

SUDOKU – Sudoku 16x16

Source: <http://www.spoj.com/problems/SUDOKU/>

A Sudoku grid is a 16x16 grid of cells grouped in sixteen 4x4 squares, where some cells are filled with letters from A to P (the first 16 capital letters of the English alphabet), as shown in the figure. 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 4x4 square it occupies. The initial content of the grid satisfies the constraints mentioned above and guarantees a unique solution.

						C						O	I		
J			A	B	P		C	G	F			H			
	D			F	I	E							P		
G		E	L	H					M	J					
			E				C			G					
I			K	G	A	B						E	J		
D	G	P			J	F						A			
E				C	B			D	P				O		
E		F	M			D			L	K		A			
C								O	I		L				
H	P	C		F	A			B							
		G	O	D				J						H	
K			J			H	A	P		L					
	B		P		E		K			A					
H		B		K		F	I	C							
	F			C		D		H		N					

a) Sudoku grid

F	P	A	H	M	J	E	C	N	L	B	D	K	O	G	I
O	J	M	I	A	N	B	D	P	K	C	G	F	L	H	E
L	N	D	K	G	F	O	I	J	E	A	H	M	B	P	C
B	G	C	E	L	K	H	P	O	F	I	M	A	J	D	N
M	F	H	B	E	L	P	O	A	C	K	J	G	N	I	D
C	I	L	N	K	D	G	A	H	B	M	O	P	E	F	J
D	O	G	P	I	H	J	M	F	N	L	E	C	A	K	B
J	E	K	A	F	C	N	B	G	I	D	P	L	H	O	M
E	B	O	F	P	M	I	J	D	G	H	L	N	K	C	A
N	C	J	D	H	B	A	E	K	M	O	F	I	G	L	P
H	M	P	L	C	G	K	F	I	A	E	N	B	D	J	O
A	K	I	G	N	O	D	L	B	P	J	C	E	F	M	H
K	D	E	M	J	I	F	N	C	H	G	A	O	P	B	L
G	L	B	C	D	P	M	H	E	O	N	K	J	I	A	F
P	H	N	O	B	A	L	K	M	J	F	I	D	C	E	G
I	A	F	J	O	E	C	G	L	D	P	B	H	M	N	K

b) Solution

Input

The first line of the input contains an integer K - determining the number of datasets ($K \leq 10$). Each data set encodes a grid and contains 16 strings on 16 consecutive lines as shown in the example input below. 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.

Output

For each data set in the input print the completed 16x16 Sudoku as specified by the rules above. The program prints the solution of the input encoded grids in the same format and order as used for input. The output for each data set should be separated by single empty lines.

Example

Input :

2

```
---N-----  
---B--H--IJ--P--  
K-----PO--B--H--  
-H----LKP-N-C---  
H--GJ----NOP--C-  
-----I-M-K-P-ON  
----BC-----  
-----O----C-----  
-----J-NK--AB-O  
A-OPC-F--G----LK  
I-----M--PA--D-  
-----B-F----JHG  
----LMO-CP----E-  
--M----GDEFJ---  
-C---E----I---M-  
F-D----J-L--B---  
  
---H-J--M-----  
-M--C-A-EH-GIK--  
-AB-G-EH-----  
K---O----D--E---  
-N-----F-G-J---  
-FGI-K--NA-----  
-----FI-----POA  
L--M--N--EC-FH--  
I---M--NO---CE--  
-CD--HG--NL-O-P-  
-K-NA-----D-GI--  
--PB----GJ---M-N  
-----D--KI-----  
--MOB-----HJI-  
-----ML-P--BDF--  
-----IH-L---P---
```

Output :

```
POCNDIEAHMFGKLJB  
DLFBMGHCEIJKOPNA  
KIGENJPOLABCDHFM  
MHAJFBLKPONDCGIE  
HDBGJAKLINOPEMCF  
CAJLGFIEMHKBPDON  
OPNFBCMDAJGEHIKL  
EMIKPONHDFCLGABJ  
GFMCEDJINKLHABPO  
AJOPCHFNBGDIMELK  
IBLHOKGMJEPAFNDC  
NKEDALBPFCMOIJHG  
BGHILMOFCPAJNKED  
LNKMHPCBGDEFJOAI  
JCPAKEDGOBINLFMH  
FEDOINAJKLHMBCGP  
  
EONHDJIKMLPFABCG  
DMLPCBAFEHNGIKJO  
FABCGNEHJIKOLDMP  
KIJGOLMPCDBAENHF  
HNODEABMFPGLJCKI
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PFGIHKCDNAOJBLEM
CJKELGFIDBMHNPOA
LBAMJPNOKECIFHGD
IGHJMDPNOFAKCELB
MCDFKHGBINLEOAPJ
OKENACJLBMDPGIFH
ALPBIFOEGJHCKMDN
JEFLPODAHKINMGBC
NPMOBKAGACFDHJIL
GHIKNMLCPOJBDFAE
BDCAFIHJLGEMPONK