GOTO **COPENHAGEN**

Craft software with confidence in 2026

Climbing Inside theMachine

Linda Liukas
@lindaliukas


ПРИВЕТ, РУБИ
TERE, RUBY!
Linda Liukas





www.helloruby.com


www.
helloruby.
com


Play is..iterative,
exploratory, and
failure-tolerant.



www.helloruby.com

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.



Share | Tweet | Embed

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

9,258
backers

$380,747
pledged of $10,000 goal

0
seconds to go



Project by

Linda Liukas
New York, NY

Contact me

First created · 13 backed

Linda Liukas 1456 friends

Website: helloruby.com

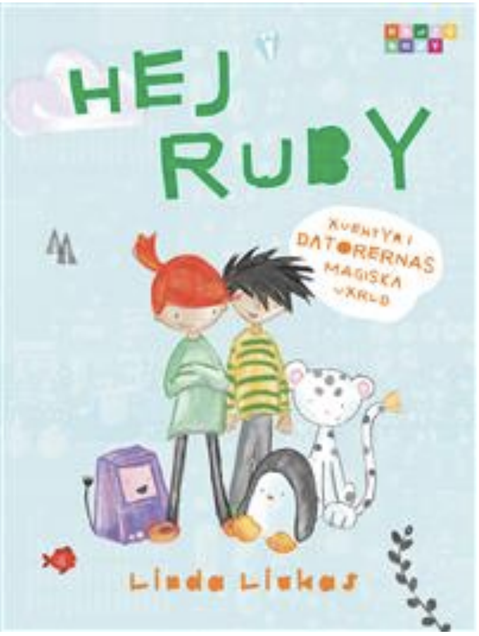
www.helloruby.com



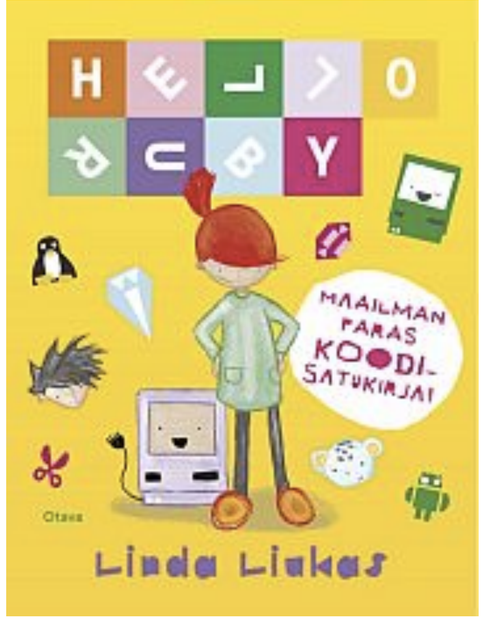


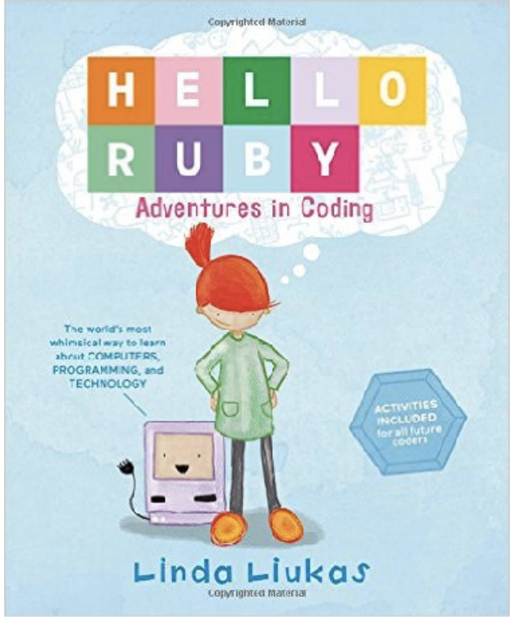










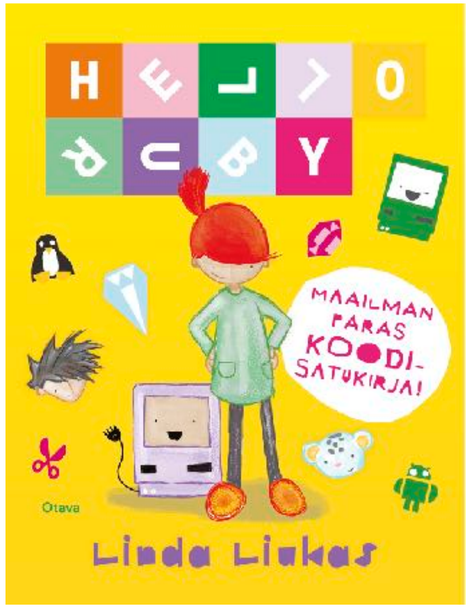






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The big ideas of computer science are exactly the same as 80 years ago.



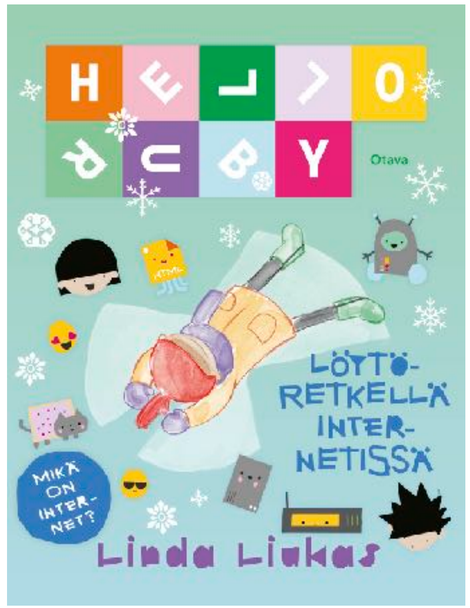
A story of a small girl and a big adventure in thinking like a computer.

- Computational Thinking
- Decomposition
- Algorithms
- Sequences



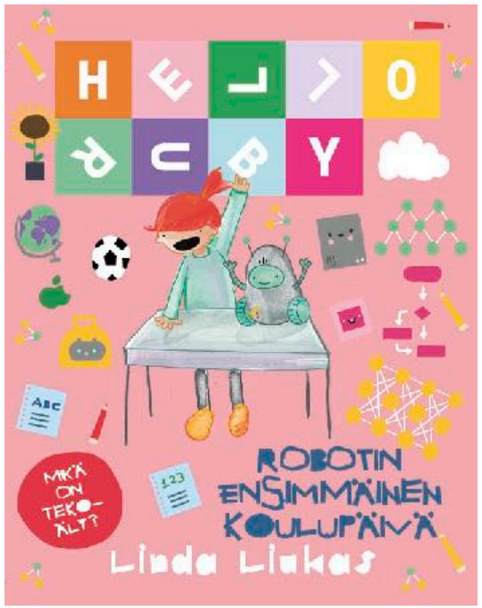
A twist on Alice in Wonderland: Ruby falls inside a computer!

- Hardware of computers
- Software of computers
- Input/output
- Sensors
- What are computers?



What if you could build the Internet out of snow?

- Networks and infrastructure
- Hardware of Internet
- Software of Internet
- Applications
- Staying safe online



A modern Pinocchio: Ruby wants to take the robot to school to learn

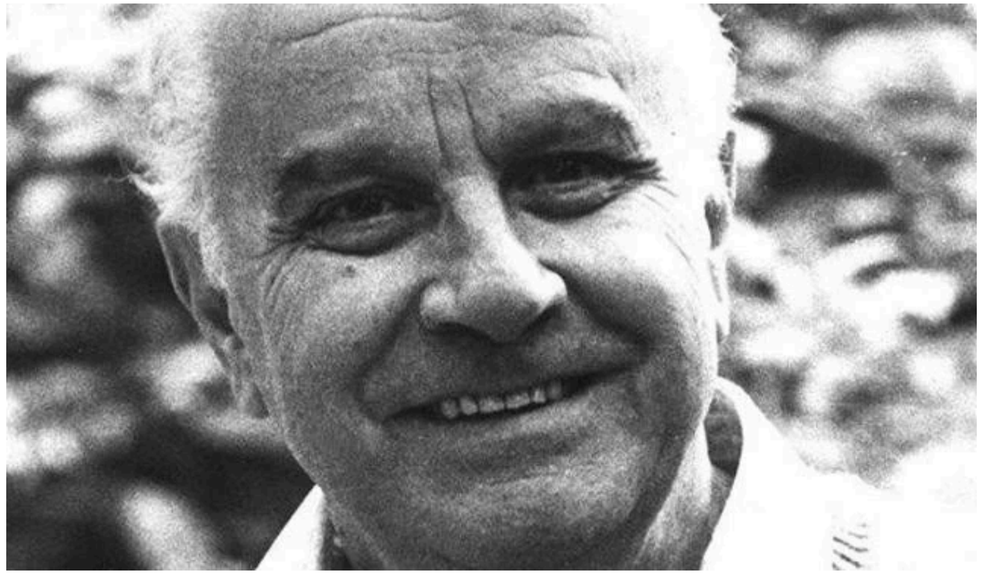
- AI and Machine Learning
- Computers vs. Humans
- Bias in AI
- What AI can do?

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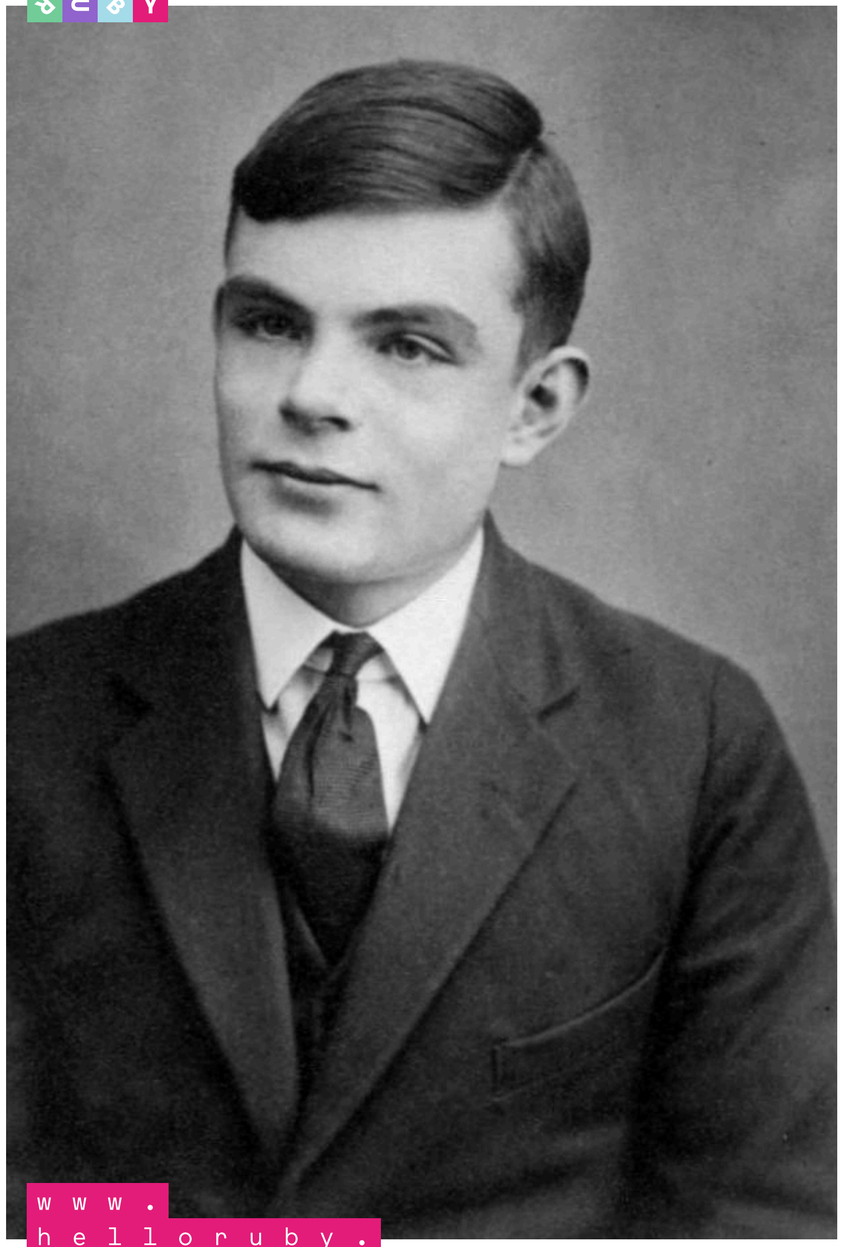






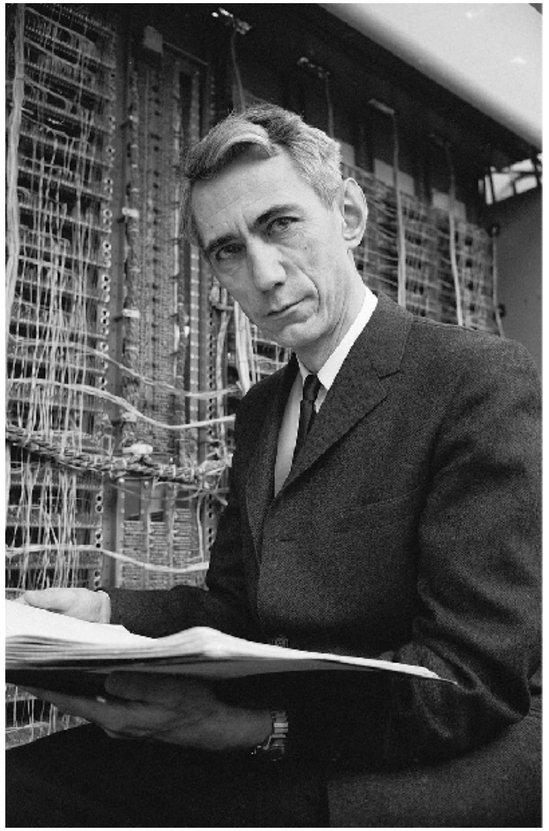


Montessori, Piaget, Papert, Malaguzzi, Tove Jansson











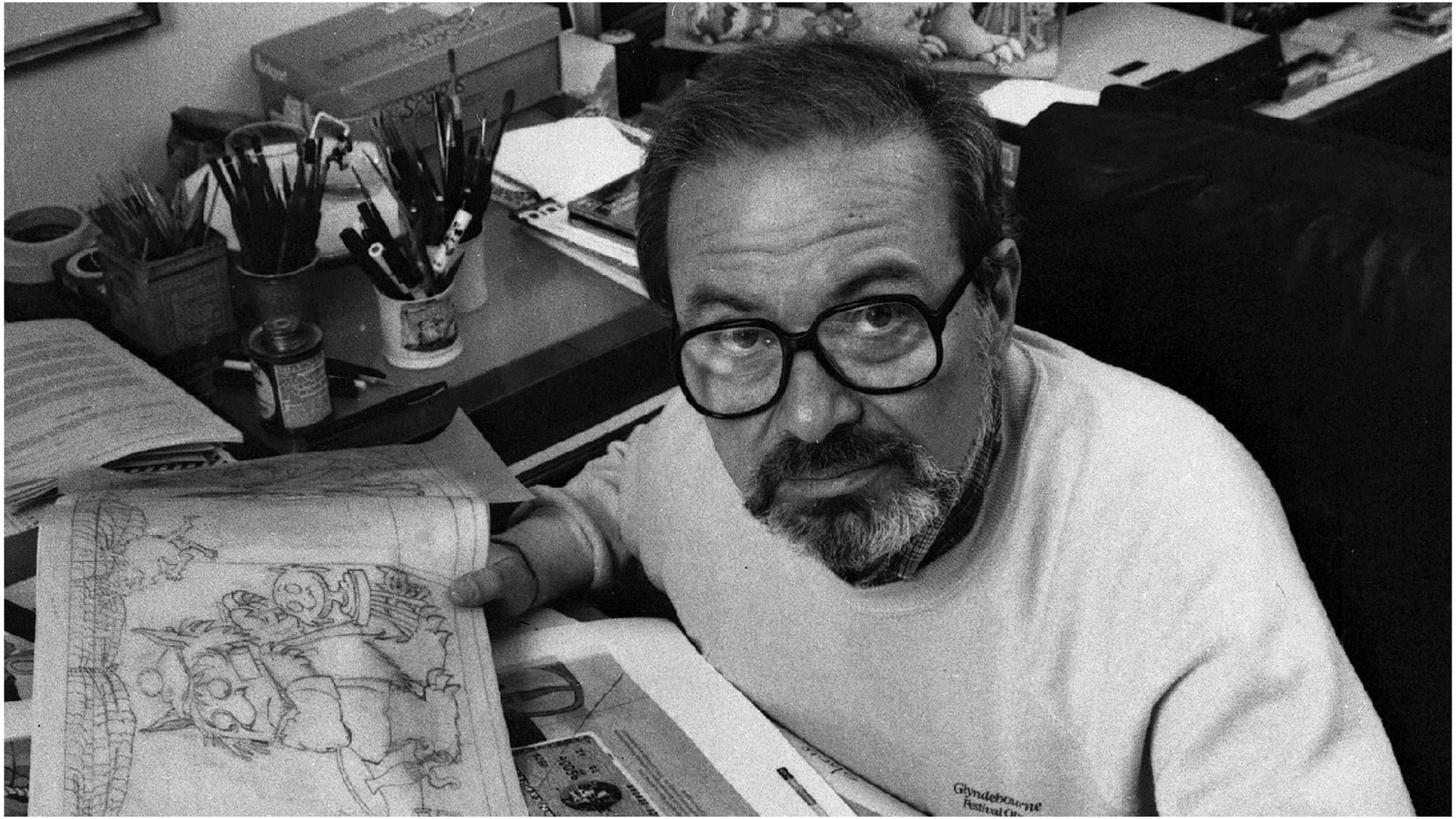
Turing, von Neumann,
Boole, Lovelace, Shannon,
Bush, Kay

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Stories

Stories, that shape our ideas of who we are, how we relate to others are and how to understand the world.



“I loved it so much I ate it. “

Fingerspitzengefühl
Much of our knowledge lies in our fingertips. Touch is central to our being.





Databases

big-● Data structures

Binary trees P=NP?

