Dysgu Peiriant

Tasg: Beth yw Dysgu Peiriant?
(Machine Learning)

Dysgu Peiriant

Mae Dysgu Peiriant yn system sydd â'r gallu i ddysgu a gwella o brofiad yn awtomatig heb gael ei raglennu'n benodol.

Mae Dysgu Peiriant yn canolbwyntio ar ddatblygu rhaglenni cyfrifiadurol sy'n derbyn data ac yn ei ddefnyddio i ddysgu ar eu pennau eu hunain.

Tasg: Ydych chi'n Nabod Unrhyw Systemau Dysgu Peiriant?

Systemau Dysgu Peiriant Cyfredol Siri

- Mae Siri yn gynorthwyydd wedi'i actifadu gan lais.

- Mae Siri yn gwrando ar eich cyfarwyddiadau, a, phan fo hynny'n bosibl, yn eu cyflawni.

- Gall Siri agor apiau, chwarae'ch hoff gerddoriaeth a gall hyd yn oed ddweud jôc wrthych.
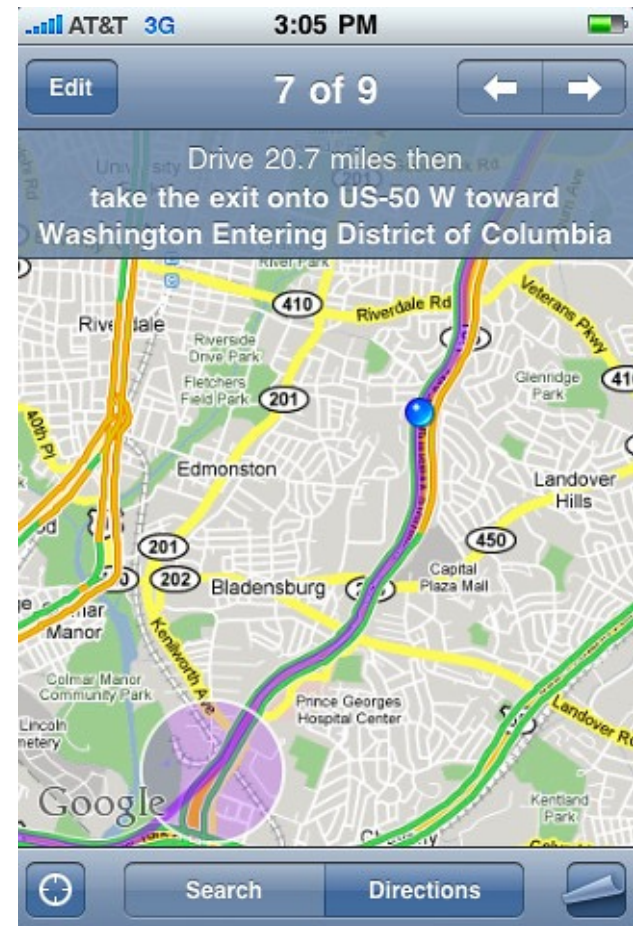
Systemau Dysgu Peiriant Cyfredol Google Maps

Gall Google ddefnyddio data lleoliad defnyddiwr ar gyfer pethau fel:

- diweddariadau traffig amser real
- amcangyfrif cyflymderau traffig cyfredol
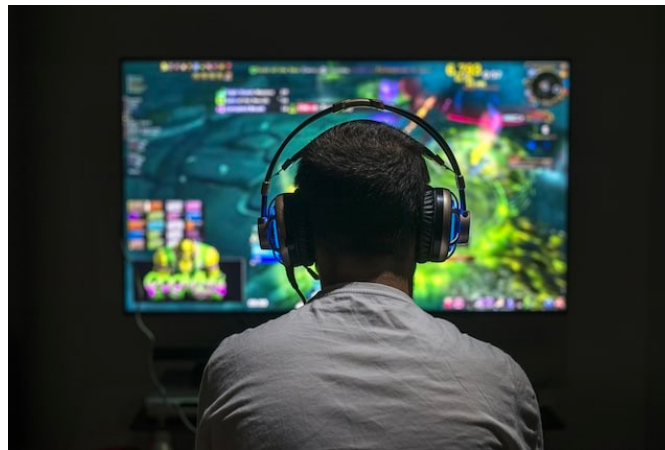- addasu cyfarwyddiadau yn unol â hynny

Systemau Dysgu Peiriant Cyfredol
Camerâu Diogelwch

Nid yw'n bosibl i fodau dynol barhau i fonitro cannoedd / miloedd o monitorau ar yr un pryd, gan ddefnyddio technolegau fel:

- adnabod **gwrthrychau** a chydnabod **wyneb**, daw hyn yn bosibl.

Systemau Dysgu Peiriant Cyfredol Dota 2

- Gêm fideo strategaeth yw **Dota 2**.

- Mae **OpenAI 5**, a ddatblygwyd gan y cwmni OpenAI, gyda chefnogaeth Elon Musk, wedi curo chwaraewyr Dota 2 profesiynnol mewn gemau un i un.
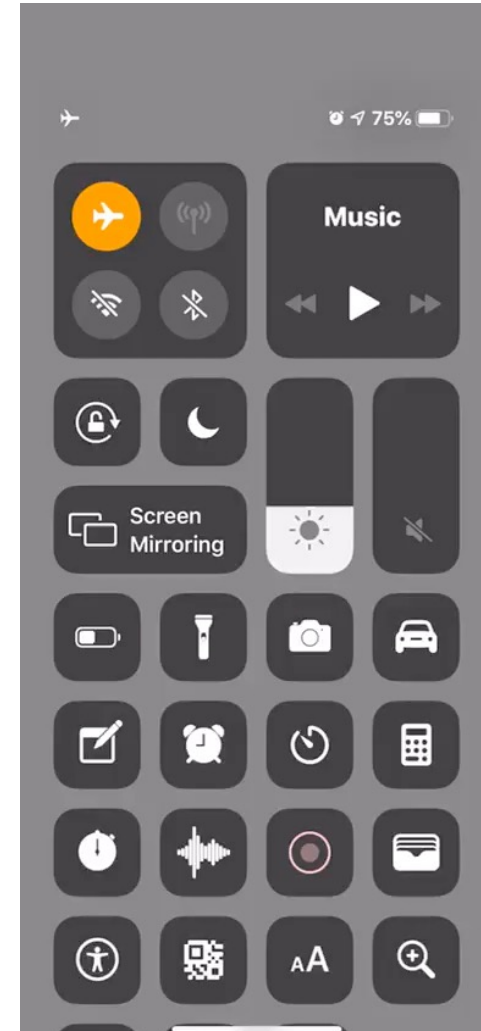
Apiau / Gemau Dysgu Peiriant Cyfredol

Draw It - ap symudol.

Mae chwaraewyr yn cystadlu â'i gilydd mewn gêm arlunio amser real ar-lein.

Y nod yw llunio un o'r ddau gategori a roddir, fel y gall y cyfrifiadur ddyfalu'n gywir.

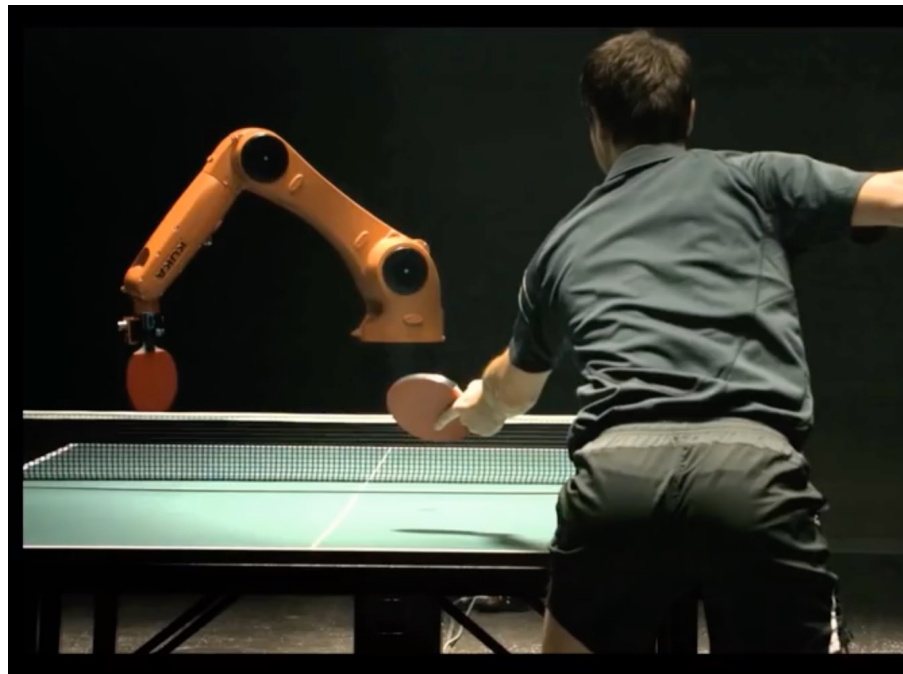Addysgir y cyfrifiadur trwy DP i adnabod lluniadau.

Cliciwch i chwarae fideo.

Systemau Dysgu Peiriant Cyfredol KUKA

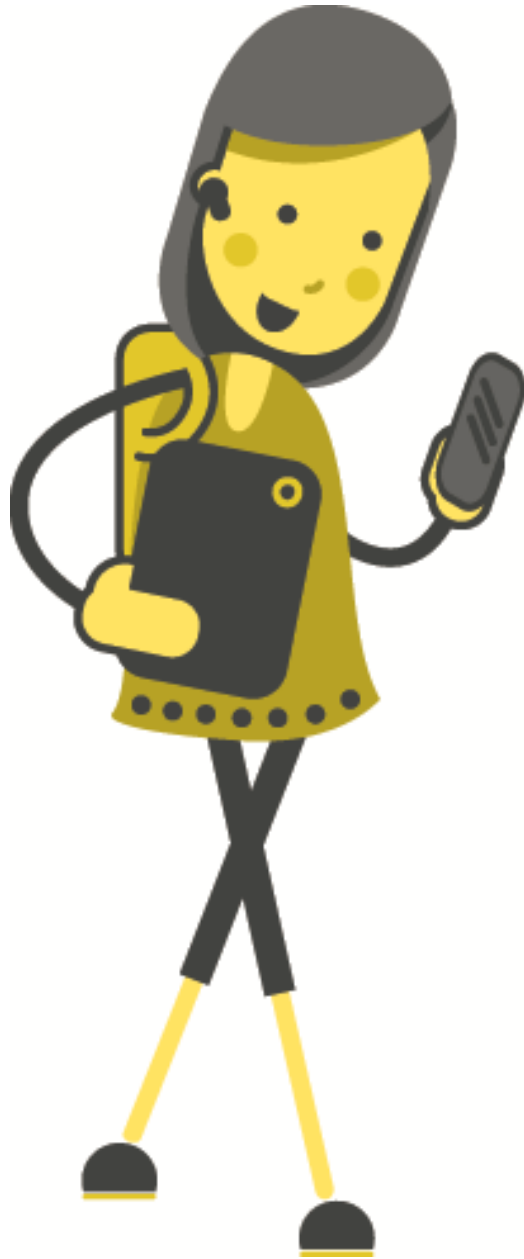KUKA yw un o brif gyflenwyr roboteg y byd.

