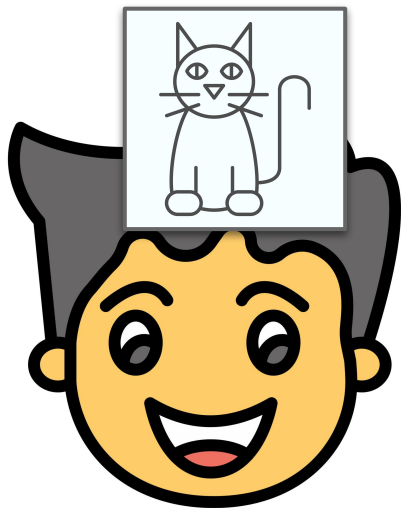
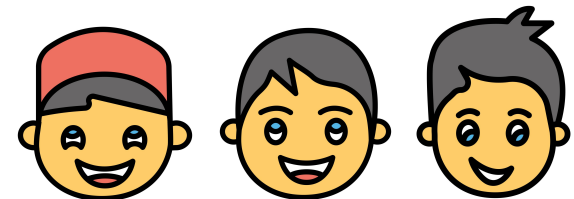


# Celebrity Heads Just add Computer Science!



**AM I  
HUMAN?**

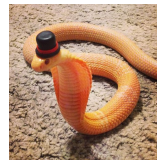
**NO**



# What do Decision trees do?

We can use them for classifying things!

You just need to ask a series of Yes/No questions to narrow down the possible answers. A decision tree where every question has only two options (like yes/no), is called a binary tree.



# What do Decision trees do?

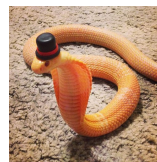
We can use them for classifying things!

You just need to ask a series of Yes/No questions to narrow down the possible answers. A decision tree where every question has only two options (like yes/no), is called a binary tree.

What questions do you need to ask to figure out

**What animal am I thinking of?**

as quickly as possible?



# What animal am I thinking of?

Does it have hair/fur?

YES

NO

Could you keep it as a pet?

Does it have feathers?

YES

NO

Is it a cat?

Is it a Giraffe ?

YES

NO

Is it a farm animal ?

Does it have legs ?

YES

NO

YES

NO

YES

NO

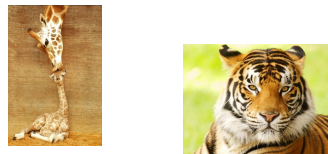
YES

NO

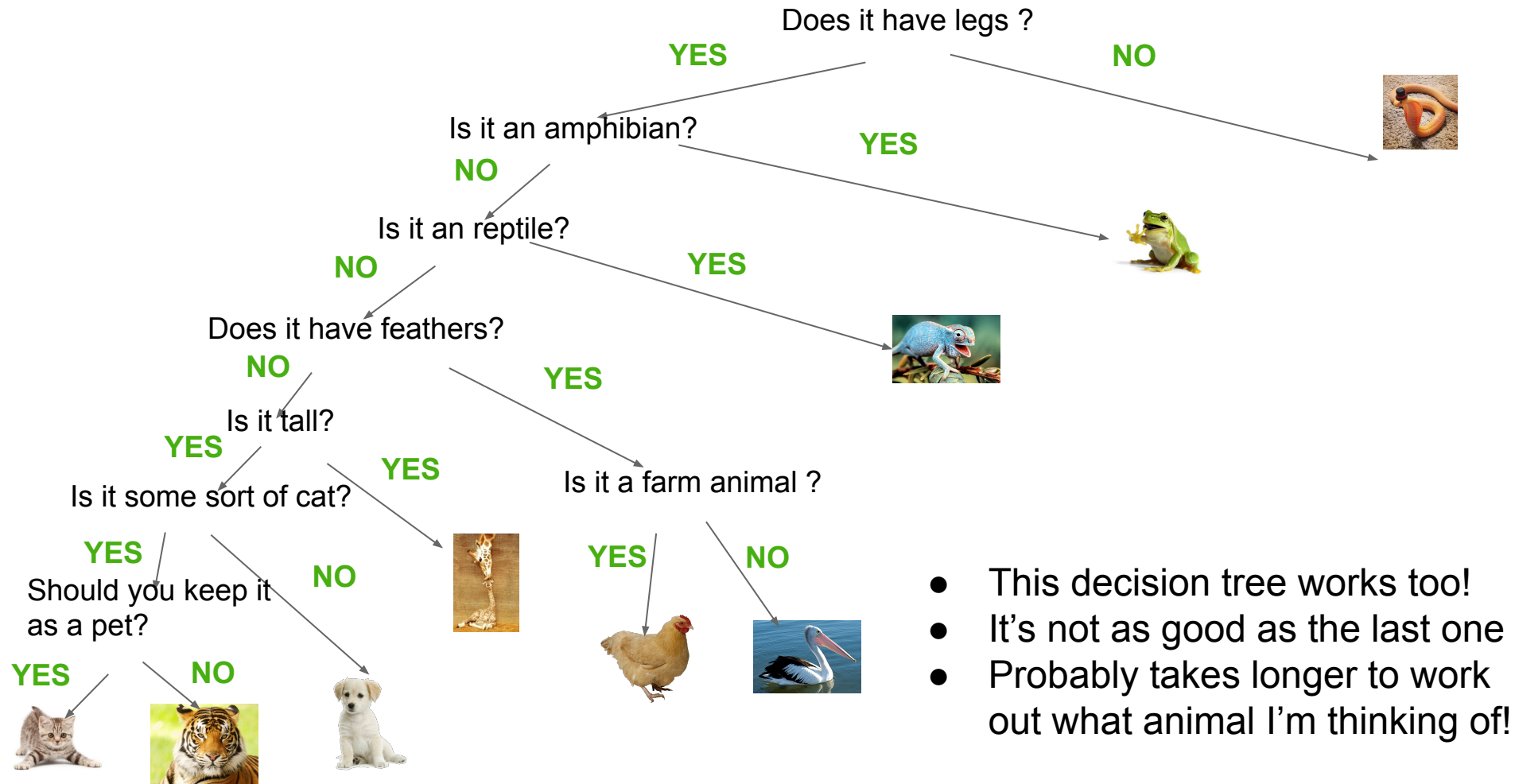
Is it a reptile?

