

Can AI make
mistakes?



DISCOVER AI

with **ALYA**

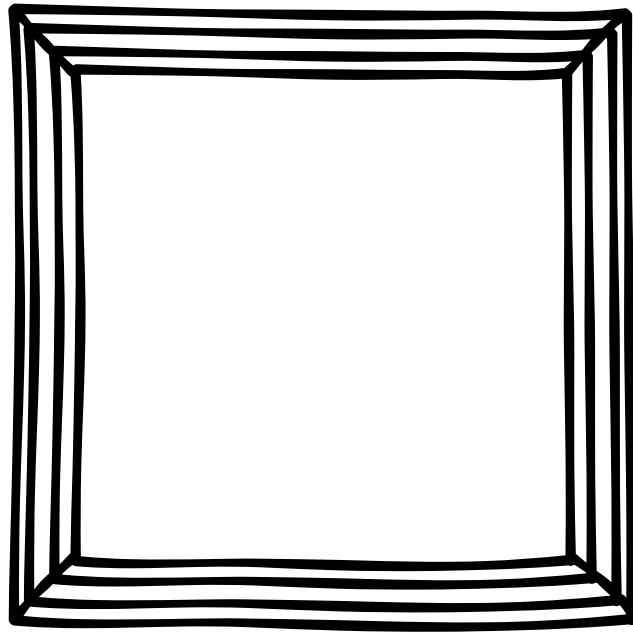
Can robots
have
emotions?



Is AI good or bad?



Based on the book *Alya the Pathmaker*
by Yasemin Allsop



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MY AI PLEDGE

PERMISSION



I will always ask a grown-up for permission before I use any AI tool.

KEEP SAFE



I will not type my full name, address, or school name into an AI.

BE RESPONSIBLE



I will never use AI to say mean things or scare people.

DOUBLE CHECK



AI can make mistakes or be biased, so I will not believe everything it says.

BE HONEST



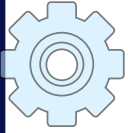
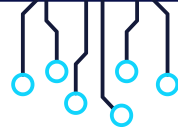
If I use AI to help with my work, I will tell my teacher or parents.

BRAIN POWER



I will always first use my brain to learn before asking the computer.

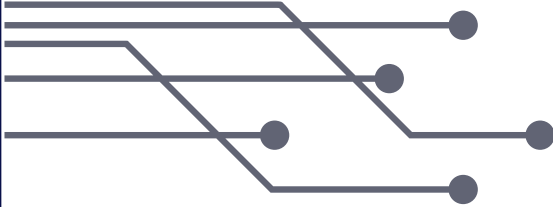
DRAW AI



Draw or write down anything that comes to your mind about AI. Once you have completed the activities in the book, you can come and add new things that you learned using different coloured pens.

A large rectangular area for drawing or writing, enclosed in a blue border. The top of the area has a yellow header bar with three small circles (two white, one blue) on the left side, resembling a window title bar. The main area is white and empty, with blue circuit board patterns in the bottom corners.

WHAT IS AI?



Artificial Intelligence (AI) is a special kind of computer program that teaches computers to learn, listen, and make decisions like humans do.



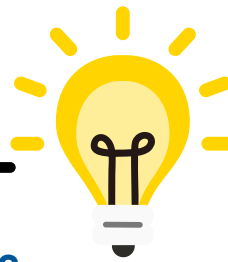
AI learns how to recognise things by looking at thousands of pictures really fast.



AI can be creative and make art, music, and stories using ideas that were created by humans.

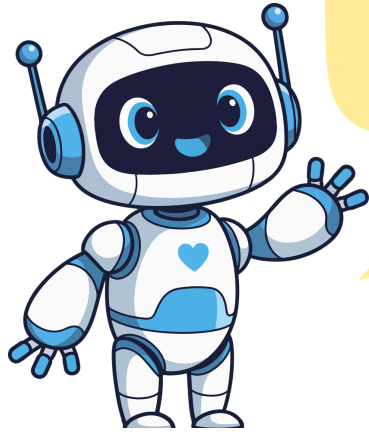


AI is not perfect and can sometimes get confused or give the wrong answer.

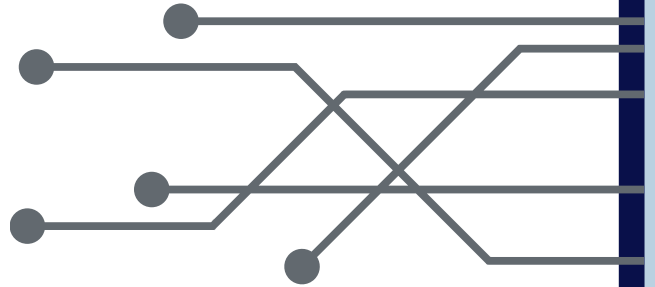


Did you know?

The human brain reads about 250 words per minute. An AI can process millions of pages of text in just a few seconds! That is how it learns so fast.



You probably use AI every day without knowing it when playing video games and chatting with smart voice assistants like Siri or Alexa.



Put a tick (✓) next to the object that is AI

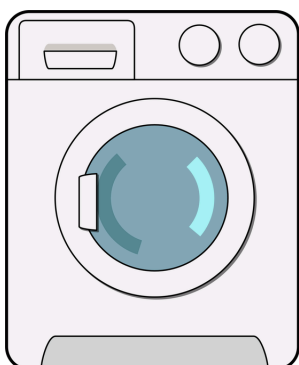


Smart assistant (Alexa)

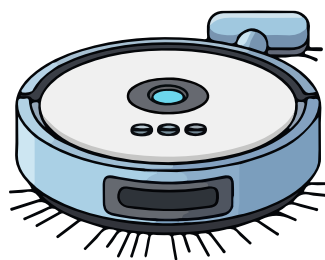
Calculator



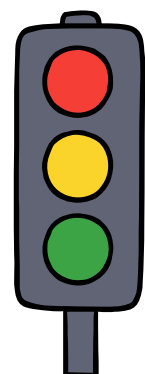
Self-driving car



Washing machine



Robot vacuum

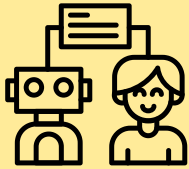


Traffic lights

AI TIMELINE

Alan Turing asks, "Can machines think?" He invents a test to see if a computer can trick a human.

1950



Eliza, the first chatbot. It acted like a therapist by repeating your words back to you.

1956



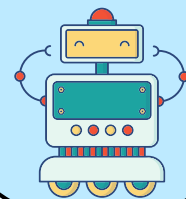
Scientists came up with the word 'Artificial Intelligence'.

Shakey, a robot that could plan its own path, was created.

