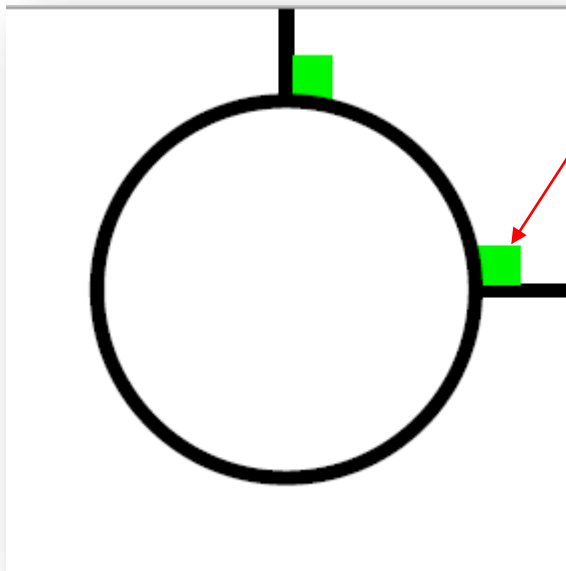

TURN ON GREEN

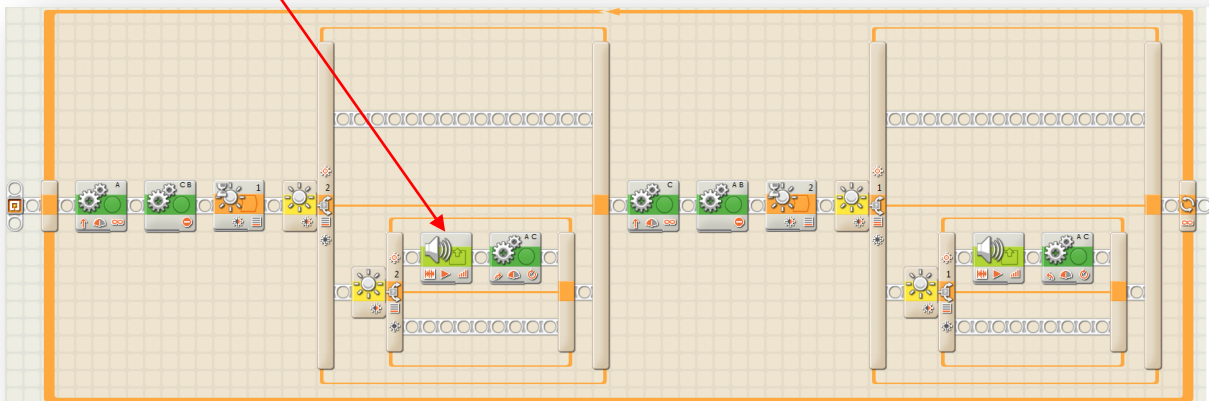
TURN ON GREEN

To be able to successfully complete the RoboCup Rescue our robot needs to be able to negotiate intersections on the course. The rescue field indicates intersections with a green square of approximately 40mm square.



We will expand Better Line Follower program to include the Turn on Green logic.

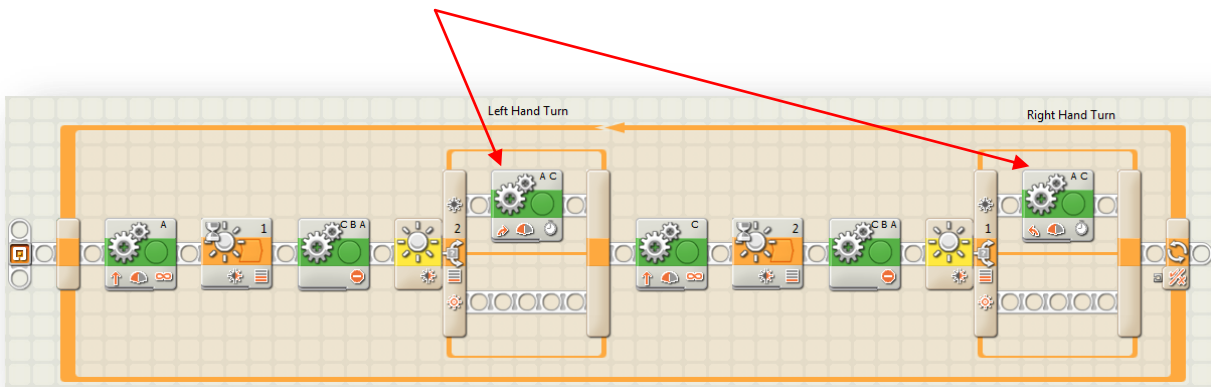
In this program we will use 'Flags' to indicate that the program has in fact detected the green square. By using a Sound as a Flag in this program, you will be able to audibly hear if the robot detect the green square correctly.



