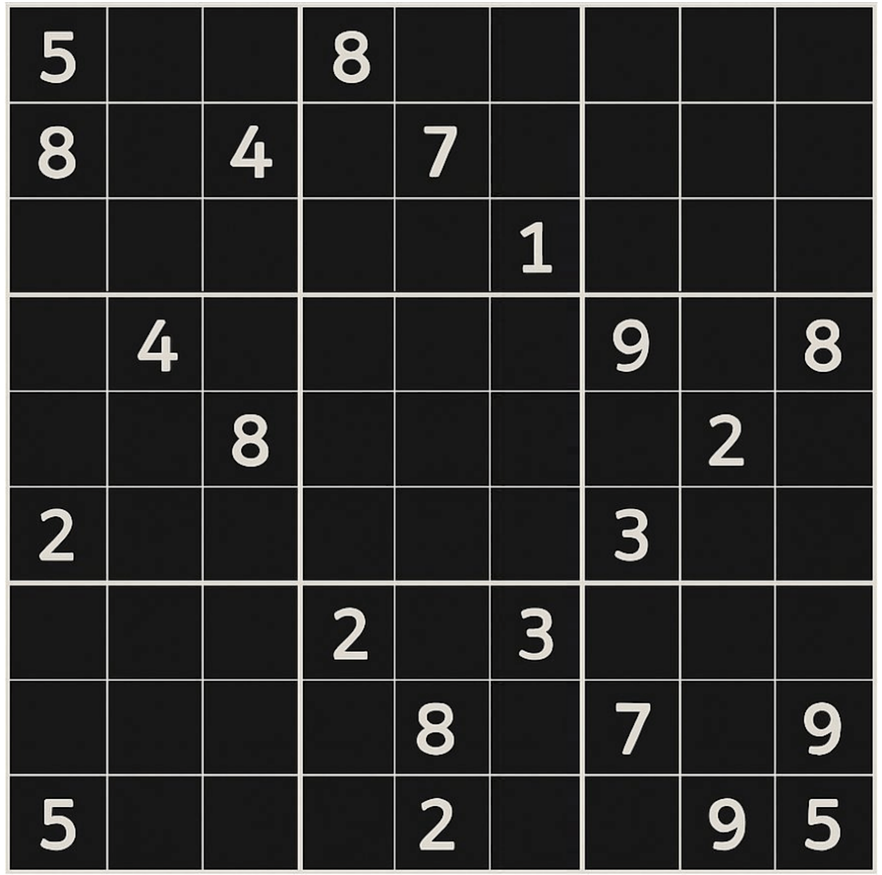
EC3272 Artificial Intelligence Project



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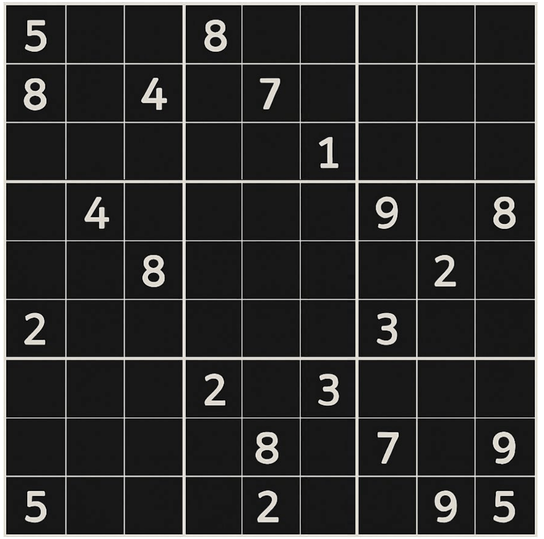
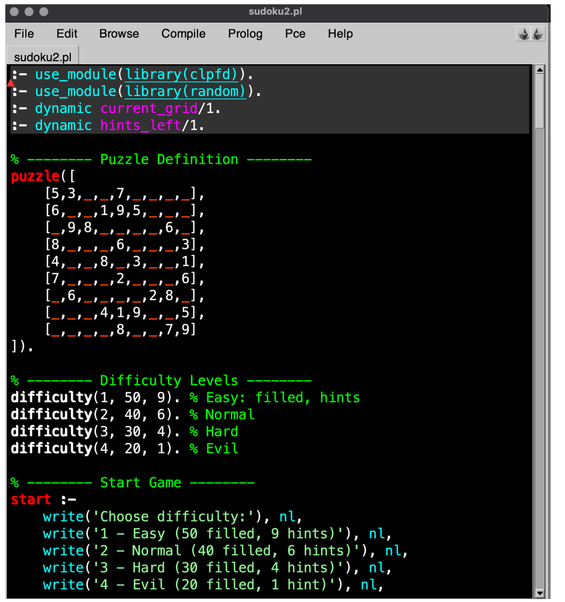
Sudoku

- A logical number placement puzzle played on a 9x9 grid divided into 3x3 sub grids.
- Fill all cells with numbers 1-9 without repeating in rows, columns, or sub-grids.



Prolog

- A declarative programming language focused on logic and reasoning.
- Ideal for solving problems defined by rules and constraints.



Objectives

- Design and implement a complete 9x9 Sudoku grid.
- Provide interactive commands: look, fill, hint, solve and check.
- Enforce Sudoku rules and validate moves.
- Develop multiple difficulty levels.
- Include hints, warnings, and scoring features.
- Demonstrate logical problem solving using prolog.

- Introduction
- Objectives
- > Facts & Constraints
- System Workflow
- System commands
- Demonstration
- Conclusion

Facts

```
% -------- Puzzle Definition --------
puzzle([
    [5,3,_,_,7,_,_,_,_],
    [6,_,_,1,9,5,_,_,_],
    [_,9,8,_,_,_,_,6,_],
    [8,_,_,_,6,_,_,_,3],
    [4,_,_,8,_,3,_,_,1],
    [7,_,_,_,2,_,_,_,6],
    [_,6,_,_,_,_,2,8,_],
    [_,_,_,4,1,9,_,_,5],
    [_,_,_,_,8,_,_,7,9]
]).
```

Constraints

- The rules of sudoku.

System Workflow

- How the program generated Sudoku puzzles?
- How the rules (constraints) are applied?
- How the user interacts (fills the squares)?
- How Prolog processes and validates the puzzle?

System Commands

- start.
- look.
- fill(row, col, num).
- hint.
- check.
- solve.
- show_initial.
- win.

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One Demo Is Worth A Thousand Explanation

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“Prolog—where the system doesn’t just execute, it reasons.”

- Logic over instructions.
- Reasoning & Inference
- Backtracking Mechanism
- Constraint Satisfaction
- Human-like Thinking
- Beyond Sudoku: Expert Systems, AI, Problem Solving

Any Questions ?