

PROBLEM: Using only AND, OR, XOR, and NOT operations, design a digital logic circuit that does the following:

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- * You have 3 machines: A, B, C. You have 4 lights.
- * If the machine is on, then its input line is TRUE. If the machine is off, its input line is FALSE.

BEHAVIOR OF THE LOGIC CIRCUIT (YOUR CIRCUIT MUST EXHIBIT THE FOLLOWING BEHAVIORS.)

- * If only 1 of the three machines is on, a single light labeled "only 1 on" is turned on.
- * If only two machines are on, a single light labeled "only two on" is turned on.
- * If all three machines are on, a single light labeled "All three on" is turned on.

* If none of the machines are on, a single light labeled "None on" is lit.

So, your circuit must satisfy the following truth table:

NOTE: T=ON, F=OFF

Machines	A	B	C	Lights
None on	F	F	F	None on
Only one on	T	F	F	Only one on
Only one on	F	T	F	Only one on
Only one on	F	F	T	Only one on
Only two on	T	T	F	Only two on
Only two on	T	F	T	Only two on
Only two on	F	T	T	Only two on
All on	T	T	T	All on

IHD WILL NEVER BE ON A TEST!
 YOU NEED NOT STUDY THIS EXAMPLE
 UNLESS YOU ARE INTERESTED IN IT.

EXPLANATION
 This is the AND gate and the corresponding truth table:



