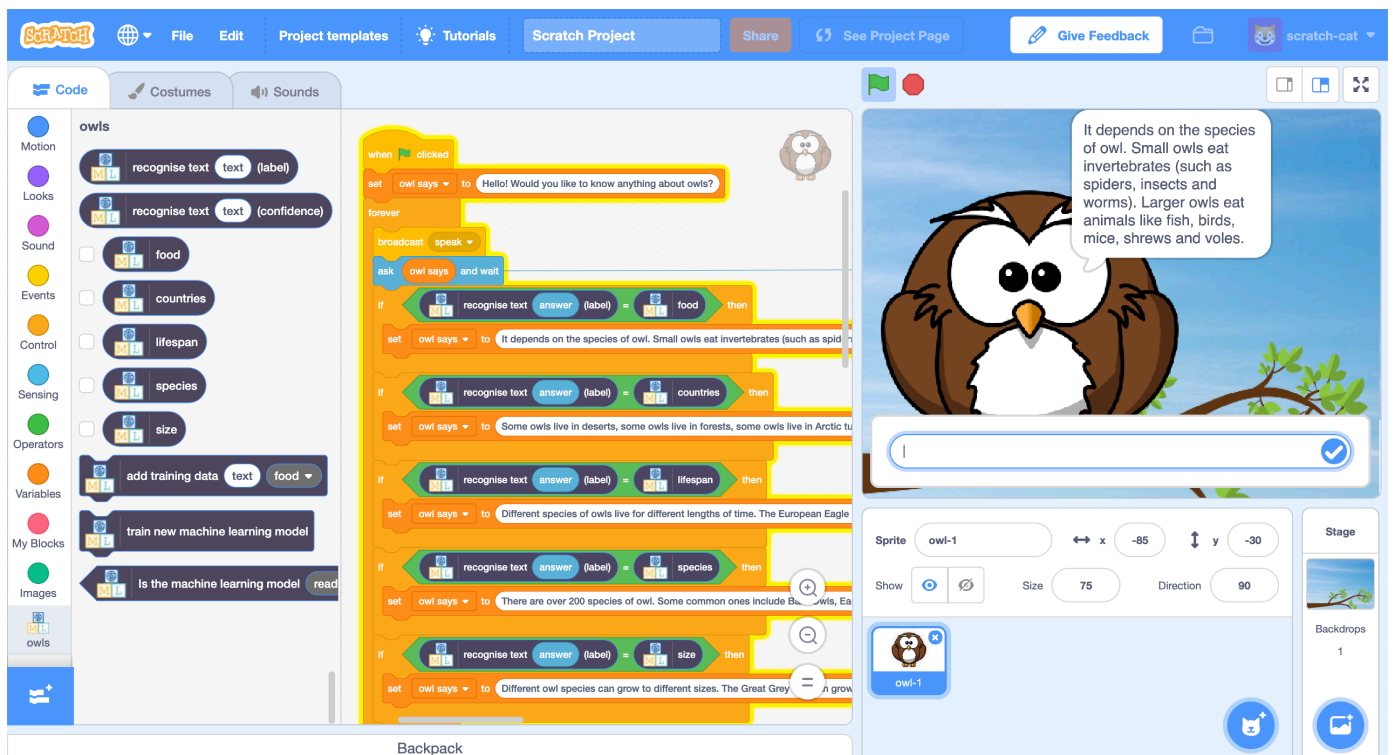


Chatbots

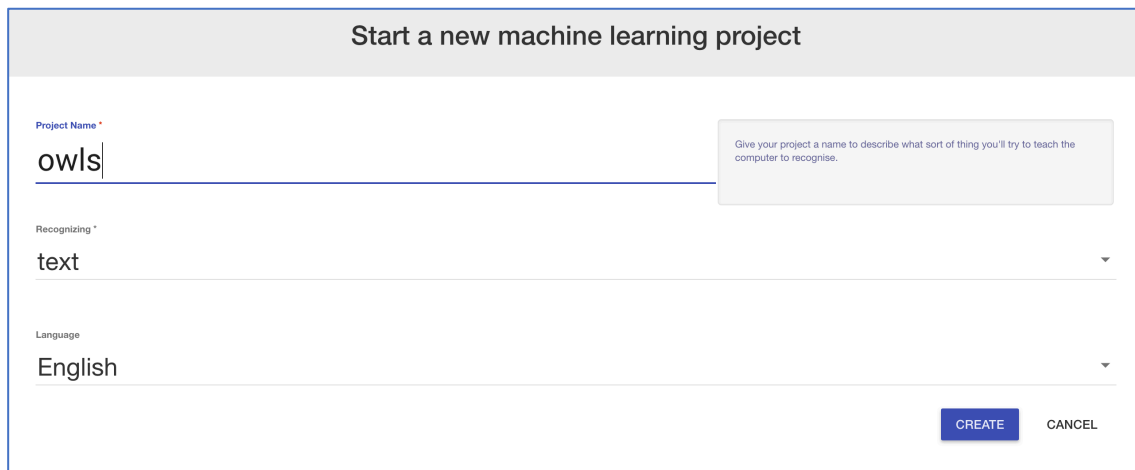
In this project you will make a chatbot that can answer questions about a topic of your choice.



