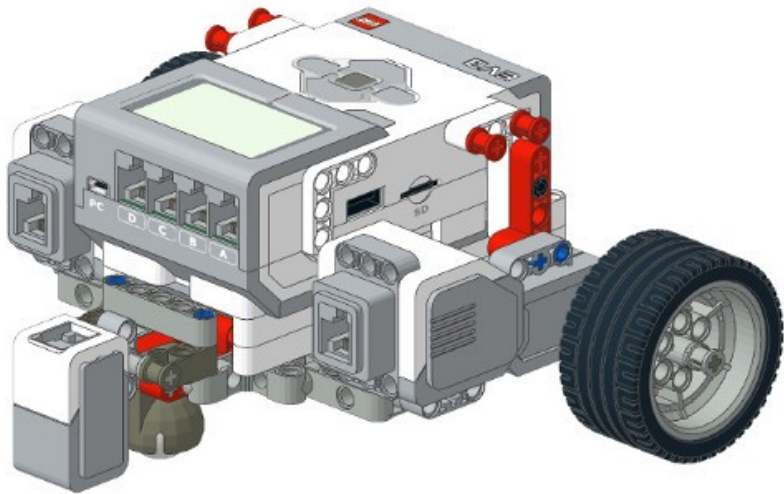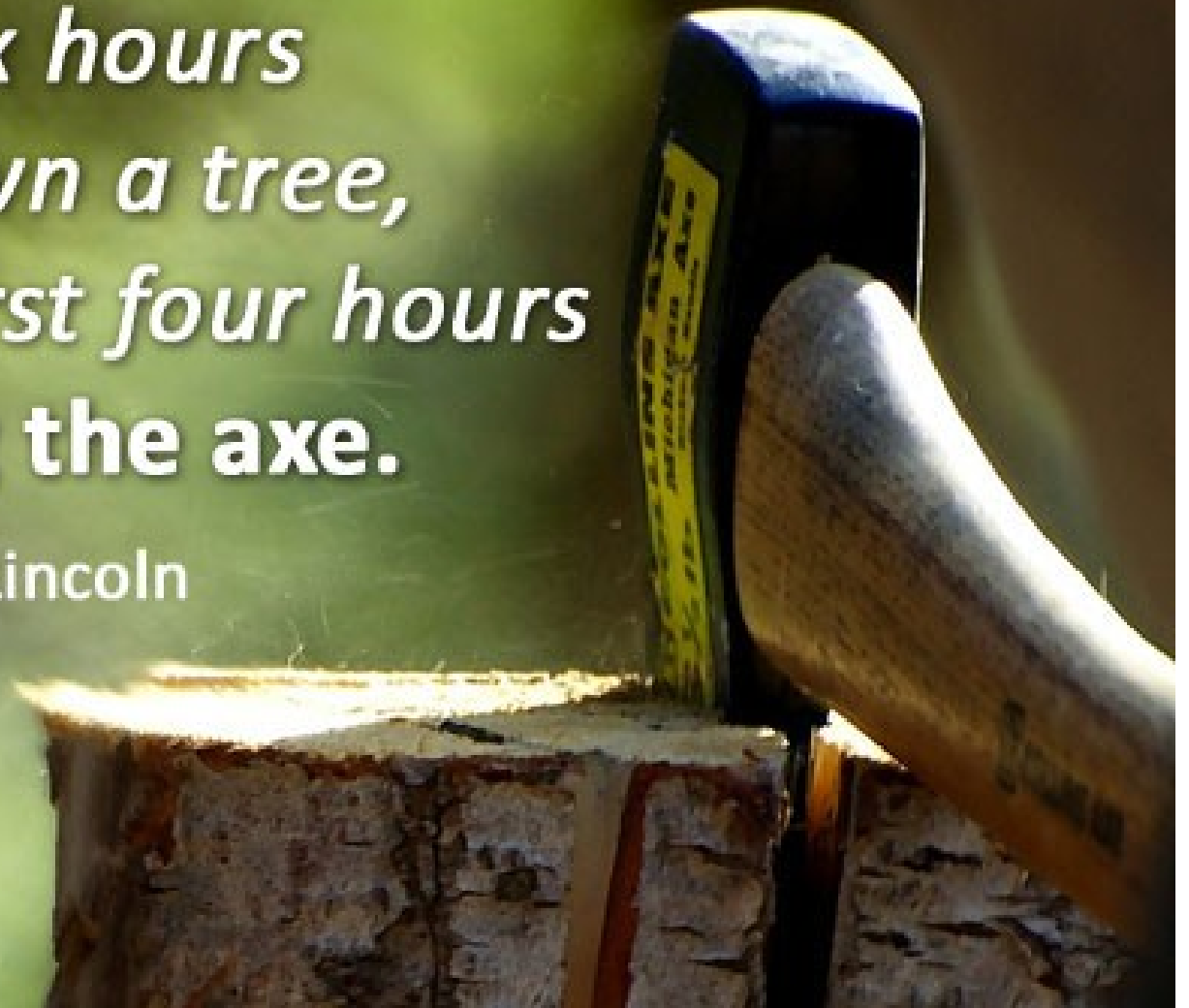# Pre-Season Preparations

