

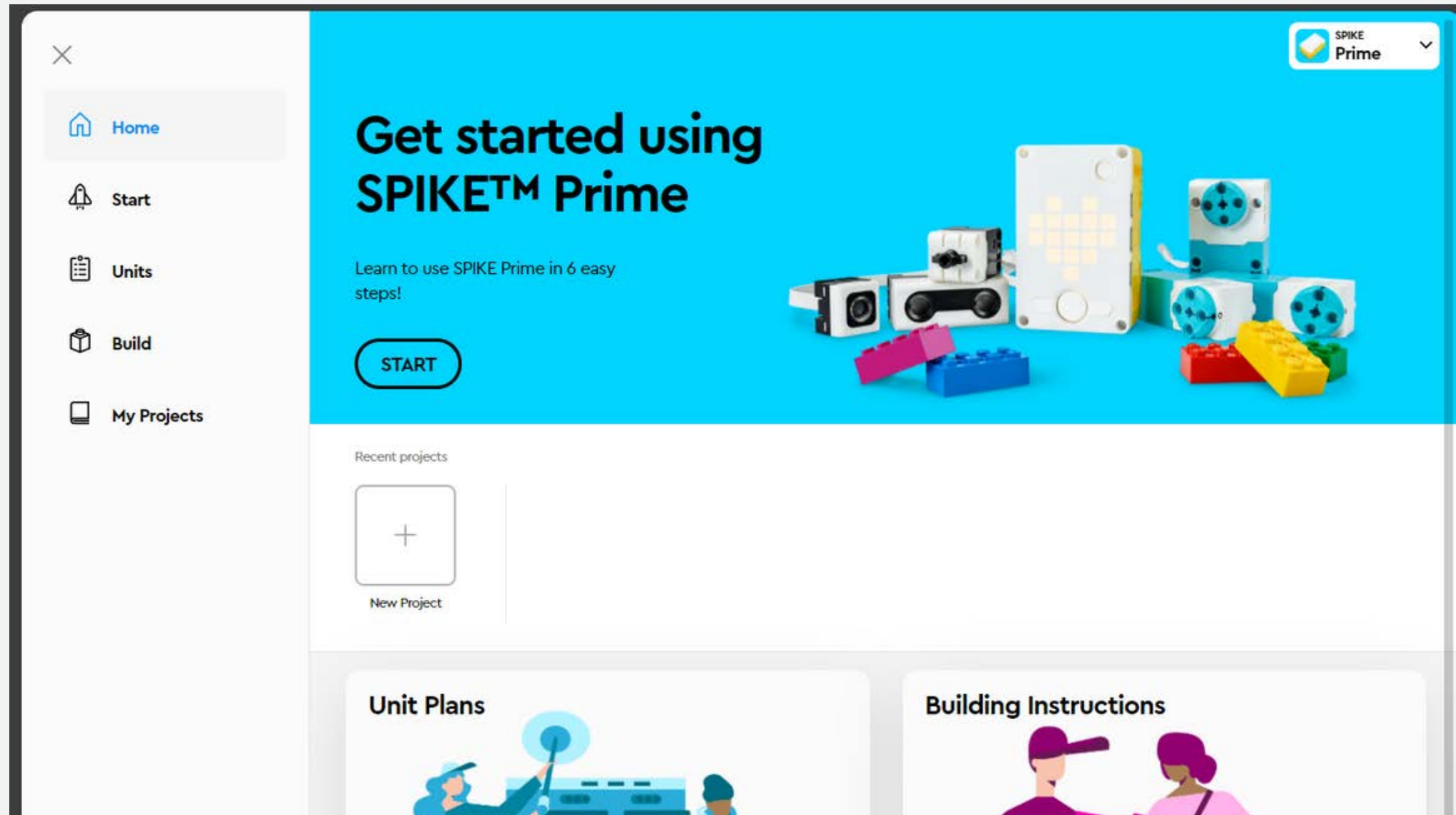
# RoboCup Junior Soccer

Training Curriculum

For **EV3** Classroom and **Spike Prime** App  
(Blocks)



