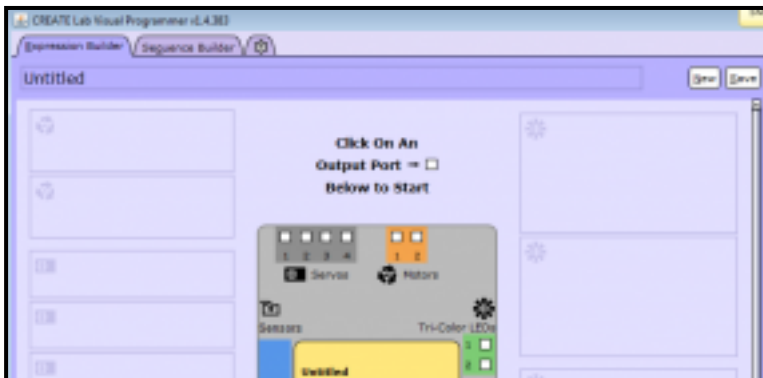




# CREATE LAB VISUAL PROGRAMMER

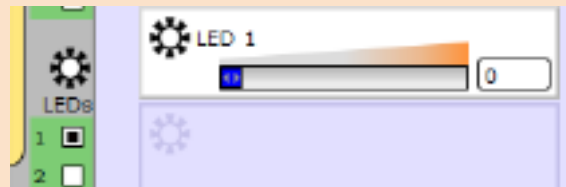
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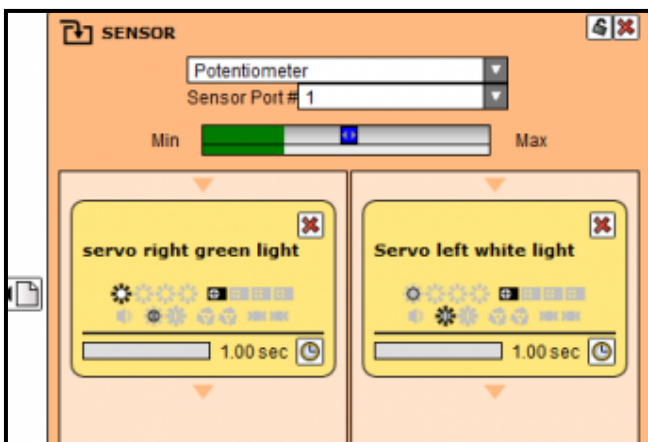
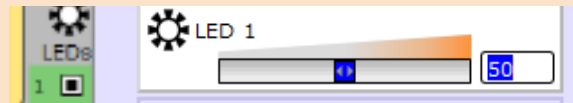
THE CREATE LAB VISUAL PROGRAMMER WAS DEVELOPED WITH HUMMINGBIRD AS PART OF THE CMU CREATE LAB ART & BOTS PROGRAM.

THE VISUAL PROGRAMMER USES A STORY-BOARDING APPROACH TO PROGRAMMING THAT IS QUICK AND EASY TO LEARN.

THE INTERFACE ALLOWS YOU TO RAPIDLY CREATE **EXPRESSIONS** BY SELECTING OUTPUTS AND SETTING THEM OFF...



OR ON!



ONCE SEVERAL EXPRESSIONS HAVE BEEN BUILT, YOU CAN CREATE A **SEQUENCE** THAT USES THESE EXPRESSIONS TO MAKE A PROGRAM.

THIS COMIC WILL WALK YOU THROUGH ALL THE STEPS OF USING VISUAL PROGRAMMER INCLUDING:

INSTALLING

MAKING EXPRESSIONS

MAKING SEQUENCES

USING SENSORS

USING COUNTERS

## INSTALLING

VISUAL PROGRAMMER IS FREE TO DOWNLOAD AND USE. NAVIGATE TO [WWW.HUMMINGBIRDKIT.COM/LEARNING/USING-VISUAL-PROGRAMMER](http://WWW.HUMMINGBIRDKIT.COM/LEARNING/USING-VISUAL-PROGRAMMER) TO DOWNLOAD.

ON THE SITE, YOU'LL SEE THREE ICONS REPRESENTING COMMON OPERATING SYSTEMS. CLICK ON THE ONE THAT MATCHES YOUR COMPUTER'S OS TO BEGIN THE DOWNLOAD.