Table tennis bot
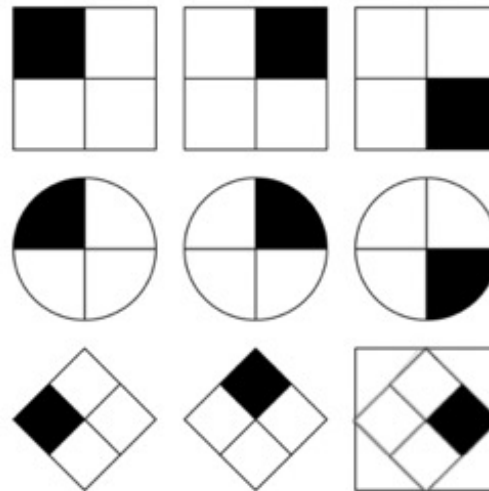
KUKA

Cliciwch i chwarae fideo.

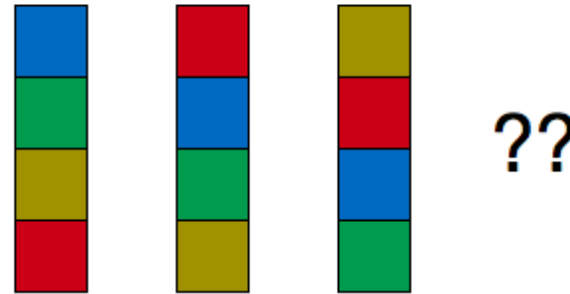# Tasg: Sut Mae DP yn Gweithio?

Ateb: Cydnabod Patrwm

Cydnabod patrwm yw'r gallu i adnabod patrymau mewn setiau data.

Gall cyfrifiaduron ddysgu o batrymau, er enghraifft gall cyfrifiadur ddysgu'r gwahaniaeth rhwng lluniau, fel y siapiau a'r lliw a ynddyn nhw.

Tasg: Cydnabod Patrwm (1)

Beth sy'n dod nesaf?

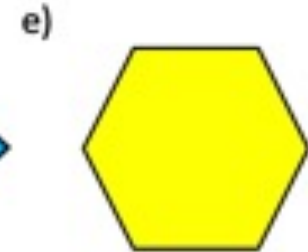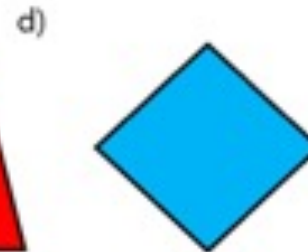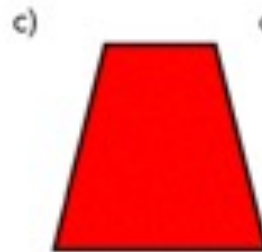# Tasg: Cydnabod Patrwm (2)

Beth sy'n dod nesaf?

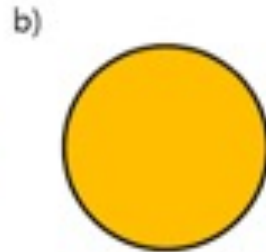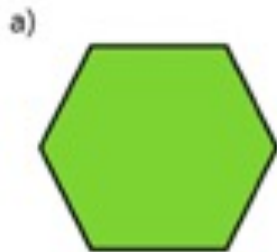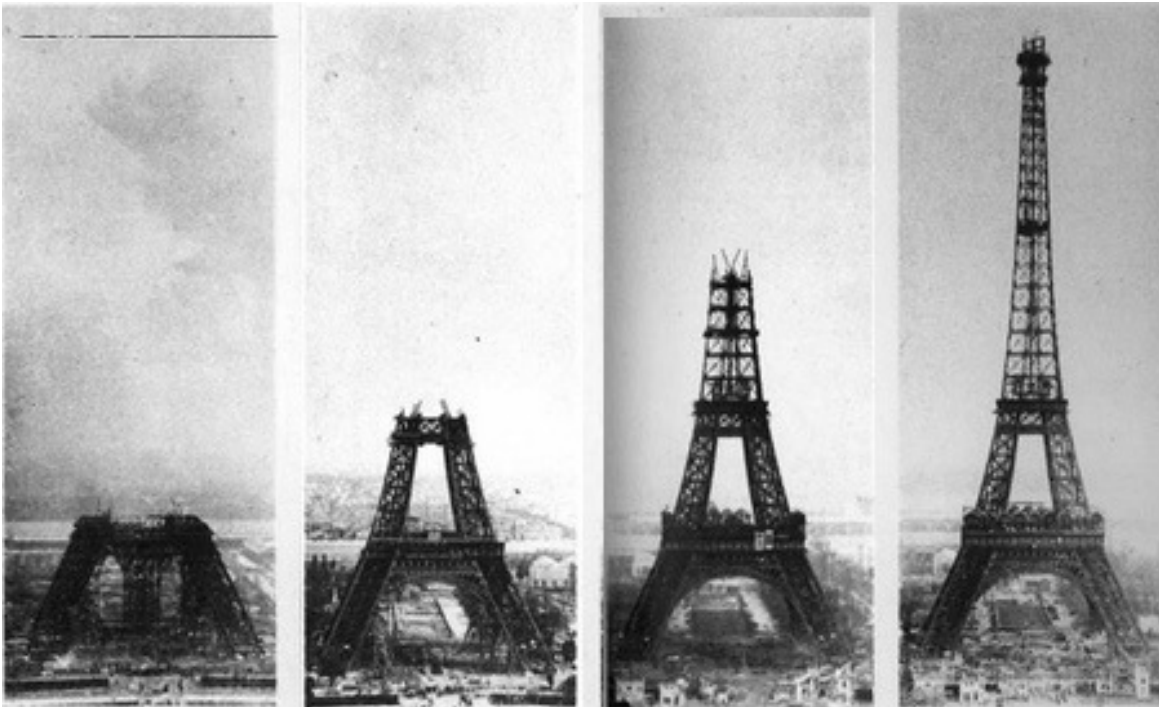a) b) c) d) e)
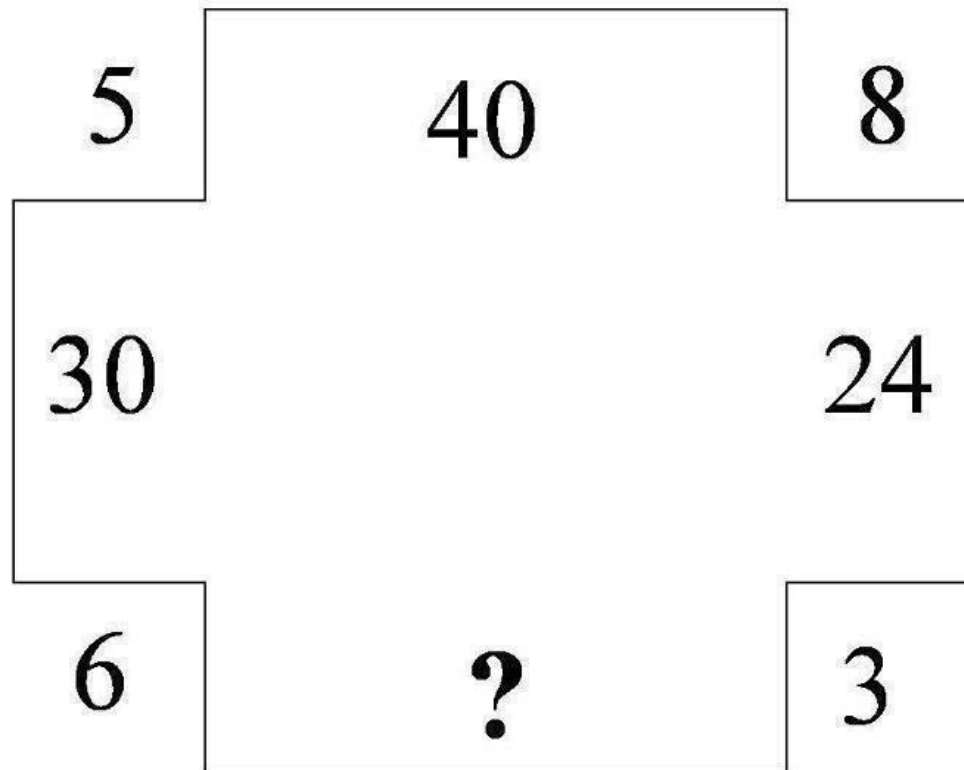
Tasg: Cydnabod Patrwm (3)

Tŵr Eiffel oedd y strwythur talaf yn y byd tan 1930. Os cymerwyd y tair delwedd gyntaf uchod ar Fawrth 1888, Gorffennaf 1888, a Thachwedd 1888, pa un o'r dyddiadau canlynol yw'r mwyaf rhesymol ar gyfer y llun olaf o'r twr gorffenedig?

a) Ionawr 1890

b) Gorffenaf 1889

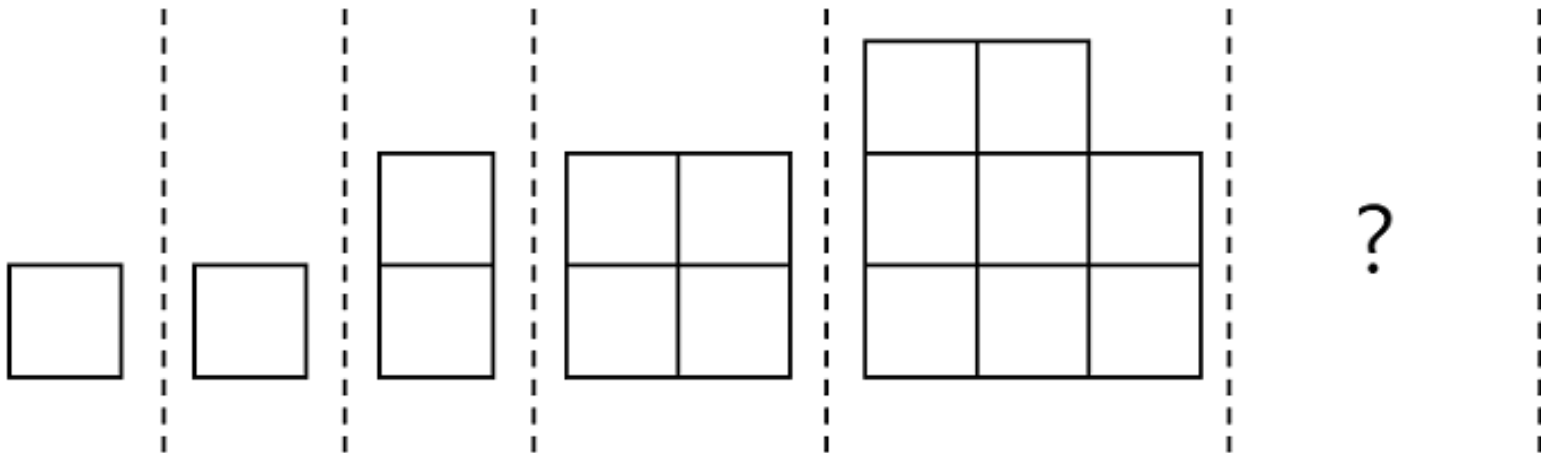c) Mawrth 1889

d) Rhagfyr 1888

Tasg: Cydnabod Patrwm (4)

Pa rif sy'n ffitio i'r marc cwestiwn?

