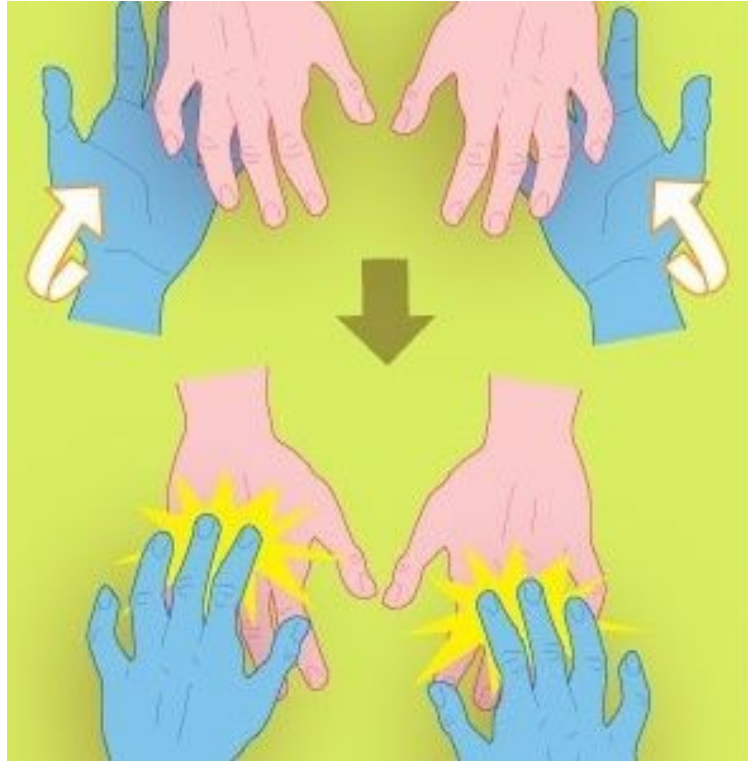


2018 NCSU Glove Controller Workshop

Kaho Abe
NCSU
April 18th, 2018

Hand Clapping Game



Source: American Grandparents Association

What if these were functional?



Walmart.com



Etsy, GoFollowRabbits

Nintendo Power Glove (1989)



Peregrine Game Glove (2010)



