ADVANCED PROGRAMMING LESSON

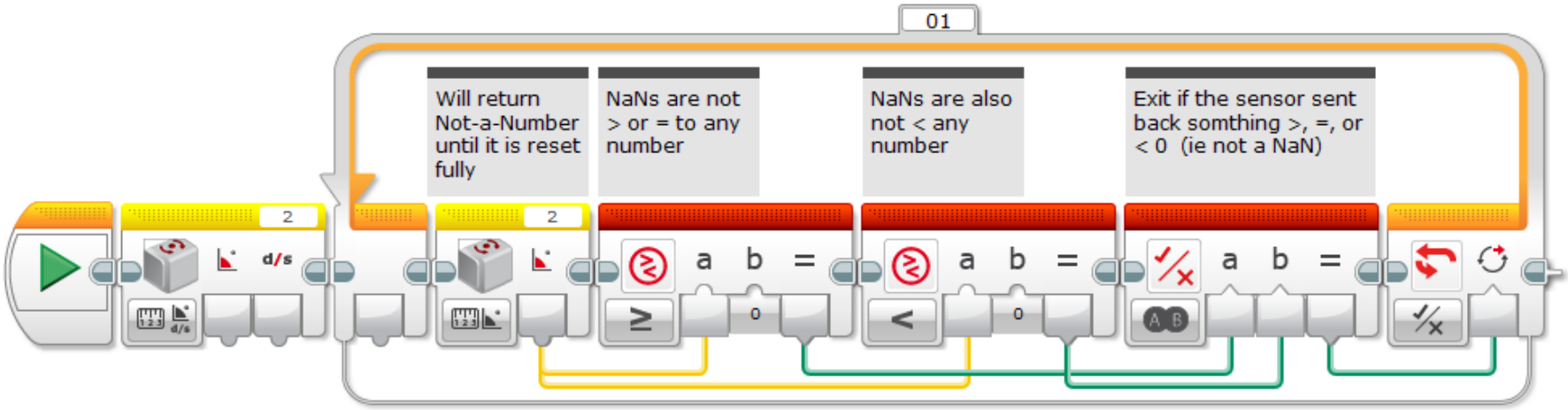
Alternative Gyro Drift and Lag Strategies from other teams

The Construction Mavericks

GYRO DRIFT STRATEGY BY HOOSIER GIRLZ

- Having a fixed time wait for the gyro to calibrate (as presented in the Gyro Turn Lesson) may not always work. This is Hoosier Girlz' alternative method to re-calibrate the gyro
- The gyro returns "Not a Number" (NaN) until it has actually reset and NaNs are not >, =, or < any number. This is because they are not numbers
- The only way you can know when it is fully reset is to make sure you are getting back a real number, instead of a Not-a-Number value
  - STEP 1: Read both rate and angle in a single block
  - STEP 2: start a loop
  - STEP 3: read angle
  - STEP 4: check angle >= 0
  - STEP 5: check angle < 0
  - STEP 6: OR outputs of steps 4 & 5
  - STEP 7: If the output of step 6 is true, exit loop
- At this point, the sensor drift should be gone.

