

C0ding Workshop Wk05: Yuta Nakayama

Quick Overview:Week05

- **Introduction to Communication/Network**
- ***5-0 Circuit Bending Workshop***
- ***5-1 Sharing Sensor Data over the Internet***
- ***5-2 Motion Tracking using Kinect***

5-0 Circuit Bending Exercise

1. Identify the operating voltage of the device. (battery/ AC adaptor)
 - Find out **Power**/GND lines, how they are routed.
 - **Solder+Extend them into the power rows of BreadBoard.**
2. List up INPUTs/OUTPUTs and their functions of the device.
 - INPUT: Buttons, Switches, microphone etc...
 - OUTPUT: Displays, LED, Speaker, motor, etc...
 - Function: alarm, warning, trigger gun shot etc...
3. Solder + Extend INPUT/OUTPUT signals to the bread board.
4. Try if those INPUT/OUTPUT can be triggered from other signals (**POWER**/GND etc...) .
5. Check if the machine can be operatable by arduino 5v power out.
 - IF yes -> use arduino input/output to control those signal.
 - IF no -> use “FET module” to control
(avoid plugging into arduino input.)

DON'T BE AFRAID OF BRAKING THE DEVICE!

Internet of the things

- Tele-Present Water (David Bowen)
http://www.dwbowen.com/tele_water.html
- Tele-Present Wind (David Bowen)
<http://www.dwbowen.com/telewind.html>



5-1 Arduino <--> Internet

Sharing Sensor data over COSM: <https://cosm.com/>

Bio Media Art Workshop(Tama Art University: in JP):
http://yoppa.org/tau_bmaw12

The screenshot shows the COSM website interface. At the top, there's a navigation bar with the COSM logo (tagline: 'Connect to your world'), links for 'About', 'How it works', and 'Support/API', a search bar, and a user menu for 'didny' with options like 'Console', 'Keys', 'Debug', 'Apps', 'Settings', and 'Logout'. The main content area features a large orange circle with the text 'How Cosm Works'. Below this, a paragraph states: 'The Internet of Things was an idea. Now it's a reality. Right now on the Cosm platform, developers and companies are connecting devices and apps to securely store and exchange data. It's the one solution that brings big ideas about the world to the world.' The page is divided into two main columns: 'Build.' on the left and 'Collaborate.' on the right. The 'Build.' column includes sections for 'Connect your device' (mentioning Arduino, fitness trackers, etc.), 'Handle real-time data' (mentioning XML, JSON, CSV, RESTful API, and socket-server), and 'Control, monitor and analyze'. The 'Collaborate.' column includes sections for 'Search for devices' (querying by user, location, tag, etc.) and 'Find interesting data' (browsing and searching for real-time data). A central vertical axis with circular icons (a smartphone, a network graph, and a gear) connects the 'Build' and 'Collaborate' sections.

How Cosm Works

The Internet of Things was an idea. Now it's a reality. Right now on the Cosm platform, developers and companies are connecting devices and apps to securely store and exchange data. It's the one solution that brings big ideas about the world to the world.

Build.

Connect your device
Prototype with Arduino, configure commercial fitness trackers, energy monitors and air quality sensors, or [deploy your own product](#).

Handle real-time data
Push and pull XML, JSON and CSV data to our secure and scalable [RESTful API](#) and [socket-server](#) for bi-directional interaction between devices and the web.

