



Production



CAD



Programming



Electronics

# Clémence Sulmont

## DESIGN ENGINEER



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# Color Master

*A sassy opponent*

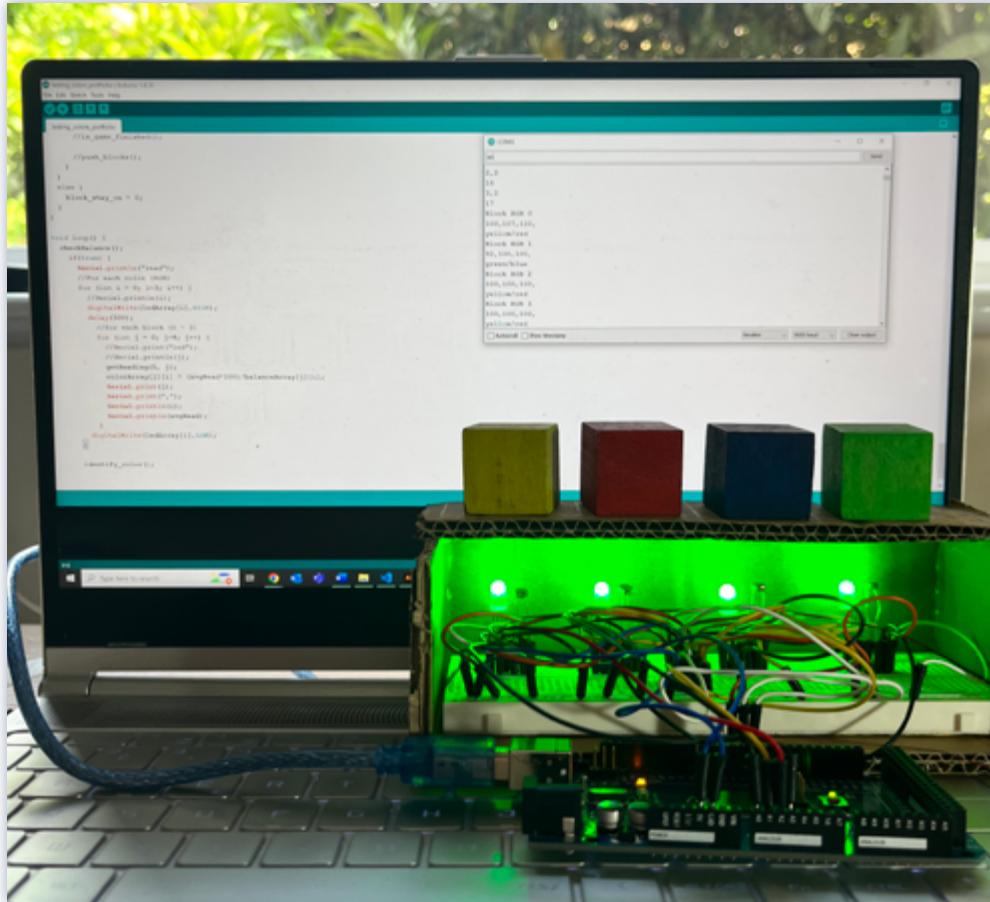
Mastermind is a simple logic game in which the user attempts to find the hidden code through multiple iterations. Play against the Color Master, as he removes the wrongly placed blocks but keeps those rightly placed until you crack the code, or lose!



