



ARDUINO BASICS: PROTOTYPING YOUR FIRST PROJECT



COLUMBIA UNIVERSITY SCIENCE & ENGINEERING LIBRARIES



HELLO!

(again)

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QUICK NOTE:

- ❑ This is not a hands-on session.
- ❑ This session assumes prior knowledge of the Arduino hardware and software system.



What You'll Learn:

- ❑ Brainstorming project ideas and seeing them to completion.
- ❑ Where to get help!

THE *BIG* QUESTION:



MOTIVATION

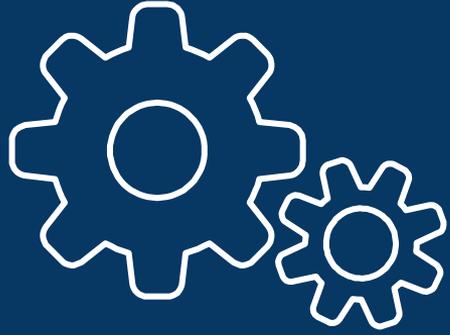
A row of several golden trophies on a wooden surface, with the word 'MOTIVATION' overlaid in large white letters. The trophies are arranged in a line, receding into the background, and are set against a dark, blurred background. The lighting is warm, highlighting the metallic sheen of the trophies.



EXERCISE #1

First question:

Think about the perfect gadget you *desperately* need, but don't have (or, perhaps, doesn't even exist yet). What would it do? What problems would it solve?



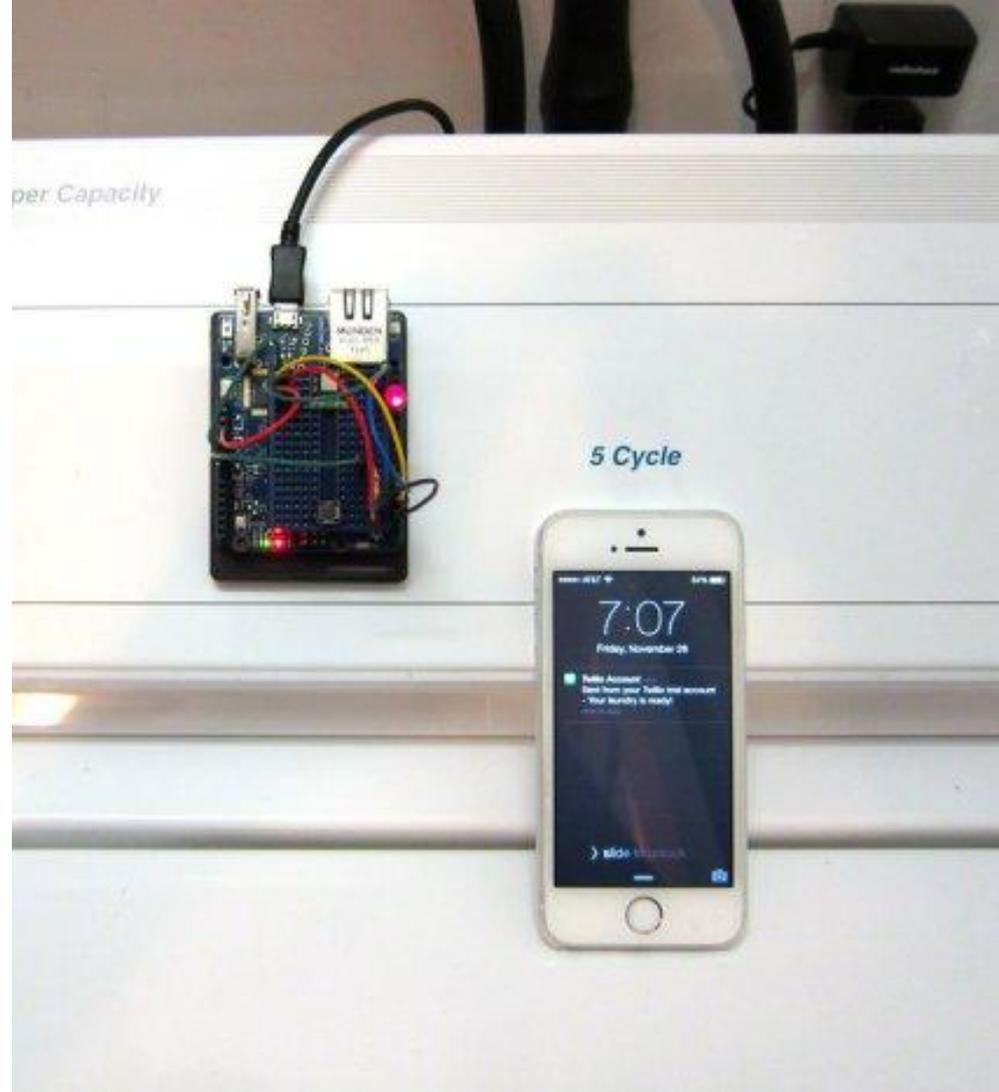
ARDUINO PROJECT EXAMPLES:

USEFUL

PROJECTS

LAUNDRY

text message alert



TWITTER

automated coffee pot



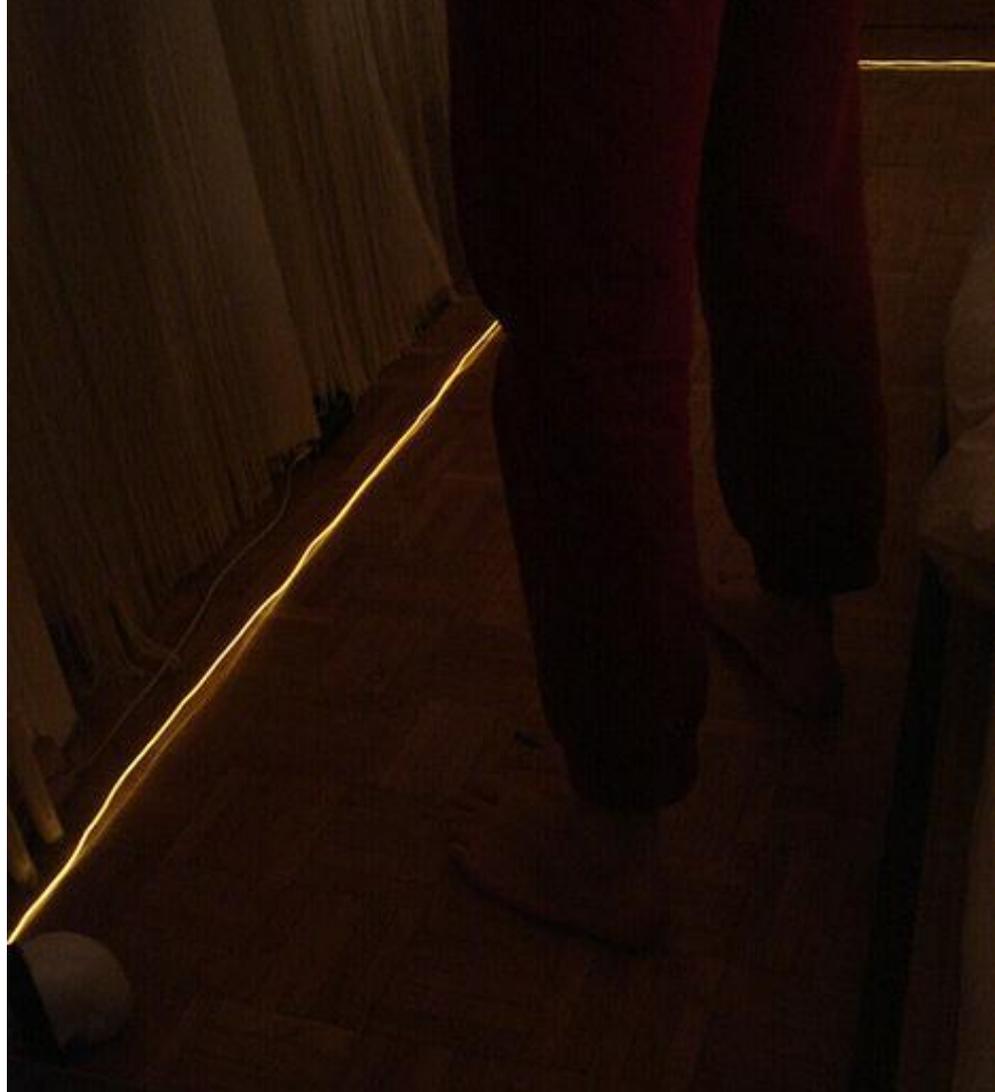
FINGERPRINT

garage door opener



