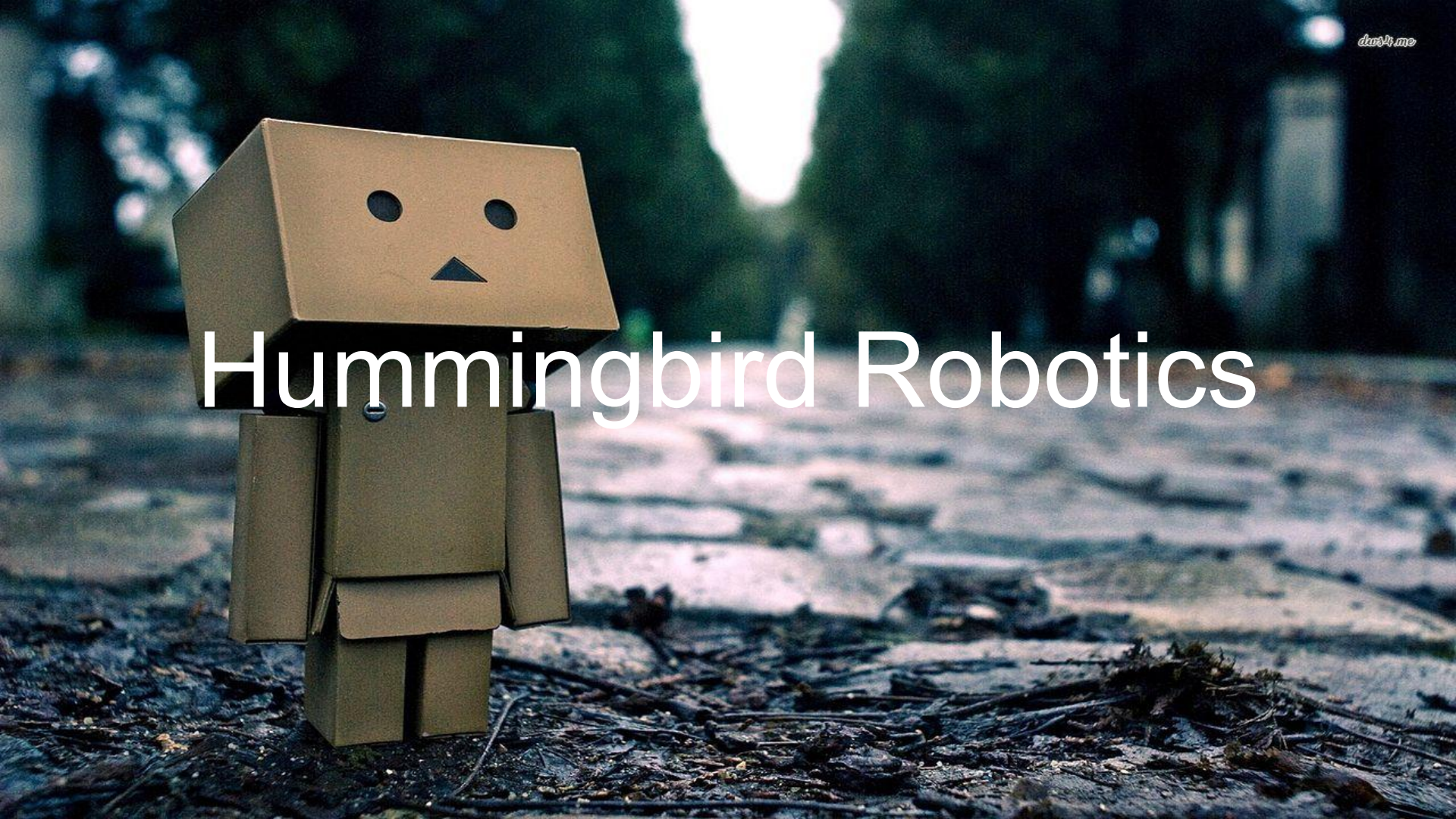
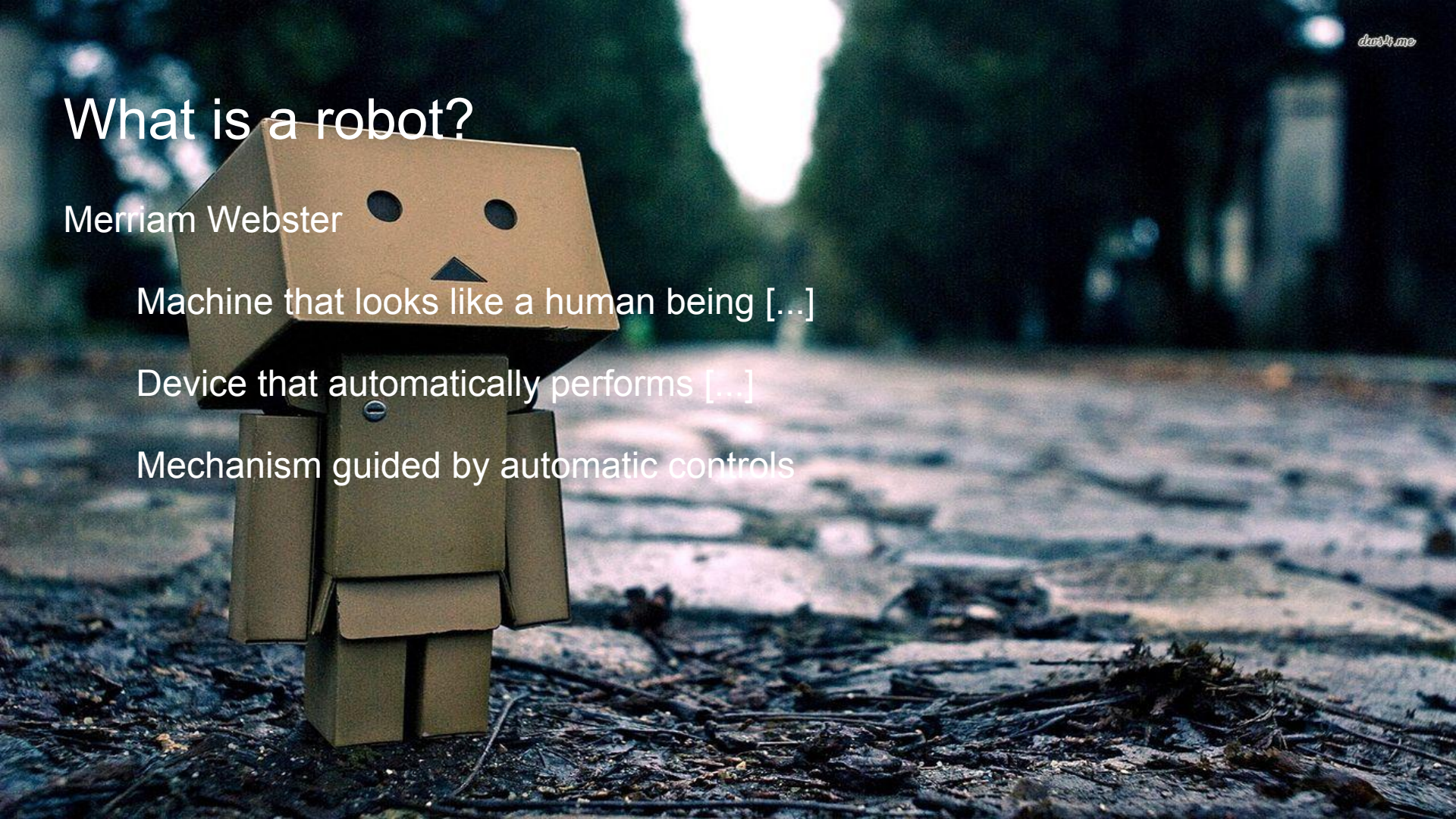

Hummingbird Robotics

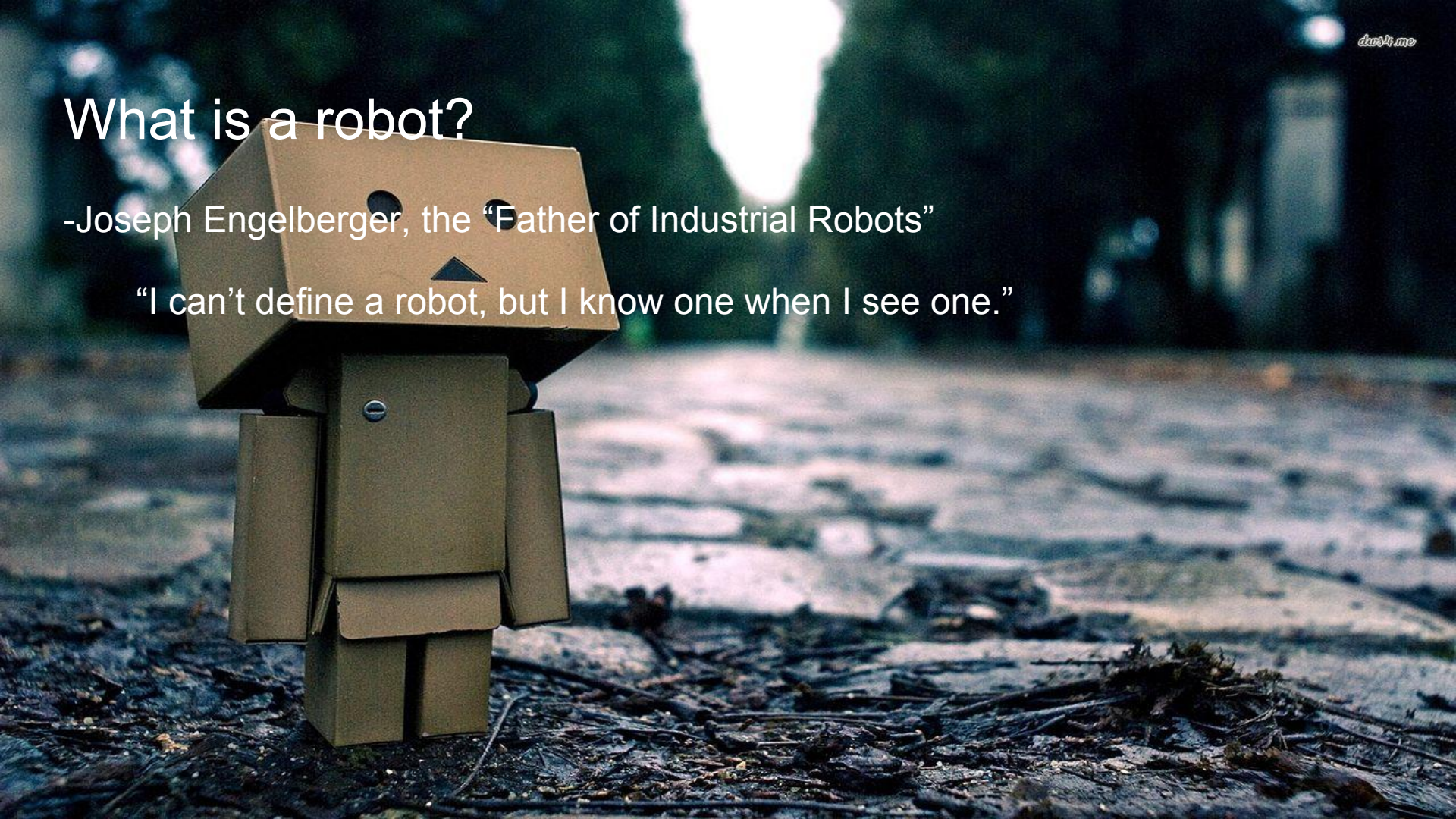
What is a robot?