Laser Tag



vice.com

Cosplay



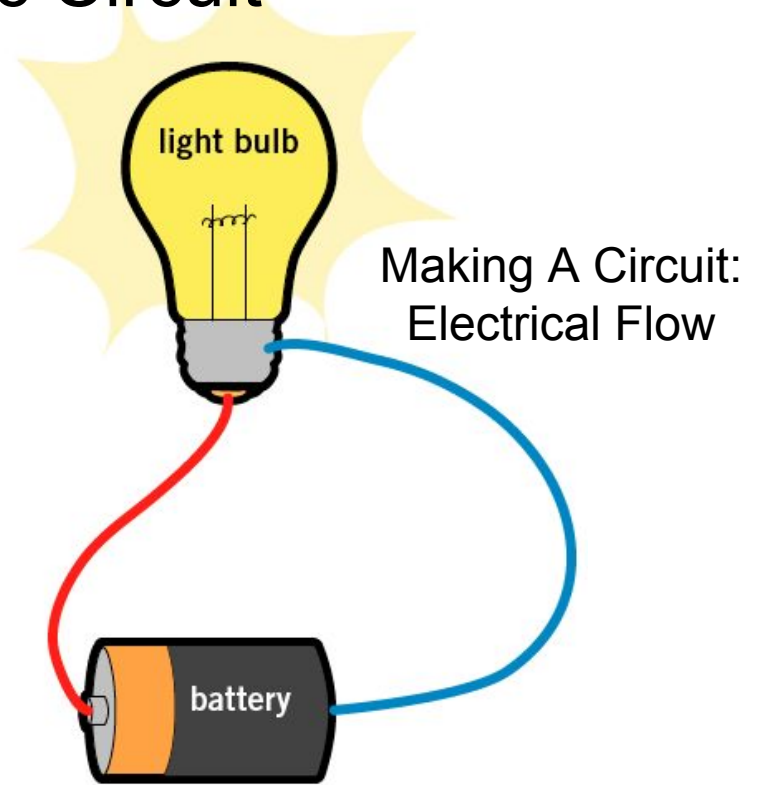
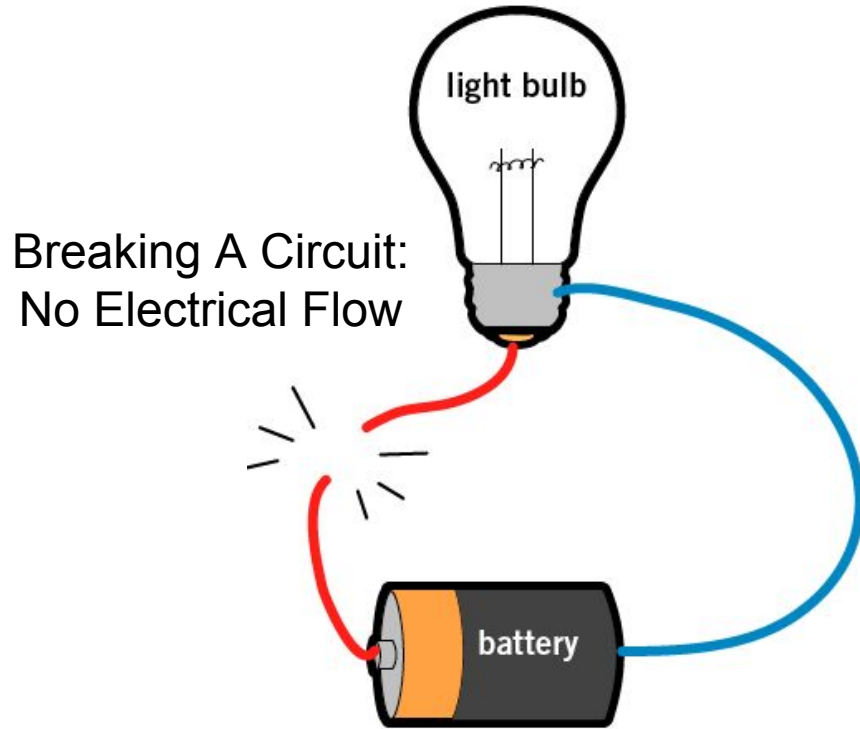
LARPing (Live Action Role Playing)



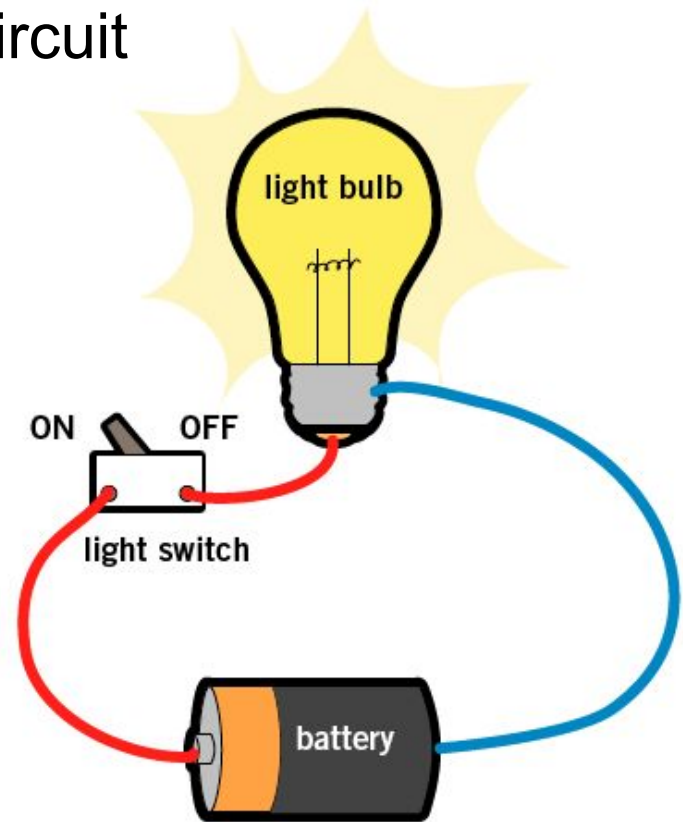
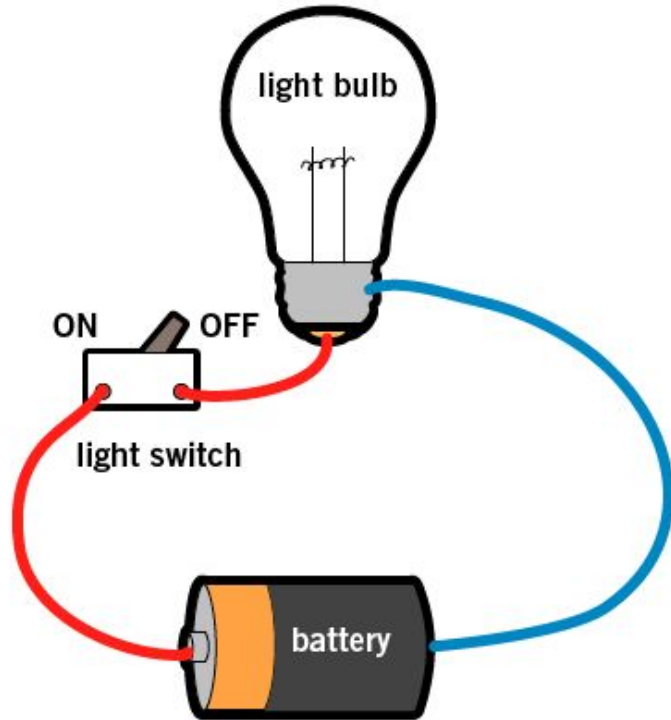
LARPING.org

