EUREKA
number
18
SNAIL MAIL

IN THIS ISSUE...
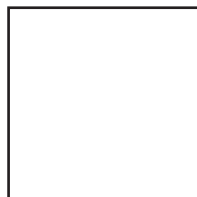
DEAR SNAIL MAIL PARENTS ...14

Is your household enjoying Snail Mail? Please help CodeVA by filling out a quick survey! Your feedback will help us continue to make free offline STEAM activities for children and families, and you may receive a $5 Amazon gift card! Link on page 14.

To:

WELCOME TO SNAIL MAIL EDITION 18!

In this copy of Snail Mail we decided to learn about *travelling* from two different perspectives: electricity and electronics. How does electricity travel? And how do we use electronics to get from place to place? It turns out that both of those questions needed investigating before we were able to appreciate how much technology we use every day. So many types of technology rely on electricity! Including our navigation technology, from smartphones to satellites.

We rely on these machines in order to get mail, but also to participate in fun activities like geocaching. Has your family ever geocached? The Eureka team would love to hear what kind of technology you use to find buried treasure and discover new locations.

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

A CIRCUIT IS A RACETRACK FOR ELECTRICITY

When we use electricity to turn on a lamp or run our microwave, what we're actually doing is completing a circle. The circle is made of **conductive materials**, ingredients that electricity can travel through. When electricity follows a conductive material, like copper wire, it eventually goes through our electronics. But it doesn't stay there! It goes through and leaves again. All of this happens very quickly and doesn't stop until we break the circle by flipping a switch or pulling out the plug. A circle of electricity is called a **circuit**.

A circuit that has electricity flowing through it is kind of like a racetrack for our power grid. Good thing electricity can't get a flat tire.
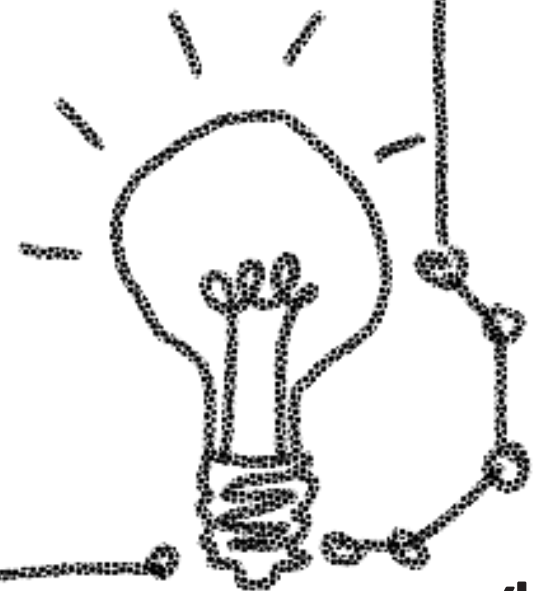
DAWON KAHNG AND MOHAMED ATALLA

Dawon Kahng, a South Korean immigrant, and Mohamed Atalla, an Egyptian immigrant, met while working at Bell Labs in the 1950's. We now know Bell Labs as the phone company NOKIA, but back in the 1950's it was one of the forefront technology companies! Together at Bell, these two men created something called MOSFET. What is MOSFET? MOSFET is short for METAL-OXIDE-SEMICONDUCTOR FIELD-EFFECT TRANSISTOR.

Basically what this means is they invented a door, called a "gate", for electricity to travel through. We call these gates "transistors". While transistors existed before the invention of the MOSFET, they figured out a brand new way to make these kinds of gates! They used Metal, Oxide, and a Semiconductor as ingredients to build the gate, kind of like a minecraft recipe. What makes this gate so special is that it can be both really tiny, and very easy to produce!

Bell Labs initially ignored the technology, thinking that it was too different from existing technology to catch on, but time proved Bell Labs wrong and MOSFETs exploded in popularity!

We know that computers use Binary Code as a language, and each MOSFET is kind of like a brain cell for the computer that can remember a 1 or a 0 depending on if the gate is open or not! Because of how smart, small, and easy to make MOSFETS are, they allowed electronics to shrink in size, use electricity more efficiently, and become capable of more, paving the way for the miniature computers we interact with today!

