A POSTERIORI

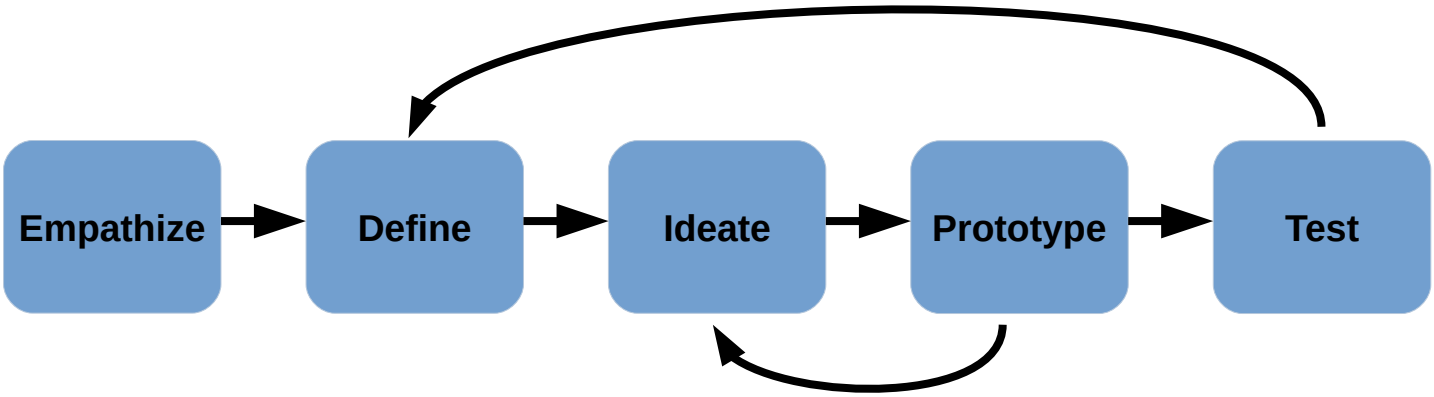
Play · Experience · Learn

Name:		Class:	

Lesson 7 (Defining the Problem)

Slides – https://a9i.sg/huayi
mBlock – https://ide.mblock.cc (start mLink too!)

Design Thinking



5 Phases of Design Thinking

Define (Defining the Problem)

- Write the Problem Statement
- One of the hardest part of the process
- Empathize helps us gain insights
- Define helps us make sense of it

What makes a good problem statement?

- Human-centered
- Broad enough for creative freedom
- Narrow enough to be manageable

5 "Why" Technique

- Repeatedly ask "Why"
- Developed by Toyota
- Must understand the user first
- If you cannot answer "Why", go back to to the "Empathize" stage, don't make assumptions!

Example of 5 "Why"
Working adults are often unhealthy.

1) Why are they unhealthy? => **Because they didn't exercise enough**
2) Why don't they exercise enough? => **Because they are too busy**.
3) Why are they too busy? => **Because they have work and family time.**
4) Why are they not exercising during family time? => **Because their kids couldn't join them.**
5) Why couldn't their kids join in the exercise? => **Because the exercise facilities isn't suitable for kids.**

ALP Project (Define)

Discuss in your group and fill in the following. **Make sure to keep this; you'll need to include it in your ALP report.**

5 "Why"?
Apply the 5 "Why" to the problems faced by your target group.

_____

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Write!
Write down your problem statement.

