

Teaching Self-Driving Machines

Lesson 14 Answer Sheet

Name: _____ **Answer Guide** _____

Date: _____

Vocabulary

Artificial Intelligence - using computing systems to perform tasks that usually require human intelligence

Algorithm - a process of rules to follow in problem-solving operations

Supervised Learning - a machine learning approach where an algorithm is trained using labeled data

Activity 1

Navigating a Self-Driving Car

1

Using the Ari Compass Application, you'll write directions for a self-driving car to navigate the streets between a Start and an End location. Using the On a Map setting, first orient to North using the provided compass.

With Ari to model and use as the self-driving car, drive the route between the Start and End location, noting the direction of travel on Ari's screen. Use this directional information in addition to any map details provided and a ruler to navigate and record the steps for the self-driving car.

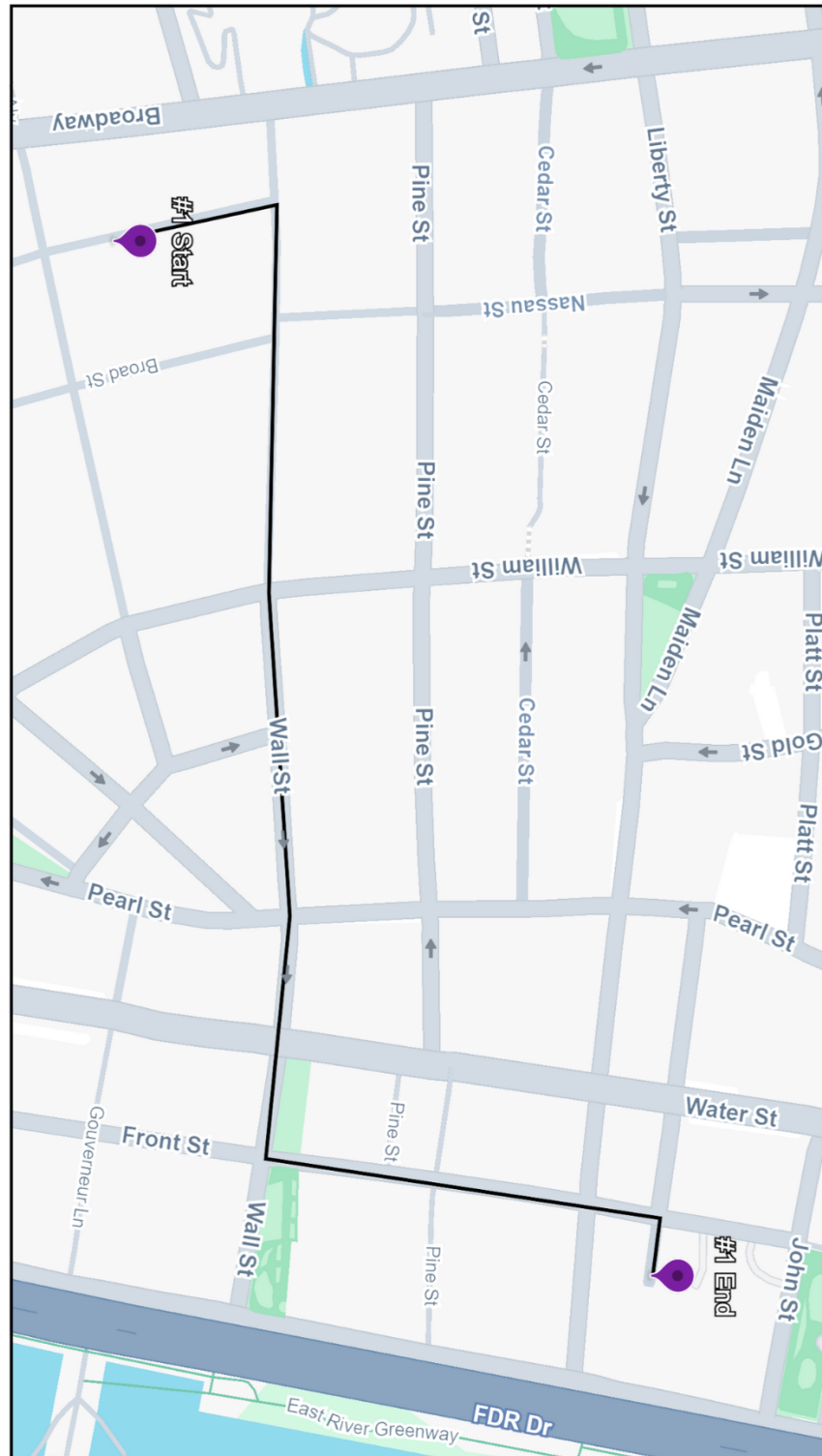
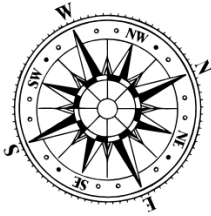
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Lesson 14 Answer Sheet

