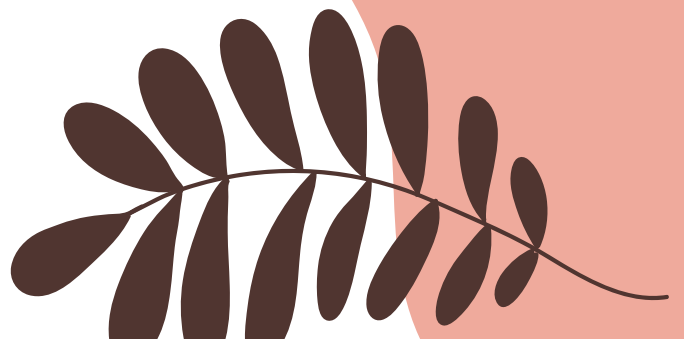


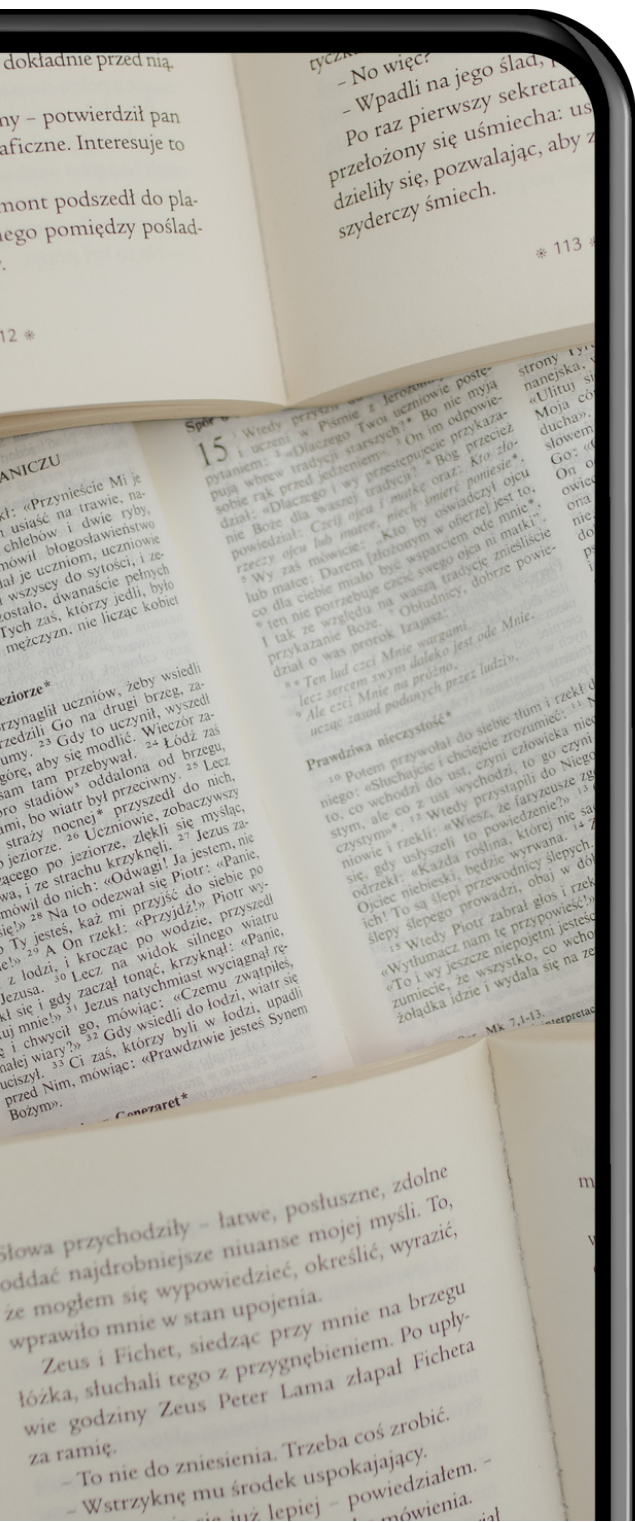
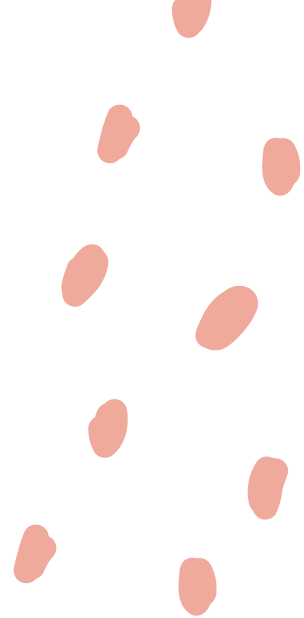