In 1975 Kahng and Atalla received an award for inventing the MOSFET and in 2009 they were both inducted into the National Inventors Hall of Fame!
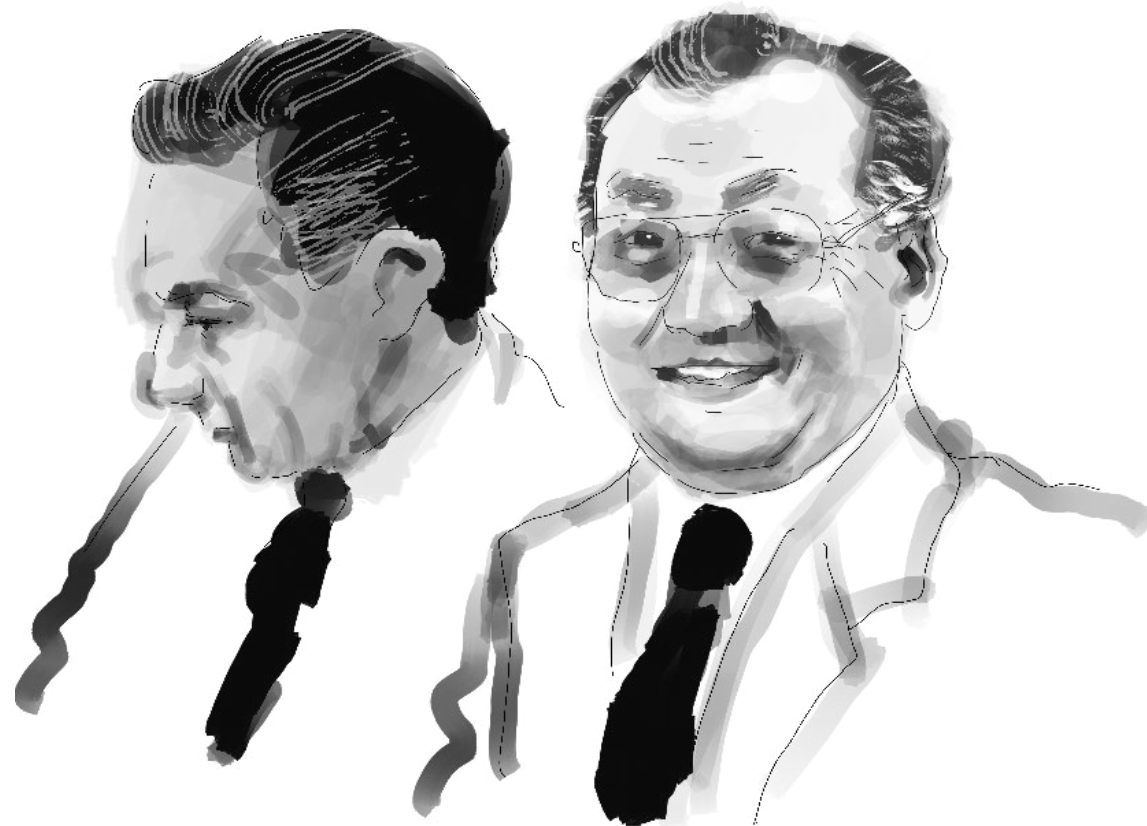
A MOSFET style transistor (opposite page). Mohamed Atalla (above left), and Dawon Kahng (above right).

GPS NAVIGATION & GEOCACHING
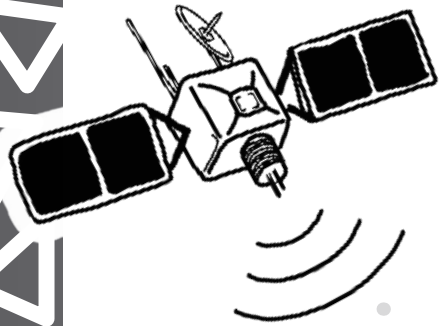
Maneuvering our world has become much more accessible by modern GPS technology, but what exactly is it? GPS is an acronym for Global Positioning System, which is the system of satellites that orbit the Earth 24 hours a day, all year round. The advancements in GPS technology have been significant since the satellites were first launched in the 1980's. Nowadays, smart watches, tablets, and phones contain GPS tracking software with phenomenal accuracy and tracking to give us very accurate readings on locating things and finding directions.