Making & Breaking a Circuit

Making and Breaking a Electric Circuit



Making and Breaking a Electric Circuit



This concept exists all around us!

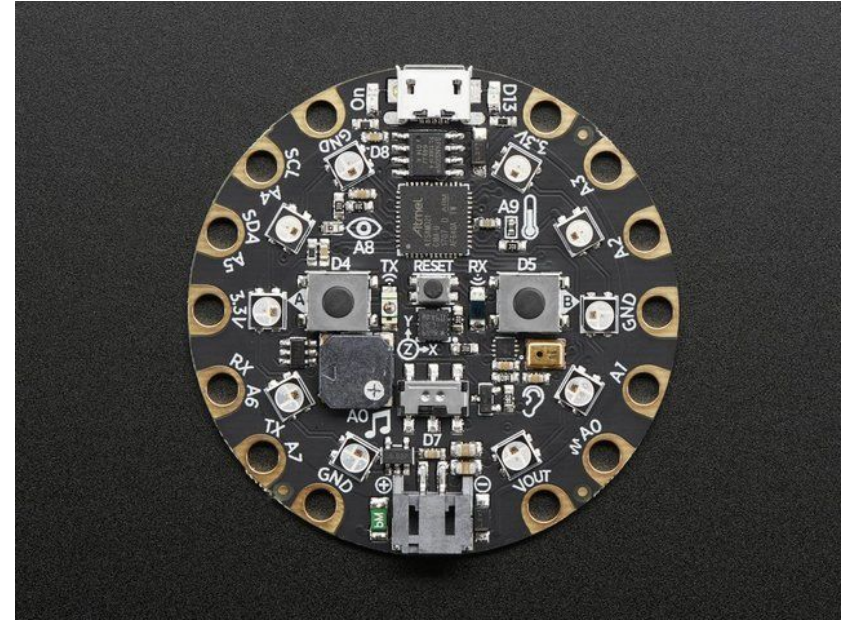


**A keyboard and mouse
is a bunch of switches!**



Circuit Playground from Adafruit

- All-in-one board designed for those who want to learn about programming hardware
- Can be programmed using a variety of methods: block-based, Javascript, CircuitPython, Arduino
- Is open source
- Has many sensors and other features built in
- Can act as USB keyboard, mouse
- Great for wearables



More Information: <https://learn.adafruit.com/adafruit-circuit-playground-express>

Let's make the gloves!

