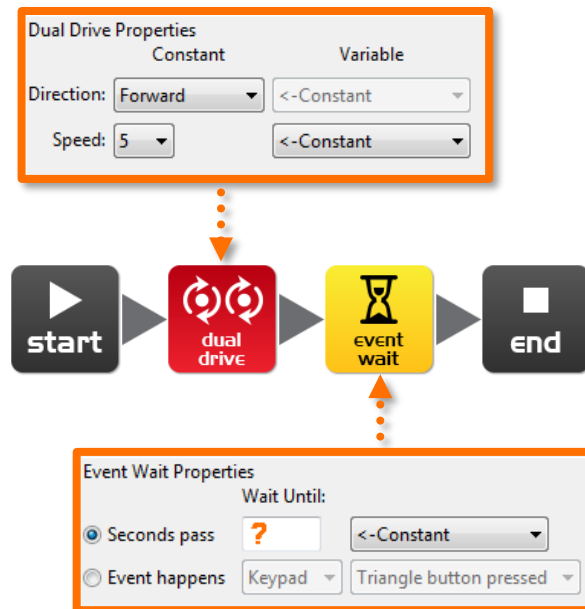# Group Solutions

Lesson 2 Worksheet 2.1 – Drive the robot forward

Write the following program to drive the Edison robot forward.

Set the 'Seconds pass' (replace?) to an amount of time in seconds to have the robot drive a few inches.

Minimum amount of time is 0.01 seconds.

Maximum amount of time is 327.67 seconds.
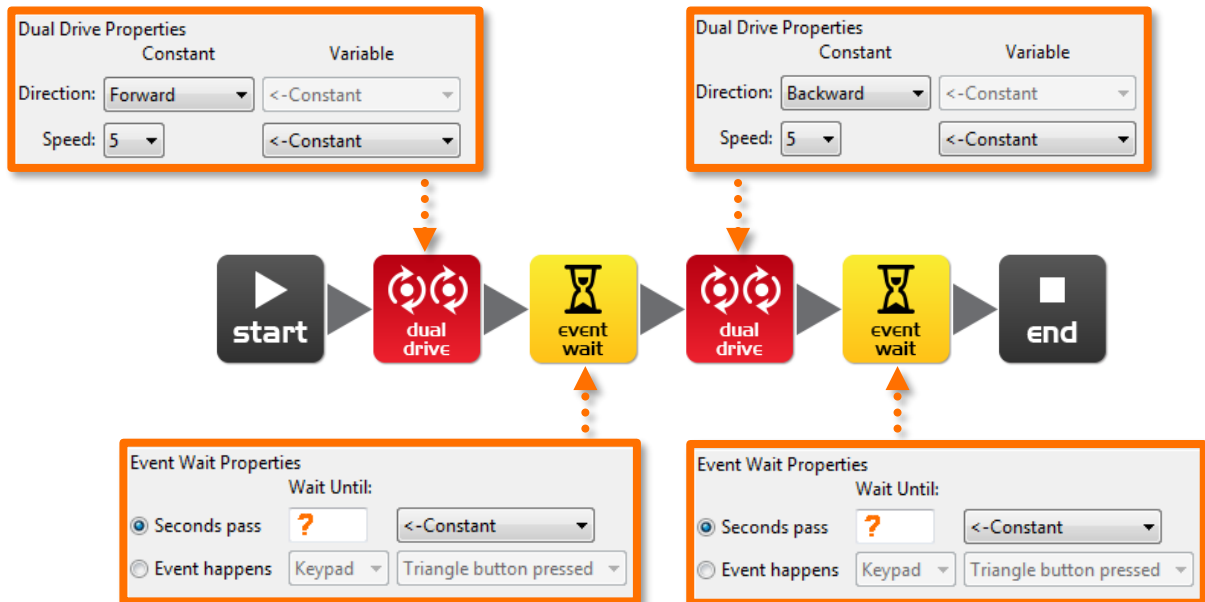
Connect the EdComm cable to the headphone socket on the computer or tablet and turn up the volume to full. Plug the other end of the EdComm cable into Edison as shown.

Name: _____

Lesson 2 Worksheet 2.3 – Forward and then backward

Write the following program to drive the Edison robot forward and then backward.

