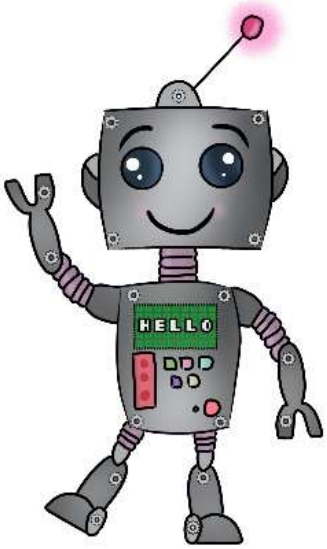
Hey, I’m Vijay. I’m here to tell you about Fin and Tech!

Hi, I’m Bey. Nice to meet you. I’m here to talk about Cloud Computing and Open Finance

I am Robbie and will tell you all about Artificial Intelligence.



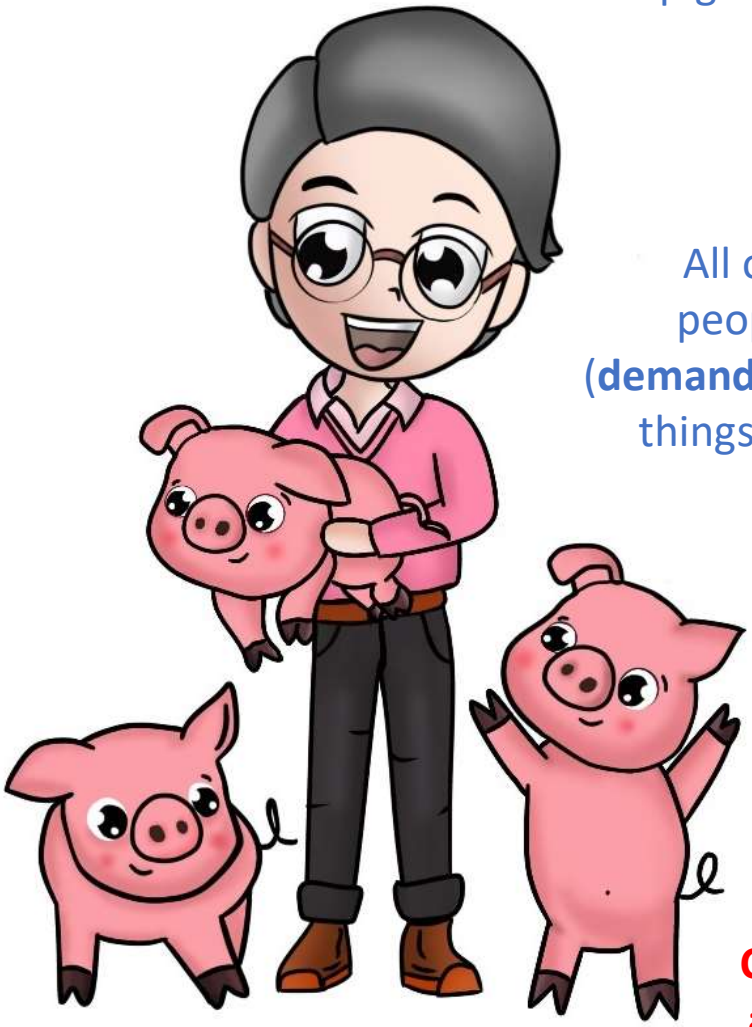
I’m Suzy! And I’ll talk you through how to pay for things

My name is Bill! I’ll be explaining blockchain.

Thousands of years ago, people began to **trade.** Trade is all about **buying** and **selling** things. This is the core of what is called **economics,** and is based upon the laws of **supply** and **demand.**

Imagine Bey has a cow. She wants to sell the cow. This is known as **supply.**

But she has no one to sell the cow to. There is no **demand.**



Then Bill comes along and he has three pigs that he wants to trade with Bey for her cow.

This is **demand**.

All of economics is founded on people who want to buy things (**demand**) and people who have the things they want to buy (**supply**).

Can you explain what supply and demand means to you?

Soon, people started buying and selling lots and lots of things, from fruit and vegetables to milk and cheese and more.

Markets emerged and trading became more difficult, because there were so many people buying and selling.

Then someone invented **money.**


Pigs for Sale!
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Originally, money was issued by the government,
and backed by valuable things like gold and silver.

Today, money is usually bits and bytes of data on computers and mobile phones, rather than gold or silver. So, we can pay with cash but also with a text message, a touch of our phone or just a quick swipe.

This is FinTech.

FinTech brings together money and finance and trade, with technology.

Fin is finance and **Tech** is technology.

With FinTech, we are able to use the internet and mobile telephone to do things much more easily than ever before.

Can you explain what FinTech means to you?

As people did more buying and selling, things got bigger and bigger. Soon, countries all over the world were trading with each other.

Everyone was buying and selling things and a place to store money was needed.

This is how **banks** came about and why **finance** is needed.

In a similar way to how governments invented money to make trade easier, governments invented banks to make it easier to deal with money.

Banks can store money and send money abroad, and they are trusted because they are **regulated** by governments.

Can you explain what a bank is for?

The **Tech** in FinTech is technology.

