



**CITIZENS
OF THE FUTURE**

Innovations to Leapfrog
Global Education

Education Innovations in Practice

Falk Auditorium

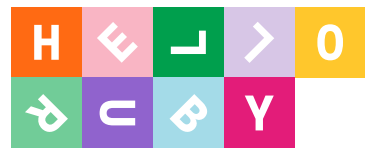


CITIZENS OF THE FUTURE

Innovations to Leapfrog
Global Education

LINDA LIUKAS

Founder, Hello Ruby
[@lindaliukas](https://twitter.com/lindaliukas)



ABC of Technology

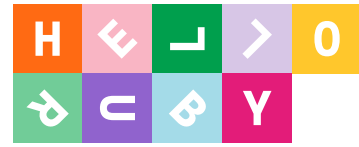


Linda Liukas
@lindaliukas

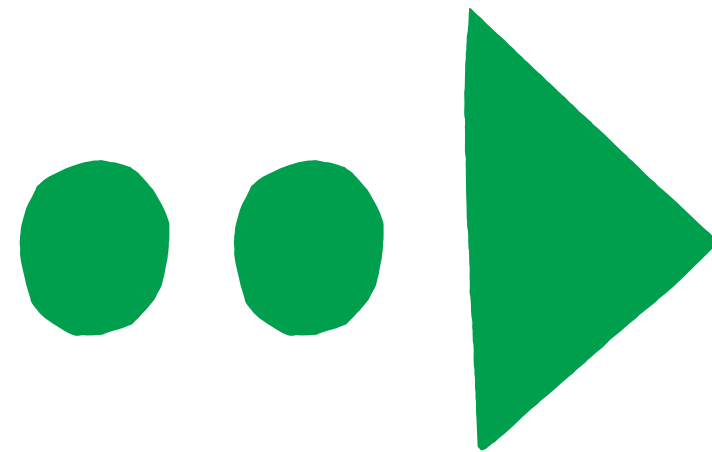


**Programmer
Illustrator
Author
Business school
dropout**





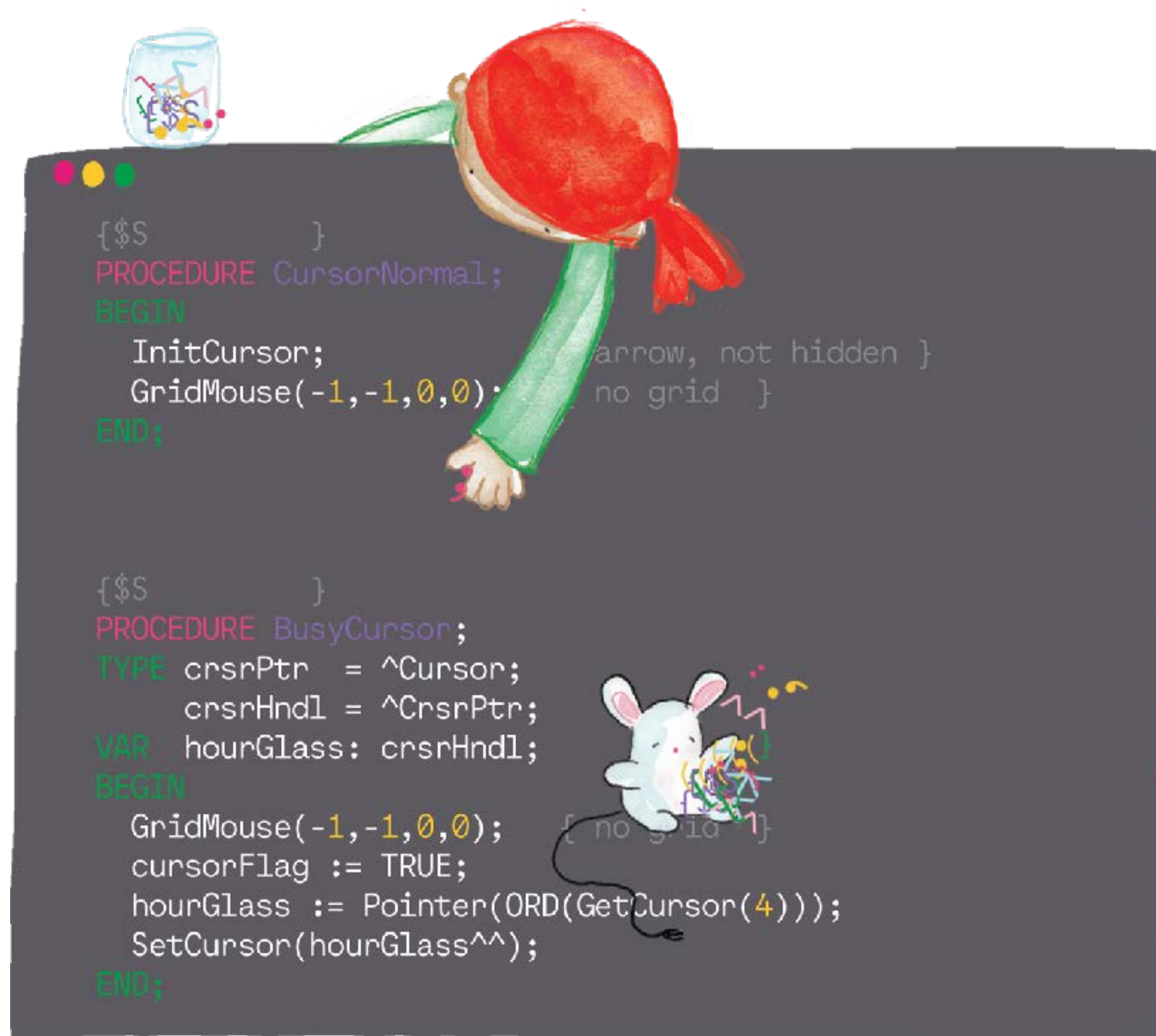
If code is the new
lingua franca, instead
of grammar classes, we
need poetry lessons.





Hi

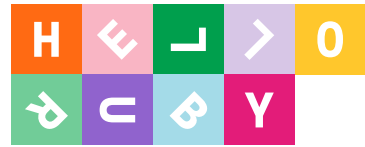




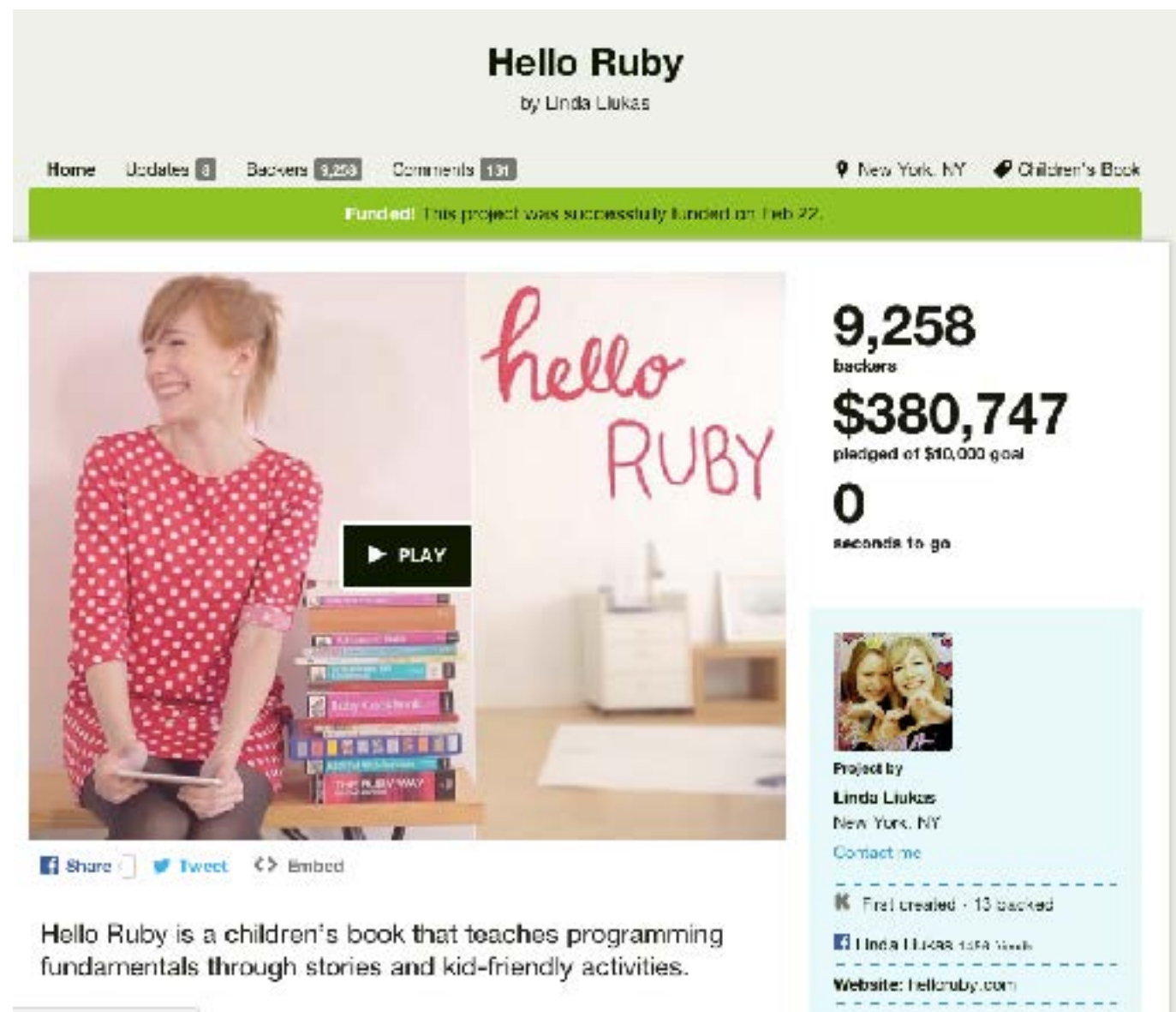
Stories..

..help us make sense
of the world.

..connect us to
ourselves and to each
other.



IT ALL STARTED WITH A KICKSTARTER CAMPAIGN



...WHICH REPRESENTED 20% OF ANNUAL BOOK EXPORTS OF ENTIRE COUNTRY OF FINLAND



..TODAY, FOUR BOOKS ABOUT CODING, COMPUTERS; INTERNET AND AI, PUBLISHED IN 25 LANGUAGES

Preparing
kids for a
world where
so many
problems are
computer
problems.

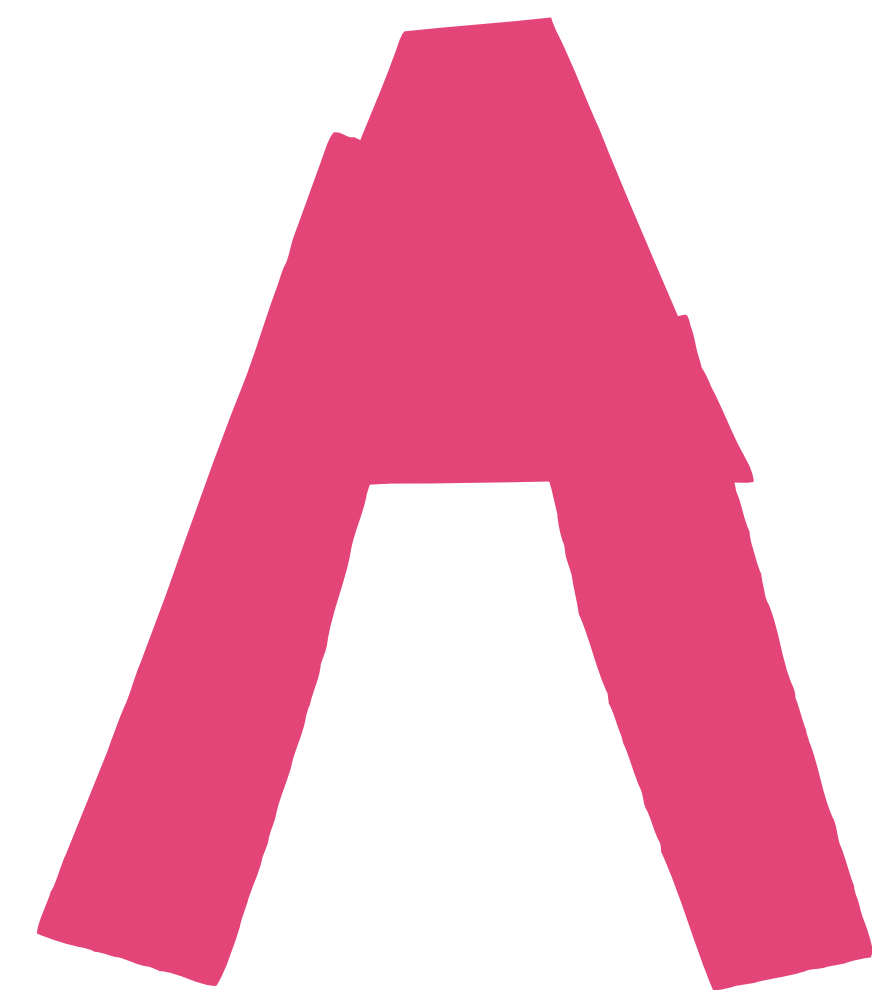
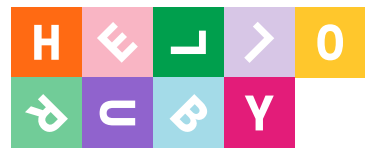




what did we learn?

1. Exact commands.
2. In the right order.
3. Naming things is important (and you can't make spelling mistakes)
4. Instructions should cover all scenarios and be modifiable.
5. **Even the biggest problems in the world are just tiny problems stuck together.**





is for
algorithm

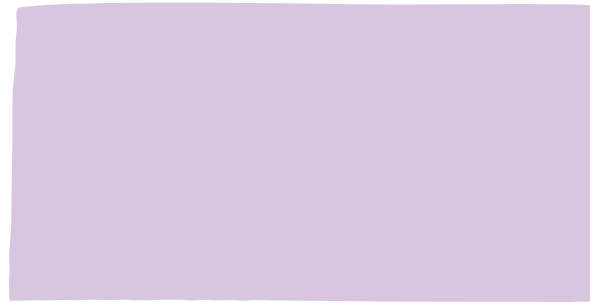
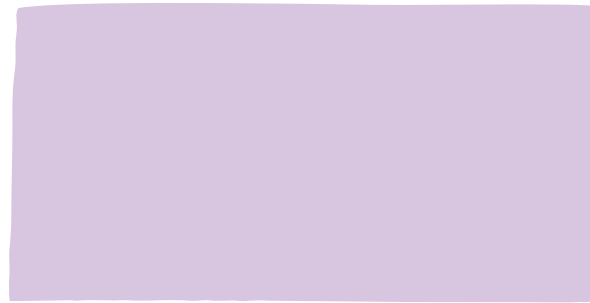
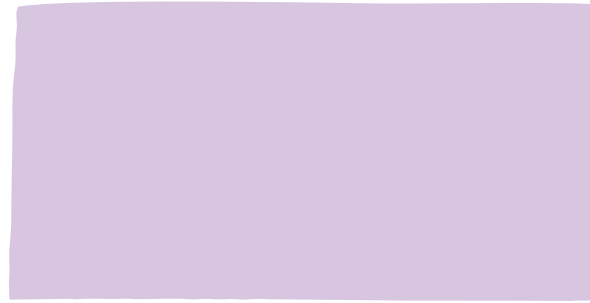
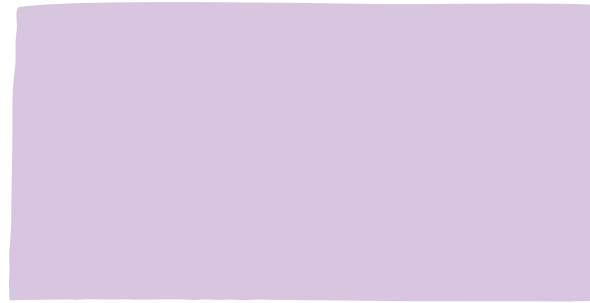




“In most mathematical lessons the whole difference lies in the fact that the student is asked to accept from outside an already **entirely organised intellectual discipline** which he may or may not understand”
– Jean Piaget

“Don’t present students with **pre-organised vocabulary and concepts**, but rather provide students with a **learning environment grounded in action.**”
– Jean Piaget

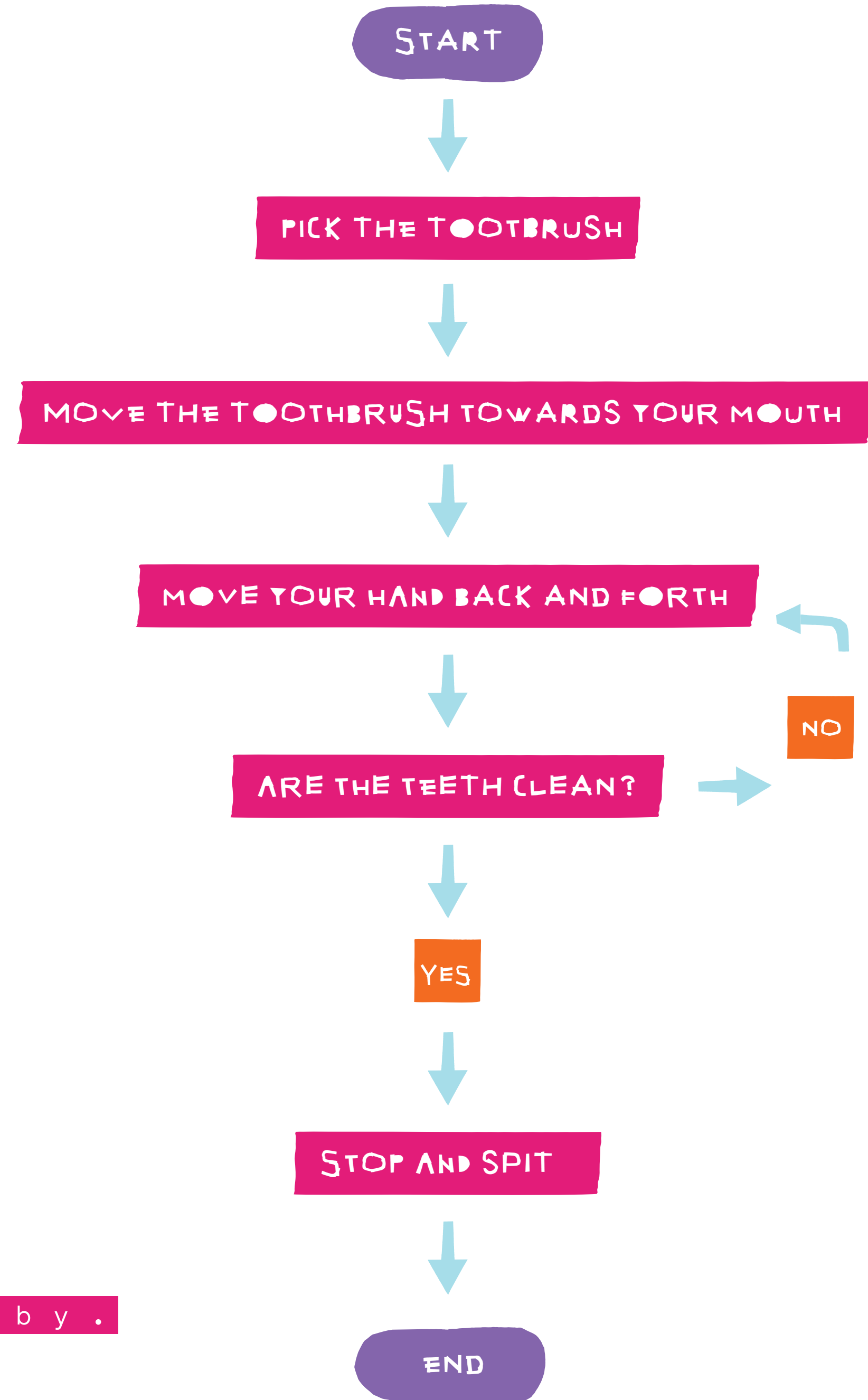
START



END

BRUSH YOUR TEETH





... do we know what a toothbrush is?

.. what about the toothpaste?

.. remember to open the toothpaste?

.. remember to stop moving your hand towards the mouth!

.. defining clean



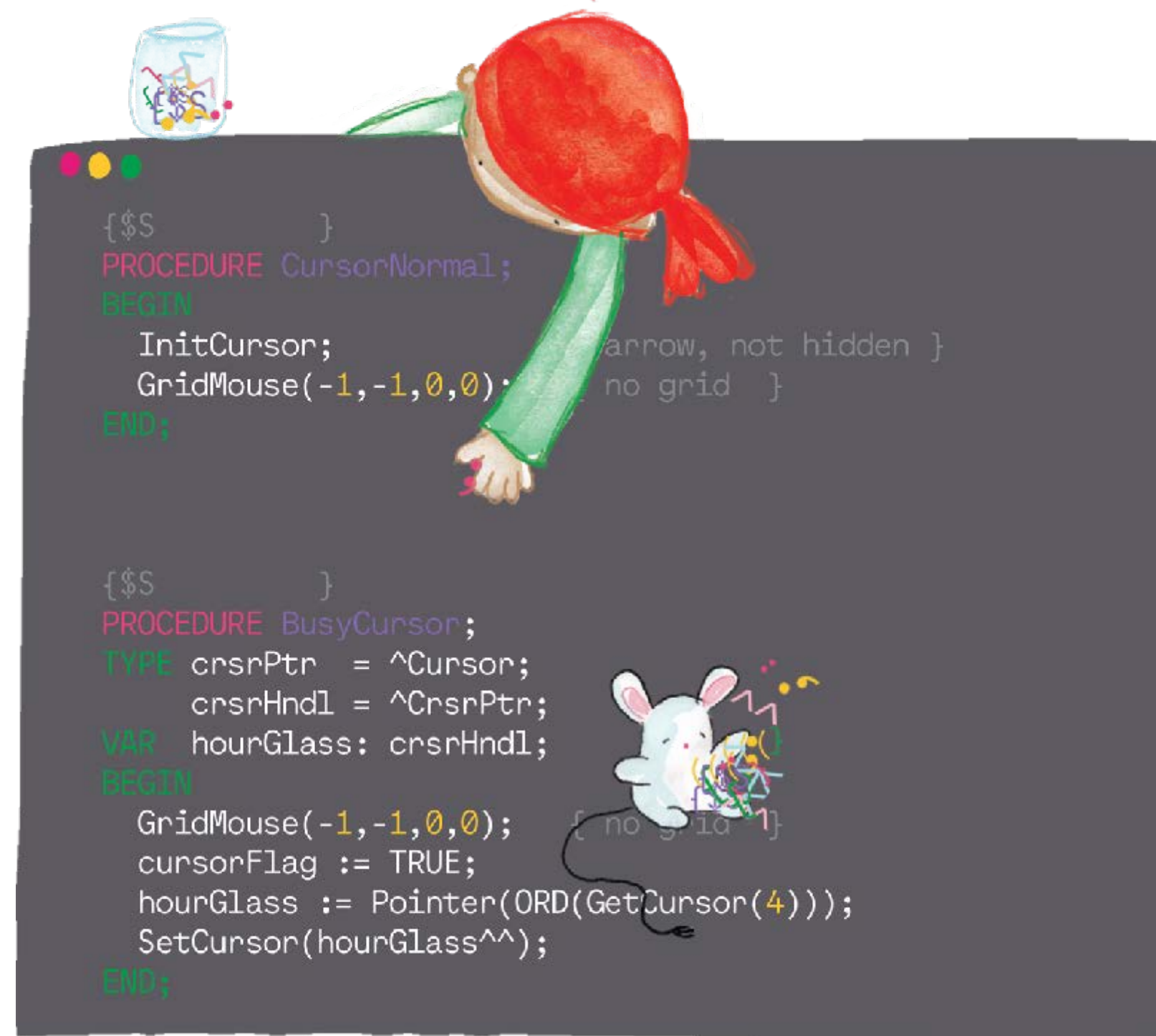
How many asked for help?