MAC

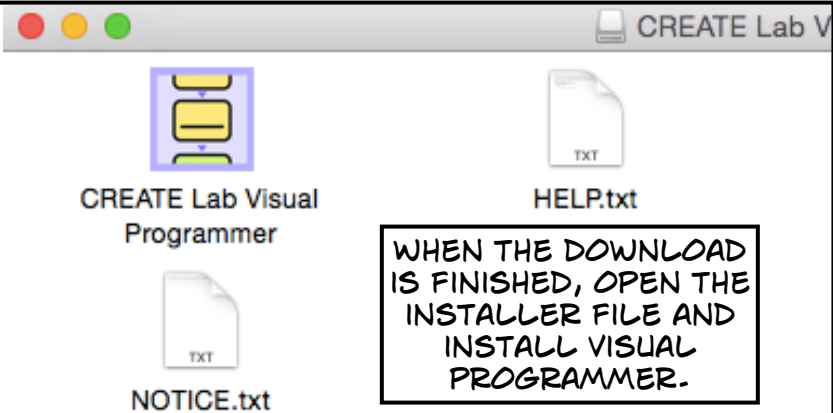


LINUX



WINDOWS

PLUG IN A HUMMINGBIRD USING THE USB CABLE.

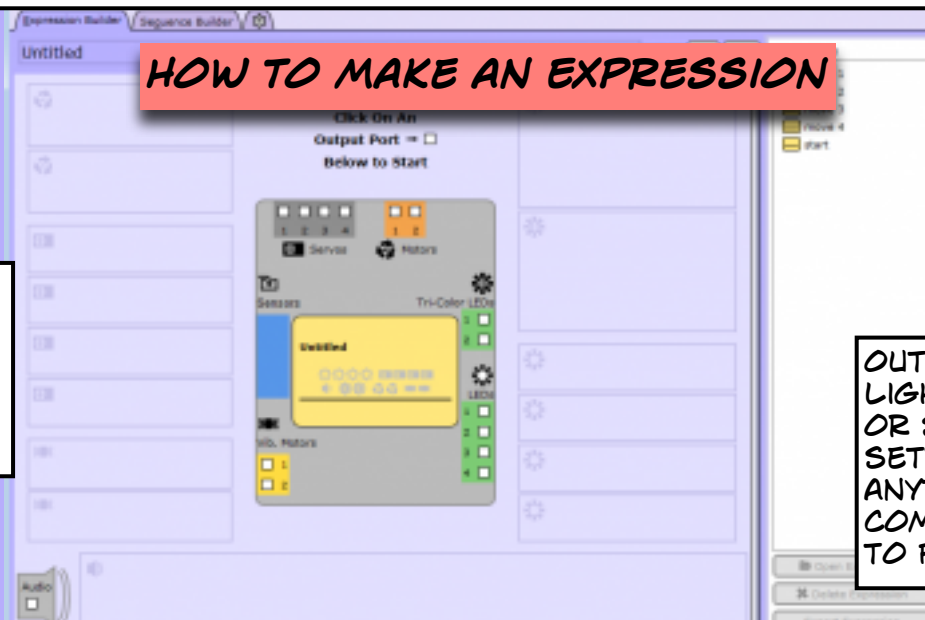


WHEN THE DOWNLOAD IS FINISHED, OPEN THE INSTALLER FILE AND INSTALL VISUAL PROGRAMMER.

(ON SOME COMPUTERS, YOU MAY BE ASKED TO INSTALL JAVA. VISIT THE HUMMINGBIRD SITE FOR HELP WITH THIS OR OTHER TROUBLESHOOTING PROBLEMS.)

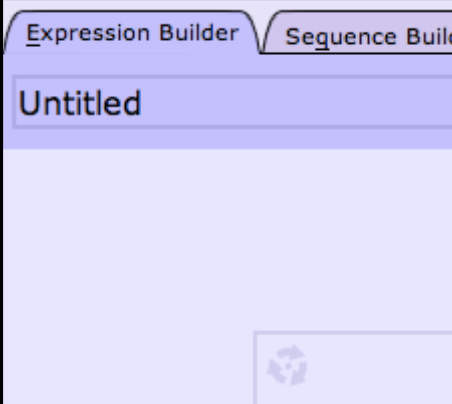
## HOW TO MAKE AN EXPRESSION

AN EXPRESSION CONTAINS THE SETTINGS OF ONE OR MORE OUTPUTS.