# Introduction to the coding interface



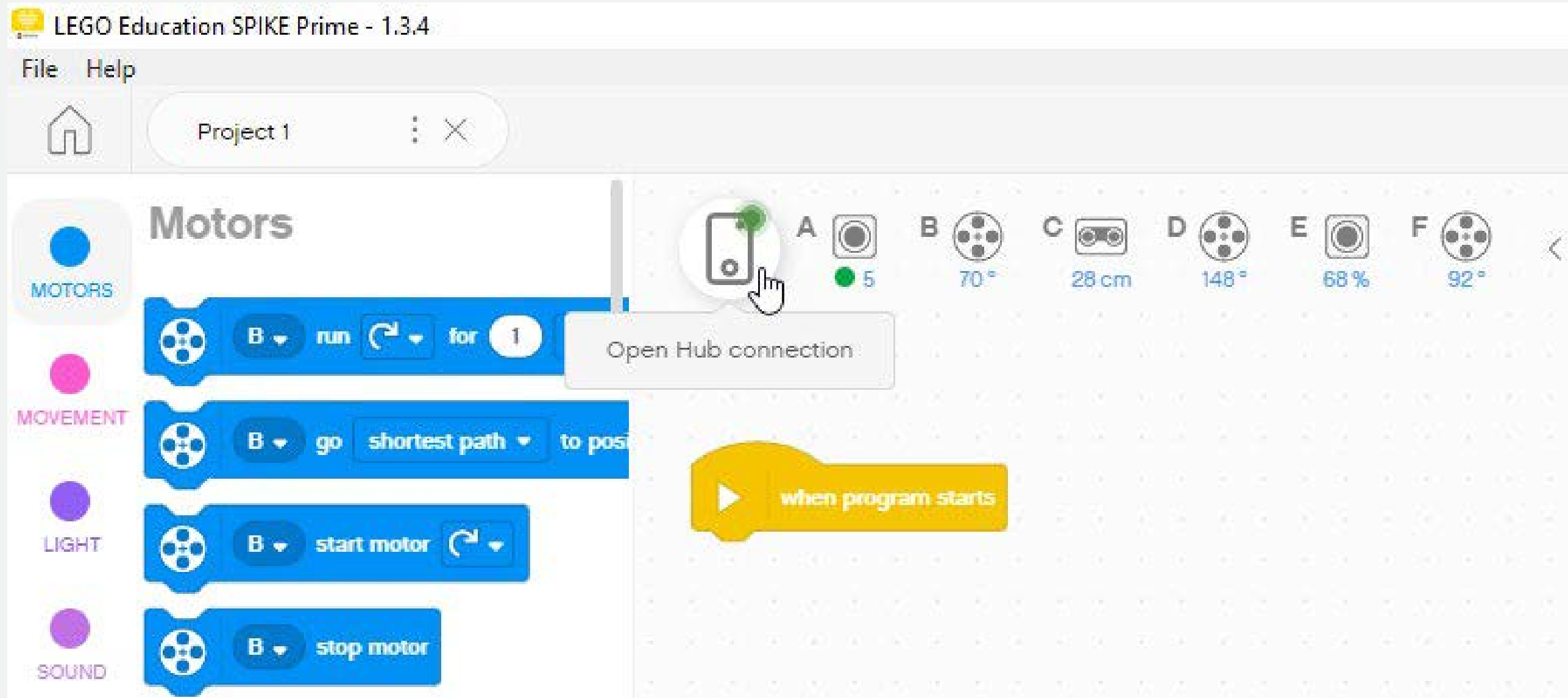
## From the HOME page

- Tutorials
- Teaching unit plans
- Build instructions
- Links to your recent projects

## New Project

- Open a new window
- Choose to code in either:
  - WORD BLOCKS (Scratch)
  - PYTHON
- This presentation will focus on coding with word blocks