Set the 'Seconds pass' (replace **?**) to an amount of time in seconds to have the robot drive forward and then backward.
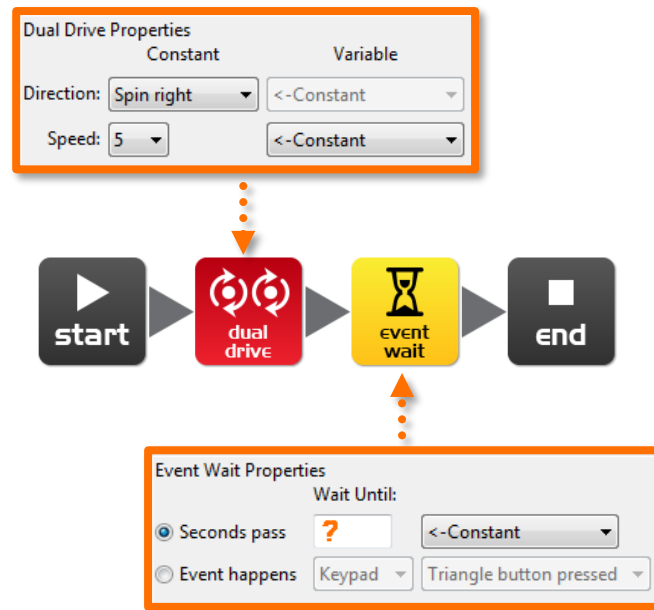
Minimum amount of time is 0.01 seconds.

Maximum amount of time is 327.67 seconds.

Name: _____

Lesson 3 Worksheet 3.1 – Right turn 90 degrees

Write the following program to turn the Edison robot right 90 degrees (90°). Use Activity sheet 3.1 or marked lines on a desk as start and stop markers.

Set the 'Seconds pass' (replace?) to an amount of time in seconds to have the robot turn right exactly 90°.
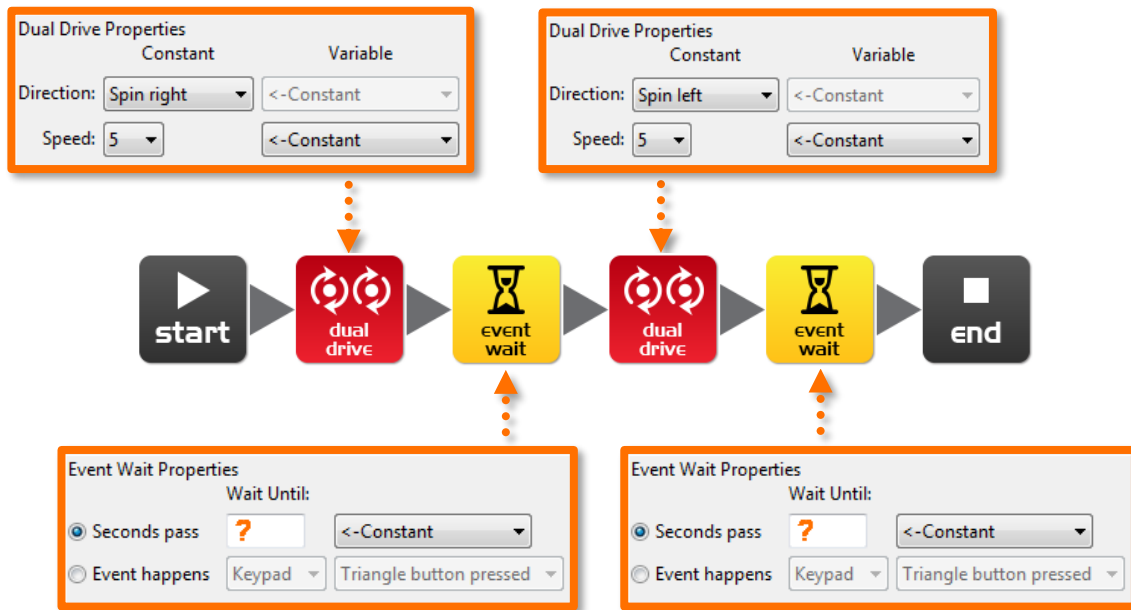
 Minimum amount of time is 0.01 seconds.

 Maximum amount of time is 327.67 seconds.

Try different amounts of time until your robot turns right from the start point to the end point.

Name: _____

Lesson 3 Worksheet 3.3 – Right turn, then left turn

Write the following program to turn the Edison robot right 90 degrees (90°) and then left 180 degrees (180°). Use Activity sheet 3.1 or marked lines on a desk as start and stop markers.

Set the 'Seconds pass' (replace**?**) to an amount of time in seconds to have the robot turn right exactly 90° and then left 270° (90° + 180°) degrees.

Minimum amount of time is 0.01 seconds.

Maximum amount of time is 327.67 seconds.