What is a robot?

Merriam Webster

> Machine that looks like a human being [...]
>
> Device that automatically performs [...]
>
> Mechanism guided by automatic controls



What is a robot?

-Joseph Engelberger, the “Father of Industrial Robots”

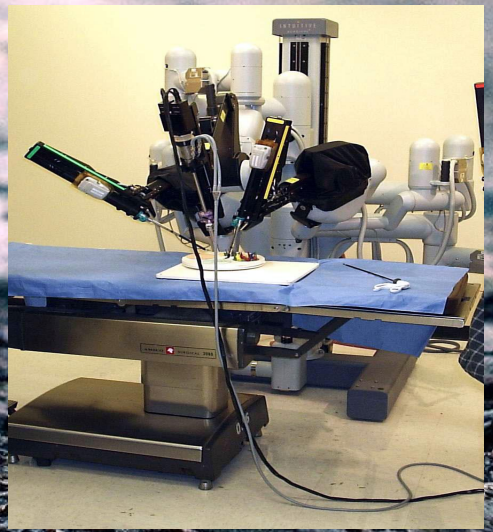
“I can’t define a robot, but I know one when I see one.”

Explore Planets

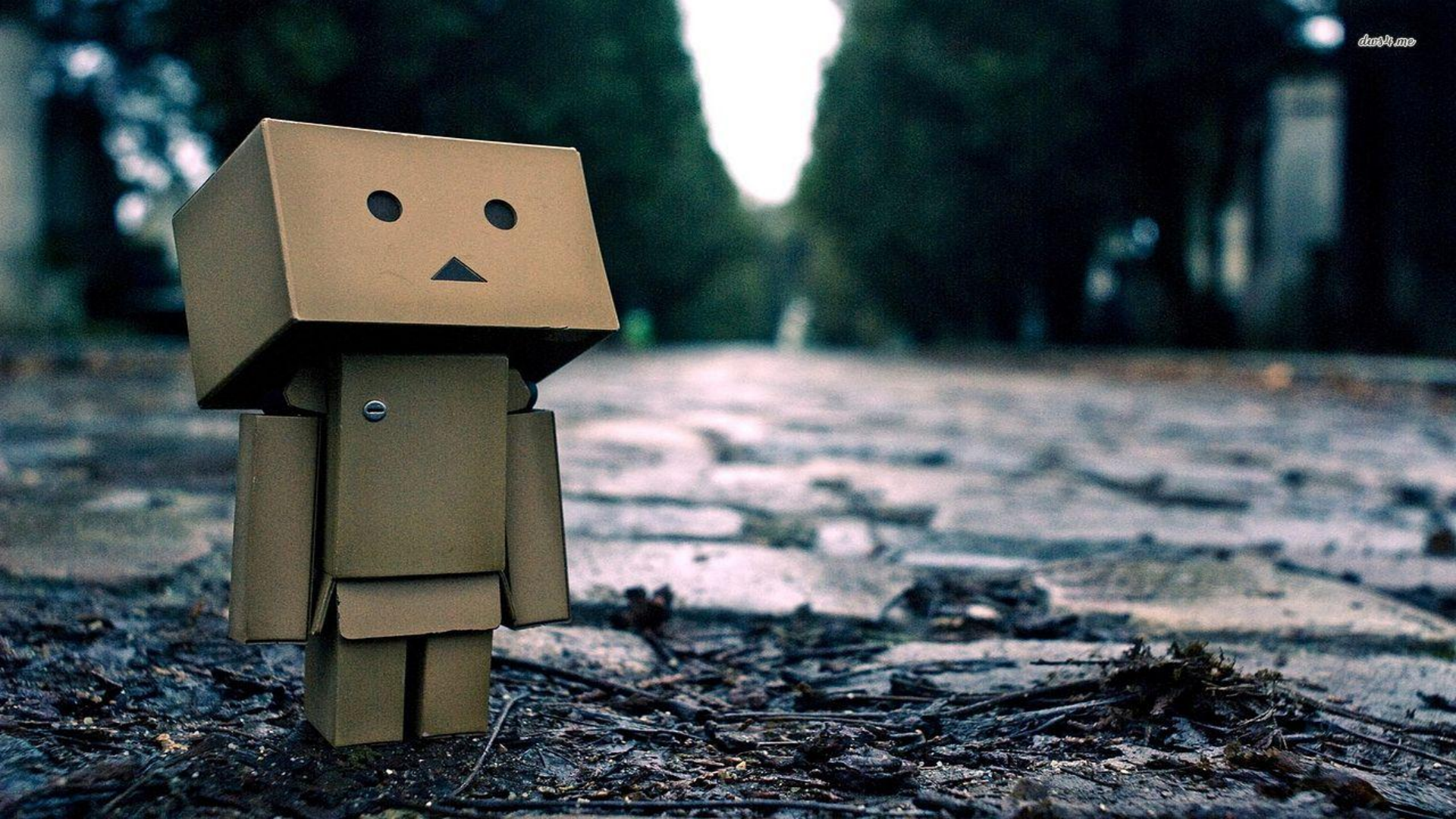
Create Art

Work in Factories

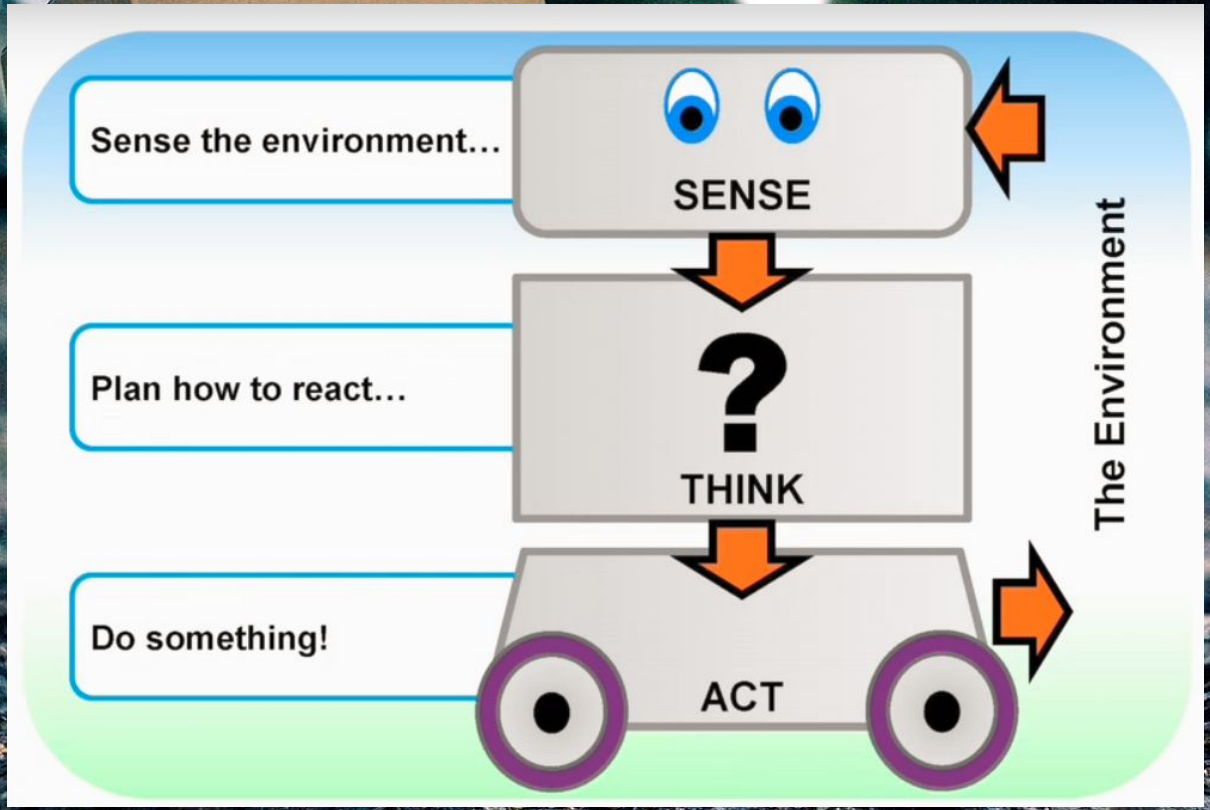
Autonomous Cars

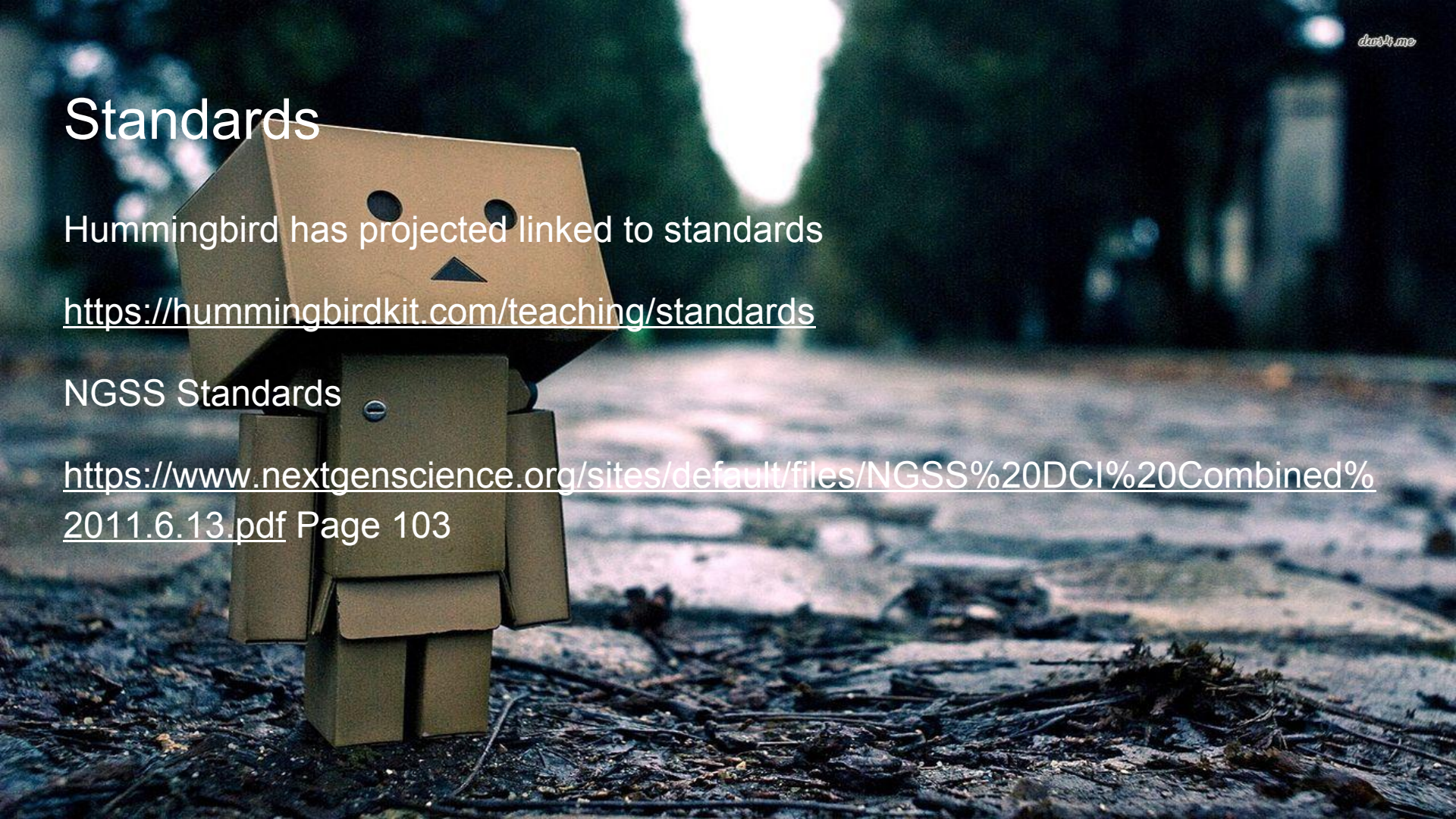


Perform Surgery


dunk.me

The Sense-Think-Act Rob





Standards