Tasg: Cydnabod Patrwm (5)

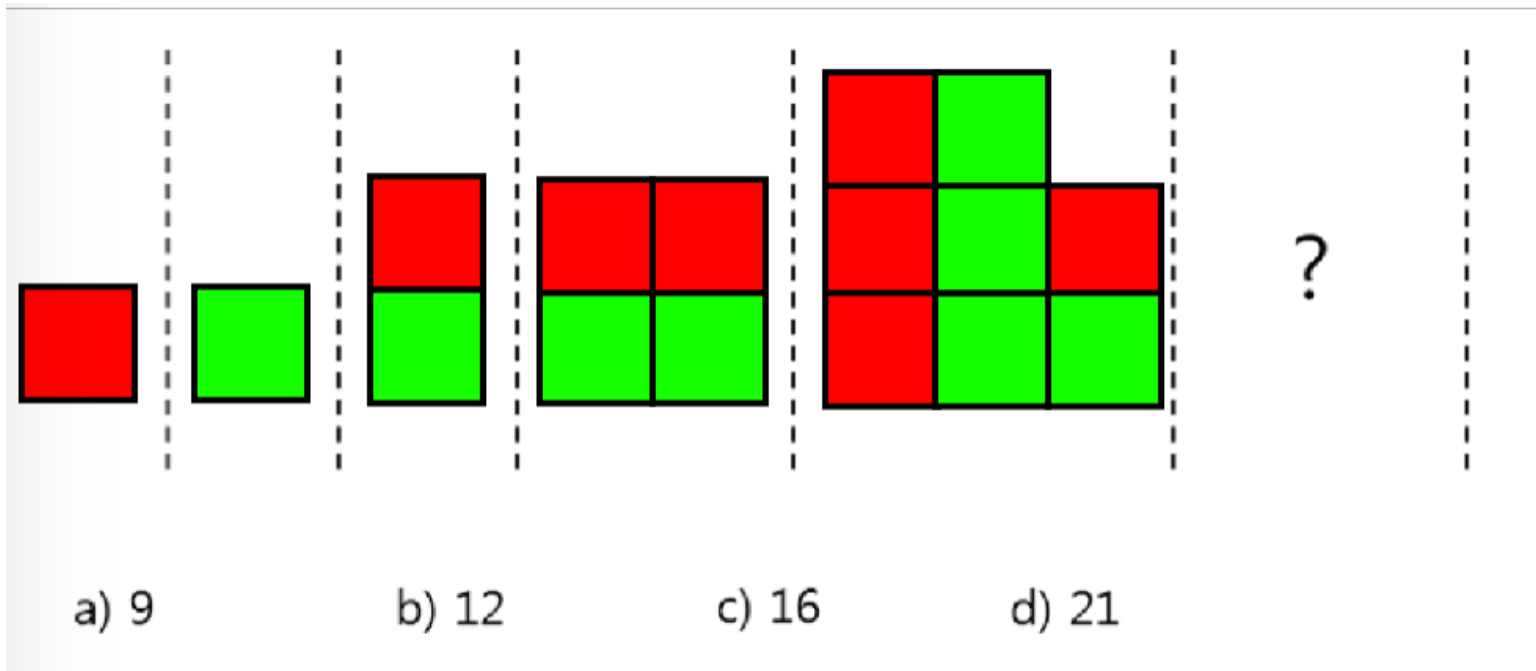Beth yw nifer y sgwariau yn yr adran olaf lle mae'r marc cwestiwn?

a) 9   b) 12   c) 16   d) 21

Tasg: Cydnabod Patrwm (5) Gair o Gymorth

Beth yw nifer y sgwariau yn yr adran olaf lle mae'r marc cwestiwn?

a) 9   b) 12   c) 16   d) 21

Tasg: Cydnabod Patrwm (6)

Beth sy'n dod nesaf?

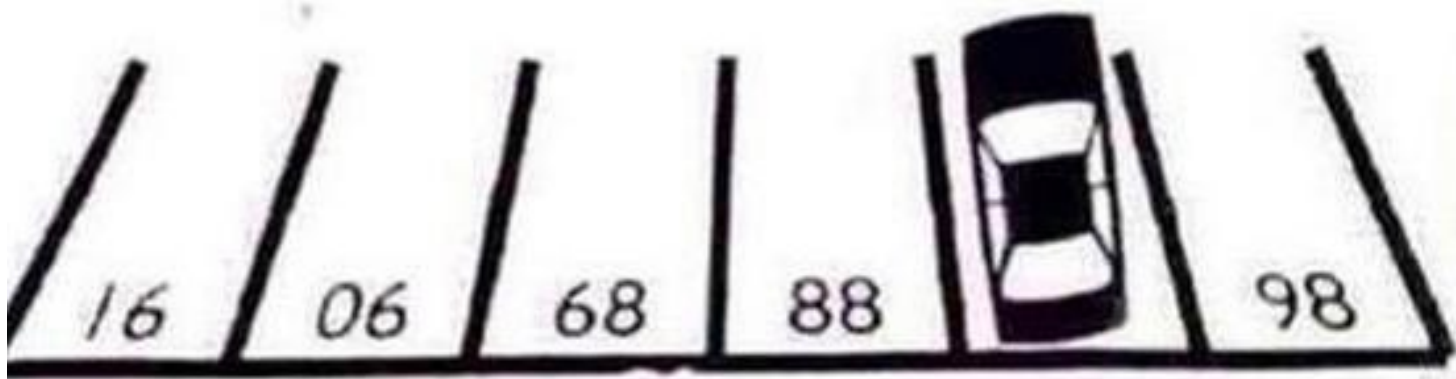1 2 3 4 5 6 7 ?

a) 9   b) 8   c) 8   d) 6
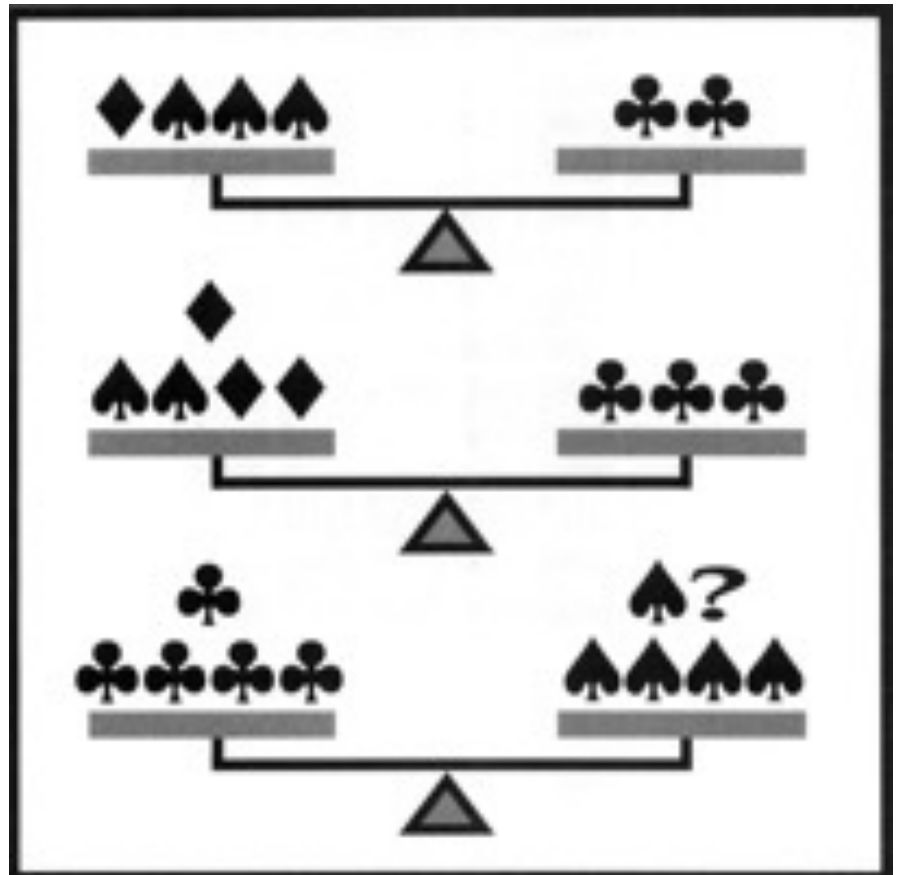
Tasg: Cydnabod Patrwm(7)
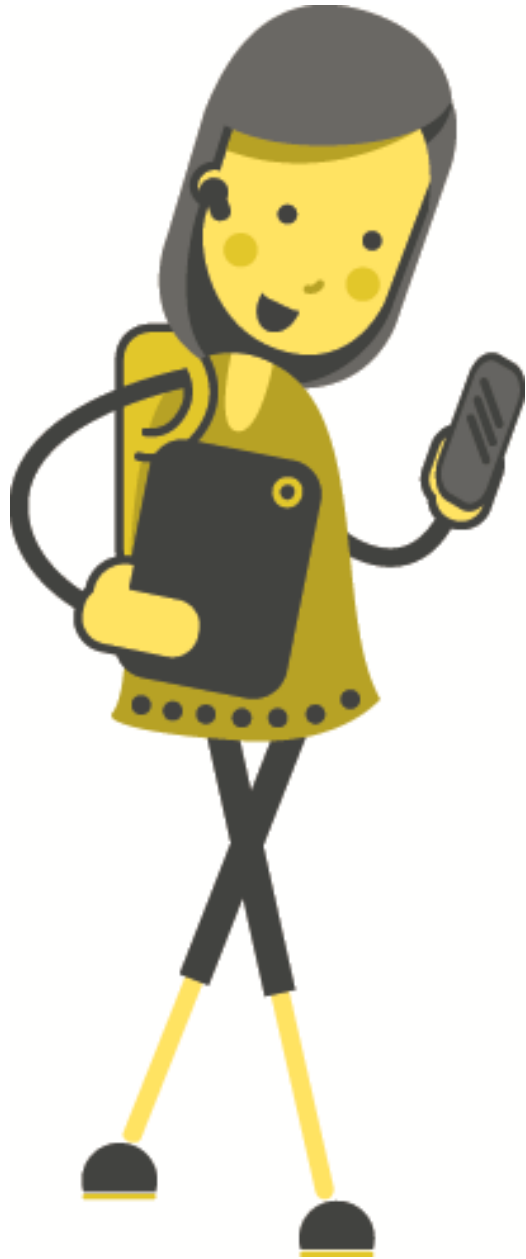
Ym mha rif mae'r car hwn wedi'i barcio?