Try different amounts of time until your robot turns 90° right from the start point to the end point and then left 270° to the bottom end point.
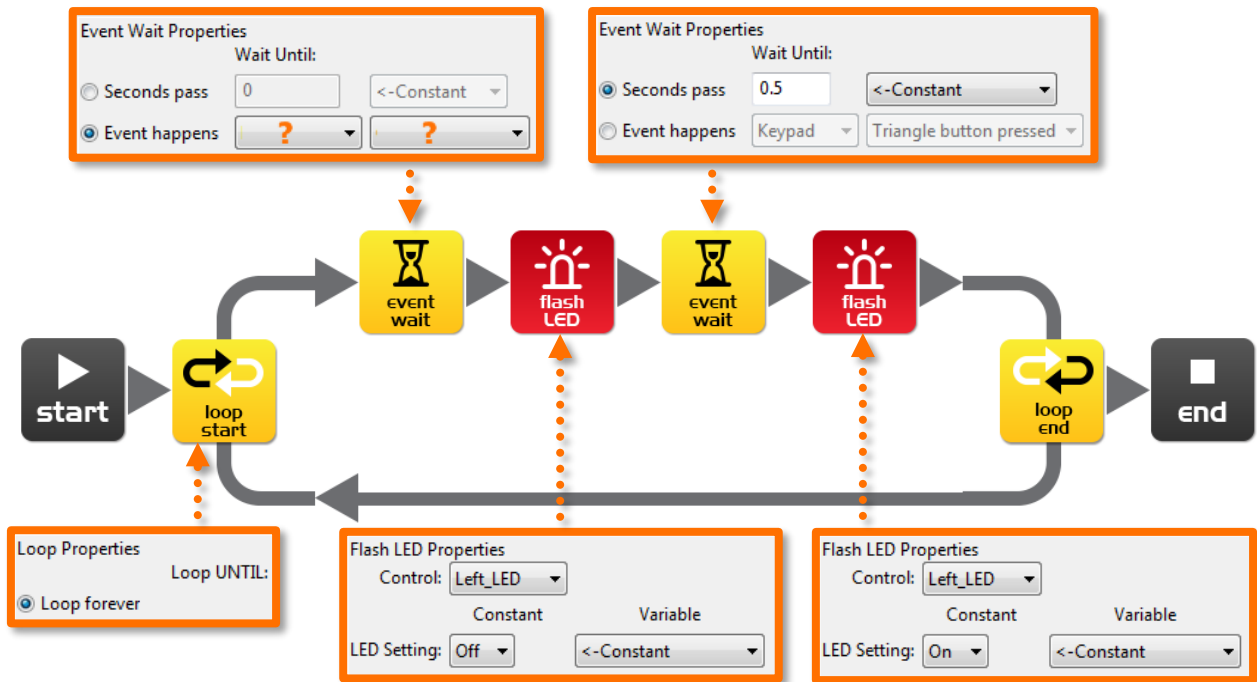
What is the correct amount of time to get your robot to turn 90°, then 270°?

90°: _____, 270°: _____

Name: _____

Lesson 6 Worksheet 6.1 – Flash LED in response to clap

Write the following program to have the Edison robot flash the left LED in response to a loud sound such as a clap.


In this program the first event wait icon is not being used to wait for time. Instead the program will not continue from this point until a specific event occurs.

Within the first event wait icon's properties box select the 'Event happens' radio button and then select the event type you think is required to respond to a clap.

