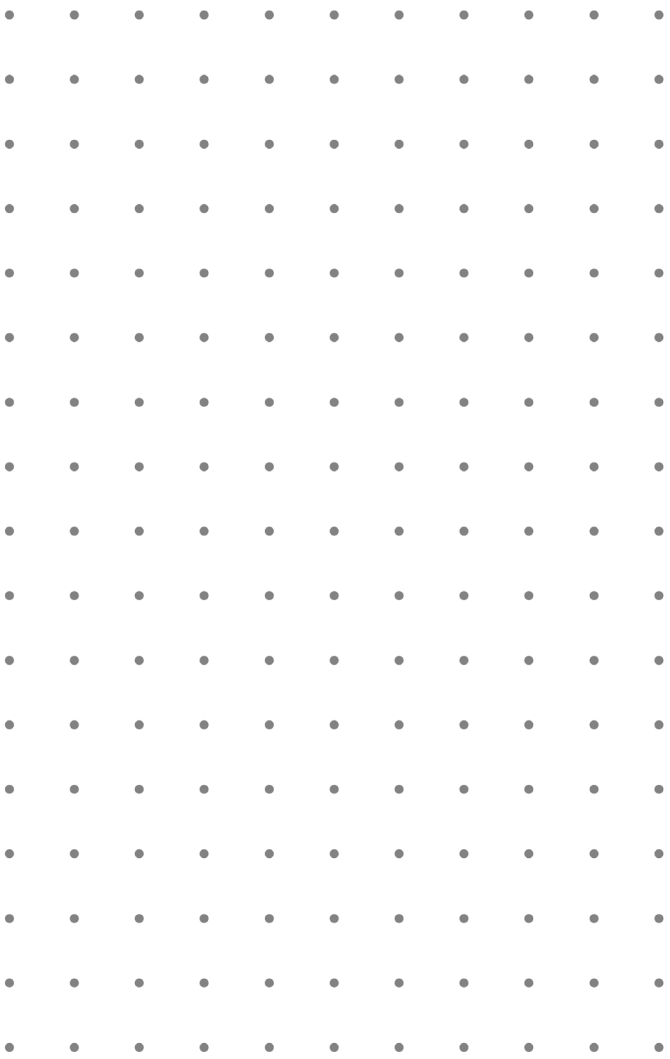
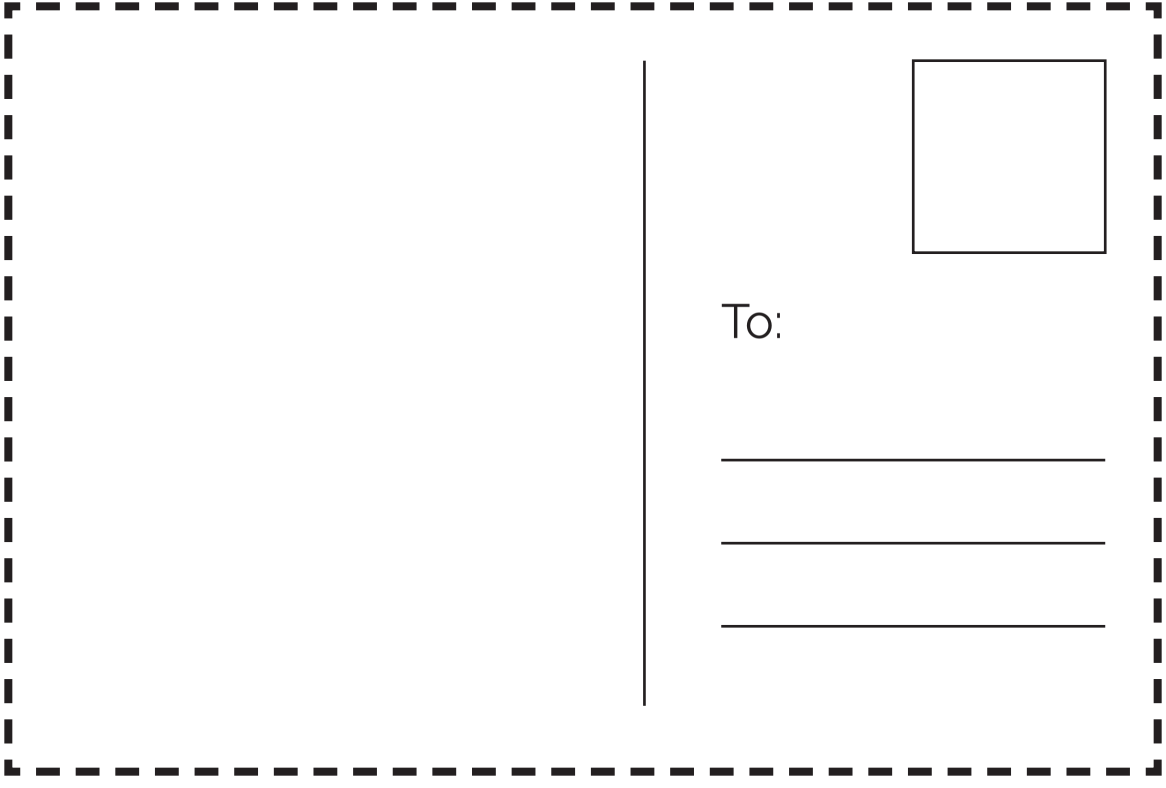
Eureka Snail Mail