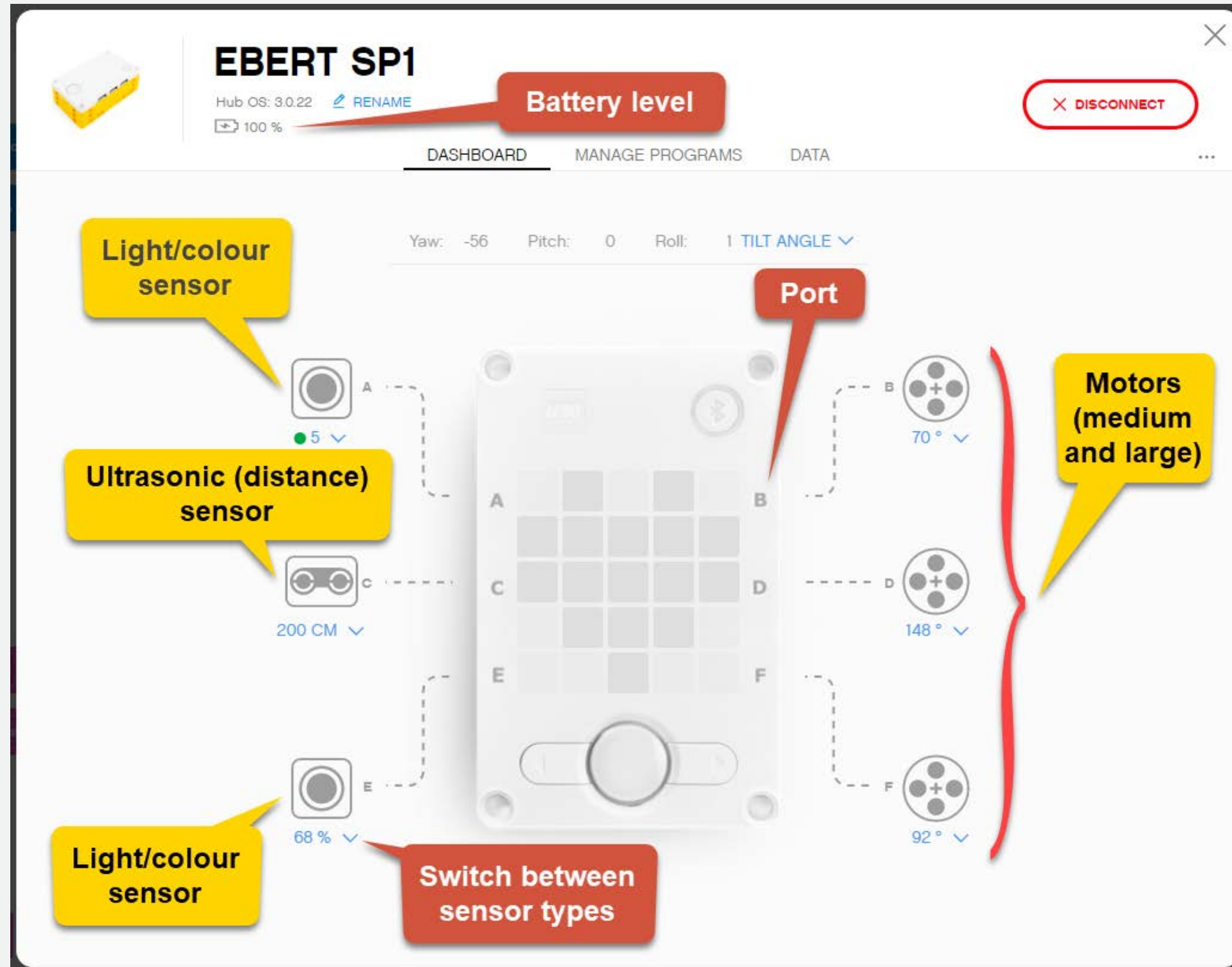
# Introduction to the coding interface



Quick view of port connections

- For details click on the brick icon to open the "Dashboard"

# Introduction to the coding interface



## Dashboard (if connected)

- Battery level indicator
- Port position for all connected inputs and outputs
  - All ports can act as either input or output ports for Spike Prime
  - EV3: top port are for motors, bottom ports are for sensors
- Readings from each port
  - What is viewed can be set using the dropdown menu

# Introduction to the coding interface

## Palette of programming blocks

- Details about each programming block can be found under "Help"

