Programming the Robot

- Learning the interface
- Moving
- Turning
- Loops

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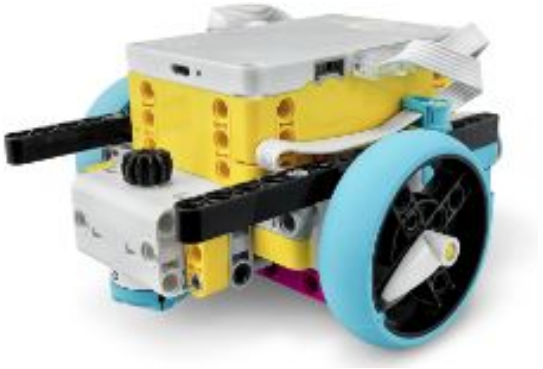
EV3 vs Spike Prime



- We'll be using the EV3 Classroom software for demonstration
- Programming blocks in Spike Prime are not exactly the same, but are very similar
- I'm sure you'll figure it out! Let us know if you need help.

EV3 Classroom

Spike Prime

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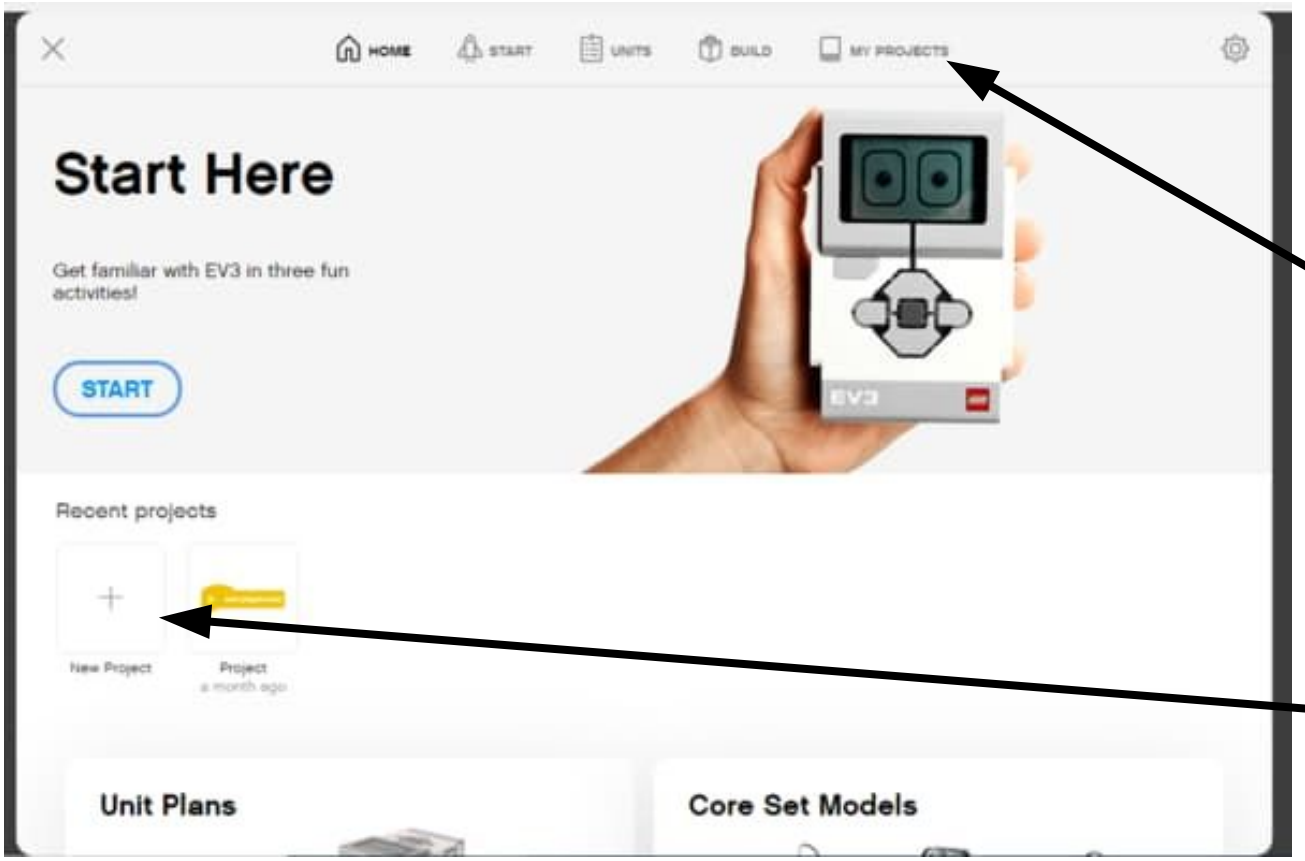
Starting a New Project



Select “My Projects” to see your past projects

Start a “New Project”

