Candy Machine

Model Name and Number: Candy Machine YE.521.

Topic: Ultrasonic Sensor and Color Sensor.

Accessory tools: 3 nail beams, 10 smooth lines 4, lines, 6 gear racks.
12 2*4 bricks divided to 3 colors (not black, grey or white).

Lesson's Goals:

- Student will practice using the Ultrasonic Sensor.
- Students will practice using the Color Sensor.
- Students will develop a technical understanding.

Lesson Structure:

1. Explain the model built in class.
2. Operational Algorithm.
3. Construction.
4. Programming.
5. Play with the model.
6. Dismantle and rearrange the Young Engineer kits - 10 minutes before class dismisses.

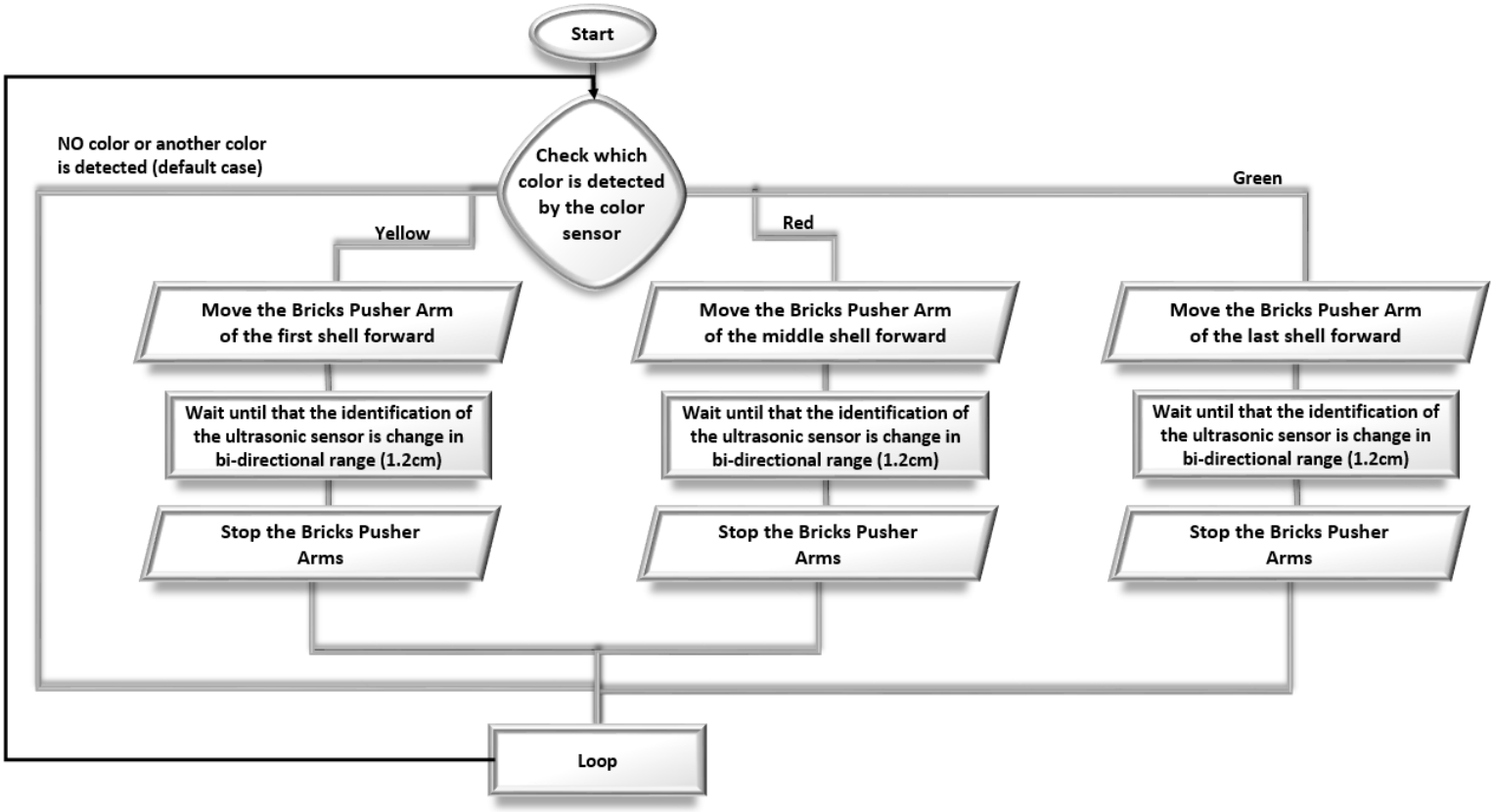
Explanation of the model to be built in class:

The model built in class today is called "Candy Machine". The machine has three shelves containing "products" in three different colors (not gray, black or white). In addition, the machine allows students to insert "money" (the four "2 bricks"), matching the colors of the "products" on the shelves. When inserting "money" in a specific color, the machine will supply one suitable "product" of the same color (a red brick that serves as "money" will match the red "product" on the shelf).

The model is composed of two motors and the combination of a Color Sensor and Ultrasonic Sensor. First, you must insert the pole arm (a beam connected to the gear rack) into each shelf and fill the shelves of the model with the "products".
The Color Sensor identifies the "money" that enters the machine and activates the correct motor. As the engine is running, the "products" are

pushed forward by the pole until the last "product" falls. As soon as the Ultrasonic Sensor detects the falling brick, the motor stops. Note that only the two bottom shelves are connected to an engine, this is done intentionally and will be explained later in the lesson plan.

Operational Algorithm:



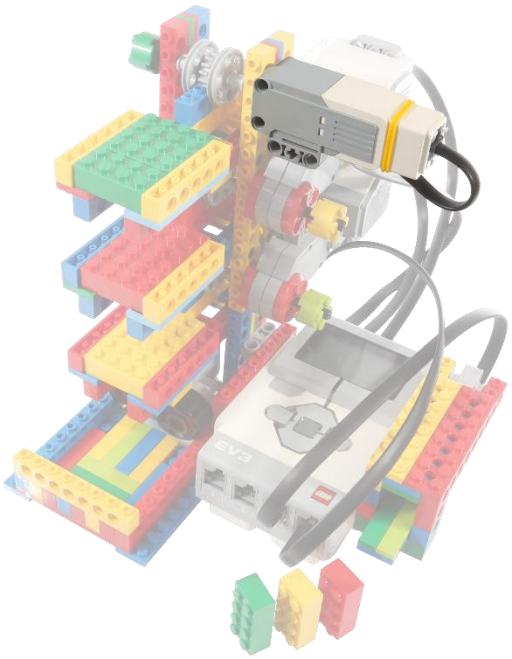
Playing with the Model:

The challenge in this task is to first start the machine, use different amounts of "money" per the color of the "product" and then successfully run the top shelf., (each color has a different "price").

Presenting the Problem:

Students must find a solution to operate the top shelf.

Solution:



Please note that the last motor connection is not included in the instructions. The goal is that the students will solve the lack of an engine by using an engine that is not the same but will be sufficient.

Programming:

Notes for the instructor:

- ✓ Students should be assisted with insertion of the pole if there is difficulty.
- ✓ The instructor should emphasize that the students need to technically understand the model's operation so that they can find a solution.