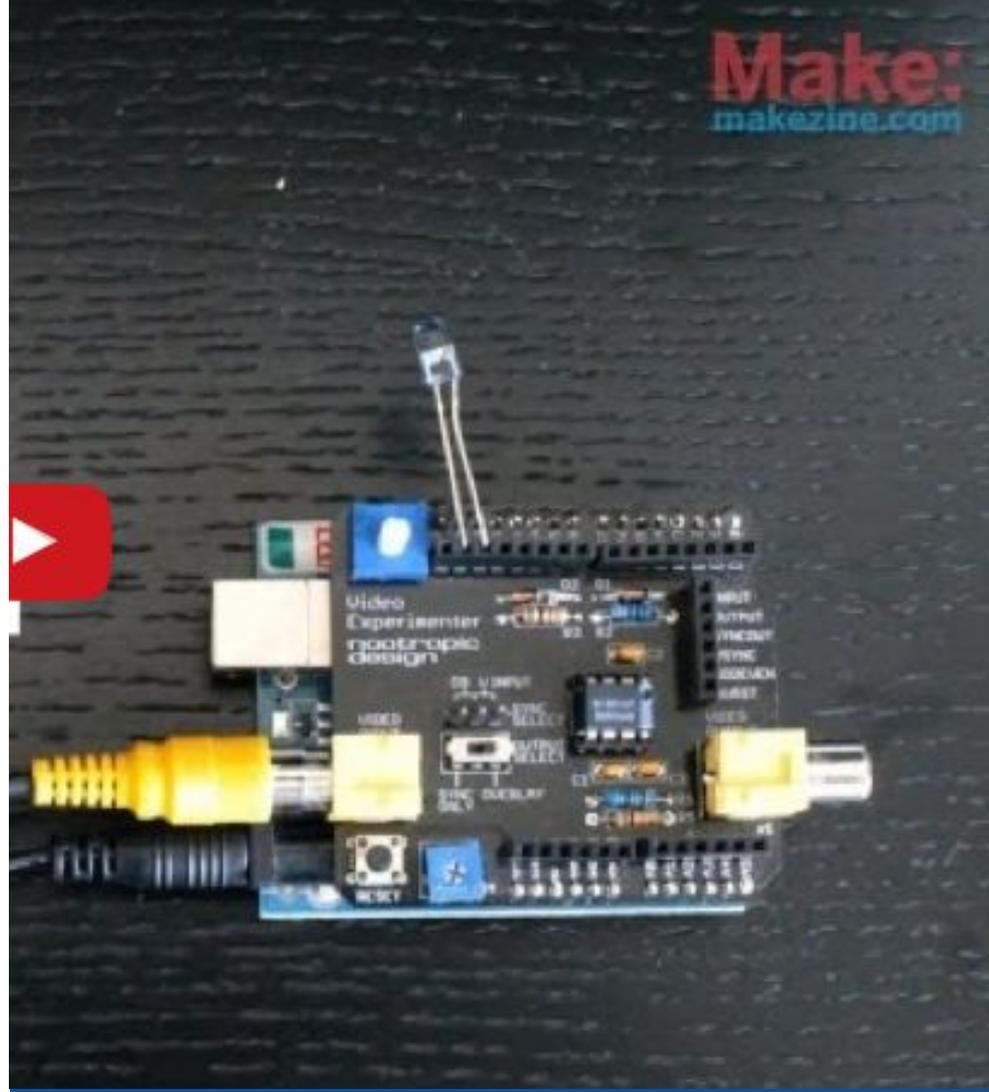
MOTION SENSOR

LED bed lights



ENOUGH ALREADY

muting mechanism



THE “EYE WRITER”

eye tracking system



TURN SIGNAL

arduino wearables