Memory allocation

Distributed programming



```python
def flip(arr, k):
    left = 0
    while left < k:
        arr[left], arr[k] = arr[k], arr[left]
        k -= 1
        left += 1

def max_index(arr, k):
    index = 0
    for i in range(k):
        if arr[i] > arr[index]:
            index = i
    return index

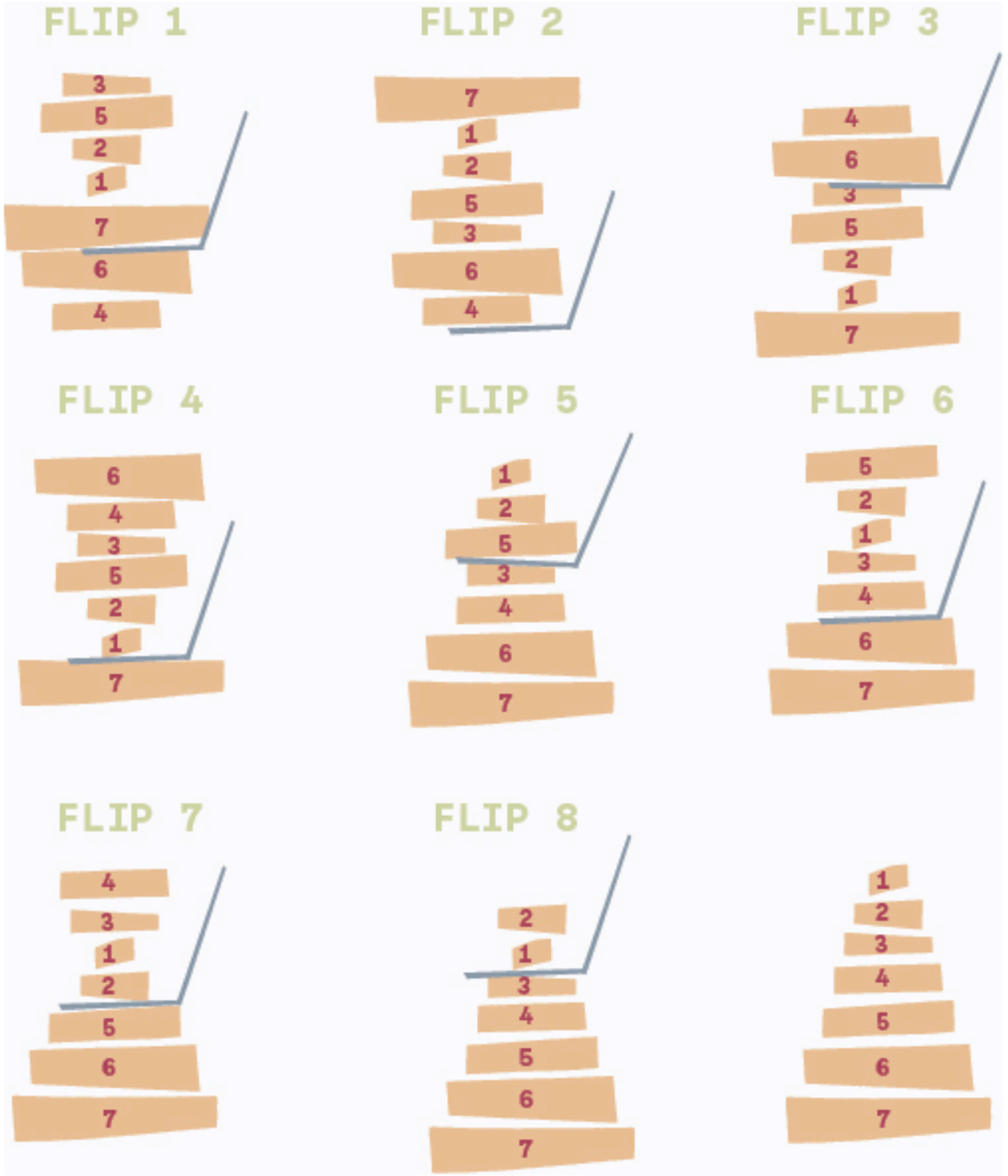
def pancake_sort(arr):
    n = len(arr)
    while n > 1:
        maxdex = max_index(arr, n)
        flip(arr, maxdex)
        flip(arr, n - 1)
        n -= 1

arreglo = [15, 8, 9, 1, 78, 30, 69, 4, 10]
pancake_sort(arreglo)
print(arreglo)
```

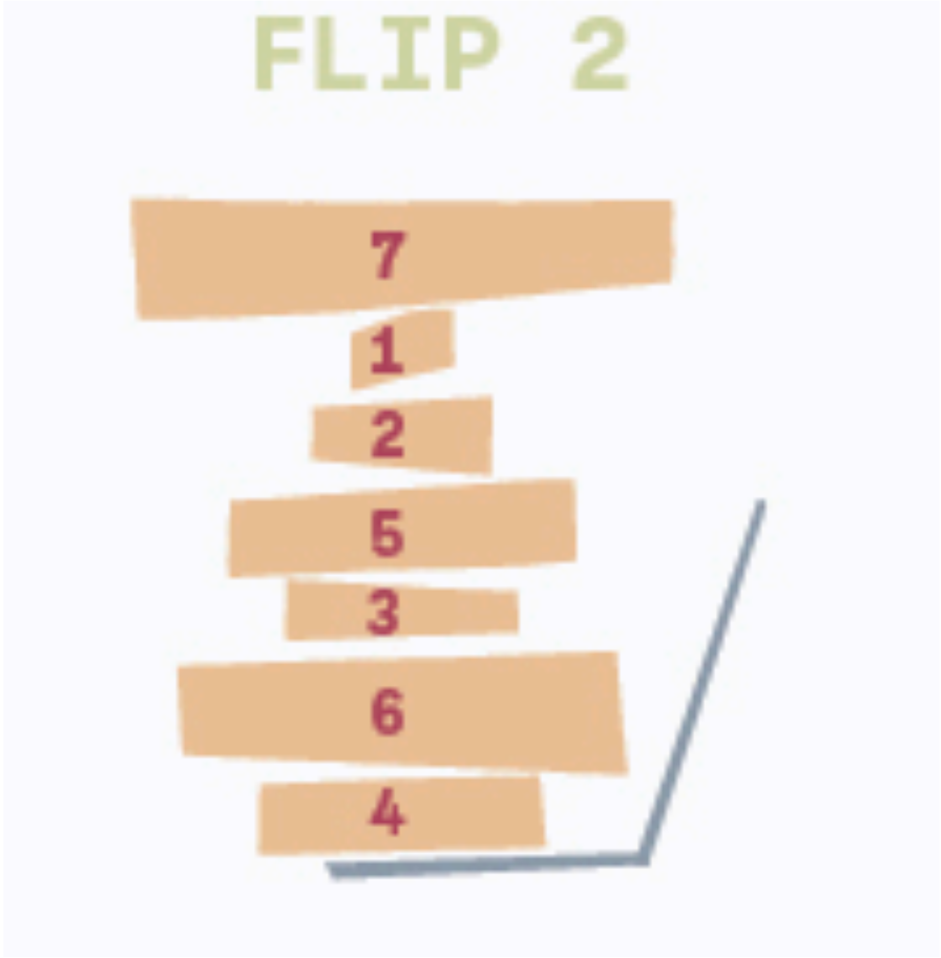

FLIP 1
FLIP 2
FLIP 3
FLIP 4
FLIP 5
FLIP 6
FLIP 7
FLIP 8
DONE!



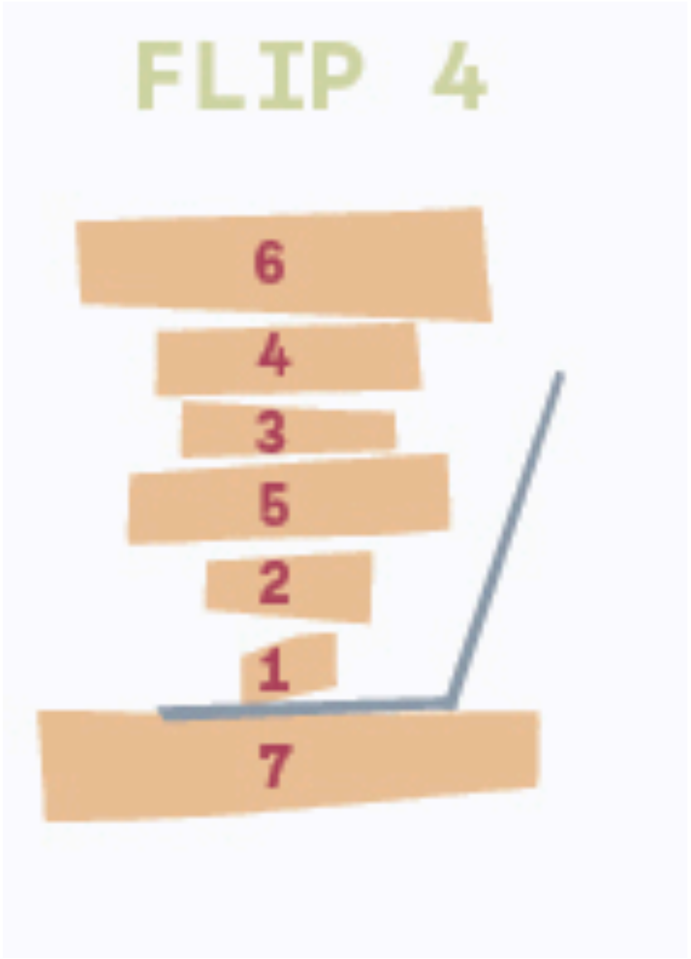



FLIP 1
3
5
2
1
7
6
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FLIP 2
7
1
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5
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4
FLIP 3
4
6
3
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2
1
7
FLIP 4
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FLIP 5
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FLIP 6
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FLIP 7
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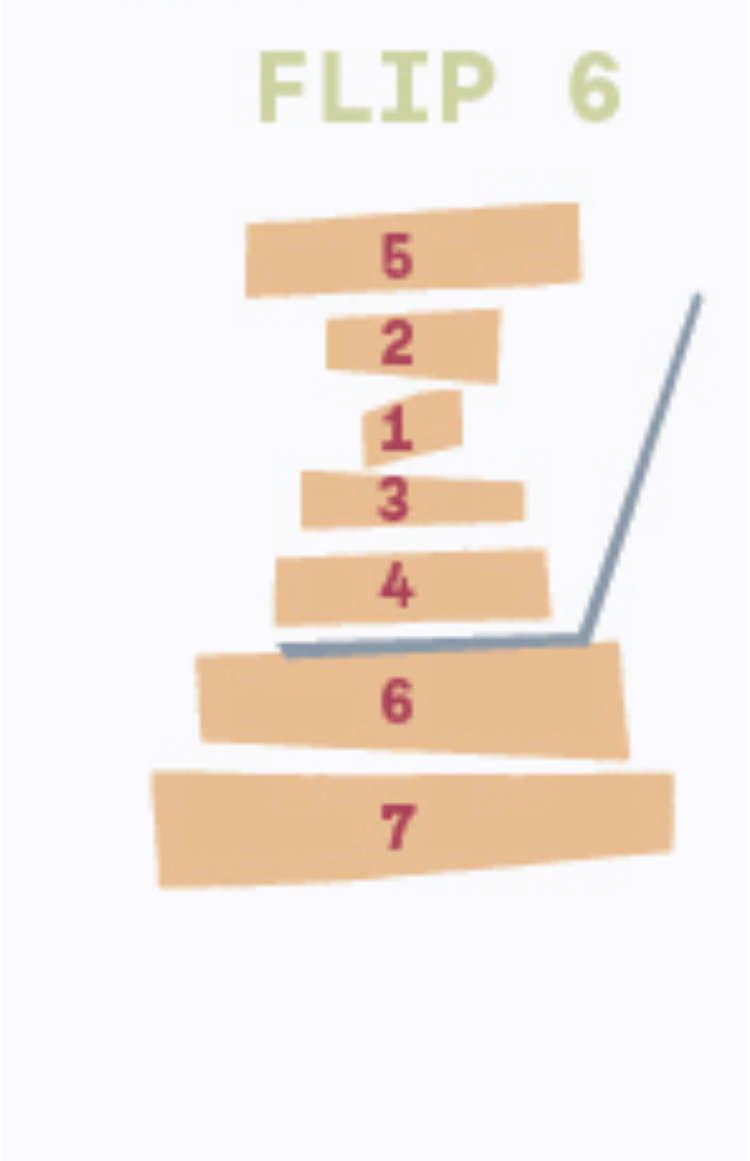

FLIP 1
3
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FLIP 2
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FLIP 3
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FLIP 4
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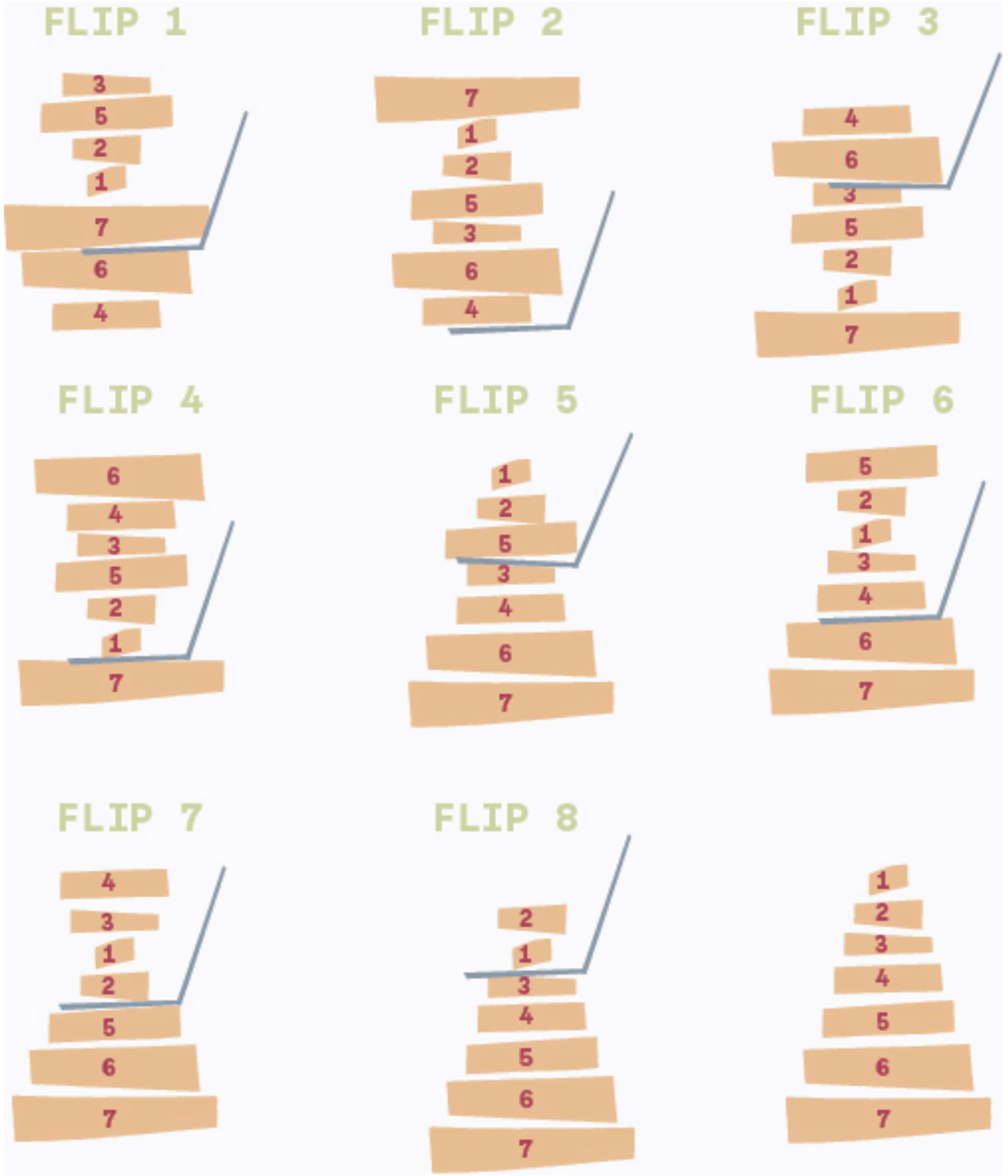

FLIP 5
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4
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7


FLIP 6
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FLIP 7
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2
5
6
7


FLIP 8
2
1
3
4
5
6
7


1
2
3
4
5
6
7


FLIP 1
3 5 2 1 7 6 4
FLIP 2
7 1 2 5 3 6 4
FLIP 3
4 6 3 5 2 1 7
FLIP 4
6 4 3 5 2 1 7
FLIP 5
1 2 5 3 4 6 7
FLIP 6
5 2 1 3 4 6 7
FLIP 7
4 3 1 2 5 6 7
FLIP 8
2 1 3 4 5 6 7
1 2 3 4 5 6 7

