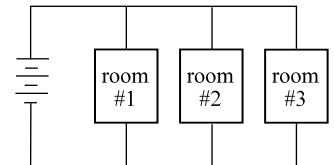


Introduction

You are an electrical engineer that has been hired to develop a monitoring panel for the airlocks on a Lunar Space Station Project (LSSP). Currently, there are three rooms in the LSSP with various combinations of airlocks. In addition, each room is wired in parallel with the power source and the other rooms (see diagram).



Restrictions

1. You will be given two class periods to design and build your panel. All work must occur within the classroom. Extra time, if needed/warranted (teacher’s decision), is available at lunch/after school.
2. Your monitoring panel must include the following items:
 - a master light to show that the power is always on
 - a master switch that turns the main power to the airlocks on and off
 - a switch for each air lock that has an “Airlock Open” position and an “Airlock Closed” position
 - a light for each room that comes on when the appropriate conditions are met (see below)

Room 1	2 airlocks	light comes on when both airlocks are closed
Room 2	2 airlocks	light comes on when either airlock is closed
Room 3	3 airlocks	light comes on when (a) airlock 1 and either airlock 2 or 3 is closed or (b) either airlock 1 and 2 are closed or only airlock 3 is closed.

Hint: recall the 3 light bulb wiring task and the various combinations

Building Materials

- connecting wires
- 8 paperclips (switches)
- 4 mini-christmas lights (not LED)
- cardboard panel (~ 11 x 14)
- 1 9V battery

Note: these are your responsibility to find and bring. While some materials may be available in the classroom don’t count on them being there!

Instructions

1. Design a circuit diagram of your monitoring panel.
2. Submit the diagram to the chief engineer (teacher) for approval.
3. Once you have received approval, wire your panel.
4. Present your circuit diagram and LSSP panel (along with a marking scheme) to the chief engineer (teacher). You will be required to (i) demonstrate and (ii) verbally explain to the chief engineer how your panel operates.
5. Once assessed you will need to dismantle your panel and recycle/reuse the building materials.

LSSP PANEL MARKING SCHEME	
CIRCUIT DIAGRAM <input type="checkbox"/> full page (8½ x 11) <input type="checkbox"/> ruler <input type="checkbox"/> neat <input type="checkbox"/> correct symbols <input type="checkbox"/> no short circuits	/5
MASTER • power-on light • switch	0 2 0 2
ROOM 1 (2 airlocks) • no short circuit • wired parallel to source/other rooms • light comes on when both airlocks are closed	0 1 0 2 0 4
ROOM 2 (2 airlocks) • no short circuit • wired parallel to source/other rooms • light comes on when either airlock is closed	0 1 0 2 0 5
ROOM 3 (3 airlocks) • no short circuit • wired parallel to source/other rooms • light comes on when (a) airlock 1 & either airlock 2 or 3 is closed or (b) either airlock 1 & 2 are closed or only airlock 3 is closed	0 1 0 2 0 8
OTHER (0 = poor 1 = good 2 = very good 3 = excellent) • student name on panel • panel decorated • verbal explanation • quality of wiring (neat, easy to follow, minimum of wire, ...)	0 1 0 1 2 3 0 1 2 3 0 1 2 3
TOTAL	/45
Comments	