

UNSURE HOW TO  
USE THE KIT  
THAT LIES  
BEFORE YOU?  
NO FEAR! FOR  
YOU ARE ABOUT  
TO READ  
DETAILED  
INSTRUCTIONS  
ON...

HOW TO USE THE LABS'

# Hummingbird

KIT!

INSTRUCTIONS BY JESSE LE

THE HUMMINGBIRD KIT  
CONTAINS ALL THE  
INNER WORKINGS OF A  
ROBOT. THE SENSORS,  
THE MOTORS, THE  
BRAIN...PRETTY MUCH  
EVERYTHING EXCEPT  
THE BODY OF THE  
ROBOT ITSELF. YOU'LL  
HAVE TO MAKE THAT OUT  
OF CARDBOARD, CRAFT  
SUPPLIES, OR  
WHATEVER IS AROUND!

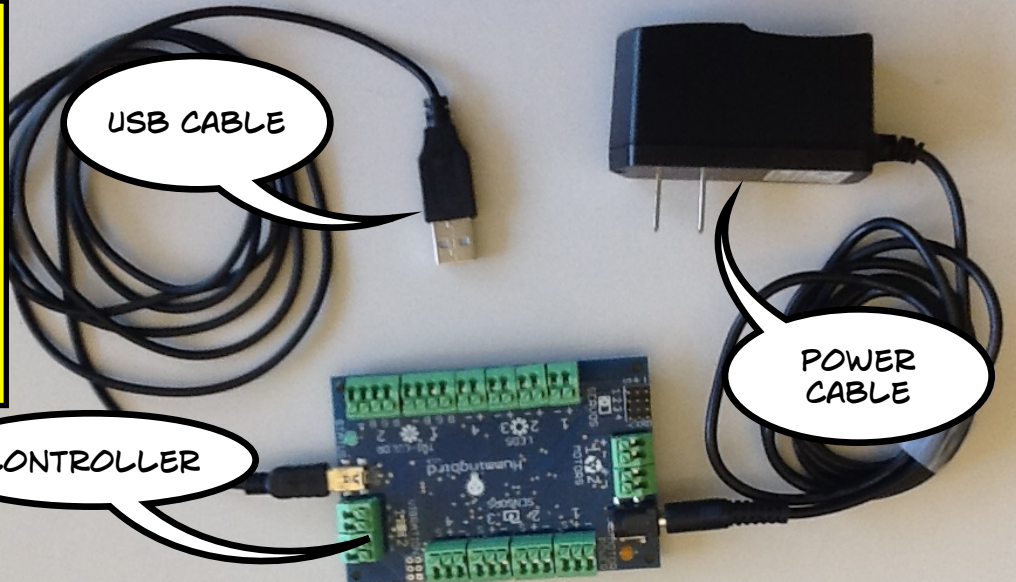


HERE'S WHAT'S INSIDE.  
FIRST, THE  
**CONTROLLER**. THIS  
CONNECTS TO THE  
COMPUTER AND DOES  
THE THINKING FOR THE  
ROBOT. EVERYTHING  
ELSE CONNECTS TO  
THIS. IT'S ALSO  
WHERE YOU PLUG IN  
POWER FOR YOUR  
MOTORS.

USB CABLE

CONTROLLER

POWER  
CABLE





NEXT, THERE ARE **SENSORS**. THERE IS ONE FOR:

- DISTANCE
- LIGHT
- SOUND
- TEMPERATURE
- ROTARY (A KNOB YOU CAN TURN)

DISTANCE

LIGHT

SOUND

TEMPERATURE

ROTARY

THERE ARE LIGHTS AS WELL. 8 LEDS WITH FIXED COLORS...

AND 2 THAT CAN CHANGE THEIR COLORS!

THESE WILL HAVE 4 WIRES EACH

THERE ARE 2 VIBRATION MOTORS...

