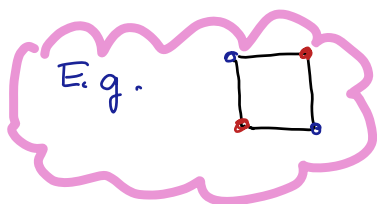
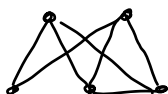


# Vertex Coloring

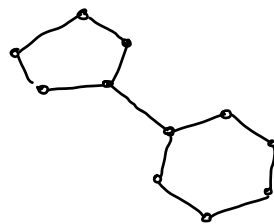
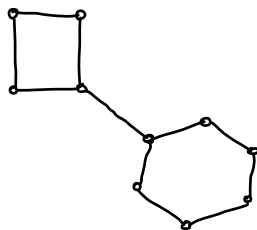
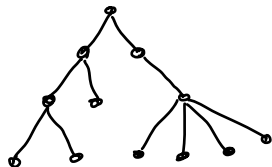
① How can we color the picture below using only red & blue chalk so that if two dots are connected by a line, they have different colors?



② Can we color the following picture in the same way? Why not?



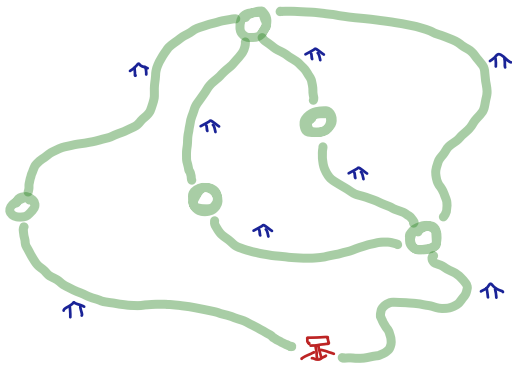
④ Try the following four examples. If it doesn't work, what goes wrong?



⑤ Using your observations of what worked and what went wrong, come up with an example (that we didn't show before) that works. Be creative!

⑥ Form a prediction. What must be true of a picture like this to color its dots with two colors?

# A Magical Quest

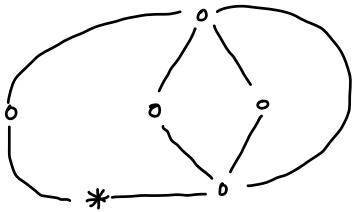


① You are an adventurer, tasked with collecting 8 magic berries from cottages in an enchanted forest.

You receive the following map and are told that each time you travel along a trail, it vanishes behind you.

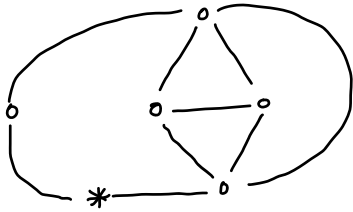
Can you and your teammates escape from the same place you started, use every path, and not get lost.

② To save time, we will now draw the above magic forest like this. The dots are crossroads and the lines are paths with cottages.

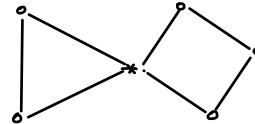
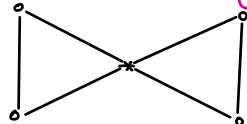
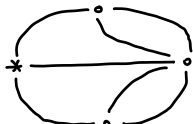


The star is the forest entrance.

Another cottage appears! Could we perform the same task and escape from the following magic forest? Why or why not



③ Try the following four magic forests



④ Using your observations, draw an example of a magical forest that you CANNOT escape from.

⑤ Form a prediction. What must be true for you to escape a magical forest like this?