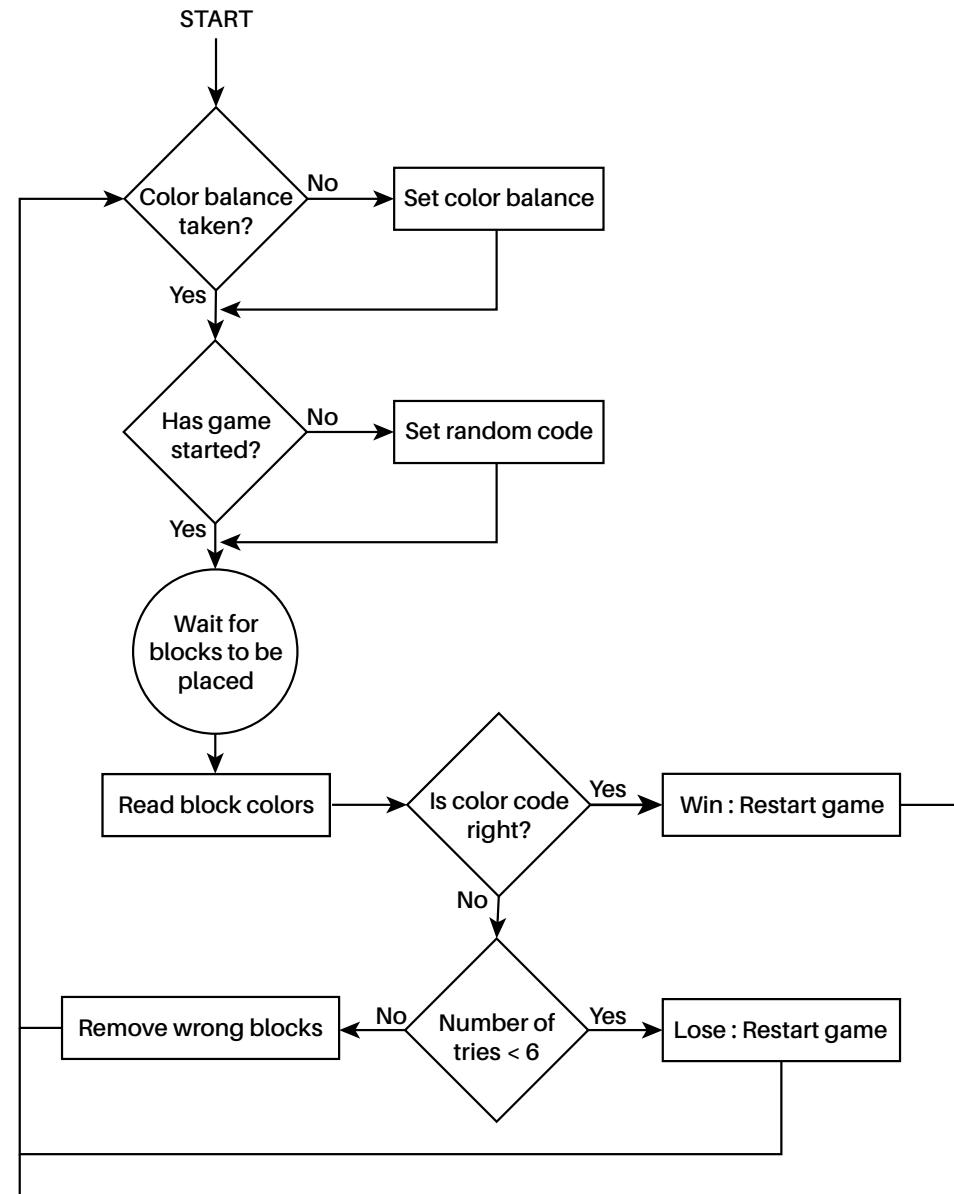
Programmed on an Arduino  
Mega 2560 with C++



Electronics assembly to make color sensors  
and unique arm movements in response