Hummingbird has projected linked to standards

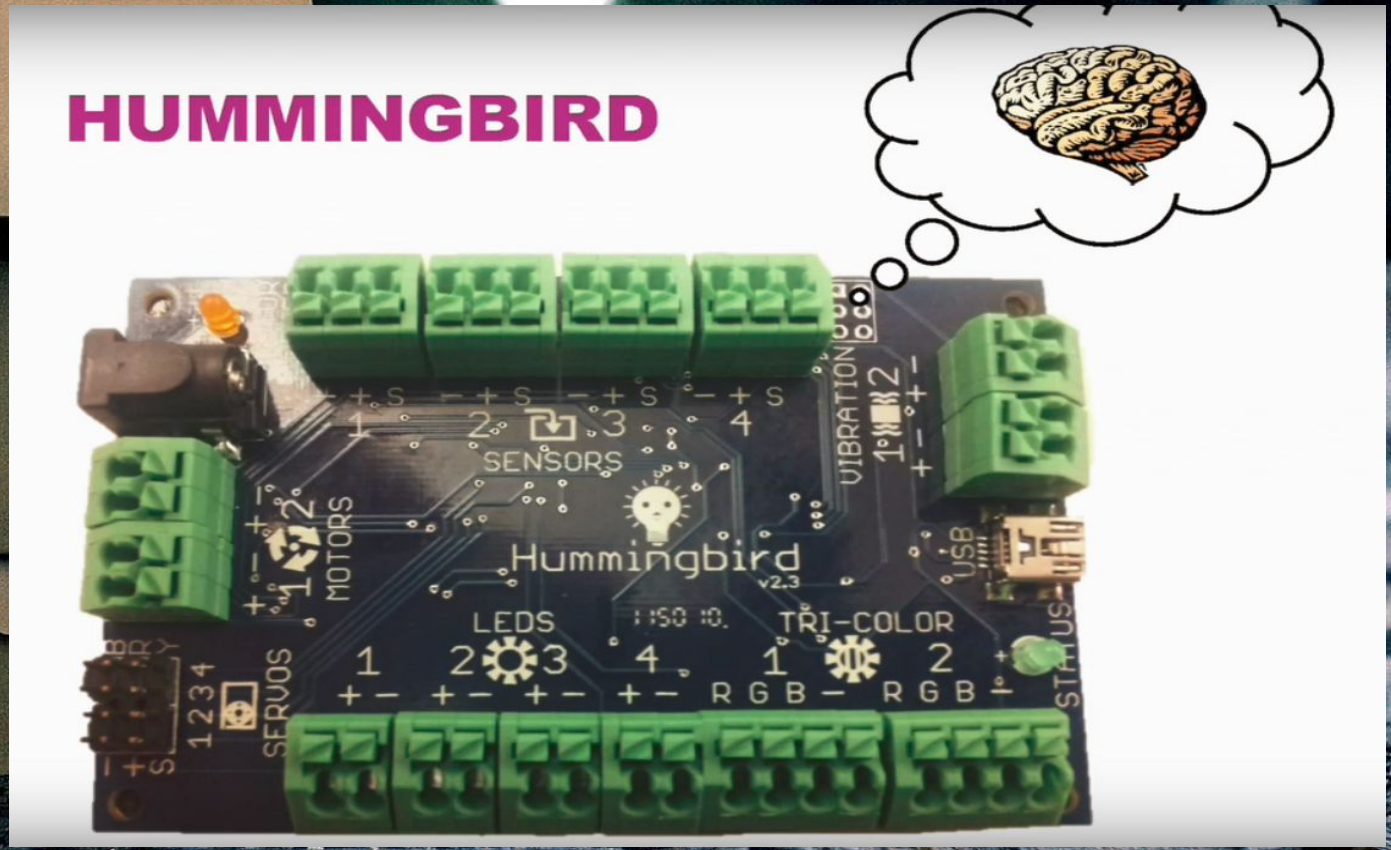
https://hummingbirdkit.com/teaching/standards

NGSS Standards

https://www.nextgenscience.org/sites/default/files/NGSS%20DCI%20Combined%2011.6.13.pdf Page 103

Robot Hardware

Microcontroller

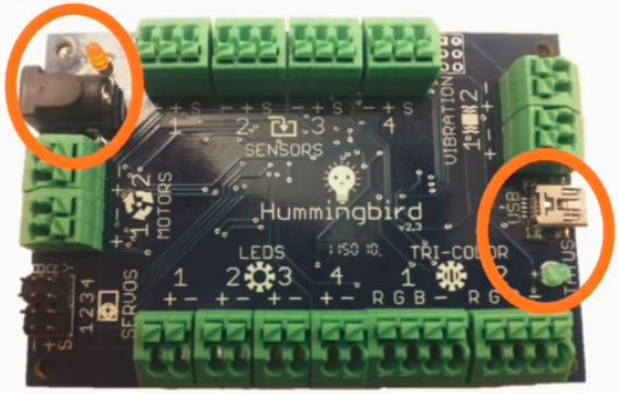


Robot Hardware

HUMMINGBIRD

Motor Power Port

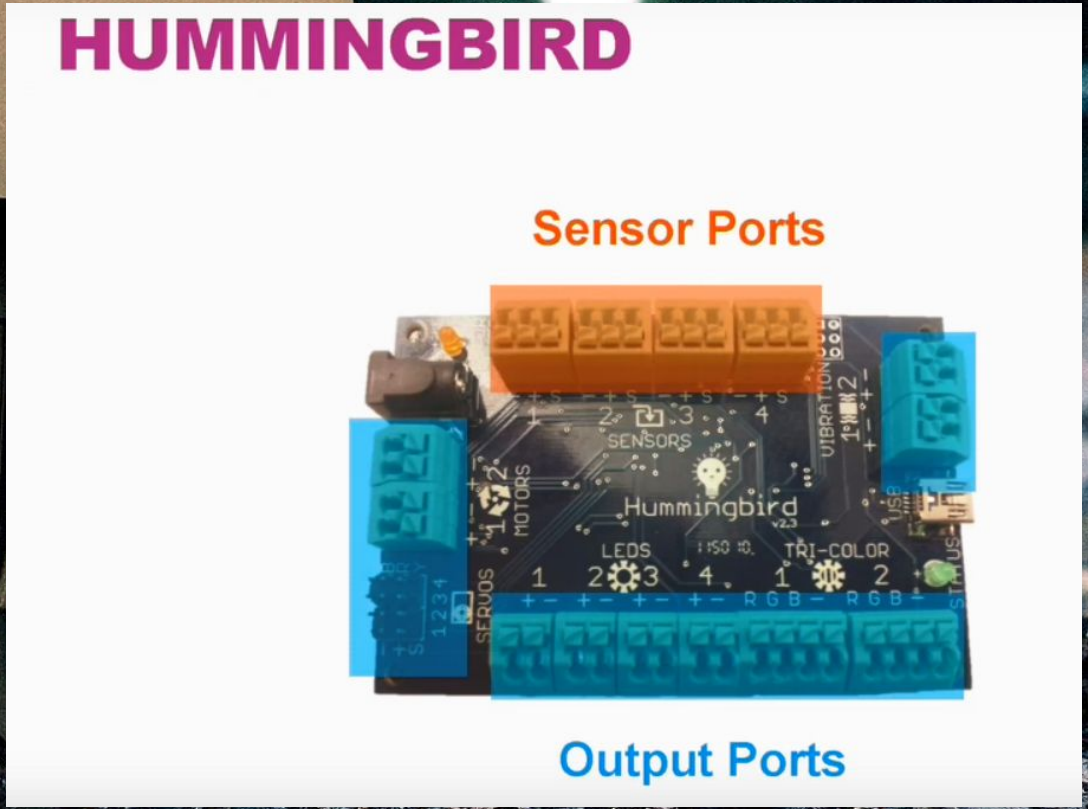
Motor Power Indicator



USB Port

Status Indicator

Robot Hardware



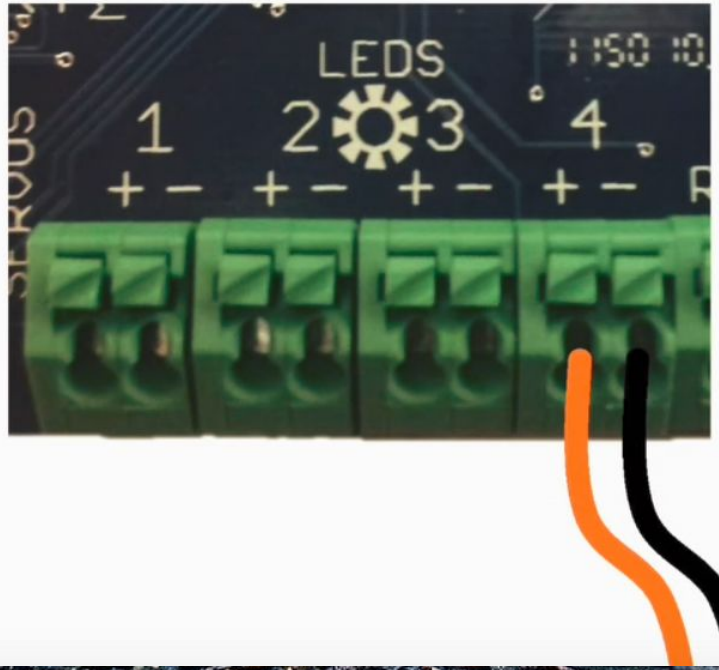
LED - a single color light source with controllable brightness

Hint! The light color matches the wire color.