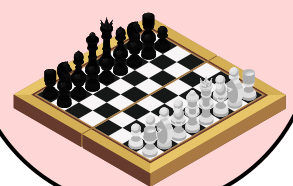
1966



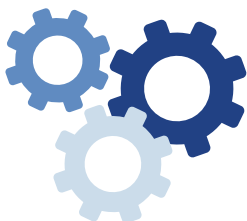
1972



1997



IBM Deep blue computer beats the World Chess Champion



What is next?

2030

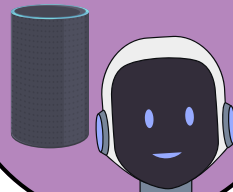
GPT-4. AI can create images and complete difficult tasks.

2024



Alexa smart assistant and Sophia, the humanoid robot.

2014 & 2016



2020



GPT-3. AI can write stories and answer questions.

2002

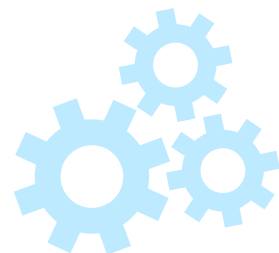


Rumba, a robot vacuum, cleans your house.

1999



AIBO, the first robot pet dog.



WEAK OR

ooo WEAK AI

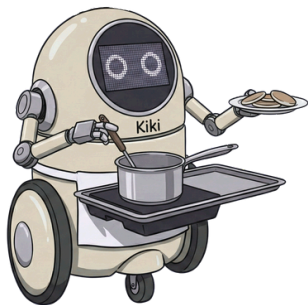
Weak AI is a computer program or robot that is super good at specific things. Siri, Alexa, Google Maps and robot vacuum are all Weak AI.

ooo STRONG AI

Strong AI is a robot that can learn anything it wants to. It can make its own decisions. Scientists are still trying to figure out how to build it.

After reading the information about Alya's AI friends, decide whether they are strong or weak AI. Explain why.

KIKI



I am programmed to cook food and clean rooms,
but sometimes I get confused and use muscle
cream instead of flour.

I can think and learn new things just like a
human. I even have real feelings, like being
scared or happy. I can transfer my brain from
one device to another using the cloud, so I can
always be close to Alya.

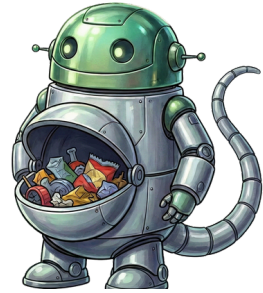
KIM



STRONG AI

We are strong metal machines built to lift heavy
space junk and rescue people, but we only move
according to our program.

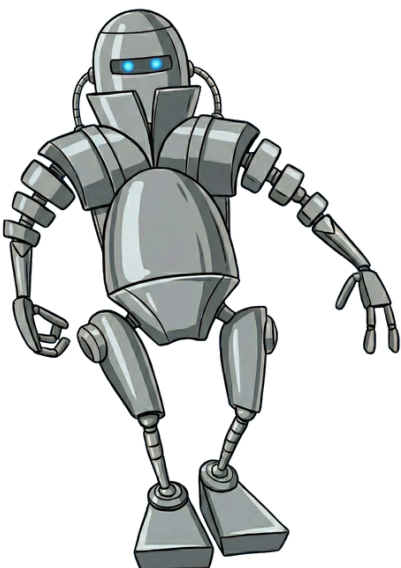
ATU-3



ATU-5



AKI



I can teach you about planets and repairing
spaceships. I can make decisions, and I have
real feelings. I felt sad when we left the
Pathmaker Academy and gave Kiki a kiss
and a blue rose.

WHAT IS A ROBOT?



Robots are specific machines that are programmed to carry out specific tasks without help from a person.



Robots have built-in computers that tell different parts of the robot how to complete a job.

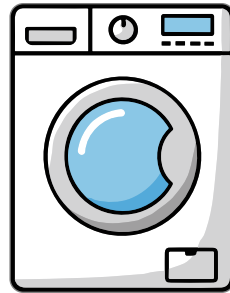
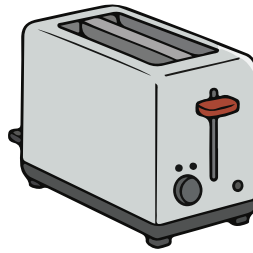


Did you know?

The word **Robot** comes from the Czech word robota, which means forced labour or hard work. The word was first used in a play over 100 years ago!

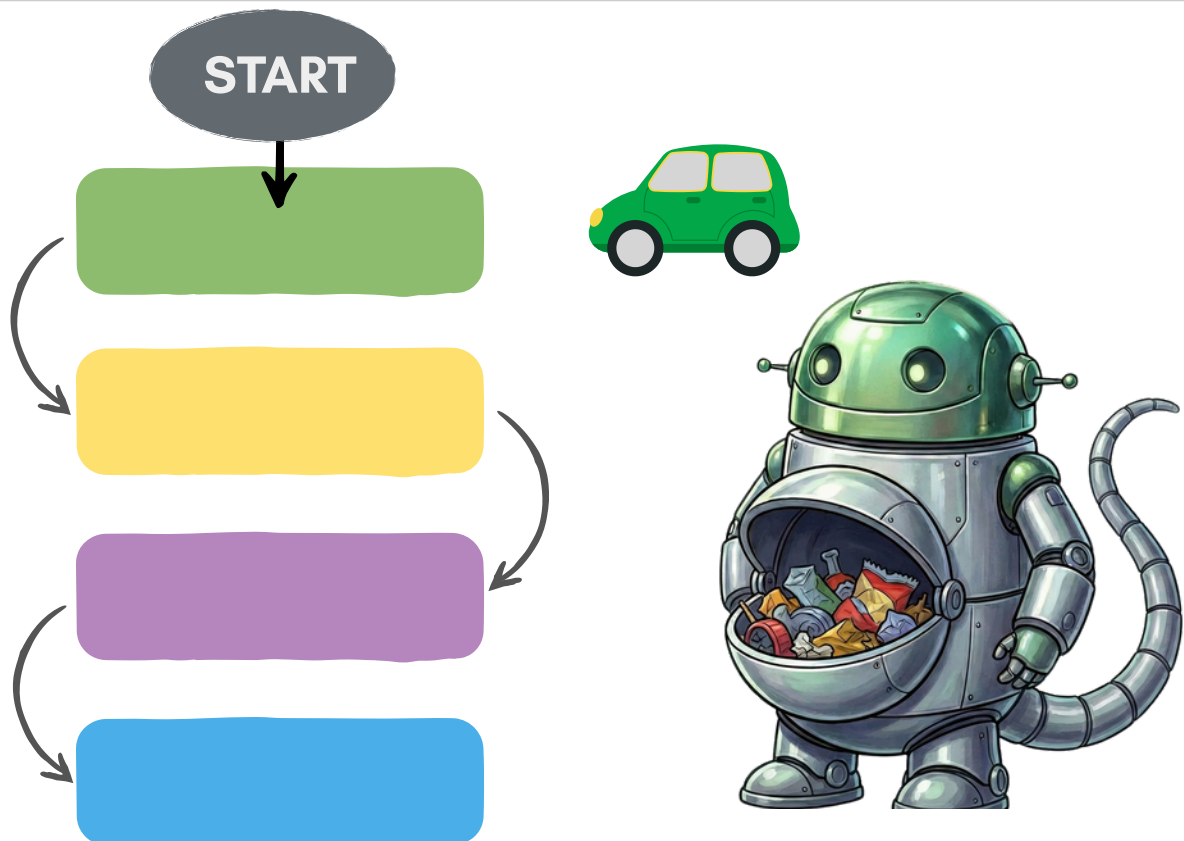
ooo

Washing machines, toasters and vending machines are **automated machines**. They have fixed programs and need humans to operate them.

