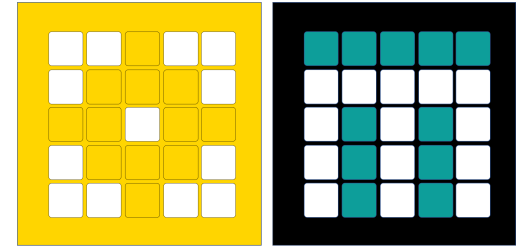


# PRIME LESSONS

By the Makers of EV3Lessons



# EVENT SYNCHRONIZATION

BY SANJAY AND ARVIND SESHAN

# LESSON OBJECTIVES

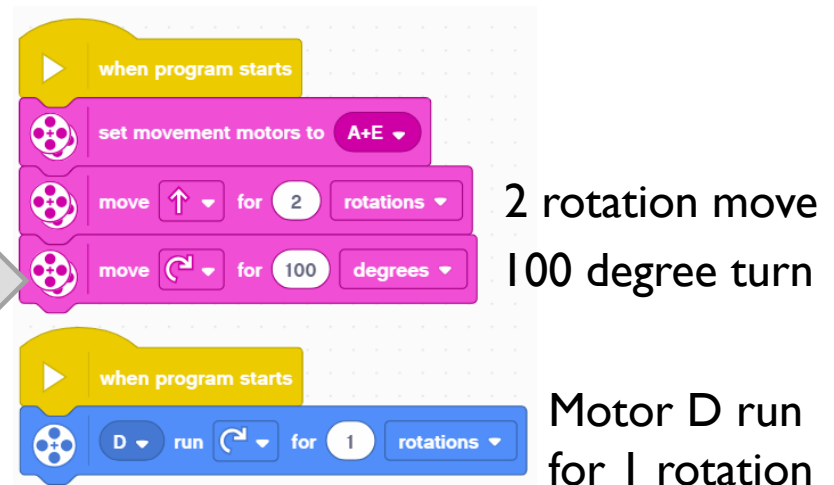
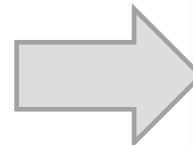
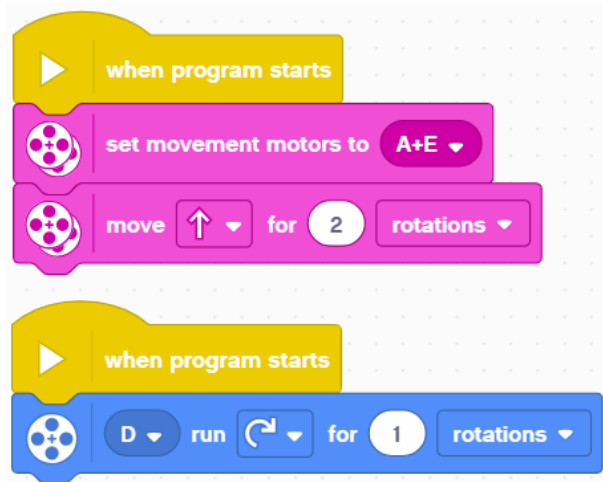
- Understand what the “synch problem” is when you use events
- Learn techniques to ensure that two events end before moving to the next block of code (Variables and Wait Blocks)

# 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

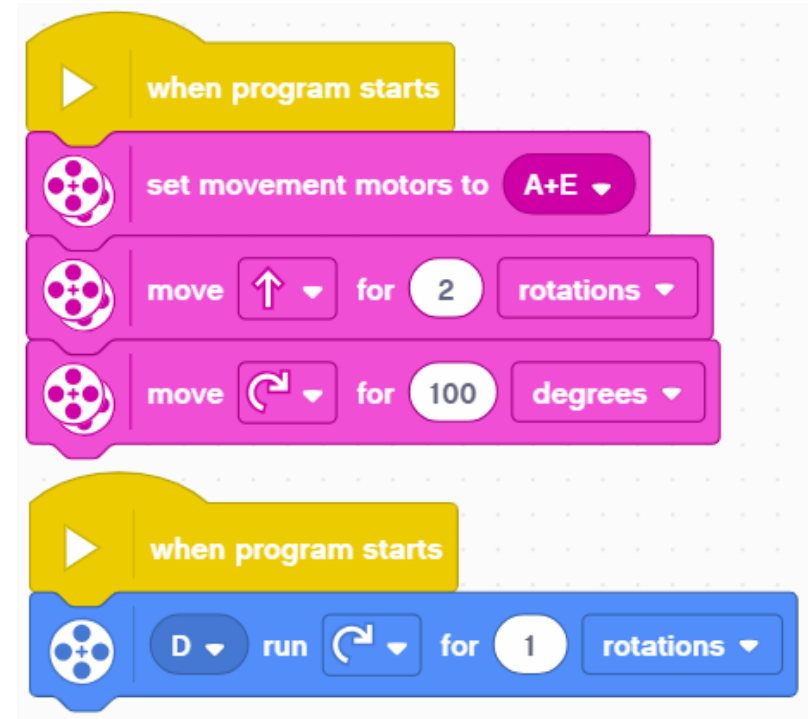
In the picture below, will the 100 degree turn start after motor D is done or before?