Playable Fashion Weekend Workshop: Glove Worksheet

with Kaho Abe & Ramsey Nasser
November 2013 at Eyebeam Art & Technology Center

Materials:

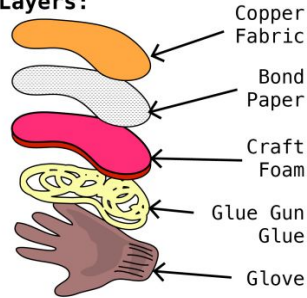
- Copper Fabric (LessEMF)
- Work Gloves (Home Depot)
- Bonding Paper (Amazon)
- Craft Foam (craft stores)
- Flora & USB cord
- 2 Alligator Clips

Tools:

- Glue gun
- Scissors
- an Iron
- Scrap cotton fabric



Layers:



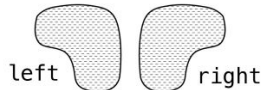
TEMPLATE FOR CONDUCTIVE PADS

Cutting:

- Cut 2 pieces of Color Foam
- Cut 2 pieces of Copper Fabric
- Cut 2 pieces of Bonding Paper

** For bonding paper, note smooth and rough sides. Must cut mirrored paid for right and left gloves.

Cut along dotted line



Note: make sure you print at full scale or the scale of the template will be changed.

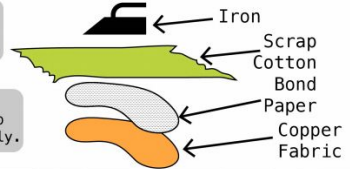
Step 1:

Place bonding paper rough side down, on top of copper piece. Cover with scrap cotton fabric, and iron for 3 seconds. Make sure you cover all areas.

tip: use scrap cotton fabric when ironing to stop iron from getting destroyed with glue from bonding paper.

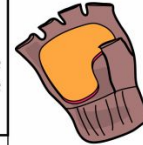
tip: don't over use iron or glue will get all over the place.

tip: steam should be turned off on iron to melt the glue properly.



Step 2:

Wait til it's cool to the touch. Carefully peel paper from glue. There should remain a adhesive layer on the copper piece.

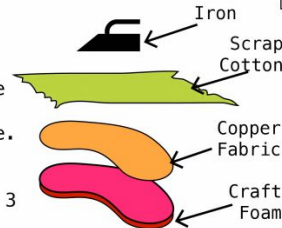


Step 4:

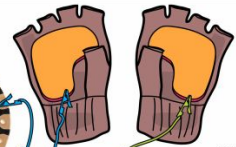
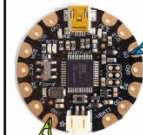
Use glue gun to glue copper/foam piece down to glove, copper side up.

Step 3:

Place copper piece, adhesive side down, on top of foam piece. Cover with scrap cotton and iron for 3 seconds.

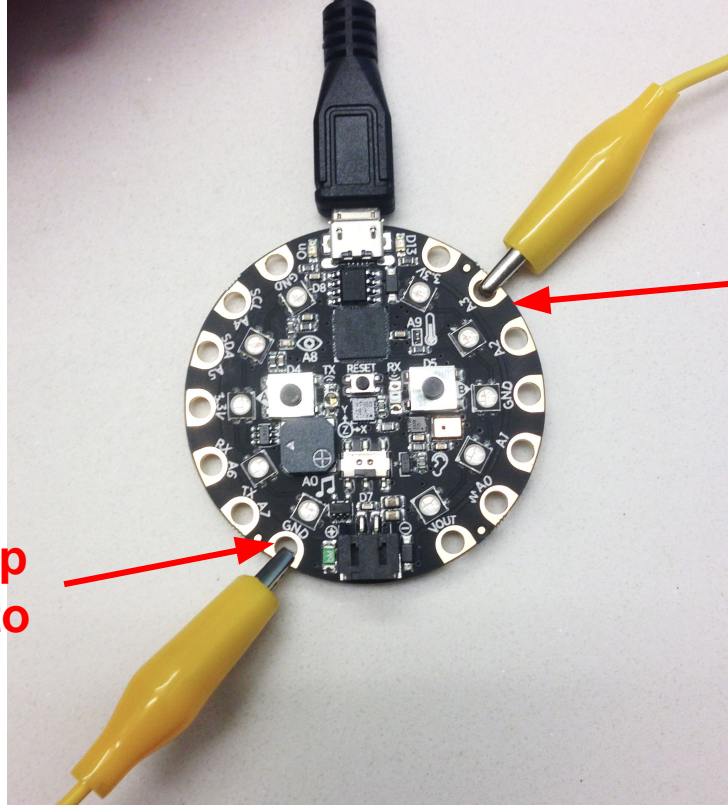


Step 5: Flora



With alligator clips, connect pads to D9 and GND on Flora.