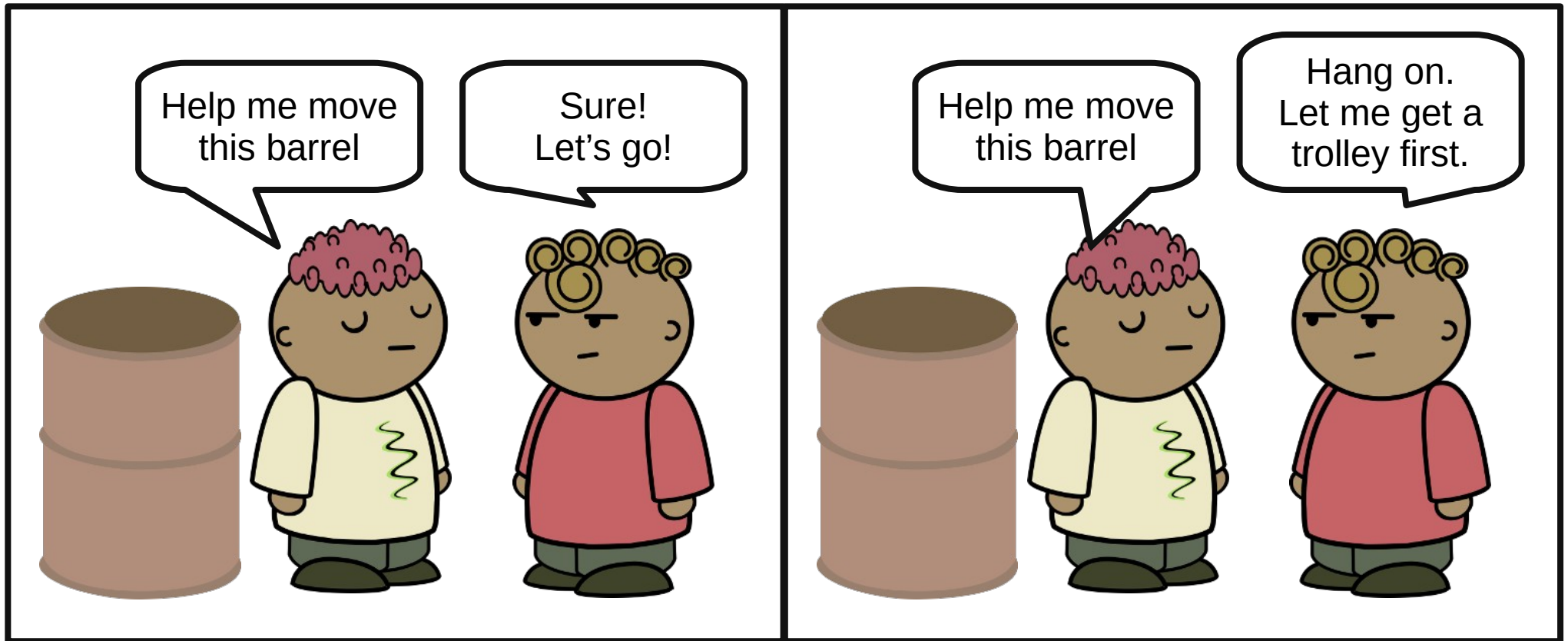A POSTERIORI

Play · Experience · Learn

Why Prepare?

