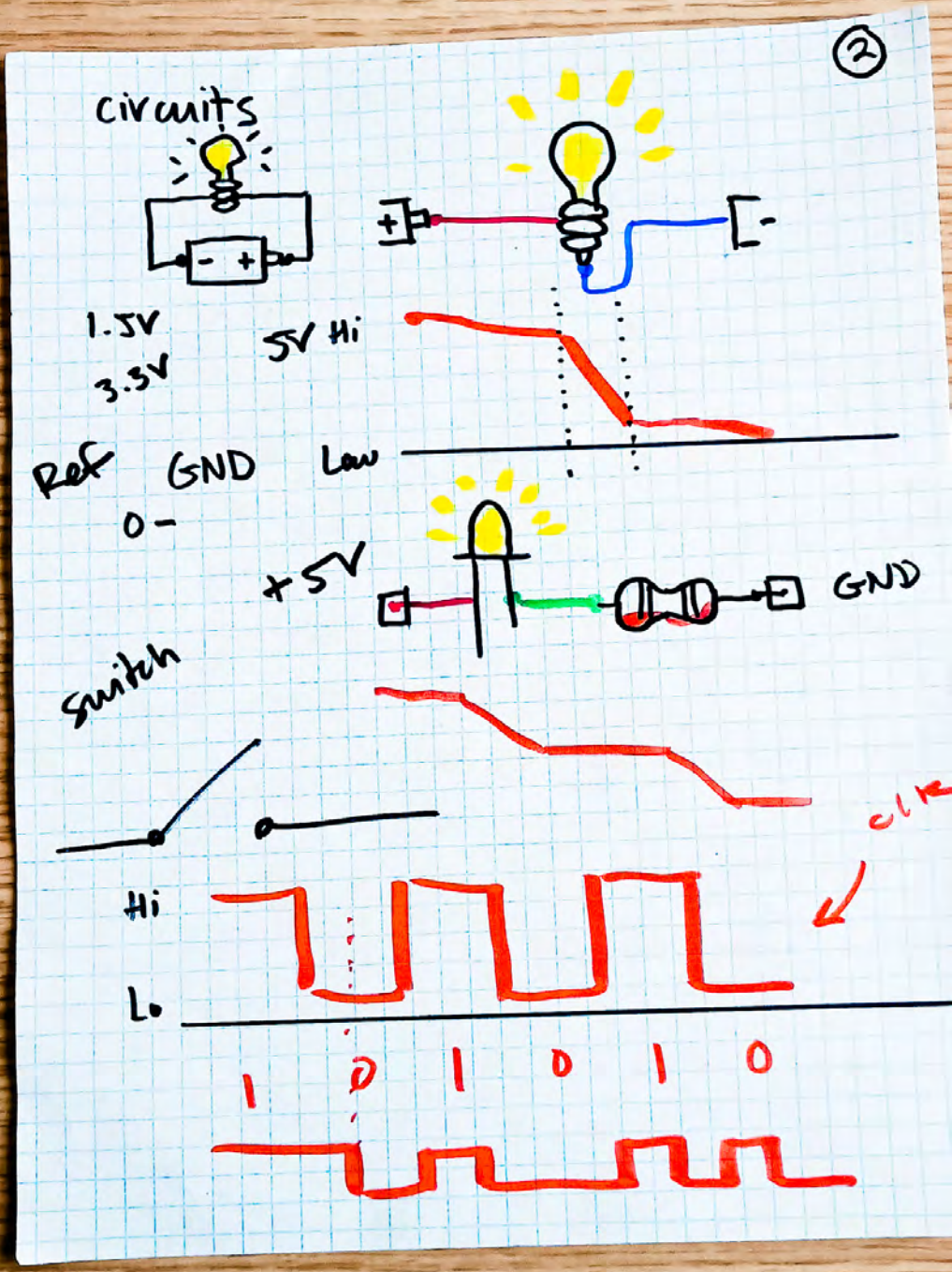
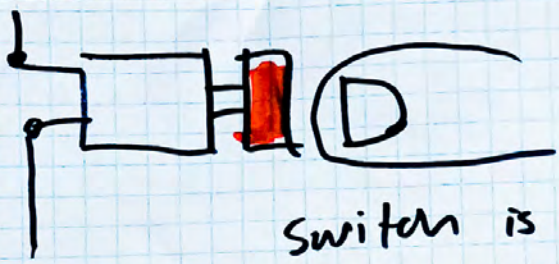
COGS 300 Intro 02 Jan 8/26

