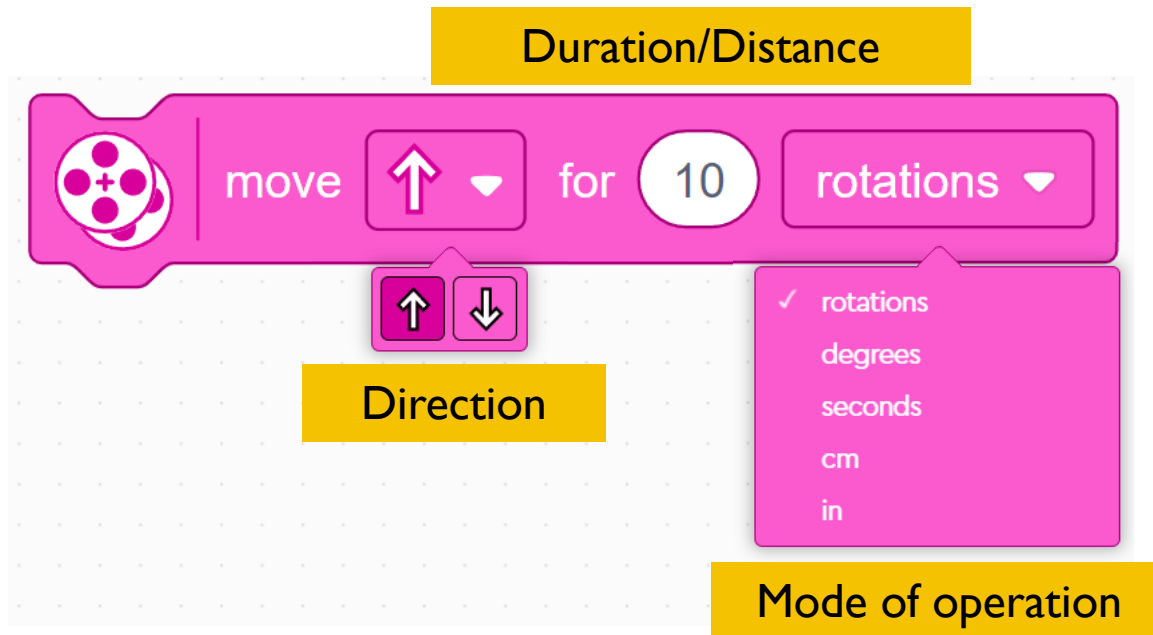# MOVING STRAIGHT

SANJAY AND ARVIND SESHAN

This lesson uses SPIKE 3 software

LESSON OBJECTIVES

■ Learn how to make your robot go forward and backwards

■ Learn how to use the Move blocks

■ Note: Although images in this lessons may show a SPIKE Prime, the code blocks are the same for Robot Inventor
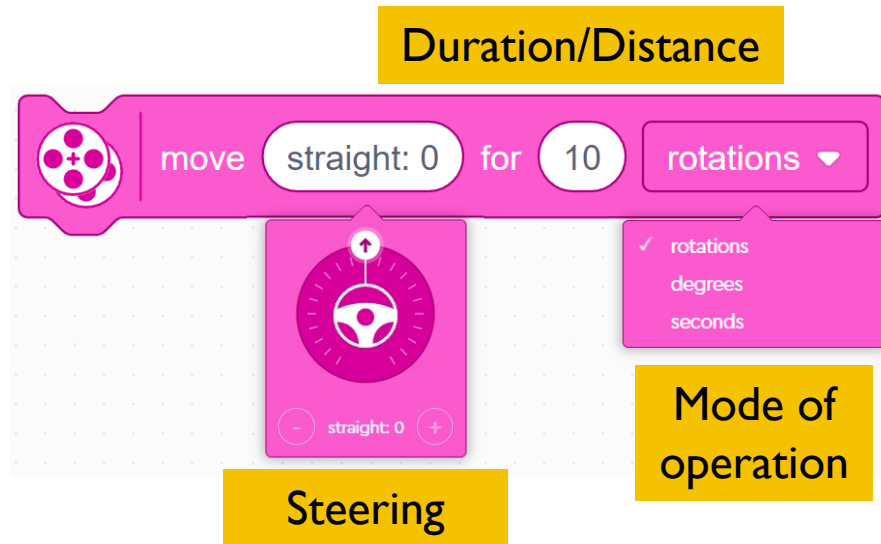
MOVE FOR DURATION