If I had six hours to chop down a tree, I'd spend the first four hours sharpening the axe.

~ Abraham Lincoln

Why Prepare?
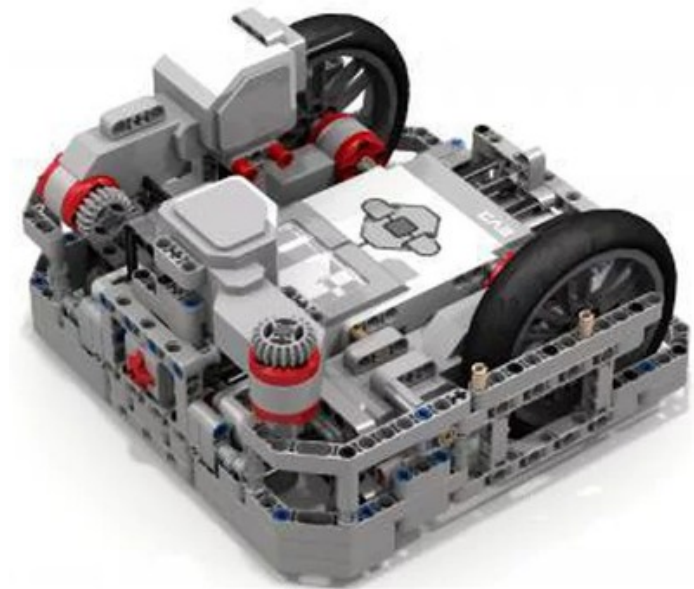
- Having the right tools help you work faster

**Who will get the job done faster?**

What to prepare?

- Base robot
  - The best teams re-uses the same base robot every year (...with modifications and improvements)
  - Can add and remove attachments for each mission

- Useful functions / My blocks
  - Makes your programming easier
  - Less trial and error
  - Neater and more understandable programs

Base Robot

Fllying Tortoise (David Luder)

