

Problem 6—Sudoku  
*written by Andy Poe and Dave Powers*

When Michelle Kwan is not skating, she enjoys putting her feet up with the latest book of Sudoku puzzles. Sudoku was (contrary to popular belief) invented in the USA in 1979, but did not catch on in the USA until 2005. It's been a popular diversion in Japan since 1986. (Sudoku is obviously a variation of the Latin Square puzzle, which is much older.)

Sudoku is a 9x9 grid containing the digits 1 through 9. The trick is to fill the grid with digits so that each digit appears exactly once in each row, column, and in each of the nine 3x3 subgrids. Some of the digits are already supplied, and you must fill in the rest. Your task, very simply, is to solve Sudoku problems quickly.

**INPUT SPECIFICATION.** Each input case consists of a 9x9 grid of characters. Each line consists of digits and/or spaces representing missing digits. Each line is terminated by <EOLN> and an extra <EOLN> follows each input case. Each input case is guaranteed to have a unique solution.

**OUTPUT SPECIFICATION.** The output cases should appear in the same order as their input cases. Each output case should be of the form “Case *c*” (where *c* is the input case number) followed by two <EOLN> characters followed by the solution grid followed by an extra <EOLN>.

**SAMPLE INPUT.**

```
.6.1.4.5.<EOLN>
..83.56..<EOLN>
2.....1<EOLN>
8..4.7..6<EOLN>
..6...3..<EOLN>
7..9.1..4<EOLN>
5.....2<EOLN>
..72.69..<EOLN>
.4.5.8.7.<EOLN>
<EOLN>
..6.....<EOLN>
284.....5<EOLN>
...372...<EOLN>
57.....2.<EOLN>
...781...<EOLN>
.9.....67<EOLN>
...943...<EOLN>
8.....743<EOLN>
.....1..<EOLN>
<EOLN>
<EOF>
```

**SAMPLE OUTPUT.**

```
Case.1<EOLN>
<EOLN>
963174258<EOLN>
178325649<EOLN>
254689731<EOLN>
821437596<EOLN>
496852317<EOLN>
735961824<EOLN>
589713462<EOLN>
317246985<EOLN>
642598173<EOLN>
<EOLN>
Case.2<EOLN>
<EOLN>
736458912<EOLN>
284169375<EOLN>
951372684<EOLN>
573694821<EOLN>
462781539<EOLN>
198235467<EOLN>
617943258<EOLN>
829516743<EOLN>
345827196<EOLN>
<EOLN>
<EOF>
```