BZZZZZ

2 ROTATING MOTORS, AND 4 SERVOS! (SERVOS ARE LIKE A MECHANICAL ARM; THEY CAN ROTATE TO A CERTAIN POINT)

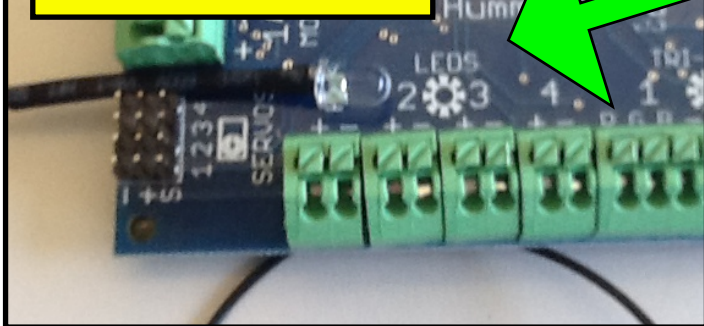
MOTOR

SERVO

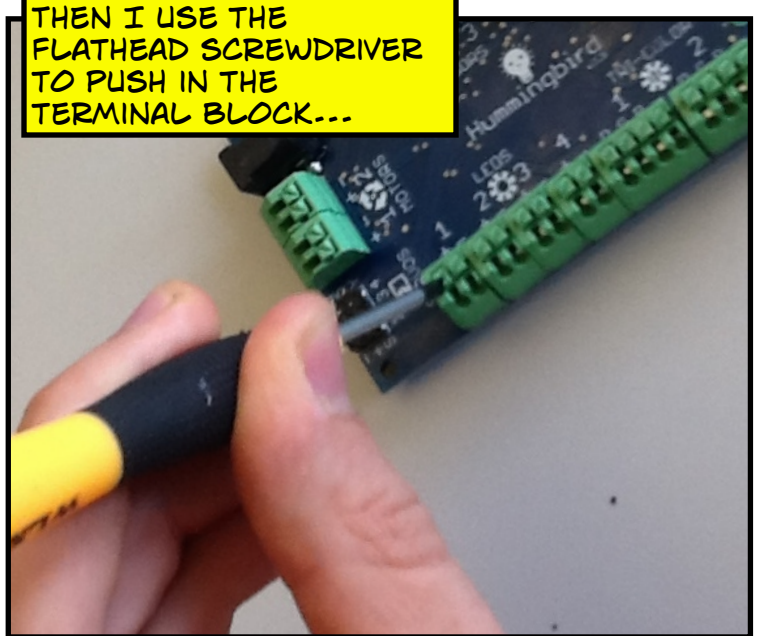
EXTENSION CABLE



EACH COMPONENT  
PIECE HAS A  
DESIGNATED  
ATTACHMENT SPOT ON  
THE CONTROLLER. FOR  
EXAMPLE, I'M GOING  
TO ATTACH AN LED.  
FIRST I FIND WHERE IT  
SAYS "LEDS" ON THE  
CONTROLLER---