Route #1

Name: _____ Answer Guide _____

Date: _____



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Name: _____ **Answer Guide** _____

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Date: _____

Route Directions

Use the map above to direct a self-driving car from the Start and End location noted by a placemark. Include any relevant map information in your directions, along with compass directions provided by the Ari Compass Application.

1. North 22mm
2. East 132mm
3. North 55mm
4. East 8mm

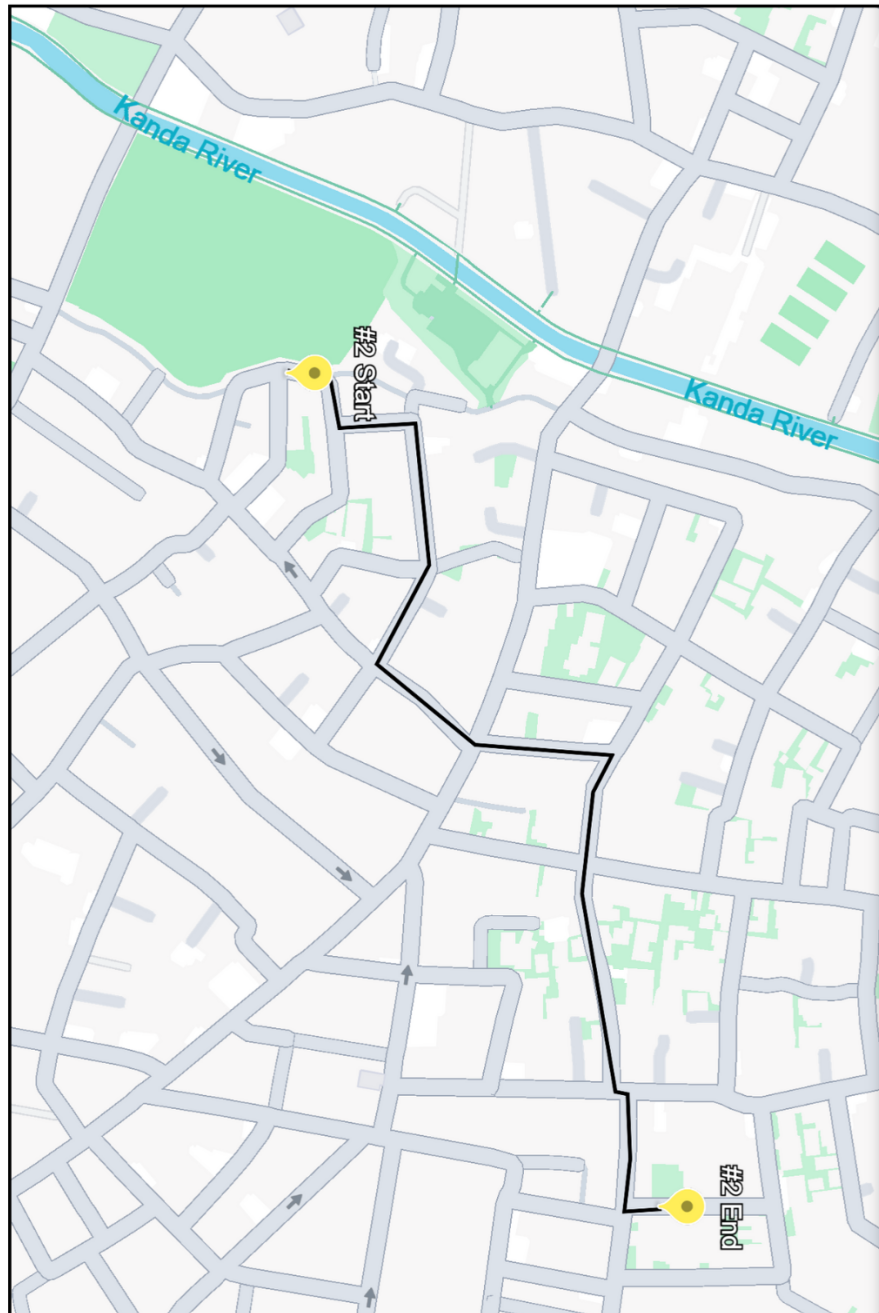
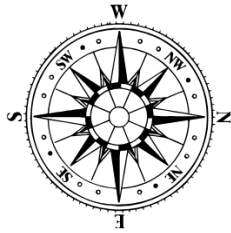
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Lesson 14 Answer Sheet

