Arts/Tech Collaboration

With Embedded Systems and Kinetic Art

SIGGRAPH2013

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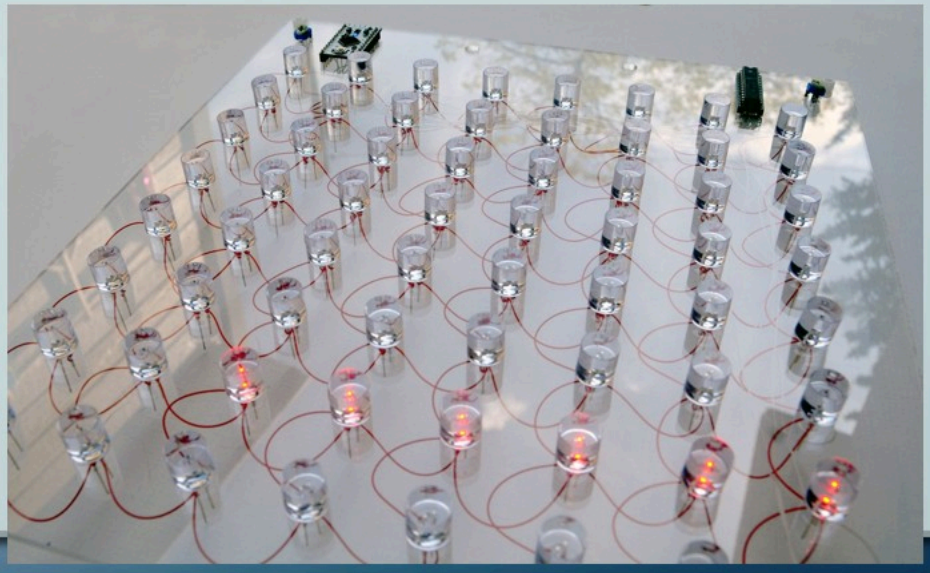
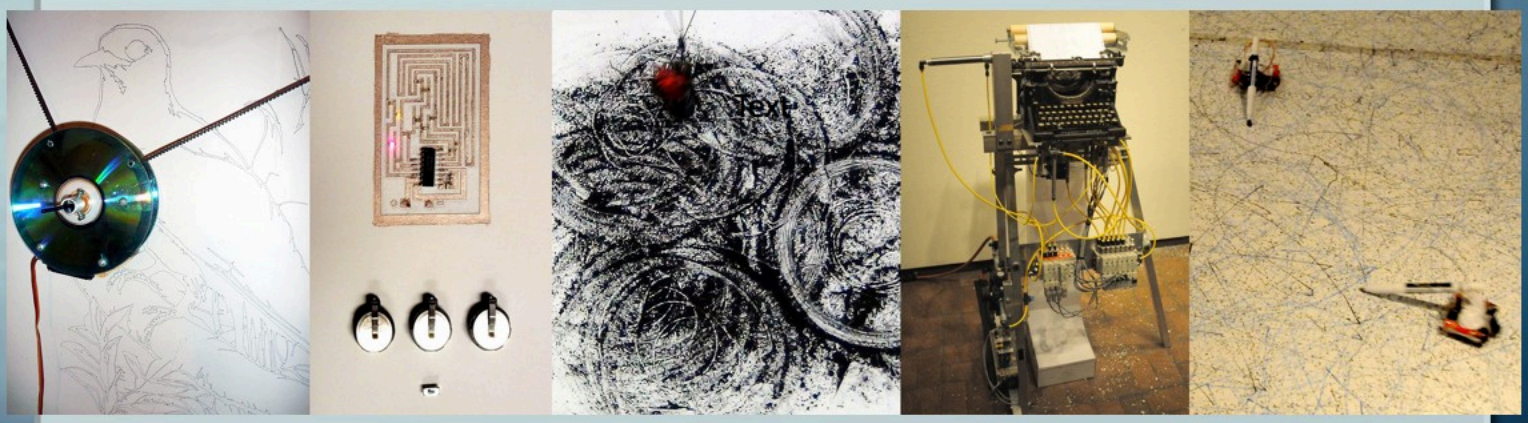
Agenda

I argue that arts/technology collaboration is a powerful framework for enhancing ideas in both arenas



Context

I frame this in the context of ***kinetic art*** and its connection to ***embedded systems***