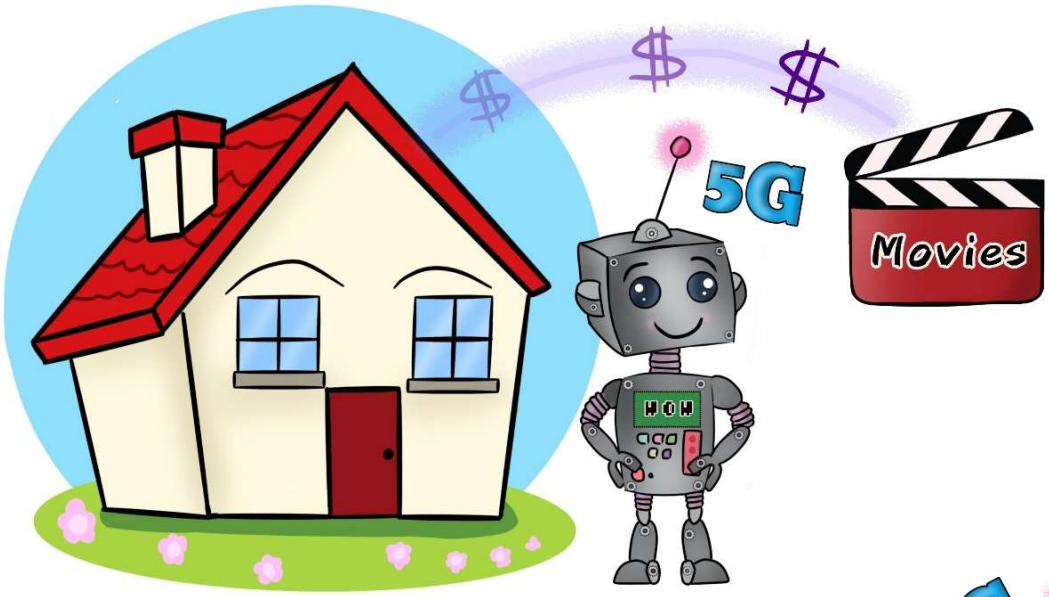
Do you know much about technology?

Technology is all those things around you that have chips inside and connect to the network.

That might include your computer and mobile phone, as well as your family car, your home and more.

This is called **the internet of things** where cars, houses and even your clothes can connect to the network.

And FinTech is all about creating a new way of doing banking and dealing with money to support the internet of things.



My house can get movies and games from the internet, and FinTech makes it easy to buy those things.

My car can pay for gas and charges without having to get out of the car, because FinTech makes it easy to pay for those things.

What does the internet of things mean to you?

FinTech uses **the internet** to create brand new ways to pay for, buy and sell things.

They are creating **new internet marketplaces**, where banks are not needed for all the things they used to do.

FinTech even creates ways to give people money they need to buy things, when they don't have enough money.

How?

Well, it's all based upon new technologies called **cloud computing** and **open finance.**

Over to you Bey!

Thanks Vijay and hi everyone! I'm Bey!

Vijay asked me to explain **cloud computing.**

Cloud computing is a service offered by companies who rent out their computers to anyone who needs them, when they need them.

They call it computers-as-a-service and now we have lots of things "as-a-service" like software, technology and money!

They run these things in clouds, which are not actual clouds in the sky but clouds of computing power on the internet.

When you connect to these services, you probably don't realise that you are connected to a cloud, as the cloud runs on what is called **a server farm.**

A server farm is a huge number of computers that sit together on the internet, waiting for people to use them when they need them.

Can you explain what a server farm is?
Can you explain how Cloud Computing works?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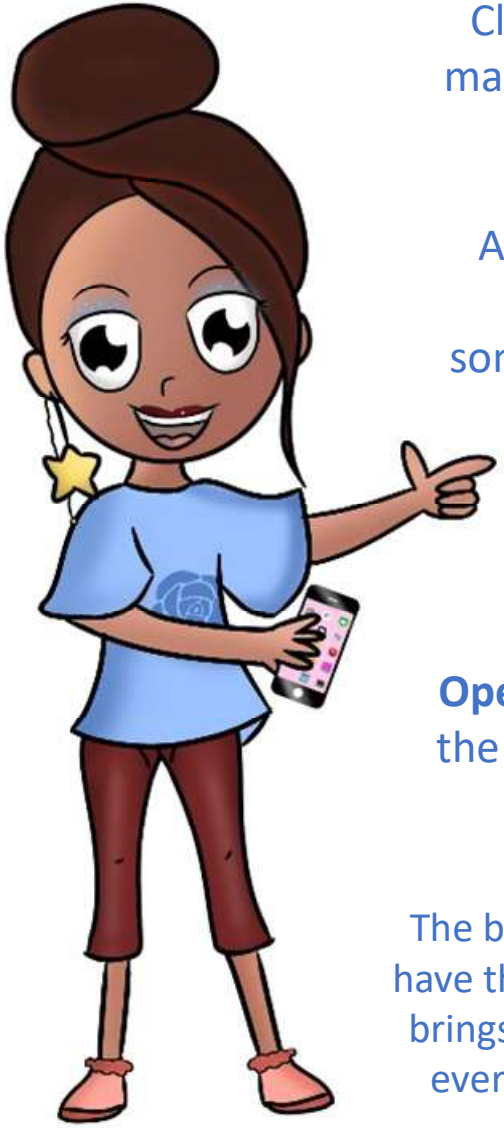
Here is a server farm!



