BEGINNER PROGRAMMING LESSON

EV3 Classroom: Basic Turning
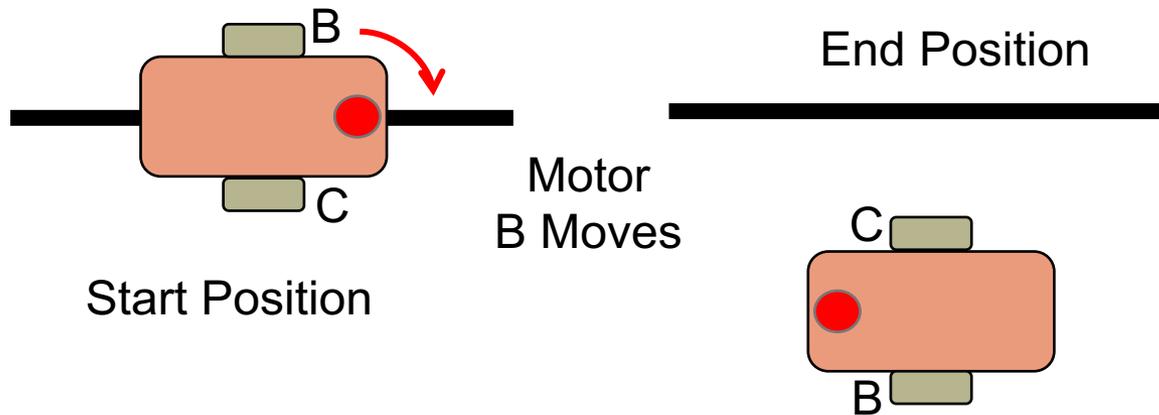
By Sanjay and Arvind Seshan

EV3 CLASSROOM LESSON
BY EV3LESSONS.COM

LESSON OBJECTIVES

1. Learn to turn the robot a desired number of degrees

2. Learn the differences between Spin and Pivot Turns

3. Learn how to program two different type of turns

4. Learn to write pseudocode

PIVOT VS. SPIN TURNS

180 Degree Pivot Turn

B

C

Start Position

Motor B Moves

End Position

C

B

180 Degree Spin Turn

Start Position

B

C

Motors B and C Move

End Position

C

B

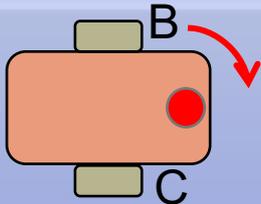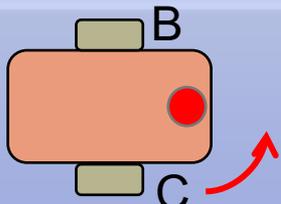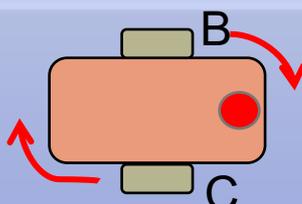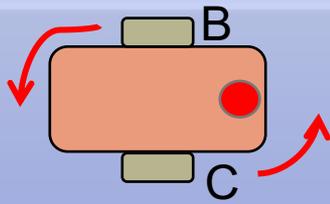Notice where the robot ends in both pictures after a 180 degree turn.

In the Spin Turn, the robot moves a lot less and that makes Spin Turns are great for tight positions. Spin turns tend to be a bit faster but also a little less accurate.
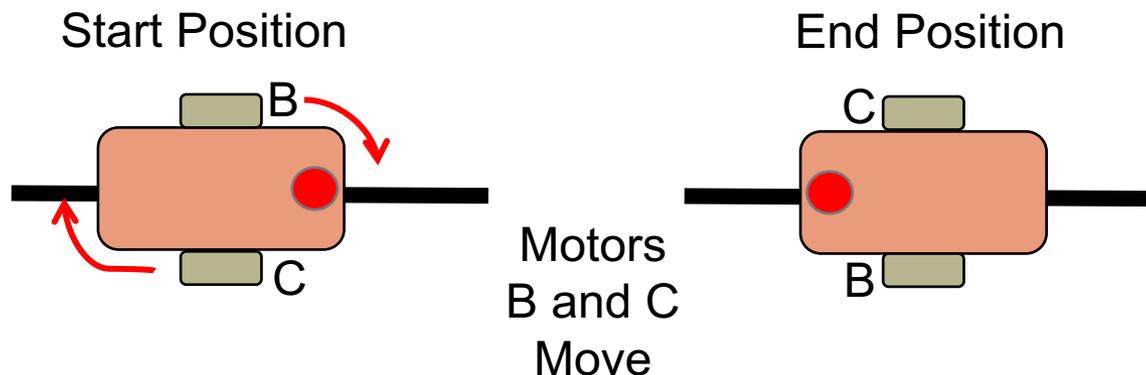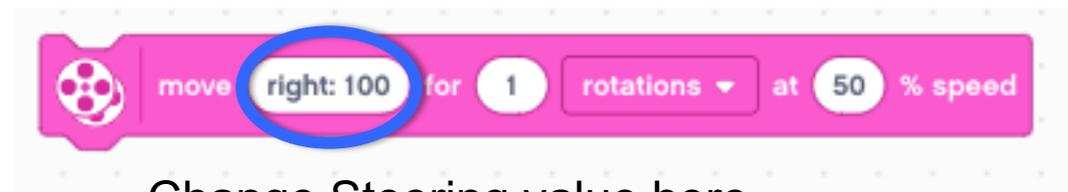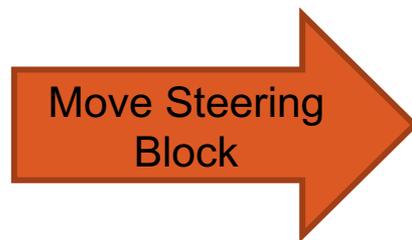
So when you need to make turns, you should decide which turn is best for you!