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Programming Screen

Back to home screen

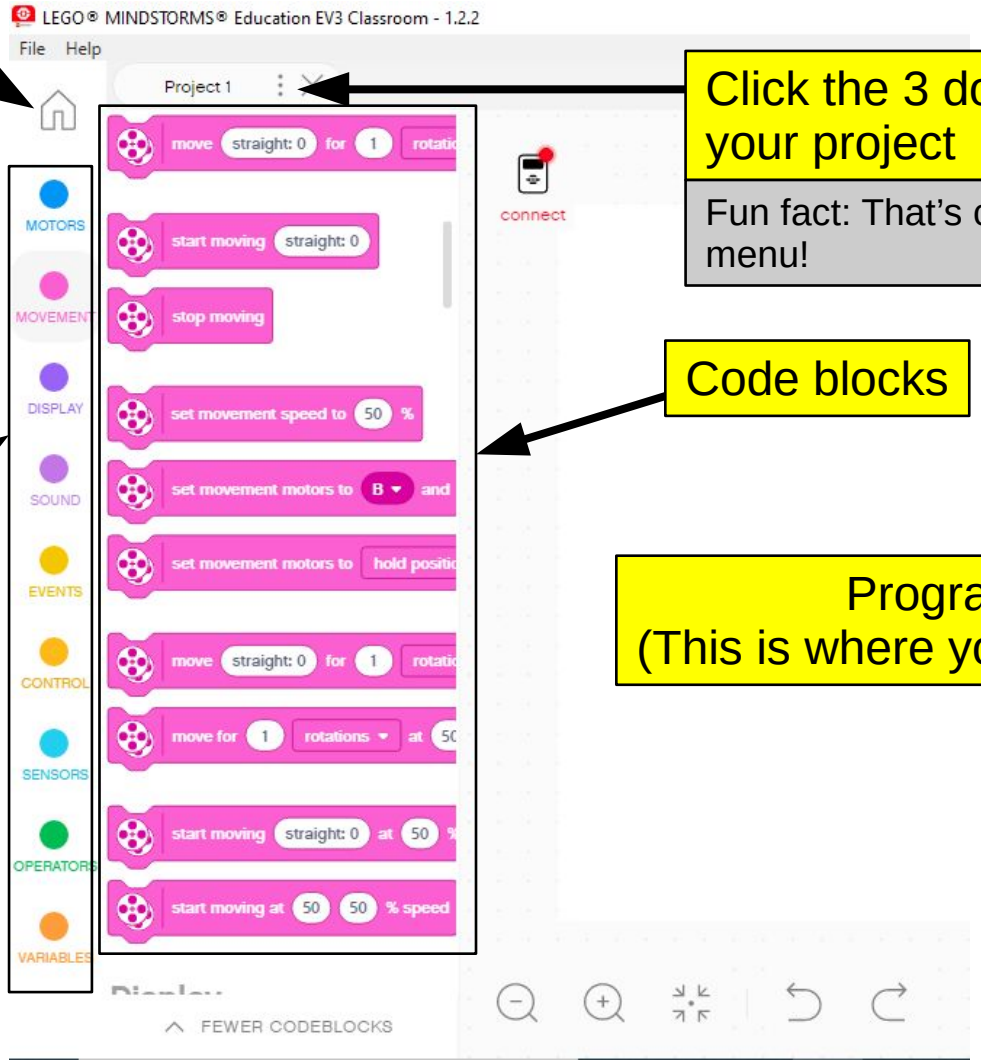
Click the 3 dots to rename your project

Fun fact: That's called the kebab menu!

Code blocks

Blocks palette

Programming Area
(This is where you write your program)



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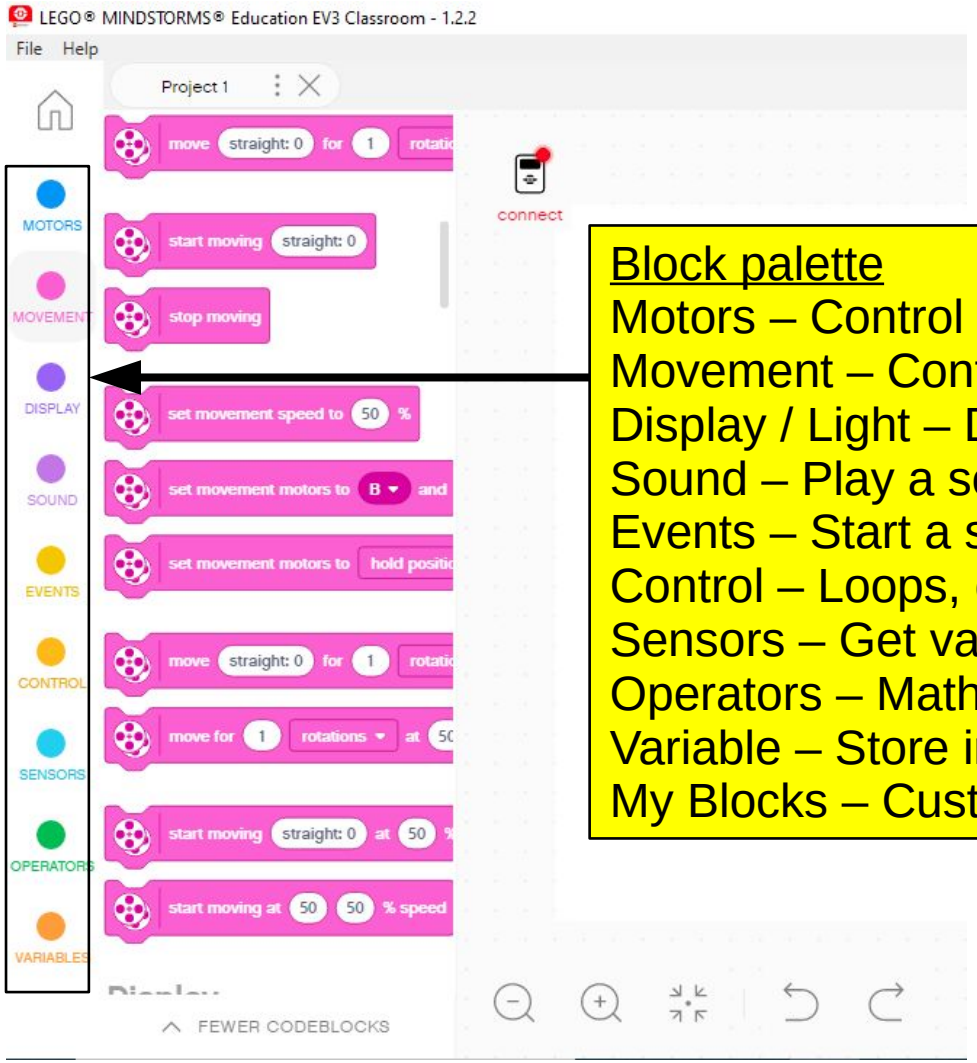
Programming Screen