Route #2:

Name: _____ Answer Guide _____

Date: _____



Teaching Self-Driving Machines

Name: _____ **Answer Guide** _____

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Date: _____

Route Directions

Use the map above to direct a self-driving car from the Start and End location noted by a placemaker. Include any relevant map information in your directions, along with compass directions provided by the Ari Compass Application.

1. East 7mm
2. North 10mm
3. East 18mm
4. Southeast 15mm
5. Northeast 17mm
6. North 18mm
7. Southeast 5mm
8. East 55mm
9. North 6mm

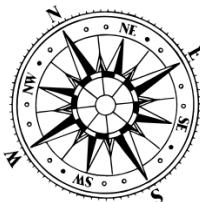
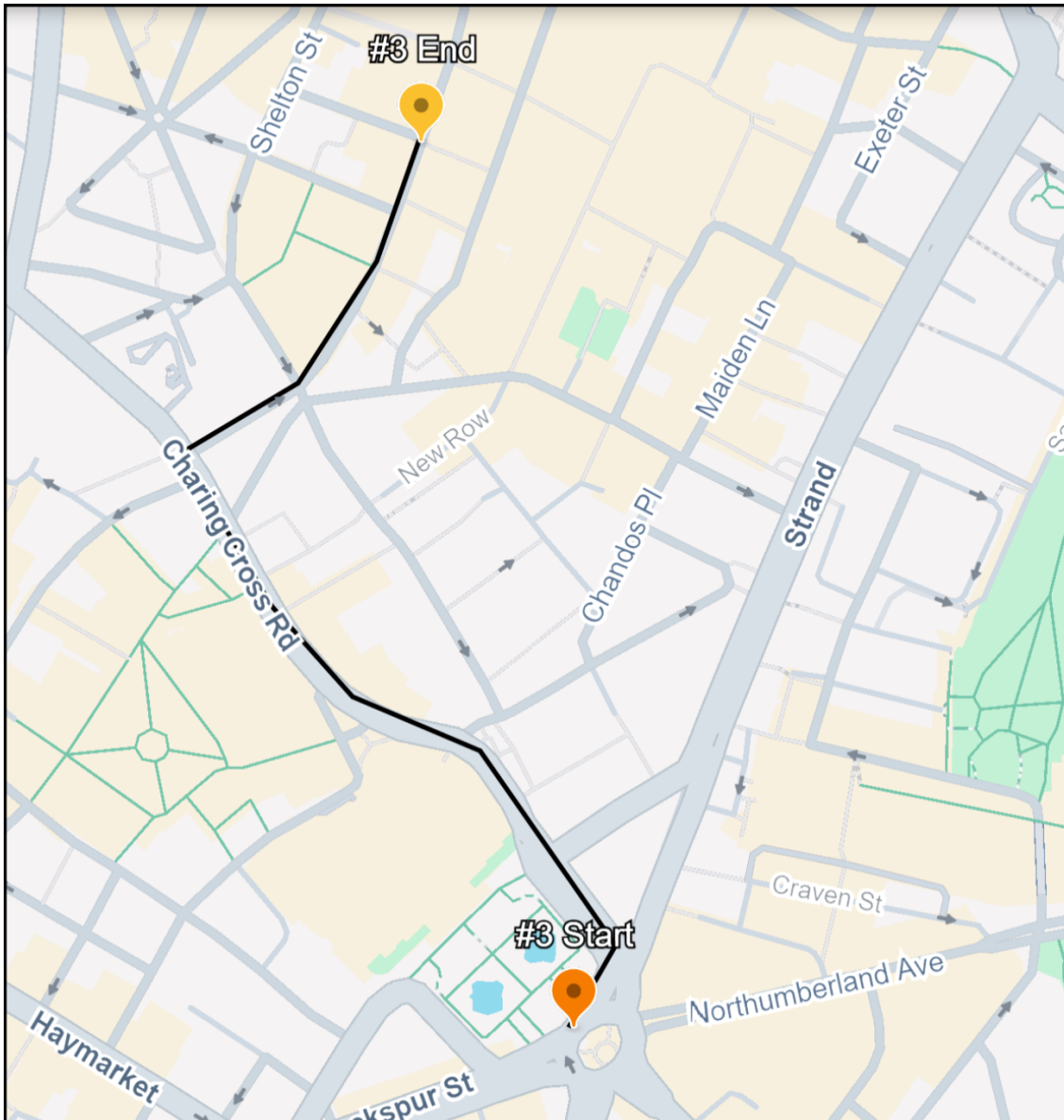
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Lesson 14 Answer Sheet

