EV3 Classroom:

Parallel Beam (Event) Synchronization

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**EV3 CLASSROOM LESSON BY EV3LESSONS.COM**

Lesson Objectives

↗ Understand what the "synch problem" is when you use events

↗ Learn techniques to to ensure that two events end before moving to the next block of code (Variables and Wait Blocks)

↗ Prerequisites: Parallel Beams Lesson, Variables, Wait Blocks

Using Events Inside Programs

↗ Events are great for doing two things at the same time

    ↗ Often want to do something after you complete the event

    ↗ Hard to tell which event will finish first (called the "synch problem")

↗ Need to synchronize the events to make sure that blocks execute when you expect them to

In the picture below, will the turn start after motor A is done or before?   **Answer: You do not know**
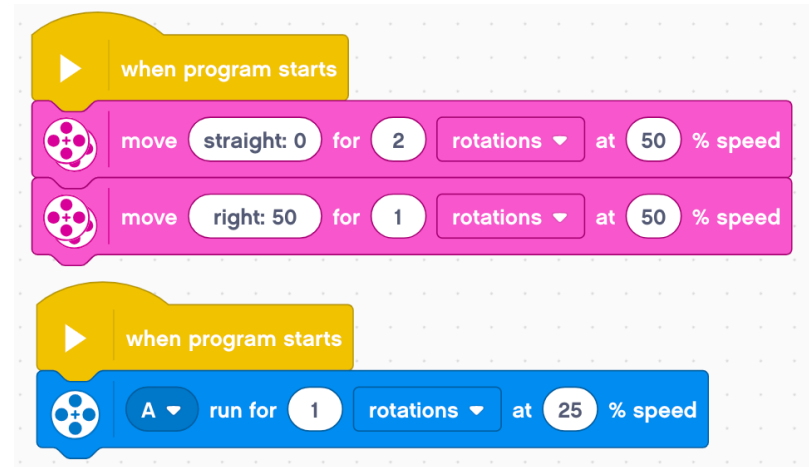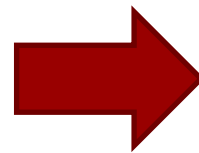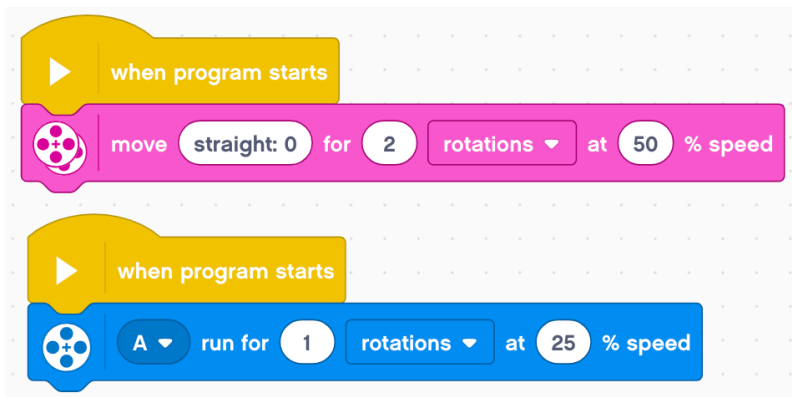
Ensure That Both Beams Finished

↗ In this example, we want both the 2 rotation move and the motor A move to finish before the 360 degree move steering (the turn)

↗ In the EV3-G software, we gave several solution to fixing this problem including variables, data wires, loops, and My Blocks.

