Spacehacks Mission Control Manual

You are mission control. Your partner, the engineer, is on a failing spaceship and you must help them repair it by directing them verbally. There are several possible challenges that the engineer may encounter, and the solution to each is contained in this manual. Good luck!

Challenge #1: Short Circuit Logic

A circuit board in a critical system of the ship has broken. Find a replacement before it's too late!

The engineer is presented with a circuit board that must be replaced, along with a list of potential replacement boards to choose from. Each circuit board has the following attributes:

1. A number of nodes, ranging 2 - 5 (inclusive).
2. Wires connecting the nodes, some cut and some intact.
3. An LED colored light in the corner.

There are several cases in which a replacement option is a valid choice for a given original board. Each possible case is listed in the table below. A cell marked '-' means that any value for that attribute will fit that case. "> original" means the replacement board's value for that attribute must be more than the original's value for that attribute. A cycle is a set of intact wires that, followed in sequence, takes a node back to itself. All numerical ranges are inclusive.

Table Format

Case	Attribute
Case #	Required value(s) for original board
	Required value(s) for replacement

Possible cases for original-replacement pairs

Case	LED color	# of nodes	# of wires	# of cut wires	# of cycles
1	Red	-	-	-	-
	Red	≥ 4	-	0	≥ 2
2	Red	3 - 5	-	-	-
	Red	3 - 5	-	≥ 1	1
3	Blue	5	-	0	-
	Blue	5	-	-	≥ 2
4	Blue	5	-	2	≤ 1
	Blue	5	-	-	-

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Case	LED color	# of nodes	# of wires	# of cut wires	# of cycles
5	Blue	-	-	-	-
	Blue	2 - 4	1	-	-
6	Blue	-	-	-	-
	Blue	2 - 4	-	all	-
7	Blue/Green	3	-	-	0
	Red	-	-	2	0
8	Blue/Green	3	-	0	-
	Red	-	-	0	≥ 1
9	Blue/Green	2	-	0	-
	Red	-	-	-	1
10	Blue/Green	2	-	1	-
	Red	-	-	-	0
11	-	-	-	0	-
	NOT Red	> original	-	0	1
12	-	-	-	0	2
	NOT Red	> original	-	0	2
13	-	-	-	≥ 1	0
	NOT Red	> original	-	> original	0
14	-	-	-	≥ 1	-
	NOT Red	> original	-	> original	1
15	-	3	2	all	-
	NOT Red	3	2	all	-
16	-	3	3	-	-
	NOT Red	3	-	-	-