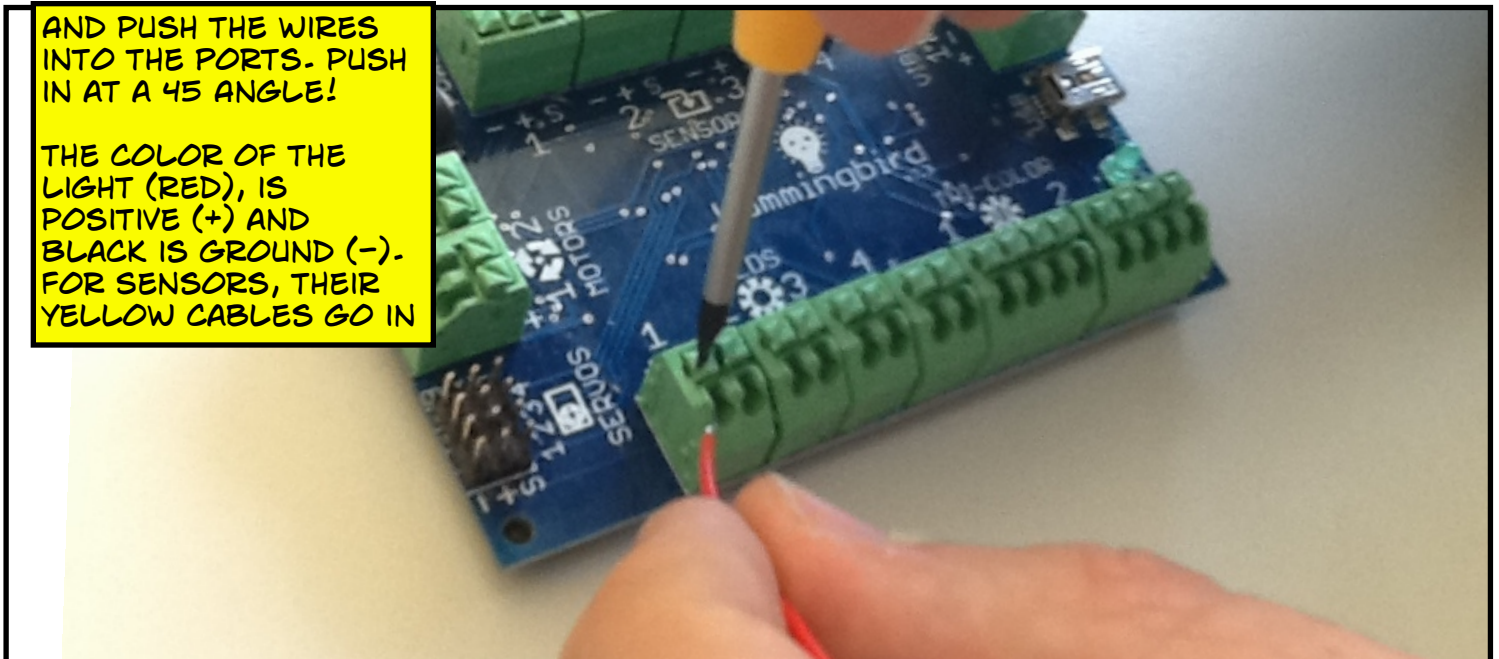


THEN I USE THE  
FLATHEAD SCREWDRIVER  
TO PUSH IN THE  
TERMINAL BLOCK---



AND PUSH THE WIRES  
INTO THE PORTS. PUSH  
IN AT A 45 ANGLE!