Tasg: Cydnabod Patrwm (8) Fwy Anodd

Mae'r ddwy raddfa uchaf yn y ddelwedd ar y dde mewn cydbwysedd perffaith. Faint o ddiamwntau fydd eu hangen i gydbwyso'r set waelod?

Tasg:
Efelychiad DP

Dysgu Peiriant Gyda Scratch

https://machinelearningforkids.co.uk

Dewiswch Cymraeg!

Proses Dysgu Peiriant

Gadewch inni ddweud, rydym am allu hyfforddi cyfrifiadur i ddidoli set o luniau yn ddwy bentwr: un pentwr o luniau o ieir bach yr haf, ac un pentwr o luniau o weision y neidr.

Sut fyddem ni'n dechrau'r broses hon?

Beth sydd ei angen arnom?
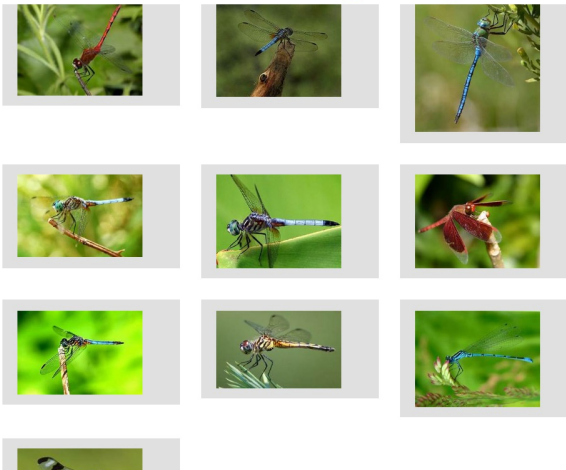
Heb DP

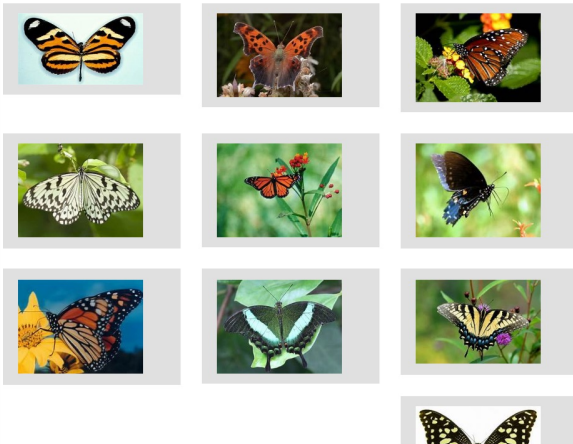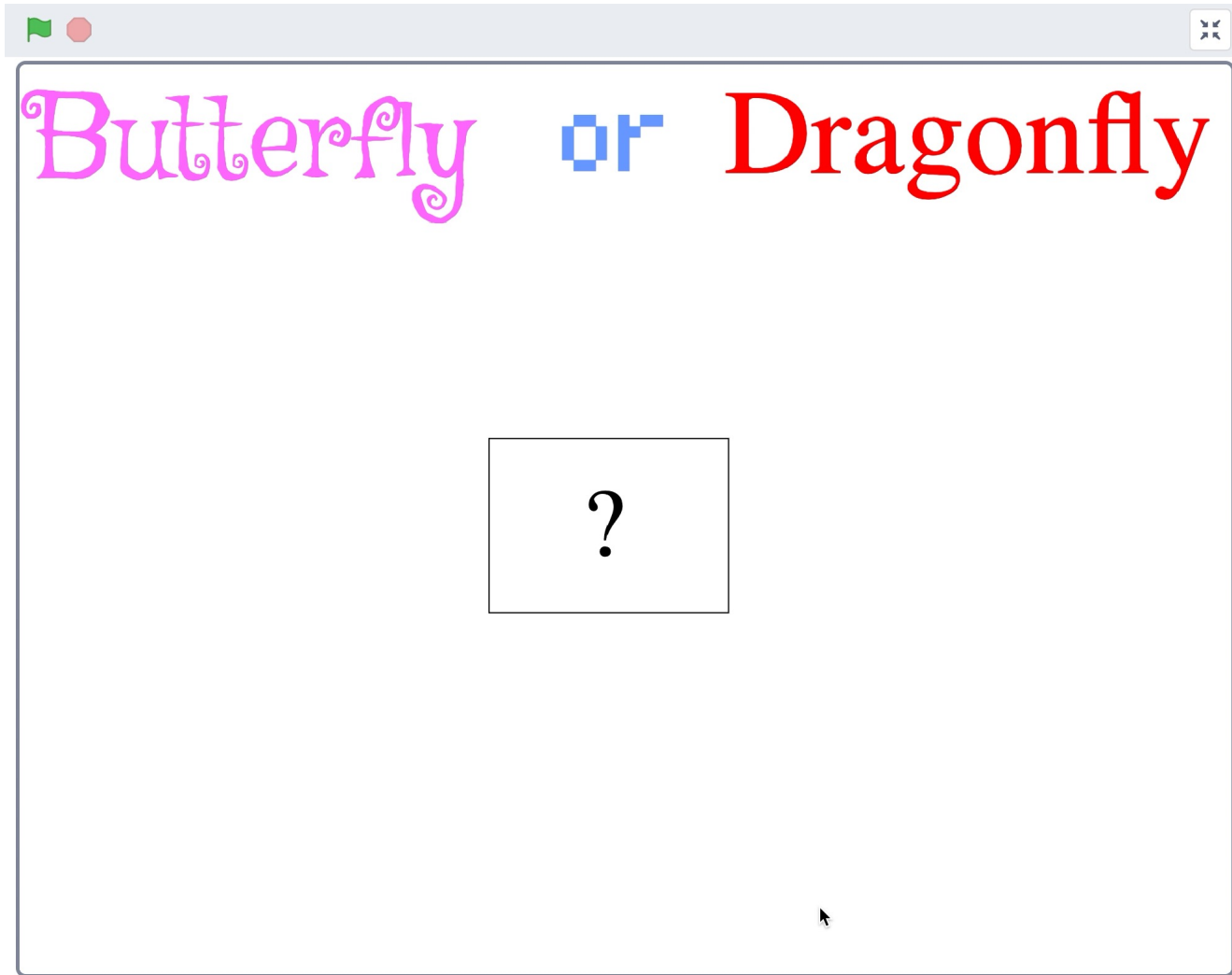Click to play video.

Gyda DP

Click to play video.
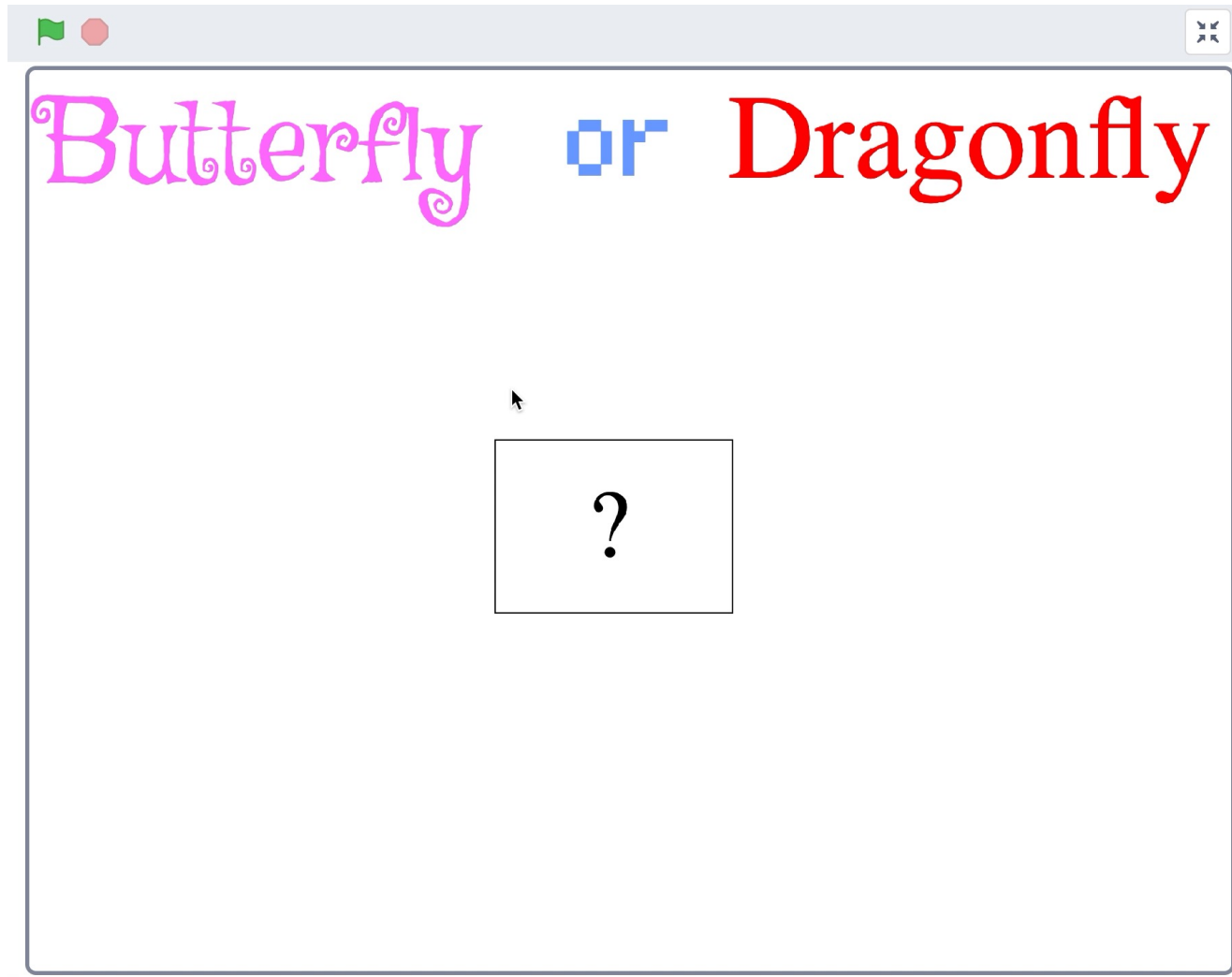
Gwnewch Fi'n Hapus

Gwnewch Fi'n Hapus

Ewch i https://machinelearningforkids.co.uk/, cliciwch iaith Cymraeg

Cliciwch ar "Dechrau".