YES

NO



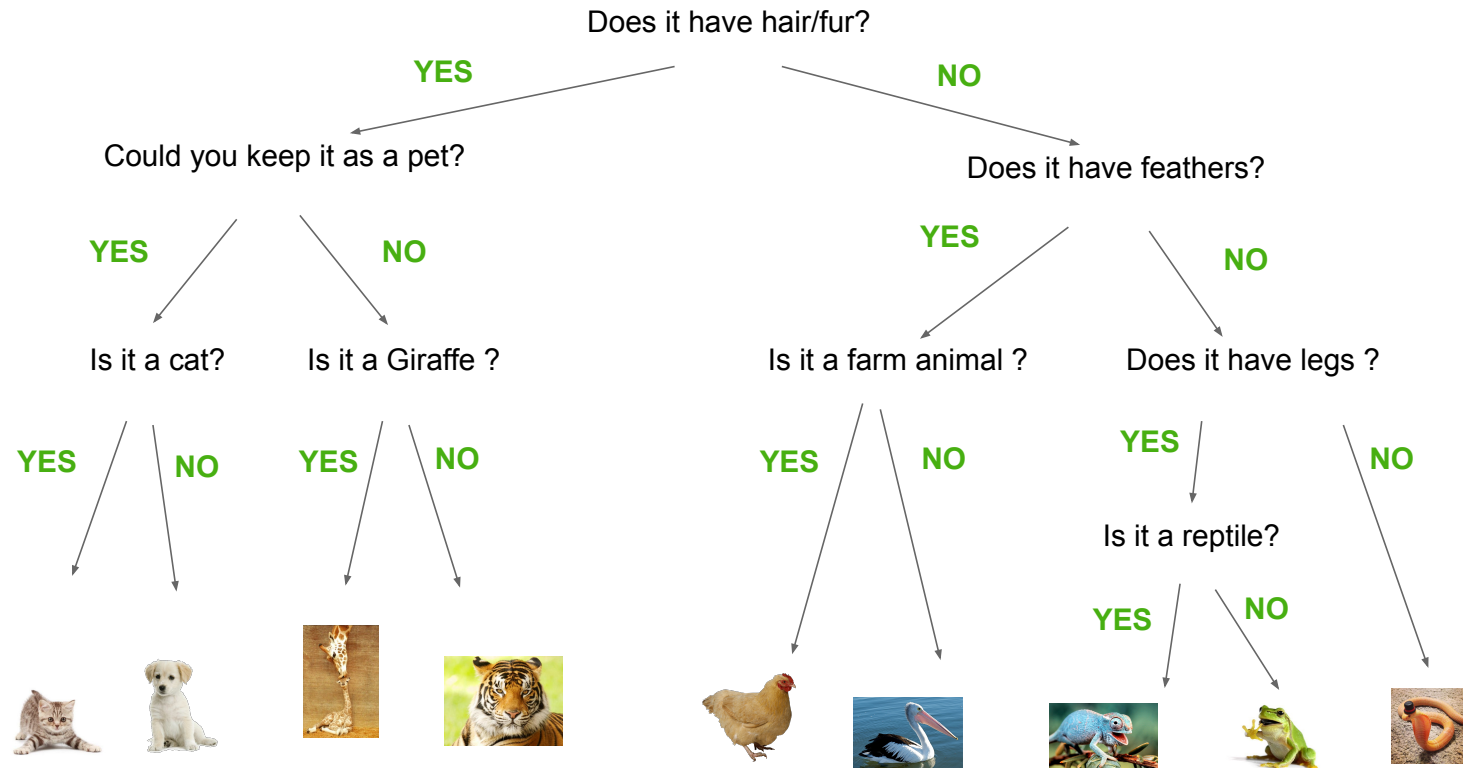
# What animal am I thinking of?