Control, monitor and analyze

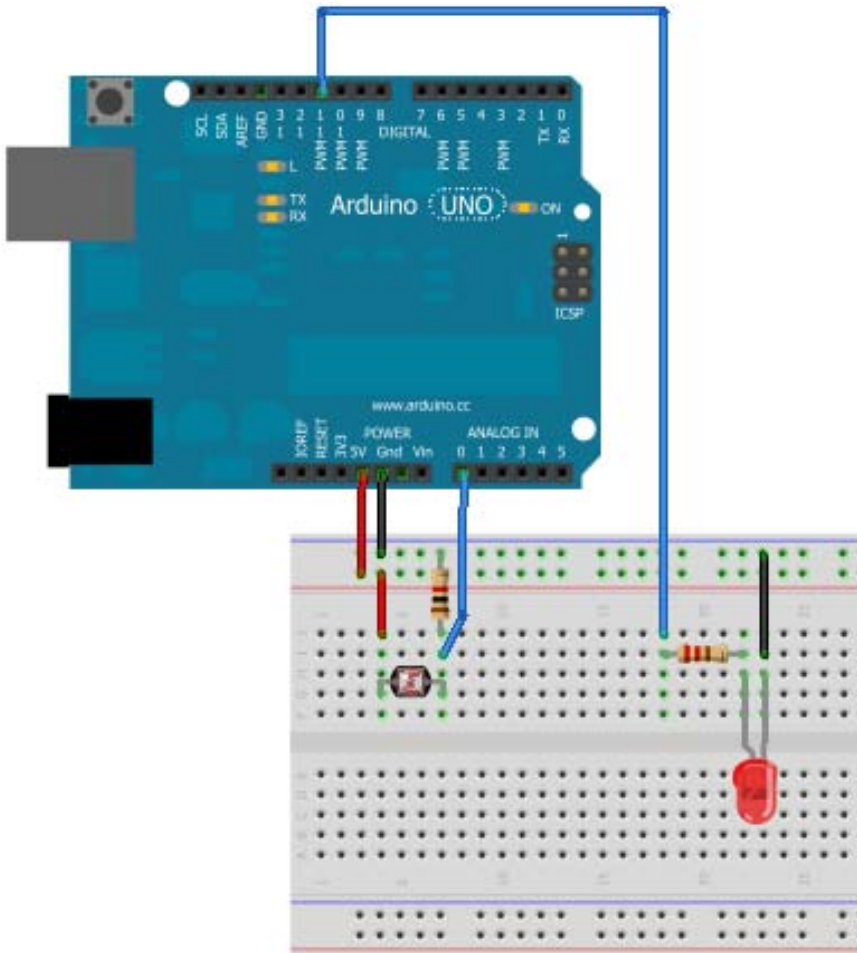
Collaborate.

Search for devices
Query for devices and sensors by user, location, tag and unit or find [commercial products](#) that