Name: _____

Lesson 6 Worksheet 6.2 – Drive in response to a clap

Write the following program to have the Edison robot drive forward in response to a clap.
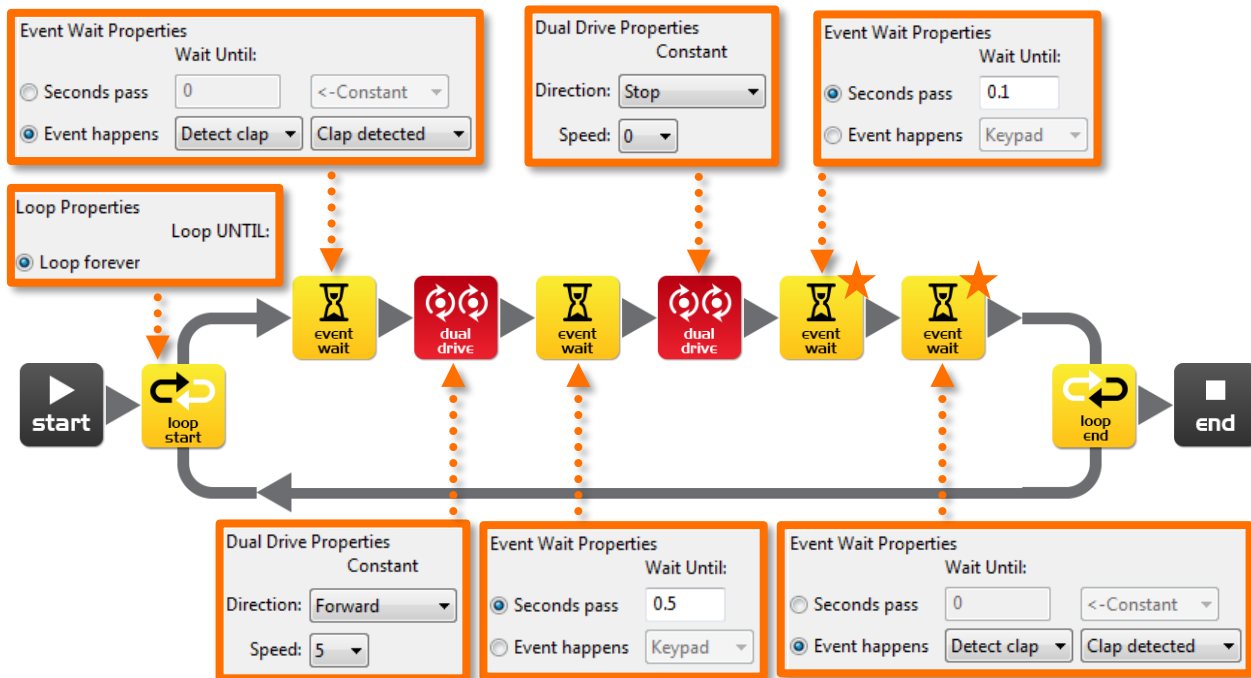
The Edison robot's sound sensor is not just sensitive to claps, but can also respond to any loud sound. This includes the robot's motors, gears and wheels, which also make sound as they turn. To prevent the sound of the robot driving from triggering the sound sensor there are two additional icons used in this program and are marked above with orange stars. The first event wait icon is set to 0.1 seconds and gives the robot's motors time to stop. The second event wait icon is set to wait for a clap and will allow the program to continue, because it will have detected the sound of the motors.

You will need to use these two icons after stopping the motors if you are using the clap sensor.
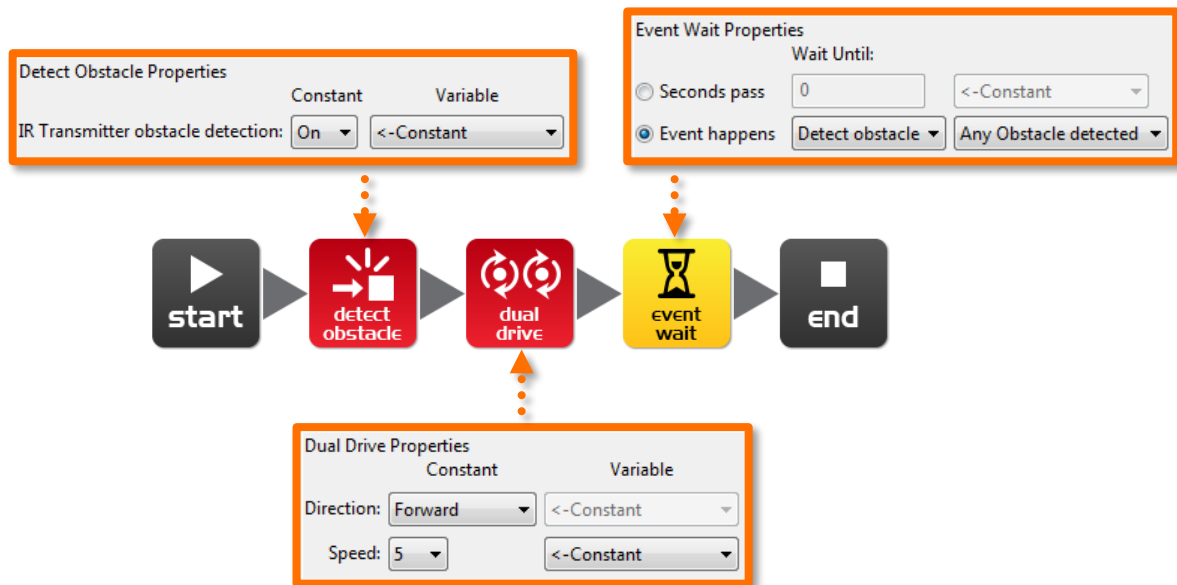
Experiment with different directions in the first dual drive icon and with the following event wait icon to create different movements.

What other directions and times did you try?

