

# Takanoja tuntemattomaan: sata kielitä tulevaisuudelle

H E L > O  
S C B Y

**O h j e l m o i j a  
K u v i t t a j a  
K i r j a i l i j a  
K a u p p i s - d r o p o u t**



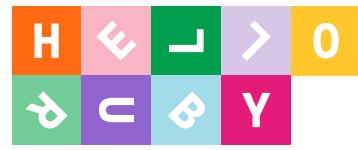


## Rails Girls - first experience in software craftsmanship

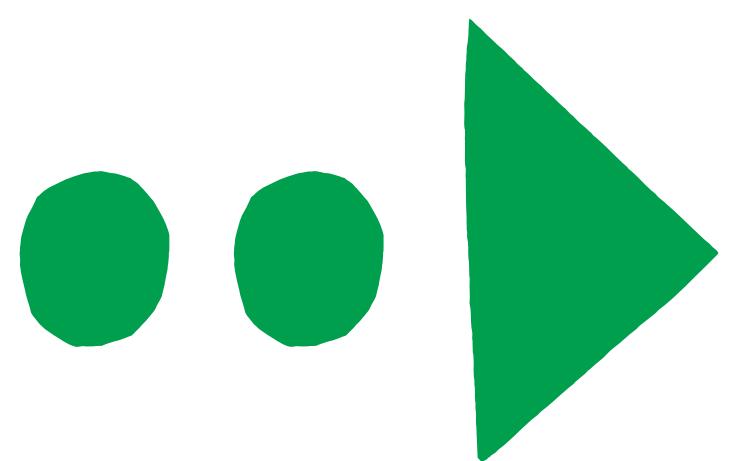


**227 RAILS GIRLS EVENTS** — [API](#) · [view source](#)





Jos koodi on 2000-luvun  
keksimisen kieli, kieliopin  
sijaan meidän pitäisi  
opettaa runonlausuntaa.



Hi

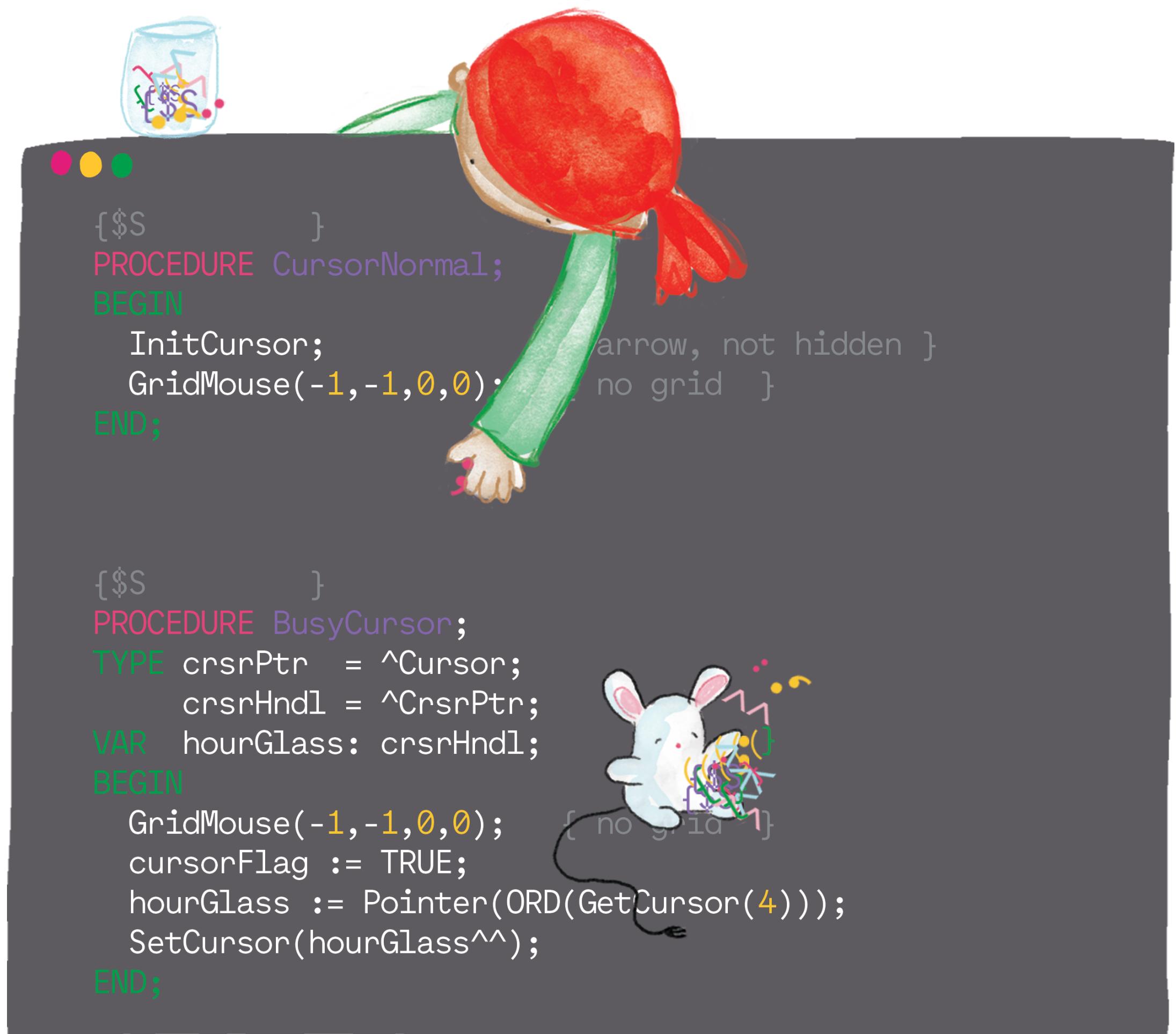


H < - > 0  
D = Y



**GAMIFIED TUTORIAL:  
STEP-BY-STEP  
INSTRUCTIONS, EASE  
OF ACCESS**

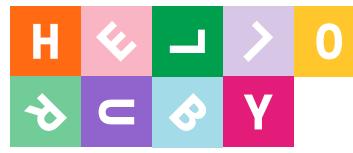
**OPEN-ENDED  
PLAYGROUND:  
LOW FLOOR,  
WIDE WALLS,  
HIGH CEILING**



# Tarinat..

.. auttavat meitä  
ymmärtämään  
maailmaa.

.. auttavat meitä  
ymmärtämään  
itseämme ja toisiamme.



# KAIKKI ALKOI KICKSTARTERISTA VUONNA 2014.

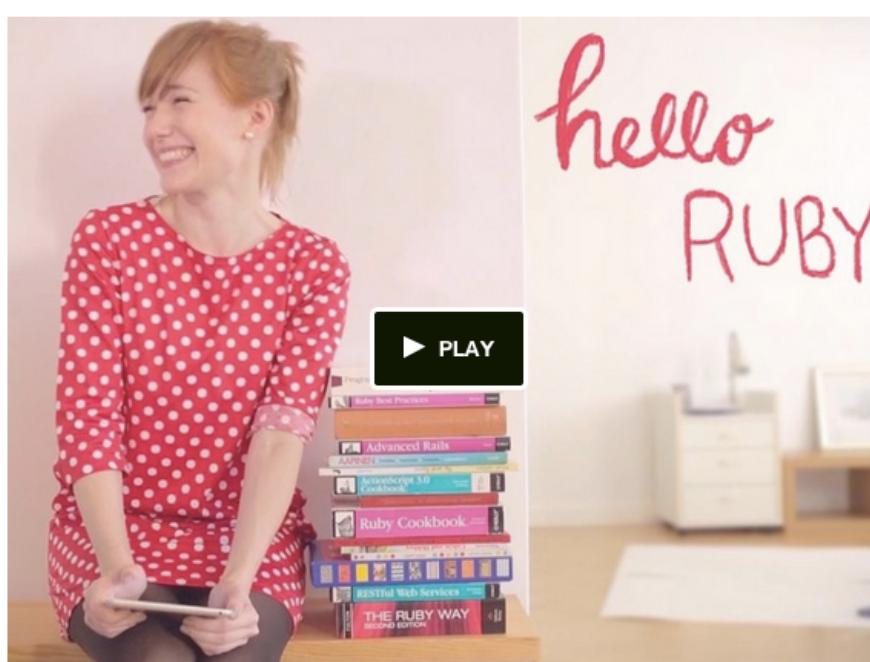
**Hello Ruby**  
by Linda Liukas

Home Updates 8 Backers 9,258 Comments 131  
New York, NY Children's Book

Funded! This project was successfully funded on Feb 22.

**9,258**  
backers  
**\$380,747**  
pledged of \$10,000 goal  
0  
seconds to go

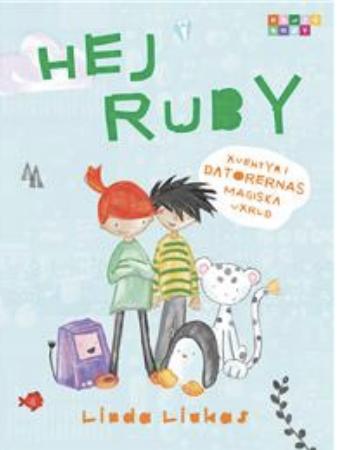
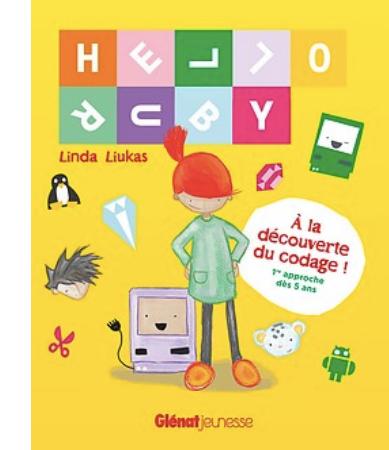
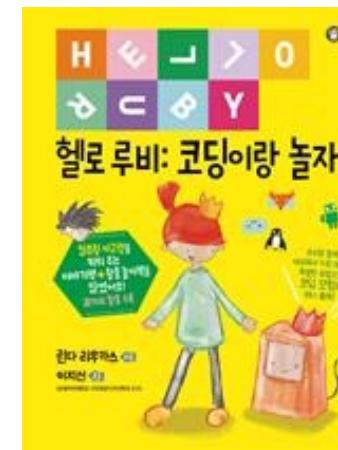
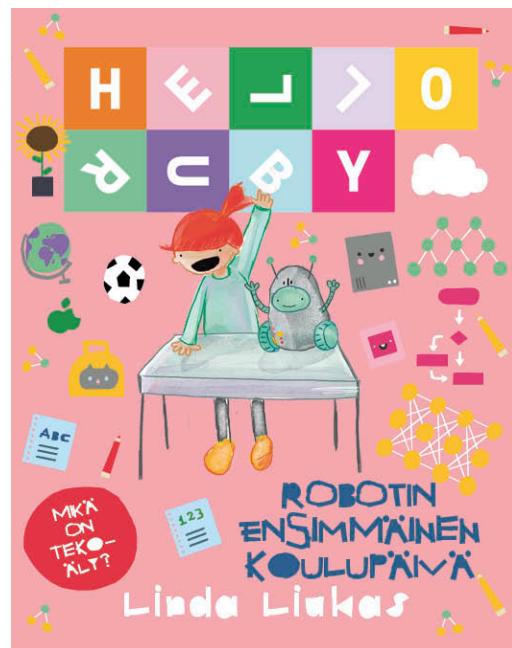
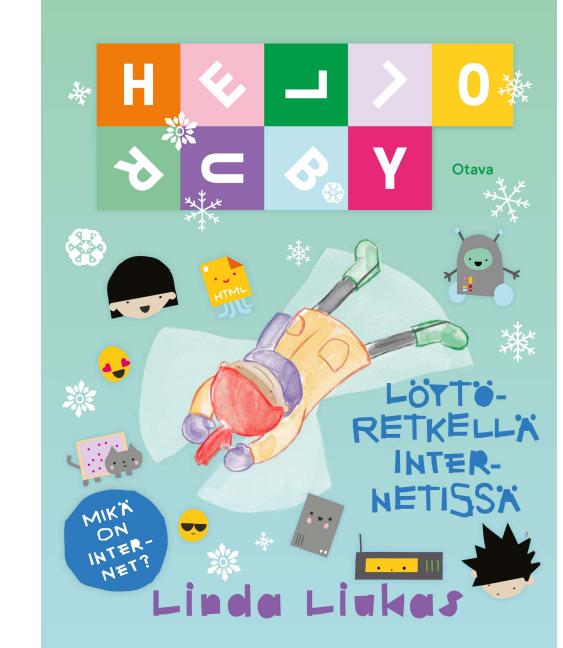
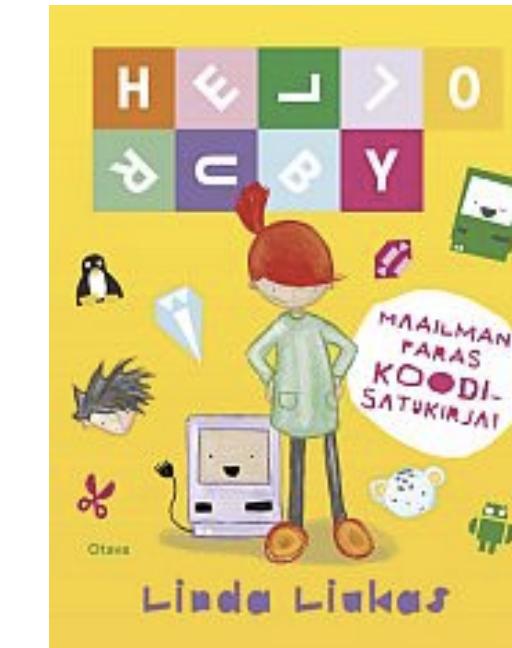
**PLAY**



Project by Linda Liukas New York, NY Contact me

First created · 13 backed  
Linda Liukas 1456 friends  
Website: [helloruby.com](http://helloruby.com)

Hello Ruby is a children's book that teaches programming fundamentals through stories and kid-friendly activities.

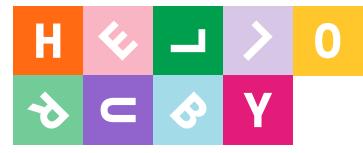


.. JOKA OLI 20% SUOMEN  
VUOSITTAISESTA  
KIRJALLISUUSVIENNISTÄ.

.. TÄNÄPÄIVÄNÄ NELJÄ KIRJAA OHJELMOINNISTA,  
TIETOKONEISTA, INTERNETISTÄ JA TEKOÄLYSTÄ -  
KÄÄNNETTY 25 KIELELLE.

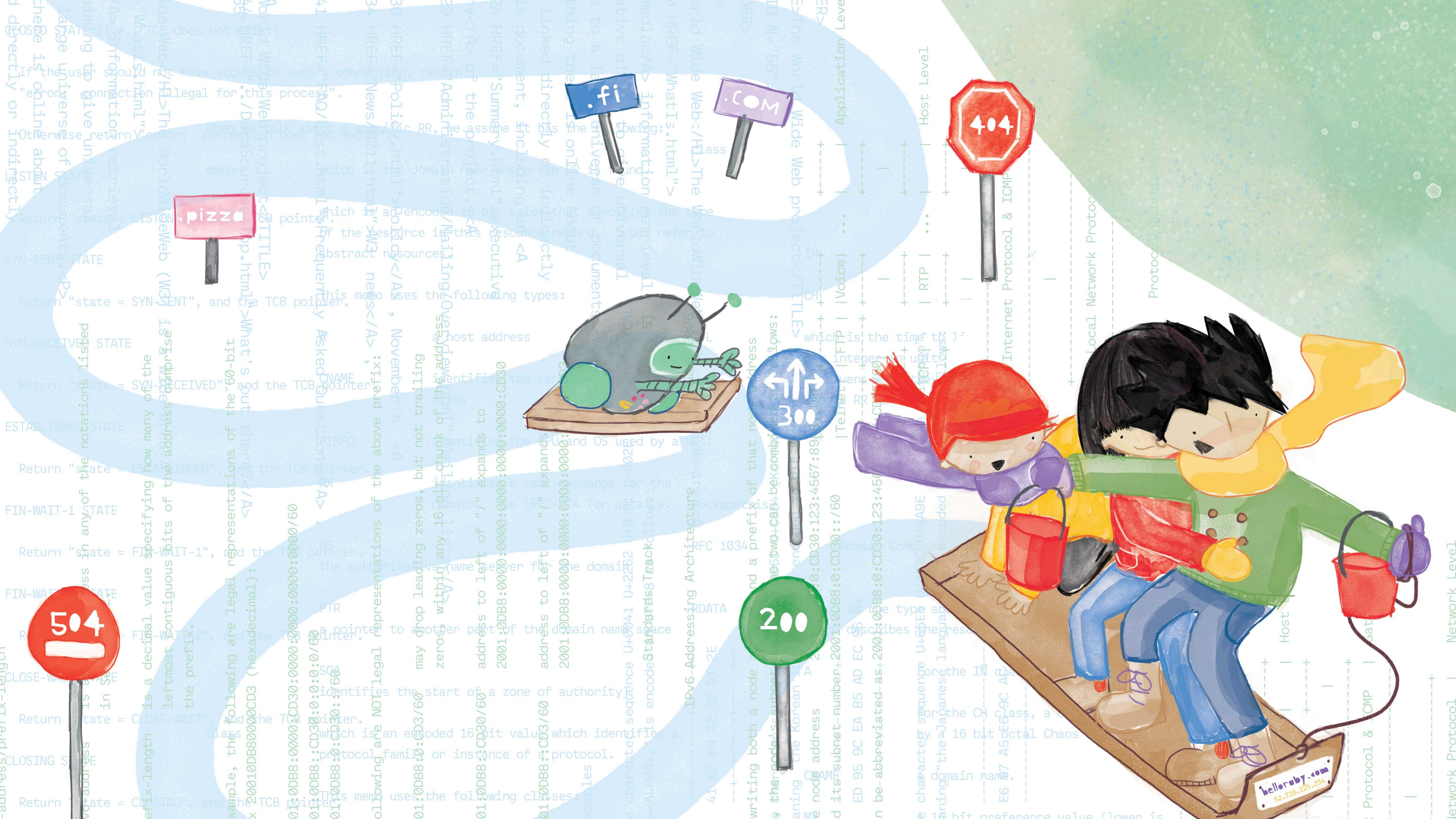
Lasten  
kasvattaminen  
maailman, jossa  
yhä useampi  
ongelma  
ympärillämme on  
tietokone ongelma.





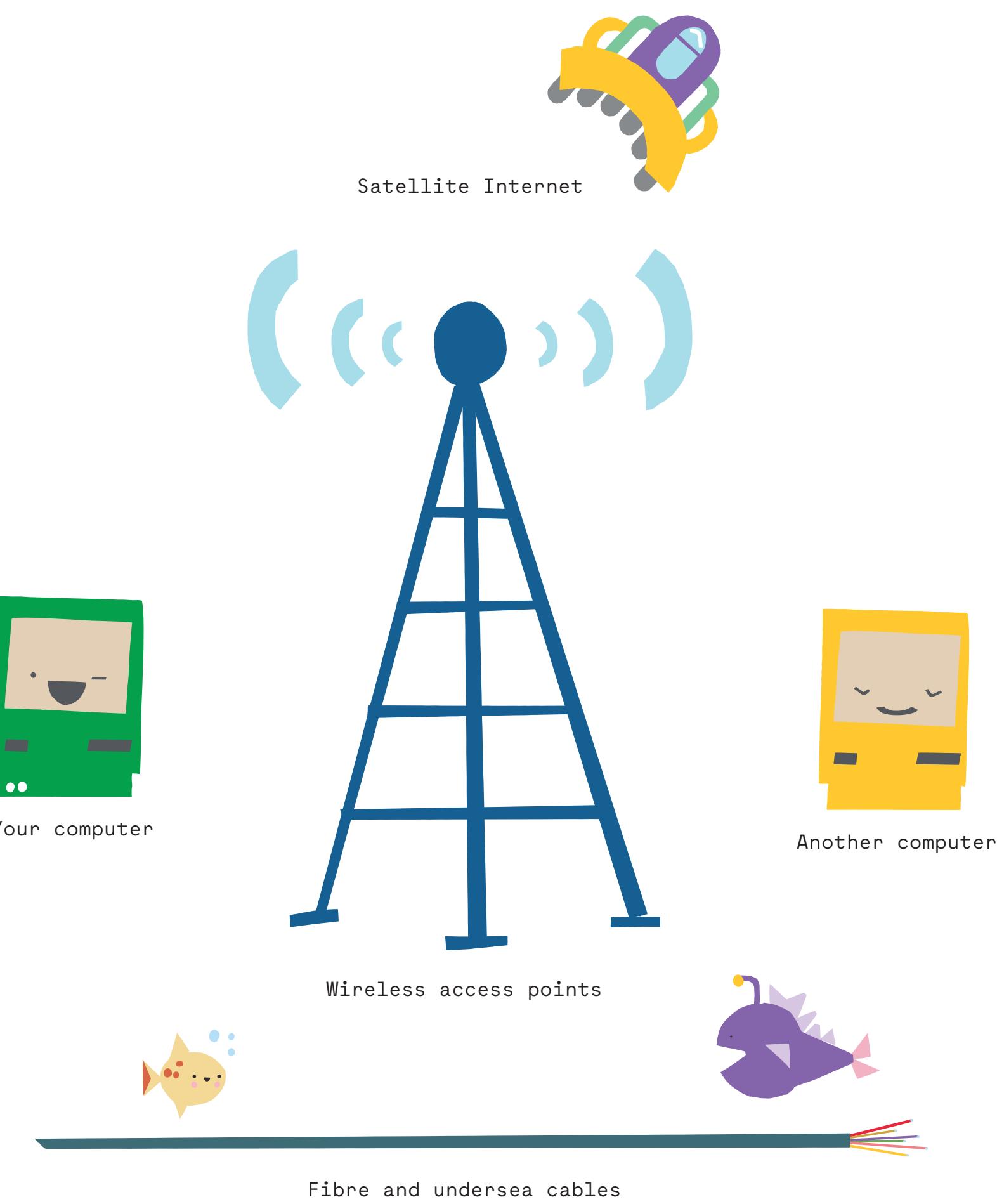
**Mitä tapahtuu maailmassa,  
jossa meillä ei ole sanoja  
kuvata sitä, mikä on  
ympärillämme?**





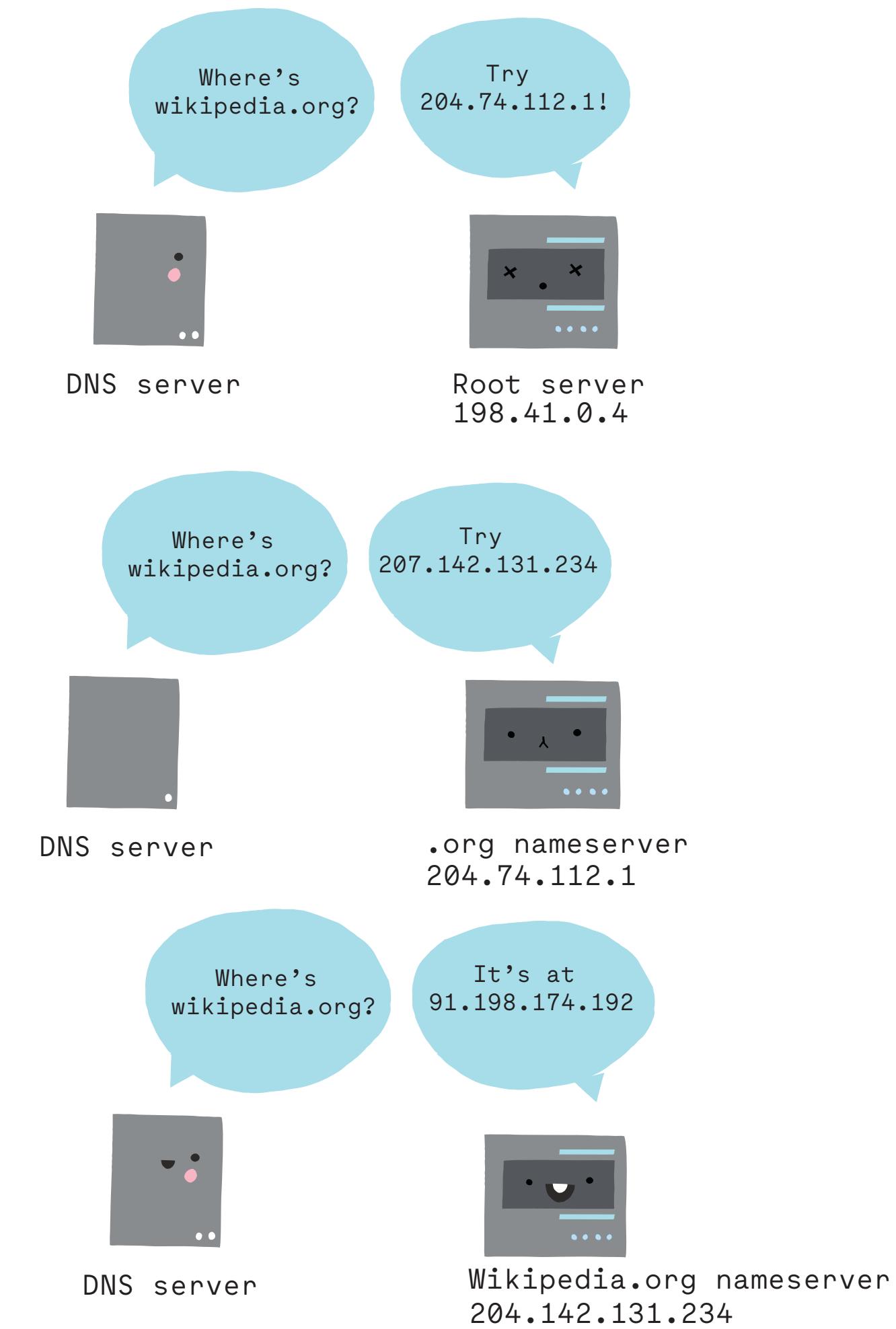


H E L > O  
S U B Y

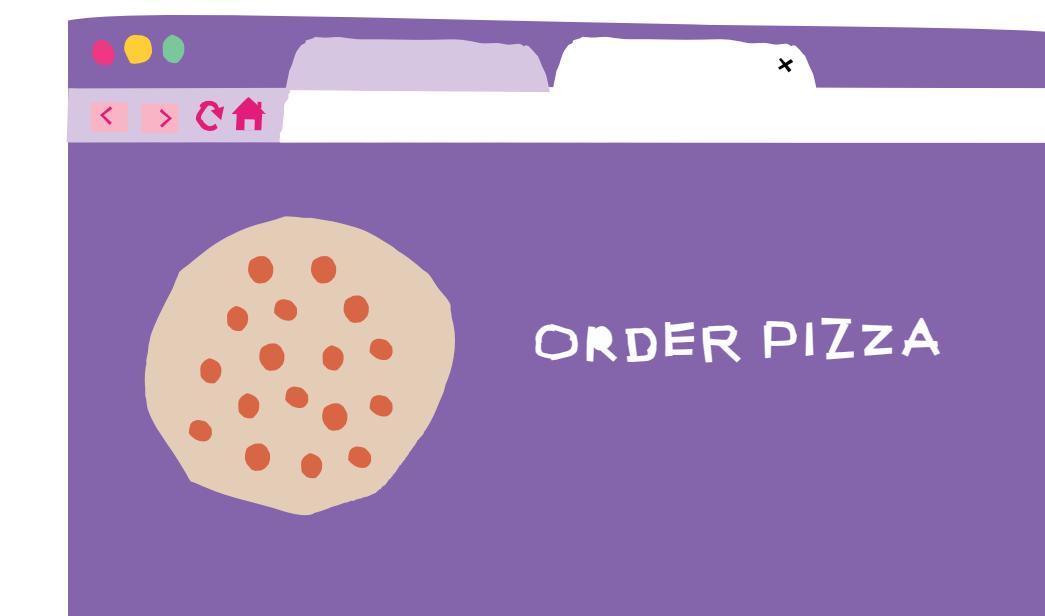


Hardis

w w w .  
h e l l o r u b y .  
c o m



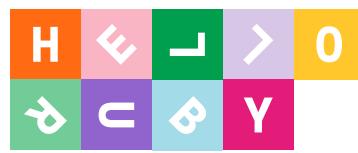
Softa



Yhteiskunta

“Computer Science is no more about computers than astronomy is about telescopes.”