are pre-configured for Cosm.

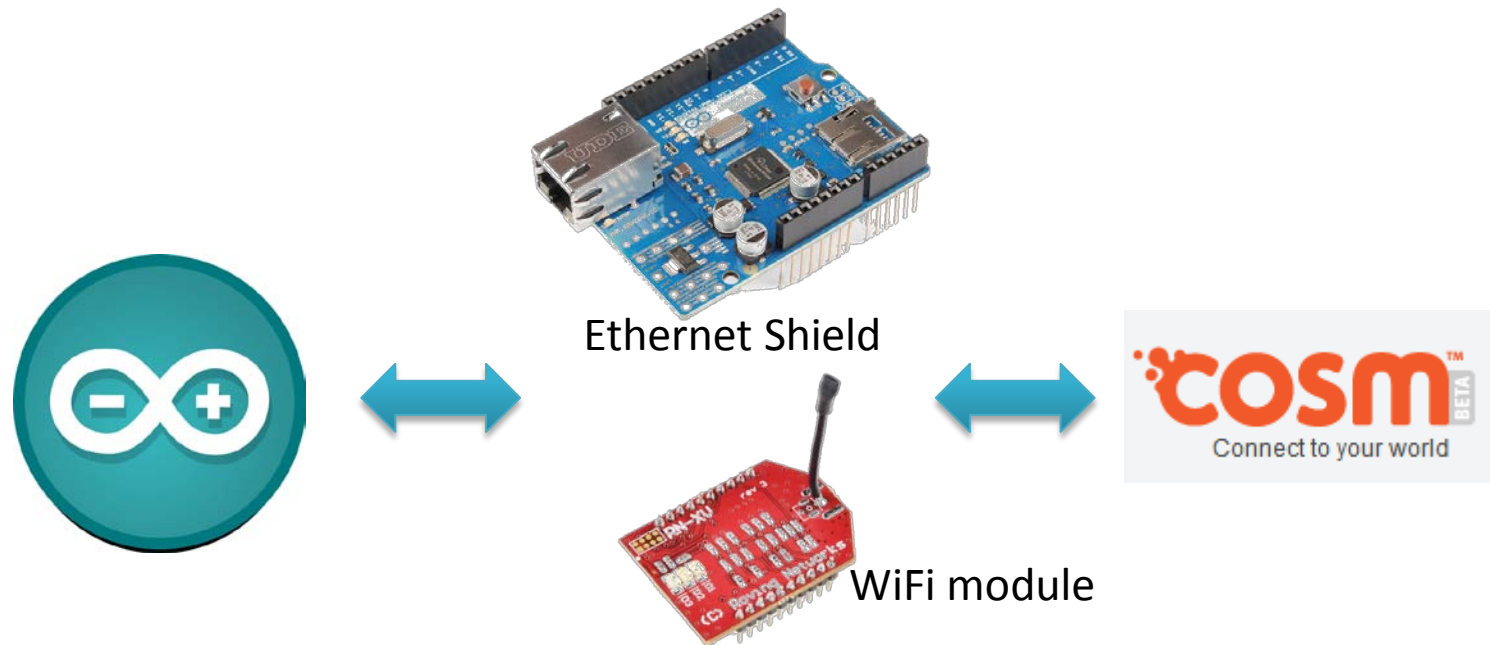
Find interesting data
[Browse](#) and [search](#) to discover what's happening right now, both near you and throughout the world.