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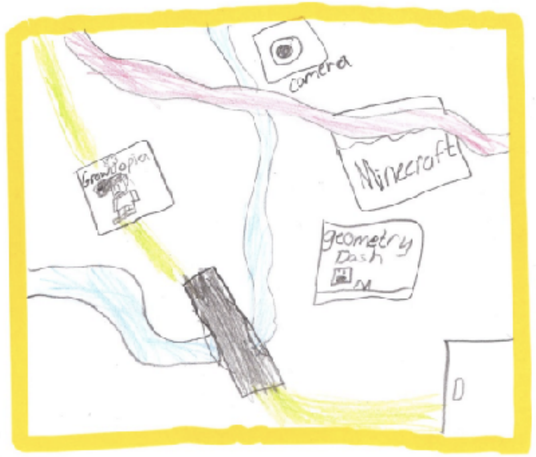
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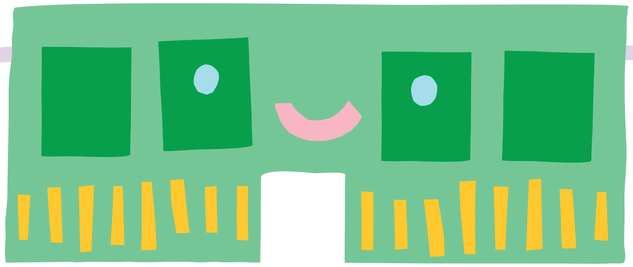
arreglo = [15, 8, 9, 1, 78, 30, 69, 4, 10]
pancake_sort(arreglo)
print(arreglo)
```

This is a pancake sorting algorithm

WHAT IS INSIDE A COMPUTER?

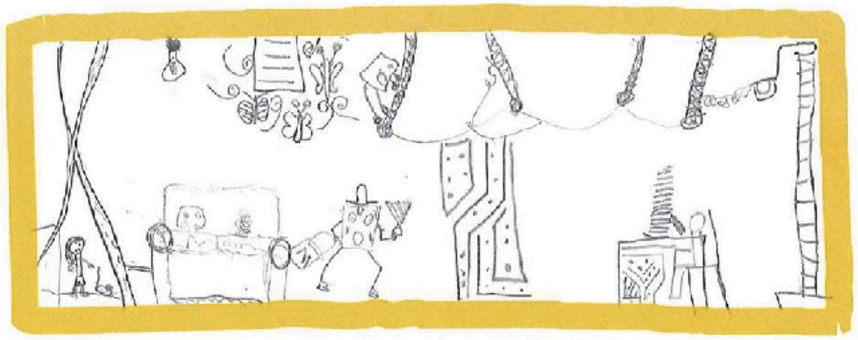






Draw!

Draw how you imagine a computer works :)
What does the inside look like? How does it function? Is there magic?



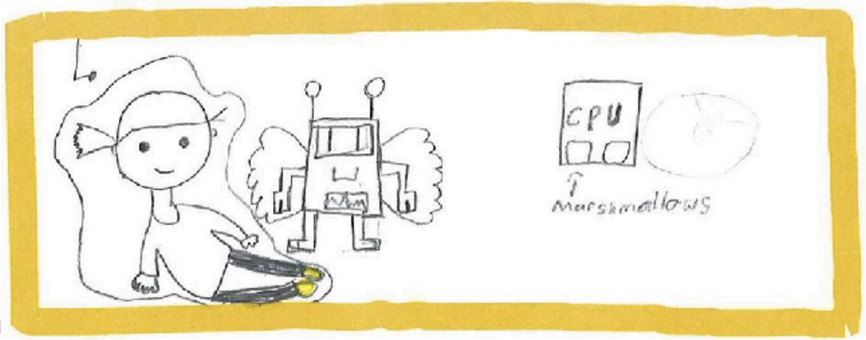
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Draw!

Draw how you imagine a computer works :)
What does the inside look like? How does it function? Is there magic?





Input

CRAWL OUT
BACKSIDE
FIRST!

Output

Process

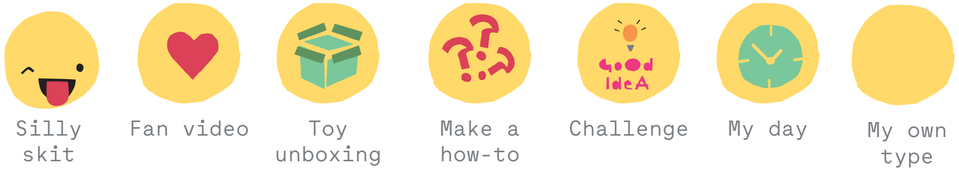




TASK 14

VLOGGER

What type of a video are you making?



Silly skit | Fan video | Toy unboxing | Make a how-to | Challenge | My day | My own type

Break your video into a storyboard. Draw or write the main idea.

Draw a small preview window of your video and write a title and a short description.

What kind of image would spark interest of someone on YouTube?

Choose a title that descibes your video, but is also interesting!

Write a very short summary of your video.

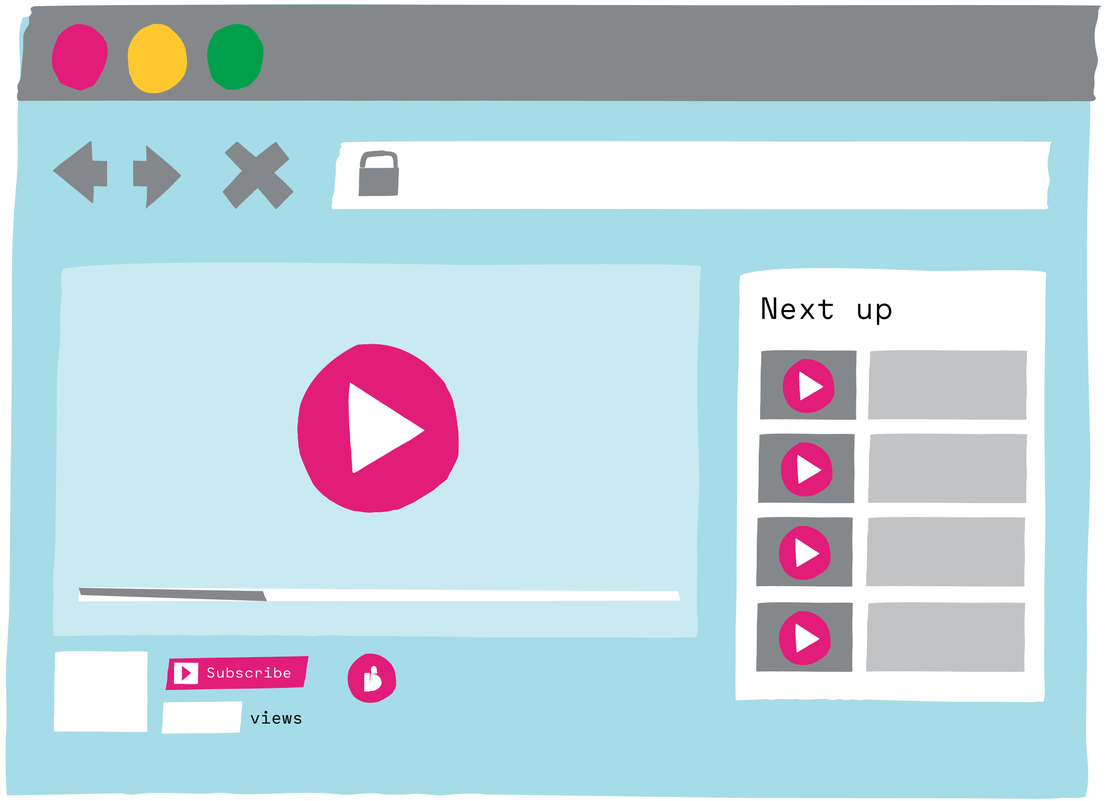
These help computers categorise the content.
Examples: #flying pigs, #mashup #dance

Perform your video to a friend. Remember to give thumbs-up!

DisCuss

There are 400 hours of new videos uploaded on YouTube every hour. How can YouTube suggest videos for you to watch next? What kind of things might the computer look when recommending videos?

Where is the algorithm?



'Surprise Play Doh Eggs Peppa Pig Stamper Cars Pocoyo Minecraft Smurfs Kinder Play Doh Sparkle Brilho';

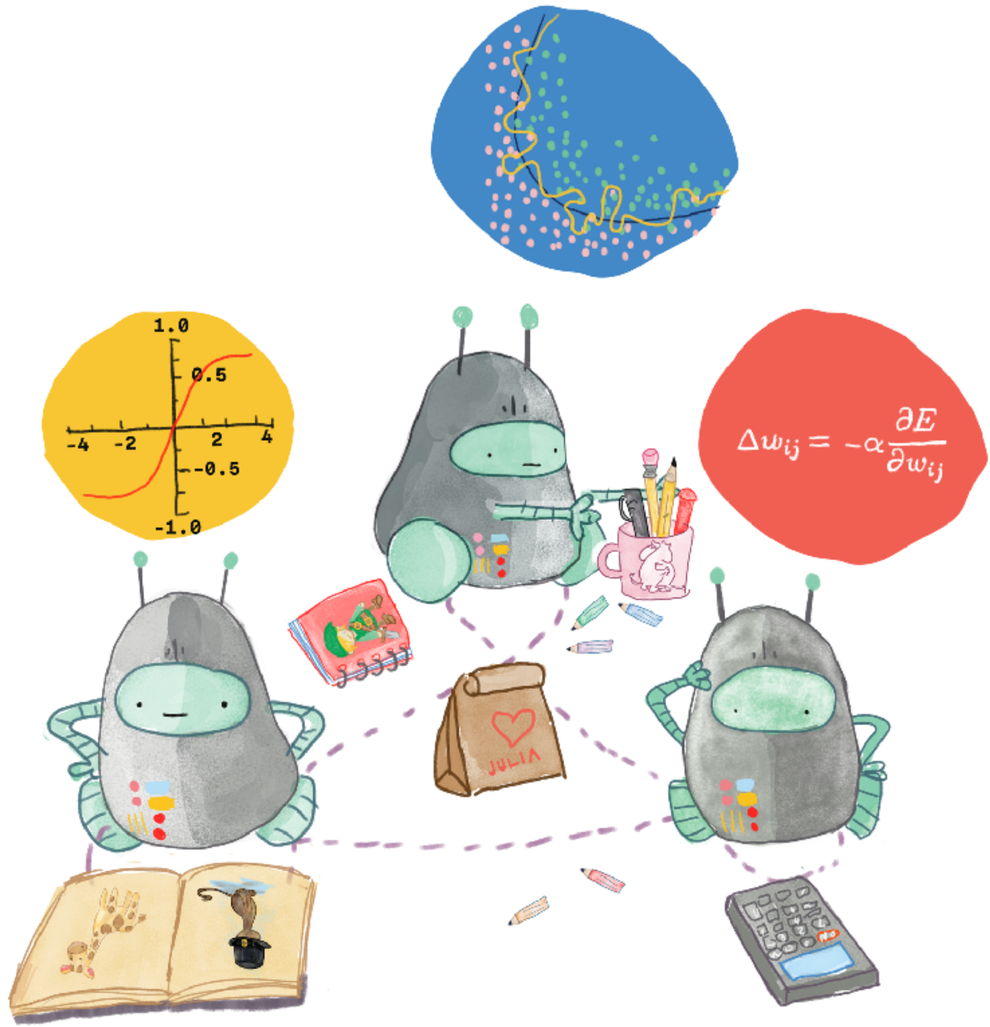
ANALOGY
Tell me what it's like.

DIAGRAM
Help me visualize it.

EXAMPLE
Allow me to experience it.

PLAIN ENGLISH
Describe it with everyday words

TECHNICAL DEFINITION
Discuss the formal details.



Playful

Allow for repetition



Simple

Self-teaching

Beautiful

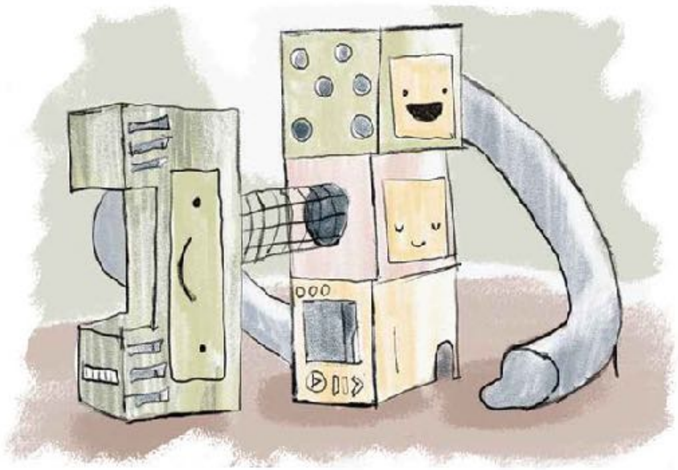
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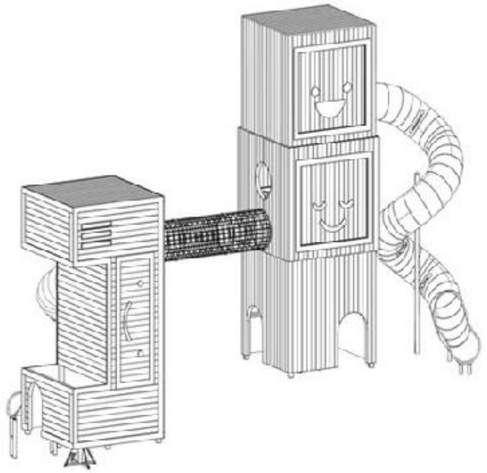
"In most mathematical lessons the whole difference lies in the fact that the student is asked to accept from outside an already **entirely organised intellectual discipline** which he may or may not understand"
- Jean Piaget

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


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So there’s an idea, then what?

Adapted from ideas in Highfield & Goodwin (2013)



PEDAGOGICAL DESIGN

Instructive

Drill and practice

Predetermined task

Single response required

Manipulable

Manipulable representations

Flexible solution strategies

Guided discovery

Constructive

Open-ended

Construction of content/digital artefacts



Stories about humans, stories about things, stories about ideas and human imagination.

Unlikely partnerships?

Helsinki
Helsingfors

maisema-arkkitehtitoimisto Näkymä Oy

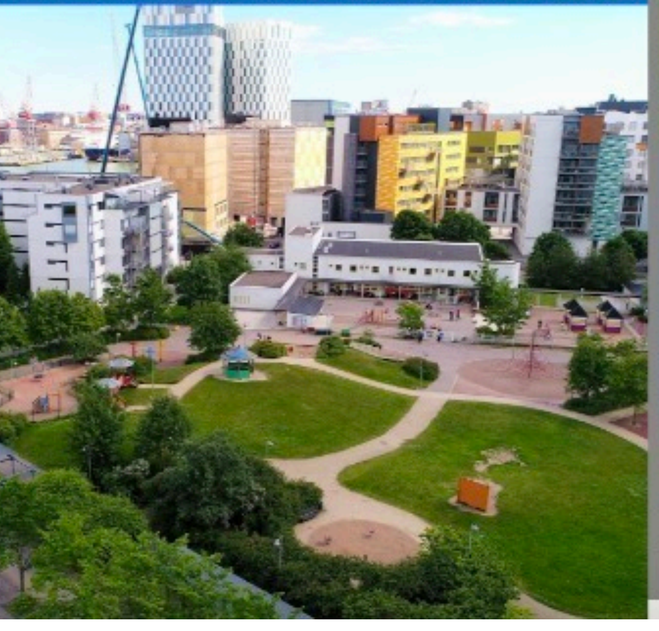
MONSTRUM
ARTISTIC PLAYGROUNDS

and several departments within the city, a children’s book author, 300 kids and 30 educators.