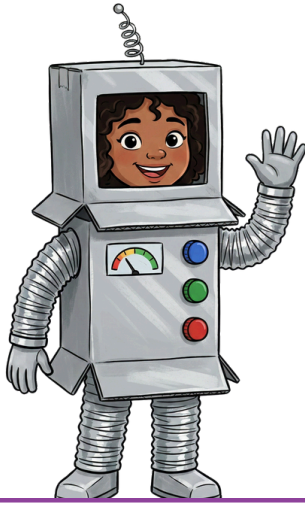


Write an algorithm for ATU-3

Humans use algorithms to program robots. An algorithm is a set of step-by-step instructions for completing a task. Can you write an algorithm for ATU-3 to pick up the green toy car and put it in its mouth in its belly?



AI VS ROBOT

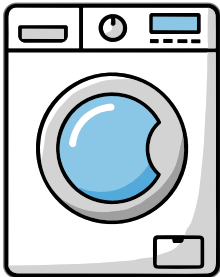


The robot is the body, but AI is the brain. Without a brain, the robot wouldn't know what to do. For example, a floor robot wouldn't be able to detect dirt without sensors and AI algorithms.

The **input** is the information we give the computer, like pressing a button on a washing machine.

The **output** is what the computer gives back. Like the washing machine making a sound when it is finished.

AI, robot or automated machine?



Washing machines

Floor robots

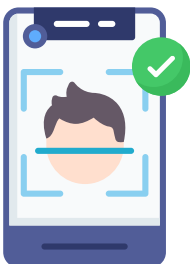
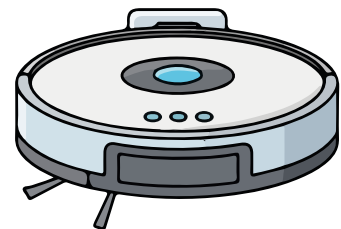


Photo unlock (Face ID)

SPACE JUNK

Atu's are robots programmed to sort the space junk.
Use their program to help them sort the items correctly.

If metal
scrap:
conveyer
belt

If battery:
conveyer
belt

If not metal
and blue:
blue
headed
ATU

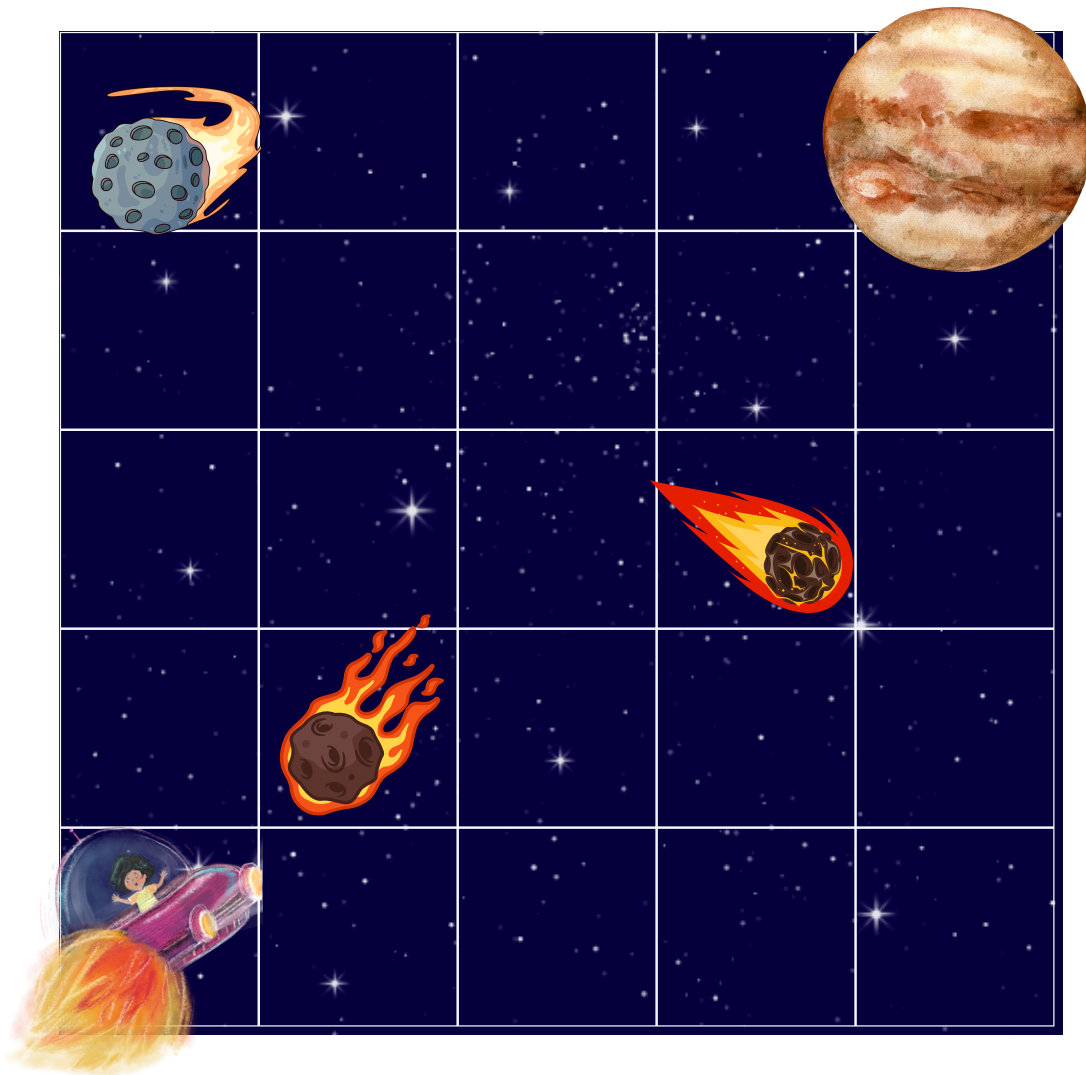
If not metal
and green:
green
headed
ATU

