EV3 Classroom:
Parallel Beam (Event) Synchronization

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Lesson Objectives

- Understand what the “synch problem” is when you use events
- Learn techniques 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
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
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
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.
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.
This tutorial was created by Sanjay Seshan and Arvind Seshan

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