Cloud has opened up financial services and banking to many companies who can launch services using what are called **APIs, Application Program Interfaces.**

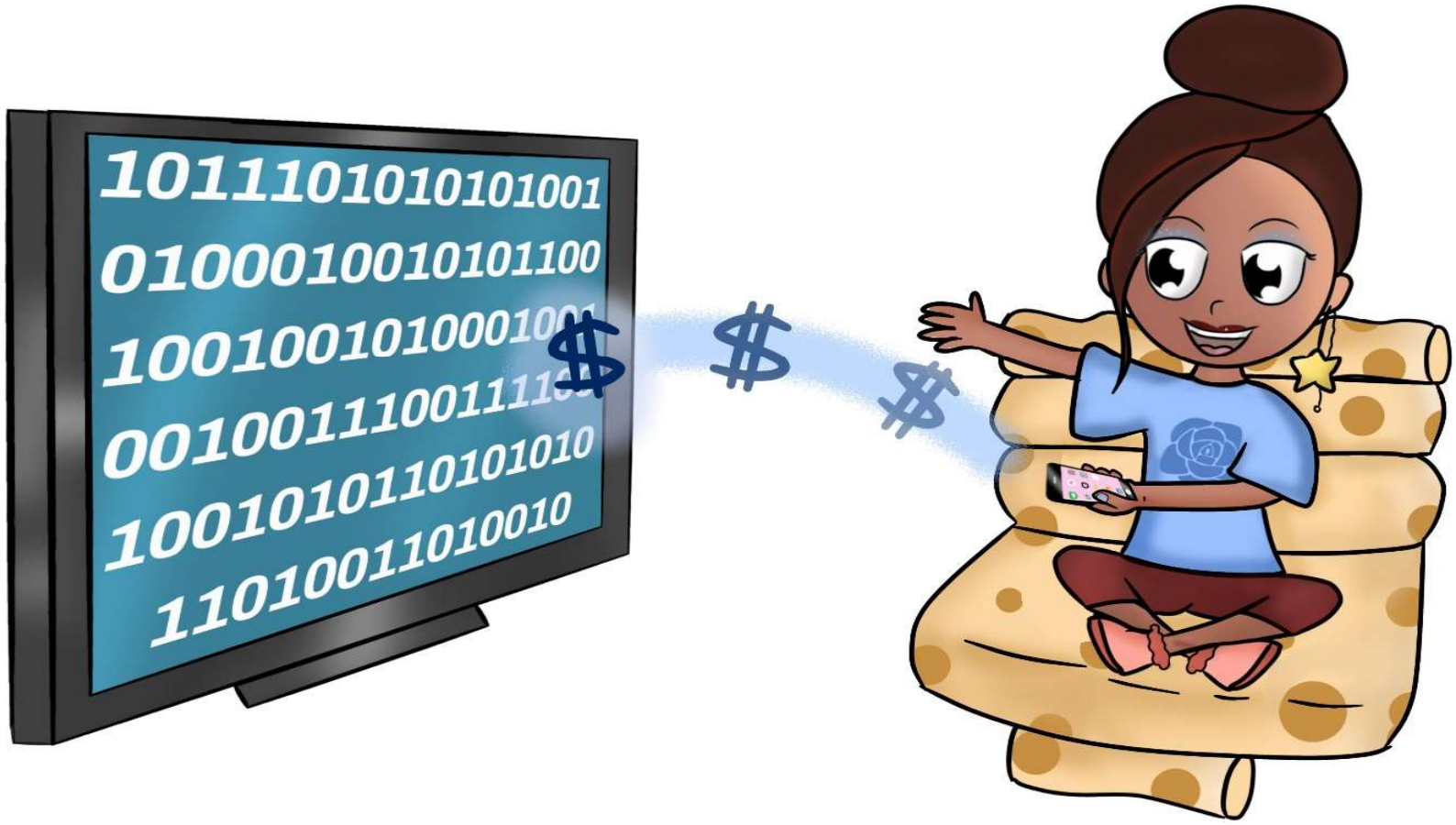
APIs are little bits of code that do just one thing – like make a payment or lend some money or invest in something – and using APIs is bit like a big jigsaw puzzle.

One part of the puzzle is your money and how you spend it. Another part of the puzzle is who you spend it with and where.

Open Finance is all about bringing together all the bits of the puzzle, so you can see what you spent, where and when, with who.

The bank has a bit of that data, and other companies have the rest of that data. It's a jigsaw puzzle. And APIs brings all that data together into one easy way to see everything. They assemble the puzzle in the cloud.

Thanks to Cloud Computing, APIs and Open Finance, all of our financial needs can be turned into data – 1's and 0's – on the internet. That is what has led to the rise of FinTech. FinTech does not replace banks, but it takes the banking data – their 1's and 0's – and makes them work for paying for anything, anywhere, anytime.



Data is the critical point here.

Everything in the world is being turned into data – 1's and 0's on the internet.

All of your photos, movies, games and more, are 1's and 0's on the internet. It is called **binary.**

By converting everything into binary code, anything can be turned into data on the internet, including money. That's what FinTech is all about: making everything to do with money and trade easy using data – the binary code of 1's and 0's – on the internet.

What do APIs do?
What is Open Finance?

OK, Suzy, over to you.