TURN ON GREEN (CONT...)

Start with the Better Line Follower program and rename it to **LineFollower-TurnOnGreen.rbt**

1. Remove the two Move Blocks from the Switch Blocks.



Note: Remember to check your Light Sensor readings to determine the values you need to type in.

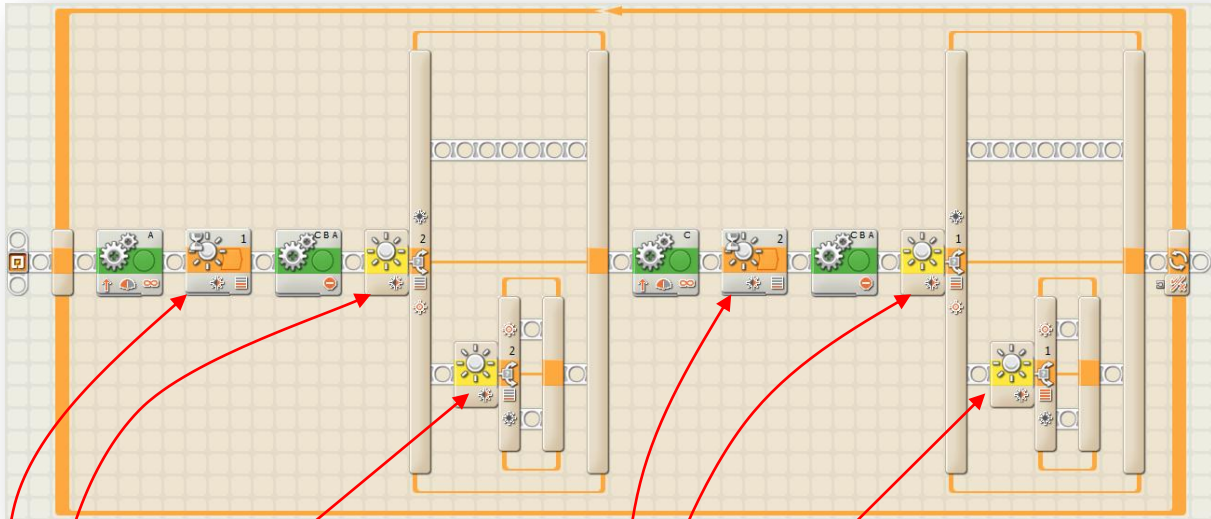
Use the View menu on the NXT to record the values of the two Light Sensors for White, Green and Black.

Use a table, similar to the one below to record the Light Sensor readings.

	WHITE	WHITE/GREEN MIDPOINT	GREEN	GREEN/BLACK MIDPOINT	BLACK
LIGHT SENSOR 1	62	54	45	41	37
LIGHT SENSOR 2	58	50	42	39	35

TURN ON GREEN (CONT...)

2. Now place two Switch Blocks as shown below.



2a. Set the properties of Sensor, Light Sensor Port to Port 2, Compare to Greater Than Black/Green Midpoint of Sensor 2. (39)

Change the outer Switch Blocks Compare to Greater Than Green/White Midpoint of Sensor 2. (50)

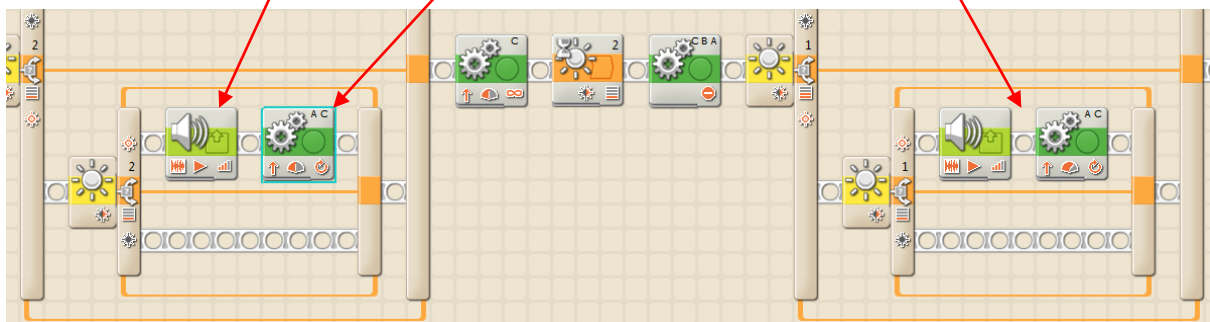
Change the Wait Block Until to Less Than the Black/Green Midpoint of Sensor 1. (41)

2b. Set the properties of Sensor, Light Sensor Port to Port 1, Compare to Greater Than Black/Green Midpoint of Sensor 1. (41)

Change the outer Switch Blocks Compare to Greater Than Green/White Midpoint of Sensor 1. (54)

Change the Wait Block Until to Less Than the Black/Green of Sensor 2. (39)

3. Now place a Sound Block and a Move Block as shown below. The same in this Switch Block.



3a. Leave the Sound Block as the default sound.

