



## 2659 - Sudoku

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A Sudoku grid is a  $16 \times 16$  grid of cells grouped in sixteen  $4 \times 4$  squares, where some cells are filled with letters from A to P (the first 16 capital letters of the English alphabet), as shown in figure 1a. The game is to fill all the empty grid cells with letters from A to P such that each letter from the grid occurs once only in the line, the column, and the  $4 \times 4$  square it occupies. The initial content of the grid satisfies the constraints mentioned above and guarantees a unique solution.

Figure 1. Sudoku

a) Sudoku grid

b) Solution

Write a Sudoku playing program that reads data sets from a text file.

### Input

Each data set encodes a grid and contains 16 strings on 16 consecutive lines as shown in figure 2. The  $i$ -th string stands for the  $i$ -th line of the grid, is 16 characters long, and starts from the first position of the line. String characters are from the set  $\{A, B, \dots, P, -\}$ , where '-' (minus) designates empty grid cells. The data sets are separated by single empty lines and terminate with an end of file.

### Output

The program prints the solution of the input encoded grids in the same format and order as used for input.

### Sample Input

```
--A----C-----O-I
-J--A-B-P-CGF-H-
--D--F-I-E----P-
-G-EL-H-----M-J--
----E-----C--G---
-I--K-GA-B---E-J
D-GP--J-F----A--
-E---C-B--DP--O-
E--F-M--D--L-K-A
-C-----O-I-L-
H-P-C--F-A--B---
---G-OD---J----H
K---J----H-A-P-L
--B--P--E--K--A-
-H--B--K--FI-C--
--F---C--D--H-N-
```

## Sample Output

FPAHMJECNLBDKOGI  
OJMIANBDPKCGFLHE  
LNDKGFOIJEAHMBPC  
BGCELKHPOFIMAJDN  
MFHBELPOACKJGNID  
CILNKDGAHBMOPEFJ  
DOGP IHJMFNLECAKB  
JEKAF CNBGIDPLHOM  
EBOFPMIJDGHLNKCA  
NCJDHBAEKMOFIGLP  
HMPLCGKFIAENBDJO  
AKIGNODLBPJCEFMH  
KDEMJIFNCHGAOPBL  
GLBCDPMHEONKJIAF  
PHNOBALKMJFIDCEG  
IAFJOECGLDPBHMNK

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