↗ However, only the variable solution will work in the EV3 Classroom software and it will need to be altered to work.
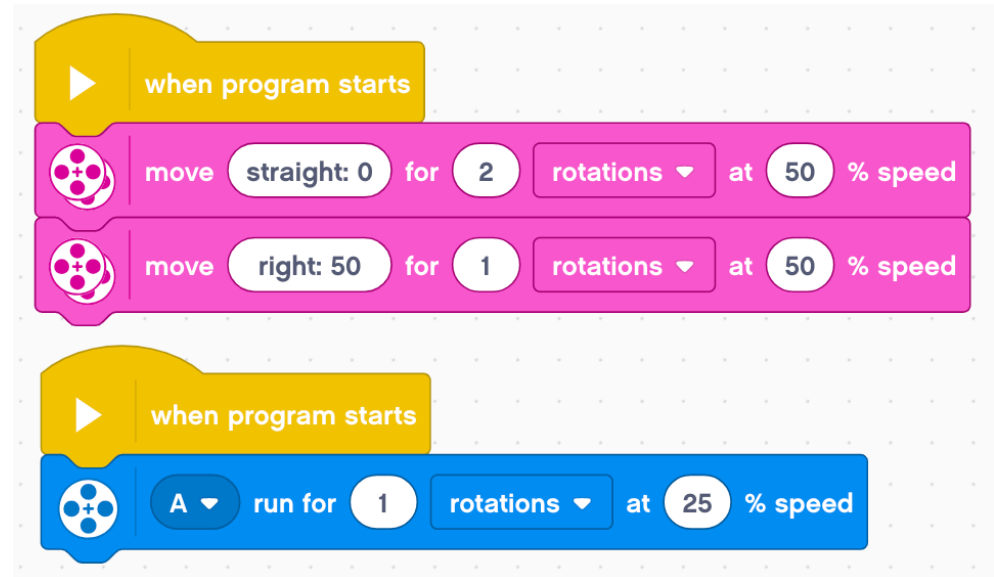
Use Variables To Synchronize
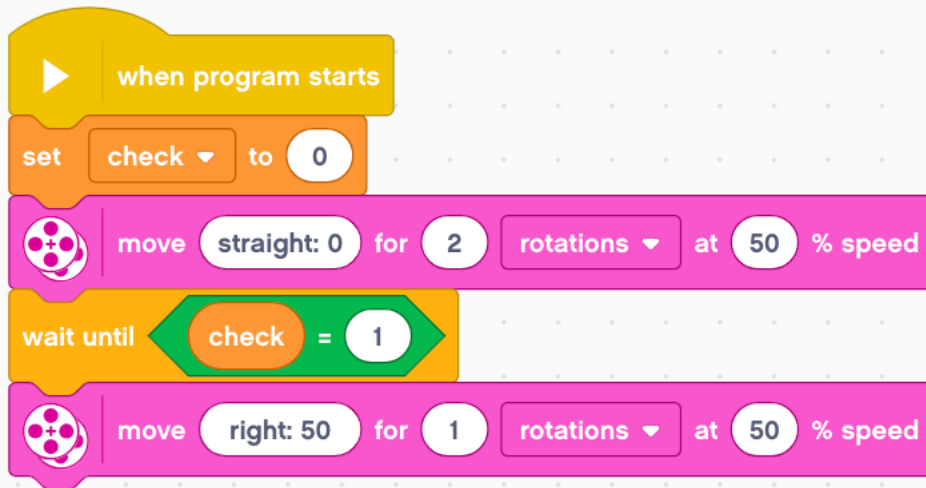
1. Set variable "check" to a number that is not 1
2. Move straight for 2 rotations
3. Wait for second event to finish by waiting for "check" to be set to 1
4. Turn right for 1 rotation
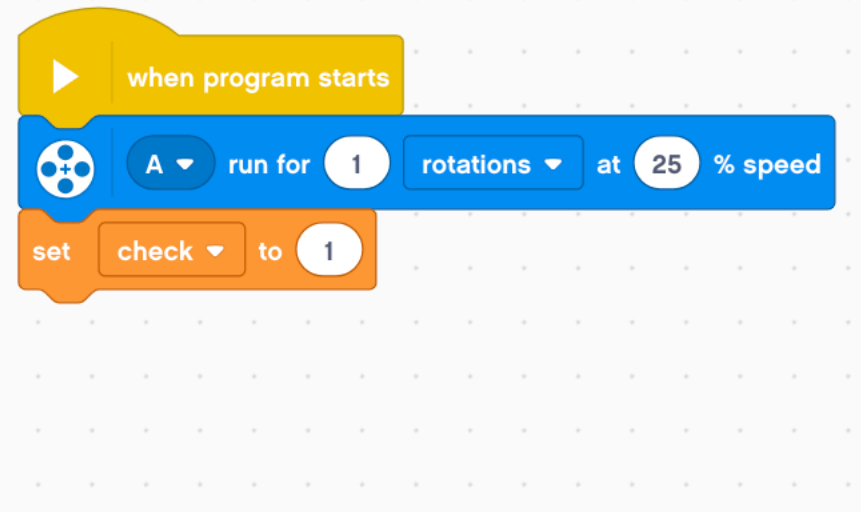
1. Turn Motor A 1 rotation
2. Set check to 1

Challenge: Squaring on a Line

This example is from the Squaring on a Line Lesson

- ↗ Synchronization is critical for aligning on a line using events

- ↗ As a challenge, complete the Squaring on Line lesson.

- ↗ Note: You must ensure that both events in an align are completed before moving onto the next block
  - ↗ Otherwise, the robot will not be straight on a line

Discussion Guide

1. **What is the "sync problem"?**
    Ans. When you write code with multiple events, you are not certain when the two events will complete. You don't know if one event might finish before the other.

2. **How can this be solved?**
    Ans. The problem of synchronization can be solved by using Wait Until Blocks and Variables. The second event will set a variable to a specific value at its end and the first event will wait for that value to be set.

Credits

↗ This tutorial was created by Sanjay Seshan and Arvind Seshan

↗ More lessons at www.ev3lessons.com