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A Few Words About Sudoku, Which Has None

By WILL SHORTZ

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IT is said that nature abhors a vacuum. As humans we seem to have an innate desire to fill up empty spaces. This might explain part of the appeal of sudoku, the new international craze, with its empty squares to be filled with digits.

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Since April, when sudoku was introduced to the United States in *The New York Post*, more than half the leading American newspapers have begun printing one or more sudoku a day. No puzzle has had such a fast introduction in newspapers since the crossword craze of 1924-25.

A friend in New York reports that his elderly father, a lifelong reader of *The Daily News*, which does not yet print sudoku, has switched to *The Post* to get his daily fix. A correspondent reports buying three out-of-town newspapers a day for their sudoku. Truly addicted solvers choose from the dozens of books available, and do the puzzles obsessively, one after another.

Why sudoku? And why now?

The craze started in England last November, when Wayne Gould, a retired judge from New Zealand, persuaded *The Times* of London to print the puzzle. Judge Gould had seen sudoku in a Japanese puzzle magazine and written a computer program for creating sudoku at any desired level of difficulty.

Japanese puzzle magazines are filled with novel and ingenious logic puzzles. They are as

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popular in Japan as crosswords are in the United States. But Judge Gould saw two things in sudoku that set it apart: the rules, which can be stated in one sentence, and the size, which does not vary with degree of difficulty.

Every puzzle craze in history has come along at an opportune time, and the same is true of sudoku. The world's first puzzle craze, tangrams, the seven-block puzzle introduced from China around 1817, could not have been possible before significant international trade and printing. The 15 Puzzle, in 1880, and Rubik's Cube, in the early 1980's, involved new manufacturing processes. And crosswords required a high educational level in the general public and the ability of newspapers to produce and print crossword grids easily, which did not occur until the 1920's.

For its part, sudoku - a short form of the Japanese words meaning "only single numbers allowed" - could not have become popular before the rise of personal computers. Nearly all sudoku puzzles are computer generated, using programs that understand all the logical solving strategies, from the most basic to the most sophisticated, and so can determine mathematically how hard or easy a puzzle is. Before computers, it would have been laborious for a human to prove that each sudoku puzzle has a unique solution, as it must, and almost impossible for a human to rate its difficulty precisely.

People do puzzles for many reasons. Chief among them is that puzzles give the solver a feeling of being in control. Most of life's challenges don't have black-and-white solutions, and many have no resolution at all. We jump into the middle of problems and muddle through as best we can. With sudoku - or any other human-made puzzle - carrying it through from start to finish, and finding the perfect solution in the end, can produce a feeling of great pride.

The audiences for crosswords and sudoku, understandably, overlap greatly, but there are differences, too. A crossword attracts a more literary person, while sudoku appeals to a keenly logical mind. Some crossword enthusiasts turn up their noses at sudoku because they feel it lacks depth. A good crossword requires vocabulary, knowledge, mental flexibility and sometimes even a sense of humor to complete. It touches numerous areas of life and provides an "Aha!" or two along the way. Sudoku, on the other hand, is just a logical exercise, each one similar to the last.

A maxim in the puzzle world says that every puzzle type has a flaw. The traditional crossword, for example, relies too much on short words heavy with vowels, like aloe and oleo, to work. An acrostic puzzle, which involves the solver's transferring letters from a word list to a grid and back, can be tedious. If sudoku has a major failing, it is that it is unforgiving of error. If you make a mistake and enter a wrong digit in a square, and then base other reasoning on that mistake, it is practically impossible to localize the problem and undo it. You have to erase the entire puzzle and start over, which can be frustrating.

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One potential flaw that sudoku does not have is repetition. The number of possible ways to fill a 9-by-9 sudoku grid is calculated at 6,670,903,752,021,072,936,960 - and the number of different ways to give starting digits for solving all these combinations is almost unfathomable. There is never a chance of running out of sudoku puzzles.

Will Shortz is crossword puzzle editor of The New York Times. His most recent books are collections of sudoku.

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For that sudoku puzzle, it's probably a 9x9 grid with a few numbers filled in it. Perhaps there's even a posted difficulty level. For many, this represents the outer limit of one's puzzle knowledge. Specifically with regards to sudoku, did you know that there's much more out there? Colors, different configurations of cages, words, and images make for puzzles that in some ways can be even more of a logical challenge than the typical 9x9. Many more variations involving different grid sizes have come about that change up the game. Generally, grids exist in the form of x^2 where x is the number of squares vertically or horizontally in a square cage (also sometimes called a house): 4x4 (2x2 in a cage). No puzzle has had such a fast introduction in newspapers since the crossword craze of 1924-25. A friend in New York reports that his elderly father, a lifelong reader of The Daily News, which does not yet print sudoku, has switched to The Post to get his daily fix. A correspondent reports buying three out-of-town newspapers a day for their sudoku. Truly addicted solvers choose from the dozens of books available, and do the puzzles obsessively, one after another.