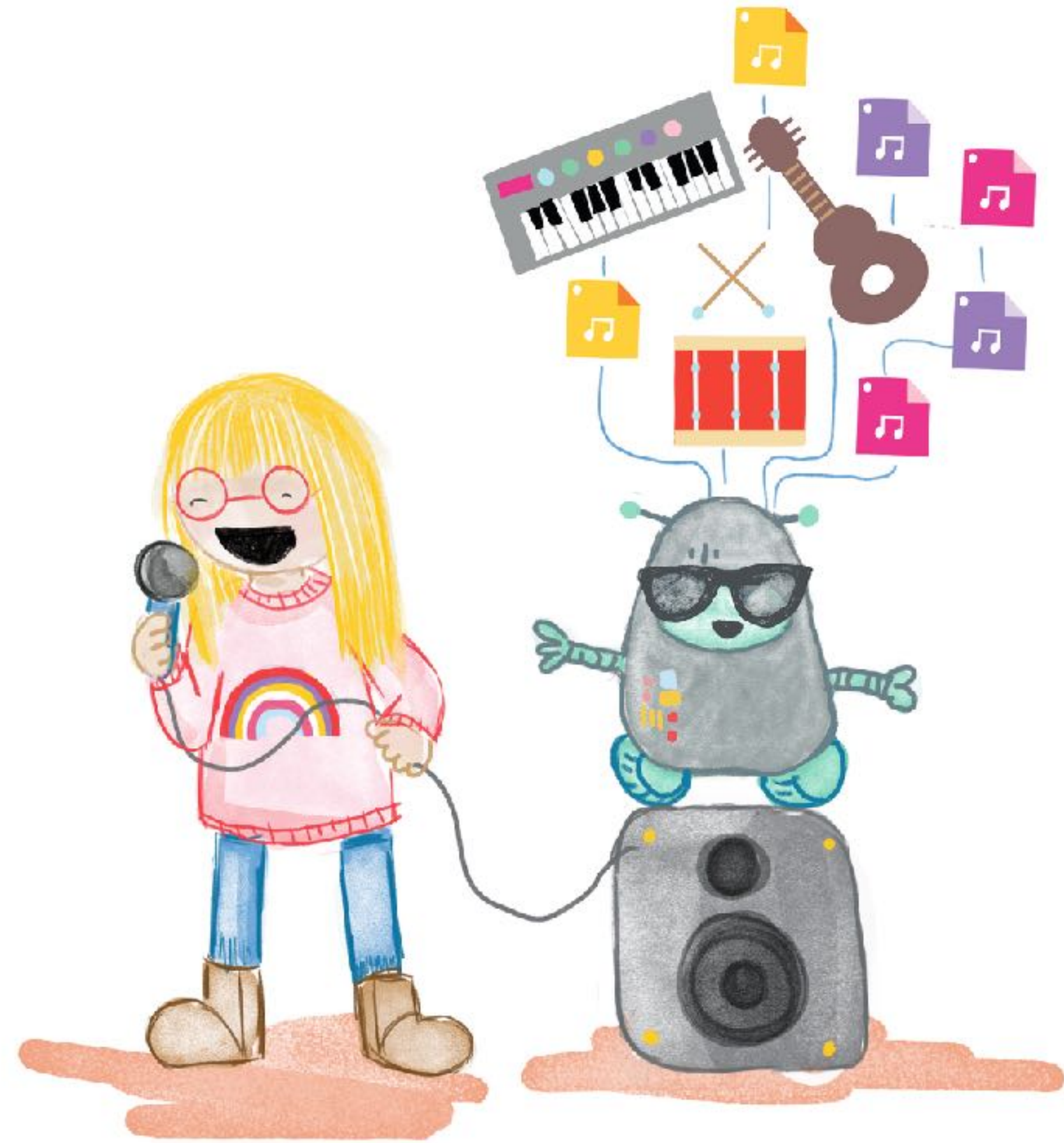
Pair programming

The other one drives, the other one gives instructions.

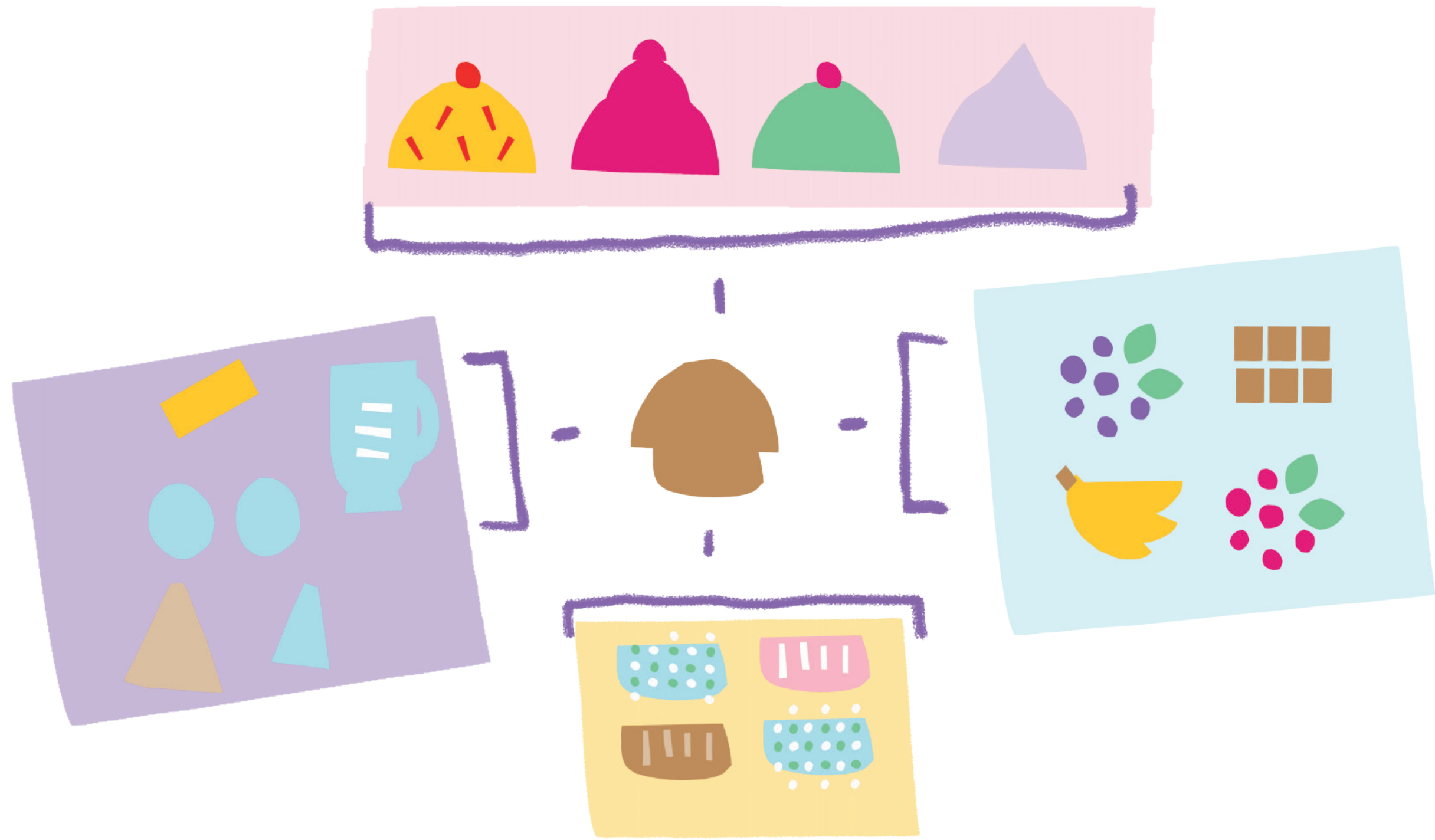


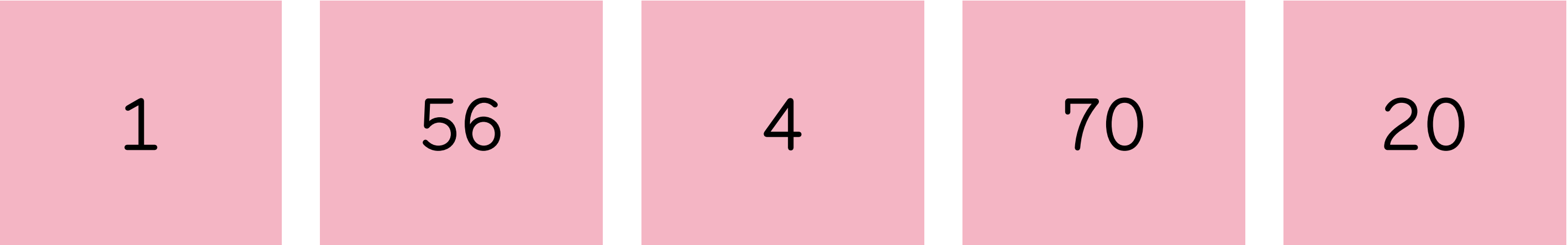
Debugging

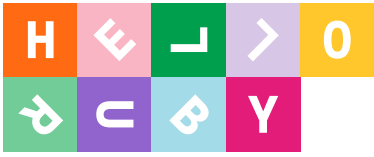
1. Explain to three friends what you tried to do before asking teacher.
2. Explain in English. Draw. Act. Talk to a rubber duck.



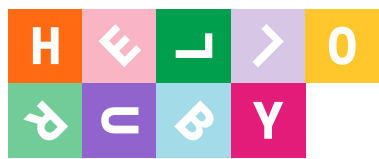
Creativity







1	56	8	67	71
78	24	4	33	20
45	81	2	70	10
1	66	98	89	82



	715	1	56	8	67	71	82 0	71
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71	71	455	56	8	67	71	677	712
----	----	-----	----	---	----	----	-----	-----

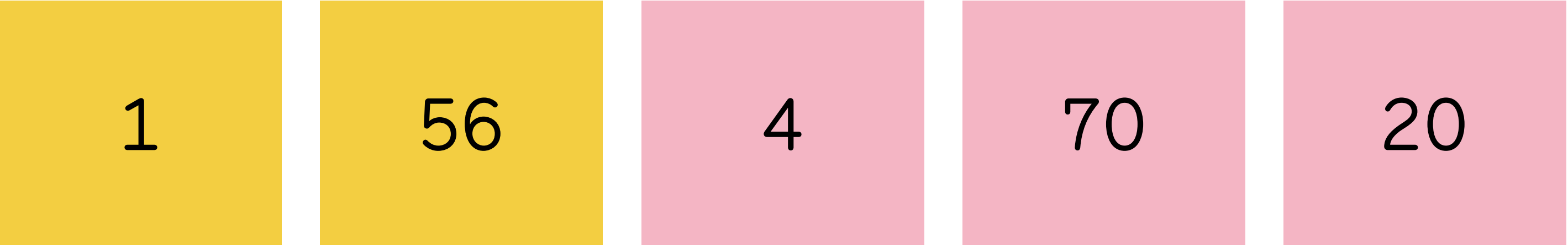
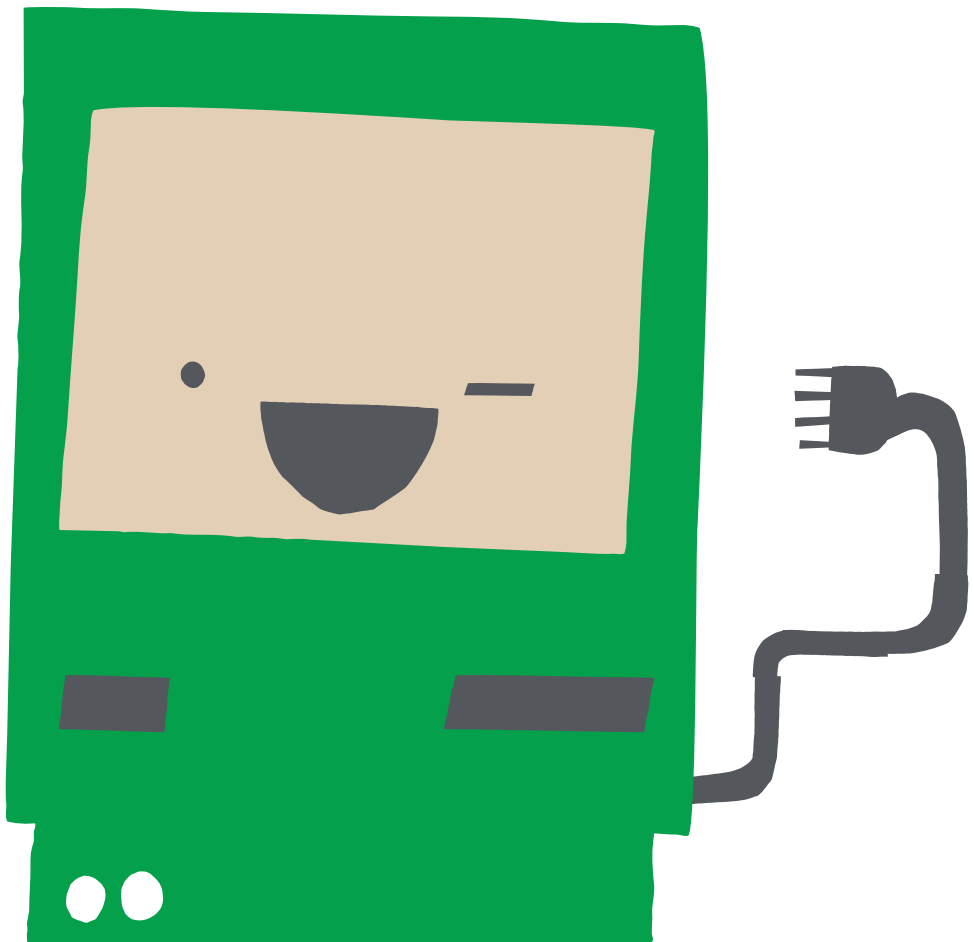
20	20	78	24	343	433	20	201	20
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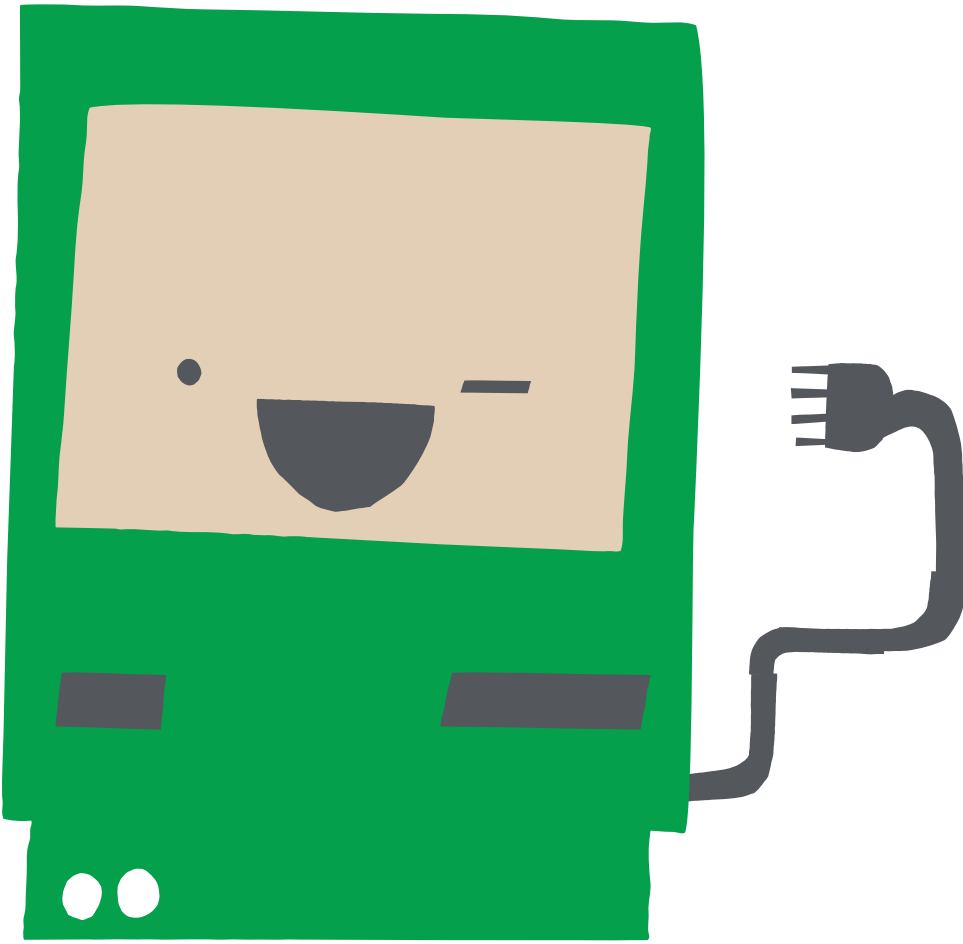
10	348	45	81	2	470	670	10	10
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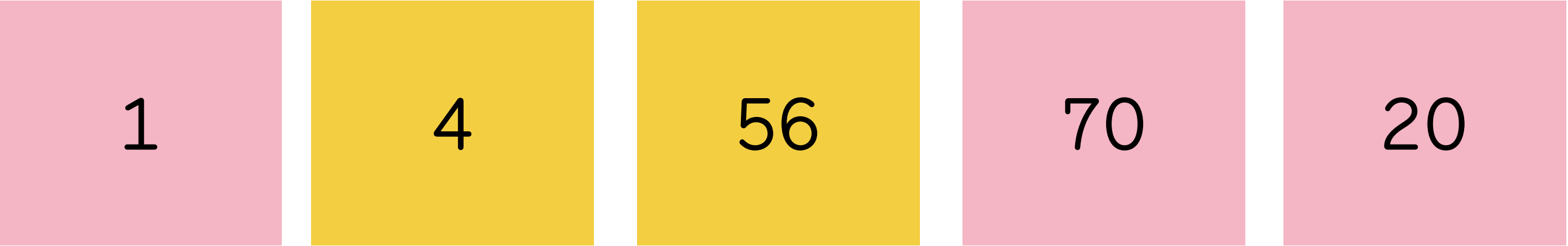
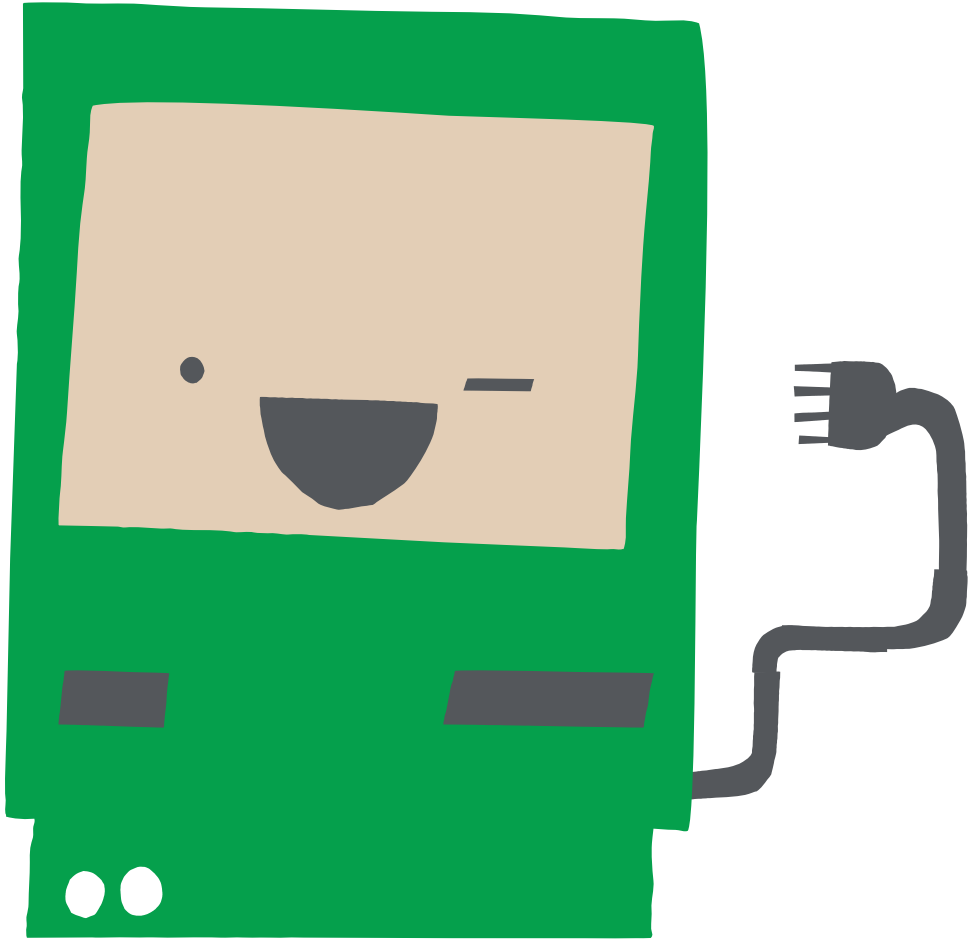
322	821	1	66	98	89	82	82	82
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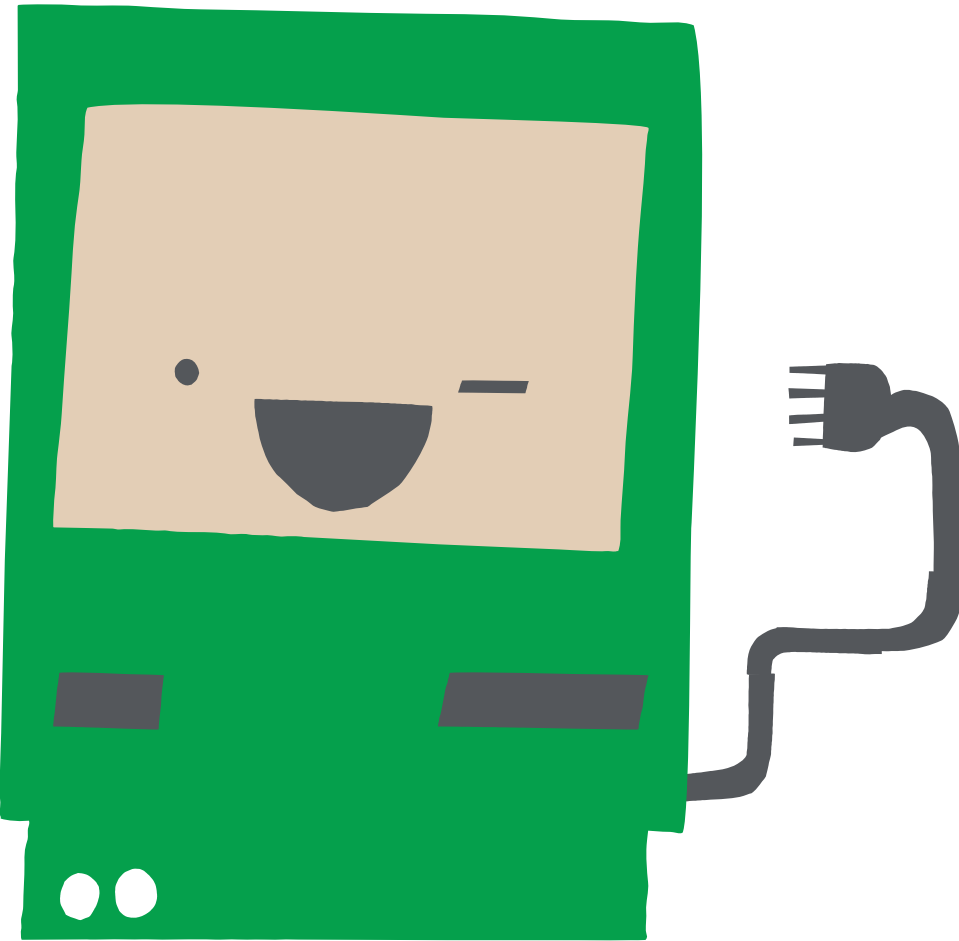