OUTPUTS MIGHT BE LIGHTS, MOTORS, OR SERVOS. THE SETTINGS MIGHT BE ANYTHING FROM COMPLETELY OFF TO FULL POWER!

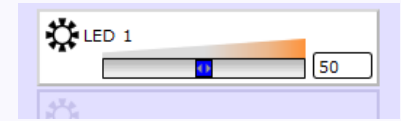
TO CREATE AN EXPRESSION, OPEN VISUAL PROGRAMMER AND MAKE SURE THAT YOU ARE IN THE "EXPRESSION BUILDER" TAB.



SELECT THE OUTPUT(S) YOU WOULD LIKE TO SET,



SET THE VALUE OF SAID OUTPUT(S),



CLICK SAVE, AND SAVE YOUR EXPRESSION



THE NAME IS UP TO YOU; JUST CHOOSE SOMETHING YOU'LL REMEMBER WHEN YOU HAVE DOZENS OF EXPRESSIONS!

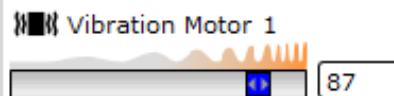
THERE ARE MANY TYPES OF OUTPUTS:

### SINGLE COLOR LED



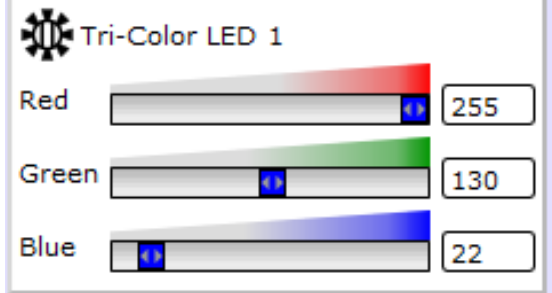
USE A SLIDER TO SET THE BRIGHTNESS OF THE LED TO OFF (0) TO BRIGHTEST (100).

### VIBRATION MOTOR



USE THE SLIDER TO SET THE INTENSITY OF THE VIBRATION MOTOR FROM 0 TO 100.

### TRI-COLOR LEDS



USE A SLIDER TO SET THE BRIGHTNESS OF EACH **RED**, **GREEN**, AND **BLUE** HUES FROM OFF (0) TO BRIGHTEST (255).

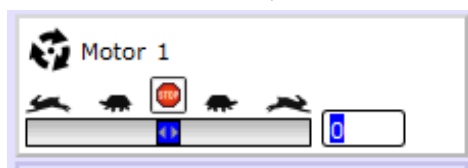
DIFFERENT COMBINATIONS CREATE DIFFERENT COLORS. ALL HUES SET TO BRIGHTEST WILL CREATE A WHITE LIGHT.

### SERVOS



USE THE SLIDER TO SET THE SERVO ANGLE FROM 0 TO 180.

### MOTOR



USE THE SLIDER TO SET THE SPEED AND DIRECTION OF THE MOTOR. THE MOTOR TURNS BOTH CLOCKWISE AND COUNTER-CLOCKWISE AND CAN RUN FASTER (HARE) OR SLOWER (TURTLE).

### AUDIO

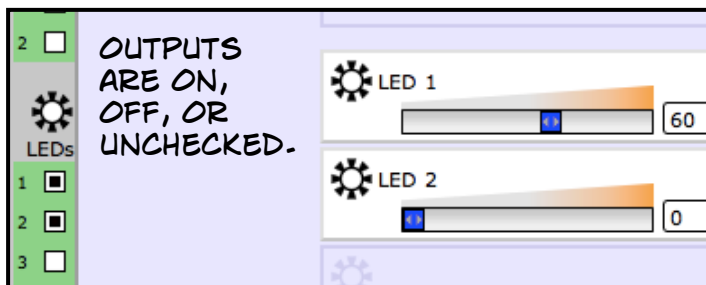


SELECT FROM A TONE, CLIP OR SPEECH. PRESS PLAY TO TEST.

