Bionic Hand

Model Name and Number: Bionic Hand. YE.509.

Topic: Wait touch sensor (pressed).

Accessory tools: 7 Nail Beams, 8 Cross Nails, 2 Touch Sensors, Disposable cups and Lego@ Tower form 2*4 bricks.

Lesson Goal's:

- Students will learn about Touch Sensor.
- Students will learn about Wait command (pressed).

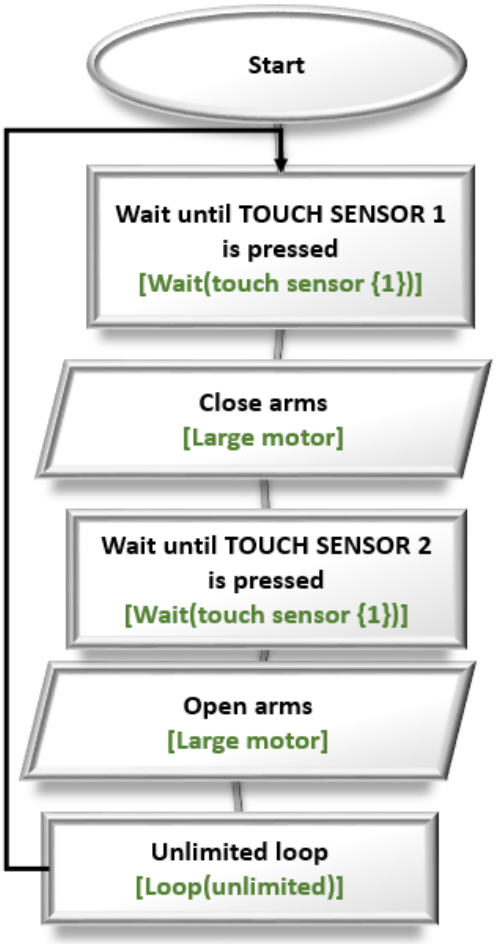
Lesson Structure:

1. Explain the model built in class.
2. Operational Algorithm - Flow Diagram.
3. Explain the Touch Sensor.
4. Explain the Wait command (compare state-(pressed)).
5. Construction.
6. Programming.
7. Playing with the model.
8. Dismantling and rearranging the Young Engineers kits - 10 minutes before class dismisses.

Explanation of the model:

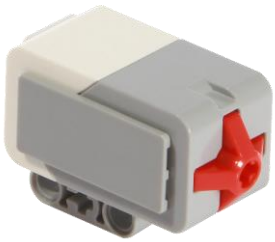
The model that we are building in class is called the "Bionic Hand". The model can be put on top of the student's hand, closing and opening with two Touch Sensors. Touch Sensor 1 is responsible for closing the hand and Touch Sensor 2 is responsible for opening the hand.

Pseudo Code - Flow Chart:



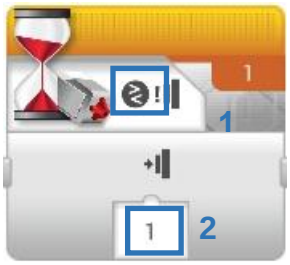
Touch Sensor:

The Touch Sensor is used as a switch - off and on. There is a sensor in the electrical circuit that opens and closes. The sensor has two states - 0 and 1. When the circuit is closed an input with the value 1 is sent to the smart brick (pressed). When the circuit is open an input with the value 0 is sent to the smart brick (released) .



Wait command:

This command is used to pause the program from reading the rest of the code; please note that this is not a motor stop command, rather a Wait command.



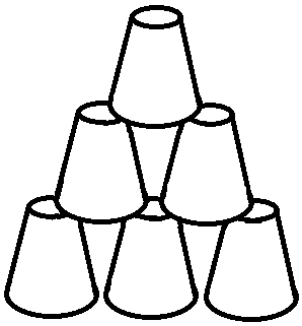
Selection 1- choose the type of Wait command condition. select (Touch Sensor), then select option (Compare) and finally select option (State).

Selection 2- There are three options: "0,1 and 2." 0 - the sensor is released, 1 - the sensor is pressed and 2 – bumped, pressed and released. Note, that in this lesson we will learn about the first option.

Programming Screen Shot:

Playing with the models:

1. Pyramid cups challenge: This game will require children to build cup pyramids using a bionic hand. Please note that it is difficult to stabilize the cups and not crush them while using the bionic hand. The group that completes the pyramid first wins. The competition will conduct as follows: three cups at the bottom, two cups in the middle and one cup at the top. To avoid crushing the cups while arranging the pyramid, the power of the engine must reduce. Note, that while one player starts, the previous player can move the bionic hand to another player on his team.



2. Relay race: For this race, we need to build a Lego@ tower. The students will need to use the bionic hand to move the Lego@ tower from one side of the room to the other without dropping parts. If one member of the group drops the Lego@ tower, they must go back and start the race again. The game will be a tournament between three groups, with each group using two bionic hands. Group 1 + Group 2 is facing each other and the third group is facing the winner.

Notes for the instructor:

- ✓ Note that in the pyramids cups challenge you need to reduce power, and in the relay race, you need to increase power to succeed.