

Sudoku

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

The Daily SuDoku: Sun 26-Jun-2005 very hard
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Sudoku has a fascinating history. "Su" means number in Japanese, and "Doku" refers to the single place on the puzzle board that each number can fit into. It also connotes someone who is single—indeed, one way to describe the game is "Solitaire with numbers." Although its name is Japanese, its origins are actually European and American, and the game represents the best in cross-cultural fertilization. Unlike many games which spring from one culture and are then absorbed by others, Sudoku's development reveals it to be a true hybrid creation.

(<http://www.sudokudaily.net/history.php>)

How to Play Sudoku?

Sudoku requires no calculation or arithmetic skills. It is essentially a game of placing numbers in squares, using very simple rules of logic and deduction. It can be played by children and adults and the rules are simple to learn.

Sudoku Objective

The objective of the game is to fill all the blank squares in a game with the correct numbers. There are three very simple constraints to follow. In a 9 by 9 square Sudoku game:

- Every row of 9 numbers must include all digits 1 through 9 in any order
- Every column of 9 numbers must include all digits 1 through 9 in any order
- Every 3 by 3 subsection of the 9 by 9 square must include all digits 1 through 9

Every Sudoku game begins with a number of squares already filled in, and the difficulty of each game is largely a function of how many squares are filled in. The more squares that are known, the easier it is to figure out which numbers go in the open squares. As you fill in squares correctly, options for the remaining squares are narrowed and it becomes easier to fill them in.

Write a program that can solve a 9x9 Sudoku puzzle

Instructions

- Put the starting grid in a file called `sudoku.txt` that will be read by the program. An example can be found on the pages of PI and is of ascii type, where a `-` means no information specified, see below.

```
4---8-1--
1----67-5
---9--2--
--94-56-2
-----
6-12-83--
--5--9---
8-61----9
--2-6---7
```

(example of file `sudoku.txt`)

- The output of the program must be printing the solution on the screen, in the format shown below

```
-----
| 4 2 3 | 5 8 7 | 1 9 6 |
| 1 9 8 | 3 2 6 | 7 4 5 |
| 5 6 7 | 9 1 4 | 2 3 8 |
-----
| 3 8 9 | 4 7 1 | 5 6 2 |
| 2 7 4 | 6 3 5 | 9 8 1 |
| 6 5 1 | 2 9 8 | 3 7 4 |
-----
| 7 1 5 | 8 4 9 | 6 2 3 |
| 8 3 6 | 7 5 2 | 4 1 9 |
| 9 4 2 | 1 6 3 | 8 5 7 |
-----
```

(example of output)

- Work in groups of 2.
- Use the Linux C compiler (`gcc`) for the program. Hand in your work on a floppy 1.4 MB.
- Deadline: 15 December 2003
- Counts for 20% of final note (together with 80% of exam).
- Who has more than or equal to 14 has to come and talk to a docent.
- Without handing in the work and passing with a mark of at least 10, you will not be admitted to the exam or exam de recurso.
- Students who hand in work equal to others will be barred from the exams.