Name: _____

Lesson 7 Worksheet 7.2 – Detect obstacle and stop

Write the following program to have the Edison robot drive until it encounters an obstacle.


The red (control group) detect obstacle icon is required to turn the obstacle detection system on and starts the IR light emitters.

The dual drive speed is set to 5 to allow the robot to detect an obstacle before colliding with it. If the speed is too fast then the robot will crash into obstacles.

Name: _____

Lesson 7 Worksheet 7.3 – Detect obstacle and avoid

Write the following program to have the Edison robot drive until it encounters an obstacle, then turn 180° and drive for 1 second away from the obstacle.
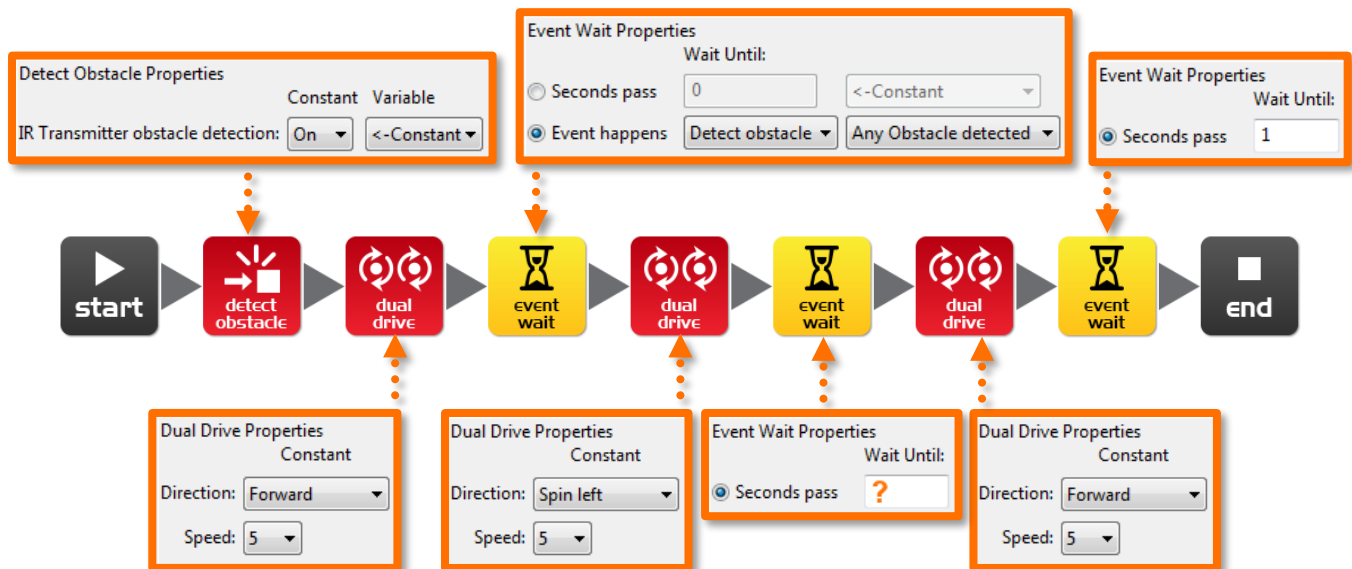

In lesson 3 (Worksheet 3.2), you found the right amount of time to have the robot to turn 180°. Use this time again where indicated above by the orange question mark (**?**).

What is the correct amount of time to get your robot to turn 180 degrees?