- Motors
  - Small, thin wheels, far apart

- Sensors
  - Far apart and close to ground for accurate line alignment

- Flat front and back
  - For wall alignment
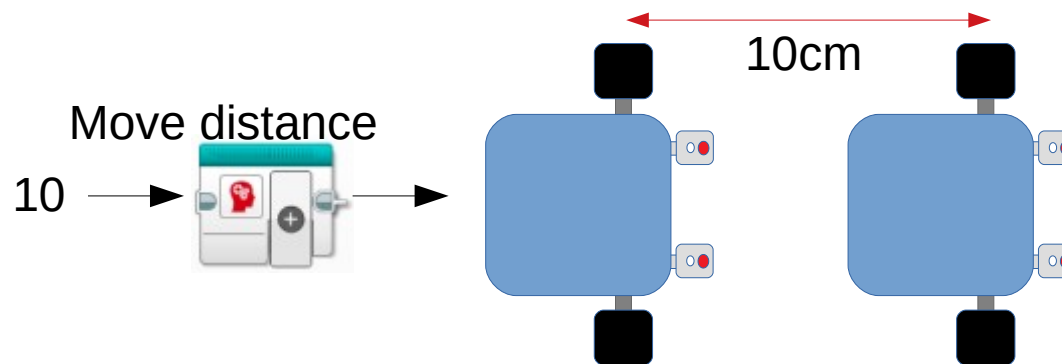
- Flat sides
  - For wall gliding (situational)
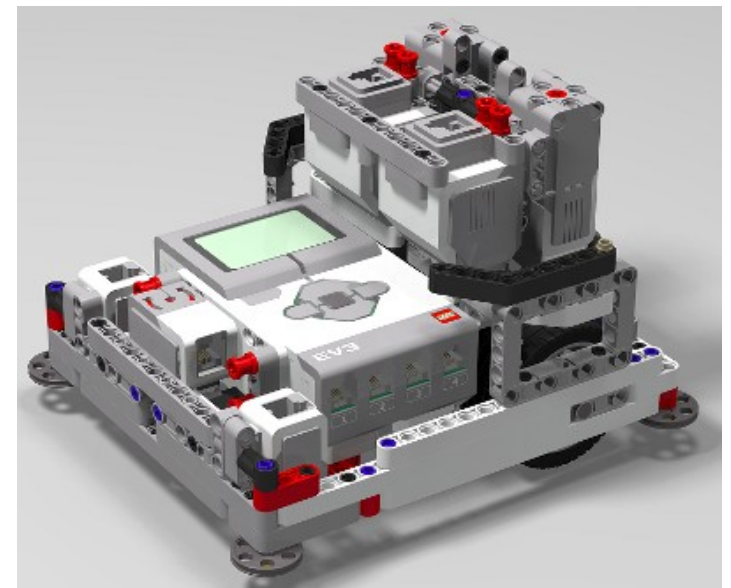
DroidBot Model C (Seshan Brothers)
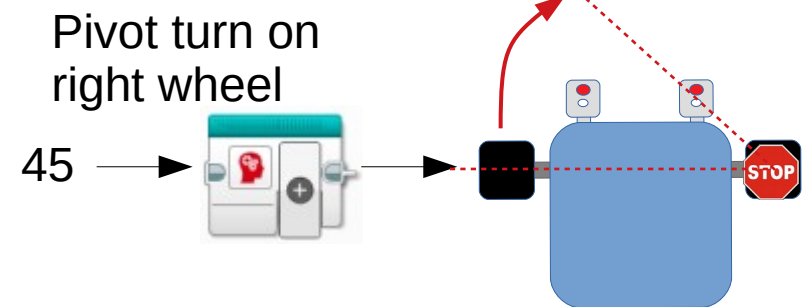
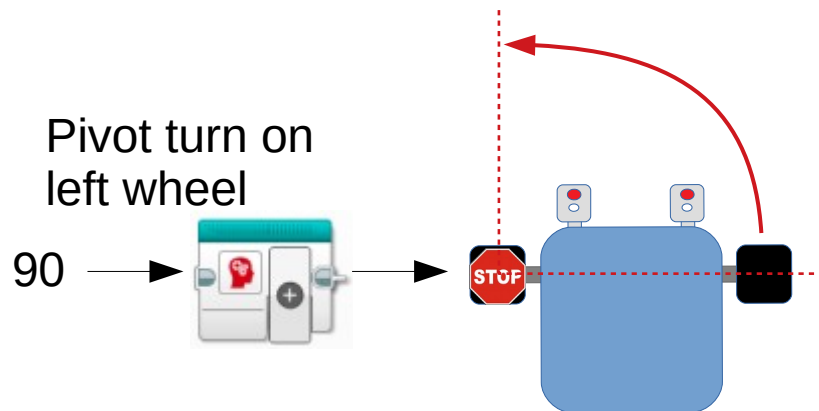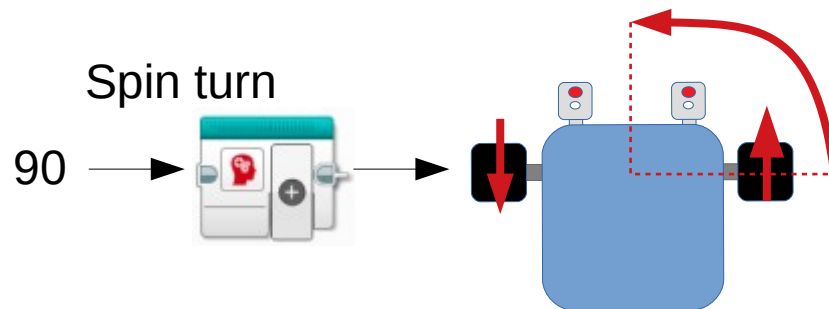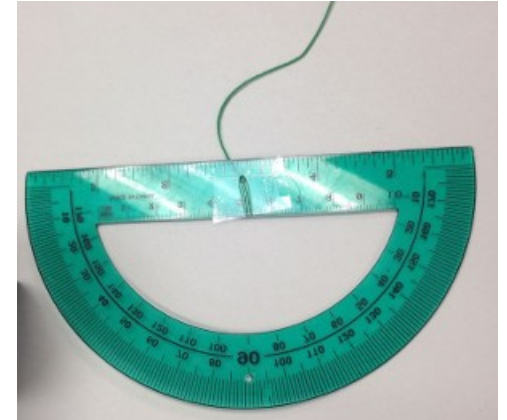# Useful Functions (Dead Reckoning)