**TONE:** CHOOSE TONE FROM THE PIANO KEYS AND SET THE DURATION AND VOLUME.

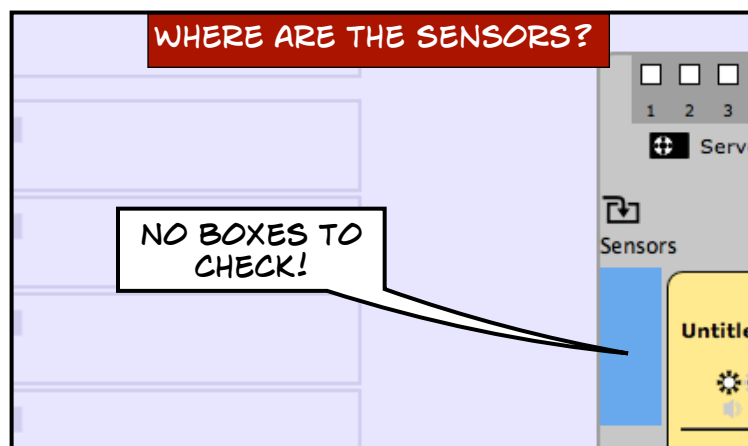
**CLIP:** CHOOSE A CLIP FROM THE DROP-DOWN MENU OR UPLOAD YOUR OWN.

