



TURNS AND
MAKING TURN MY BLOCKS
- Droids Robotics

Pivot Turns and Spin Turns

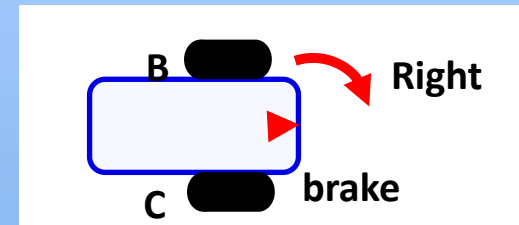
- **Pivot Turn:**

- Moves only ONE motor
- Use the Motor block because you will be turning only 1 motor.
- Set the motor power for motor B and off for motor C
- Right wheel will not move. Left wheel will move.

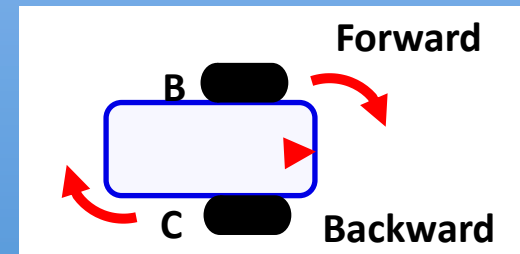
- **Spin Turn:**

- Moves both motors in opposite directions from each other
- Use Move Block with steering set to 100 depending on the direction of the turn.
- Motor B will have positive power and will move clockwise and Motor C will turn counter-clockwise (negative power)

Pivot Turn



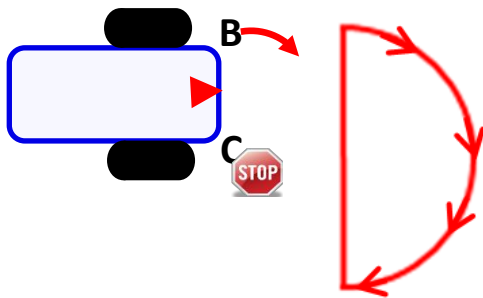
Spin Turn



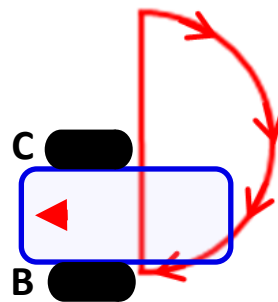
Which Turn to Use in FLL

180 Degree Pivot Turn

Start Position

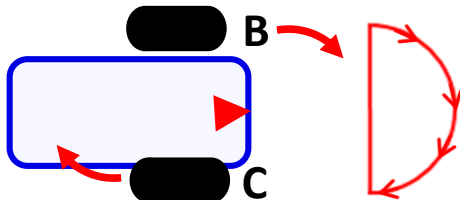


End Position

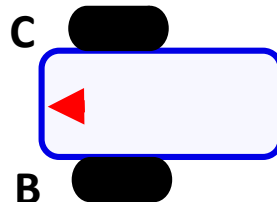


180 Degree Spin Turn

Start Position



End Position



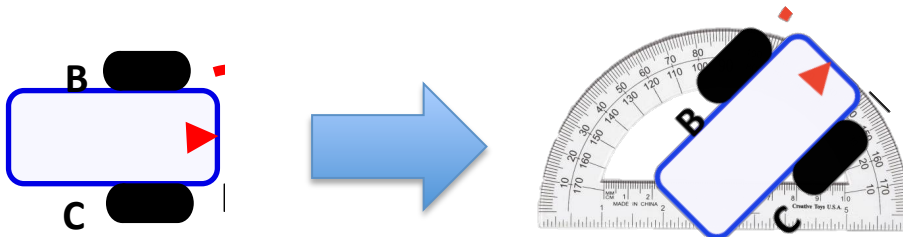
On the left are pictures to highlight the differences between turns. Notice where the robot ends in both pictures after a 180 degree turn. In the Spin Turn, the robot moves a lot less and that makes Spin Turns are great for tight positions. Spin turns tend to be a bit faster but also a little less accurate. So when you need to make turns on the FLL board, you should decide which turn is best for you!

Making a Turn My Block

- Just like Move Inches, you can also create a My Block for turns. In Move Inches, we had to figure out how much the robot wheels rotate for one inch on a ruler.
- To make a Turn Degrees My Block, you have to figure out how much your rotation sensor on the motor turns for one degree on a protractor
- **A Turn My Block will be extremely useful to any FLL team because now you can measure your turns using a protractor!!!**



You can use the EV3 to measure how much your wheel turns. **We call this rotation degrees.**



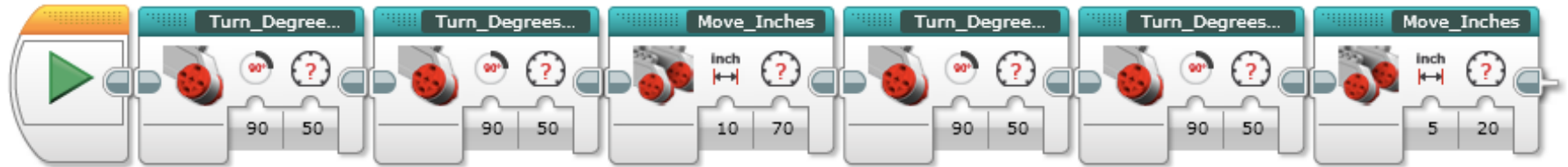
45 degree turn by the robot in the real world can be measured with a protractor. **We call this protractor degrees.**

Measuring the Rotation Sensor

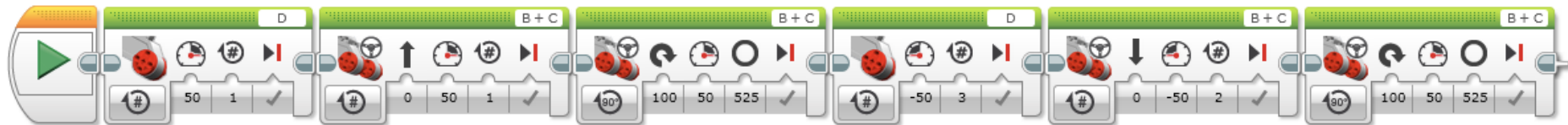
- The EV3 has a Port View Function which lets it display values measured by sensors
- In this section, we will show you how to use the port view to measure turns.
- **Step 1:** Go to Port View on your brick. On the EV3, it is on the third menu to the right. Look for the value for one of your drive motors (motors attached to your wheels)
- **Step 2:** Turn the robot 90 degrees (Pivot Turn) yourself – using your hands to turn one wheel. Make sure the wheels don't slip when you do this.
- **Step 3:** Look at the **rotation degrees** value and write down the number of degrees (n)
- **Step 4:** Divide the number from step 3 (n) by 90 ($n/90$)
- This is the number of how many motor **rotation degrees** are in 1 **protractor degree**.
- You can now use this information to make a Pivot Turn My Block called Turn Degrees. Please see my attached EV3 file. There are Phases marked for you to follow. Once you understand the code, you can modify this code to make a Spin Turn My Block as well.

Why should you bother?

Because of Move Inches and Turn My Blocks, your missions will look like this...



Instead of this....



Now, your code is easier to read and easier to modify!!!

Hope you liked our lesson.