- Move distance (cm)
    - Use with a measuring tape to reduce trial and error

Useful Functions (Dead Reckoning)

- Turns
  - Use with a protractor
  - Spin turn (degrees)
  - Pivot turn right and Pivot turn left (degrees)

Spin turn

90

Pivot turn on left wheel

90

Pivot turn on right wheel

45

Useful Functions (Alignment)

- Clockwise align to line

- Counter-clockwise align to line

Clockwise Align

Counter-Clockwise Align
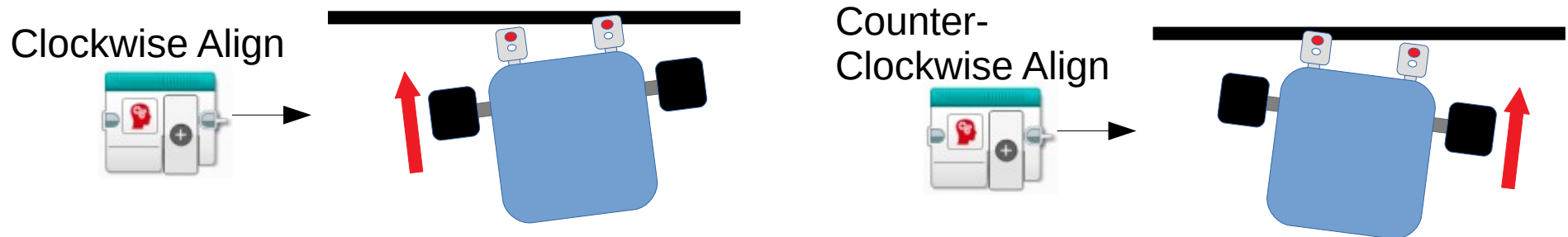
- Move till white (Left and Right)

- Move till black (Left and Right)

Move till black
(Stops when it
reaches the black line)
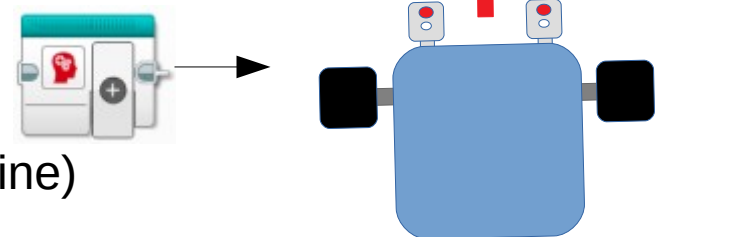
Useful Functions (Alignment)

- Rotate to gyro angle (degrees)
  - Unlike a normal spin turn, this takes reference from the starting angle
  - Similar use as wall alignment, and can be used when the wall isn't available
  - Must calibrate gyro before use

Rotate to angle

0

Useful Functions (Following)