July 2020 issue 5

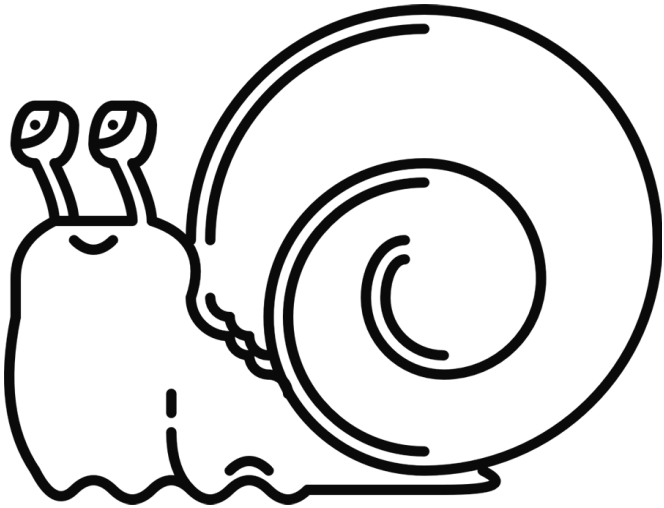

To:

Logic Puzzles

This month we're focusing entirely on Logic Puzzles! Not only are logic puzzles fun brain teasers, but are a procedural step-by-step way of thinking that can help bridge the gap between the way people think and the way computers think! Computational thinking is a way of breaking down problems in a logical way that allows a computer to help us solve them. This process of computational thinking helps us understand how to break problems into smaller parts that can be answered quickly with simple logical questions.

If you are proud of anything you make and want to share your creations, have a parent help you post it to social media using the hashtag **#projectsnailmail**