HOW TO MAKE PIVOT AND SPIN TURNS

| Steering Value			
50	**-50**	**100**	**-100**
Pivot Turn Right	Pivot Turn Left	Spin Turn Right	Spin Turn Left

Move Steering Block

move right: 100 for 1 rotations ▼ at 50 % speed

Change Steering value here

MOVE STEERING

- **Found in the movement tab in the palette**

- **The first input (by default straight) determines the steering value. It ranges -100 to 100.**

- **The second input determines the distance to travel and its unit (rotations, degrees, or seconds). We will be using degrees.**

- **The 3rd input determines the speed of the robot (range of -100 to 100).**

- **Tip: use the Control block Stop (stop and exit program ▼) to end the program at the end of your project**
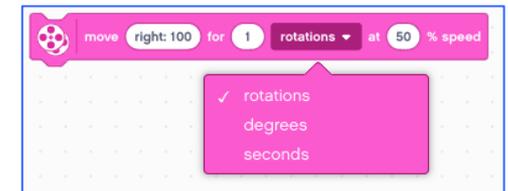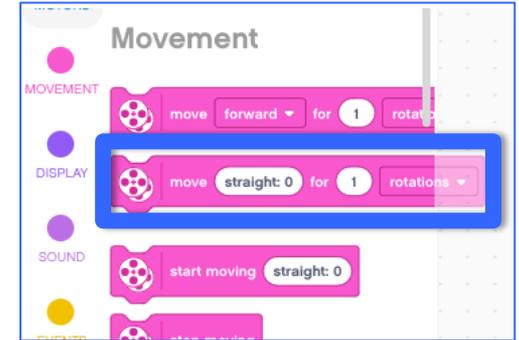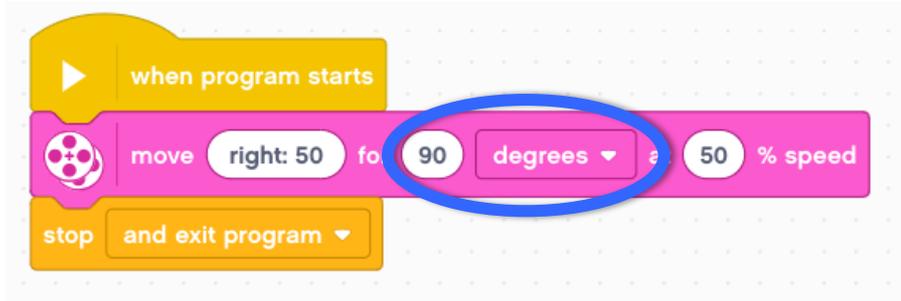
MAKING A PIVOT TURN FOR 90 DEGREES
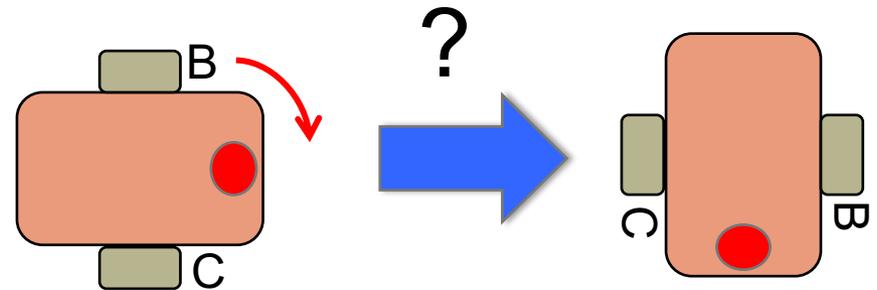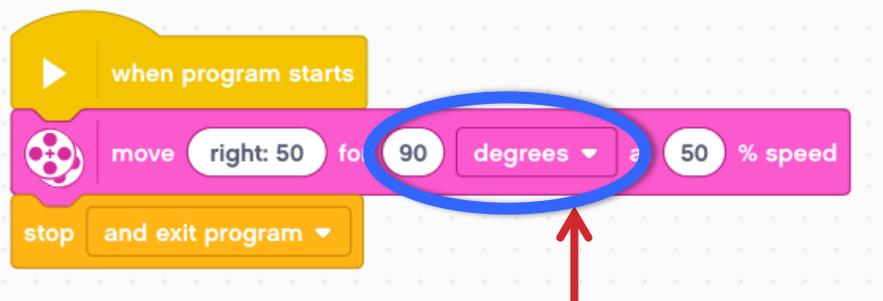
Program your robot to turn 90 degrees
Does the robot actually turn 90 degrees if you just pick 90 degrees for distance?