- Move distance following wall
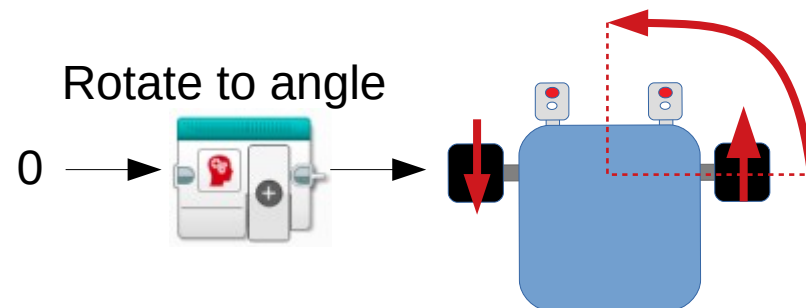 - Use ultrasonic pointing sideways
  - Useful when traveling long distance
  - Better to glide against wall if not turning

Move distance following wall

20, 5

20cm

5cm

5cm
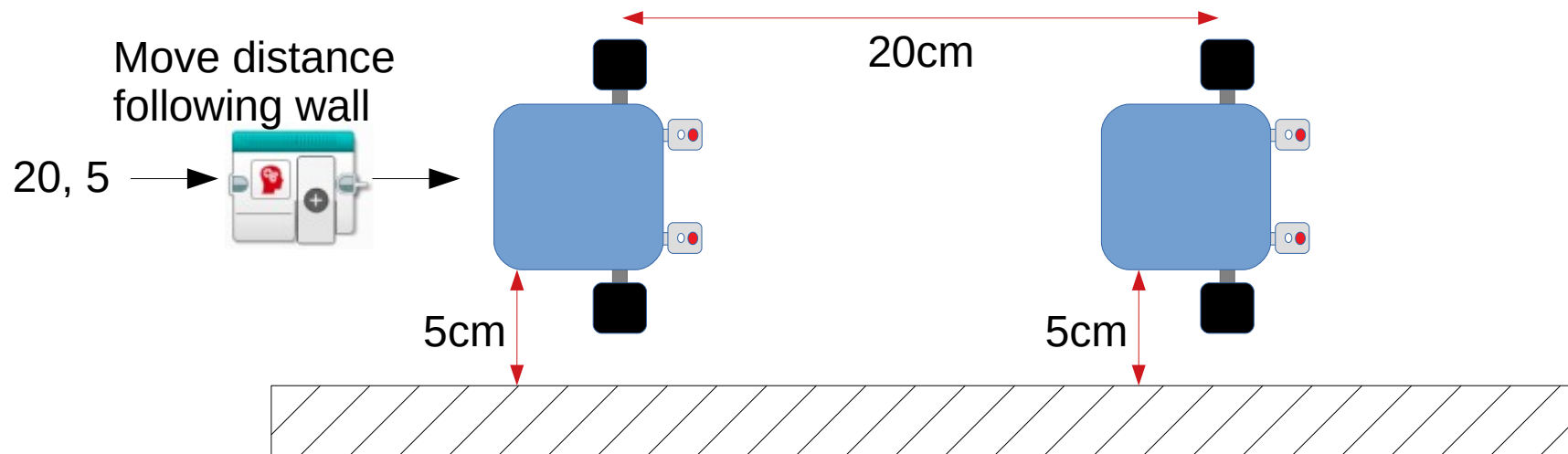
Useful Functions (Following)

- Move distance following line
  - Left sensor and Right sensor
  -

Move distance
following line

20

20cm
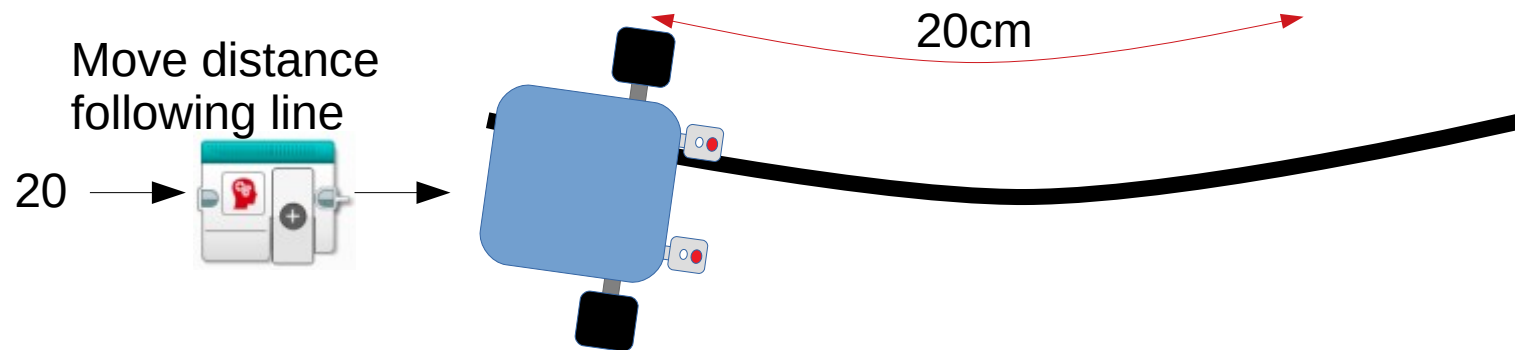
Useful Functions (Following)