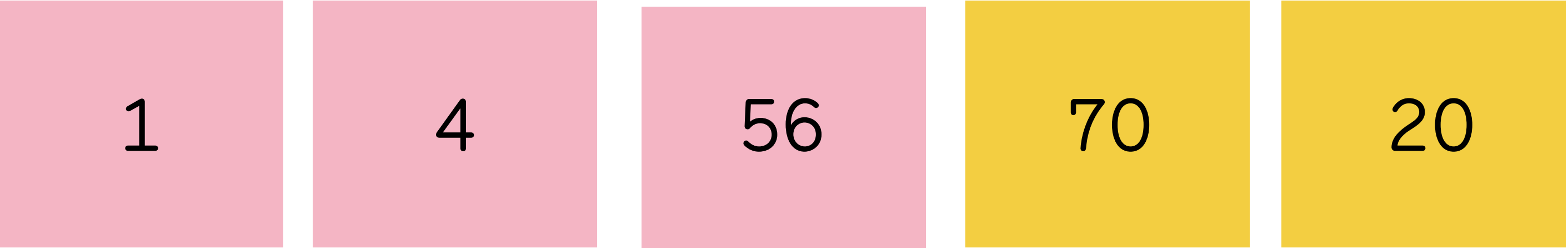
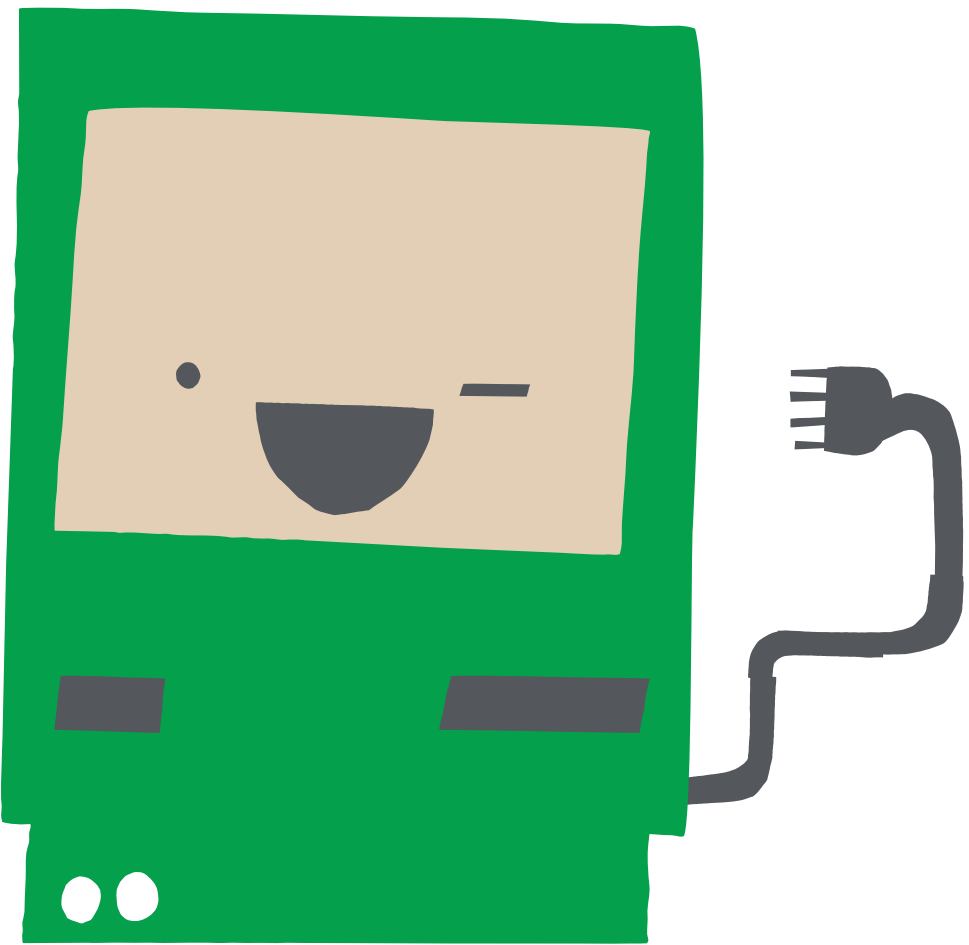
	71	1	56	435	67	171	71
--	----	---	----	-----	----	-----	----

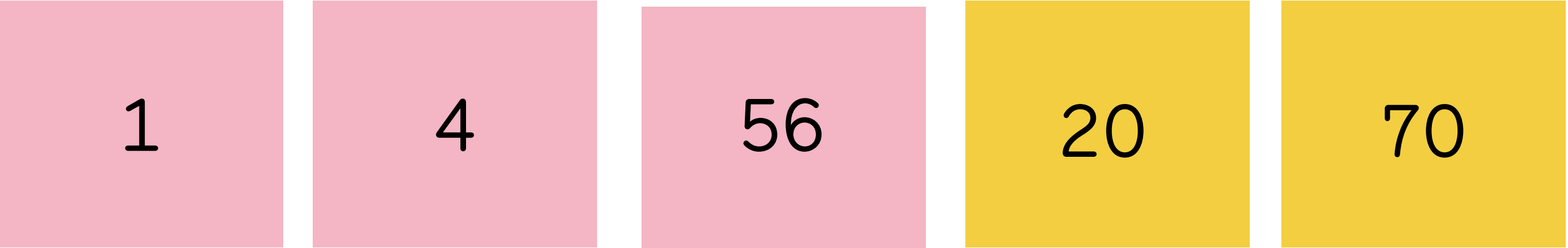
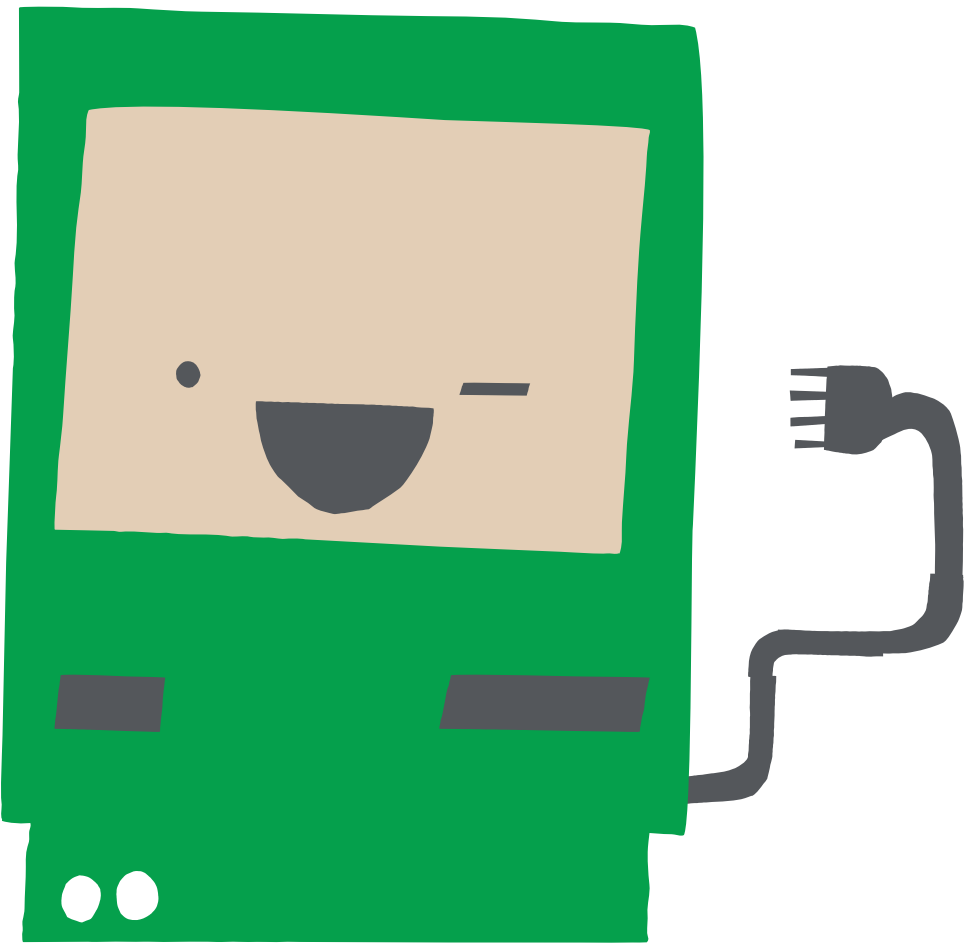


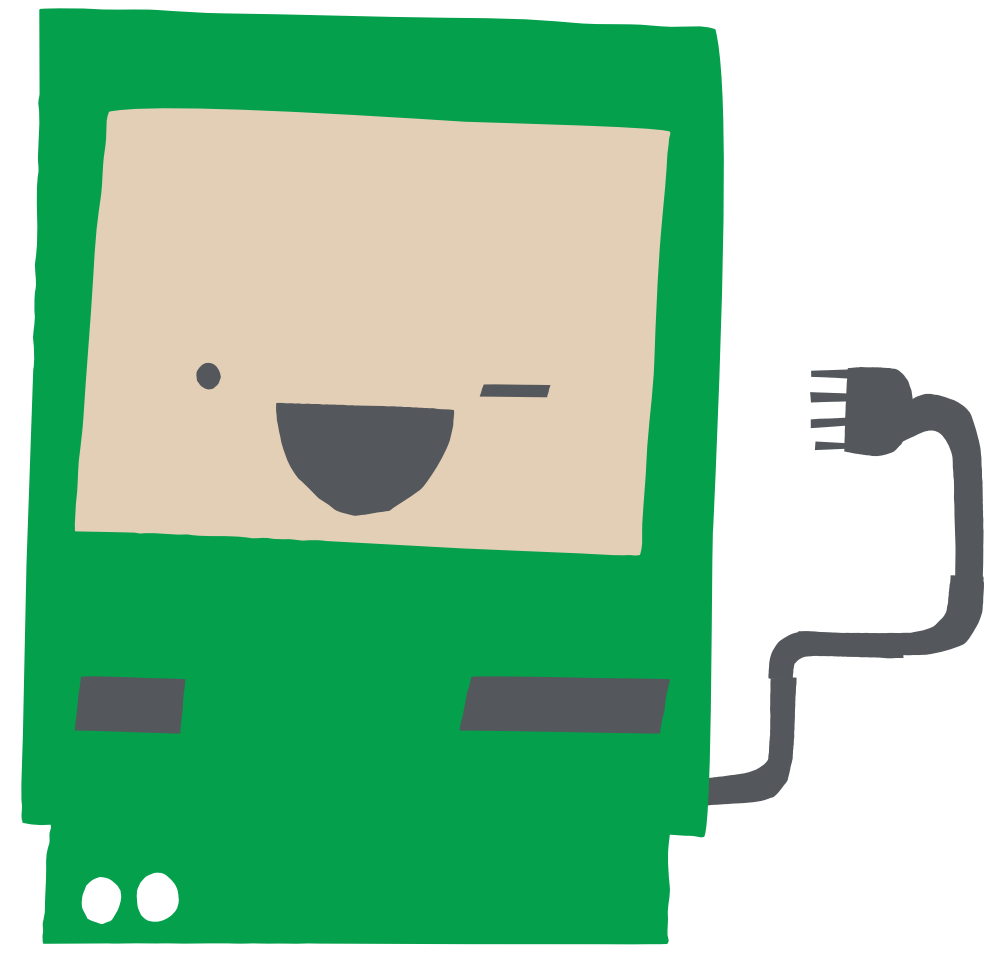












**This is called
bubble sort algorithm.**

Where is the algorithm?

What is the world's best ice cream?



The World's Best Ice Cream

Everyone says so, you should try it.

★★★★★

Ad

List of ice cream flavours

Wikipedia

Top 10 Places to Eat Ice Cream

Travel magazine

The 11 Best Summer Ice Cream Flavors Of 2016

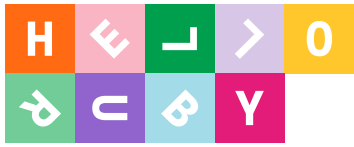
Foodstore

Find your next ice cream favorite, today!

Ad

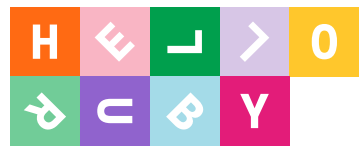
Get your ice cream delivered!

Ad

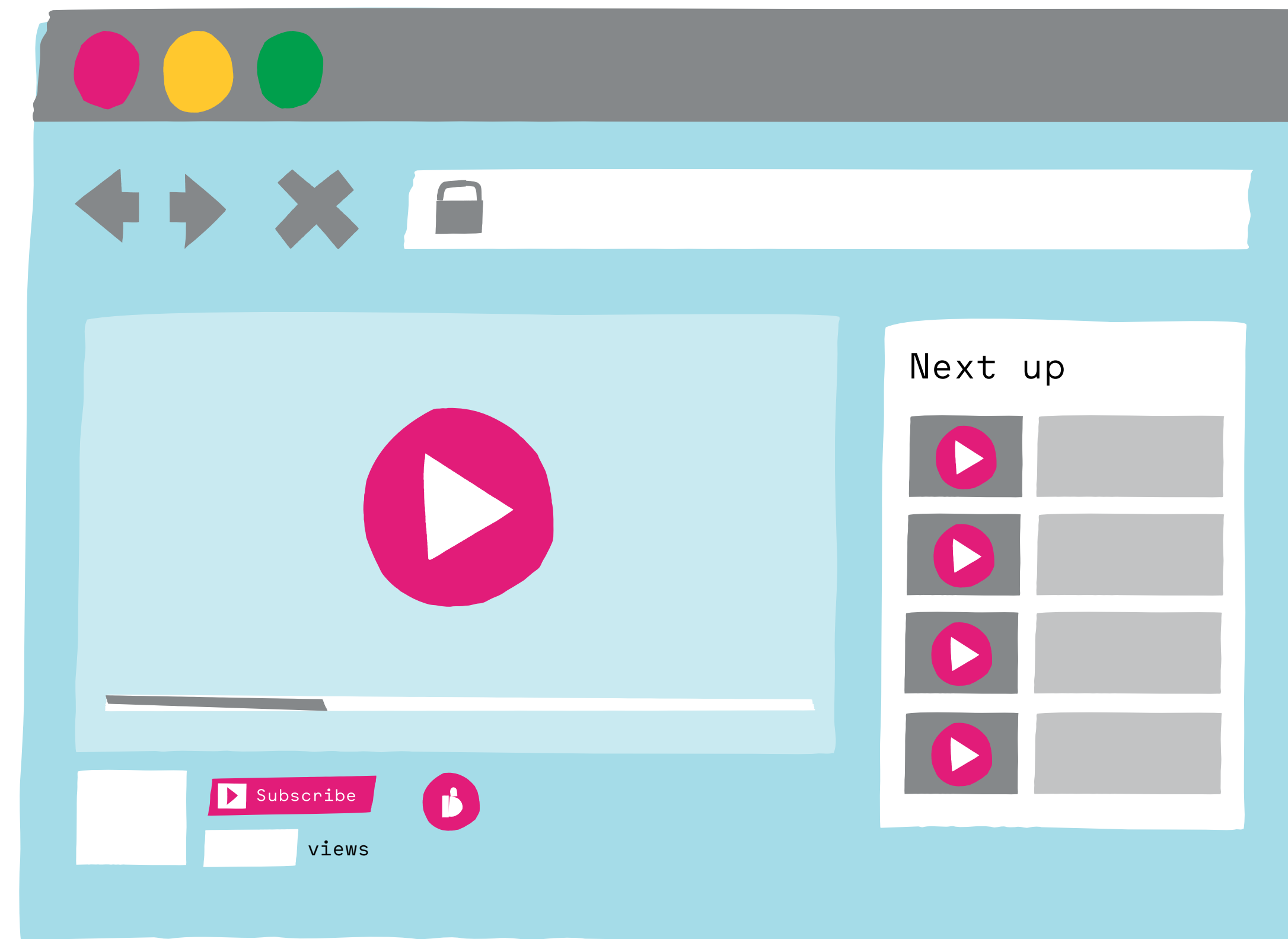


Where is the algorithm?





Where is the algorithm?

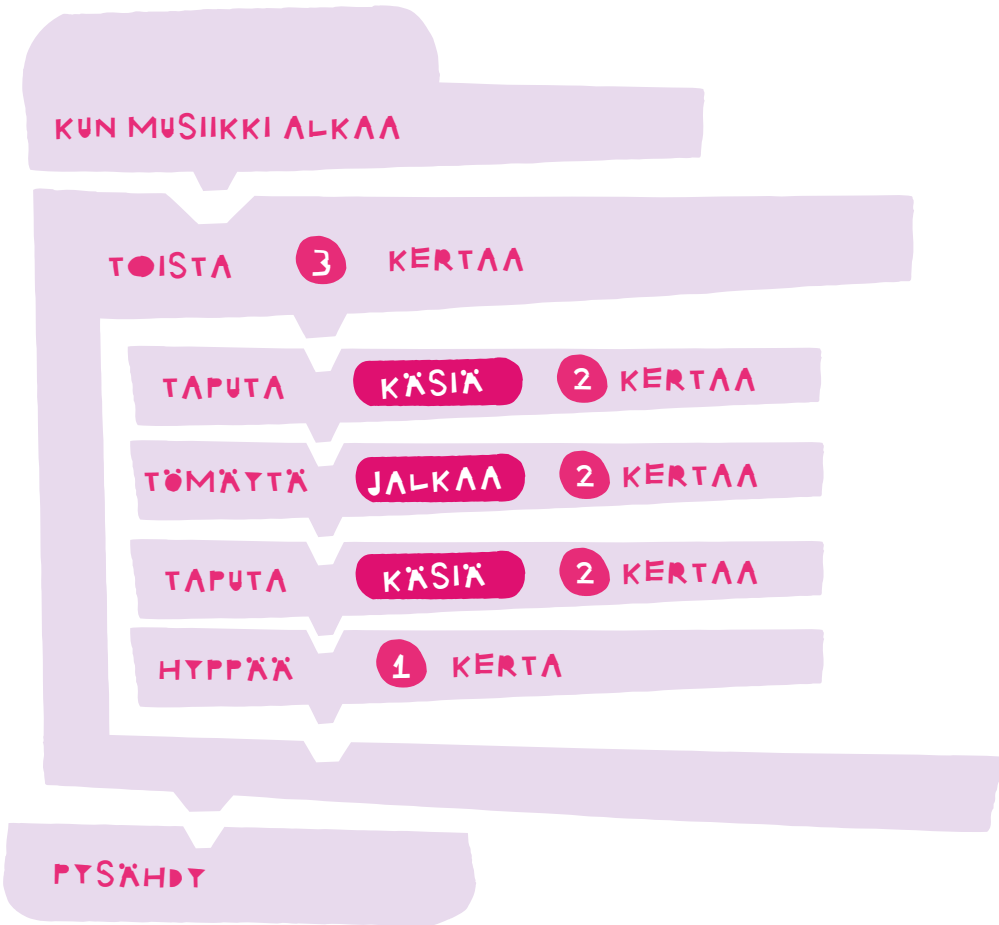


ABSTRACTIONS OF COMPUTING

Kinetic



Visual



Code

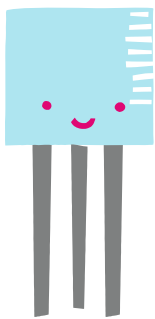
```
for i in 0..1
  puts "Clap"
end

for i in 0..1
  puts "Stomp"
end

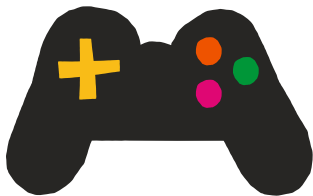
for i in 0..1
  puts "Clap"
end

puts "Jump"
```

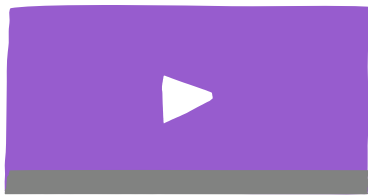
Practice



A thermometer.



A game.



A website.



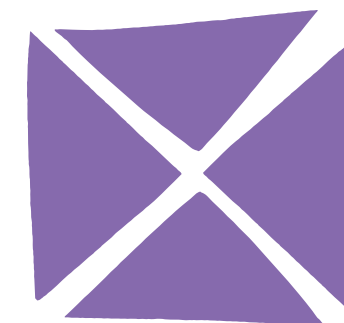
CONCEPTS



Data

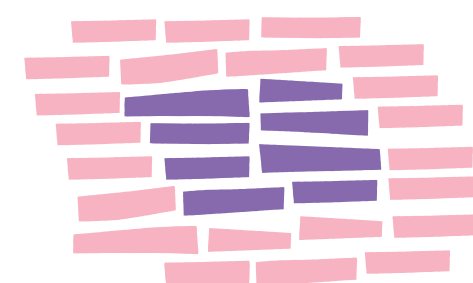


Automation



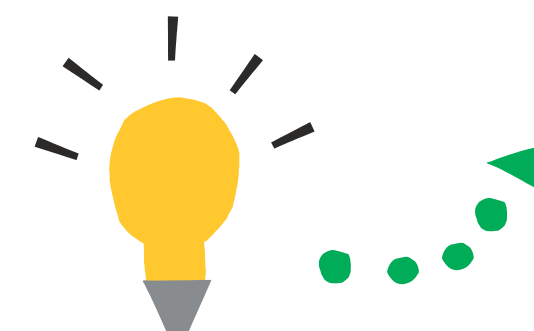
Persistence

PRACTICES



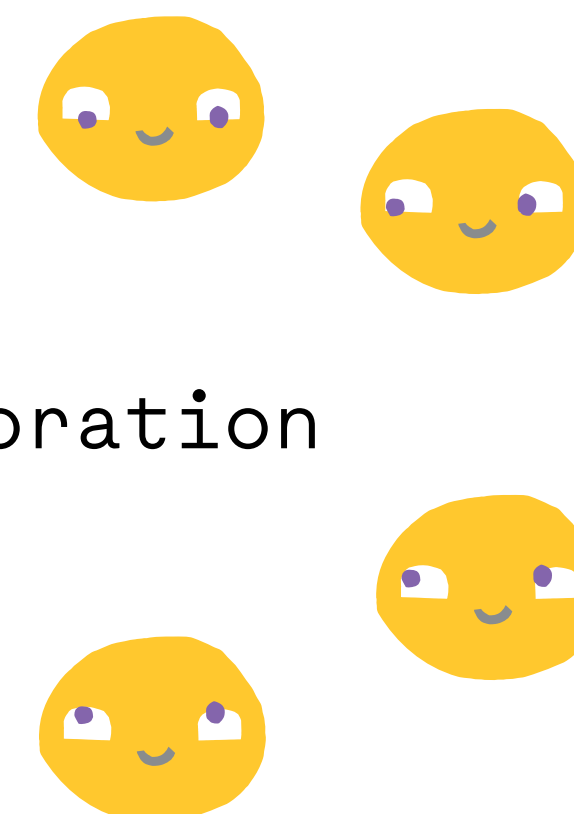
Pattern recognition

Systems thinking

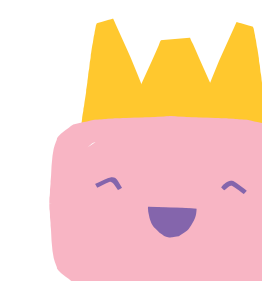


Tinkering

Collaboration



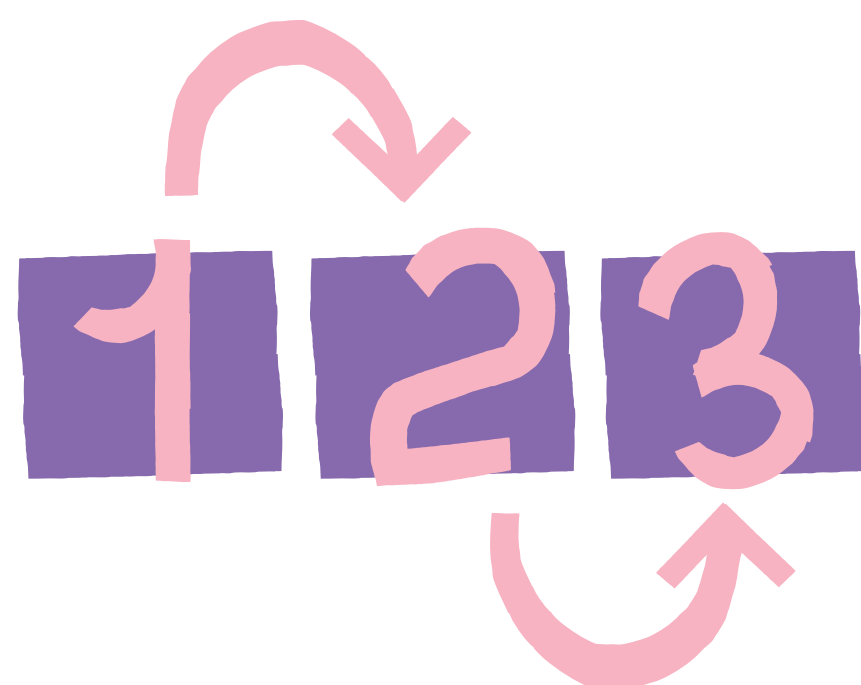
Creativity



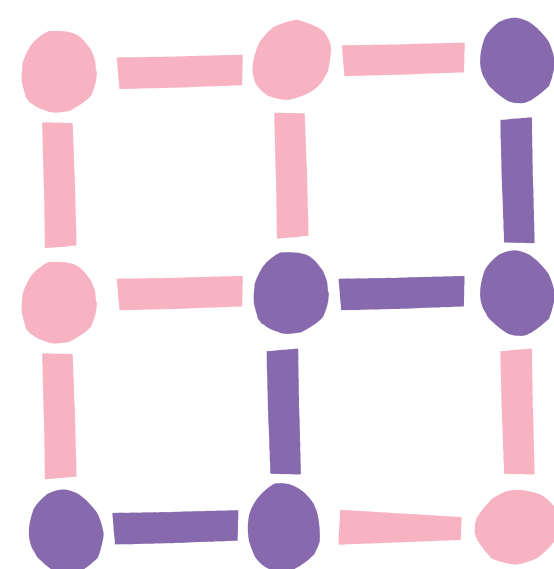
Debugging

Computational thinking

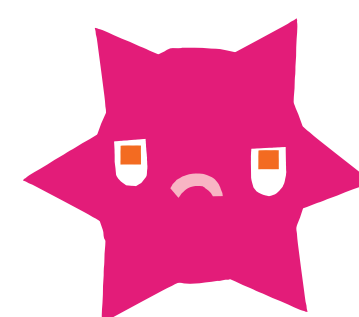
Thinking about problems in a way that allows computers to solve them. Computational thinking is something people do, not computers. It includes logical thinking and the ability to recognise patterns, think with algorithms, decompose a problem, and abstract a problem.