The satellites in space transmit signals that send parameters to GPS devices that track their exact locations.The receivers in these pieces of modern technology measure the distance to the satellites in space via the amount of time it takes for them to receive the satellite's signal. Former GPS devices and receivers used to be standalone devices that were handheld but modern technology has integrated GPS features into almost every smartphone available today.

A very fun hobby for outdoor adventurers is Geocaching. Geocaching involves searching for items or "caches" that are logged with GPS coordinates.
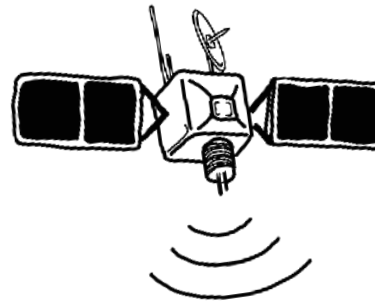
They can range from notebooks with logs from previous finders, to boxes and containers with trinkets and mystery items. They are also located all over the world! There are many apps and websites that exist to share information on geocaching and where to search and get started on this fun recreational activity.
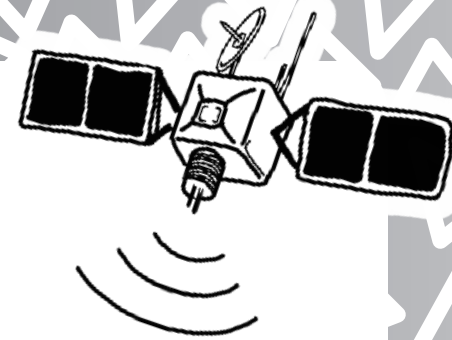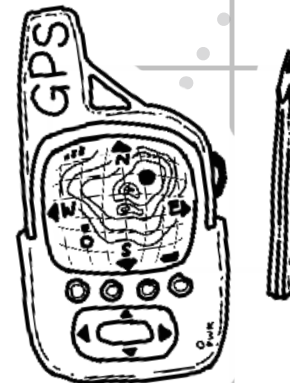
MOTHERBOARD MAZE

Can you find a way through this maze without crossing your own path or skipping any of the important components?

Make sure your path goes through the processor, hard drive, and memory!

processor

memory

hard drive
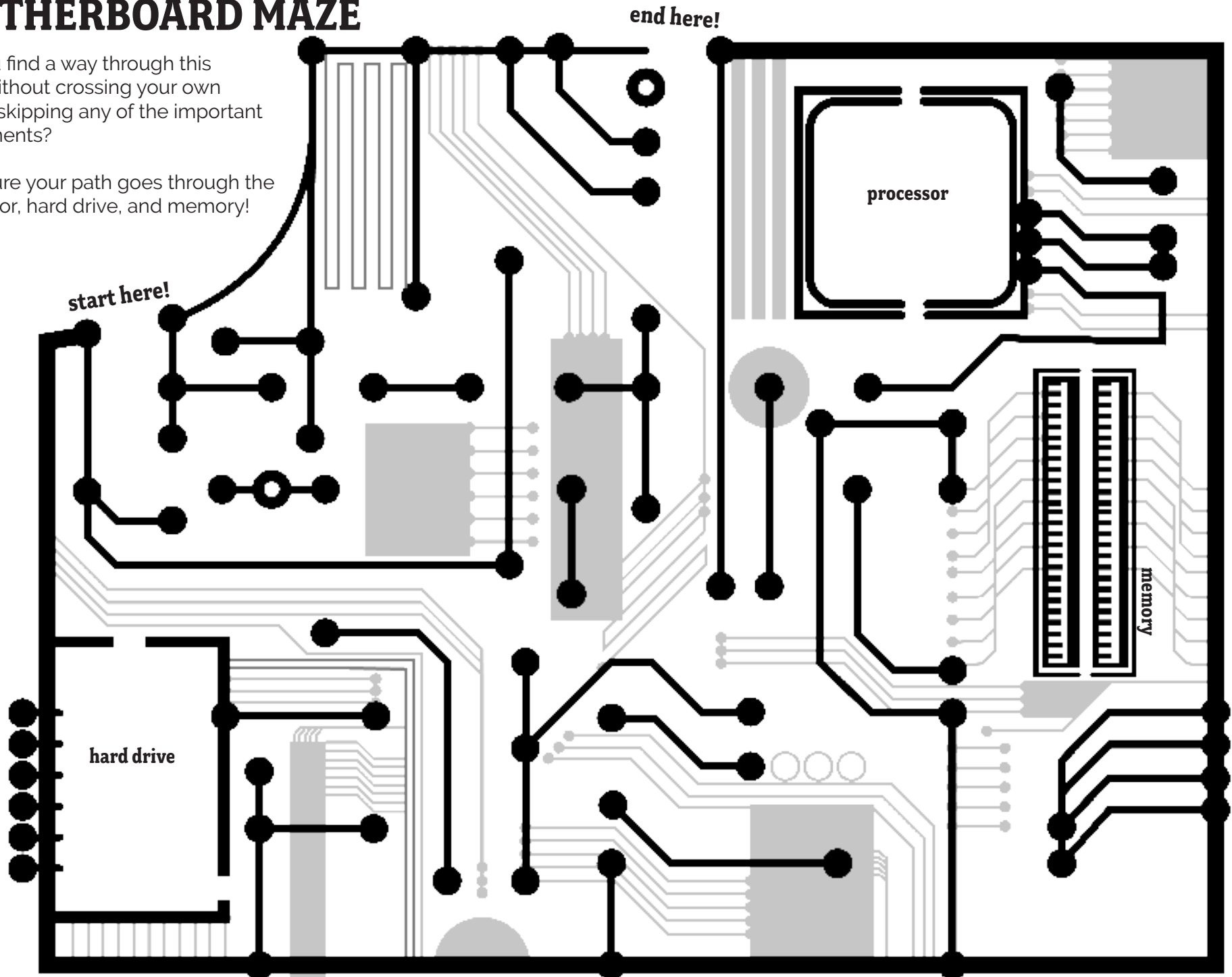
SEE YOU NEXT MONTH!

