Problem of the Week
## Problem D and Solution
Next Corn Maze

Problem

Ezra goes to a local farm to do a corn maze. The map of the corn maze is given.

On the day he arrives, the farm has the restrictions that he can only travel south, east, southeast, or southwest along a path. Using these restrictions, how many different routes can he take from Start to Finish?

Solution

We label the Start with the letter S and the Finish with the letter F. We label the other seven intersections in the maze as A, B, C, D, E, G, and H, as shown. We also place arrows on the paths to show the direction in which Ezra can travel.
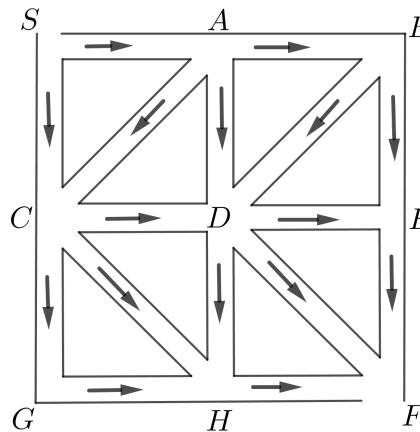
We will count the number of routes from S to each intersection, and keep track of this information by placing a number at each intersection.

Since you can only travel south, east, southeast, or southwest along a path, from S there is only one route to A and only one route to B. Therefore, we place a 1 at intersection A to keep track of the number of routes from S to A. We also place a 1 at intersection B to keep track of the number of routes from S to B.
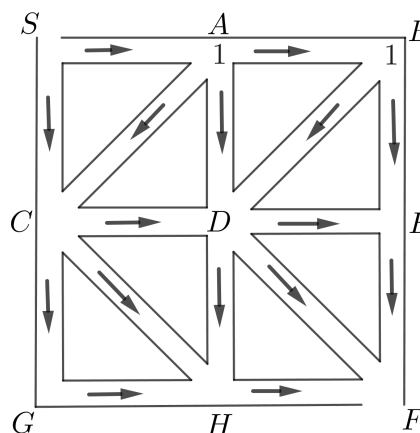
To get to intersection C, Ezra could travel directly from S or through A. Since there is only 1 route from S to A, there are 2 routes from S to C. We place a 2 at intersection C.

To get to D, Ezra must travel from either A, B, or C. Therefore, the total number of routes from S to D is equal to the number of routes from S to A, plus the number of routes from S to B, plus the number of routes from S to C, or $1 + 1 + 2 = 4$. We place a 4 at intersection D.

To get to E, Ezra must travel from either B or D. Therefore, the total number of routes from S to E is equal to the number of routes from S to B plus the number of routes from S to D, or $1 + 4 = 5$. We place a 5 at intersection E.
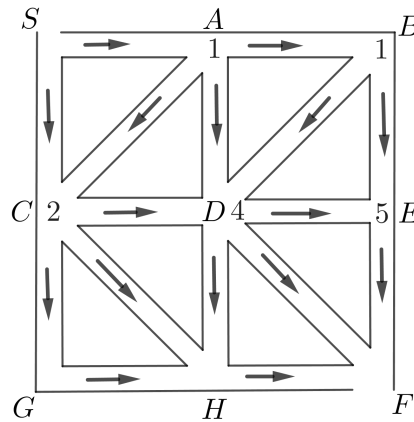
To get to intersection G, Ezra must travel from C. Therefore, there are only 2 routes from S to G, and we place a 2 at G.

To get to intersection H, Ezra must travel from either C, D, or G. Therefore, the total number of routes from S to H is equal to $2 + 4 + 2 = 8$. We place an 8 at H.

Finally, to get to intersection F, Ezra must travel from either D, E, or H. Therefore, the total number of routes from S to F is equal to $4 + 5 + 8 = 17$. We place a 17 at F.
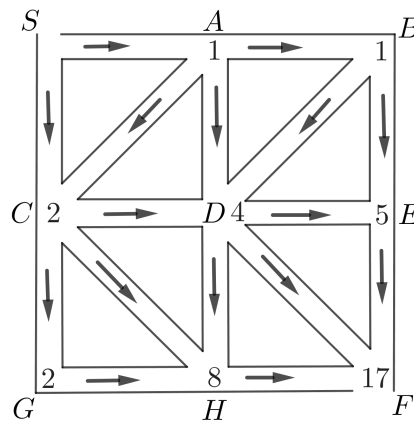
Therefore, there are a total of 17 different routes that Ezra can take from Start to Finish.