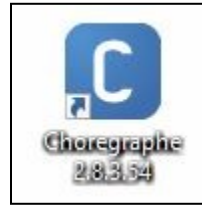




Robot Body Language



Goals for this session:

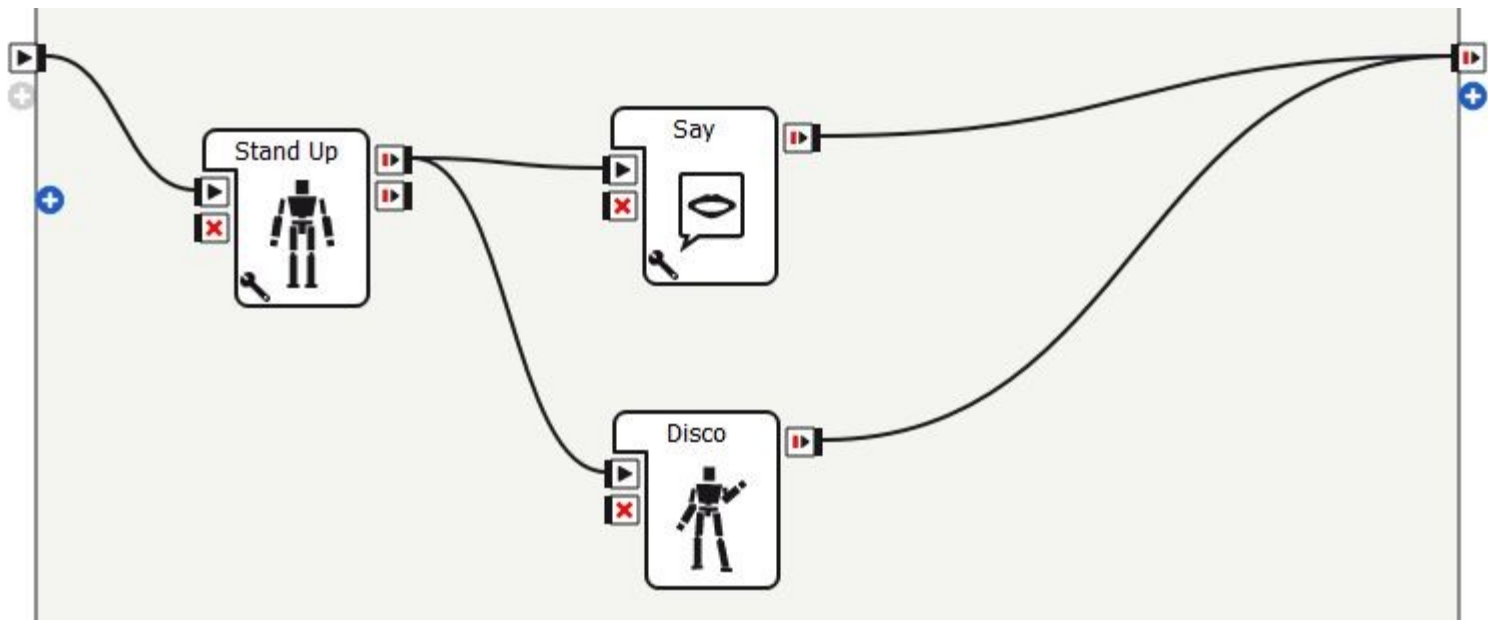
- Understand the purpose of "Wait for Signals" box and when to use it in a program
- Understand the purpose of the "Bumpers" box and incorporate it into a program.

So far, we have learned about the basics of dragging boxes, making the robot talk, and linking the talk to a movement.

But what if you want the robot to move and talk at the same time? One way is with the "Wait for Signals" box. The "Wait for Signals" box is utilized with other boxes, making the robot wait until all previous boxes are complete before moving on in the program.

Drag the "Stand Up", "Say", and "Disco" boxes and connect as shown in the diagram.

For example, if the program has the robot say hello and do a "Disco" dance at the same time, the program must include a "Wait for Signals" box. Otherwise the program will end before the disco dance is completed, because "Say" takes less time to perform and will automatically end the program before the disco dance is done. Run this program example to see the need for a "Wait for Signals" box.



Drag a "Stand Up" Box (in "Movement" > "Posture"), a "Say" box (in "Speech" > "Creation"), and an Animation box of your choice onto the workspace.