_____

Name: _____

Lesson 7 Worksheet 7.4 – Obstacle avoidance

Write the following program to have the Edison robot continuously drive avoiding obstacles.
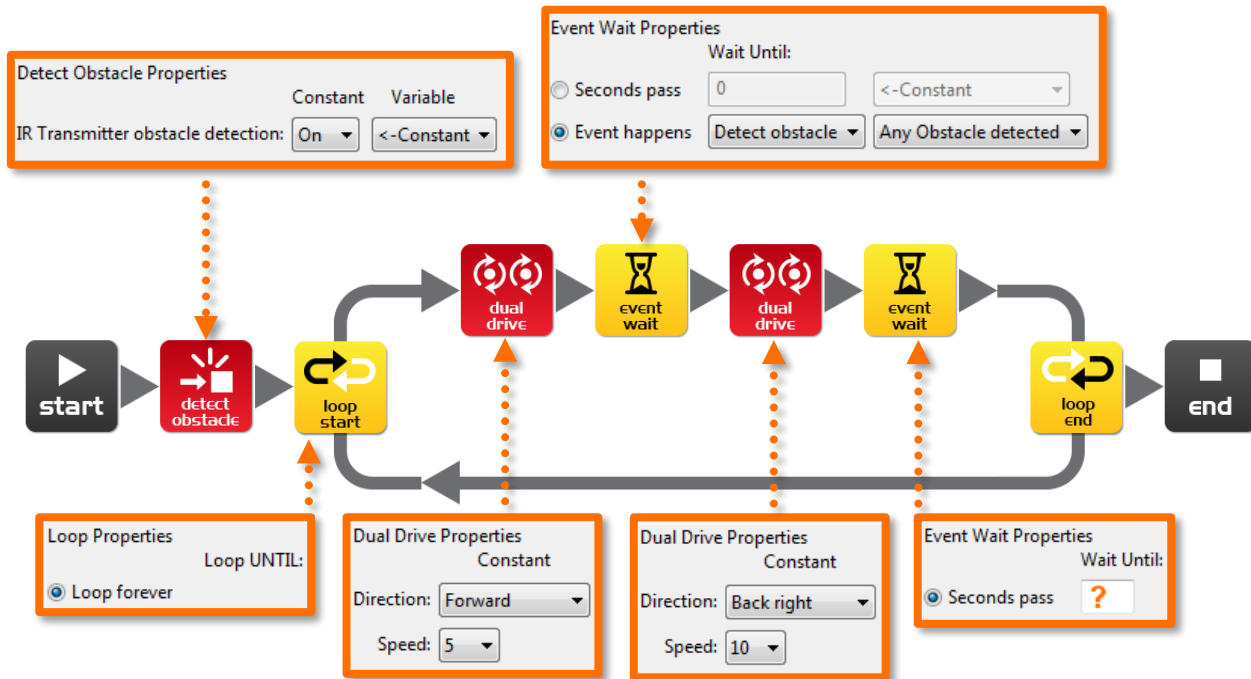
Try experimenting with different amounts of time in the second event wait icon. This time setting determines how long the robot turns for and is indicated above by the orange question mark (**?**).

Name: _____

Lesson 7 Worksheet 7.5 – Right and left detection

Write the following program to have the Edison robot continuously drive avoiding obstacles to the left and right.
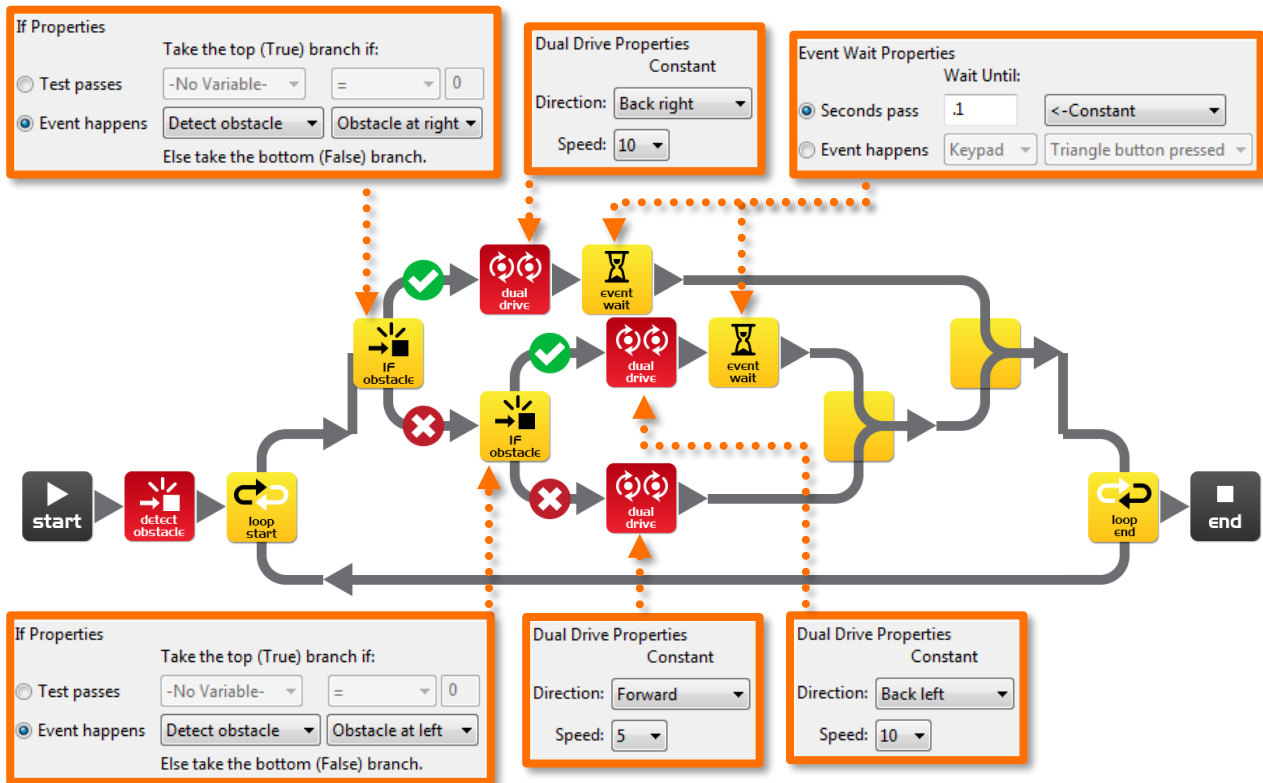
In the above program we are using 'IF' icons. These are very important icons, because they give the robot the ability to make decisions without human guidance. When this occurs in a robot it is now called an autonomous robot, as it has artificial intelligence.