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1. Decide on a **topic** for your chatbot
Choose something that you know well enough to be able to answer questions about.
It could be a place (e.g. The town where you live?)
It could be an animal (e.g. Tigers? Dinosaurs?)
It could be an organisation (e.g. Your school)
It could be something from history (e.g. Vikings? Romans?)
*For the rest of this worksheet, I'll be using **owls***
2. Think of **five things** someone might ask about your topic
*e.g. for **owls**, this could be:*
 - * *What do owls eat?*
 - * *Where in the world do owls live?*
 - * *How long do owls live?*
 - * *What types of owls are there?*
 - * *How big do owls grow?*
3. Go to <https://machinelearningforkids.co.uk/> in a web browser
4. Click on “**Get started**”
5. Click on “**Log In**” and type in your username and password
If you don't have a username, ask your teacher or group leader to create one for you.
If you can't remember your username or password, ask your teacher or group leader to reset it for you.
6. Click on “**Projects**” on the top menu bar
7. Click the “**+ Add a new project**” button.

8. Name your project and set it to learn how to recognise “**text**”.
Click the “**Create**” button



The screenshot shows a form titled "Start a new machine learning project". It has three input fields: "Project Name" with the text "owls", "Recognizing" with a dropdown menu set to "text", and "Language" with a dropdown menu set to "English". A blue "CREATE" button and a grey "CANCEL" button are at the bottom right. A tooltip for the Project Name field says: "Give your project a name to describe what sort of thing you'll try to teach the computer to recognise."

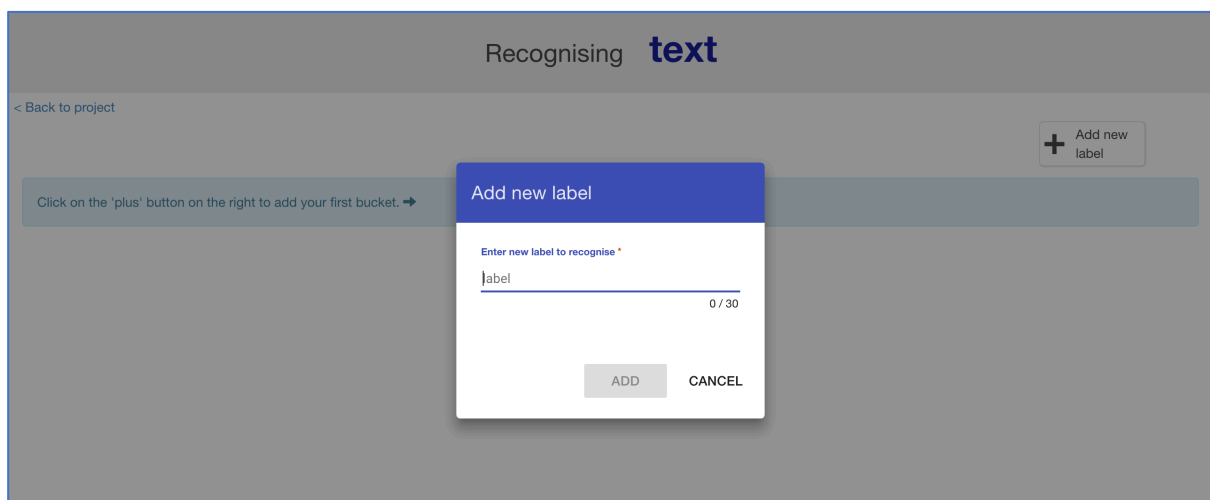
9. Click on your new project in the projects list

10. Click the **Train** button.



The screenshot shows the project dashboard for "owls". It has three main sections: "Train" (Collect examples of what you want the computer to recognise), "Learn & Test" (Use the examples to train the computer to recognise text), and "Make" (Use the machine learning model you've trained to make a game or app, in Scratch or in Python). Each section has a blue button: "Train", "Learn & Test", and "Make". A large blue arrow points from the top right towards the "Train" button.

11. Click the “+ Add new label” button



The screenshot shows the "Add new label" dialog box. It has a title bar "Add new label" and a text input field with the placeholder "label" and a character count "0 / 30". There are "ADD" and "CANCEL" buttons at the bottom. The background shows the "Recognising text" interface with a "+ Add new label" button in the top right corner.

12. Type in **one word** that sums up the first of your things from Step 2, then click **Add**.

I used “food” to sum up questions like “What do owls eat?”

The screenshot shows a web interface for a project titled "Recognising text as food". The interface has a navigation bar at the top with links for "About", "Projects", "Worksheets", "News", "Help", and "Log Out". A "Language" dropdown is on the right. Below the navigation bar, there is a header area with the text "Recognising text as food". A link "< Back to project" is on the left. On the right, there is a button "+ Add new label". The main area contains a large rectangular box with the word "food" at the top. At the bottom of this box is a button "+ Add example".