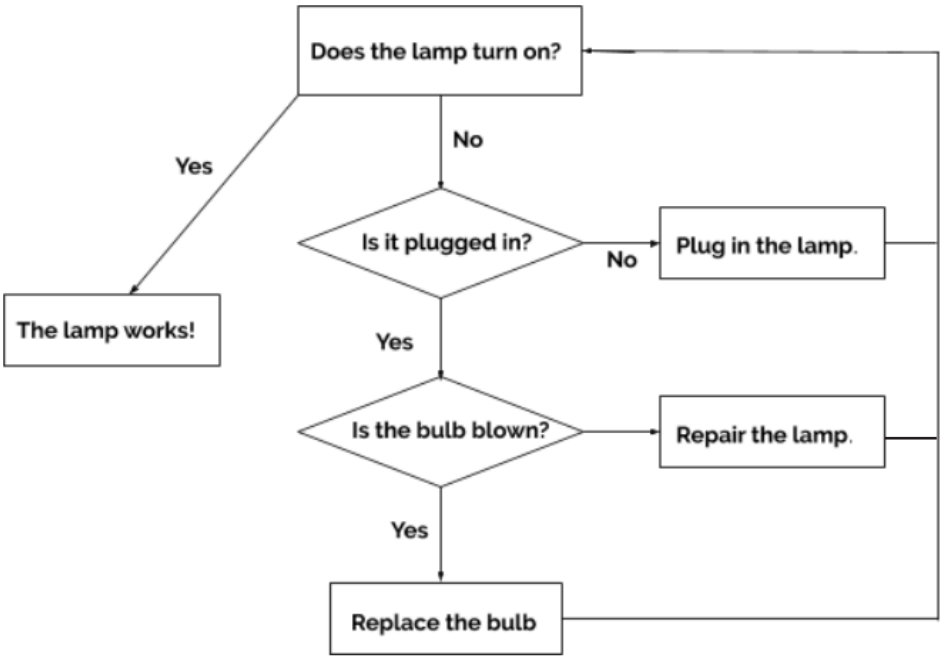
-The Snail Mail Team



Computational Logic

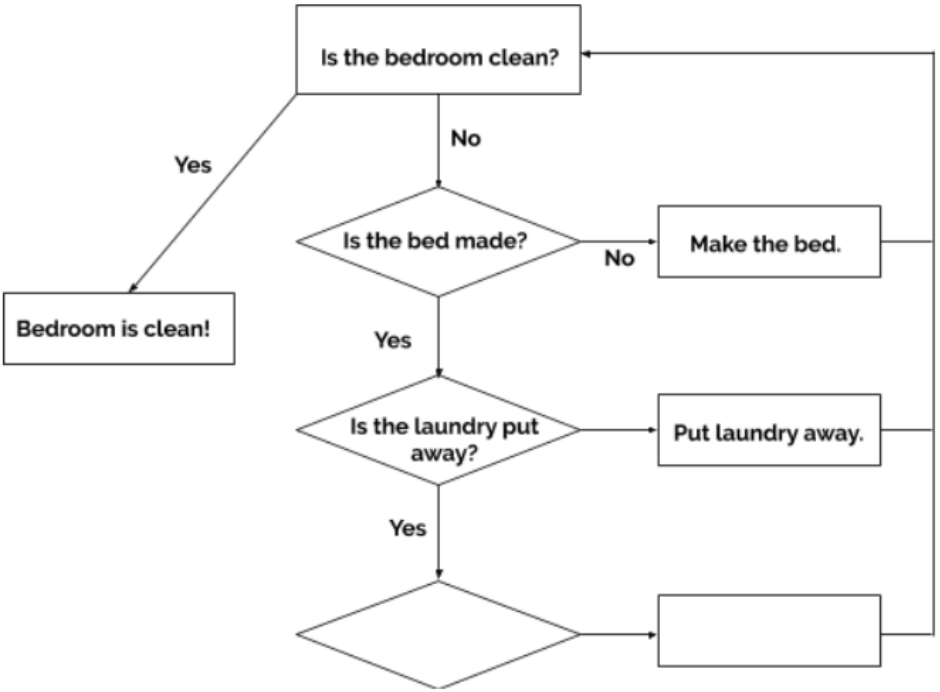
We are going to use flowcharts to explore computational thinking. For the example below we have a desk lamp that isn't turning on. We want to try and see if we can figure out a simple, logical process to turn the lamp on.

For our lamp, the first question we ask is whether the lamp is plugged in or not. If the lamp is unplugged we would plug in the lamp to see if that was the problem. If our lamp is already plugged in we then need to check the light bulb. If the light bulb is the problem then we would replace the bulb and see if that solved the problem. After each question we go back to the start and check and see if the lamp is working. If neither of those solutions solves the problem then we need to get the lamp repaired.



We can use flowcharts for so many situations! Using the example above as a guide, think about the aspects of a room in your house that needs to be cleaned and make a flowchart around the needs of that room. Break down each part of the process to help make the whole task easier!

Here is the start of a logical flowchart for cleaning a bedroom. Can you come up with some more steps?



Snail Team's Fave Puzzles

1.

Three pirates discover 100 gold coins, and must decide how to divide up the treasure. They decide that the oldest pirate should propose a distribution, and all the pirates (including the proposer) will vote on whether they will accept the distribution, or throw the proposer overboard, in which case the next oldest pirate will propose a distribution, continuing the game. Ties result in an accepted distribution.

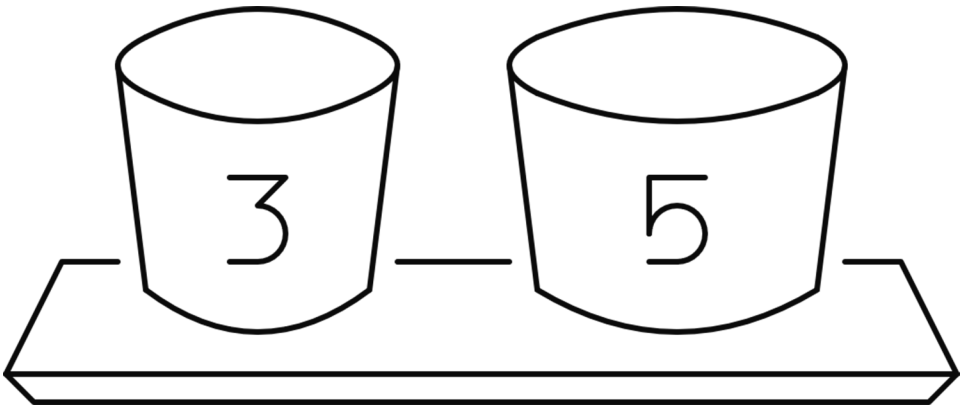
Assuming all the pirates are perfectly rational, extremely greedy, and bloodthirsty (so they will vote to throw the proposer overboard unless they earn more coins otherwise) how many coins can the oldest pirate earn?