Block palette

Motors – Control one motor at a time
Movement – Control two motors to move the robot
Display / Light – Display words / pictures on the main brick
Sound – Play a sound
Events – Start a script when something happens
Control – Loops, conditions, etc
Sensors – Get values from sensors
Operators – Math and logic
Variable – Store information
My Blocks – Custom blocks that you create

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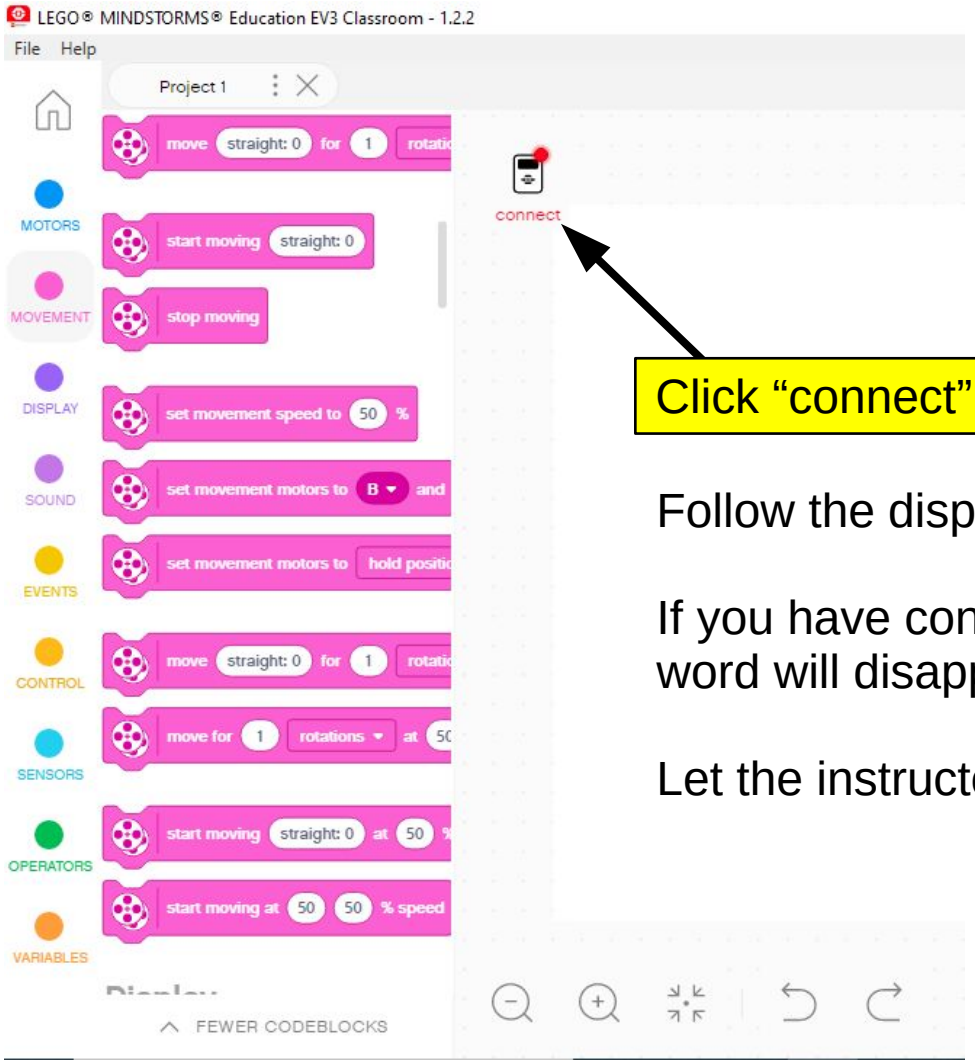
Programming Screen



Click “connect” to connect to your EV3 / Spike Prime

Follow the displayed instructions.

