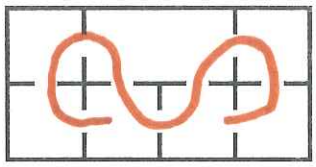
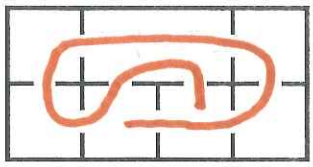
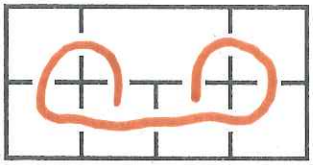
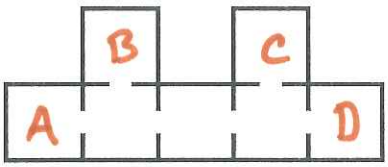
MA111-011 Mini-Exam 4 Practice

A dragon's tour of a floorplan walks through each door exactly once.

Here is a floorplan. Draw a dragon tour.

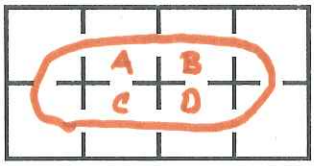




Here is a floorplan. Explain why there is no dragon tour.



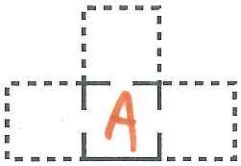
Each room has only one door. The only way to use it without being trapped is to start in that room. Can only start once, get trapped once, but there are 4 > 2 traps.

Here is a floorplan. Explain why there is no dragon tour.



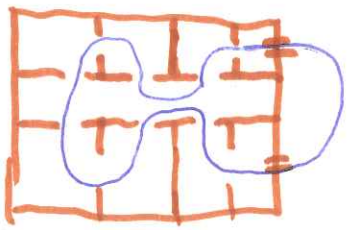
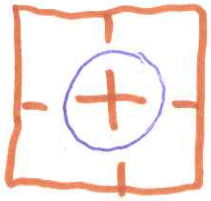
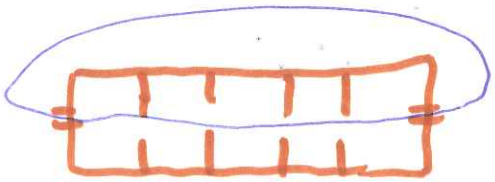
A, B, C, D are also traps. Odd # of Doors = Trap

Here is part of a floorplan. Explain why no dragon tour can start and stop in the same room.

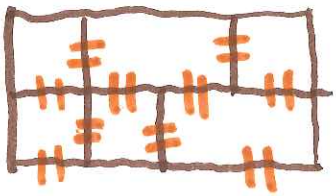


A is a trap. You can go in once, go out once, but the next time you go in, there is no exit!

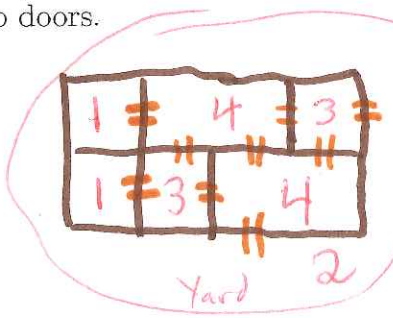
Draw a floorplan (or two or three) with a dragon tour that starts and stops in the same place.

Draw a floorplan with 7 rooms (counting the yard, if you have any exterior doors). Two of the rooms should have 3 doors, two of the rooms should have 4 doors, two should have 1 door, and one should have two doors.



Nope



$3+3+4+4+1+1+2=18$

$\frac{18}{2}=9$ doors

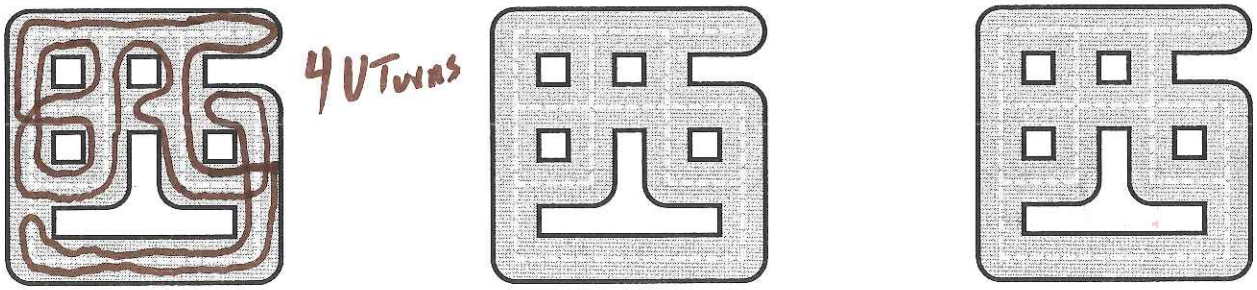
Why is it impossible to draw a floorplan with 7 rooms (counting the yard, if you have any exterior doors) if we require that two rooms have 4 doors, two rooms have 3 doors, two rooms have 2 doors, and one room has 1 door.

$4+4+3+3+2+2+1=19$ sides of doors (each room counts a ~~each~~ side of the door)

$\frac{19}{2}=9.5$ doors is impossible

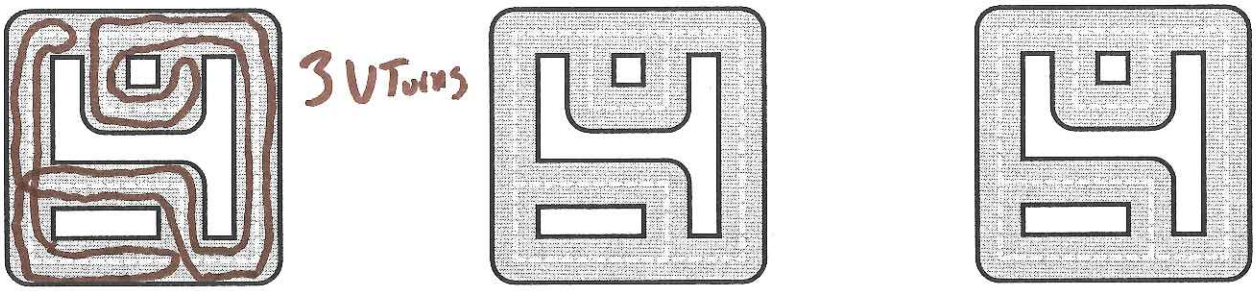
A garbage route is a driving loop so that you drive down each side of the road (the right side both times, from your point of view) exactly once. You can make right turns, and left turns, and U-turns, but make sure to end up on the right side of the road.

Here is a neighborhood. Find a garbage route. Extra credit for only one u-turn.



4 UTurns

Here is another neighborhood. What is the fewest number of u-turns?



3 UTurns