Collaborate with others

Sharing LightSensor(LDR) data over the Internet



Various ways to share sensor data over the Internet

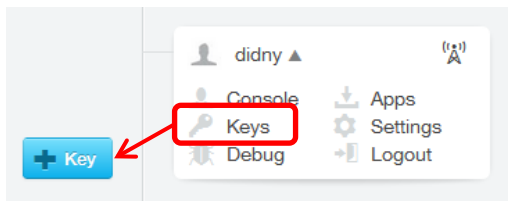


Uploading sensor feed to COSM

1. Create an account on COSM & Log in

2. Create an API Key

- Label: CodeWksp (or any name)
- Feed Restrictions: Use any public feed
- Access Privilege: All



Create a Secure Sharing Key

You can create a Secure Sharing Key here, or see [your other keys here](#).

Label * CodeWksp

- Feed Restrictions
- ☒ Use any public feed
 - ☐ Use any feed (including my private feeds)
 - ☐ Use specific feed(s)

- Access Privileges
- ☒ read
 - ☒ create
 - ☒ update
 - ☒ delete
 - ☒ all



API Key

3. Install Cosm-Processing-Library

<https://github.com/jmsaavedra/Cosm-Processing-Library/blob/master/distribution/cosm-1/download/cosm.zip>

Copy an unzipped folder into

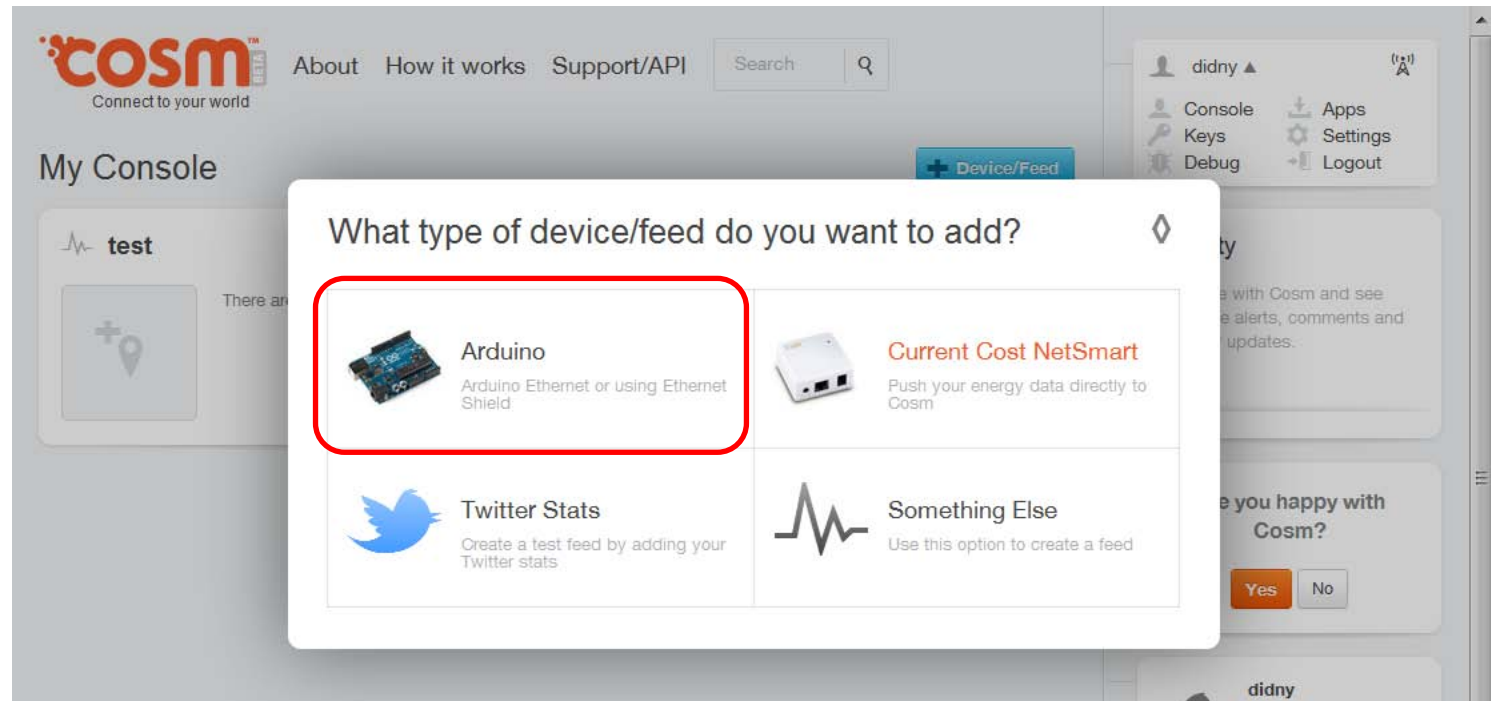
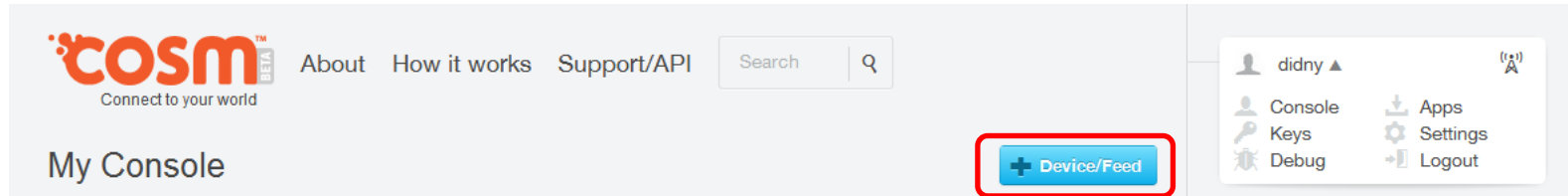
Windows:

\Documents\processing\libraries

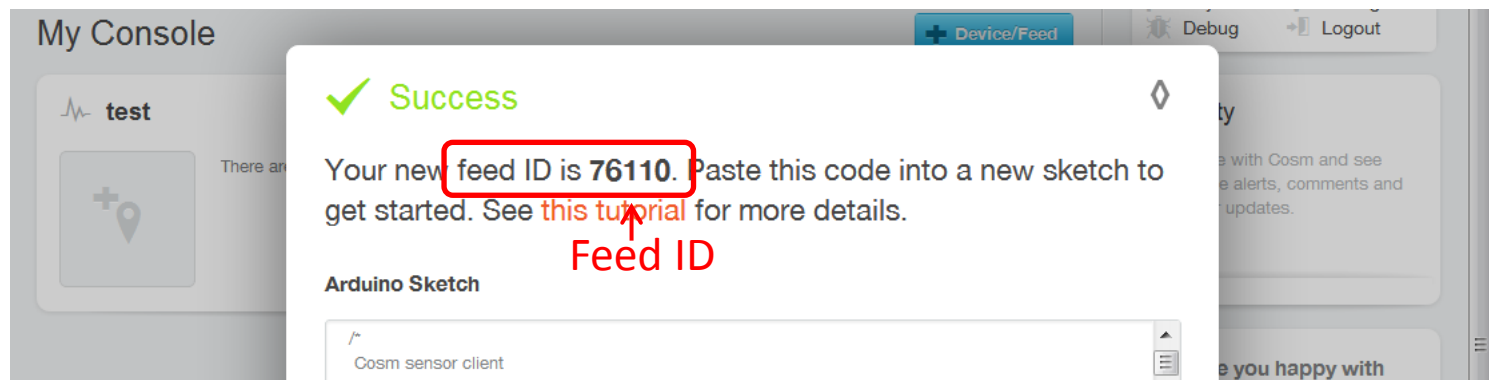
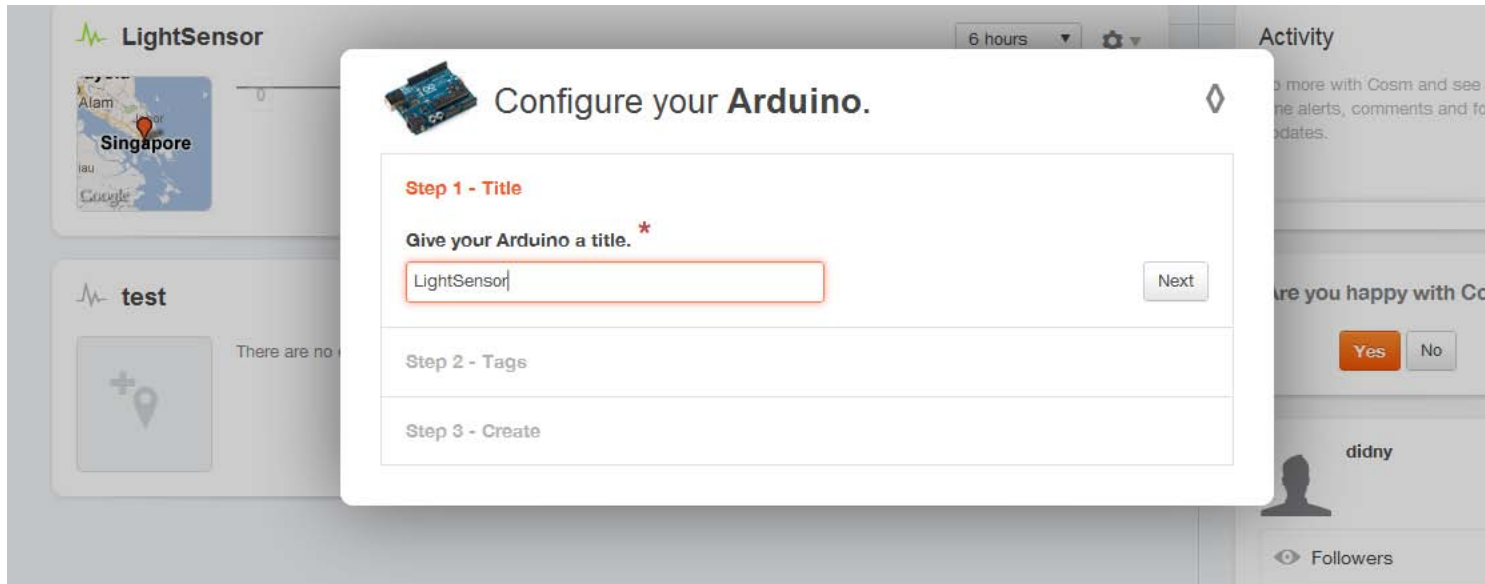
Mac:

/Document/processing/libraries

4. Create a sensor feed on COSM



4. Create a sensor feed on COSM



Arduino Code:

\01.dataSendToCosm\arduino\cosmSendReceive\

```
// an LED connected on Pin11.
```

```
int led = 11;
```

```
// the setup routine runs once when you press reset:
```

```
void setup() {
```

```
  // initialize the digital pin as an output.
```

```
  pinMode(led, OUTPUT);
```

```
  Serial.begin(9600);
```

```
}
```

```
// the loop routine runs over and over again forever:
```

```
void loop() {
```

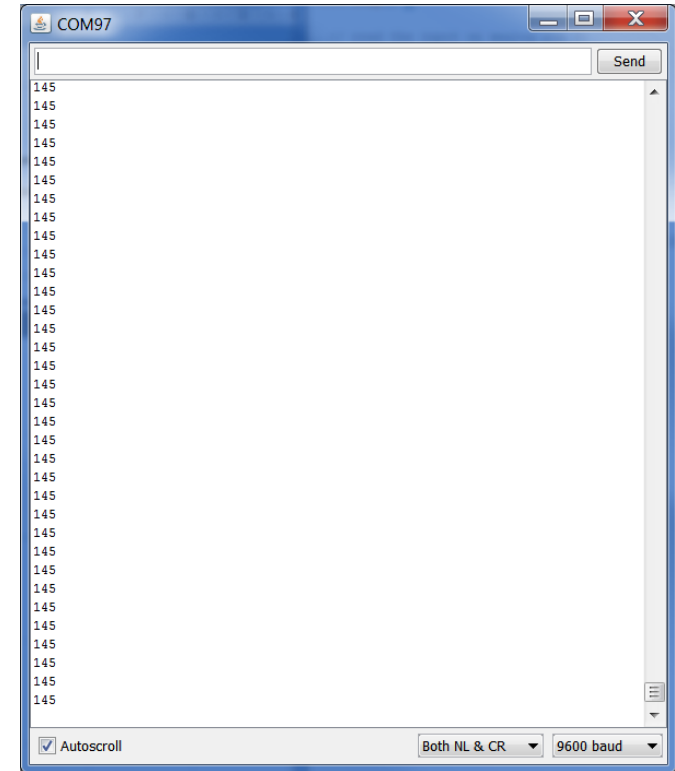
```
  // Read the Sensor Input A0 and send a value to the Serial Port.
```

```
  int sensorValue = analogRead(A0);
```

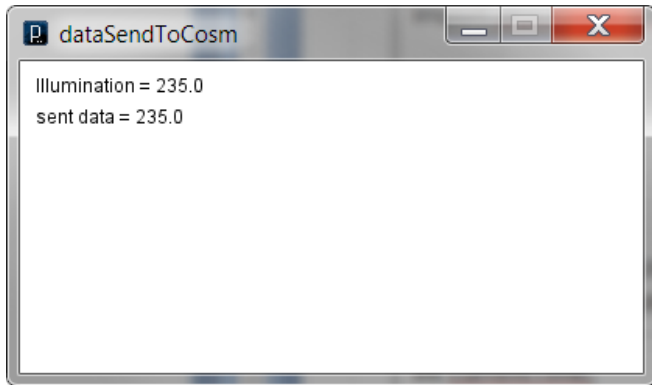
```
  // print out the value you read:
```

```
  Serial.println(sensorValue);
```

```
}
```



Processing Code



```
import cosm.*;  
DataOut feed;
```

```
String apiKey = "YOUR_API_KEY";  
String feedId = "YOUR_FEED_ID";
```

```
int sendInterval = 1000;
```

```
feed = new DataOut(this, apiKey, feedId);
```

```
void sendVal() {  
    feed.setStream(0, illumination);  
    sendData = illumination;  
}
```