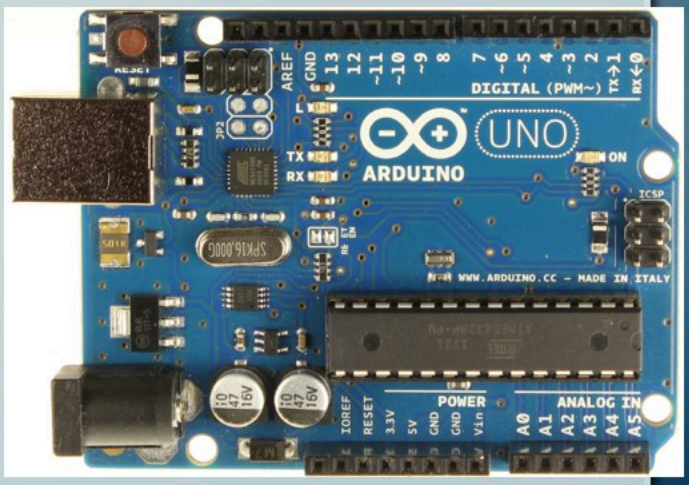


Cross-Disciplinary Class

- Bring Art students and Computer Science and Engineering (CSE) students together
  - Design and build embedded-system-controlled kinetic art
  - Goal is benefit for both groups of students
- Fundamental nature of ***Design***?
  - Design thinking vs. computational thinking?

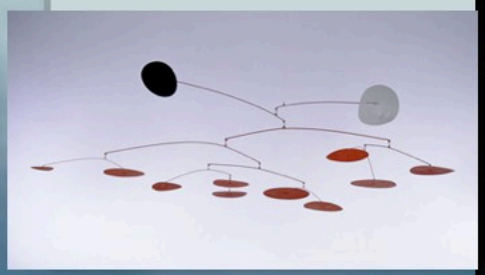
Embedded Systems

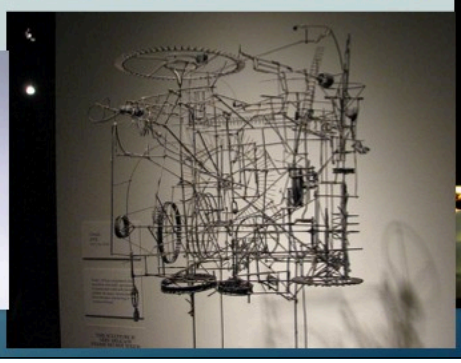
- Computer systems that are embedded into a complete device
  - Often small or special purpose computers or microprocessors
  - Designed to perform one or a few dedicated functions
  - Often reactive to environmental sensors
  - Often designed to directly control output devices