Duration/Distance

Set in Configuration
To use this block you will set the speed, stop mode, motor ports, wheel size (see Configuring Robot Movement Lesson)

move ↑ for 10 rotations

Direction

- ✓ rotations
- degrees
- seconds
- cm
- in

Mode of operation

- Simplest move block – just gives control over direction and distance

- Other move blocks give control over speed and steering

MOVE WITH STEERING FOR DURATION

Duration/Distance


Steering

Mode of operation

Set in Configuration
To use this block you will set the speed, stop mode, motor ports, wheel size (see Configuring Robot Movement Lesson)

- This block allows you to control the move distance and turning of the robot.

- This block gives control over steering by giving different amounts of power to the left and right wheels. "straight: 0" steering give equal power to both wheels, which makes the robot move straight. right:100 and left:-100 give full power to both wheels but turn them in opposite directions, which makes the robot spin right or spin left.

- Note that the non-linear steering in SPIKE 2 has now been fixed in SPIKE 3. See this video for more details.
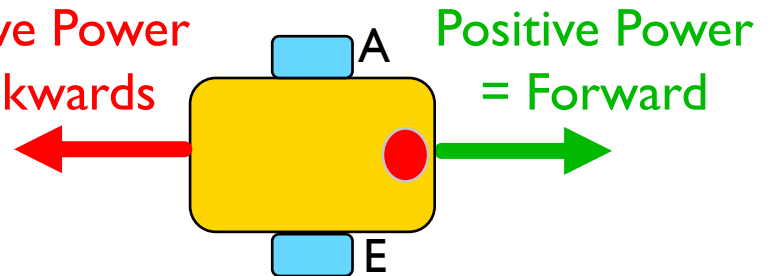
NEGATIVE VALUES

- You can enter negative values for power or distance

- This will make the robot move backwards

- If you negate two values (e.g. power and distance, or distance and backwards direction), the robot will move forward.
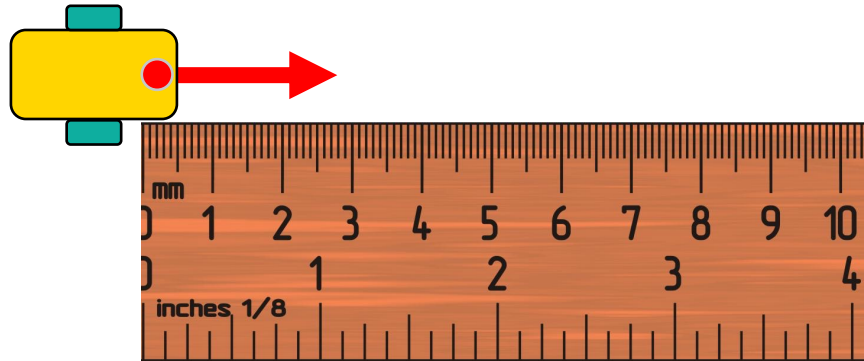
Negative Power =
Backwards

Positive Power
= Forward

Negative Power
= Backwards

A

Positive Power
= Forward

E
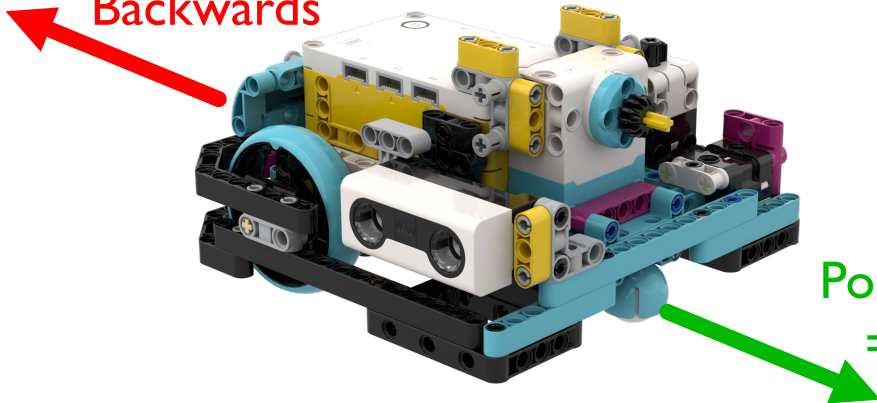
CHALLENGE 1: MOVE 10 CM

- Move the robot 10 centimeters forward

- Basic steps:

  - Configure your robot

  - Use a Movement Block (Move Tank or Move For Duration block) and move forward for 10cm
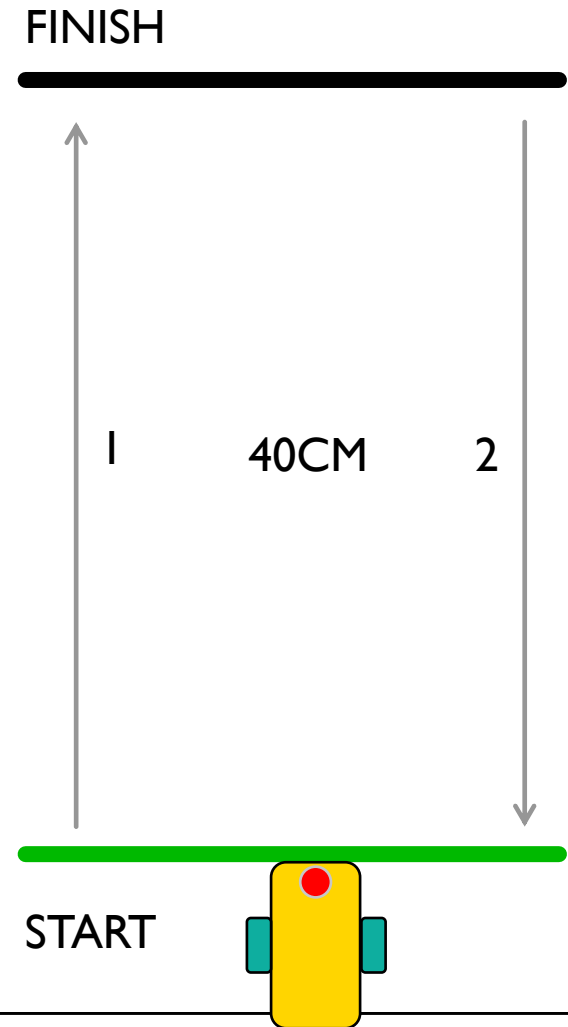
CHALLENGE 1 SOLUTION

- Configure your robot

- If you are using the smaller SPIKE Prime wheels on Droid Bot IV, set the one rotation to 17.5cm (image on the right)

- If you are using the larger SPIKE Prime wheels on ADB, remember to set one rotation to 27.6cm

- Move forward for 10 cm. The same cm mode is available in other move blocks.
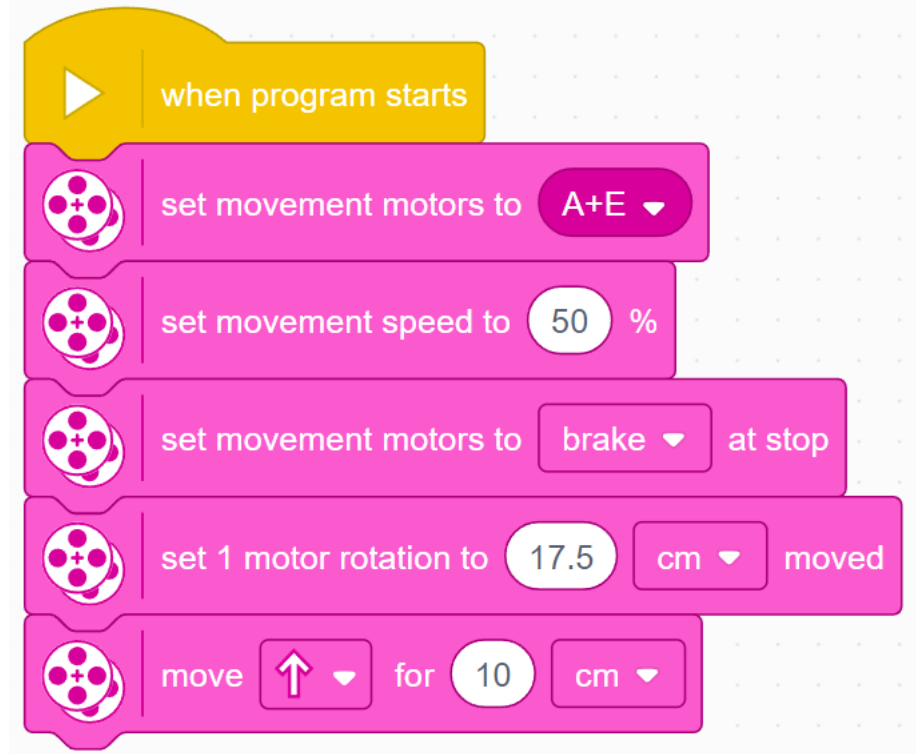
CHALLENGE II: MOVE FORWARD AND BACK

- Move your robot forward from the start line to the finish line (1) and back to the start (2)

- Basic steps:

  - Configure your robot

  - Use a Movement Block and move forward for the desired amount (40cm)

  - Use the same Movement Block to move backwards (40cm)

FINISH

1   40CM   2

START

CHALLENGE II SOLUTION

- Configure your robot

- If you are using the smaller SPIKE Prime wheels on Droid Bot IV, set the one rotation to 17.5cm (image on the right)

- If you are using the larger SPIKE Prime wheels on ADB, you will set one rotation to 27.6cm

- Robot moves forward 40cm and backwards 40cm
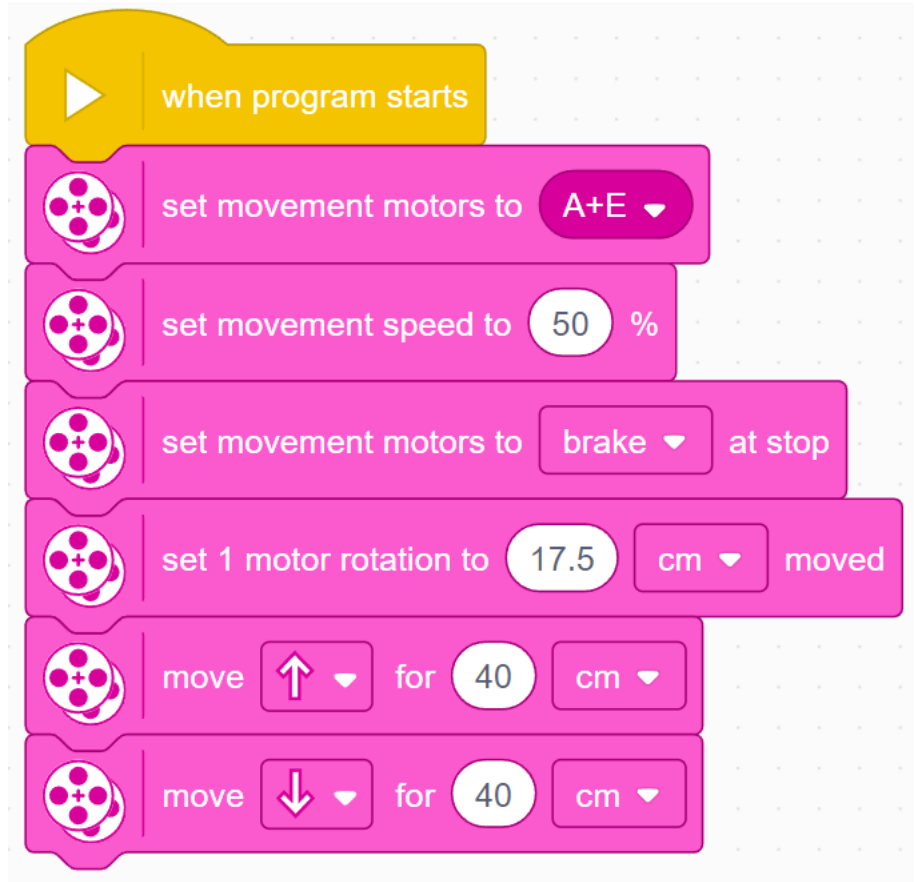
START MOVING AND STOP MOVING BLOCKS

start moving ↑ ▾

start moving (straight: 0)

start moving at (50) (50) % speed

stop moving
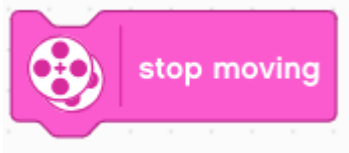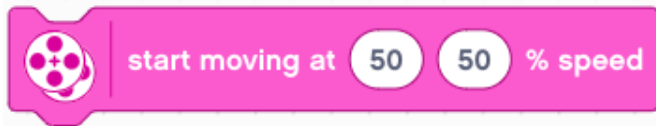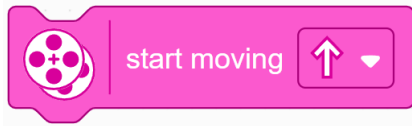
- There are 4 more move blocks in the Movement palette.