Retrieving data from COSM

```
import cosm.*;
DataIn feed;

String apiKey = "YOUR_API_KEY";
String feedId = "YOUR_FEED_ID";

feed = new DataIn(this, apiKey, feedId);

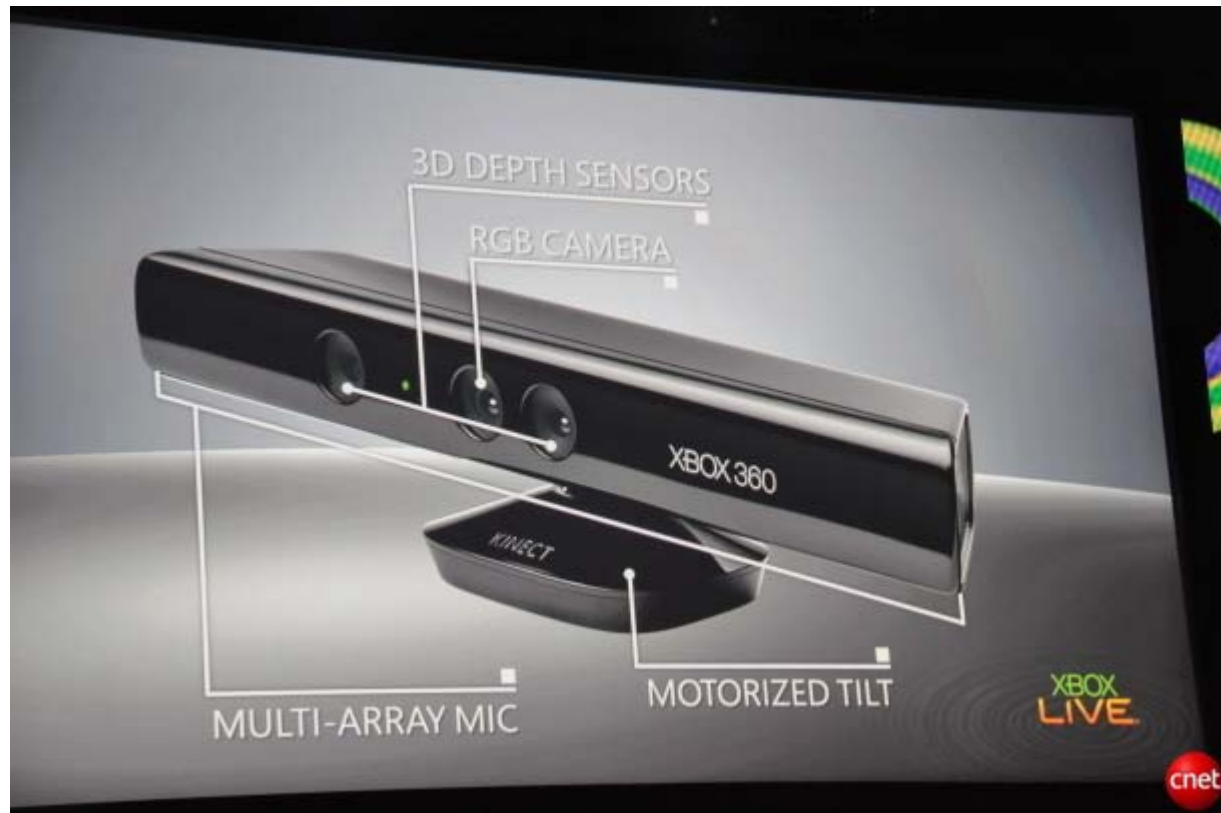
void requestData() {
    feed.connect();
    feedValues[count] = feed.getValue(0);
    println(feedValues[count]);
    count = ++count % width;
}
```

Motion Tracking

Audience: <http://random-international.com/work/audience/>



Microsoft Kinect



http://reviews.cnet.com/8301-21539_7-20007665-10391702.html

Kinnect Hack

<http://www.engadget.com/2010/11/19/kinect-hack-creates-worlds-greatest-shadow-puppet-video/>



TUIO Kinect

<http://code.google.com/p/tuiokinect/>



<http://vimeo.com/21525588t>

Assignment Wk05

01: Attach a sensor(s) in your home/studio environment and record/share a daily activity over COSM.

(ex. Pressure sensor -> Chair = Chair Usage)

02: Create an object that respond to the value changes of a sensor feed on COSM.