The Interactive Book

Estelle Perdrix
Elisa Leterrier
Marie Terrien
Isabel Carrera

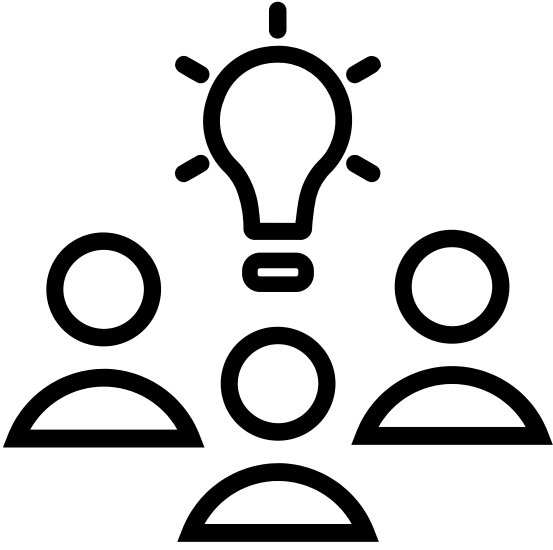


Index



INDEX	2
BRAINSTORMING	3
COMPONENTS	4
STORY & DESIGN	5,6
FINAL RESULT	7





Brainstorm

Last semester we worked on the Interactive Story Lamp, which was a project in which we worked with LED's, arduino, button sensors, a speaker, we used the lazer cutter and a SD card to hold the recordings. For this semester, we decided to go an other step further with our project, parting from the same idea of a story telling lamp. This time, to make things more interesting, we decided to add different sensors to make the lamp even more interactive with the user.

Our first idea was to keep the idea of a lamp, but we had to remake the story in order to use more sensors. We also had to decide what sensors we wanted to use, so that way we could adapt our story to the sensor we were using. We knew that with the knowledge we had and with a little bit of help, we could use:

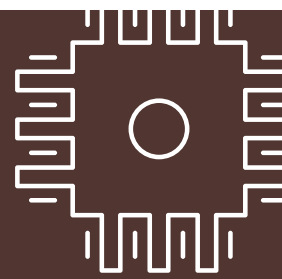
- **Touch sensor**
- **Big sound sensor**
- **Small sound sensor**
- **Motion sensor**
- **Temperature sensor**

The next step was to determine the design of the lamp, and for this we also had to establish the possible user. We decided that kids on ages 6-10 would be our perfect user. Because of this, we made a mood-board to brainstorm a possible design.



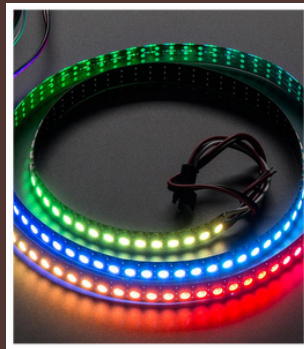
As our lamp is supposed to be used by little kids, we wanted it to be the most interactive, fun and attractive. We opted for a book design with a fun cutout on the cover that had to do with the story, this way the little kids could imagine the story more and have fun while using the lamp as it would be 100% interactive.

Components



LED lights

We decided to use the NeoPixel Digital RGB LED strip we used last time. With the new project, we still needed to light up the lamp with different colors, so this LED was our best option.



Touch sensor

The touch sensor, also known as a touch button or touch switch, is commonly employed for device control, such as touchable lamps. It functions similarly to a button but is increasingly replacing traditional buttons in modern devices due to its sleek appearance.



