Ball Painter

Model Name and Number: Ball Painter. YE.508.

Topic: The printer operation**,** Loop Command (count).

Accessory tools: 1 Technical 9 Beams, 6 Nail Beams, 1 Angular Nail Beams, 1 Large Wheel rim, 4 Styrofoam Balls of 6-8 centimeters and one marker per group.

Lesson's Goals:

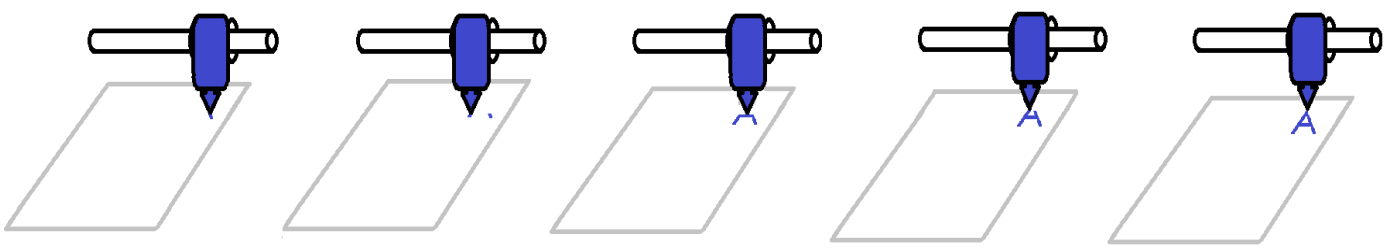
- Students will learn how a printer operates.
- Students will discuss with the instructor about algorithm operation.
- Students will learn about the Loop commend (count).

Structure of the lesson:

1. Explain how a printer works.
2. Explain the model which will be built in class.
3. Operational Algorithm - Flow Diagram.
4. Explain the Loop command.
5. Construction.
6. Free Programming.
7. Dismantling and rearranging the Young engineer kits - 10 minutes before class dismisses

Printer Operation:

A printer operates on the principle of creating a painting on top of many points. The points then create a full picture. There is an inkjet printer (marker in our model) which moves across the axis (arm moves up and down in our model) as the paper is driven out and the printing advances (rotating ball in our model). Drawing on the page is done by drawing dots across the page. The result of the drawing points is that every strap together creates a complete picture.



Explanation of the model built in class:

In this class, the students build a model that can draw on a ball. The ball model is installed on a rotating axle. The axle is then installed over an arm which moves left and right. The edge of the arm is connected to a marker. In addition, the arm can move up and down.

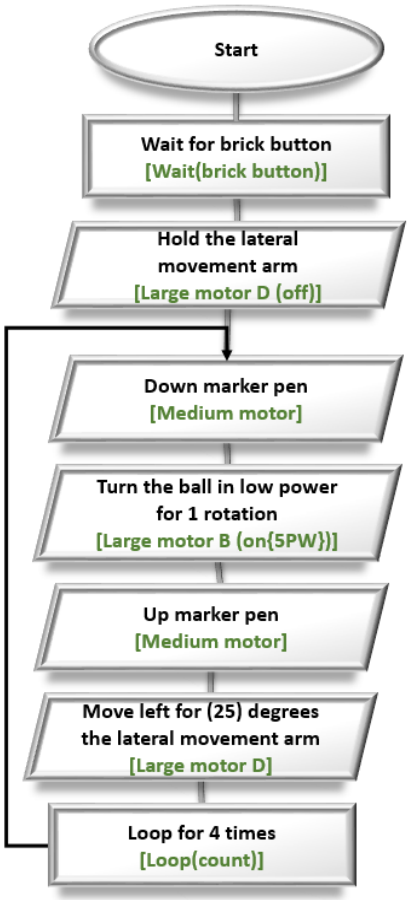
When the ball rotates and the arm moves down, the marker will draw on the ball.

The goal of the lesson is to allow the students to use their imagination and program the arm to draw different designs on the ball.

Pseudo Code - Flow Chart:

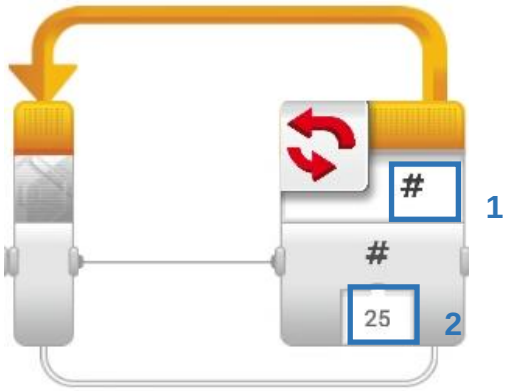
The following flow chart depicts the algorithm for specific drawings on the ball. Each student will create their own algorithm. This chart is designed to create a sketch of four equidistant lines on the right side of the ball. The first command is designed for correct alignment of the marker. Programming will begin when we press on the smart brick, which is achieved by placing the marker at the center of the arm.

Commands inside the loop include: transferring ink from the marker to the ball, rotating the ball, lifting the marker, moving the arm to the left arm with one step (25 degrees).



Loop command:

Ask the students if they remember what Loop command does? (Remind them that they learned it during Lesson 6 - Domino).



Loop command count is designed to produce several iterations on a sequence of a certain commands contained within it.

Selection 1- choose the type of Loop command.
Selection 2- set the number of repetitions

In our case, the choice will be Loop command count.

Notes for the instructor:

- ✓ Distribute four Styrofoam balls and a marker to each group, each child receives one ball, the fourth ball is for practice.
- ✓ Assist the students with attaching the Styrofoam ball to the axis.
- ✓ Please note that programming images appearing in the instructor manual and website are designed for a situation where the marker arm is in the center during the first position.
- ✓ In this lesson, students will program on their own and create different drawings on the ball. Each ball will be unique per the student's programming.
- ✓ At the beginning of the programming, add Wait command by pressing the smart brick.

Programming Screen Shot: