

1 Digits

- (a) How many 7-digit numbers have no two adjacent digits equal?

- (b) How many 5-digit palindromes are there? (A palindrome is a number that reads the same way forwards and backwards. For example, 27872 and 48484 are palindromes, but 28389 and 12541 are not.)

2 Anagrams

An anagram of a word is any re-ordering of the letters of the word, in any order. It does not have to be an English word.

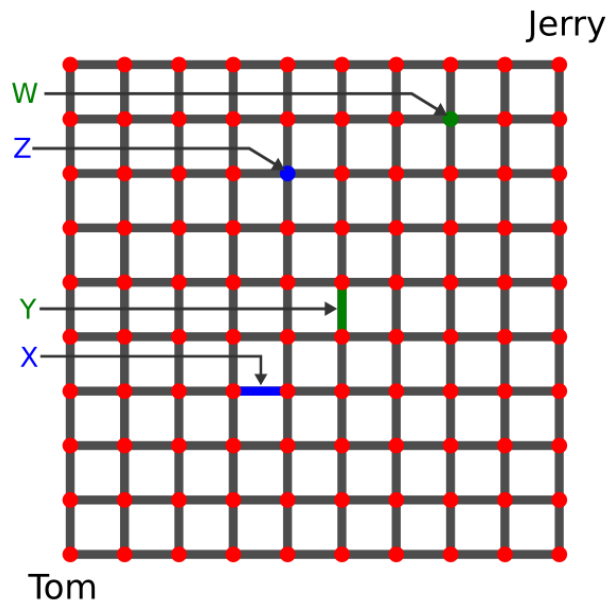
- (a) How many different anagrams are there of COVERAGE?

- (b) How many different anagrams are there of COVF EFE?

- (c) How many different anagrams are there of COVF EFES that contain EECS?

3 Maze

Let's assume that Tom is located at the bottom left corner of the maze below, and Jerry is located at the top right corner. Tom of course wants to get to Jerry by the shortest path possible.



- (a) How many such shortest paths exist?
- (b) How many shortest paths pass through the edge labeled X ?
- (c) The edge labeled Y ? Both the edges X and Y ? Neither edge X nor edge Y ?
- (d) How many shortest paths pass through the vertex labeled Z ? The vertex labeled W ? Both the vertices Z and W ? Neither vertex Z nor vertex W ?