Think of miniature colored light bulb with a dimming knob

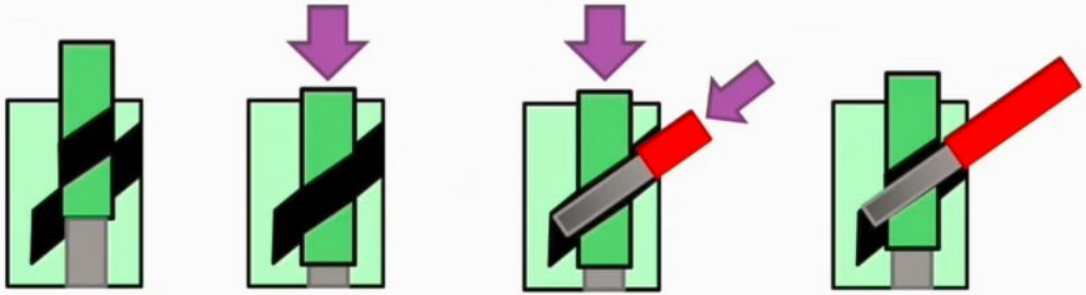
LEDs

USING AN LED



CONNECTION STEPS

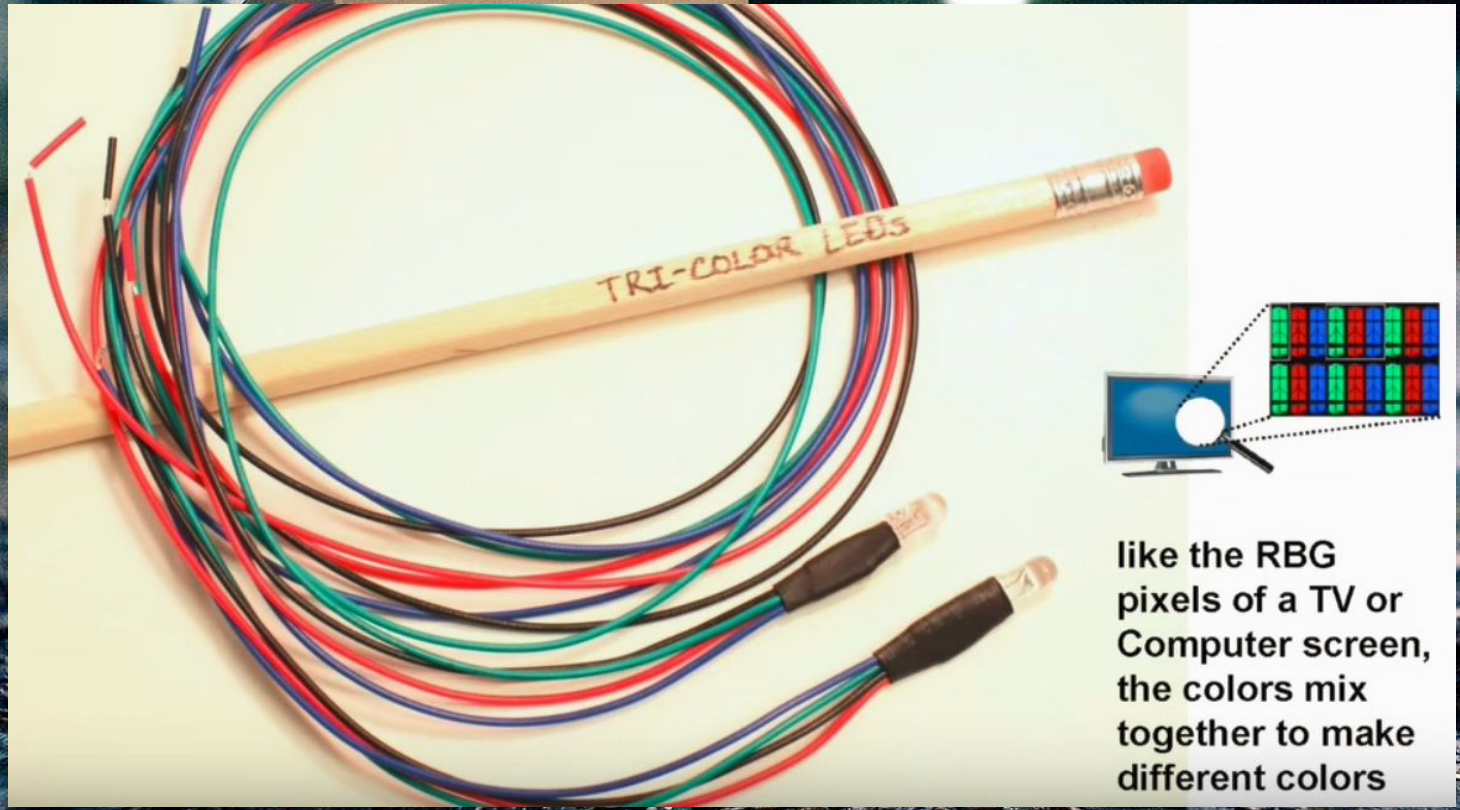
1. Remove any plastic from end of wire
2. Use thumb and index finger to twist individual strands together tightly



3. Press little button on top
4. Wire should insert easily
   - If you have to push it hard – make sure the button is all the way down
5. Release button to finish

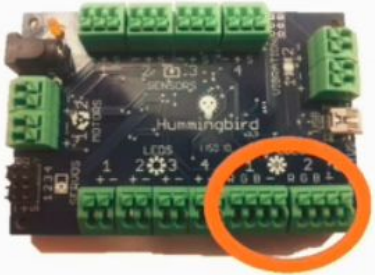
Tri-Colored LEDs

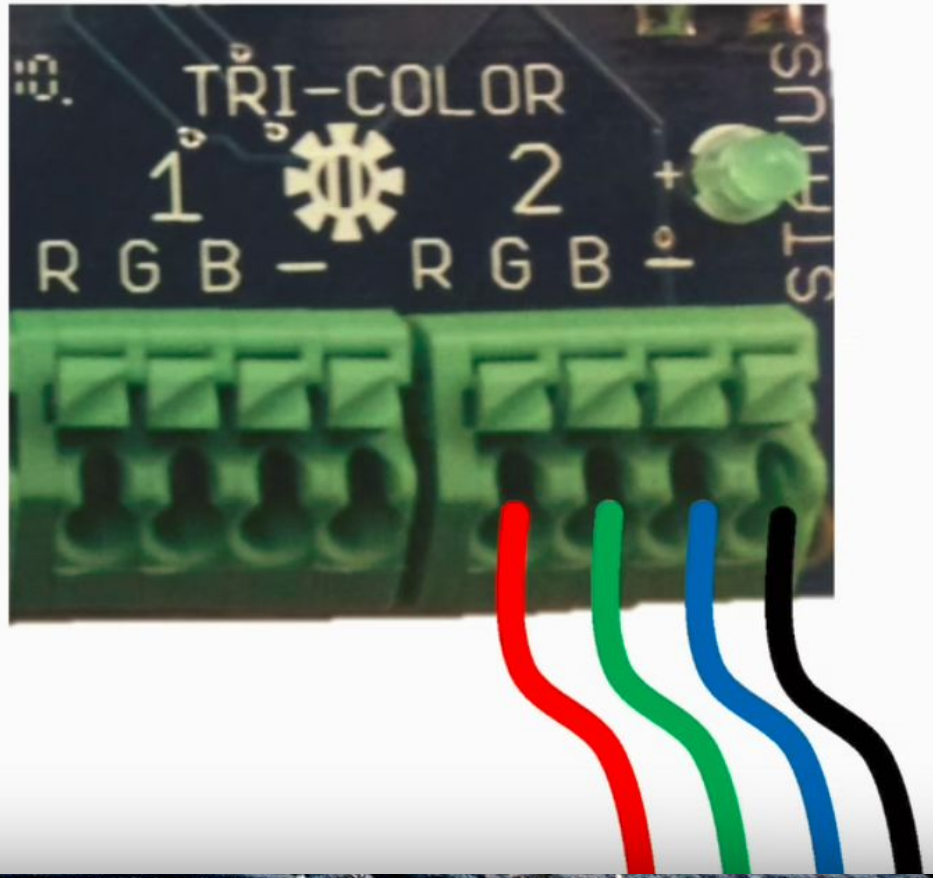
A red-green-blue (RGB) light source which can produce many light-based colors



like the RBG pixels of a TV or Computer screen, the colors mix together to make different colors

