Robotic Merit Badge Session #2

- July 25, 2015
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Agenda

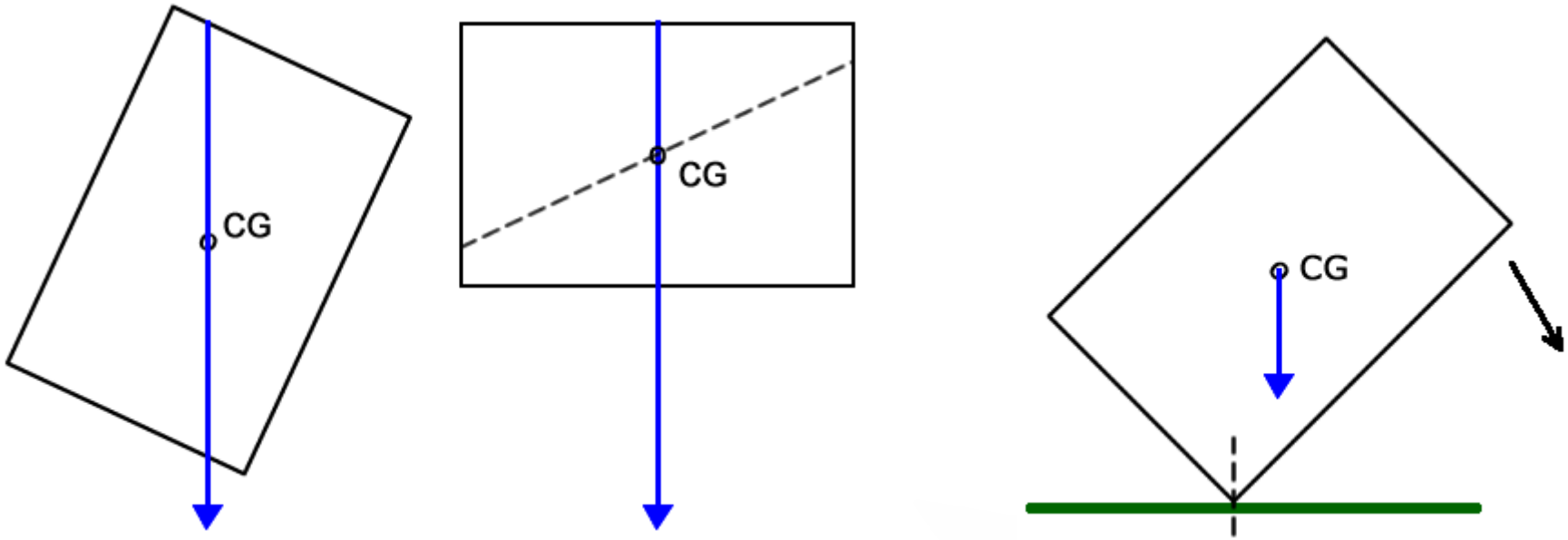
- Engineering Notebook
- Mechanical Design
  - Center of Gravity
  - Gears
- Programming
  - Development Tips
  - Exercises
- Assignment to work on before Session #3

Engineering Notebook

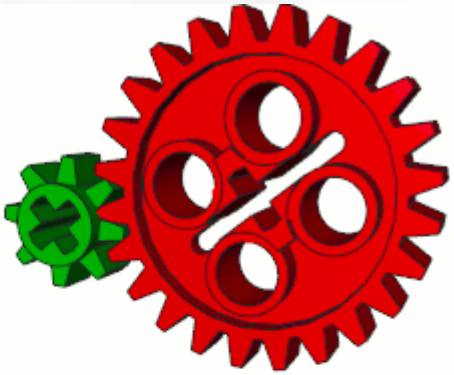
- Put your name on your notebook
- Design
  - Ideas – What tasks will your robot perform?
  - Review with counselor for approval (Deadline August 8th)
- Tests
  - How will you test your robot?
  - How did your tests help refine your design?
- Logic and software
    - What is the logic that your control software will follow?
- Description and sketch/picture of robot
- Potential for Improvements – What could be better?

Mechanical Design – Center of Gravity

- Center of Gravity- Indicator of stability

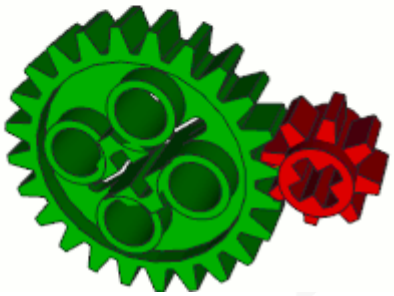


Mechanical Design – Gears

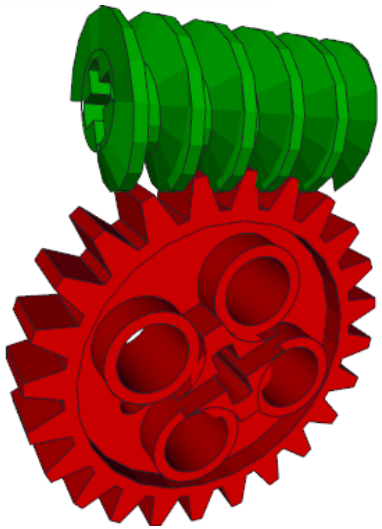


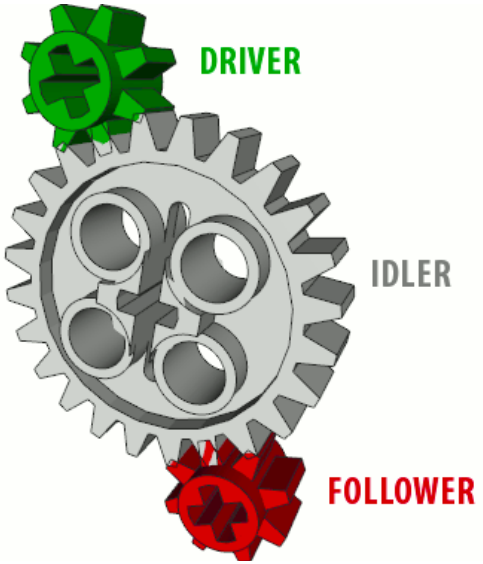
GEARING DOWN

Gear Ratio =
Driver teeth/Follower teeth



GEARING UP





Beveled Gears

Programming Tips

- A robot will do exactly what you tell it to do, but not always what you want it to do
- Write a little, test a little
- Write lots of small programs to understand how things work before attempting a large program.
- Save programs often.
- Create different versions of the program at stable development points.
- Look at example programs to see how they work

Analyzing The Test Program

- Load the Test Program
- Follow the logic of the the program. What does it do?
- Program your Edison using the “Program Edison” button

Programming Exercises – Generating an SOS Signal

- Create a program to generate the SOS Morse Code signal with one LED
  - 3 short blinks,
  - 3 long blinks,
  - 3 short blinks
  - Pause
  - Repeat.
- A short blink is 0.25 seconds on
- A long blink is 0.75 seconds on
- Each blink is separated by 0.75 seconds of “off”
- Pause between each SOS word is 1.75 seconds
- Save Program as BlinkSOS

Programming Exercises – Using Sensors

- Modify the BlinkSOS program to start blinking when an object is detected and stop blinking when no object is detected.
- Save the program as BlinkSOSDetect

Homework

- Continue thinking about your robot design and write your ideas in the Engineering Notebook.
- Be creative and have fun.
- If you design a robot with two Edisons, I will give you another Edison robot!
- Design due on or before August 8th.
- Finish any incomplete programming exercises from EdBook 2 and class.