- Dijkstra



A

niin kuin  
algoritmi

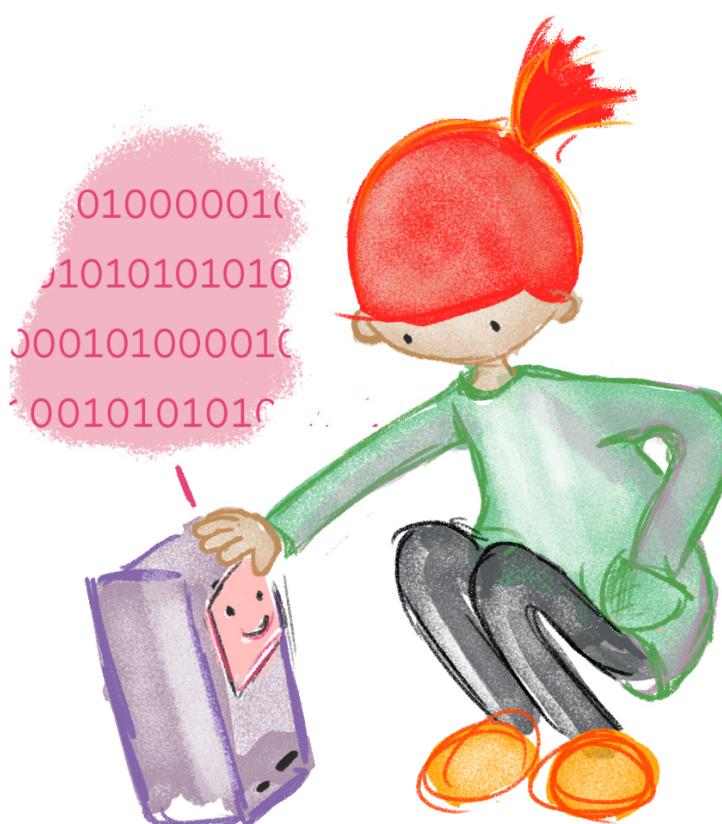


H E L L O  
R U B Y

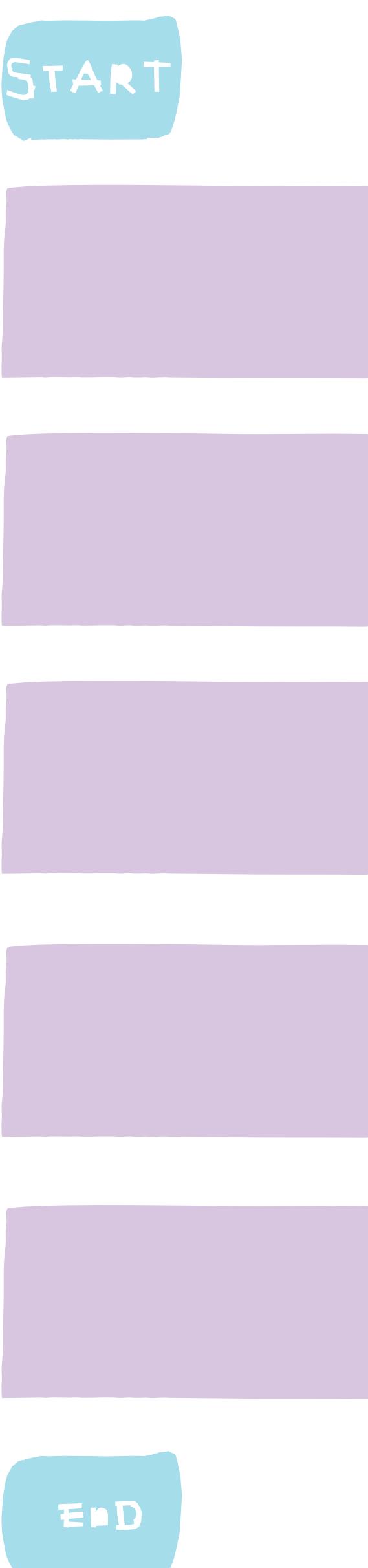


# Mitä opimme?

1. Oikeat komennot
2. Oikeassa järjestyksessä
3. Asioiden nimeäminen on tärkeää.
4. Ohjeiden pitää kattaa kaikenlaiset tilanteet.
5. Suurimmatkin ongelmat maailmassa ovat vain nippu pieniä ongelmia yhdessä.

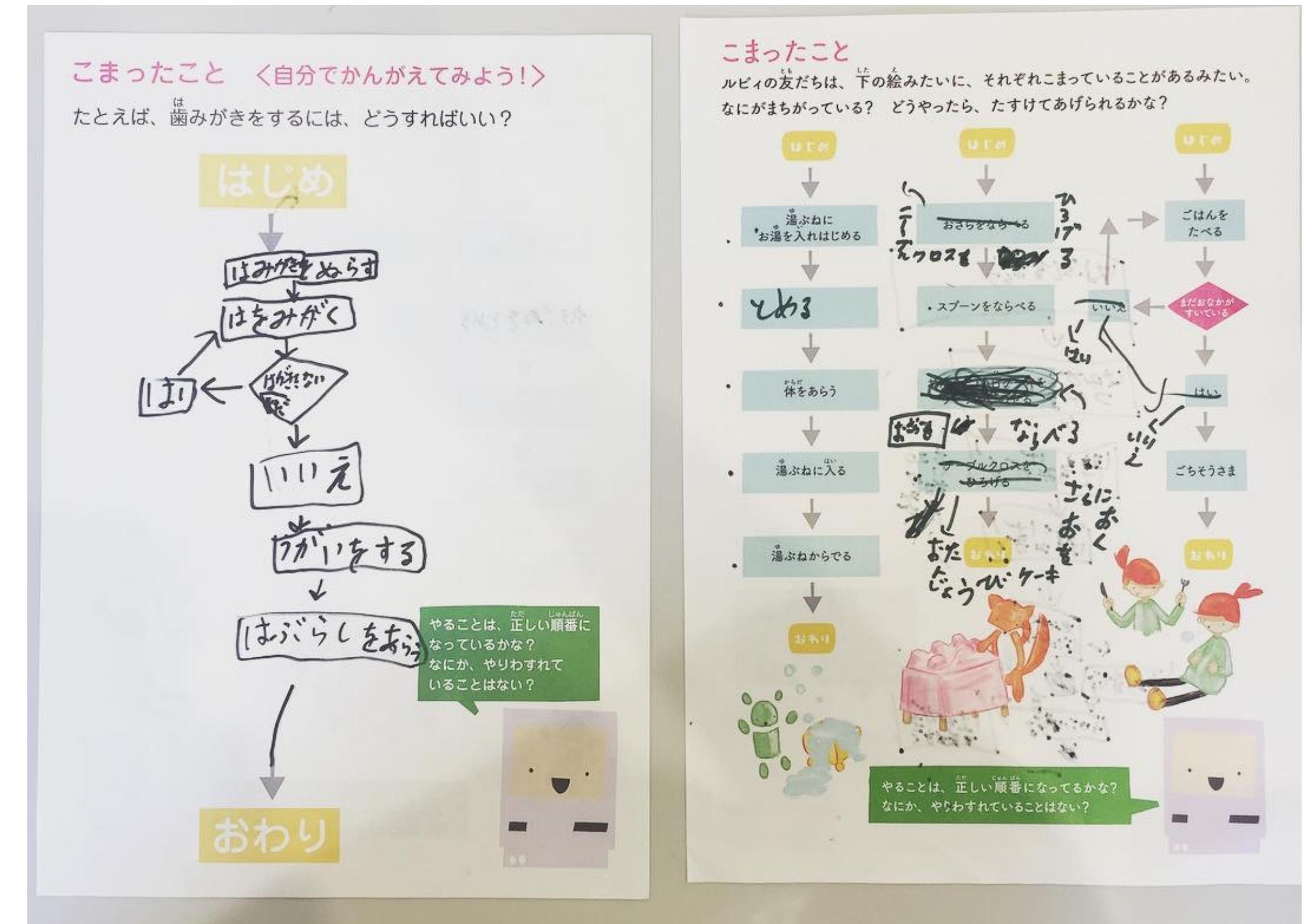
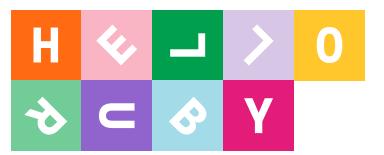


H E L > O  
H U R U Y



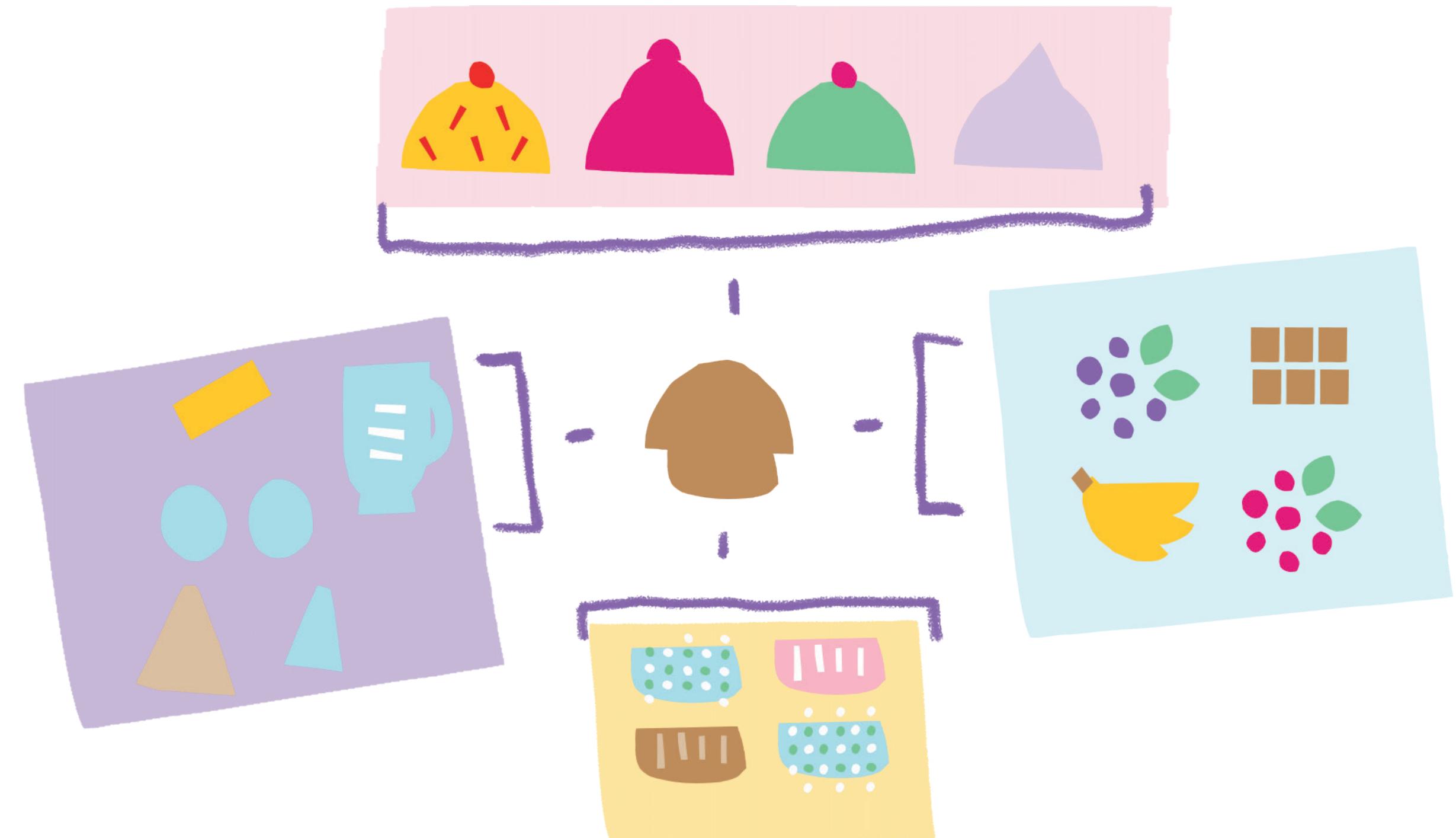
PESÉ  
HAMPÁAT!





# MITEN MENI?

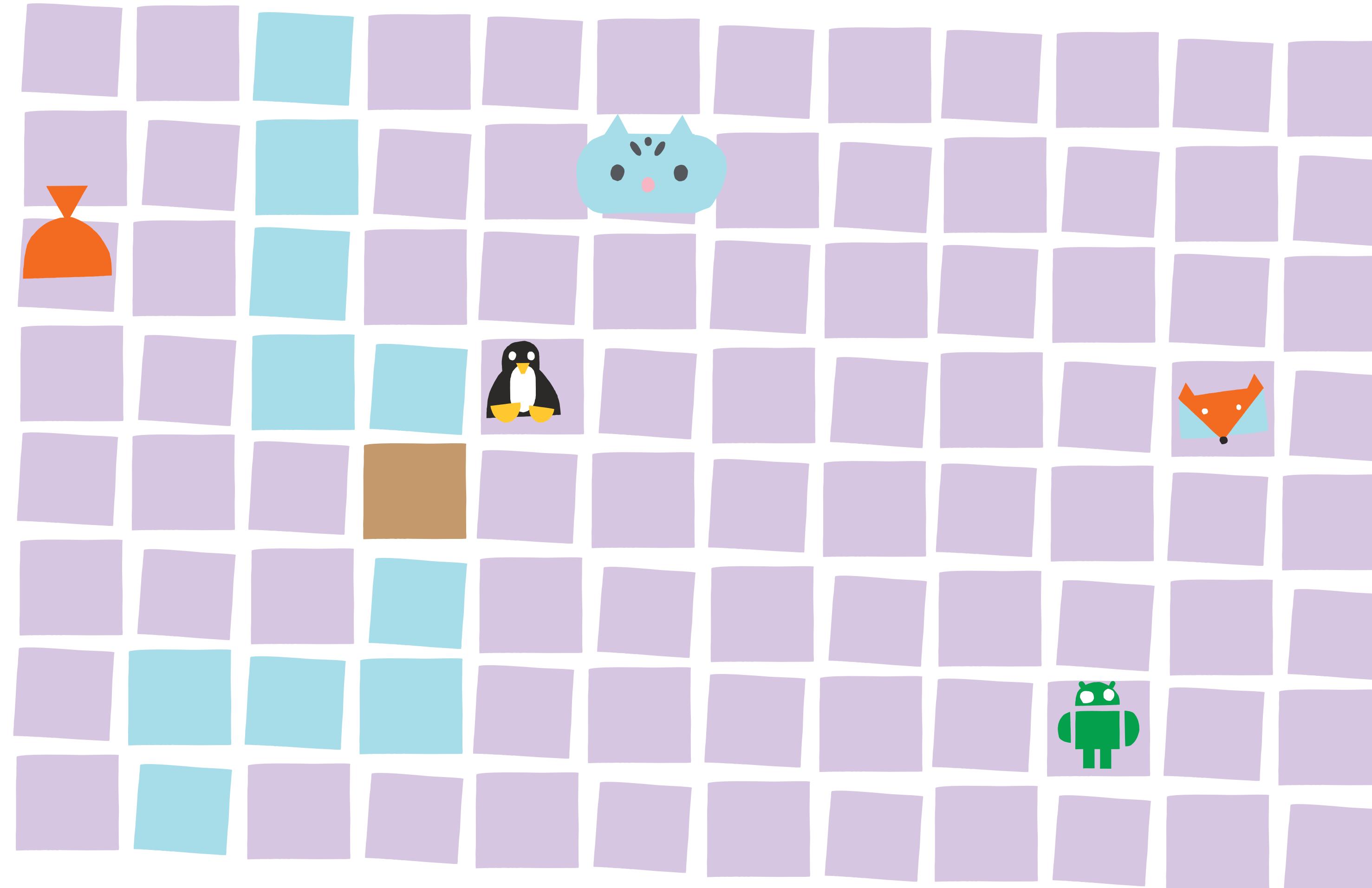
H E L L O R U B Y  
S C F Y



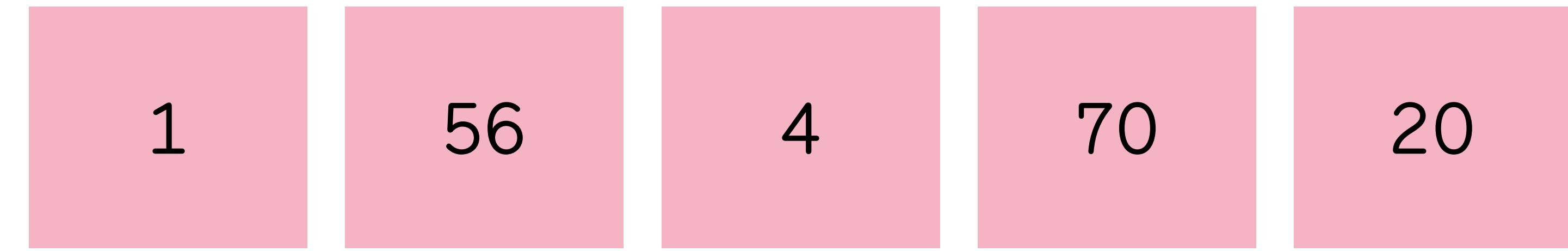
www.  
helloruby.  
com

H < - > 0  
d c ⚡ Y

- Go right
- ← Go left
- ↓ Go down
- ↑ Go up
- ★ Stop and say hi!
- {} Go back



H E L > 0  
h e l l o r u b y .  
c o m



w w w .  
h e l l o r u b y .  
c o m

H E L > 0  
W N B Y

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

H E - > 0  
d c b Y

715	1	56	8	67	71	82	0	71
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71	71	455	56	8	67	71	677	712
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20	20	78	24	343	433	20	201	20
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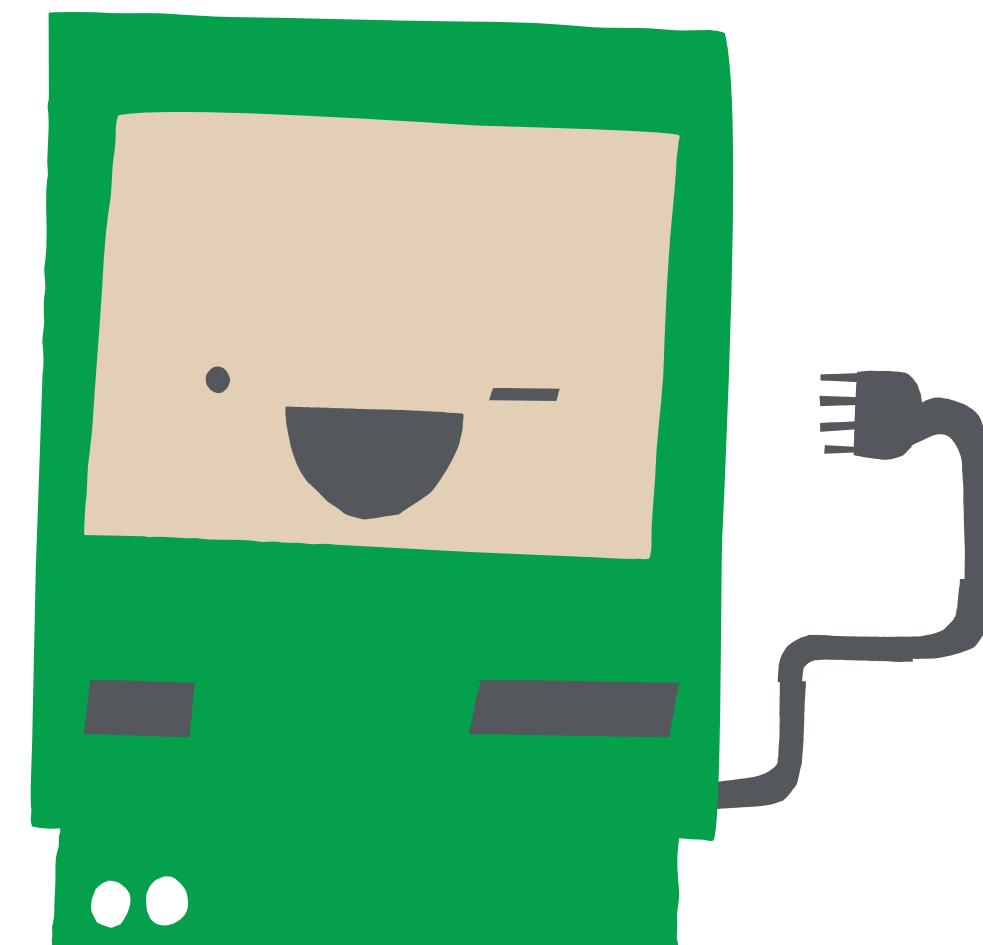
10	348	45	81	2	470	670	10	10
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322	821	1	66	98	89	82	82	82
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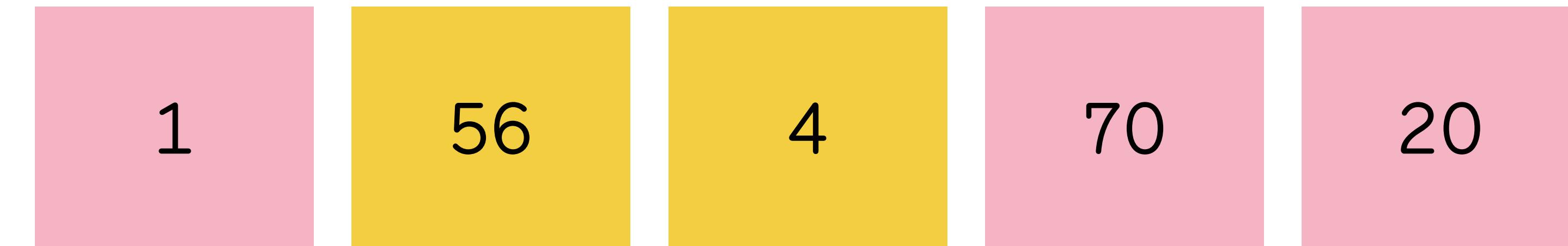
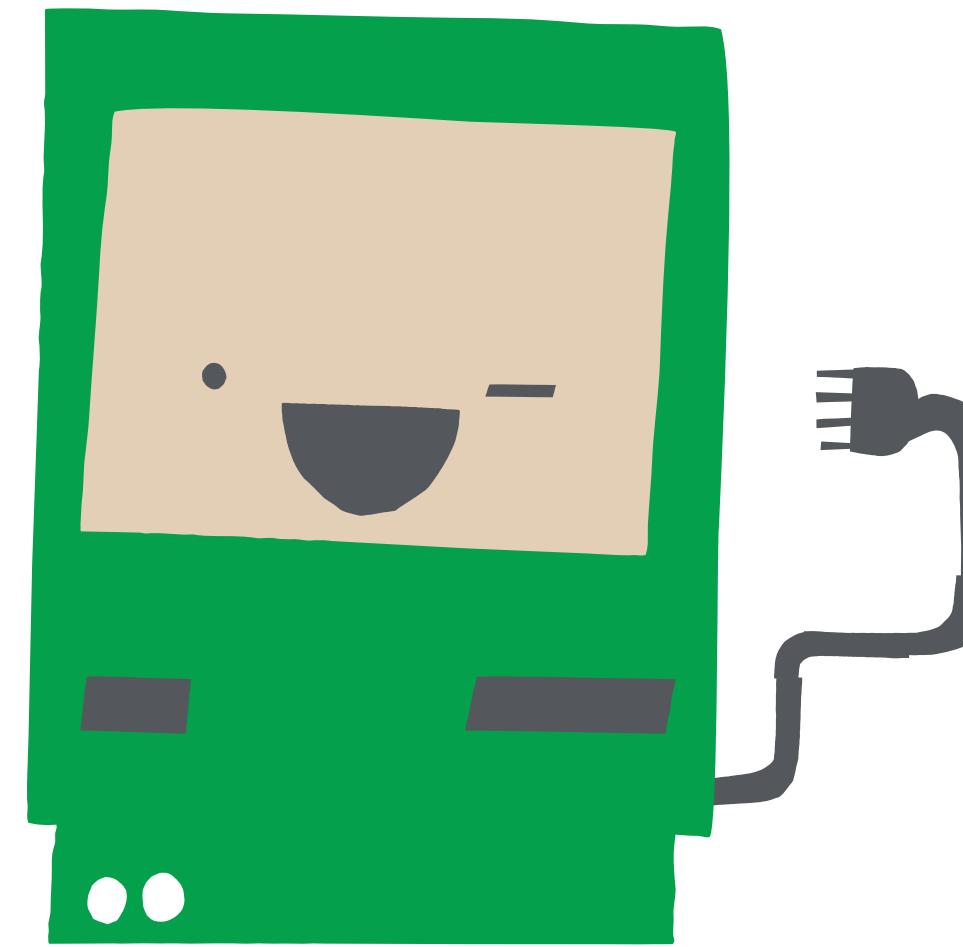
www.  
hellorubby.  
com

71	1	56	435	67	171	71
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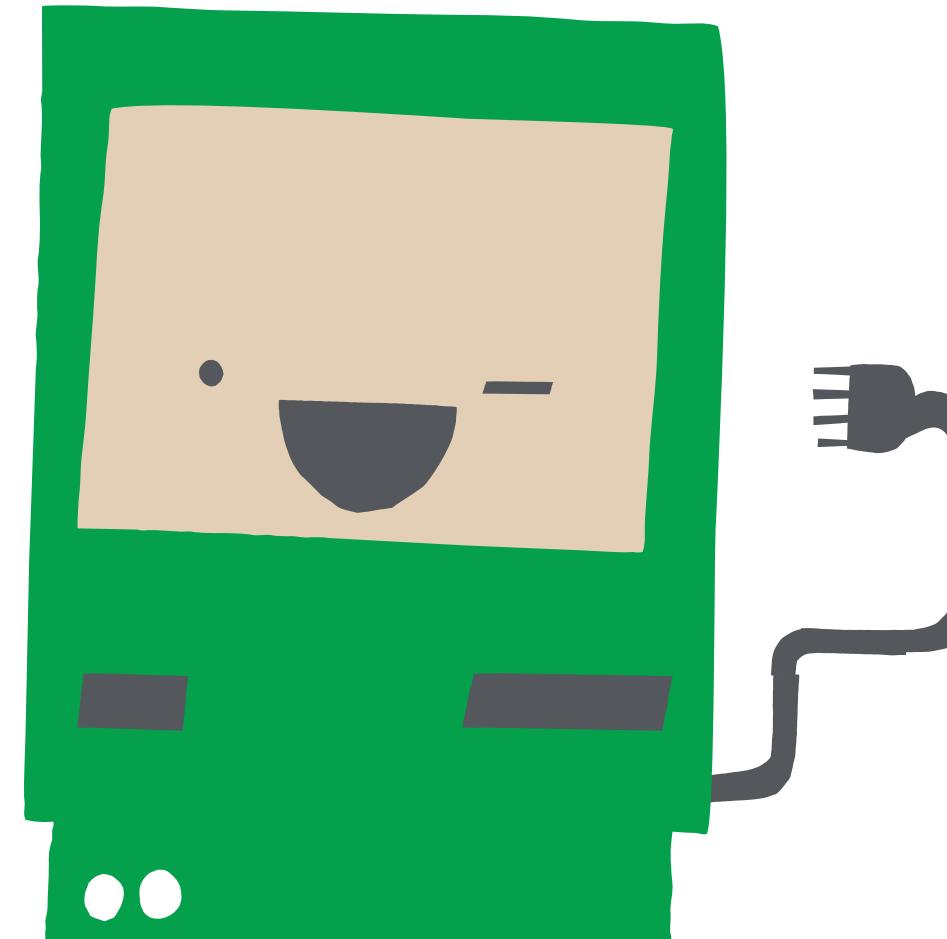
H E L > 0  
d u b Y