Step 5 on Worksheet



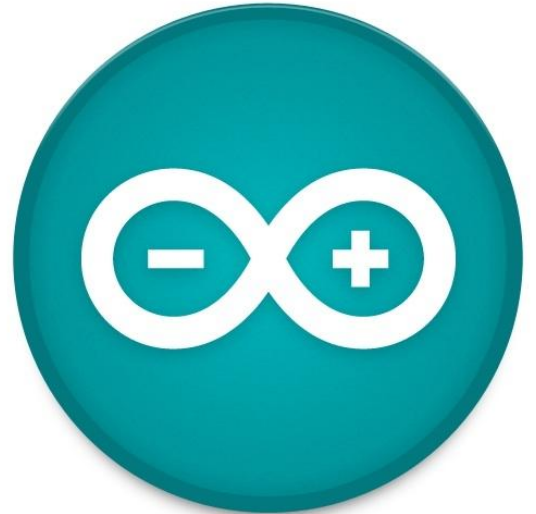
Connect alligator clip from GND (Ground) to a glove.

Connect alligator clip from A3 to the other glove.

Arduino Code

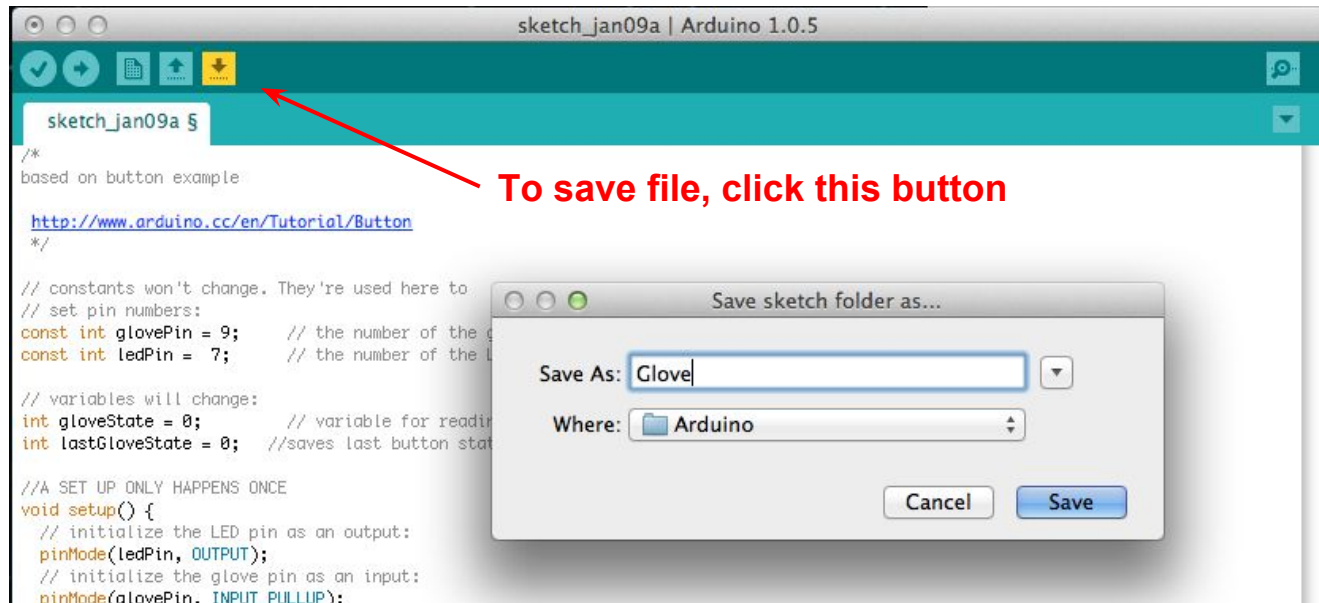
<https://github.com/kahodesu/NCSU-2018-Workshop>