TURN ON GREEN (CONT...)

3b. Set the First Move Block to Ports A and C, Direction Forward, Steering Right, Power 60 and Duration to 1 Rotation.



3c. Set the Second Move Block to Ports A and C, Direction Forward, Steering Left, Power 60 and Duration to 1 Rotation.



4. Make sure that you have plugged the motors into the correct ports on the NXT brick before downloading and running the program.
5. Make sure your robot is on and that the robot is plugged into the USB cable, then go to the NXT Control and select the Download button.



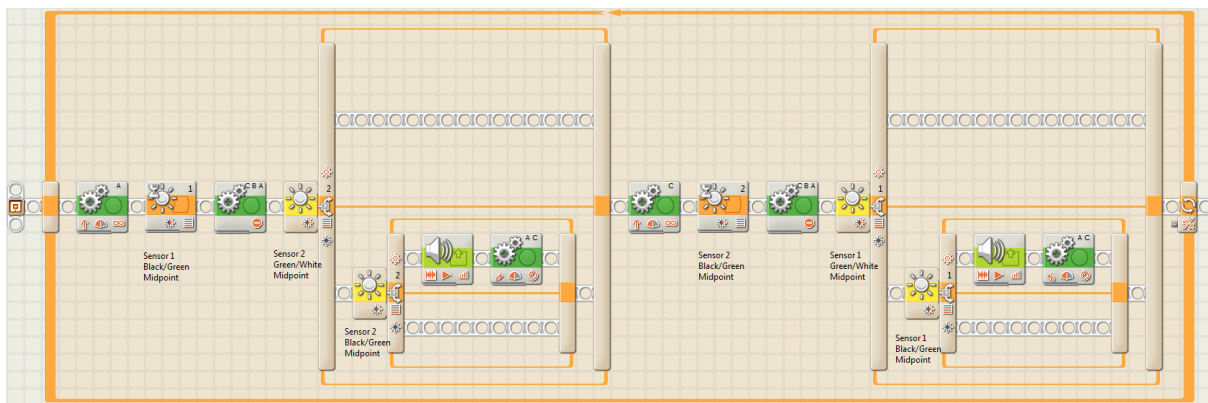
6. Once the program has downloaded to your robot you have the choice of unplugging your robot and navigating to your program and running it, or you can keep it connected and use the Run button to control your robot from the computer.



CHECKPOINT

Experiment with the values of your Sensors and trace the logic of the Switch Blocks in order for your robot to follow the line and detect the green intersections.

LOGIC OF THE PROGRAM



The program starts and MotorA rotates causing the robot to swing to the left. When Light Sensor 1 detects black, MotorA stops. The first Switch Block then looks at the value of Light Sensor 2, IF it detects white then the robot is on the line and the program follows the upper Sequence bar. Now MotorC rotates causing the robot to swing to the right. When Light Sensor 2 detects black, MotorC stops. The second Switch Block then looks at the value of Light Sensor 1, IF it detects white then the robot is still on the line and the program follows the upper Sequence Bar, hits the end of the Loop Block and goes to the beginning.

Now MotorA rotates causing the robot to swing to the left. When Light Sensor 1 detects black, MotorA stops. This time the first Switch Block looks at the value of Light Sensor 2 and finds that it is a value less than white. The program this time follows the lower sequence bar and hits the inner Switch Block of the first Switch Block. Light Sensor 2 is again looked at to determine if the value is Green or Black. IF the value is in the green range then the program will follow the upper Sequence Bar and make a sound and then swing to the left making the intersection turn required of the Rescue field.

Note: This program does not address the possibility of the two Light Sensors seeing Black. A strategy for this scenario is that you robot has travelled through the green intersection indicator and is looking at the tee of the intersection. Alternatively, the robot is over a sharp turn and both Light Sensors are above the black line. In both of these cases the sampling rate of your sensors is too long, meaning that your robot is travelling too fast and is not getting the readings from the light Sensors quickly enough to react and turn. Sometimes, however, these situations cannot be avoided so a possible solution is to have your robot backup a short distance and then restart the line following.