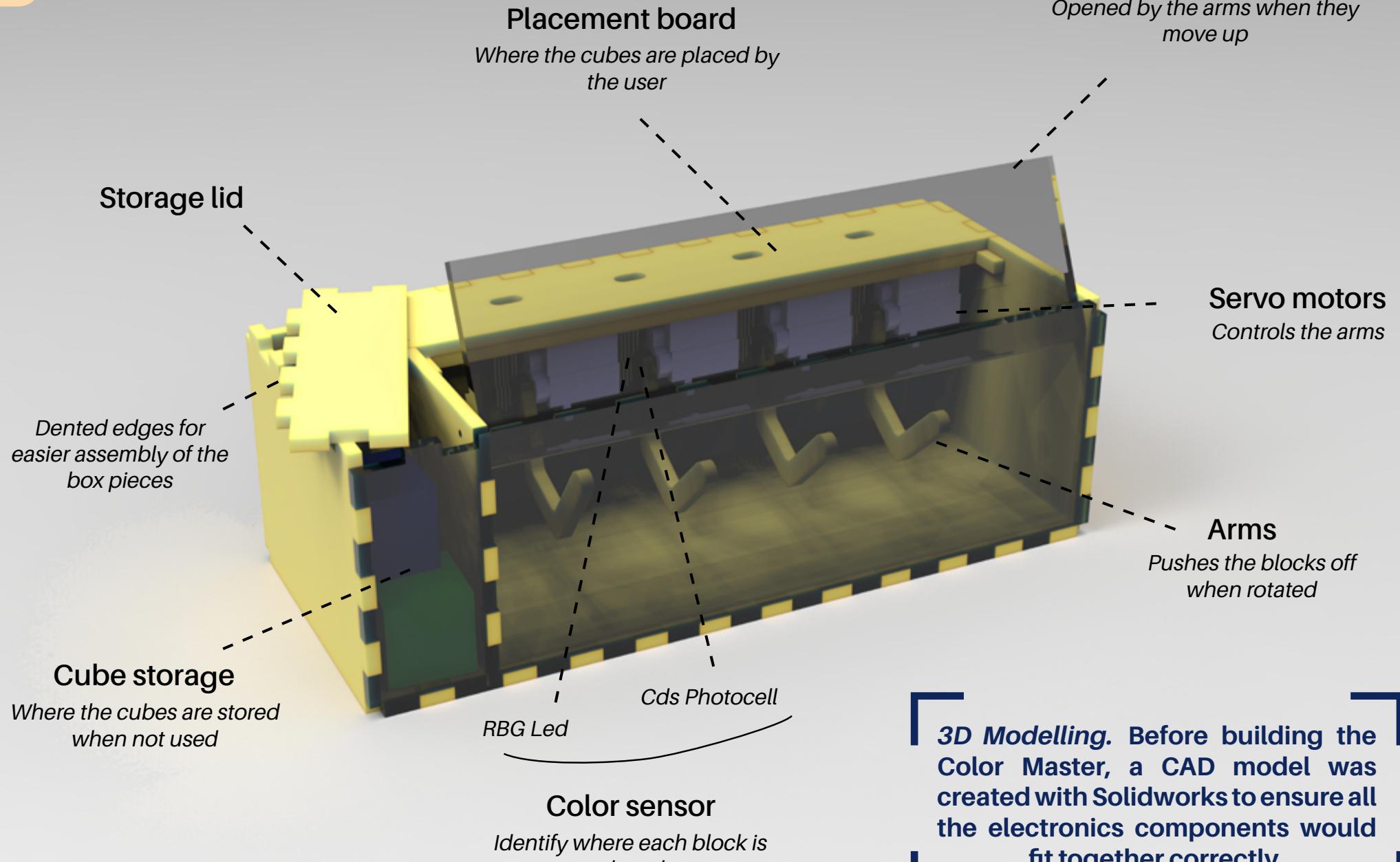
Custom color sensors. Red, green and blue are flashed by RBG Leds through the hole under the cubes, and the reflected light perceived by Cds Photocells identifies each color.



Programming. A robot lacks the spontaneity and personality a human opponent would have. Therefore, a series of different movements were taught to the box and selected at random when blocks were pushed off.



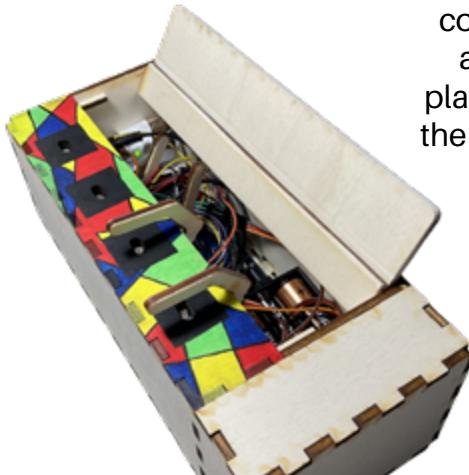
Design validation  
with CAD



**3D Modelling.** Before building the Color Master, a CAD model was created with Solidworks to ensure all the electronics components would fit together correctly.



Prototyping, laser cutting & workshop assembly



*Final Assembly.* All components were assembled and placed accurately in the box finalizing the Color Master.