<https://bit.ly/2qGUtBT>



Cut & Paste into Adafruit Arduino IDE

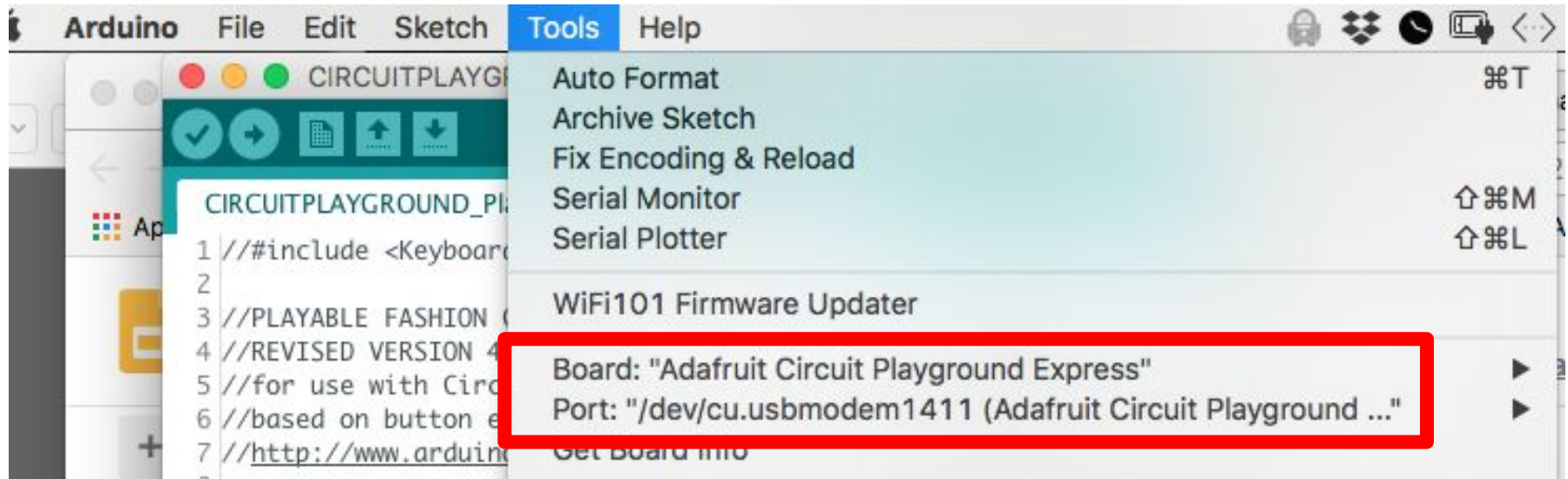
- Cut and paste code into Adafruit Arduino IDE window
- Save Arduino file with new name (whatever you want!)