AUTOMATIC PET FEEDER

3D printed and user
programmed

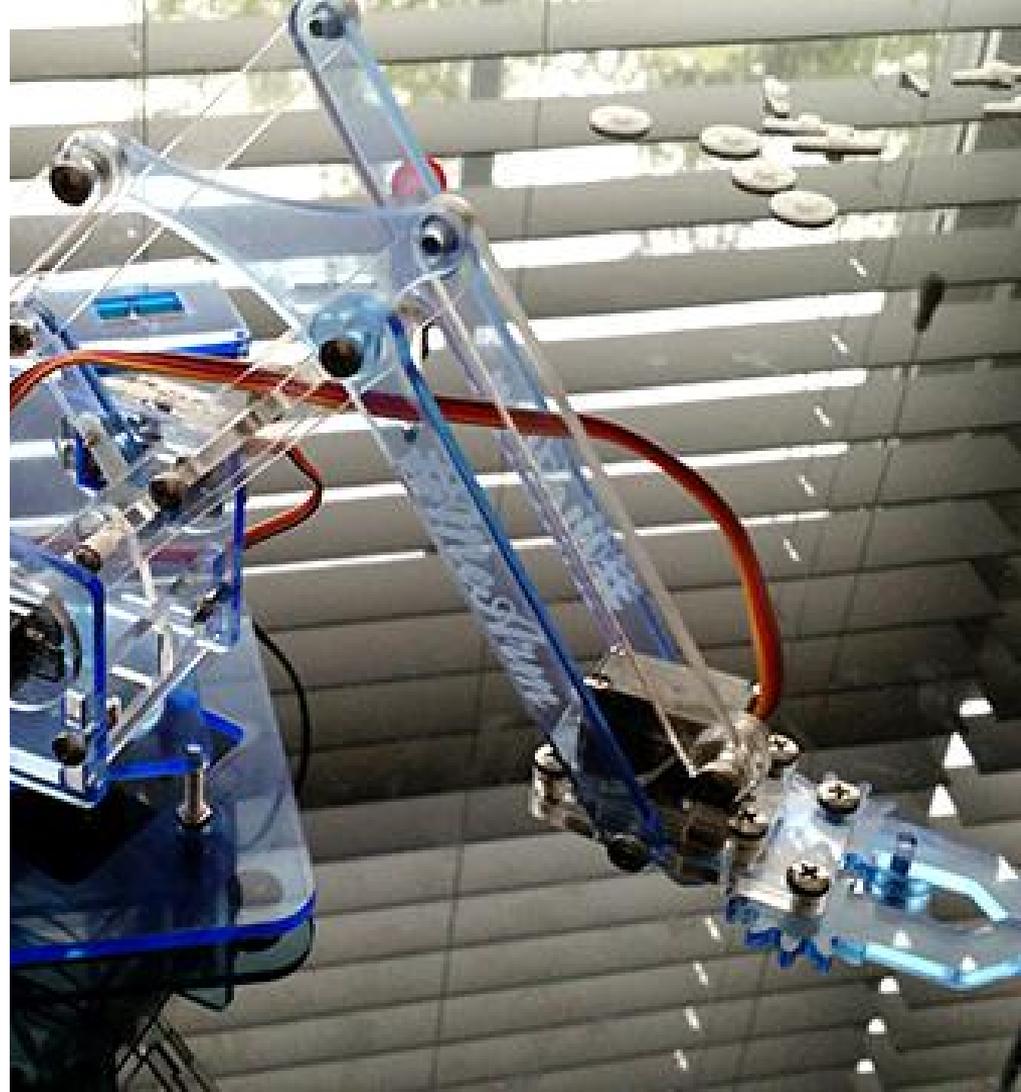
<http://www.instructables.com/id/Automatic-Arduino-Powered-Pet-Feeder/>



