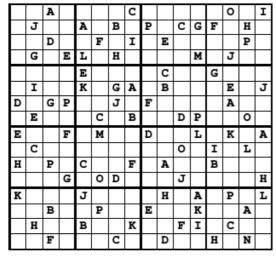
A Sudoku grid is a  $16 \times 16$  grid of cells grouped in sixteen  $4 \times 4$  squares, where some cells are filled with letters from A to P (the first 16 capital letters of the English alphabet), as shown in figure 1a. The game is to fill all the empty grid cells with letters from A to P such that 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.



P	A	н	М	J	E	С	N	L	В	D	K	0	G	I
J	М	I	A	N	В	D	P	K	С	G	F	L	Н	E
N	D	ĸ	G	F	0	I	J	E	A	н	М	В	P	С
G	С	E	ы	K	Н	P	0	F	Ι	М	A	ъ	D	N
F	н	В	E	L	P	0	А	С	K	J	G	N	I	D
I	L	N	ĸ	D	Ġ	A	н	В	М	0	P	E	F	J
0	G	P	I	н	J	М	F	N	L	Е	U	A	K	В
E	K	A	ш	U	N	В	G	Ι	D	P	ы	Н	0	М
В	0	F	P	М	Ι	J	D	G	Н	L	N	ĸ	С	A
С	J	D	Н	В	A	E	ĸ	M	0	F	I	G	L	P
М	P	т	U	G	K	F	I	A	E	N	В	D	J	0
K	Ι	G	z	0	Δ	L	в	P	J	С	E	F	М	Н
D	E	М	J	I	F	N	С	Н	G	A	0	P	В	L
L	В	С	D	P	М	Н	E	0	N	K	5	I	A	F
н	N	0	В	A	L	K	М	J	F	I	Δ	U	E	G
	F	J	0	E	U	G	L	D	P	В	н	М	N	K
	N G F I O E B C M K D L	J M N D G C F H I L O G E K B O C J M P K I D E L B	J M I N D K G C E F H B I L N O G P E K A B O F C J D M P L K I G D E M L B C	J M I A N D K G G C E L F H B E I L N K O G P I E K A F B O F P C J D H M P L C K I G N D E M J L B C D	J M I A N N D K G F G C E L K F H B E L I L N K D O G P I H E K A F C B O F P M C J D H B M P L C G K I G N O D E M J I L B C D P	J M I A N B N D K G F O G C E L K H F H B E L P I L N K D G O G P I H J E K A F C N B O F P M I C J D H B A M P L C G K K I G N O D D E M J I F L B C D P M	J M I A N B D N D K G F O I G C E L K H P F H B E L P O I L N K D G A O G P I H J M E K A F C N B B O F P M I J C J D H B A E M P L C G K F K I G N O D L D E M J I F N L B C D P M H	J M I A N B D P N D K G F O I J G C E L K H P O F H B E L P O A I L N K D G A H O G P I H J M F E K A F C N B G B O F P M I J D C J D H B A E K M P L C G K F I K I G N O D L B D E M J I F N C L B C D P M H E	J M I A N B D P K N D K G F O I J E G C E L K H P O F F H B E L P O A C I L N K D G A H B O G P I H J M F N E K A F C N B G I B O F P M I J D G C J D H B A E K M M P L C G K F I A K I G N O D L B P D E M J I F N C H L B C D P M H E O	J M I A N B D P K C N D K G F O I J E A G C E L K H P O F I F H B E L P O A C K I L N K D G A H B M O G P I H J M F N L E K A F C N B G I D B O F P M I J D G H C J D H B A E K M O M P L C G K F I A E K I G N O D L B P J D E M J I F N C H G L B C D P M H E O N	J M I A N B D P K C G N D K G F O I J E A H G C E L K H P O F I M F H B E L P O A C K J I L N K D G A H B M O O G P I H J M F N L E E K A F C N B G I D P B O F P M I J D G H L C J D H B A E K M O F M P L C G K F I A E N K I G N O D L B P J C D E M J I F N C H G A L B C D P M H E O N K	J M I A N B D P K C G F N D K G F O I J E A H M G C E L K H P O F I M A F H B C C C C C C C C C C C C C C C C C C	J M I A N B D P K C G F L N D K G F O I J E A H M B G C E L K H P O F I M A J F H B E L P O A C K J G N I L N K D G A H B M O P E O G P I H J M F N L E C A E K A F C N B G I D P L H B O F P M I J D G H L N K C J D H B A E K M O F I G M P L C G K F I A E N B D K I G N O D L B P J C E F D E M J I F N C H G A O P L B C D P M H E O N K J I	J M I A N B D P K C G F L H N D K G F O I J E A H M B P G C E L K H P O F I M A J D F H B E L P O A C K J G N I I L N K D G A H B M O P E F O G P I H J M F N L E C A K E K A F C N B G I D P L H O B O F P M I J D G H L N K C C J D H B A E K M O F I G L M P L C G K F I A E N B D J K I G N O D L B P J C E F M D E M J I F N C H G A O P B L B C D P M H E O N K J I A

a) Sudoku grid

Figure 1. Sudoku

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  $\{A,B,\ldots,P,-\}$ , 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 ----0-I-L--C--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 DOGPIHJMFNLECAKB **JEKAFCNBGIDPLHOM EBOFPMIJDGHLNKCA** NCJDHBAEKMOFIGLP HMPLCGKFIAENBDJO AKIGNODLBPJCEFMH KDEMJIFNCHGAOPBL GI.BCDPMHEONK.ITAF PHNOBALKMJFIDCEG **IAFJOECGLDPBHMNK**