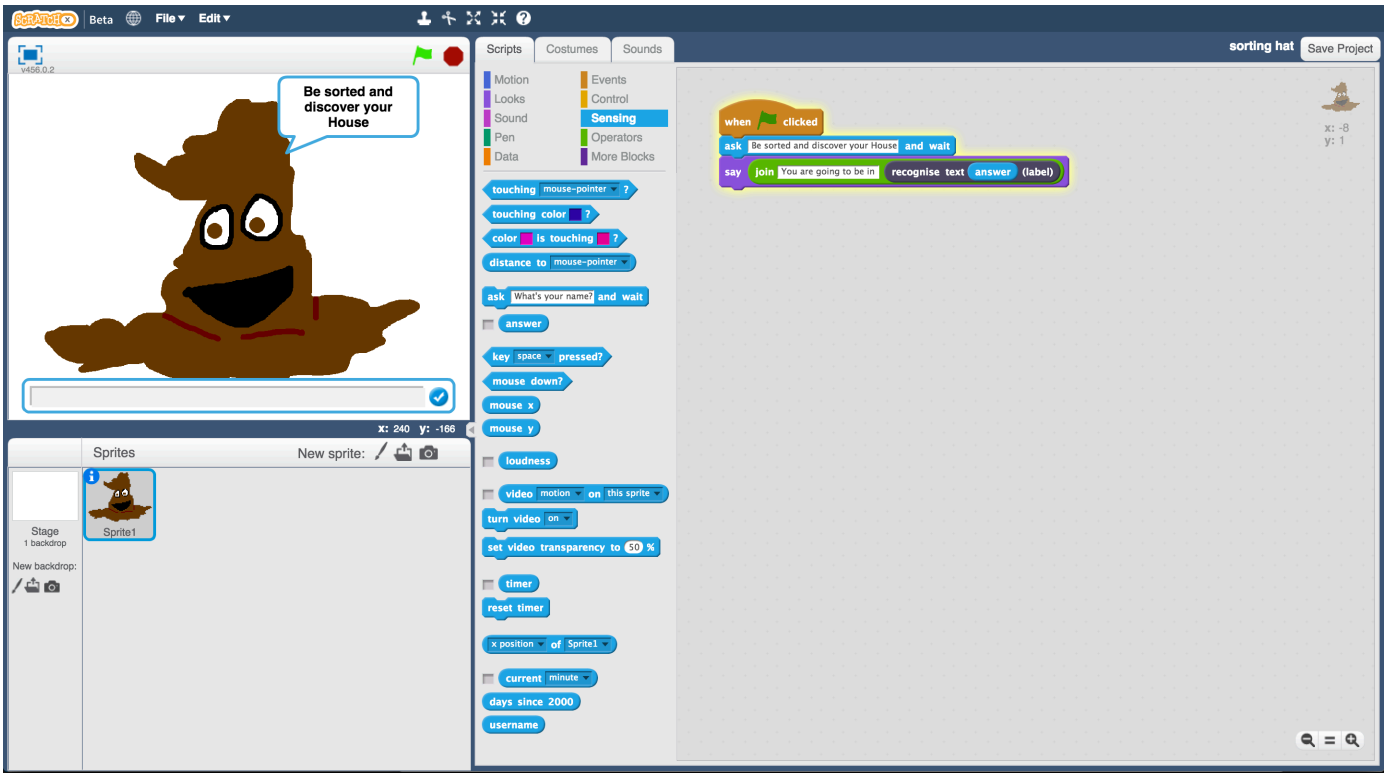
Sorting Hat

In this project you will make a Sorting Hat that will put you in one of the Hogwarts school houses based on what you say.

You will teach the computer to recognise how students in different houses speak by giving it examples of dialog from the books.



The idea for this project came from Ryan Anderson, who made a real-life sorting hat with his daughter!

https://www.ibm.com/blogs/think/2016/06/watson-sorting-hat/

1. You will need some Harry Potter books for this project.
Go to the school library!

2. Go to https://machinelearningforkids.co.uk/ in a web browser

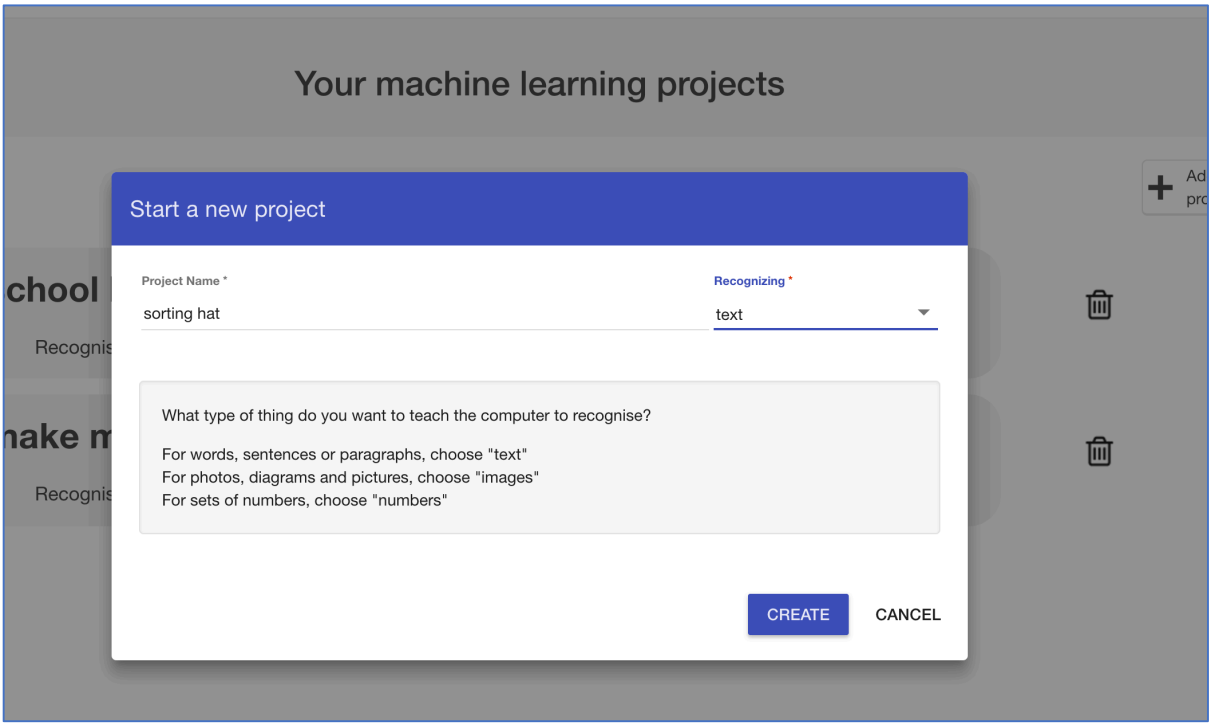
3. Click on "**Get started**"