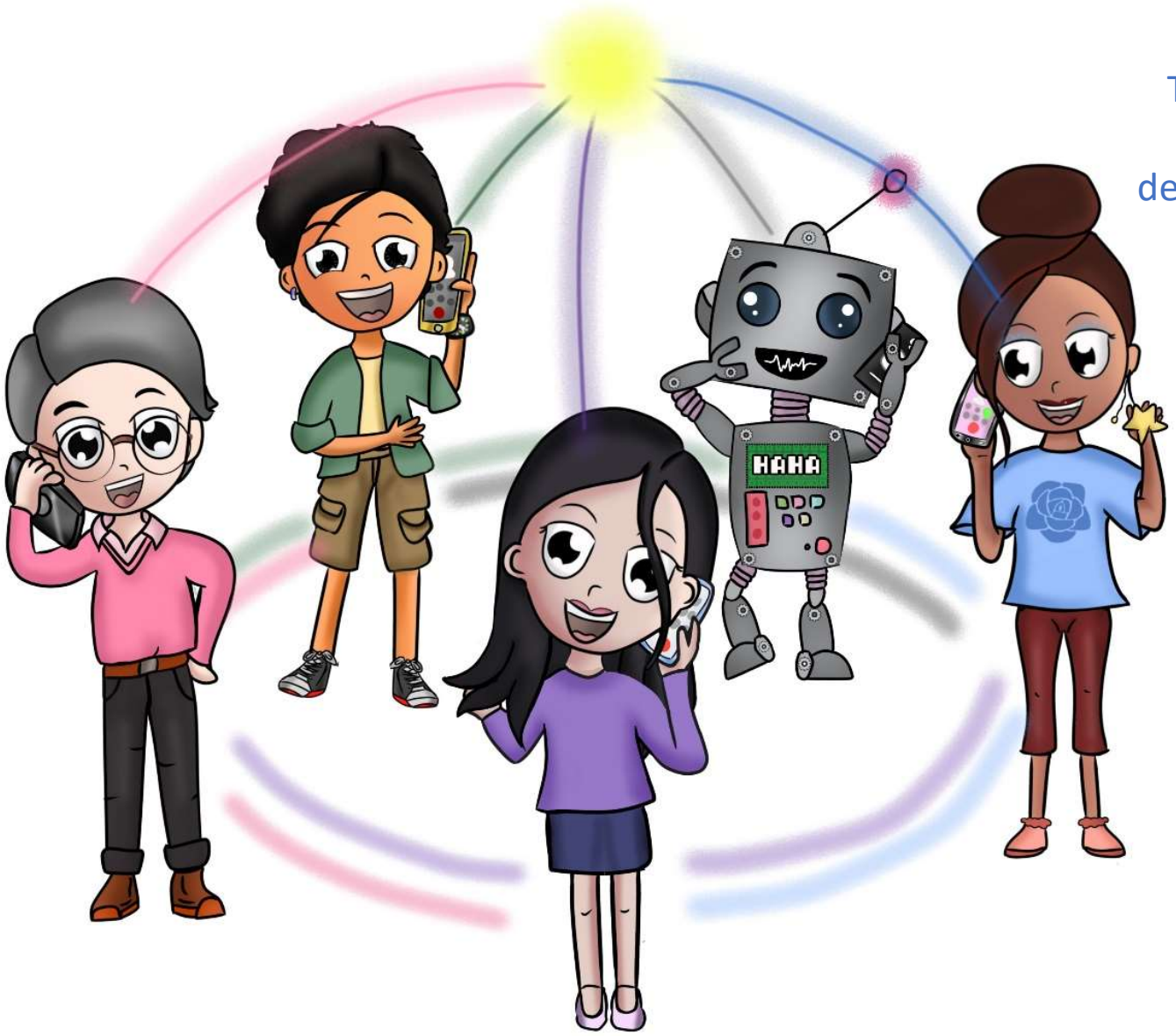
Thanks Bey and hi folks! I'm Suzy.

One thing Bey didn't tell you is that Cloud, Open Finance and APIs has made a thing called **peer-to-peer networking** a big FinTech thing.

Peer-to-peer is where someone can send something directly to someone else on the internet. It is quite revolutionary as people used to have to send things via someone else, like a bank. Now they don't!

You cannot do peer-to-peer without other people on the network. It is the same as people trying to sell a cow in market. If no one else is in the market, you cannot sell a cow. If no one else is on the network, you cannot send something to someone else as there is no-one there.

But, unlike a market where buyers and sellers gather together and sell directly to each other, the internet created a new thing called **The Network Effect.**



The Network Effect means that if one person joins your network, you can deal one-to-one, peer-to-peer, through the network. Then, as more people join, each new person adds more networking. This is because our connections are not one-to-one but one-to-many.

This is why the internet is so powerful and revolutionary. For example, if three people are on the network, you have actually have **six** direct connections:

Me-to-you
You-to-me
Me-to-them
Them-to-me
Them-to-you
You-to-them

Add a fourth person and you have twelve connections. Add a fifth and you have twenty. The more you add, the more the connections until everyone is connected directly, one-to-one, peer-to-peer.

Today, there are billions of people on the network – half the planet – all connected directly. They can talk, share and trade together directly. This is the power behind your social media and the power behind FinTech. The fact that we can talk, share and trade together directly with billions of people on the network.

This is a hugely powerful concept that has created a new way of trading in everything from holidays to movies to money. It is completely new and different and is all thanks to the network effect of the internet, internet of things, mobile telephone and anything else on the network.

Can you explain *The Network Effect?*

How does peer-to-peer work?

Borrower

Lender

Because we can all connect together on the network, anyone can send money to anyone else on the network.

There are two major sorts of peer-to-peer services in finance: **lending** and **payments**.

Peer-to-peer lending is where someone sends money to another person over the network. It could be from their mobile phone, laptop or even their car or fridge!