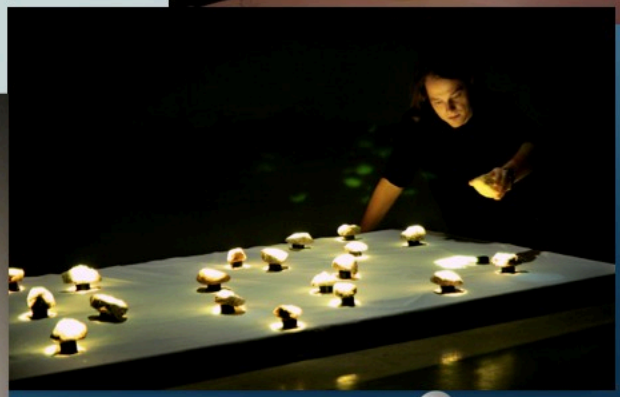


Kinetic Art

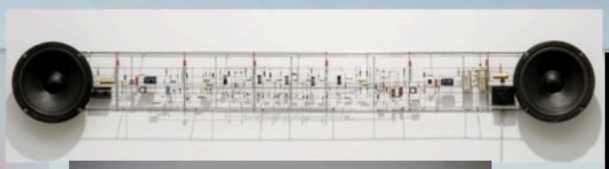
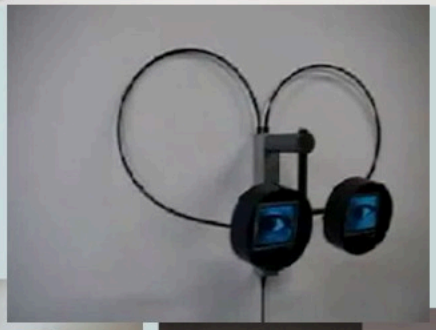
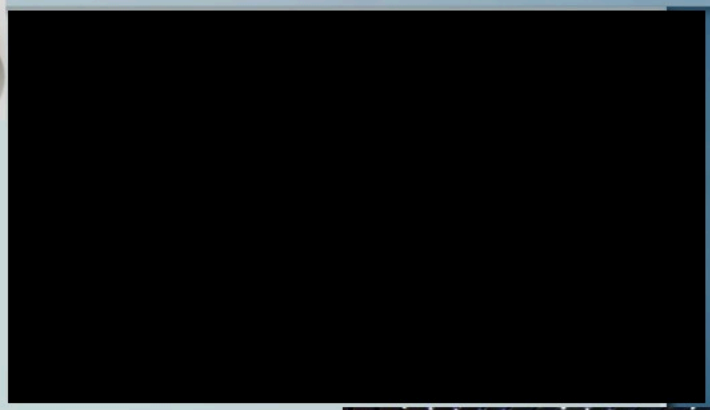
- Contains moving parts
  - Depends on motion, sound, or light
- Often controlled by microcontrollers
  - motors, actuators, transducers...
- Often reactive to environment







Electronic Kinetic Art

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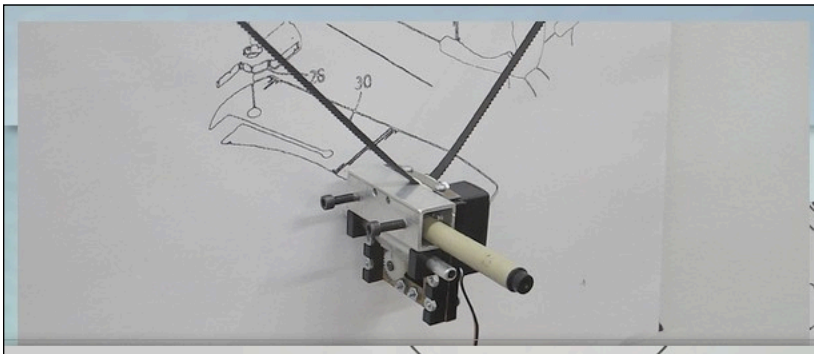
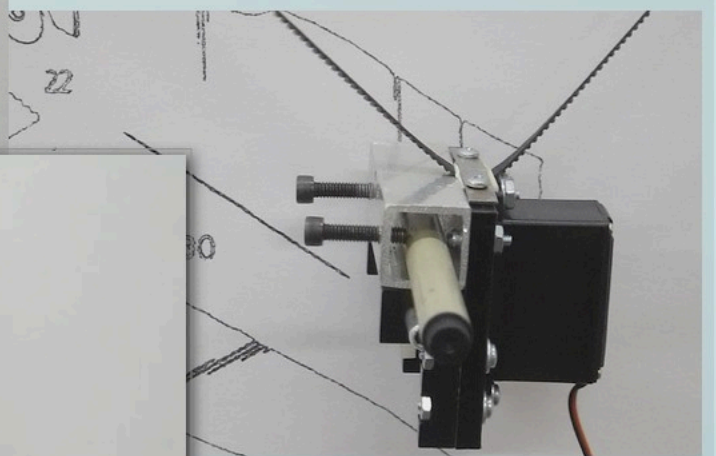
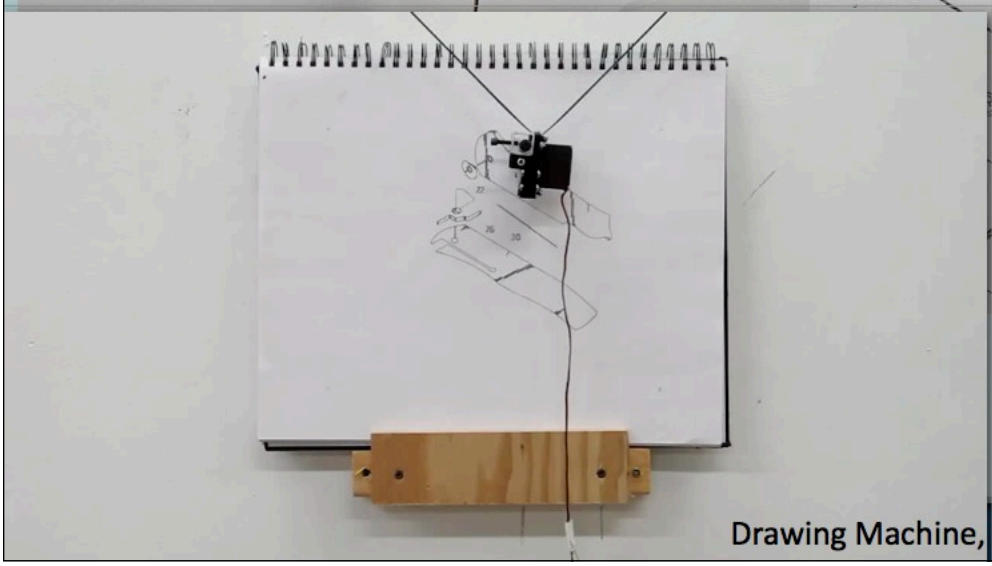
SIGGRAPH Art Gallery