4. 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.

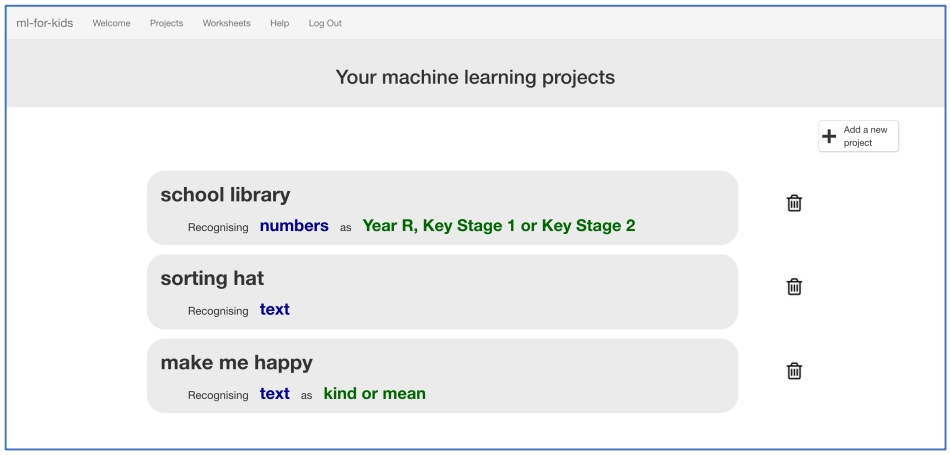
5. Click on "**Projects**" on the top menu bar

6. Click on the **"+ Add a new project**" button.

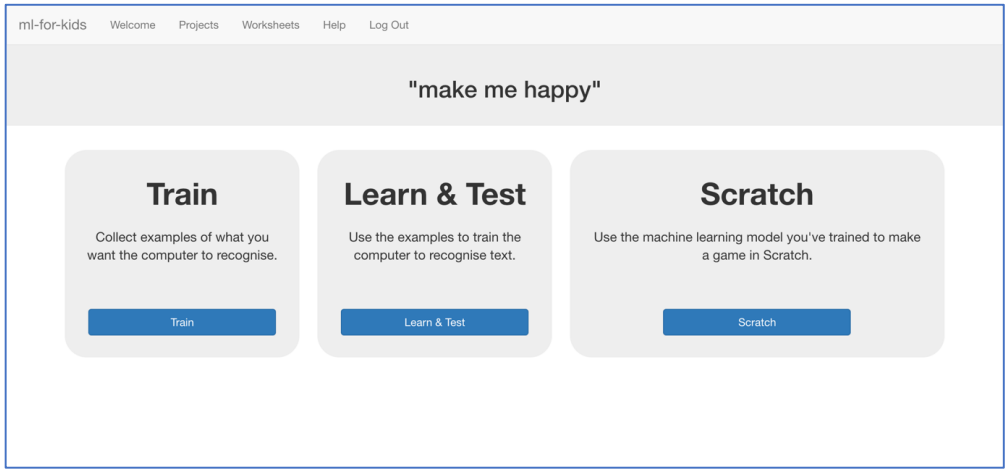
7. Name your project "sorting hat" and set it to learn how to recognise "**text**"