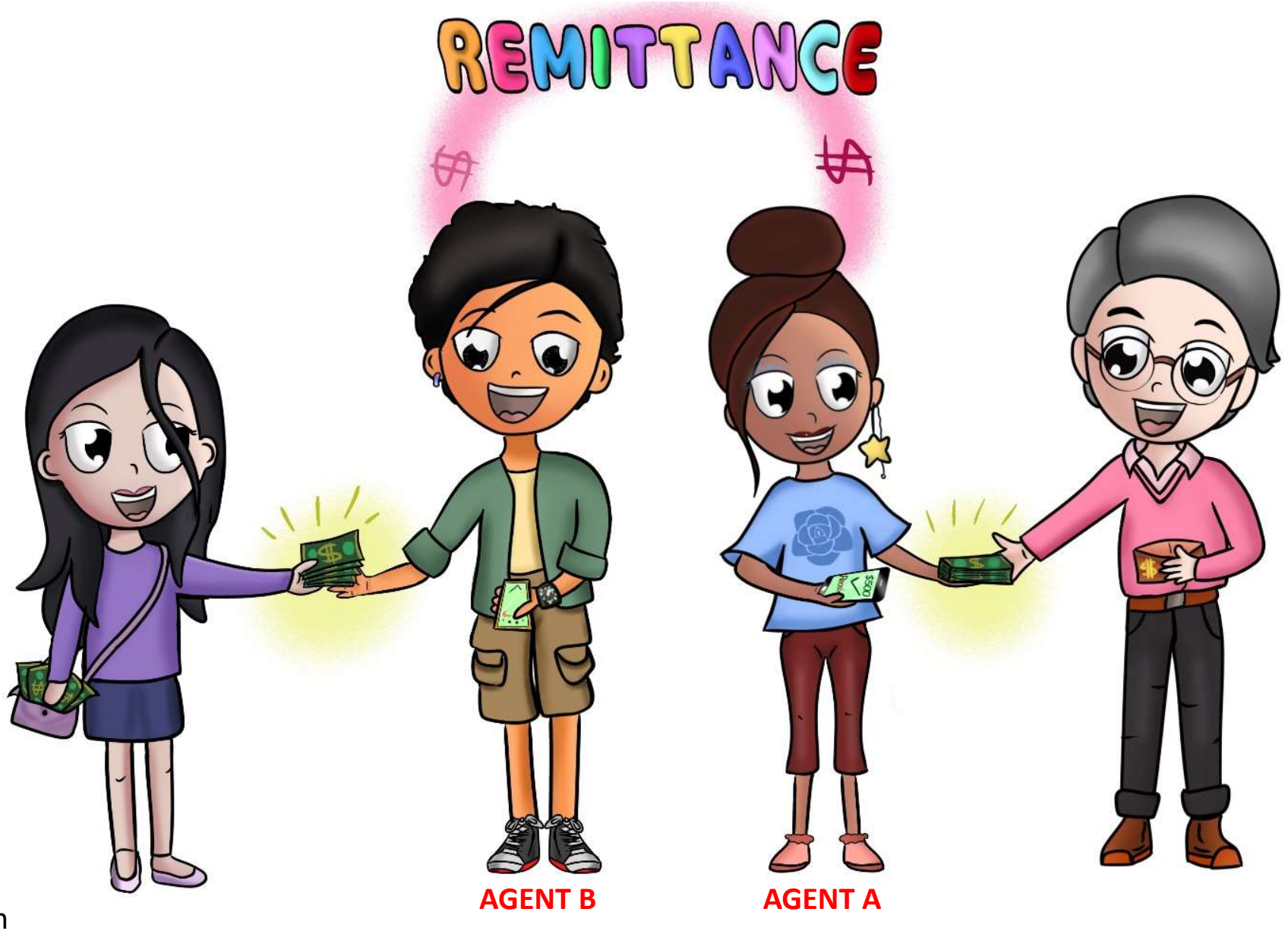
They want the money back, and so they are lending the money and not giving it away. The person receiving the money is then called a **borrower**.

Peer-to-peer payment allows anyone, anywhere, anytime to send money to anyone else through the network to pay for something. The person sending is the buyer and the person receiving is the seller. If you use the internet to buy anything from someone who is not a company, then that is a peer-to-peer payment.

But if you live in a country with a poor banking system, you will have to visit a person who manages money and gives you the cash.

This is called **remittances**.

For example, let's say that Bill wants to send Suzy some money. Bill lives in America and Suzy lives in Asia. The way this would usually be done with remittances is that Bill would pay an agent to send the money to Suzy, and the agent in the other country gives Suzy the cash.



Peer-to-peer payment and lending has led to other big changes, like creating our own money systems on the network. These are called **cryptocurrencies,** and are inspired by a technology called **distributed ledgers.**

I'm going to hand over to Bill to explain those, but before I do so, I want you to answer two questions for me.

What is peer-to-peer lending?

Can you explain a remittance to me?

Thanks Suzy and hello. I'm Bill!

I'm going to talk to you about distributed ledgers and cryptocurrencies.