**SPEECH:** TYPE THE WORD(S) YOU WANT YOUR ROBOT TO SPEAK.



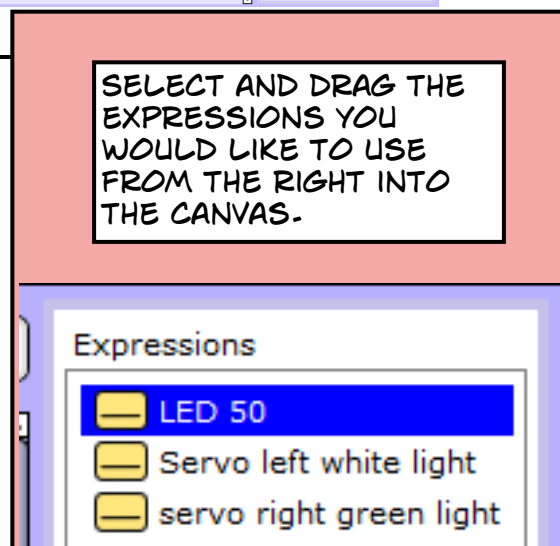
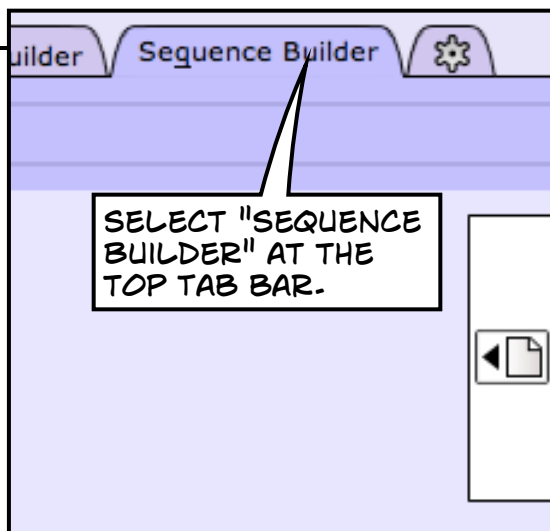
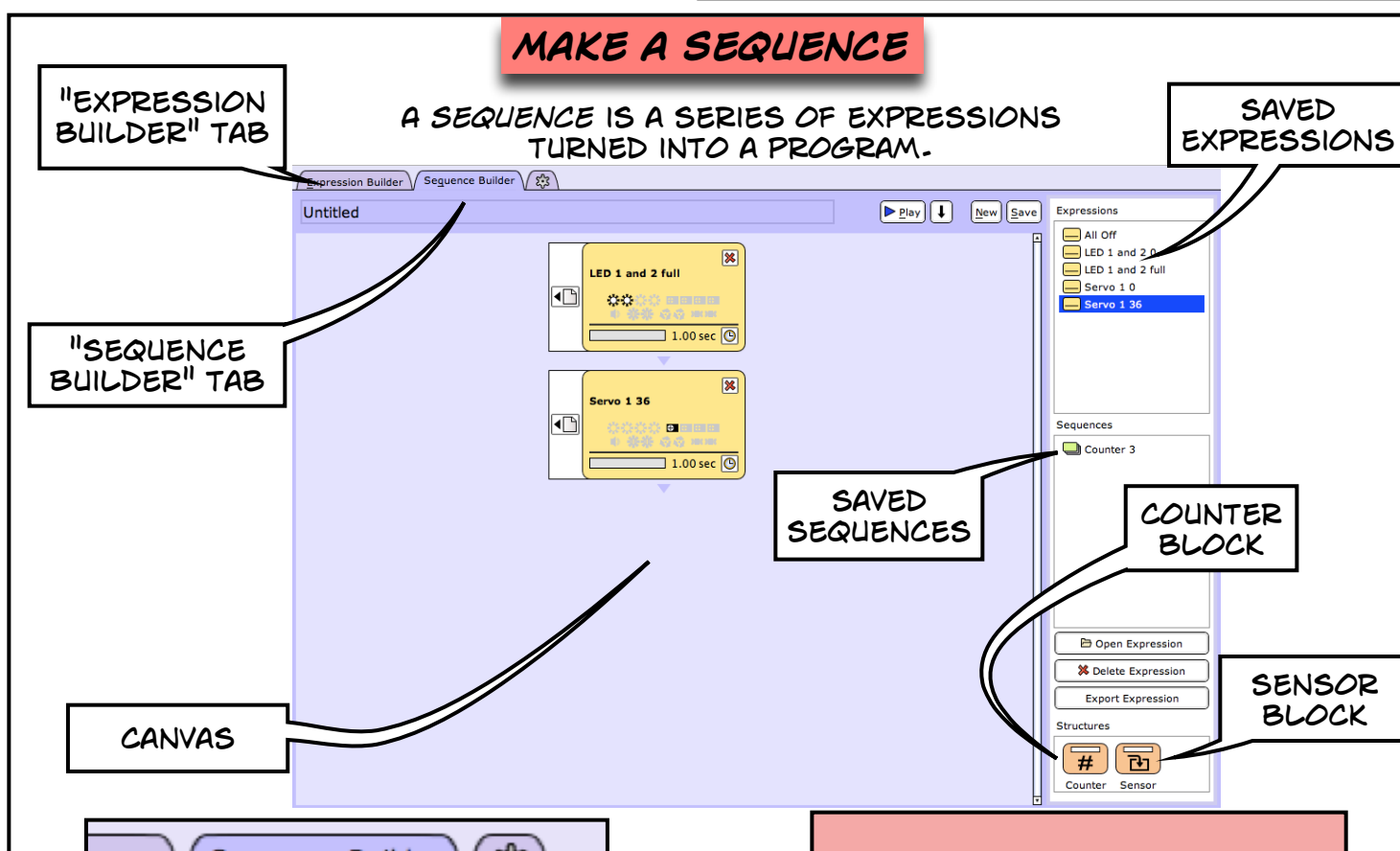
IF AN OUTPUT BOX IS UNCHECKED, IT DOES **NOT** NECESSARILY MEAN THAT THE OUTPUT IS OFF. FOR EXAMPLE, IF YOU TURN AN LED ON AND THEN UNCHECK THE SLIDER BOX, YOU WILL NOTICE THE LED STAYS ON.

TO MAKE SURE AN OUTPUT IS OFF, SELECT THE OUTPUT CHECK BOX AND MOVE THE SLIDER TO TURN OFF THE OUTPUT.



SENSORS ARE NOT VISIBLE IN THE EXPRESSION BUILDER BECAUSE THERE IS NO WAY TO "SET" THEM. THEY'RE USED IN THE SEQUENCE BUILDER TO CHOOSE BETWEEN DIFFERENT EXPRESSIONS.

## MAKE A SEQUENCE





DRAG EXPRESSIONS SO THEY ARE LISTED IN THE ORDER YOU WOULD LIKE TO USE.