USING A TRI-COLOR LED

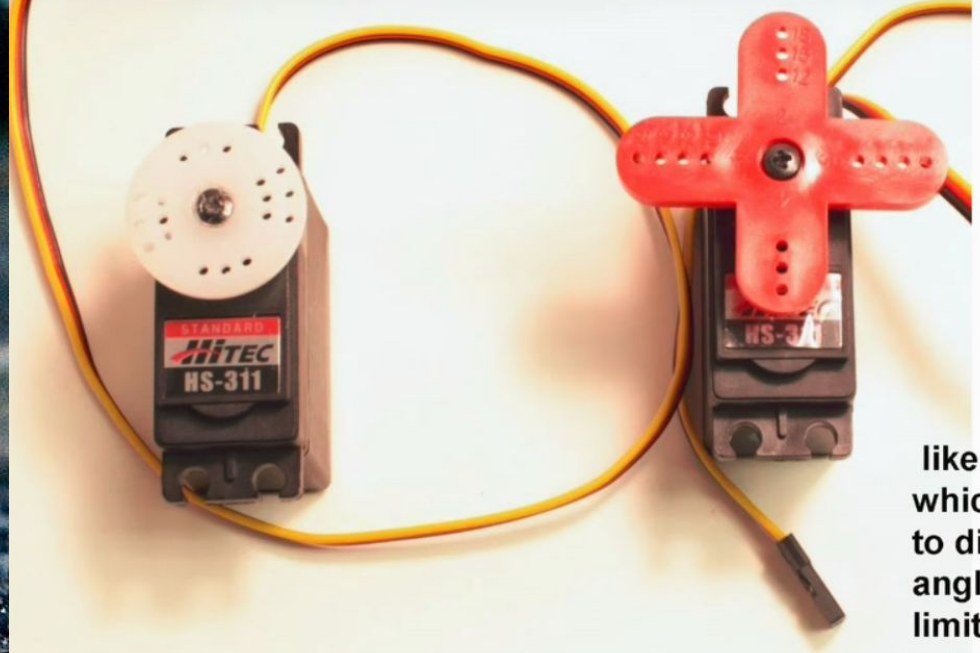




Servo Motors

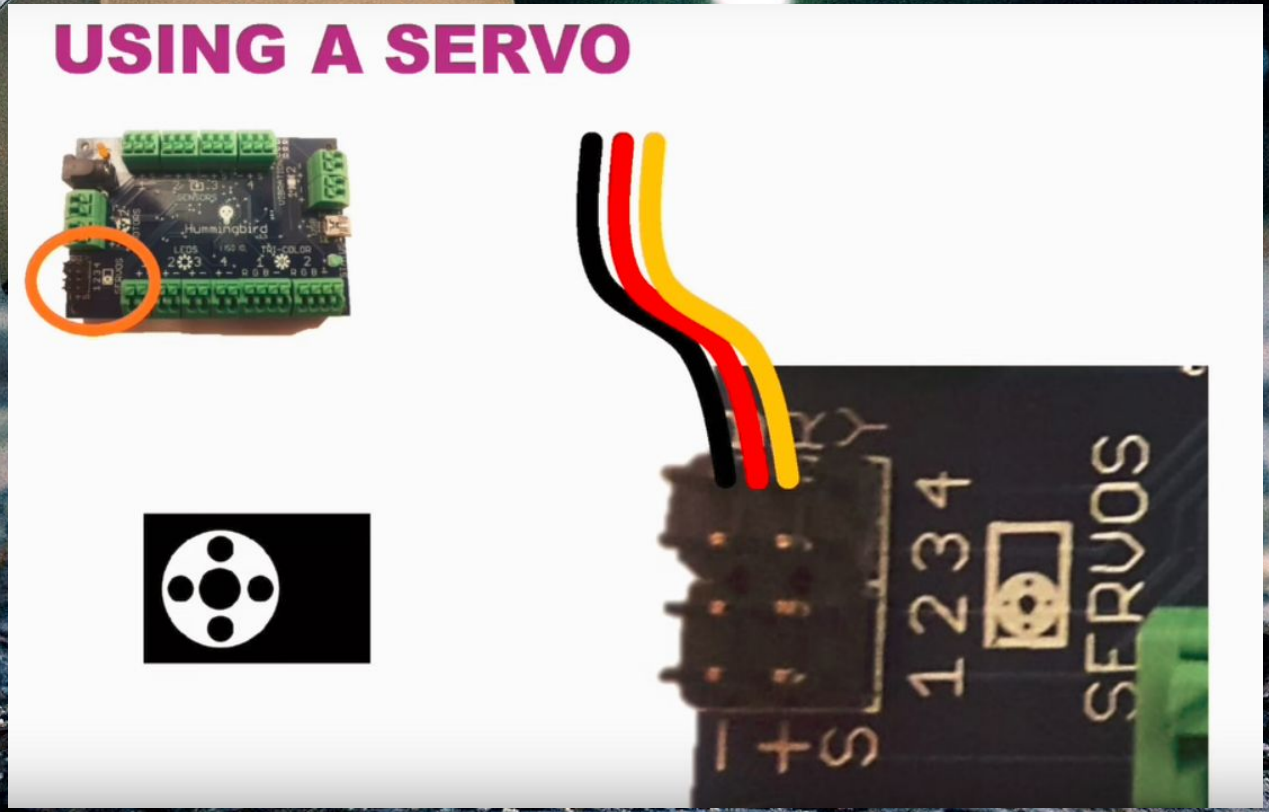
SERVO

a limited range motor with controls for specific angular positions



like an elbow which can move to different angles through a limited motion range

Servo Motors plug into the pins; not a block

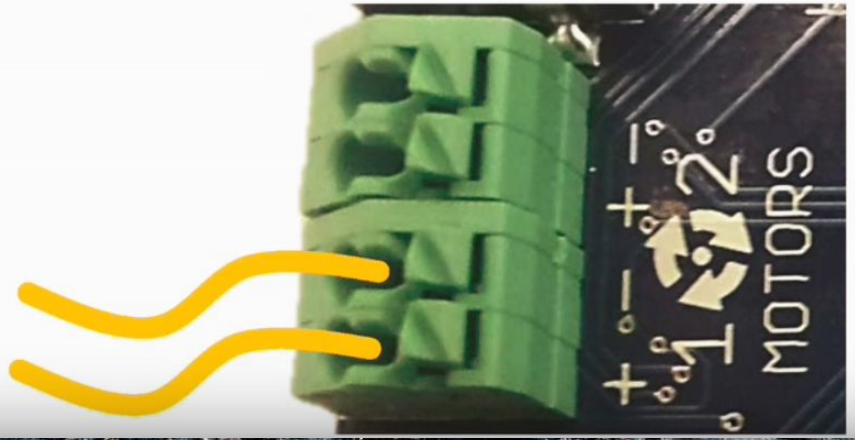


Motors

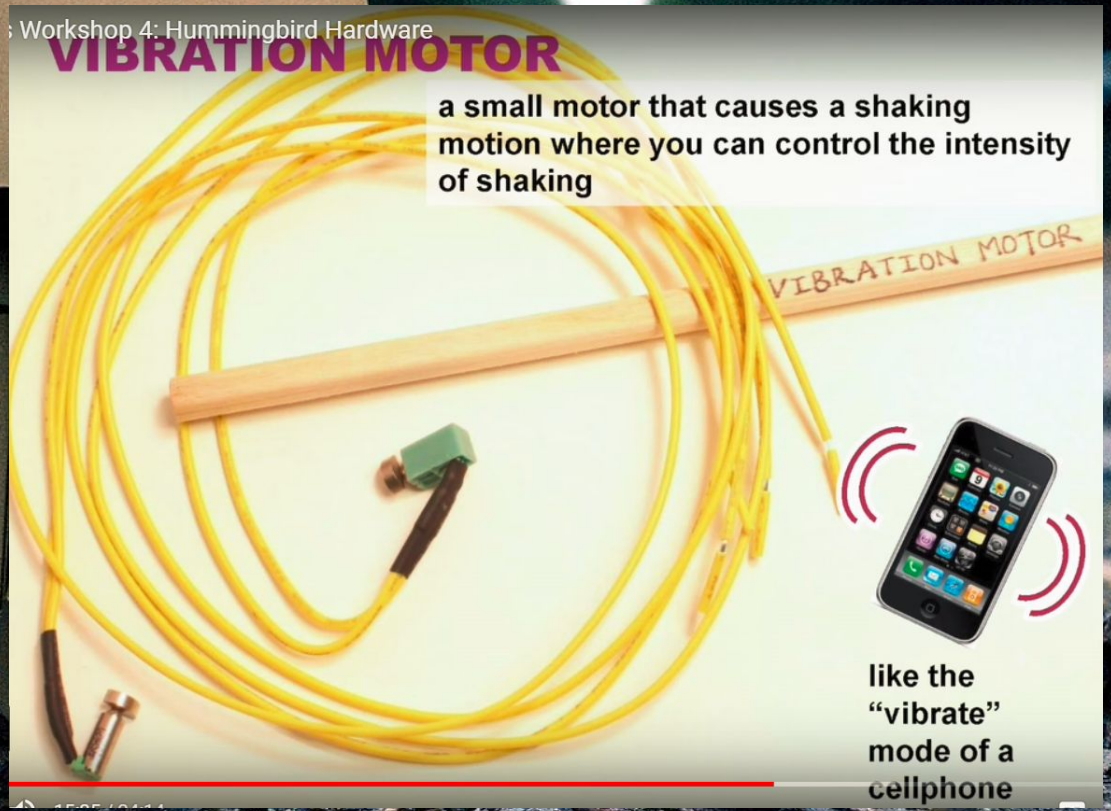
An electric motor with speed control that can rotate in either direction indefinitely.