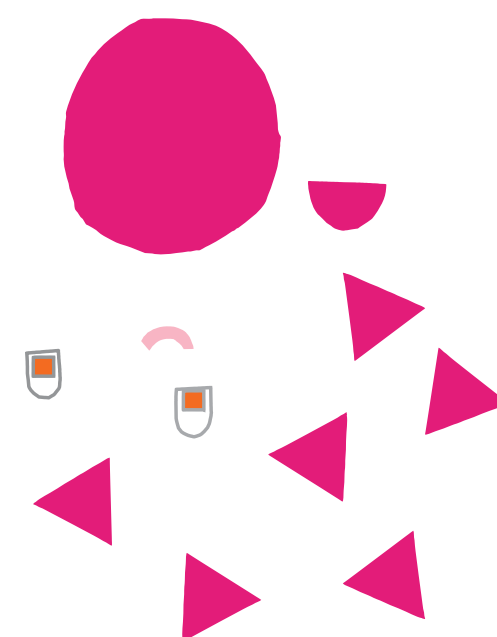
Logical & critical thinking



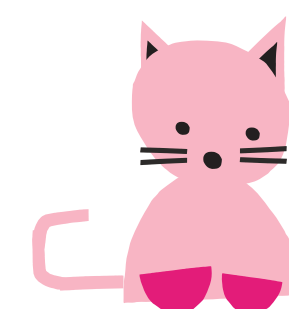
Algorithms

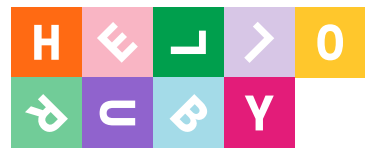


Decomposition



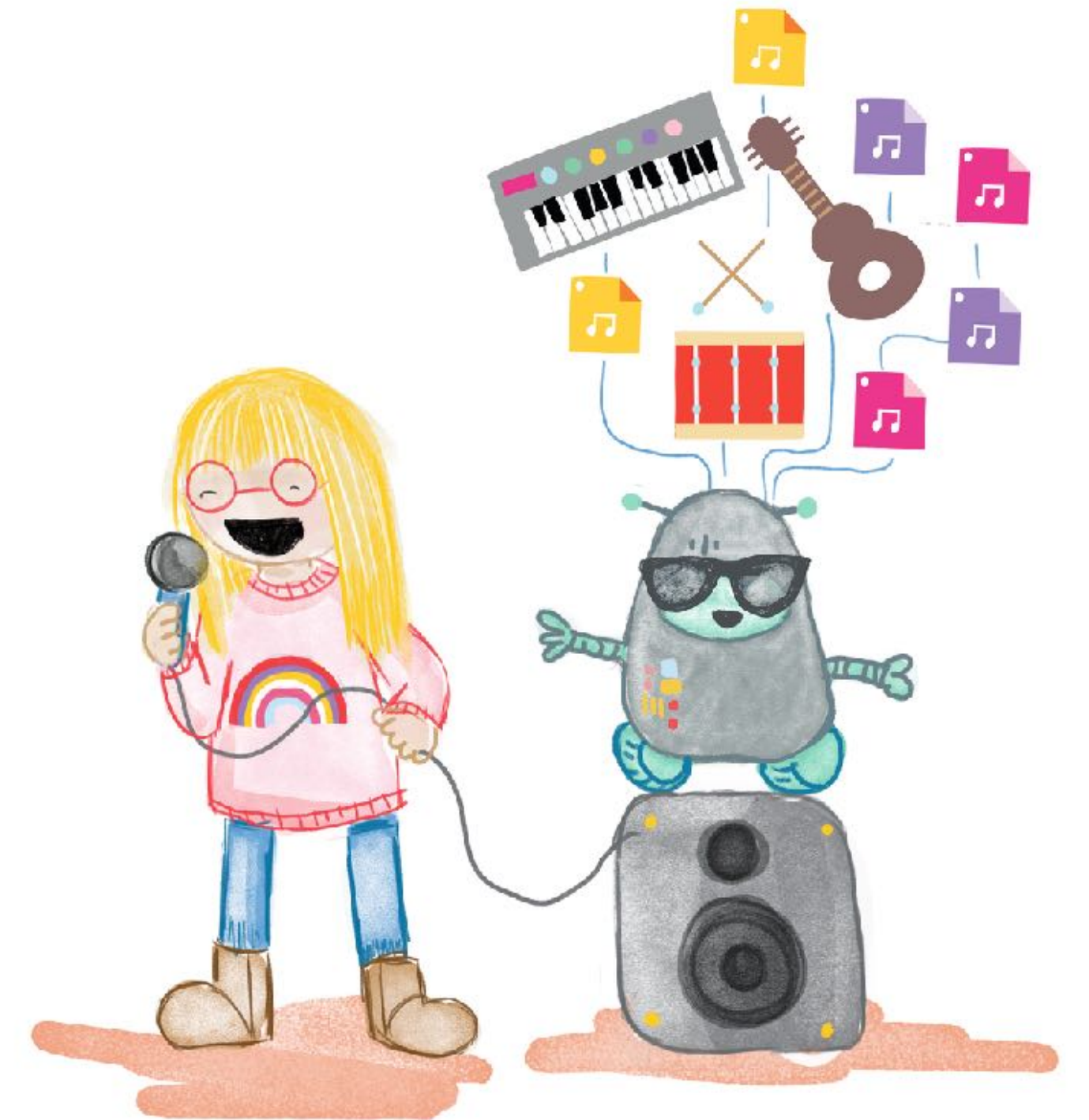
Abstraction





B

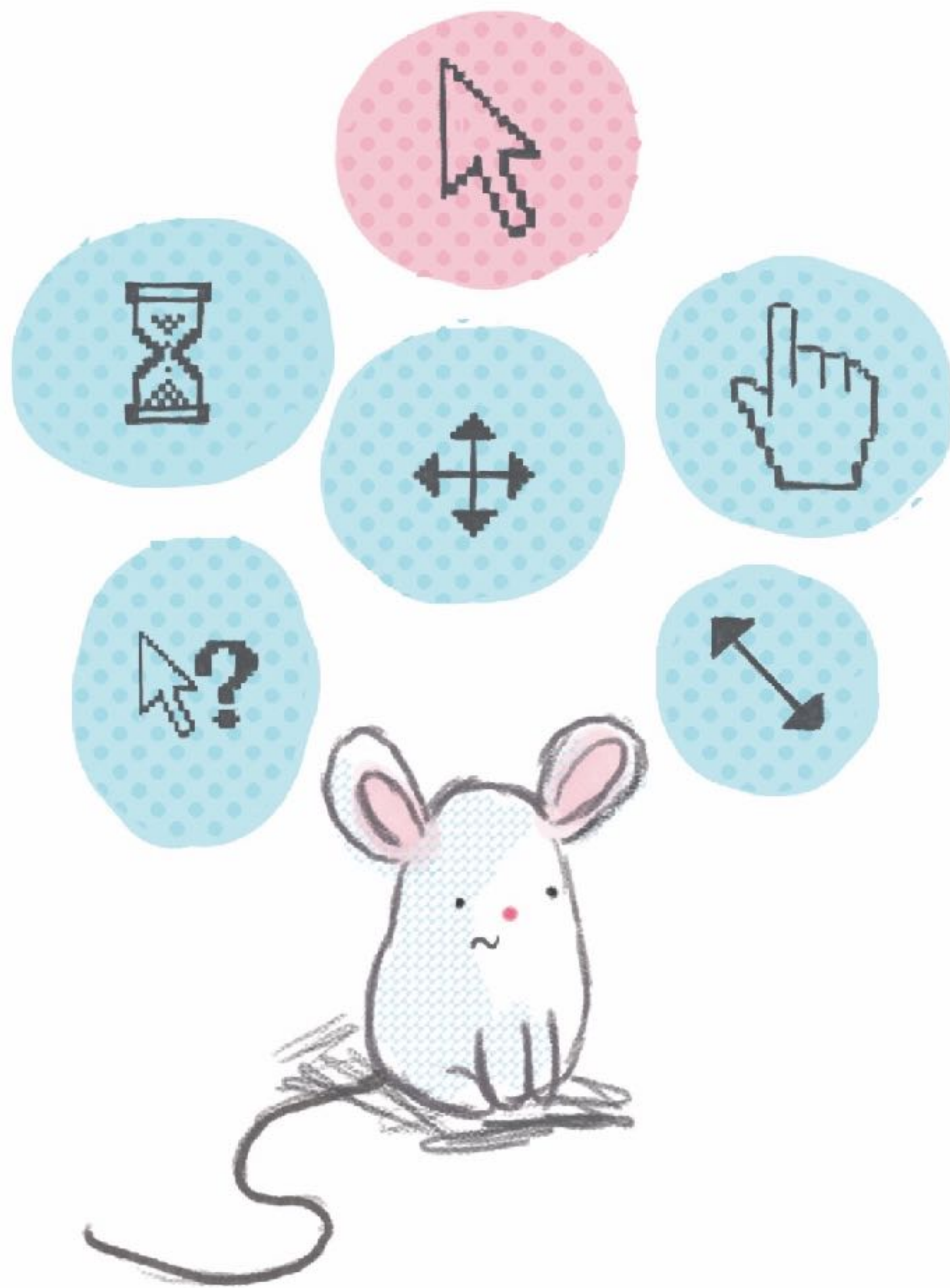
is for
(boolean) logic

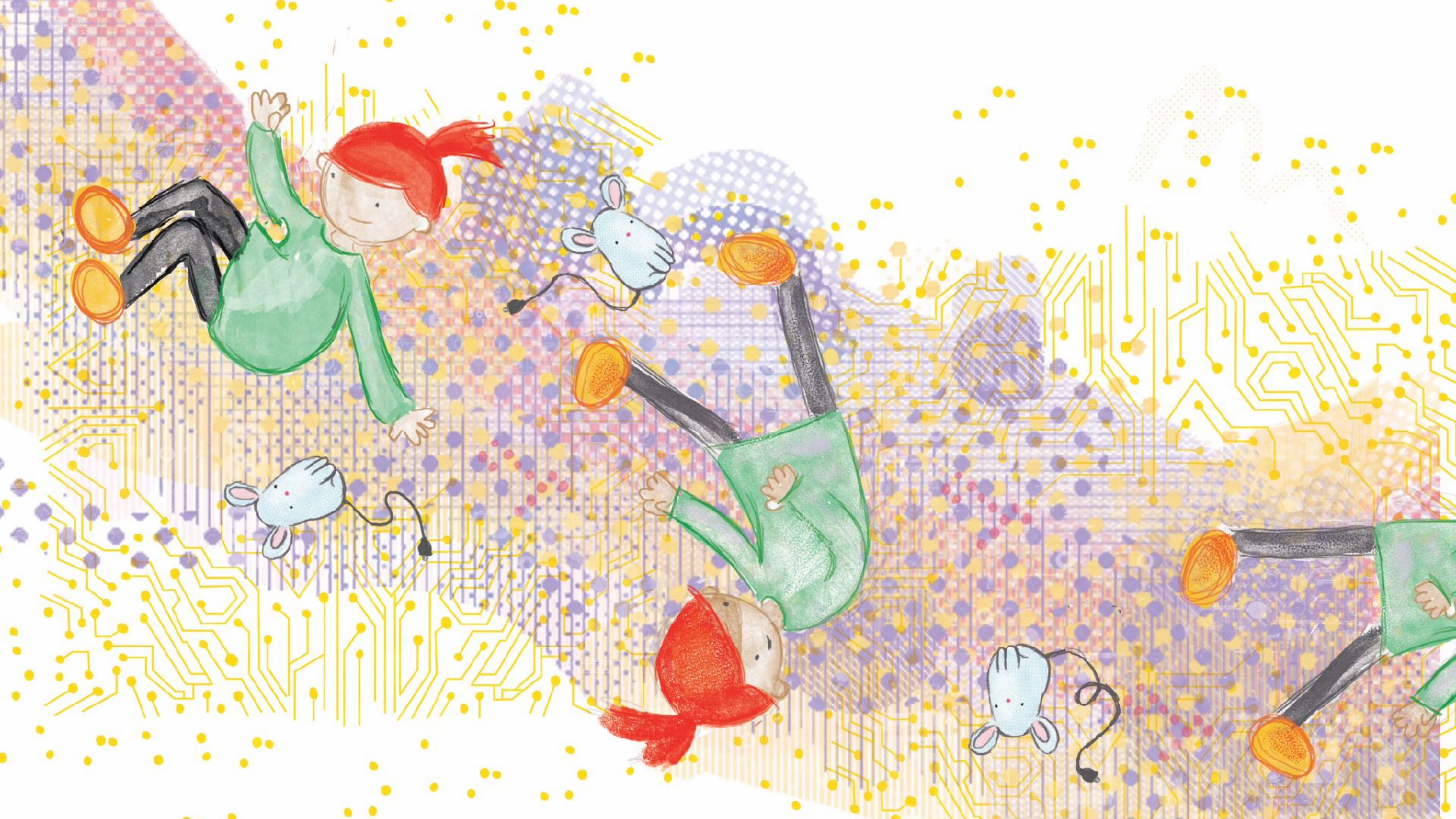




Computers
are
abstraction
machines.





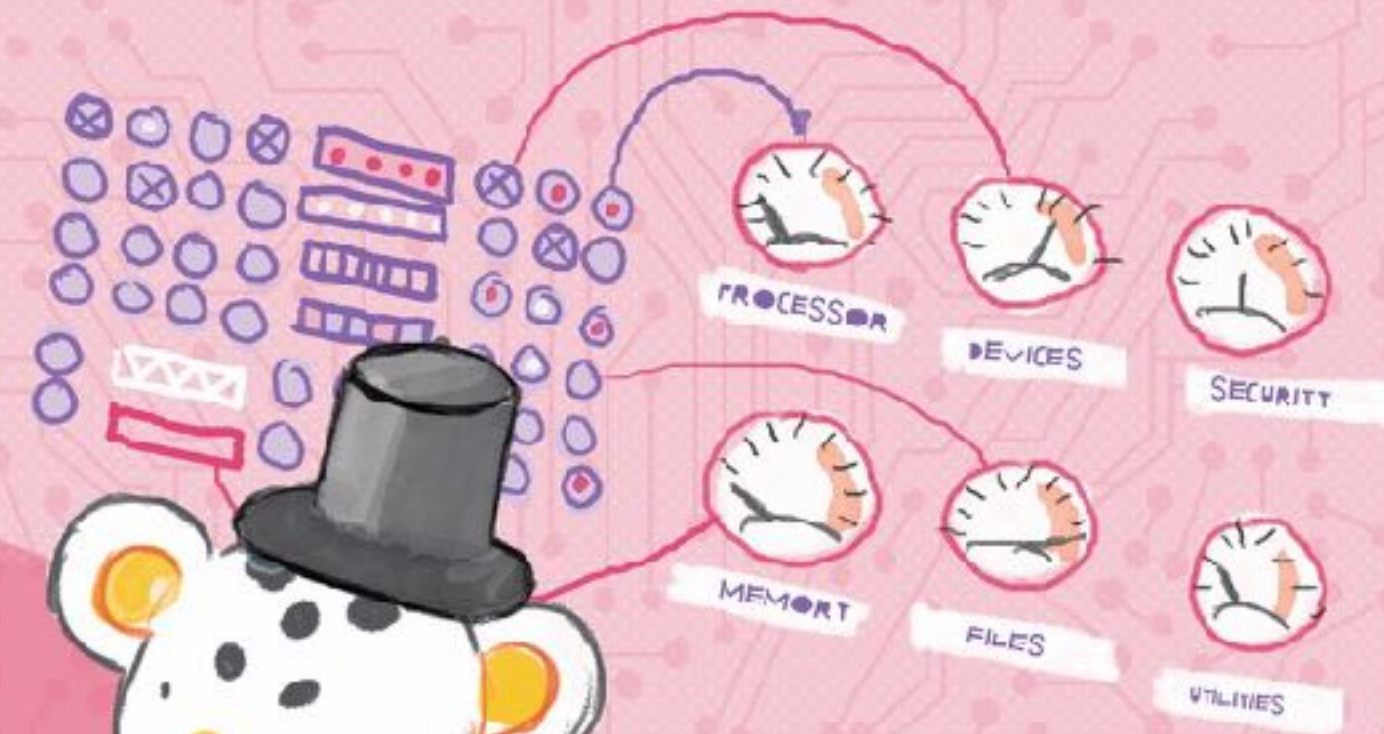
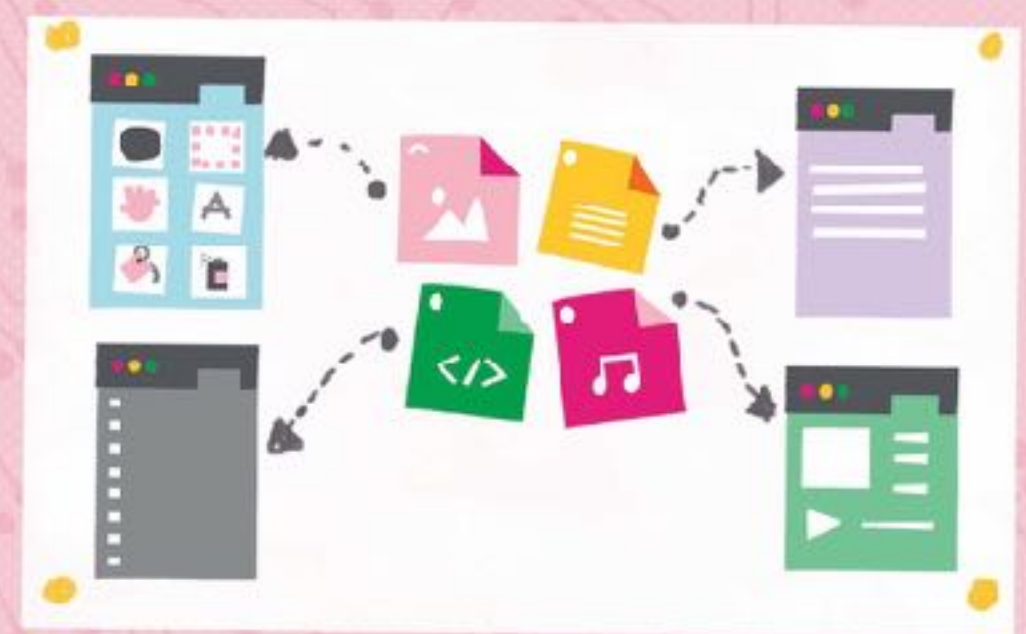






FETCH! EXECUTE!
STORE!