Cliciwch ar "Rhowch gynnig arni nawr".

Cliciwch ar "Projects" ar ben y dewislen.

Cliciwch y botwm "+Ychwanegwch brosiect newydd".

Enwch eich prosiect "Gwnewch fi'n hapus" a'i osod i ddysgu i cydnabod "testun" a chliciwch y botwm "Creu".

Gwnewch Fi'n Hapus

Gwnewch sprite gyda thair gwisg :

1) Gwyneb "Ansicr".

2) Gwyneb "Hapus".

3) Gwyneb "Trist".
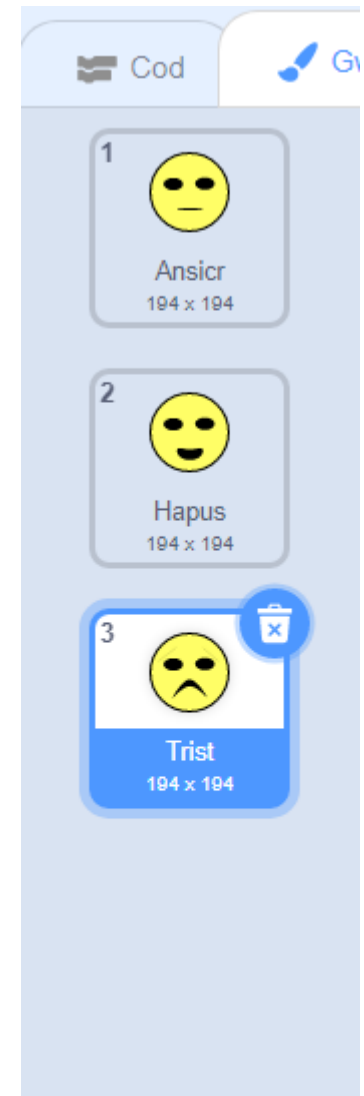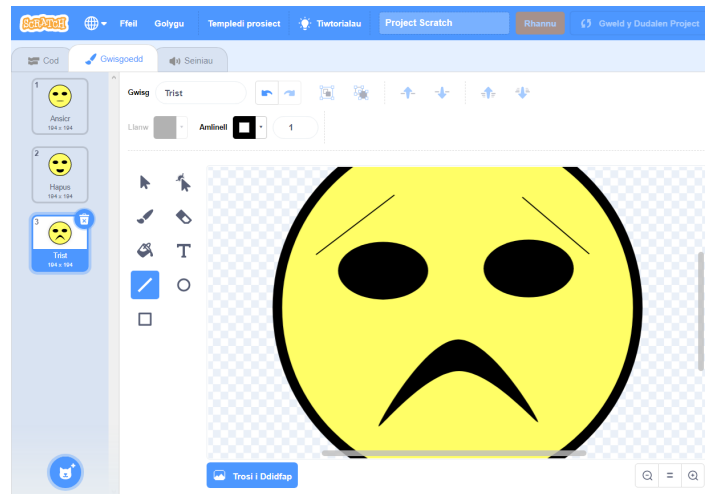
Gwnewch Fi'n Hapus

Rhaglennwch eich Corlun i:

1) Pan ddechreuwn y gêm, dangos gwyneb ansicr.

2) Gofyn y cwestiwn "Ysgrifennwch neges: "

3) Os mai'r ateb yw "Rydych chi'n cŵl" yna, dangos gwyneb hapus.

3) Os mai'r ateb yw "Dwi ddim yn hoffi ti" yna, dangos gwyneb drist.

Gwnewch Fi'n Hapus
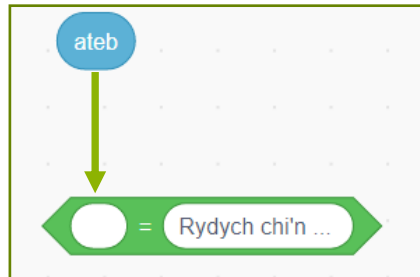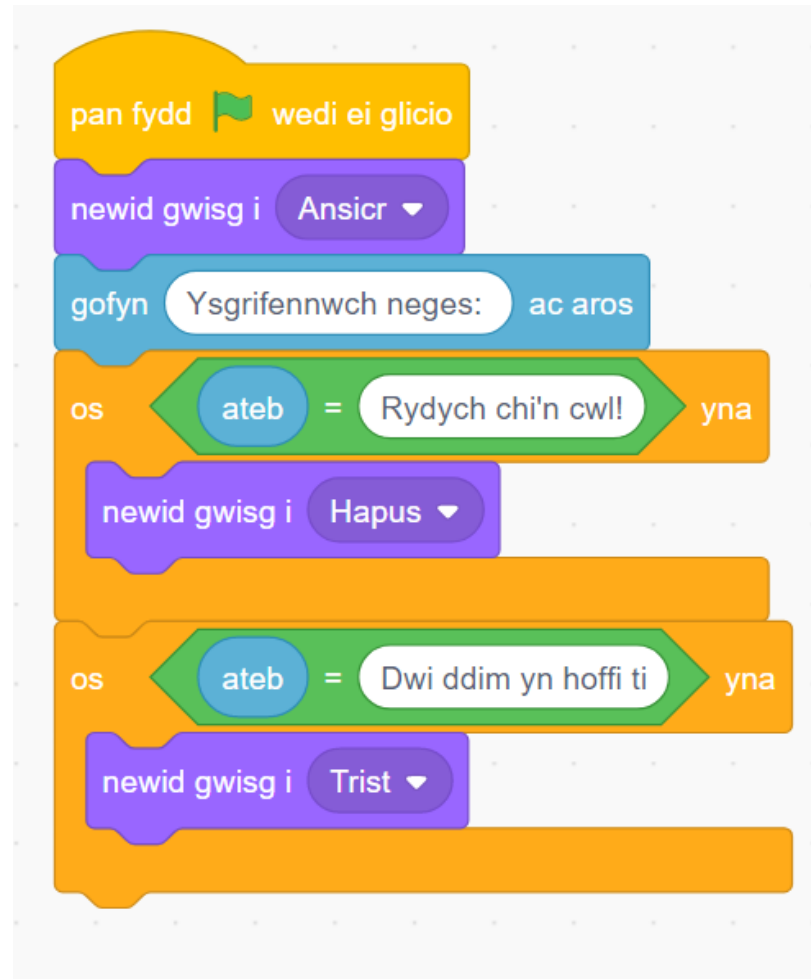
Gwnewch Fi'n Hapus

Beth Ydych Chi Wedi'i Wneud Hyd yn Hyn?

Rydych chi wedi creu corlun sy'n hapus pan ddywedwch ei fod yn 'cŵl' ac yn drist pan ddywedwch eich bod chi ddim yn hoffi nhw'.

Fodd bynnag, beth yw'r broblem gyda'n gêm?

Sut allwn ni ei wella?

Gwnewch Fi'n Hapus

Hyfforddi'r Peiriant

Gwnewch Fi'n Hapus

Cliciwch y botwm "Ychwanegwch enghraifft" yn y label "pethau_caredig", a theipiwch y pethau mwyaf caredig y gallwch chi feddwl amdani.

Cliciwch y botwm "Ychwanegwch enghraifft" yn y label "pethau cas", a theipiwch y sarhad mwyaf creulon y gallwch chi feddwl amdano (**byddwch yn rhesymol ac yn briodol, dim byd anweddus**).

Ysgrifennwch o leiaf **chwe** chanmoliaeth ac o leiaf **chwe** sarhad.

(Yn Saesneg gan nad yw'r algorithm dysgu peiriant yn deall Cymraeg)

Gwnewch Fi'n Hapus

Cydnabod **text** fel **pethau_caredig or pethau_cas**

< Yn ôl i'r prosiect

+ Ychwanegu label newydd

pethau_caredig

Your hair looks great today

You're a lovely person

I appreciate you

I think you're amazing

That Jacket looks great on you

You're my best friend

+ Ychwanegwch enghraifft

6

pethau_cas

You smell

I don't like you

You're an idiot

You smell bad

You are so useless

I hate you

+ Ychwanegwch enghraifft

6

Gwnewch Fi'n Hapus

Cliciwch ar y ddolen "<Yn ôl i'r prosiect".

Yna cliciwch ar y botwm "Dysgu a Phrofi".

Cliciwch ar y botwm "Hyfforddi model dysgu peiriant newydd". Cyn belled â'ch bod wedi nodi nifer cyfartal o enghreifftiau, dylai'r cyfrifiadur ddechrau dysgu sut i adnabod negeseuon o'r enghreifftiau rydych chi wedi'u rhoi iddo.

Beth Ydych Chi Wedi'i Wneud Hyd yn Hyn?

Rydych chi wedi dechrau hyfforddi cyfrifiadur i gydnabod bod testun yn garedig neu'n gas.

Gelwir hyn yn "ddysgu dan oruchwyliaeth" oherwydd y ffordd rydych chi'n goruchwylio hyfforddiant y cyfrifiadur. Bydd y cyfrifiadur yn dysgu o batrymau yn yr enghreifftiau rydych chi wedi'u rhoi iddo.

Gwnewch Fi'n Hapus

Rhaglennwch eich Corlun i:

1) Pan ddechreuwn y gêm, dangos gwyneb ansicr.

2) Gofyn y cwestiwn "Ysgrifennwch neges: "

3) Os cydnabyddir bod yr ateb yn "garedig" yna, dangos wyneb hapus.

4) Os cydnabyddir bod yr ateb yn "gas" yna, dangos wyneb trist.

Gwnewch Fi'n Hapus
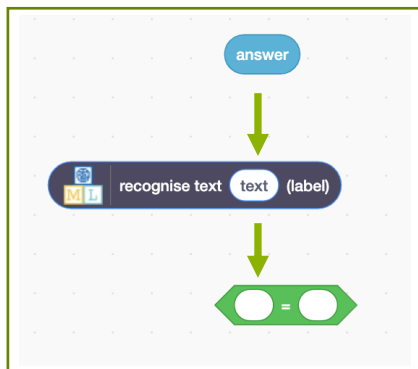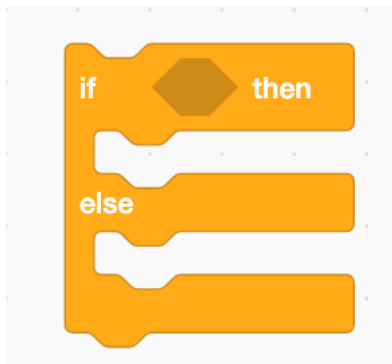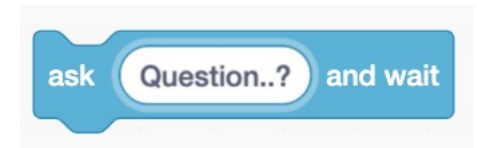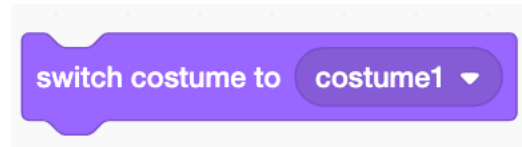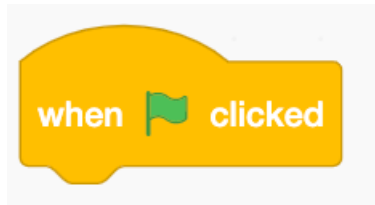
Gwnewch Fi'n Hapus

Tips

More examples!
The more examples you give it, the better the computer should get at recognising whether a message is kind or mean.

Try and be even
Try and come up with roughly the same number of examples for kind and mean.
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 messages.

Mix things up with your examples
Try to come up with lots of different types of examples.
For example, make sure that you include some long examples and some very short ones.

What have you done?

You have modified your Scratch character to use machine learning instead of the earlier approach.

The more examples you give it, the better it should get at recognising messages correctly.

Activity: 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?

Write a reply (easy)
Instead of just changing the way they look, make your character reply, based on what it recognises in the message!

Try a different character (medium)
Instead of a person's face, why not try something different, like an animal?
It could react in different ways, instead of smiling.
For example, you could make a dog that wags their tail if you say something kind to it!
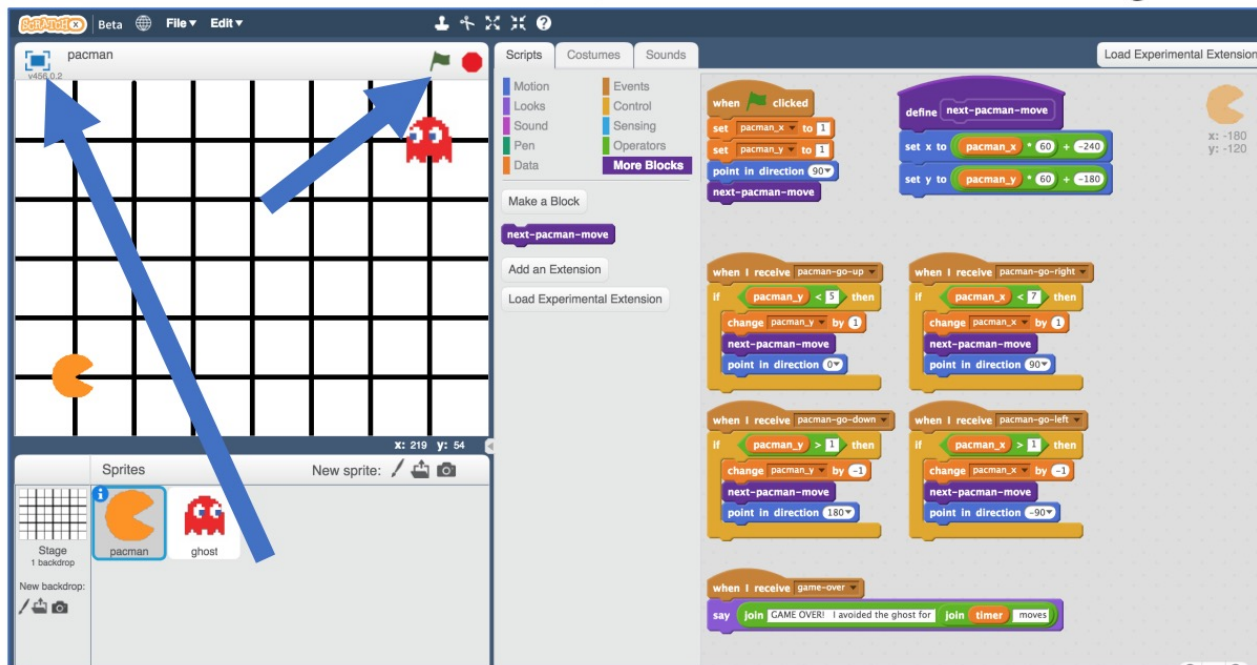
Different emotions (hard)

Instead of kind and mean, could you train the character to recognise other types of message?

Activity: ML Simulation 2

Pac-Man

In this project you will create a Pac-Man game in Scratch that is able to learn from how you play.

Pac-Man

Go to https://machinelearningforkids.co.uk/scratchx in a browser.
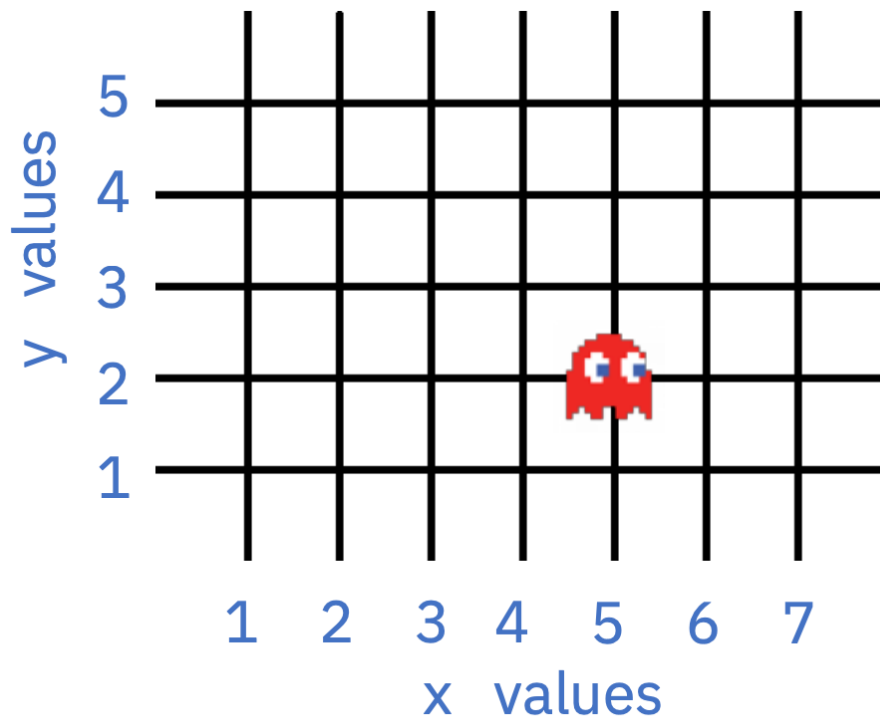
Click Project templates -> Pac-Man to open the Pac-Man template for this project.

Play a few games of Pac-Man and avoid the ghost as long as you can.

Pac-Man

Representing Pac-Man in Scratch:

The game board is a graph. Pac-Man and the ghost can only travel along lines.
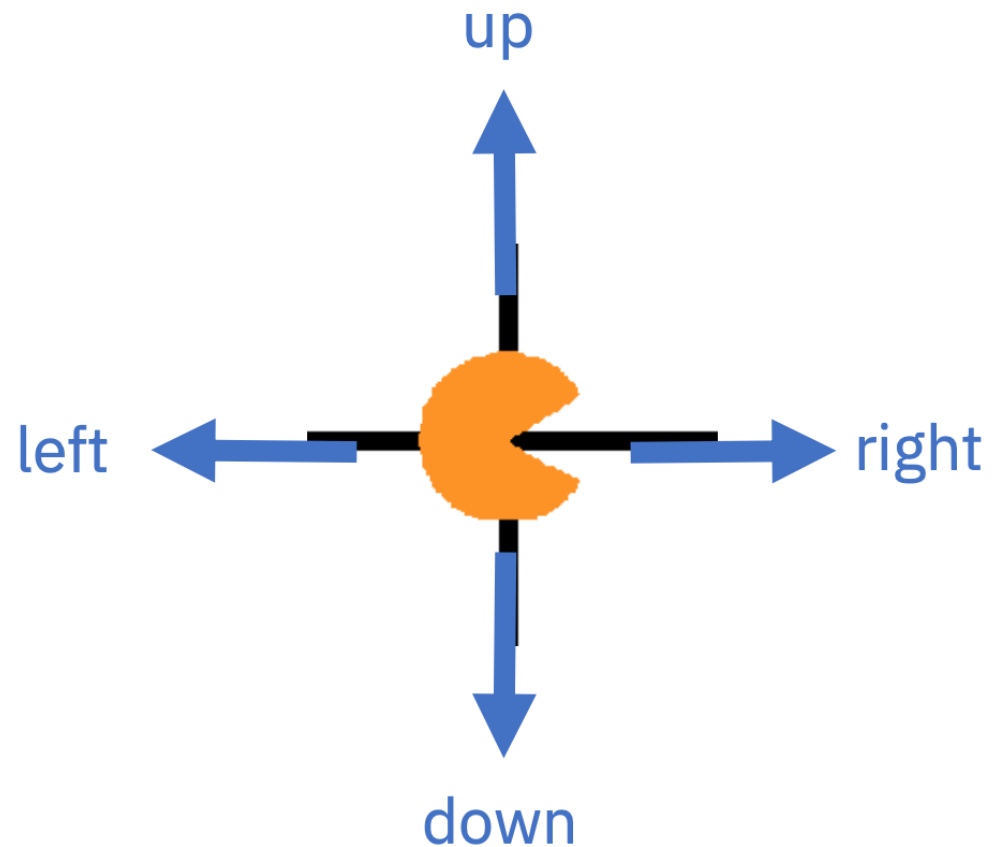
The location of each character is stored as:
- an x-value (a number from 1 to 7) and,
- a y-value (a number from 1 to 5).

For example, the ghost on the left is at: X = 5 Y = 2.

Pac-Man

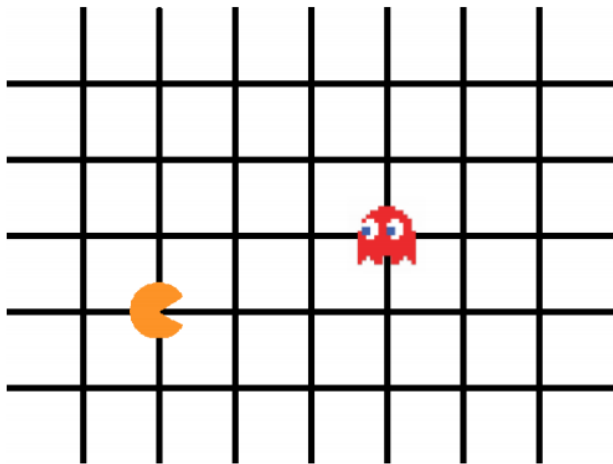At each turn, the character has to choose between four moves: up, down, left, right.

(There are no diagonal moves.)

up

left

right

down

What are we going to do?

You're going to train Pac-Man to avoid the ghost. You will do this by showing it examples of how you play the game.

