# Puzzle Grid

Principle

There are two types of people who are attracted to Sudoko. The gambler is characterised by jumping into the puzzle right away, with the *feeling* (the province of the senses, not of the intellect) that if he tries enough permutations, and tries hard enough, eventually he will find the solution. He is also characterised by changing numbers he has chosen; spending hours without finding a solution; and rarely completing even the Moderate level. I cannot teach the gambler anything.

The other type knows (the province of the intellect), either intuitively or formally, that the puzzle is an exercise in logic. He is characterised by having *certainty* about each number he places, and *not* spending hours, even when he cannot solve the puzzle. This is the unimpaired, honest, beginner. If you have solved a few puzzles and you would like to master Sudoku, to get past the Moderate level without struggle, this article is for you.

In order to solve any problem affectively, one must understand the principle involved. The principle in Sudoku is **logic**, pure deductive logic.
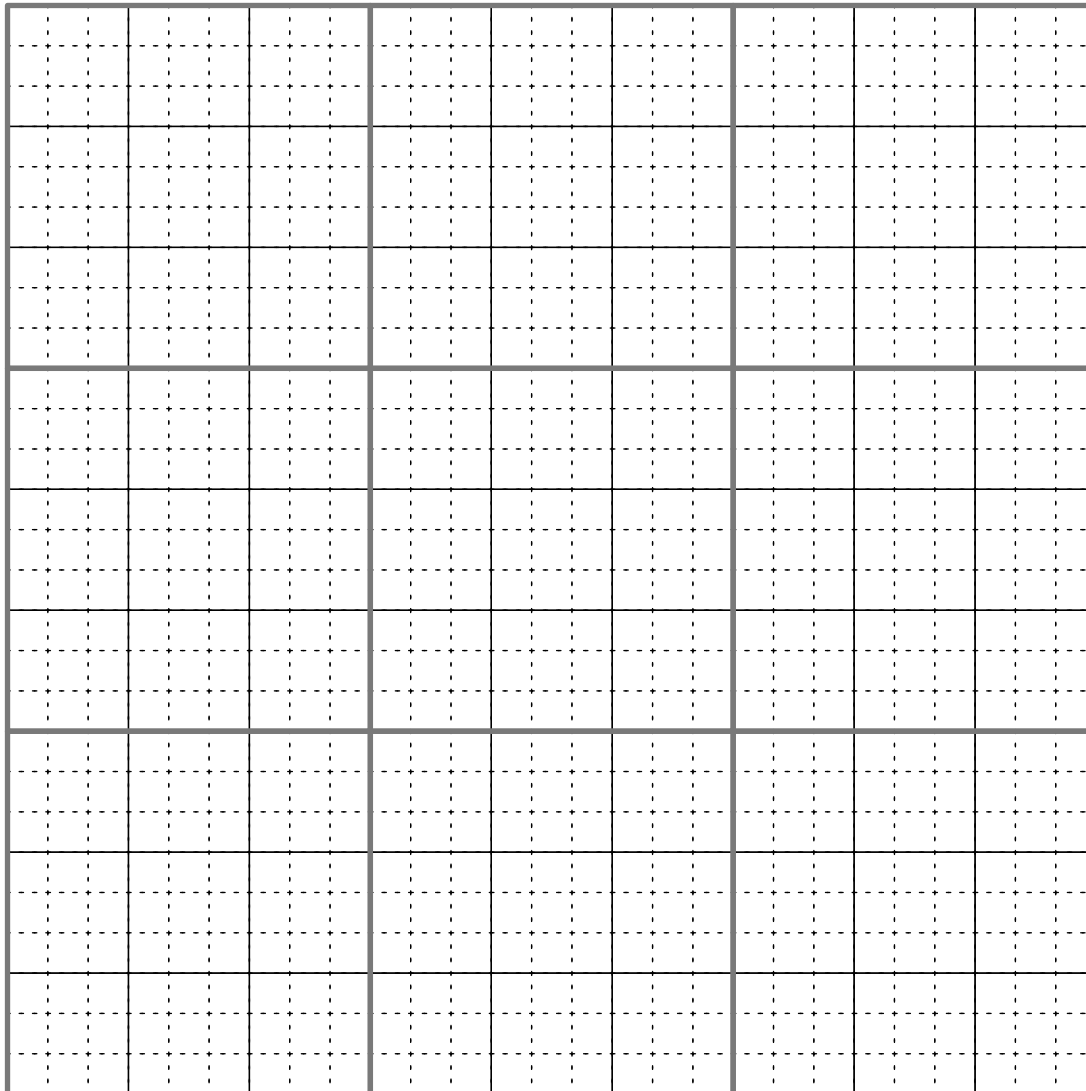
Terms