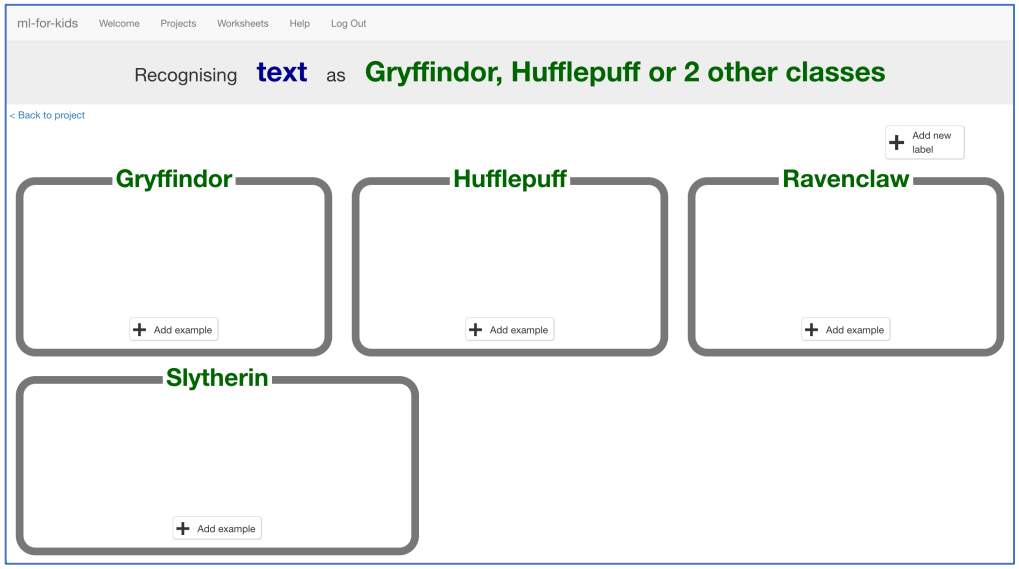
8. “sorting hat” should now show up in your projects list. Click on it.



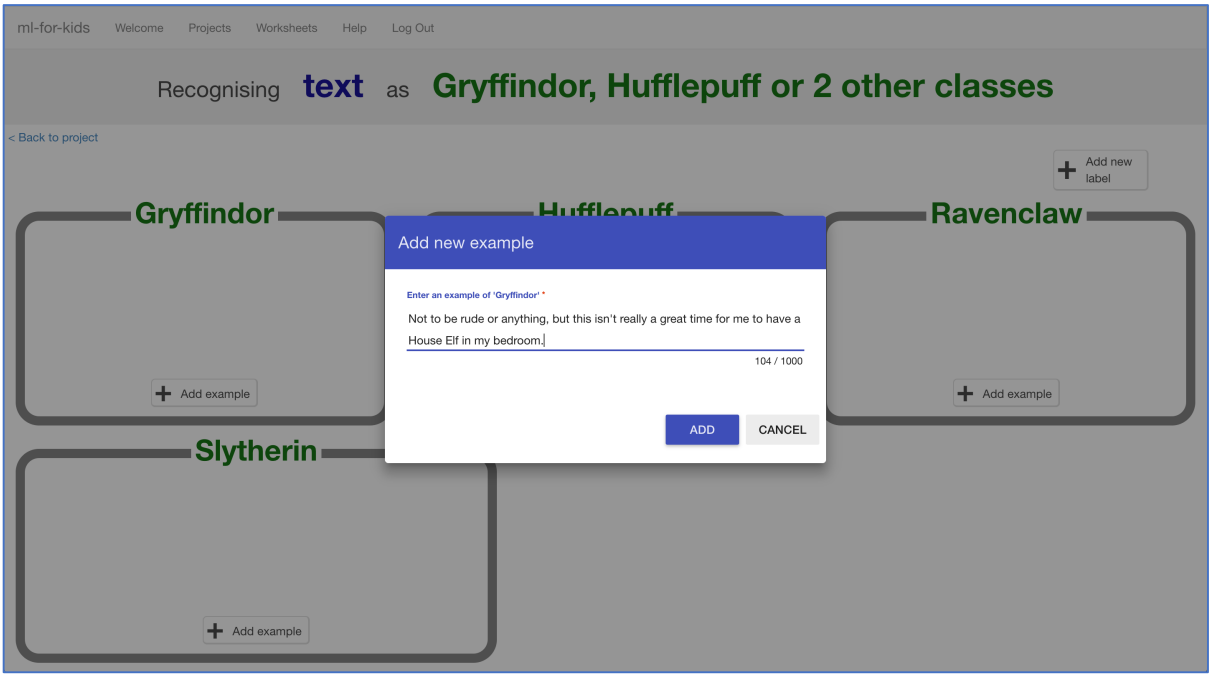
9. We’ll start by collecting examples of quotes to train the computer with. Click on the **Train** button.



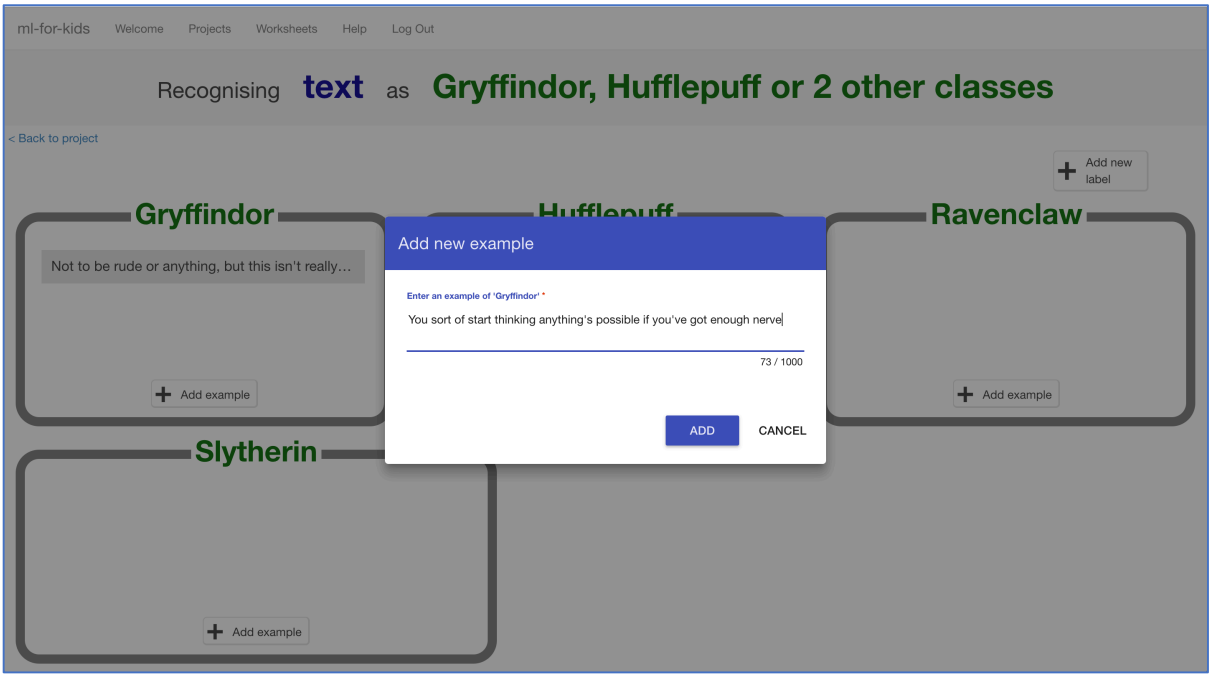
10. Click on **“+ Add new label”** and call it “Gryffindor”.
Do that again, and create buckets for Hufflepuff, Ravenclaw & Slytherin



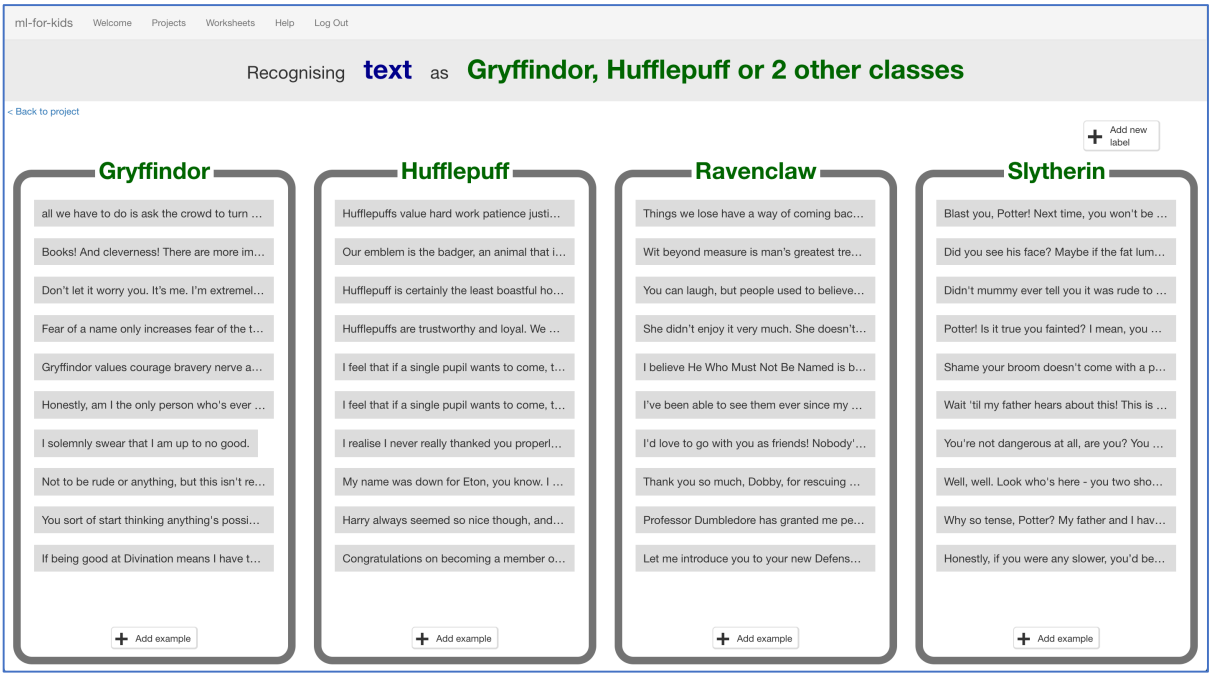
11. Click on the "**Add example**" button in the "Gryffindor" bucket. Find a quote by Harry Potter and type it into the box. Click "**Add**"



12. Find another quote from another character in Gryffindor. Click on the "**Add example**" button in the Gryffindor bucket and type it in.



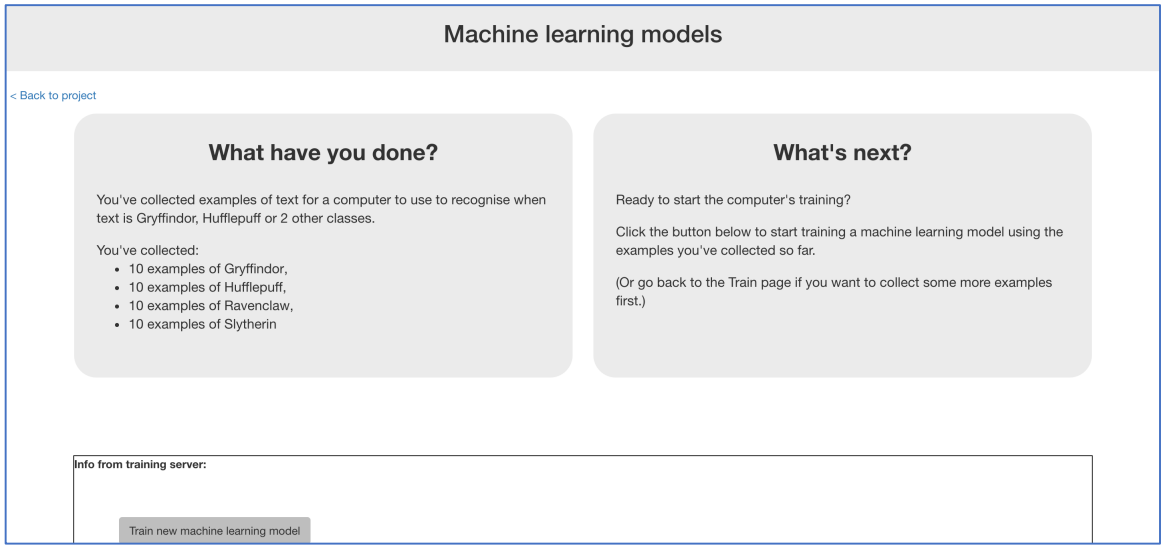
13. Keep going, collecting examples of quotes for each of the houses.
If your computer screen is big enough, you might want to press Ctrl and – (the dash/minus key) at the same time to fit more on the screen.



14. When you've collected enough, click on the **"< Back to project**" link.

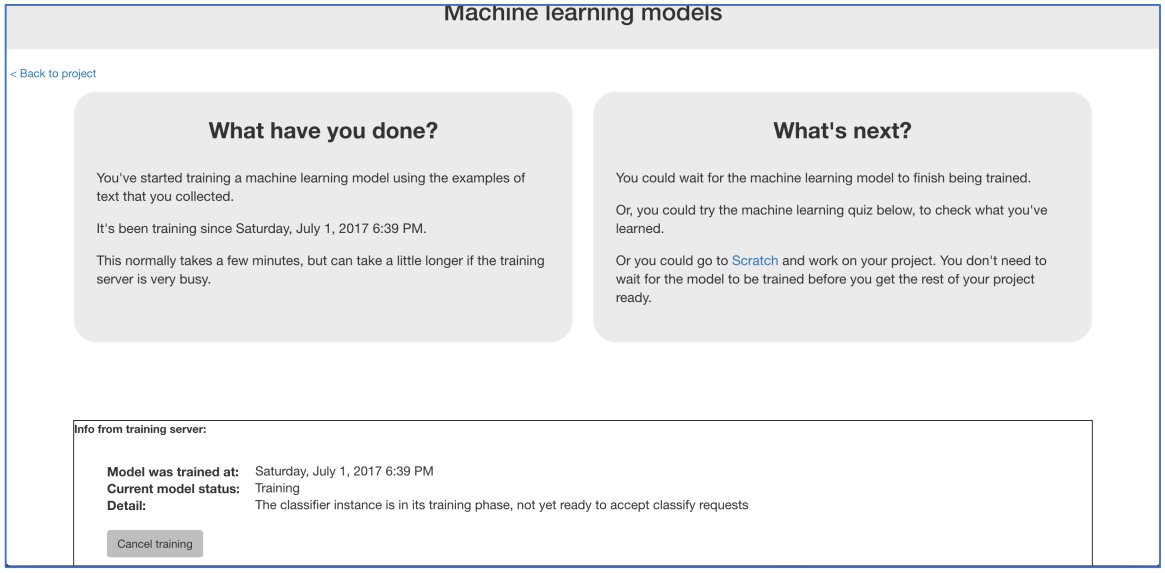
15. Next, you need to use all of the examples that you've collected to train the computer. Click on "**Learn & Test**"

16. Click on the "**Train new machine learning model**" button at the bottom of the page.



17. Wait for the training to complete. This can take a few minutes.

While you're waiting, try to complete the multi-choice quiz at the bottom of the page to test your machine learning knowledge.



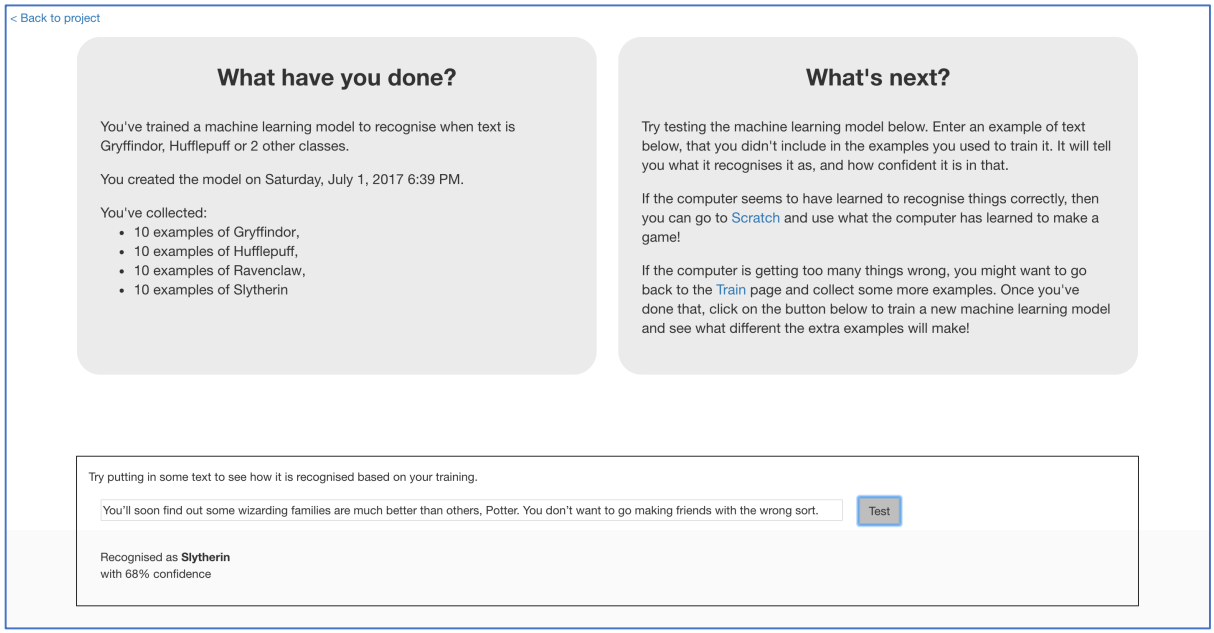
18. Once the training has completed, a Test box will be displayed.

Try testing your machine learning model to see what the computer has learned.

Test it with example quotes that you haven't shown the computer before.

If you're not happy with how the computer recognises text, go back to step 13, and add some more examples.

Make sure you repeat step 16 to train again with any new examples.



What have we done so far?

You've started to train a computer to recognise the use of language by different characters in the Harry Potter books.

These examples are being 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 that sentences are structured.

These will be used to be able to make predictions about people not in the book, just like the Sorting Hat does.

Don't worry if your model seems to get a lot wrong. With only a handfuls of examples of each house, the computer won't have had very much to learn from yet. If you were doing this for real, you'd be collecting dozens or hundreds of examples for the computer to train on.

19. Click on the **"< Back to project**" link, then click on the "**Scratch**" button.

This page will be updated with instructions on how to use the new blocks in Scratch from your project. Keep the page open if you need to check back on how to use them.

Tips

More examples!

The more examples you give it, the better the computer should get at recognising what the different school houses have in common.

Try and be even

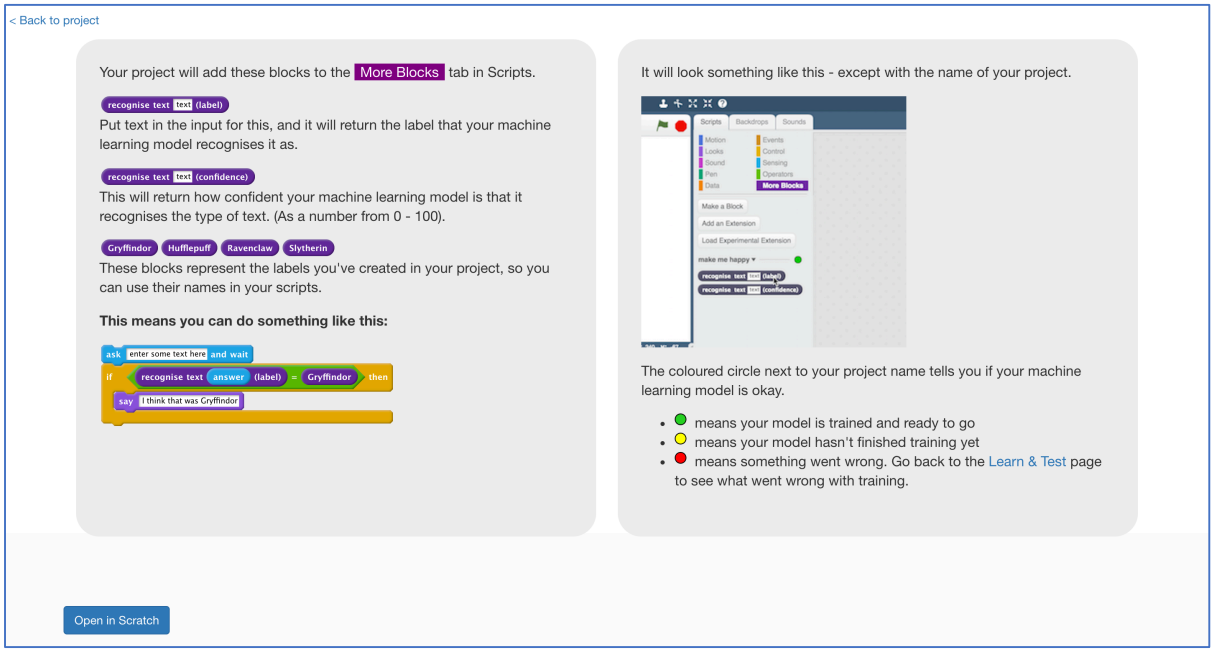
Try and come up with roughly the same number of examples for each House.

This can be difficult – particularly for Hufflepuff! But try not to focus only on Gryffindor and Slytherin. If you have a lot of examples for some houses, and not the others, the computer might learn that being in those houses is more likely than the others. That would probably affect the predictions that it makes.