If you have connected successfully, the “connect” word will disappear.

Let the instructor know if you need help.

First Program!

Always start with an “Event” block

This will tell the robot when to start running your program

Most of the time, we’ll be using this one

You can find it under “Events”

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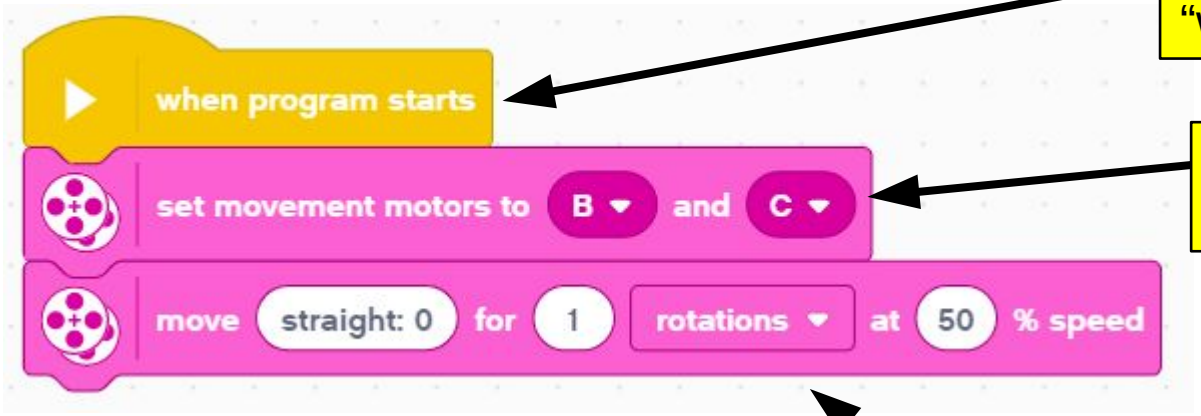
First Program!



Run the code blocks below this "when the program starts"

Tell the robot which motors are used for the left and right wheel

Move straight forward for 1 rotation at 50% speed

The Spike Prime uses "cm" by default but you can change it to rotation

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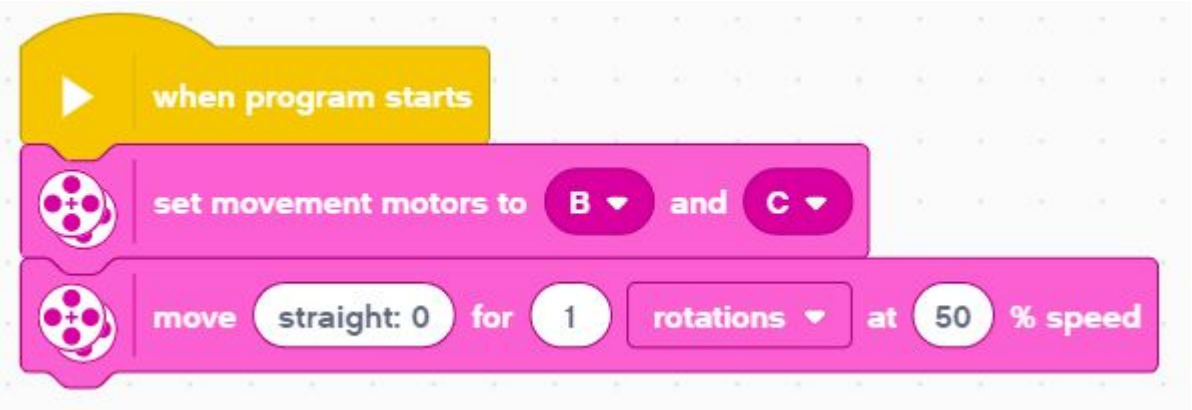
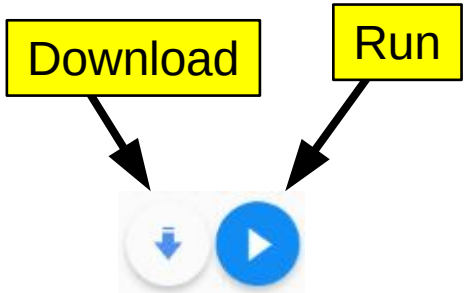
First Program!





Download
Send program to robot. You can then run it from the robot menu.

Run
Run the program on the robot immediately

Try it out!
- Run the program on your robot.