H E L > 0  
W U B Y



H E L > 0  
d u b Y



1

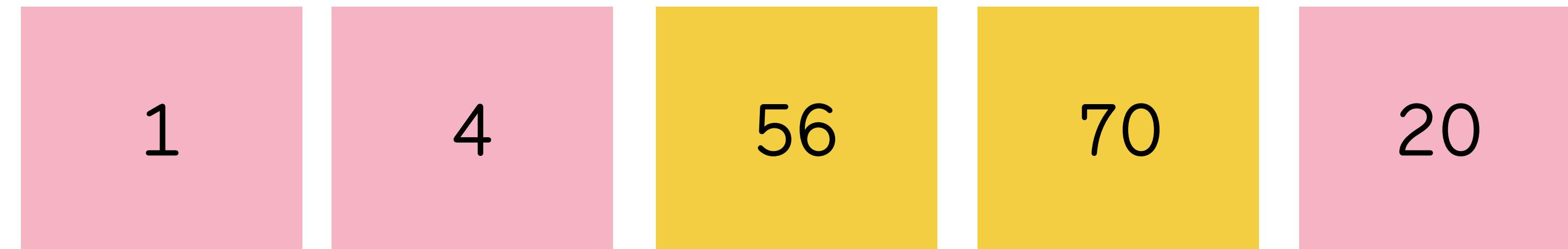
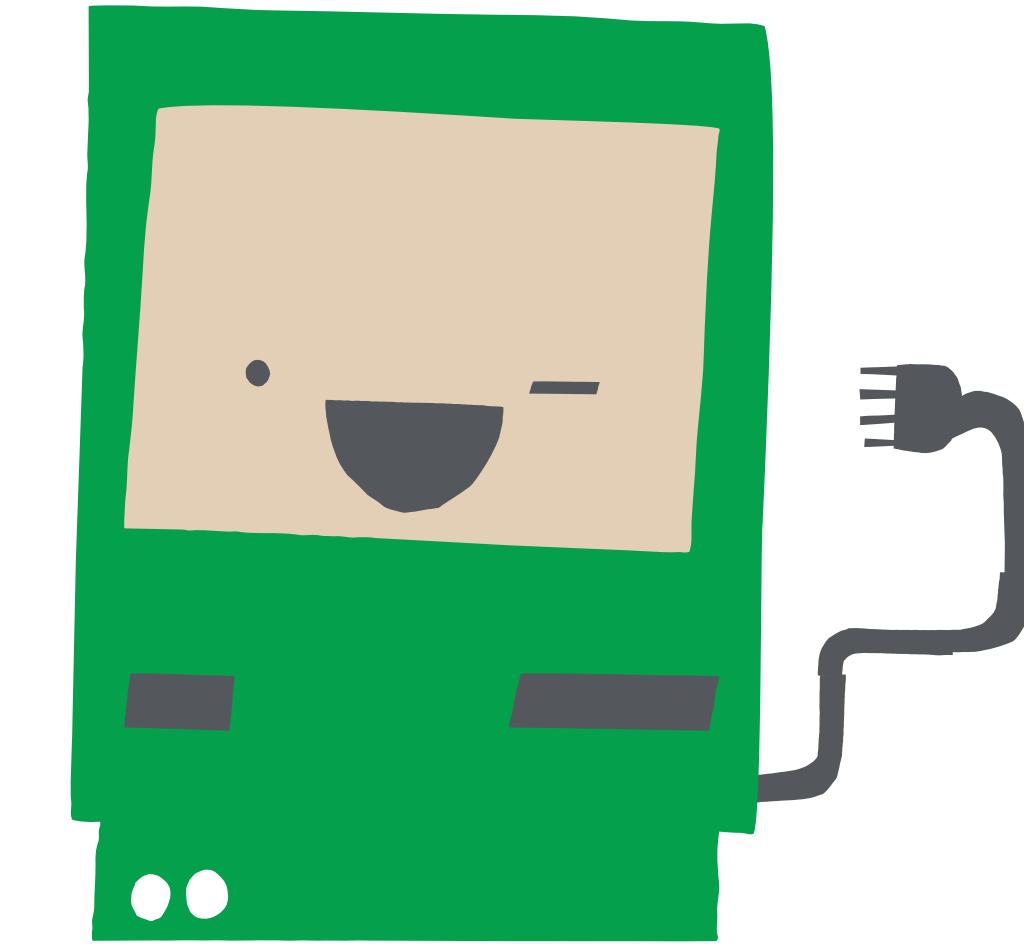
4

56

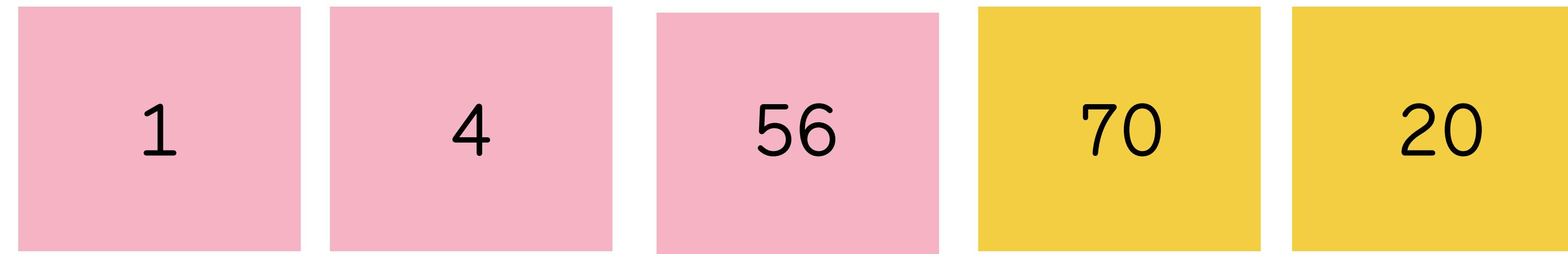
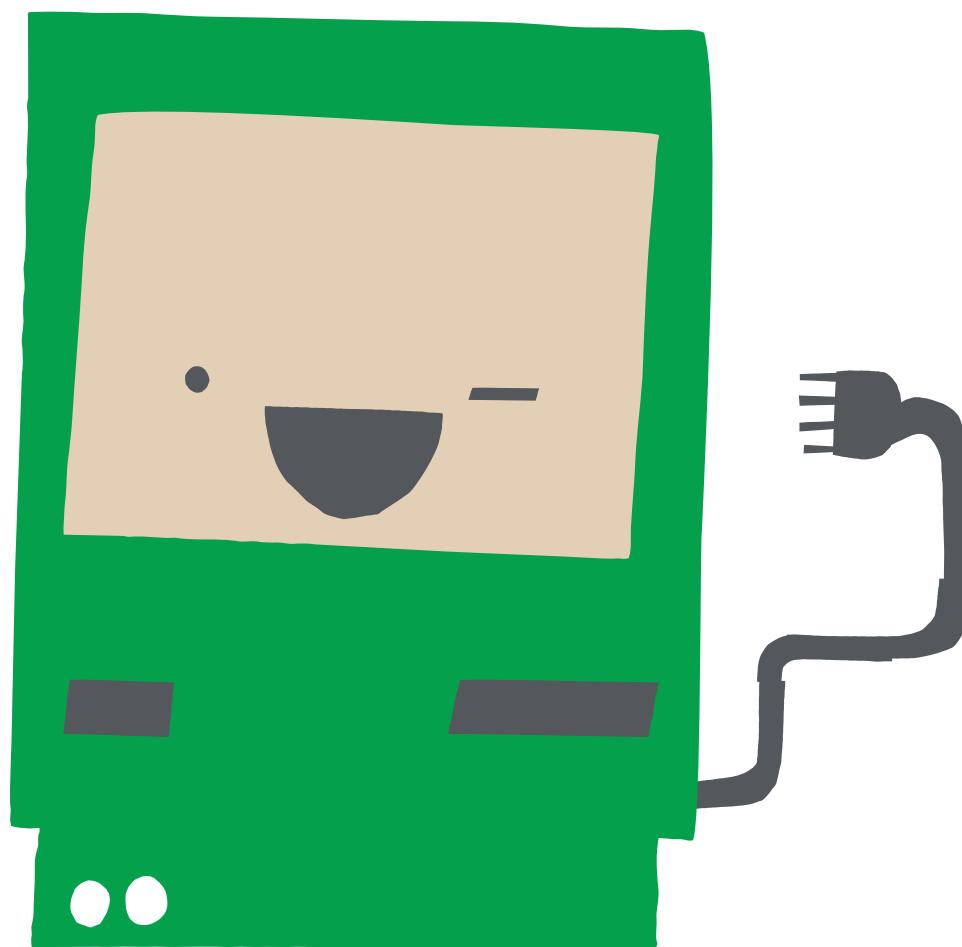
70

20

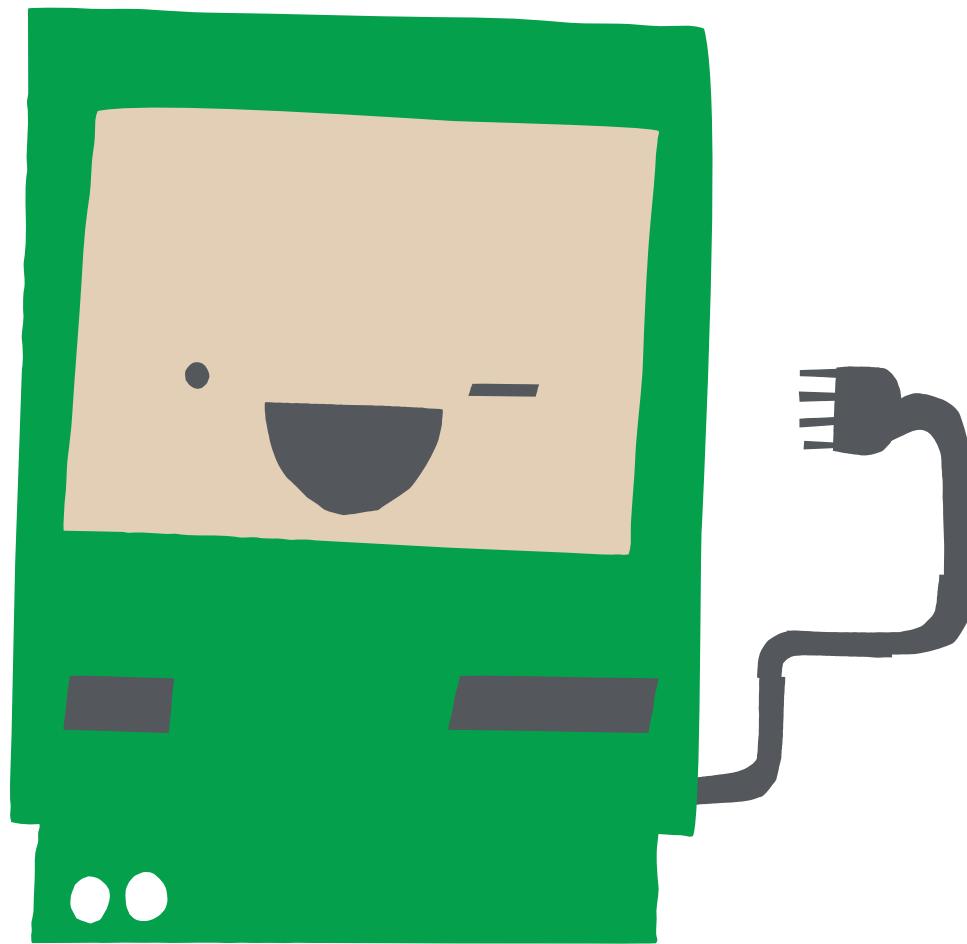
H E L > 0  
d u b Y

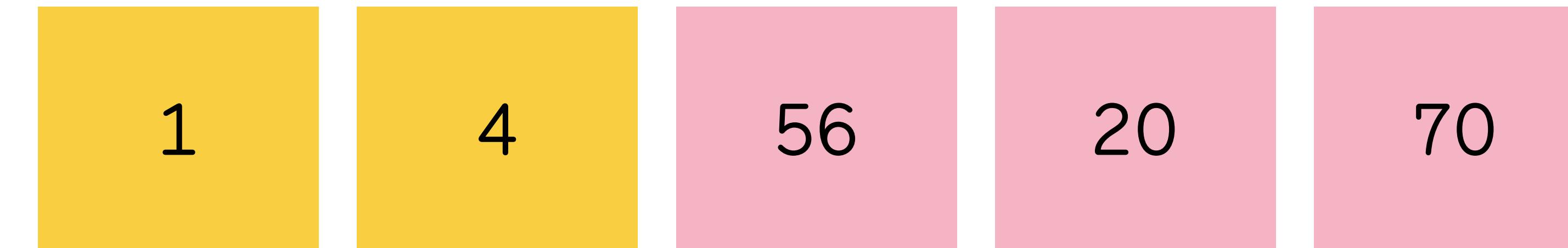
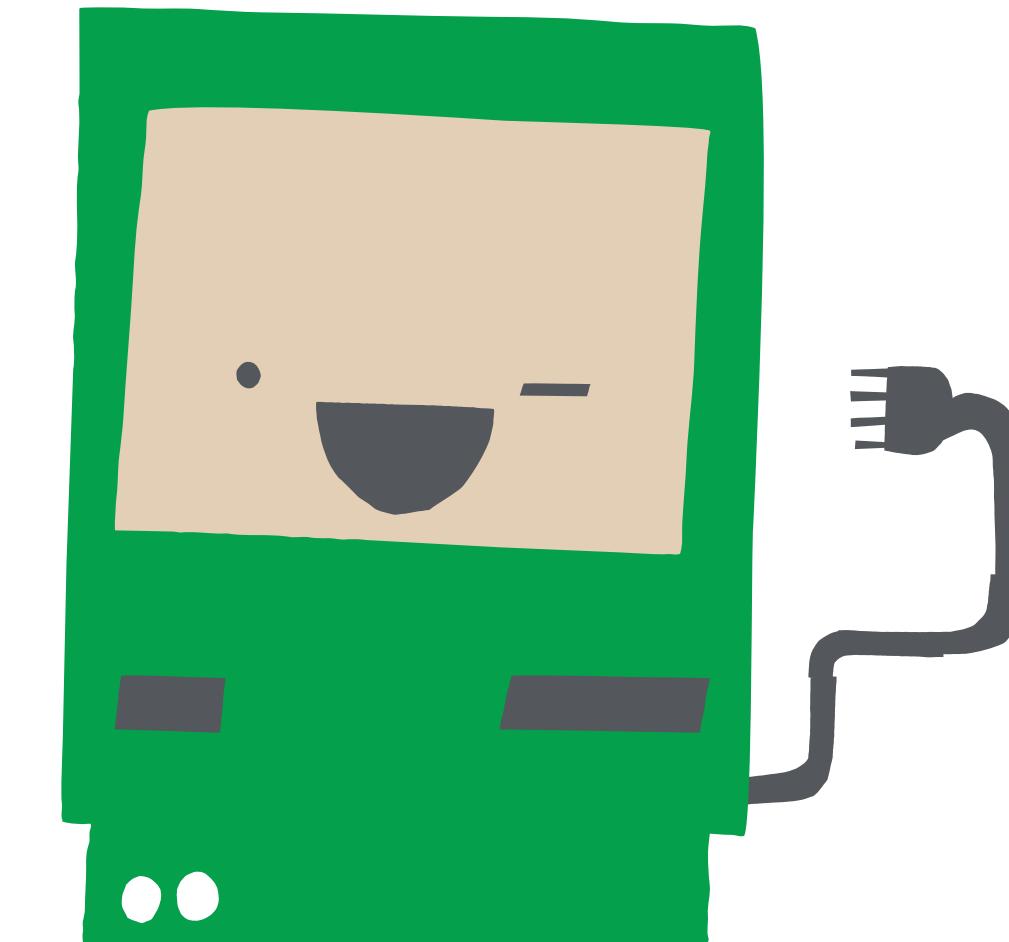


H E L > 0  
W N B Y

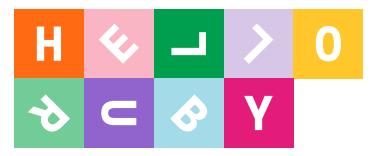


H E L > 0  
W N B Y





Tätä kutsutaan  
kuplalajitteluksi  
( bubble sort algoritmi ).



# Missä algoritmi?

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*

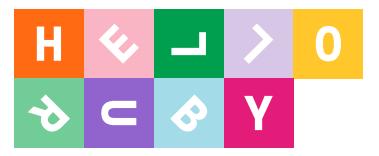
Find your next ice cream favorite, today!

Top 10 Places to Eat Ice Cream  
*Travel magazine*

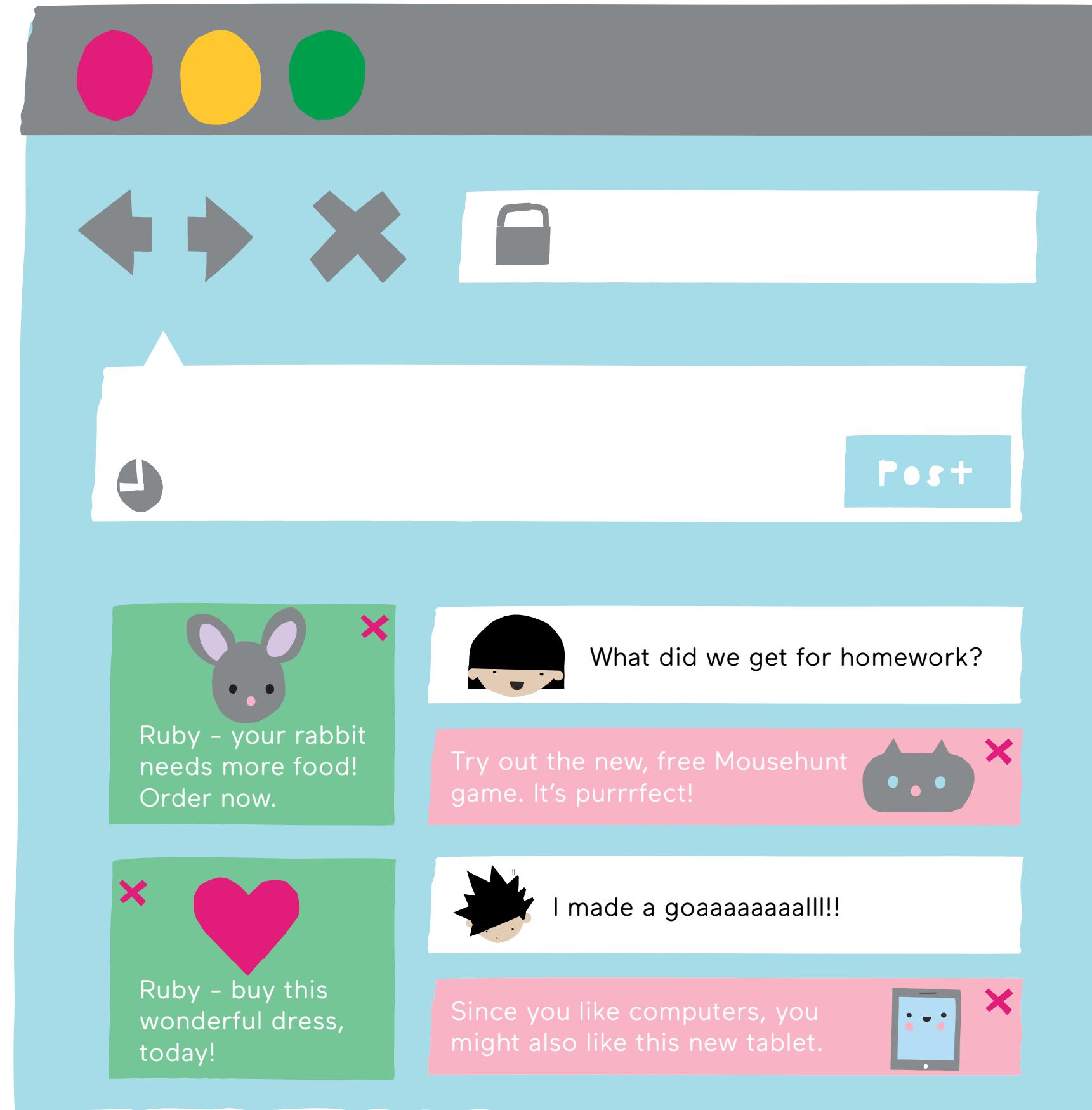
Get your ice cream delivered!  
**Ad**

The 11 Best Summer Ice Cream Flavors Of 2016  
*Foodstore*

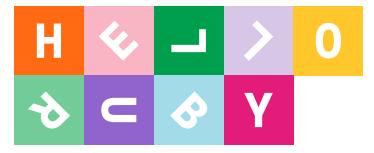
[www.hellooruby.com](http://www.hellooruby.com)



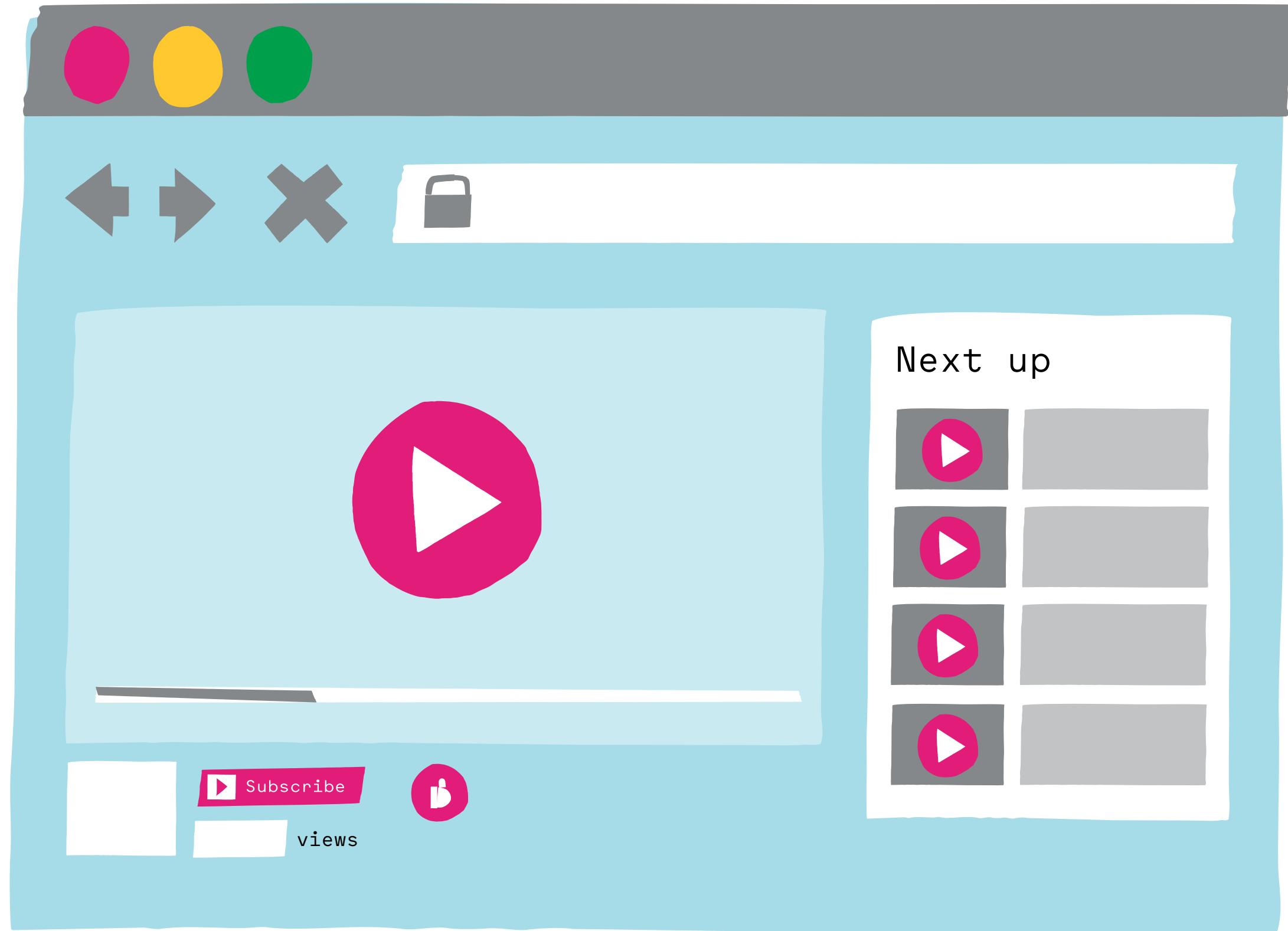
# Missä algoritmi?



w w w .  
h e l l o r u b y .  
c o m



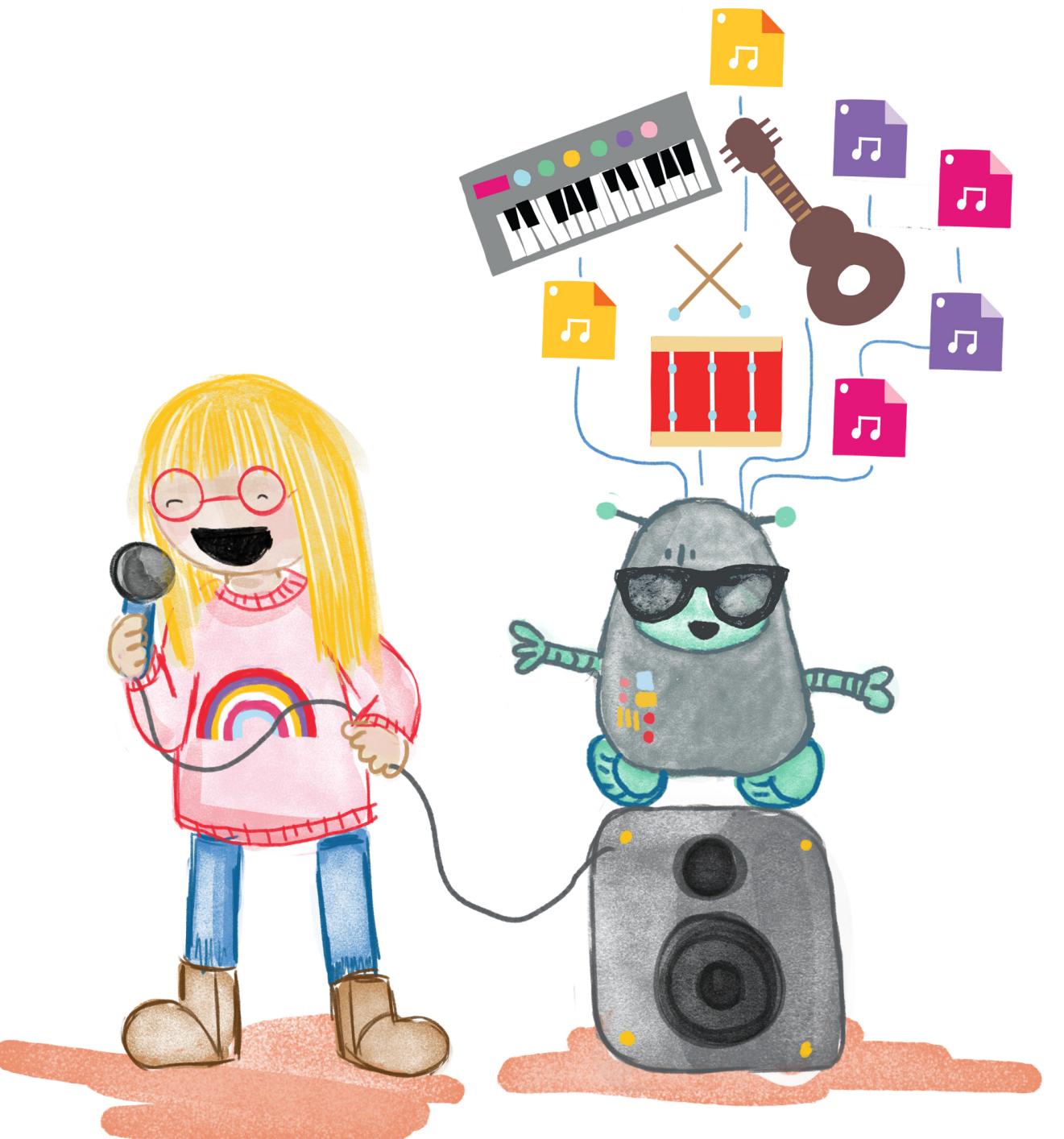
# Missä algoritmi?



H E L > O  
R U B Y

B

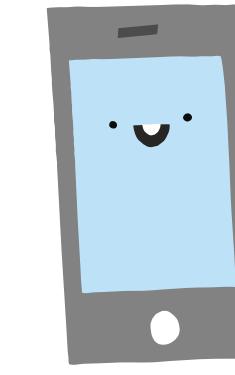
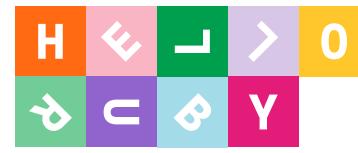
niinkuin  
big data



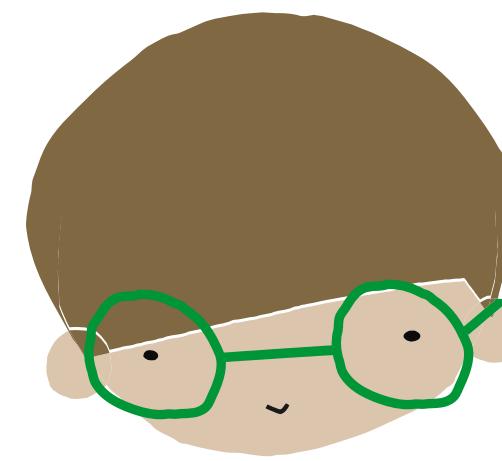
H E L > O  
d c f Y

# Mikä ihmeen koneoppiminen?

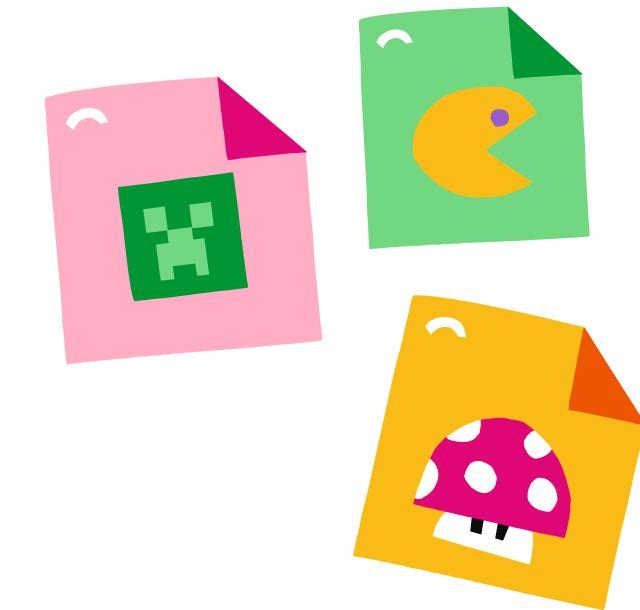




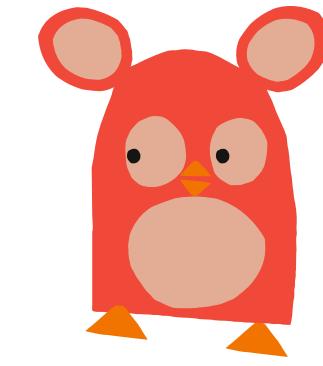
KÄNNYKKÄ, JOLLA  
PÄÄSEE INTERNETTIIN.