Warm up: Draw straight lines. + spacing
Play with angle + length.
use a ruler + freehand.

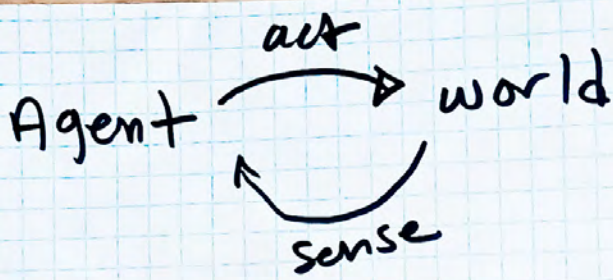

②
circuits
+
-
1.5V
3.3V
5V Hi
Ref
GND
Low
0-
+5V
GND
switch
Hi
Lo
clk
1
0
1
0
1
0



switch is sensor

int = whole number

```
int ledState;        ← state
void setup() {
  // runs first
}
void loop() {
  // runs forever
}
```



$P(\text{ledState} = 0)$?

50%

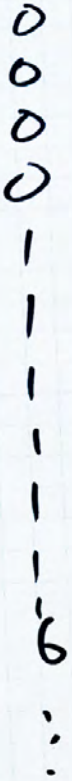
$\text{ledState} \in \{1, 0\}$

★ Experiment design

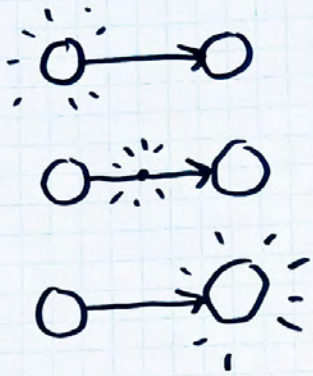
1. protocol
2. study materials

Materials

digitalRead(A0)



$$P(\text{event}) = \frac{\#\text{ of event}}{\text{samples}}$$



T = threshold

decay

$A \longrightarrow B$

$T_A = 1 \qquad T_B = 2$

★ Design an intruder alert system. System of switches.

Reflection: what does it mean for a system to know or sense something?

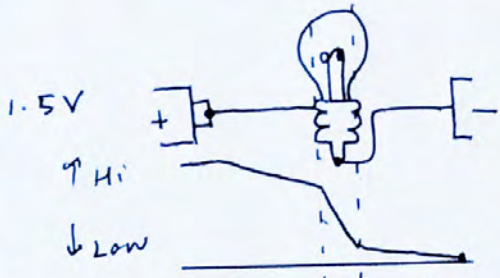
Intro 02

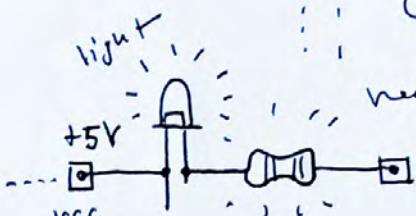
00:00 Draw lines repeatedly. Use a ruler.
Play with spacing.

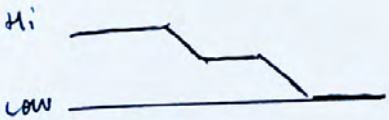
Learn control. Pair with previous.

Last time, we saw our first circuit:

Basic circuitry becomes experientially obvious:
1. Takes a closed circuit to make it "work"
2. Voltage matters.