Route #3:

Name: _____ Answer Guide _____

Date: _____



Teaching Self-Driving Machines

Name: _____ Answer Guide _____

Lesson 14 Answer Sheet

Date: _____

Route Directions

Use the map above to direct a self-driving car from the Start and End location noted by a placemaker. Include any relevant map information in your directions, along with compass directions provided by the Ari Compass Application.

1. Northeast 18mm
2. North 33mm
3. Northwest 66mm
4. East 20mm
5. Northeast 40mm

Activity 2

Training a Self-Driving Car Algorithm

You'll be using [Teachable Machine](#) to train an AI algorithm, similar to one that is used in self-driving cars to navigate roads. You are going to train your model on images that are commonly seen when driving so that your self-driving car knows how to appropriately recognize **Stop** signs and **Traffic** lights.

1

1. Locate an image of a **Stop Sign** and a **Traffic Light** and paste it below.

Stop Sign	Traffic Light
	

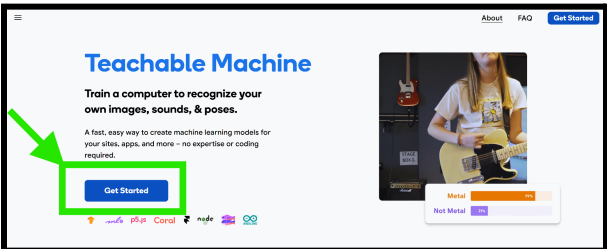
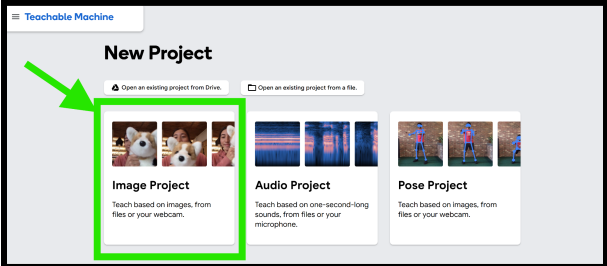
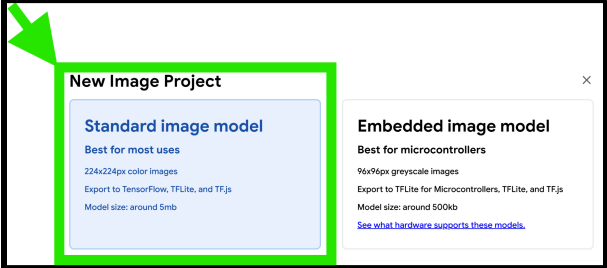
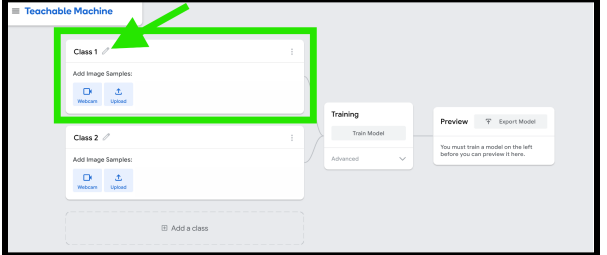
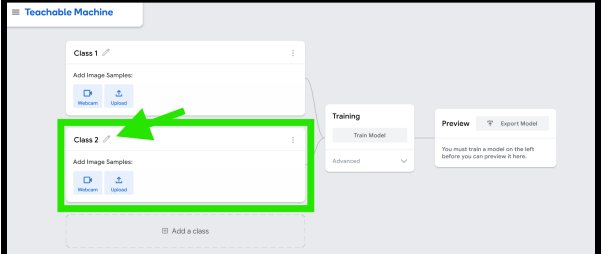
2. Follow the steps below to navigate to the Teachable Machine - artificial intelligence training space.