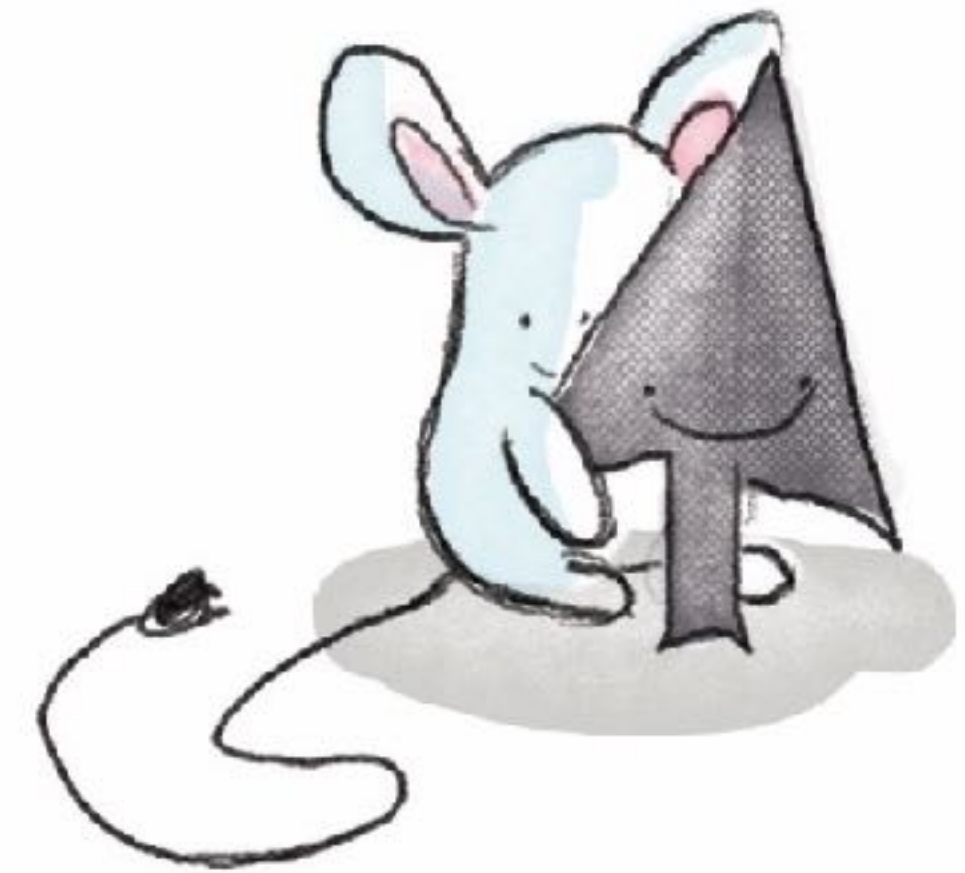




HARDWARE

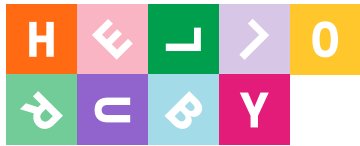
SOFTWARE

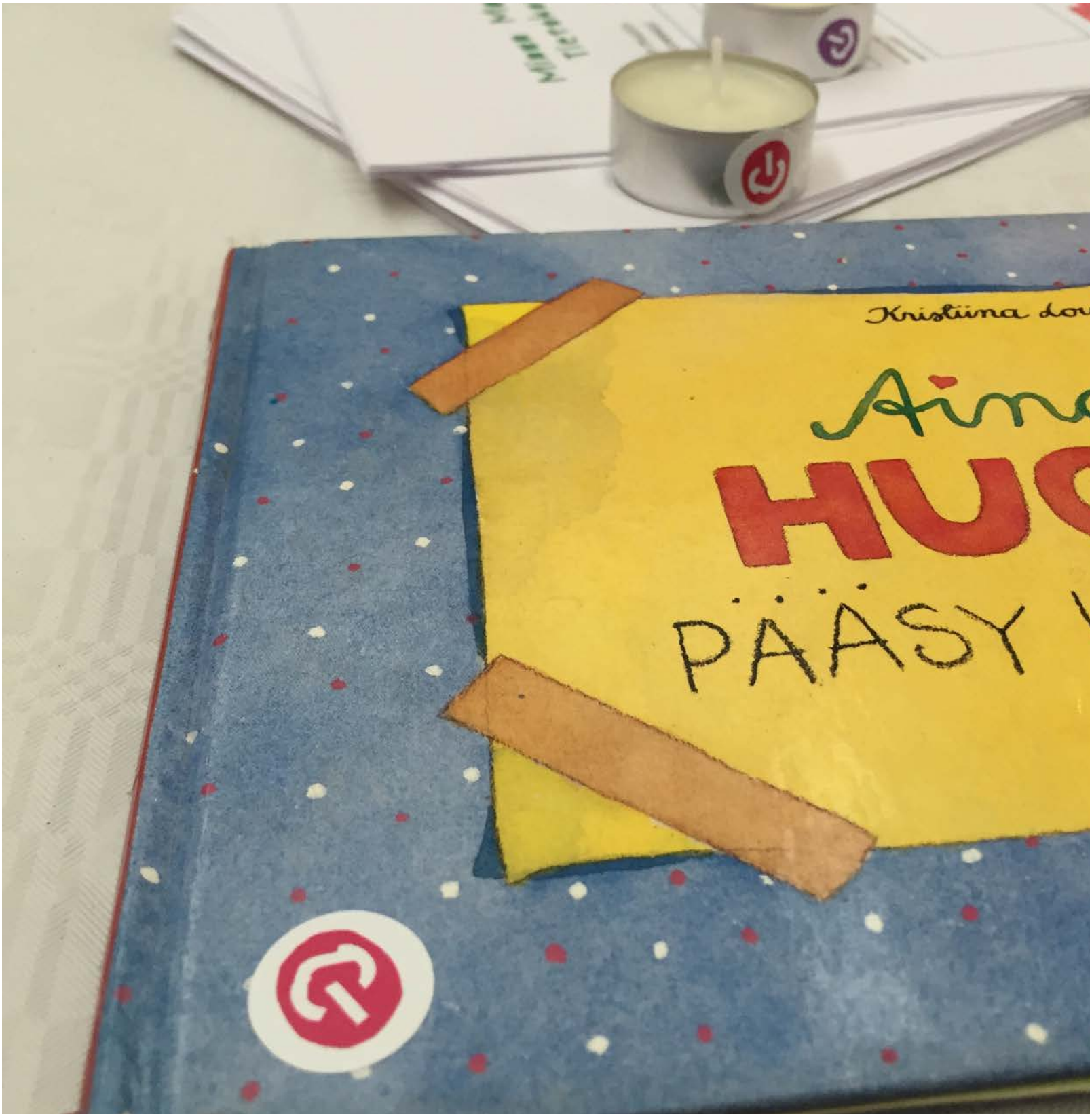






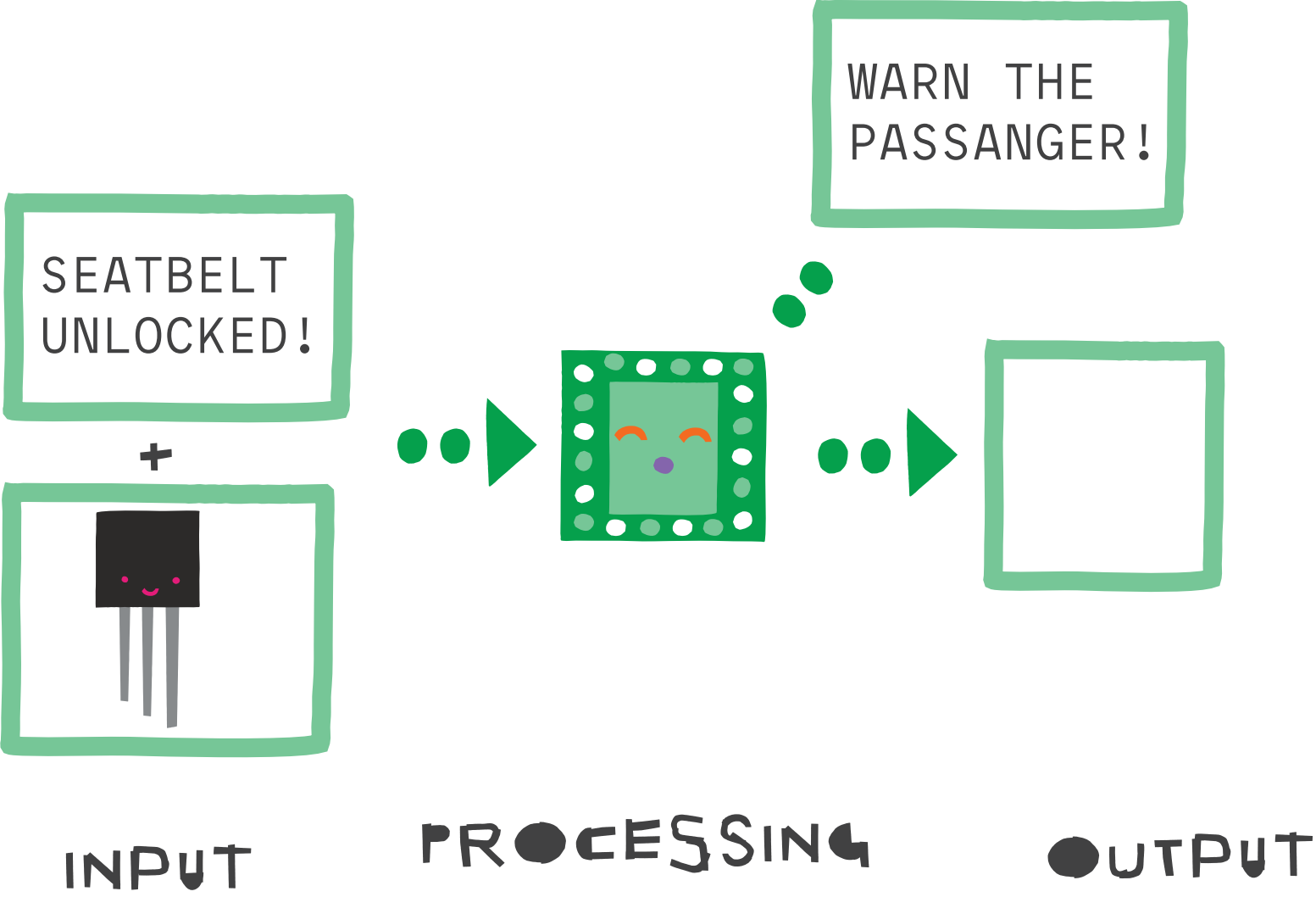
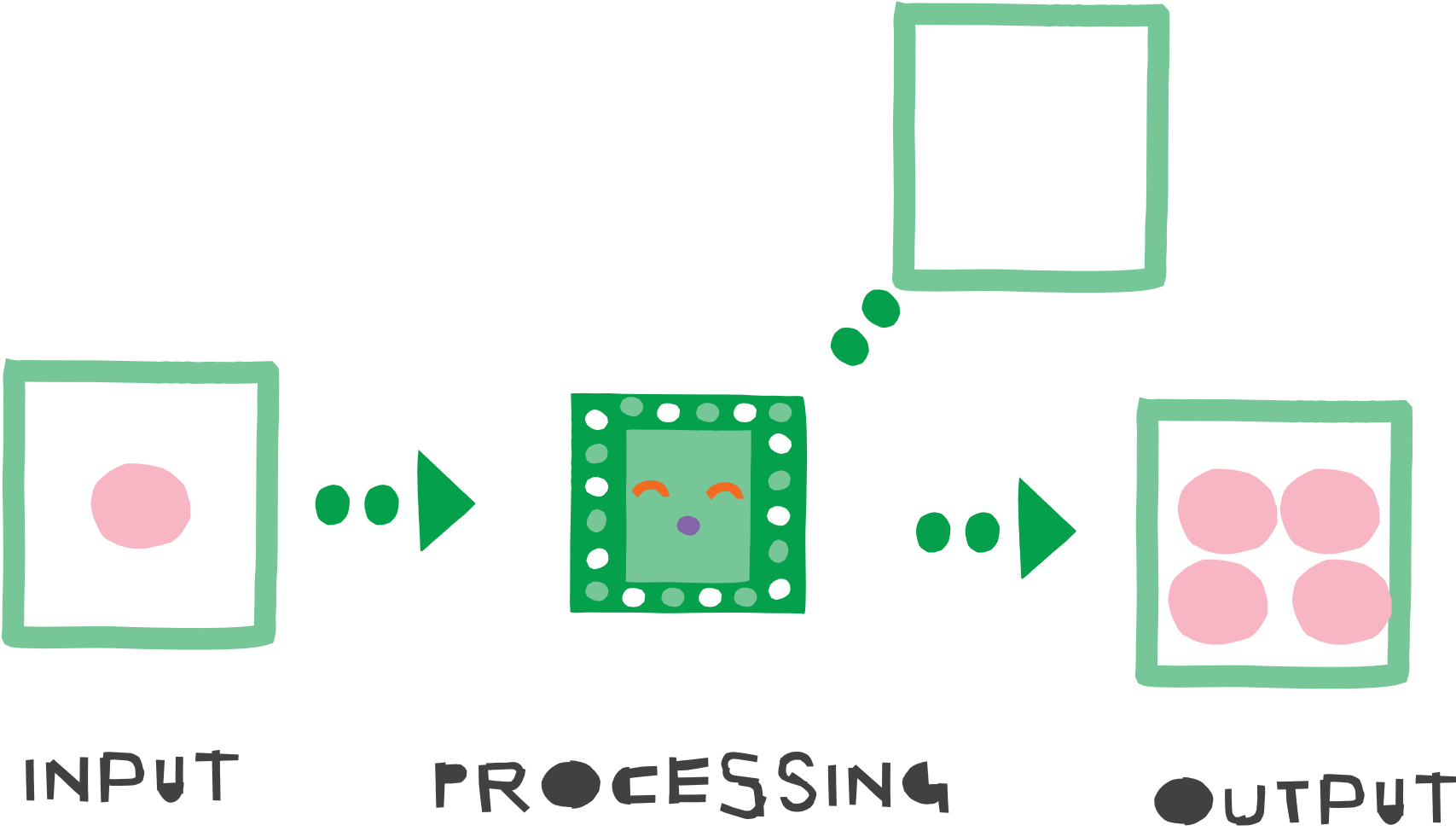
Computers
are
abstraction
machines.





**YOU
ARE
GREAT!**

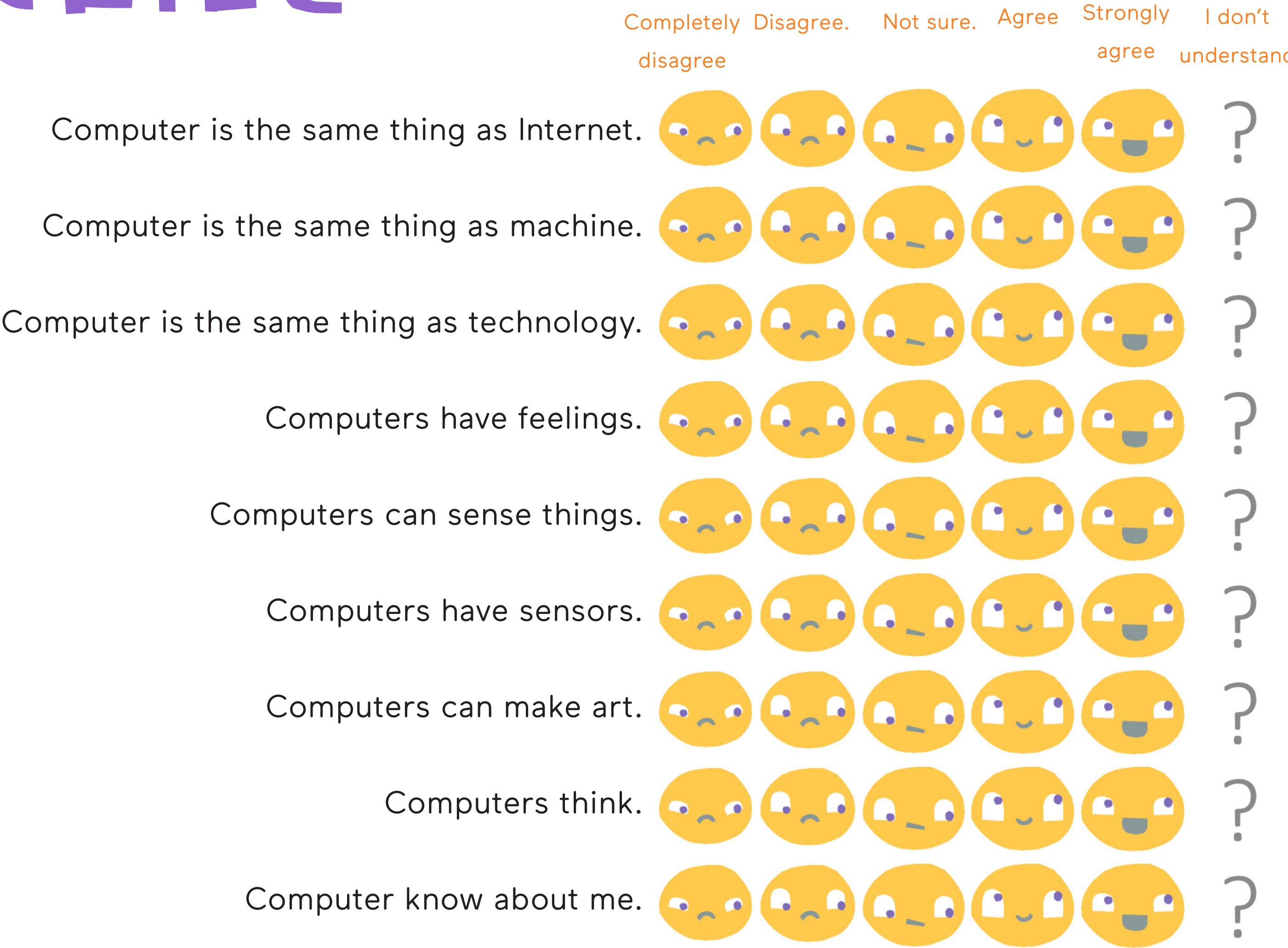




Notional machine

“An abstraction of the computer that one can use for thinking about what a computer can and will do.”
- Benedict DuBoulay

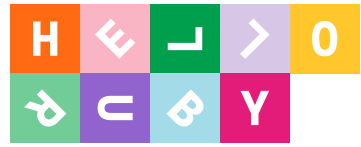
“We want students to understand what a computer can do, what a human can do, and why that’s different. To understand computing is to have a robust mental model of a notional machine.”
- Mark Guzdial



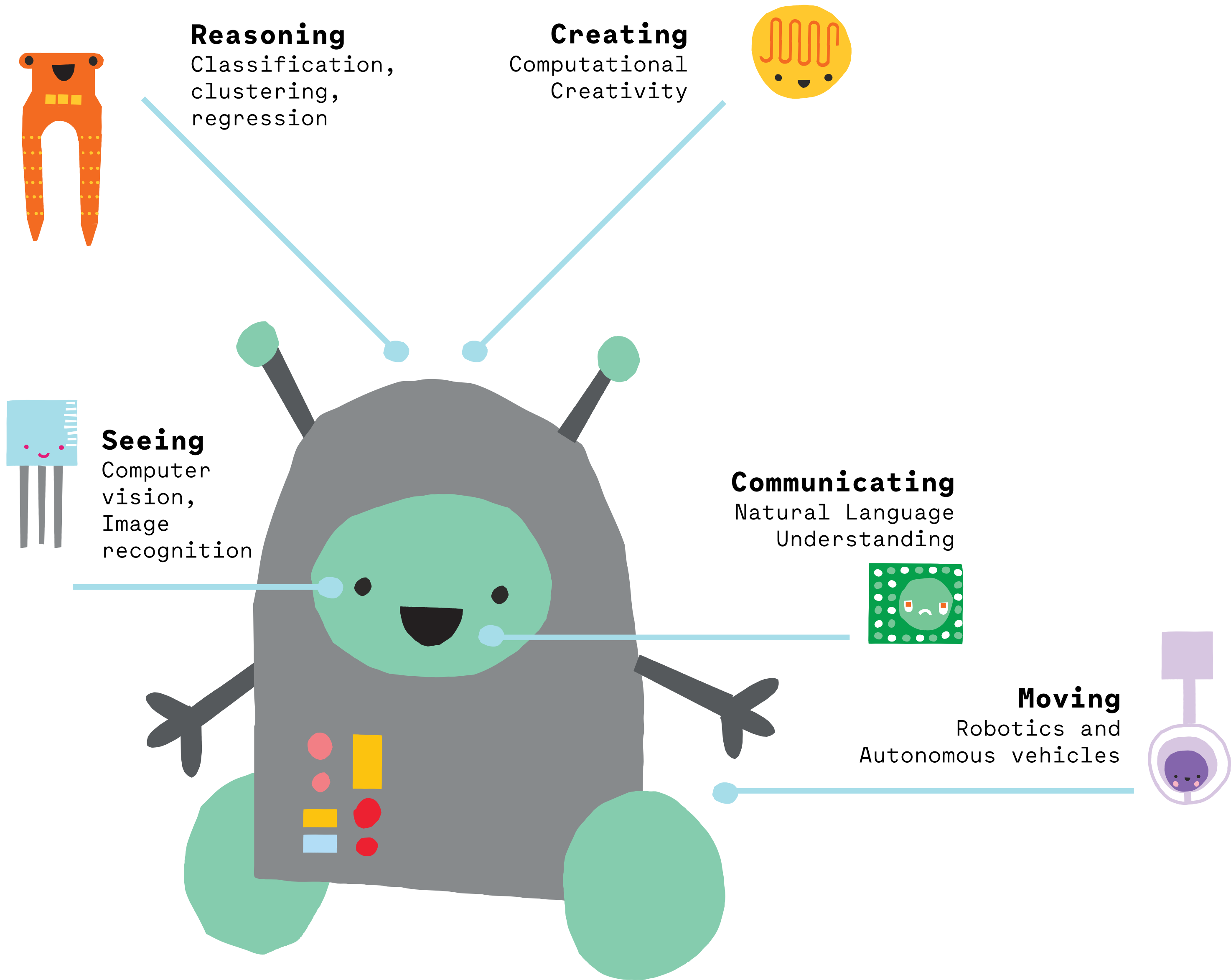
C

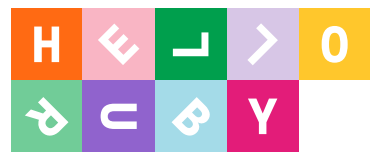
is for
creativity





Machine Learning





INPUT

OUTPUT

APPLICATION

Picture

Are there human faces (0 or 1)

Photo tagging

English sentence

French sentence

Translation

Car cameras

Position of other cars

Self-driving cars

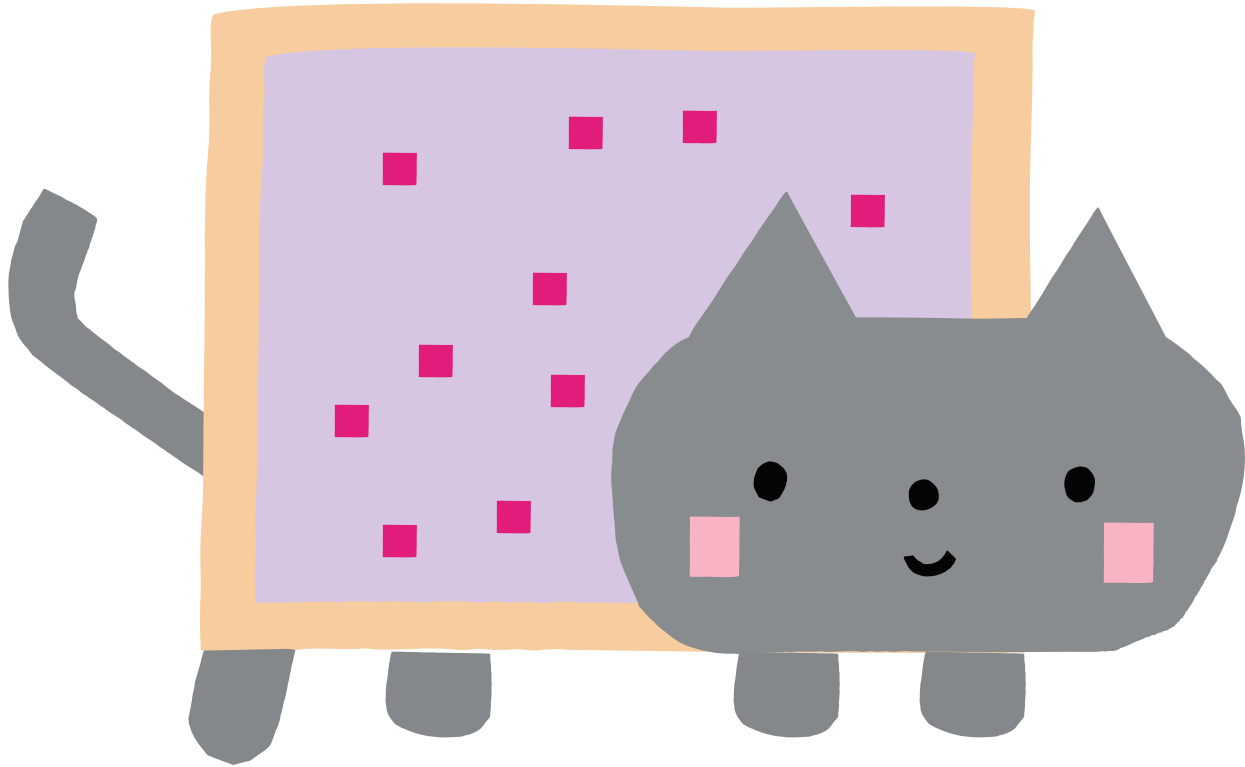
Audioclip

Transcript of audio clip

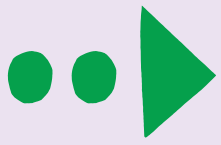
Speech recognition



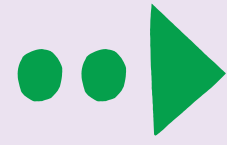
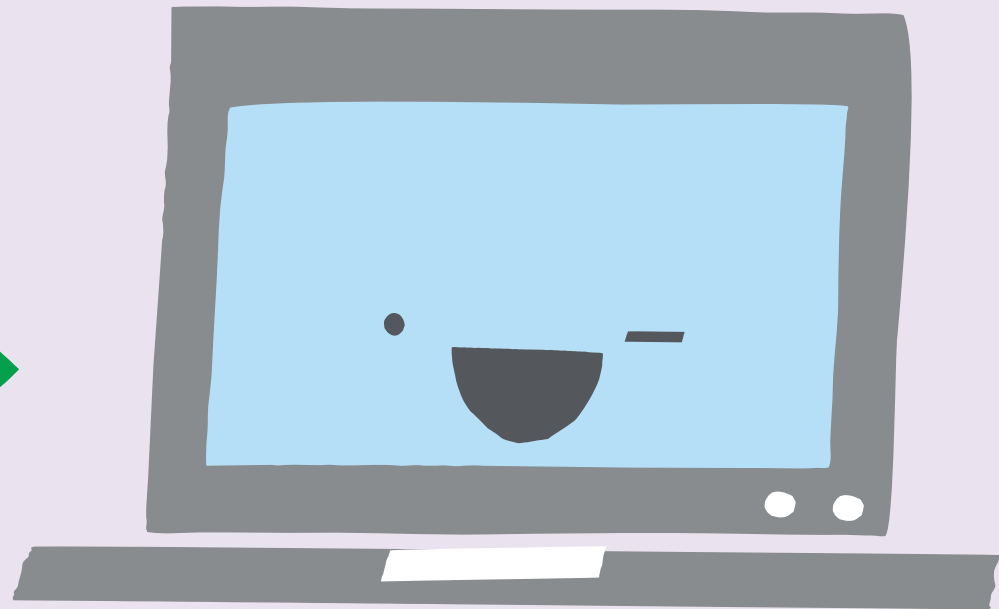
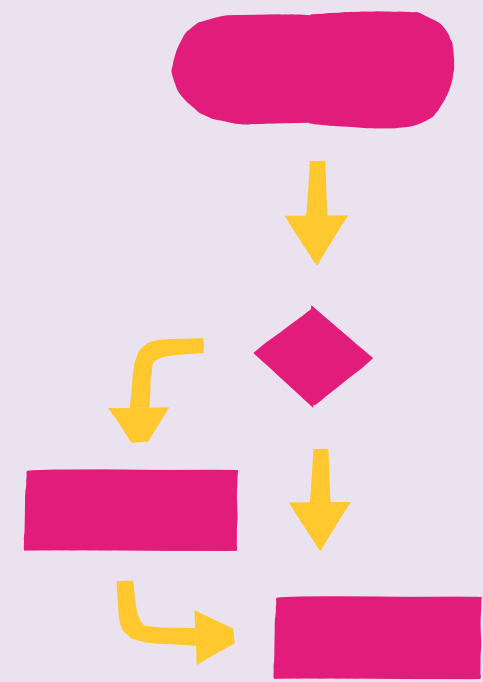
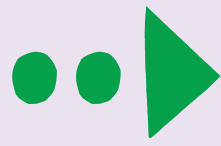
Is this a cat?