OPETTAJA

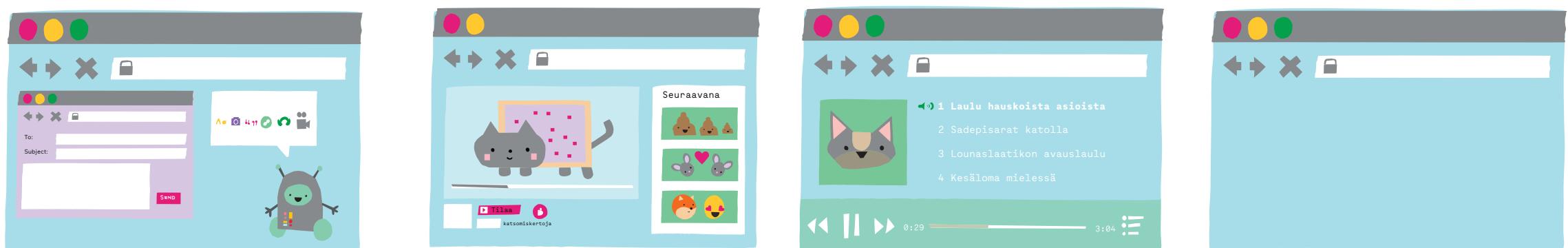
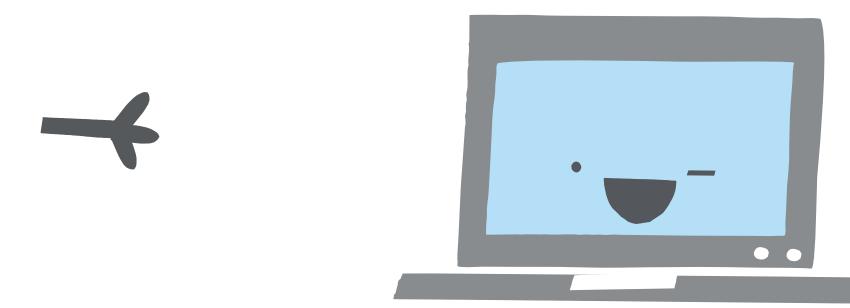
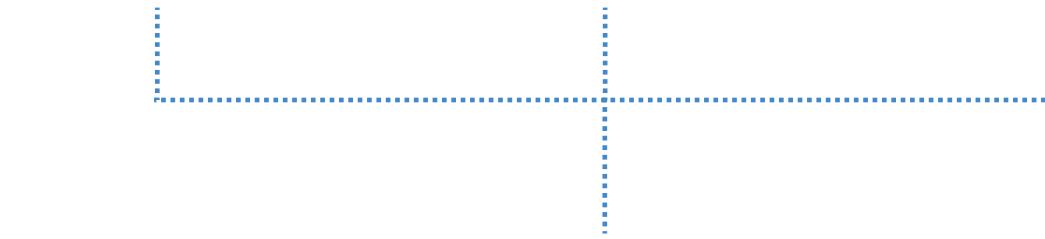
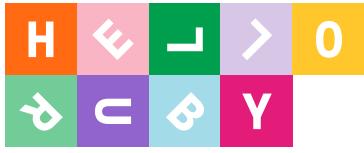


TIETOKONEPELI



LELU, JOKA VASTAA  
ESITTÄMÄÄSI  
KYSYMYKSEEN.

# Tekoäly

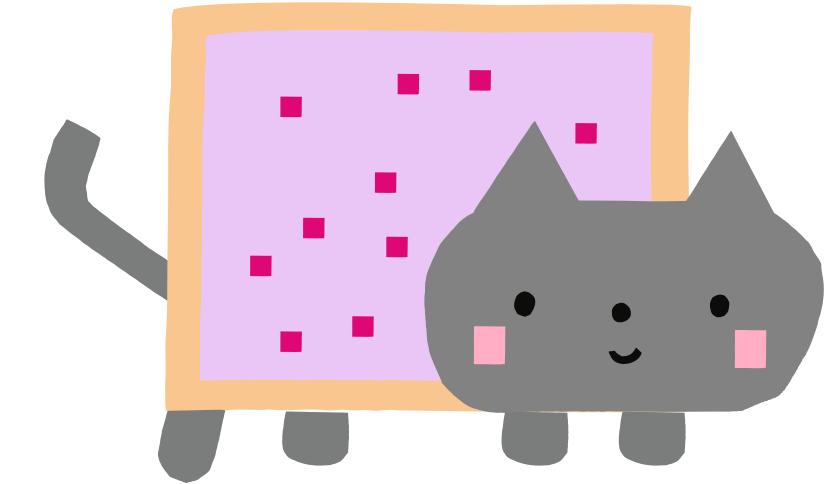


# Miksi koneoppiminen juuri nyt?

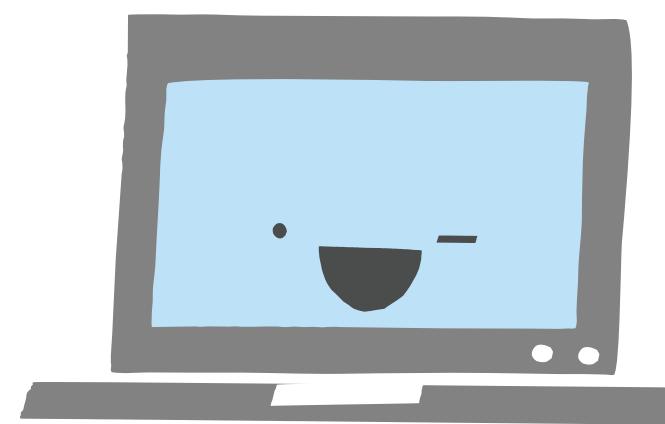
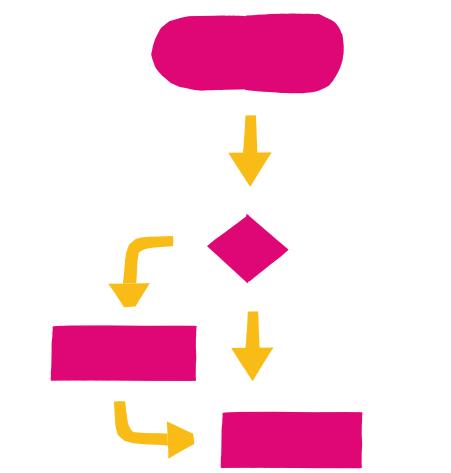
1. Data
2. Laskentateho
3. Opettamisen ja jakamisen kulttuuri



Onko tämä kissa?



Tarkka kuvaus kissasta  
ohjelointikielleä



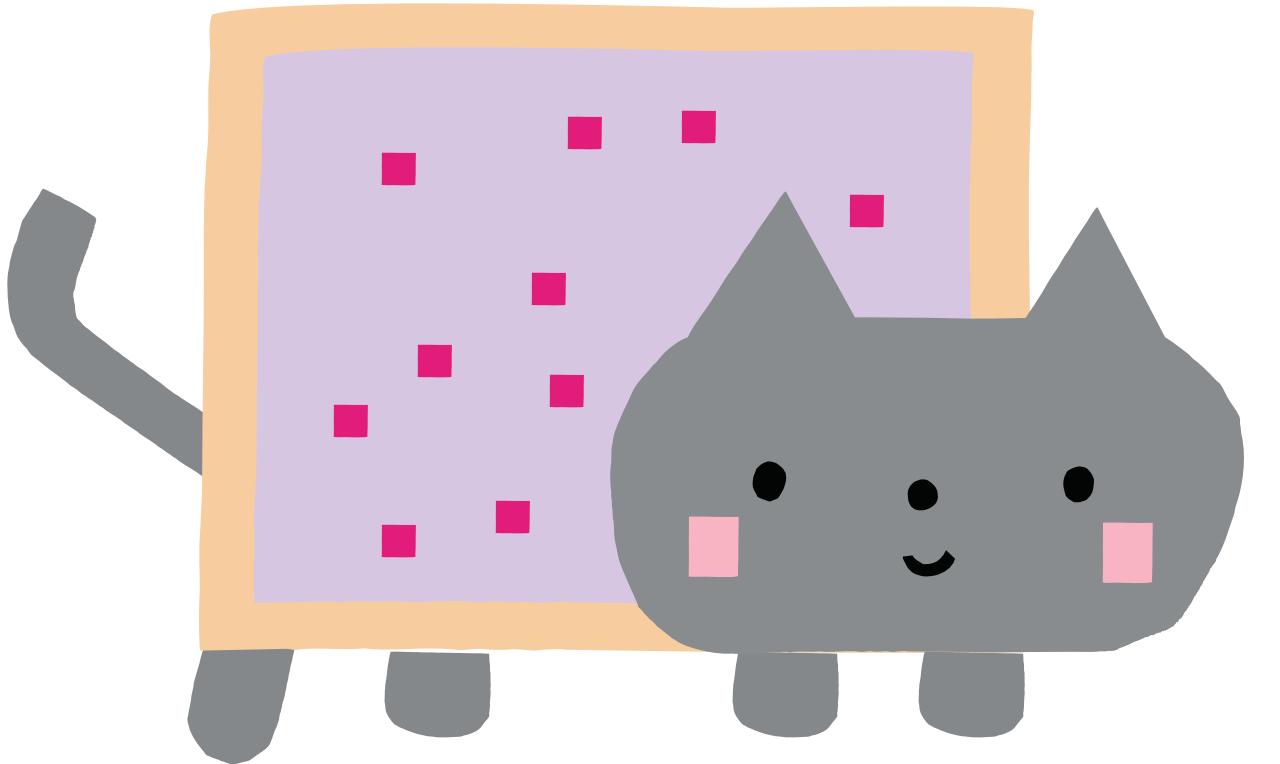
Paljon esimerkkejä  
kissoista

Perinteinen ohjelointi

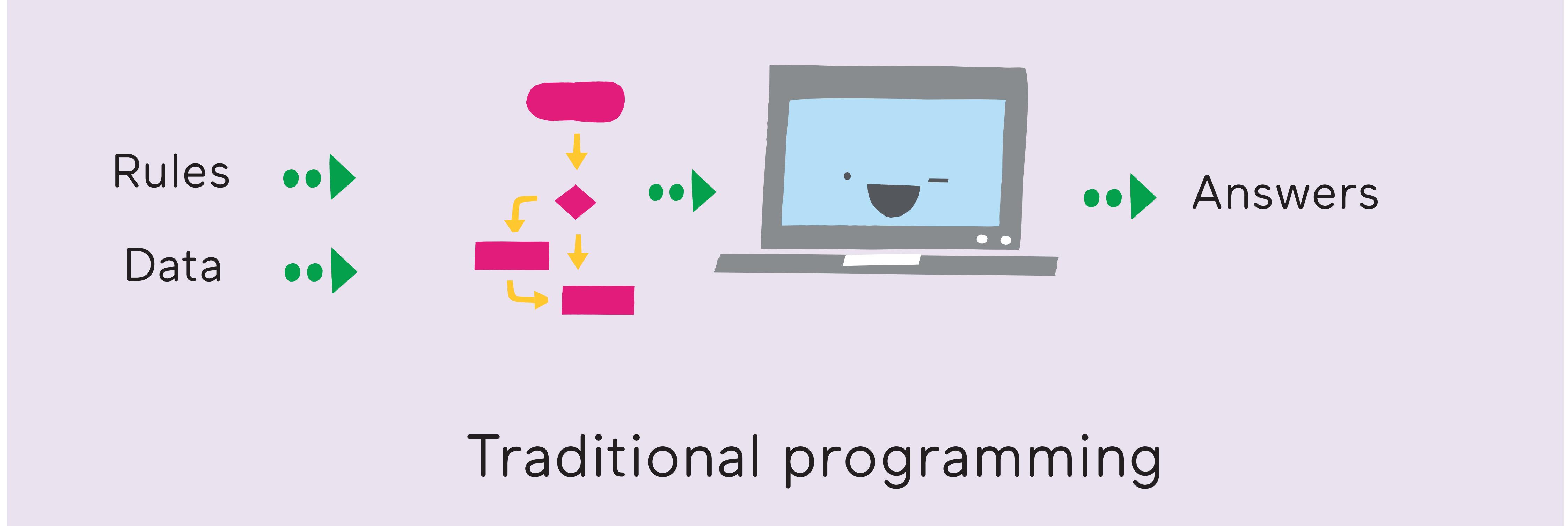
Koneoppiminen

H < - > 0  
d u f Y

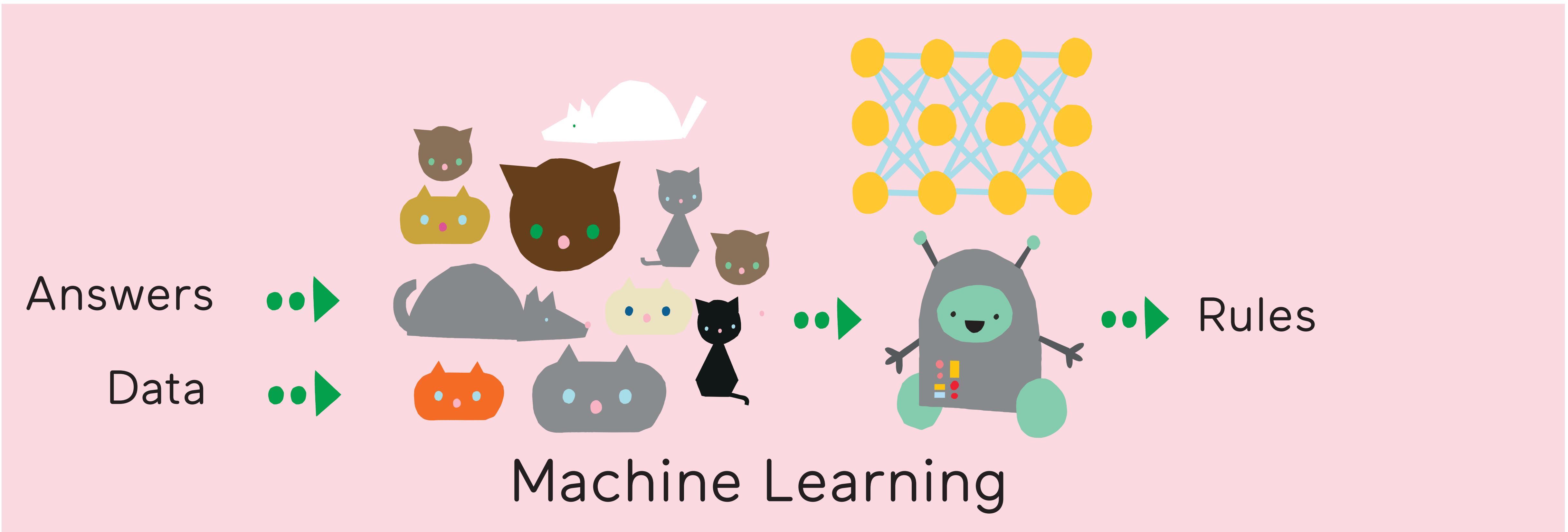
Is this a cat?



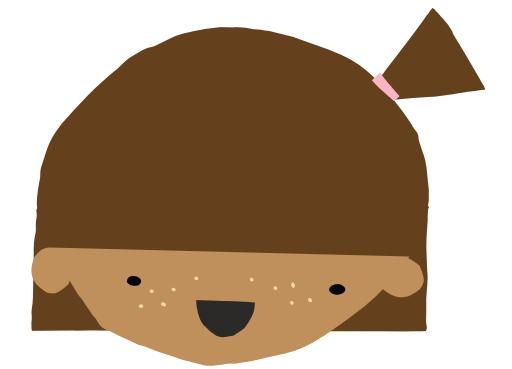
H < - > 0  
d c & Y



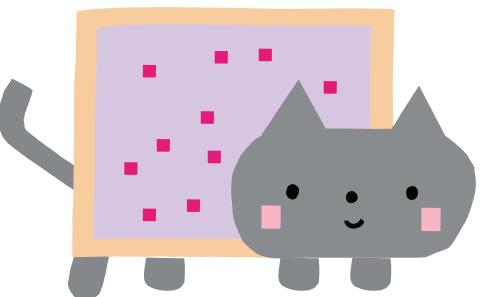
www.  
hellorubby.  
com



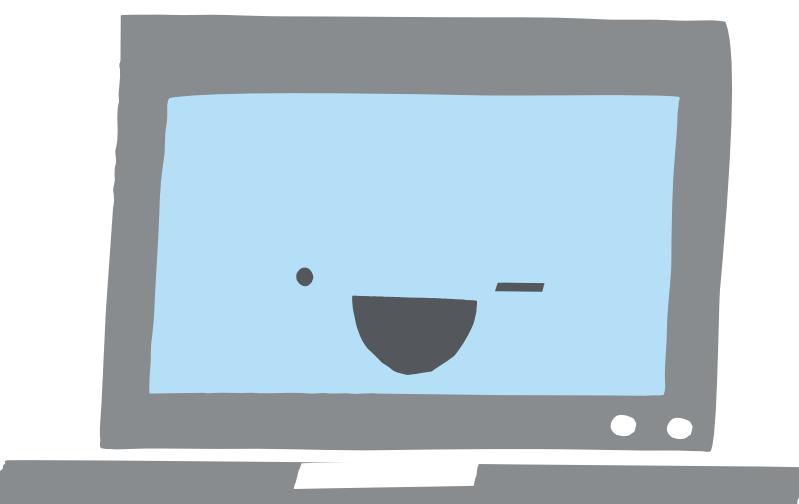
H E L > 0  
S C B Y



PROBLEM TO SOLVE  
Is this a cat?



ANSWER THE QUESTION



H E L > O  
S C B Y

# GATHER DATA

Examples of cats

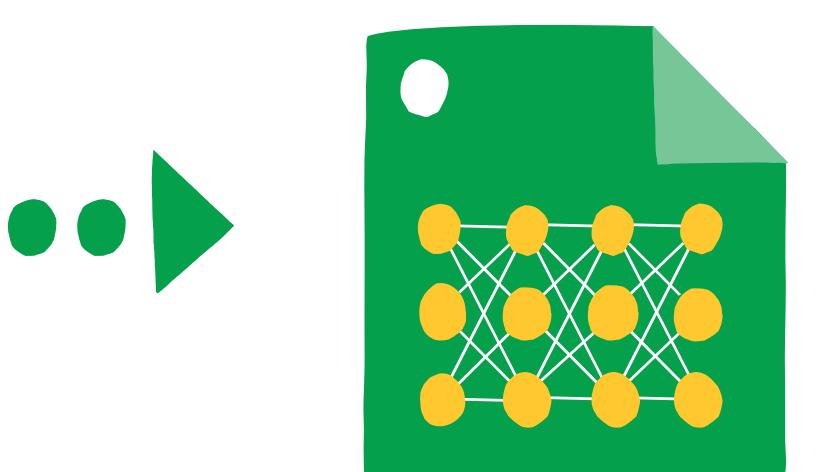


## GATHER DATA

Examples of cats



## BUILD A MODEL

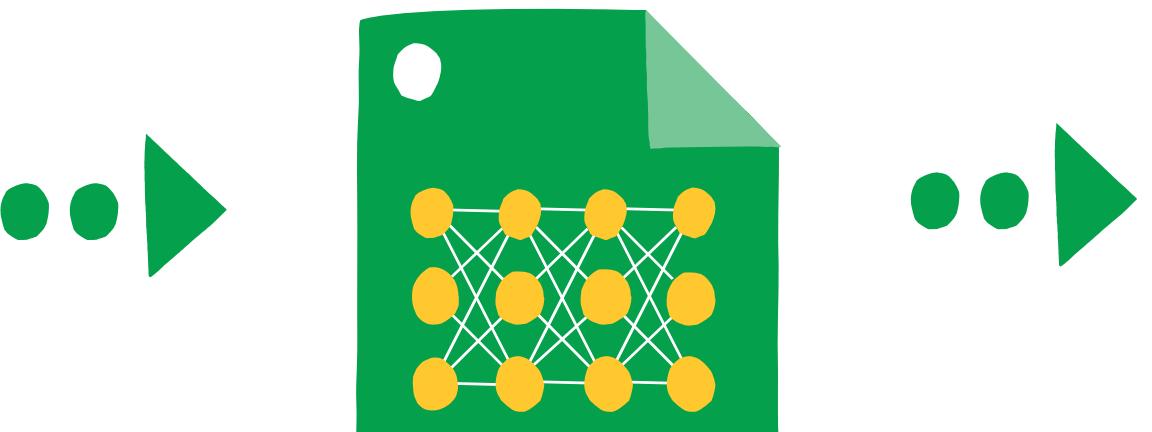


## GATHER DATA

Examples of cats

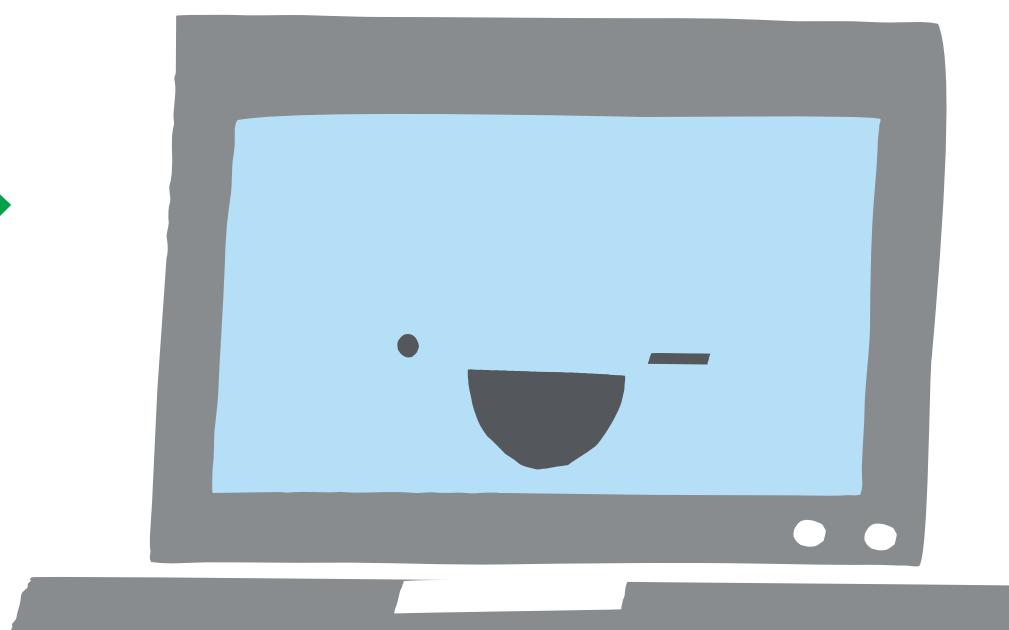


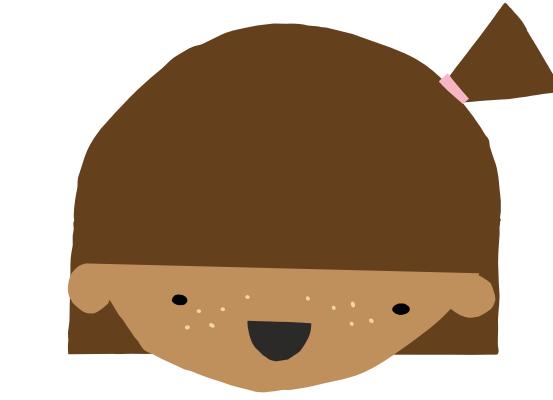
## BUILD A MODEL



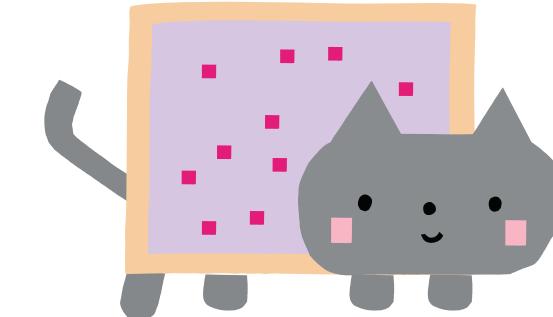
## ANSWER THE QUESTION

Yes!





PROBLEM TO SOLVE  
Is this a cat?