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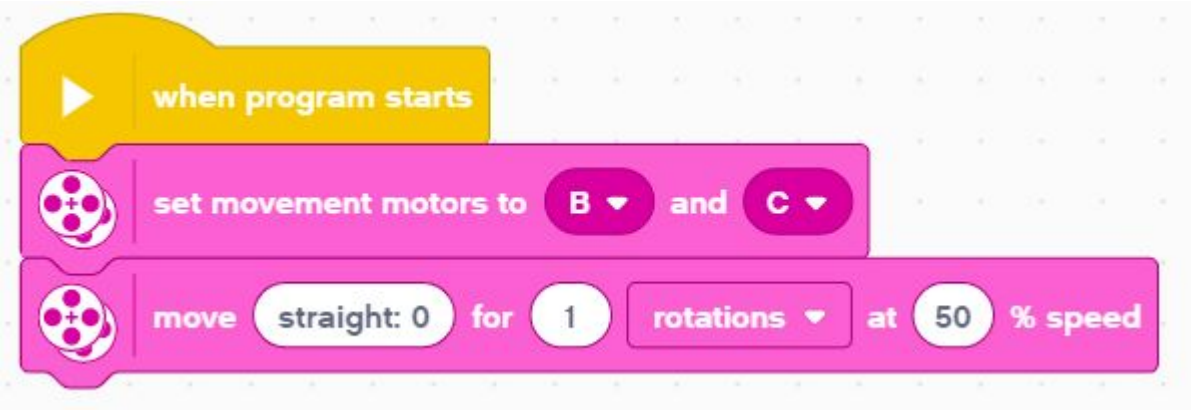
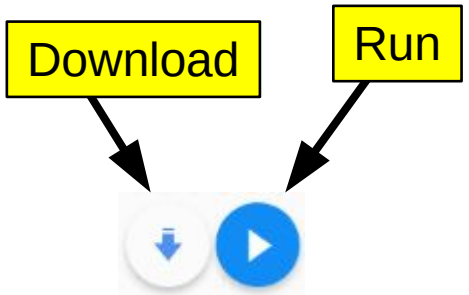
First Program!





Challenges

What happens when you...

- change the number of rotations?
- change the speed?
- change the “straight: 0” to some other value?
- set a negative number of rotations (eg. “-1”)?

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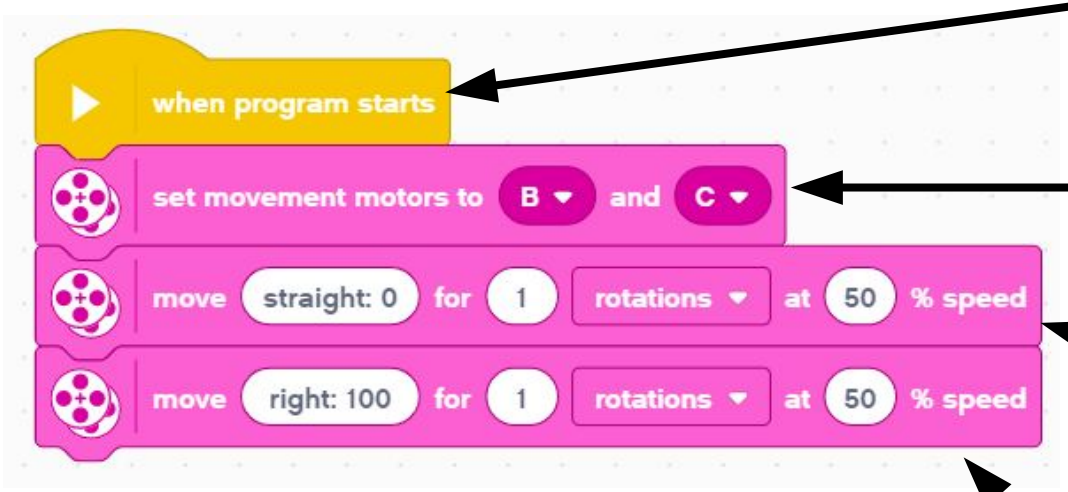
Turning



Run the code blocks below this “when the program starts”

Tell the robot which motors are used for the left and right wheel

Move forward for 1 rotation

Move right “100” for 1 rotation

What does the “100” mean? Try out different values and see what happens.

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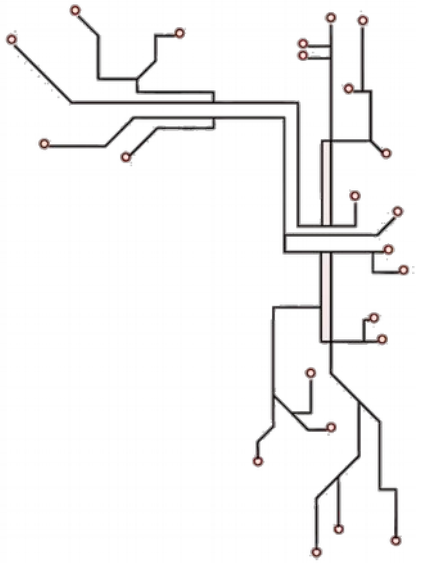
Turning

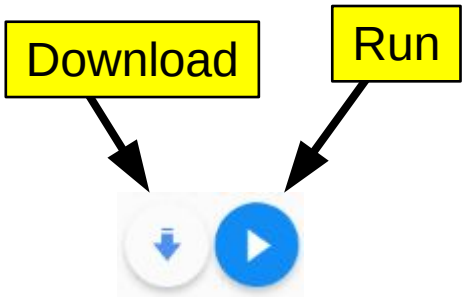
Move...
0 : Go straight
100 : Spin turn right
-100 : Spin turn left
Other : Gradual turn