13. Do that again for all of the things in your list from Step 2
*The words you choose don't really matter, as long as **you** understand what they mean.*

The screenshot shows a web interface for a project titled "Recognising text as food, countries or 3 other classes". The interface has a navigation bar at the top with links for "About", "Projects", "Worksheets", "News", "Help", and "Log Out". A "Language" dropdown is on the right. Below the navigation bar, there is a header area with the text "Recognising text as food, countries or 3 other classes". A link "< Back to project" is on the left. On the right, there is a button "+ Add new label". The main area contains five rectangular boxes arranged in two rows. The top row has three boxes labeled "food", "countries", and "lifespan". The bottom row has two boxes labeled "species" and "size". Each box has a button "+ Add example" at the bottom.

14. Click the “+ Add example” button in one of the buckets

15. Type in an example of how someone might ask that question

The screenshot shows a modal dialog box titled "Add new example" with a blue header. Inside, there is a text input field with the placeholder "Enter an example of 'food'". Below the input field, the text "What sort of foods do owls eat?" is entered. To the right of the input field, the character count "31 / 1000" is displayed. At the bottom of the dialog, there are two buttons: "ADD" (in blue) and "CANCEL". The background shows a grid of categories: "food", "lifespan", "species", and "size", each with an "Add example" button. There is also an "Add new label" button in the top right corner.

16. Click "Add"

17. Repeat until you've got **five examples** of how to ask that question.

The screenshot shows the main project interface. At the top, it says "Recognising text as food, countries or 3 other classes". Below this, there are five vertical panels, each representing a category: "food", "countries", "lifespan", "species", and "size". Each panel has a list of example questions and an "Add example" button at the bottom. The "food" panel contains five example questions: "What sort of foods do owls eat?", "What do owls eat?", "what do owls like to eat?", "what foods do owls like?", and "What do they eat?". The other panels are currently empty.

18. Repeat until you've got at least five examples in every bucket

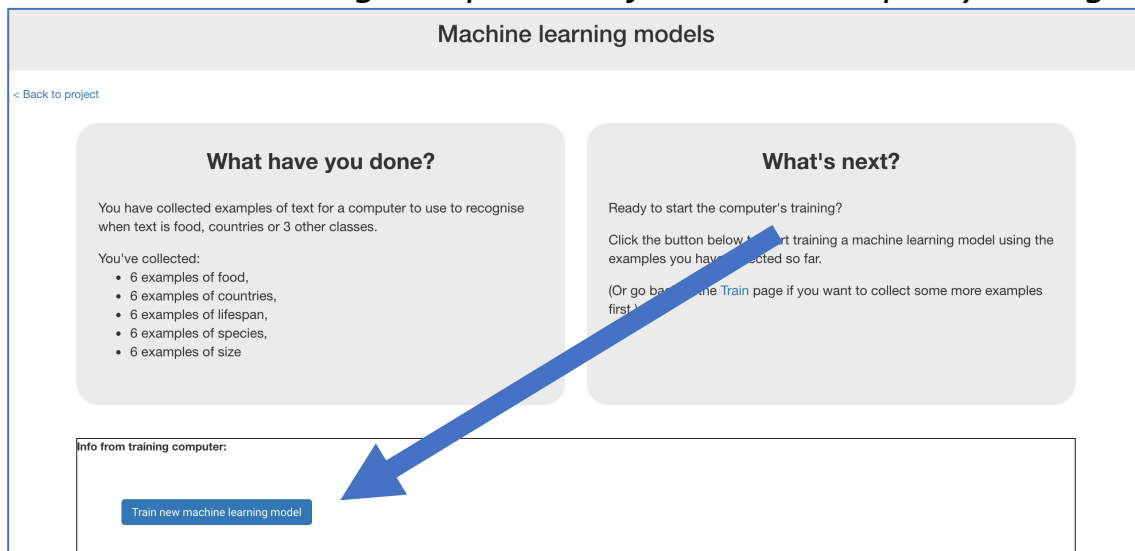
The screenshot shows the main project interface with five categories, each containing multiple example questions. The "food" category has five questions: "What sort of foods do owls eat?", "What do owls eat?", "what do owls like to eat?", "what foods do owls like?", and "What do they eat?". The "countries" category has three questions: "Where do owls live?", "What areas of the world are owls fou...", and "What countries have owls?". The "lifespan" category has three questions: "how long do you live for?", "How old can owls get?", and "How long can an owl live?". The "species" category has three questions: "What are the main species of owl?", "What species of owls are there?", and "What are the different breeds of owls?". The "size" category has six questions: "How big are owls?", "What size are you?", "How big can owls get?", "How tall are you?", "How long are you?", and "How big do owls grow to?". Each panel has an "Add example" button at the bottom. The interface also includes a navigation bar at the top with links to "About", "Projects", "Worksheets", "News", "Help", and "Log Out", and a "Language" dropdown menu.