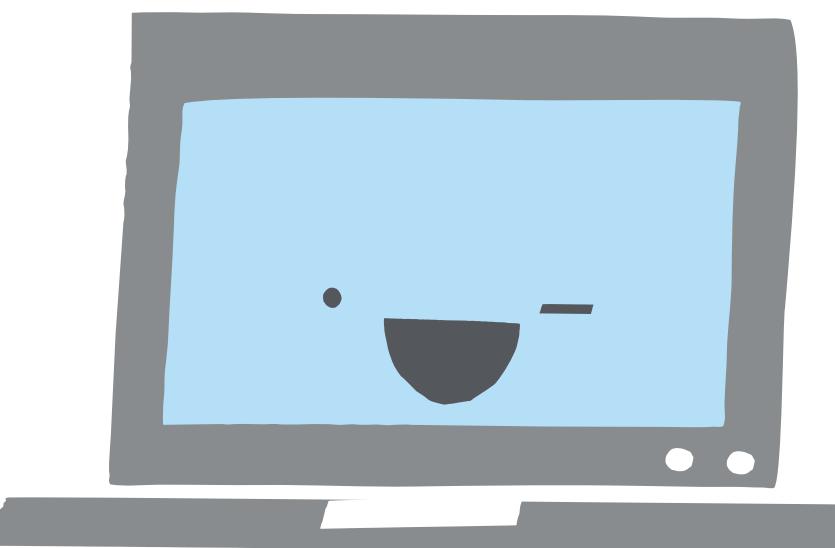
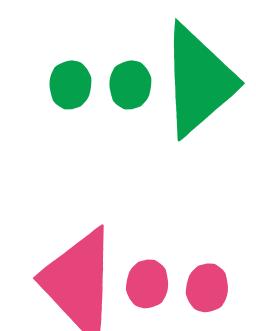
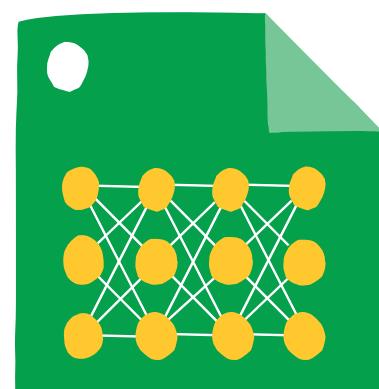


## GATHER DATA

Examples of cats



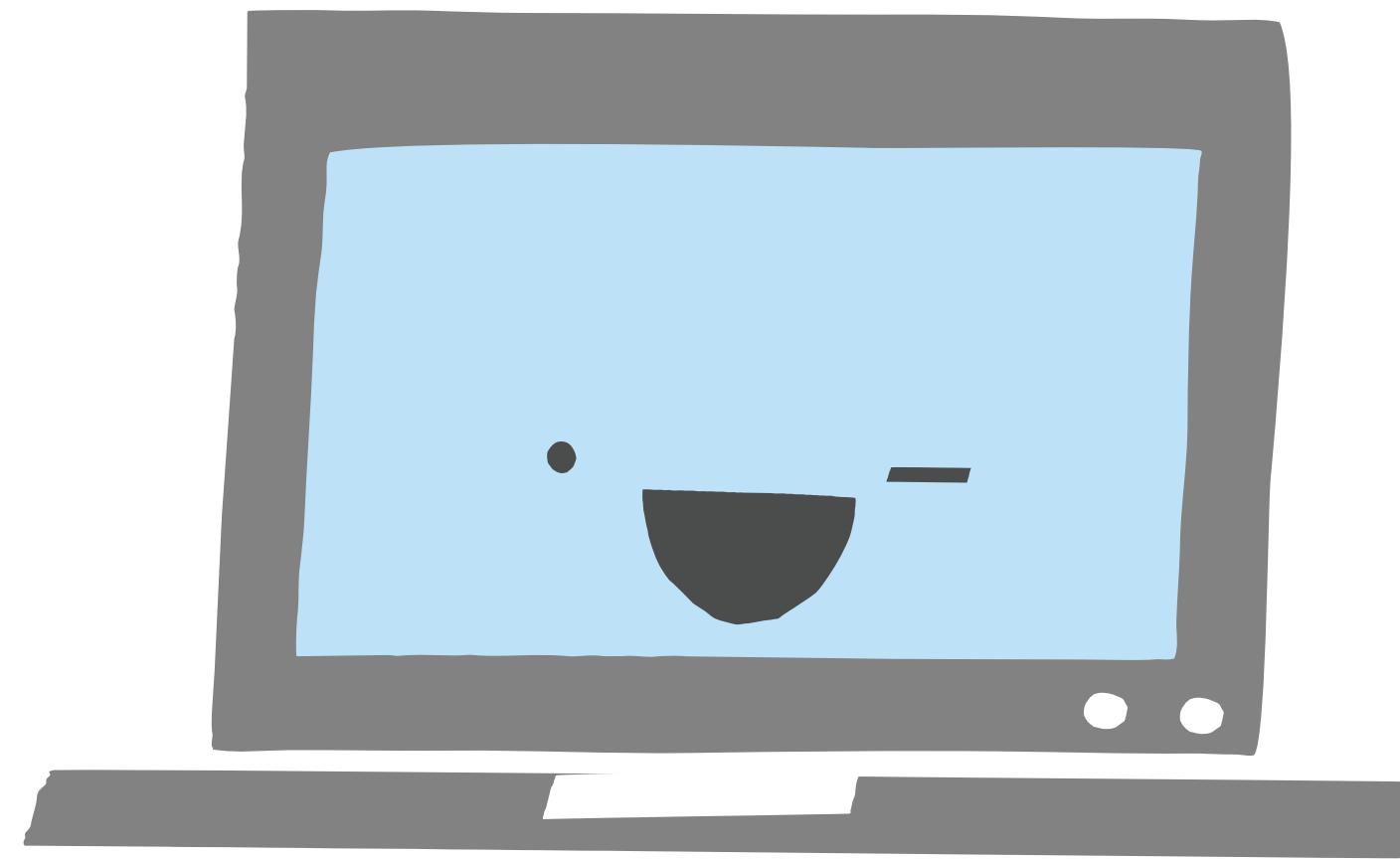
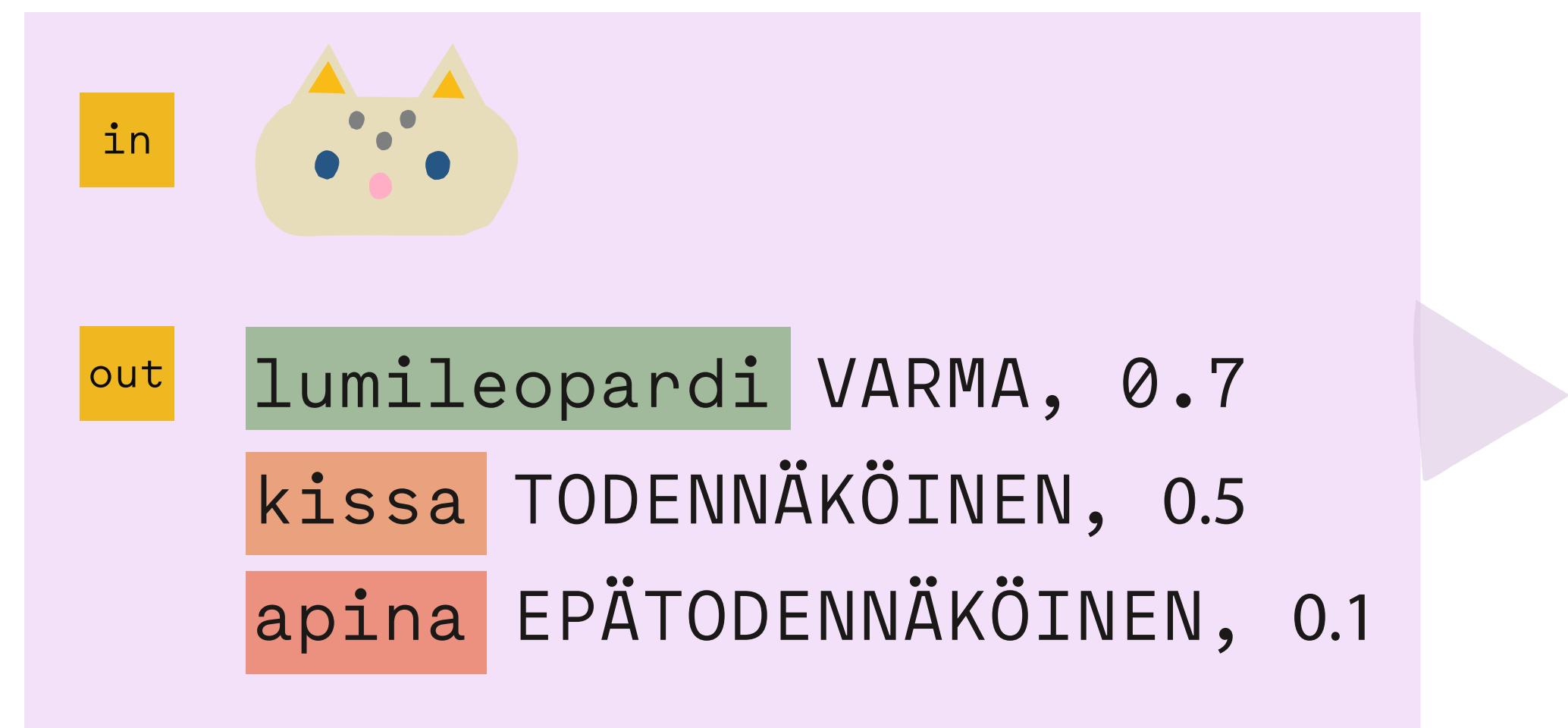
## BUILD A MODEL

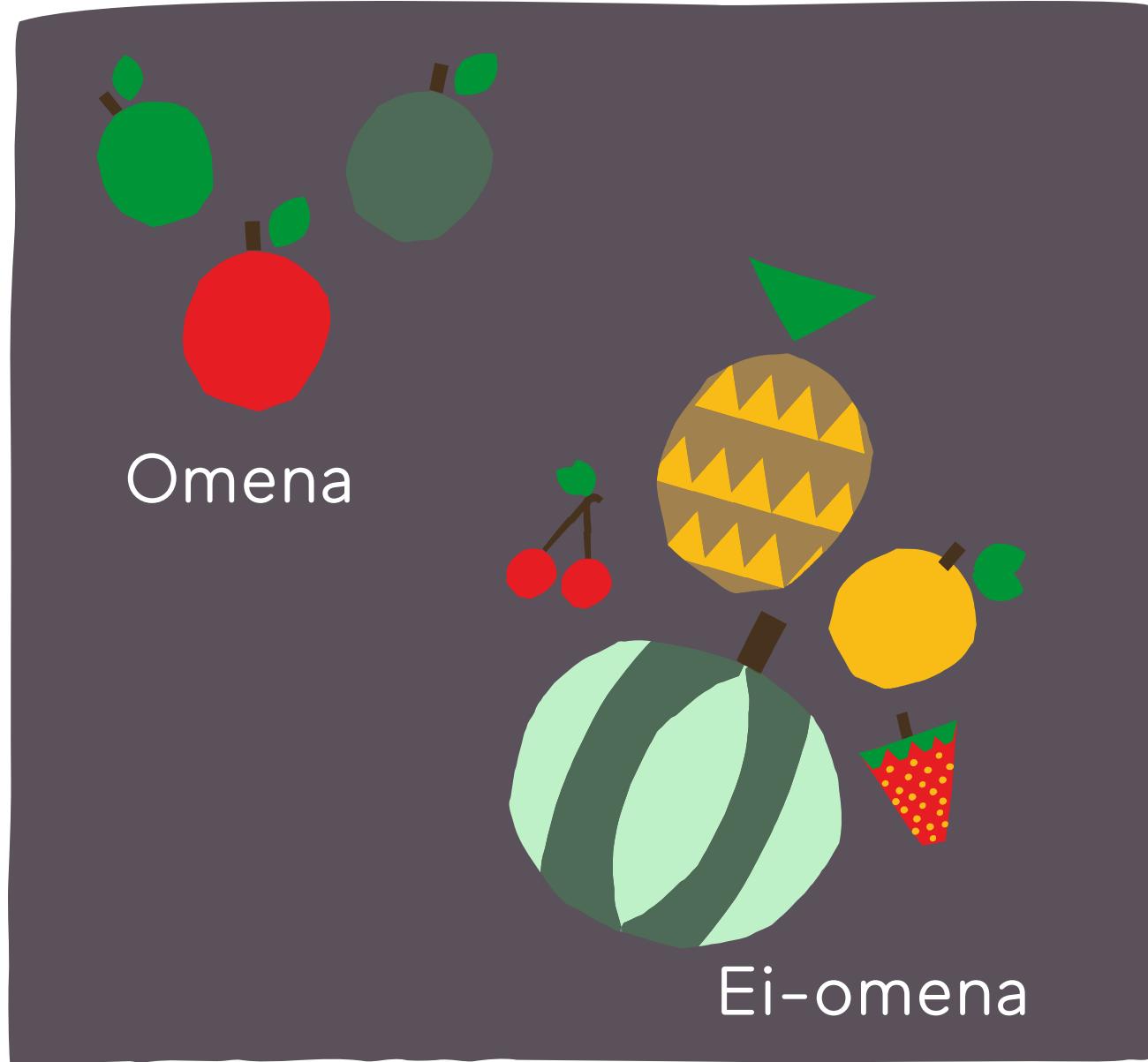


## ANSWER THE QUESTION

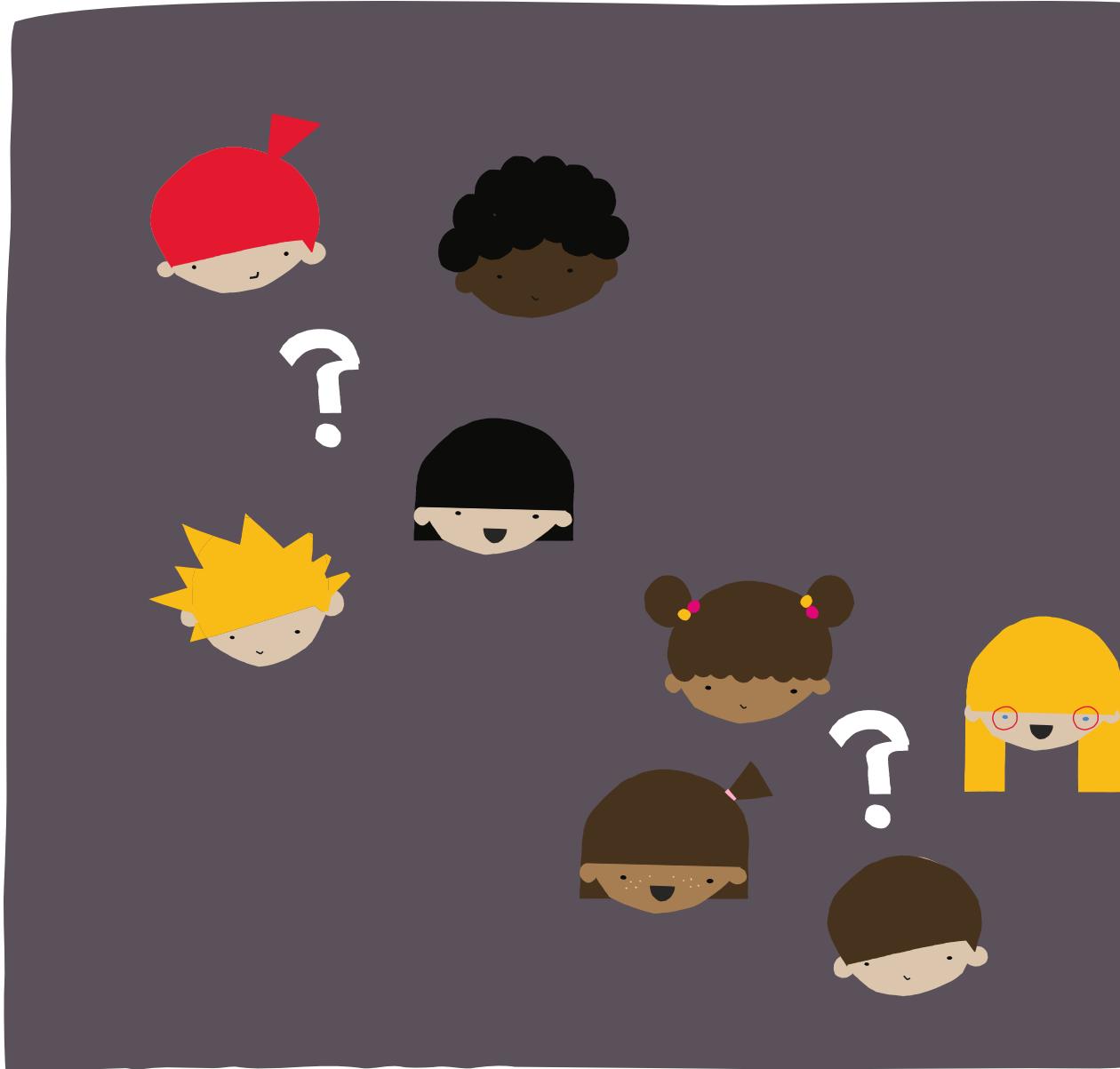
Yes!

## UPDATE MODEL





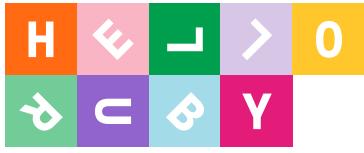
**OHJATTU  
OPPIMINEN**



**OHJAAMATON  
OPPIMINEN**



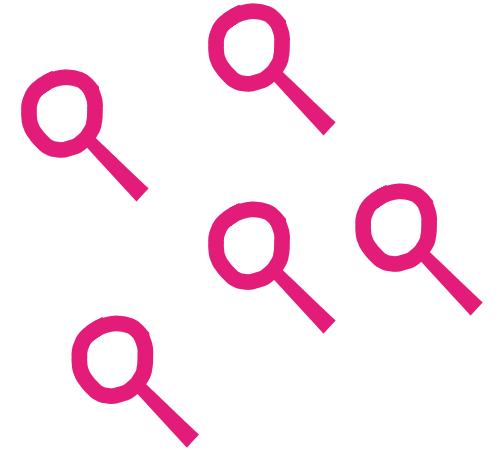
**VAHVISTUS  
OPPIMINEN**



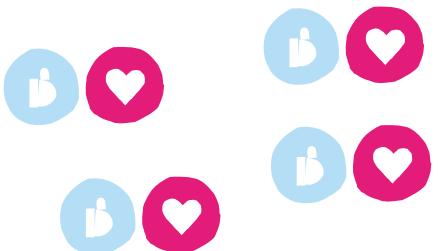
# Dataselfie

Write up the following information.

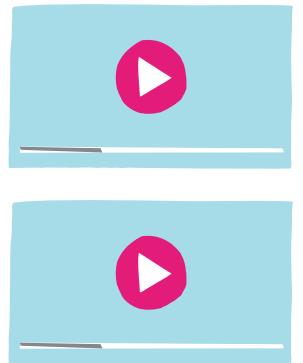
5 things you've searched online



4 things you've liked or given thumbs up to



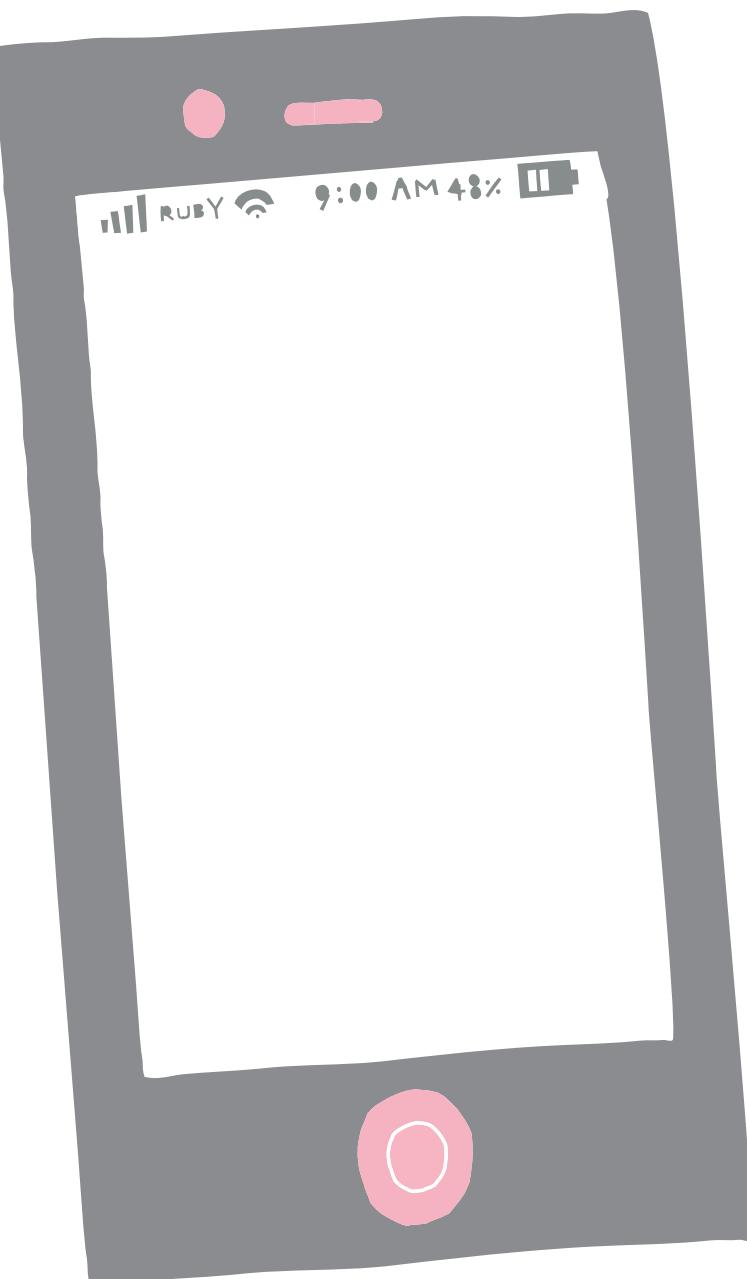
3 videos you've watched



2 places you've been with a mobile phone

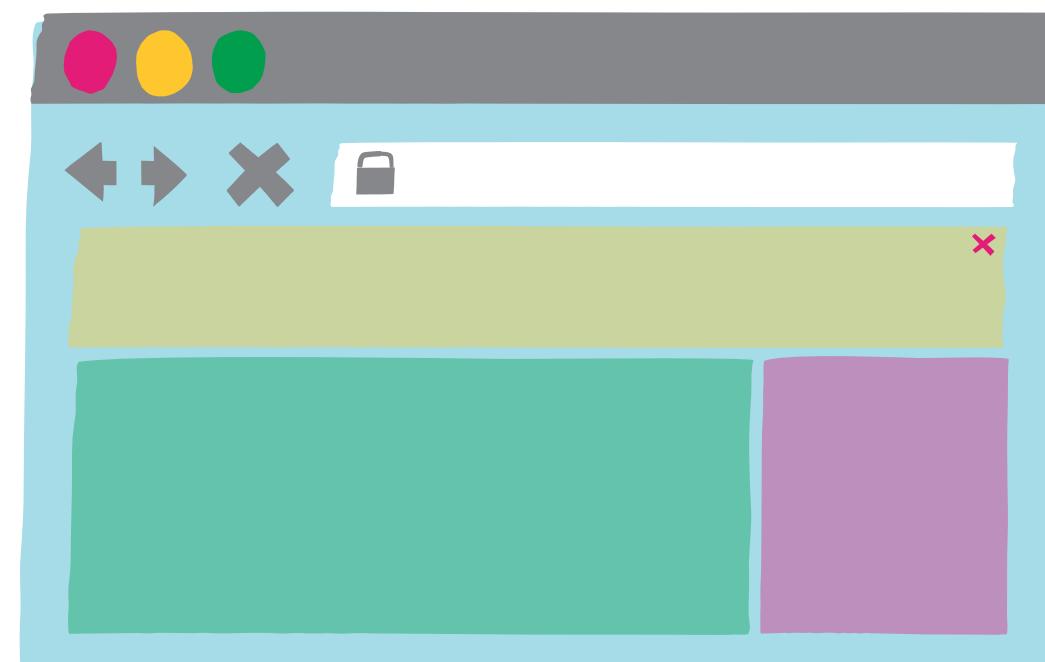


1 person you've messaged with



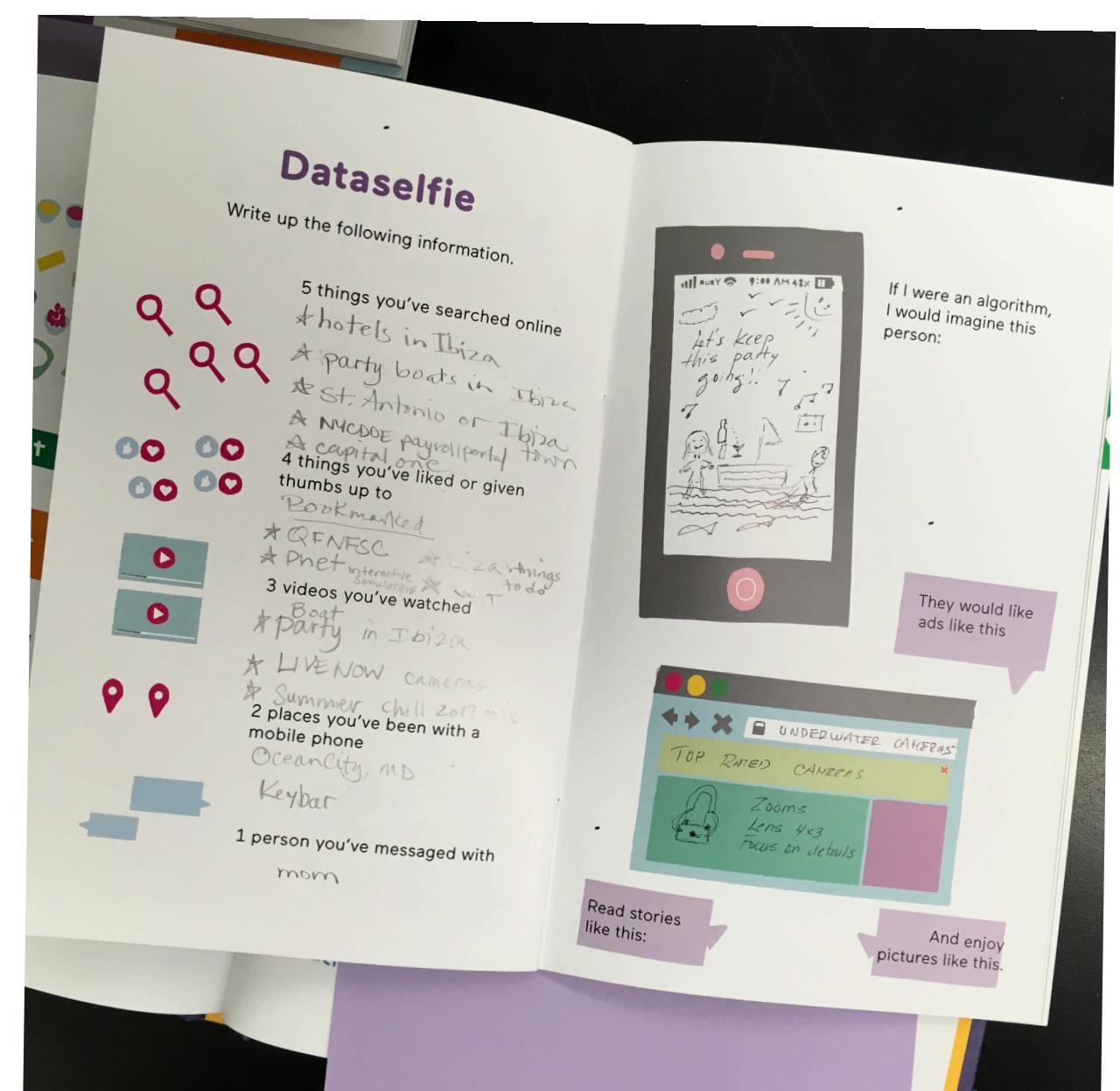
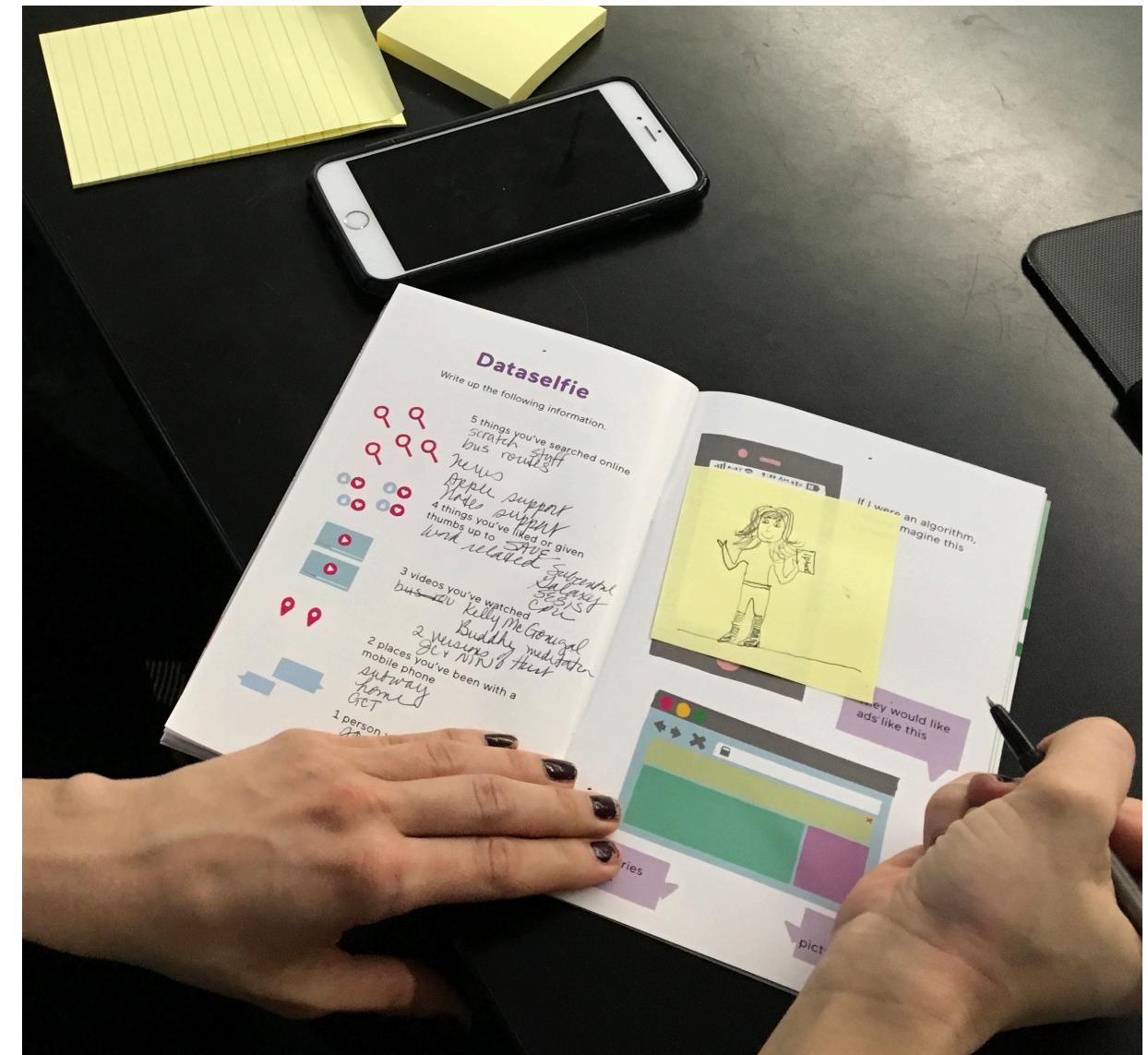
If I were an algorithm,  
I would imagine this  
person:

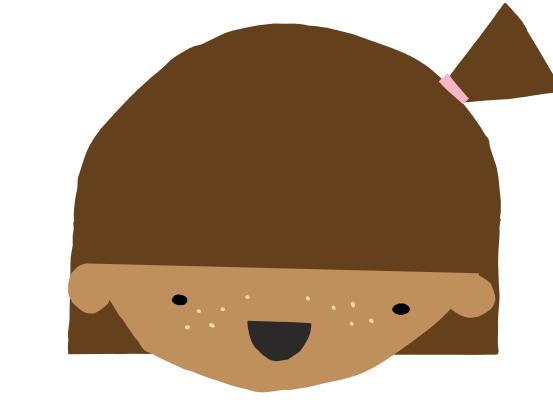
They would like  
ads like this



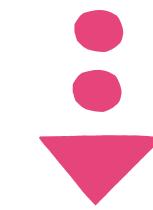
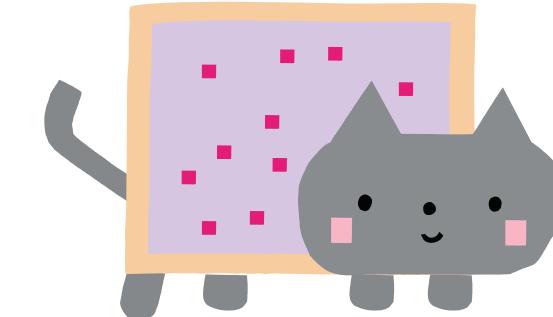
Read stories  
like this:

And enjoy  
pictures like this.