FUN

PROJECTS

ROBOTIC ARM



FLAMETHROWING Jack-O-Lantern

<http://www.instructables.com/id/Flamethrowing-Jack-O-Lantern/>

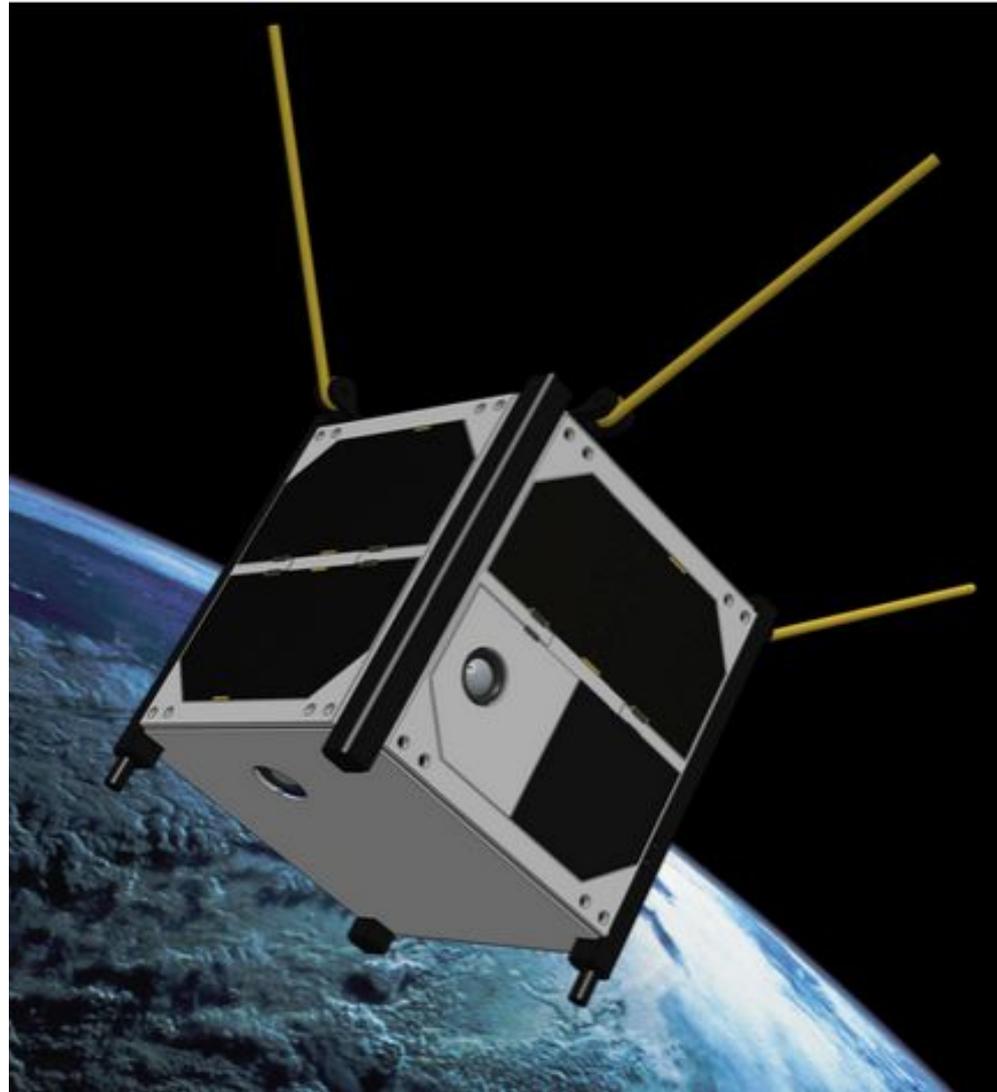


CHALLENGING

PROJECTS

ARDUSAT

arduino satellite





EXERCISE #1

Let's try this again:

Reconsider the original question: think about the perfect gadget you *desperately* need, but don't have (or, perhaps, doesn't even exist yet). What would it do? What problems would it solve?

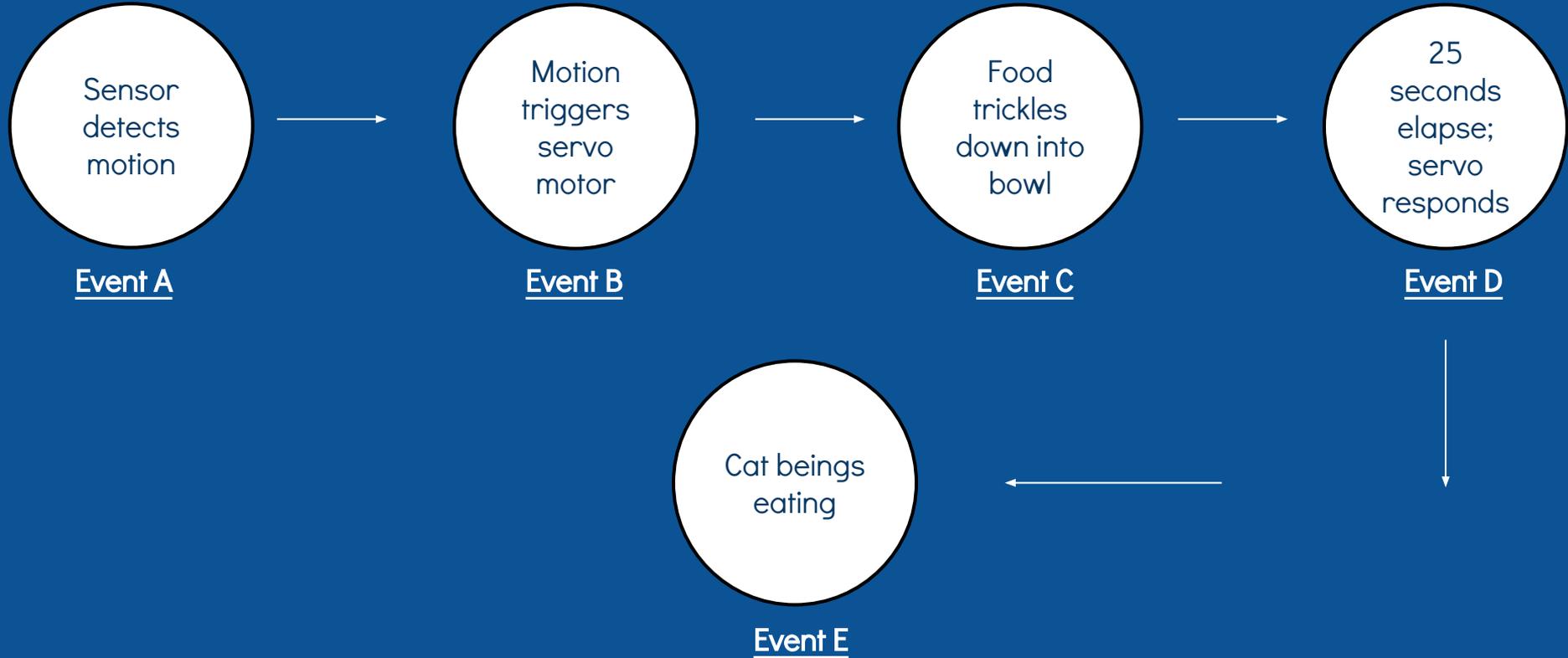


EXERCISE #2

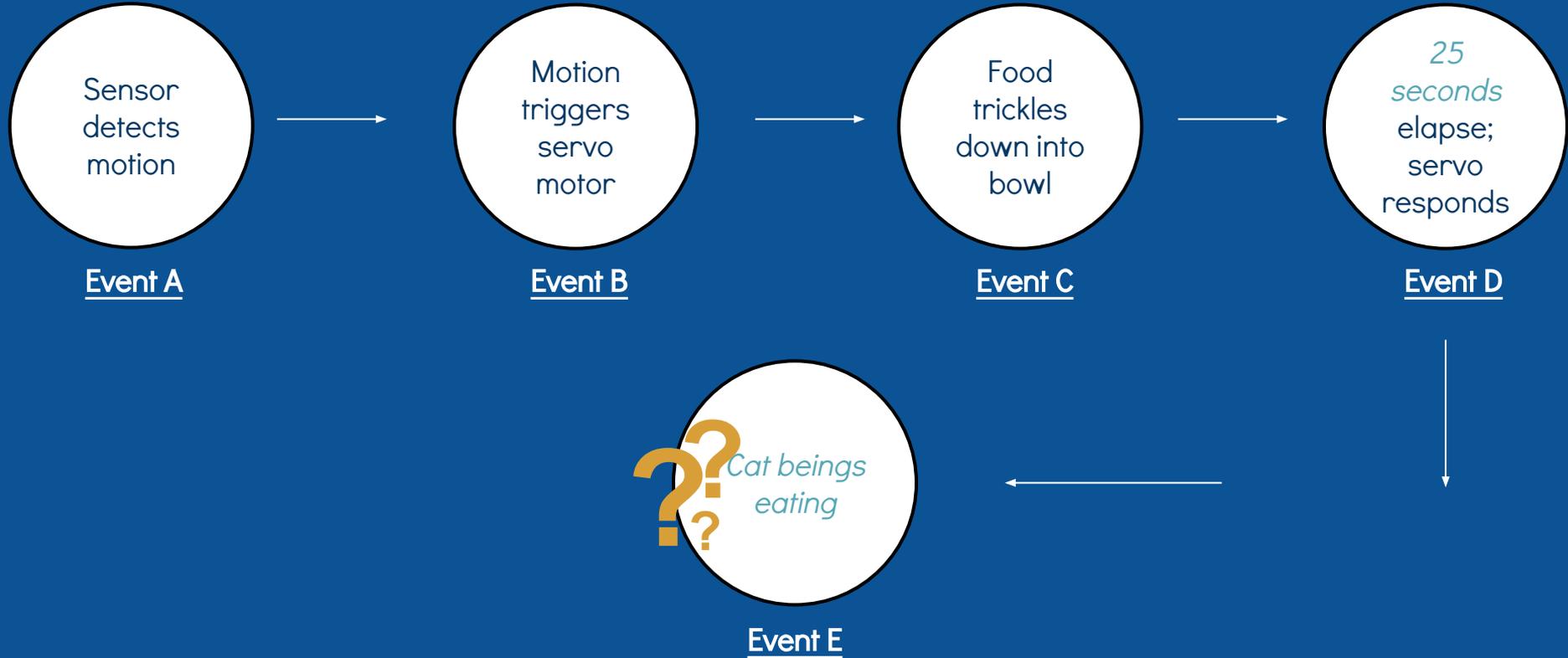
BREAKING IT DOWN:

- ❑ Logically -- what is your project *doing*? Walk me through what happens from event A (turning on the device) to event Z (shutting it off).
- ❑ What kind of information are you recording or storing?
- ❑ What boards, sensors, screens, or other devices do you need to successfully run your project from start to finish?
- ❑ Does your Arduino need to communicate with other devices for this project? If so, which ones?
- ❑ Does completing this project require specialized knowledge you don't have?