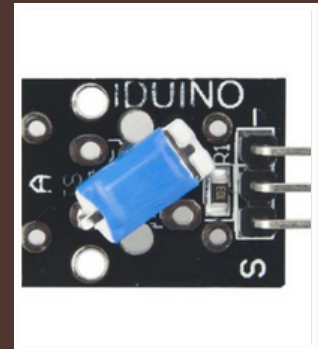
Temperature sensor

We are using the LM35 sensor. It has a supply voltage of 4-20V, a temperature sensitivity of -55°C up to 155°C. It also has an accuracy of $\pm 0.5^\circ\text{C}$ to $+25^\circ\text{C}$ and $\pm 1^\circ\text{C}$ from -55°C to $+150^\circ\text{C}$.



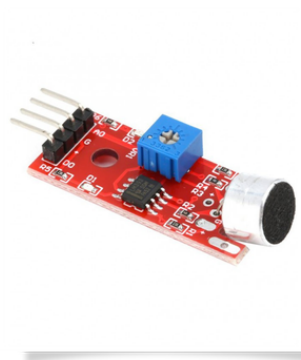
Motion Sensor

For this sensor, we are using SE059. The sensor detects when the module is tilted via a switch closure activated by a metallic rolling ball. It has a digital output and a 3.3V-5 V supply voltage.



Big sound Sensor

We are using the sound sensor v1.1, this sensor can detect sound waves. The main goal was to use this to detect loud noises made along the story, like voice noises or clapping sounds. It operates with a voltage of 3.3-5V. This sensor is capable of determining noise levels within 100 dB



Small sound sensor

We chose the BMP085 pressure sensor to detect blowing pressure needed along the story. Pressure range: 300-1100 hPa Voltage: 1.8-3.6 V



Arduino

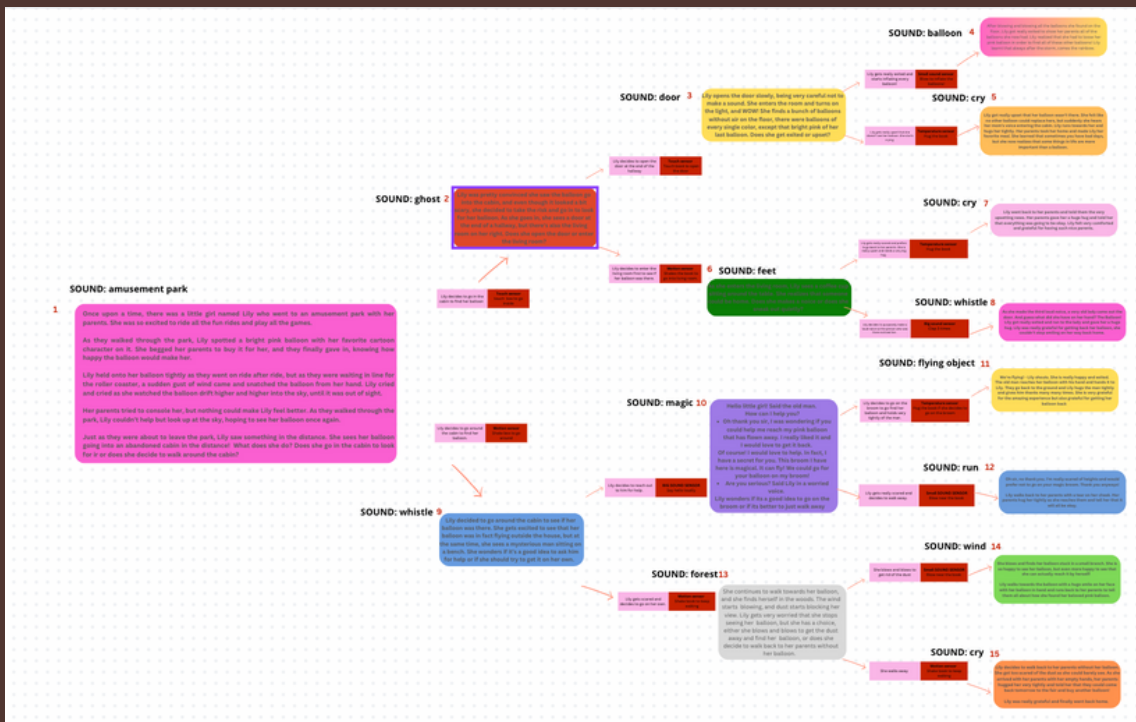
We used Arduino with various sensors. These sensors allowed us to control audio with a simple touch, detect movements, monitor temperature changes, and respond to both subtle and loud sounds. By integrating these sensors into our Arduino project, we were able to create interactive and precise systems that intelligently react to their surroundings. Arduino proved to be a versatile and powerful platform, providing us with the flexibility to experiment and innovate.