Action -Motor control

Outputs –Sound and display

Flow control –Program control elements

Sensors –Inputs

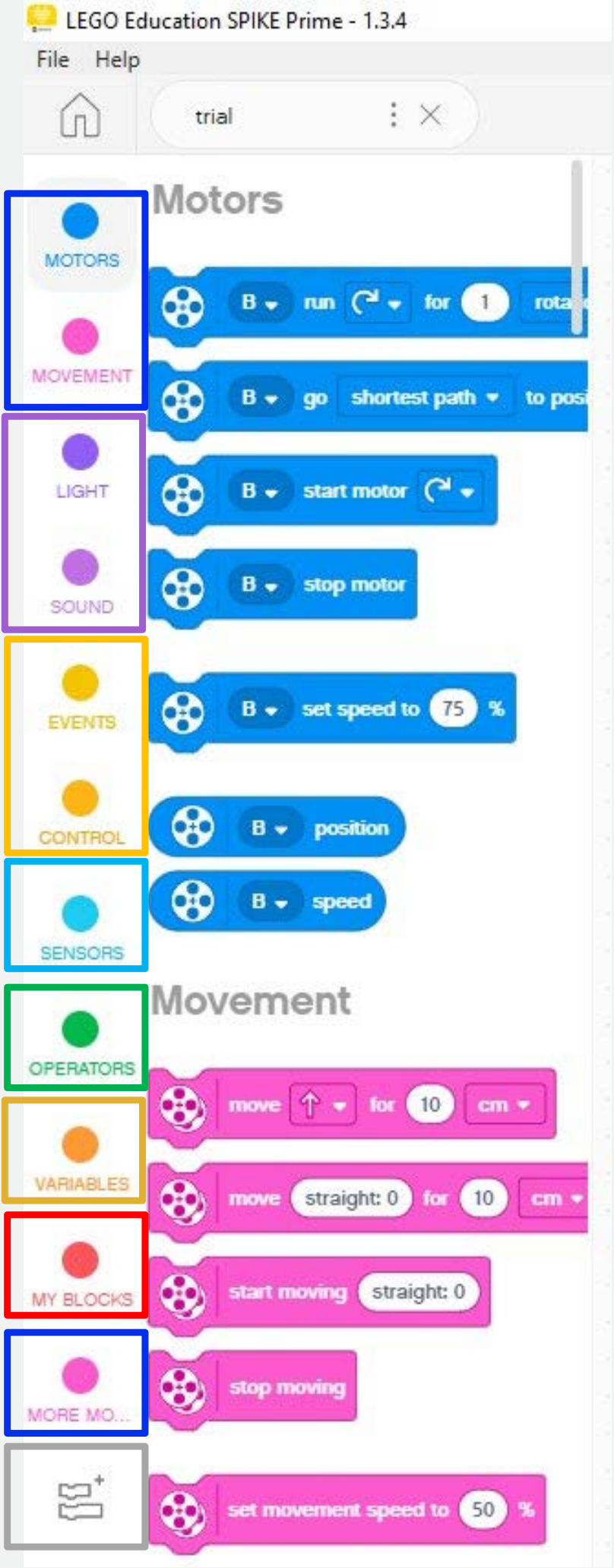
Operators –Mathematics and comparisons

Variables –data containers

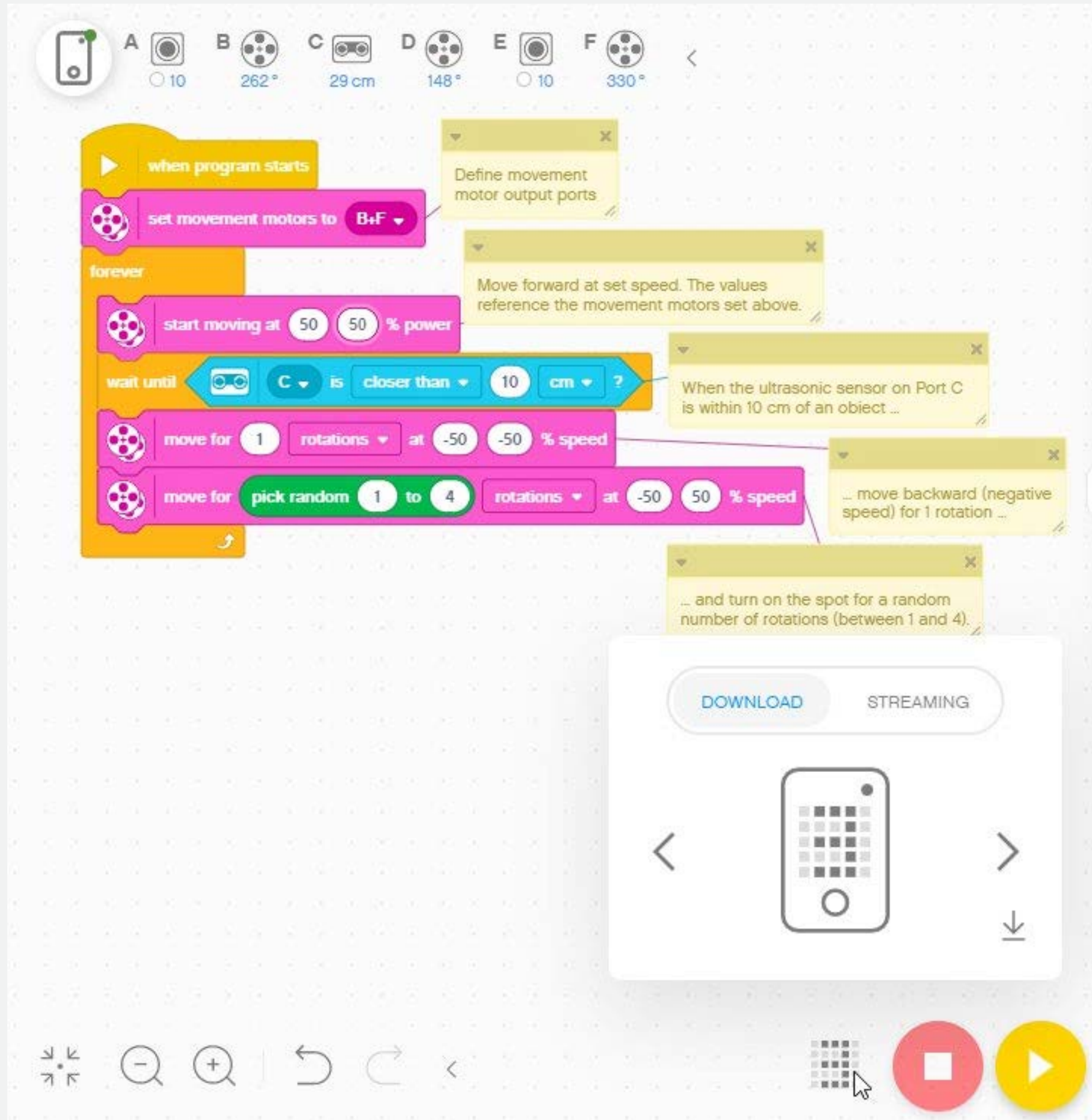
Functions –collecting blocks of code

Action –More movement blocks (from extensions)

Extensions –Additional code blocks



# Example of simple program



## Things to note:

- Encourage students to add comments to explain code (the comments are a bit overdone in this example)
- Encourage students to clean up the programming canvas
- When ready to download code to robot, click on the 5 x 5 grid at the bottom to select the program storage position (0 –19) on the hub
- Click on the down arrow to download to hub

# Getting help

The screenshot shows the EV3 Mindstorms help interface. At the top, there is a navigation bar with a close button, a 'Close lobby' button, and menu items for HOME, START, UNITS, BUILD, and MY PROJECTS. A sidebar on the left contains a list of help categories: General, Language, Legal, Help (selected), Help Files, Interacting with the App, Hardware Overview, Types of Word Blocks, Word Block Description (expanded), Motor Blocks Category, and Light Blocks Category. The main content area displays the 'Word Block Description' section, which includes a sub-section for 'Motor Blocks Category' and two detailed descriptions: 'Run Motor for Duration' and 'Motor Go to Position'. The version number '1.3.4 (1.3.4)' is visible in the bottom left corner.

Close lobby

HOME START UNITS BUILD MY PROJECTS

## Help

### Word Block Description

#### Motor Blocks Category

Motor Blocks either make the motors run or retrieve information from the motors. The *Motor Blocks* category contains the most common Motor Blocks.

#### Run Motor for Duration

This block will run one or more motors clockwise or anticlockwise for a specified number of rotations, seconds or degrees.

The motor speed is set by the Set Speed Block. The default speed is 75%.

'Stall detection' is enabled by default. See the *Turn Stall Detection On/Off Block* for more information.

#### Motor Go to Position

This block sets one or more motors to a specified position. The motor can be set to run clockwise, anticlockwise or to take the shortest path to the specified position. The position ranges from 0 to 359 degrees.

