Movement with Bee-Bots

The purpose of this activity is for educators to engage in plugged computational thinking by programming a robot to navigate a maze. There are two ways to participate in this activity:

- **Option 1:** Use the Bee-Bot robot (~$100)
- **Option 2:** Use the screen-based Bee-Bot online emulator (free and available on all devices)

Depending on your session format and group size, you might choose Option 1, Option 2, or both.

Key Concepts

- **Algorithm:** set of step-by-step instructions required to solve a problem or complete a task
- **Computational thinking:** set of critical thinking and problem-solving skills, practices, and processes that everyone, including computer scientists, can learn and use in various contexts
- **Computer science:** study of computers and computational systems
- **Plugged:** with the use of technology

Materials and Setup

Option 1:

- Bee-Bot robot (1 per pair/small group)
- Large 5x6 grid made of 1 ft. x 1 ft. squares
- Paper
- Pencil or pen

Option 2:

- Bee-Bot online emulator
- Paper
- Pencil or pen

20 minutes

Pairs or small groups

Option 1: In-person
Option 2: In-person or virtual

Option 1 (Bee-Bot Robot) Activity Instructions

1. Bee-Bot is a robot that can move up or down and turn right or left (refer to Figure 1).
2. Turn on the robot. Use the directional arrows on top of the Bee-Bot to program a sequence for the robot to move around. Then, press "Go" to observe the robot perform the sequence, or algorithm.
   a. To delete a programmed sequence, press the "X" button.
   b. To pause the robot while it is moving, press the "||" button.
3. Place the large grid (refer to Figure 2) on the floor or table. Program the robot to move from one point on the grid to another point.
4. Create your own mazes and challenges. For example, program the robot to get to the cheese (refer to Figure 2) by navigating around the lakes.
5. Use paper and a pencil or pen to record your algorithms.

Figure 1. Bee-Bot

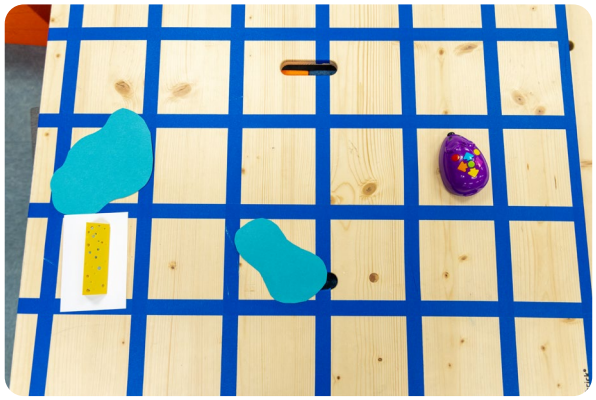

Figure 2. Large grid

Option 2 (Bee-Bot Online Emulator) Activity Instructions

1. Open the Bee-Bot online emulator (refer to Figure 3).
2. The bottom left side of the screen includes the same directional arrows and buttons that you would find on the tangible Bee-Bot robot.
3. Use the directional arrows to program a sequence for the robot to move around. Then, press "Go" to observe the robot perform the sequence, or algorithm.
   a. To delete a programmed sequence, press the "X" button.
   b. To pause the robot while it is moving, press the "||" button.
4. On the top left side of the screen, use the dropdown menu to select one of the following mazes for the Bee-Bot:
   a. Country Road Mat
   b. Dice Mat
   c. Number Line Mat
   d. Old West Mat
   e. Shapes, Colors, and Size Mat
   f. U.S. Coins Mat
   g. Butterfly Mat
5. Program the robot to move from one point on the maze to another point.
6. Create your own mazes and challenges. For example, using the Country Road Mat (refer to Figure 3), program the robot to start at the apple trees, move through the road, and end at the farm stand.
7. Use paper and a pencil or pen to record your algorithm.

Figure 3. Bee-Bot Online Emulator

Reflect and Discuss

- In what ways was this coding activity playful? In what ways did you need to use creativity in your coding?
- How might you adapt this activity for children in your learning setting?