19. Click on the “< Back to project” link

20. Click the “Learn & Test” button

21. Click the “Train new machine learning model” button

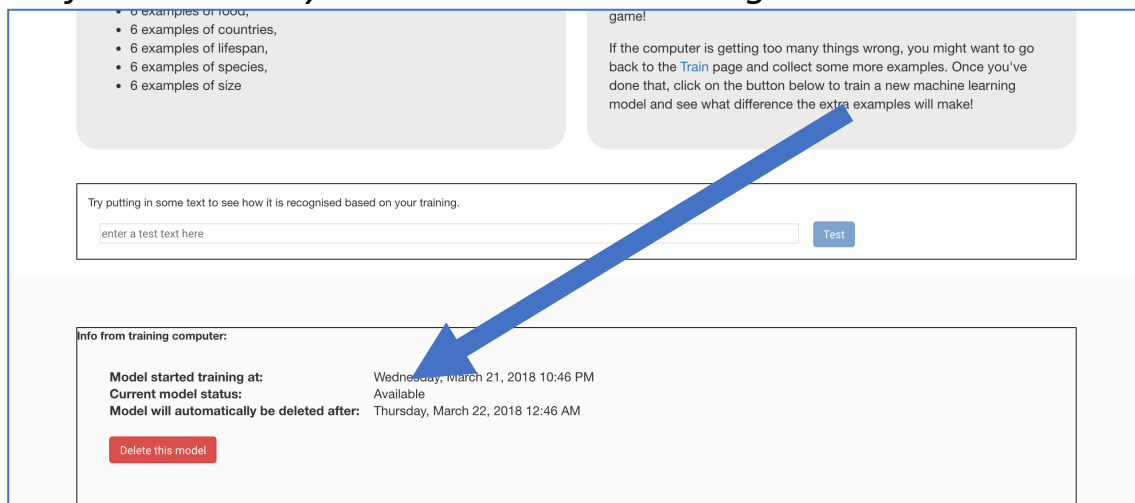
As long as you’ve collected enough examples, the computer should start to learn how to recognise questions from the examples you’ve given to it.



22. Wait for the training to complete.

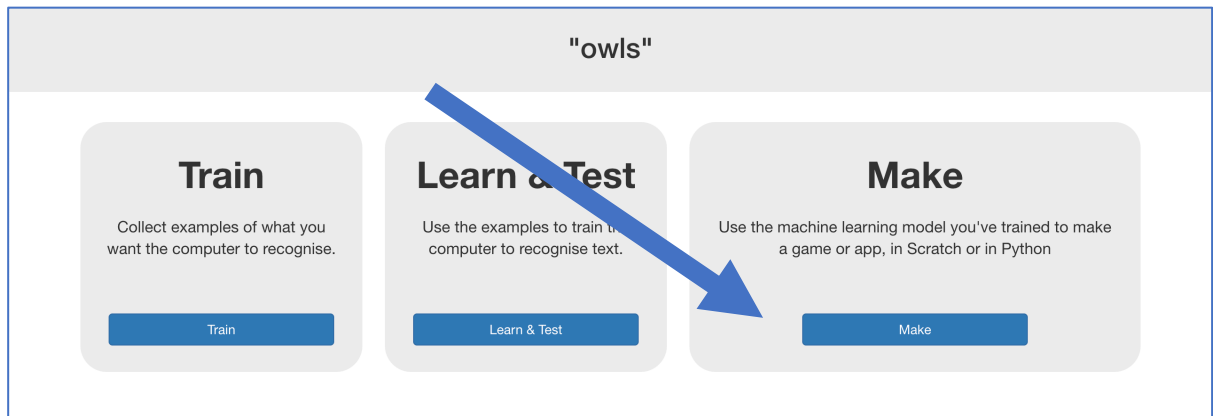
This might take a couple of minutes.

It's finished once you see the “status” change to “Available”



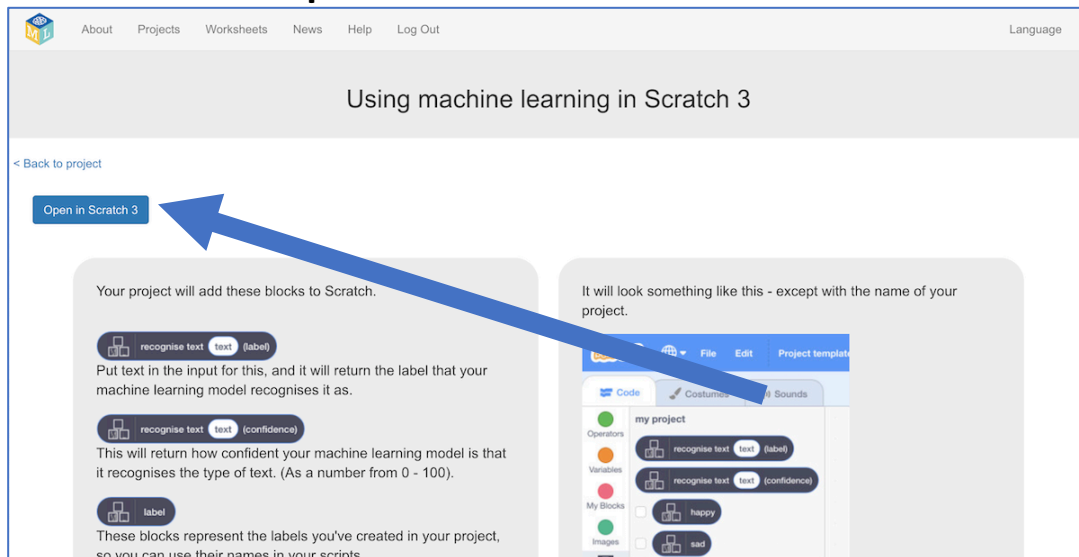
23. Click the “< Back to project” link

24. Click the “Make” button



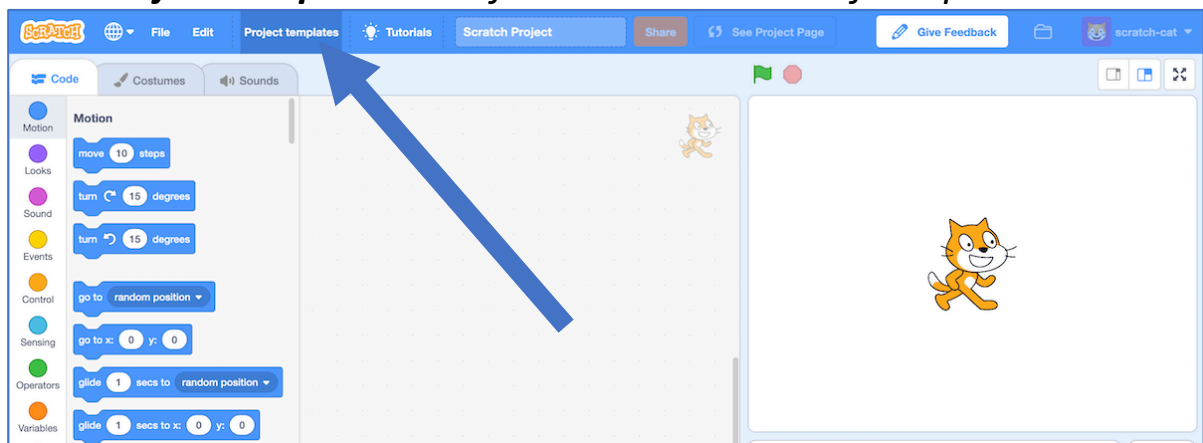
25. Click “Scratch 3”

26. Click the “Open in Scratch” button

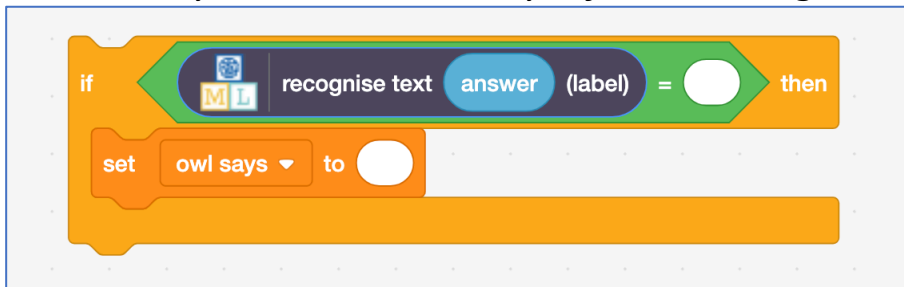


27. Open the Owls project template

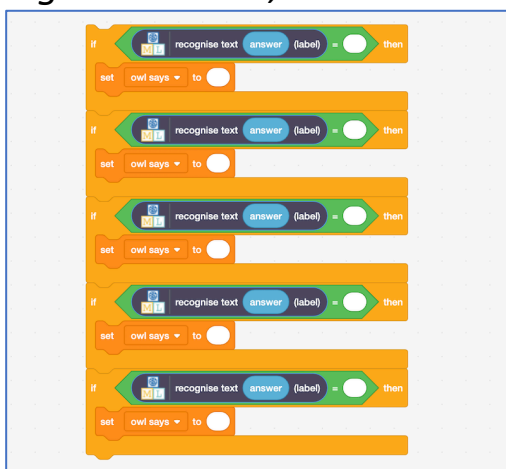
Click **Project templates** and find Owls in the list of templates



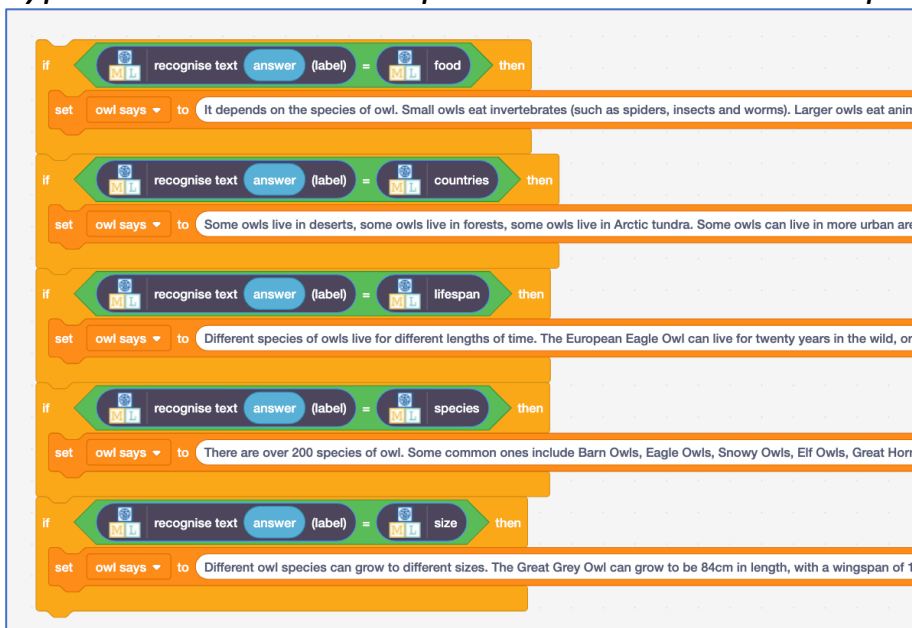
- 28.** Create this little snippet of script but don't attach it to anything yet
Make sure you choose "owl says" for the orange block.



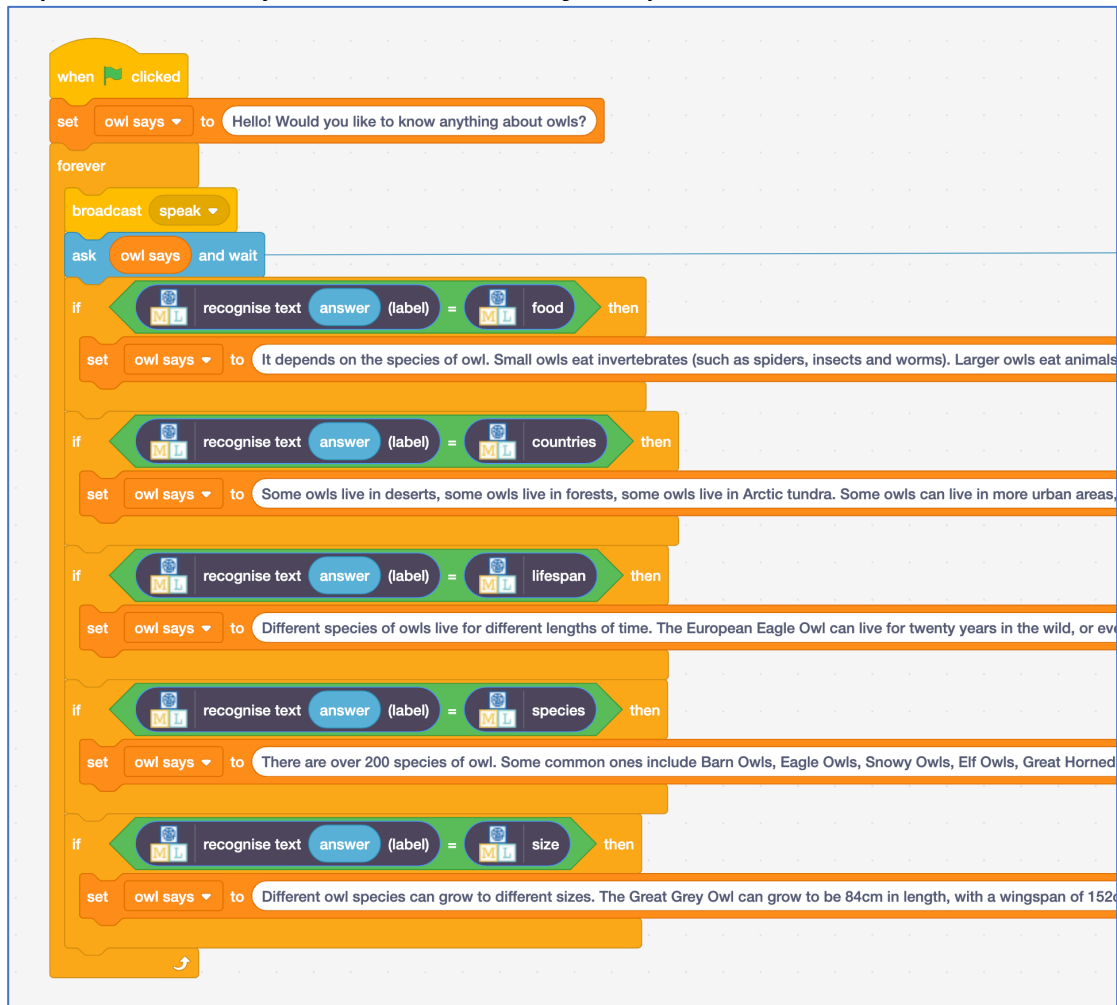
- 29.** Duplicate it four times and join them all together
Right-click on it, and click "Duplicate"



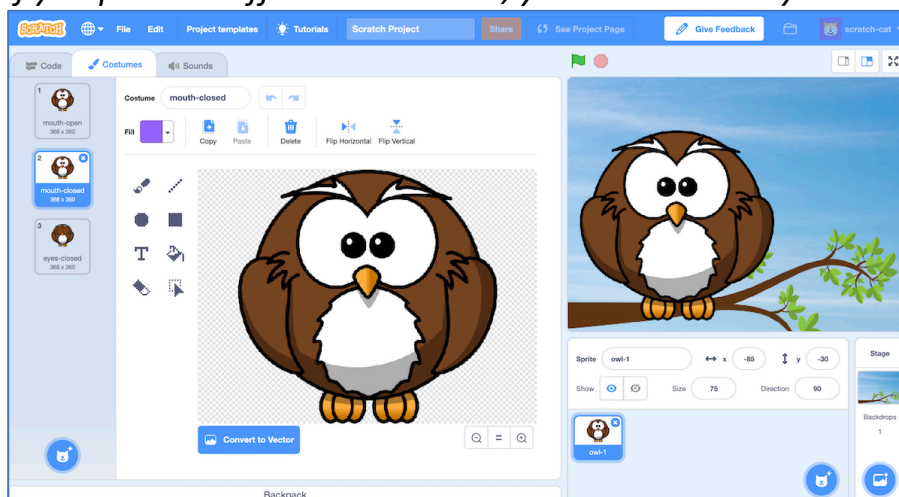
- 30.** Fill in each copy of the block
*Drag the label for one of your questions into the top space, and
Type the answer to the question into the bottom space*



- 31.** Drag this new block into the Green Flag block prepared for you. Remove the “Sorry. I haven't been taught anything yet.” block and replace it with your new chunk of script.

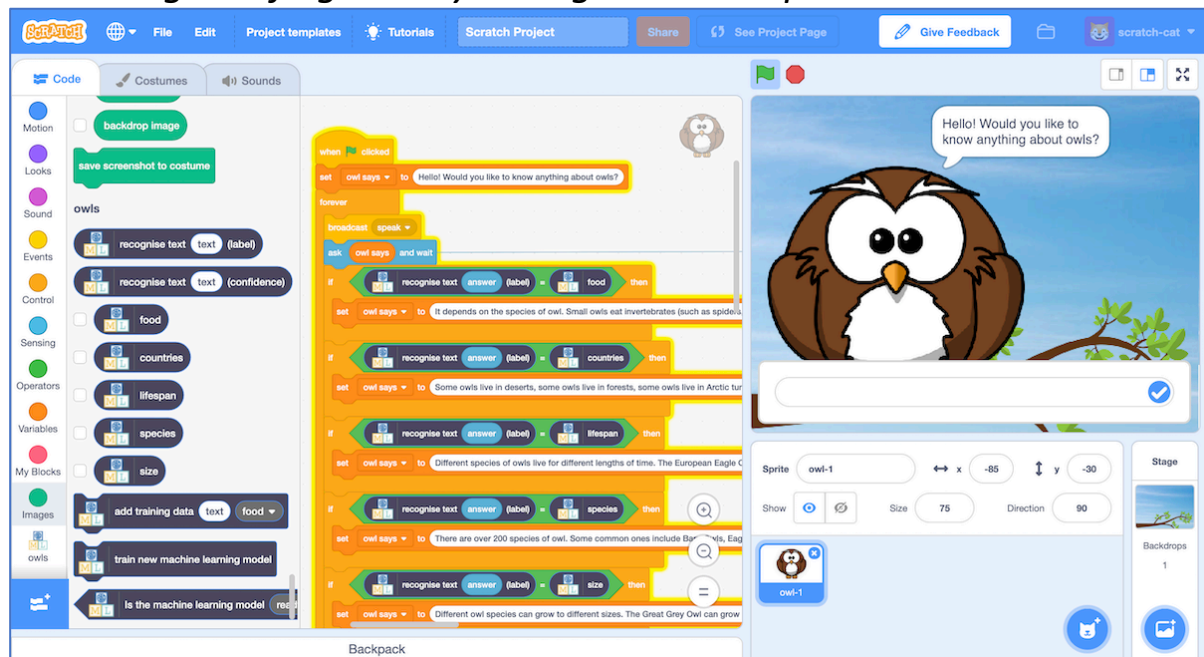


- 32.** Draw your chatbot
*Unless you've chosen **owls** as a topic, you'll need to draw your own character*
If you provide different costumes, you can animate your character while it talks.



33. Test your chatbot!

Click the green flag and try asking the owl a question



What have you done so far?

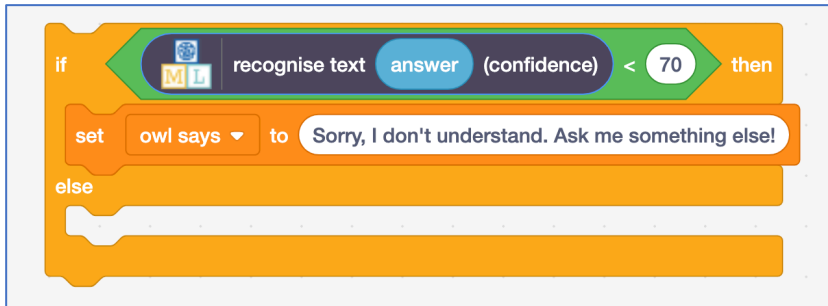
You've started to train a computer to recognise questions on a topic. Instead of trying to write rules to be able to do this, you did this by collecting examples. These examples were used to train a machine learning "model".

This is called "supervised learning" because of the way you are supervising the computer's training.