*User Experience.* Games must be portable and easy to set-up, therefore a small storage space for the blocks was added on the side of the box.



*User Testing.* Verified the arms managed to push the blocks off. Validated the code with various users, ensuring it would behave as expected with all players.

# Spotfind

*A helpful item tracker for the elderly*

With SpotFind, never lose your treasures again! The device communicates with the tags attached to your frequently lost items, to help you find them when needed. It will vibrate every time a signal is received and the LEDs will light up to tell you how far away it is.

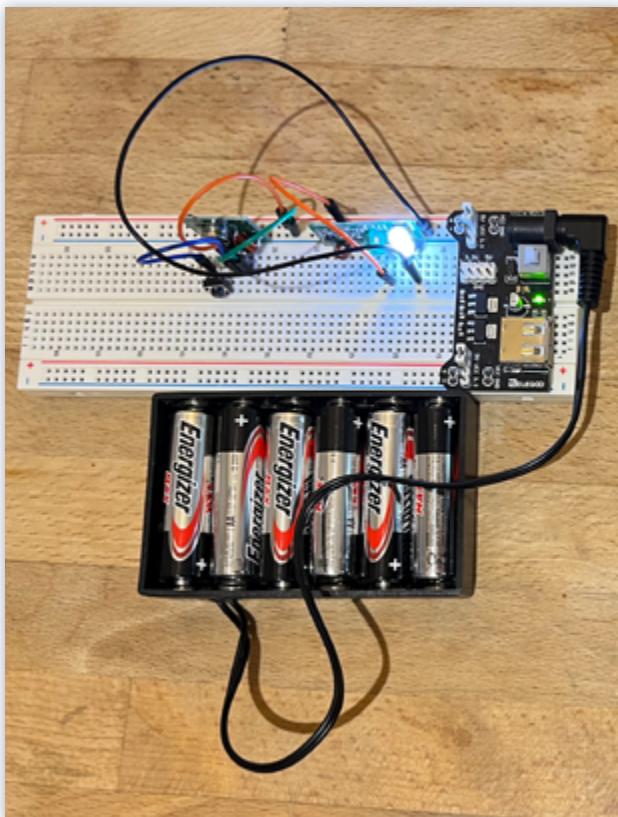




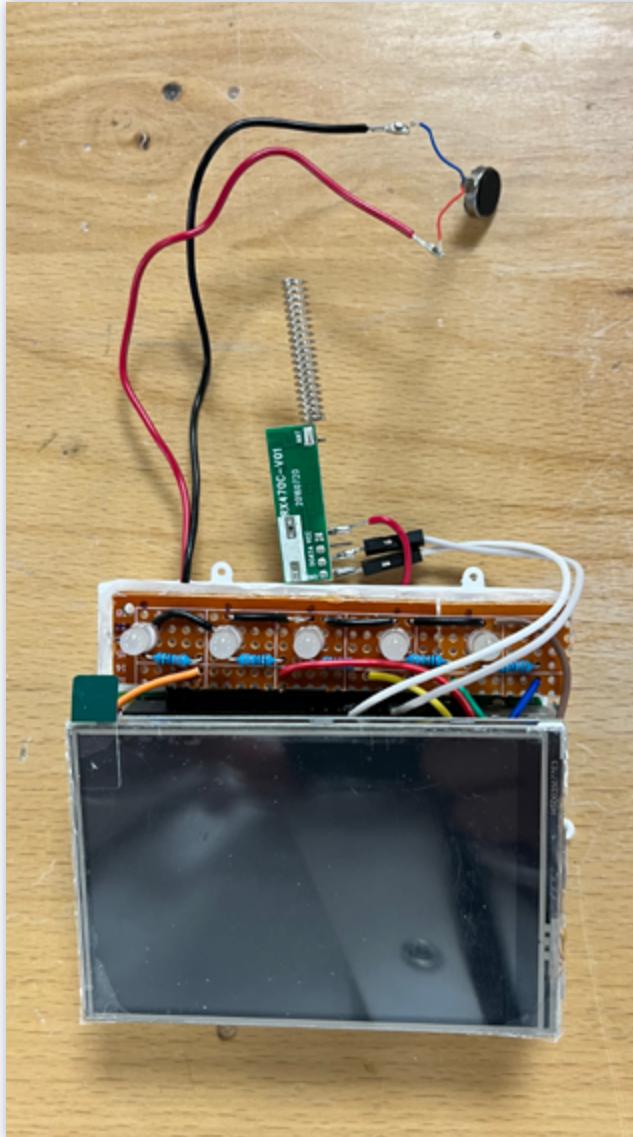
Rigourous desk research for an informed experimentation and assembly