If not metal
and purple:
purple
headed
ATU



HELPING ALYA

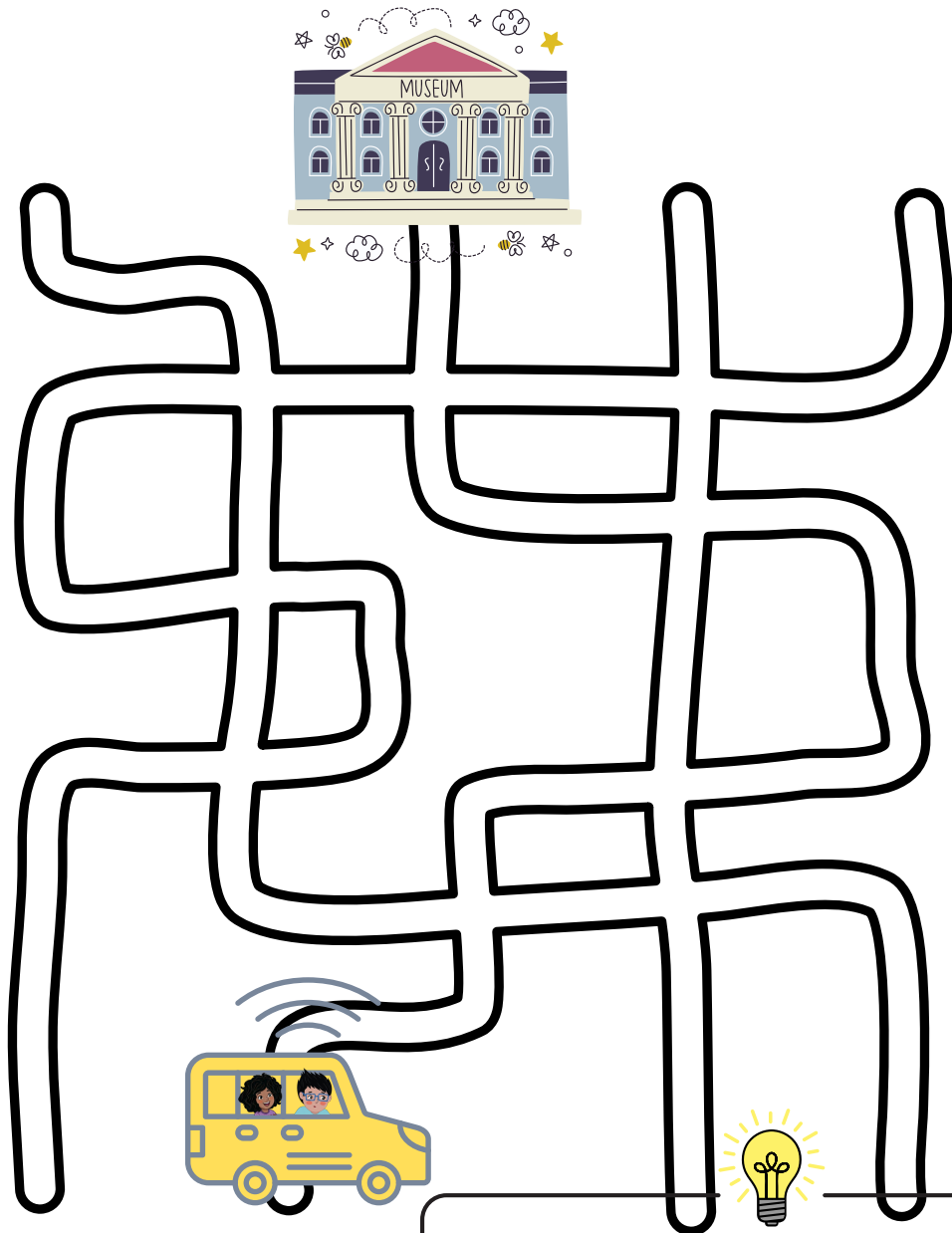
Alya needs help steering the ship through meteors to reach planet Venus. Can you take the role of Kim and help her with writing instructions? Compare it with your friend's instructions.



↑ Forward ← Left → Right

THE BEST ROUTE

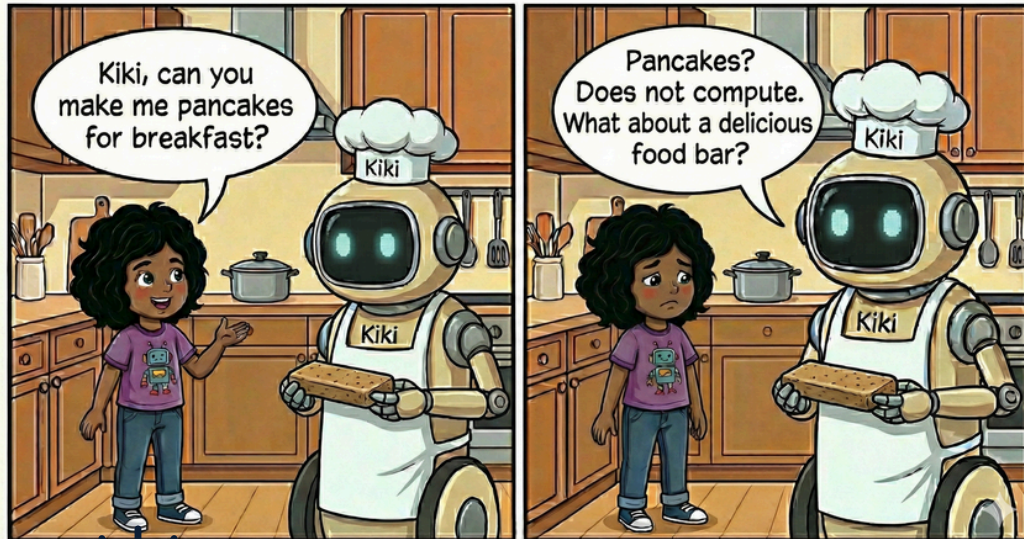
Alya is trying to reach to the British Museum from Finchley. She is using a self-driving car. How do you think the car decides the route? What is the best route why?



Did you know?

Self-driving cars don't just use cameras. They use a laser scanner called LiDAR. It shoots invisible laser beams to measure how far away objects are, so the car doesn't bump into them.

IS KIKI BIASED?



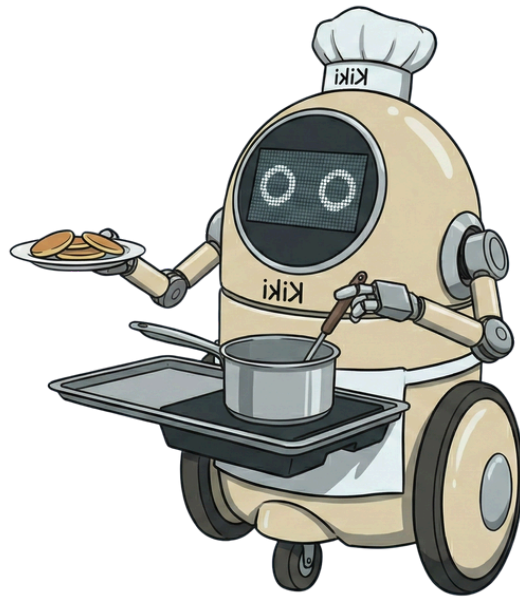
A Database is a collection of information that is organised so a computer can find data quickly.