Rules

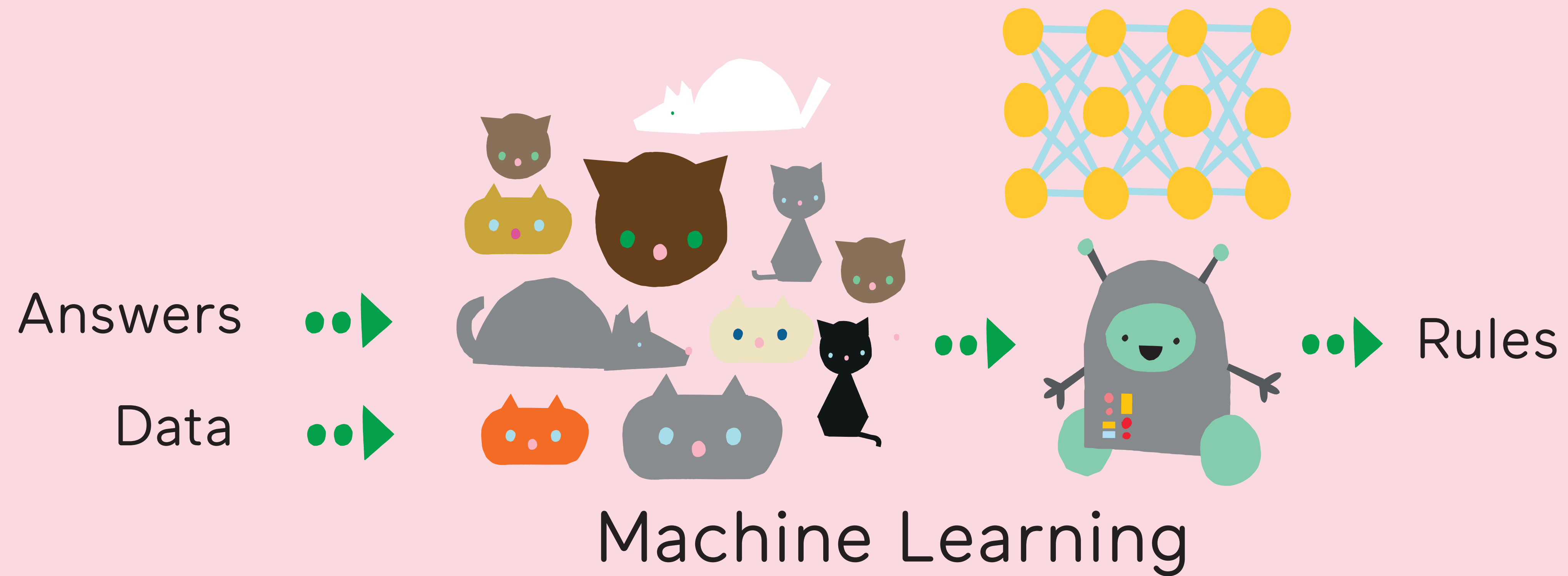


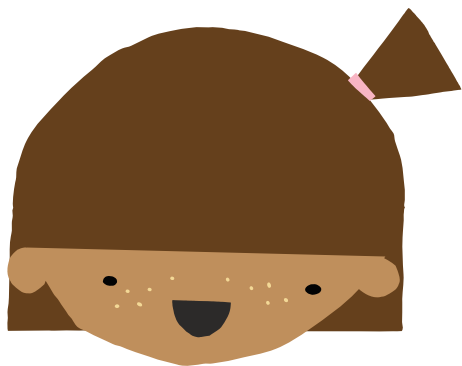
Data



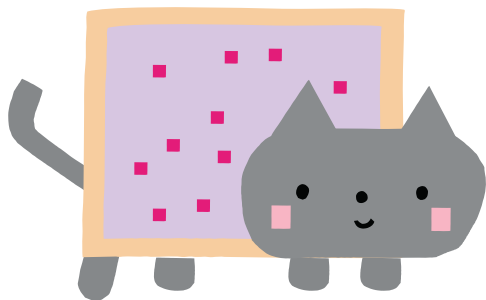
Answers

Traditional programming

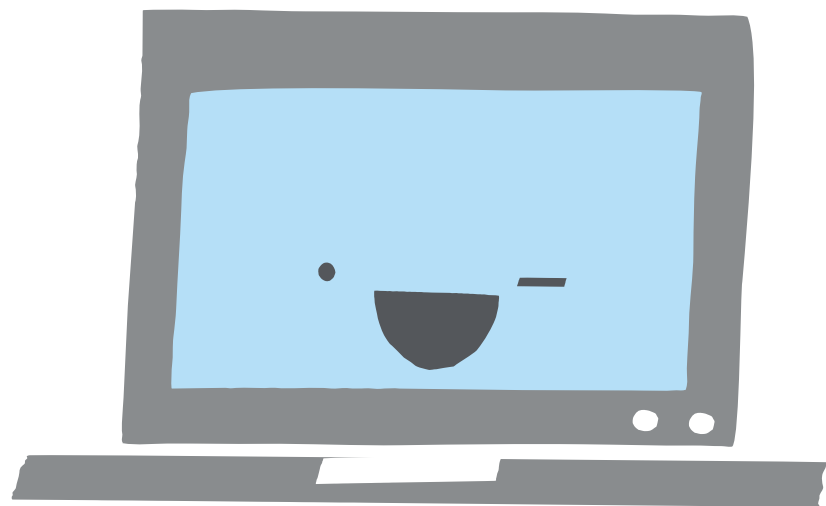


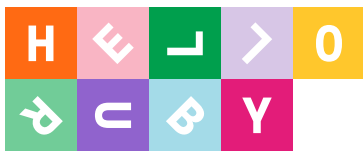


PROBLEM TO SOLVE
Is this a cat?



ANSWER THE QUESTION





GATHER DATA

Examples of cats

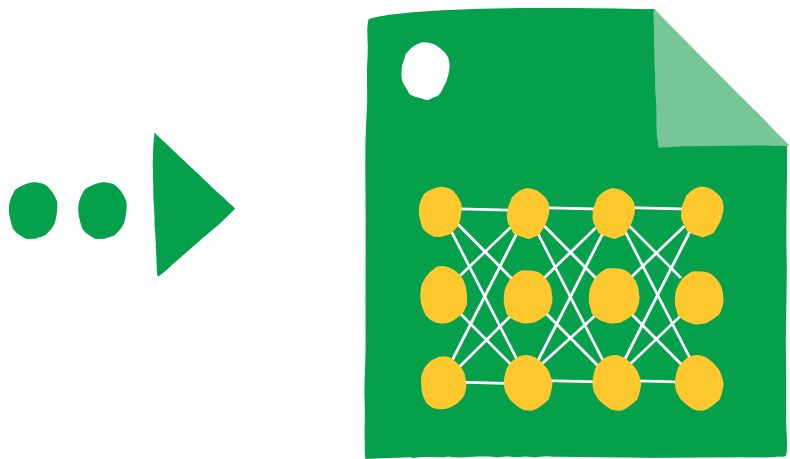


GATHER DATA

Examples of cats



BUILD A MODEL

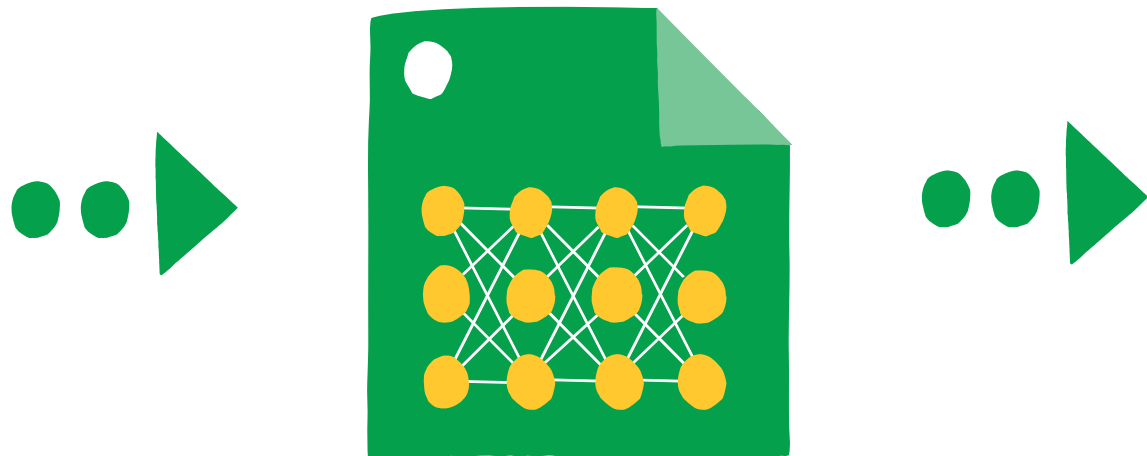


GATHER DATA

Examples of cats

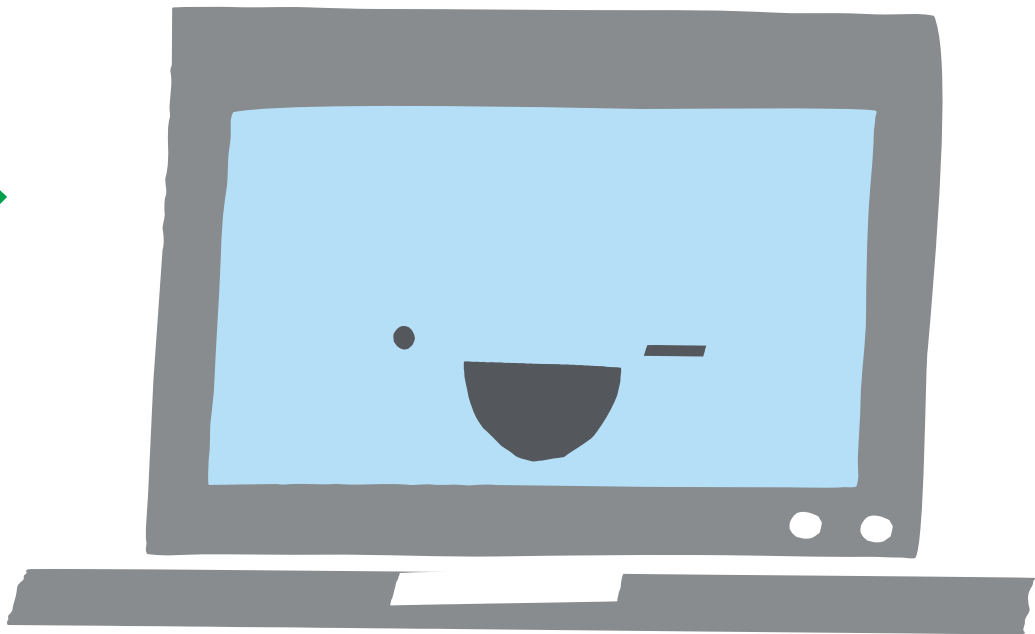


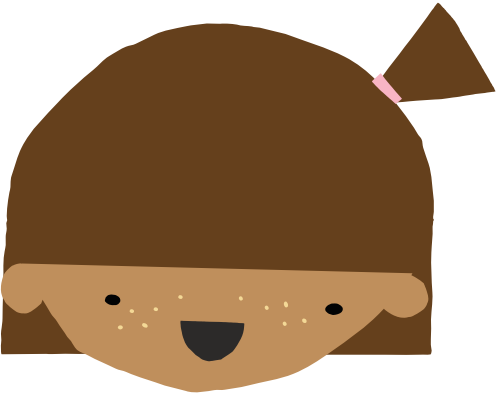
BUILD A MODEL



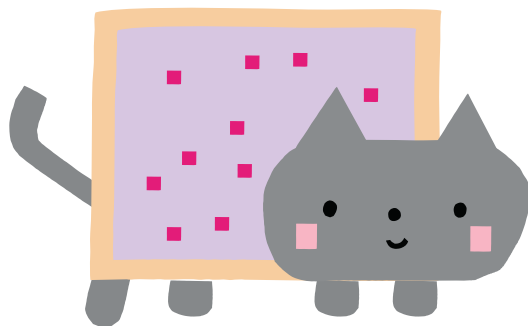
ANSWER THE QUESTION

Yes!





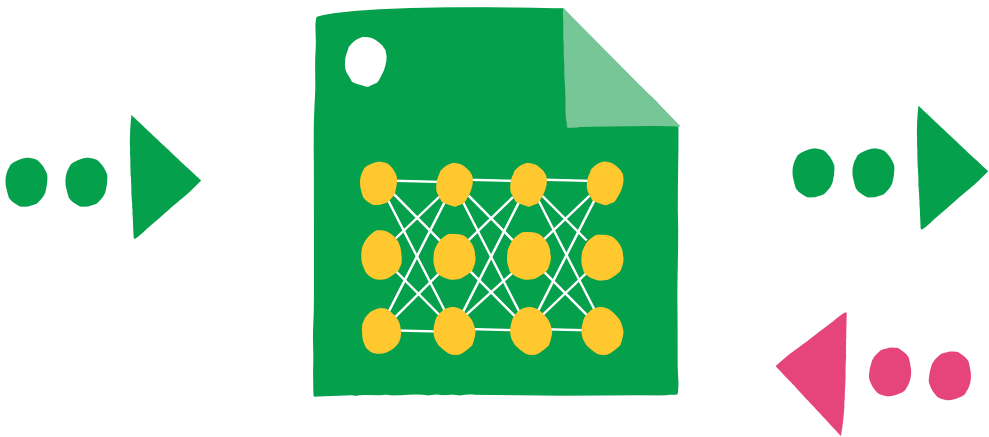
PROBLEM TO SOLVE
Is this a cat?



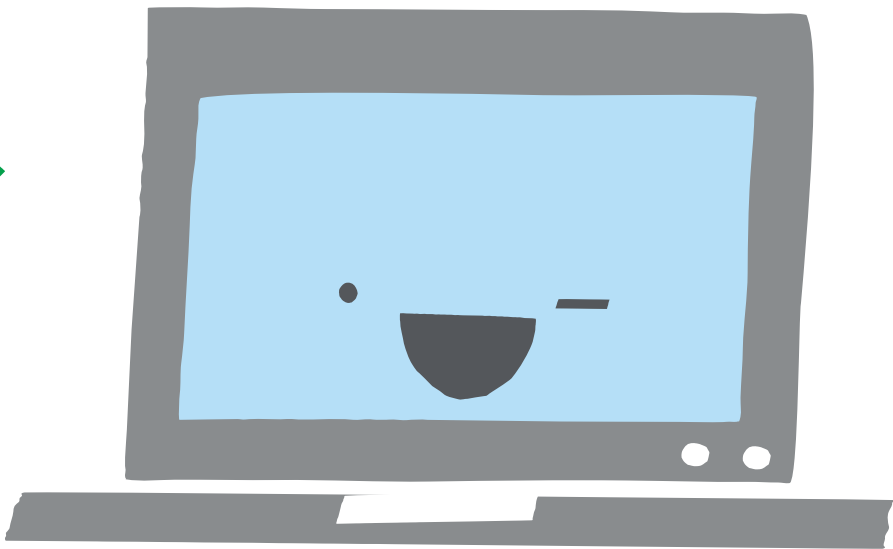
GATHER DATA
Examples of cats



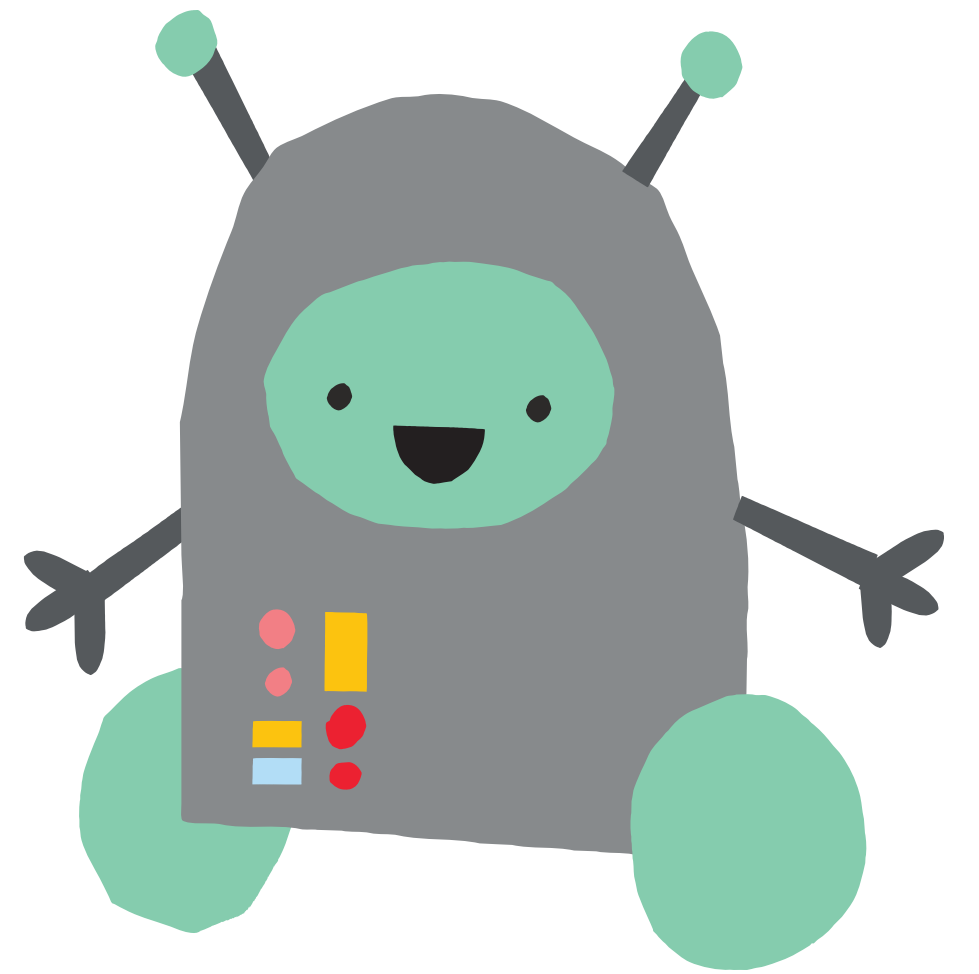
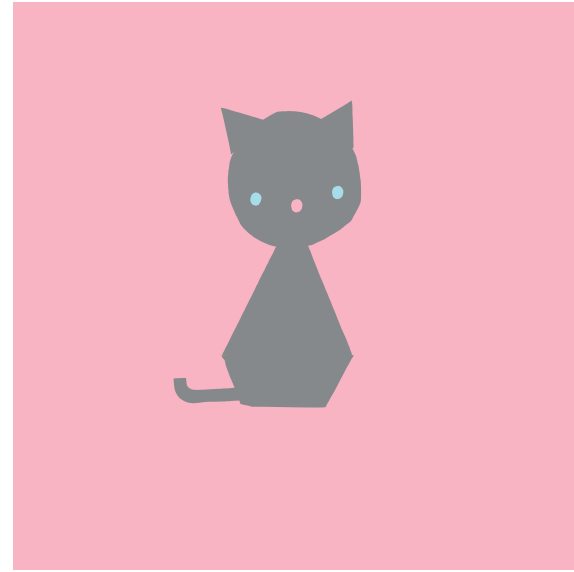
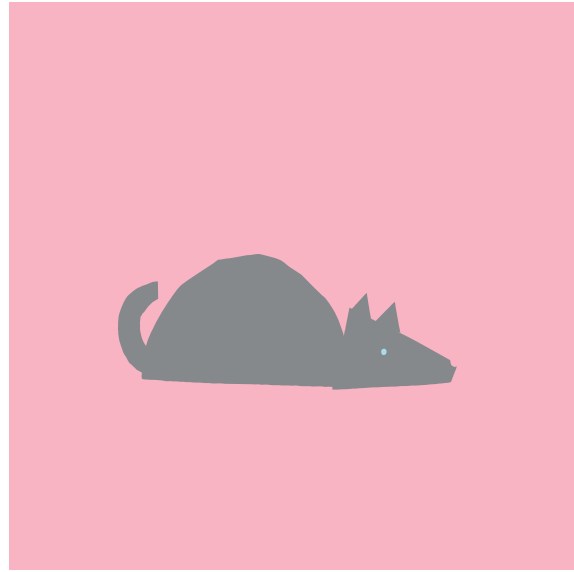
BUILD A MODEL

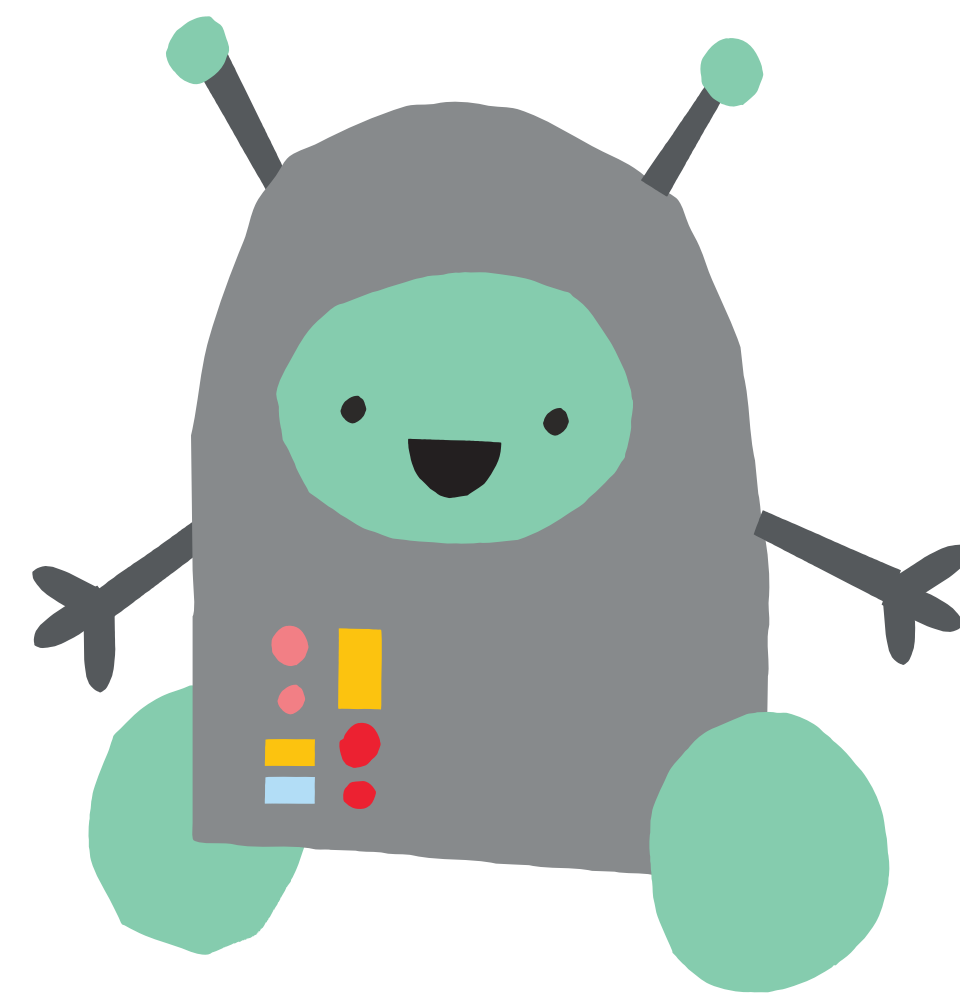
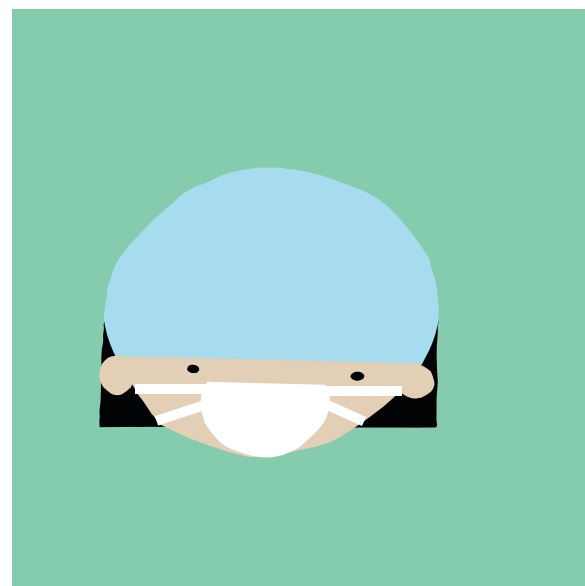
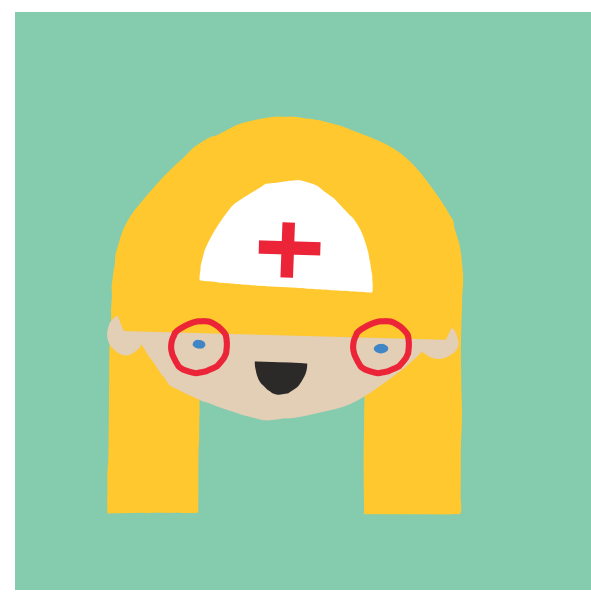


ANSWER THE QUESTION
Yes!