Thank you for participating in this month's Snail Mail! Did you know you can sign up a friend for free? Tell us your favourite part and get involved with other Eureka programs! You can share your projects and drawings with us directly at: codeva.info/SubmitYourSnailMail

Sincerely Yours
The Snail Mail Team

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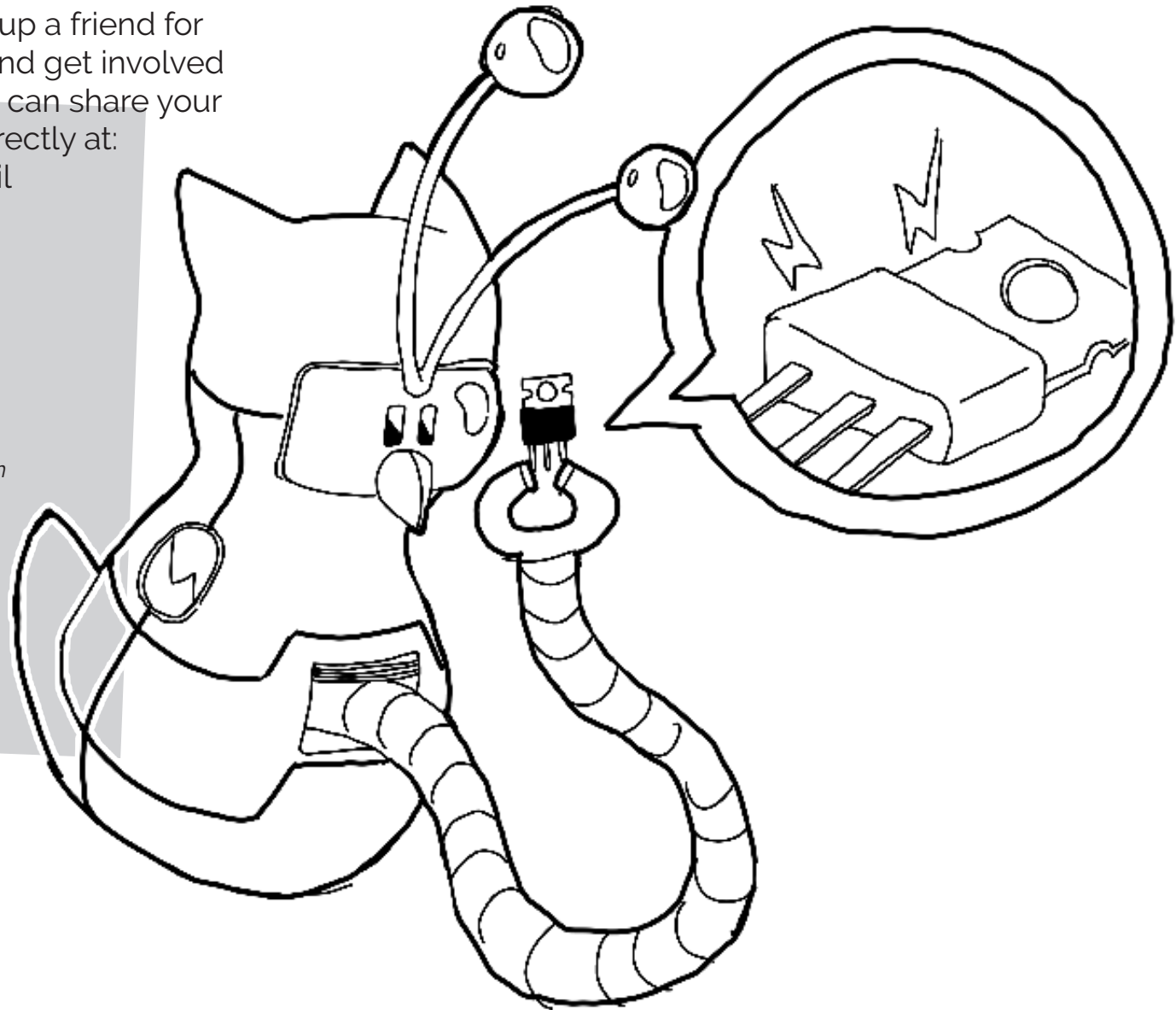*Natasha Blush, Pepper Blush*

