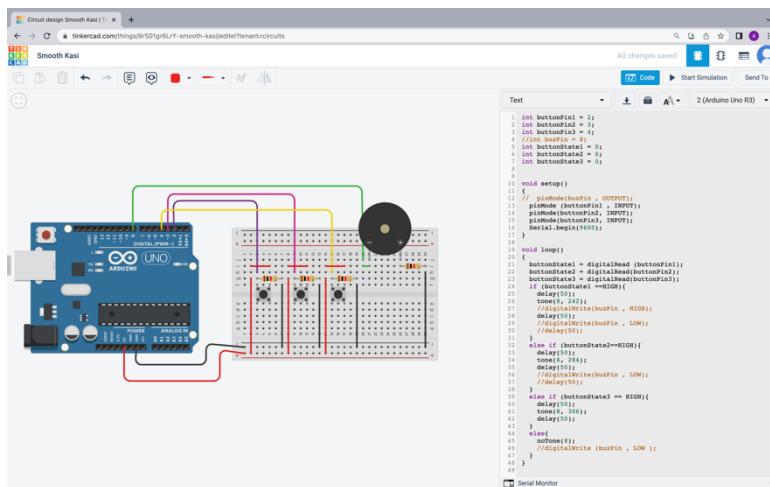
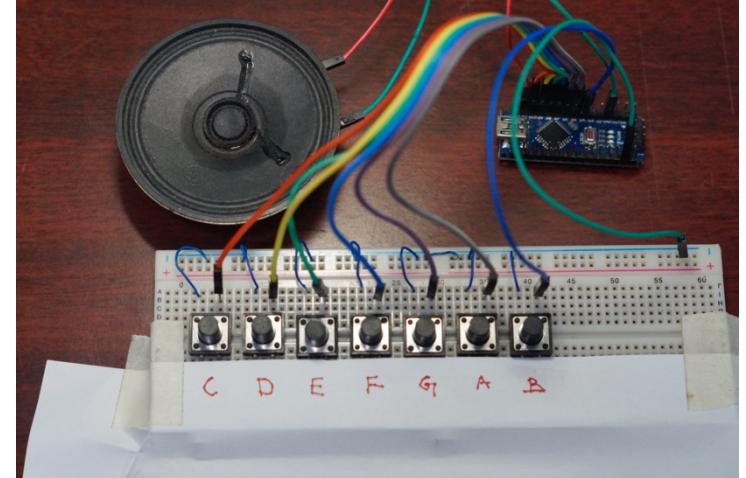
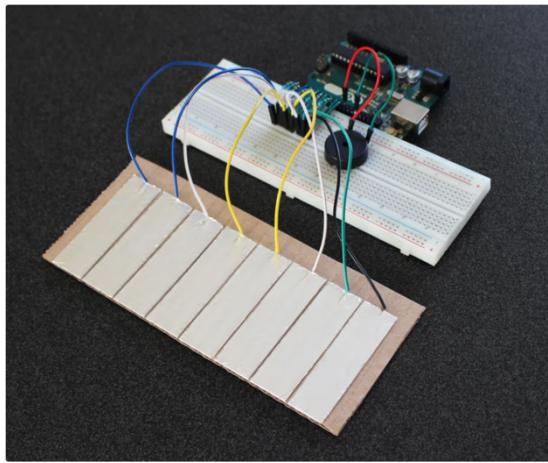
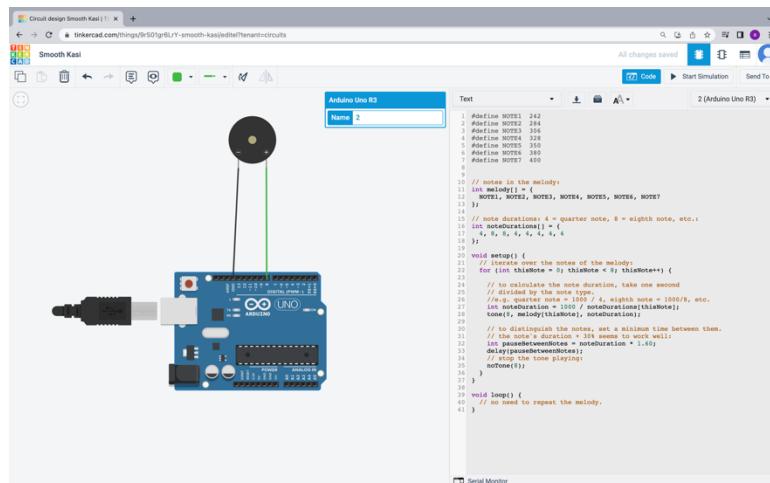


README FILE PIANO PROJECT

For my final project I chose to make a piano key with Arduino and make a visual representation of piano in p5js. My inspiration was another project related to making a synthesizer using Arduino.