Motor

USING A MOTOR

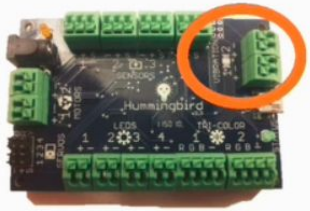


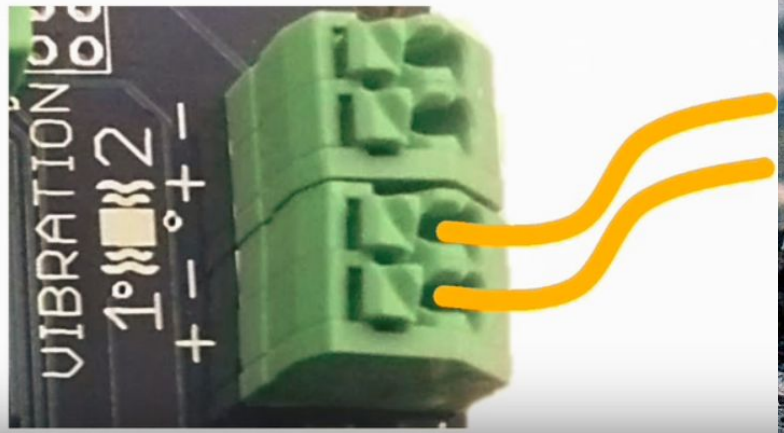
Vibration Motor



Vibration Motor

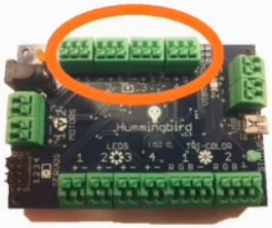
USING A VIBRATION MOTOR

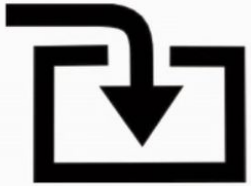


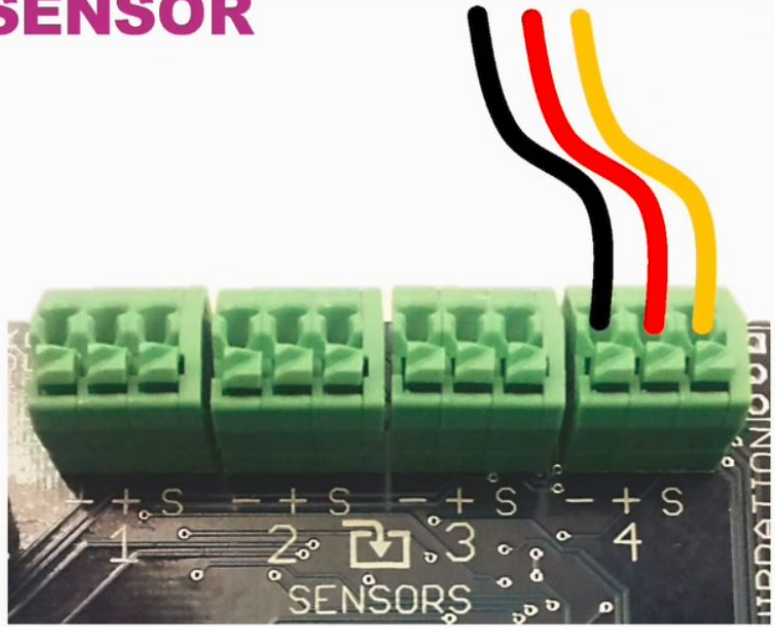


Sensors

USING A SENSOR



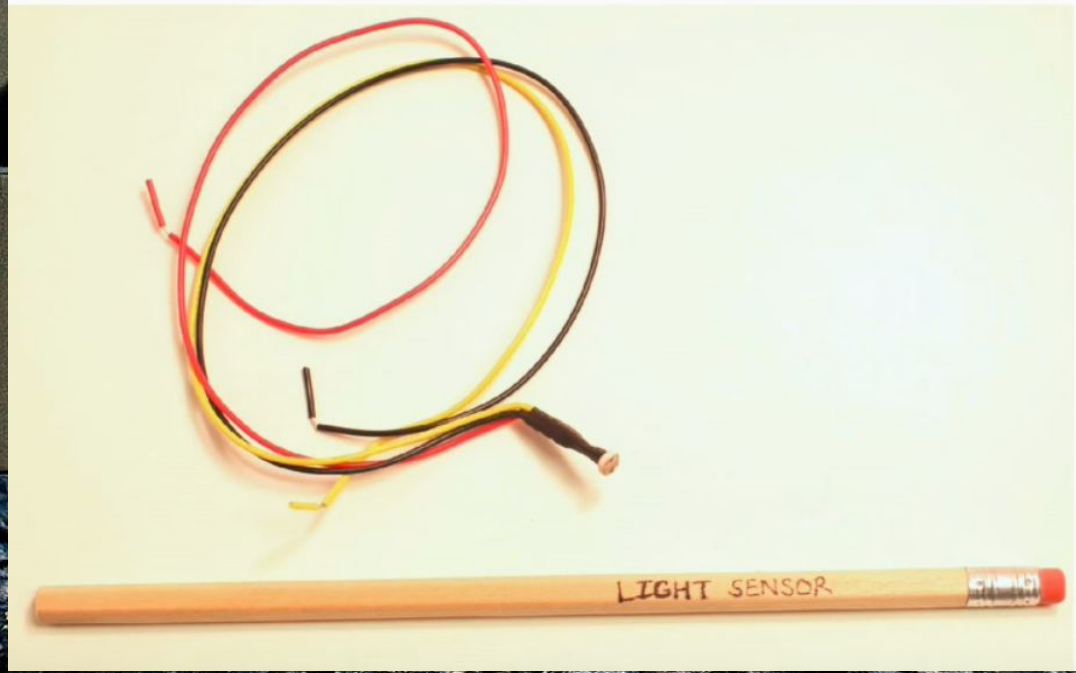




Hint! Any sensor type can be used in any sensor port.

Light Sensor

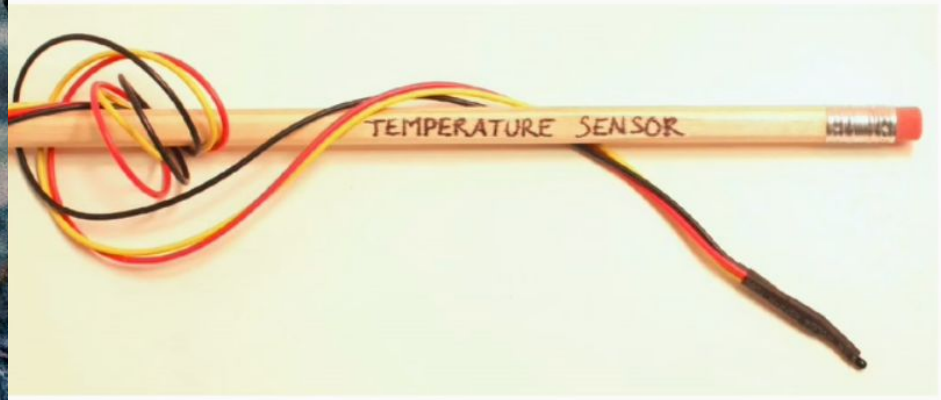
a sensor that detects how bright the ambient light is



like in walkway lights that turn on at dark

Temperature Sensor

a sensor that detects the temperature



like in modern digital thermostats

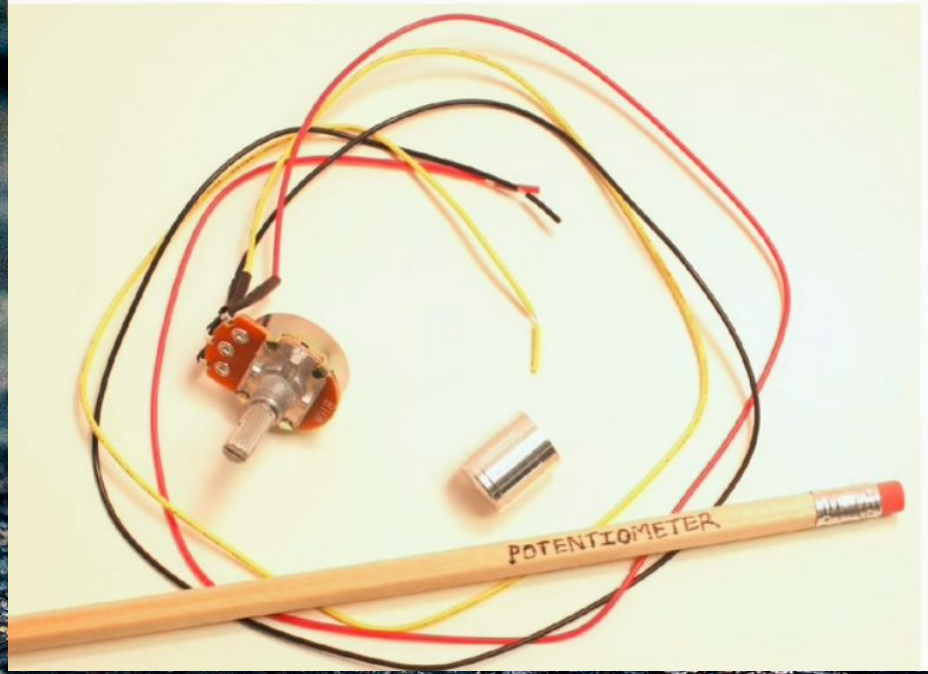
Distance Sensor

a sensor that detects how far away something is

like in “no touch” soap dispensers

Potentiometer

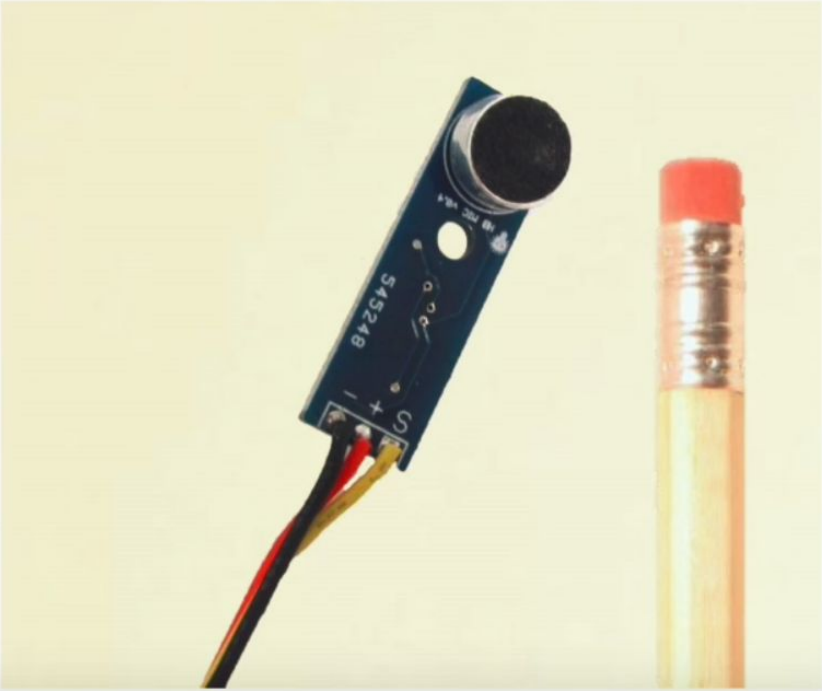
a sensor that detects how it has been rotated