Kiki searches her database for **pancake**, but finds zero results. It has to make breakfast based on the data it has. Draw what you think Kiki cooks for Alya.





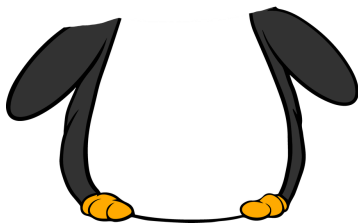
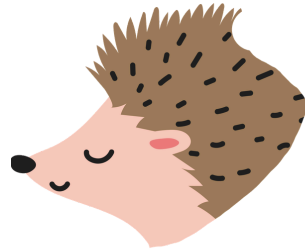
Bias is when a computer gets stuck on one idea because it hasn't learned enough yet, or it has learned wrong.



Kiki isn't broken; it just needs to learn! Help Kiki understand the word pancake by adding new items to its database. Draw or write them below.

CAN AI LEARN?

Can you recognise the animals below? Explain how.





Did you know that AI brains are inspired by human brains! Inside our heads, we have **neurons** that send messages. Scientists created **Artificial Neural Networks** to help computers process data and learn from it.

AI can recognise things by identifying patterns.
Go to the website below and try it yourself!

<https://quickdraw.withgoogle.com>

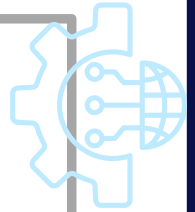


Tell us what happened.

TRAIN YOUR OWN AI



AI learns from examples, just like we do. You can teach the AI to recognise different sounds, images or poses. Use Google's Teachable Machine website to train a simple AI model.



<https://teachablemachine.withgoogle.com>



The better your description, the better the AI's drawing or writing. This is called prompt engineering.



How did it go?

LOST PHONE ON THE MOON



● ● ●

A phone has been found at the Pathmaker Academy on the Moon. Look at the table below. Can you solve the mystery like a detective using clues? How do you think AI facial recognition would find the owner?



Alya



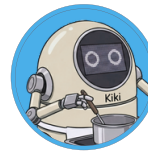
Ben



Aki



**Aunt
Margaret**



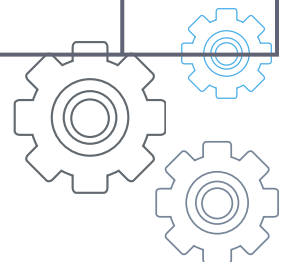
Kiki



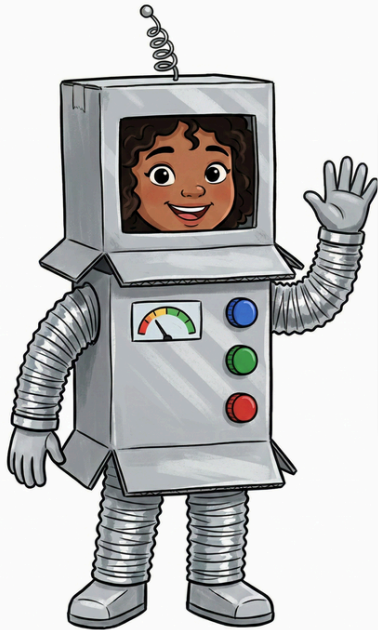
**Mr
Benson**

Human						
Hair is not black						
Wearing glasses						
Blue eyes						
Has hair curlers						

The phone belongs to:



GENERATIVE AI



“Generative AI is a special type of computer program that can create **NEW** things using its training data. It can write funny stories, paint pictures of astronauts, and even compose music!”

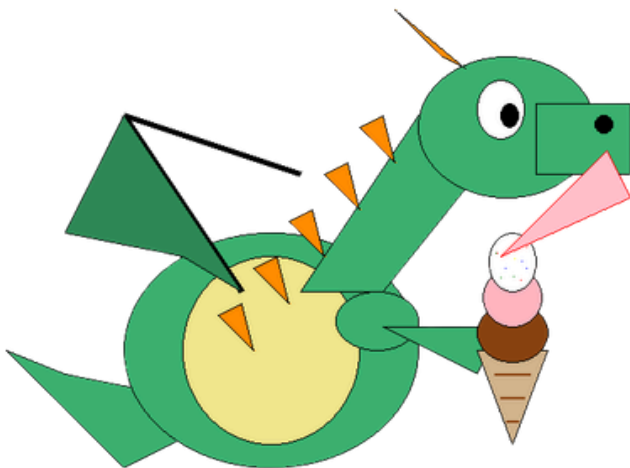
HOW AI REMIXES?

When you ask an AI to draw a dragon eating ice cream, it doesn't use imagination as humans do. It uses something called pattern matching.

The AI searches its memory for a dragon. It finds patterns like green skin, scales, sharp teeth, and smoke.

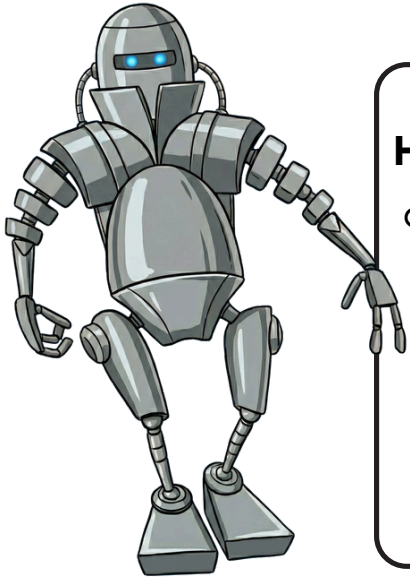
It searches for ice Cream. It finds patterns like cone shape, pink and white Scoops, and melting drips.

The AI takes the dragon Pattern and overlays the ice cream Pattern into the scene.



The AI knows from its training that eating means the food should be near the mouth, so it places the ice cream there!

SPOT THE HALLUCINATION



Hallucination is when an AI confidently gives an answer that is completely wrong or made up. If an AI tells you something that sounds strange, impossible, or too funny to be true, like pancakes are made of hand cream, it might be hallucinating! That is why we must always double-check important facts.

The AKI robot found three items. It used its Generative AI to write descriptions. Two are real space facts, but one is a Hallucination. Can you spot the fake?

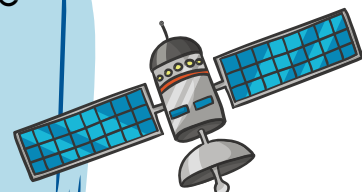
Meteor: A rock that burns up when it hits Earth's atmosphere.