GYRO DRIFT CODE FROM HOOSIER GIRLZ

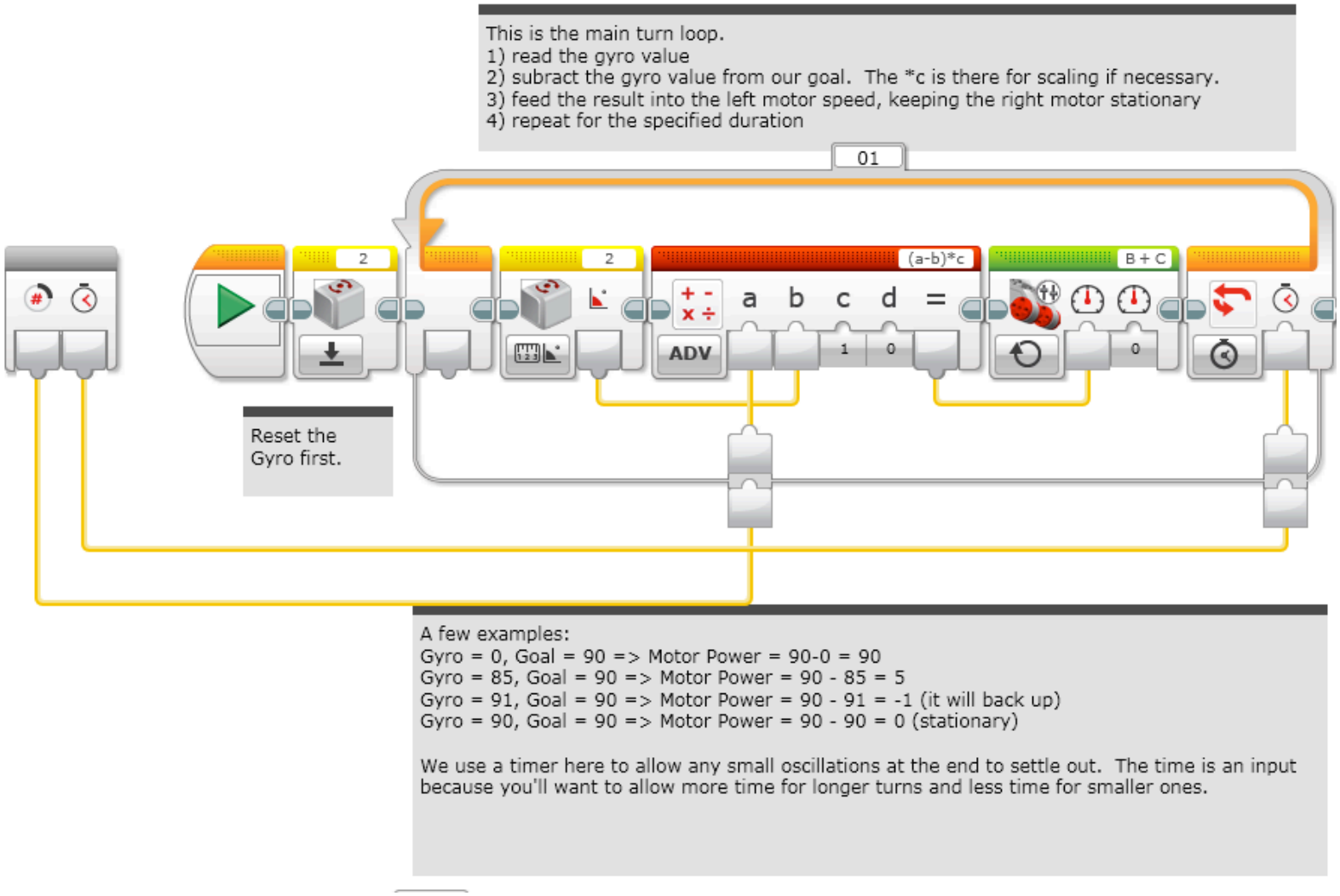


Code by Hoosier Girlz: http://www.fllhoosiergirlz.com/

GYRO LAG STRATEGY BY THE CONSTRUCTION MAVERICKS

- Improvement over the simple overshoot correction mechanism used in the Gyro Turn lesson.
- This method uses proportional control loop to actively steer the robot in the right direction
  - Uses the current gyro position and where it wants to point to determine how to set the motor power.
- Note from Construction Mavericks: It's not perfect, but we have had much better success with these blocks than the overshoot-corrected ones.
- Tip from Construction Mavericks: Try to set the outer loop to an infinite loop. Once the robot settles into place, pick it up and rotate it and watch it try to get back to where it wants to be.