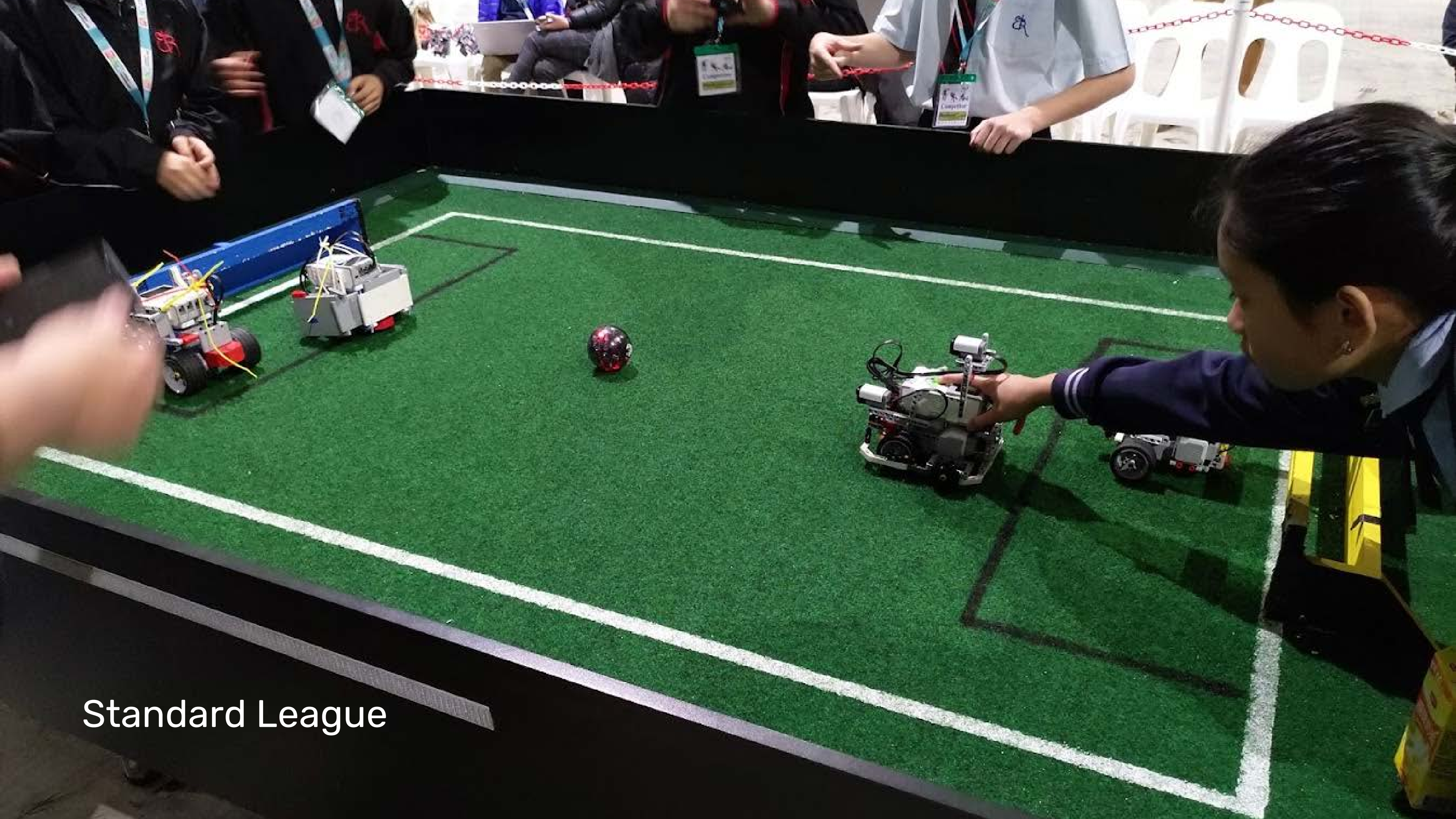
The motor speed is set by the Set Speed Block. The default speed

1.3.4 (1.3.4)

“Help” isn’t as extensive as it was in the previous version of EV3

Mindstorms

“Help” includes short descriptions of types of code blocks how to use individual code blocks



Standard League



# Coding a Goalie

Where to start?

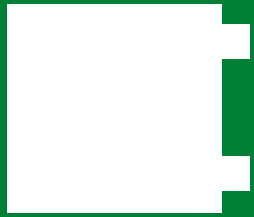
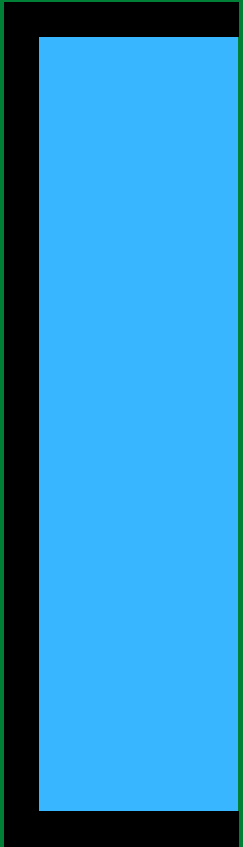
The robot needs to:

- Be able to **find** the ball
- Be able to **hit** the ball

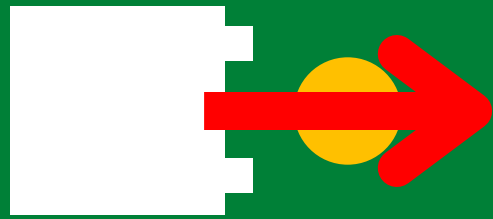
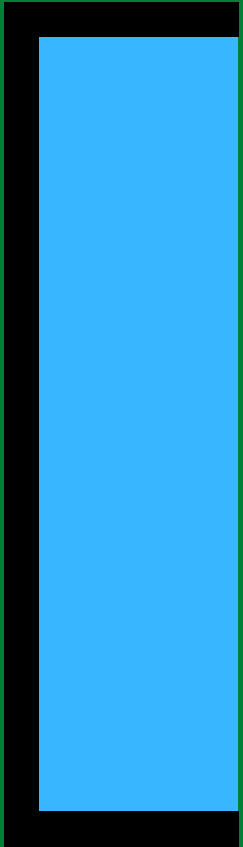




If the ball is far away, don't move



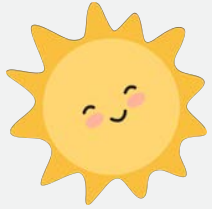
If the ball is close...



Move forward and hit the ball

# "Mexican wave"

The start of all programs



Where are the motors connected to?

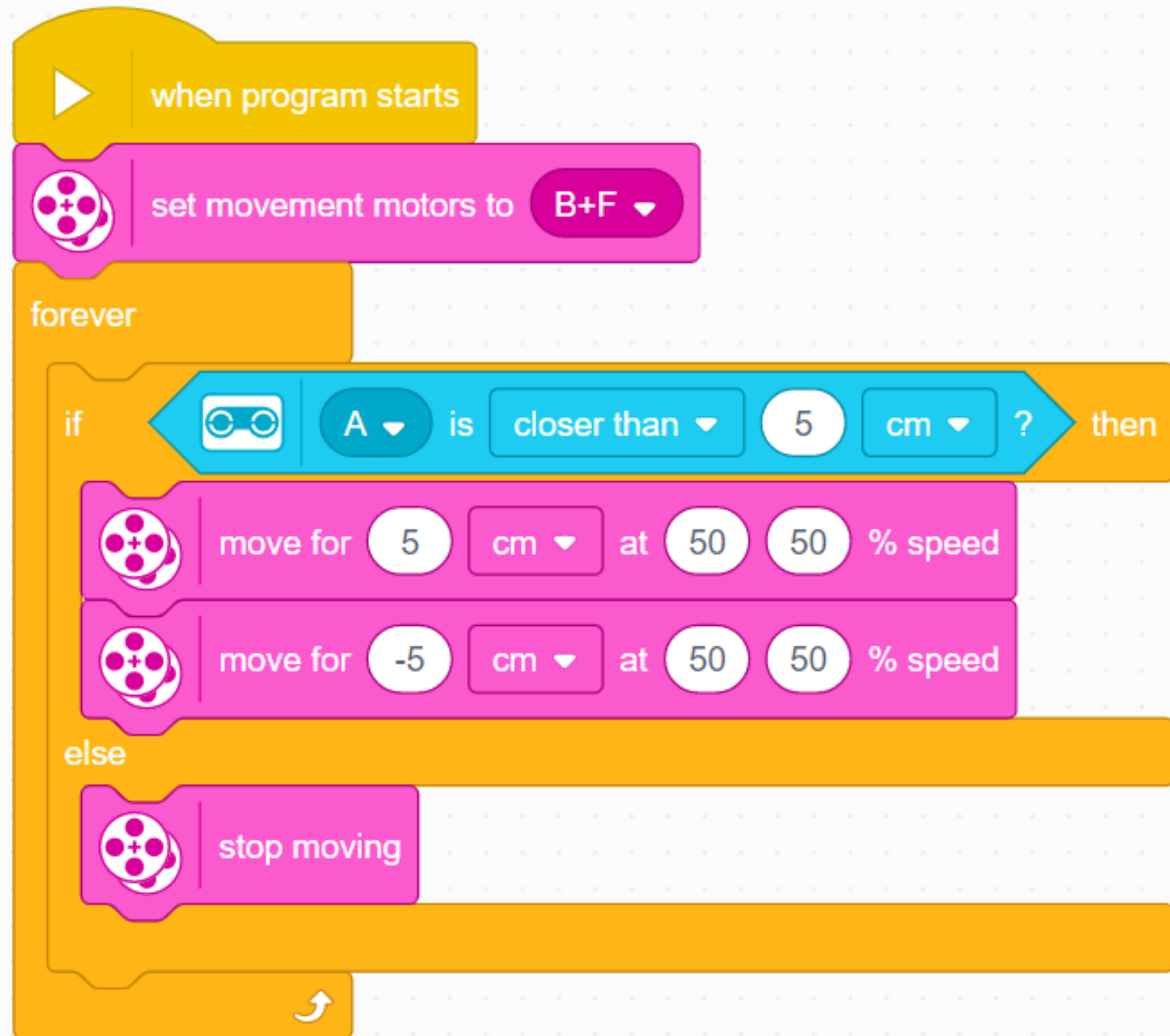
Where is the sensor connected to?

