Chatbots

In this project you will make a chatbot that can answer questions about a topic of your choice.
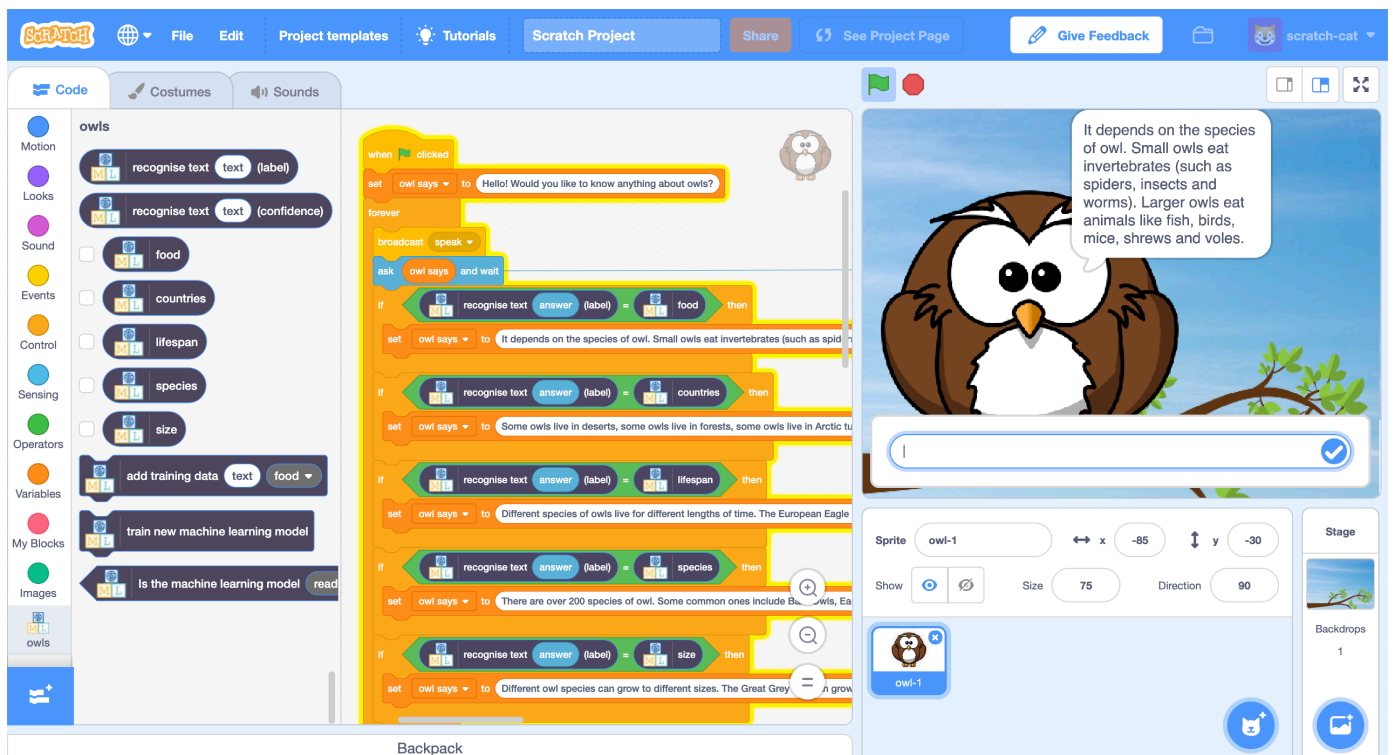
1. Decide on **a topic** for your chatbot

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.

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8. Name your project and set it to learn how to recognise "**text**". Click the "**Create**" button
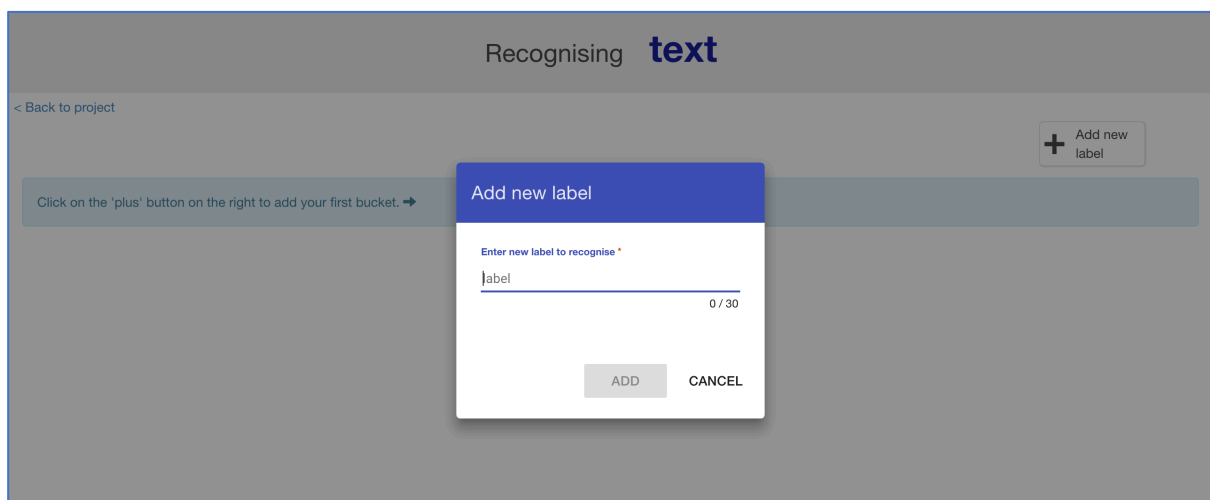
9. Click on your new project in the projects list

10. Click the **Train** button.

11. Click the "**+ Add new label**" button

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?"

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.*

14. Click the "**+ Add example**" button in one of the buckets

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

16.   Click "**Add**"

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

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

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.
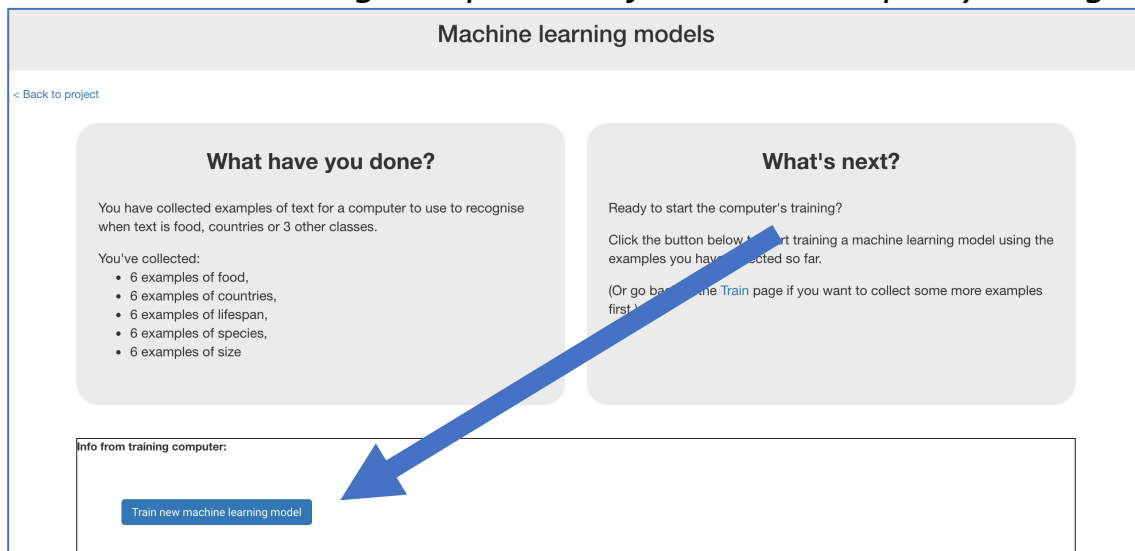
22. Wait for the training to complete.
This might take a couple of minutes.
It's finished once you see the "status" change to "Available"
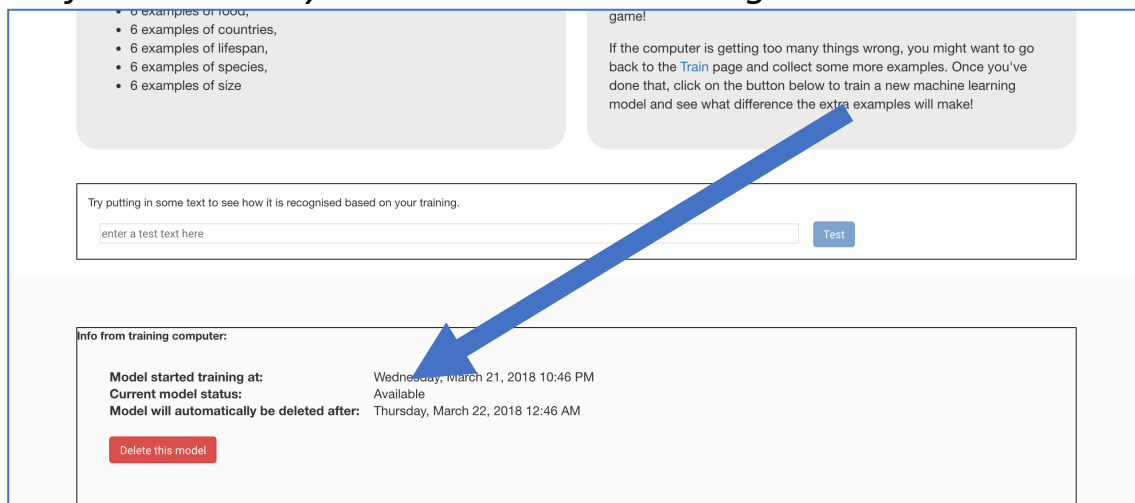
23. Click the "**< Back to project**" link

24. Click the "**Make**" button
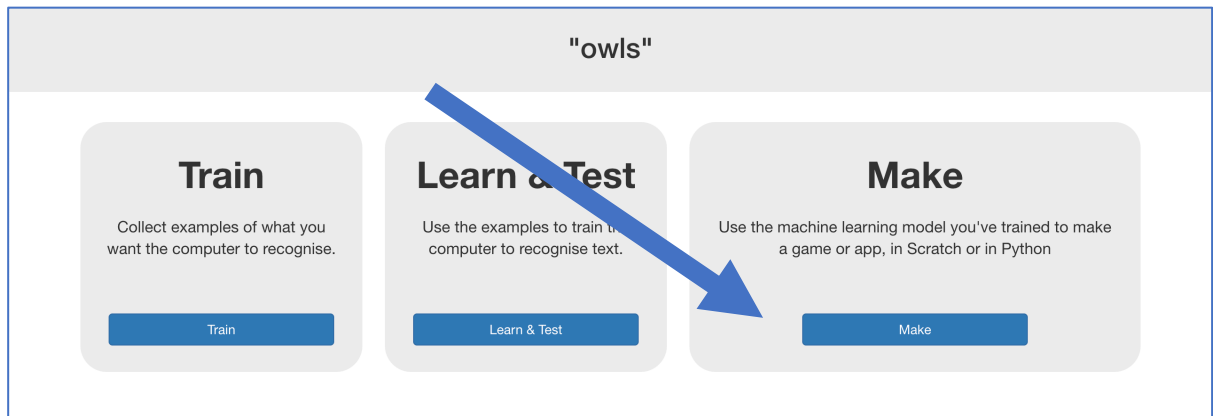
25. Click "**Scratch 3**"

26. Click the "**Open in Scratch**" button
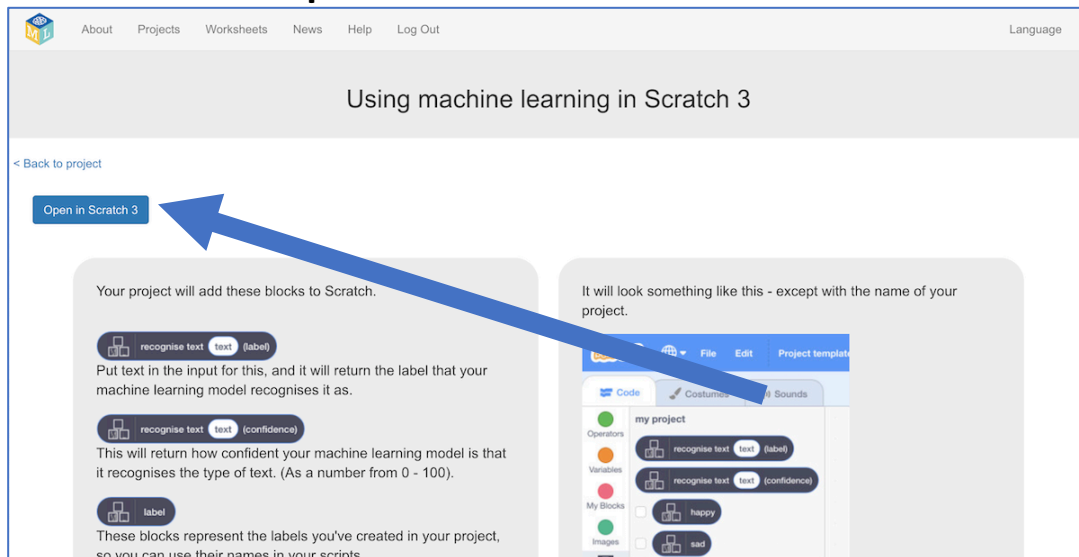
27. Open the Owls project template
*Click **Project templates** and find Owls in the list of templates*
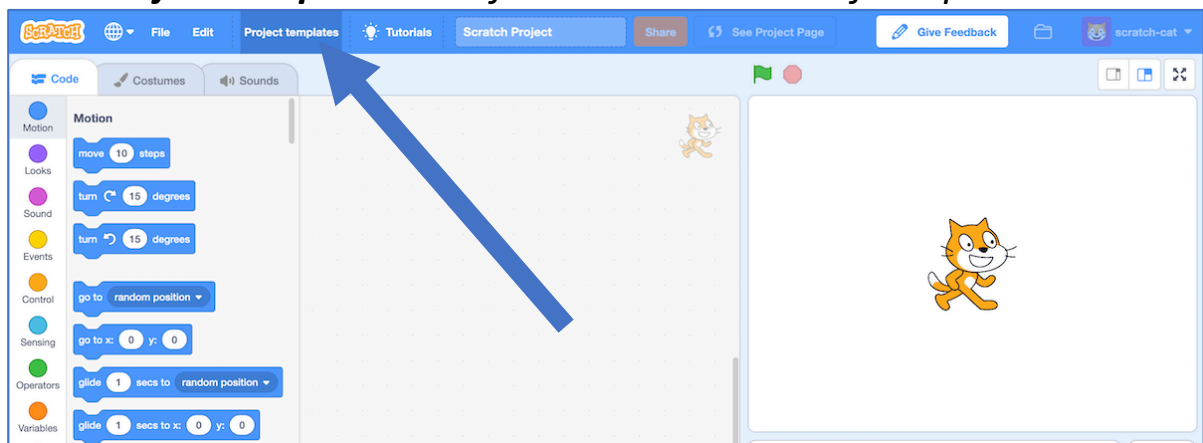
28. Create this little snippet of script but don't attach it to anything yet
Make sure you choose "owl says" for the orange block.
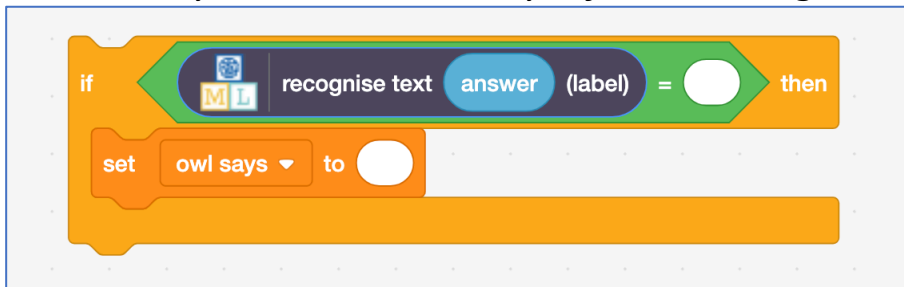
29. Duplicate it four times and join them all together
Right-click on it, and click "Duplicate"
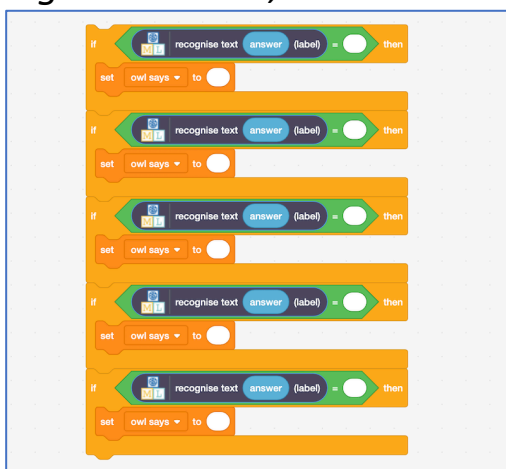
30. Fill in each copy of the block
Drag the label for one of your questions into the top space, and
Type the answer to the question into the bottom space
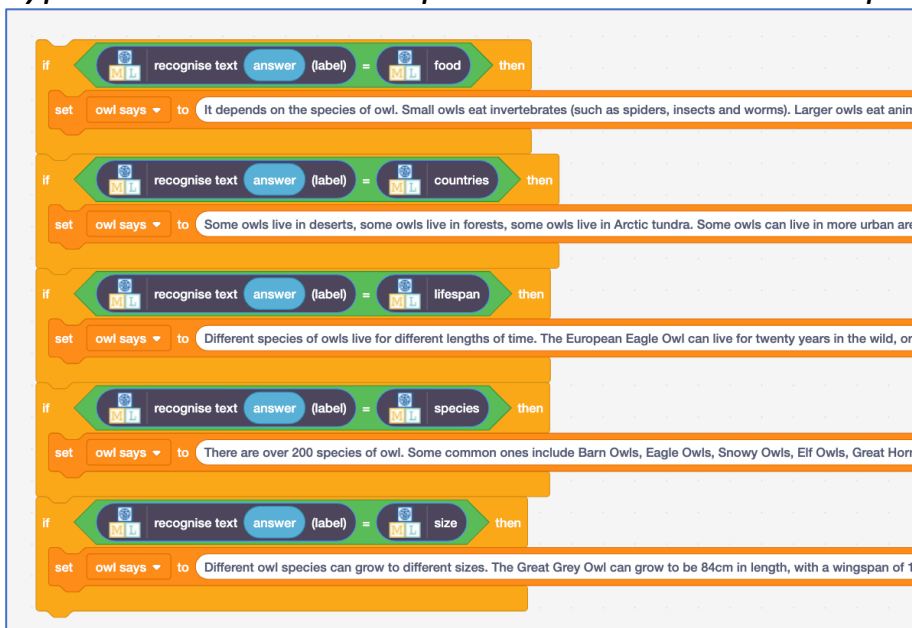
31. Drag this new block into the Green Flag block prepared for you.
Remove the "Sorry. I haven't been taught anything yet." block and replace it with your new chunk of script.
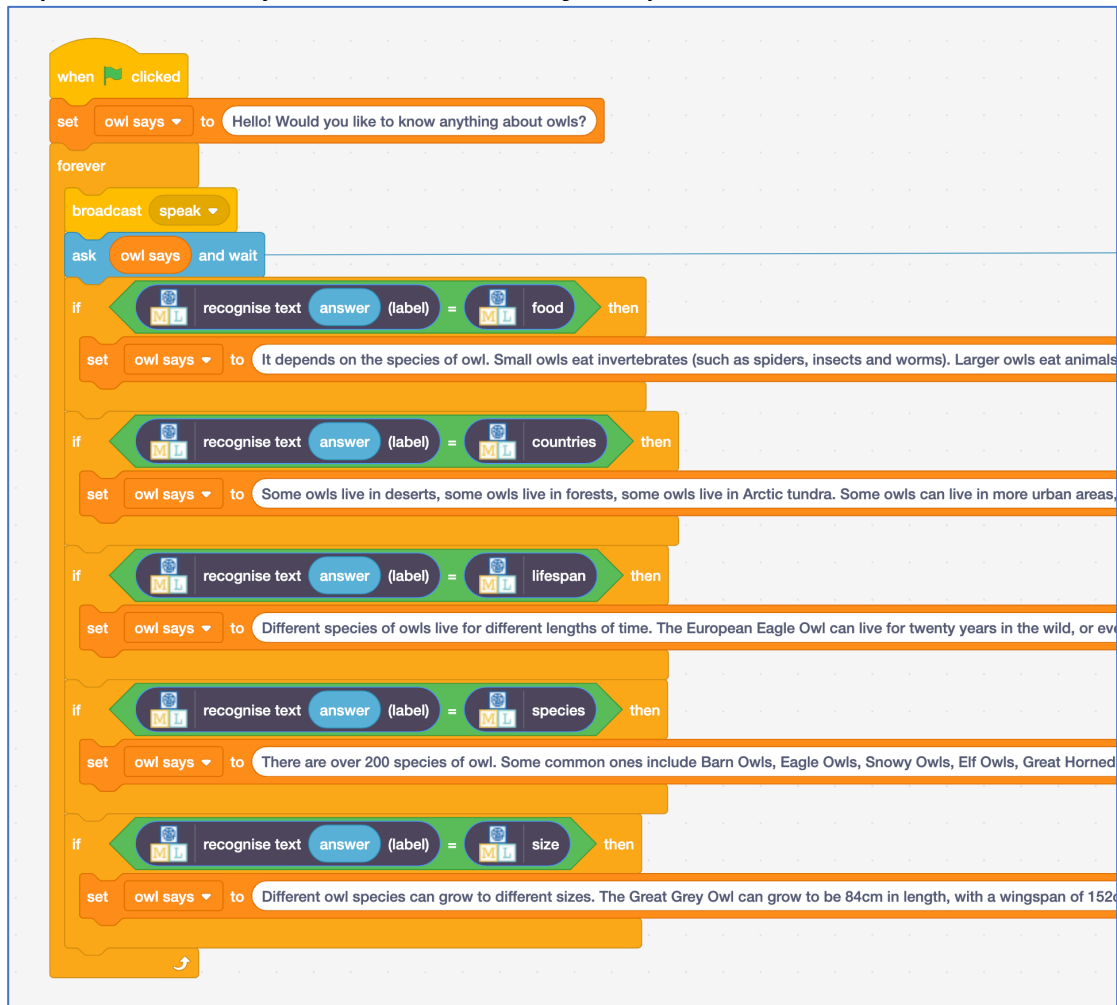
32. Draw your chatbot
*Unless you've chosen **owls** as a topic, you'll need to draw your own character*
If you provide different costumes, you can animate your character while it talks.
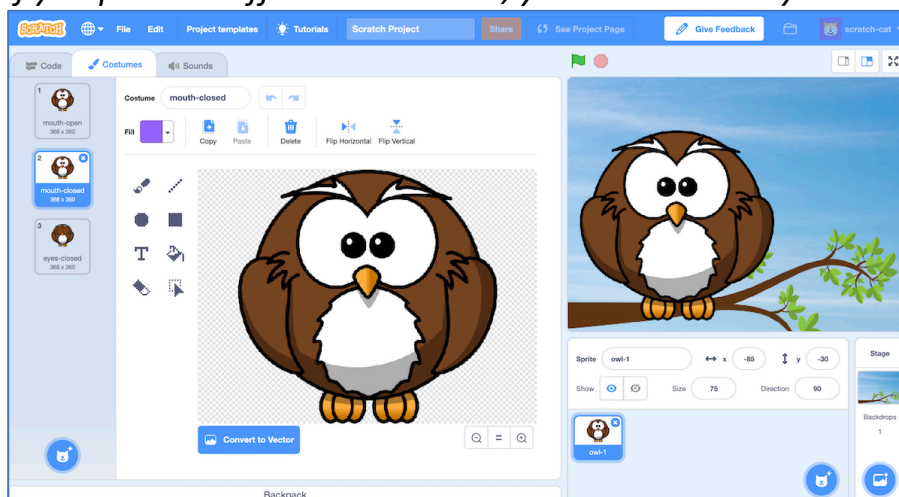
33. Test your chatbot!

Click the green flag and try asking the owl a question
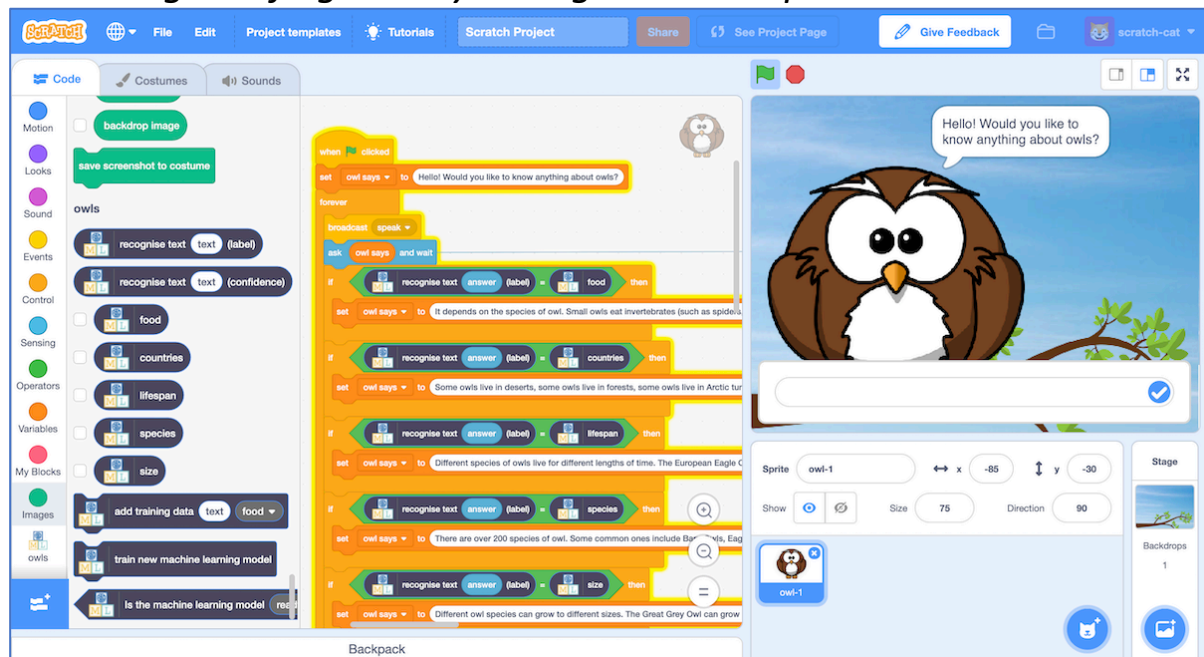
What have you done so far?

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.

```
if  < recognise text (answer) (confidence) < 70 >  then
    set owl says ▼ to  Sorry, I don't understand. Ask me something else!
else

```
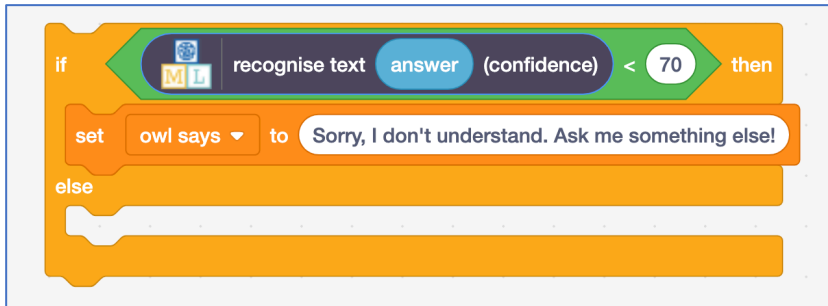
35. Add this into your script from before.

```
when 🏴 clicked
set owl says ▼ to  Hello! Would you like to know anything about owls?
forever
    broadcast speak ▼
    ask  owl says  and wait
    if  < recognise text (answer) (confidence) < 70 >  then
        set owl says ▼ to  Sorry, I don't understand. Ask me something else!
    else
        if  < recognise text (answer) (label) = food >  then
            set owl says ▼ to  It depends on the species of owl. Small owls eat invertebrates (such as spiders, insects and worms). Larger owls
        if  < recognise text (answer) (label) = countries >  then
            set owl says ▼ to  Some owls live in deserts, some owls live in forests, some owls live in Arctic tundra. Some owls can live in more u
        if  < recognise text (answer) (label) = lifespan >  then
            set owl says ▼ to  Different species of owls live for different lengths of time. The European Eagle Owl can live for twenty years in the
        if  < recognise text (answer) (label) = species >  then
            set owl says ▼ to  There are over 200 species of owl. Some common ones include Barn Owls, Eagle Owls, Snowy Owls, Elf Owls, Gr
        if  < recognise text (answer) (label) = size >  then
            set owl says ▼ to  Different owl species can grow to different sizes. The Great Grey Owl can grow to be 84cm in length, with a wings
```
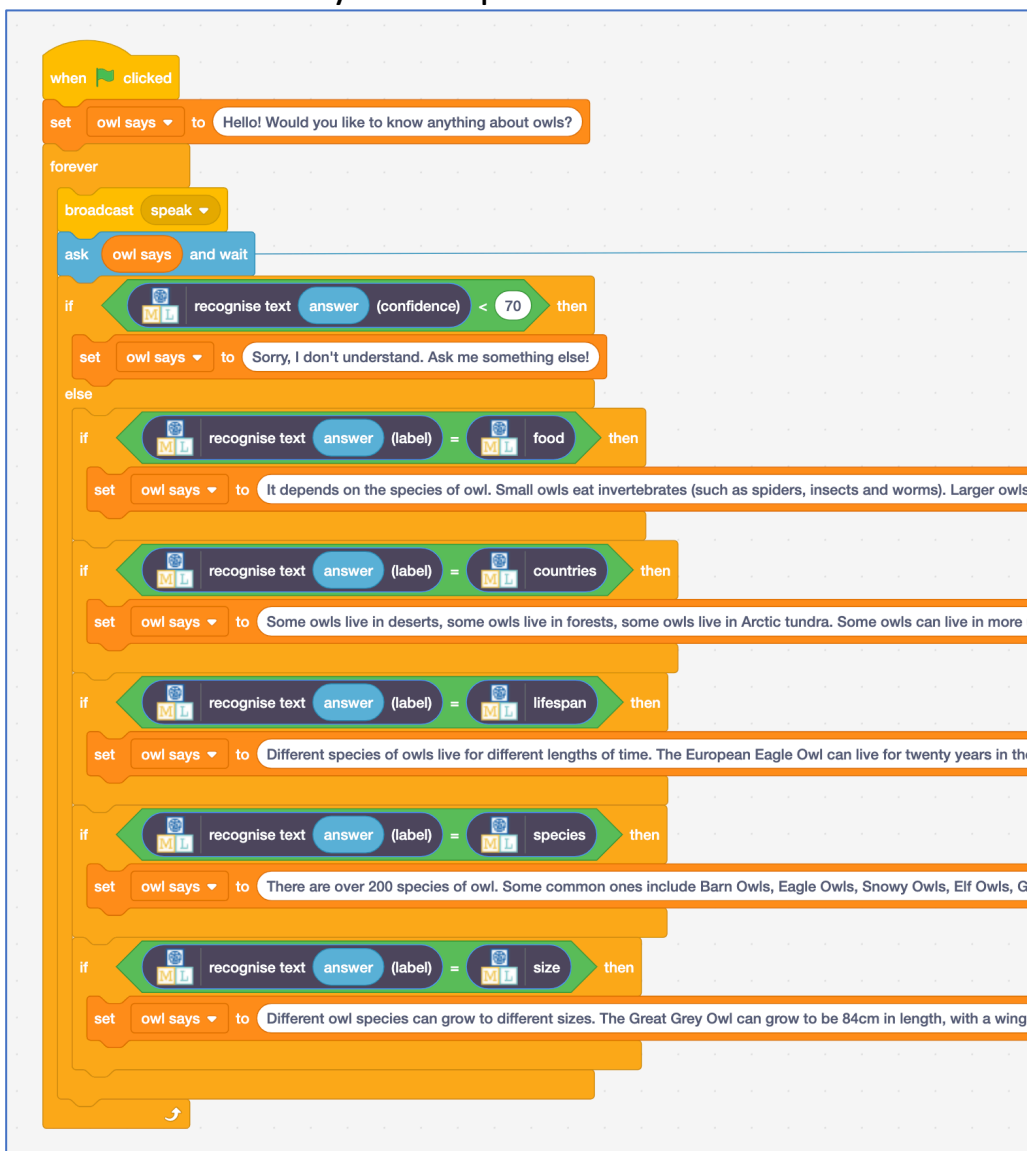
Ideas and Extensions

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.

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