UPDATE MODEL

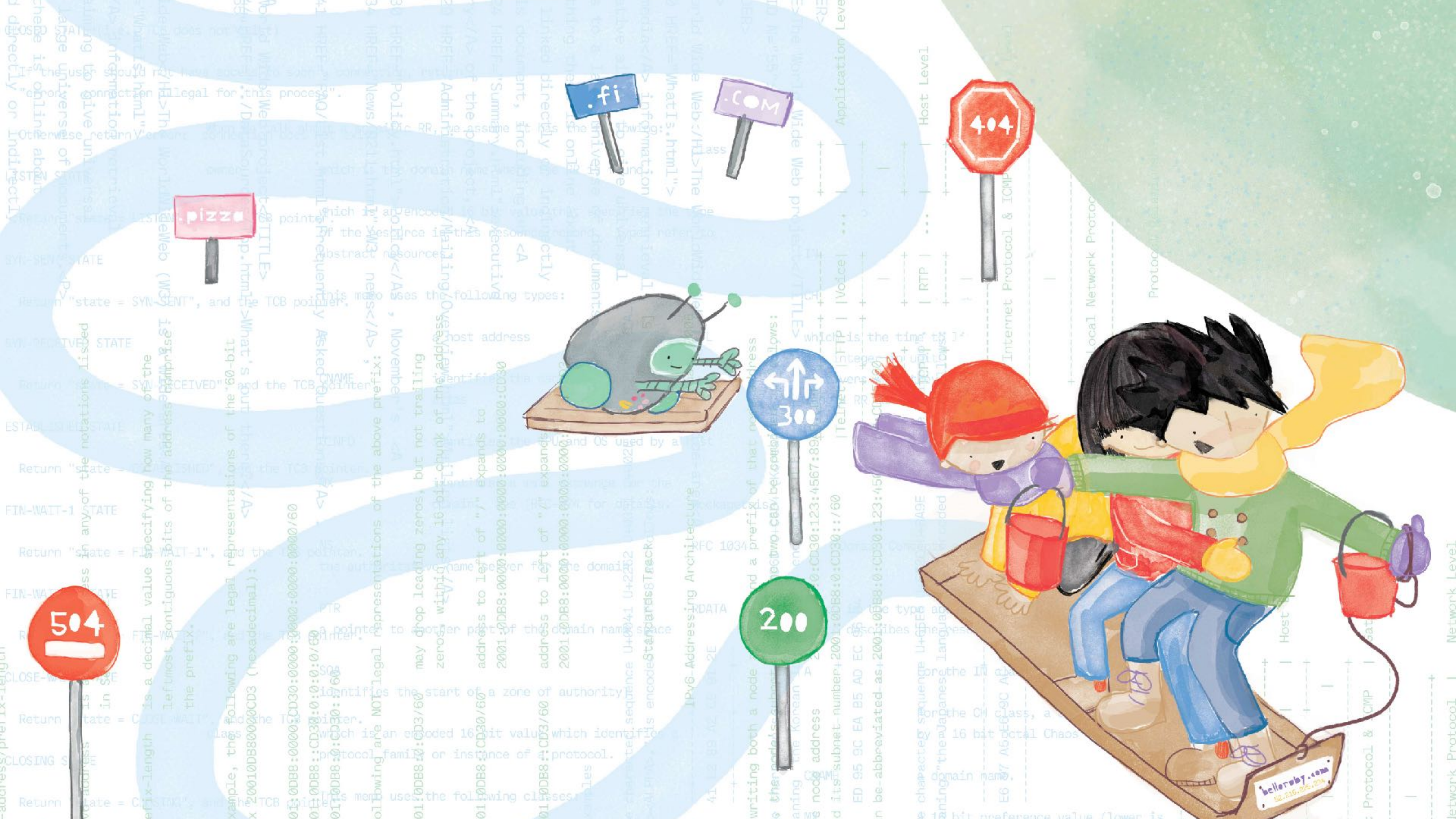




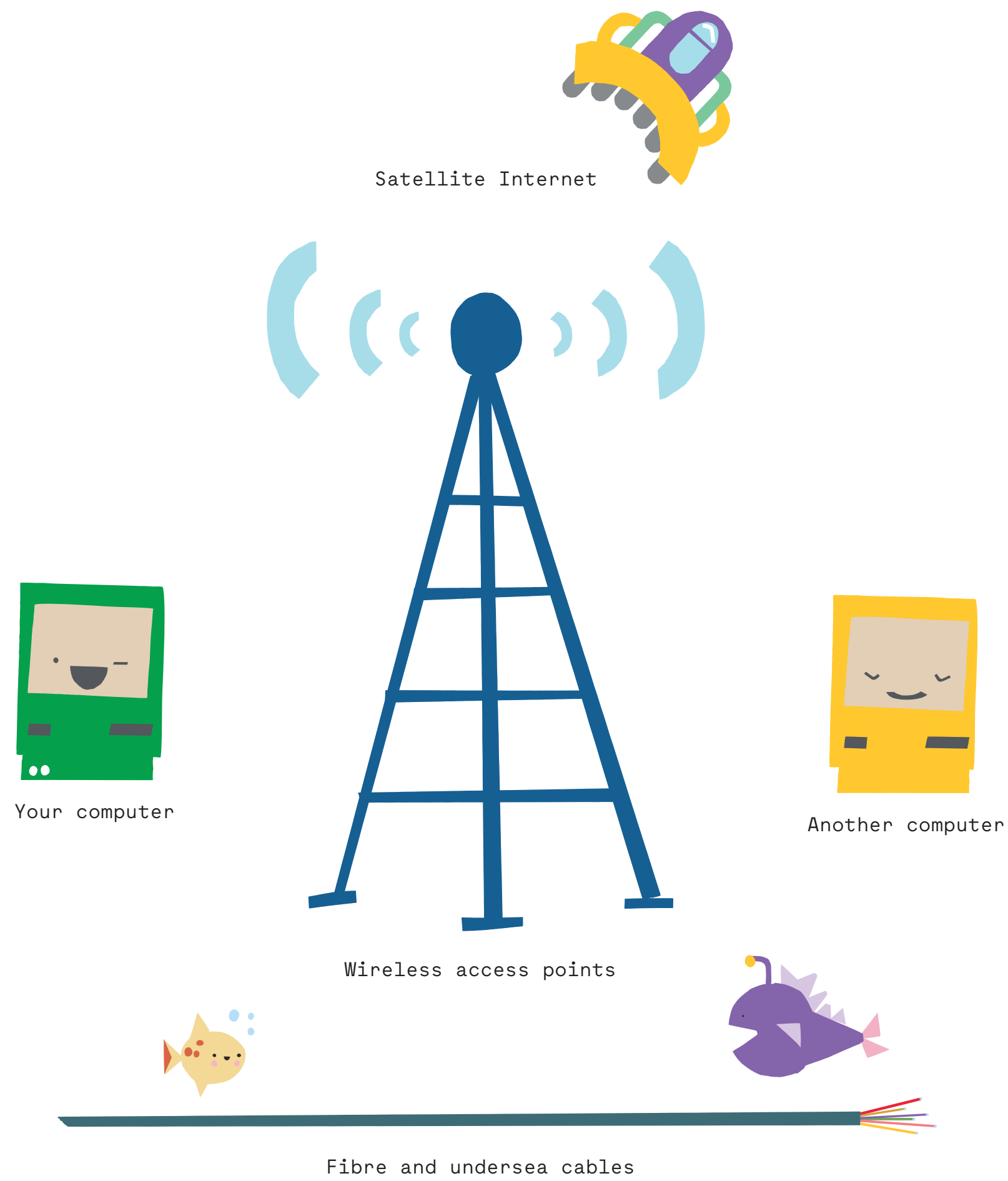


**What happens in a world where
we don't have the vocabulary
to express what is around us?**

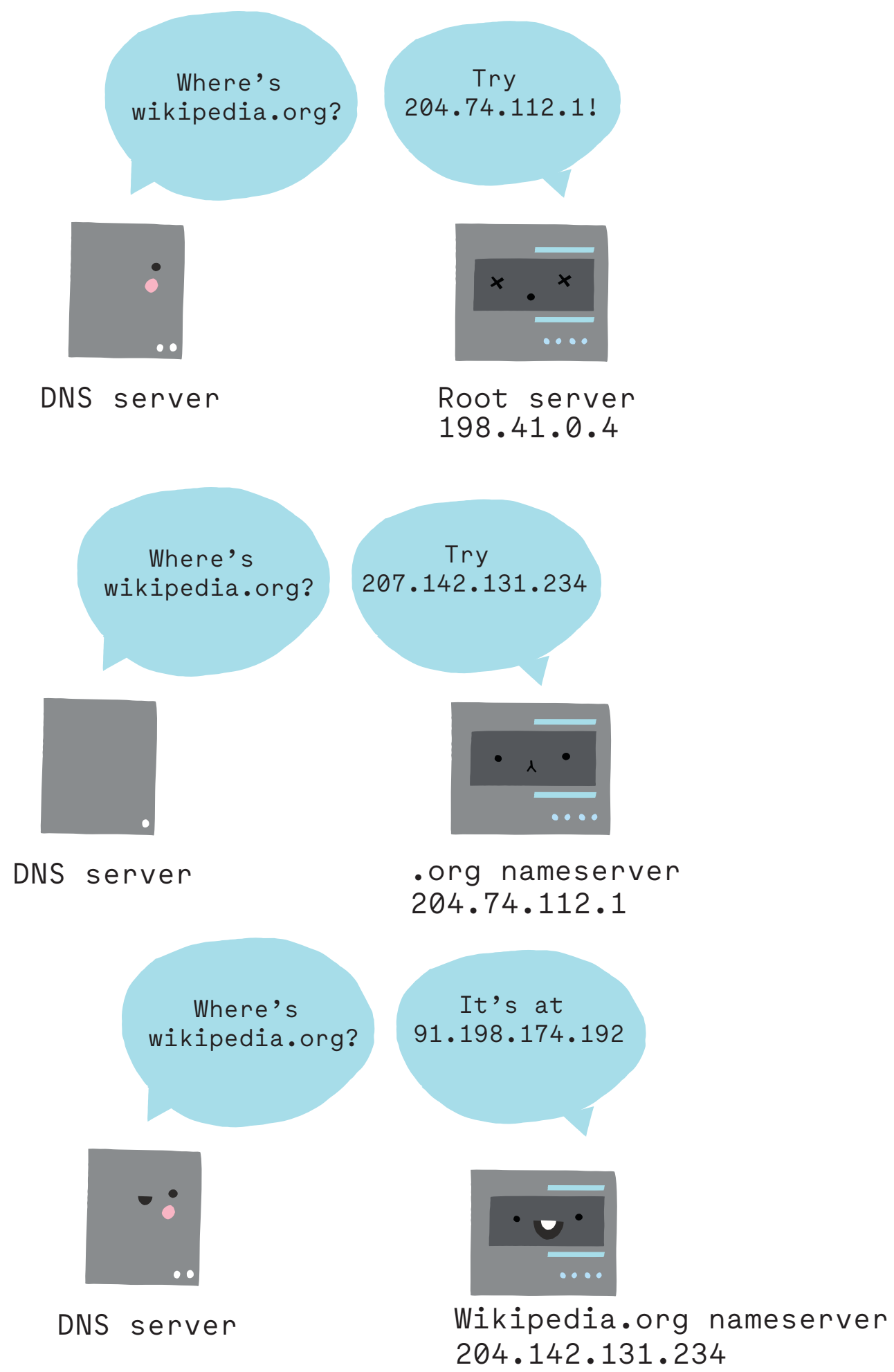




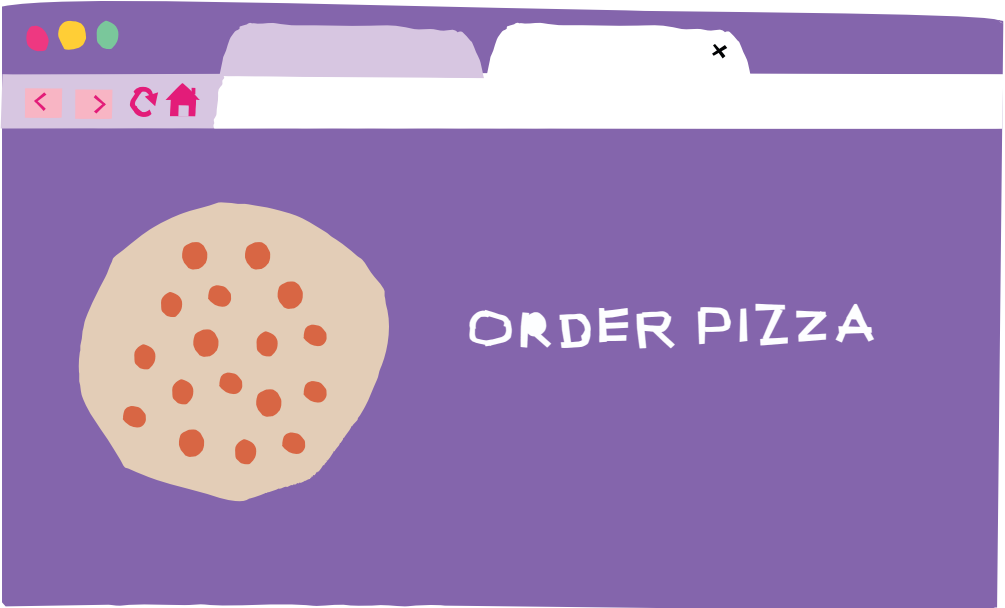




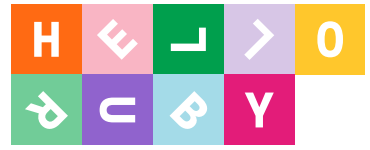
Hardware



Software



Society



Technology is built on humanity.

Computer (*km-pytr*)

n.

person who makes calculations or computations; a calculator, a reckoner; spec. a person employed to make calculations in an observatory, in surveying.

Technology (from Greek τέχνη)

Techne, "art, skill, cunning of hand"; and -λογία, -logia[1]. Techniques, skills and competencies alongside the tools needed to do the job.

Agriculture is a technology;
democracy is a technology.

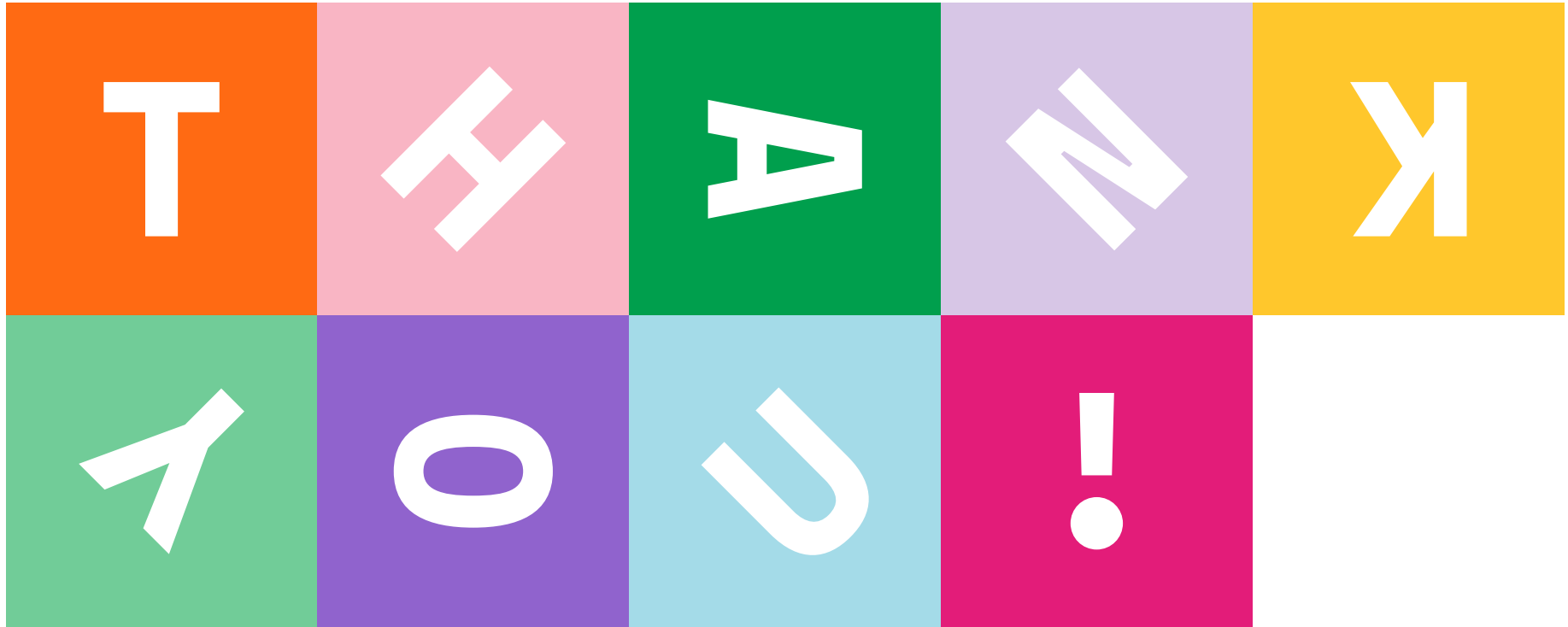
Exercise 3

Explain!

What is technology? What is it used for?
And who uses it?

Technology is electricity that
moves. It is used to play. I use it to have a
conversation with my mom. We use a
WhatsApp application. People uses technology.





L i n d a
L i u k a s
A u t h o r
&
I l l u s t r a t o r
H e l l o
R u b y
+ 3 5 8 4 1 5 1 4 3 4 0 5
l i n d a @ h e l l o r u b y . c o m
t w i t t e r : @ l i n d a l i u k a s
w w w . h e l l o r u b y . c o m



CITIZENS OF THE FUTURE

Innovations to Leapfrog
Global Education

CLAUDIO SASSAKI

Co-Founder and CEO, Greekie
[@ClaudioSasaki](https://twitter.com/ClaudioSasaki)

IDB
#01

May
2018



geekie





**7 days in 7
minutes**

Get to know the routine of Mr. Vinicius...

Vinicius is one of 2 million Brazilian teachers

IDB

Nº

#01



99%

of Brazilian teachers
earn less than
R\$3,500

He is married and has two little girls,
and, just like his Brazilian colleagues,
earns a wage equal to \$972 a month

To be able to pay the bills, he
teaches in 3 different schools.

**He has barely any spare time to support
the development of his own daughters.**

Saturday and Sunday

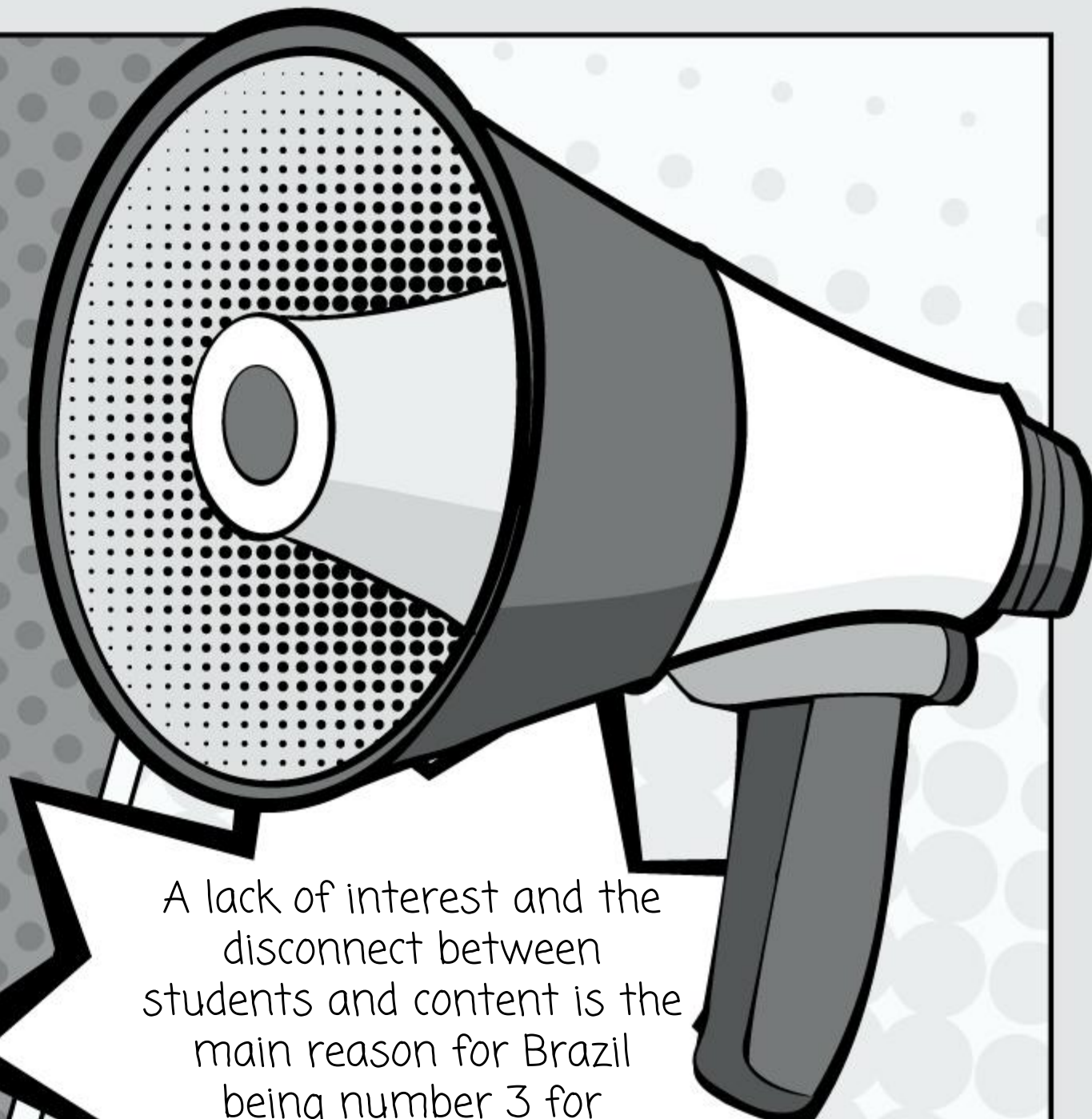
IDB

Nº

#01



Vinicius starts the week by giving up some family time in order to select content that can add to his classes, to make them more dynamic



A lack of interest and the disconnect between students and content is the main reason for Brazil being number 3 for high-school dropout among countries assessed by the UNDP.

Vinicius doesn't want to lose a single student!

Monday

IDB

Nº

#01



At 7 in the morning
Vinicius was ready to
start the first of five
lessons the day.

At 7:20 he hadn't
managed to start
teaching his content,
as he had to check
which students had
done the homework.

**In Brazil, 33% of
teachers time goes to
bureaucratic activities.**

Tuesday

IDB

Nº

#01



Our teacher starts moving to the next chapter of his content when he realizes that half the class can't keep up with him.

He is forced to stop the lesson and review the content of previous chapters.

The half that had learned it is now inattentive and bored.



Wednesday

IDB

Nº

#01



Today he has to prep different tests for all of his classes.

He knows it's going to cost him 4 hours and is afraid he won't get to tell his kids a bed-night story.

Vinicius starts the day thinking about the night he is about to face.



