What is a ROBOT?
Is this a Robot?
Is this a Robot?
Sense

- Light Sensor
- Sound Sensor
- Camera
- Temperature Sensor
- Pressure Sensor
- Distance Sensor
- Moisture Sensor
- Data about people

Act

- Go from point A to B
- Move hand to grab an object
- Run
- Walk up a stairs
- Avoid an obstacle
- Recommendations
Sense  Plan  Act

Light Sensing Robot
Path Planning Robot
Roomba in Action
Robot Tour
What are we going to do Today?
Components

Hummingbird Robotics Board
Components

Hummingbird Robotics Board
Components

Single color LEDs (green, yellow, red, and orange) and Tri-Color LEDs

Hummingbird Robotics Board
Components

Single color LEDs (green, yellow, red, and orange) and Tri-Color LEDs

Hummingbird Robotics Board
Components

- 2 Servo Motors
- Single color LEDs (green, yellow, red, and orange) and Tri-Color LEDs
- Hummingbird Robotics Board
Components

Hummingbird Robotics Board

Single color LEDs (green, yellow, red, and orange) and Tri-Color LEDs

Light Sensor

2 Servo Motors
Components

Hummingbird Robotics Board
All content Pictures : http://www.hummingbirdkit.com/

Single color LEDs (green, yellow, red, and orange) and Tri-Color LEDs

2 Servo Motors

Light Sensor
Some Ideas

https://www.youtube.com/watch?v=lSDWkF4uybA
How to connect an LED?

Hint! The light color matches the wire color.
USING AN LED
1. Press little button on top with orange terminal tool
2. Wire should insert easily
   - If you have to push it hard – make sure the button is all the way down
3. Release button to finish
TRI-COLOR LED

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

Like the RGB pixels of a TV or computer screen, the colors mix together to make different colors.
LET’S BLINK SOME LEDS!
Building Expression with Tri-color LED and Servo

Expression 1: Red  Don’t Move
Expression 2: Blue  Move Left
Expression 3: Green  Move Right
You are allowed to glue things to the motors using hot glue guns - go to the glue gun station near the front right.

Craft supplies on the right side of the room

Stickers - construction paper - markers!!

GO AT IT!!!
Discuss Ideas?
Questions?
Backup Slides
Using the programmer
How to make an expression?

1. Select the output(s) you would like to set [Example: Single Color LED on port 1].

2. Set the values of those output(s). [Example: LED 1 to 50% brightness]

3. Select “Save” and name your expression. The name is completely up to you, just choose something you'll remember once you have a list of dozens of expressions!

4. You will see your expression name on the right of the screen.
USING A SERVO
LET’S MOVE A SERVO!
Building Sequence
Sequence

1. Select “Sequence Builder” at the top tab bar.
2. Select and drag the expressions you would like to use from the right into the canvas.
3. Drag expressions so they are listed in the order you would like to use.
4. Set the timing of each expression by clicking on the clock symbol. You can use decimals for times less than one second (like 0.1).
5. Select “Play”
Using Loops

A counter is helpful if you would like to repeat a sequence a certain number of times. For example, to make a servo-driven arm wave three times.

1. Drag the counter block over from the right.
2. Select and drag the expressions you wish to use into the counter block.
3. Select the “lock” at the top of the counter block to set the number of iterations.
4. Play your sequence by selecting “play”.

![Counter Block Image]
Using Sensor in the loop

1. Select the “Sensor” block from the bottom right and drag into the main screen.

2. Select the type of sensor from the drop down menu

3. Select the expressions you wish to use for each sequence and drag them into the proper track.

4. Each sequence track can be looped independently by selecting the arrow at the bottom.
Using Sensor in the loop

There are two tracks for sequences of one or more expressions. For example, if you are using a distance sensor, there is one sequence track for when an object is close to the sensor and one sequence track for when the object is far away from the sensor.

You set which track is played by moving the blue slider. If the green bar is to the left of the blue slider, the track on the left will play. If it is to the right of the slider, the track on the right will play.

TIP: You can place expressions or other sensor and counter structures above or below the sensor structure. Your sequence can be as long as you want.
Using Sensor in the loop

3. Select the expressions you wish to use for each sequence and drag them into the proper track.

4. Each sequence track can be looped independently by selecting the arrow at the bottom.

TIP: You can place expressions or other sensor and counter structures above or below the sensor structure. Your sequence can be as long as you want.