Ruoholahden leikkipuisto





fruitnberry.com #ilmakuvaus #realestatemarketing #aeria...

Vladimir Kourakevitch

Valokuva – heinäk. 2017

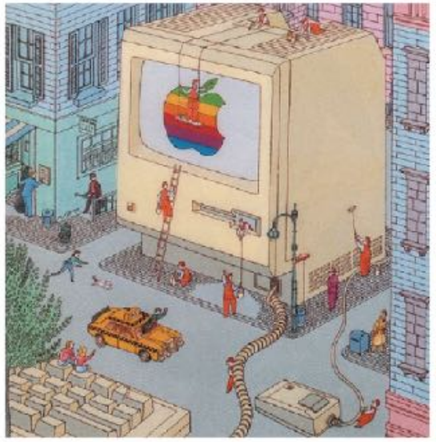


Google

Kuva otettu: heinäk. 2017 Tekijänoikeudet saattavat rajoittaa kuvan käyttöä. Picasa Suomi

Untitled

PLAYGROUND INSPIRATION







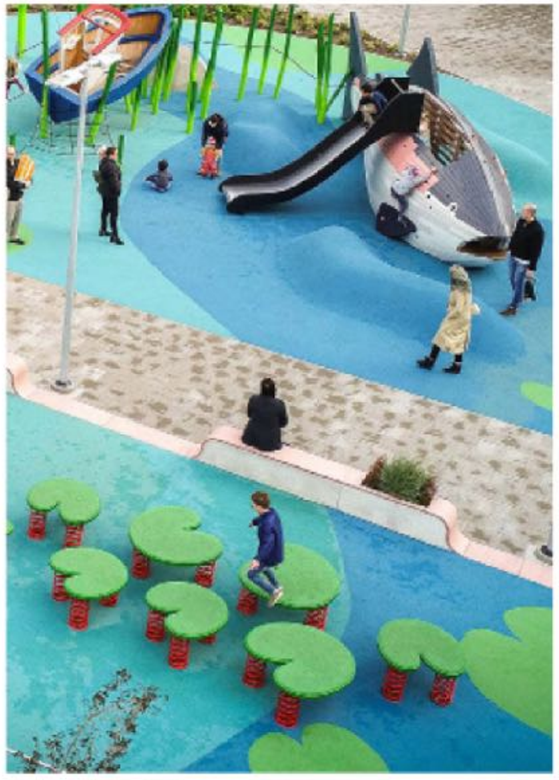


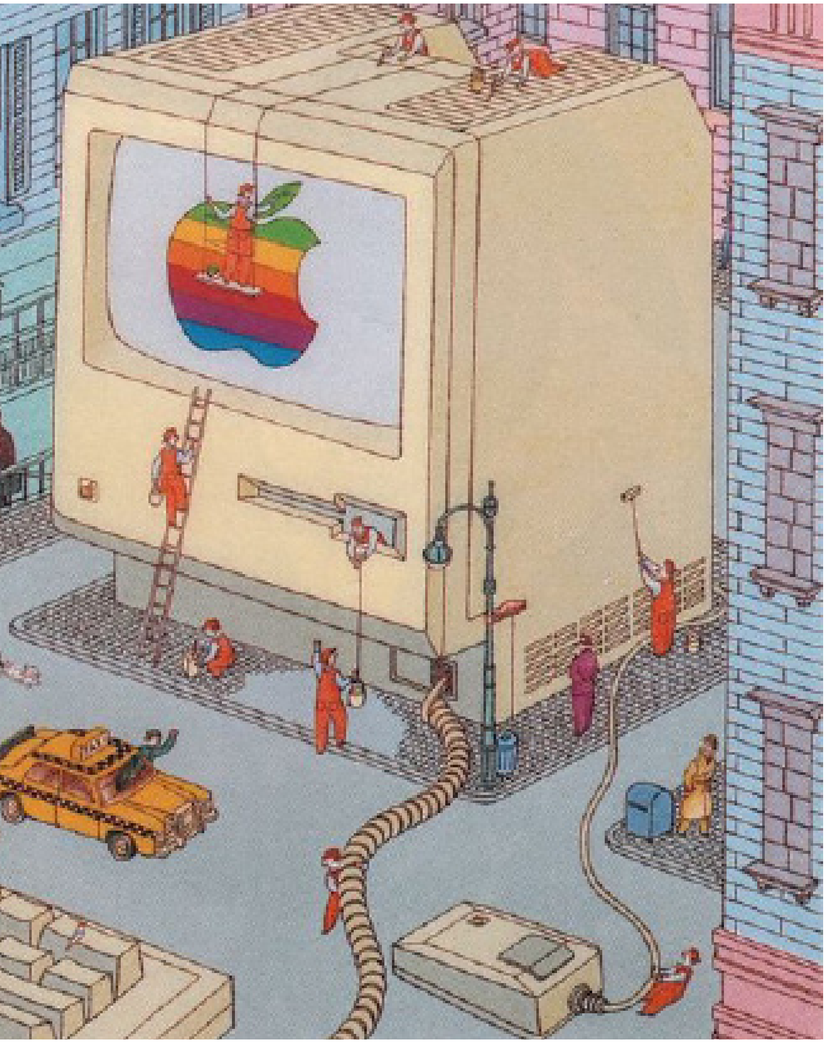










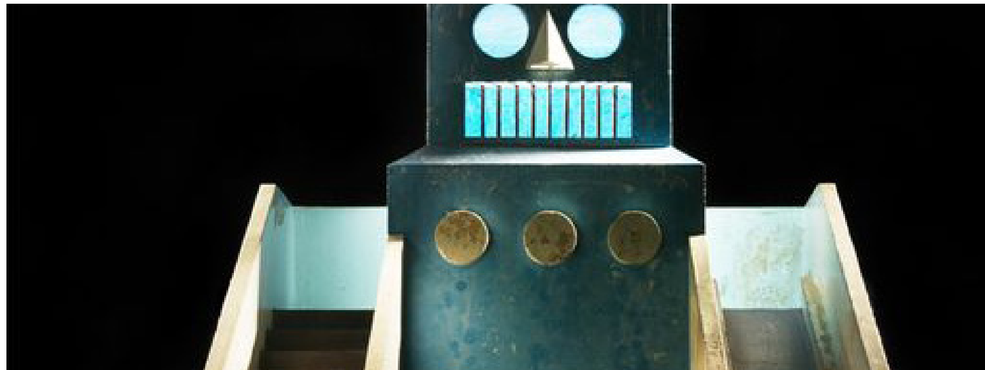


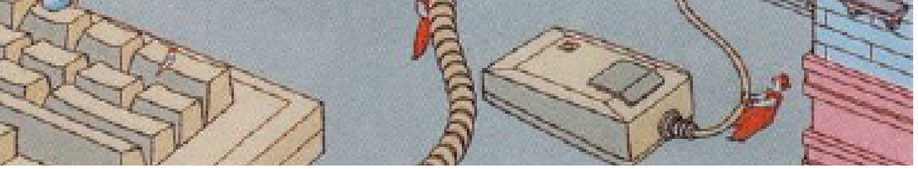






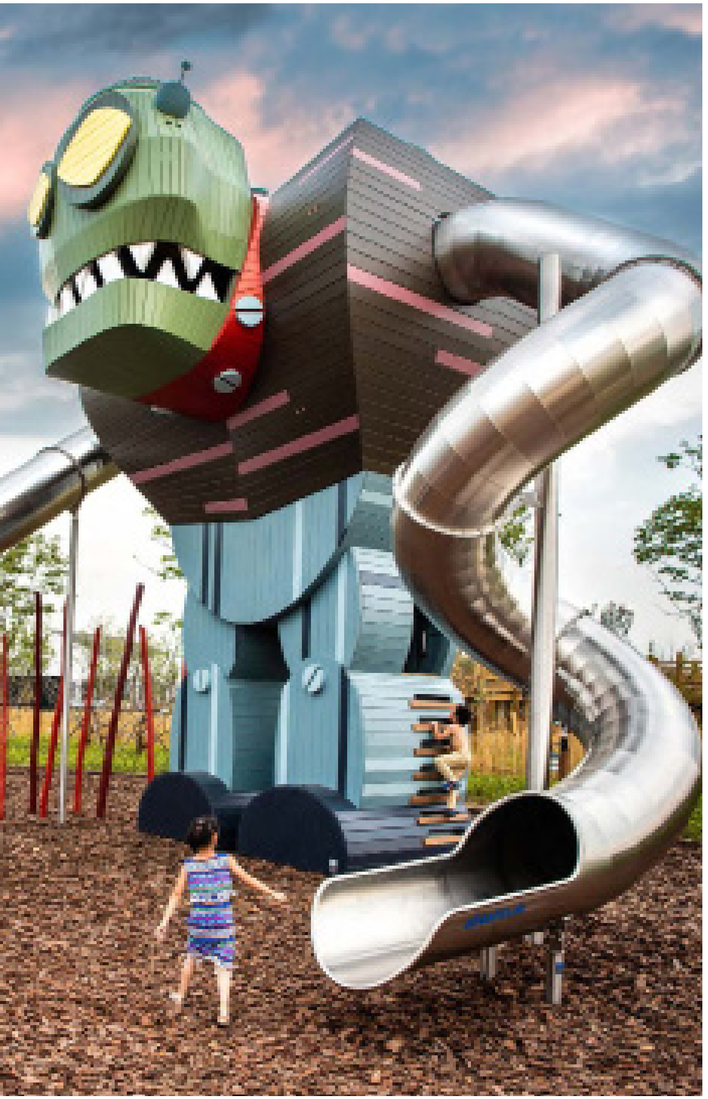

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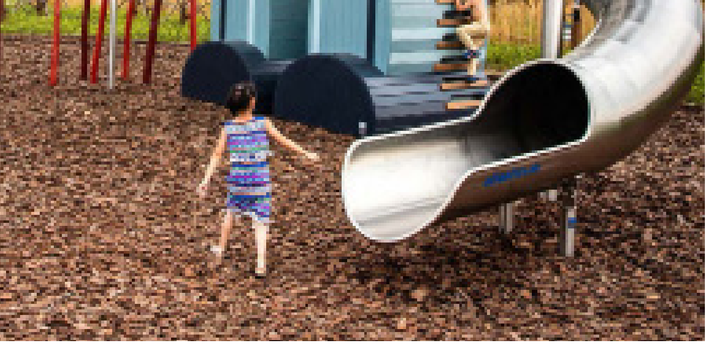



20
CCP



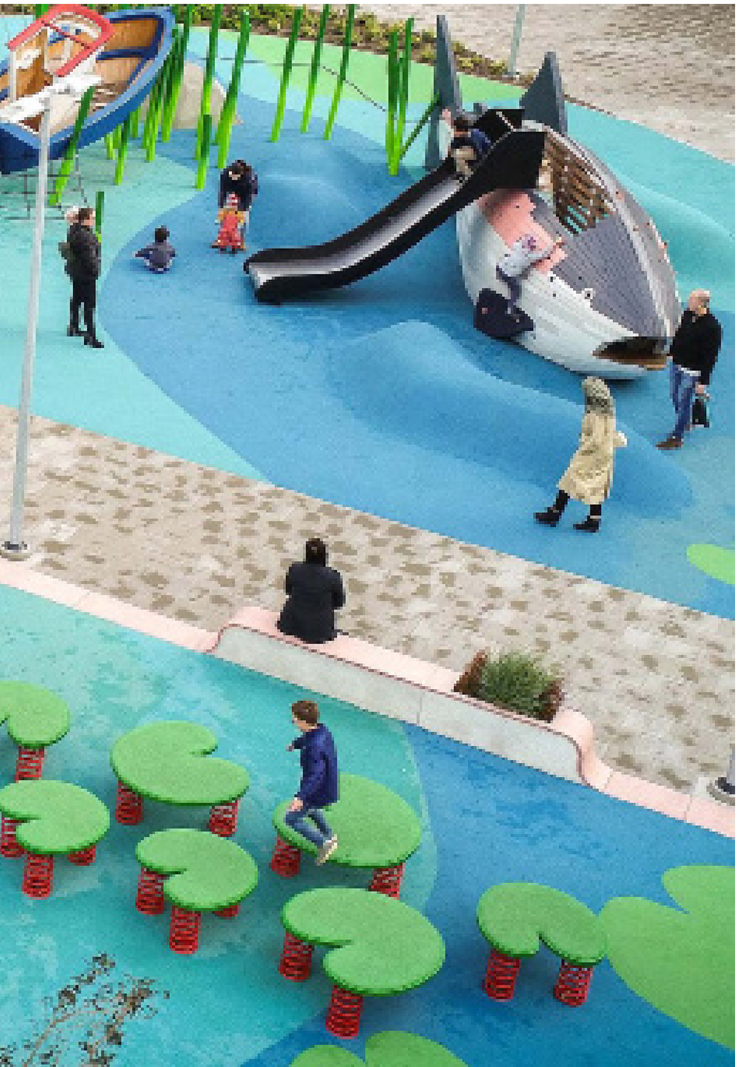






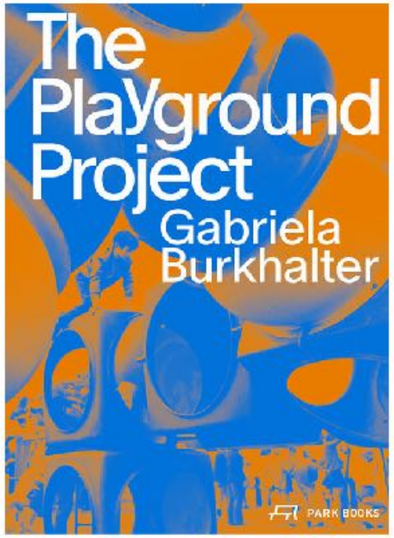




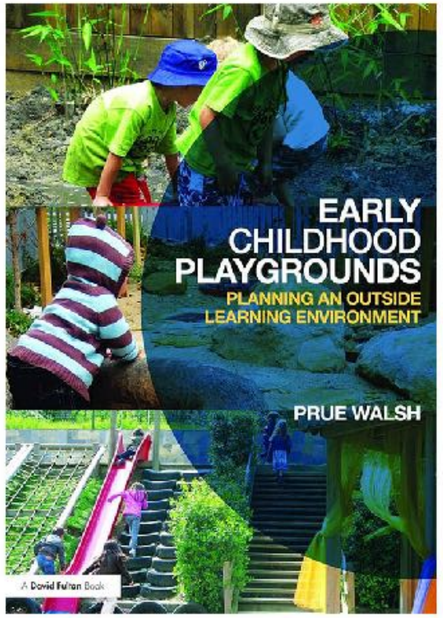


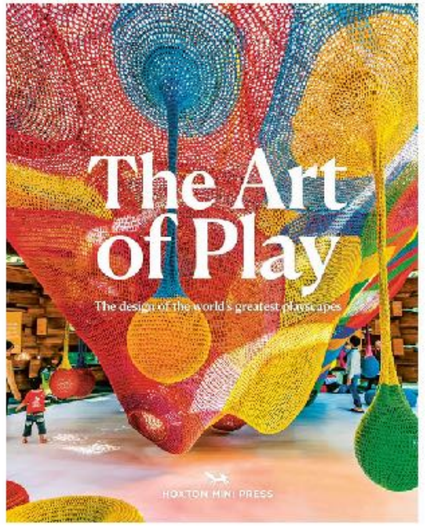

Shift

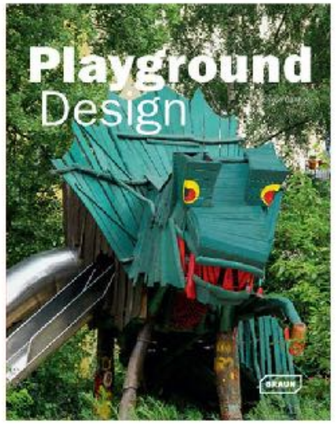
BOOKSHELF

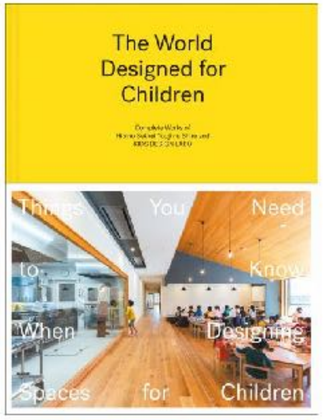






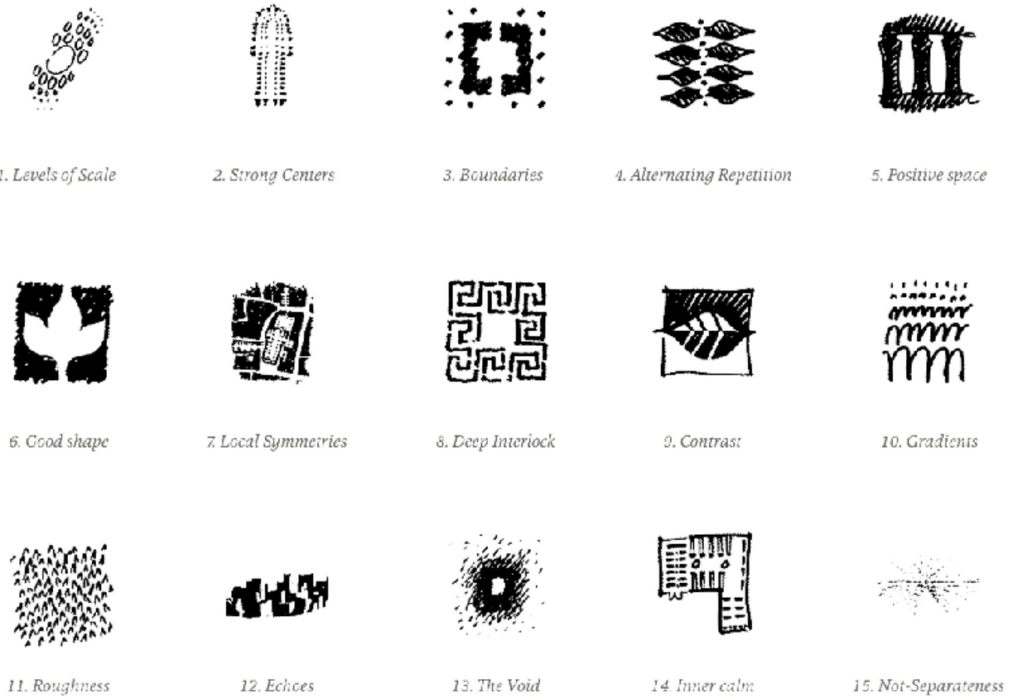


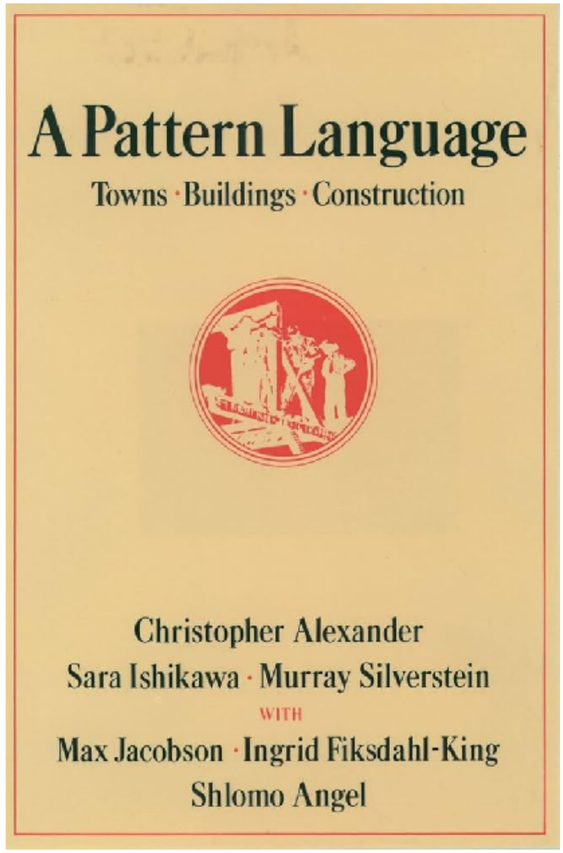






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CHRISTOPHER ALEXANDER: PATTERN LANGUAGE

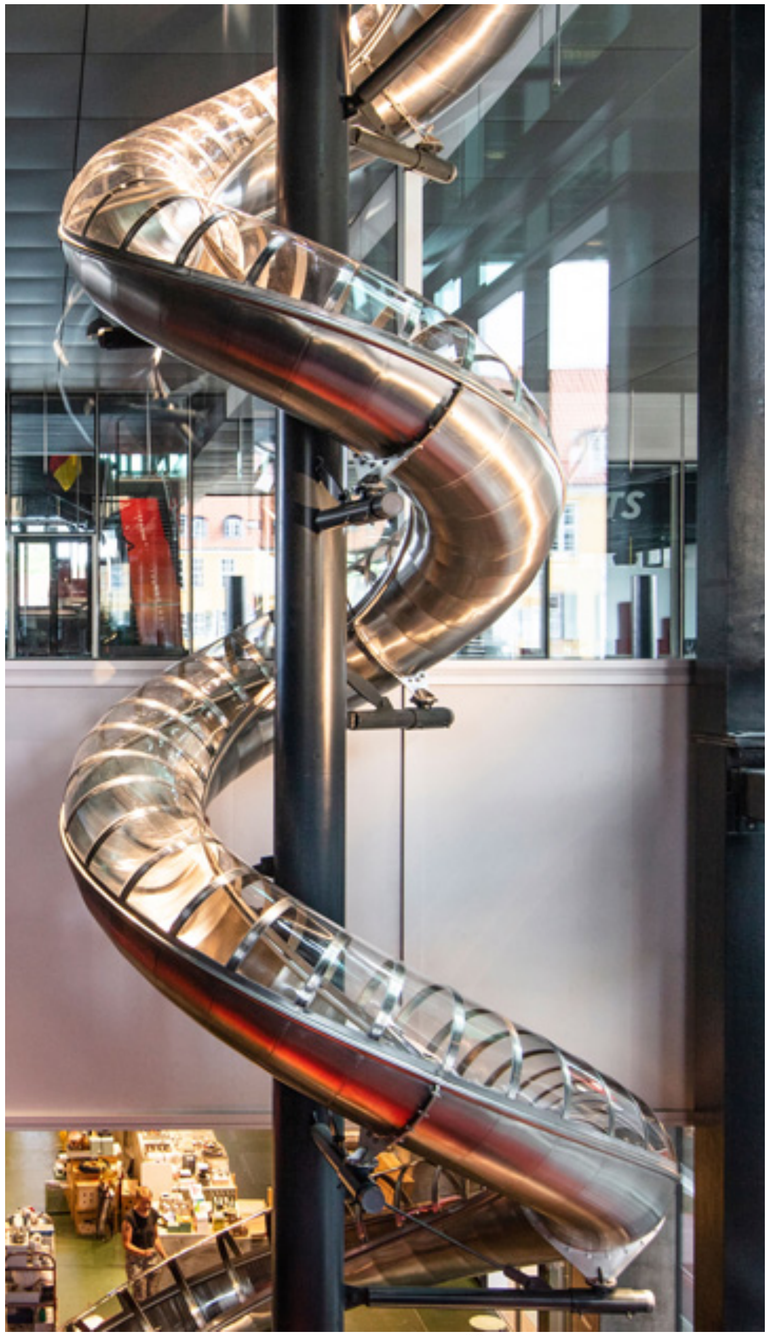




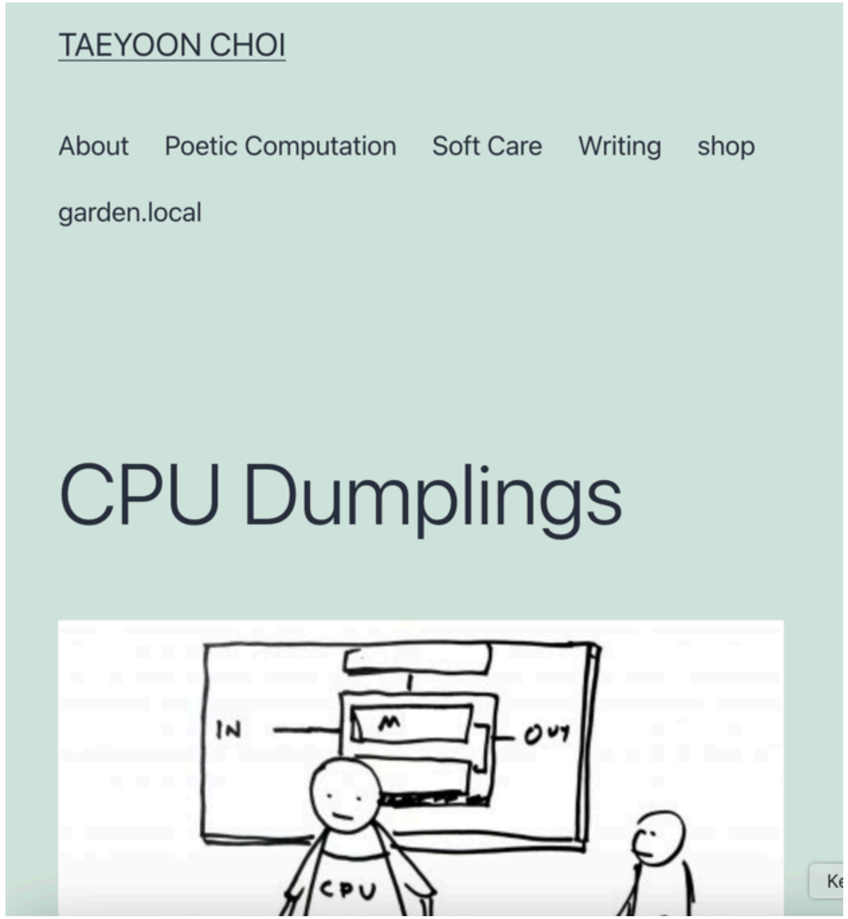
+ YINKA ILORI



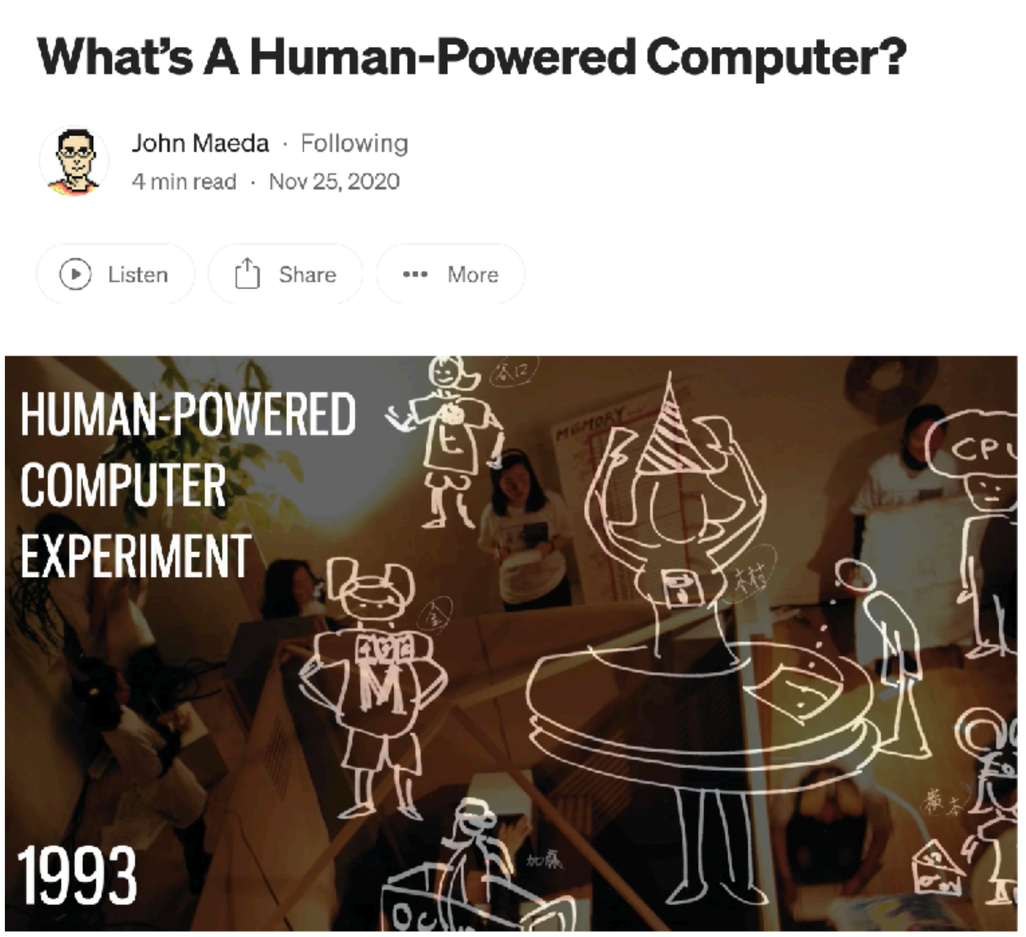
+ FLORENTIJN HOFMAN



+ CARSTEN HÖLLER



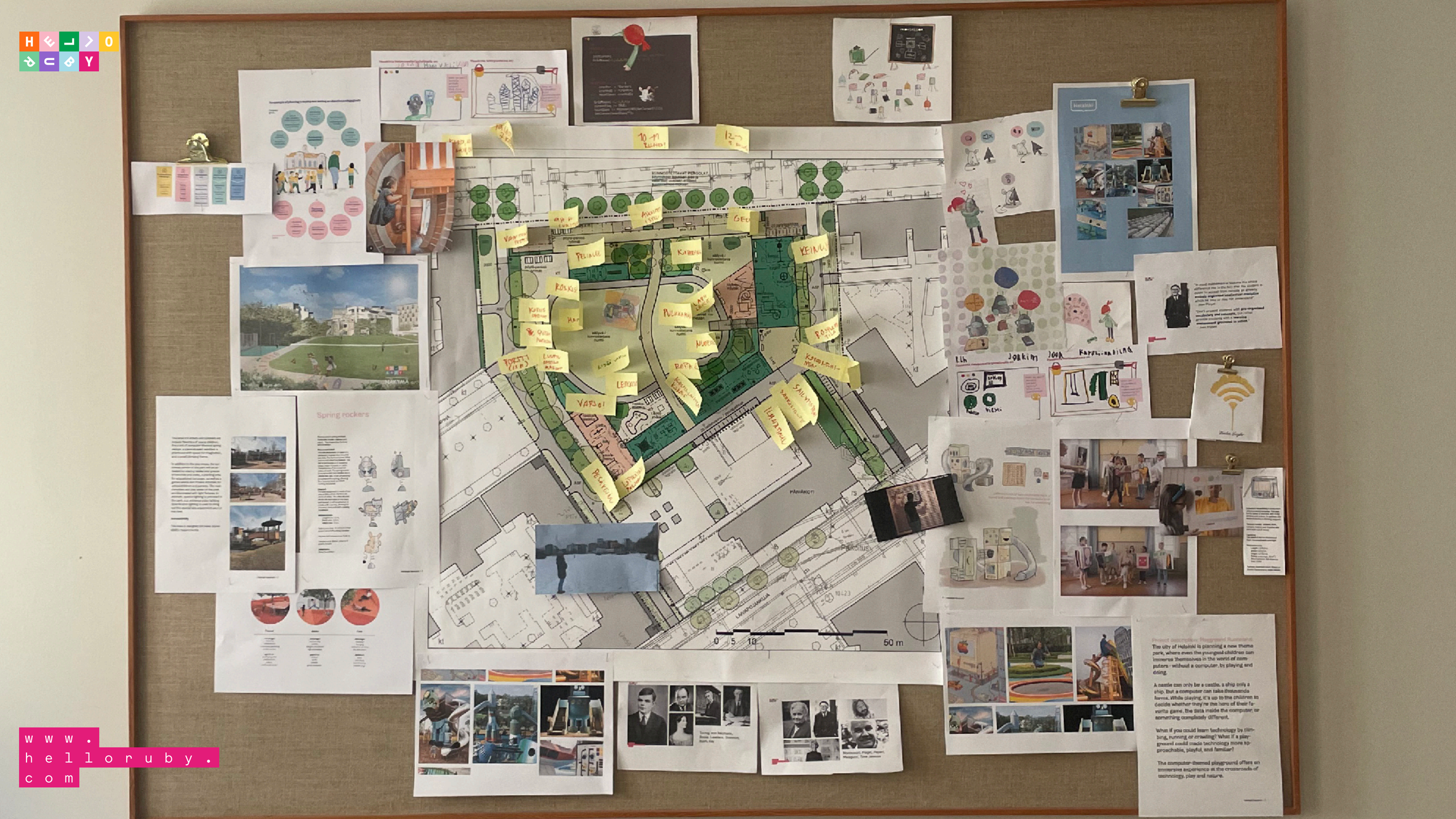
TAEYOON CHOI: CPU DUMPLINGS



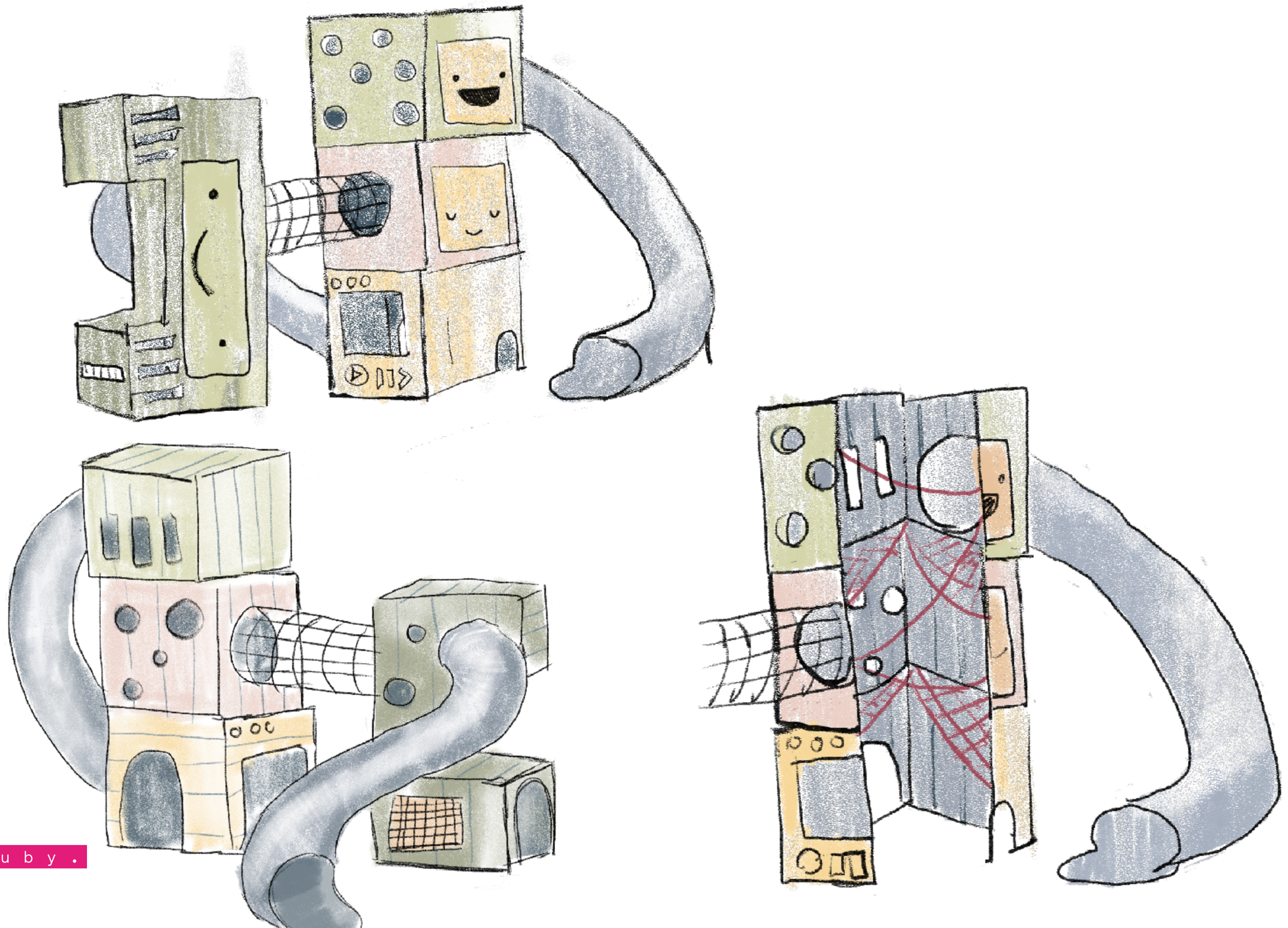
JOHN MAEDA: WHAT'S A HUMAN-POWERED COMPUTER?



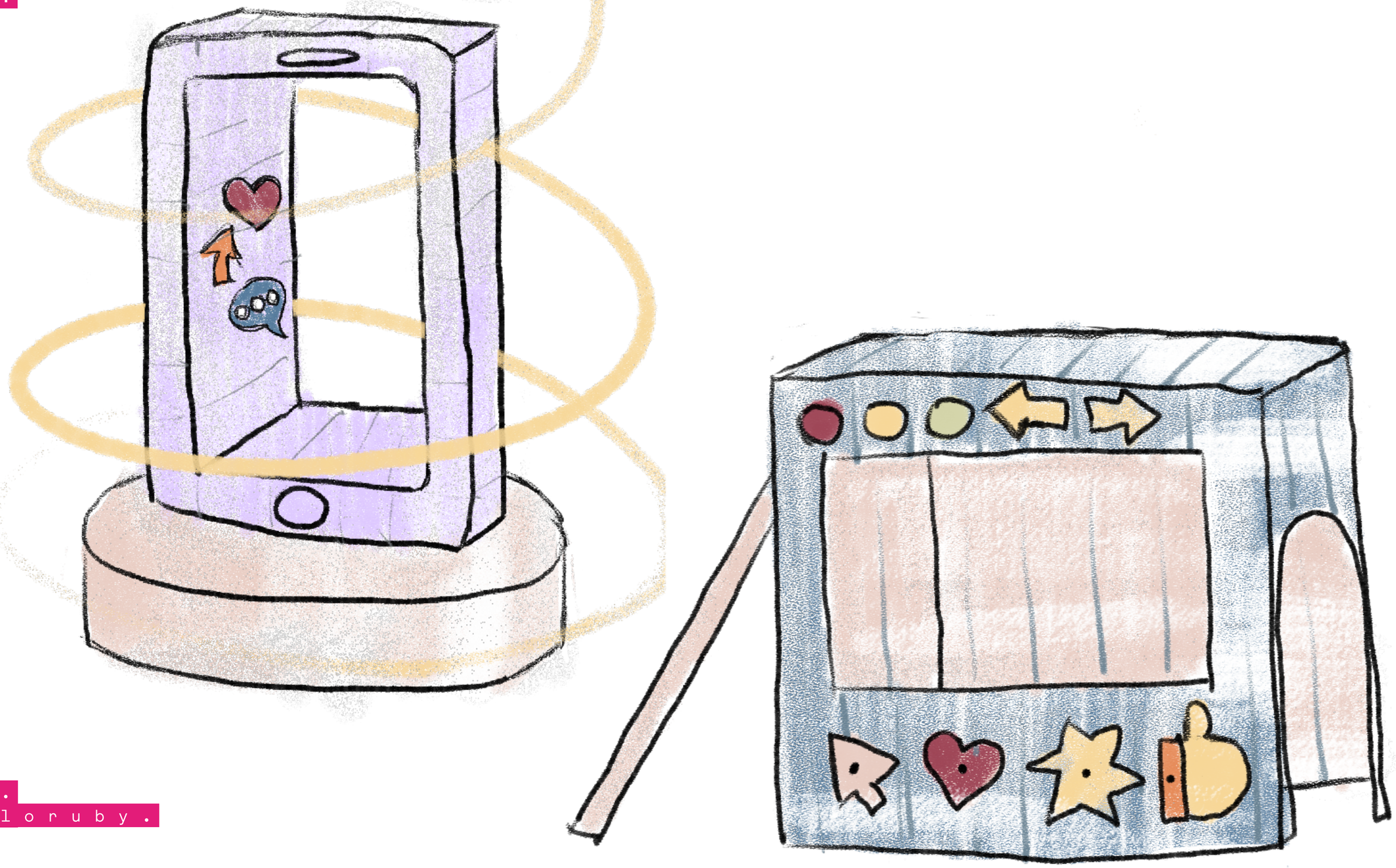
DYNAMICLAND: BOOKSHELF (PHYSICALITY & AGENCY)



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For me, the most important parts for an outdoor area of a playground are:

- Quality play equipment
- Versatile play functions
- Activities for different age groups
- Play areas sheltered from the weather
- Various seating options
- Playground meals during summer
- Friendly staff
- Short distance from home / kindergarten / school
- Child's friends
- Guided activities for families with young children
- Activities offered for schoolchildren
- Getting to know other adults
- Comfortable facilities
- Familiar people from the neighbourhood
- Activities during school holidays
- The club for 2—4-year olds
- Other

When designing the outdoor area of the playground, I would like it to encourage:

- Learning something new
- Risk-taking and adventure play
- Collaboration
- Accessibility
- Play
- Accomplishment
- Supporting play for across different age groups
- Safety
- Tranquility
- Other

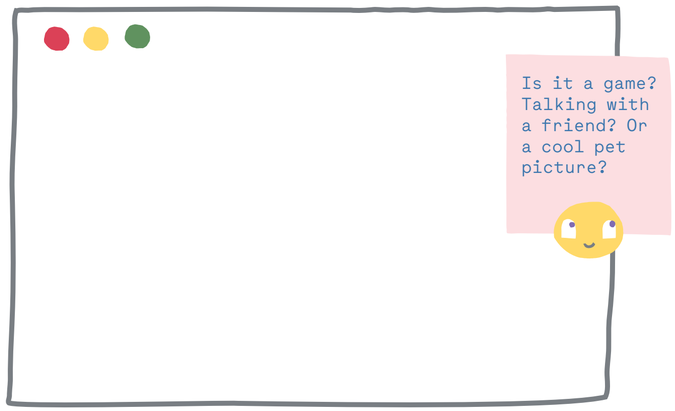
Hi!

We are planning the renovation of this park and want to hear the views from the visitors and other stakeholders of the park.

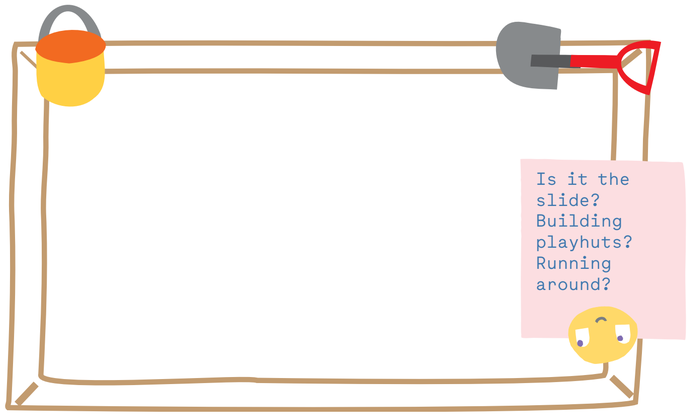
Share your views by scanning the QR code.
The questionnaire is open until December 1sti.



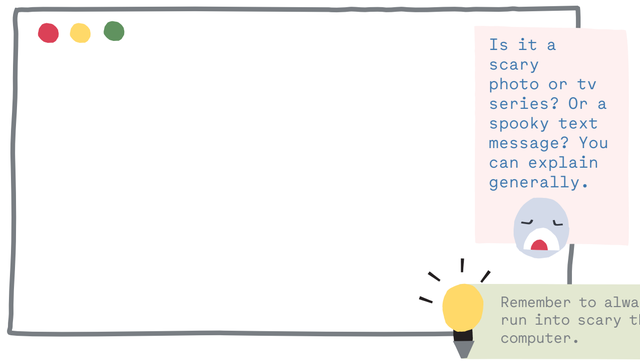
Most fun on a computer or a phone:



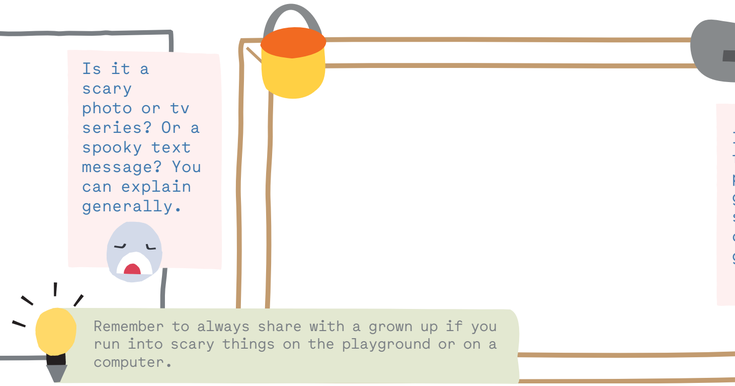
Most fun on the playground:



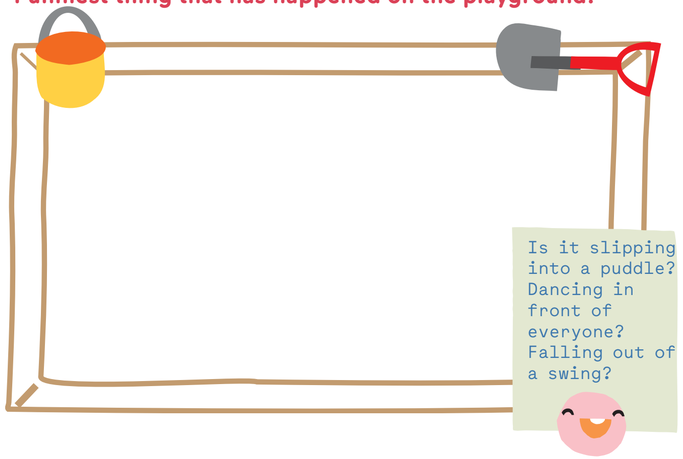
The scariest thing I've seen on a computer or a phone:



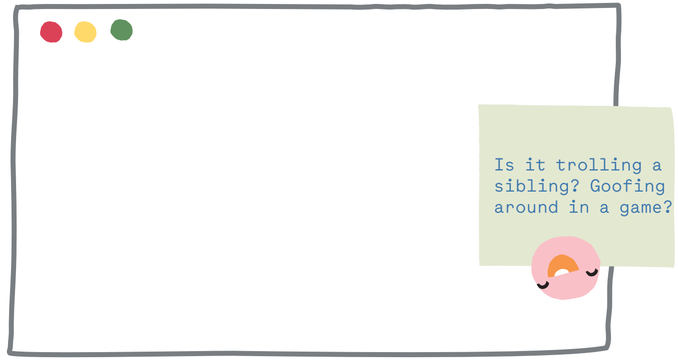
The scariest thing I've seen on a playground:



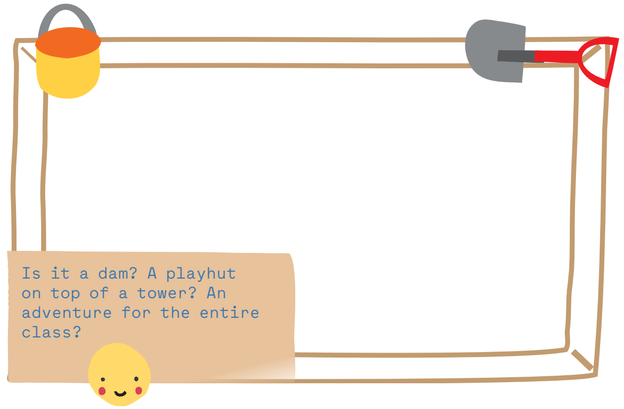
Funniest thing that has happened on the playground:



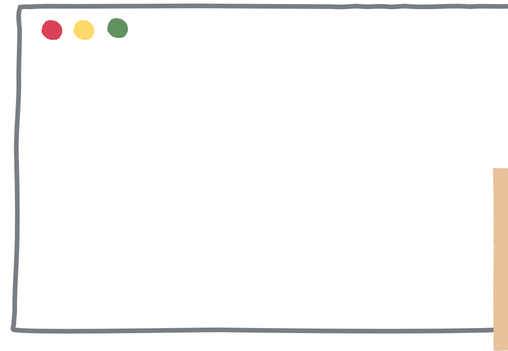
Funniest thing that has happened on a computer or phone



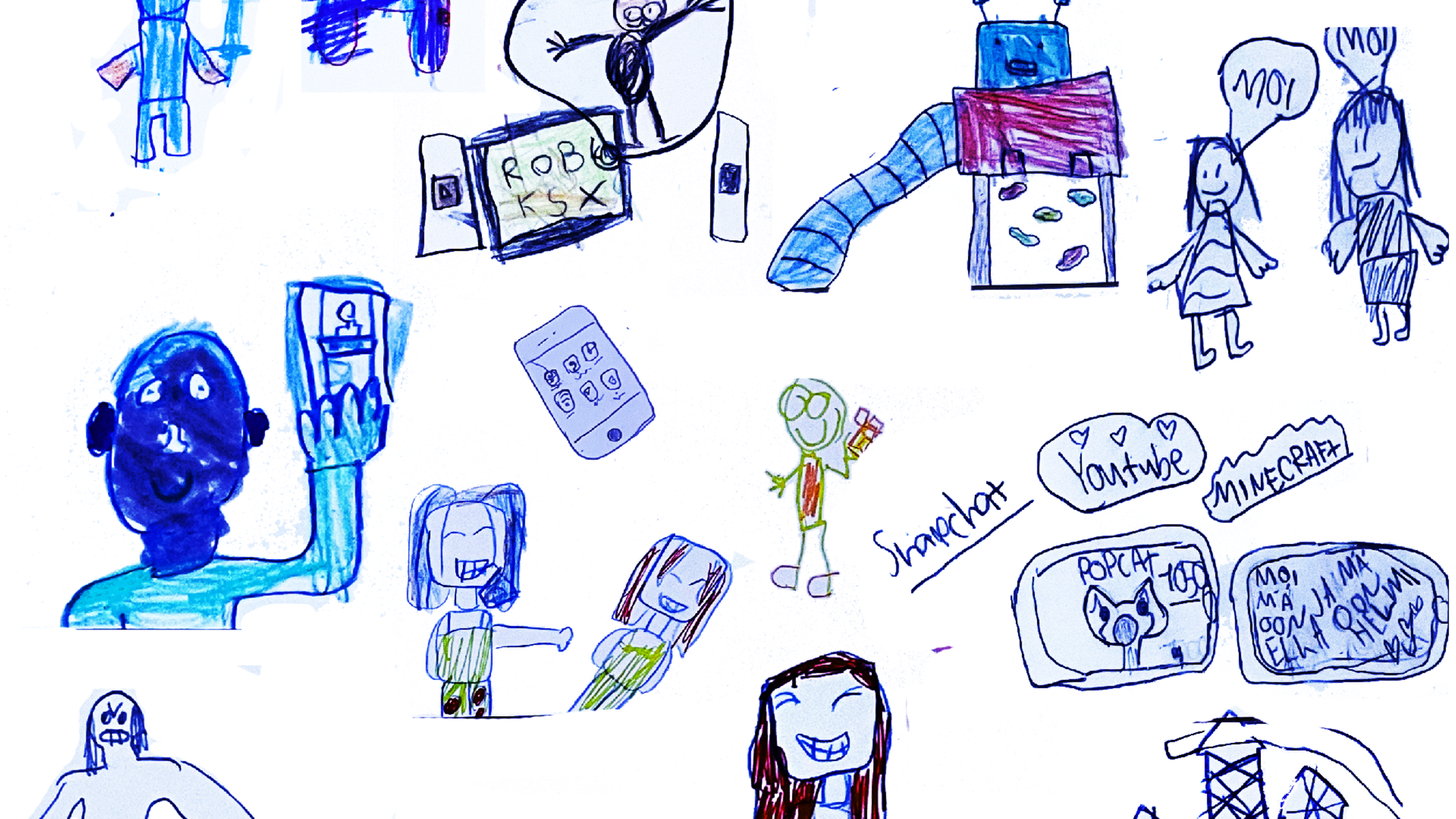
The coolest thing I've built on the playground:



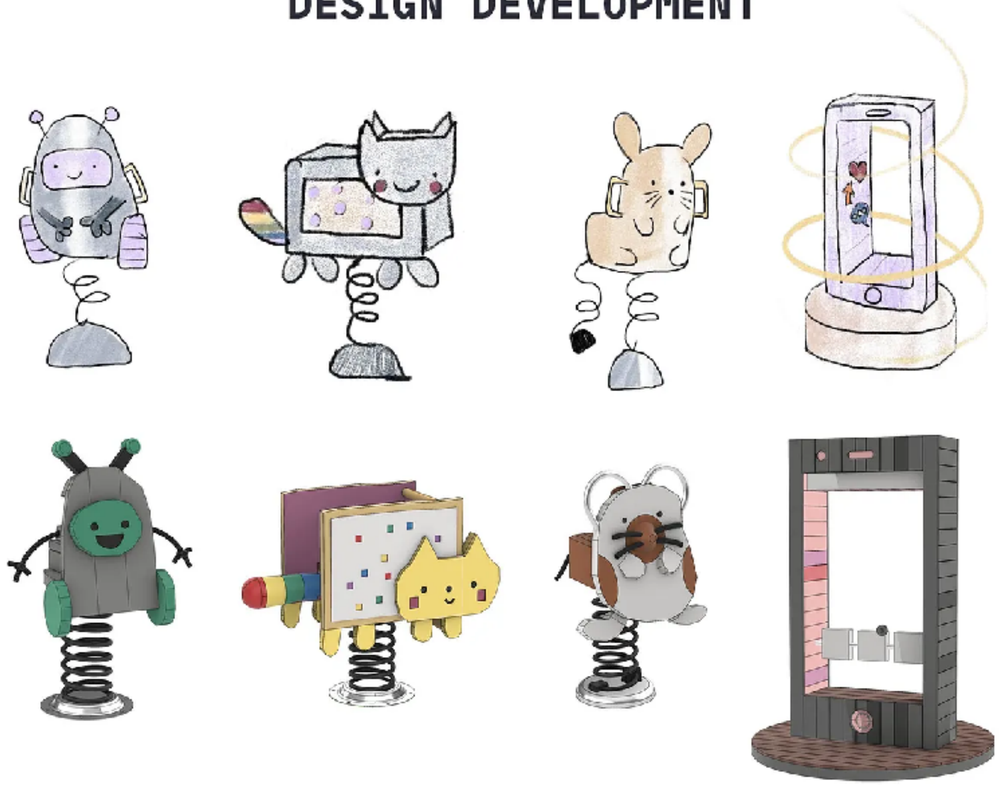
The coolest thing I've built on the computer or phone:



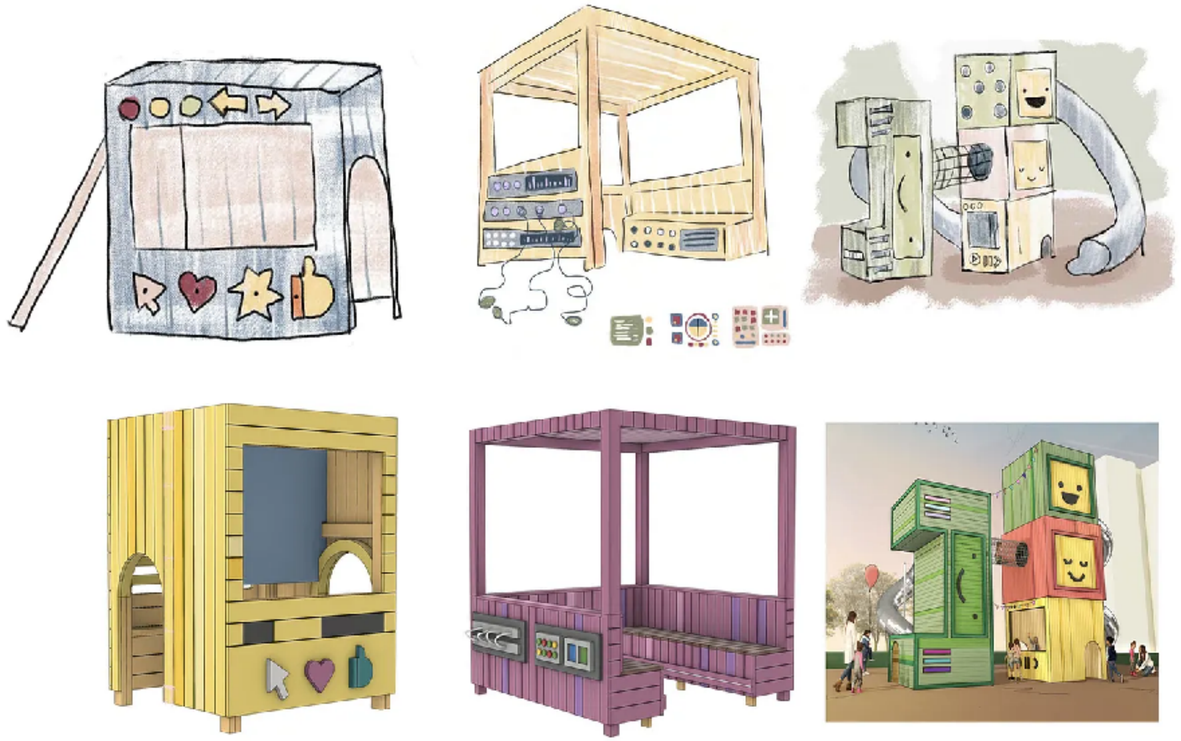
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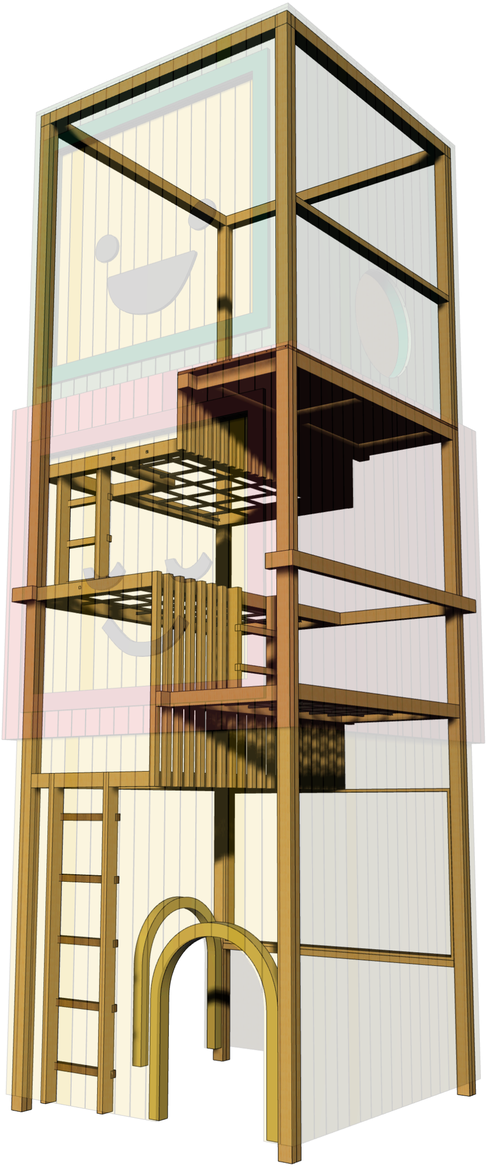

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KSX
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Youtube
MINECRAFT
Snapchat
POPCAT
MOI MÁ OON JI MÁ ELLA

DESIGN DEVELOPMENT



DESIGN DEVELOPMENT







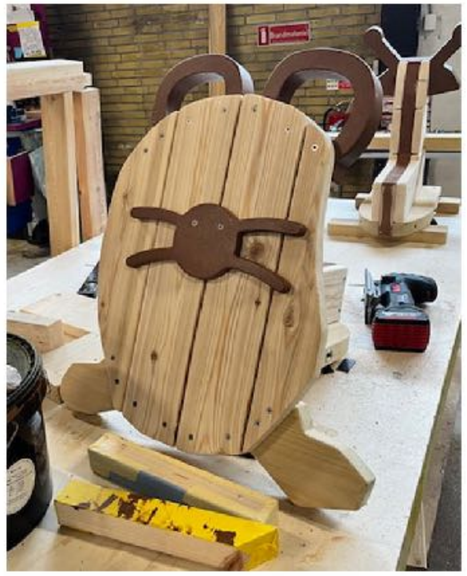


CONSTRUCTION



















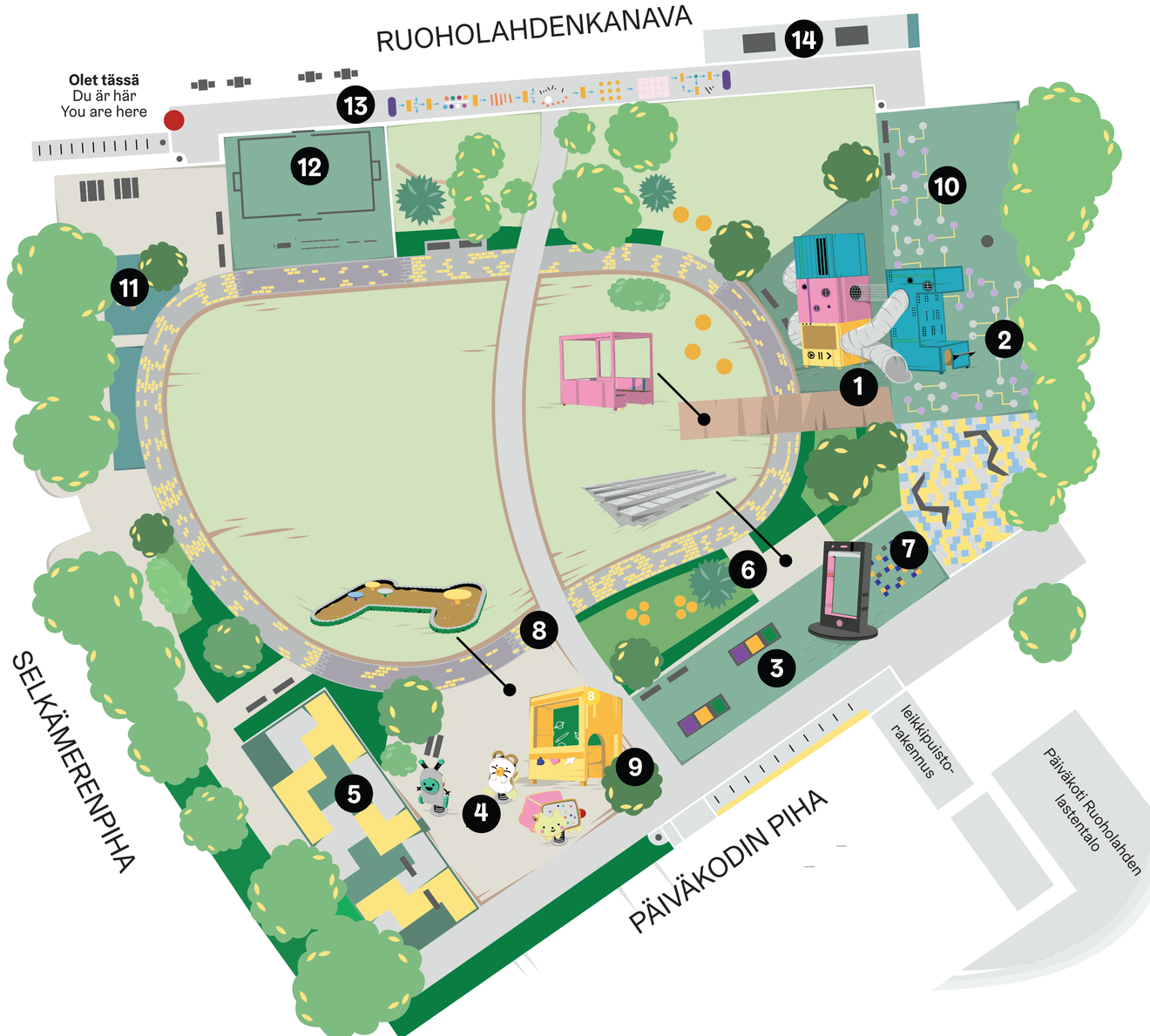

ESI

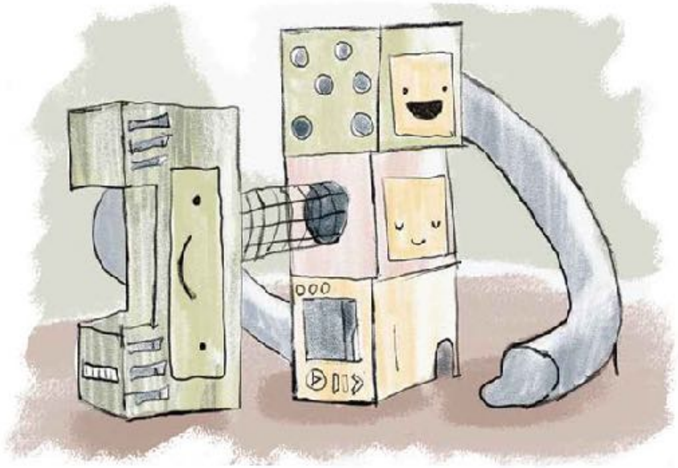


Safe, resource-rich environment allows for self-directed, project-based learning and conflict resolution.

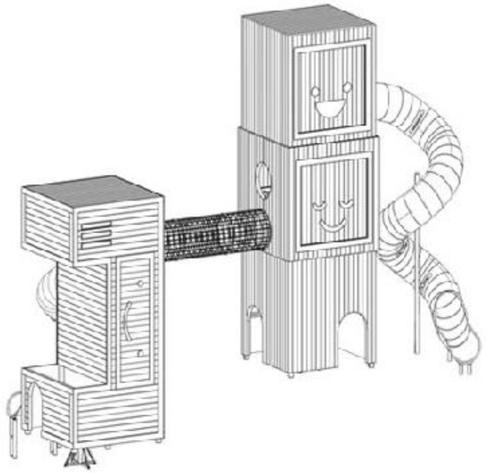
Physical space allows people of diverse backgrounds to come together, interact and model ways of being.

Create environments and cultures that are playgrounds, not proving grounds.











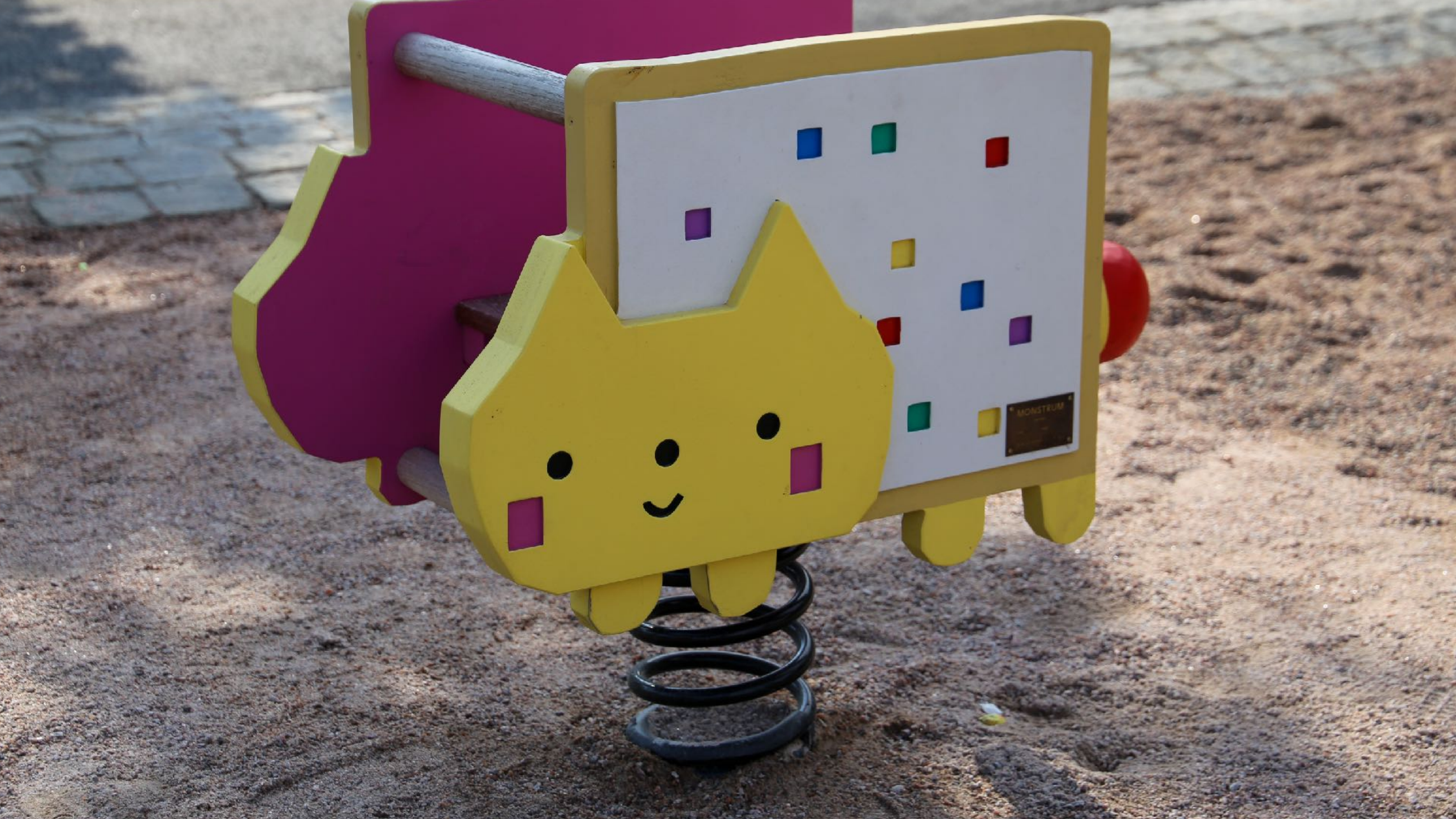
2. Playground as hardware, playground as software


Hardware?








MONSTRUM






Ride walk chair


Tervetuloa! Привет!
Välkommen! Salaam! Tere!
مرحبا ! Buresboahtin!
Marhaba! Hello! Nǐ hǎo! سلام !
console.log('tervetuloa!');!
Mikä on leikkipuisto?
Vad är lekparken? What is a "lekkikuulon"?
Helsinki
Helsingfors




Esc
Back
Tab
Q W E R T Y U I O P Å
Enter
Caps Lock
A S D F G H J K L Ö Ä
Shift
Z X C V B N M
Ctrl
Alt Gr
Ctrl


Software?

PERHEAAMU klo.10-11
Muovailuleikkejä kaikenikäisille

RAKENTELULEIKKEJÄ klo.10-11
ulkona kaikenikäisille

VAUVA-AAMU klo.10-11.30
Keväistä taiteilua vauvoille

RUOHIKSESSA RAIKAA klo.10-10.30

LEIKKIPUISTO SULJETTU KLO.9-12
EI OHJATTUA HETKEÄ

TIISTAI 7.5. LUOVUUS LENTOON klo.10-11
Äitienpäivän kahvitarjoilu sekä korttien taiteilua äideille ja tärkeille ihmisille. Kaikenikäisille.

KESKIVIIKKO 8.5. VAUVA-AAMU klo.10.30-11.30
Vauvojen musiikkihetki **klo.10.30**
HUOM! Poikkeava aika

TORSTAI 9.5. HELATORSTAI,
LEIKKIPUISTO SULJETTU

PERJANTAI 10.5. LEIKKIPUISTO SULJETTU

Loruhetki klo.10-10.30.
Esillä myös pieni kirjasto, lukumaja ja kaikenikäisille sopivia kirjoja, joita voi tutkia ja lukea yhdessä aikuisen kanssa.

TIISTAI 30.4. LUOVUUS LENTOON klo.10-11
Vapputeiteilua ja vappufunnelmaa kaikenikäisille. Halutessaan voi pukeutua teemaan sopivasti!

KESKIVIIKKO 1.5. VAPPU, LEIKKIPUISTO SULJETTU

TORSTAI 2.5. RUOHIKSESSARAIKAA klo.10.30-11.
Musiikkihetki kaikenikäisille.
HUOMIOITHAN MUUTTUNEEN KELLONAJAN!

PERJANTAI 3.5. VIKKELÄT JALAT klo.10-11





PUISTO RUOHOLAHTI
na lapsiperheille 22.4.-26.4.

TÄNÄÄN LEIKITÄÄN klo.10-10.30.
Satuheronta kaikenikäisille, myös vauvoille!

LUOVUUS LENTOON klo.10-11
Taiteilua kaikenikäisille

Vauva-aamu klo.10-11.30.
Värileikki yli 4kk ikäisille vauvoille.
Ohjattu tuokio klo.10-11.
Mukaan sotkun kestävät vaatteet.

RUOHIKSESSARAIKAA klo.10-10.30
Musiikkihetki kaikenikäisille

VIKKELÄT JALAT klo.10-11
Leikkiä ja liikettä yli 1-vuotiaille
ULKONA



LEIKKIPUISTO RUOHOLAHTI
Viikko-ohjelma lapsiperheille 15.4.-19.4.

MAANANTAI 15.4. TÄNÄÄN LEIKITÄÄN palloleikkejä ja harjoitellaan pallonkäsittelytaitoja klo.10-11. Kaikenikäisille, sopii myös vauvoille!