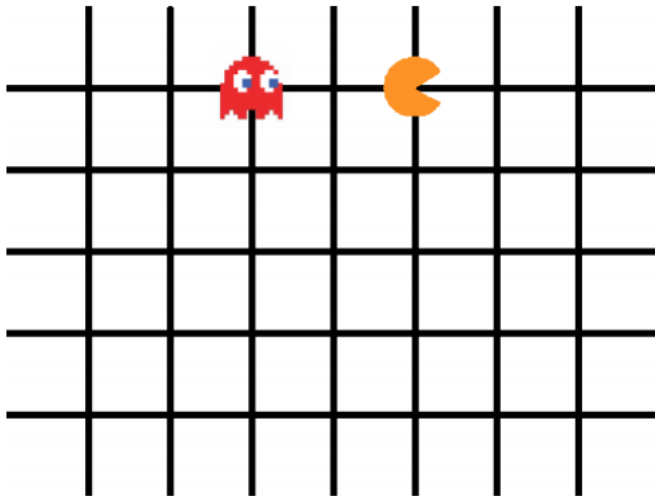Imagine the board looks like this, if you decide to go up:

Pacman x	2
Pacman y	2
Ghost x	5
Ghost y	3

This table represents choice "up".

What are we going to do?

Imagine the board looks like this, if you decide to go down:

Pacman x	5
Pacman y	5
Ghost x	2
Ghost y	5

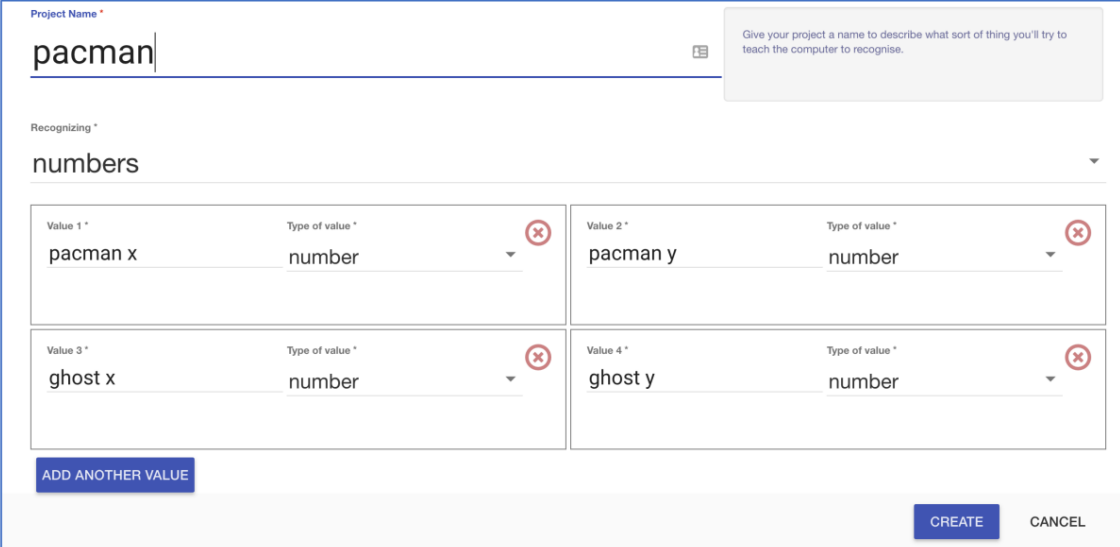The table represents choice "down".

Pac-Man

Go to "Projects".

Click the "+Add a new project" button.

Name your project "pacman" and set it to learn how to recognise "numbers".

Pac-Man

Click "Add a value" and name a value "pacman x" and make it a "number".

Click "Add another value" again and repeat to add values for the other three positions: "pacman y", "ghost x", "ghost y"

Pac-Man

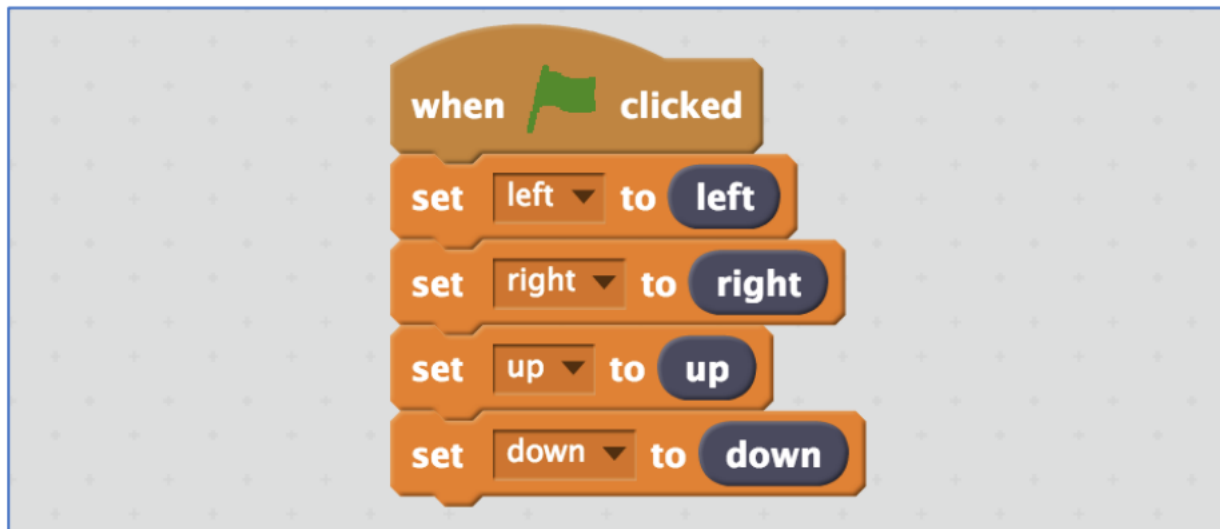Click "+ Add new label" and create labels shown below:

Pac-Man

Open the Pac-Man template again.

Click on the "Stage" and find the "when green flag clicked" script that sets the "left", "right", "up", "down" constants.
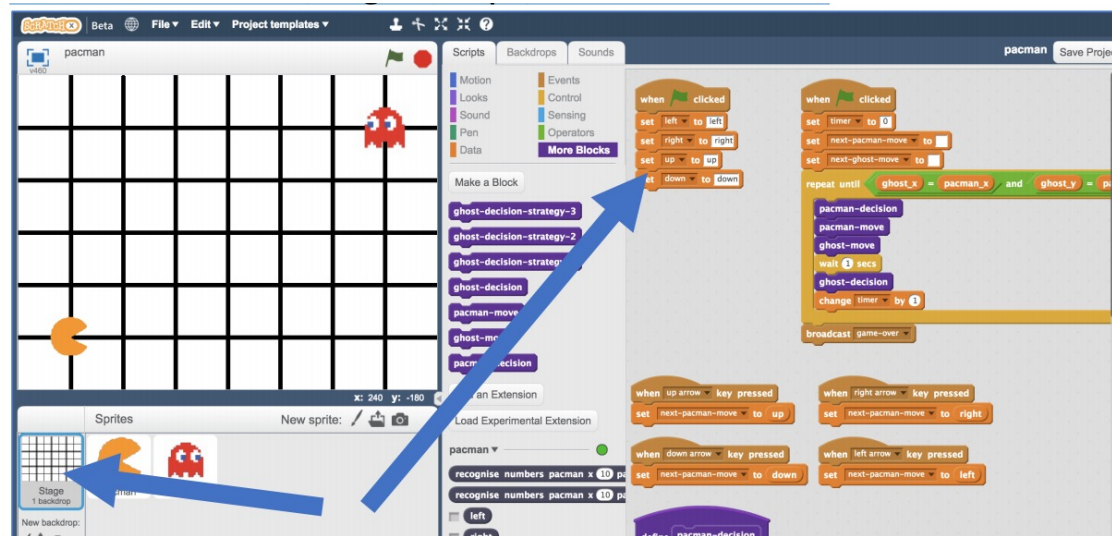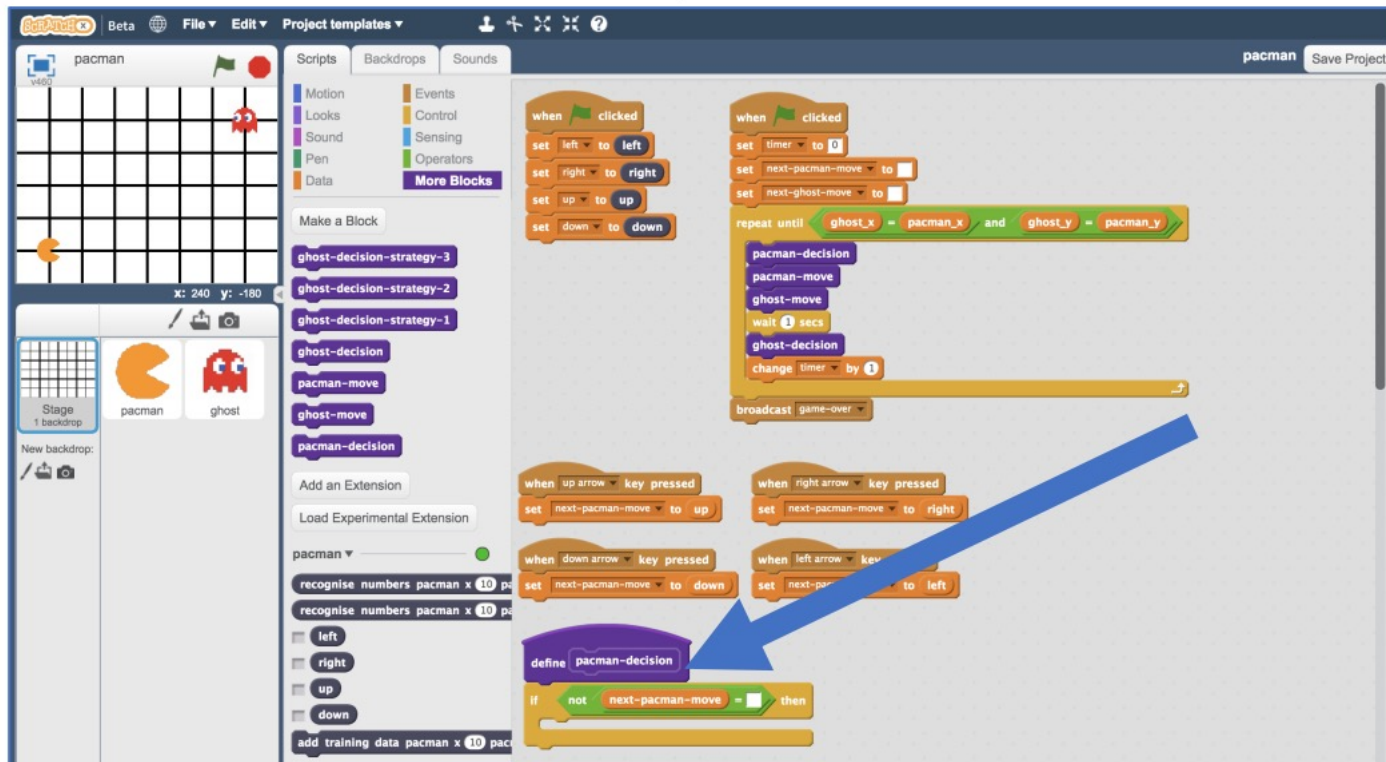
Pac-Man

Modify the script to use your new blocks from the pacman project.

