

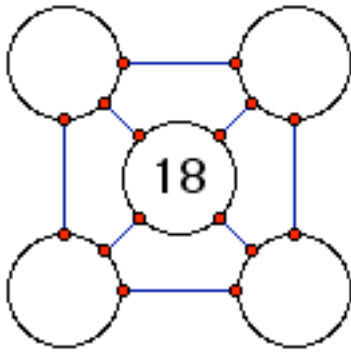
Digit Sums, Paths and Patterns

Patten Math Circle, March 3, 2011

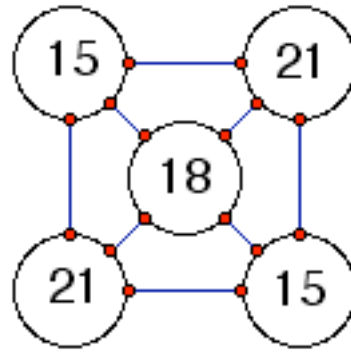
Joshua Zucker, joshua.zucker@stanfordalumni.org

In each diagram, fill in the circles with positive whole numbers in such a way that each circle's number is the sum of the digits of all the numbers it is connected to.

Example

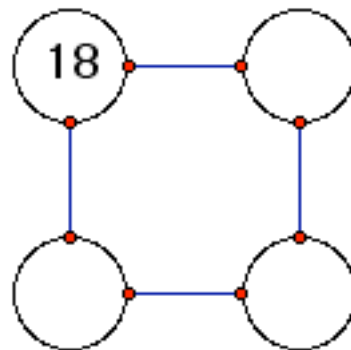
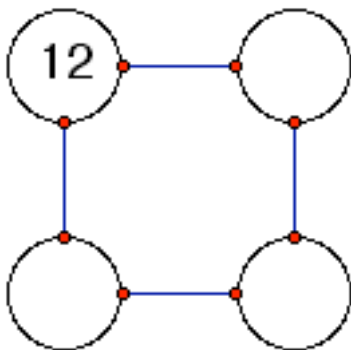
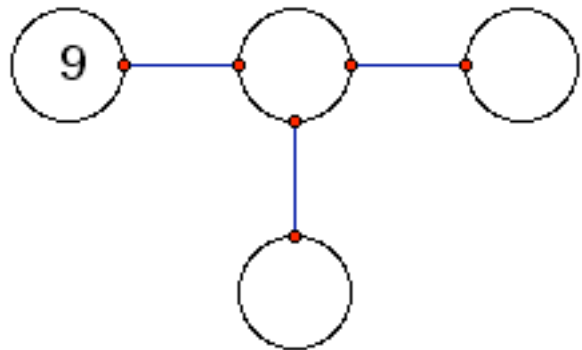