An 'If' icon asks whether a condition is true or false. If the result is true the program takes the path with a tick. If the result is false the program takes the path with the cross.

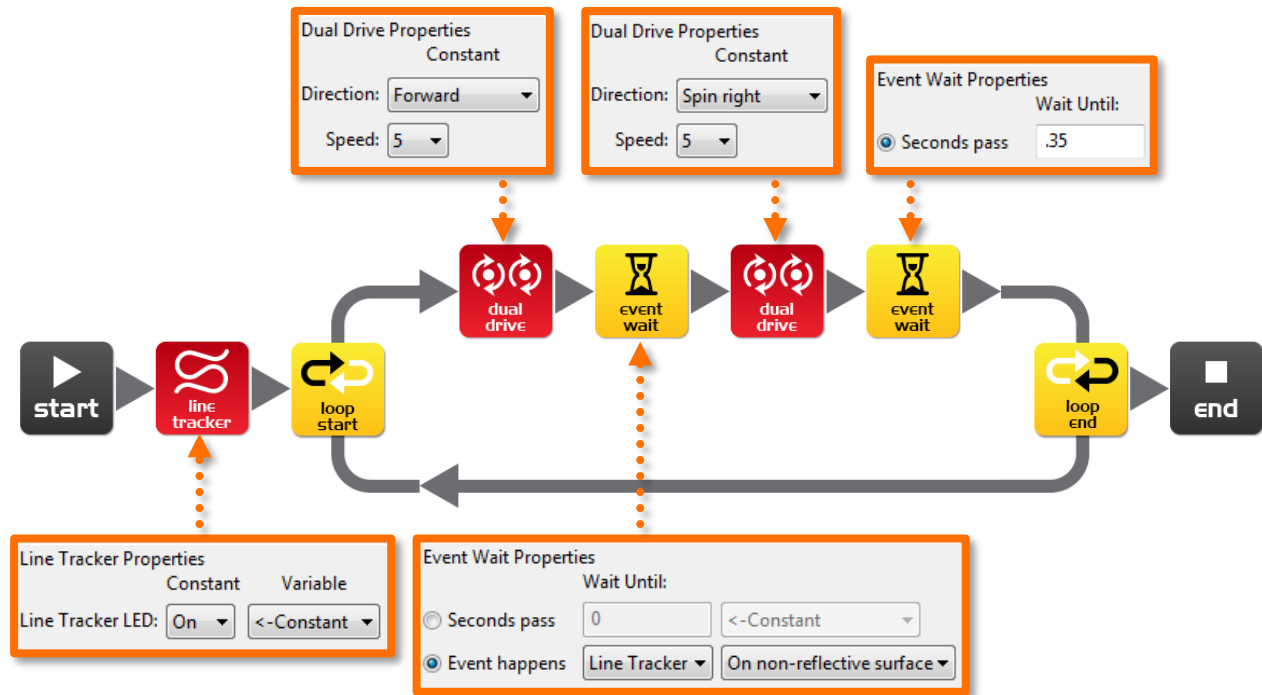The above program has three different paths that it can take based on where an obstacle is. Explain in your own words what these three paths cause the robot to do:

1. No obstacle detected: Drive forward

2. Obstacle detected on right: Drive backwards towards the right for 0.1 seconds, then restart the loop

3. Obstacle detected on left: Drive backwards towards the left for 0.1 seconds, then restart the loop

Name: _____

Lesson 8 Worksheet 8.3 – Drive inside a border

Write the following program to have the Edison robot drive within a border.