Ans. NO! Solution on next page

HOW DO YOU MAKE THE ROBOT TURN 90 DEGREES?

Ans. Try using the port view to measure the turn and then input the correct number of degrees. For the EV3 Educator robot, it is 360 degrees.

TEACHER INSTRUCTIONS

- **Split up class into groups as needed**

- **Give each team a copy of the Turning Challenge Worksheet**

- **Challenge Details are on Slide 9**

- **Discussion Page Slide 10**

- **Challenge Solution on Slide 11**

TURNING CHALLENGES

Challenge 1

- Your robot is a baseball player who has to run to all the bases and go back to home plate.

- Can you program your robot to move forward and then turn left?

- Use a square box or tape
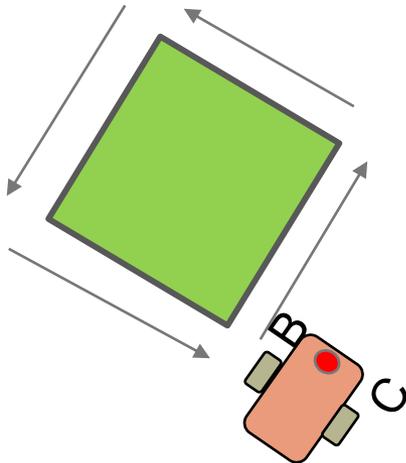
Challenge 2

- Your robot baseball player must run to second base, turn around and come back to first.

- Go straight. Turn 180 degrees and return to the same spot.

Second Base

B C

Start and End position

First Base
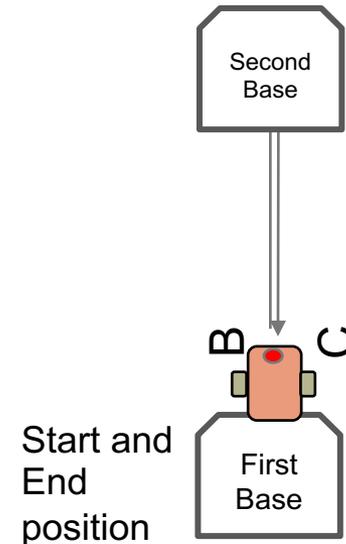
CLASS DISCUSSION GUIDE

Did you try PIVOT and SPIN turns? What did you discover?

Pivot turns were fine for Challenge 1, but for Challenge 2, if we used Pivot turns, we were farther away from the base.

What situations would one work better than the other?

Spin turns are better for tight turns (places where there is not enough space) and you stay closer to your original position.

What is PSEUDOCODE? Why do you think programmers find it useful? (pseudocode is from the worksheet)

Pseudocode allows programmers to write out their code in plain English before you code in a programming language. It lets you plan and think before you sit down to code. It lets you share your ideas with others you are working with in a common language.
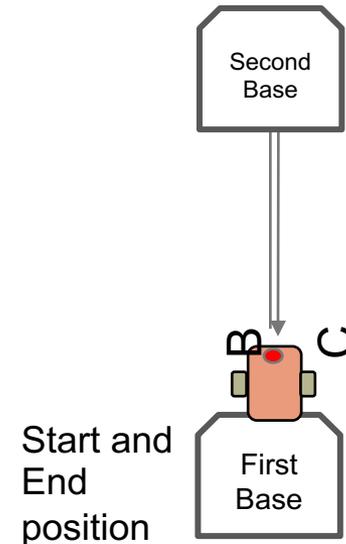
CHALLENGE SOLUTIONS

Challenge 1

You probably used a combination of move steering to go straight and do **pivot turns** to go around the box.
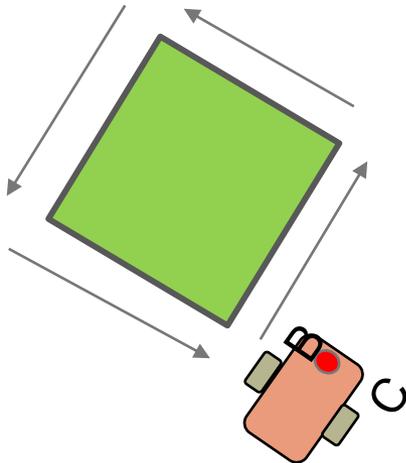
Challenge 2

You probably used a **spin turn** because it is better for tighter turns and gets you closer to the starting point!

Second Base

Start and End position

First Base

CREDITS

- **This tutorial was created by Sanjay Seshan and Arvind Seshan**

- **More lessons are available at www.ev3lessons.com**