2.

Four jolly men sat down to play,
They played all night 'till break of day.
They played for gold and not for fun
With separate scores for everyone.
When they came to square accounts,
They all had made quite fair amounts.
Can you the paradox explain,
If no one lost, how could all gain?

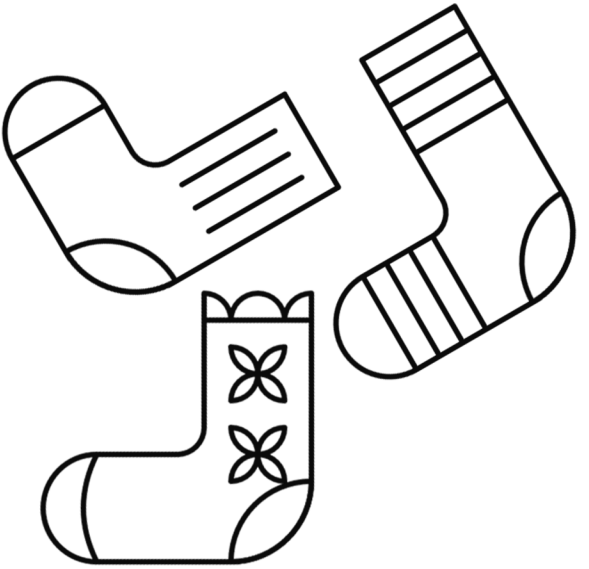
3.

If you had an infinite supply of water and a 5-liter and 3-liter bucket, how would you measure exactly 4 liters? The buckets do not have any intermediate markings.



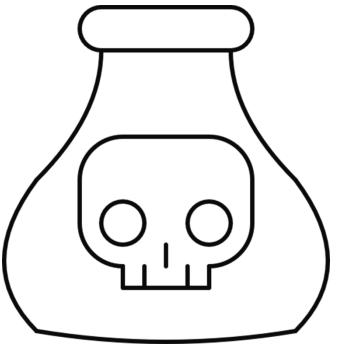
4.

There are 20 different socks, of two types, in a drawer in a completely dark room. What is the minimum number of socks you should grab to ensure you have a matching pair?



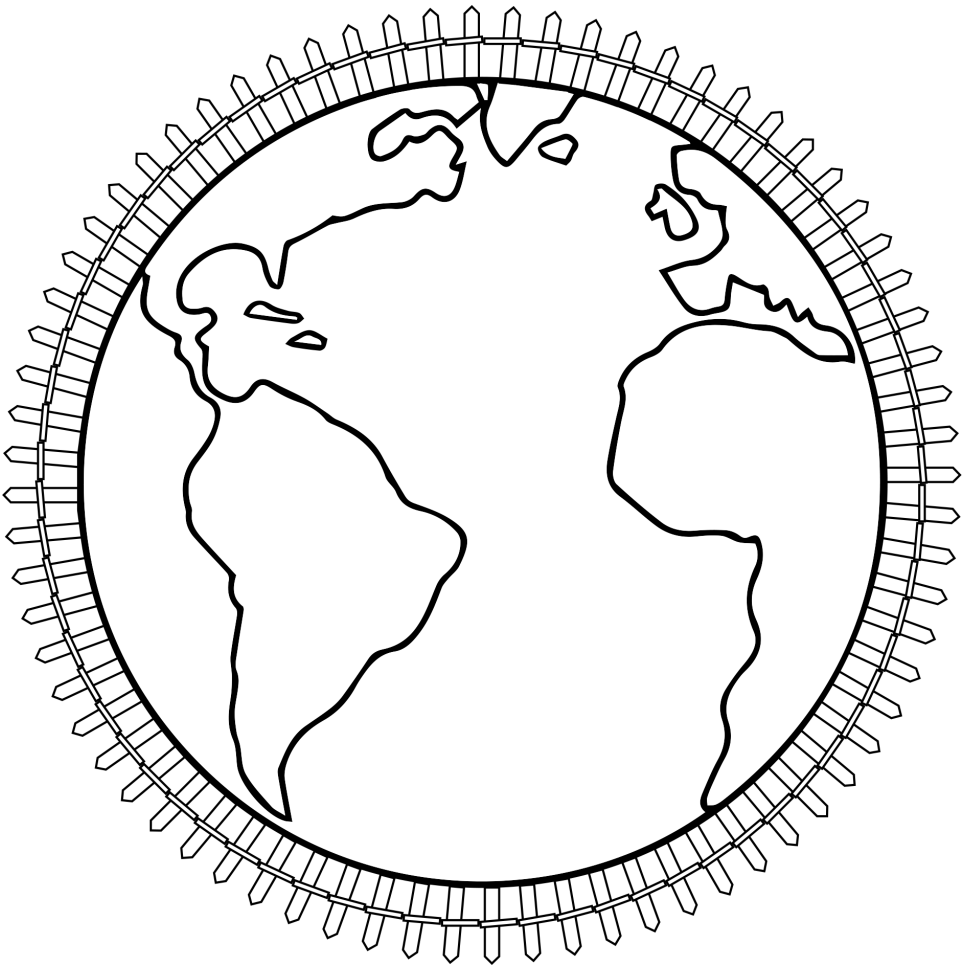
5.