Drawing Machine, Robert Twomey, 2013

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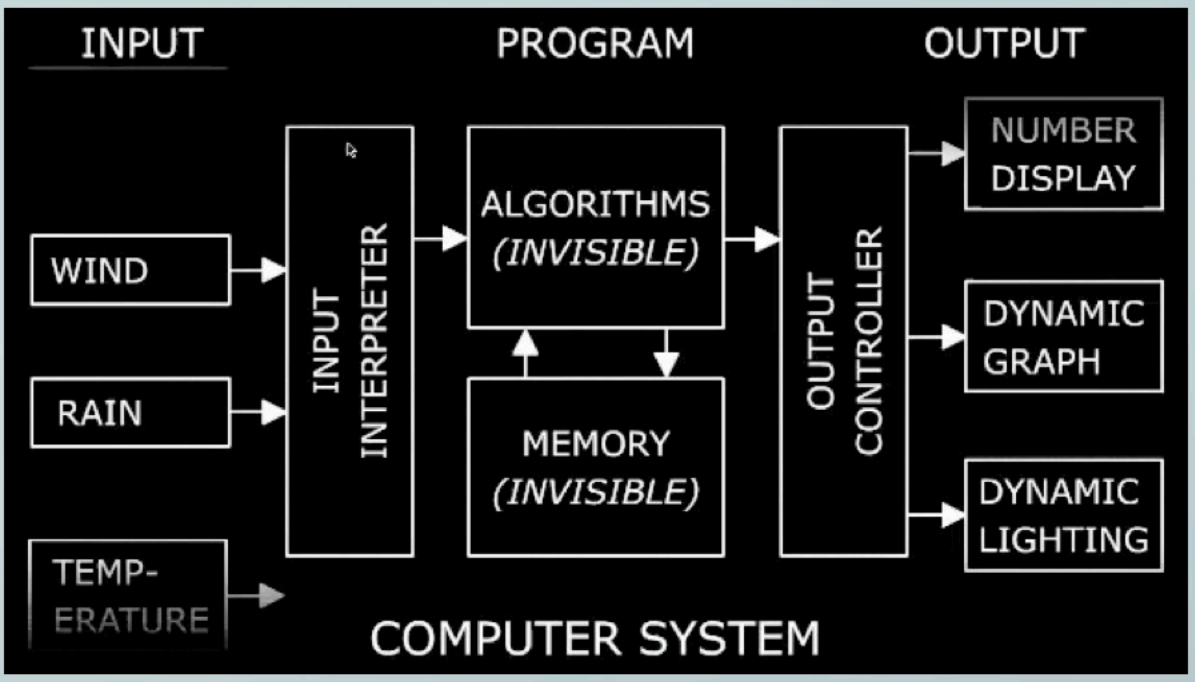
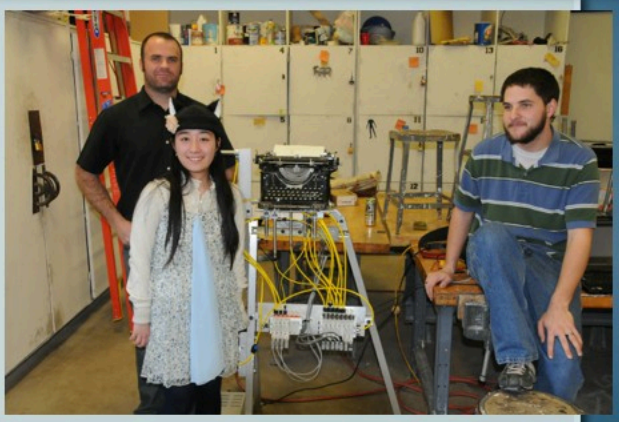
Jim Campbell's Algorithm