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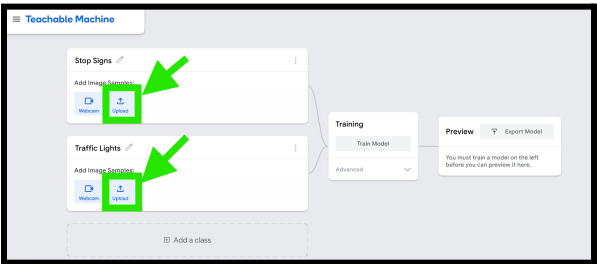
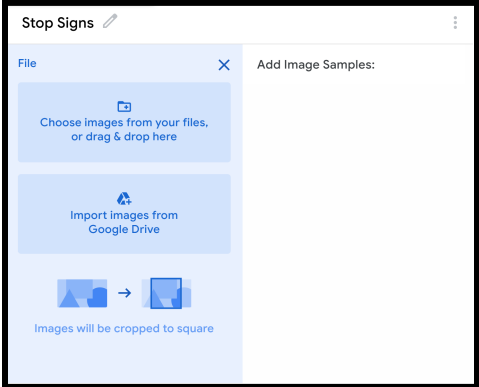
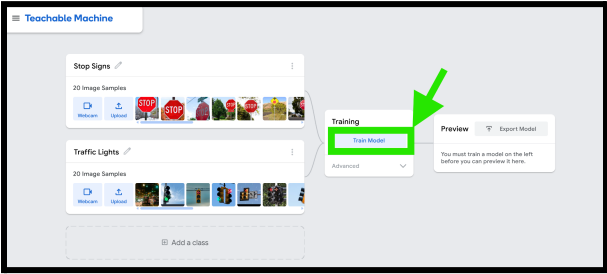
	Select Get Started from the main window.
	Select an Image Project.
	Choose the Standard Image Model for the image project.
	Rename Class 1 by selecting the pencil icon to Stop Signs.
	Rename Class 2 by selecting the pencil icon to Traffic Lights.

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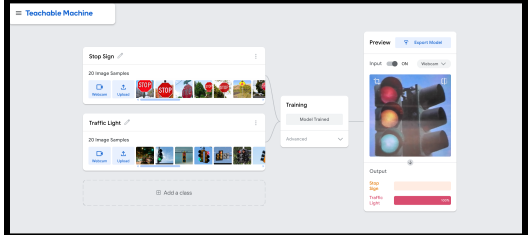
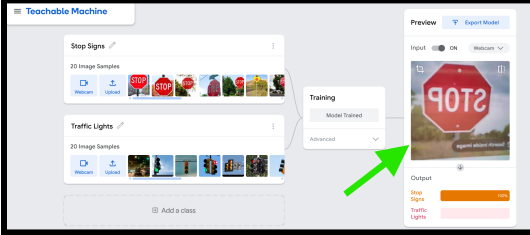
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	Upload the stop sign images provided by your teacher to the Stop Sign class by selecting the Upload icon. Upload the traffic light images provided by your teacher to the Traffic Lights class by selecting the Upload icon.
	Based on how your teacher provided the images to you, select the appropriate option.
	Select Train Model