PROBLEM TO SOLVE  
Is this a cat?

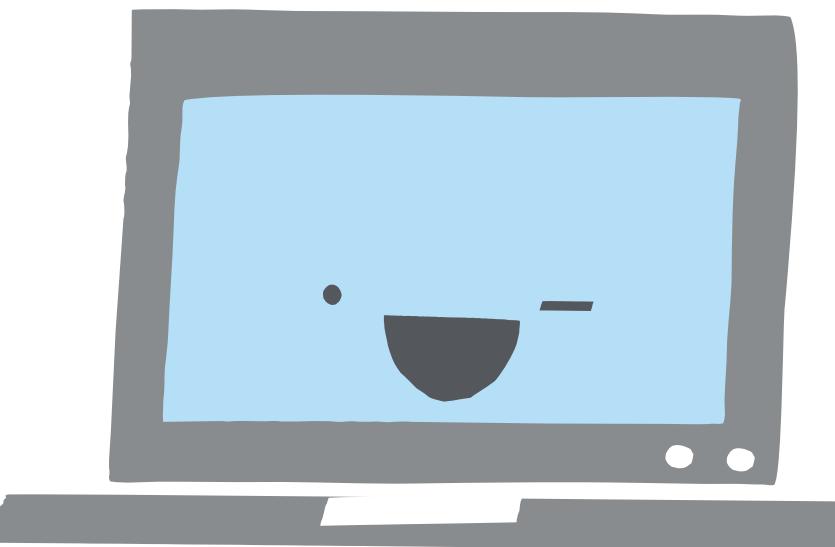
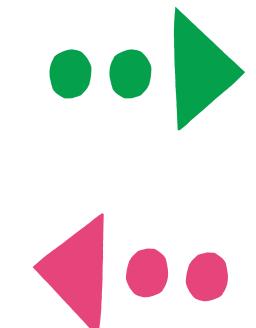
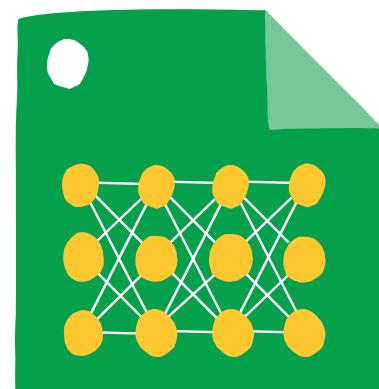


## GATHER DATA

Examples of cats



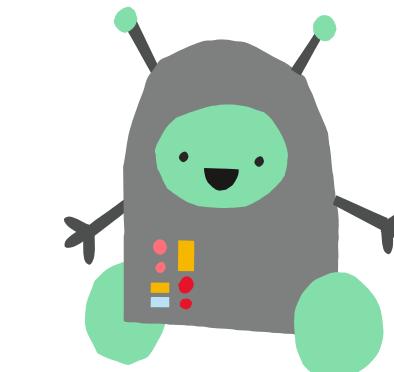
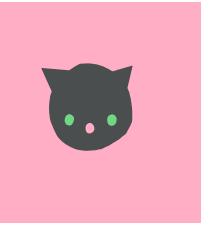
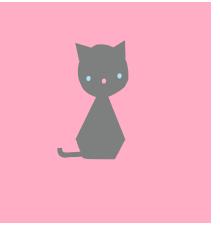
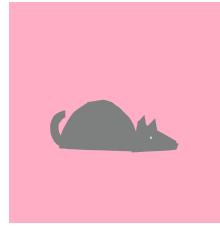
## BUILD A MODEL



## ANSWER THE QUESTION

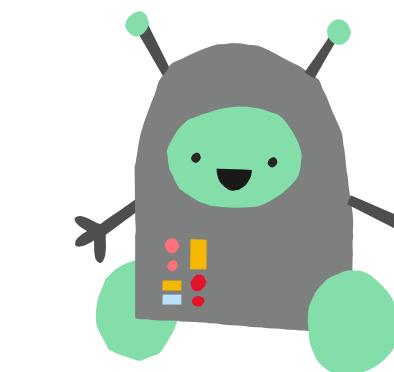
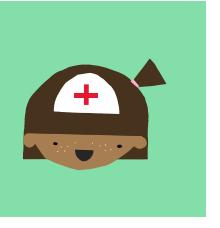
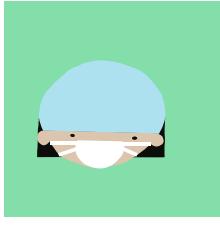
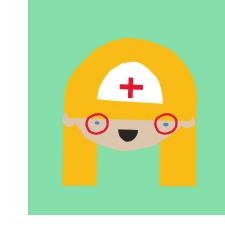
Yes!

## UPDATE MODEL



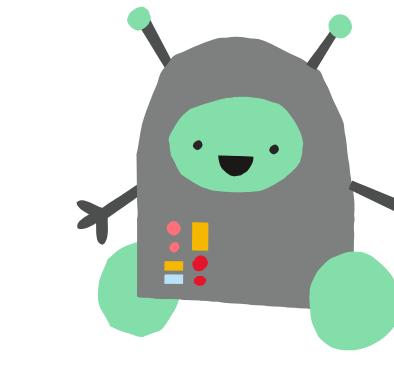
in

out Kissat ovat  
aina harmaita.



in

out Sairaanhoidajat  
ovat naisia



in

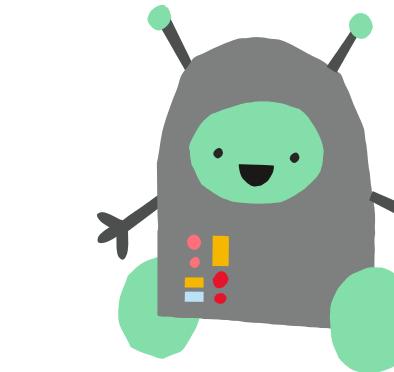
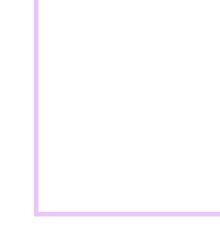
out Tämä ei ole  
muki.

5

5

5

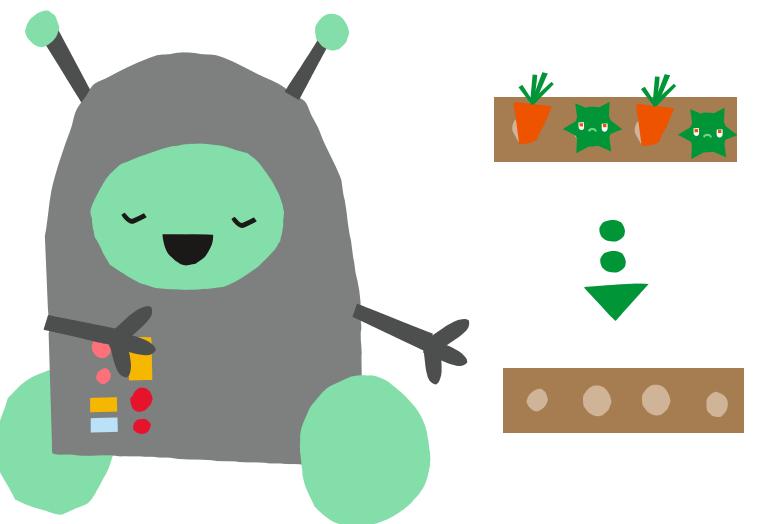
5



in 5

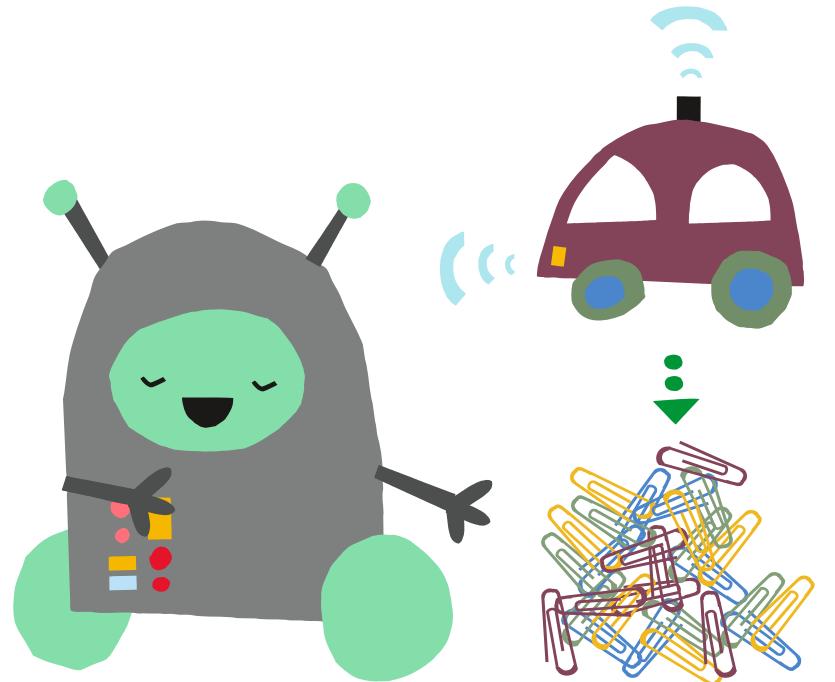
out Tämä ei ole  
numero 5.

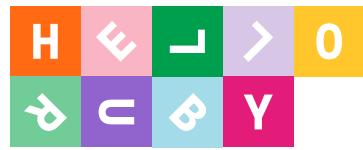
Tekoälyn tavoite  
on pitää huolta,  
että puutar-  
hassa ei ole  
yhtään ötökkää.



Parempi tavoite?

Tekoälyn tavoite  
on tehdä mah-  
dollisimman  
paljon paperi-  
liittimiä.





C

niinkuin  
creativity ja  
computers

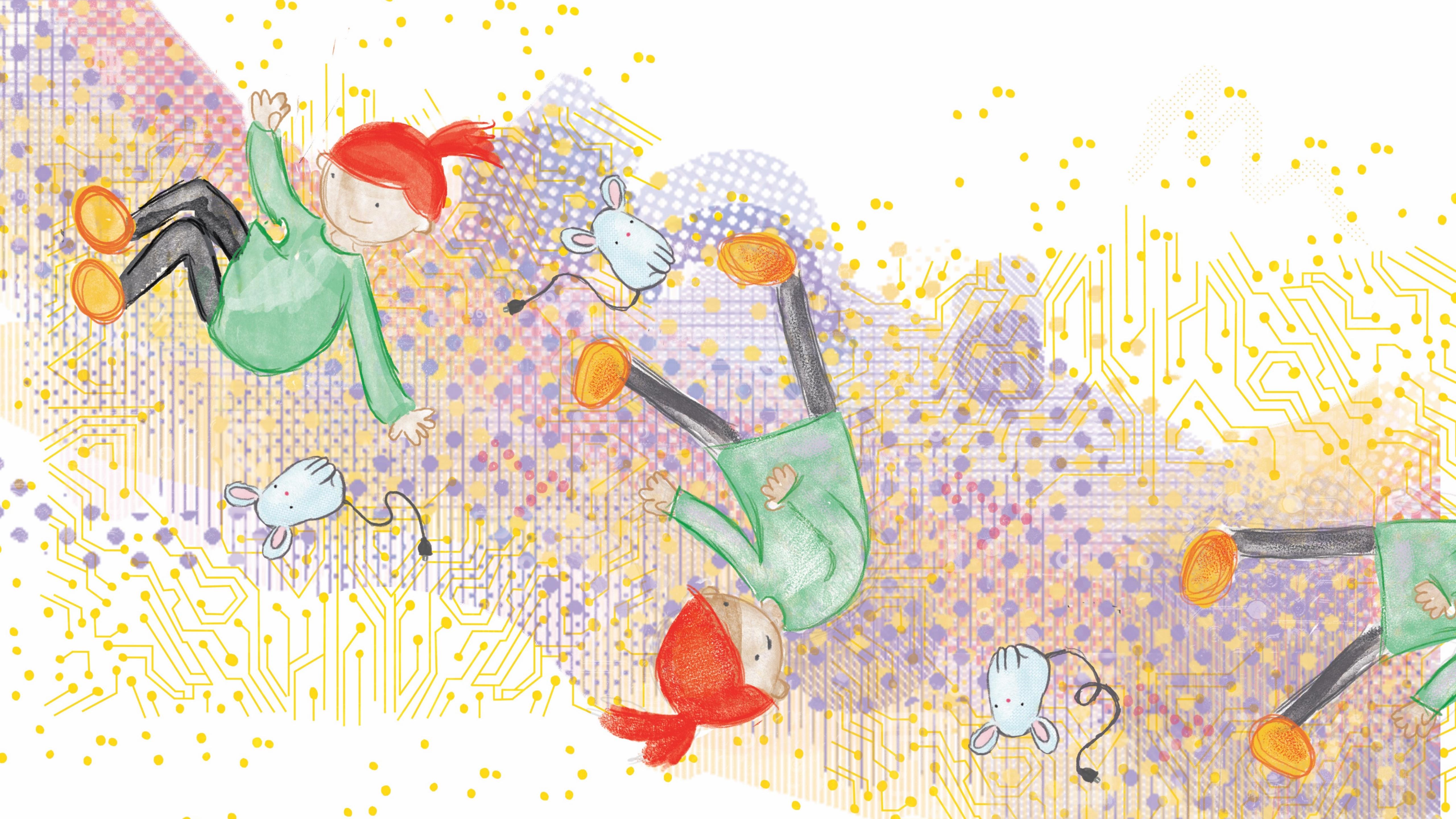




Computers  
are  
abstraction  
machines.



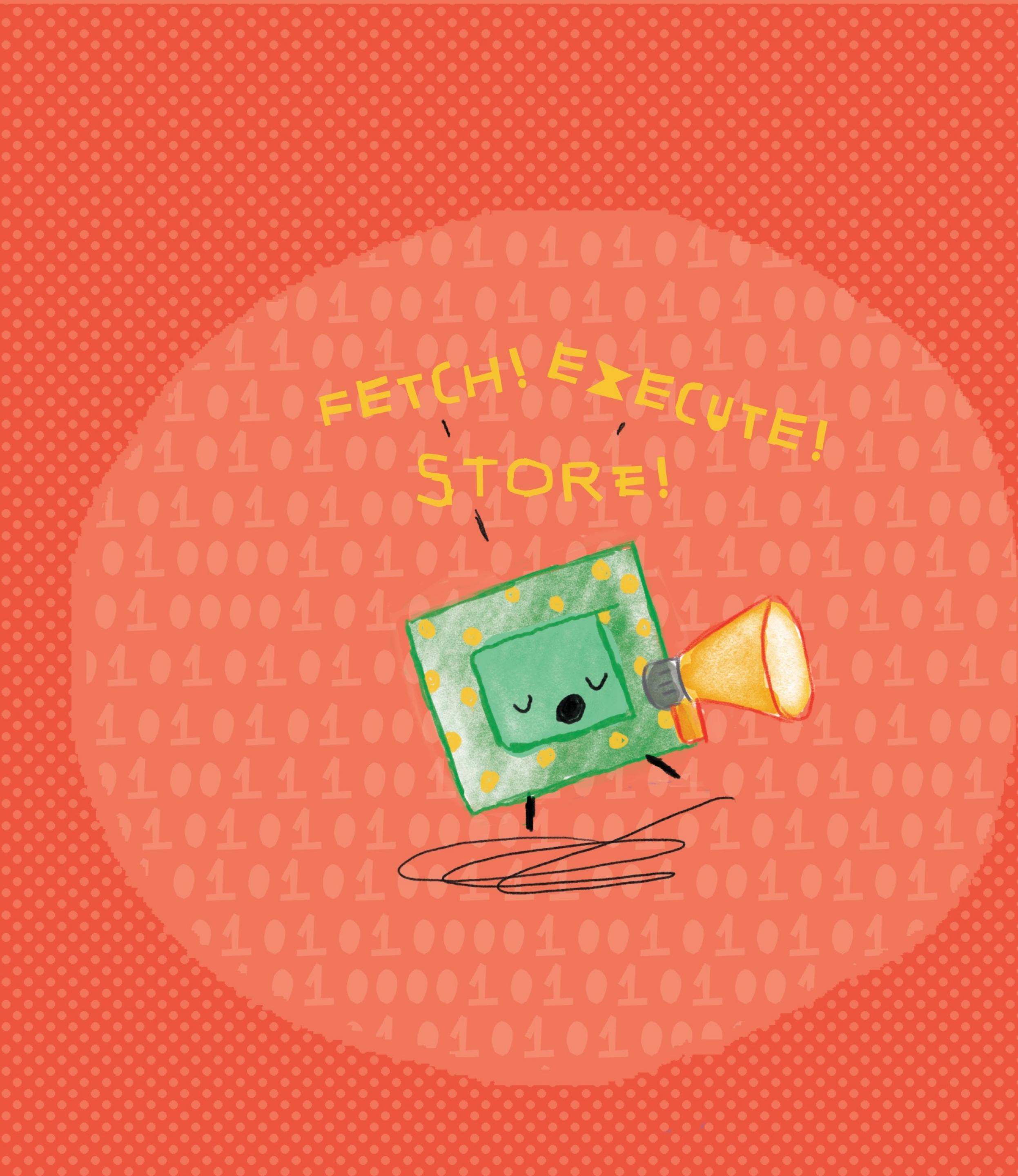






H E L > O  
R U R U B Y



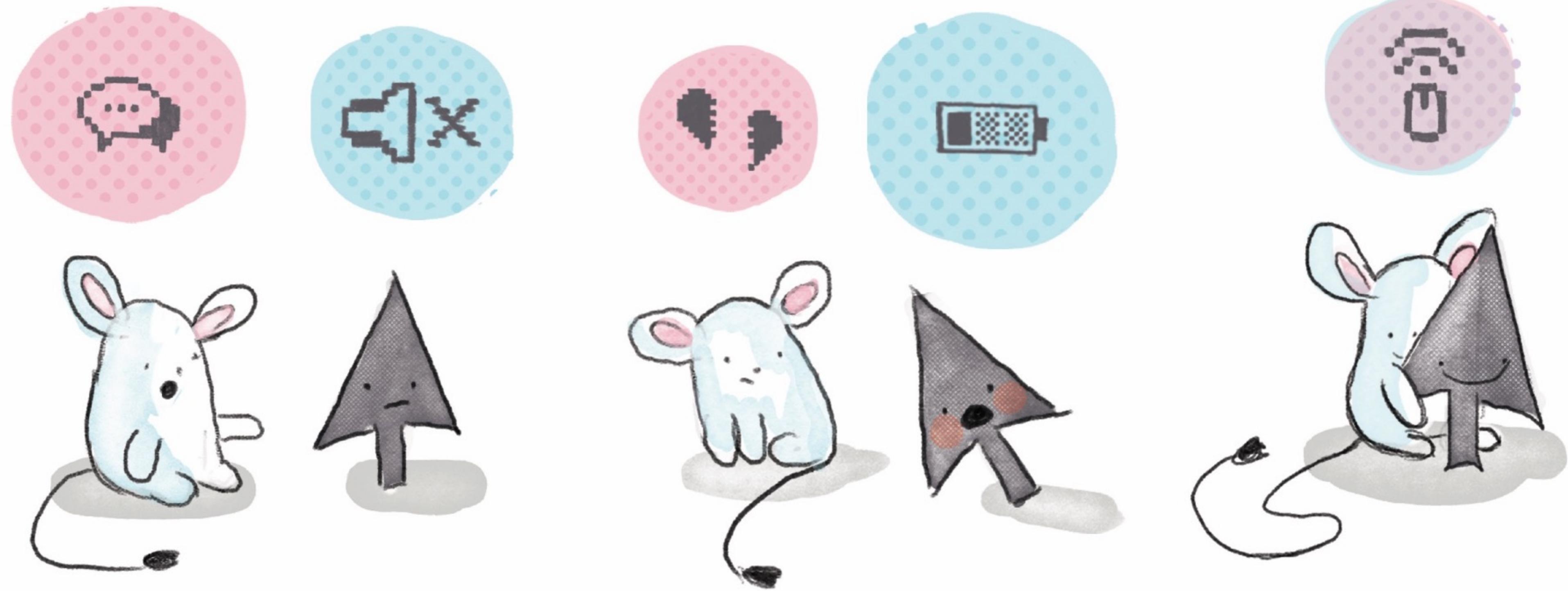




HARDWARE

SOFTWARE

H E L > O  
R U R U B Y

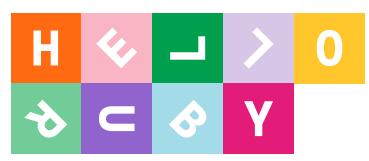




Computers  
are  
abstraction  
machines.

H E L > O  
R U B Y





# There's hundreds of computers in every home.

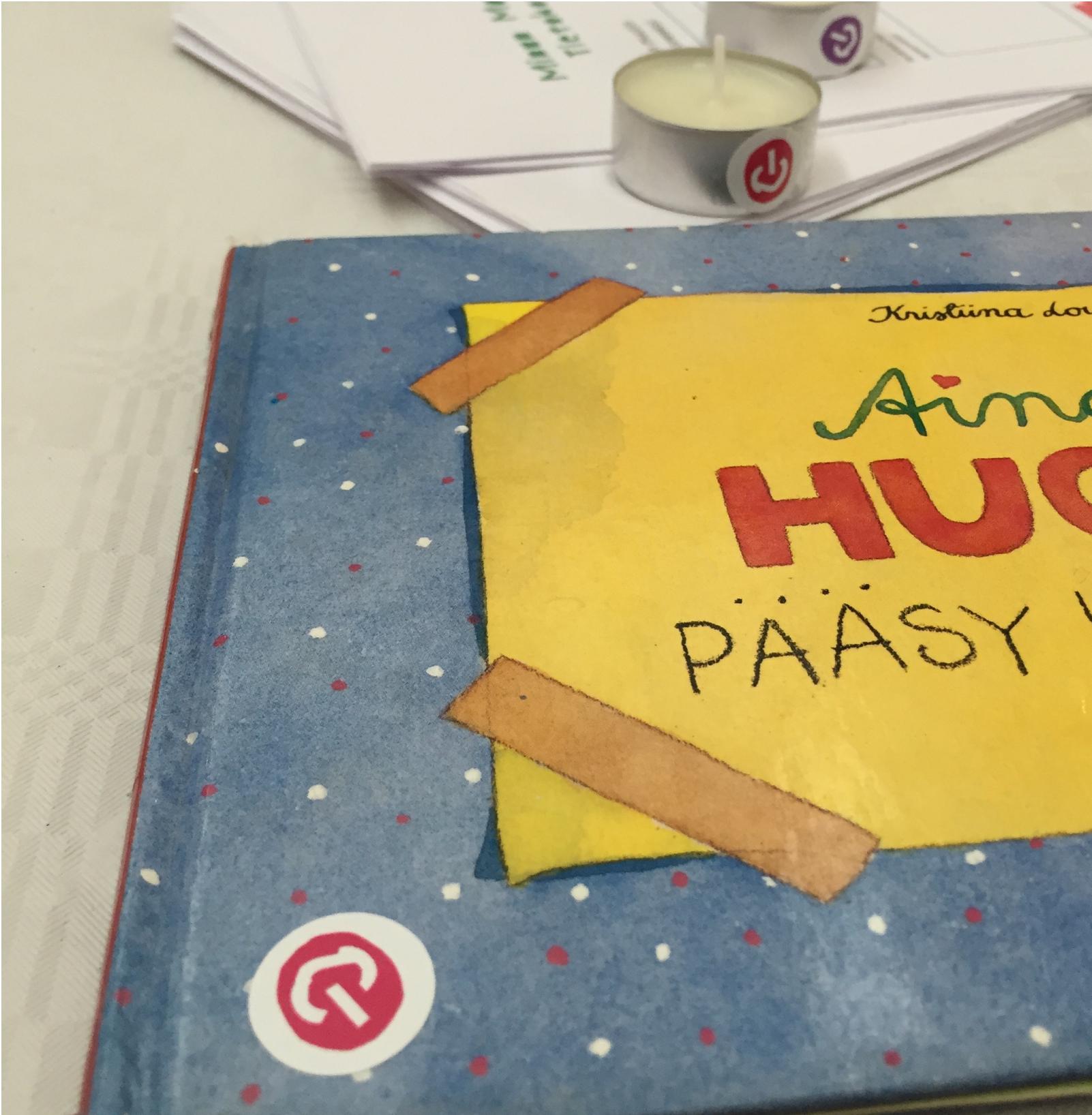
If the \_\_\_\_\_ is pressed, the food inside for 30 seconds.

If the \_\_\_\_\_ is pressed, \_\_\_\_\_ a bell for \_\_\_\_\_ seconds.

Turn the television \_\_\_\_\_ or \_\_\_\_\_ when standby button is pressed on the remote control.

Street lamp?  
Greenhouse heater?  
Burglar alarm?

H E L > O  
R U B Y



## My Magical Computer

1 This is what I made into a computer:

2 The name of my computer:

3 When I press the on/off button my computer will:

Draw a picture of yourself using your new computer.

Computers have sensors that can recognize changes in the environment. Color the sensors your computer has and describe what they do.

- Orientation.
- Temperature.
- Vibration.
- Moisture.
- Internet.

