# Reading an Encoder with an Arduino

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# Encoder Signals Background

- https://youtu.be/jBjt1ZOb9PI
- background on how encoders work
  - incremental encoders generate two square waves
  - for maximum resolution, the encoder count should be incremented or decremented on each edge of the square waves
  - which of the two waves is leading tells you the direction of rotation

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# Big Ideas

- global variable `encoder_count`
- `encoder_count` gets incremented or decremented at each interrupt edge
  - rising edges of the encoder channel A for this example
- must specify a function called an interrupt service routine (ISR) to be called when the rising A edges occur
- the ISR determines whether to increment or decrement `encoder_count`

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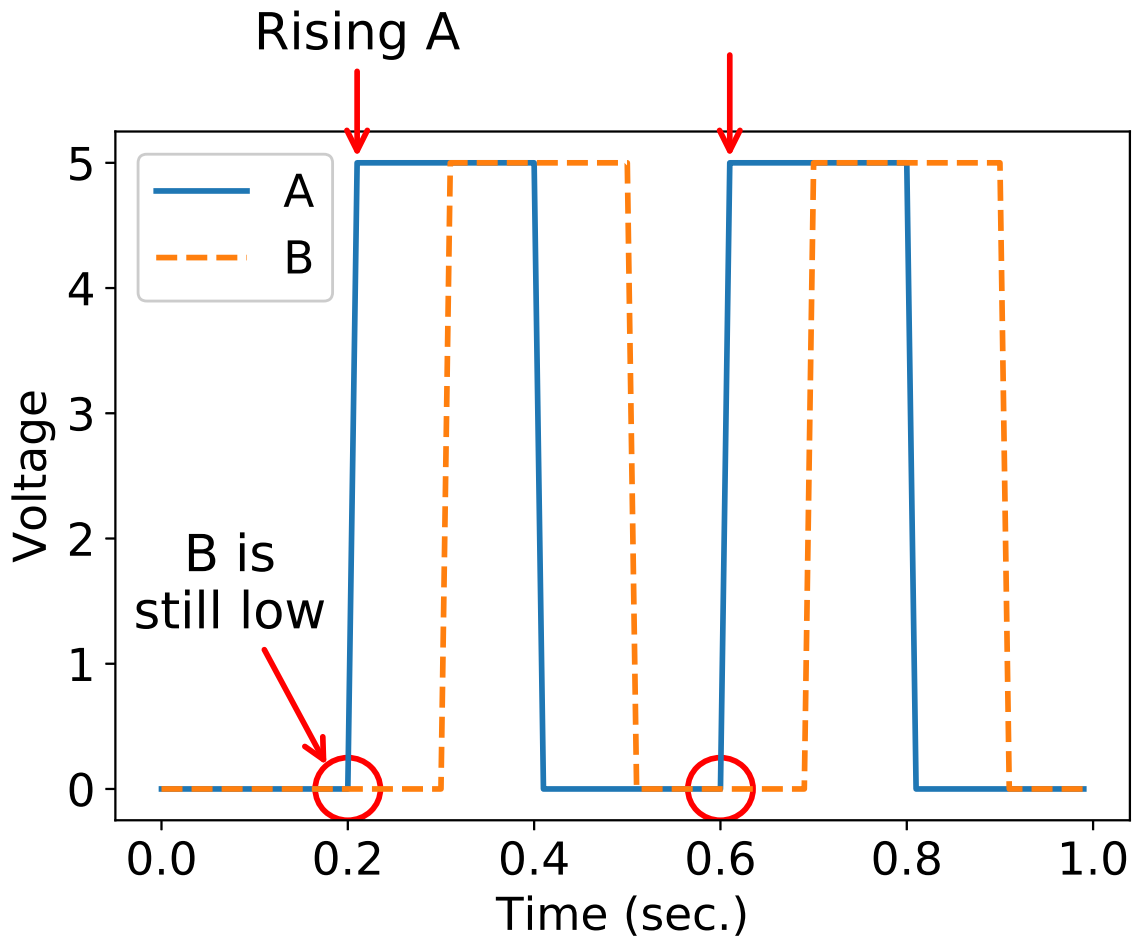
# A Leading B