Class Overview

- Basic reactive programming with embedded systems
  - Electronics fundamentals
  - Sensors and actuators as I/O
- Basic 3d art concepts
  - Formal elements: aesthetics, proportion, balance, tension
  - Material studies and mechanical linkages
- Studio-based instruction model

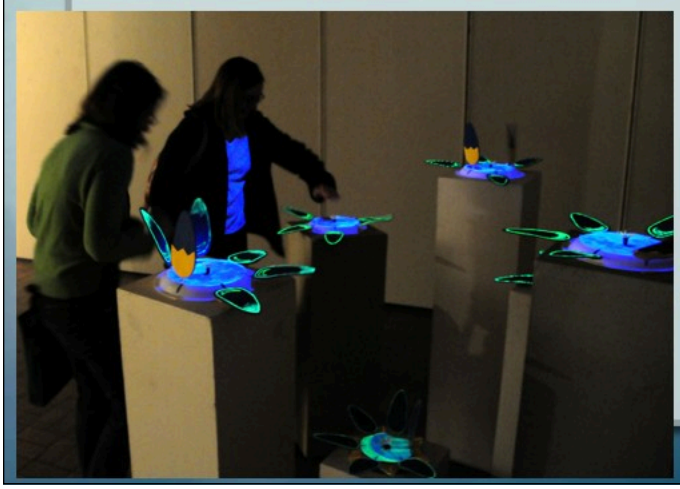


Class Overview

- Individual and group projects
  - Everybody tries everything individually
  - Also work in interdisciplinary teams
- Finish with a gallery show
  - 2009/2010: Invisible Logic
  - 2010/2011: Intersectio
  - Spring 2012: Drawing Machines

Enhancing Creativity

- Creative design and design-thinking: powerful concepts
  - One definition: enhanced creativity is generating many potential solutions instead of gravitating quickly to one