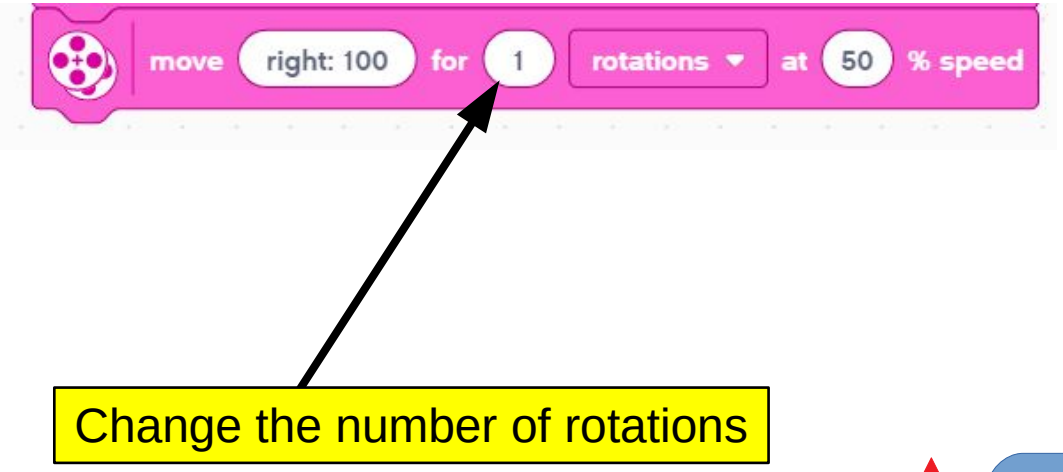
Spin turn
One wheel going forward and the other going backwards

* The Spike Prime turns differently from the EV3. Try out different move values to see how it behaves.

Turning

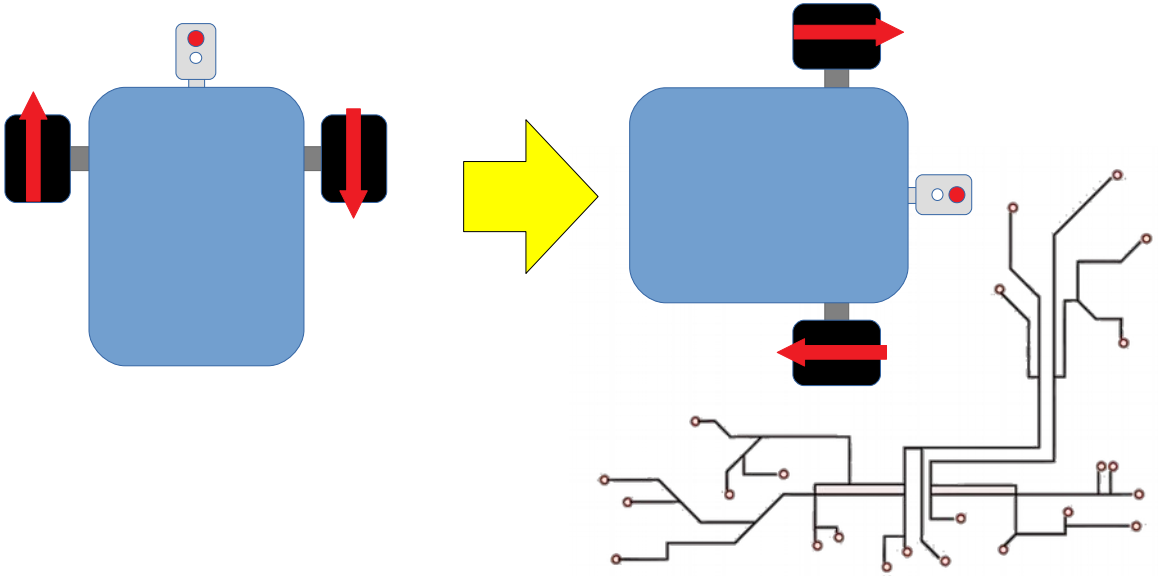






Challenges

Get your robot to turn 90 degrees
How many rotations do you need?
What about 180 degrees?



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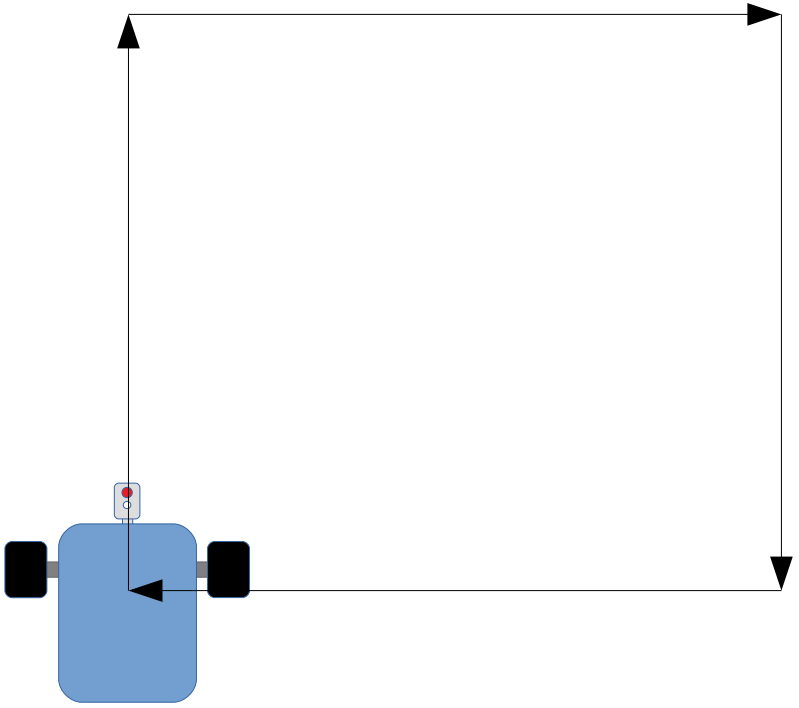
Square movements