TIISTAI 16.4. LUOVUUS LENTOON klo.10-11
Taiteilua kaikenikäisille

KESKIVIIKKO 17.4. Vauva-aamu klo.10-11.30.
Värileikki yli 4kk ikäisille vauvoille.
Ohjattu tuokio klo.10-11.
Mukaan sotkun kestävät vaatteet.

TORSTAI 18.4. RUOHIKSESSARAIKAA klo.10-10.30
Musiikkihetki kaikenikäisille

PERJANTAI 19.4. VIKKELÄT JALAT klo.10-11
Leikkiä ja liikettä yli 1-vuotiaille
ULKONA

Ylös • alas • kierähdys • hop!

Vauvasirkus valloittaa
keväällä etelän leikkipuistot

Vauhdikkaassa vauvasirkushetkessä tempoillaan yhdessä vauvan kanssa. Vauva nautii vauhdinhurmasta ja hitaista heilyttelyhetkistä. Laulut, lorut ja leikit tekevät vauvasirkustuokiosta hauskan yhdessäolohetken ja värikkäät sirkusesineet herättävät uteliaisuuden. Tuokio sopii yli 4 kk ikäisille vauvoille, jotka eivät vielä kävele. Tuokiot ovat maksuttomia. Ilmoittaudu mukaan leikkipuistoon sähköpostilla, tuokioissa on rajoitettu osallistujamäärä.

Lahnalahti
Lauttasaarentie 40a, lp.lahnalahti@hel.fi
6.5.2024 Klo 9.30-10.15
6.5.2024 Klo 10.45-11.30

Ruoholahden ja Sepän yhteinen vauvasirkus järjestetään Albertin olohuoneella, Albertinkatu 33,
lp.ruoholahti@hel.fi
22.5.2024 Klo 9.30-10.15



MAANANTAI

TIISTAI 9.4.

KESKIVIIKKO

TORSTAI 11.4

PERJANTAI

2024





LEIKKIPUISTO RUOHOLAHTI
Viikko-ohjelma lapsiperheille 1.4.-5.4.

MAANANTAI 1.4. 2. PÄÄSIÄISPÄIVÄ.
LEIKKIPUISTO SULJETTU

TIISTAI 2.4. LUOVUUS LENTOON klo.10-11
Taiteilua kaikenikäisille

Vauvasirkus Albertin olohuoneella yhteistyössä leikkipuisto Sepän kanssa klo.9.30-10.15
TUOKIO TÄYNNÄ!

KESKIVIIKKO 3.4. Vauva-aamu klo.10-11.30.
Vauvojen loru- ja musiikkihetki klo.10-10.30

TORSTAI 4.4. RUOHIKSESSARAIKAA klo.10-10.30
Musiikkihetki kaikenikäisille

PERJANTAI 5.4. VIKKELÄT JALAT klo.10-11







EC PP 1-6

This activity supports students in planning and presenting their ideas, understanding the role of media, and giving and receiving constructive feedback. It also enhances communication, collaboration, and technological skills through playful learning.

Screen

Students design their own video show. Discuss what types of videos are available on the internet (e.g., skits, daily vlogs, unboxing videos, challenge videos). Students can use props such as stuffed animals for their presentations. Perform the live videos for each other. Viewers can encourage the performers by giving thumbs up or forming a heart shape with their hands. Afterward, share positive comments.

Tip: Create an online store display on the screen. What would the store sell? How would it be advertised?

Tip: Introduce "special effects" by using lights, music, or natural materials as props.

Digital Competency Path Objectives:

- I experiment with different devices and programs or apps to produce media (Grade 3).
- I can distinguish between factual and fictional content (Grade 2).
- I recognize unreliable websites (Grade 4).
- I understand that personal data is collected when I use the internet and apps (Grade 3).

Curriculum Connections:

- Early Childhood Education: Various forms of expression, Development of emotional skills
- Pre-primary: Communication and expression, Technological readiness
- Grades 1-2: Students develop their communication and interaction skills and practice expressing ideas (Mother Tongue and Literature).