THE COLOR OF THE  
LIGHT (RED), IS  
POSITIVE (+) AND  
BLACK IS GROUND (-).  
FOR SENSORS, THEIR  
YELLOW CABLES GO IN

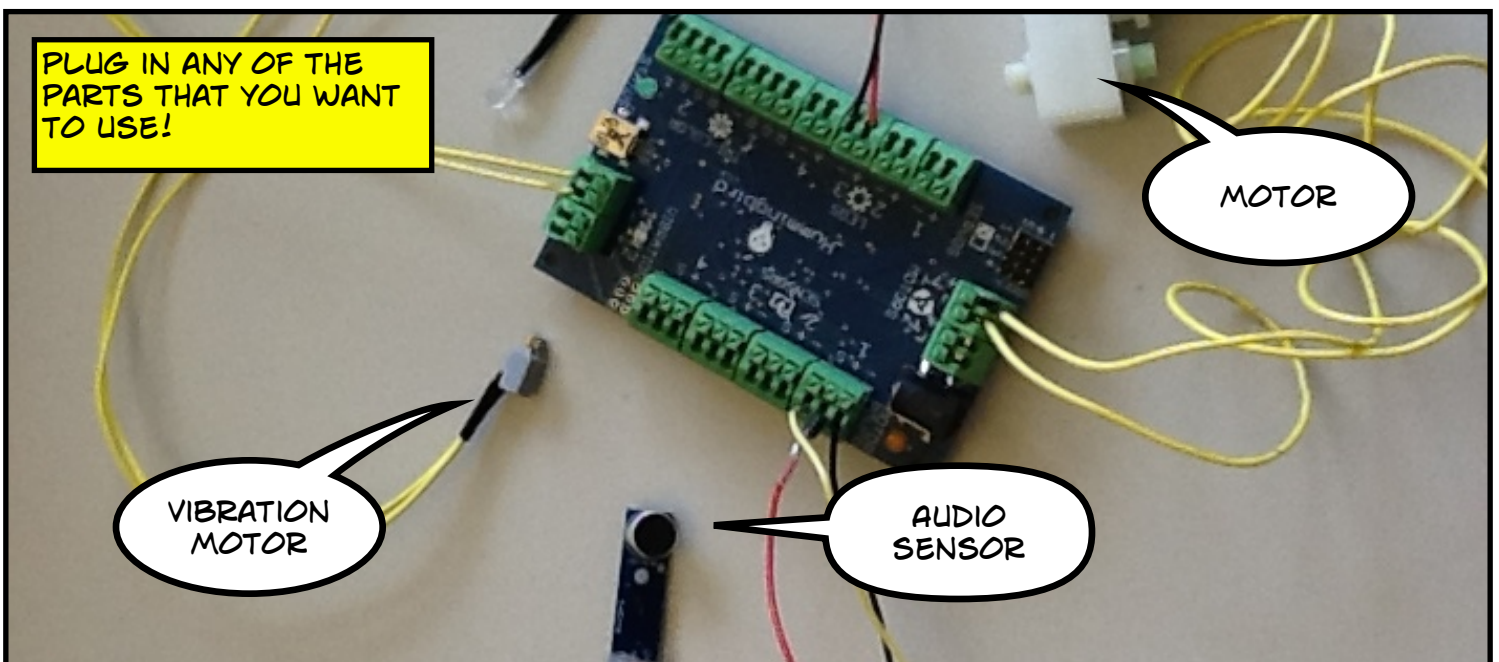


PLUG IN ANY OF THE  
PARTS THAT YOU WANT  
TO USE!