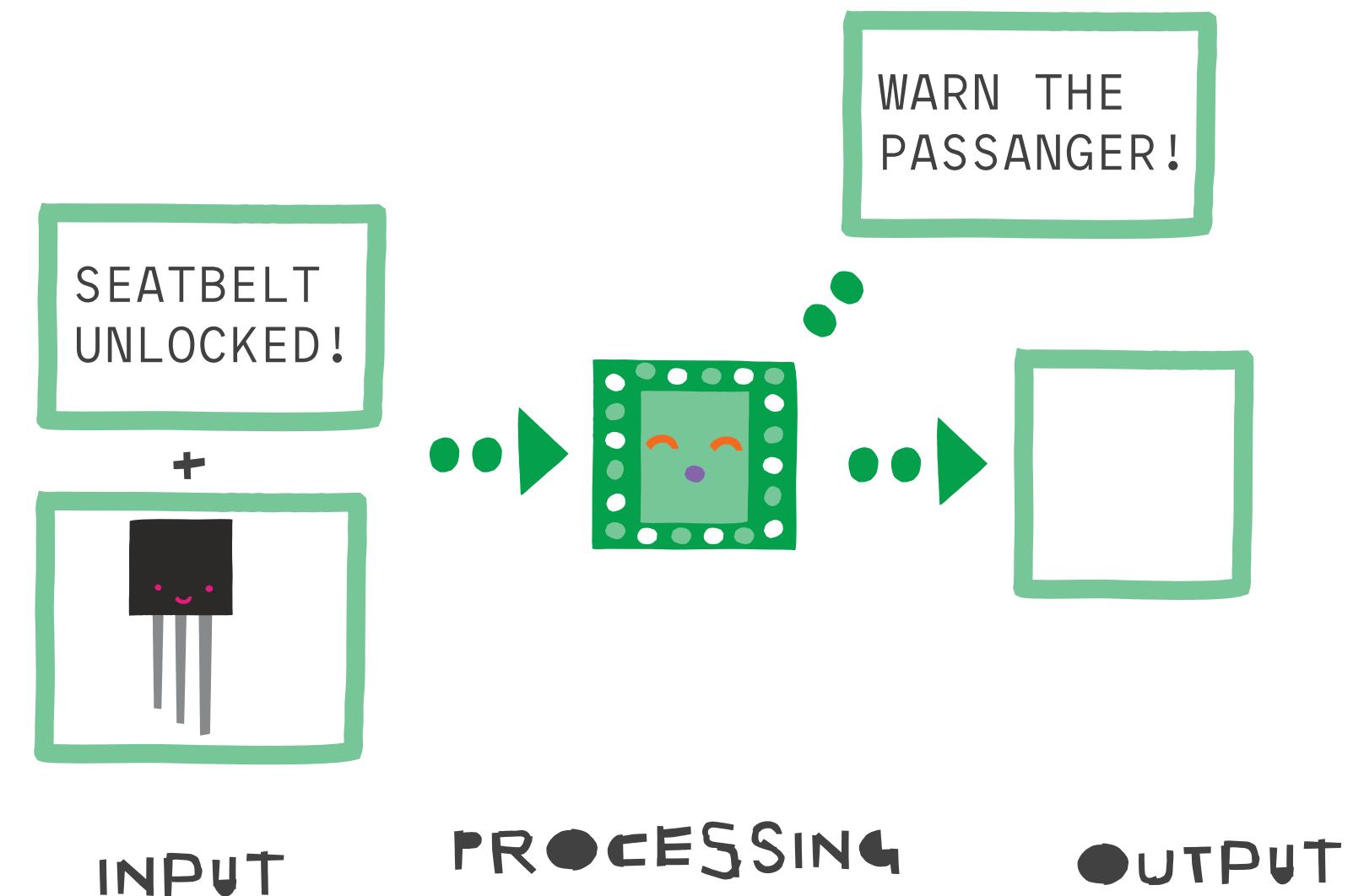
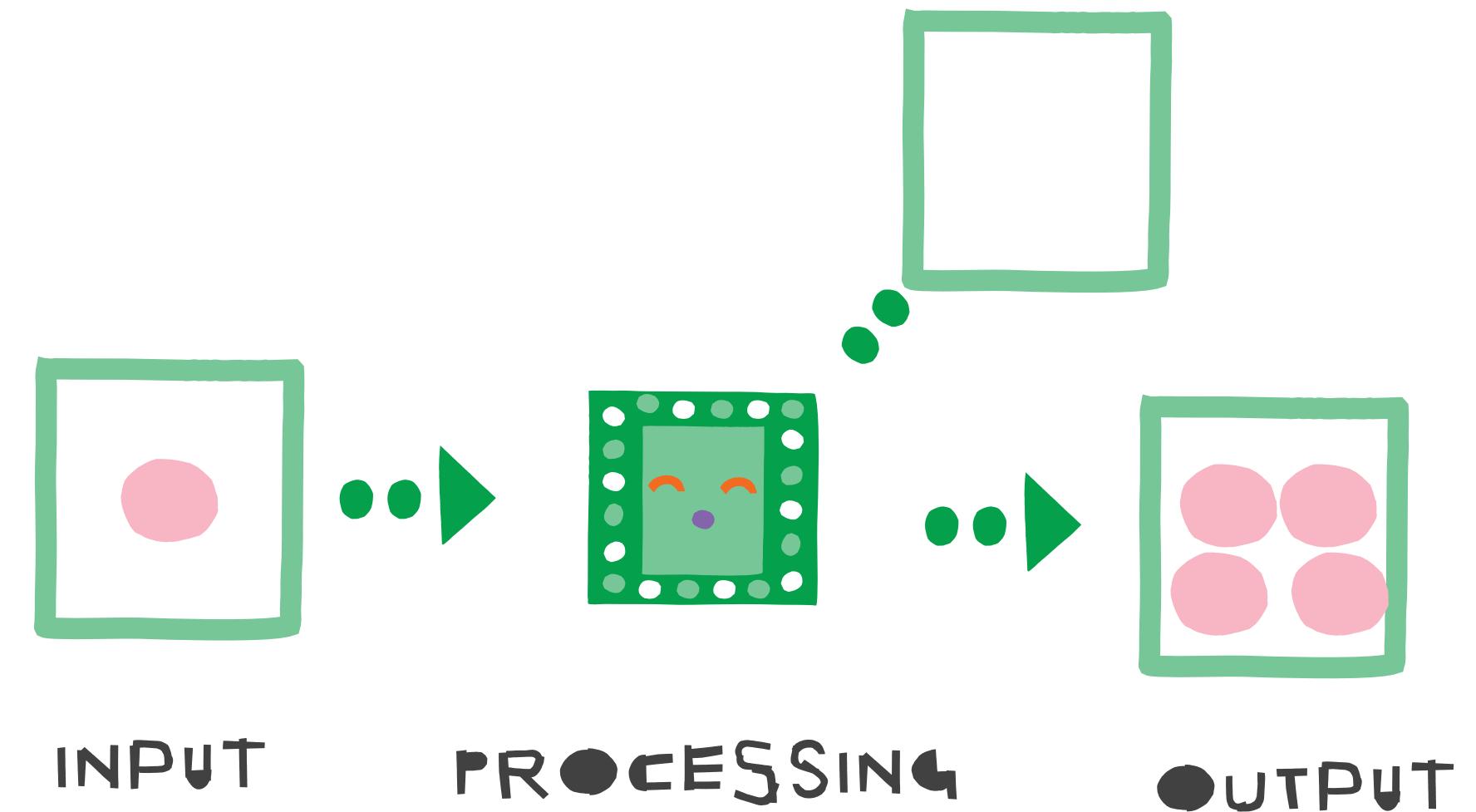
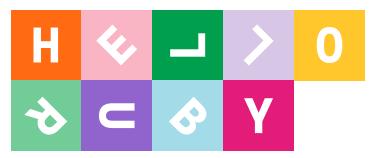
www.  
helloruby.  
.com

YOU  
ARE  
GREAT!

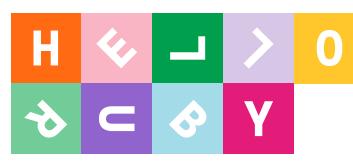
H E L > O  
H C B Y



www.  
helloruby.  
com



www.  
helloruby.  
.com



# 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

Completely Disagree.  
disagree



?

Computer is the same thing as Internet.



?

Computer is the same thing as machine.



?

Computer is the same thing as technology.



?

Computers have feelings.



?

Computers can sense things.



?

Computers have sensors.



?

Computers can make art.



?

Computers think.



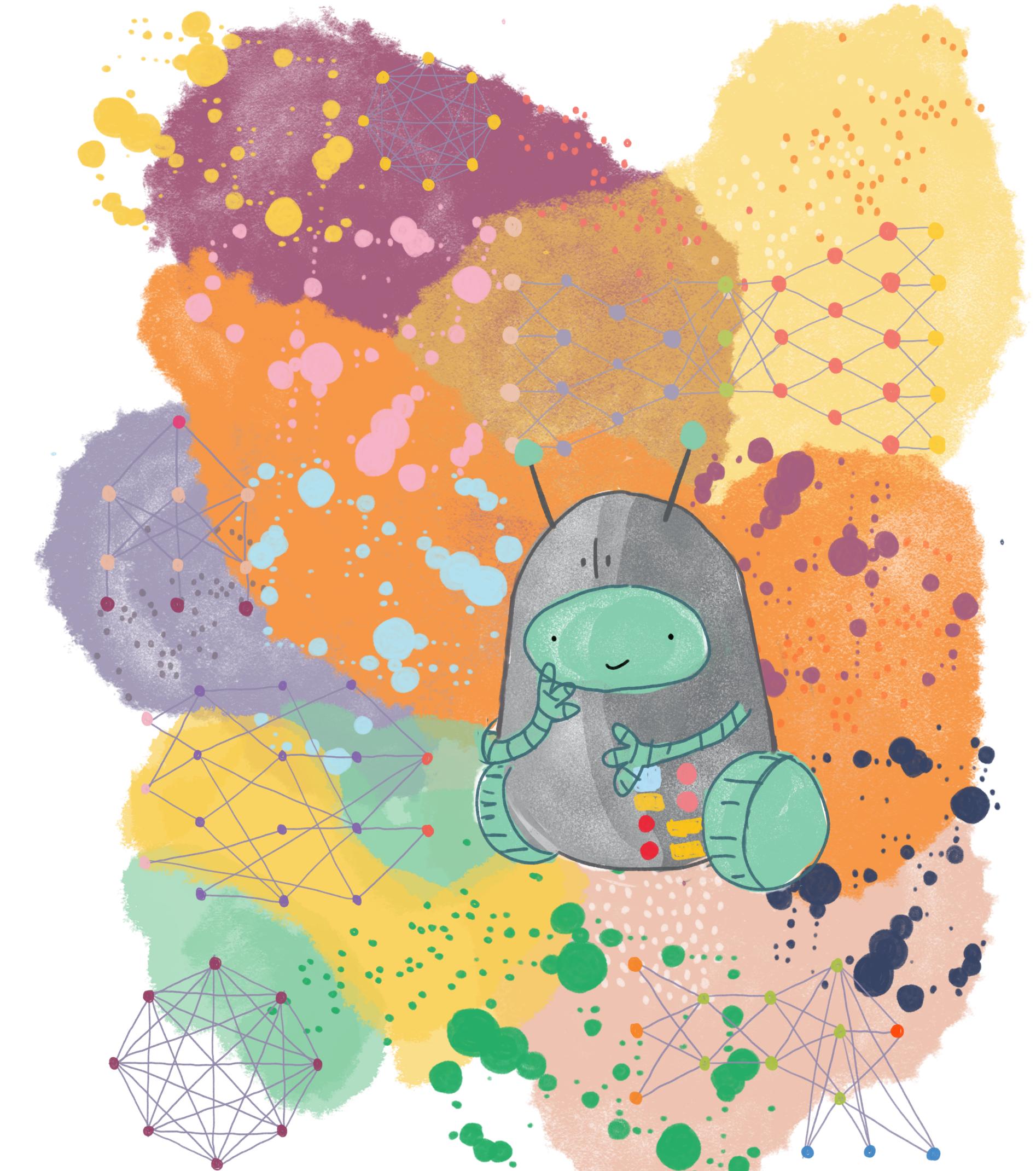
?

Computer know about me.



?

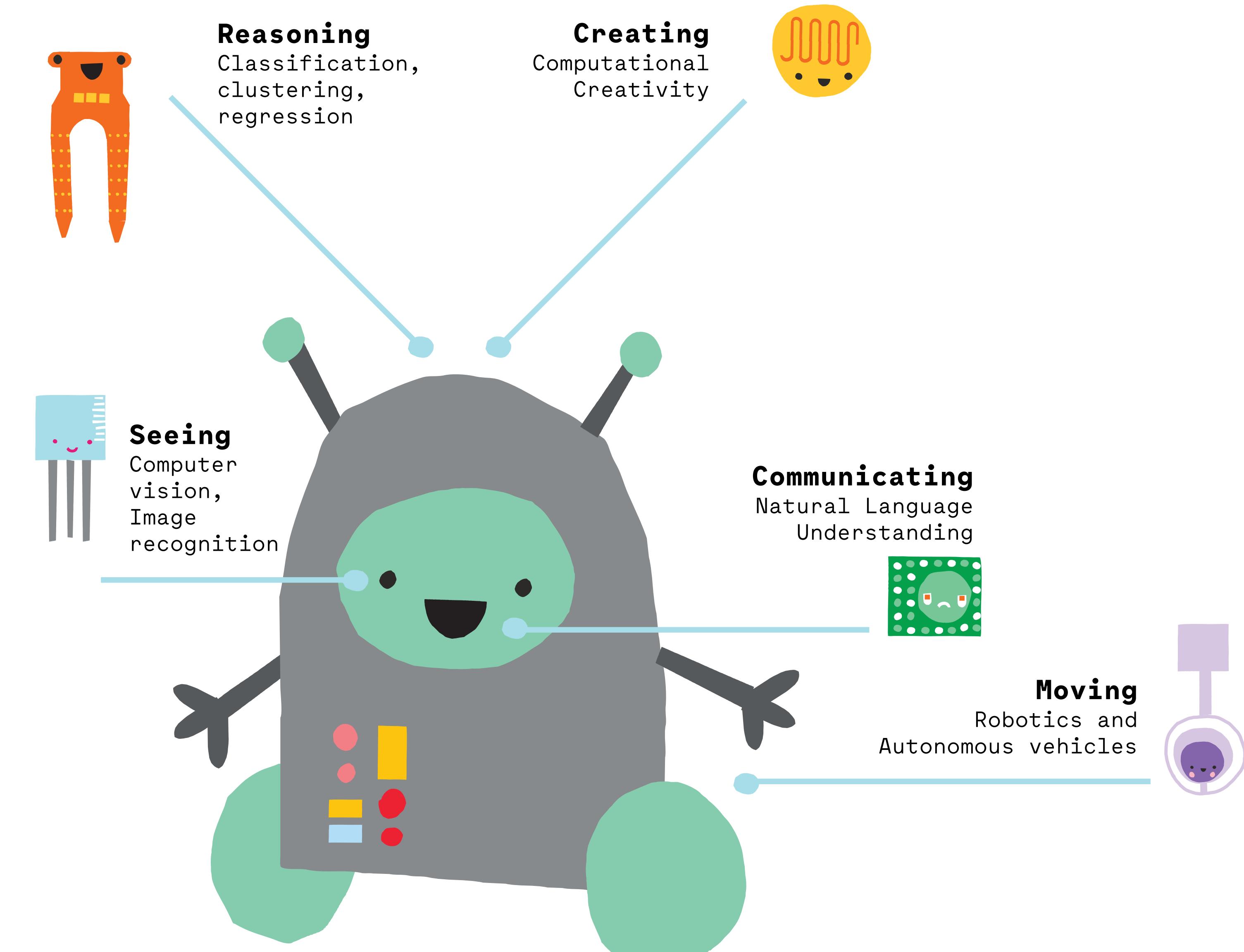
H E L L O R U B Y  
H C B Y



Varokkaa lohikäärmeitä.



# Koneoppiminen





## INPUT

Picture

English sentence

Car cameras

Audioclip

## OUTPUT

Are there human faces (0 or 1)

French sentence

Position of other cars

Transcript of audio clip

## APPLICATION

Photo tagging

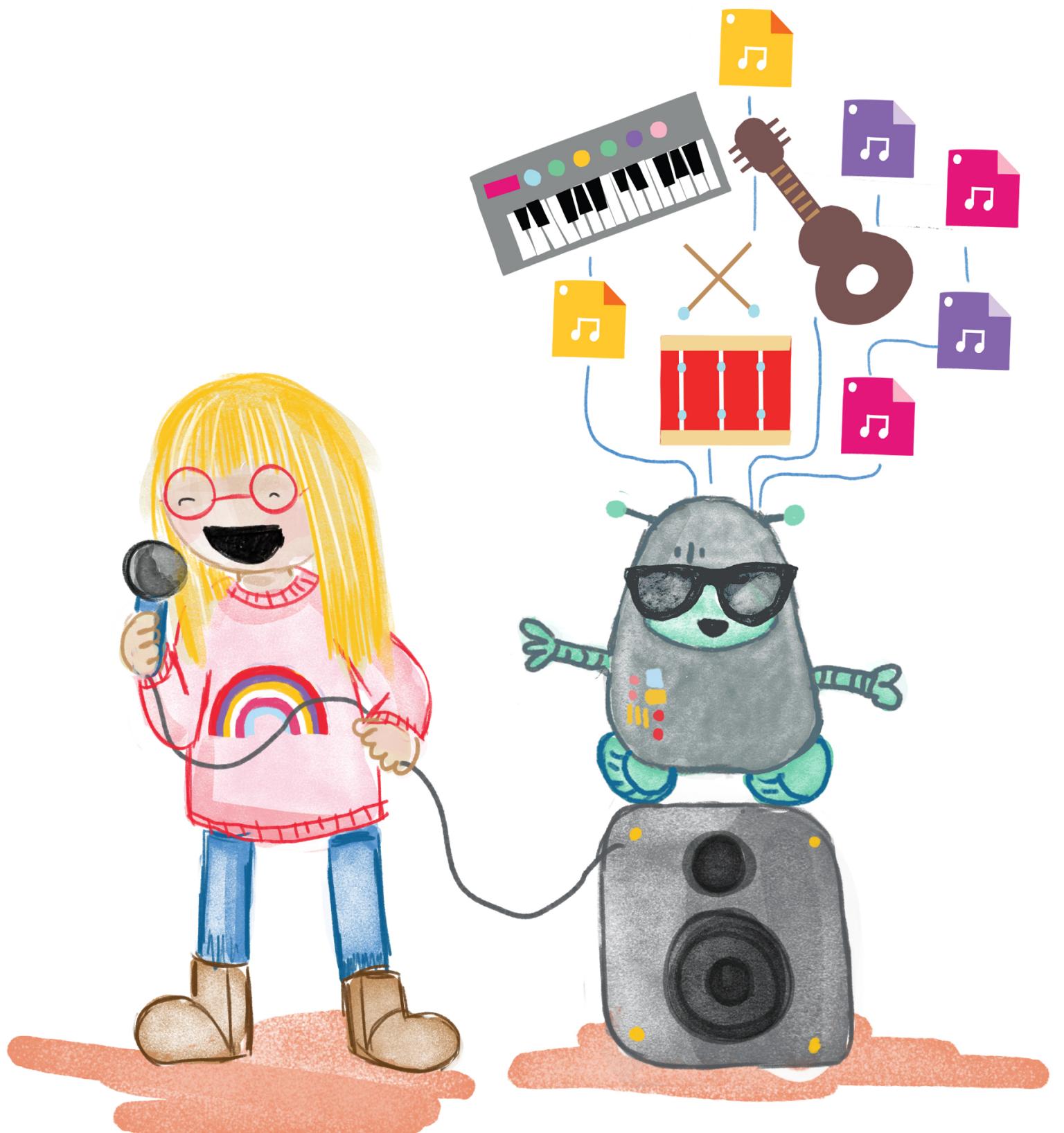
Translation

Self-driving cars

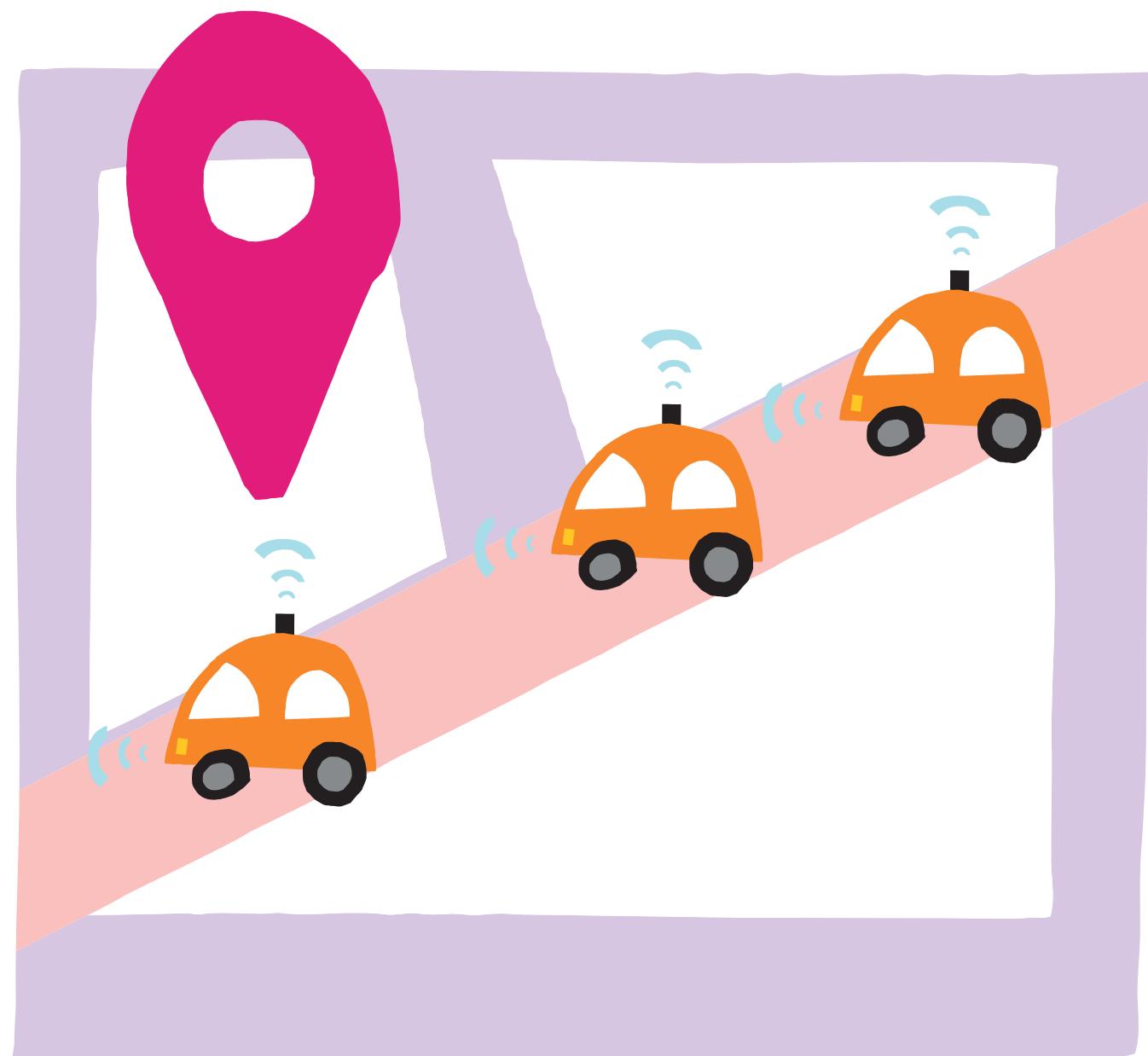
Speech recognition

H E L > O  
R U B Y

# Lopuksi

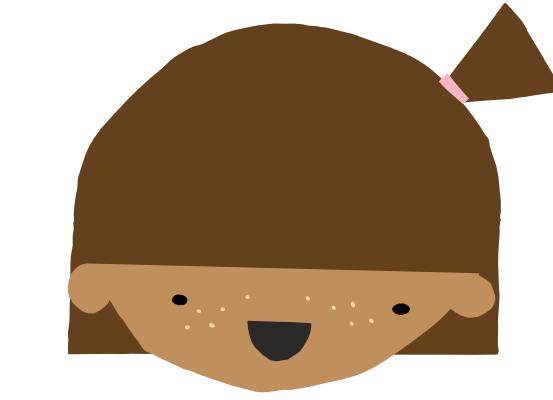


H E L > O  
R U B Y

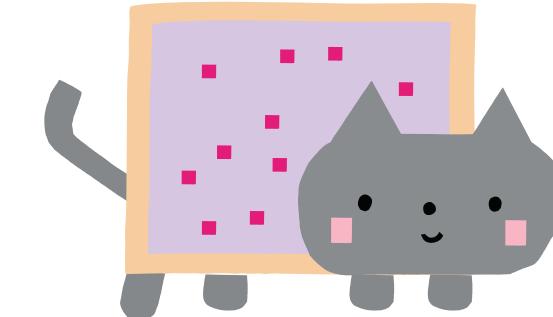








PROBLEM TO SOLVE  
Is this a cat?

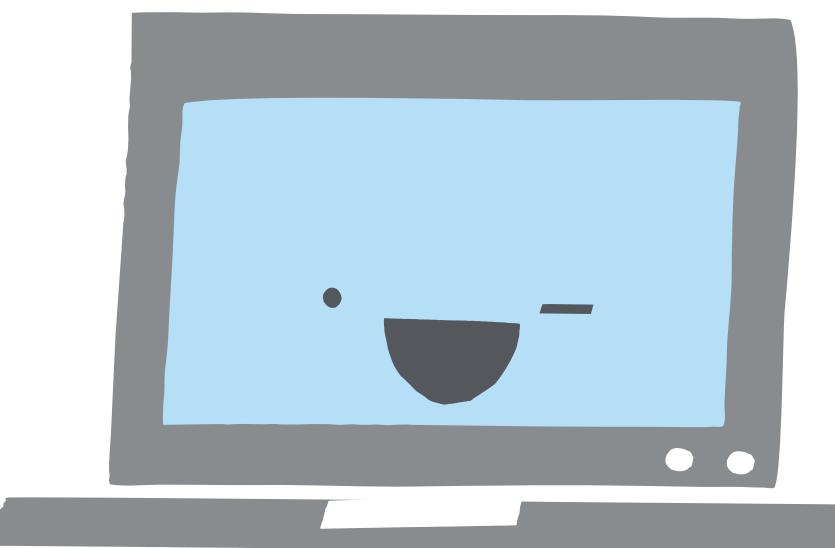
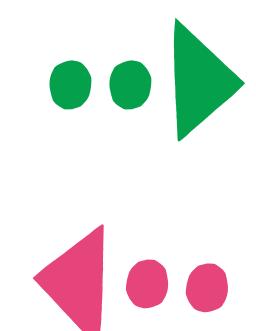
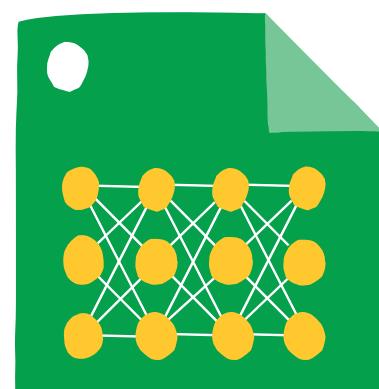


## GATHER DATA

Examples of cats



## BUILD A MODEL



## ANSWER THE QUESTION

Yes!

## UPDATE MODEL

H E L L O R U B Y



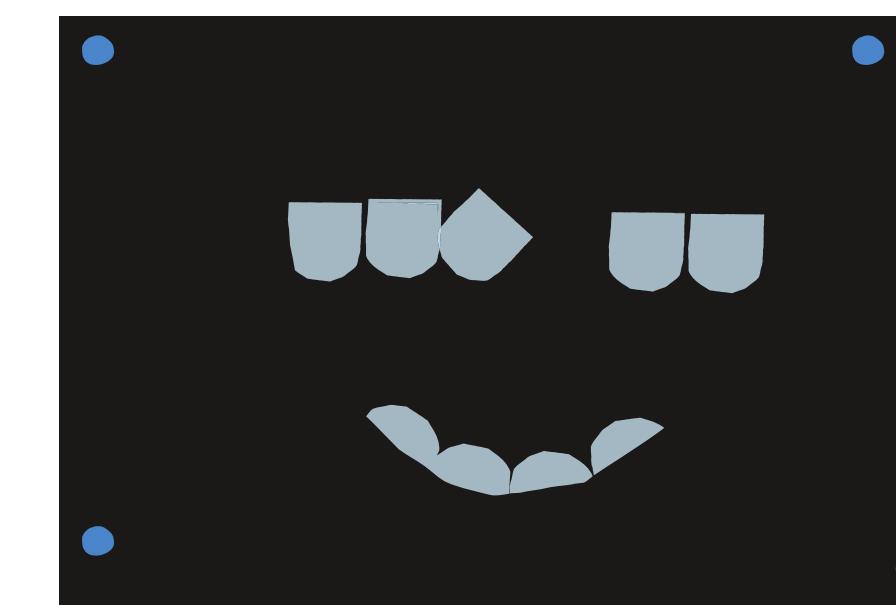
Ihmisen kysyy  
kysymykset.  
Kone antaa  
vastaukset.

# HAMMASLÄÄKÄRI

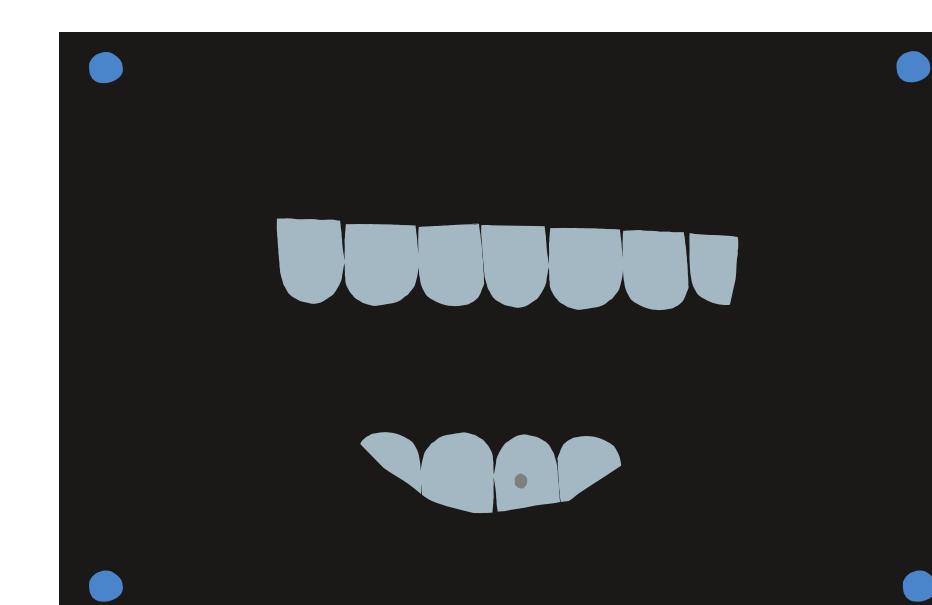
Tulevaisuudessa hammaslääkärin apuna hyörii tekoäly, joka on erityisen nopea löytämään röntgenkuvista poikkeamat, mutta ei osaa helpottaa jännitystä. Löydätkö sinä keiden hampaat heiluvat? Entä kenen hampaista löytyy reikä? Mitä hammaslääkäri voi tehdä ylimääräisellä ajalla?