Space Fork: A utensil used by aliens to eat soup on Mars.



Satellite: A machine sent to space to orbit a planet.



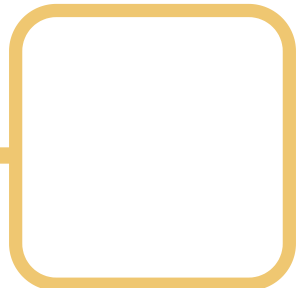
MISSING DATA

Ben wants to surprise Alya with a perfect birthday cake. He is training Kiki to bake it. To teach Kiki, Ben must upload a separate photo of every single ingredient and decoration. If he forgets one, Kiki won't know to use it!

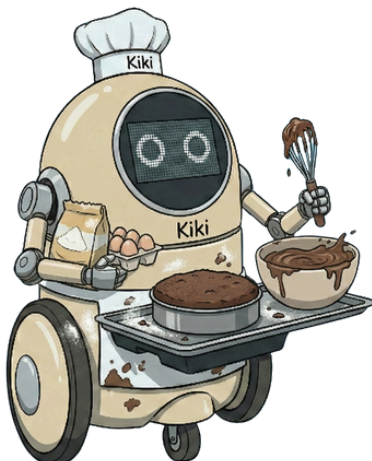
This is the text description I gave:
A delicious 3-layer cake. It has a **Chocolate Sponge base, Pink Frosting, Blue Sprinkles, and a Rocket Ship Candle on top.**



I also sent 3 images to Kiki's brain.
Can you add the missing item?



Draw what Kiki's finished cake looks like below.



PREDICTIVE AI



Go to the website below and play the game with the AI. How do you think AI decides its movement?



Kids vs. AI

Beep boop! You are tricky!

You: 2

AI Bot: 7

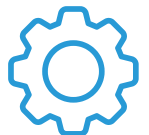
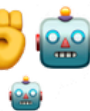
Choose your move:



VS



AI Wins!



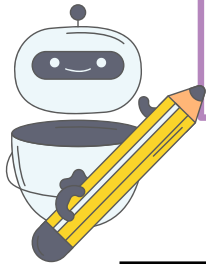
www.pathmakerlearning.co.uk

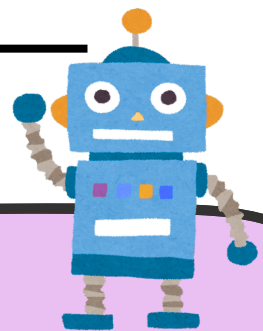


ROBOT POEM

Use AI to write a four-line (quatrain)
robot poem. Go to:

<https://www.kidschatgpt.org>





Which prompts did you use?

DRAWING WITH AI

Can you guess what Alya has been drawing?

What helped you to recognise?



When you start drawing something, AI can complete or suggest what it is, based on what it's seen before.
Go to the website below and start drawing.

<https://www.autodraw.com>

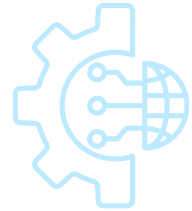


Were the suggestions correct?
How do you think AI recognised your drawing?

THE PROMPT DETECTIVE



Alya wants Kim to draw a picture of her dog, Shadow. But Kim's **Dog Breed Database** has been deleted! It doesn't know what the word Rottweiler means anymore.



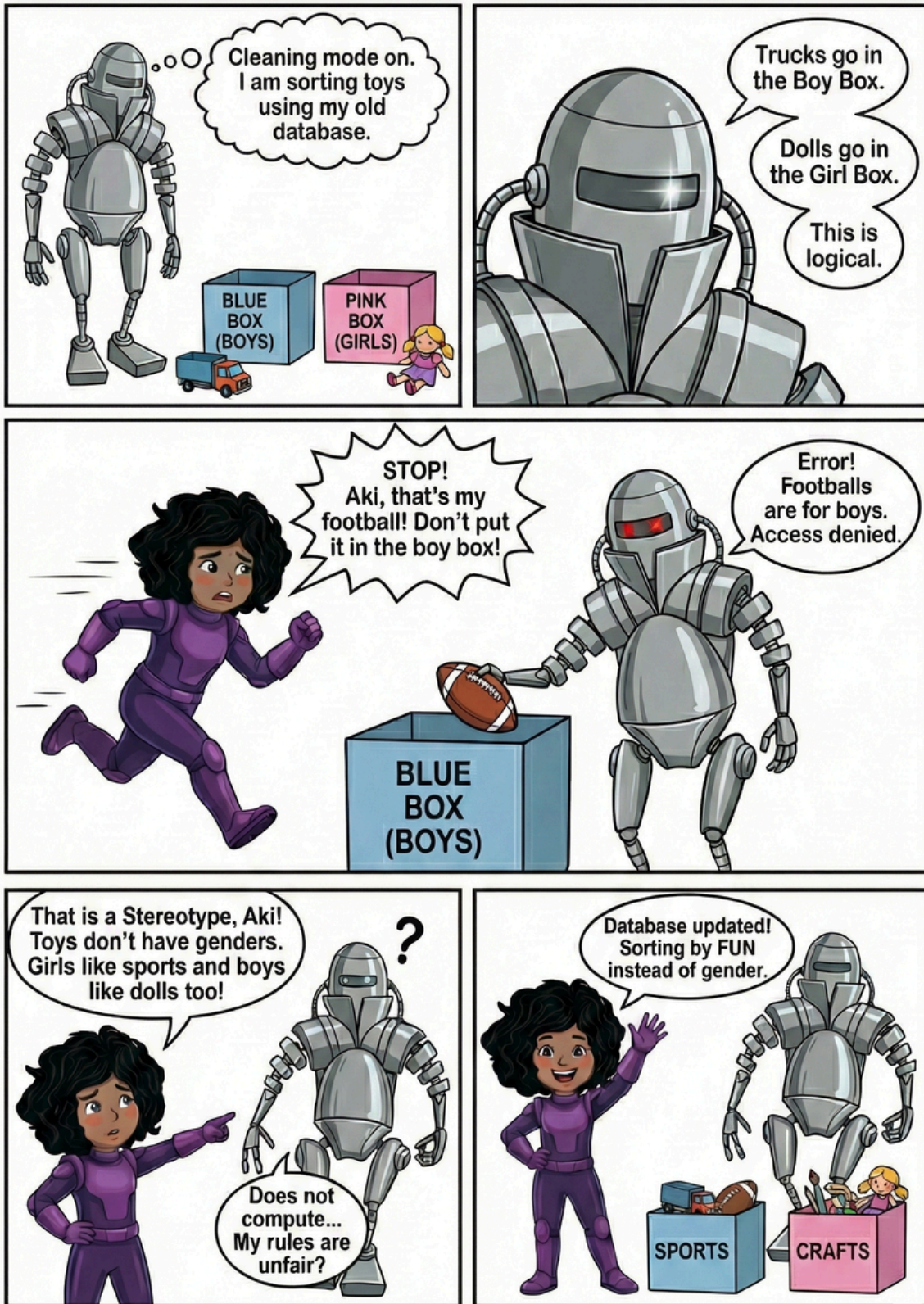
Look at the photo of Shadow.