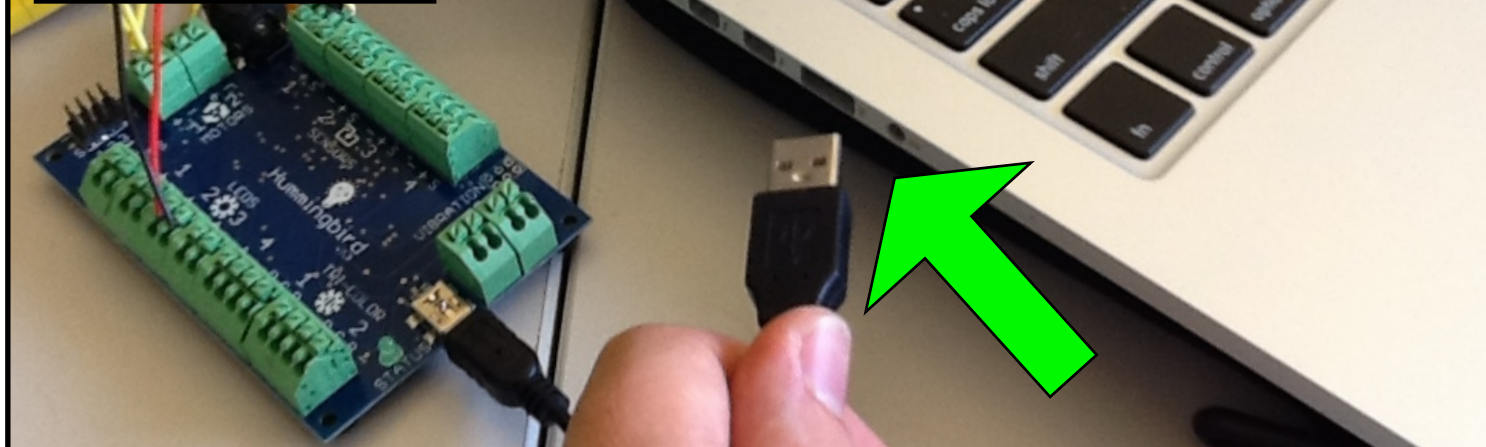
VIBRATION  
MOTOR

AUDIO  
SENSOR

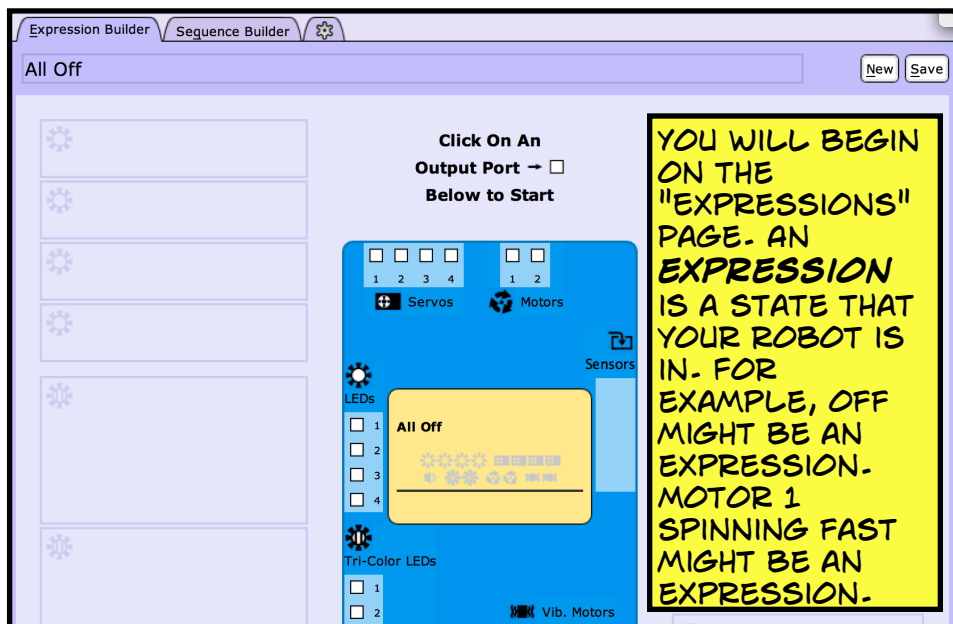
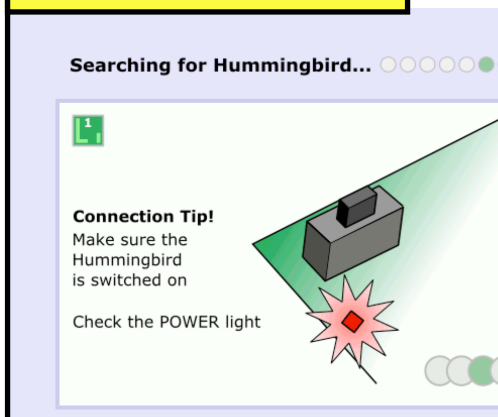
MOTOR



NOW LET'S TALK PROGRAMMING. FIRST, CONNECT YOUR CONTROLLER TO A COMPUTER WITH THE USB CABLE.

