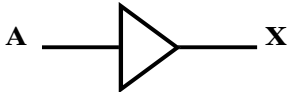
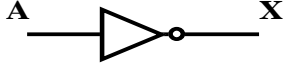
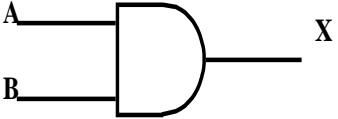
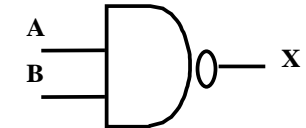
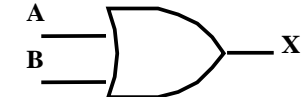
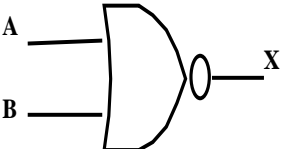




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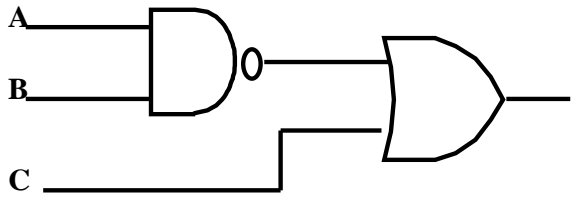
See Boolean Algebra for a description of the category as well as references.

NAME	GRAPHICAL SYMBOL	ALGEBRAIC EQN	TRUTH TABLE															
BUFFER		$X = A$	<table border="1"> <thead> <tr> <th>A</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> </tr> </tbody> </table>	A	X	0	0	1	1									
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AND		$X = AB \text{ or } A*B$	<table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	A	B	X	0	0	0	0	1	0	1	0	0	1	1	1
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NAND		$X = \overline{AB} \text{ or } \overline{A*B}$	<table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	A	B	X	0	0	1	0	1	1	1	0	1	1	1	0
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OR		$X = A+B$	<table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	A	B	X	0	0	0	0	1	1	1	0	1	1	1	1
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NOR		$X = \overline{A+B}$	<table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	A	B	X	0	0	1	0	1	0	1	0	0	1	1	0
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EXCLUSIVE-OR (XOR)		$X = A \oplus B$	<table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> </tr> </tbody> </table>	A	B	X	0	0	0	0	1	1	1	0	1	1	1	0
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EQUIVALENCE (XNOR)		$X = \overline{A \oplus B}$	<table border="1"> <thead> <tr> <th>A</th> <th>B</th> <th>X</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>1</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	A	B	X	0	0	1	0	1	0	1	0	0	1	1	1
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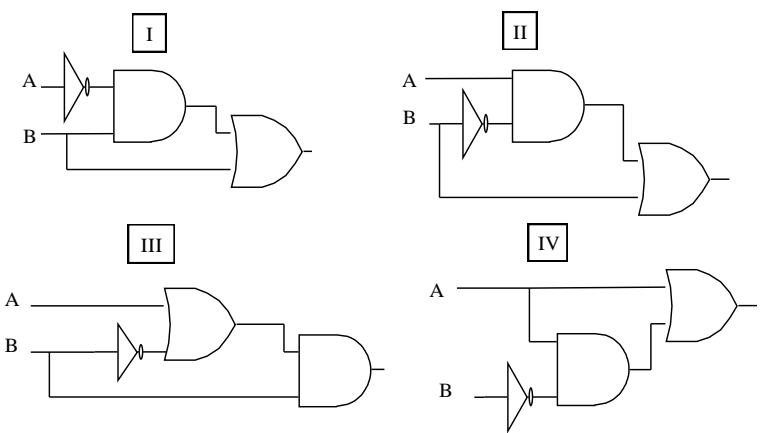
Find all ordered triplets (A, B, C) which make the following circuit **FALSE**:

$(1, 1, 0)$

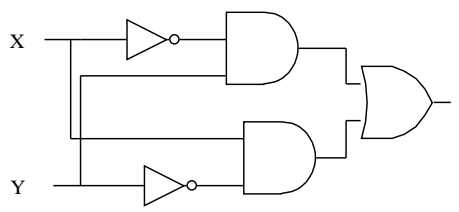


Which circuit produces the most TRUE values?

II



Redraw the diagram using the fewest number of gates possible.



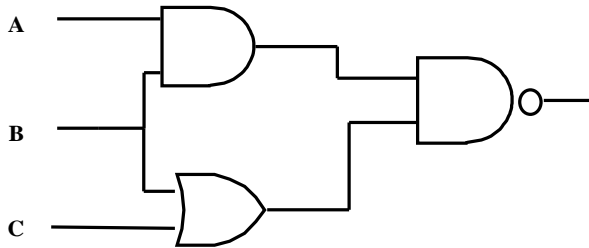
The circuit translates to

$$X\bar{Y} + \bar{X}Y = X \oplus Y$$

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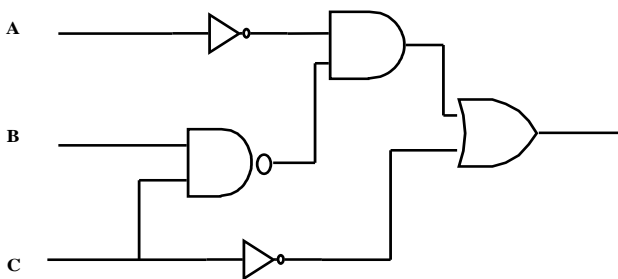
Simplify the Boolean expression represented by this circuit using the fewest numbers of parentheses,

$$\overline{\overline{A + B}} = \overline{AB}$$

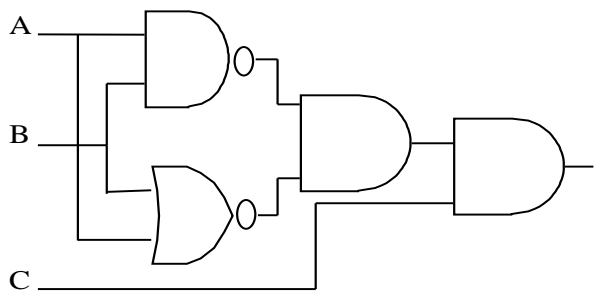


How many ordered triples make the circuit FALSE?

3



Translate the following circuit to a Boolean expression and simplify the expression.



$$\begin{aligned} (\overline{AB})(\overline{A + B})(C) &= (\overline{A + B})(\overline{AB})(C) \\ &= (\overline{AB} + \overline{AB})(C) = \overline{ABC} \end{aligned}$$