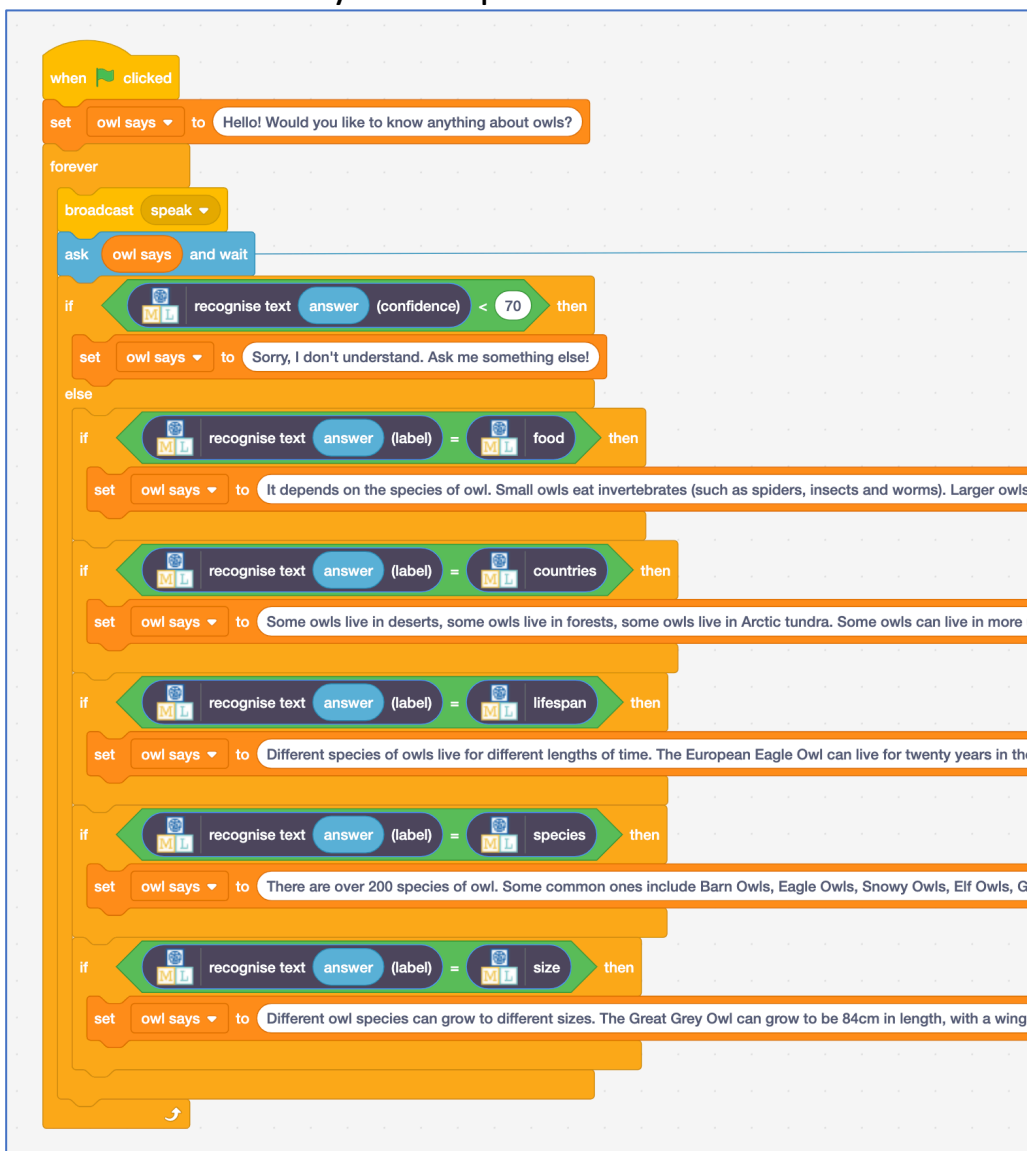
The computer will learn from patterns in the examples you've given it, such as the choice of words, and the way questions are structured. These will be used to be able to recognise new questions.

The biggest problem with this is that if you ask it something unexpected, it will still give you one of the answers you've written

- 34.** Create this little chunk of script, that you can use when someone asks a question that wasn't on your list from step 2.
*The confidence score is a percentage (from 0 to 100).
It will be lower if someone asks a question that isn't similar to any of the examples you used to train the machine learning model.
Use this to return a "I don't understand" message if the score is too low.*



- 35.** Add this into your script from before.



Ideas and Extensions

Now that you've finished, why not give one of these ideas a try?

Or come up with one of your own?

Try other chatbots

<http://talktothetrex.com> is a good example of the sort of thing you've made. Give it a try and see if you can get any ideas of how to improve your bot.

Add more topics

Can you add more topics to your chatbot, so that there are more types of question that it can answer?

Provide alternate answers

If someone asks the same question more than once, they'll get the exact same answer every time.

Can you update your Scratch script so that it varies the answers each time a little? Or just starts the answer with "You've asked me this before, but"

Ask follow-up questions

Can you update your Scratch script so that it replies with a question? It can then recognise the answer to that question, in a similar way to how you made it recognise questions.