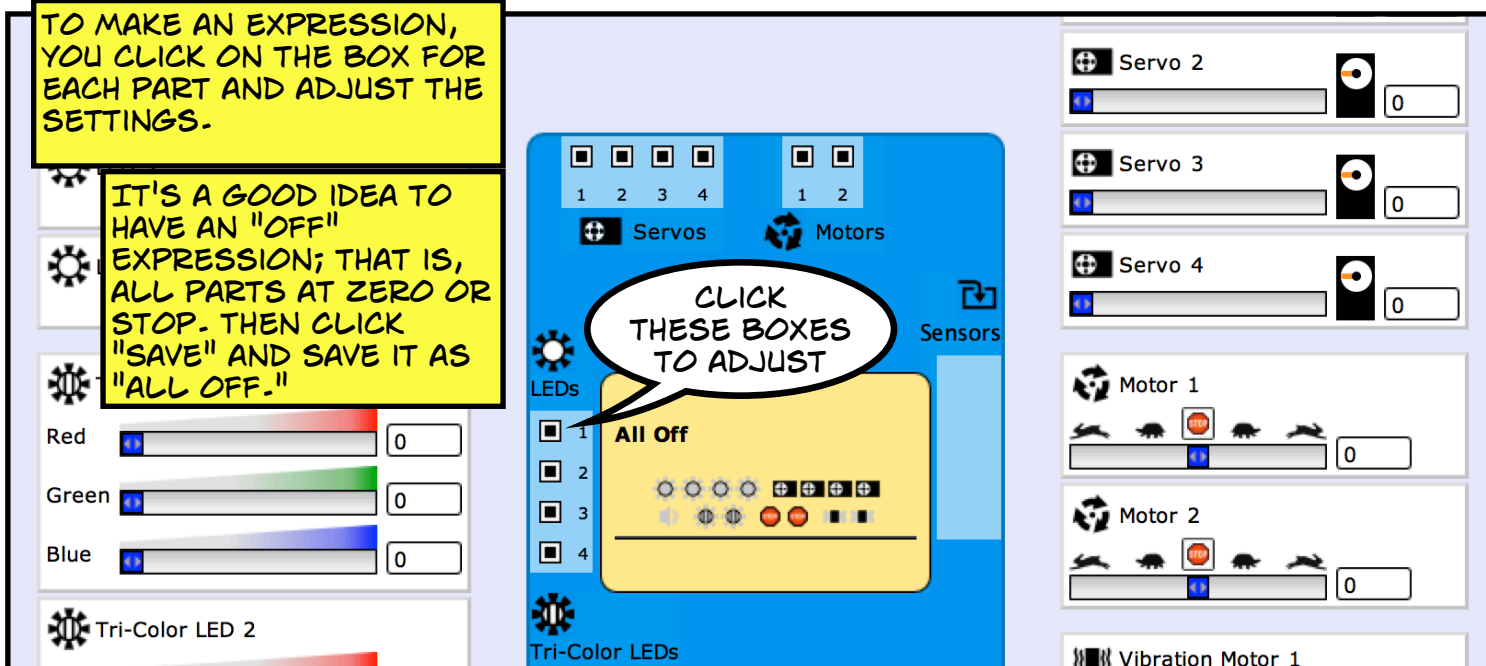


OPEN "CREATE VISUAL PROGRAMMER." IT WILL SEARCH TO MAKE SURE THAT THE HUMMINGBIRD IS CONNECTED.



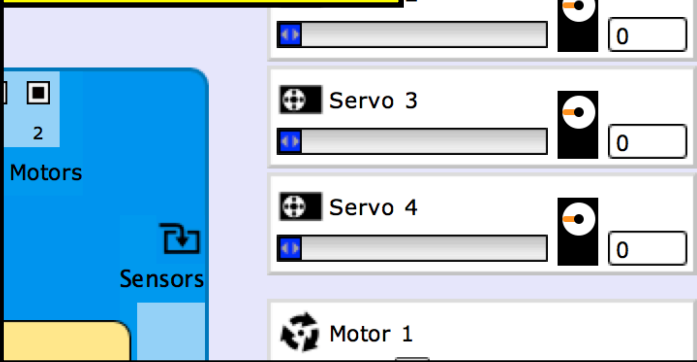
TO MAKE AN EXPRESSION, YOU CLICK ON THE BOX FOR EACH PART AND ADJUST THE SETTINGS.

IT'S A GOOD IDEA TO HAVE AN "OFF" EXPRESSION; THAT IS, ALL PARTS AT ZERO OR STOP. THEN CLICK "SAVE" AND SAVE IT AS "ALL OFF."





NOW HIT "NEW" TO CREATE ANOTHER EXPRESSION. HERE, I'VE GOT A RED LED PLUGGED INTO LED 1, SO LET'S MAKE AN EXPRESSION TO TURN THAT ON.



LED 1 ON

LED 1

ADJUST HERE

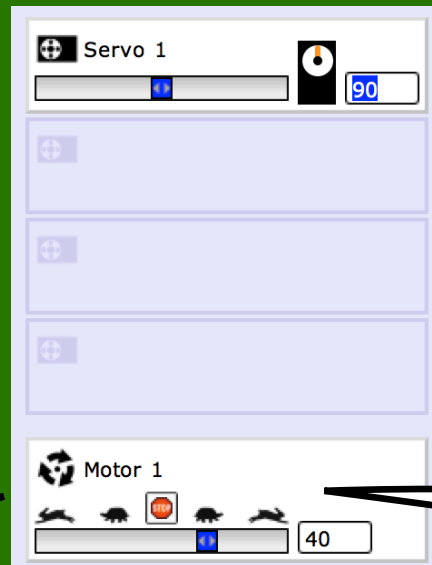
SELECT "LED 1" AND MOVE THE SLIDER TO THE RIGHT. YOU SHOULD SEE THE BULB GET BRIGHTER! SAVE THIS EXPRESSION AS "LED 1 ON" OR SOMETHING SIMILAR.

ACTIVATE HERE

LED 1 ON

A SINGLE EXPRESSION CAN CHANGE OR ACTIVATE MULTIPLE PARTS. FOR EXAMPLE, LET'S CREATE AN EXPRESSION THAT GETS THE MOTOR TURNING AND TWISTS THE SERVO TO 90 DEGREES.

COUNTER-CLOCKWISE



CREATE A NEW EXPRESSION, AND SELECT BOTH MOTOR 1 AND SERVO 1. TURN MOTOR 1 TO 40 AND SERVO 1 TO 90.

CLOCKWISE

MAKE SURE TO SAVE THIS EXPRESSION AS SOMETHING NEW.

Save As

Save as:

Move!

OK

Cancel

SO HOW DOES THE ROBOT KNOW HOW TO SWITCH FROM ONE EXPRESSION TO ANOTHER? THAT'S WHERE SEQUENCES COME IN. AT THE TOP, CLICK THE "SEQUENCE BUILDER" TAB.




