Smart Line Following (Follow the Black Ink Road)

Time required: 60 minutes

There are some tweaks that can be made to make the line following smoother. We are going to create a **turnLeft** block, and **turnRight** block to make the line following smoother. We will use a couple of variations of car turns instead of tank turns. Car turns are smoother.

Boolean (Flag) Variables

This program introduces the concept of Boolean (flag) variables. Boolean (flag) variables allow the mBot to keep track of something, to give it the ability to remember something. The **turningLeft** variable keeps track of the last direction the mBot turned.

- If the mBot turned left last, **turningLeft** is set to 1 or true
- If the mBot turned right last, **turningLeft** is set to 0 or false.
- If the mBot last turned left and lost the line, it will keep turning left until it finds the line.

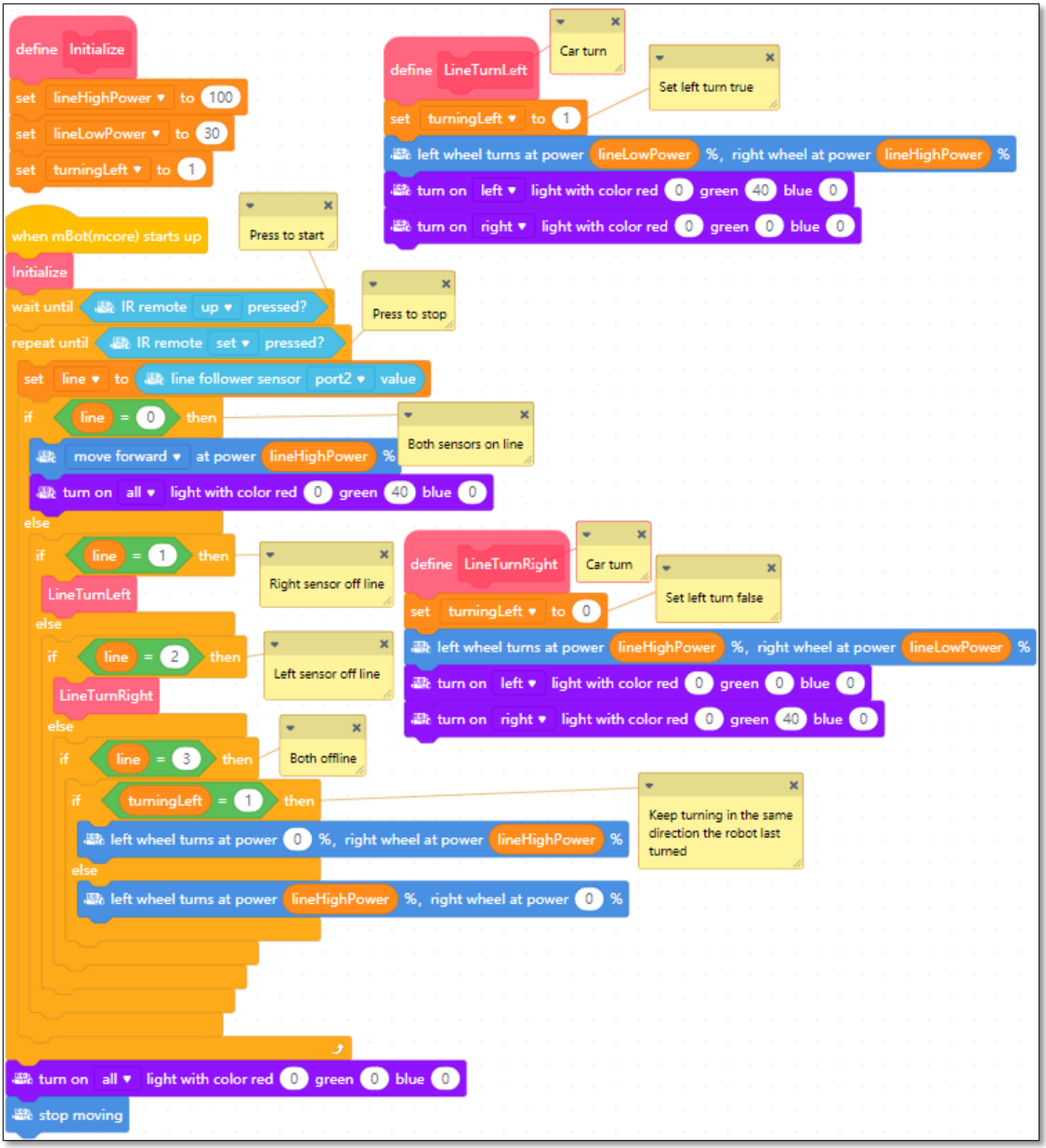
Remembering which direction it turned last gives the mBot a better chance of finding the line again.

Tutorial Assignment

1. Start mBlock, open Simple Line Following. Save the program as **Smart Line Following**.
2. Complete and test the program as pictured with the requirements listed.

Requirements

- Accurately follow the line (doesn't get off course)


define Initialize
set lineHighPower to 100
set lineLowPower to 30
set turningLeft to 1
when mBot(mcore) starts up
Initialize
wait until IR remote up pressed?
repeat until IR remote set pressed?
set line to line follower sensor port2 value
if line = 0 then
move forward at power lineHighPower %
turn on all light with color red 0 green 40 blue 0
else
if line = 1 then
LineTurnLeft
else
if line = 2 then
LineTurnRight
else
if line = 3 then
if turningLeft = 1 then
left wheel turns at power 0 %, right wheel at power lineHighPower %
else
left wheel turns at power lineHighPower %, right wheel at power 0 %
turn on all light with color red 0 green 0 blue 0
stop moving
Press to start
Press to stop
Both sensors on line
Right sensor off line
Left sensor off line
Both offline
Keep turning in the same direction the robot last turned
define LineTurnLeft
Car turn
Set left turn true
set turningLeft to 1
left wheel turns at power lineLowPower %, right wheel at power lineHighPower %
turn on left light with color red 0 green 40 blue 0
turn on right light with color red 0 green 0 blue 0
define LineTurnRight
Car turn
Set left turn false
set turningLeft to 0
left wheel turns at power lineHighPower %, right wheel at power lineLowPower %
turn on left light with color red 0 green 0 blue 0
turn on right light with color red 0 green 40 blue 0

Assignment

Start with your tutorial project and add the following.

- Change the LED’s to indicate right and left turn and going straight ahead.
- Don’t add notes while your mBot is line following. That slows down the sensor readings.