AUTOMATIC PET FEEDER



AUTOMATIC PET FEEDER





SAMPLE IDEAS:

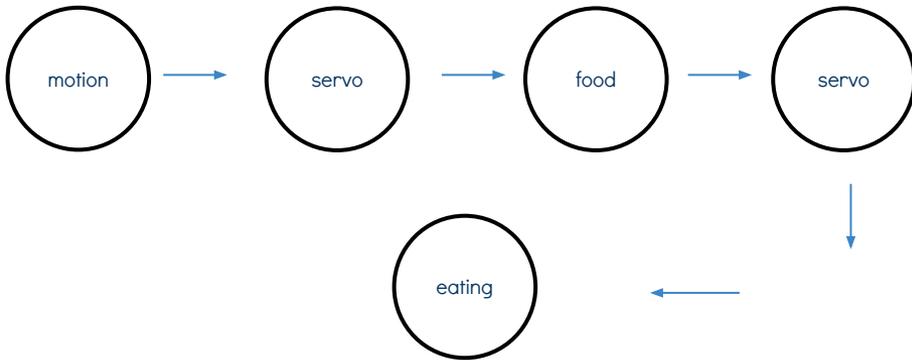
- ❑ Create an Arduino bot that records some sensor's data, then updates a corresponding Twitter feed and texts you its results.
- ❑ Create an arduino wearable that records and responds to some kind of motion.





EXERCISE #3

PROGRAMMING



LAY IT OUT

```
Sweep | Arduino 1.6.5
Sweep
/* Sweep
by BARRAGAN <http://barraganstudio.com>
This example code is in the public domain.

modified 8 Nov 2013
by Scott Fitzgerald
http://www.arduino.cc/en/Tutorial/Sweep
*/

#include <Servo.h>

Servo myservo; // create servo object to control a servo
               // twelve servo objects can be created on most boards

int pos = 0; // variable to store the servo position

void setup()
{
  myservo.attach(8); // attaches the servo on pin 9 to the servo object
}

void loop()
{
  for(pos = 0; pos <= 180; pos += 1) // goes from 0 degrees to 180 degrees
  {
    // in steps of 1 degree
    myservo.write(pos); // tell servo to go to position in variable 'pos'
    delay(15); // waits 15ms for the servo to reach the position
  }
  for(pos = 180; pos>=0; pos-=1) // goes from 180 degrees to 0 degrees
  {
    // in steps of 1 degree
    myservo.write(pos); // tell servo to go to position in variable 'pos'
    delay(15); // waits 15ms for the servo to reach the position
  }
}

```

RECOMMENDED RESOURCES:

- ❑ [What is electricity?](#)
- ❑ [A First Lab in Circuits and Electronics](#)
- ❑ [All About Circuits](#)
- ❑ [Arduino “How To” e-books](#)
- ❑ [SparkFun PCB Basics Guide](#)
- ❑ [Software: Fritzing and LTSpice](#)
- ❑ Youtube (in this case) is better for finding video tutorials; try
Jeremy Blum’s comprehensive [Tutorial Series for Arduino](#)
- ❑ [SparkFun](#) (detailed guides with pictures and linked explanations)
- ❑ [Adafruit](#) (detailed guides and some video content)
- ❑ [Connecting Arduino with other programming languages](#)



GET HELP

Science and Engineering Libraries:

ref-sci@columbia.edu or jcb2257@columbia.edu

Arduino [project guidance](#) forum

[Project books](#)

[Stack Exchange](#)

[Reddit forum](#)

SURVEY!

bit.ly/CUSELWorkshopSurvey

Other questions? Comments? You can find me at
@jeninthelib & jcb2257@columbia.edu

THANK YOU!

Special thanks to all the people who made and released these awesome resources for free:

- ! Presentation template by [SlidesCarnival](#)
- ! Photographs by [Unsplash](#)