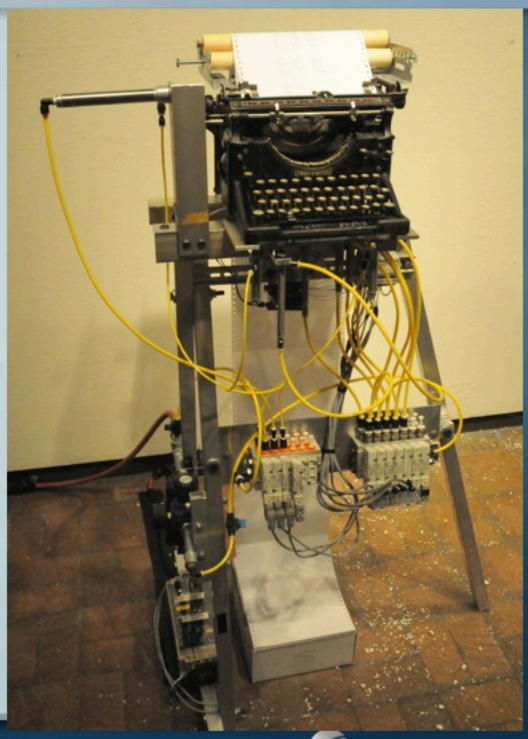
Kinetic art is serious stuff…

… but not regular CS projects

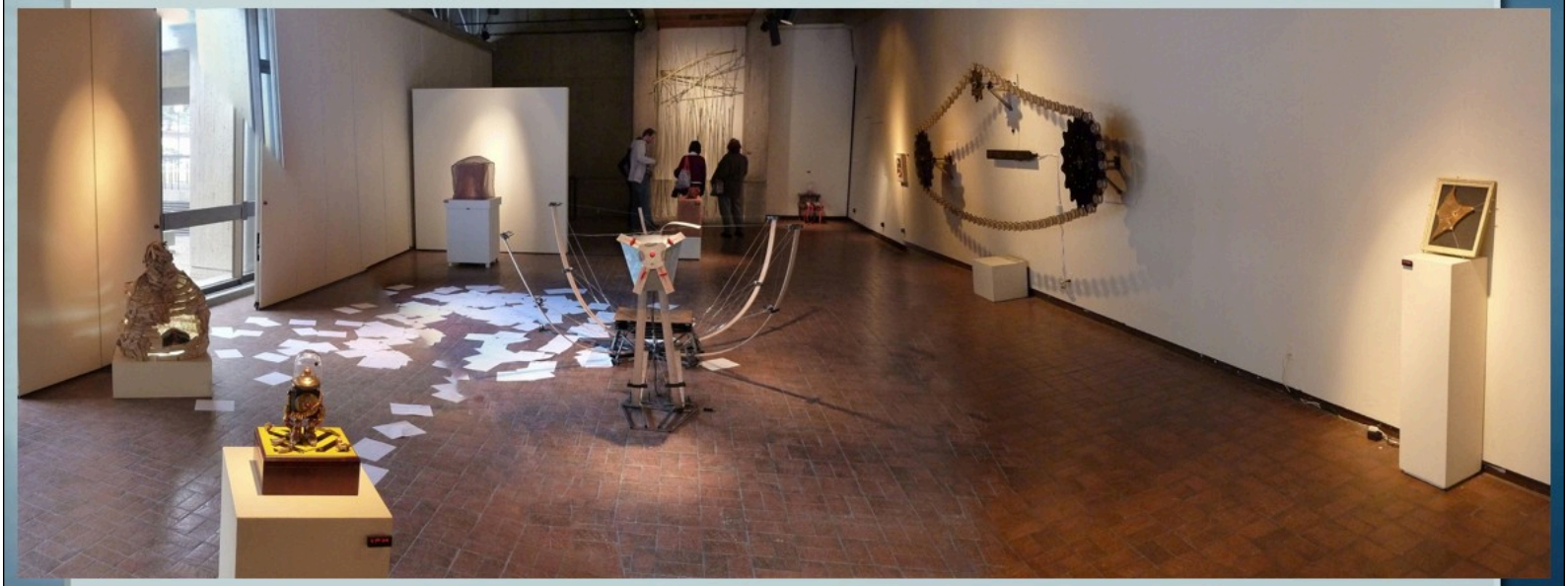
CS students have the freedom to explore without worrying about getting it "right"

HW Infrastructure

- Controller – Arduino
- Sensors
  - Potentiometers/knobs, light, motion (PIR), distance, vibration (piezo), sound, temperature, etc.
- Actuators and transducers
  - LEDs , servos, DC motors, stepper motors, sound, etc.
- Other parts
  - LED drivers, transistors, resistors, diodes
  - LCD displays, SPI/I2C peripherals
  - Power supplies, soldering stations, wire, etc.



Examples of Student Projects



Examples of Student Projects

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Student Comments

- I now have a much better understanding of how to "think about art" and also saw an entirely different side of computer science.
  - –Artists have a completely different mindset and it was nice to get a new perspective on things. It really made me learn to appreciate the creative thinking they brought to the table.
- I enjoyed it and already have suggested it to several artists and engineers I know!
  - –I feel more competent in both [art and computer science] having experienced each side in a new way.

Conclusions

- Embedded systems and kinetic art is a natural collaboration
  - Exploration of fundamental design concepts
  - Design-thinking is a natural complement to computational-thinking
- Studio instruction model is fascinating
  - Both groups of students benefit from working with each other
  - Cross-college collaboration – just the beginning!

Contact

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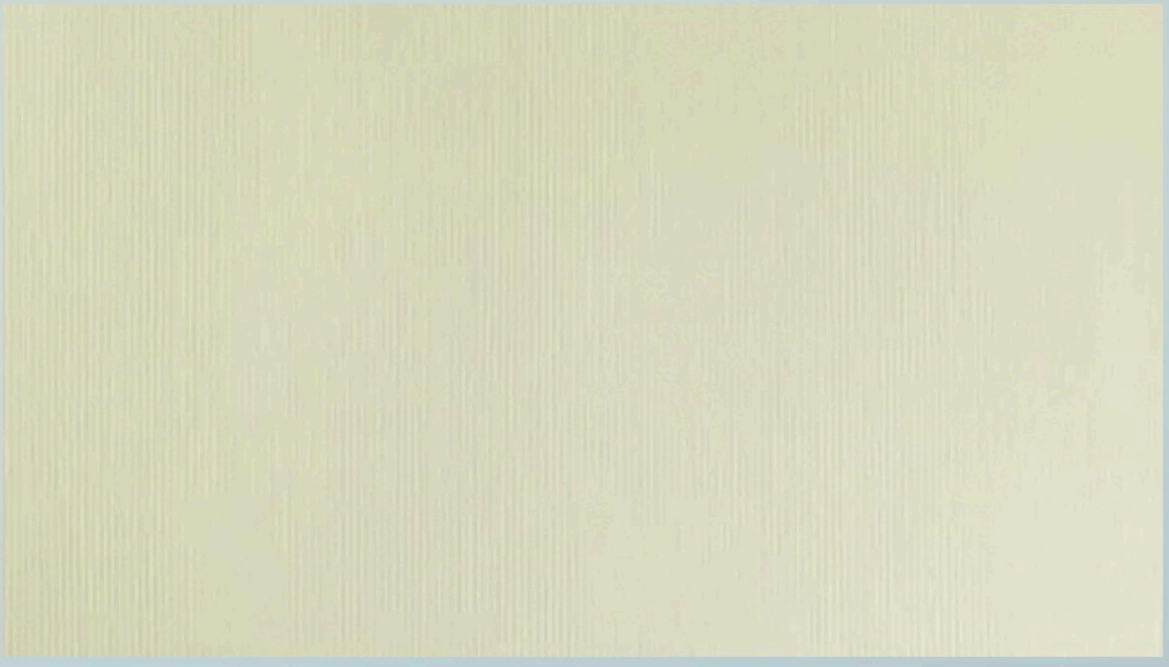
Extra Slides

