

Problem of the Week

Problem C and Solution

Corn Maze

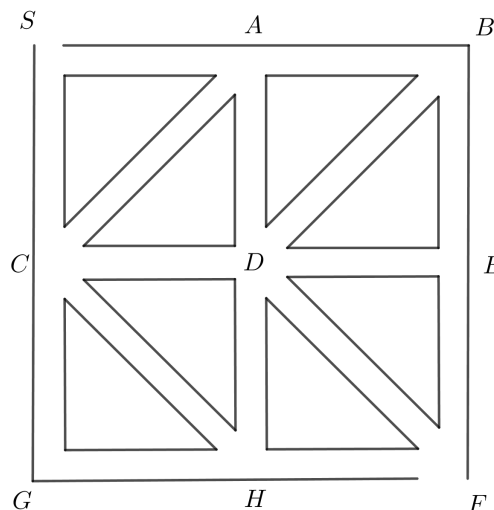
Problem

Baljit and Harinder go to a local farm to do a corn maze. The map of the corn maze is given. On the day they arrive, the farm has the restrictions that they can only travel south, east, or southeast along a path. Using these restrictions, how many different routes can they take from Start to Finish?

Solution

We can solve this problem by tracing out different routes and counting how many we find. We will set up a systematic approach to do so, to ensure that we do not miss any routes.

We begin by labelling 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.



Starting at S , Baljit and Harinder can only travel next to A or C .

Case 1: Baljit and Harinder travel from S to A .

Since Baljit and Harinder can only travel east, south, or southeast along a path, they have only two choices for where to go next: B or D .

- If Baljit and Harinder travel to B , then since they can only travel east, south, or southeast, they must go to E next, followed by F . Therefore, one route from S to F is from S to A to B to E to F .
- If Baljit and Harinder travel to D , then since they can only travel east, south, or southeast, they can go to E , F , or H next.



- If they travel from D to E , they must then go to F . Therefore, one route from S to F is from S to A to D to E to F .
- If they travel from D to F , we have found another route. Therefore, one route from S to F is from S to A to D to F .
- If they travel from D to H , they must then go to F . Therefore, one route from S to F is from S to A to D to H to F .

In total, there are four routes from S to F in which Baljit and Harinder first travel from S to A .

Case 2: Baljit and Harinder travel from S to C .

Since Baljit and Harinder can travel east, south, or southeast along a path, they have three choices for where to go next: D , H , or G .

- If they travel from C to D , they again have three choices for where to go next: E , F , or H .
 - If they travel from D to E , they must then go to F . Therefore, one route from S to F is from S to C to D to E to F .
 - If they travel from D to F , we have found another route. Therefore, one route from S to F is from S to C to D to F .
 - If they travel from D to H , they must then go to F . Therefore, one route from S to F is from S to C to D to H to F .
- If they travel from C to H , from H they must go to F . Therefore, another route from S to F is from S to C to H to F .
- If they travel from C to G , they must then go to H and then to F . Another route from S to F is from S to C to G to H to F .

In total, there are five routes from S to F in which Baljit and Harinder first travel from S to C .

Therefore, there are a total of $4 + 5 = 9$ different routes that Baljit and Harinder can take from Start to Finish.