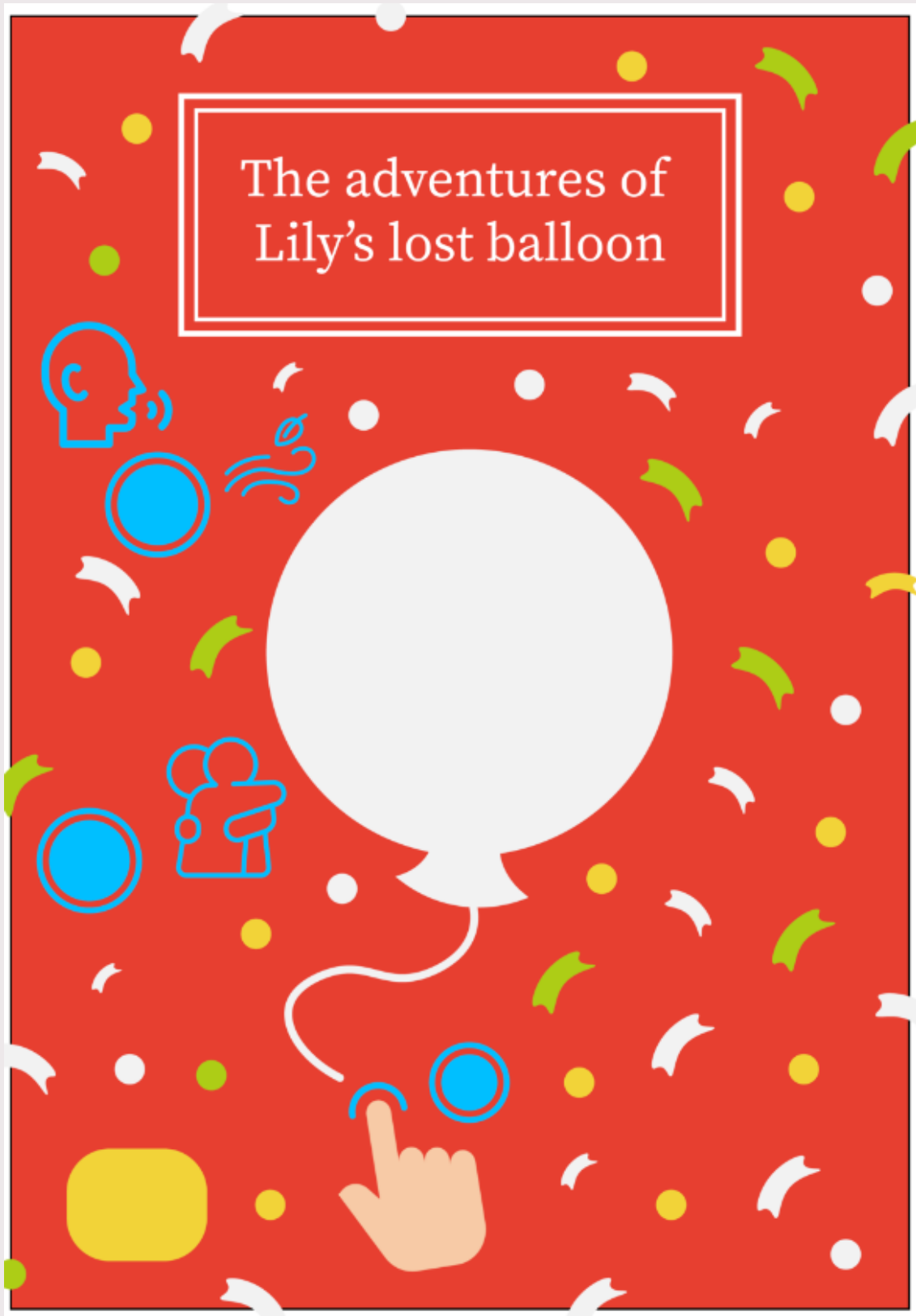
Story & Design



After deciding the types of sensors we wanted to use, we had to create a story. We parted by the fact that it had to be a children's story and that the story had to have different outcomes along the story line, in which each outcome had to make the listener choose between two options. The main idea of the project is that the user has to interact with the book either making a sound, shaking the book, blowing to it, etc. for the story to continue in the direction they want.