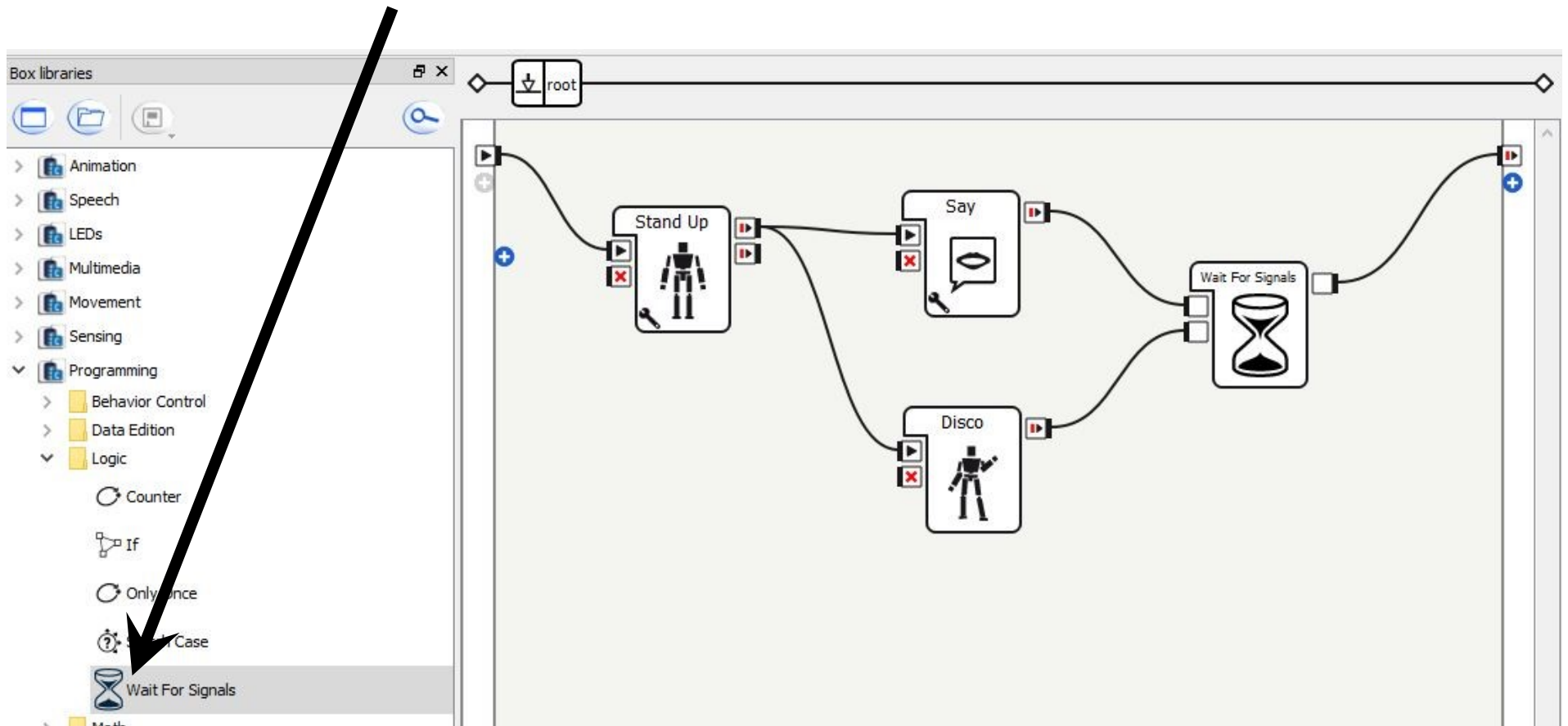
Navigate to "Programming" > "Logic" and drag a "Wait for Signals" box onto the workspace.

Connect the "Stand Up" box to both the "Say" box AND the chosen animation box.

Connect the "Say" box to the top input square and the animation box to the bottom input square on the "Wait for Signals" box.

Then connect the "Wait for Signals" box to the end.

Run program.