Challenges

Program your robot to move in a square

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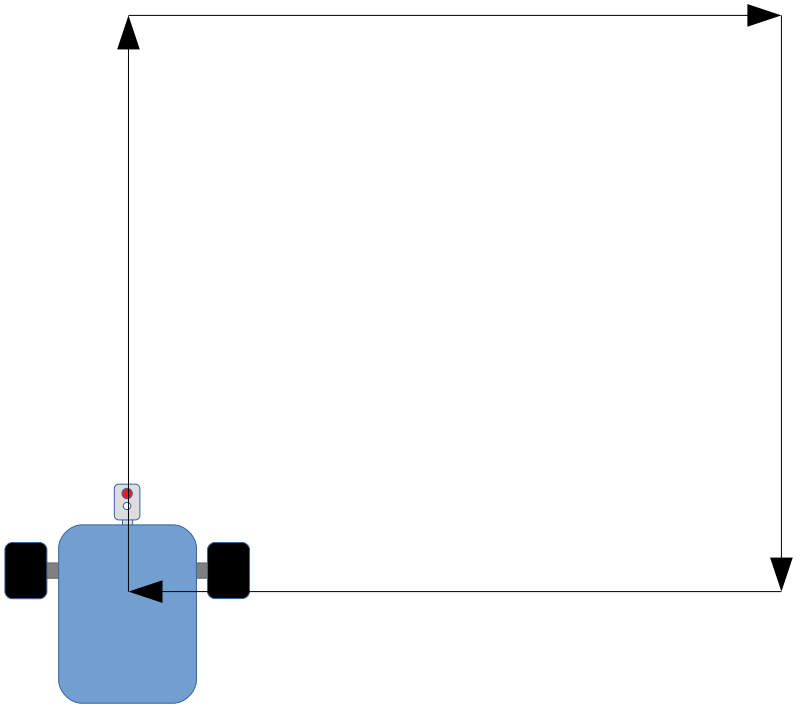
Square movements