- More examples of student projects

Examples of Student Projects



Examples of Student Projects

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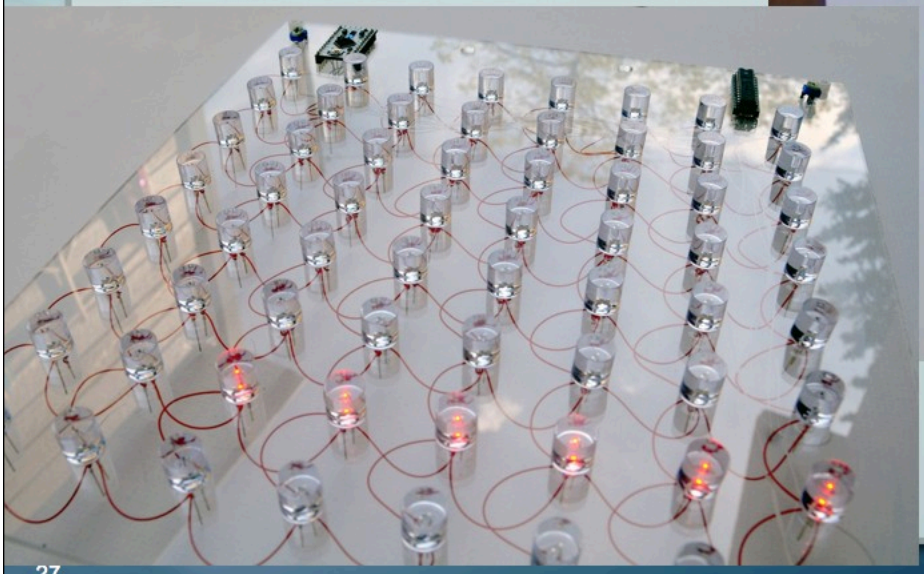
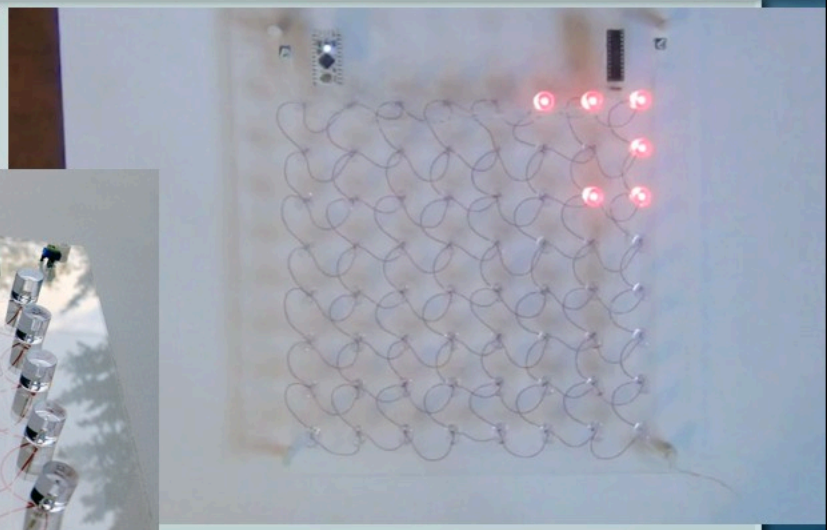
Intersectio