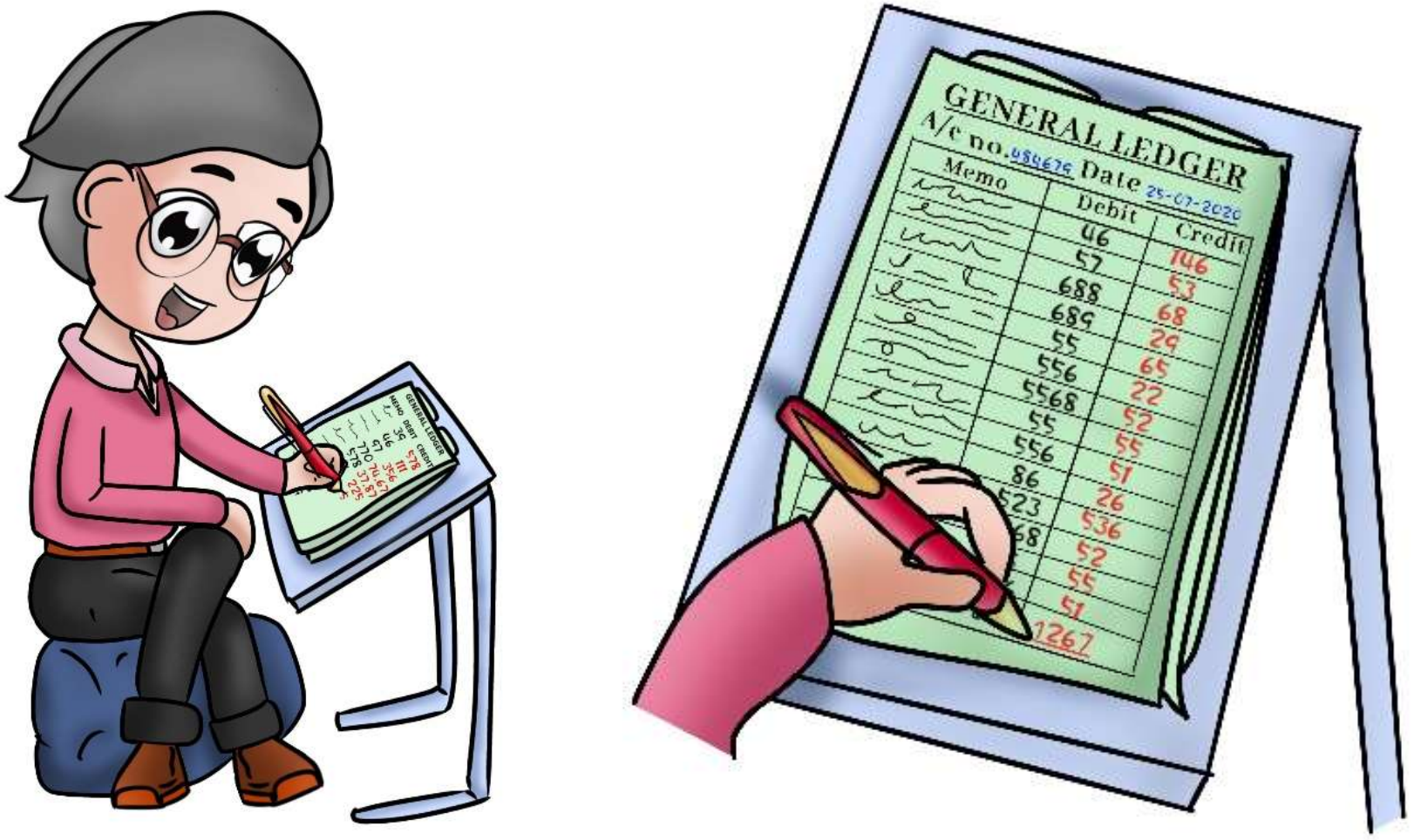
All of banking is built upon the idea of **a ledger**.

Do you know what a ledger is?

A ledger is a system of recording money.

When you spend money, you get **a debit**. When you receive money, you get **a credit**.

The difference between your debits and credits is your **bank balance**.



For hundreds of years, this system has been looked after by banks, but that is changing because of what are called distributed ledgers.

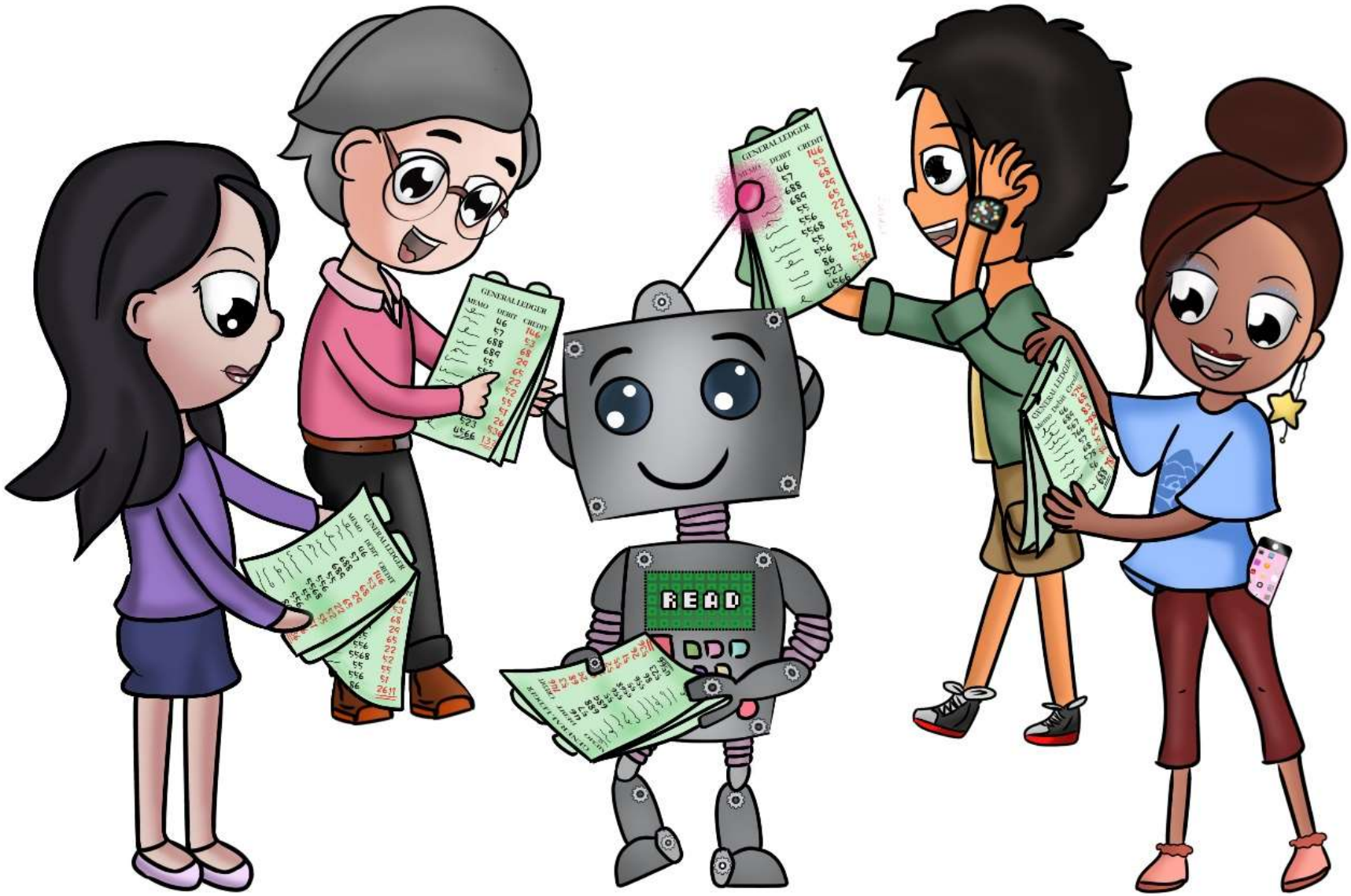
Distributed ledger technology (DLT) allows everyone to have a copy of the ledger. Before, only the bank had the ledger. Now, everyone can see the ledger.

We could not do this before, because it needed to be totally secure. After all, if anyone could access the ledger, they could change your **bank balance,** and possibly make you richer or poorer. That would be good for criminals, but bad for you.

Then, technology developed a system where the ledger could be shared and no-one could change it. Technologists have a word for this – they call it **immutability.**

The idea is that because everyone can see the ledger – it is distributed to everyone who needs to see it – it cannot be changed without everybody seeing the change. That makes it better and more secure than just one bank looking after the ledger.

In other words, the network looks after the ledger.



The core technology behind distributed ledgers is called **blockchain**.

Blockchain allows money in and money out – debits and credits – to be recorded securely and available for everyone to see securely. This is because blockchain technology adds every action of spending money as a block to the chain, that can never be changed.

The blocks are blocks of data that are chained together in sequence. Like an ABCD or 1234 of what has been spent, by who, when, and recorded automatically and securely.

It is an amazing technology that started in 2009 with something called **bitcoin,** a cryptocurrency.

But, before we talk about bitcoin, I have a few questions for you:

What is a debit and what is a credit?

Do you know what a ledger is?

Can you describe how a distributed ledger works?

Bitcoin appeared in 2009 and is one of the first ever digital currencies that worked!

There are now many digital currencies. Some are issued by governments, some by banks, some by the network and some by companies.

In fact, there are many digital currencies in the world, but people like bitcoin because it is a global currency with no government involved.

Other people hate the fact there is no government involved, as they only trust money issued by governments.

This is a big debate that people are having:
what will the money of the future be? The money issued by governments or by the internet?

What do you think?

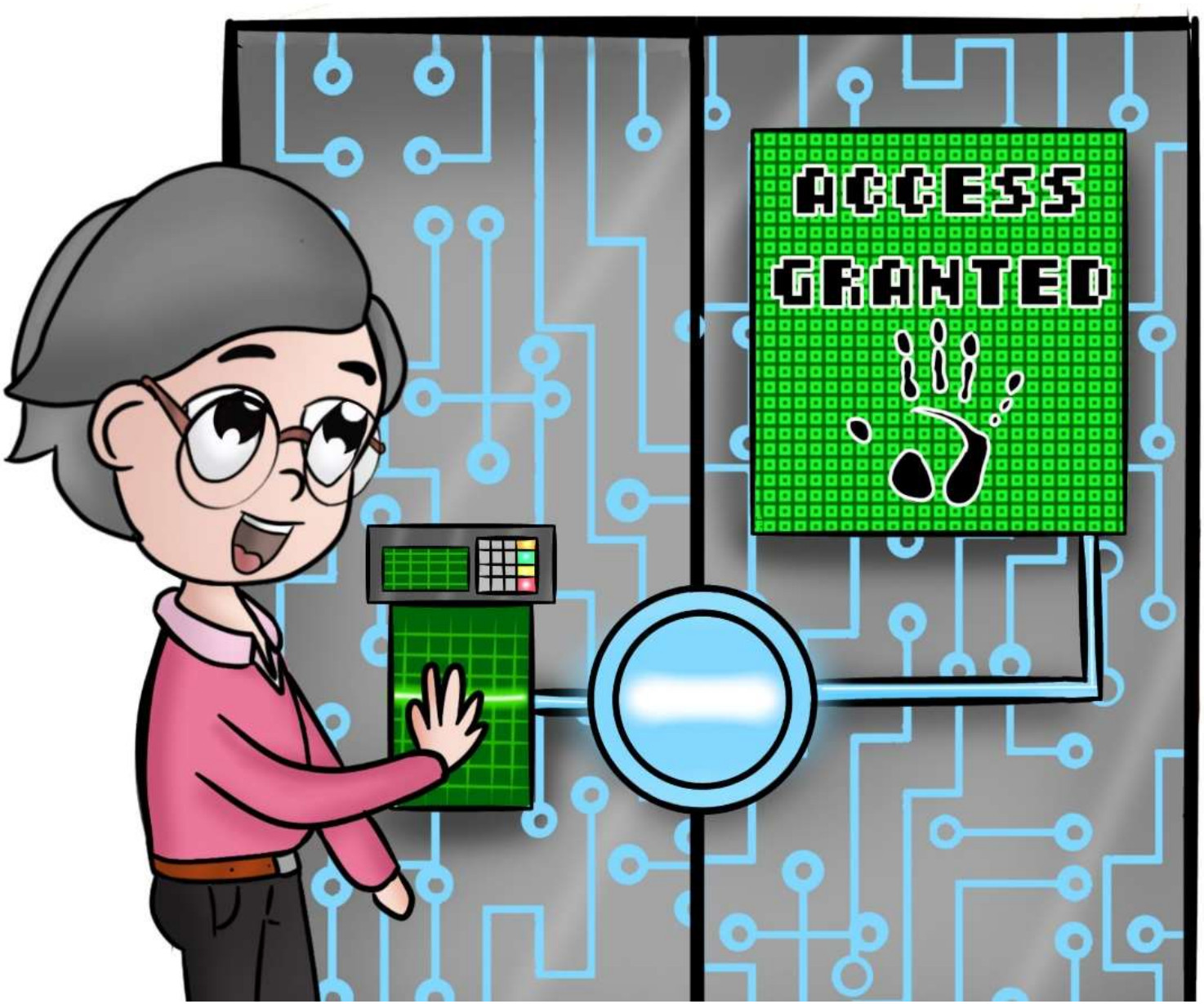
Whoever issues the money, a key thing to access it is a process called **authentication.** This is the process of checking you are who you say you are. Banks and FinTech companies do this by checking your **identity.**