_____

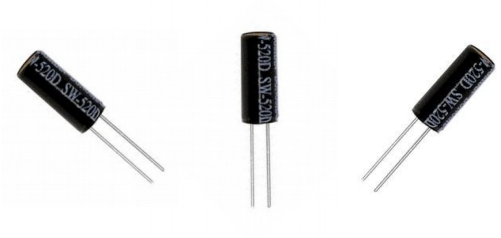
_____

_____

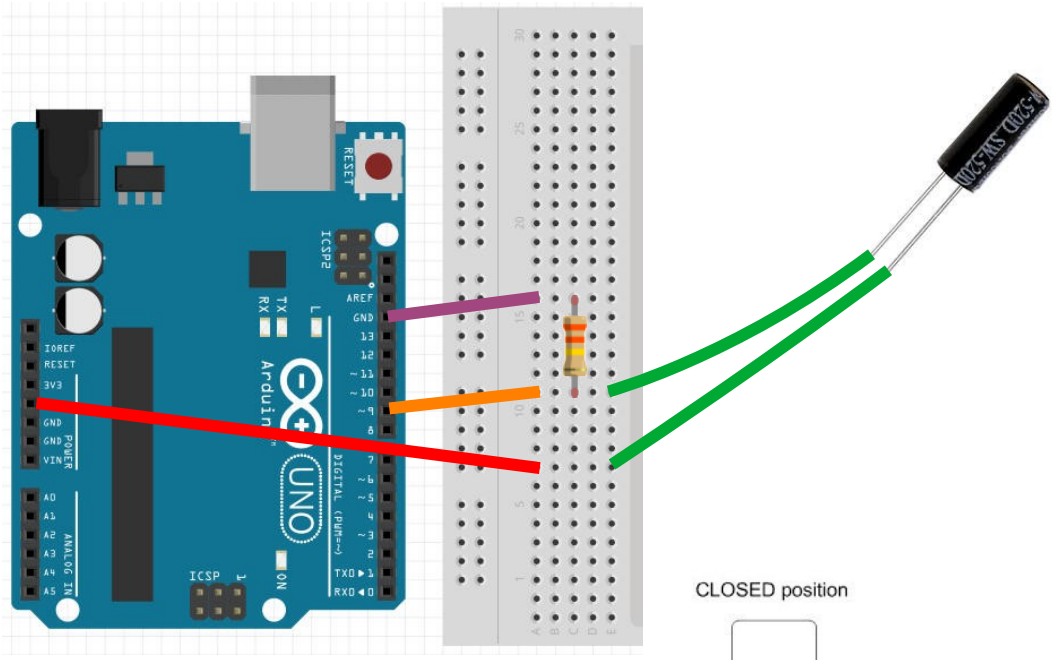
Tilt Switch

- Works just like a push button switch
- Need pull-up / pull-down resistor!
- Turns on when tilted upwards
- Turns off when tilted downwards

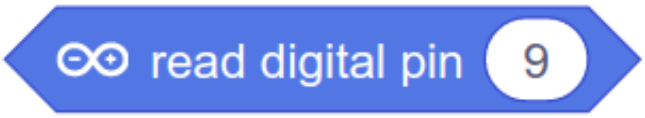
On Position

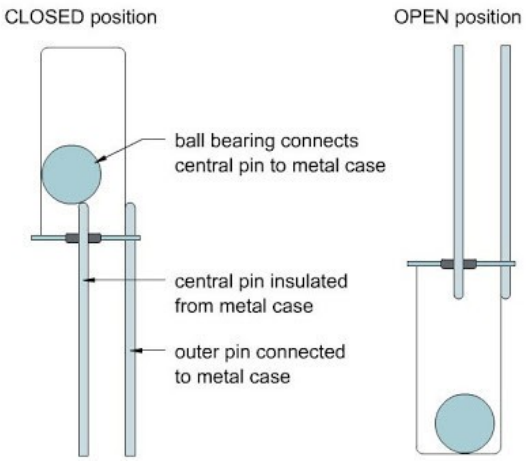


Off Position



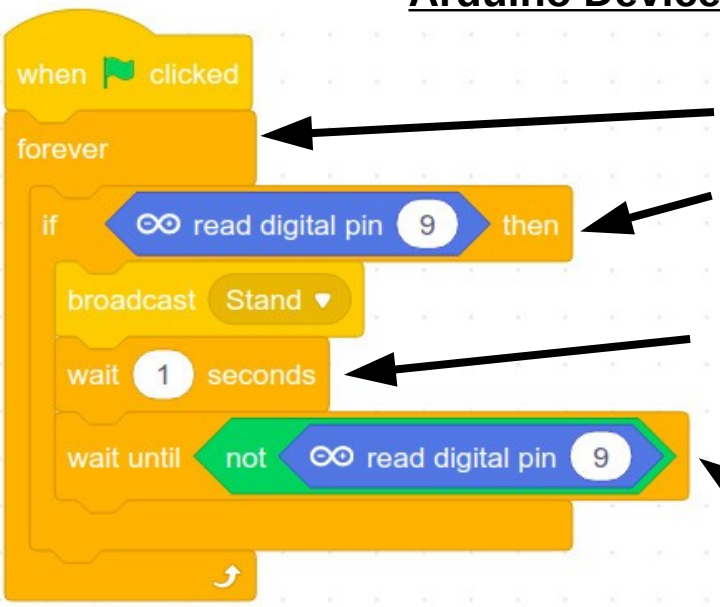
Read using “read digital pin”