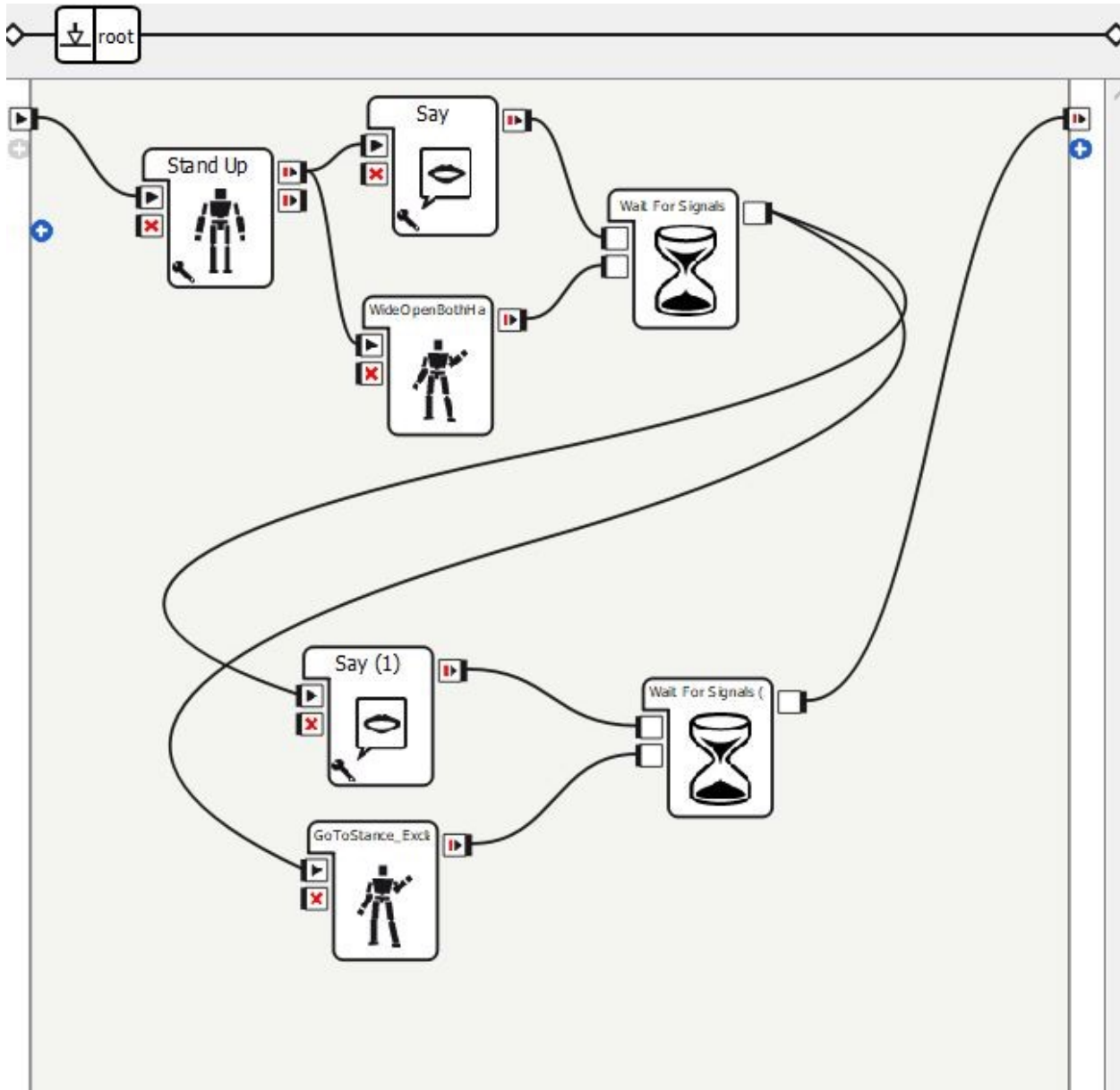
Besides the Mood and Entertainment boxes, there are more general animations that you can use in combination with the “Say” box to give your robot a more lifelike appearance when it is walking.

These are under “Animation” > “Dialog animations” and then choose which type of animation you want—Affirmation, Negation, Exclamation, etc.

These are gestures that someone would naturally make in conversation. If someone said “I like your hat” and you said “Mine?” you would gesture towards yourself or your hat. These boxes program the robot to make such gestures.

Again, remember to pick the NAO gestures, not the Pepper ones.

