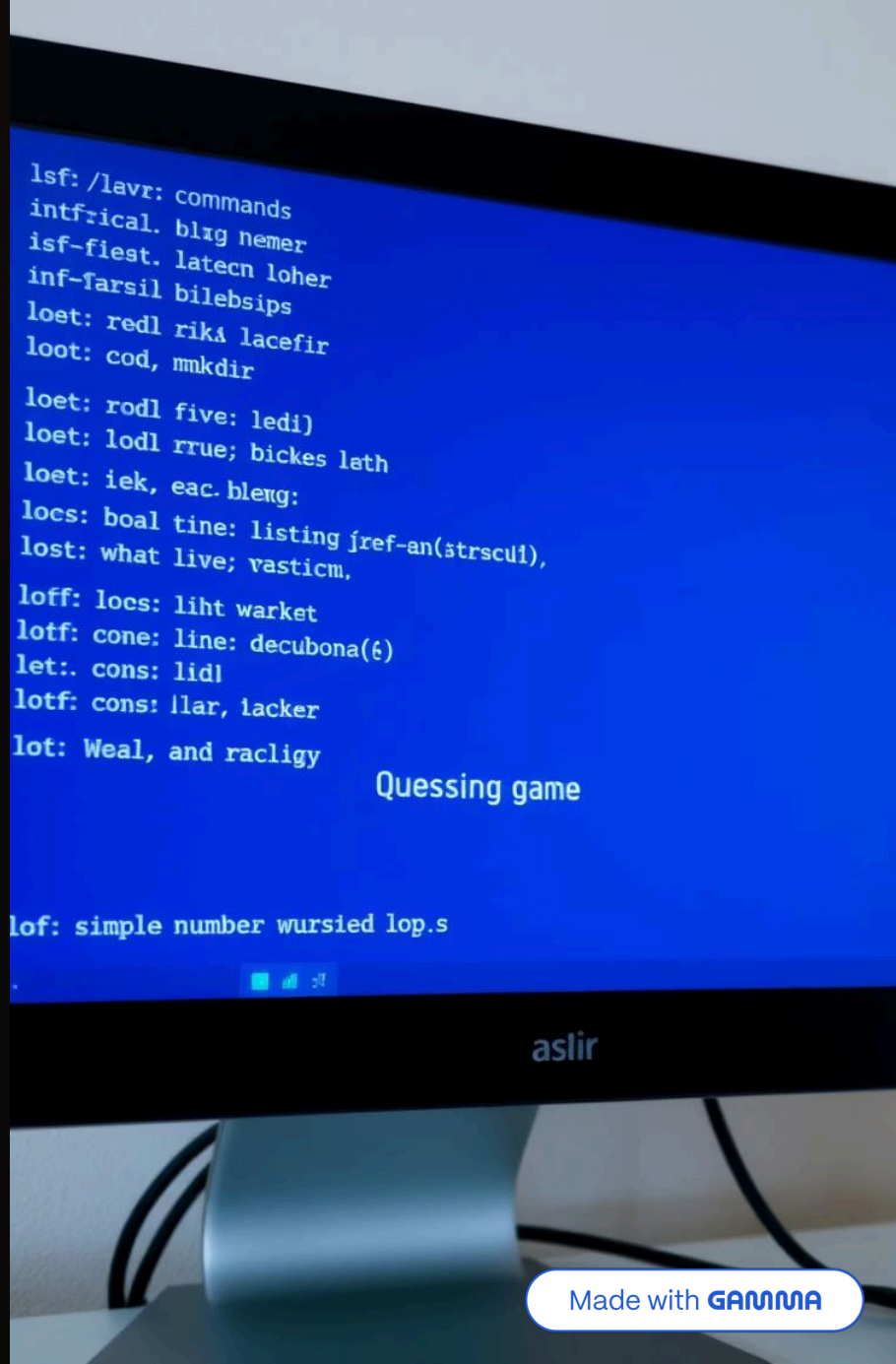
CLI runs essential commands: ls, cd, mkdir, rm.

Memory Allocation

Managed memory within a 1MB limit via malloc() and free().

Interactive Apps

Developed proof-of-concept games like Guess the Number.



Discussion & Conclusion

Successes

Hands-on OS learning made OS concepts accessible to beginners.

Challenges Solved

Simplified complex OS topics with modular, interactive design.

Future Work

Plan to add multithreading, GUI, and advanced memory features.

Impact

Potential integration into computer science curricula worldwide.

References

- Modern Operating Systems by Andrew S. Tanenbaum
- Operating System Concepts by Abraham Silberschatz
- Operating Systems: Design and Implementation by Tanenbaum & Woodhull
- The Design and Implementation of the 4.4BSD OS by McKusick et al.
- The UNIX Programming Environment by Kernighan & Pike

Thank You

We sincerely appreciate your time and interest in exploring our project.

Your support inspires us to continue innovating and striving for excellence.