Servo 1 0

3.00 sec

SET TIMING FOR EACH EXPRESSION BY CLICKING THE CLOCK SYMBOL.

YOU CAN USE DECIMALS FOR TIMES LESS THAN ONE SECOND (LIKE 0.1)!

SELECT "PLAY".

Play

CLICK THE ARROW TO TOGGLE BETWEEN DIFFERENT MODES: "PLAY ONCE" AND "LOOP".

## USING SENSORS

Structures

Counter

Sensor

SELECT THE SENSOR BLOCK FROM THE BOTTOM RIGHT AND DRAG IN INTO THE CANVAS.

Distance Sensor (Original)

Sensor Port # 1

Near

Far

SELECT THE SENSOR TYPE FROM THE DROP DOWN MENU.

IN THE SENSOR BLOCK, THERE ARE TWO TRACKS FOR SEQUENCES OF EXPRESSIONS. FOR EXAMPLE, IF YOU ARE USING A DISTANCE SENSOR, THERE IS ONE TRACK FOR WHEN AN OBJECT IS CLOSE TO THE SENSOR, AND ANOTHER FOR WHEN THE OBJECT IS FAR FROM THE SENSOR.

SENSOR

Distance Sensor (Original)

Sensor Port # 1

Near

Far

LED 1 and 2 0

LED 1 and 2 full

1.00 sec

1.00 sec

THE BLUE SLIDER SETS THE SENSOR'S SENSIVITY.

IF THE GREEN IS TO THE LEFT OF THE BLUE BAR, THE LEFT TRACK WILL PLAY.

IF THE GREEN IS TO THE RIGHT, THE RIGHT TRACK WILL PLAY.

SELECT THE SAVED EXPRESSIONS YOU WANT TO USE FOR EACH SEQUENCE AND DRAG THEM INTO THE PROPER TRACK.

Expressions

- All Off
- LED 1 and 2 0
- LED 1 and 2 full
- Servo 1 0
- Servo 1 36

Sequences

- Counter 3

EACH TRACK CAN BE LOOPED INDEPENDENTLY BY CLICKING THE ARROW AT THE BOTTOM.



PLAYS ONCE

LOOPS



(TIP: YOU CAN PLACE EXPRESSIONS OR OTHER SENSOR AND COUNTER BLOCKS ABOVE OR BELOW THE SENSOR STRUCTURE. YOUR SEQUENCE CAN BE AS LONG AS YOU WANT.)

## USING A COUNTER

# COUNTER



1 time

Drag-and-Drop  
Expressions and  
Sequences

A COUNTER IS HELPFUL IF YOU WOULD LIKE TO REPEAT A SEQUENCE A CERTAIN NUMBER OF TIMES.

DRAG A COUNTER BLOCK FROM THE BOTTOM RIGHT INTO THE CANVAS.

Open Expression

Delete Expression

Export Expression

Structures



Counter



Sensor

# COUNTER



1 time

Servo 1 0



1.00 sec

SELECT AND DRAG THE EXPRESSIONS YOU WISH TO USE INTO THE COUNTER BLOCK.

# COUNTER



Number of iterations: 1

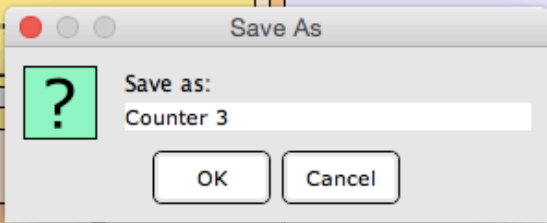
SELECT THE LOCK ICON AT THE TOP OF THE COUNTER BLOCK TO SET THE NUMBER OF ITERATIONS.

PLAY YOUR SEQUENCE BY SELECTING "PLAY".