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RESOURCES

To keep up with what CodeVA and Eureka are doing and to see current class offerings, visit us at **CodeVirginia.org**

Apps/Websites for Geocaching:
Geocaching by Groundspeak - geocaching.com/play

Computer Science Classes & Learning
adafruit - adafruit.com
hour of code - hourofcode.org
micro:bit - microbit.org

Art & Design
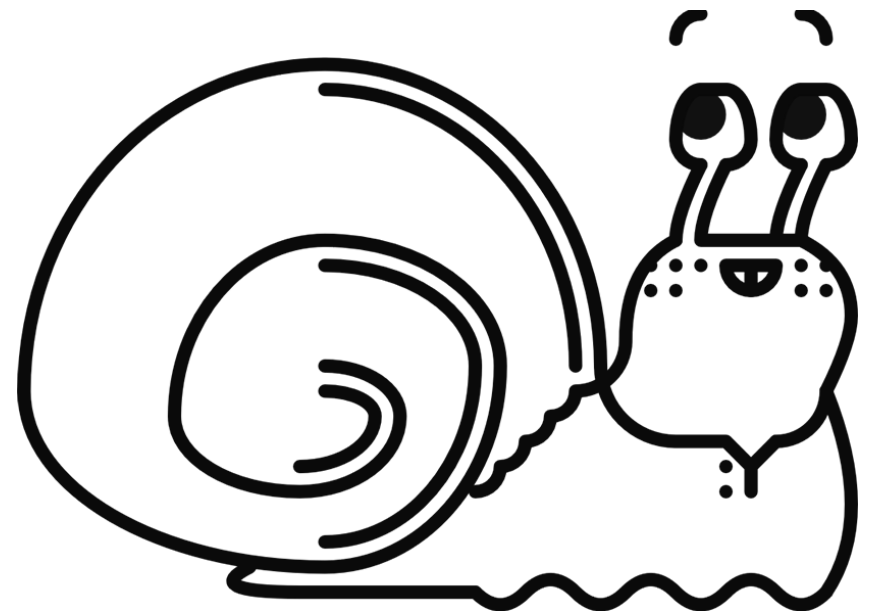earsketch - earsketch.gatech.edu
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Would you like to help us improve Snail Mail? Answer the physical survey, or access the survey online via computer or mobile device: bit.ly/CodeVASnailMail

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