Project Overview

We built a car with Tinkamo blocks and we plan to have two sensors on the car, a color sensor and a distance sensor.

Since we only got one battery in our Tinkamo kit, now we are only able to install one sensor on the car.

If we got enough battery blocks, we can have both sensors working at the same time on the car.
Personas

- **Name:** Tom
- **1st grade student**
- Interested in hands-on things and color
- Loves playing with Lego
- His parents want him to access to music AEAP

- **Needs**
  - Play with interactive products
  - Find more ways to release his imagination

- **What we want him to do**
  - Have fun when combining his imagination with music and visuals
  - Have an immersive experience with educational purpose
  - Learn to share the opportunity with friends

- **Name:** Ariel
- **7th grade student**
- Interested in music but never systematically learns music
- Previously learned about coding

- **Needs**
  - Learn basic music knowledge
  - Express music ideas in an easier way

- **What we want her to do**
  - Have fun when composing music
  - Basic understanding of music theory
  - Further develop creativity
  - Learn to share resources, ideas while socializing in a new way
Experience Design Sequence

**Attraction:** Paraphrasing visual things with music & visualising music; Learn the notes on the piano

**Engagement**
1. Follow the instruction and generate preset melodies - becoming familiar with the mapping between different block distances & notes/colors & timbres
2. Create one’s own Lego arrangements and generate new melodies
3. Recognize the notes on a piano
4. Gain a collaborative experience and share your own set of melody with people around the world

**Conclusion:**
1. Users will acquire basic knowledge of music (pitch, beats, timbre, etc.)
2. Users can learn how to work effectively in a team and socialize with other users
## Connecting Design with User

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<th>1st Grader -- Tom</th>
<th>7th Grader -- Ariel</th>
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| **Before**       | ● Perception of color and distance  
                   ● A basic understanding of music  
                   ● Able to play with Lego         | ● Knowledge of music  
                                                               ● Basic programming skills |
| **After**        | ● Gain the creative thinking of combining color, distance and music (visual and audio) | ● Create their own melody  
                                                               ● Know about lego and control the Tinkamo car |
What we built - Tech part

- Connection between Tinkamo blocks and computer
- Max/MSP sketches - color sensor & distance sensor
  - Colors - Different instruments in Logic
  - Distance - different notes
  - Algorithm in Max/Msp
- Processing sketches - color sensor & distance sensor
What we built - Physical part

A real life piano roll!
- Legos = note
- Distance = pitch
- Lego length = note duration
- Tinkamo car = tempo

*(2) 4 x 3 lego blocks = 1 beat
What we built - UI design part
User testing

● First graders
  ○ Learn to play and interact with the digital interface under the guidance of adults
  ○ Expectation: reconstruction of built-in melodies and basic music theory

● Seventh graders
  ○ Explore the digital UI and the physical composition by themselves (both individually and in group)
  ○ Expectation: familiarity with the project, construction of popular music and their own pieces as a team.
Next Step

- Multiple sensors for different uses, allowing the user more freedom
- Implementing and integrating code into T-Flow
- Perfect the accuracy of the distance sensor to create a consistent tempo
- Layout and tools to allow more lego building that’s product can be turned into a composition
- What type of electronic music will be made from this physical composition?
- How will this change user’s perspective on the relationship between music and technology?