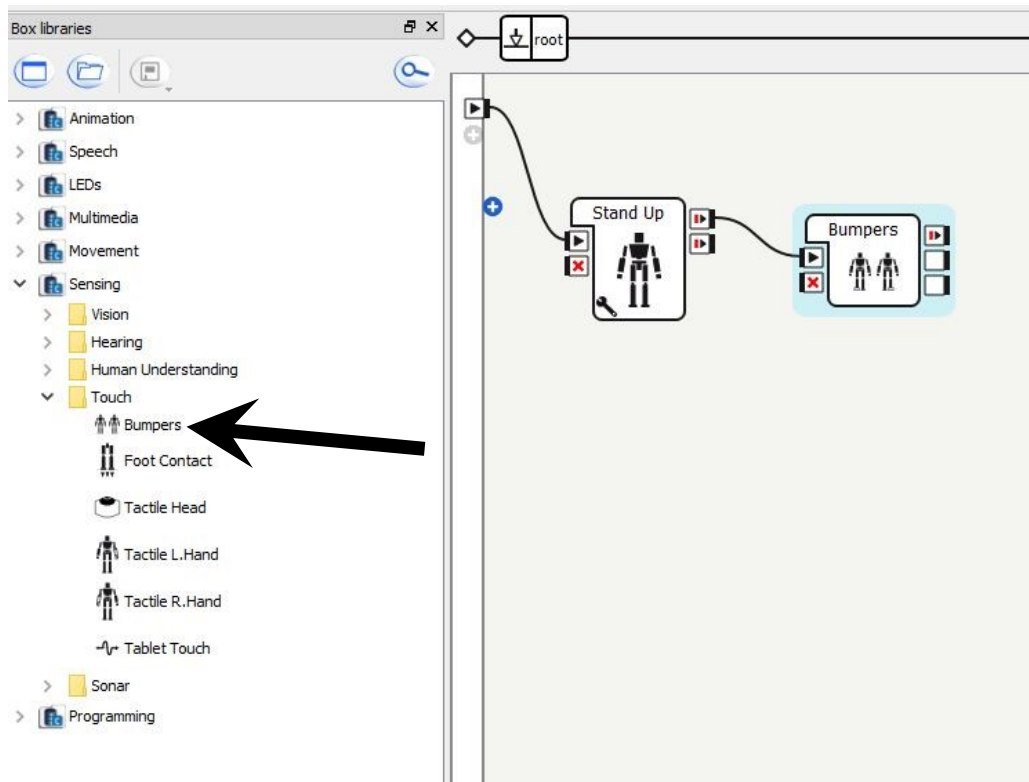
You can right click on the box menu and choose “Collapse All” to close all the folders at once.



Here is an example of a program combining all these elements.

The robot talks and makes a gesture. The “Wait for Signals” box instructs the robot to wait for both those actions to finish before moving on to the next two boxes.

Again the “Wait for Signals” box ensures the robot has completed both those actions before ending the program.



Bumpers:

The grey patches on the back of each hand, the front of the feet, and the top of the robot's head, are equipped with sensory bumpers. These are programmable so when they are touched they trigger the robot to say or do something.