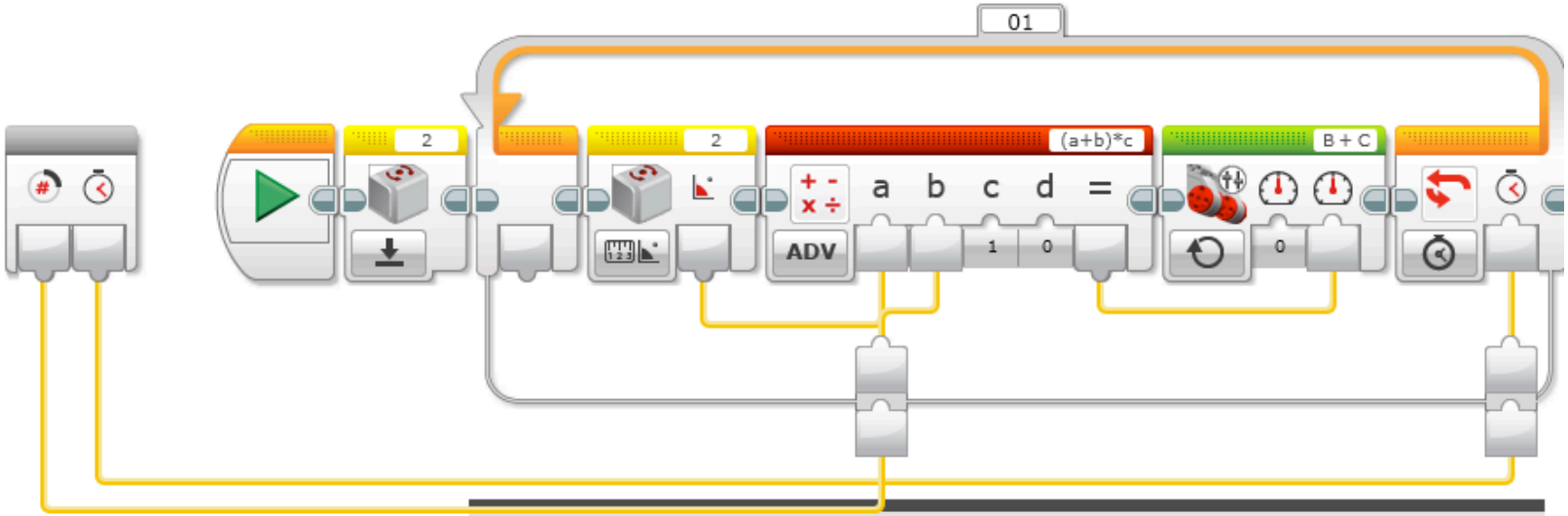
RIGHT PIVOT CODE FROM CONSTRUCTION MAVERICKS



LEFT PIVOT CODE FROM CONSTRUCTION MAVERICKS

This is the main turn loop.
** IMPORTANT - Left turns cause the Gyro to read NEGATIVE numbers

1) read the gyro value
2) add the gyro value to the goal (see note above). The *c is there for scaling if necessary
3) feed the result into the right motor speed, keeping the left motor stationary
4) repeat for the specified duration



A few examples:
Gyro = 0, Goal = 90 => Motor Power = 90+0 = 90
Gyro = -85, Goal = 90 => Motor Power = 90 + -85 = 5
Gyro = -91, Goal = 90 => Motor Power = 90 + -91 = -1 (it will back up)
Gyro = -90, Goal = 90 => Motor Power = 90 + -90 = 0 (stationary)

We use a timer here to allow any small oscillations at the end to settle out. The time is an input because you'll want to allow more time for longer turns and less time for smaller ones.

CREDITS

- This tutorial was compiled by Droids Robotics. The techniques presented are from 2 very awesome teams:
  - Hoosier Girlz: http://www.fllhoosiergirlz.com/
  - The Construction Mavericks: frank.levine@gmail.com
- Please be sure to give them credit for their work
- More lessons at ev3lessons.com
- If you have code you want to contribute, please email us at team@droidsrobotics.org