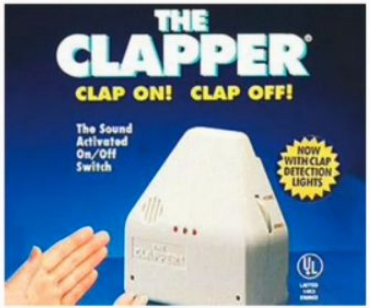


the volume control knob on a radio

Sound Sensor

a sensor that detects the volume of sounds





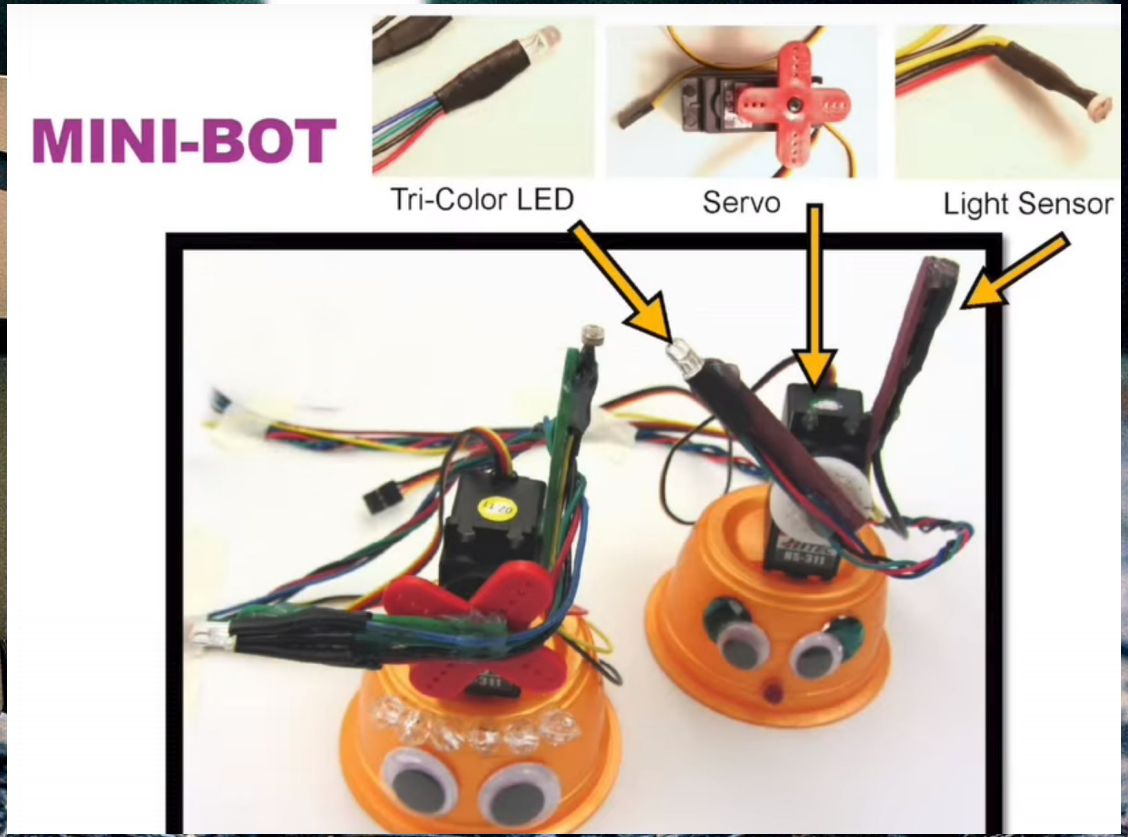
like in a sound sensitive light switch

Coding

That was the hardware stuff

Now a word about coding. We have pre-built these simple mini-bots to program.

After you master coding you are welcome to build you own robot with the mini-bot parts and other parts as needed



Software

Software is on the USB bracelet

OR

https://hummingbirdkit.com/learning/installing-scratch#WindowsInstallation

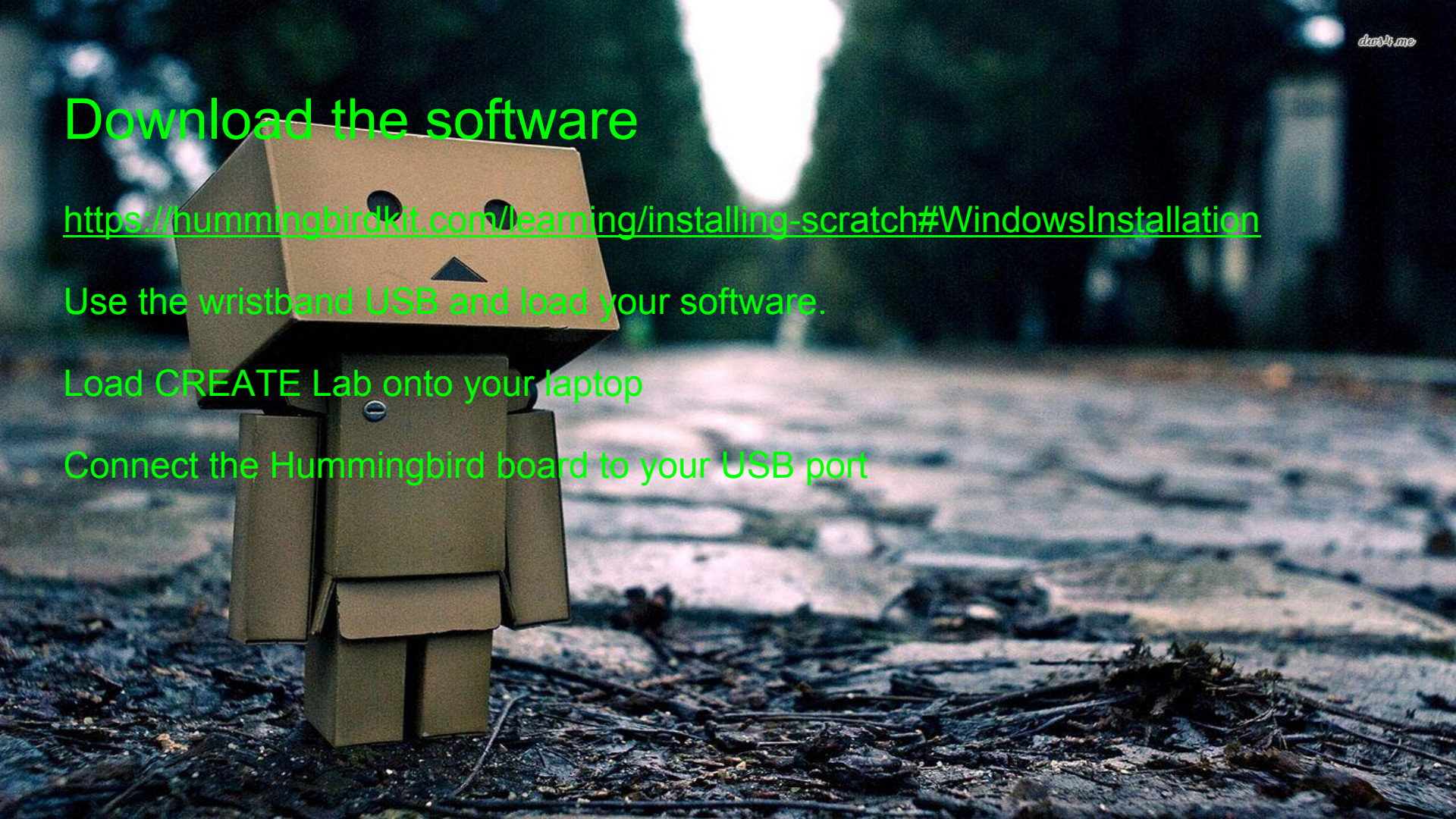
Download the software

https://hummingbirdkit.com/learning/installing-scratch#WindowsInstallation

Use the wristband USB and load your software.

