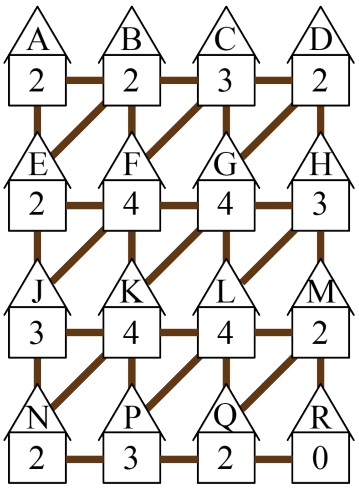
Problem of the Week
Problem D and Solution
Power Puzzle



Problem

Sixteen cabins are in a large forest, and each cabin is connected to at least two of the other cabins by walking trails, as shown in the diagram. Two cabins are said to be *neighbours* if they are directly connected by a trail segment. After a big storm, each resident walked to each of their neighbours houses to ask whether or not they had lost power. In the diagram, the number on each cabin indicates the number of its neighbours who still had power after the storm.
Determine which cabins still have power after the storm.

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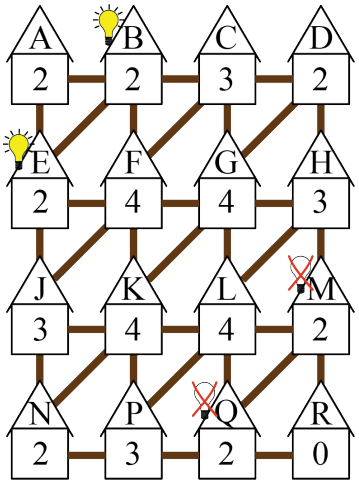
This problem was inspired by a past Beaver Computing Challenge (BCC) problem.

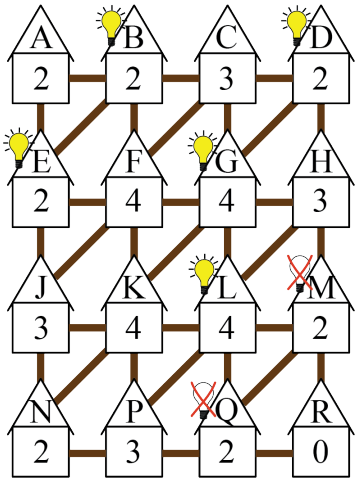
Solution

We begin by looking at cabin A. Since its neighbours are cabins B and E, and 2 of its neighbours still have power, it follows that both cabins B and E still have power. We place a lit lightbulb (💡) at each of B and E to log this information in the diagram.



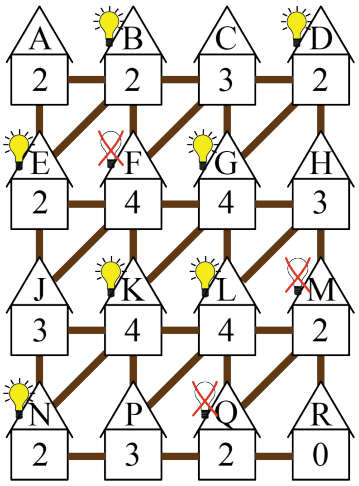
Next, looking at cabin R, none of its neighbours still have power. Since its neighbours are cabins M and Q, it follows that both of these cabins lost power (💡).

Cabin H is neighbours with cabins D, G, L, and M. Since 3 of these neighbours still have power, and we already determined that cabin M lost power, it follows that cabins D, G, and L all still have power.



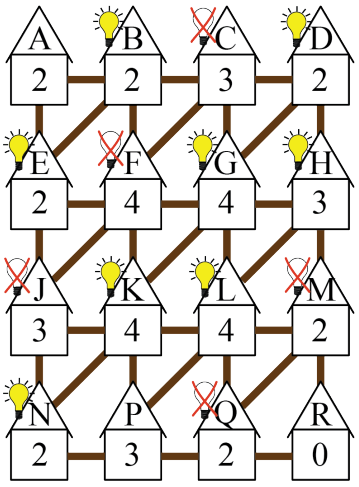
Cabin C is neighbours with cabins B, D, F, and G. Since 3 of these neighbours still have power, and we already determined that cabins B, D, and G still have power, it follows that cabin F lost power.

Cabin J is neighbours with cabins E, F, K, and N. Since 3 of these neighbours still have power, and we already determined that cabin E still has power and cabin F lost power, it follows that cabins K and N still have power.



Cabin F is neighbours with cabins B, C, E, G, J, and K. Since 4 of these cabins still have power, and we already determined that cabins B, E, G, and K still have power, it follows that the remaining two cabins, namely C and J, must have lost power.

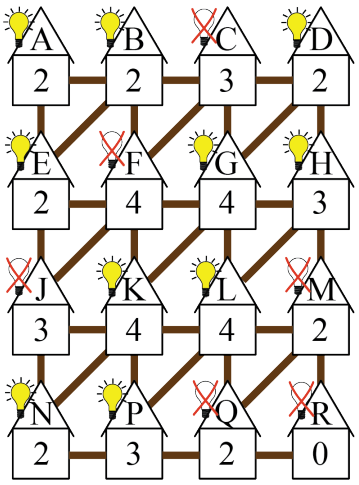
Cabin D is neighbours with cabins C, G, and H. Since 2 of these cabins still have power, and we already determined that cabin C lost power and cabin G still has power, it follows that cabin H still has power.



Cabin B is neighbours with cabins A, C, E, and F. Since 2 of these cabins still have power, and we already determined that cabin E still has power and cabins C and F lost power, it follows that cabin A still has power.

Cabin N is neighbours with cabins J, K, and P. Since 2 of these cabins still have power, and we already determined that cabin J lost power and cabin K still has power, it follows that cabin P still has power.

Cabin M is neighbours with cabins H, L, Q, and R. Since 2 of these cabins still have power, and we already determined that cabins H and L still have power and cabin Q lost power, it follows that cabin R lost power.



Thus, cabins A, B, D, E, G, H, K, L, N, and P still have power.