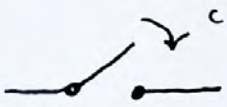






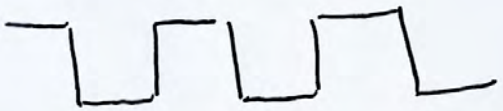
If you break the circuit, light is off. If you complete it, light is on. This is all a switch is.

* Bring out open circuits + The WTW



switch circuit symbol.

* who took 121?

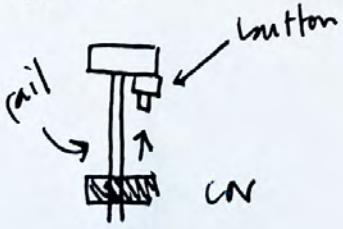


1 0 1 0 1 0

closed ↑ open ... but you get to define it!

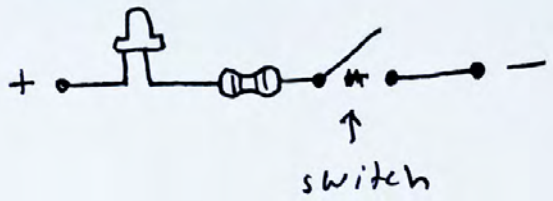
A switch is a sensor. It is "sensing" your finger. It's not a bad sensor... actually, it's one of the best!

* Limit switch demo.



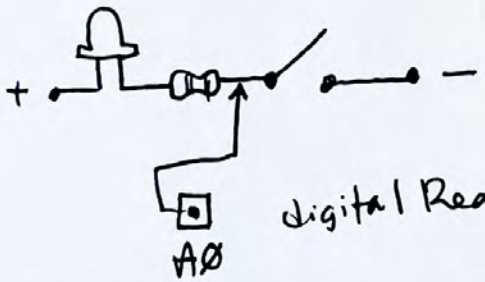
if button on:
pos = 0;

★ Build the circuit



Now, if you want to sense in the Arduino:

digitalRead(Pin);

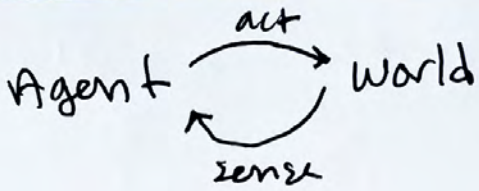


Let's look at the program.

```
int led state;          ← state
void setup() {
    pinMode(A0, INPUT);
    Serial.Begin(9600);
}
3.
void loop() {
    led state = digitalRead(A0);
    Serial.println(A0);
    delay(10);
}
```

loop

3



if Arduino is agent, your the world

"sensation"

ledState "model"

A priori ... (no prior knowledge) .. analytically
what is $P(ledState = 0)$?

$ledState \in \{1, 0\}$

Experimentally, what is $P(ledState = 0)$

↳ ★ design experiment.

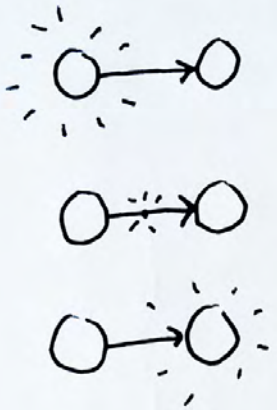
→ study materials

→ protocol

→ logs ... ?

↳ # of ϕ / total lines.

Neurons also seem to be "on" and "off" ... kind of.



but it's not "just" passing along a signal like a wire.

τ = threshold

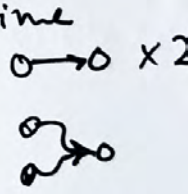
$A \longrightarrow B$

$\tau_A = 1$ $\tau_B = 1$ pulse = 1

$\tau_B = 2$

↑ two pulses activate.

time



and, actually, there's a rate of decay ... not simple! plus inhibition ... etc.

★ If time:

Design an intruder alert + Arduino.
System using only switches.

Reflection: What does it mean for
a system (agent) to
"know" or "sense"
something?