Thursday

IDB

Nº

#01

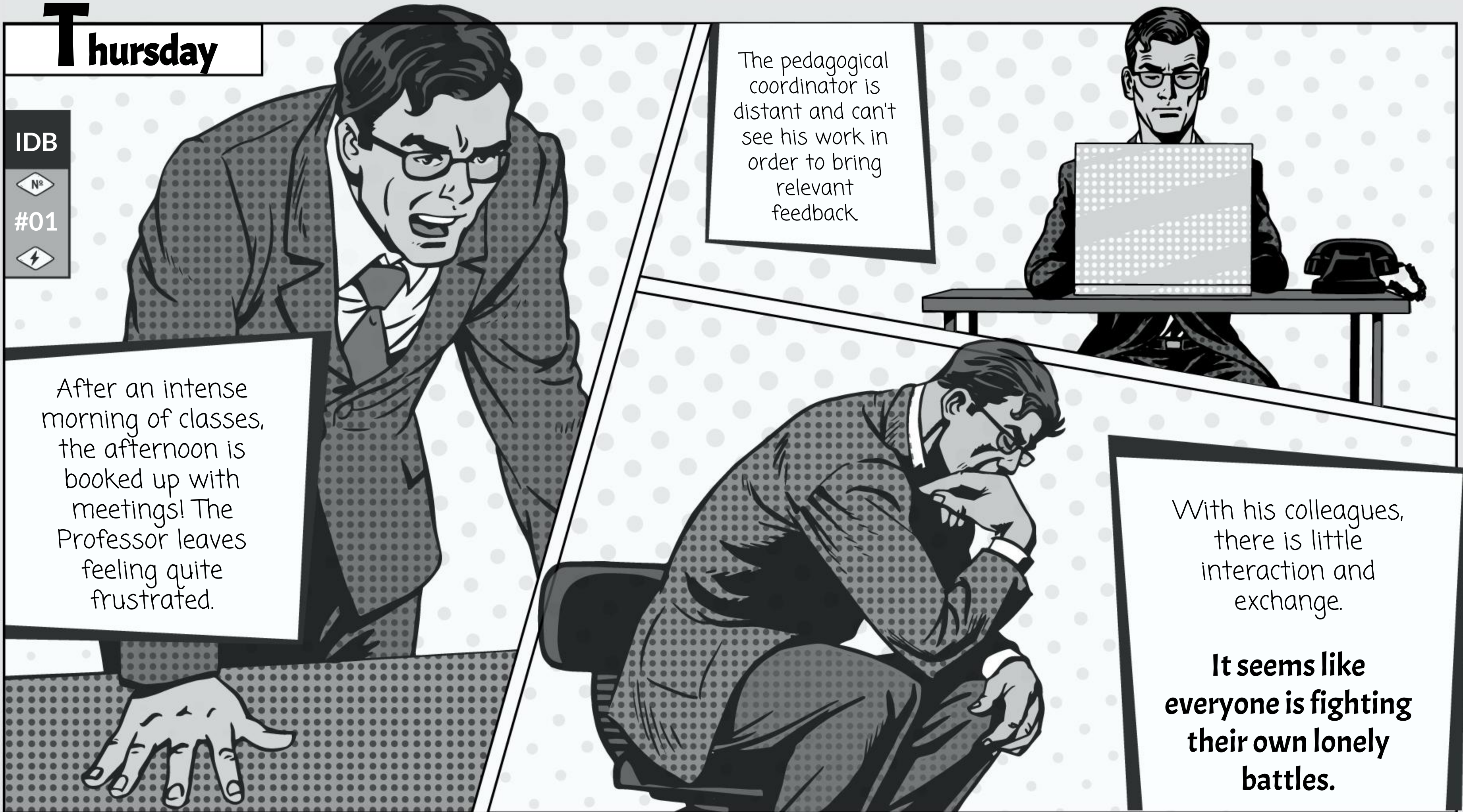


After an intense morning of classes, the afternoon is booked up with meetings! The Professor leaves feeling quite frustrated.

The pedagogical coordinator is distant and can't see his work in order to bring relevant feedback.

With his colleagues, there is little interaction and exchange.

It seems like everyone is fighting their own lonely battles.



Friday

BID

Nº

#01



Another week comes to its end and Vinicius is exhausted.

That's not even what he is most sad about:

Vinicius became a teacher because of his love of teaching, but he goes home with the feeling that his students don't learn.

He is probably right.

In Brazil, only 10% of students graduate knowing the expected minimum in math.

To be continued...

**And how
could it be
different?**

Saturday and Sunday

BID

Nº

#01



Vinicius enjoys the weekend spending time with his family and friends.

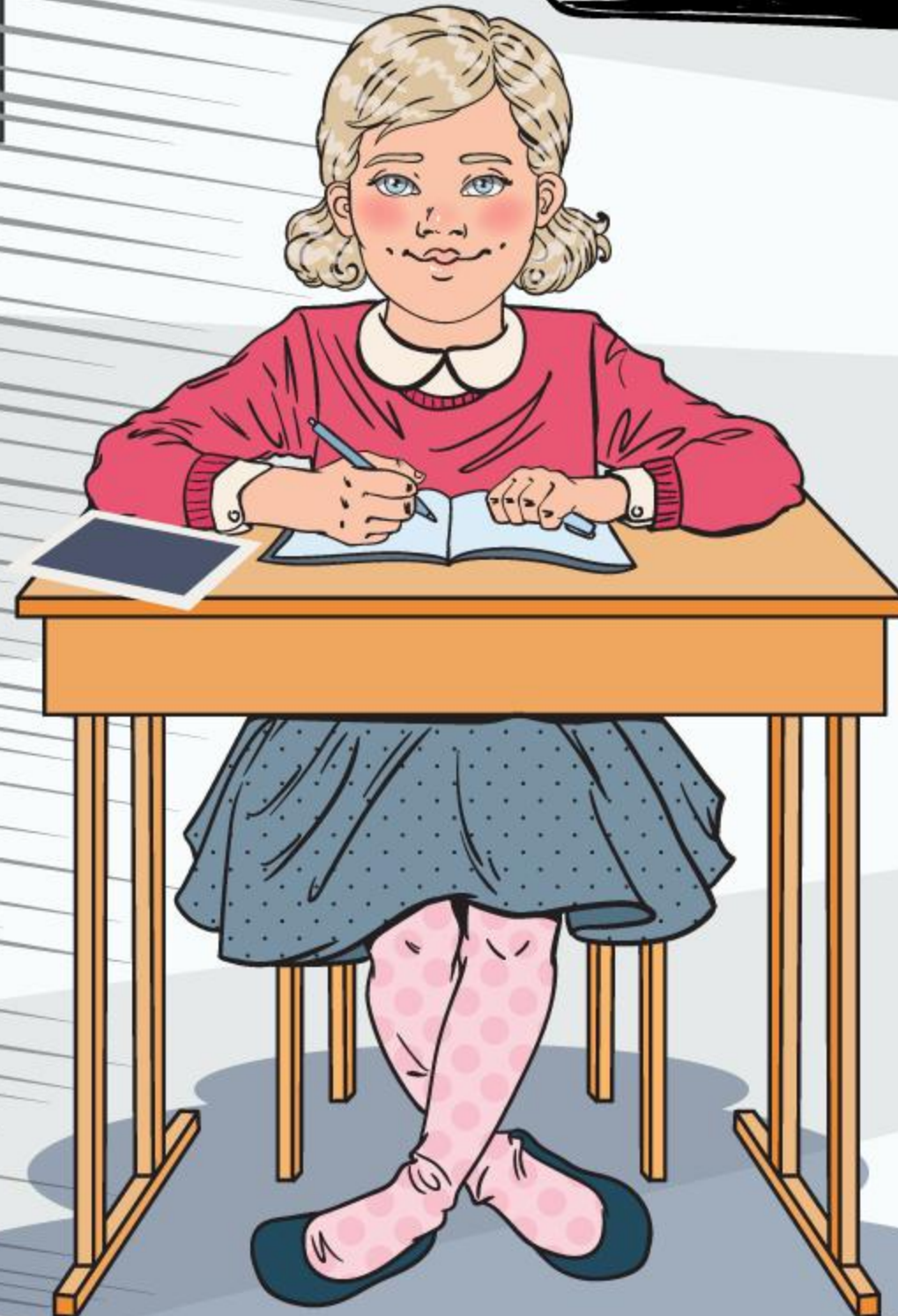
He goes to bed anxious about the following day: he wants to try something new with his students, supported by Geekie One - a solution that couples content with tools and methods that boost student's learning.

Monday

IDB

#01

The teacher uses **Geekie One** content to introduce the topic to his class.



He finishes each lesson on the day by having a little understanding evaluation: **students answer a few exercises on the same platform and, with the automatic correction tool, get to know the results straight away.**



Tuesday

BID

Nº

#01



Targeted Small Group

With data at hand, the teacher starts the lesson by dividing his class into **3 station-rotation groups, a methodology he was trained for by Geekie One's pedagogical consultancy**

Digital content station

Independent study

Vinicius is excited: he can address different needs in the same class!

Wednesday

BID

Nº

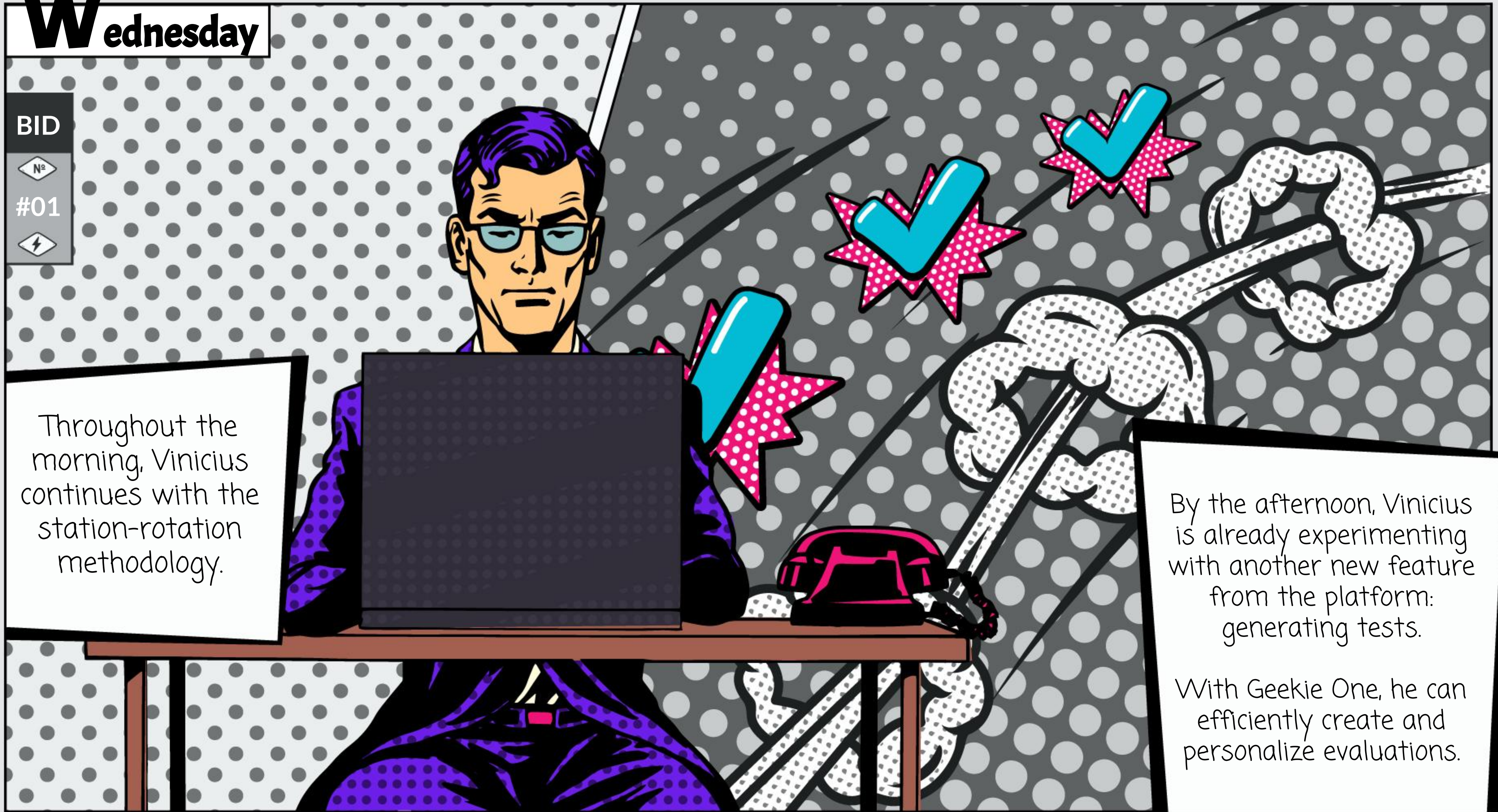
#01



Throughout the morning, Vinicius continues with the station-rotation methodology.

By the afternoon, Vinicius is already experimenting with another new feature from the platform: generating tests.

With Geekie One, he can efficiently create and personalize evaluations.



Thursday

BID

Nº

#01



On Thursdays there is the pedagogic meeting. And haven't things changed here as well!

Teachers are gathered using **Geekie One's tools to identify opportunities for interdisciplinary work.**

Vinicius loved his interaction with the pedagogy coordinator as well.

She was aware of his students development and brought valuable suggestions.

Friday

BID

Nº

#01



The teacher finishes the week excited!
He feels he managed to have more time and information to work with each student's particular needs.

Time to go home - his girls also need their father.



The end.



CITIZENS OF THE FUTURE

Innovations to Leapfrog
Global Education

KARIMA GRANT

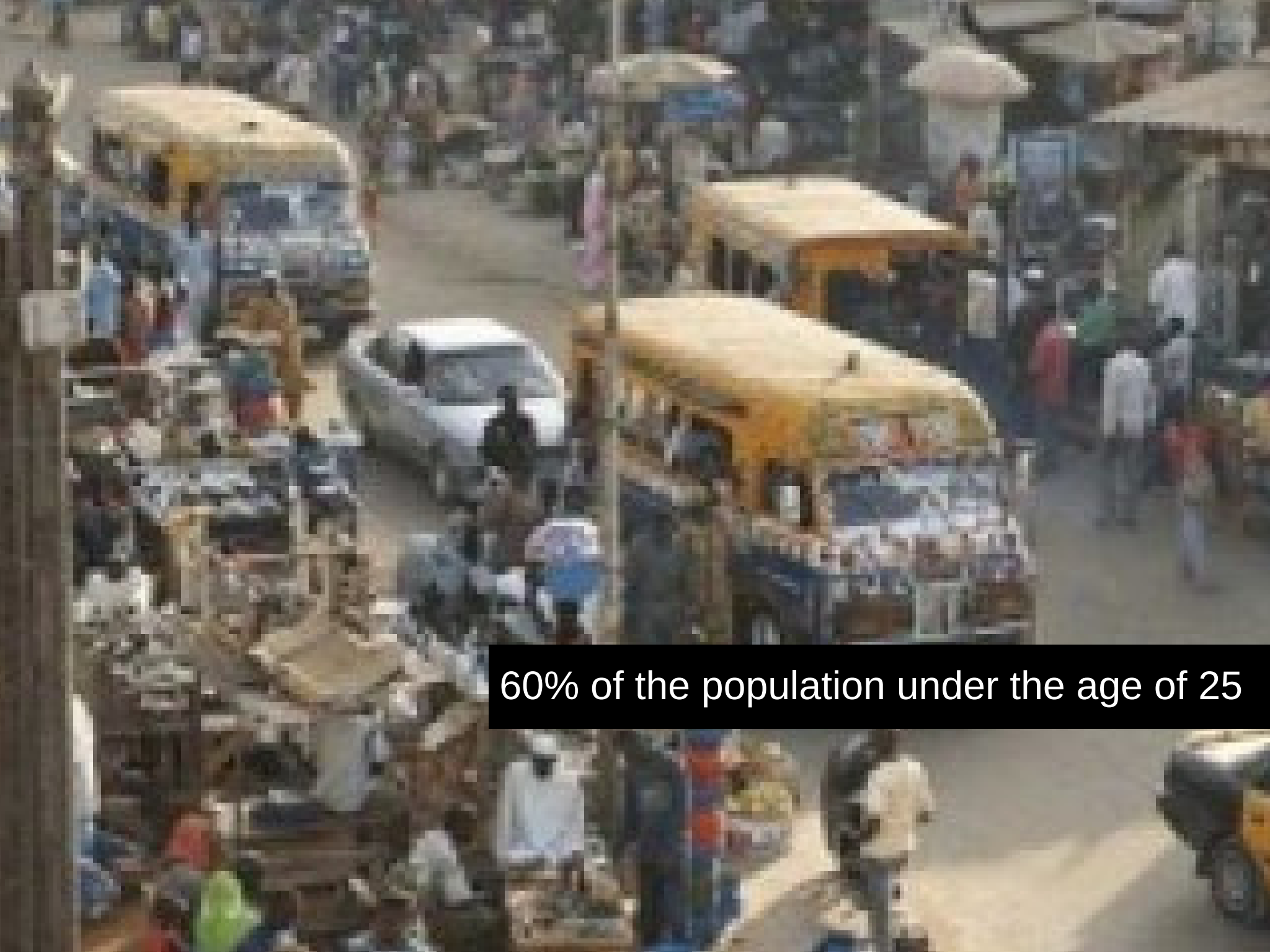
Executive Director, ImagiNation Afrika



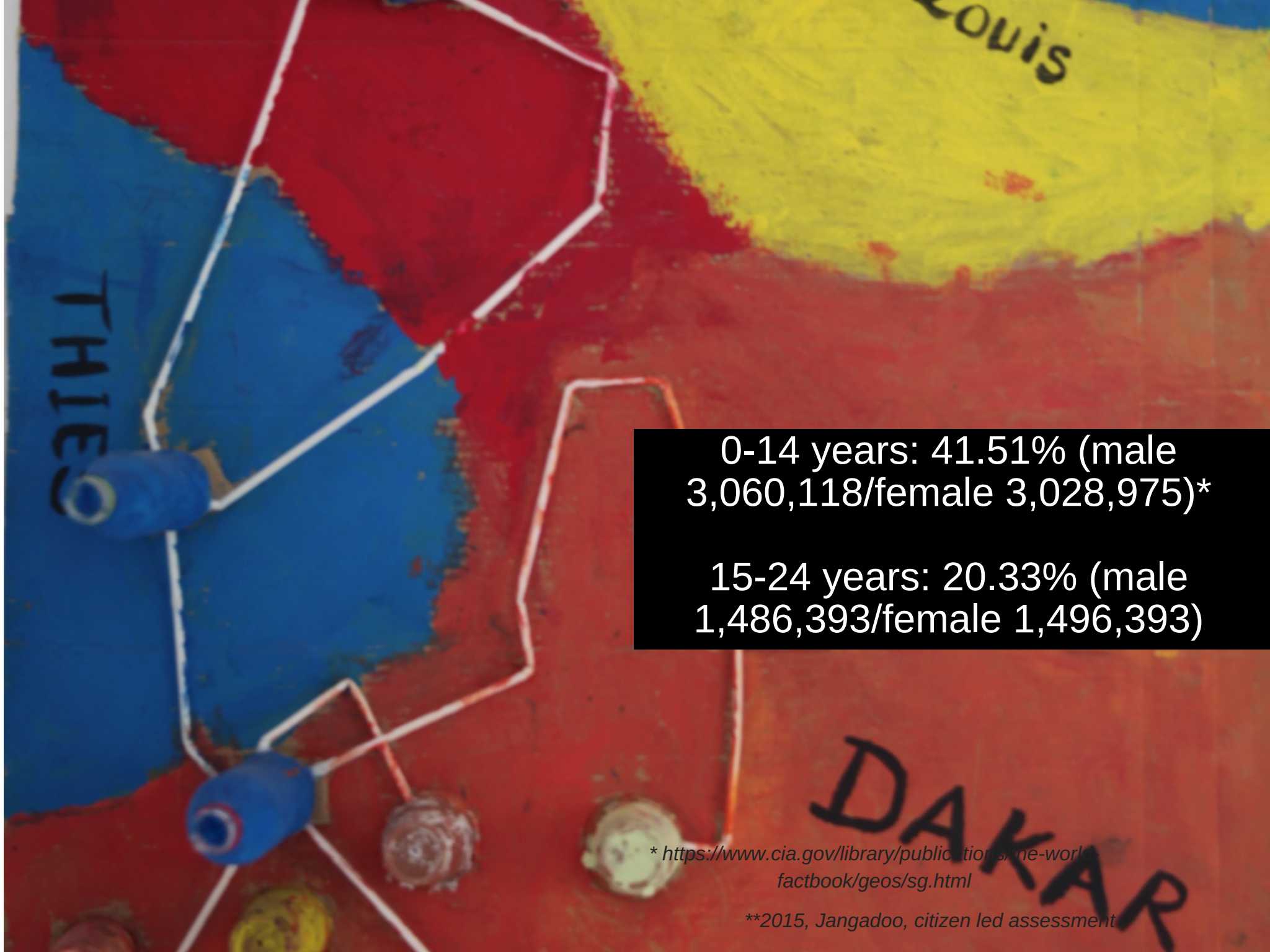
ImagiNation Afrika

LEARN. CREATE. DISCOVER.





60% of the population under the age of 25



0-14 years: 41.51% (male
3,060,118/female 3,028,975)*

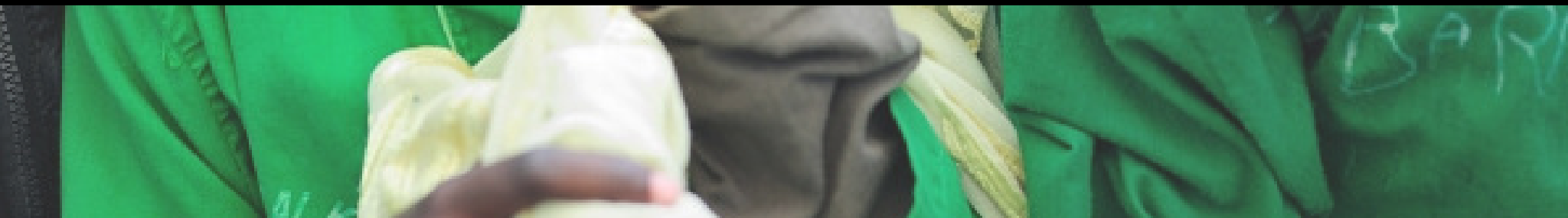
15-24 years: 20.33% (male
1,486,393/female 1,496,393)

* <https://www.cia.gov/library/publications/the-world-factbook/geos/sg.html>

**2015, Jangadoo, citizen led assessment



By grade 5, 63% of children can't read and 78% can't perform basic math skills.







Confidence, social skills, enhances creativity, overall cognitive development





Transforming how African children understand themselves and their contribution to development



Child Centered



Play



Global Thinking / Local Partners



Accessibility

Programme des Vacances

L'eau dans la ville de Dakar

26 AVRIL AU 6 MAI
de 11h à 17h

(près de l'Hôtel Océan)

- Découverte de l'eau et ses origines
 - A quoi sert un canal ?
 - Création de système de purification d'eau.
- Création de puits et de chasse d'eau
 - Comment recycler l'eau.
- Découverte des circuits d'eau et des inondations.



6 000 fcfa la semaine/30 000 fcfa pour deux semaines
5 000 fcfa pour deux semaines(pour 2 enfants et +)
Frais d'inscription: 2500 fcfa

Réservez vos places: 33 820 25 33 / 77 173 46 37

www.facebook.com/imaginationafrika



Play-based learning to develop problem solving, critical thinking skills





Pre-primary and primary school :
Early Learning, Arts and Culture, Maker Spaces





Kër ImagiNation: hub for children's learning and innovation







Developing community members/ local expertise to deliver programming





Local institutions, public spaces/ municipal governments to become stronger learning spaces for children.



L'HEURE ROUGE
une nouvelle humanité



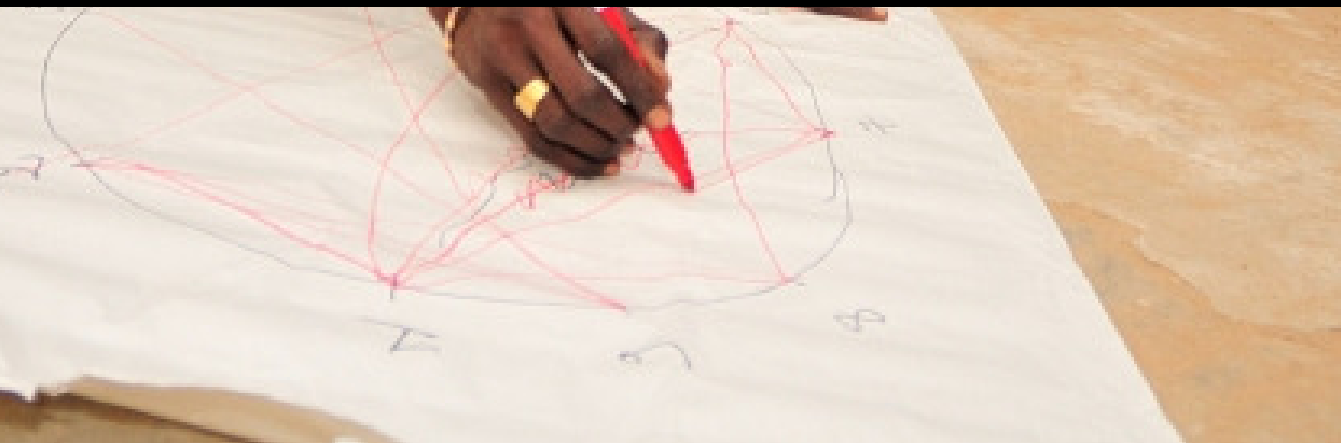
Dak'Art 2018

13ème Biennale

Developing program and accessibility for public institutions and spaces.



Teacher development and resources.



**Mathematical
Reasoning Through Play:
A Teacher's Toolkit**



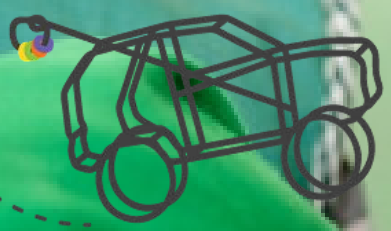


Creative thinking, problem solving through play: African changemakers





THANK YOU



ImagiNation Afrika

LEARN. CREATE. DISCOVER.