Dual Drive Properties
Constant
Direction: Forward
Speed: 5

Dual Drive Properties
Constant
Direction: Spin right
Speed: 5

Event Wait Properties
Wait Until:
○ Seconds pass   .35

Line Tracker Properties
Constant   Variable
Line Tracker LED: On   <-Constant

Event Wait Properties
Wait Until:
○ Seconds pass   0   <-Constant
● Event happens   Line Tracker   On non-reflective surface

Use Activity sheet 8.2 as a border or create your own using a large piece of paper and a thick black marker.

You can also use black electrical tape on a white desk to create a large border.
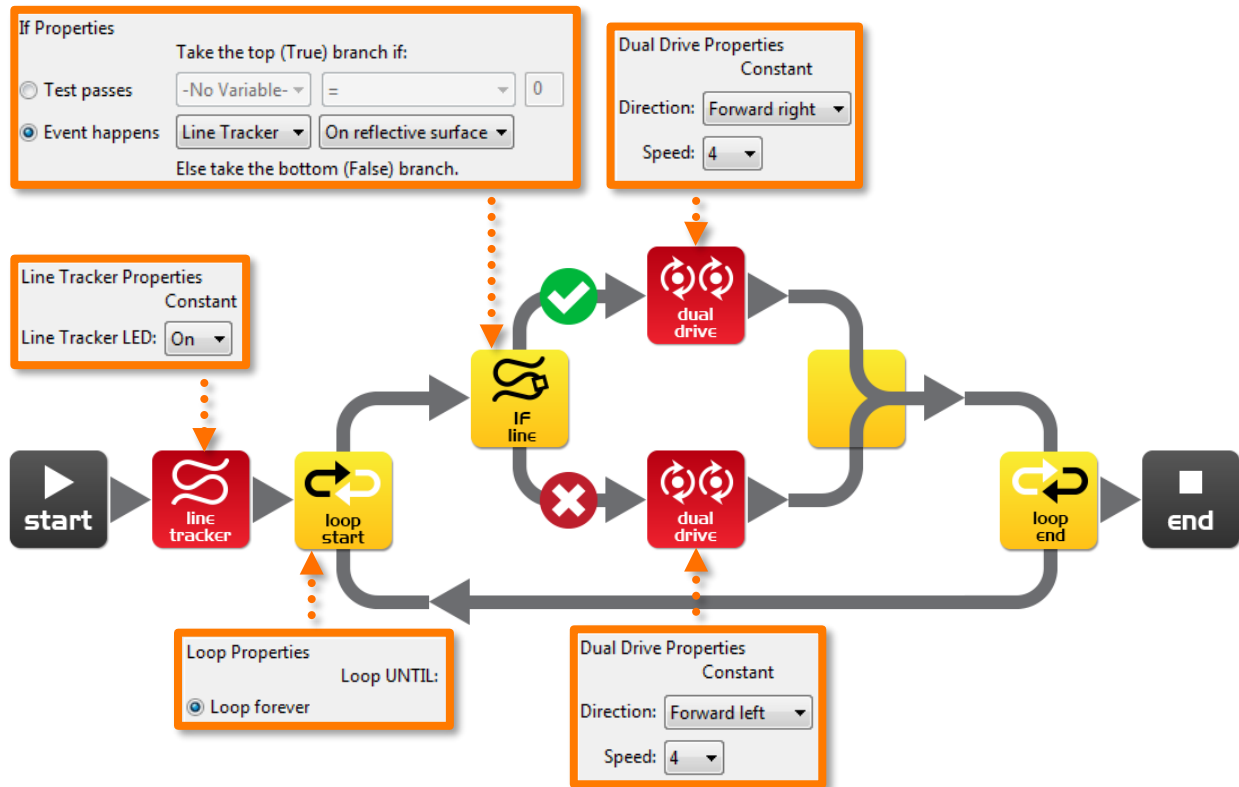
If you create a large border try adding lots of robots to see what happens.

Also, experiment with different speeds.

Name: _____

Lesson 8 Worksheet 8.4 – Follow a line

Write the following program to have the Edison robot follow a black line.

This program uses the 'IF' icon to allow the robot to decide what to do. If the line tracking sensor is on a reflective surface (white), then drive forward right at speed 4. If the line tracking sensor is not on a reflective surface, then drive forward left at speed 4. When the robot is on white it drives off white, when the robot is on black it drives off black. As it does this it moves forward and tracks the edge of the line.

Place the robot inside the track on Worksheet 8.2 and watch the robot track the line.

Challenge Problem

Come up with a program to have the Edison follow the circle track, but turn around and drive the other direction if an obstacle is encountered. The robot should beep and light up both LED's temporariliy when the obstacle is detected.