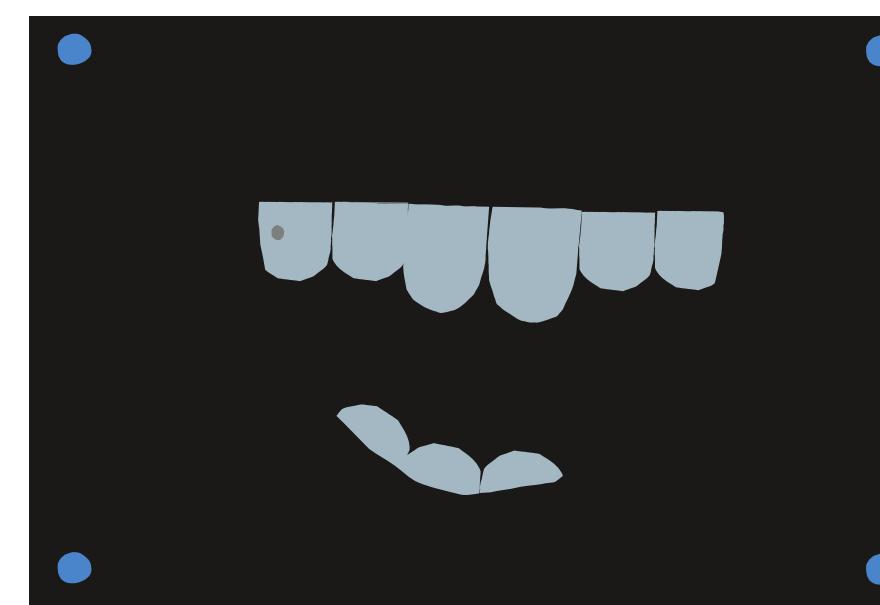
LINUS



JULIA



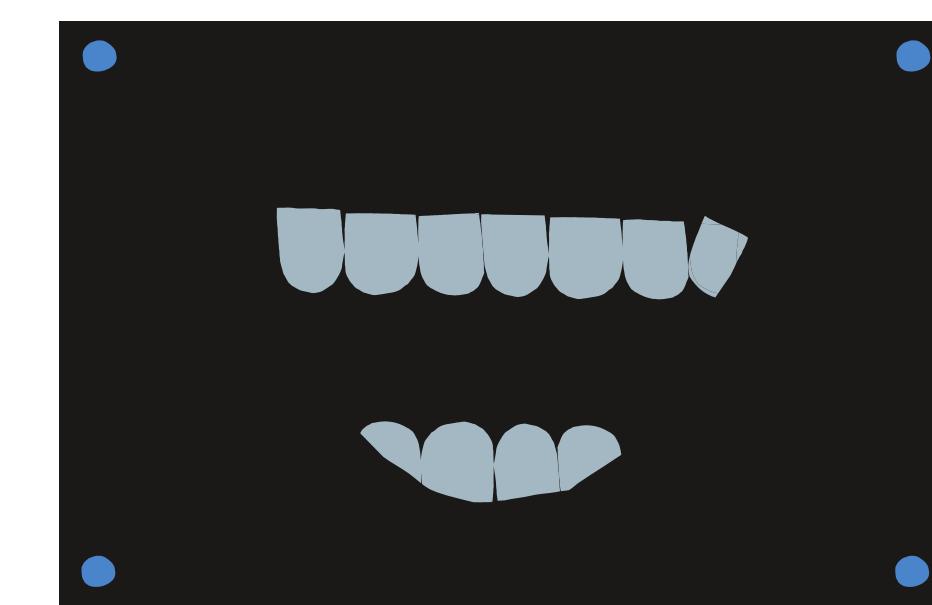
GRACE



DJANGO

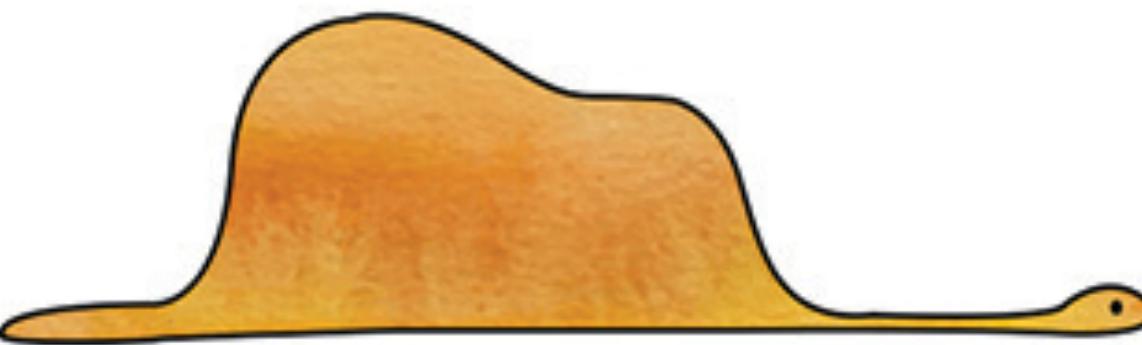


RUBY

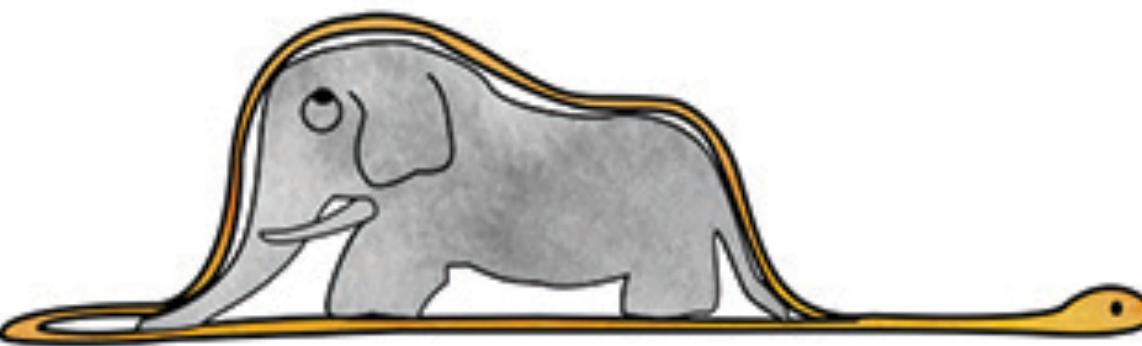


ADA

H E L > O  
d C B Y



"My drawing was not a picture of a hat.  
It was a picture of a boa constrictor digesting an elephant."



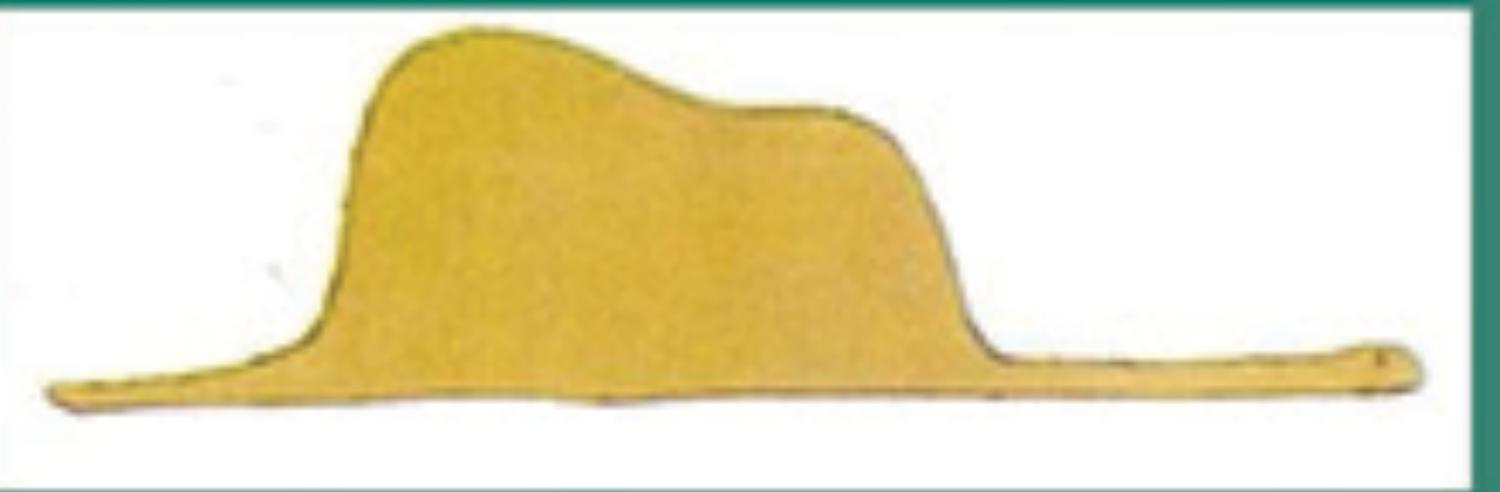
"Whenever I met one of them who seemed to me at all clear-sighted, I tried the experiment of showing him my Drawing Number One, which I have always kept. I would try to find out, so, if this was a person of true understanding. But, whoever it was, he, or she, would always say: 'That is a hat.' Then I would never talk to that person about boa constrictors, or val forests, or stars. I would bring myself down to his level. I would talk to him about bridge, and golf, and politics, and neckties. And the grown-up would be greatly pleased to have met such a sensible man.

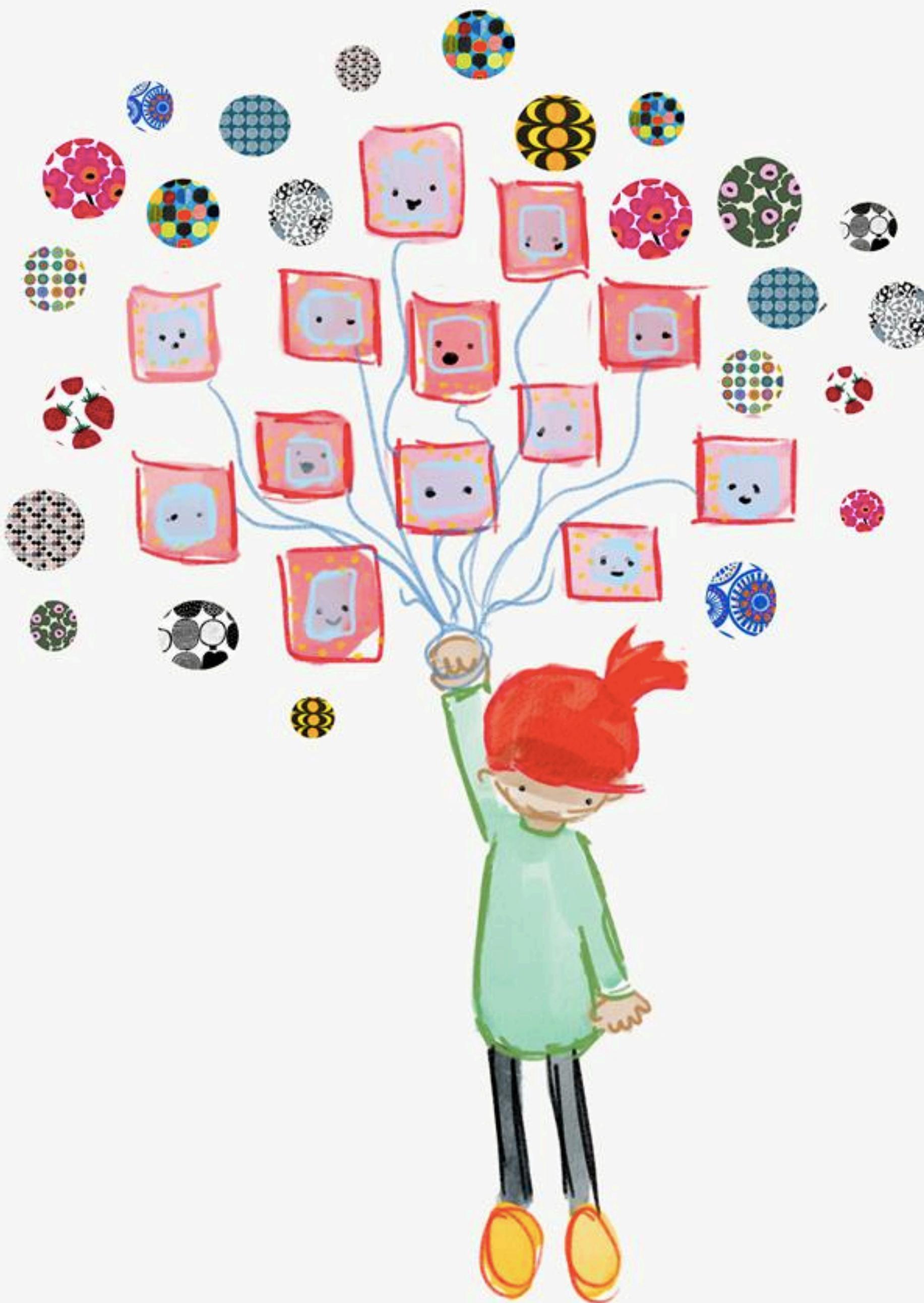
- Antoine de Saint-Exupéry"

H E L > O  
R C B Y



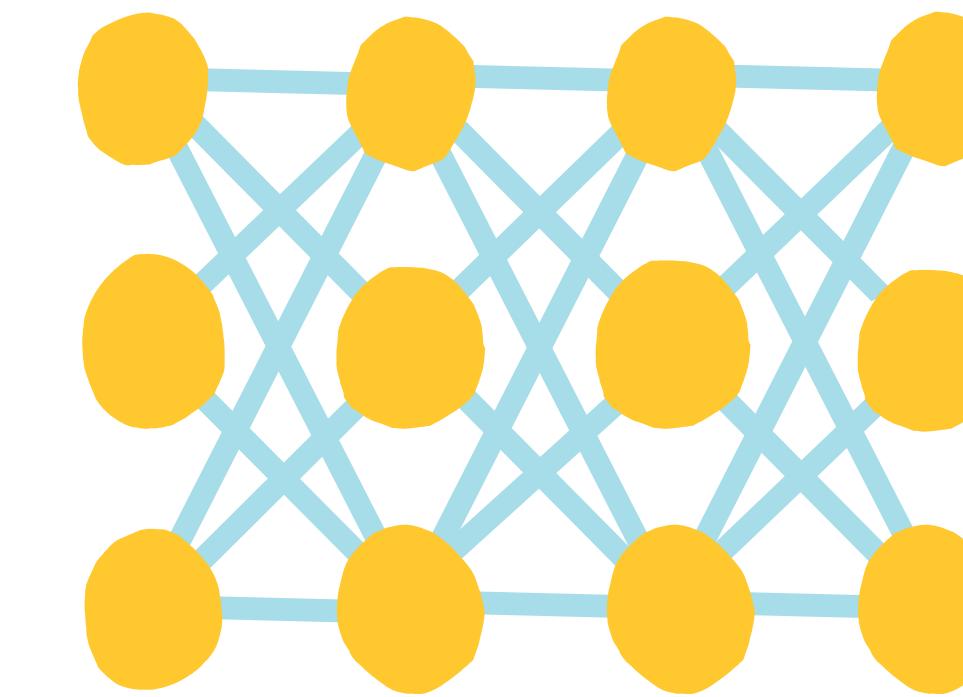
I am not really confident, but I think it's a close up of a guitar.



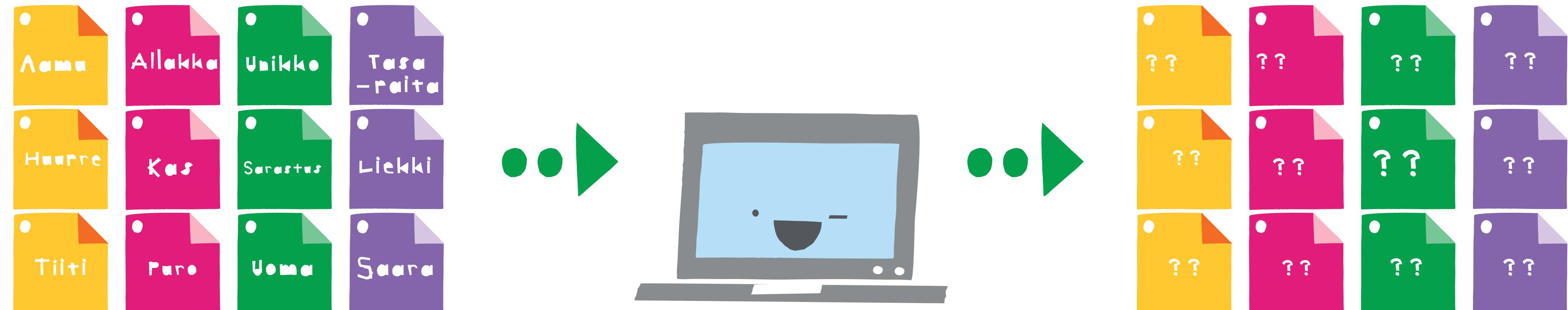


Mitä jos Armi Ratia  
olisi ollut  
ohjelmoija?

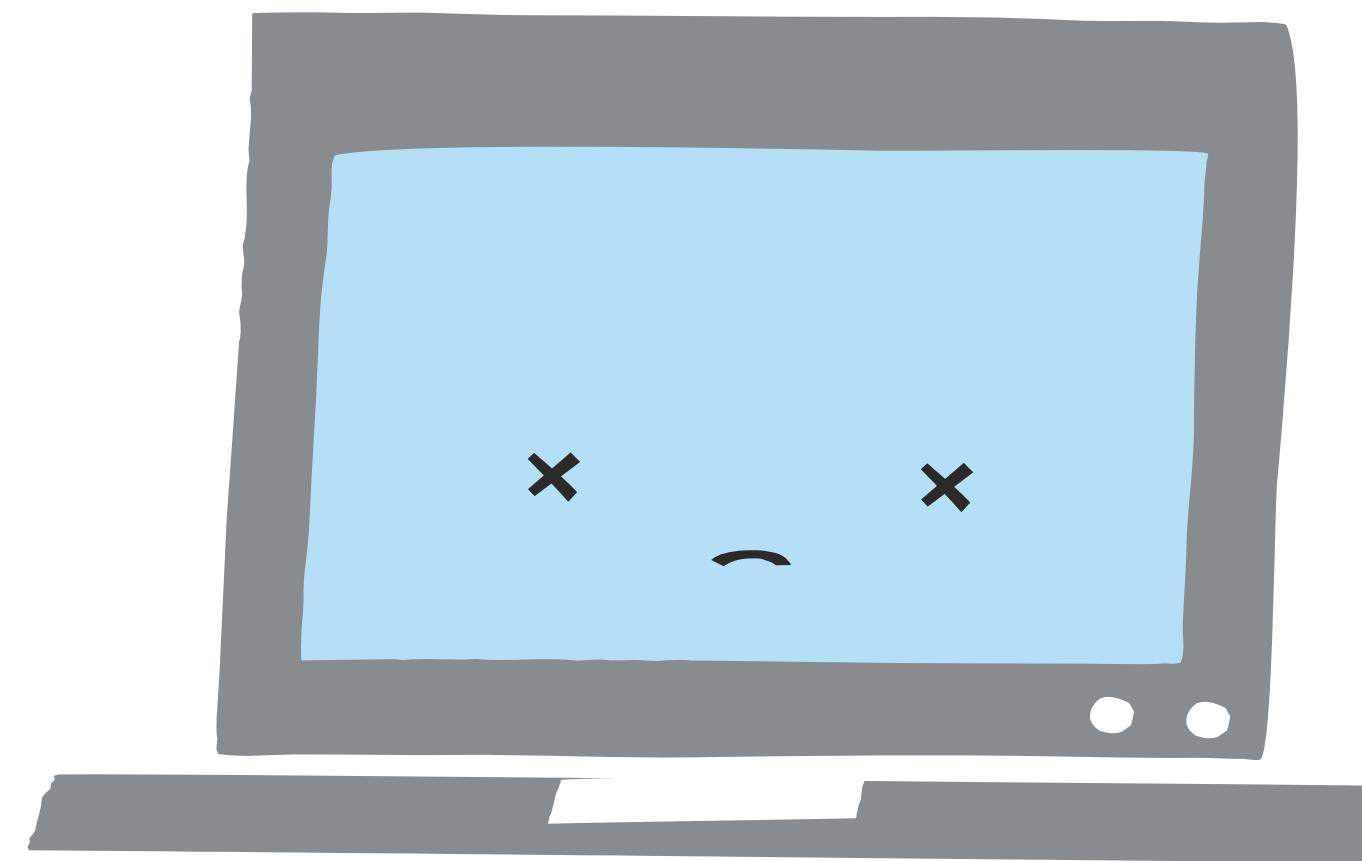
H E L > O  
d C B Y



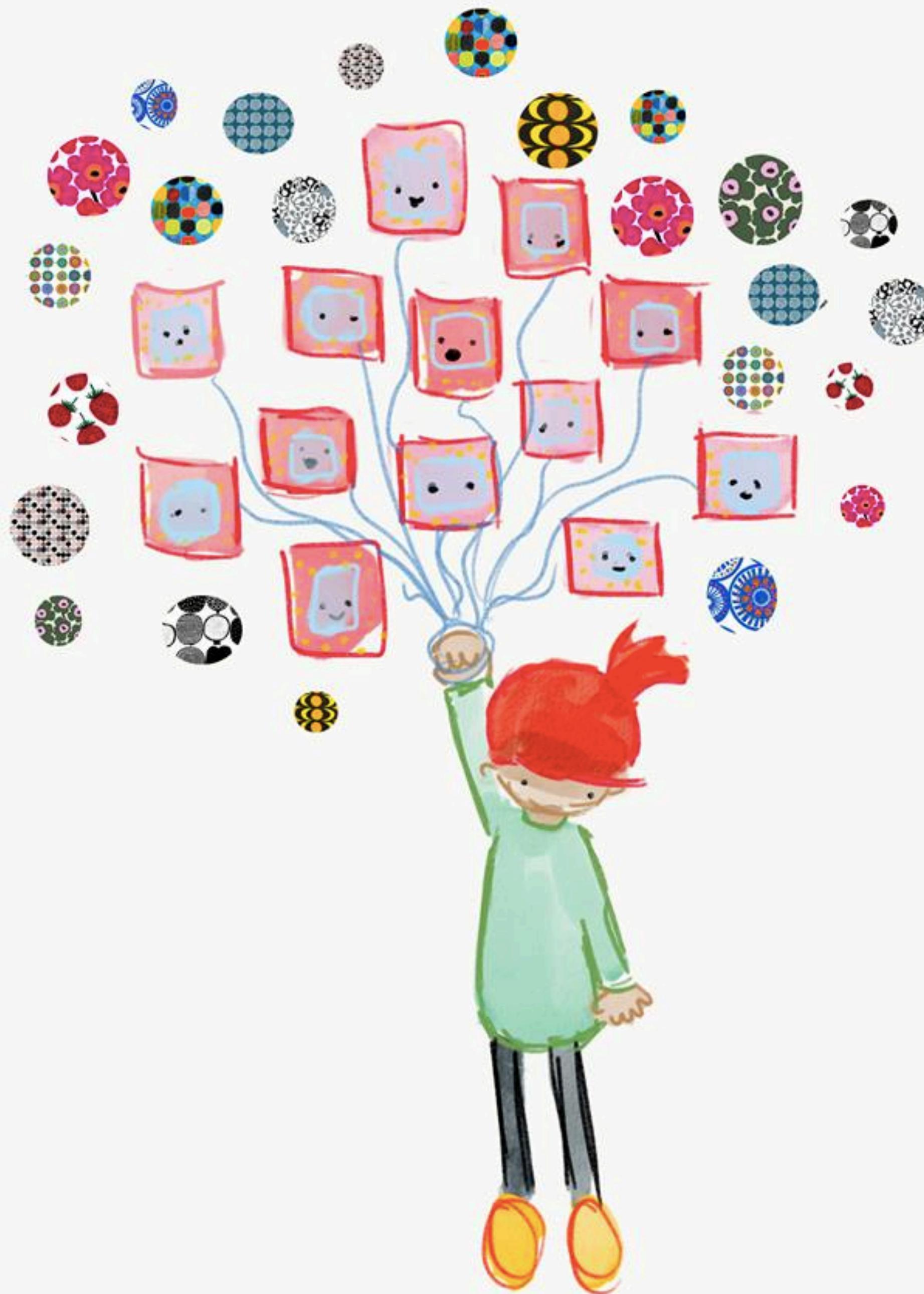
Multi-layer Recurrent Neural Networks  
(LSTM, GRU, RNN) for character-level language model



H E L > 0  
d u b Y



**Valos, Inislö,  
Lahnillilitanti,  
Ona sot,  
IkEkunit..**



**Pyinininpakka,  
Tanohalti, Putti,  
Pukukka, Tirkka,  
Ruitintullo..**



# The 100 languages

The child is made of one hundred.

The child has  
a hundred languages  
a hundred hands  
a hundred thoughts  
a hundred ways of thinking  
of playing, of speaking.

A hundred.

Always a hundred  
ways of listening  
of marveling, of loving  
a hundred joys  
for singing and understanding  
a hundred worlds  
to discover  
a hundred worlds  
to invent  
a hundred worlds  
to dream.



The child has  
a hundred languages  
(and a hundred hundred hundred more)  
but they steal ninety-nine.

The school and the culture  
separate the head from the body.

They tell the child:  
to think without hands  
to do without head  
to listen and not to speak  
to understand without joy  
to love and to marvel  
only at Easter and at Christmas.

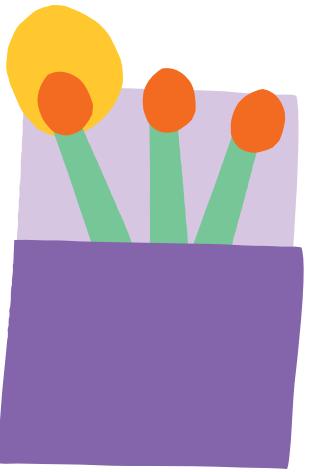
They tell the child:  
to discover the world already there  
and of the hundred  
they steal ninety-nine.

They tell the child:  
that work and play  
reality and fantasy  
science and imagination  
sky and earth  
reason and dream  
are things  
that do not belong together.

And thus they tell the child  
that the hundred is not there.

The child says:  
No way. The hundred is there.

- Loris Malaguzzi  
- (translated by Lella Gandini)  
Founder of the  
Reggio Emilia Approach



# Technology is built on humanity.

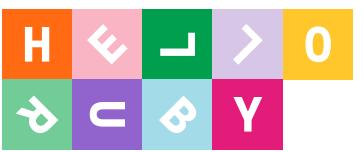
## Computer (*km-pytr*)

*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.



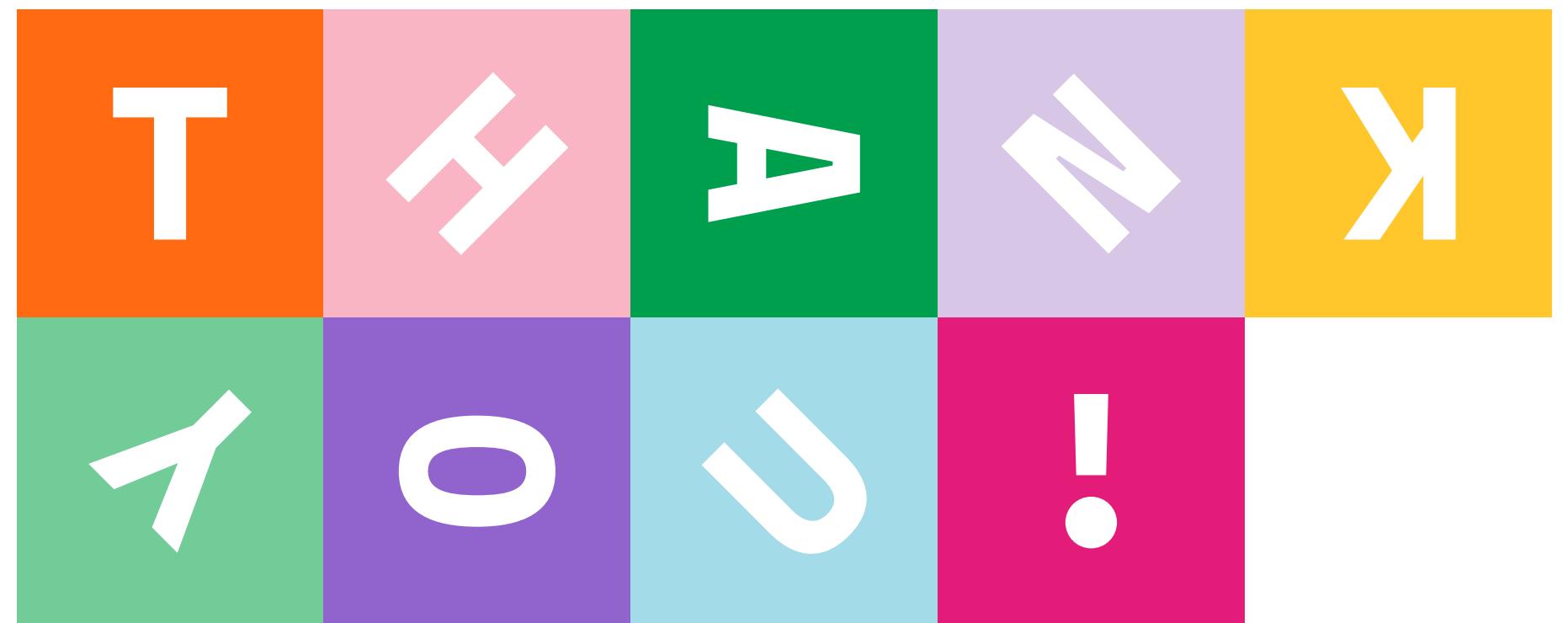
## ■ Exercise 3

### 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.





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&   
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