Pac-Man

Find the custom block "pacman-decision".

Pac-Man

Update the "pacman-decision" block to add every move you make to your machine-learning training data.

Save your work and call it pacman-learn.

Pac-Man

Click the "< Back to project" link, then click the "Train" button You should see the training examples you collected by playing Pac-Man.

What Have You Done So Far?

You are teaching a computer to play Pac-Man.

You updated a Scratch Pac-Man game so that it can collect examples of how you play and add them to a set of examples.

You will use those examples to train a machine learning "model".

Pac-Man

Click the "< Back to project" link.

Click the "Learn & Test" button.

Click the "Train new machine learning model" button.

Pac-Man

Click on the Stage.
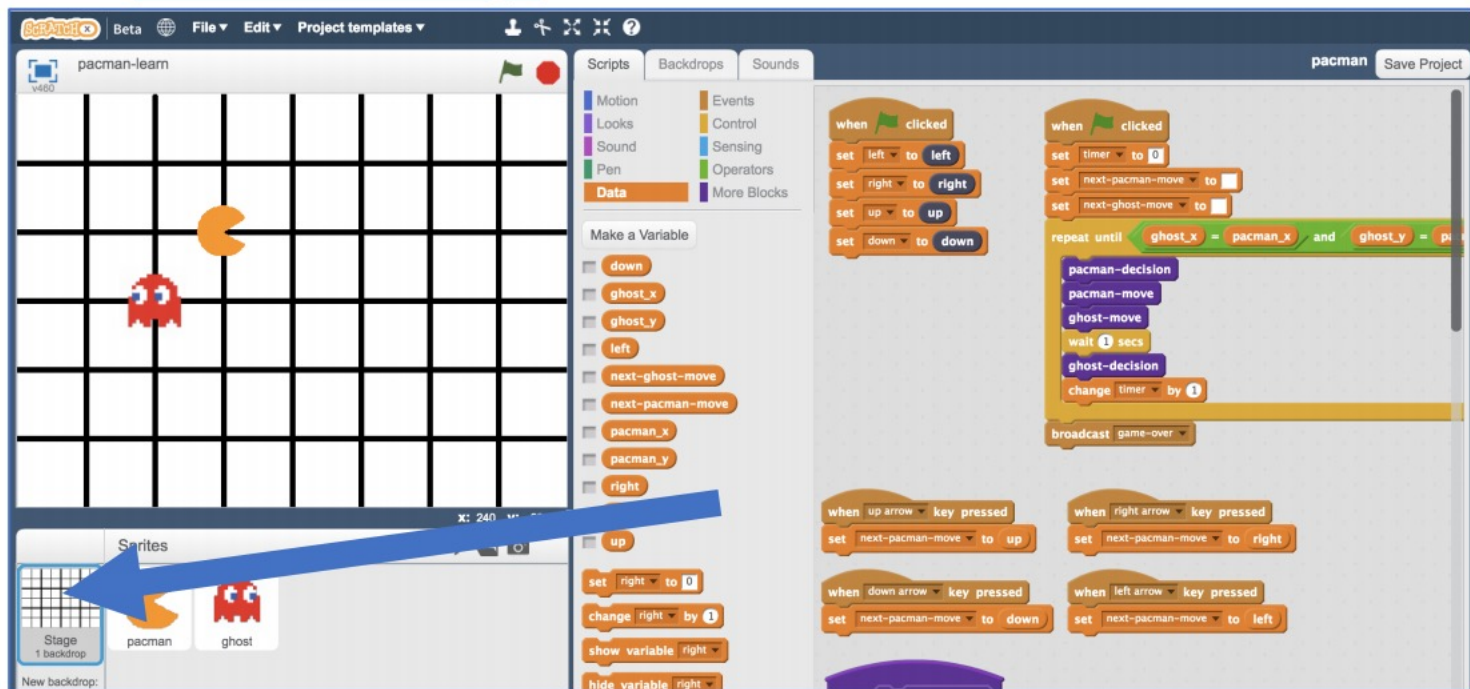
Pac-Man

Delete the key-press scripts because it's the computer's turn.

These are the scripts you do not need any more:
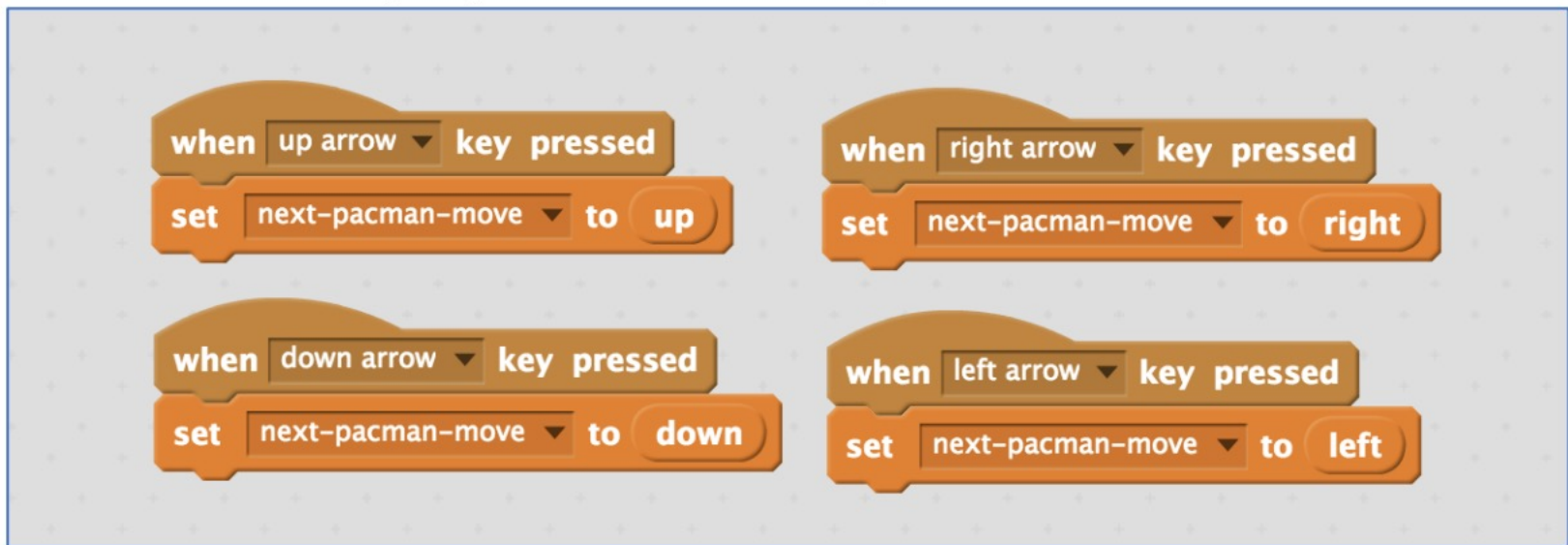
Pac-Man

Modify the custom "pacman-decision" block Instead of learning from what you are doing, now you want it to use your machine learning model.

Pac-Man

Modify the "Click Green Flag" script to remove "wait 1 second". You want the script to end up looking like this
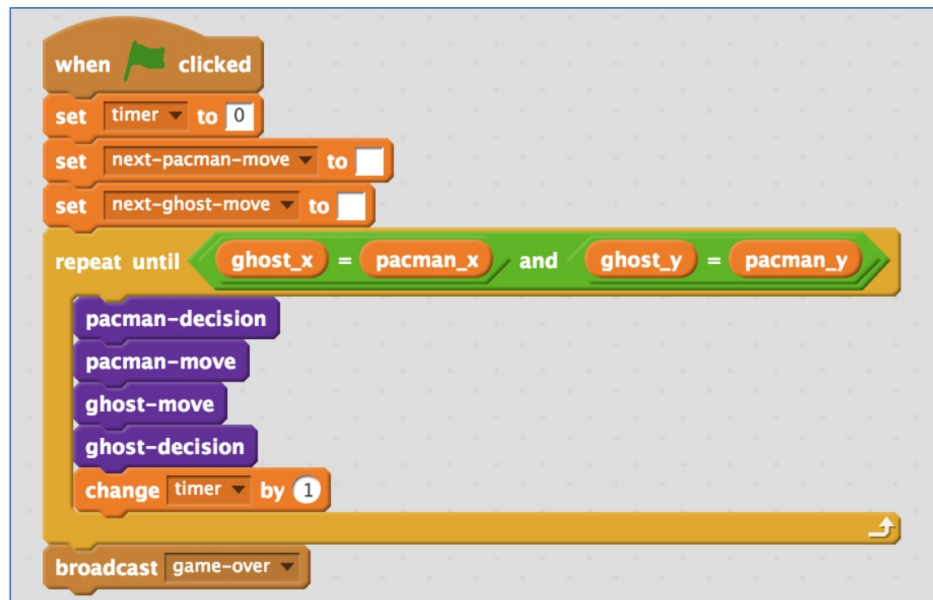
Save your work and call it pacman-play.

How To Improve Your Pac-Man?

Open training project "pacman-learn".

Play the game even more adding to the training data.

Go back to the training tool. Click the "Train new machine learning model" button.

Open testing project "pacman-play".

What Have You Done So Far?

You have trained a computer to play Pac-Man. You did not have to describe the rules to the computer.

Instead, you showed it how you play, and taught the computer by collecting examples of decisions that you made when you played.

Tips

Don't be kind!

You might be tempted to go easy on the ghost when you're playing against it. Don't. It is learning from the way that you play. If you do not play well, it cannot learn how to play well. If you want it to get better quickly, play as well as you can.

Keep training

The more examples the computer has to learn from, the better it will get. If you have time, play a lot of games and train a new model again.

Activity: 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?

Add another ghost (easy)

The game is beatable with only one ghost – Pac-Man can just carry on avoiding the ghost forever. But with a second ghost chasing after Pac-Man, it will get really hard.

Change the game board (medium)
Try making the game board bigger. Or add obstacles that Pac-Man and the ghost will need to go around.

Make your own game (hard)

This does not only work with Pac-Man. Why not make your own game in Scratch, and then train a machine learning model to be able to play it?

Activity: Create another ML game

Now that you've finished, why not go on to:

https://machinelearningforkids.co.uk/#!/worksheets

And try out the "Smart Classroom" project - *Create a smart assistant in Scratch that lets you control virtual devices.*

Click "Download" -> Quick simplified version of the project, ideal for use as a first introduction to the tool - "Download project worksheet".