Expression Builder

Sequence Builder

Mo

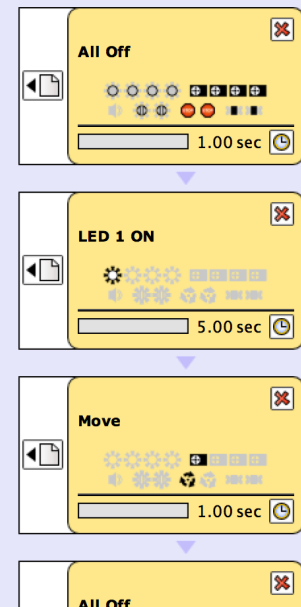
SWITCH TO THIS

## Expressions

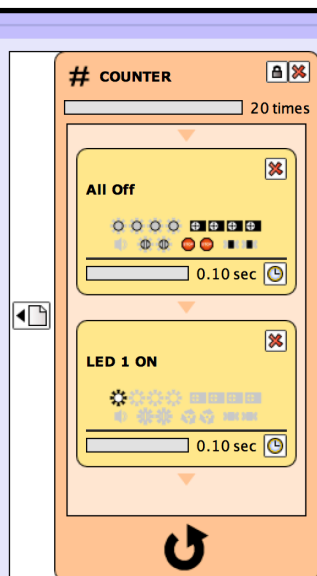
 All Off  
 LED 1 ON  
 Move

SEQUENCES WORK BY DRAG AND DROP. TO MAKE A SEQUENCE, JUST GRAB THE EXPRESSIONS YOU SAVED...

AND DRAG 'EM IN THE ORDER YOU WANT 'EM. BY CLICKING THE LITTLE CLOCK, YOU CAN CHOOSE HOW LONG BEFORE THEY CHANGE. (HIT PLAY TO SEE YOUR SEQUENCE IN ACTION.)



TO MAKE IT REPEAT, DRAG THE "COUNTER BLOCK" (LOWER RIGHT SIDE) TO THE MIDDLE. SET THE # OF TIMES YOU WANT IT TO REPEAT BY CLICKING THE LOCK. THEN PLACE YOUR EXPRESSIONS INSIDE OF IT.

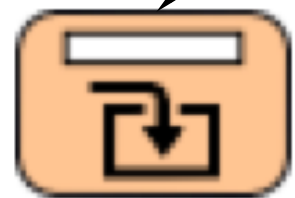


SEQUENCES CAN BE TRIGGERED BY SENSORS. TO DO THIS, DRAG A SENSOR BLOCK INTO THE MIDDLE.

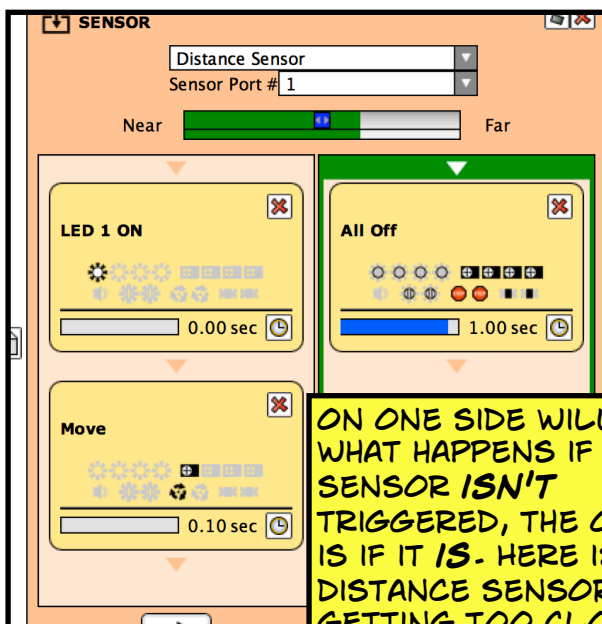
THIS HERE



Counter



Sensor



ON ONE SIDE WILL BE WHAT HAPPENS IF THE SENSOR *ISN'T* TRIGGERED, THE OTHER IS IF IT *IS*. HERE IS A DISTANCE SENSOR; GETTING TOO CLOSE TURNS EVERYTHING ON.

THAT'S IT FOR STARTERS! FOR MORE HELP, GO TO [HTTP://WWW.HUMMINGBIRDKIT.COM/LEARNING/TUTORIALS](http://www.hummingbirdkit.com/learning/tutorials)

