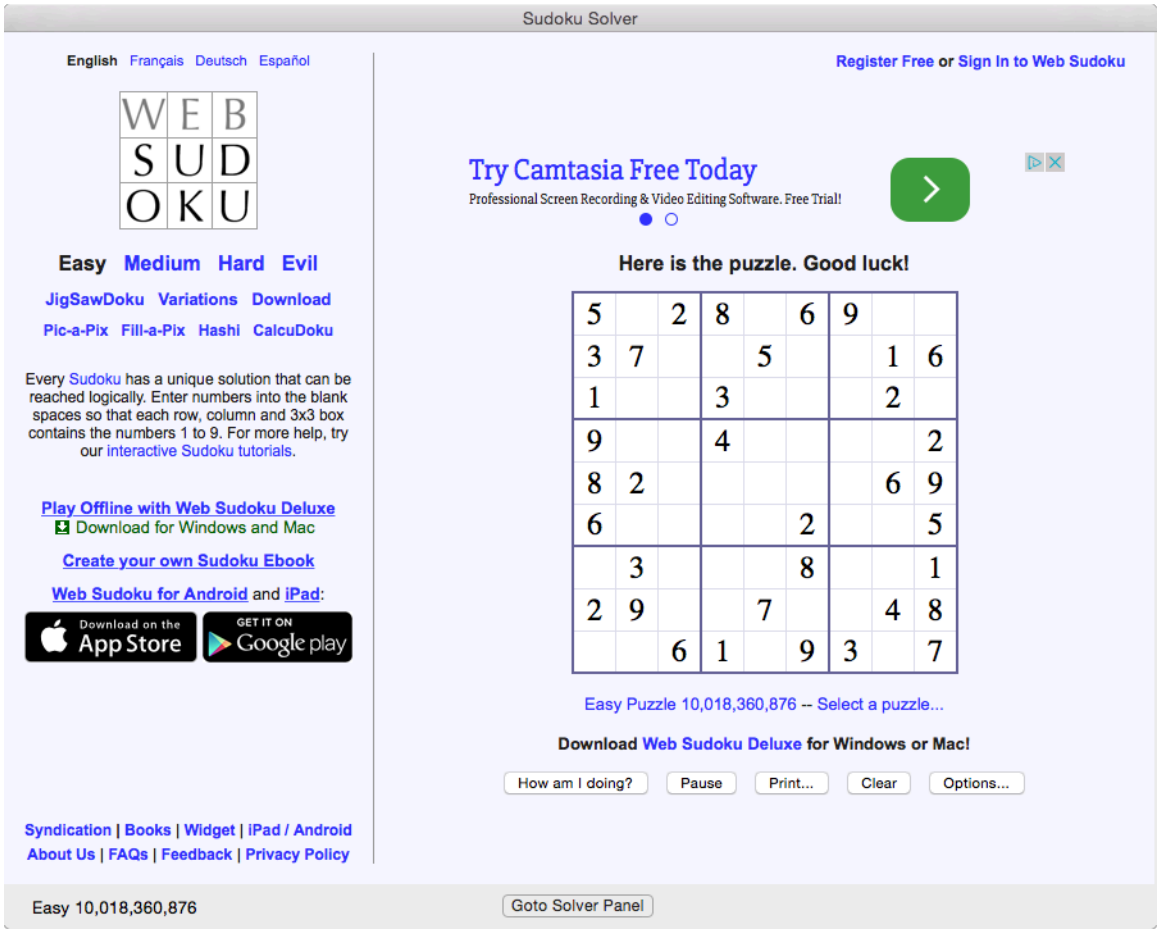
Solver Overview

Launching 'Sudoku Solver.app' causes a WebView browser to come up and a page loads from 'www.websudoku.com'. After a puzzle's data set has been successfully parsed the 'Go to Solver Panel' becomes enabled. Also, from this starting point (app launch), the user can use the Menu 'File Save' to save the current puzzle or 'File Open' to load a previously saved puzzle.



If a user selects the puzzle shown above, Easy 10,018,360,876, the Solver panel would look like the screen shot below. This puzzle is so easy that just the importation process solves it.

Notice the 'Undo' and 'Solve' buttons are disabled. This is because it's too early for any 'Undo' and there is nothing to 'Solve'.

Importing data to Sudoku Solver

To create a Solver object, an 81 cell (9x9) data set must be imported. If the data set is coming from WebView, the data will consist of valid solutions (values 1 through 9) for cells that are 'Solved' and the value '0' for 'Unsolved' cells.

For example: the above data set for the first 8 cells would have been imported with the following: { 5, 0, 2, 8, 0, 6, 9, 0, 0, ...}.

Each cell contains a set of possible solutions for that cell. Each cell becomes solved when it's set contains only 1 element. The above data set would be encoded like this:

{ {5}, {1, 2, 3, 4, 5, 6, 7, 8, 9}, {2}, {8}, {1, 2, 3, 4, 5, 6, 7, 8, 9}, {6}, {9},

{1, 2, 3, 4, 5, 6, 7, 8, 9} , {1, 2, 3, 4, 5, 6, 7, 8, 9}, ... }.

Starting with this data, the function 'ReduceAllCells' is called.

'ReduceAllCells' performs a 'pruning' process on each cell that can reduce the complexity of the puzzle through the simple process described below. It's called anytime a cell becomes solved and the potential for pruning exists.

Get the current set of possible solutions for the cell being pruned:

- remove from this set any solved values in the same row
- remove from this set any solved values in the same column
- remove from this set any solved values in the same block

If pruning occurred, update the cell with the pruned data.

Sometimes, only one number is left, in which case the cell is becomes 'Solved'.

Most 'Easy' puzzles are too easy to be used by the Solver. The Solver wasn't written for this type of puzzle.

All imported data sets are validated by the 'IsPuzzleValid' function. This function is also called at various times during the solving process.

The ' IsPuzzleValid' checks for duplicate solved values for each Row, Column, and Block. If any duplicate is found the puzzle is not valid which is handled as a serious error.

Menus- Save and Open

A puzzle may be saved to a '.txt.' file at any time. Also, a correctly formatted '.txt' file can be read and loaded into the Solver at any time. This can allow the Solver to solve puzzles from sources other than 'www.websudoku.com'.

Undo and Solve Buttons

Each time the 'Solve' button is pressed a snapshot of the puzzle is securely written to a temporary file. This allows for nested Undo.

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