- The overall grid is 9x9 **cells**
- Each cell must contain a number between 1 and 9.
- Each number must appear once, in its **row**; its **column**; and its 3x3 **box**.
- For each cell, to begin with, there are therefore, 9 **possible** numbers.
- Each **cell** is in of one of two **states**:

Determined

It contains a number that has been determined.
- This includes the numbers **given** at the start.
- For the logical person, determination is by deductive logic, and therefore it is *certain*.
- For others it is by trial and error.
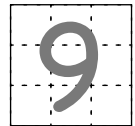
Cell, with Determined Number

Undetermined

It is awaiting determination, from the *set* of possibles, a maximum of nine.
- Possibles exclude those that are *im*possible (due to conflicts).
- Each possible number has a specific **place**:
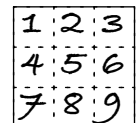
Cell, showing Possibles and their Placement

Strategy

There are two distinct phases in the game play. If you do not understand and appreciate this, or if you avoid the first phase, the puzzle will degenerate to guesswork; reversals; and struggle. On the other hand, understanding this guarantees a correct result (even if the puzzle cannot be completed), because each deduction, each determined number, is correct and *certain*. Thus it takes substantially less time. Stated otherwise, if you do not understand and appreciate this, the Moderate level and above will be impossible to solve.

Phase I · Identify Possibles

1 Set the puzzle. Fill in the given numbers in their cells, in large size, using ink.
2 Identify the possibles for each vacant cell. This is a straight-forward process that requires just a few minutes, it cannot be avoided. The possibles are simply those that do not conflict with the given numbers. That is, it excludes the ***im*possibles. Do not attempt to solve the puzzle at this stage. Logic demands discipline. Be precise.
3 Use a pencil and an eraser. Fill in the possible 1 across the whole board; then the possible 2, and so on. When complete, check your work, it must be perfect.
4 Place each possible for the cell in the small dotted square, as shown. This will assist you in Phase II: visually scanning the board for an 8 is made easier when 8 is always in the same place in each cell.
5 In Easy and Moderate puzzles, during this phase, it might happen that you determine a number. Eg. that 7 is the *only* possible for a particular cell. Of course, it is no longer a possible, it is a certainty, it is determined. Fill in that cell in large, size. But do not let that seduce you into abandoning this phase and jumping into the next: it is such small successes that seduce the gambler.

Phase II · Determine Numbers

1 Determine each undetermined cell *from* its possibles, as identified in Phase I. Contemplate the conflicts between *possibles*, not merely conflicts between determined numbers. Therefore, knowledge of the possibles *across the board* is essential, hence this page may be of assistance.
2 Solve the puzzle. For each cell, use deductive logic to identify ***im*possibles, and remove them from the set of possibles. It is a process of incrementally reducing the possibles, such that either (a) just one possible remains in a cell, or (b) the possible is the single possible in a particular row; column; box. Scan them for it.
3 A cell is a member of a row; column; box. When a cell is determined, erase that possible from the other cells in its row, its column, and its box. Thus possibles in *other* cells are reduced. The board is clean, and you are left to evaluate only the remaining possibles.
4 If you come to a stand-still, where you cannot reduce the possibles further, and the puzzle is not complete, use *further* deductive logic to identify more ***im*possibles and reduce the possibles.

Further Logic

This article is for beginners, I have detailed the strategy that enables you to solve a puzzle affectively, and to progress beyond the Moderate. The further logic that is required for harder puzzles is identified, but not given here (it makes game play even faster). But that further logic requires this strategy, hence it is fundamental.

The harder the puzzle, the more deductive logic required. If you cannot complete the puzzle, it means that your powers of deductive logic are limited, a situation that can be improved by learning logic formally. Every puzzle can be solved, because Sudoku is a game of pure deductive logic. Logic is the fundamental mechanism of the intellect, that is why solving a puzzle is so rewarding: it confirms the function of the intellect. In these dark days of marketed; propagandised; legislated insanity, and programming passed off as "education", all of which have the goal of perverting the intellect, it is a relief to hold fast against the tide. Enjoy.