In this project you will make a simple version of the card game “Snap!” in Scratch.

To have your move, you’ll take a photo of your card.

But first, you’ll need to train the computer to look at your photos and recognise the different cards in your pack.
You’ll need a digital camera for this project. A computer webcam is easiest, but anything you can use to take photos is okay.

1. You’ll need the `snap.sbx` starter file for this project. If you haven’t got this, ask your teacher or group leader.

2. Make four cards
   I made these from two sheets of A4 white paper. I cut both of them in half, giving me four large cards. I drew a club, spade, heart and diamond on the centre of each using a felt pen.

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 “snap” and set it to learn how to recognise “images”.

![Start a new machine learning project]

9. Click the “Create” button

10. You should see “snap” in the projects list. Click on it.

11. Click on “Train”

![“snap”]

12. Click the “+ Add new label” button and create a bucket called “heart”.

13. Do that again, to create buckets for “diamond”, “club” and “spade”.

We need to collect example of photos of your cards.

This means taking photos of them, and uploading them to a photo sharing site on the Internet.

The next few steps will explain how to do this using your computer webcam and the website imagebin.ca. But any digital camera and any photo sharing website would work just as well.

Skip to step 18 if you use a different site to upload your photos to.

14. Open a new browser window or tab, and go to https://ibm.biz/mlforkids-webcam

15. The Preview window shows the current view from your webcam. You will need to click “Approve” or “Allow” if your web browser asks permission to use your webcam.
16. Hold one of your cards to the webcam and click the “**Take photo and upload to imagebin**” button.
Every photo you take is uploaded immediately to imagebin.ca.

17. Take **10** photos of each of your cards.
18. Arrange your windows so both web browser windows (the machine learning training buckets and the photos you’ve taken) are side by side.

19. Drag the photos from the photo site and drop them in the correct bucket in the machine learning tool.

20. Click on the “< Back to project” link.
21. Click the “Learn & Test” button.

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

23. Wait for the training to complete. This might take a few minutes. *While waiting, try to complete the machine-learning multi-choice quiz at the bottom of the page.*

What have you done so far?

You’ve started to train a computer to recognise cards as being heart, diamond, club or spades. You are doing it by collecting example photos. 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 colours and shapes from each of the photos you’ve given it. These will be used to be able to recognise new photos.
24. Click the “< Back to project” link, then click the “Scratch” button. *This page has 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.*
More examples!

The more examples you give it, the better the computer should get at recognising whether a card is heart, diamond, club or spades.

Try and be even

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

If you have a lot of examples for one type, and not the other, the computer might learn that type is more likely, so you’ll affect the way that it learns to recognise photos.

If you’d rather use imgur.com than imagebin...

use https://dalelane.github.io/webcam-to-imgur instead
25. Click the “Open in Scratch” button at the bottom to launch the Scratch editor.

You should see five new blocks in the “More blocks” section from your “snap” project.

26. Open the “snap.sbx” project file.

Click File -> Load Project

Click OK when it asks to replace the contents of the current project.
27. Click on the “computer card” sprite

28. Create this script

This script will let the computer pick a random card.
29. Click on the “your card” sprite

30. Create this script
   *This script will let the computer recognise your card.*

31. Click on the “snap” sprite

32. Create these scripts
33. Click on the “result” sprite

34. Create these scripts
   This script will display what the computer thinks your card looks like

35. Save your project
   Click File -> Save Project
36. Shuffle your paper cards and pick one at random

37. Click on the “your card” sprite, then the costumes tab.
   Click on the “New costume from camera” button

38. Use the webcam to take a photo of the card you picked
   *Click Save when you’re ready to take the photo*
39. Click the **Green Flag**

The computer will choose a random card for its side.

*It will try to recognise your card, and if they match, it’ll display “SNAP!”*

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**What have you done?**

You’ve made a simple card game in Scratch.

The game uses a webcam to take pictures of your card, and uses machine learning to recognise the card in the photo.

This is “image recognition” – teaching a computer to recognise images.
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?

**Design your own cards**

Instead of hearts, spades, clubs and diamonds, why not make your own cards?

**Shout “snap!”**

Instead of just displaying “SNAP!” can you record yourself shouting “Snap!” and get your Scratch project to play that when the cards match?

**Make the game competitive**

Modify the game so it doesn’t display the computer’s card at first. Let it display the card at the same time it starts to recognise yours.

Who is quicker at saying “snap”? You or the computer?