3. Using a partner's device, hold the device up in front of the camera with the Stop Sign image enlarged and viewable to the camera.
 - a. Hold the device up with the Traffic Light image you found in Step 1 and ensure it's viewable to the camera.
 - b. Paste a screenshot of your screen below, testing both a Stop Sign image and a Traffic Light image.

Traffic Light Image Test Screenshot	Stop Sign Image Test Screenshot
	

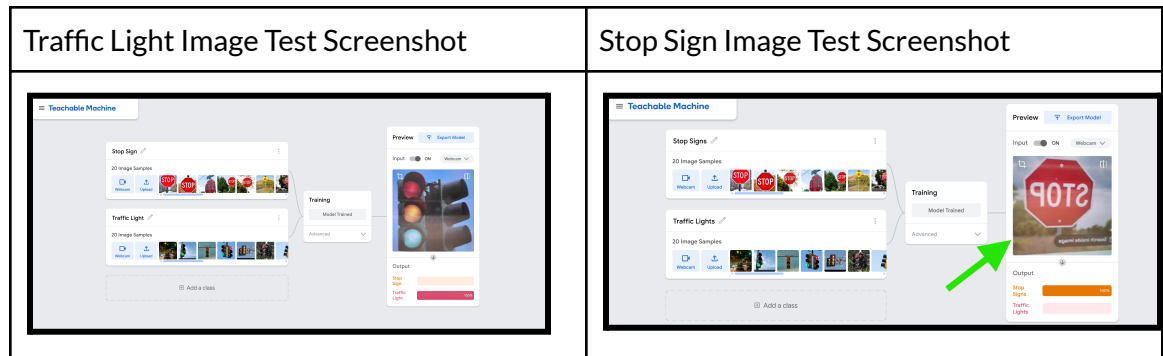
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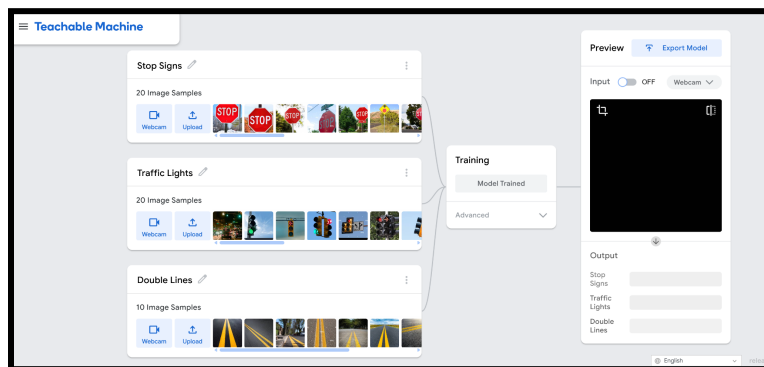
Date: _____

4. Research and upload 10 more images of traffic lights and 10 more images of stop signs to your training model. Retrain your model and test it.
 - a. Paste a screenshot of your screen below, testing both a Stop Sign image and a Traffic Light image.



2

1. Add a third class to your training model and upload 10 images to this class. This class should include another common image or sign that a self-driving car would need to recognize.
 - a. Paste a screenshot of your screen below, testing both a Stop Sign, a Traffic Light, and a third image.



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Exit Ticket

Please respond to the following prompt.

1. Compare your model's accuracy before and after retraining with additional images. What does this reveal about how AI systems learn from data?

The model's accuracy was lower before it was retrained with more images. If the algorithm has a larger data set to compare images, it makes the algorithm more likely to recognize different stop signs or traffic lights in a lot of different surroundings and environmental conditions.