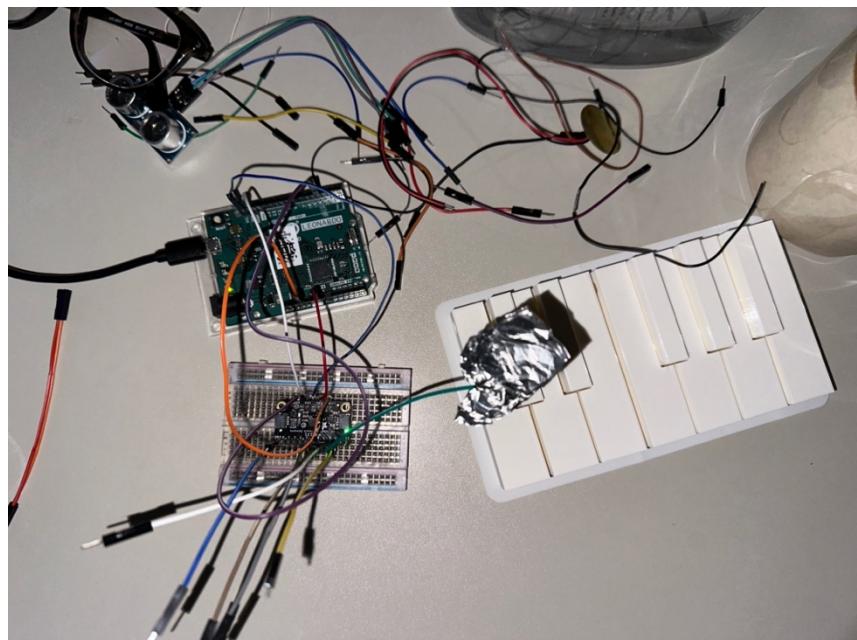
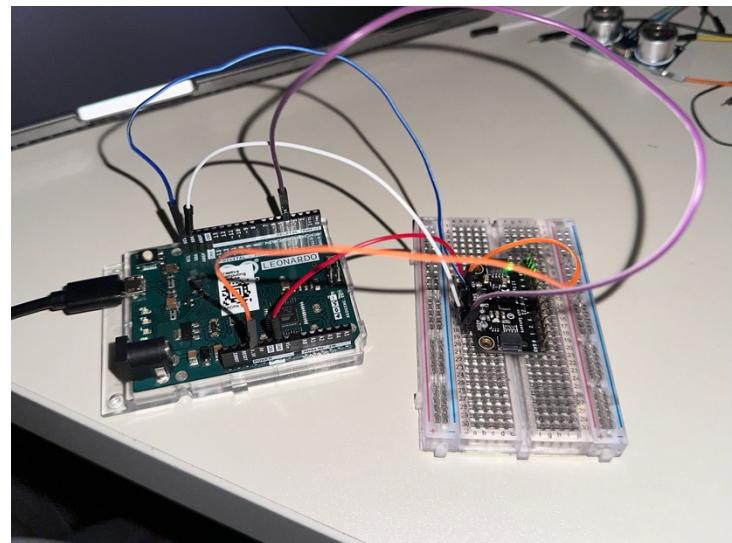
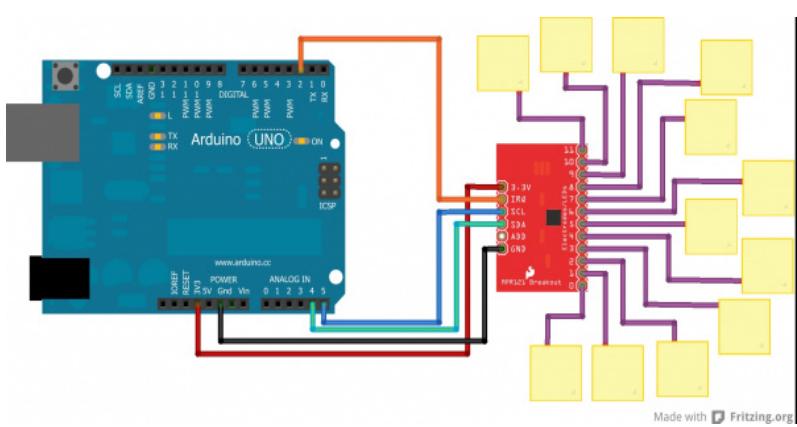
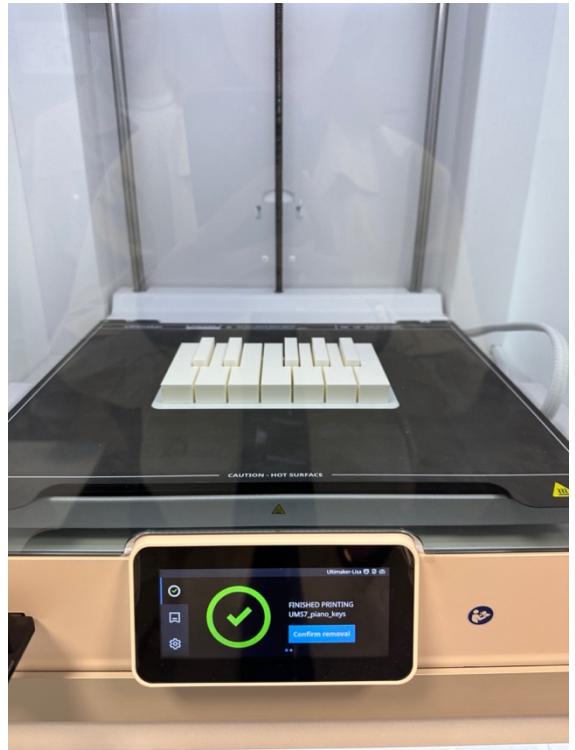
My first sketch of the piano was visualizing it on tinkercard using **buttons** as a piano tile. For the sound, I used **piezo buzzer** and in the code, I toned the sound whenever the button was pressed. In the code, first I initialized the buttons and their states (0 when is not pressed). Then, in the loop function, I made if statements, indicating, if the button is pressed, then the buzzer will make a sound with the tone I gave it in the code. If the button are not pressed anymore, then the sound stops.



