Intermediate Division - Veitch

1

	A	A	-A	-A	
B		X	X		-D
B		X	X		D
-B		X	X		D
-B		X	X		-D
	-C	C	C	-C	

2

	A	A	-A	-A	
B					-D
B					D
-B	X	X			D
-B	X	X			-D
	-C	C	C	-C	

3

	A	A	-A	-A	
B		X	X		-D
B					D
-B	X			X	D
-B					-D
	-C	C	C	-C	

4

	A	A	-A	-A	
B	X				-D
B	X				D
-B				X	D
-B					-D
	-C	C	C	-C	

PROBLEM: Given a Boolean expression with at most 4 variables, describe its Veitch Diagram. Each Boolean expression will use just the OR operator to combine terms and the terms will be joined using just the AND operator. Note that variables are eliminated from a term's representation if the variable and its negation are included in its grid representation. The Boolean expressions for the Veitch Diagrams in Figures #1 - #4 above are: 1) ~A 2) A~B 3) BC~D + ~B~CD 4) AB~C + ~A~B~C D

EXAMPLE: The expression AB + ~C + ~A~D fills the grid in the following way:

5

	A	A	-A	-A	
B	X	X			-D
B	X	X			D
-B					D
-B					-D
	-C	C	C	-C	

6

	A	A	-A	-A	
B	X			X	-D
B	X			X	D
-B	X			X	D
-B	X			X	-D
	-C	C	C	-C	

7

	A	A	-A	-A	
B			X	X	-D
B					D
-B					D
-B			X	X	-D
	-C	C	C	-C	

8

	A	A	-A	-A	
B	X	X	X	X	-D
B	X	X		X	D
-B	X			X	D
-B	X		X	X	-D
	-C	C	C	-C	

AB fills the 4 cells in Figure #5. ~C fills the 8 cells of Figure #6. ~A~D fills the 4 cells of Figure #7. Figure #8 shows all the X's combined in one diagram. Changing the X's in each row to 1's and the blanks to 0's in Figure #8, and then converting the digits to hexadecimal gives FD9B.

INPUT: There will be 5 lines of input (for clarity 10 sample inputs are given). Each line will contain a valid Boolean expression with at most 4 variables. Variables within a term will always be in alphabetical order.

OUTPUT: For each line of input, print a representation of the entries of the Veitch diagram from top to bottom as a string of 4 hexadecimal values.

SAMPLE INPUT: (http://www.datafiles.acsl.org/2020/contest3/int-sample-input.txt)

```
AB+~AB+~A~B
AB~C~D+AB~CD+~A~B~CD
AB~C~D+~AB~C~D+A~B~C~D
B~D+~B~D
~A~BD+~A~B~D
B~D+~A~BD+A~B~C
~B~C+BCD+B~C~D
A~C+ACD+~A~CD
AB~D+~ABD+A~BD+~A~B~D
B~D+~A~CD+~A~B~C~D
```

SAMPLE OUTPUT:

```
1.    FF33
2.    8810
3.    9008
4.    F00F
5.    0033
6.    F0B8
7.    9699
8.    8DD8
9.    C3C3
10.   F111
```