**Answer: You do not know**

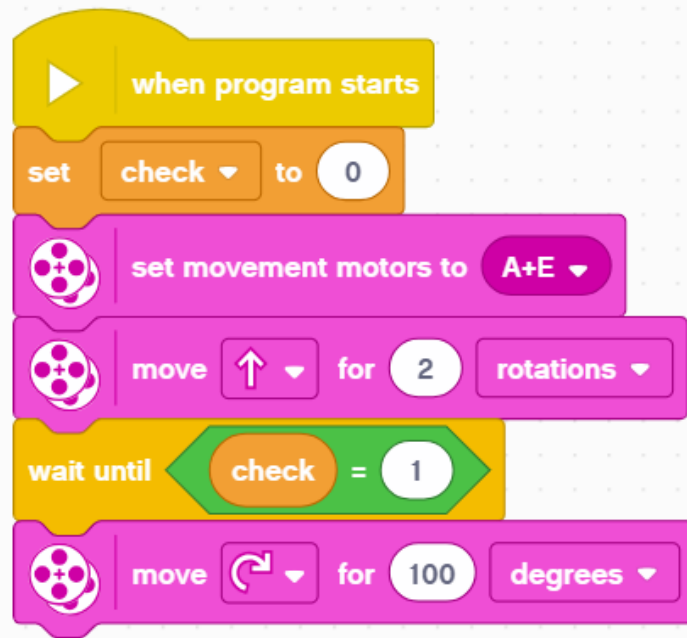


# ENSURE THAT BOTH BEAMS FINISHED

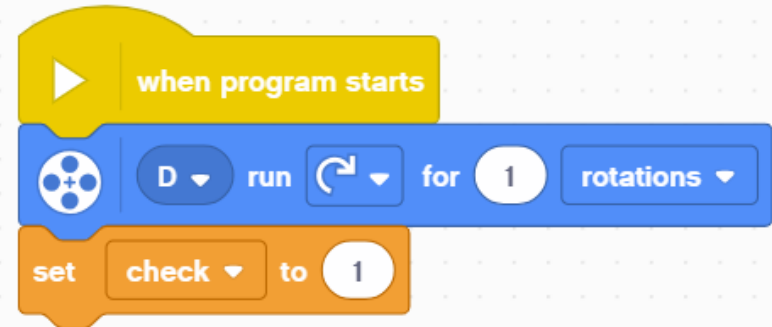
- In this example, we want both the 2 rotation move and the motor D move to finish before the 100 degree turn
- Variables can be used to solve the synch problem



# USE VARIABLES TO SYNCHRONIZE



1. Set variable “check” to a number that is not 1
2. Set movement motors
3. Move straight for 2 rotations
4. Wait for second event to finish by waiting for “check” to be set to 1
5. Turn right for 100 degrees

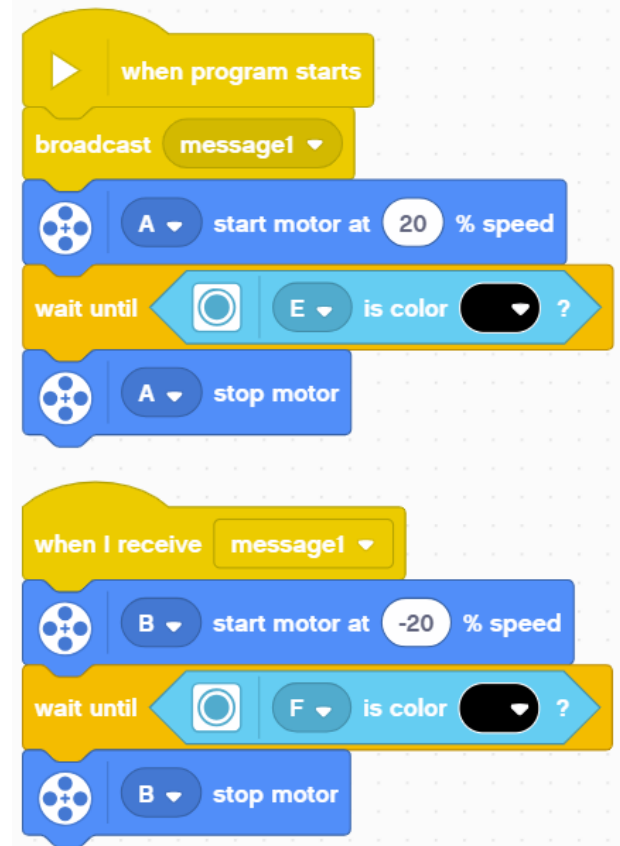


1. Turn Motor D 1 rotation
2. Set check to 1

# CHALLENGE: SQUARING ON A LINE

- Synchronization is critical for aligning on a line using events
- As a challenge, complete the Squaring on a 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

This example is from the Squaring on a Line Lesson



# 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 lesson was created by Sanjay Seshan and Arvind Seshan for SPIKE Prime Lessons
- More lessons are available at [www.primelessons.org](http://www.primelessons.org)



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