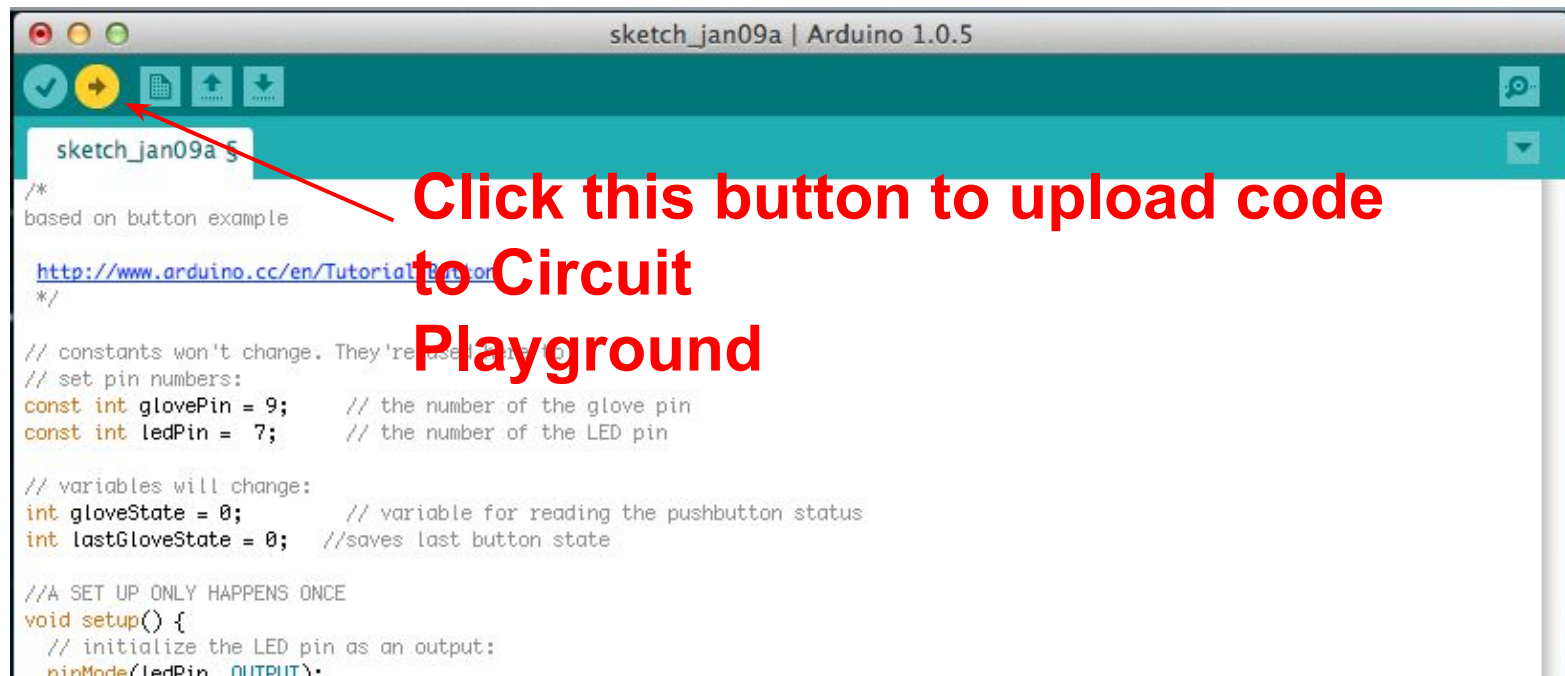
Set “Board” and “Port”

Make sure Tools>>Board>> Adafruit Circuit Playground Express

Tools>>Port>> USB port with Circuit Playground



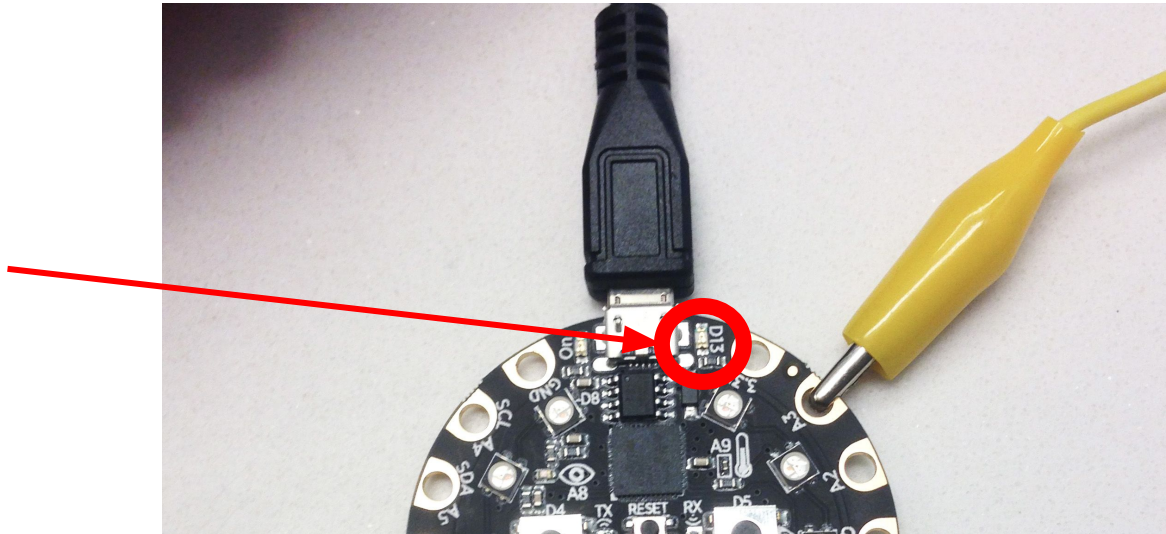
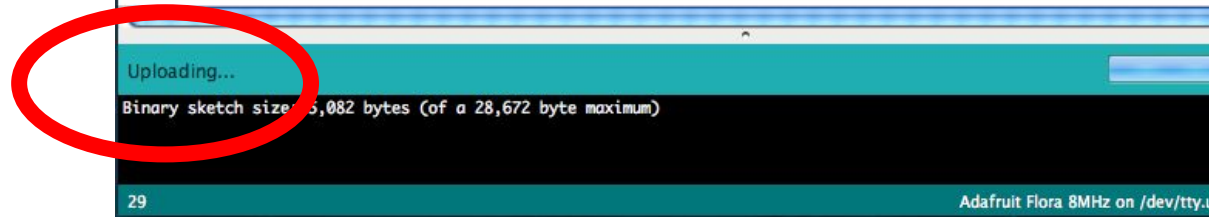
Connect Circuit Playground to Computer via USB and Upload Code