The second stage of creating the circuit was to replace the buttons with something that is more comfortable for the user to press as the buttons are quite

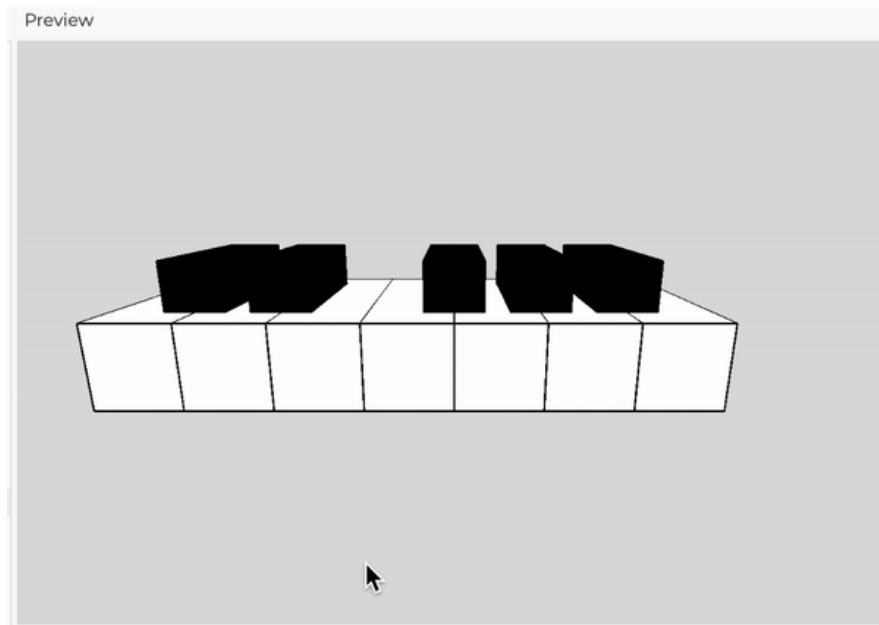
small to press. I used the 3D printing services in our university to print the piano tiles. I used an already made sketch of 3d piano tiles. (<https://www.thingiverse.com/thing:17772>). It took around 6 hours to print the tiles.

In order to connect the 3d printed piano keys to Arduino, I used a mpr121 sensor with 12 capacitive touch sensors. First, I tried using the mpr121 sensor on its own testing if the built-in examples in the Arduino works. After that I put the wires on every touch sensor to make an extension and attach them to the piano tiles with the tape.



In order for the pulse to be transported from piano tiles to the touch sensor, I had to use some conductive material such as foil to test it. In my final variant of the piano tiles, I am using conductive paint on the tiles so It will be possible to detect the touch on any place of the key.

As a visual representation of the key being pressed, I made a p5js sketch that shows the piano tiles in 3d and whenever the touch is detected the sketch show the movement of the key on the screen.



I have made 2 versions of the project: with the sound coming from the p5js sketch and one with the sound coming from the Arduino using piezo buzzer. (the links to the videos is included).

Regarding the Arduino code, as a base I used the example of the test code of the mpr121 from the **adafruit MPR121** library (that need to be installed beforehand) and modified it in a way that the transmitted information would be ‘understandable’. Basically, the information I had to transfer was the number of the key that was being touched, indication that it is actually touched and that is being released. For the piezo buzzer, I toned every key to the sound so it will make a sound that is slightly similar to the real piano. Those sound are triggered whenever the user is touching the keys and stop playing whenever the touch is released.

Then, I used the P5. SERIAL CONTROL to transfer the information for the p5js to be triggered. This library as well as an app need to be installed beforehand. As for the sound I used the Envelope library to tone my keys to the sound. The sketch was inspired by already existing one, I wanted to make the visualization in 3d as the user can see the press effect of the key on the screen.

OUTCOME

I really enjoyed the outcome of my experimental project. The sound that the computer makes from the p5js sketch and the sound that is piezo buzzer making are very different highlighting how broaden the world of electronics is. In terms

of future implications of my project, I think next step is to create a synthesizer with different effects.