Serpente Rosso





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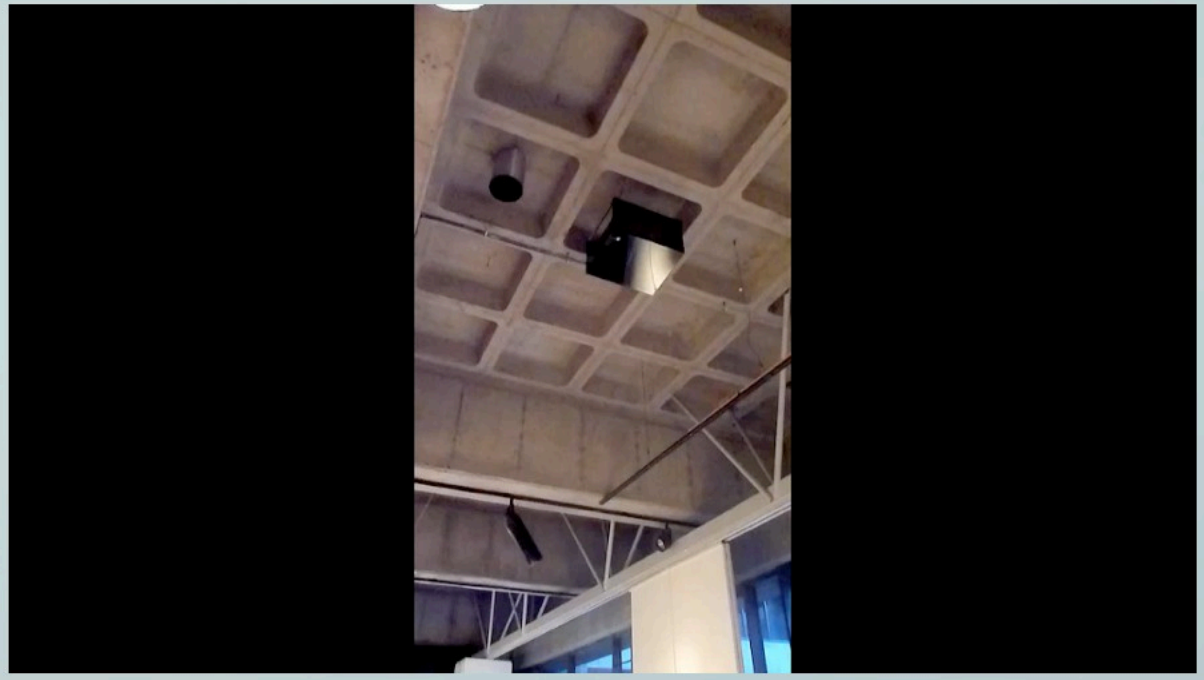

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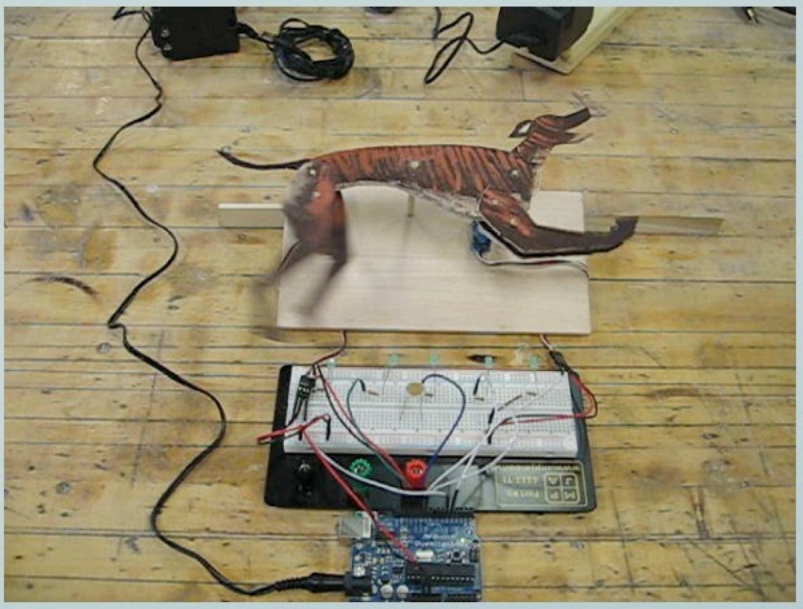
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