Uploading

You can check status at bottom left of IDE.

When you clap, RED LED should light up.



Review Code

variables

setup()

occurs once at start

loop()

occurs over and over again



```
CIRCUITPLAYGROUND_Playable_Fashion_glove_code | Ar
1 //include <Keyboard.h> FOR KEYBOARD
2
3 //PLAYABLE FASHION GLOVE CODE
4 //REVISED VERSION 4/18/2018
5 //for use with Circuit Playground
6 //based on button example
7 //http://www.arduino.cc/en/Tutorial/Button
8
9 // constants won't change. They're used here to set pin numbers:
10 const int glovePin = A3; // the pin number of the glove pin
11 const int ledPin = 13; // the pin number of the LED pin
12
13 // variables will change:
14 int gloveState = 0; // variable for reading the pushbutton status
15
16 void setup() {
17 // initialize the LED pin as an output:
18 pinMode(ledPin, OUTPUT);
19 // initialize the glove pin as an input:
20 pinMode(glovePin, INPUT_PULLUP);
21 //Keyboard.begin(); //FOR KEYBOARD
22 }
23
24 void loop(){
25 // read the state of the glove value:
26 gloveState = digitalRead(glovePin);
27
28 // check if the glove is clapped.
29 // if it is, the gloveState is LOW:
30 if (gloveState == LOW) {
31 //Keyboard.press(' ');//FOR KEYBOARD
32 digitalWrite(ledPin, HIGH);
33 } else {
34 // turn LED off:
35 //Keyboard.release(' ');//FOR KEYBOARD
36 digitalWrite(ledPin, LOW);
37 CircuitPlayground.clearPixels();
38 }
39 }
```

Web Games Demo

Canabalt <http://adamatomic.com/canabalt/>

Flappy Bird <http://flappybird.io/>

Flowers Demo

- Change code so that instead of “space”, when gloves are clapped “A” is typed out.
- Go to <http://kahoabe.net/flowers> and clap!

Hand-to-hand examples:



What to do next?

Software:

P5.js <https://p5js.org/>

Processing <https://processing.org/>

Unity <https://unity3d.com/>

Maker Websites:

Instructables

<https://www.instructables.com/>

How to Get What You Want

<http://www.kobakant.at/DIY/>

Local Maker Spaces/Communities

**Local Independent Game Dev
Communities**

Materials:

Adafruit <https://www.adafruit.com/>

Sparkfun <https://www.sparkfun.com>

lessEMF.com <https://lessemf.com/>

Thank you!

Website: <http://kahoabe.net>

Twitter: [@kahodesu](https://twitter.com/kahodesu)

Github: <http://github.com/kahodesu>