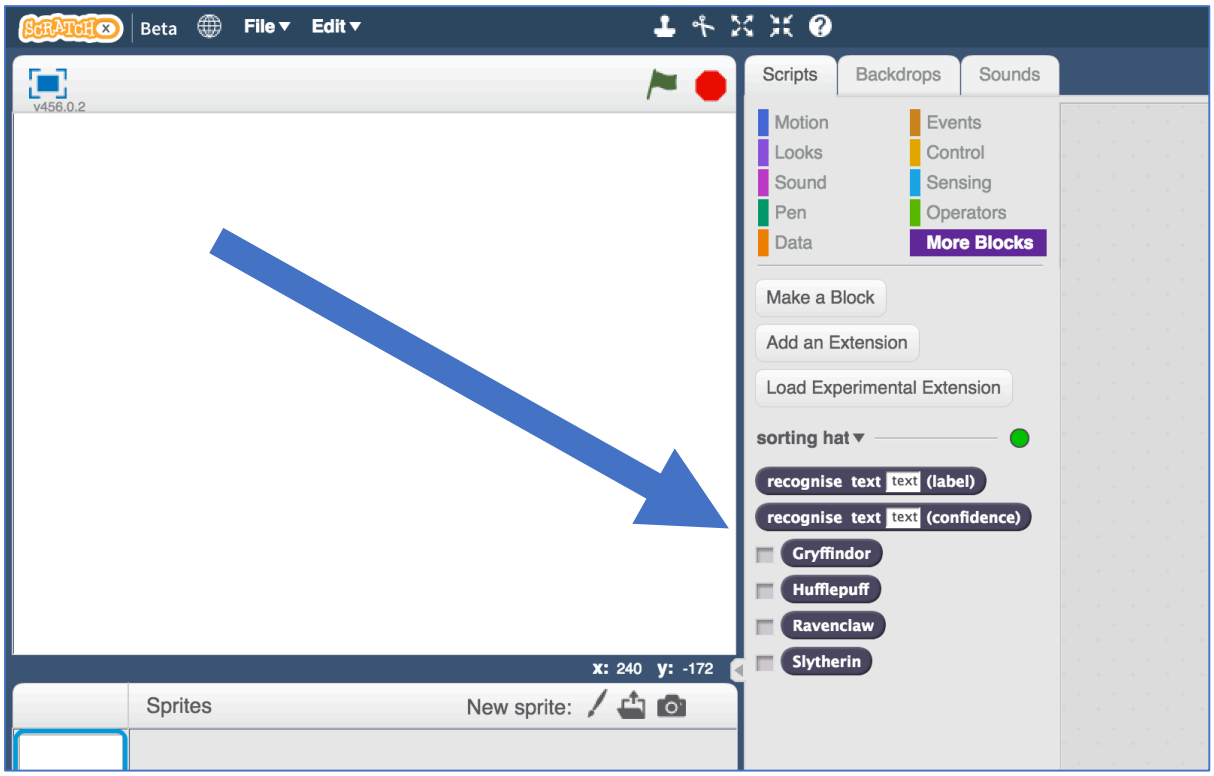
Quotes online

If you're struggling, or you don't have a copy of a Harry Potter book available, try searching for quotes of your favourite characters online.

20. Click on the "**Open in Scratch**" button at the bottom to launch the Scratch editor.



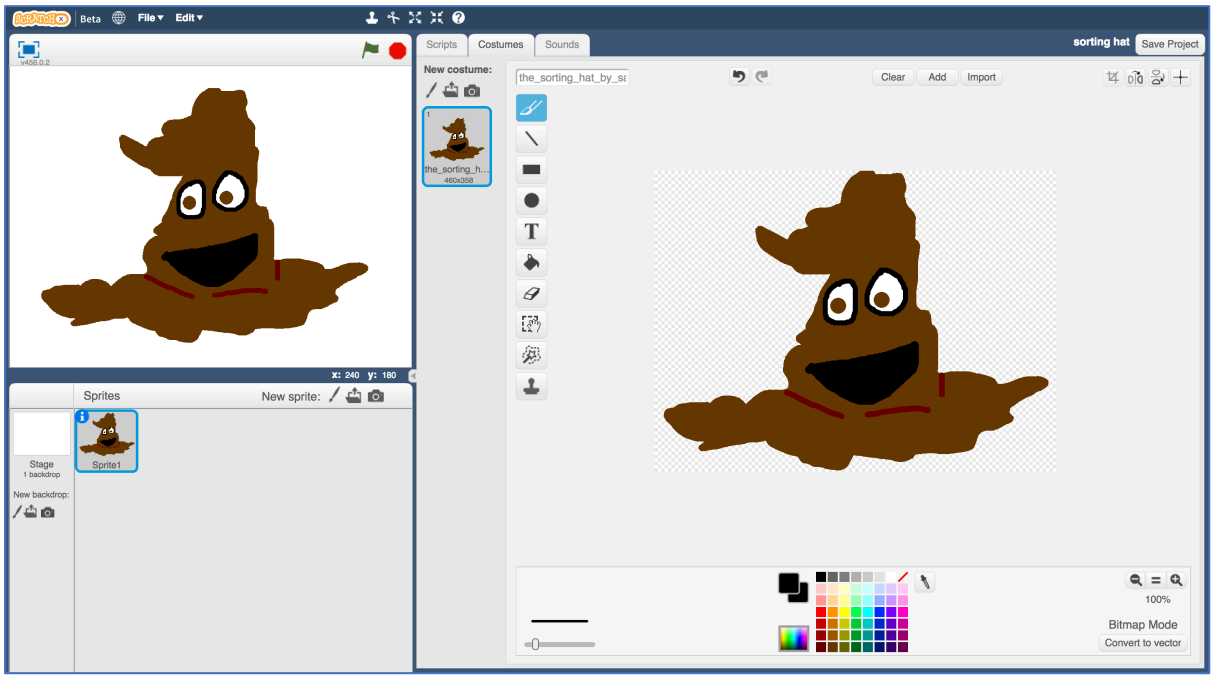
21. You should see six new blocks in the "More blocks" section from your "sorting hat" project.



