DIGITAL LOGIC CIRCUITS

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This exercise can be printed and used by teachers and students. It is recommended that you view the website (www.technologystudent.com) before attempting the design sheet .

BASIC LOGIC GATE - CIRCUITS

Below is the logic circuit for a simple house alarm. The alarm protects the front and back doors and six windows. Once the alarm is set if any of the doors or windows are opened the alarm will sound.
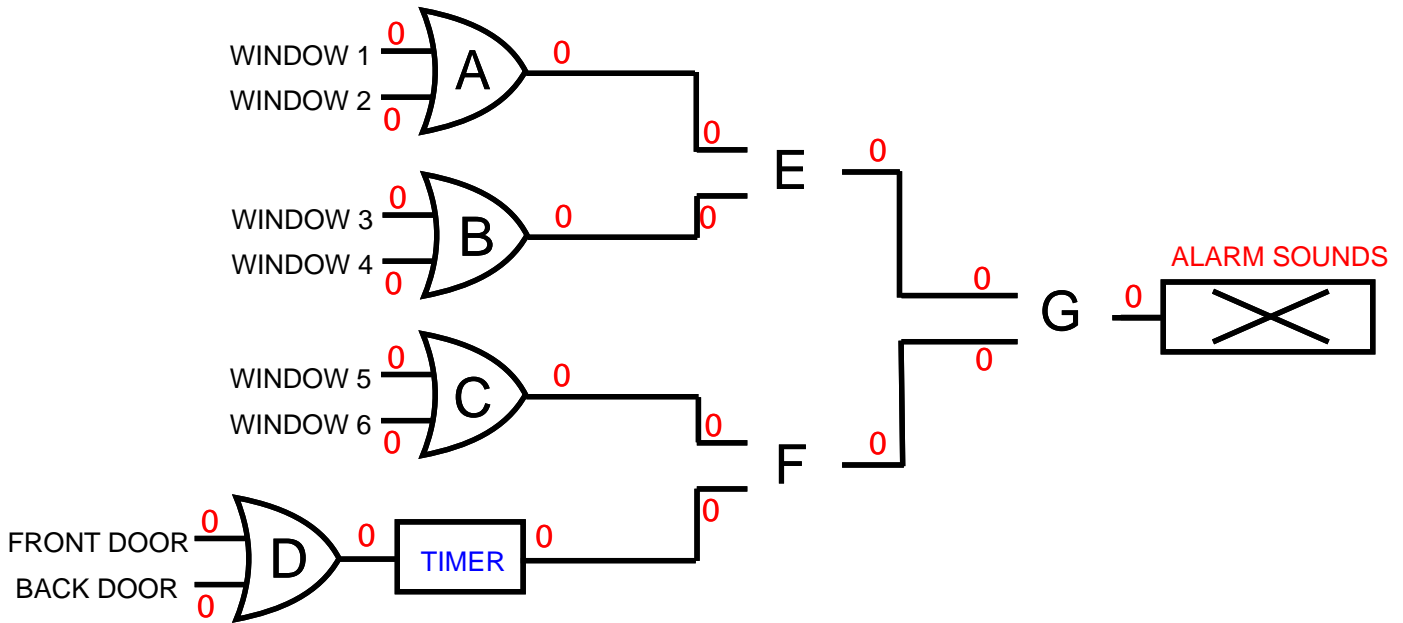The inputs for each of the gates representing the doors and windows can be connected to a vast range of sensors (eg. movement and magnetic sensors).
On the circuit below the input states of each of the sensors are '0' (false, low, off). This means that they have not detected an intruder. As a result the alarm does not sound.

1. What type of gates have been used for the windows?   _____

2. Why is a timer needed for the front and back doors?   _____

3. Draw the correct symbol for gates E, F and G.

WINDOW 1 0
WINDOW 2 0
A 0
WINDOW 3 0
WINDOW 4 0
B 0
E 0 0
WINDOW 5 0
WINDOW 6 0
C 0
F 0 0
G 0 0
ALARM SOUNDS
FRONT DOOR 0
BACK DOOR 0
D 0 TIMER 0 0 0

A thief breaks in through window 3. The logic state of the input changes to 1, high, on , True. Write the logic states of all the other inputs and outputs. Draw in the correct logic gates (see previous logic diagram). Remember the alarm must sound.

WINDOW 1 0
WINDOW 2 0
A
JEFF he's a HARDMAN
WINDOW 3 1
WINDOW 4 0
B
E
WINDOW 5 0
WINDOW 6 0
C
F
G
ALARM SOUNDS
FRONT DOOR 0
BACK DOOR 0
D 0 TIMER