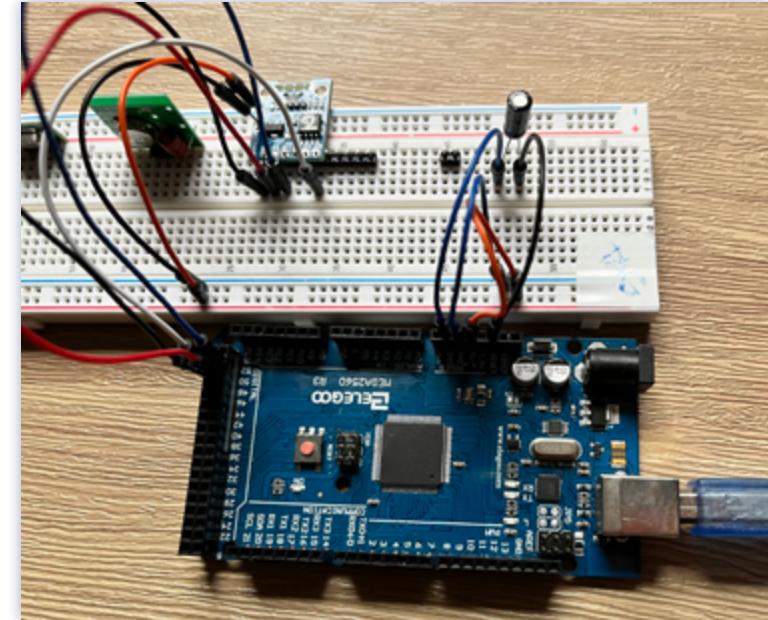
Intricate assembly of components in 8 tags and experimentation of the device's monitoring.



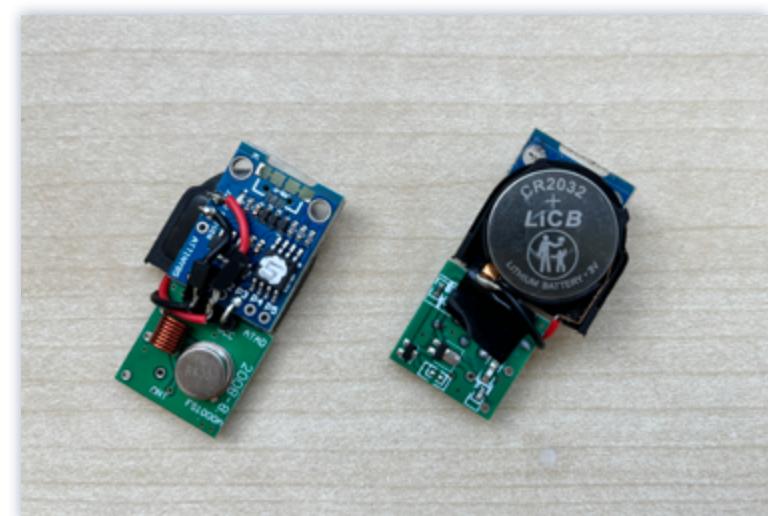
*System communication.* Radio frequency (RF) was tested and implemented between the tags and the device.



*System management.* The device is the central element of the system. Controlled by a raspberry pi, a touch screen displays the user interface, an RF receiver guarantees communication with the tags, and the vibration motor and the LED range represent the how close the tag of interest is at.



*Programming.* For an optimal tag size, AtTiny 85s (micro-controllers) were employed and coded in C++ using an Arduino as ISP.



*Tag assembly.* AtTiny 85 microcontroller, RF transmitter, coin battery cell and battery holder.