You have 1,000 bottles of juice. One contains poison and tastes bitter. How do you find the poisoned bottle using the smallest number of sips?



6.

A farmer challenges an engineer, a physicist, and a mathematician to fence off the largest amount of area using the least amount of fence. The engineer made his fence in a circle and said it was the most efficient. The physicist said that fencing half of the earth was the best. The mathematician laughed at the others and, with his design, beat them in the challenge. What did he do?



Maggie's Animal Grid Puzzle

Recognizing patterns and putting things in a specific order is part of computer science. Here are some puzzles to sharpen those skills!

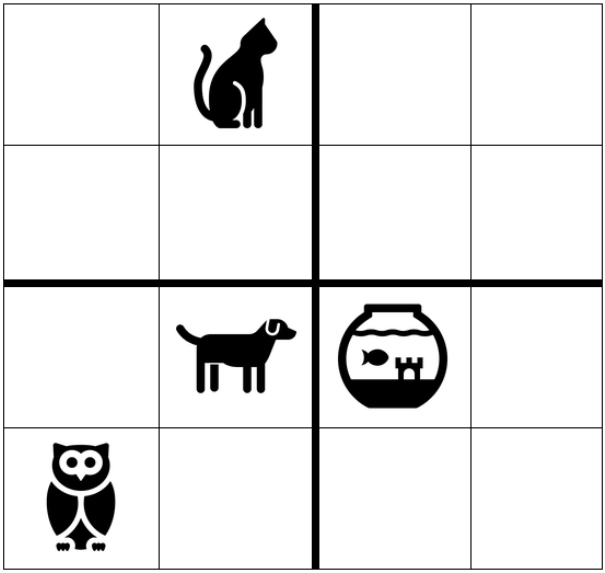
3 X 3 Animal Grid
Draw or write the names of the three animals below, inside the open squares. Put them in a specific order so that each row (side to side) and column (up & down) have only one of each animal.

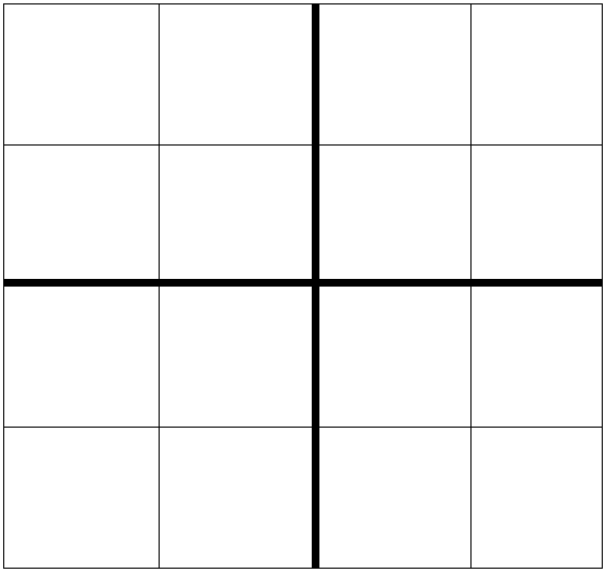
4 X 4 Animal Grid
Continue to draw the animals so that each row & column have only one of each animal. To make this one a little harder, the 2 x 2 areas can also only have one of each animal.

Added challenge:

Draw one of each animal in all of the rows, columns, 2 X 2 squares, and the two diagonal lines! Can you make your own puzzles to stump a friend?