- Grades 3-5: Students analyze texts in greater depth and improve their linguistic expression (Mother Tongue and Literature).
- Grades 7-9: Students combine critical literacy with technological skills in diverse

EC PP 1-6

This activity supports students in recognizing letters, forming words, and understanding language structures while enhancing motor skills and ICT readiness, such as understanding basic commands like copy, cut, and paste.

Tip: Try implementing commands such as capital letters, spaces, copy, cut, and paste with partners. You can also create secret messages using the keyboard!

Keyboard

Ask students to select a letter, for example, from the letters in their own names, and stand on its corresponding spot. If necessary, assign multiple letters to some students. The teacher or a student reads a word or sentence one letter at a time. When a student hears their letter, they sit on the letter spot quickly and then stand back up. Pay attention to spaces, capital letters, etc.

Saurakaa yhdessä, millainen sana tai lause muodostuu!

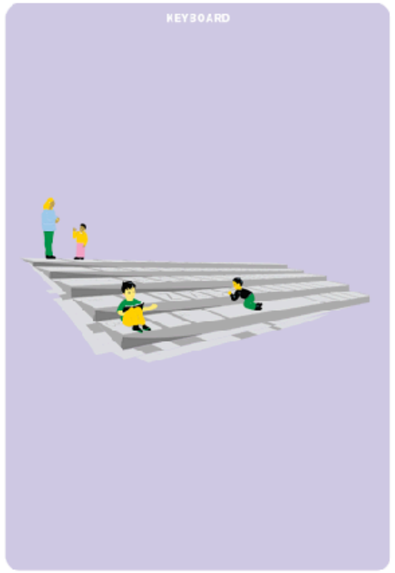
Digital Competency Path Objectives:

- I can write text using a word processor (e.g., Word or Docs) (Grade 2).
- I know various keyboard commands (e.g., copy, cut, paste) (Grade 3).

Curriculum Connections:

- **Early Childhood Education: Language and communication, Motor skills**
- **Pre-primary: Mother Tongue and Literature, interaction and collaboration**
- **Grades 1-2: Students practice expressing ideas and storytelling (Mother Tongue and Literature).**











Extending the Experience Beyond Play – Hands-on learning materials, QR-codes and interactive activities connect digital literacy to the playground, bridging the gap between physical play and computational thinking. Materials for educators ensure curriculum aligned field trips.


BINÄÄRIJÄRJESTELMÄ
Programmering Programming
Can you form your favorite letters as a binary numbers?
MONSTRUM
ON
OFF

BINÄÄRIJÄRJESTELMÄ

Programmering|Programming

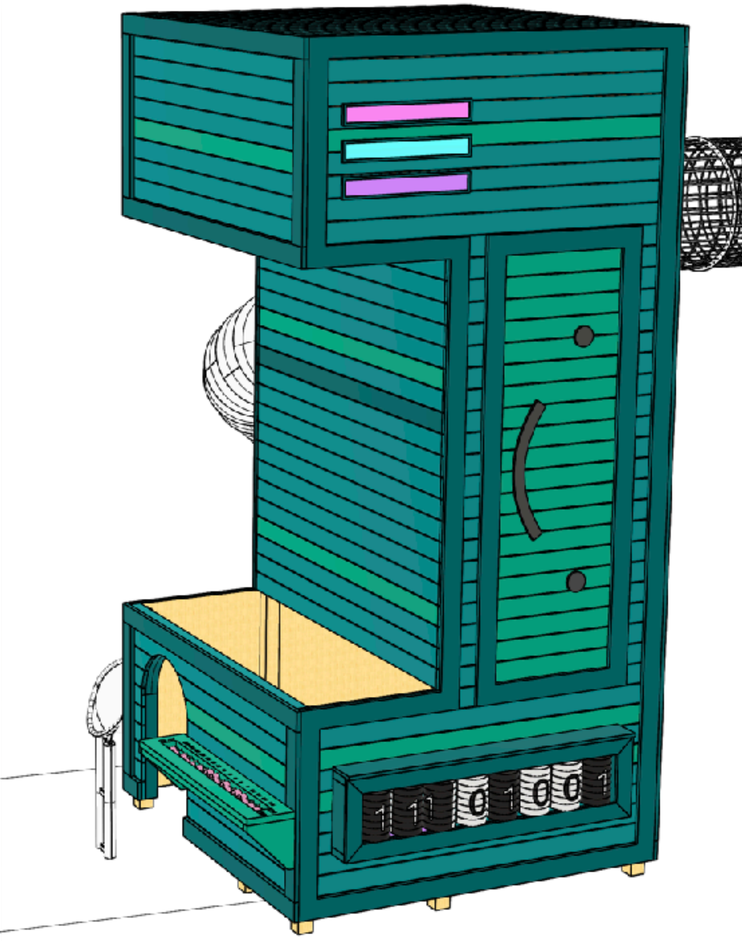
Osaatko muodostaa suosikkikirjaimesi binäärilukuna?

Kan du forma din favoritbokstav som ett binärtal?

Can you form your favorite letter as a binary number?







KÄNNYKKÄ

Mobil | Mobile phone



Pohdi päivän onnistuminen ja suunnittele pieni voitontanssi puhelimen ruudulla!

Fundera på dagens framgångar och planera en liten segerdans på telefonens skärm!

Reflect on the success of the day and plan a little victory dance on the phone screen!







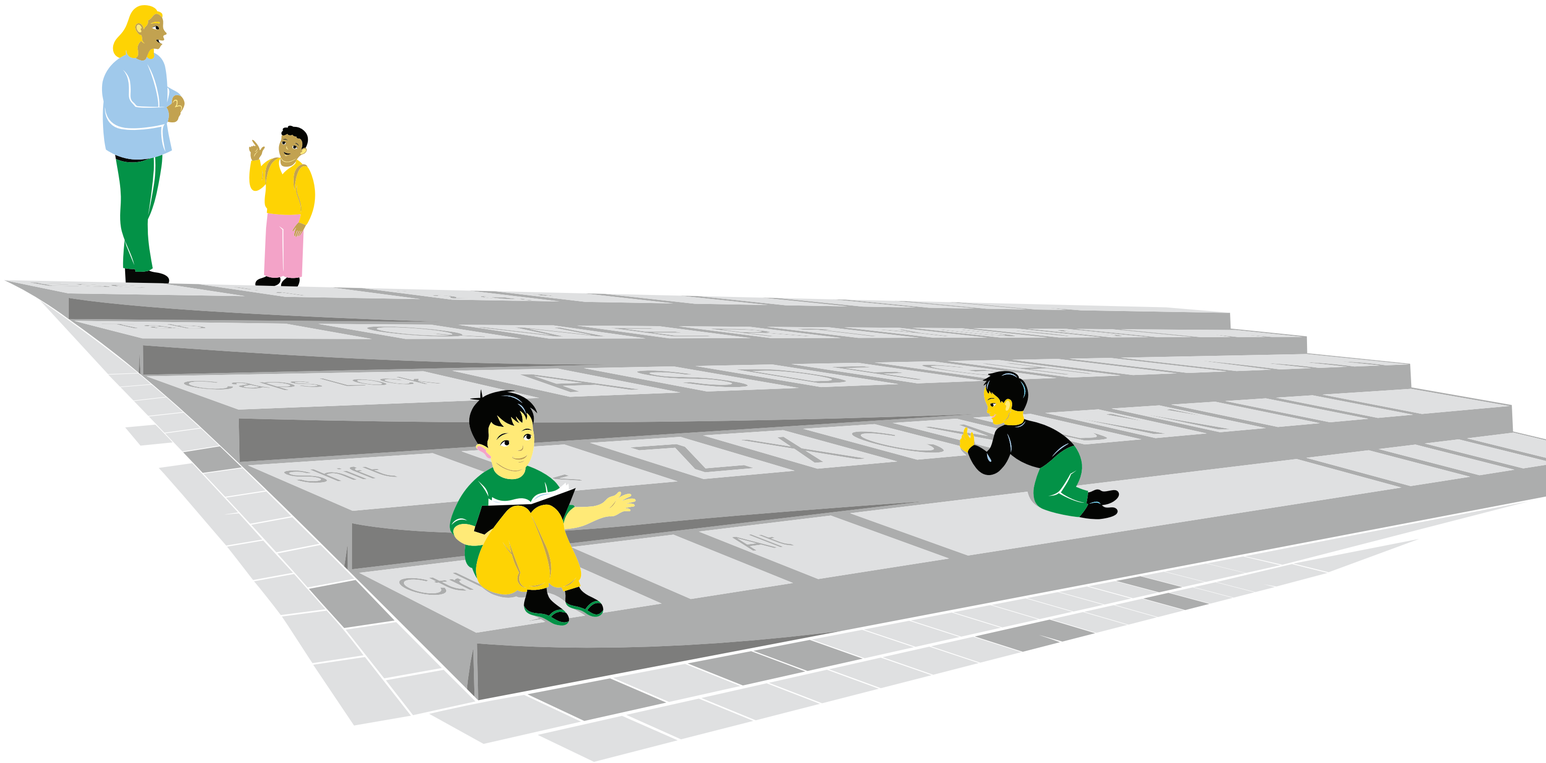
NÄPPÄIMISTÖ

Tangentbord | Keyboard

Valitse näppäimistöltä suosikkikirjaimesi tai tavaa nimesi hypellen.

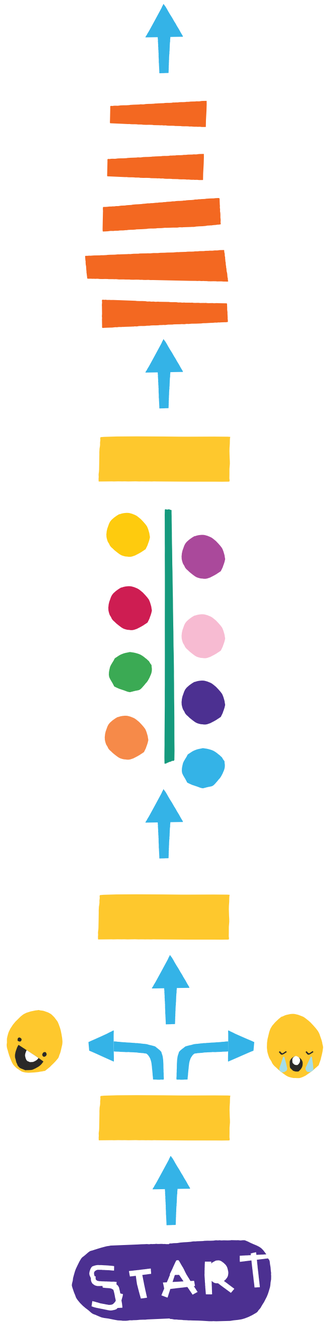
Välj din favoritbokstav från tangentbordet eller stava ditt namn genom att hoppa.

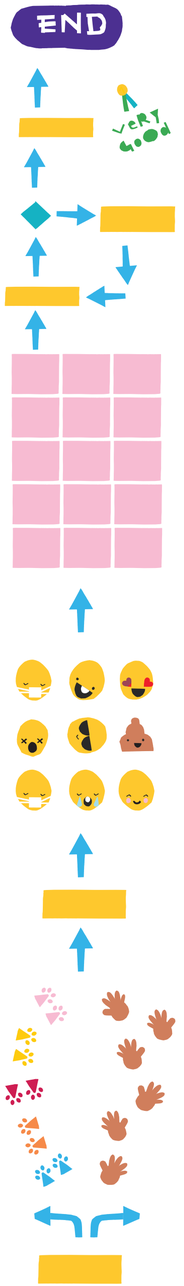
Choose your favorite letter from the keyboard or spell your name by hopping.



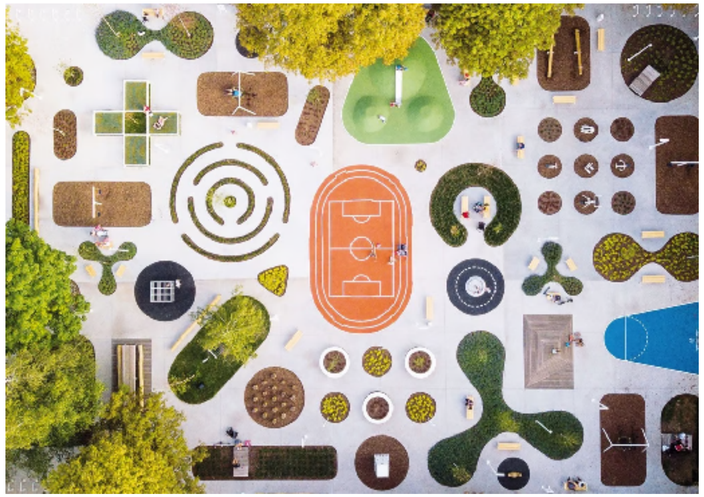
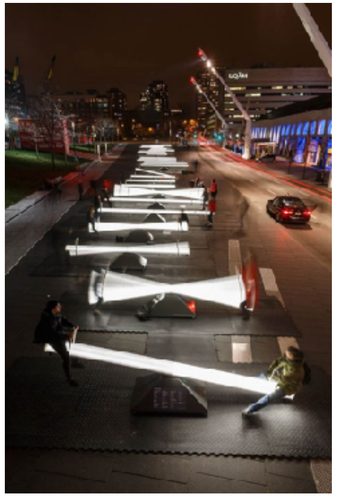

Tab
Caps
Shift
Ctrl
Alt
Enter
Backspace
Q W E R T Y U I O P Å
A S D F G H J K L Ö Ä
Z X C V B N M


START


START


END


Tutustu puistoon
Helsinki
Tervetuloa Helsingin – ja kenties koko maailman – ensimmäisen tietokoneteemaisen leikkipuiston avajaisiin!