If you have an IR seeker connected, "ball in front" is equal to 12, **like a clock.**

```
when program starts
  set movement motors to B+F
  forever loop
    if A is closer than 5 cm ? then
      move for 5 cm at 50 50 % speed
      move for -5 cm at 50 50 % speed
    else
      stop moving
```

```
A is exactly at 5 cm ?
```

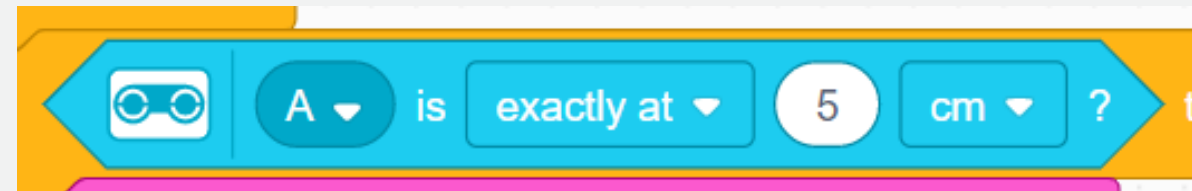
# "Mexican wave"



forever:

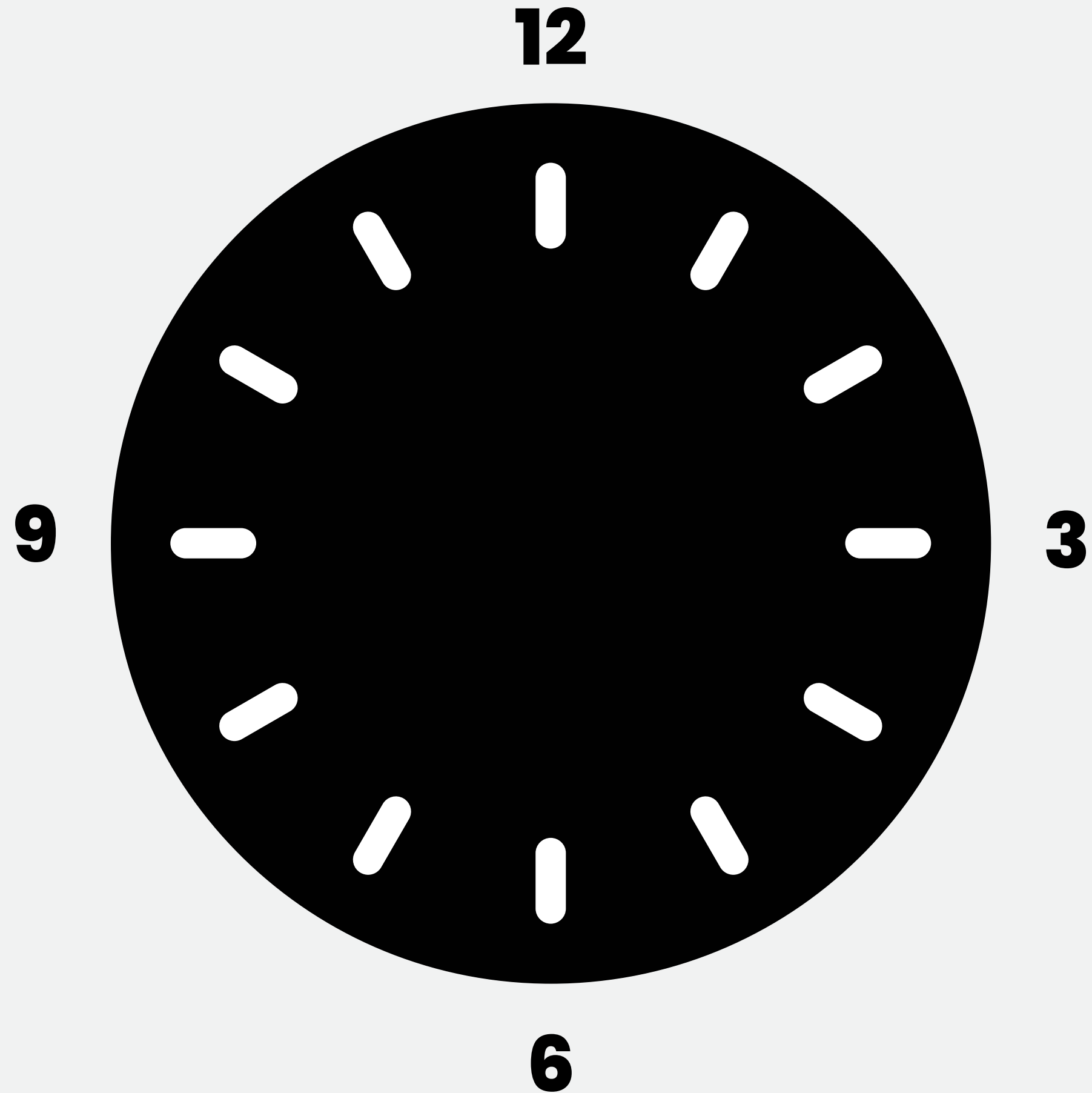
- if the ball is close and in front
  - move forward 5cm
  - move back 5cm
- otherwise
  - don't move

