# EN1-06: Simple Robotics

November 4th, 2016

# Schedule

- In the News
- Upcoming Schedule
- Midterm Review Exam
- Project 6 Assignment
- Project 7 Assignment
- Front Panel Picture Control

It's Now (Temporarily) Legal to Hack Your Own Car



http://spectrum.ieee.org/cars-that-think/transportation/systems/its-now-temporarily-legal-to-hack-your-own-car

These Robots Are Chains of Tiny Magnetic Beads

# Upcoming Schedule

**You are here**

**Wed, Nov 2nd**

Proj 6 & 7
Front Panel Controls

**Fri, Nov 4th**

Proj 6 & 7
Hands-on

"Tufts Friday"

**Mon, Nov 7th**

In-Class
Competition (Proj 6)

**Tues, Nov 8th**

TA Office Hours
(project or midterm)

**Wed, Nov 9th**

NO CLASS; group
work time

**Fri, Nov 11th**

NO CLASS;
Vetern's Day

**Mon, Nov 14th**

Proj 7: Interactive
Video Game demos
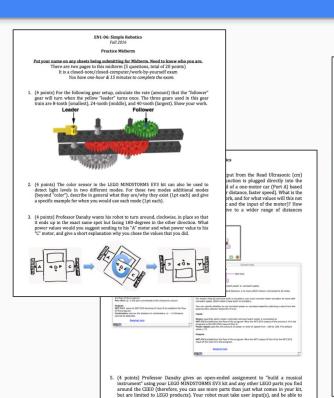
**Wed, Nov 16th**

Midterm Review
(come with questions)

**Fri, Nov 18th**

**MIDTERM**
(in class)

And assign final project...

# Midterm Exam (Practice Exam)





Exam Question: Gear Ratios (LEGO MINDSTORMS)

http://www.dreslab.com/robotics2016/2016/11/04/midterm-exam-review-questions/

# Assignment 6: In-Class Competition (11/7)

**Schedule of the Competition (subject to change):**
    3:00pm: Arrive at class (and cover any logistics)
    3:05pm: Competition details announced
    3:10pm: Answers to questions regarding Competition
    3:15pm: Start developing solutions (hardware/software) for Competition
    4:00pm: Stop developing solutions (hardware/software) for Competition
           Robots must be in starting position ready to begin Competition
    4:10pm: End of Competition, clean-up (leave room as found)
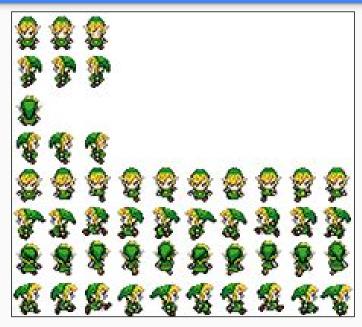    4:15pm: Depart class

# Assignment 7: Interactive Video Game

**Project Description:** For this project, you will be building an Interactive Video Game. "*Interactive*" means it needs to leverage sensors and react to the user, "*video*" means you should have some GUI (graphical user interface) for the user, and "*game*" meaning it should be fun (and have other gamelike attributes). Also, think about the "*human factors*" (branch of engineering considering the design of the interface between the user and, in this case, the robot) aspects of what you are designing. How are they holding it, interacting with it, and is the game concept well explained and makes sense to the user?

**Details (Hardware/Software):** You will use the LEGO MINDSTORMS EV3 kit as inputs (and perhaps outputs). Program the software using the LabVIEW Graphical Programming Interface. You can implement your GUI (graphical user interface) on the screen of the EV3 or use a Front Panel Picture Control in LabVIEW. You can work in pairs (2-people) or groups-of-four.

When creating an interactive game using your EV3, if you base it (conceptually) on an existing game (which is fine), try and add a unique twist/element to make it your own. Or you can invent a brand new game! It can be single player or multiplayer. Use your creativity to design the interactions and your building and programming skills to create it with the LEGO MINDSTORMS EV3 and program it in LabVIEW. Be sure to consider the "client" (the player(s) of the game) and how they are interacting and enjoying the experience. And be sure to provide them enough information (e.g. on the screen, or in terms of feedback in other ways; and remember that people don't often read instructions!).

# Front Panel Picture Control (version 5)

# Hands-on: Graphic Manipulation

**EV3 Screen Manipulation:**

(1)　Erase screen and write text to the screen
  (a)　Wait for sensor, and then change text
  (b)　Display different text based on different sensor readings
(2)　Change line number text is being written on by reading the motor value (scrolling text?)
(3)　Draw a circle and draw a square on the screen
(4)　Change the position of the circle and the square based on the motor value

**Front Panel Picture Control Manipulation:**

(1)　Draw a circle and draw a (big) square on the screen
(2)　Move the circle on the screen based on the motor value(s)
(3)　If the circle touches the square, exit the loop (game over)
(4)　Load in an external graphic file instead of the circle
(5)　Make smaller squares inside the big square; check locations of all of these against circle