Built desktop app on Raspberry Pi  
using Python and PyQt 5 (learnt  
within 3 days)



Find

Editing items : bottle, goat, phone, phone, phone, phone, pho

1	2	3	4	5	6	7	8	9	0
q	w	e	r	t	y	u	i	o	p
a	s	d	f	g	h	j	k	l	:
z	x	c	v	b	n	m	.	-	,

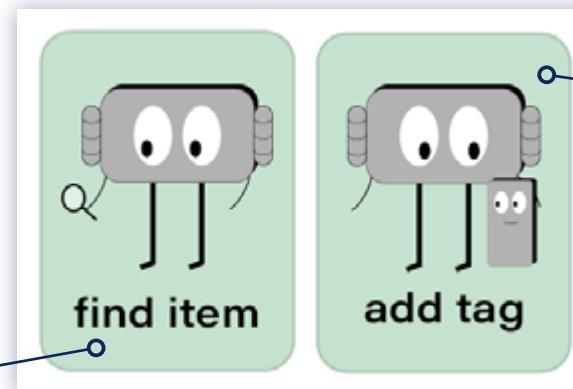
< Back Del Space ← Caps

Which item are you looking for?

Search

- 1 | bottle
- 3 | goat
- 2 | phone

< Back



What is the tag's number?

Enter

1	2	3	4	5	6	7	8	9	0
q	w	e	r	t	y	u	i	o	p
a	s	d	f	g	h	j	k	l	:
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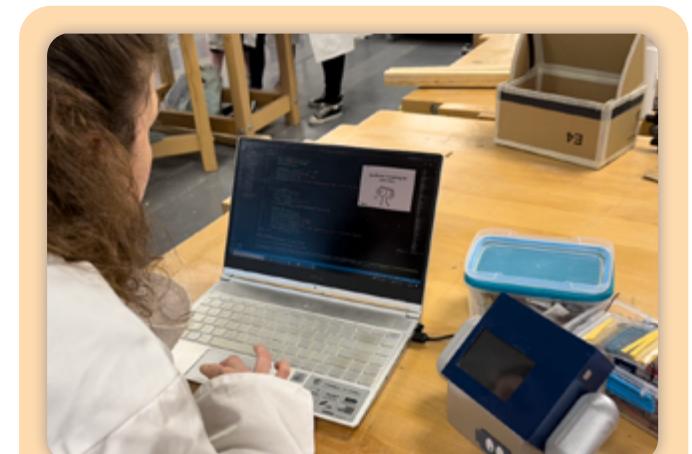
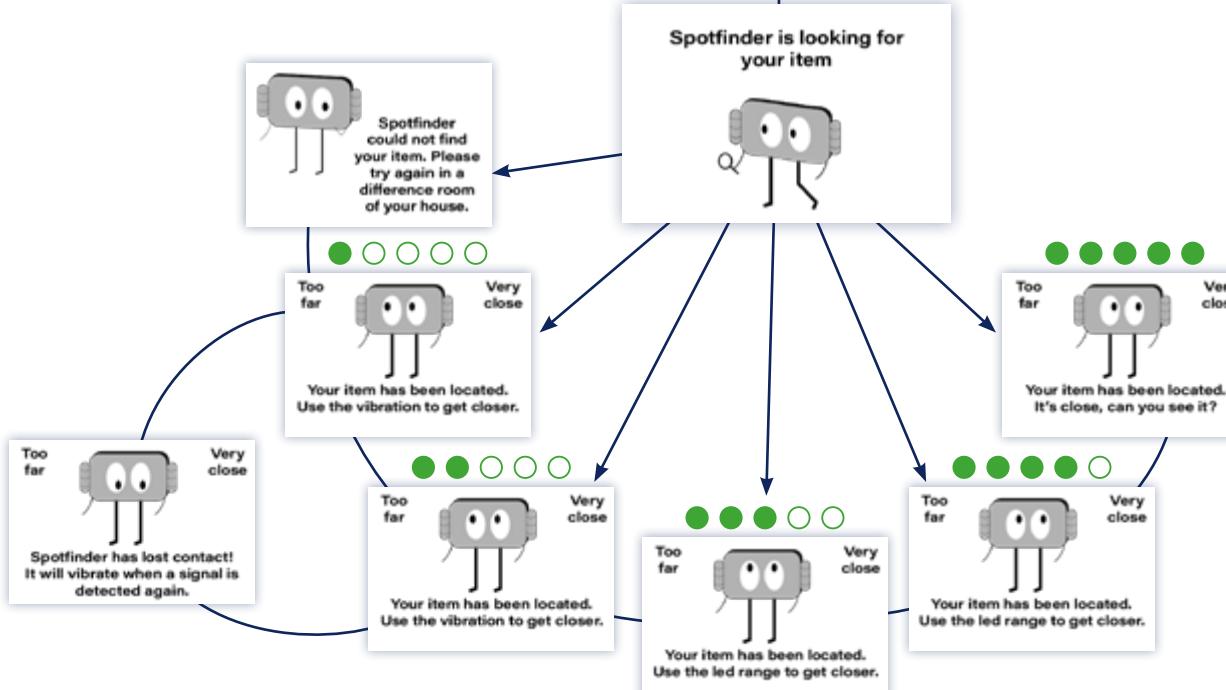
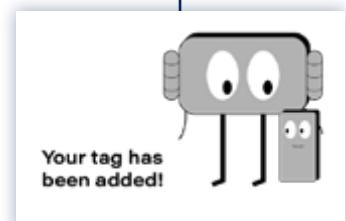
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To what item will the tag be attached?