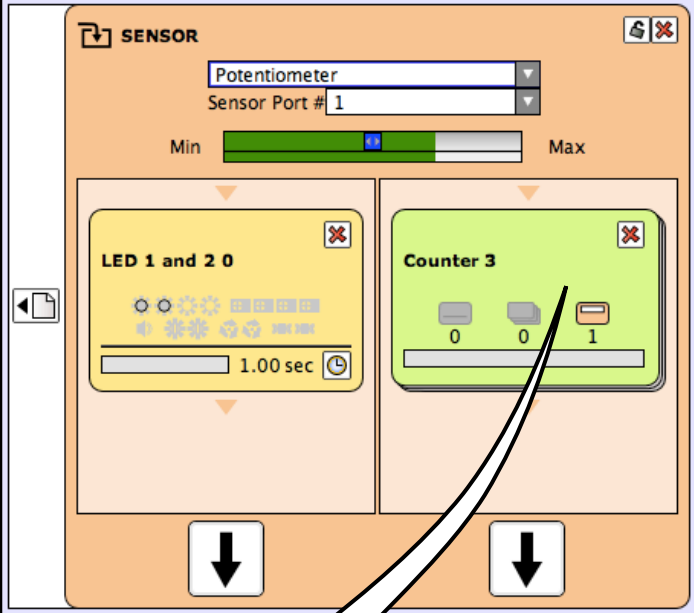
## SEQUENCE INSIDE A SEQUENCE

IT'S POSSIBLE TO CREATE A SEQUENCE AND USE IT INSIDE ANOTHER SEQUENCE.

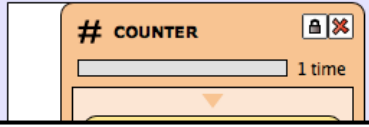
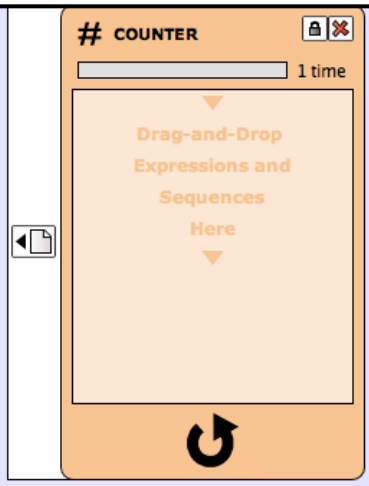
FIRST, CREATE AND SAVE A SEQUENCE (OR USE A SEQUENCE YOU PREVIOUSLY CREATED)



OPEN A NEW SEQUENCE. DRAG THE OLD SEQUENCE INTO THE NEW SEQUENCE AS YOU WOULD AN EXPRESSION.



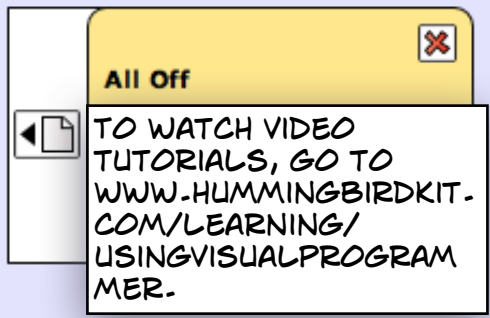
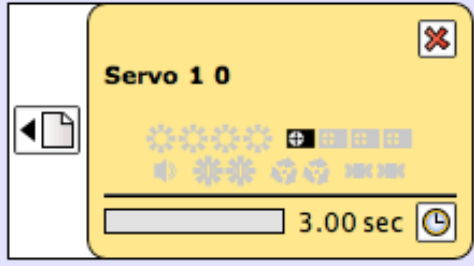
OLD SEQUENCE, TUCKED INSIDE NEW SEQUENCE



SEQUENCE IN SEQUENCE TIP: IT IS CURRENTLY IMPOSSIBLE TO DRAG COUNTER OR SENSOR BLOCKS INTO OTHER COUNTER OR SENSOR BLOCKS.

ONE WAY TO GET AROUND THIS IS SAVE A COUNTER OR SENSOR BLOCK AS A SEQUENCE, AND TO THEN DRAG THAT SEQUENCE INTO A NEW SEQUENCE.

THAT'S IT! WITH A LITTLE EXPERIMENTING, YOU'LL BE CREATING PROGRAMS THAT BRING YOUR ROBOTS TO LIFE!



TO WATCH VIDEO TUTORIALS, GO TO [WWW.HUMMINGBIRDKIT.COM/LEARNING/USINGVISUALPROGRAMMER](http://WWW.HUMMINGBIRDKIT.COM/LEARNING/USINGVISUALPROGRAMMER).