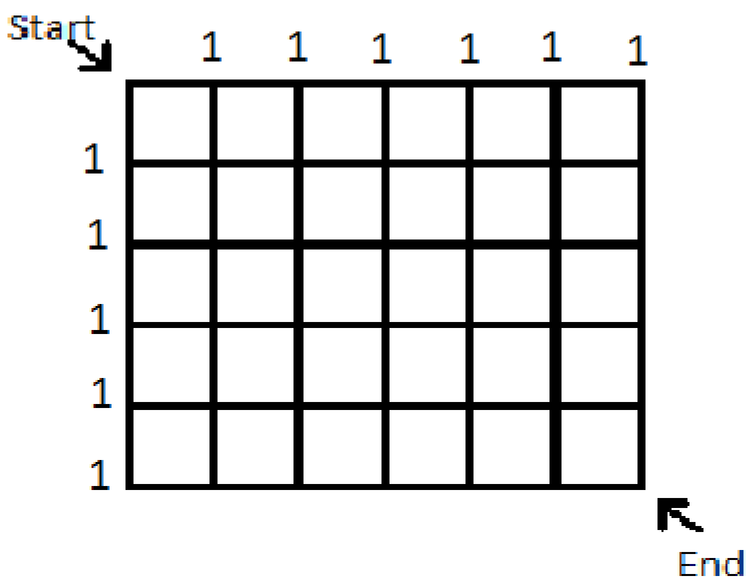
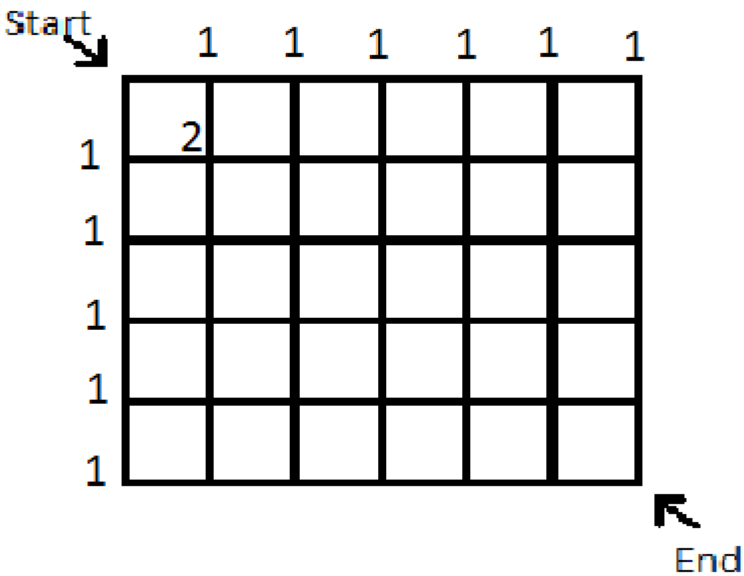
The original problem is at the end. There are several ways to think about this problem. The first explanation should be accessible to everyone while the second explanation will require some math knowledge.

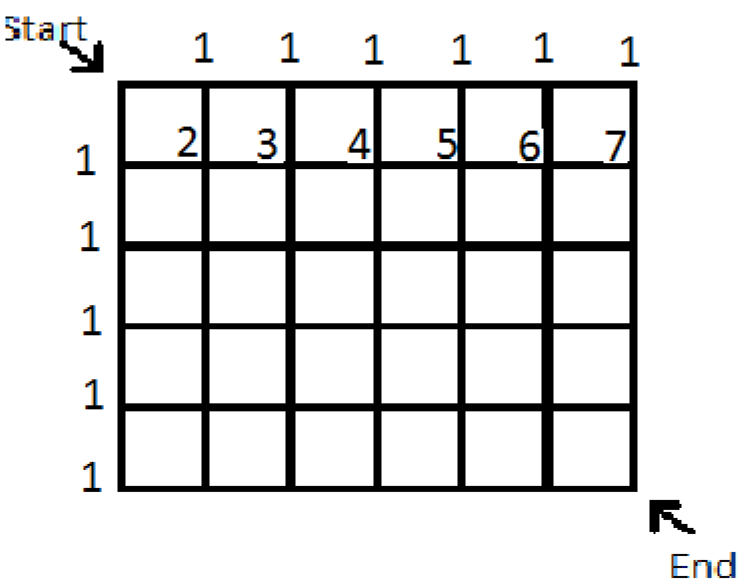
Let's count the number of ways to reach each intersection on the map. If you look at the intersections along the top there is only one way to get there: going right at all times. Likewise there is only on way to get to the intersections along the left edge. So we can label the picture as follows:



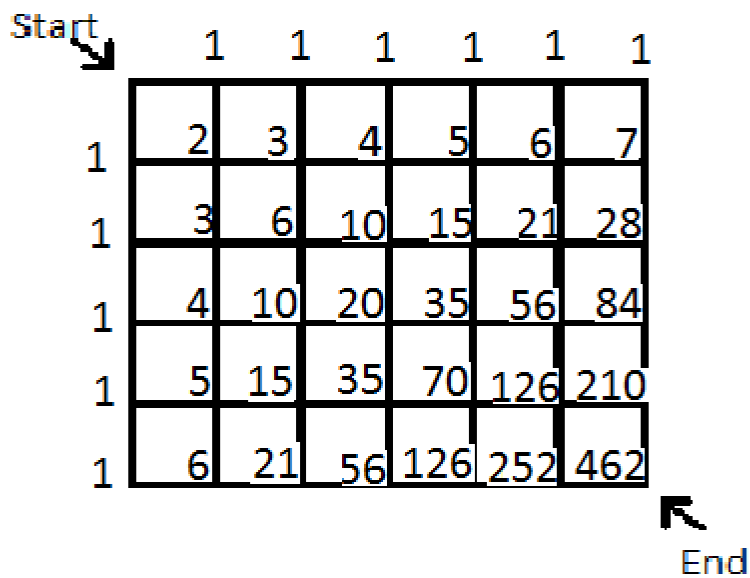
Now consider the intersection that is right one and down one from the start. There is one way to get to the intersection above it and one way to get to the left of it, so there are two ways to get there.



The intersection right two and down one can be approached 2 ways from the left and one way from above. Continuing in this manner we can fill in the rest of the second row.



Continuing this pattern we can see that the number of ways to get to any intersection is the number of ways to get to the intersection above it plus the number of ways to get to the intersection to the left of it. Thus we fill in the picture as follows:



This shows that the answer is 462.

A second way to solve the problem is to realize that to get from the start to the finish you must always move down 5 times and move to the right 6 times. Thus an example of a path from start to end might be DRRRDDRRRDD. The number of paths will be the number of ways to arrange the D's and R's. Once the positions of the D's are chosen, the R's must fill in the remaining positions. So the number of paths is the binomial coefficient $\binom{11}{5} = \frac{11!}{5!\,6!} = 462$

A taxi driver is at the top left corner of the following city map. She wants to get to the lower right corner without going out of her way. This means she will only travel down or to the right. How many different routes are possible?