Enter

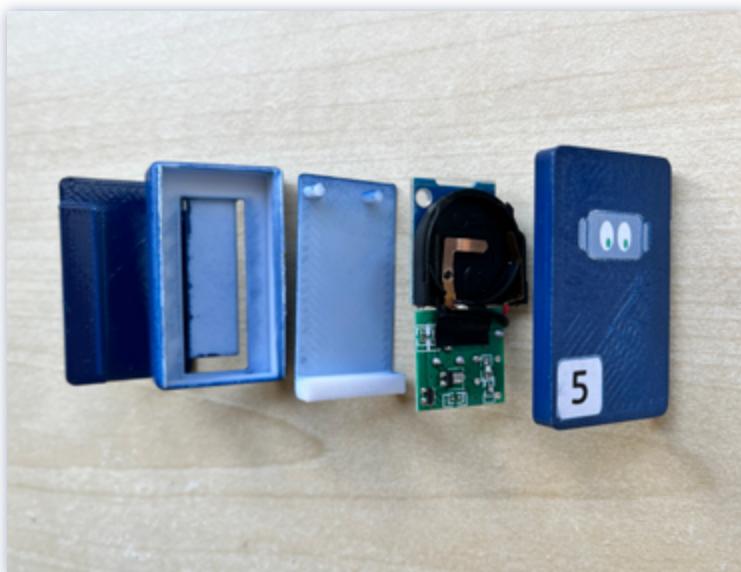
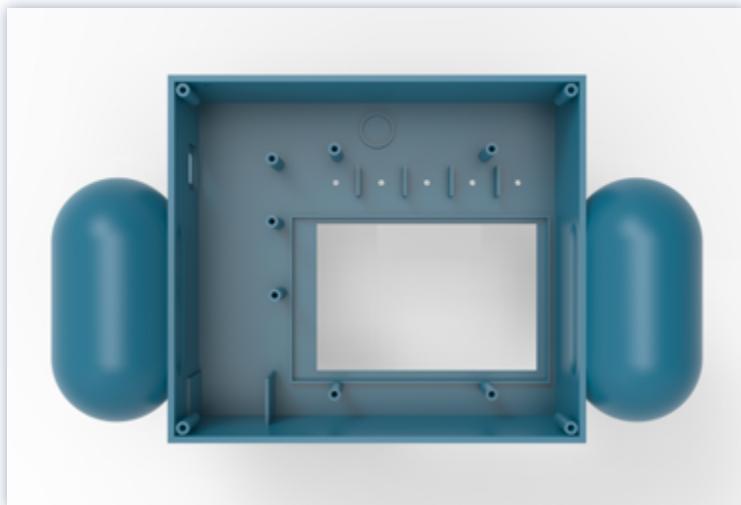
1	2	3	4	5	6	7	8	9	0
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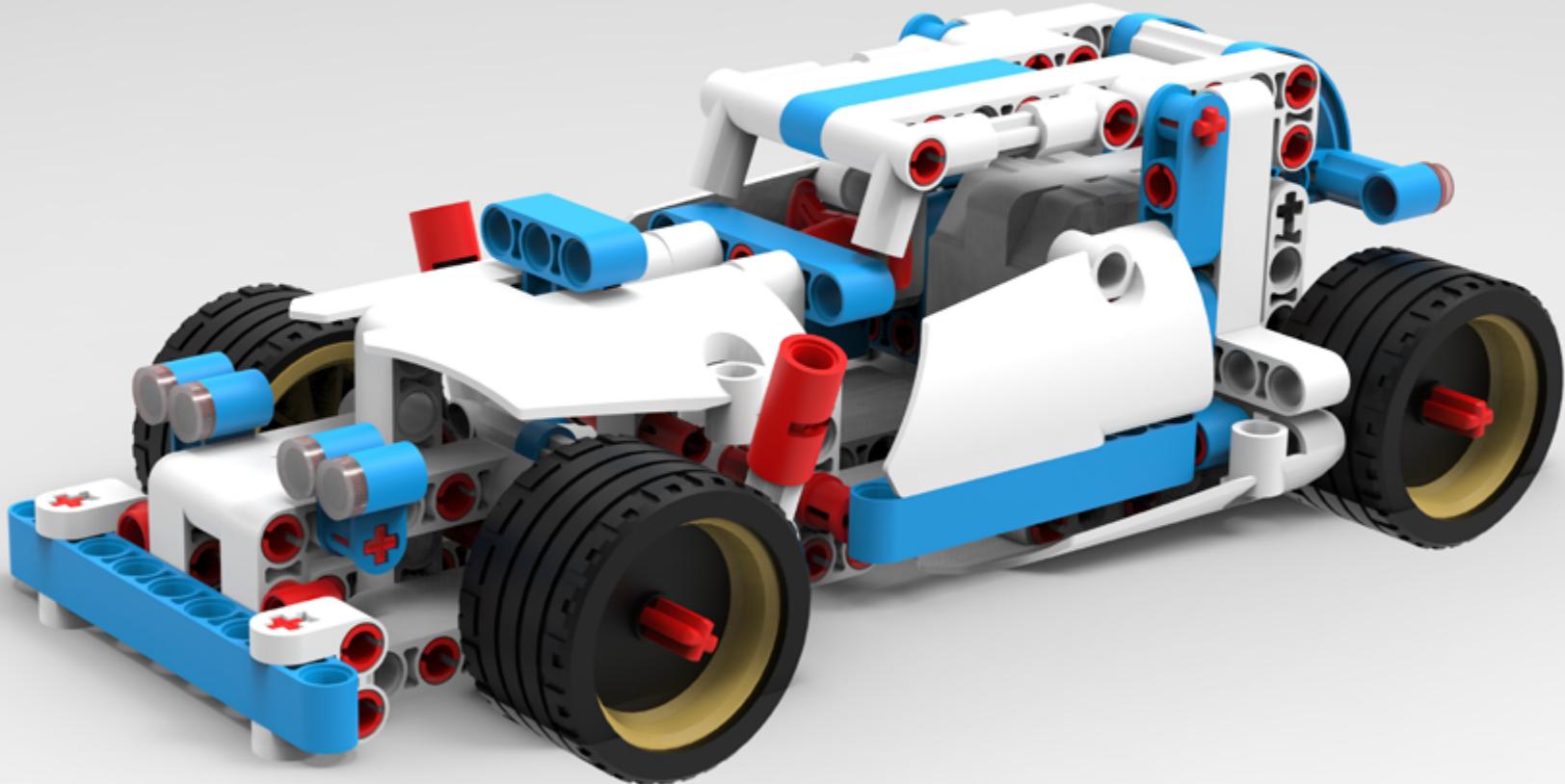


CAD casing development for easy  
fabrication and final product assembly





LEGO Technic Getaway Racer  
modelled on Solidworks and  
rendered in KeyShot 10





Pattern ideation, sewing of final result and solo photoshoot



11





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