# Let's Program Each Other! - 1 hour

## Sequencing and Representation (Computational Thinking)

**Overview**: In this lesson, children will learn about sequencing in programming and about the symbols that make up a programming language like KIBO's. Students will create their own programming symbols and act out programs with their own movement. Finally, they can translate these movement programs into programs for KIBO.

**Learning Goals**: Students will:

- Define a **program** as a sequence of instructions for a computer or robot.
- Understand that symbols can represent steps in a program.
- Create a sequence of commands for their peers to follow.

**Materials/Resources**:

- Blank paper cut into roughly 3" squares, about 20 squares per group of 3-4 children.
- **Optional:** One KIBO 10 kit or higher.
- **Optional:** KIBO Says cards. If you do not have KIBO Says cards, draw forward, backward, left, right, and "spin" arrows on pieces of construction paper.

**New to KIBO? Watch the Videos!**
If this is your first time using KIBO, we encourage you to check out our short tutorial videos at **kinderlabrobotics.com/getting-started**.

## Lesson Plan

**Inspire**: "Today we are going to create **programs**! A program is a list of instructions that a robot can understand. Just like people can understand languages like English, Spanish, and Chinese, computers and robots like KIBO have languages, too!"

Show the blue movement commands (either blocks or cards). Ask children to share their ideas about what the picture (icon) on each block might mean.

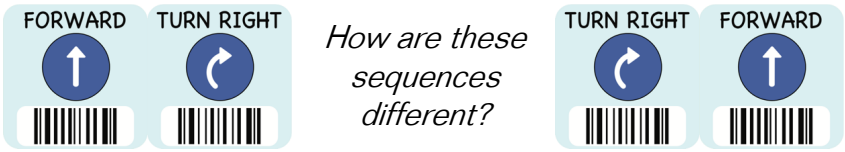
"KIBO's language uses pictures and bar-codes. Each KIBO command tells KIBO to do one thing." Show children a few different KIBO blocks or KIBO Says cards. "We can guess what the instructions do because of the pictures and the words, but KIBO reads this black and white barcode down here." Children may recognize barcodes from the backs of library books, or foods at the grocery store.

Remind students about the difference between the different **representations** on each block: English words, the symbol, and the barcode. Each of these components of a KIBO block represent the same thing, but in different ways. The word is how readers might recognize the block. The symbol or picture lets non-readers recognize the block. And the barcode is how KIBO recognizes the block.

**Connect: Play "KIBO Says"** "A program is a like a story for KIBO to act out. KIBO acts out each step, in order. Let's try being robots and acting out a program!"

This activity teaches the KIBO programming language, symbols, and sequencing. You'll use either the large KIBO Says cards from KIBO's curriculum package. Only use the blue Movement commands. If you don't have KIBO Says, use the cards you created yourself.

The game is played like the traditional Simon Says game: Students repeat actions as instructed by the teacher. First, introduce each card and what it means. Have the class stand for the game. Hold up one card at a time and say, "The programmer says to _____." Then give several instructions at a time for the students to act out in order. Experiment with sequence; how does the order of instructions change the movement?




**Small-Group Work: Program Each Other.** "Let's create our own programming commands to program each other!"

Children will work in small groups to create their own versions of programming commands like the ones KIBO uses. They might create commands like KIBO's forward and backward commands; they might invent their own like "jump" or "sit down." For each command, the group should create a drawing to represent the movement.

Once the groups have created programming commands, students take turns creating sequences with their cards to act out. Groups should rotate the "programmer" and "robot" roles so that each child has the chance to act out a program created by others.

**Reflect: What Symbols Did You Create?** Ask students to share the programming symbols they created. What differences or similarities do the students see across the groups' symbols? Did they notice the importance of sequence or order in the programs? What if one of the programs had been in a different order?

If you have access to a KIBO kit, work together to translate some of the groups' programs into KIBO commands. Scan the program to see KIBO act out the story. How is KIBO's ability to act out movement commands different from the students' ability?

## Standards Addressed

**CSTA K-12 Computer Science Standards:** 1A-AP-08, 1A-AP-09, 1A-AP-10