Sit to Stand Counter

Arduino Device



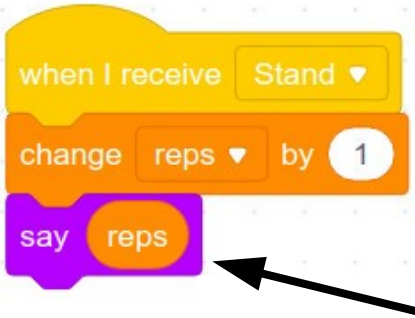
Repeats forever

Send a message if switch is closed

Switch may "bounce", this wait 1 second prevents multiple readings

Wait until switch is open, so we only broadcast once each time the user stands

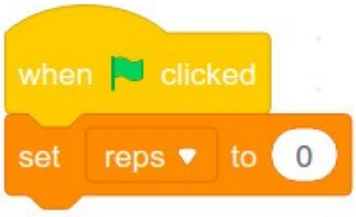
Sprite



Receives message from Arduino

Increment rep counter. Remember to create the "reps" variable first!

Read out the number of reps



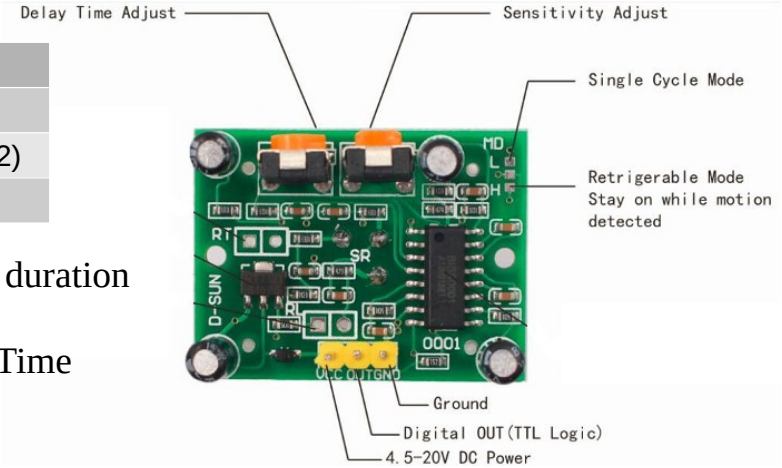
Set reps variable to zero at start

Passive Infrared Sensor

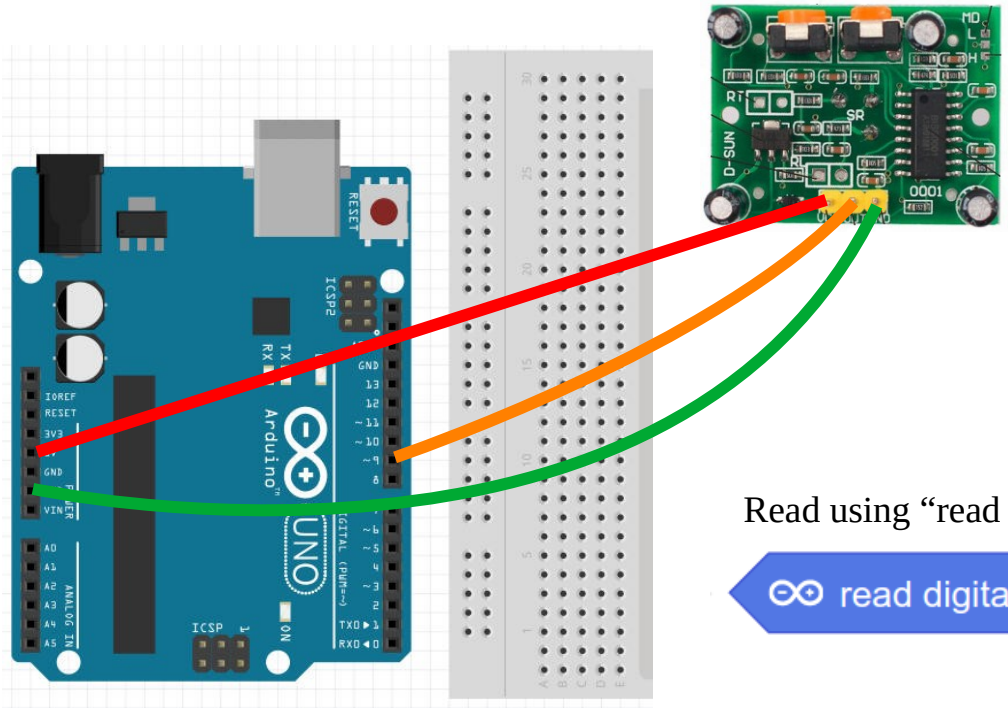
- Detects far infrared produced by warm objects (eg. human body)
- Can only detect motion, not stationary objects

Pins Connections

Sensor	Arduino
Vcc / Power	5V
Out	Any I/O (Pin 2 to 12)
Gnd	Gnd



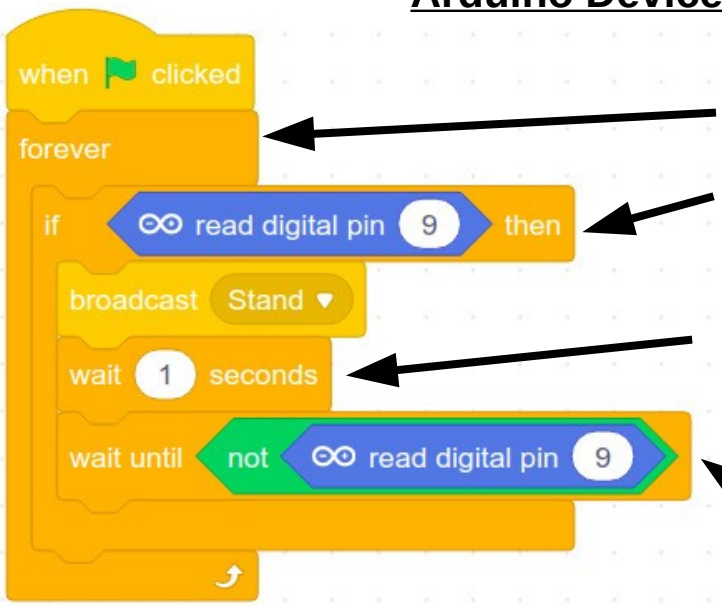
Turns on and stay on for short duration when motion detected
Adjust duration using “Delay Time Adjust”



Read using “read digital pin”

Lap Counter

Arduino Device



Repeats forever

Send a message if switch is closed

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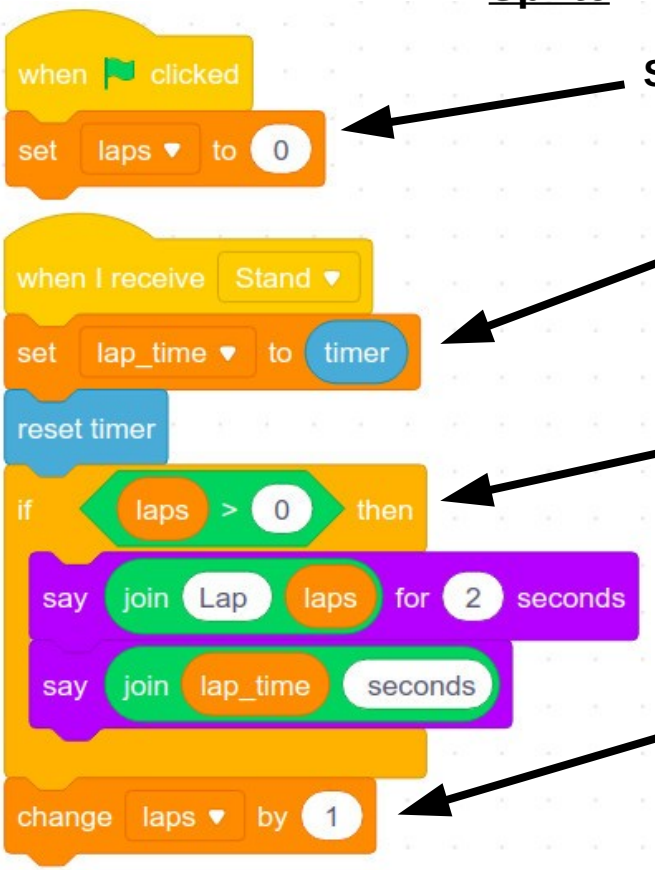
Wait until switch is open, so we only broadcast once each time the user stands

Sprite



Start count at zero

Save lap time then reset timer

If we have at least 1 lap, display lap count and lap time

Increment lap count by 1