- positive rotation
- `encoder_count` should be incremented on each rising edge

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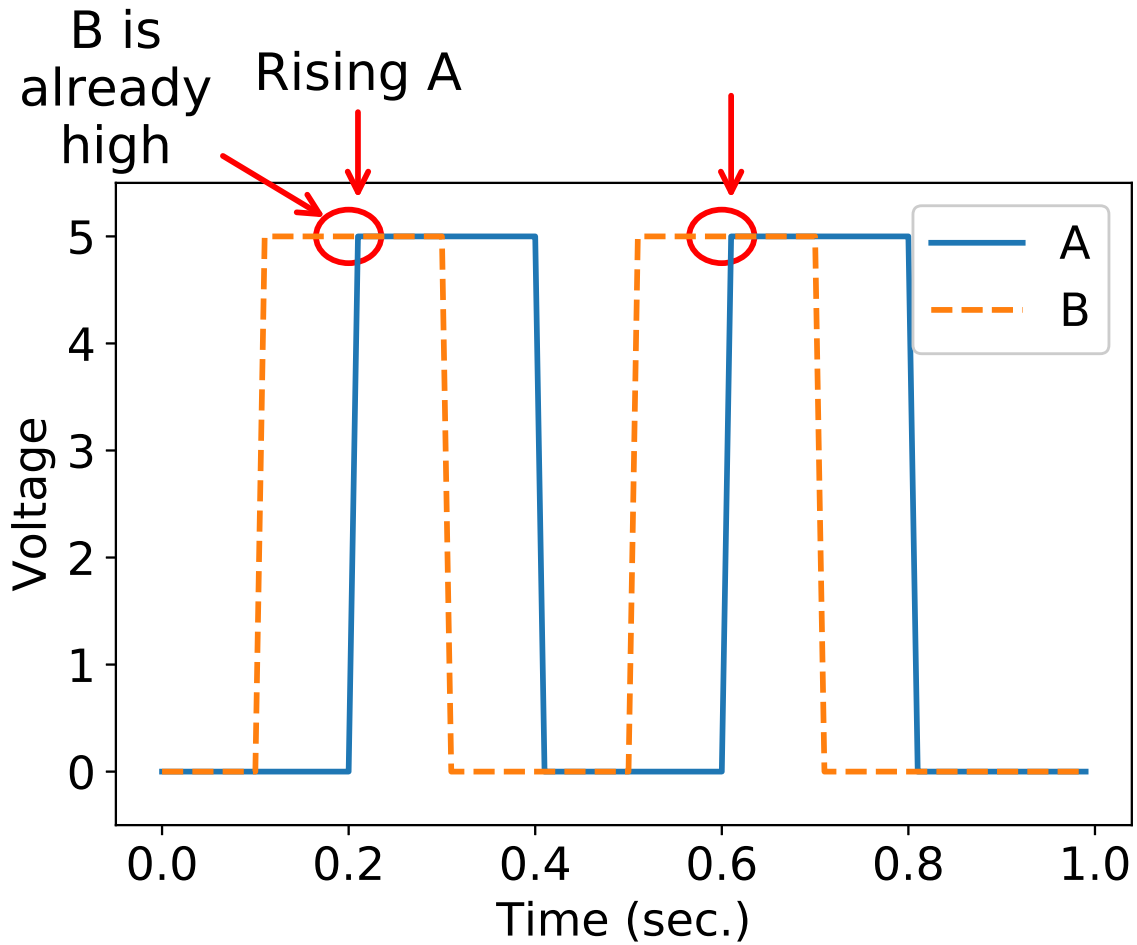
# B Leading A

- negative rotation
- `encoder_count` should be decremented on each rising edge

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# Arduino Code Overview

- define encoder pins A and B
  - encoder A must be connected to pin 2
  - set as inputs
  - might need to turn on pull-up resistors
- attach interrupt 0 (pin 2) to function that determines whether to increment or decrement `encoder_count`
  - I called my function `doEncoderL`, but you can use any name
- print `encoder_count` in `loop` to verify that it is working
  - turn motor forward and backward and make sure `encoder_count` goes up and down

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# Arduino Starter Code

- https://github.com/ryanGT/robosockey_tips/tree/master/encoders

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