- This decision tree works too!
- It's not as good as the last one
- Probably takes longer to work out what animal I'm thinking of!

# So how do we build a good tree?

- Nice and even! (This is called a balanced tree)
- Every question splits the animals in half and rules out half the animals
- Gets to final animal faster



# So how do we build a good tree??

**Ask good questions, at the right time to halve the group**



Does it have hair/fur?

YES

NO



Does it have legs ?

YES

NO



# So how do we build a good tree??

Does it have hair/fur?

YES

NO



Could you keep it as a pet?

YES

NO



**Repeat for each half!**

**Now you've ruled some out maybe some different questions are useful.**

# So how do we build a good tree??

Does it have hair/fur?

YES

NO



Could you keep it as a pet?

Does it have feathers?

YES

NO

YES

NO



# What are we going to do?

- Each team gets a pack of Celebrity Heads cards.
- There are 18 cards with information about the characters.
- There are 2 packs to try

Dog



Type: Animal  
Class: Mammal (Place  
Home: House pet

Sunflower



Type: Plant  
Feature: Flowers  
Home: Wild or a garden

Apple



Type: Plant  
Feature: Fruit  
Home: Kitchen or farm

**Garnet**  
Occupation: Defender of Earth  
Status: Fictional (Steven Universe)  
Human? ✖  
Super powers? ✔  
> Calm but firm temper  
> Demonstrates effective leadership  
> Punches things with great force

**Marie Curie**  
Lived to: 66  
Family: Married, one child  
Born: 7th Nov, 1867 (Warsaw, Poland)  
> Only scientist to ever win Nobel Prizes in two fields (Chemistry and Physics)  
> Coined "radioactivity" and discovered radioactive elements

**Princess Bubblegum**  
Occupation: Ruler of Candy Kingdom, Scientist  
Status: Fictional (Adventure Time)  
Human? ✖  
Super powers? ✖  
Created: 7th Dec 2008  
> Defends the very silly Candy Citizens  
> Has a passion for science and invention, producing bizarre and useful devices

- Your task is to look at the information on the cards and make a Celebrity Heads algorithm decision tree!

# How do we do it?

The image shows three character cards with various attributes and a 'Human?' checkbox. The first card is for Marie Curie, a real-life scientist. The second is for Princess Bubblegum, a fictional character from Adventure Time. The third is for Garnet, a fictional character from Steven Universe. Each card has a title, a photo, and several fields for information like occupation, status, and birth date. There are also checkboxes for 'Human?' and 'Super powers?'.

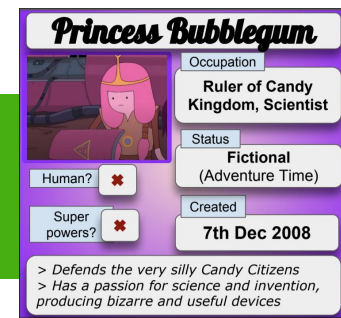
Character	Occupation	Status	Human?	Super powers?
Marie Curie	Physicist Chemist	Deceased	<input type="checkbox"/>	<input type="checkbox"/>
Princess Bubblegum	Ruler of Candy Kingdom, Scientist	Fictional (Adventure Time)	<input type="checkbox"/>	<input type="checkbox"/>
Garnet	Defender of Earth	Fictional (Steven Universe)	<input type="checkbox"/>	<input checked="" type="checkbox"/>

- **Look** at the information on the cards
- **Start at the top** and decide a question that will split the group of celebrities in half. The answer for the question is YES or NO
- Repeat **for each of the halves** you just made
- Gradually split it down until each group has only one left - write the character at the bottom of that branch

Remember - make a balanced tree!

- Ask **good questions** that will split the group in half
- Make your tree as **flat and even** as possible

# How to play?



***When you've finished building your Celebrity Heads algorithm decision tree ...***

- Someone picks a card at random (don't look at it!)
- If they want to, stick it to their forehead like in Celebrity Heads!
- That person asks your group the questions on your decision tree to work out which character they are
- Count how many questions they had to ask to work it out - the lower the better!

***You can call a tutor over to play your game!***

# Let's do it

- Get into groups of 3 - 5
- Each group gets:
  - 1 sheet butchers paper
  - Markers
  - Student instruction sheet
  - First card set
- Create your decision tree - write it on the paper
- Test it out then call a tutor over to play it
  
- Grab the second (harder) card set and another sheet of paper
- Do it again!

**Ask a tutor if  
you get stuck!**