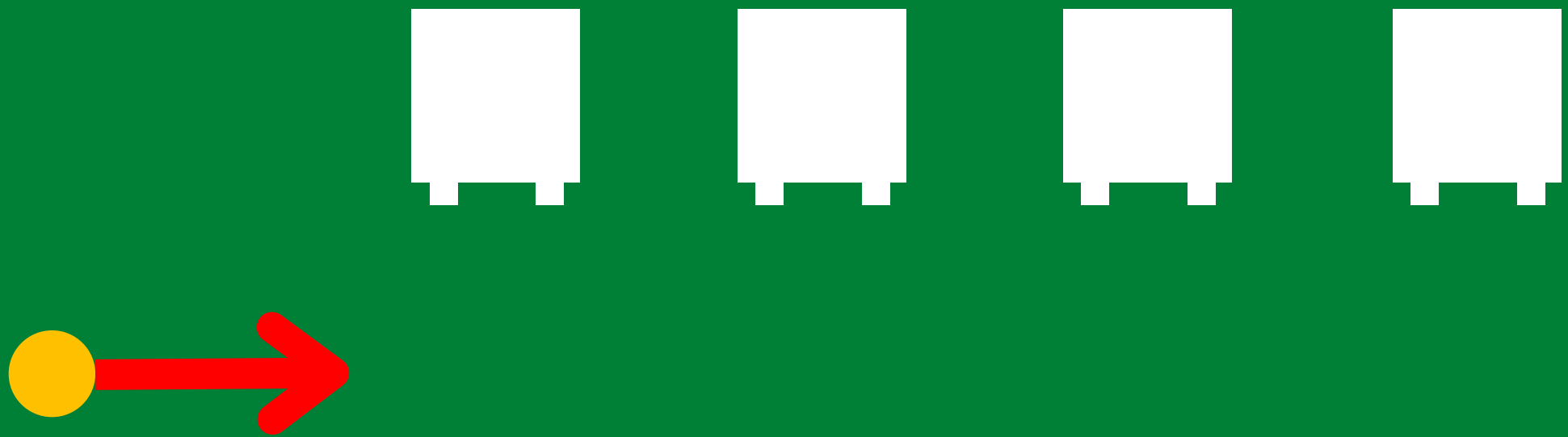
Use the distance block!



**The value we get using the IR Seeker is a number from 1 to 12.**

<https://irseeker.buildingblockrobotics.com/guides/spike-prime>

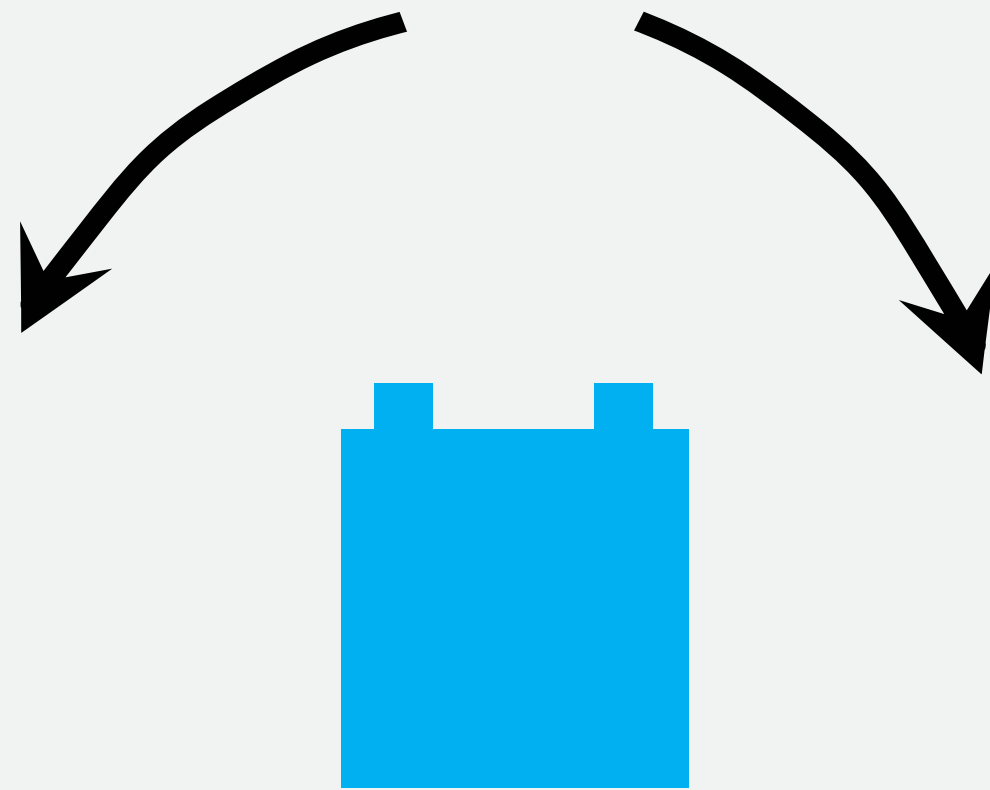




Making a mexican wave!



**Your turn - make it turn towards the ball**



# Advanced: Read the direction and signal strength as well

The image displays a Scratch code editor with a script on the left and a variables panel on the right.

**Script:**

- when program starts** block
- forever** loop containing:
  - set** *Direction* to **A reflected light**
  - set** *Strength* to **A raw red**
  - wait** 1 seconds

**Variables Panel:**

- Direction** variable with a value of 0
- Strength** variable with a value of 0