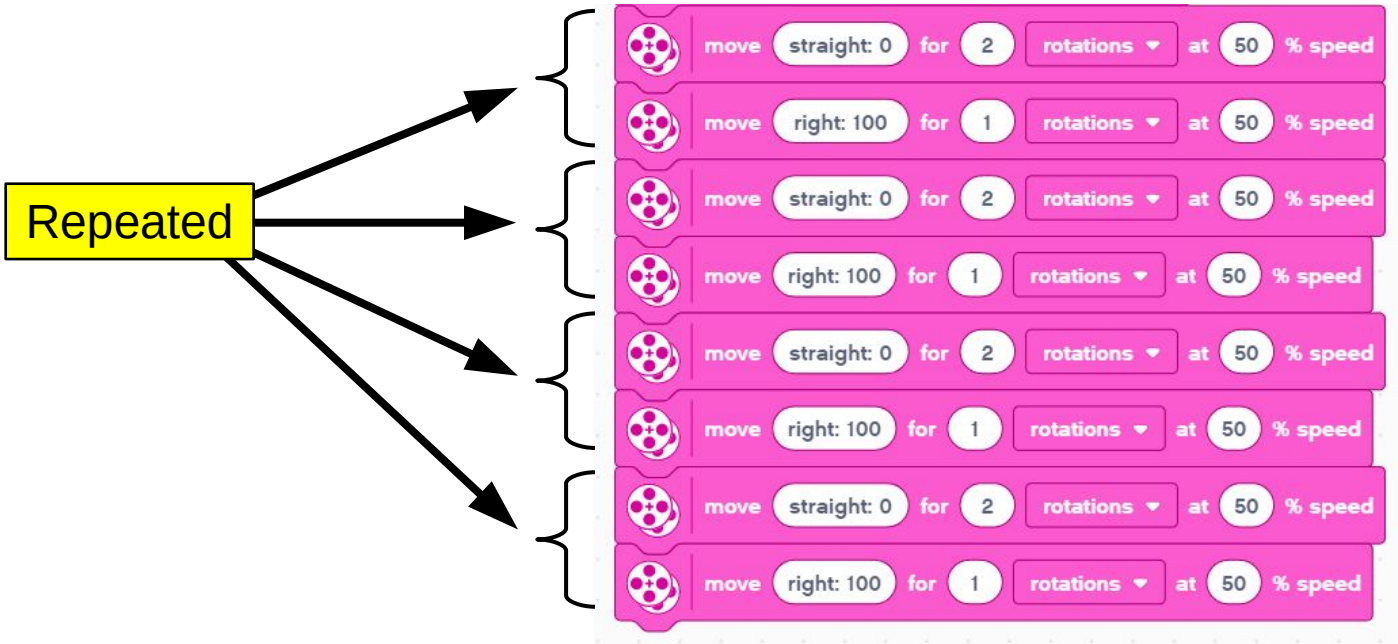
Solution



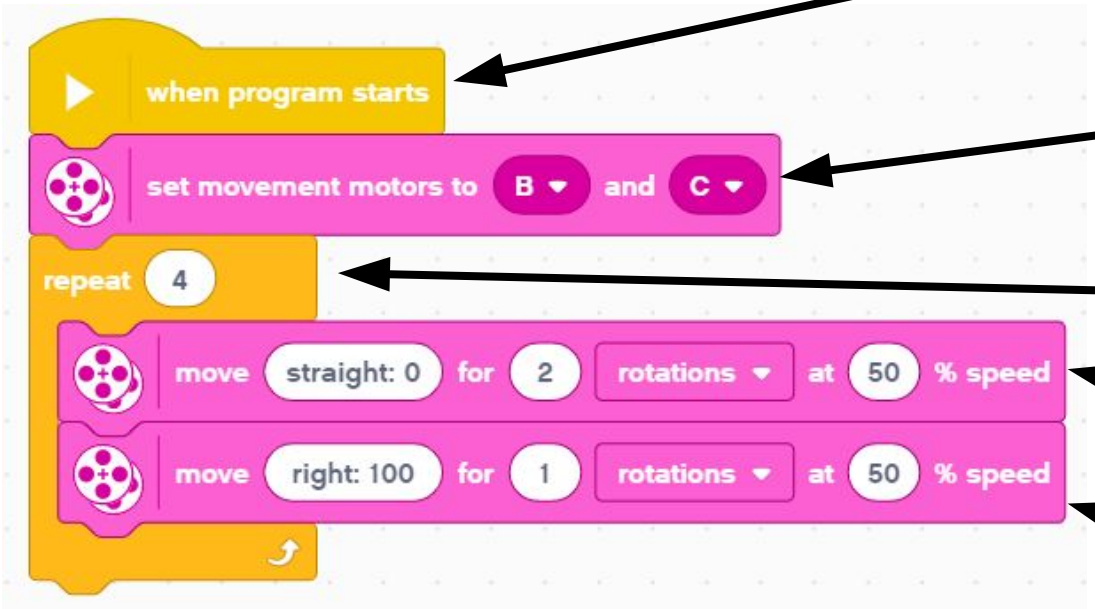
* Warning. The number of rotation to turn will be different depending on the robot. This may not work for yours.

Loops

- The last solution may work, but it took a lot of blocks!
- Most of the blocks are repeated...



Loops



Run the code blocks below this "when the program starts"

Tell the robot which motors are used for the left and right wheel

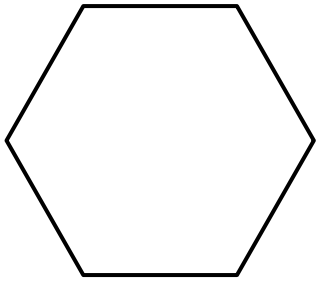
Repeat what's inside 4 times

Move straight for 2 rotations

Turn right "100" for 1 rotation

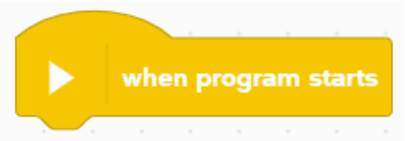
Challenges

- Program your robot to move in a triangle shape
- Program your robot to move in a hexagon shape (6 sided)

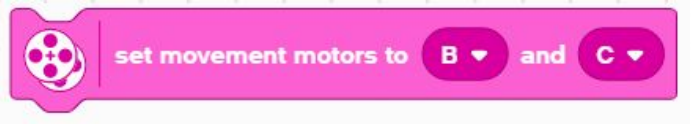


Summary

- Program starts using an event block



- Set the movement motors at the start



- “move straight: 0” makes robot move forward

- Negative rotation to make robot move backwards

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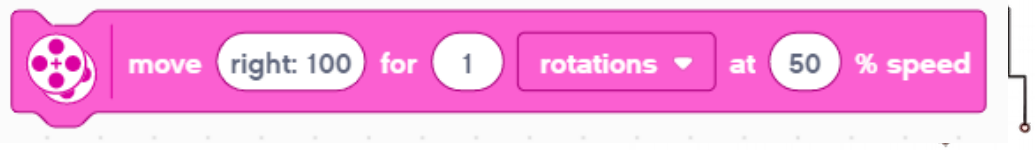
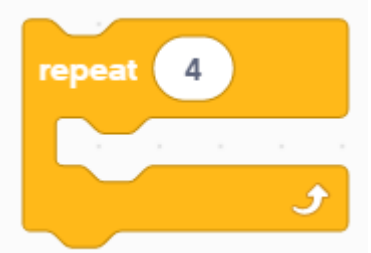
Summary

- Move “right: 100” or “left: -100” makes robot turn on the spot
- Values less than 100 creates a gradual turn



- Loops makes the code inside repeat the specified number of times



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