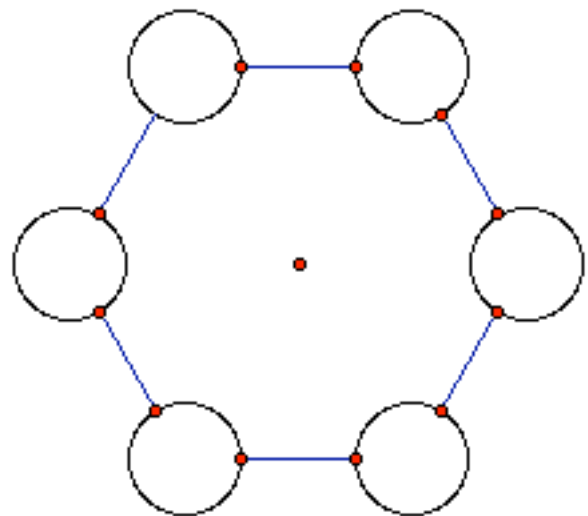
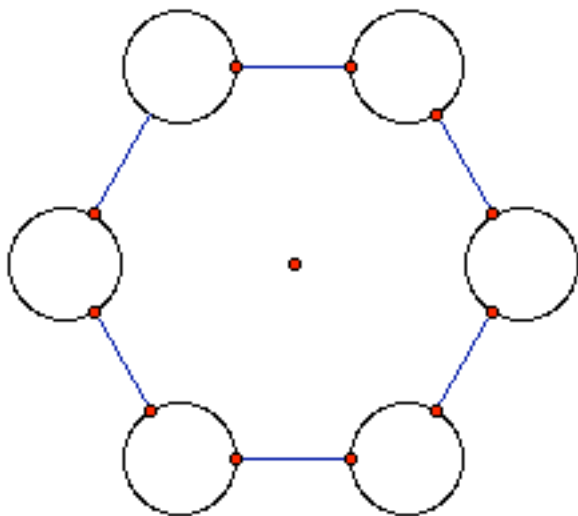
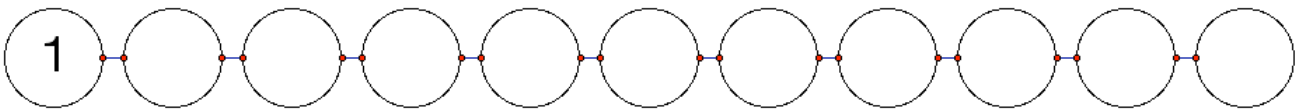
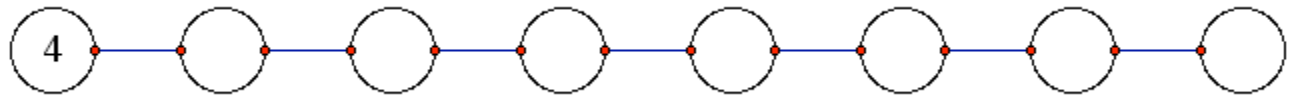
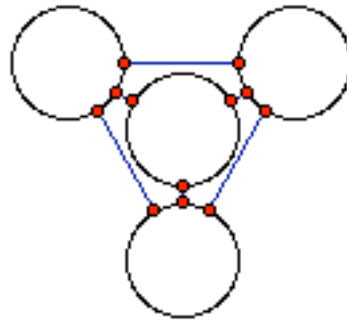
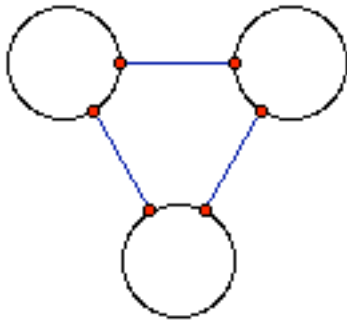
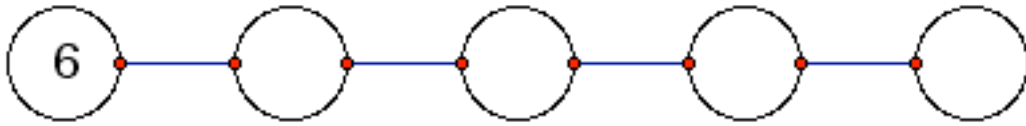
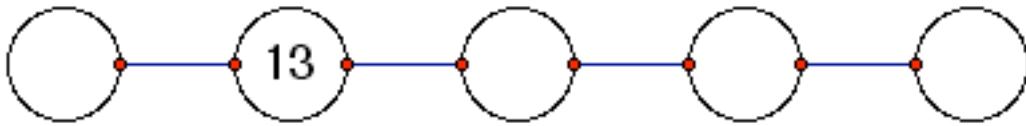
Solution



The solution works because

$15 = (2+1) + (1+8) + (2+1)$ for two of the corners,
 $21 = (1+5) + (1+8) + (1+5)$ for the other two corners, and
 $18 = (1+5) + (2+1) + (1+5) + (2+1)$ in the center.





Thanks to Erich Friedman for the ideas behind this problem.