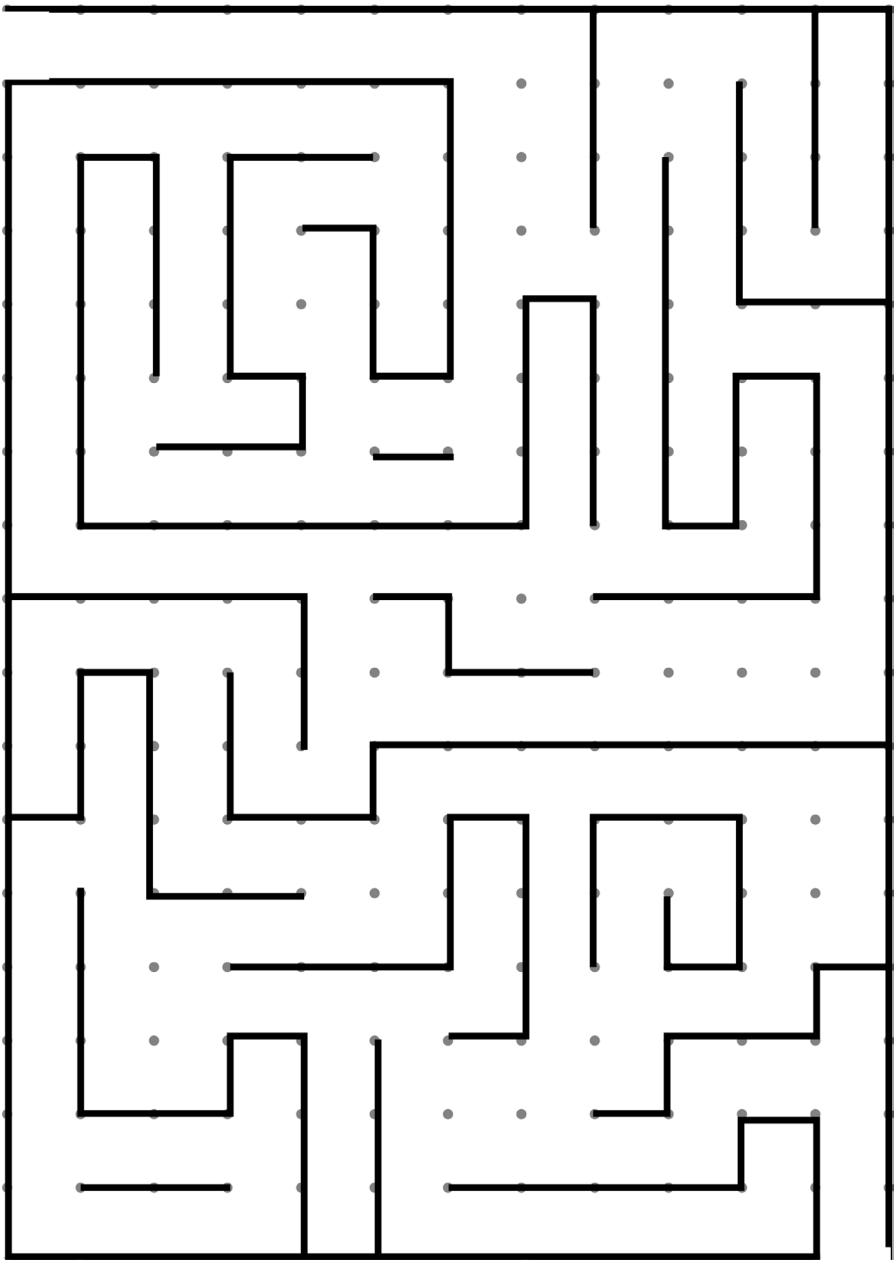


Draw a Maze

You can draw your own maze and send it to a friend. Use the postcard on the front page of this month's issue, and check out these simple instructions:

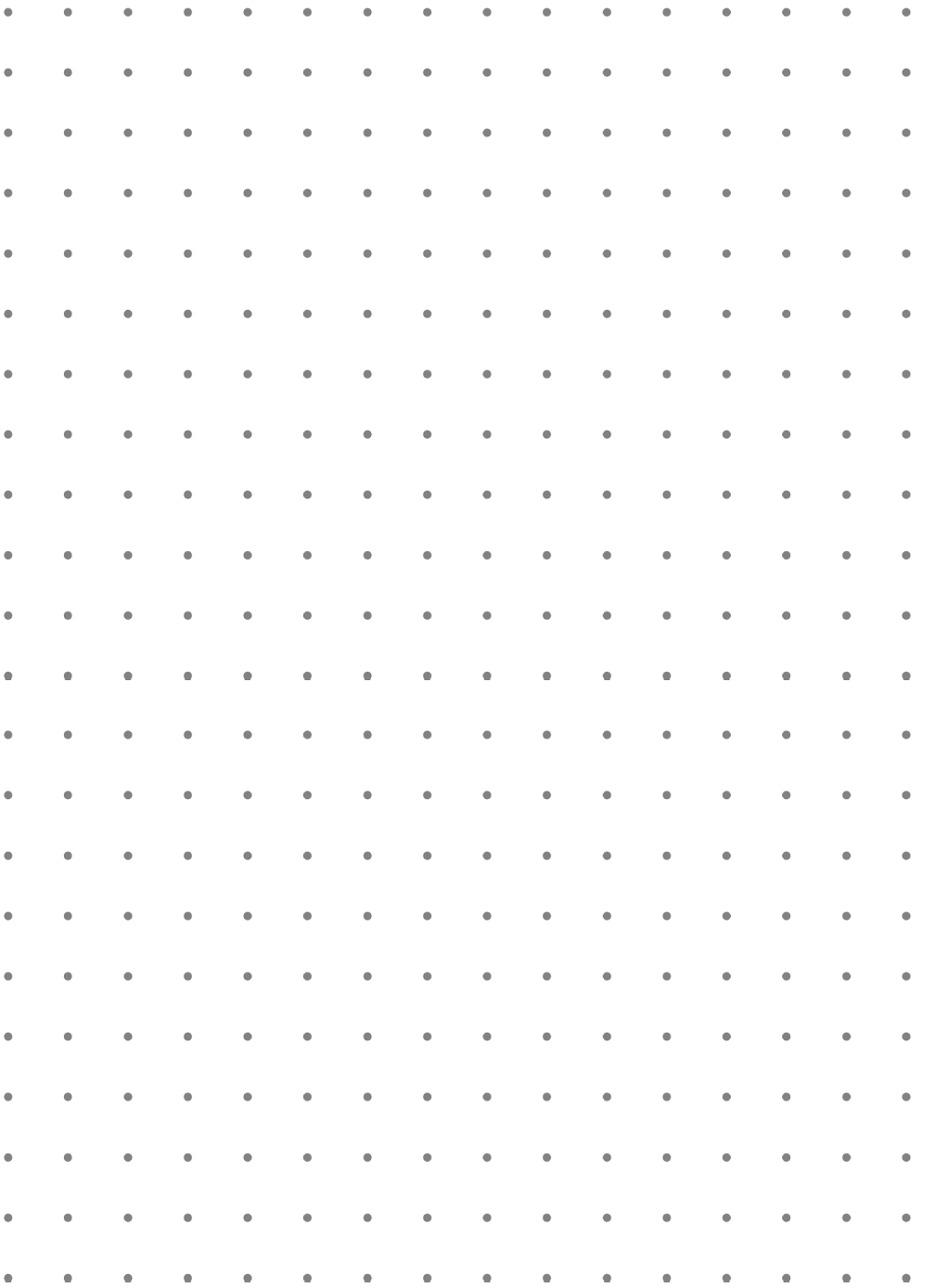
In this maze we're only using straight lines at right angles - the fancy word for that is *orthogonal*. We want to use the entire postcard for our maze.
Pick a dot on the outer wall and draw a line into the maze space, connecting the dots. The line can be an L or a long zig zag (at right angles, no diagonals)! But it can't reconnect to the outer wall, so stop drawing before it touches any other lines.
Pick another dot on the outer wall and draw another long line into the maze area. Don't let it touch the outer wall or any of the walls you just drew.
Keep drawing walls from the edge of the maze and connecting the dots. There should be very few dots left when you're done. Don't connect any of your walls to each other because that will make the maze unsolvable.
You can check your maze by trying to solve it!

Want a challenge? A braid maze is a maze with no dead ends. Instead, it's possible to keep walking in circles as you try and find the exit - sometimes these mazes are the most difficult to solve! Can you design a braid maze?



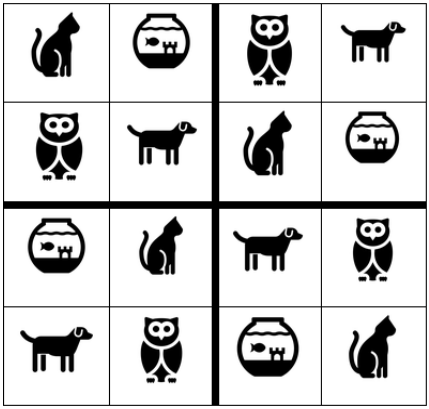
& More Mazes!

aMAZEing



Animal Puzzle Answers

Fish	Cat	Dog
Dog	Fish	cat
Cat	Dog	Fish



dog	cat	bird	fish
fish	bird	cat	dog
cat	dog	fish	bird
bird	fish	dog	cat

Logic Puzzle Answers

The middle pirate wants to toss the oldest pirate overboard so that he gets to propose the coin split. He knows that even if the youngest pirage votes against him, he will win in a tie. Then he can propose keeping all 100 coins.
The youngest pirate knows that if one pirate is tossed overboard she won't get any coins because she'll lose that tie.
The oldest pirate can propose that the youngest pirate gets only one coin, the oldest gets 99, and the middle pirate gets none. Only the middle pirate will vote no, so the proposal will pass.

