Sudoku

Adil Arhzane, Erik Englund & Oskar Persson

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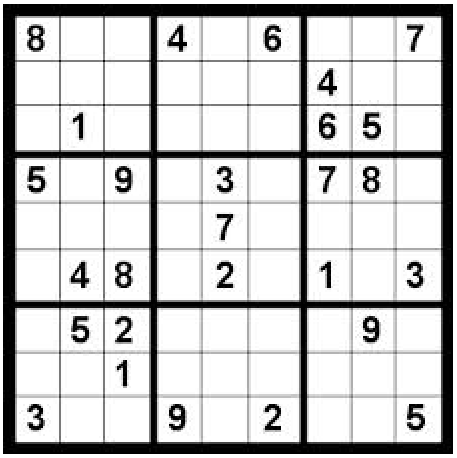
Introduction

What is a Sudoku?

A sudoku is a numeric puzzle made out of a 9 by 9 grid where each row, column and 3x3-subsection contains unique numbers from 1 to 9. The idea is that you start with a puzzle where some numbers are missing and the goal is to find out which numbers they are. An example of a typical non-solved sudoku is shown below.



8			4		6			7
						4		
	1					6	5	
5		9		3		7	8	
				7				
	4	8		2		1		3
	5	2					9	
		1						
3			9		2			5

In this project, we have focused on creating a data-program intended to solve a given sudoku-puzzle.

Implementation

Tree Structure

Datatypes

For this project, we have chosen to represent a sudoku as a datatype in SML consisting of three lists of integer lists. One of the lists represents the horizontal rows, another the vertical columns and the third the 9 different 3x3 squares.

Algorithms

Functions

function updating the three lists
checking if there is one unknown element in either list
possible solutions/next steps

Ascii

The function ascii is used to easier get a better overview of the sudoku. The function takes a puzzle and prints this in the structure of a sudoku, a 9x9 grid with 3x3 squares as subsections.

Test cases

not only the solve function, but also the auxilliary functions

Conclusion

Summary

Discussion

Possible Improvements

The main problem with solving sudokus is the time taken to solve harder puzzles. As the program is designed now it takes approximately 6 hours to solve the hardest puzzle we could find, while a “standard” puzzle requires between 20-40 seconds depending on difficulty.

References