- Move distance following gyro
  - Use the gyro to help robot move in a straight line
  - Better to align to wall or line if possible
  - MUST calibrate gyro

20cm

Move distance
while maintaining
gyro angle

20
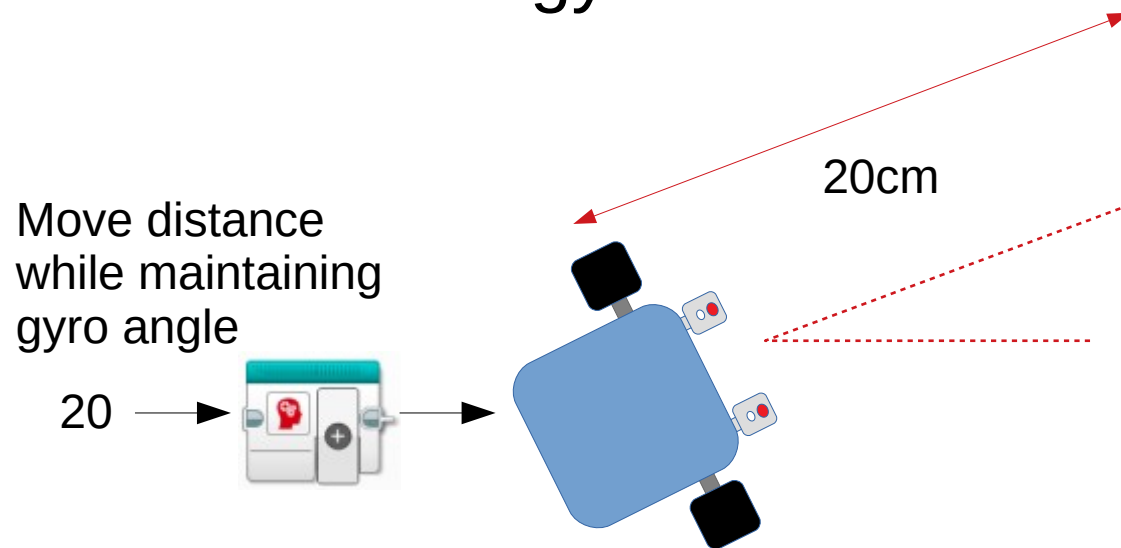
Useful Functions (Calibration)

- Calibrate light sensor
- Calibrate gyro

Useful Functions Summary

Functions	Usefulness
Dead Reckoning	
Move distance (cm)	Essential
Spin turn (deg)	Essential
Pivot turn left / right (deg)	Essential
Alignment	
CW / CCW align to line	Situational
Move till white / black	High
Rotate to gyro angle (deg)	Low
Following	
Move following wall (cm)	Low
Move following line (cm)	Essential (FLL 2019), Otherwise Situational
Move following gyro (cm)	Low
Calibration	
Calibrate light sensors	Essential
Calibrate gyro	Essential if using gyro

Caveat

- You may not need all of these functions...

- ...but most of these can be reused for future FLL and WRO

- Will likely need to prepare variations of these basic functions. For examples...
    - "Move following line (cm)" → "Move following line (until black)"
    - "Move till white" → "Move till yellow"

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