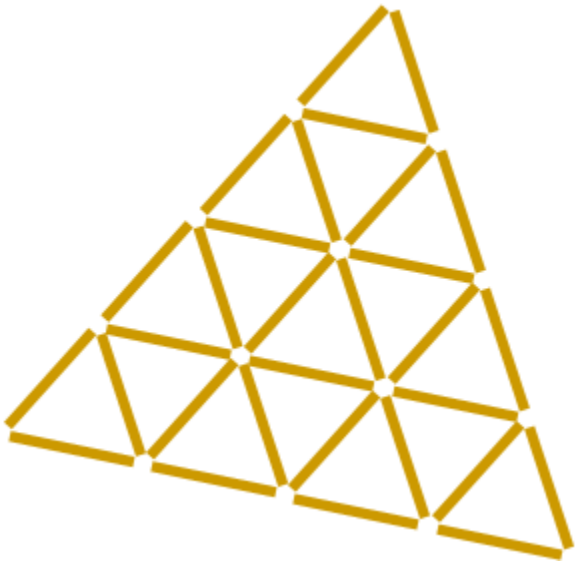
Termite Terrorists

A colony of termites has attacked a house by carving out passageways trough the floorboards. The damage done is proportional to the number of triangles and right now there are 27 of them: 16 small, 7 medium, 3 large, and 1 huge.

Which of the 15 intersections would you fill to minimize the number of triangles?
Is your solution unique?



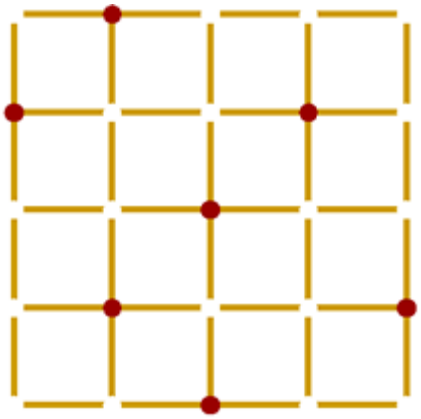
If you wanted to get rid of all triangles; how many intersections would you have to fill?

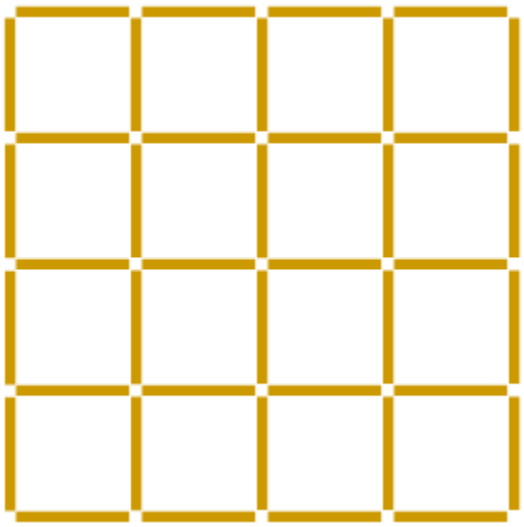
Extensions:

- Parker & Jordan from Bishop Pinkham asked people to destroy all the squares by filling in the fewest number of intersections.

  On the right is an answer using 7 intersections. Notice that each square goes through one of the red intersections.

  Solve their problem using only 6 intersections.





- It took the termites 30 passageways to create 27 triangles. Prove that the number of triangles are always less than the number of passageways, or give a counter-example.
- Create your own problem on your own grid. For more grid patterns see one of these web sites: mathworld or wikipedia.

The Math in This Problem:

This math investigation is associated with shapes, with a great emphasis on triangles. Puzzlers are presented with a huge triangle filled with smaller, identical ones. By experimenting with this shape, students must analyze its properties and figure out the ways to manipulate the total number of triangles by filling in one or more of the structure's units.