Load CREATE Lab onto your laptop

Connect the Hummingbird board to your USB port

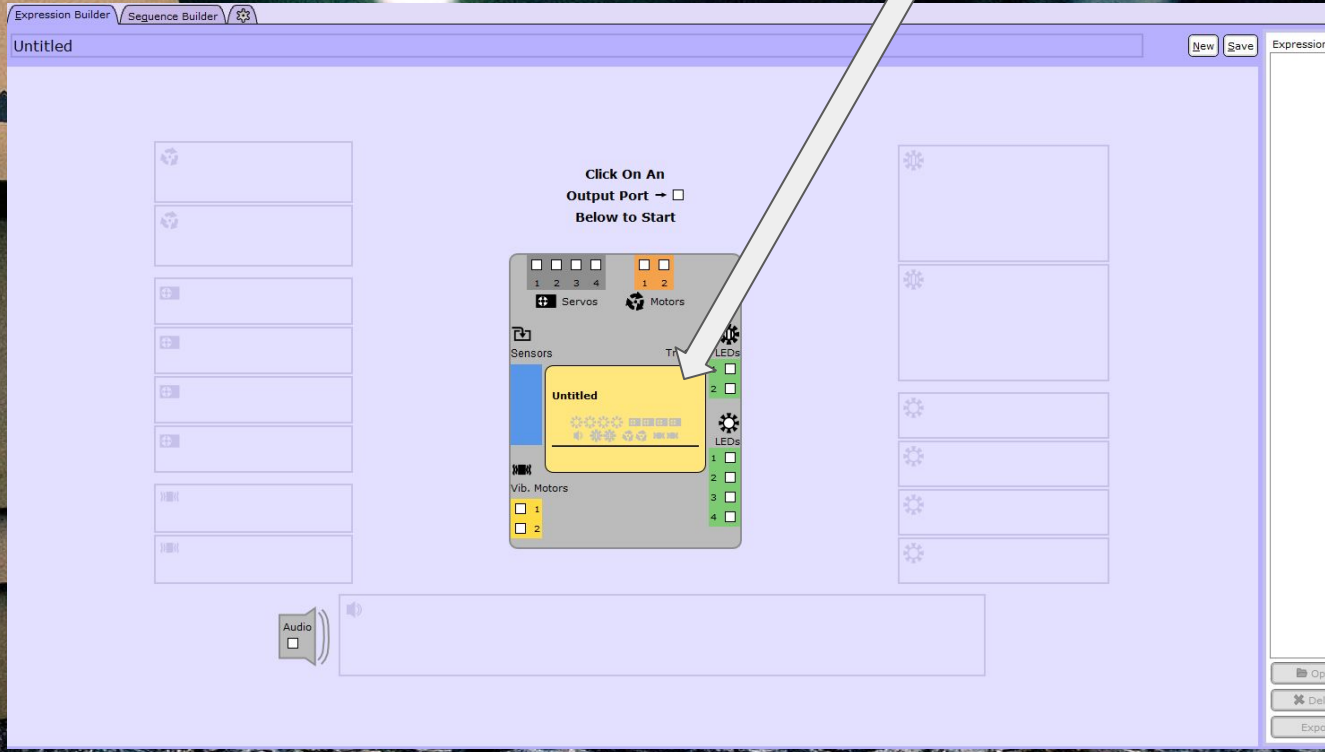


Expression Builder

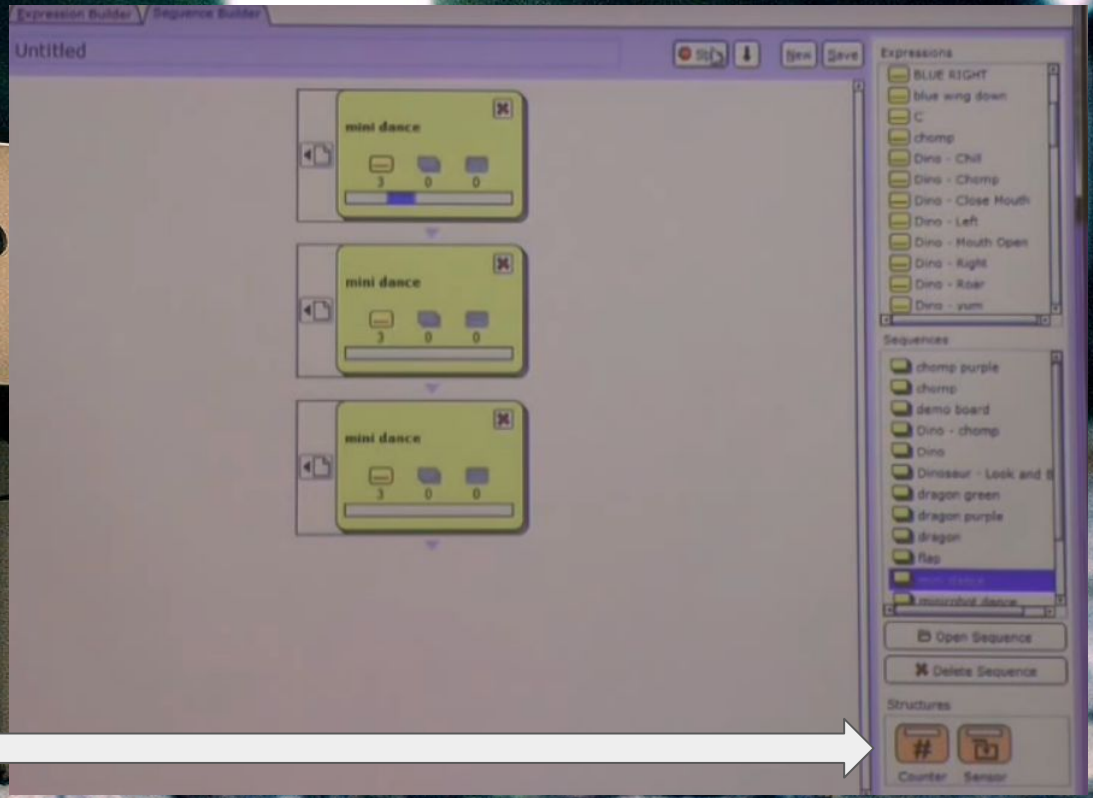
Like storyboarding

Plug in your USB and launch you software.

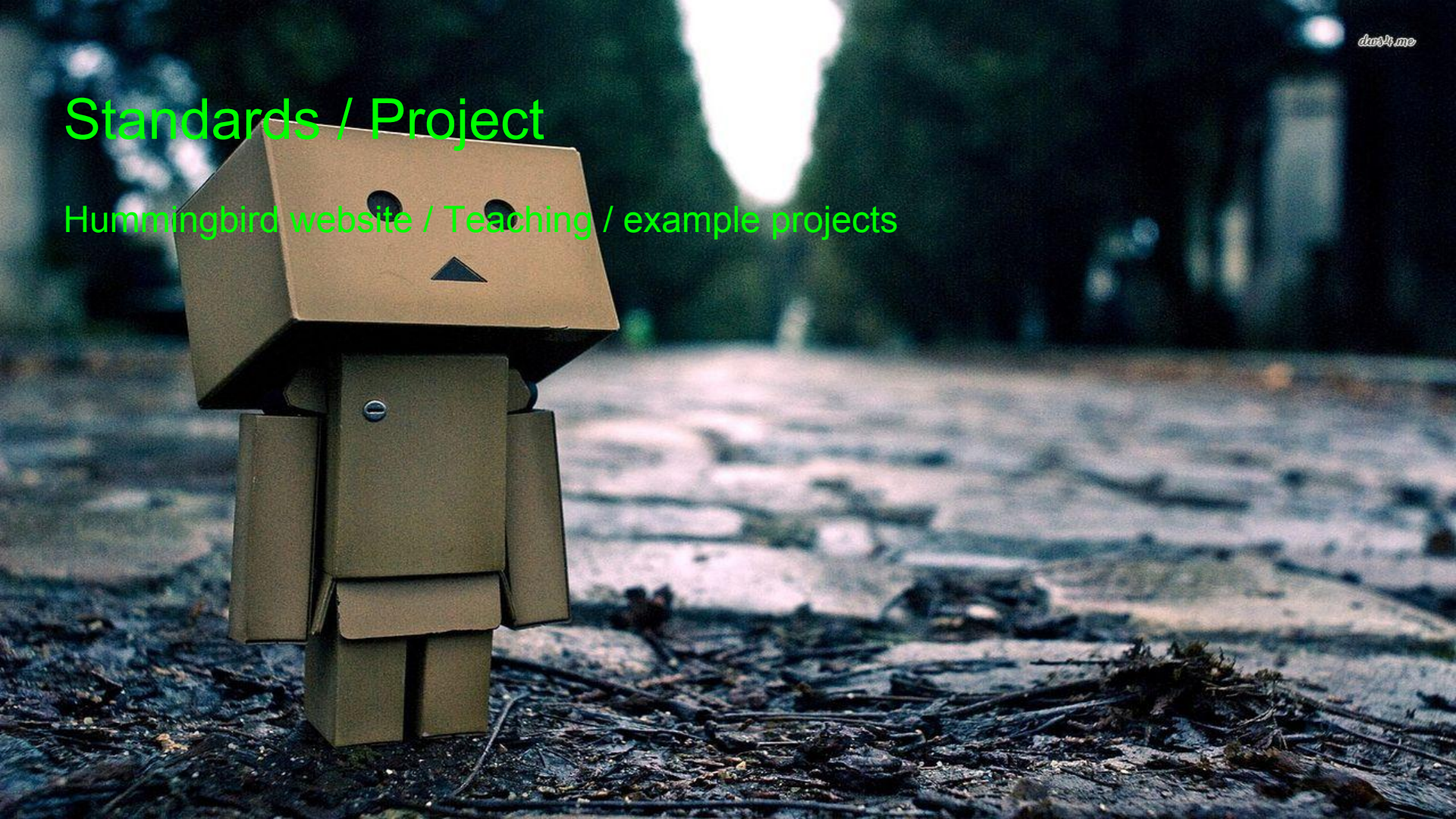
Thumbs up when get this screen.



Sequences

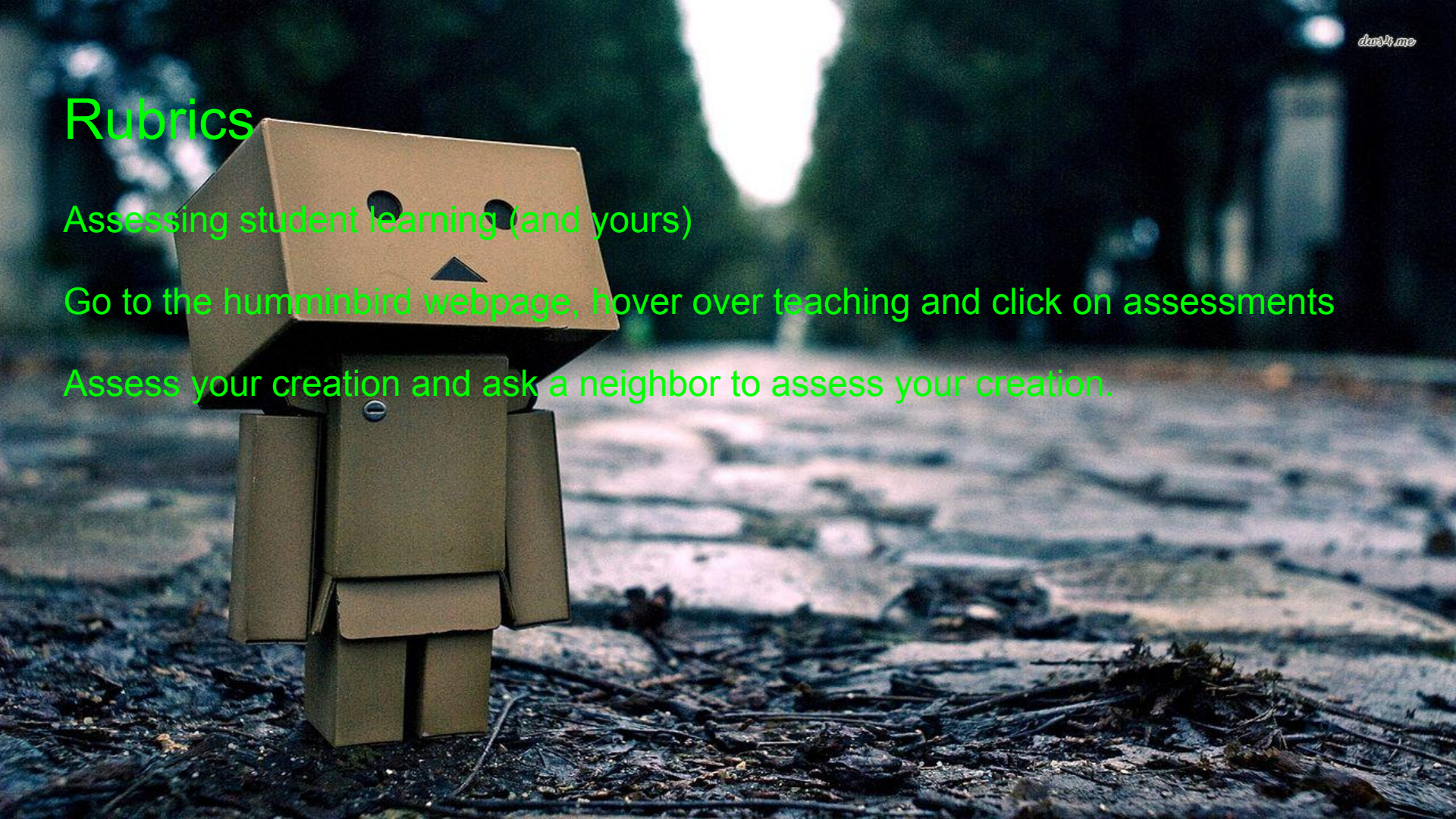


Counter
& Sensor



Standards / Project

Hummingbird website / Teaching / example projects



Rubrics

Assessing student learning (and yours)

Go to the humminbird webpage, hover over teaching and click on assessments

Assess your creation and ask a neighbor to assess your creation.

Closing Thoughts

This is a messy project that should not be scripted. It is about process not an end product that you have preconsived.

Expect no end product.

Give the specifications they need to meet