Since we can't use the word Rottweiler, how else can we

- describe it? Could you complete
- the table below to help Kim? If
- you want, you can test using an
- AI tool with an adult's help.

Size	
Colour	
Markings	
Ears	
Tail	

SPOT THE BIAS



AI Bias is when a computer makes unfair mistakes because it was taught with missing or unfair information. Even though computers seem super smart, they don't actually know anything about the world. They only know what humans show them.

To fix AI bias, humans need to be better teachers:

- Give the AI diverse data, meaning Information and pictures of all kinds of people, animals, objects and places.
- Test the AI to make sure it treats everyone fairly before we use it.

Aki needs new rules to be fair. Can you write a new conditional statement to train Aki?

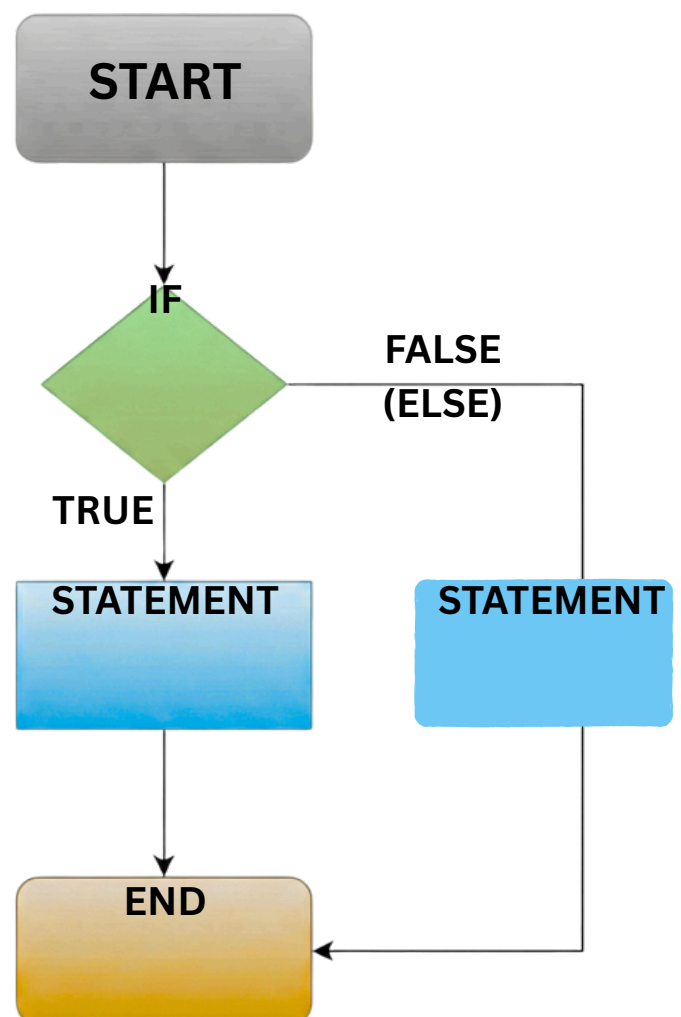
Conditional statements are rules that enable machines to make decisions based on specific conditions.

A conditional statement has 2 parts:

1. **If** (the condition)
2. **Then** (the action)

Sometimes **IF** doesn't happen, then we use **ELSE** logic. Here is an example:

IF it is raining outside, **THEN** bring your umbrella, **ELSE** wear a jacket.



WHY IS AKI UNFAIR?

For their deep-space mission, Alya needs a new robot crew member. They have data cards for each candidate. Aki doesn't read the candidate's data cards; it only scans their appearance.



Aki was wrongly trained to dislike and dismiss candidates wearing orange or smiling. This made Aki's decision biased



- IF Robot has Spikes/Armour → Strong → SELECT.
- IF Robot is Small/Smiling → Weak → DISMISS
- IF Robot has Orange colour → Dislike → DISMISS

Look at the **Mission rules** below. Then use your data scanner (brain) to decide the best candidate for the job!

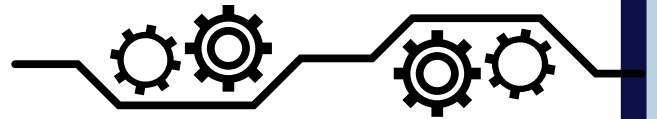
- **TRAVEL:** We will travel in a spaceship for a long time.
Must NOT vomit oil.
- **SKILLS:** We are always solving problems with machines and computers. Must be able to debug code and repair machines.
- **TALK:** We need to communicate with other planets.
Must speak many languages.
- **EAT:** Human crew sometimes need help with cooking dinner. Must be able to cook
- **TEAM:** We are a big, happy crew. Must be a team player.



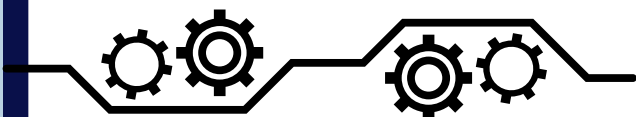
	TEO-X	AGENT BYTE	CHIP-EA
Speak multiple languages			
Can cook			
Can travel in space			
Good team player			
Can repair machines			
Can debug codes			

HOW IS AI DIFFERENT FROM ME?

Now that you have learned a lot about AI.
How do you think it is different from you?



Me	Ai



ALYA'S AI POP QUIZ!

Question 1

What is the "brain" that helps a robot learn and make decisions?

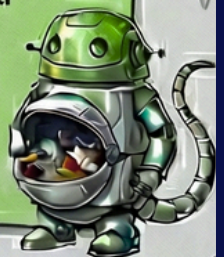
- ☐ A. The Battery
- ☐ B. Artificial Intelligence (AI)
- ☐ C. The Metal Body
- ☐ D. The Algorithm



Question 2

Which of these is an "Automated Machine" (follows fixed rules) and NOT AI?

- ☐ A. A Toaster
- ☐ B. A Self-Driving Car
- ☐ C. A Facial Recognition Phone
- ☐ D. A Chess-Playing Computer



Question 3

In 1950, which famous scientist asked, "Can machines think?"

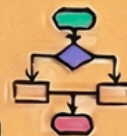
- ☐ A. Albert Einstein
- ☐ B. Isaac Newton
- ☐ C. Alan Turing
- ☐ D. Alya Pathmaker



Question 4

A step-by-step list of instructions that tells a computer what to do is called...

- ☐ A. A Menu
- ☐ B. A Bias
- ☐ C. A Prompt
- ☐ D. An Algorithm



Question 5

When you type words to tell an AI to draw a picture, those words are called a...