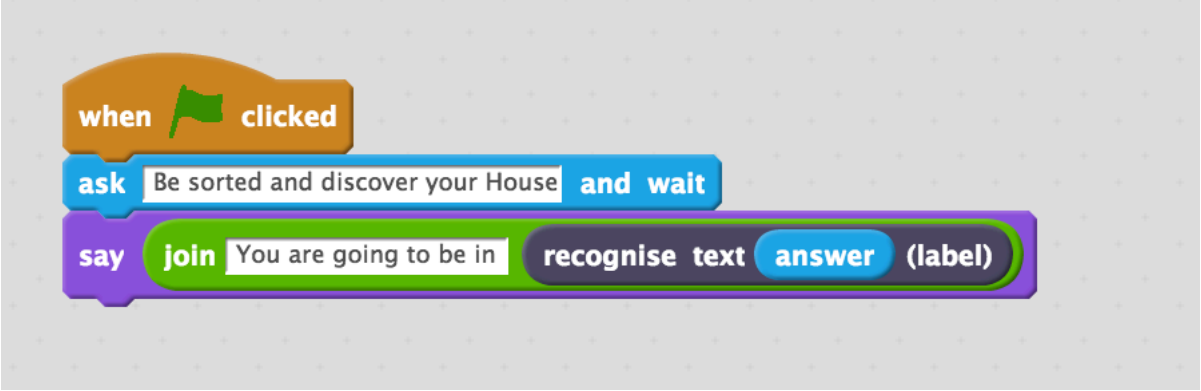
22. Create a new sprite by clicking on the paint brush icon next to "New sprite", just beneath the white canvas.

23. Draw a Sorting Hat

If you really don't like drawing, you could find a picture of the Sorting Hat online, and use that instead. Click on the folder icon next to the paintbrush to import a sprite from a file.



24. Click on the "Scripts" tab, and enter the following script.

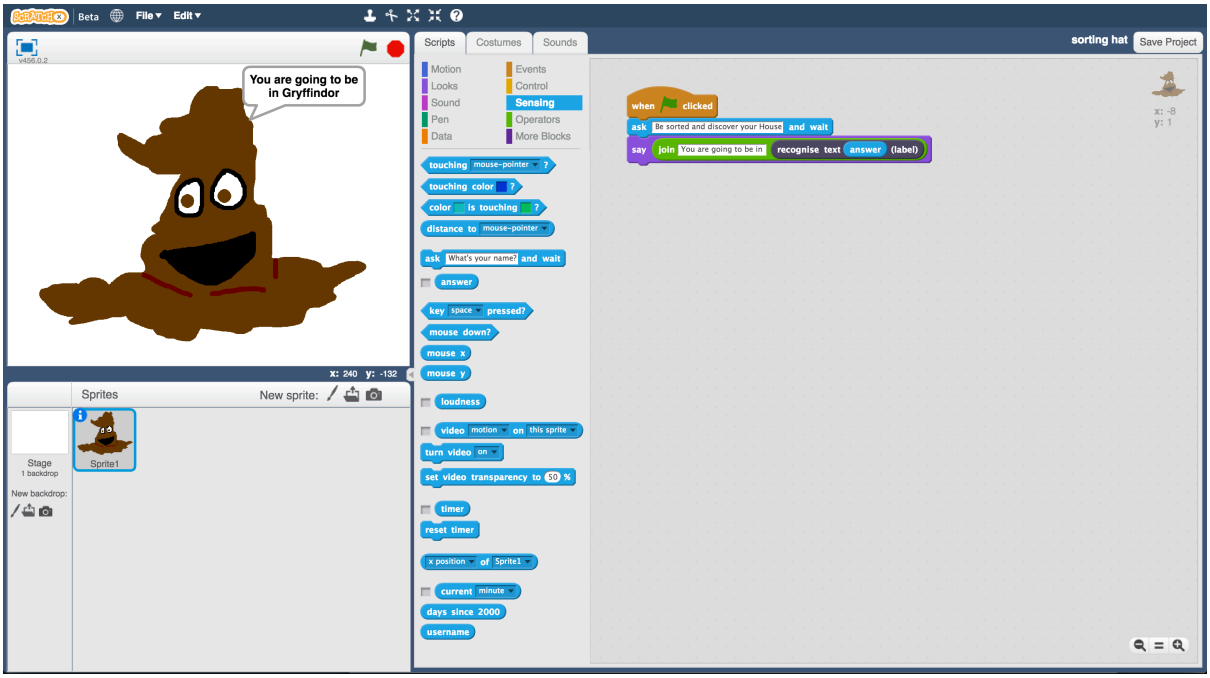


25. Test your script!

Click on the green flag, and type in a message.

Try typing in something that you would say, or something you have said and see which House the Sorting Hat would put you in!

Try it on your friends and see what House the Hat would put them in.



26. Save your project

Click File -> Save

What have we done?

You've created a Scratch game version of the Harry Potter Sorting Hat, using machine learning.

You trained that machine learning model by collecting examples of quotes from characters, and telling the computer which House they are in.

You've seen that doing this well is difficult, and needs a lot of examples.

But even with a small number of examples, it's fun to see the patterns that the computer learns, and how it tries to use that to recognise text.

The idea for this project came from Ryan Anderson, who made a real-life sorting hat with his daughter!

Instead of typing messages to it, they also used speech-to-text so that they could actually talk to their Hat. Once they converted people's voices into text, they trained a machine learning model to be able to recognise which House that should be, in a similar way to you have.

To see what the Hat looked like in action, check out their video at https://youtu.be/tSHoJoOOi9k