

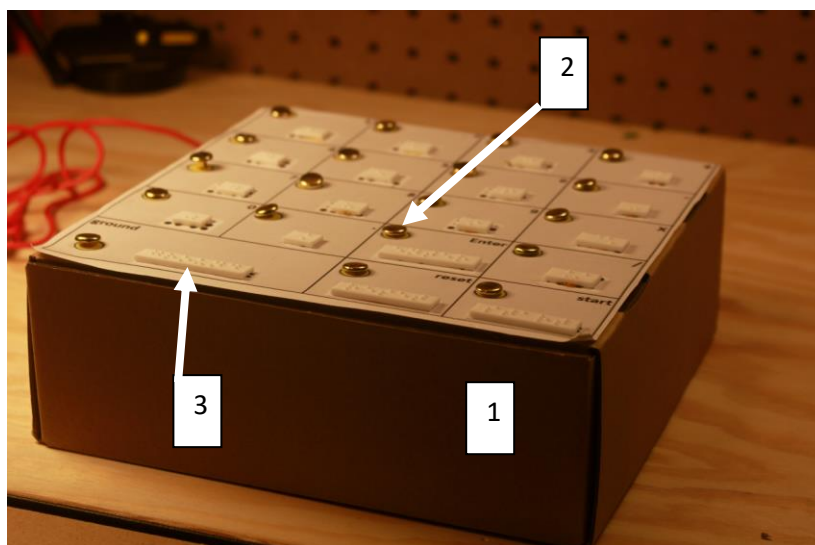
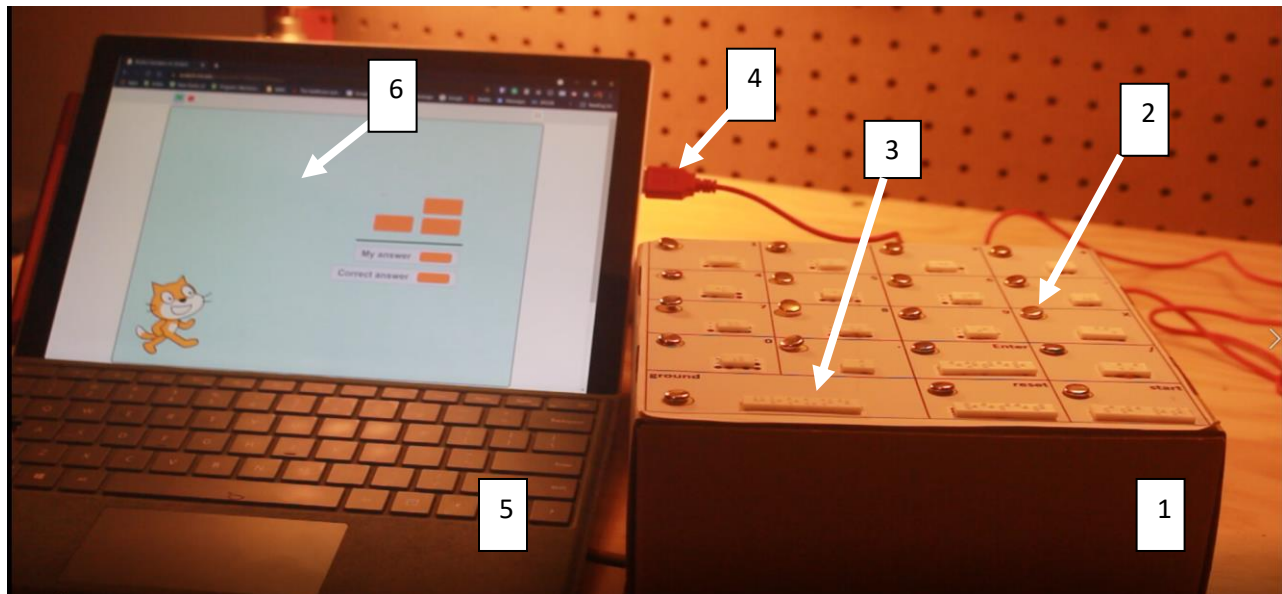
Braille Calculator

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Introduction

This device uses a [Makey Makey Classic](#), 3D printed Braille, and a scratch [project](#) to create a calculator that allows users to do simple addition, subtraction, multiplication, or division with audio feedback. The calculator will allow the user to input a mathematical expression, allow the user a chance to guess what the answer is, and finally give the correct answer and compare it to the user inputted answer and verify audibly if it was correct or incorrect.

Features



The Braille calculator devices features:

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1. Closed cardboard box containing electronics (Makey Makey) inside and Braille labels and Brass fasteners attached on face of box.
2. Brass fasteners contact points that are used to input the values
3. 3D printed Braille labels that indicate what each brass fastener button corresponds to
4. USB cable coming from the Braille calculator
5. Electronic device with a USB port and internet connection
6. Browser open with the calculator program webpage opened. This can be found here:
<https://scratch.mit.edu/projects/471598668>

Usage

Use a keyboard to test the calculator:

- Press “Spacebar” to start the calculator, then listen to the voice prompt
- Press “Enter” after each input of numbers, operations and answers
- To start over during calculation, click the mouse (again, the mouse cursor needs to be hovered over the project screen when click)

Braille Calculator Set-Up:

- To set up the device, ensure that the Calculator’s USB is plugged into the device and the calculator [webpage](#) is open on the desired device
- Examine the Braille calculator. The brass fasteners will be used as “buttons” for input to the calculator program. Each brass fastener corresponds to the 3D printed Braille label on its right.
- This device relies on using two points of conductive contact from the same source, to complete the circuit. Some common examples would be your hands, [antistatic wrist wrap](#), or any conductive household items, such as cutlery, to complete the circuit of the Makey Makey device.
- During the operation, the brass fastener for “ground”, which can be found on the bottom left, needs to be in contact the entire time, while your second contact touches the desired input’s brass fastener.

Note: An example would be your left index finger holding the “ground” brass fastener, while your right index finger touches the “one” brass fastener. As the circuit is completed, the calculator will then register the input, and your right index finger can be released.

Steps using Makey Makey Braille calculator:

- To start the calculator, hold the brass fastener “ground”, press the brass fastener “start”, then listen to the voice prompt “What’s the number?”

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- To input desired number, hold the brass fastener “ground”, press the brass fastener of the desired number, then press the brass fastener “enter”. This will trigger the voice prompt “What’s the operation?”
- To input desired operation and number, continue in same manner as above while listening to the voice prompts.
- When the calculation is done, the voice prompts will confirm if your answer is correct or not. This means the calculation has been completed.
- When finished, or if wanting to start over during calculation, hold the brass fastener “ground” and press the brass fastener “reset”.

Compatibility

- Any device with an internet connection and USB type A connection. This includes laptops, PC, tablets, phones with USB adapter.

Specifications

- Size: This depends on the box used but minimum size must be (8.5 x 11 x 3 inches)
- Weight: approximately 1lb

Cleaning

- The cardboard will be able to be wiped down using sanitizing wipes but anything that uses liquid will ruin the paper and cardboard box quality.
- 3D printed Braille should not be cleaned with high heat but can be wiped/cleansed with sprays