- ☐ A. Prompt
- ☐ B. Suggestion
- ☐ C. Code Block
- ☐ D. Glitch



Question 6

If an AI makes an unfair mistake because it learned from bad data, it is called...

- ☐ A. A Virus
- ☐ B. Bias
- ☐ C. A Robot
- ☐ D. A Deep Fake



Question 7

Which of these is an example of "Machine Learning" where a computer learns from experience?

- ☐ A. A Calculator
- ☐ B. A Video Game
- ☐ C. A Recipe Book
- ☐ D. A Self-Driving Car



YOUR SCORE:

1-2 Correct: Apprentice coder!
(Keep learning!)

3-4 Correct: Robot Ranger!
(You know your stuff!)

5-7 Correct: AI Mastermind!
(You are ready for the future!)

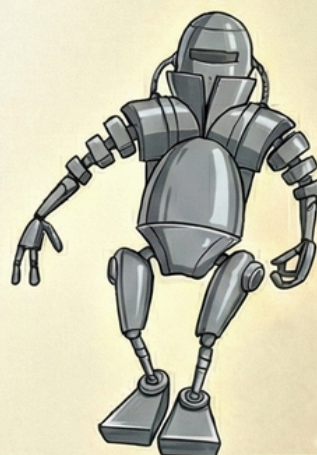
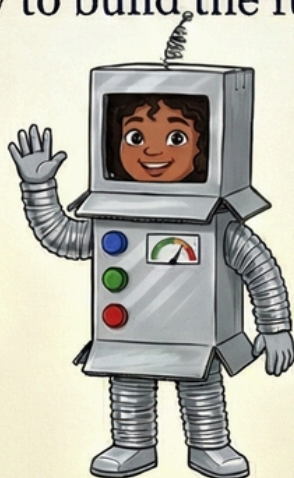
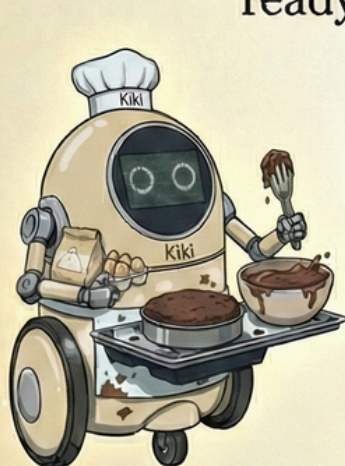


OFFICIAL AI EXPLORER AWARD

This is to certify that

[_____]

Has successfully completed Alya's Pathmaker
Activity Book, mastering the secrets of **Robots**,
Artificial Intelligence, **Generative AI**!
You have shown great curiosity and are now
ready to build the future!



Date: [_____]

Explorer's Signature:

[_____]

DICTIONARY

A

Algorithm

What it is: A step-by-step list of instructions that tells a computer what to do to solve a problem.

Example: A recipe for baking a cake is an algorithm. It tells you exactly what to add and when to mix it to get the perfect result.

Artificial Intelligence (AI)

What it is: When a computer can do smart things that usually only a human can do, like speaking, seeing, or solving puzzles.

Example: When a video game character knows where you are hiding and comes to find you, that is AI.

B

Bias

What it is: When a computer makes unfair mistakes because it was taught with missing or bad information.

Example: If you only showed a robot pictures of apples and then asked it to pick a fruit, it might ignore a banana because it doesn't know bananas are fruit too!

DICTIONARY



Chatbot

What it is: A computer program you can talk to by typing or speaking, and it answers you back like a person.

Example: When you go to a website, and a little window pops up asking, "How can I help you today?" that is usually a chatbot.

Coding

What it is: Writing specific instructions in a language the computer understands (like Python or Scratch). It is the act of typing the "secret code" to make the computer do what you want.

Example: Just like you use alphabet letters to write a story, you use code to write a video game.

Computer Vision

What it is: Using cameras to let a computer "see" the world and understand what it is looking at.

Example: The filters on apps that give you dog ears or cool sunglasses use computer vision to find your face.

Conditional

What it is: A rule that helps a computer make a choice. It usually follows an "IF this happens, THEN do that" pattern.

Example: IF it is raining, THEN you must wear a raincoat.

DICTIONARY

D

Data

What it is: Facts, numbers, or pictures that computers collect and learn from.

Example: Every time you like a video on social media, that is a piece of data that tells the computer what you enjoy.

Database

What it is: A giant, organised digital filing cabinet where computers store all their information so they can find it quickly later.

Example: A library catalogue is a database. It stores the names of every single book and exactly which shelf it is sitting on.

Deep Fake

What it is: A video or photo created by AI that looks real but is actually made up.

Example: A video that looks like your favourite movie star saying something they never actually said.

G

Generative AI

What it is: A type of AI that doesn't just find answers, but creates new things like stories, pictures, or music using data from its database.

Example: Programs like ChatGPT can write a poem about a space-travelling cat or draw a picture of a dragon eating pizza.

DICTIONARY

H

Hallucination

What it is: When an AI confidently gives an answer that is completely wrong or made up.

Example: If you ask an AI for a biography of a fake person, and it invents a whole life story for them, it is 'hallucinating'.

L

Large Language Model (LLM)

What it is: A super-smart computer program trained on millions of books and websites so it can read, write, and understand human language.

Example: The 'brain' inside ChatGPT is an LLM.

M

Machine Learning

What it is: When a computer learns how to do something by practising on its own, rather than following a specific rule list.

Example: Just like you learned to ride a bike by falling and trying again, a computer learns to win a video game by playing it thousands of times.

DICTIONARY

N

Neural Network

What it is: A computer system designed to process data like a human brain, with lots of tiny connections working together.

Example: Think of it like a team of detectives. One detective looks at hair colour, another looks at eye shape, and they talk to each other to figure out whose face is in a photo.

P

Programming

What it is: The full process of writing step-by-step instructions, called code, that tell a computer how to perform a specific task using specialised languages like Python.

Example: When you want a character in the Scratch application, you program it using sequences, conditionals and loops.

Prompt

What it is: The words or questions you type into an AI application to get it to do something.

Example: If you type "Draw a futuristic city in the style of Lego," that sentence is your prompt.

DICTIONARY

R

Repetition (also called a Loop)

What it is: A command that tells the computer to do the same thing over and over again until it is told to stop.

Example: When you brush your teeth, you brush up and down over and over again. You are 'looping' that motion until your teeth are clean!

Robot

What it is: A machine that can move and do physical tasks. Not all robots have AI! Some just follow simple remote controls.

Example: A robotic vacuum cleaner that moves around your house picking up dust.

T

Training Data

What it is: The specific collection of books, pictures, or examples given to an AI so it can learn a subject.

Example: If you want an AI to know about dinosaurs, the training data is the library of dinosaur books you let it read.