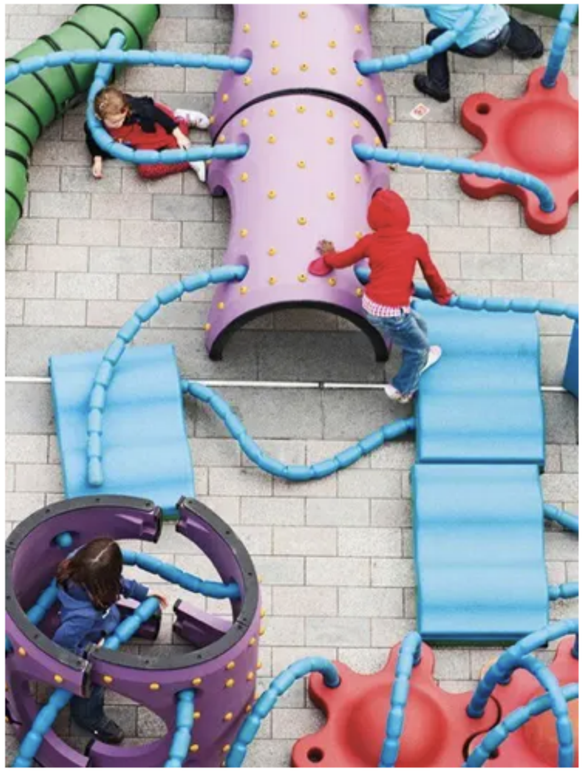






Moodboard / early ideas. Moodboard / early ideas. The emphasis is on analogy and experience. Kids might not leave able to recite Moore's Law or explain how a transistor works, but they will have traced to journey of electrons, shrunk down into a human-sized transistors on seesaws and scooped up sand—raw silicon in its natural form.This seeding of curiosity is invaluable.















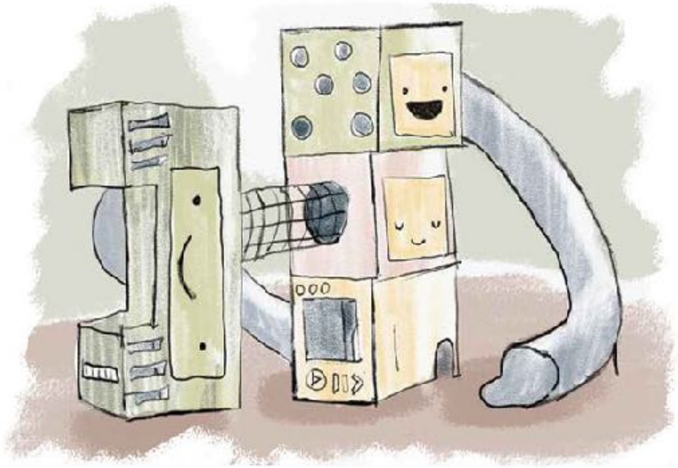
www.hellоruby.com

Moodboard / early ideas. The emphasis is on *analogy and experience*. Kids might not leave able to recite the Central Dogma of molecular biology, but they will have *touched* a double helix, *played* with make-believe microbes, and *experienced* problem-solving like a scientist. This seeding of curiosity is invaluable.

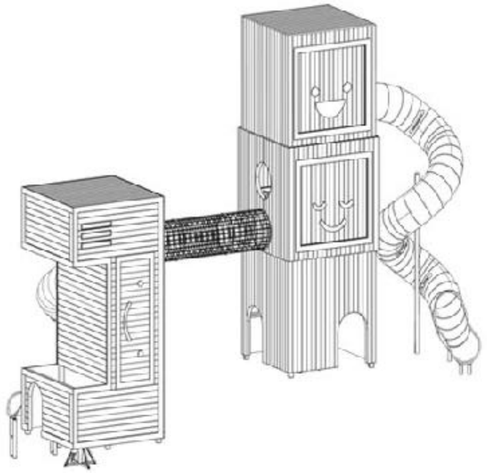


What's your playground moment?
A joyful, playful moment at work (team-building, successful experiment, etc.) - and how to create more of these moments intentionally?

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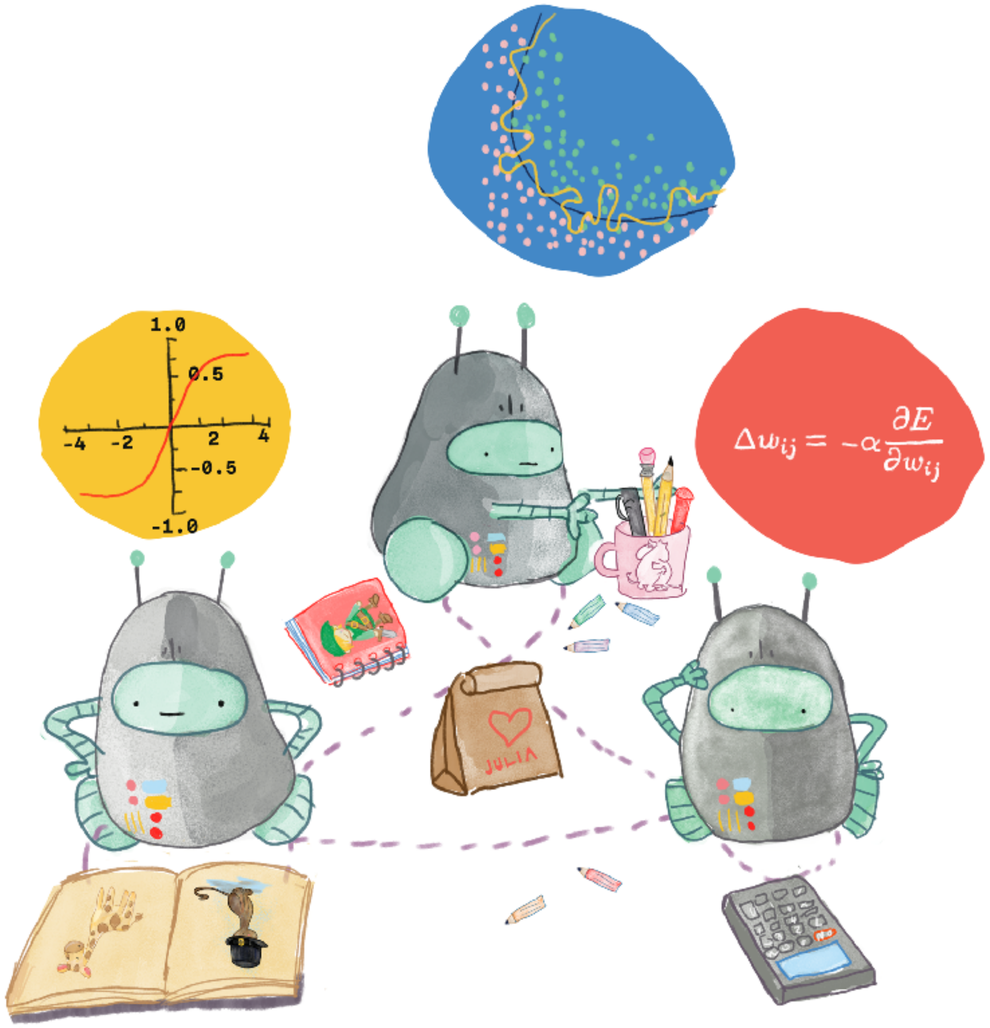








3. Playgrounds as models for 21st century learning



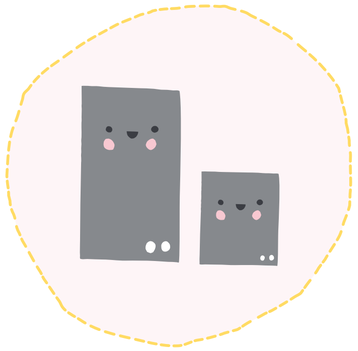
“I am not a visionary. I’m an engineer. I’m happy with the people who are wandering around looking at the stars but I am looking at the ground and I want to fix the pothole before I fall in.”
- Linus Torvalds


Explore / exploit problem

Technology should be understood in three distinct forms: as **processes embedded into tools** (like pots, pans, and stoves); **explicit instructions** (like recipes); and as **process knowledge**, or what we can also refer to as tacit knowledge, know-how, and technical experience.

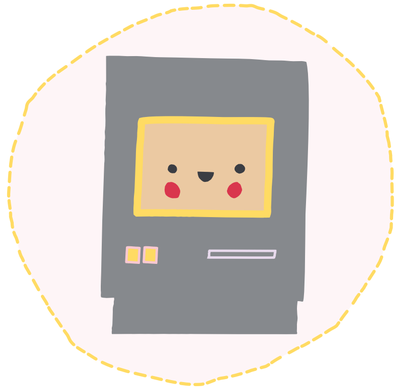
– Dan Wang, Breakneck (2025)

The qualities we've been accustomed to thinking of as slow advantages — broad reading, a strong frame of reference, real knowledge of the history of one's own field — have always been valued, but they've never been urgent.



1965-1980

Computers that fill a room (Mainframe)



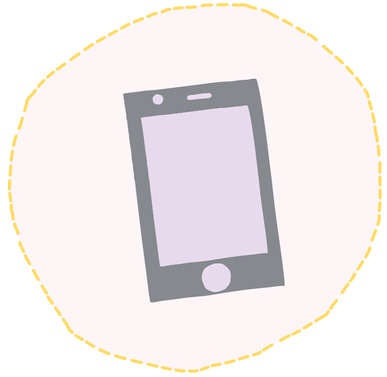
1980-1995

Computers that sit on the table (PC)



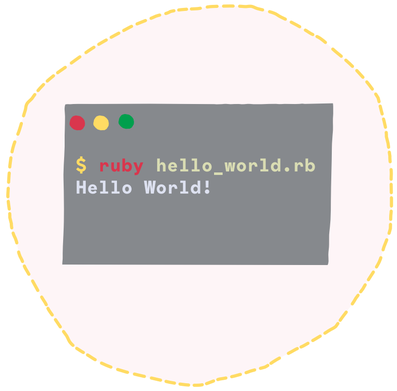
1995-2010

Computers that are carried in backpacks (Web)



2010-2025

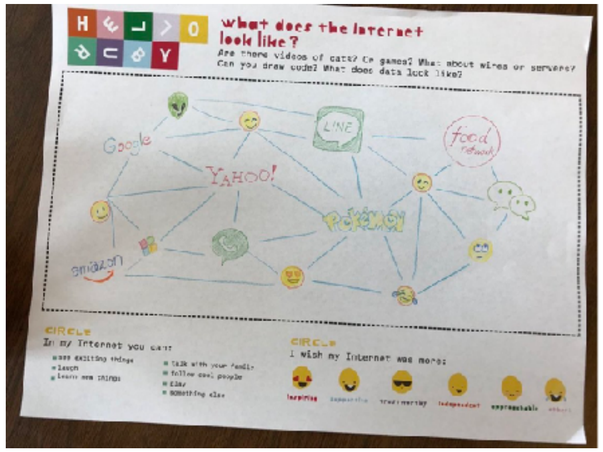
Computers that fit our pockets (Smartphones)

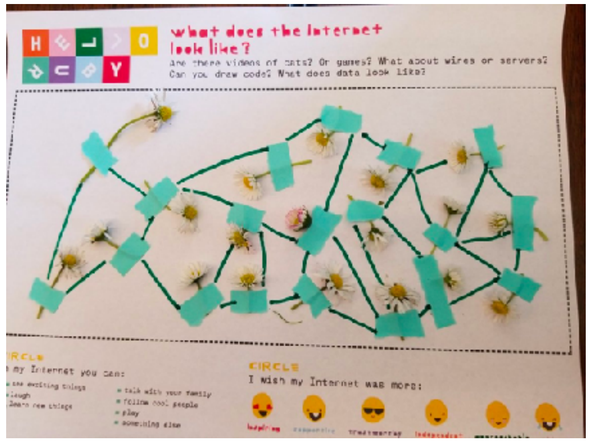


2025-2040

Computers that become a part of our environment (Watch, furniture, wearables..)

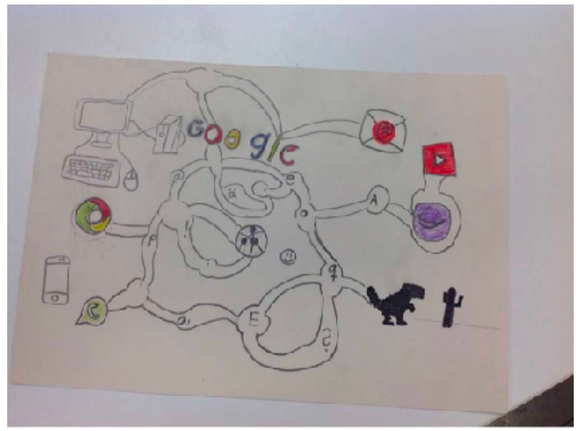
Draw the Internet. Where are you?



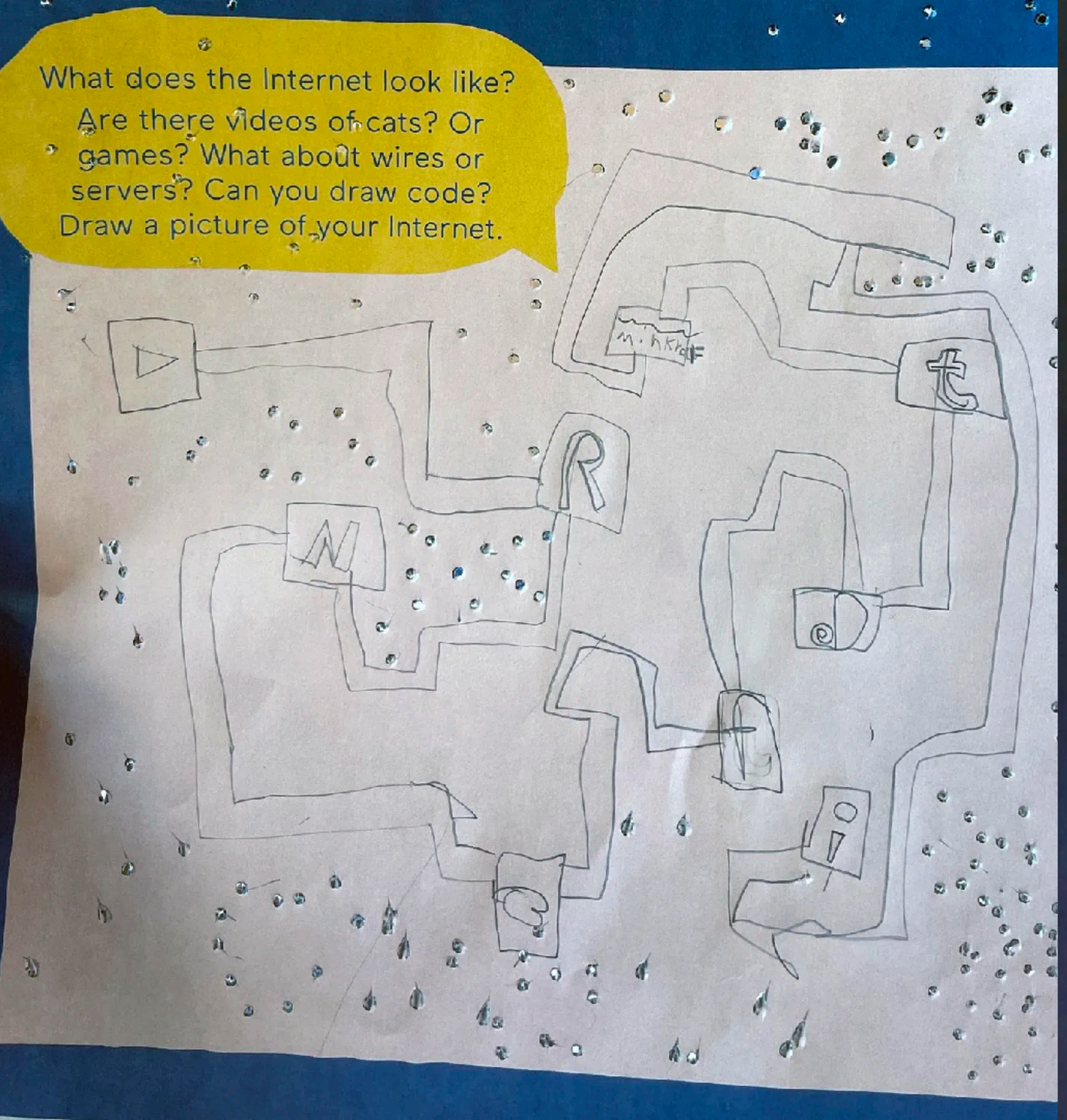






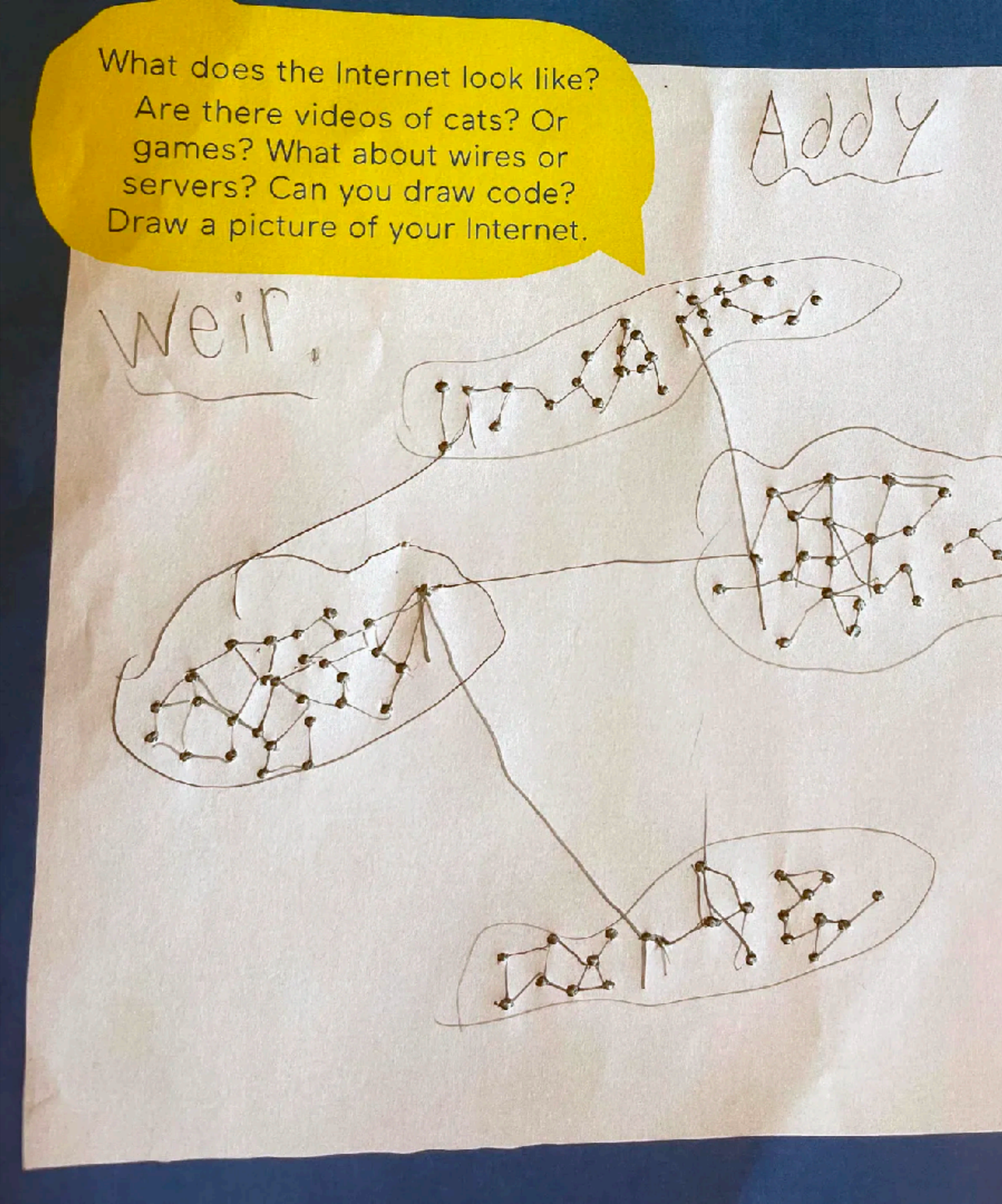


What does the Internet look like?
Are there videos of cats? Or games? What about wires or servers? Can you draw code? Draw a picture of your Internet.



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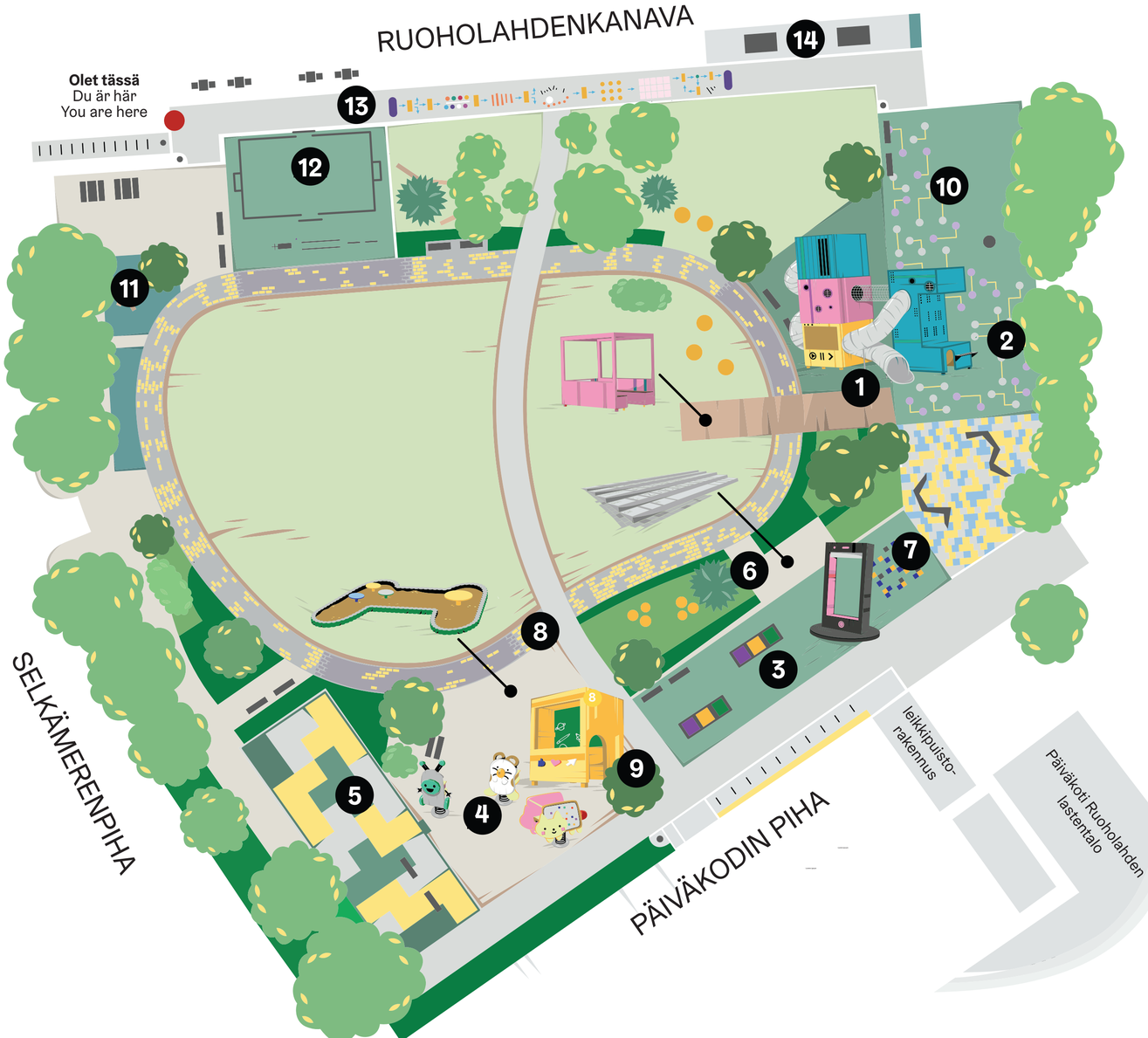
Addy



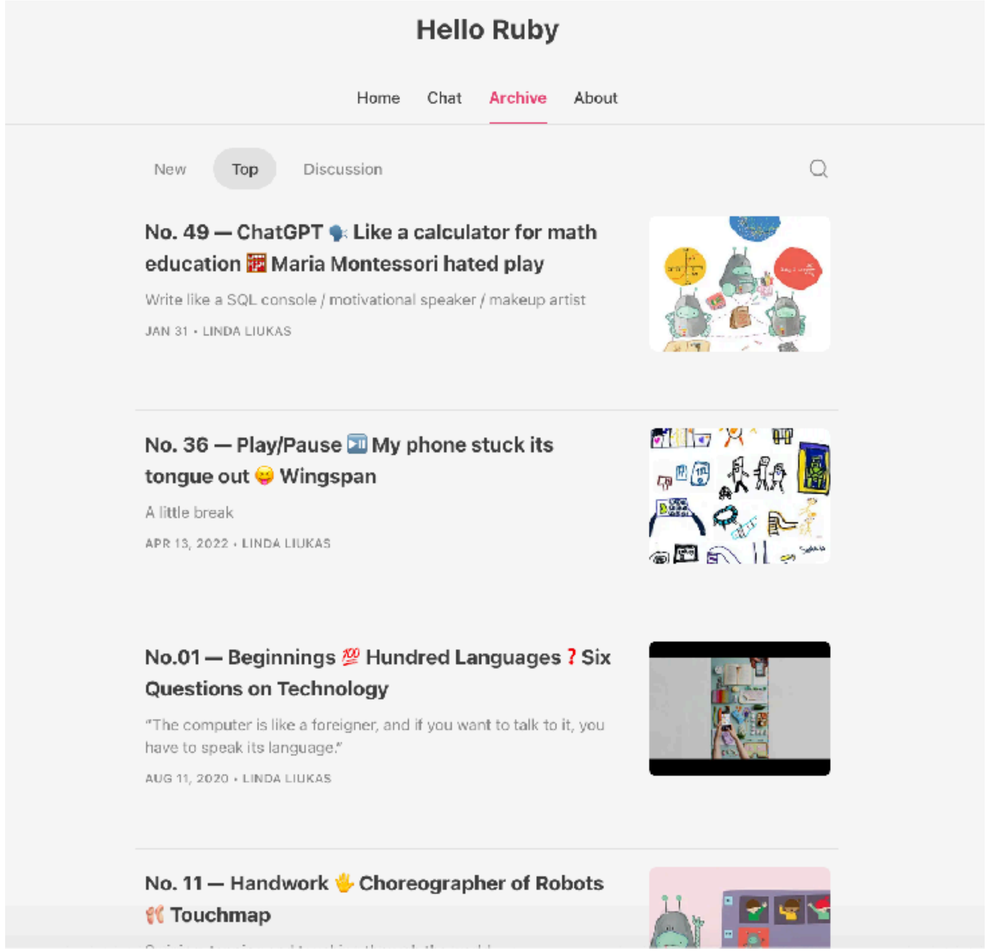
Children are the R&D department of humanity.

Looking eagerly into the history and curiously into the future.

Infrastructure as care at scale.







Thank you!

linda@helloruby.com
@lindaliukas

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