2.
The men were musicians!

3.
Fill the 5-liter bucket first. Then using that bucket fill the 3-liter bucket, being careful not to spill any. This leaves 2 liters in the 5-liter bucket.
Now chuck away the water in the 3-liter bucket and refill with the remaining 2 liters from the bigger bucket. Once again, fill the 5-liter bucket and then use this to fill the second 3-liter bucket. This will leave you with 4 liters in the 5-liter bucket.

4.
11 socks
The suggested answer given here is more to show an appreciation of the real world rather than an understanding of theory, statistics, etc. With this in mind, the only way to safely "ensure you have a matching pair" is to pick 11 socks.

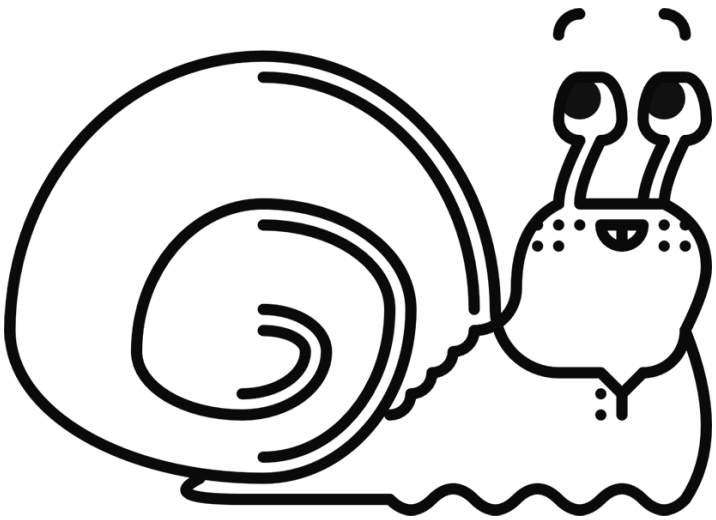
5.
10 sips
Take a small sample from each of the first 500 bottles, mix them together and take a sip. If it tastes bitter, it's one of those 500, if not it's the other 500. Then take samples from 250 of the 500 that tasted bitter and keep halving until you find the exact bottle.

6.
Well, this cheeky chappy decided to build a fence around himself. He then claimed he was outside of the fence.

CodeVA News

Full STEAM Ahead is a conference by CodeVA dedicated to empowering young women through Science, Technology, Engineering, Arts, and Mathematics. The 2020 FSA conference will be offered online over the week of August 3-7, 2020. Each track will consist of five workshops of approximately one hour each, as well as a keynote address and other opportunities to connect. To register please visit the Full Steam Ahead website **http://full-steam-ahead.info/**

CodeVA's Eureka Workshop will be hosting monthly DoodleJams the last Friday of each month! DoodleJams are an interactive virtual environment where kids can interact with each other by drawing on a shared virtual canvas! We post invitations on our blog near the date of the jam, so be on the lookout for updates at **codeva.info/DoodleJamSignUp**



Resources

computer science classes and learning
adafruit - adafruit.com
hour of code - hourofcode.org
micro:bit - microbit.org

art & design
earsketch - earsketch.gatech.edu
gb studio - gbstudio.dev
makecode - makecode.com
piskelapp - piskelapp.com
scratch - scratch.mit.edu

lightbot is a free educational browser game that centers computational thinking in a series of puzzles. Help lightbot get to the goal at lightbot.com/flash.html

codeVA
learn more about what we do at codevirginia.org

Enjoying Snail Mail?
Learn more about how we do it at
CodeVA.info/ProjectSnailMail

Did we puzzle you? Tell us what you thought of this month's Snail Mail! You can share your projects and drawings with us directly at:
codeva.info/SubmitYourSnailMail

Sincerely Yours
The Snail Mail Team

CJ, Maggie, Natasha, Nut, Pepper, Thomas, Wuga, Zach

EUREKA WORKSHOP

CodeVA

CodeVA
300 E Broad St
Richmond, VA 23219