- The Start moving blocks will turn **on** your drive motors at the given speed (and steering if given).

- These blocks have no duration/distance. After turning the motor on, the program instantly moves to the next block

- The motor will continue running until stopped or controlled by another block

- Stop moving will halt your drive motors no matter what action they are running.

START MOVING AT SPEED ("MOVE TANK")

start moving at 50 50 % speed
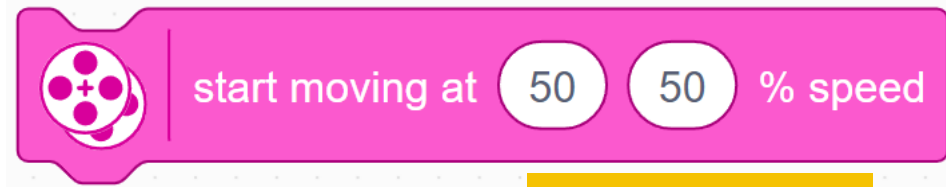
Left and Right Wheel Speeds

Set in Configuration
To use this block you will set the motor ports (see Configuring Robot Movement Lesson)

- In this block you control the two motor speeds independently. This is often called tank controls.

- This Block must be added to your Block Palette using Extensions. It is in the More Movement Palette.

In our lessons, we will use either tank controls (slide 6) or forward/backward (slide 3) since the power given to each wheel is more explicit.

WAIT BLOCKS AND CHALLENGE III

- Since Start and Stop Moving blocks execute instantly, they need to be used with other blocks to be made useful. One common way they are used is with Wait Blocks. Wait Blocks hold up the program execution until some event occurs. The lessons on sensors cover Wait Blocks in more detail.
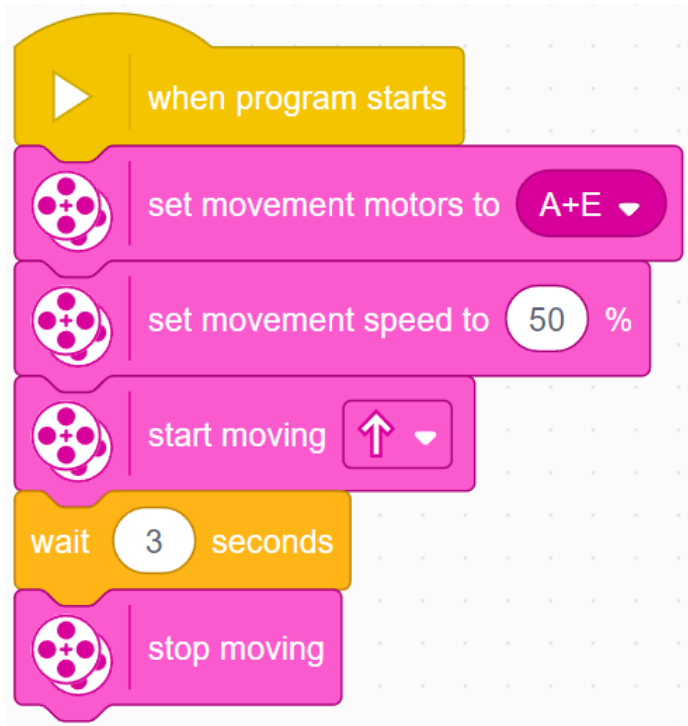
- For now, we will use the Wait for Seconds block

- This block takes the entered number of seconds to run

Challenge III:

Use Start Moving, Stop Moving and Wait blocks to make the robot move forward for 3 seconds

CHALLENGE III: MOVING FOR 3 SECONDS

■ Can you Move 3 Seconds using just the Start Moving and Wait blocks?

■ The Start Moving block starts the robot moving

■ After turning on the motors, the program begins running the Wait block. This takes 3 seconds to run.

■ The Stop Moving block makes the robot stop

CREDITS

■ This lesson was created by Sanjay Seshan and Arvind Seshan for SPIKE Prime Lessons

■ More lessons are available at www.primelessons.org