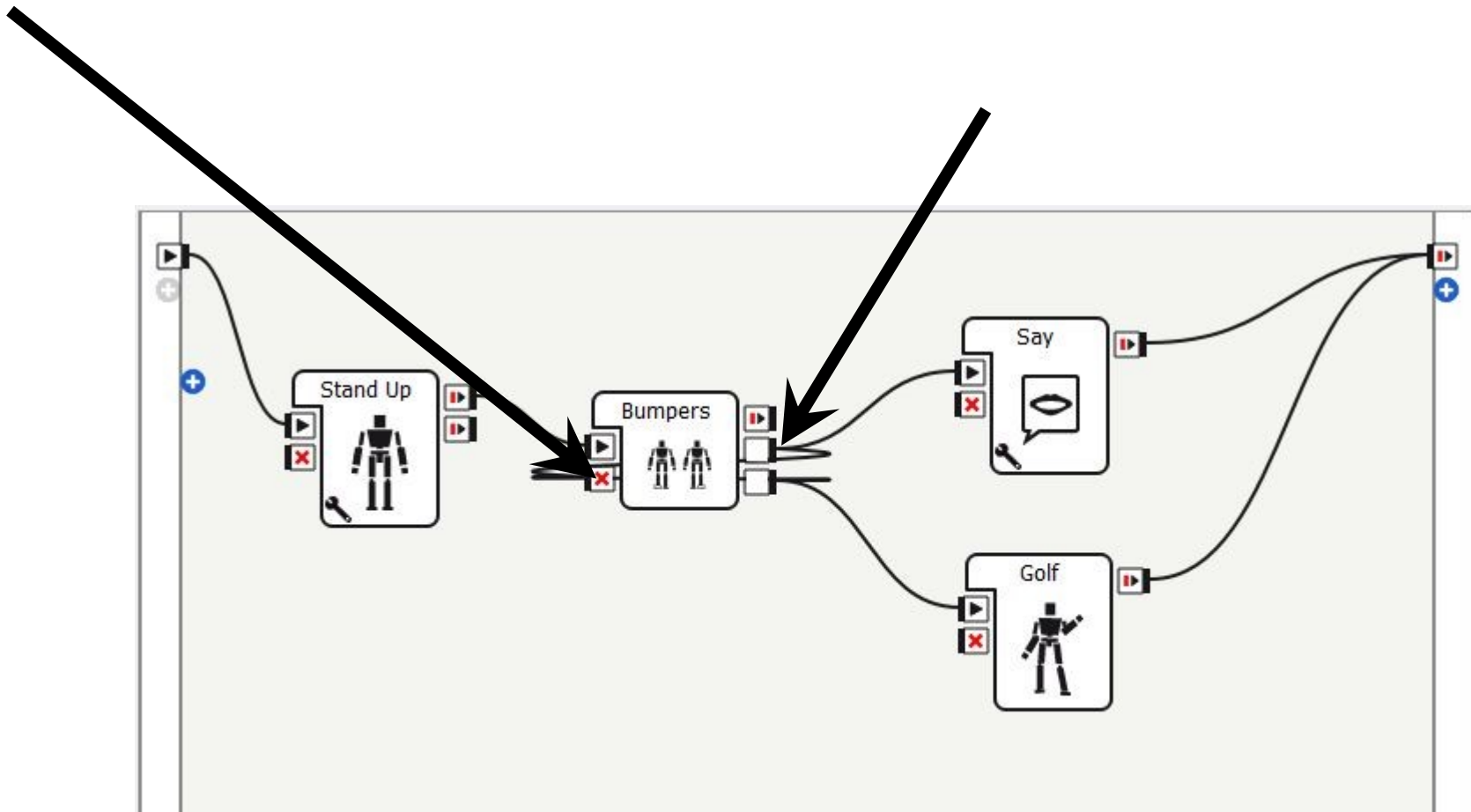
The bumper boxes can be found by navigating to "Sensing" > "Touch"

The foot bumpers are just called "Bumpers"

On the right side of the "Bumpers" box there are three small boxes for different outputs. The middle box controls the left foot bumper and the bottom box controls the right foot bumper

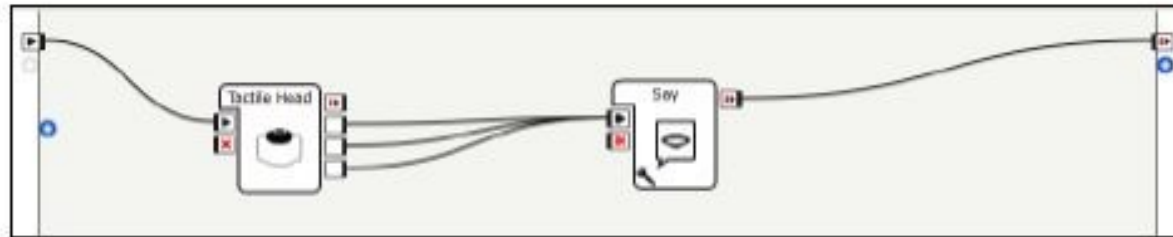
Here, the program indicates that when the left foot bumper is touched, a "Say" box is activated and when the right bumper is touched, the robot acts out a golf swing.

When using bumpers, each bumper box should be looped. Looping the bumper back to the red X on the same box, tells the robot to stop waiting for input from that bumper and will prevent the program from accidentally backtracking or starting over.



The head bumper box is called "Tactile Head". The robot's head has three sensors that can each be touched - front, middle, and back. These correspond to the 2nd, 3rd, and 4th little boxes on the right of the "Tactile Head" box. Here, all three sensors link to the same "Say" box.

**Be advised that this means EACH of the sensors leads to the "Say" box, so if you accidentally touch all three head bumpers the "Say" box will activate three times. You can eliminate this problem by only connecting one sensor to the "Say" box and making sure that sensor is touched.*



Although "Tactile Hand" has three outputs, it is best practice to only link one output box to the "Say" box.

**Be advised that this means EACH of the sensors leads to the "Say" box, so if you accidentally touch all three hand sensors the "Say" box will activate three times. You can eliminate this problem by only connecting one sensor to the "Say" box and making sure that sensor is touched.*