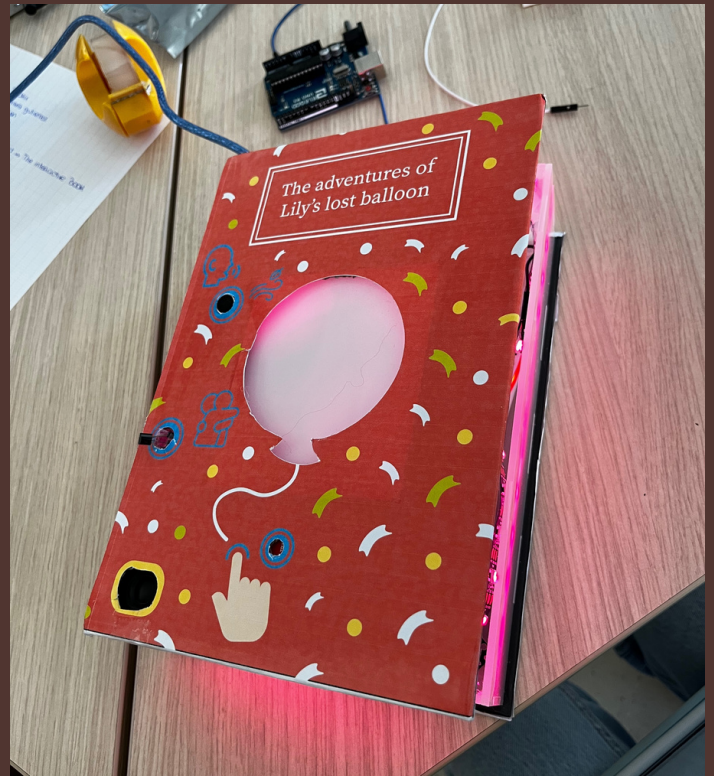


We created a story with 14 different outcomes, in which the user had to have different interactions with the book to keep the story going, all depending on what they choose.



For the cover of the book, we decided to make it fun and easy to understand for the users. The main idea of the story it has to do with a balloon, so the cover has a big balloon cutout in it. Also, we decided to decorate the cover with different symbols where the sensors are placed, so the user knows where exactly they have to interact with the book when it comes to the different decision making along the story.

FINAL RESULT



After weeks of hard work, we finally got the project. We realized that it was more ambitious than we thought, that working with that many amount of sensors, coding for each one, adapting them to the story and inserting them in the book was a quite challenging.

Even though this was challenging, we also did a good job on dividing the work between each of the group members, given each and everybody's strengths. This way, working on the project became easier and more proactive.

As for what we could improve, we realized we needed to communicate better. We should share our ideas, concerns, and progress more actively. By doing this, we can make sure that everyone's opinions are heard and that we don't miss out on any important ideas that could've had.

Secondly, we should manage our time more effectively. While we met our deadlines, we could have used our time more efficiently. By setting realistic goals for each person and for the group, and by sticking to a clear schedule, we can work better and avoid last-minute rushes.

An other problem we encountered was with the different sensors. We decided to use 5 different sensors in our project, so we had to make 5 different codes for each sensor. We had to sound sensors, a big sound and a small sound. We tried making all of them work, but at the very end, the small sound sensor had issues and we had to discard it. This made us problem solve and decided to use the big sound sensor for both big or small sounds. We also encountered a big problem making the speaker work, which is very important in the project as it is the key element that tells the story.

Finally, we believe we really learned from this project. We enforced our team working skills, we learnt a lot about sensors and coding, we also had to work on our designing skills which also made it very interesting and fun. As future engineers, we all loved working also on the story and design of the project, as it made us encourage our creative side.