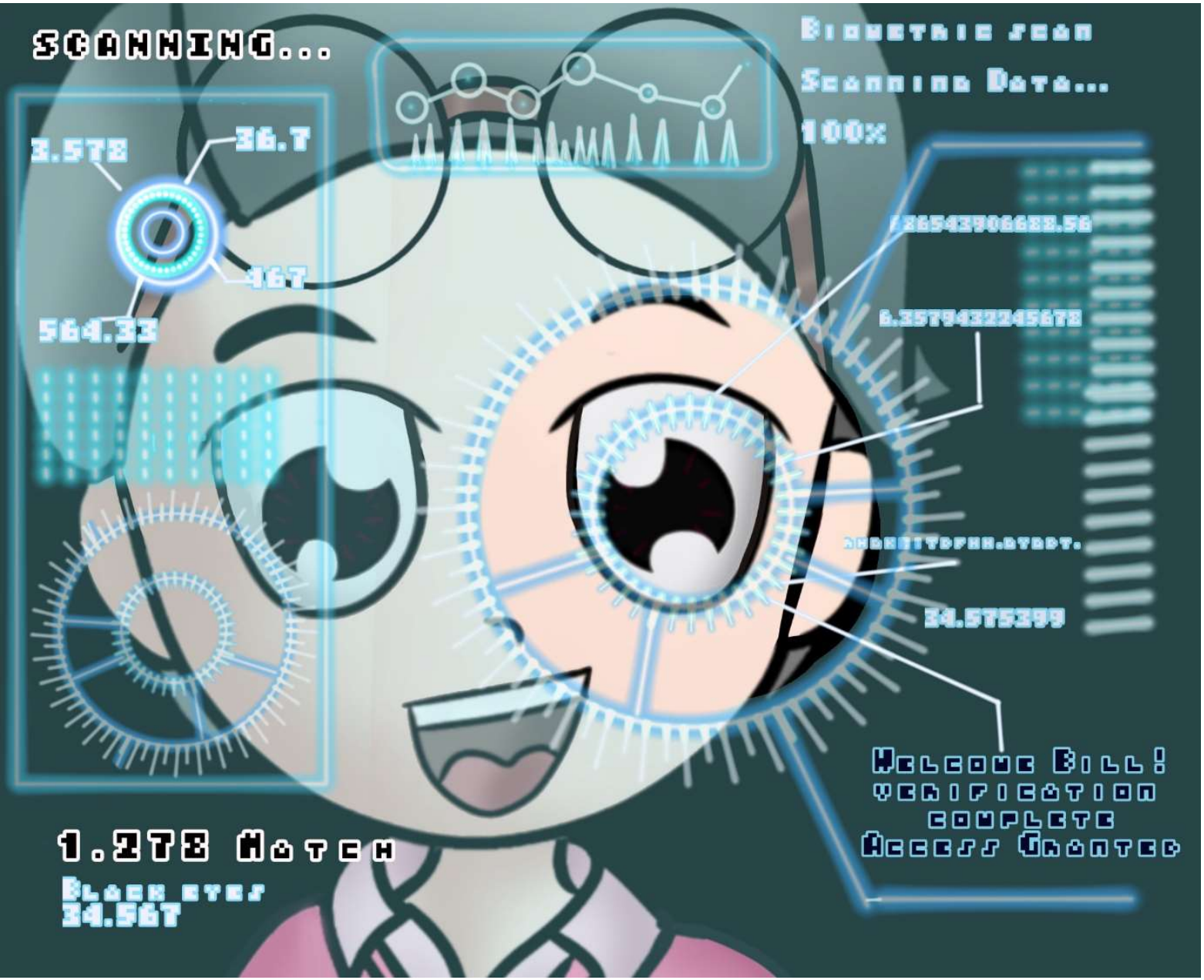
You may already have an identity if you have a passport, for example. When you travel, the people check your documents to see if it is really you.

On the internet, they do the same, and also often ask you for a password to get access to an online service.

When it comes to finance it is even more complicated, because it is all about access to money. This means you have to provide lots of identity documents and passwords to open the account.

The system authenticates your identity and, if everything matches up, then you can open your account and access the money.



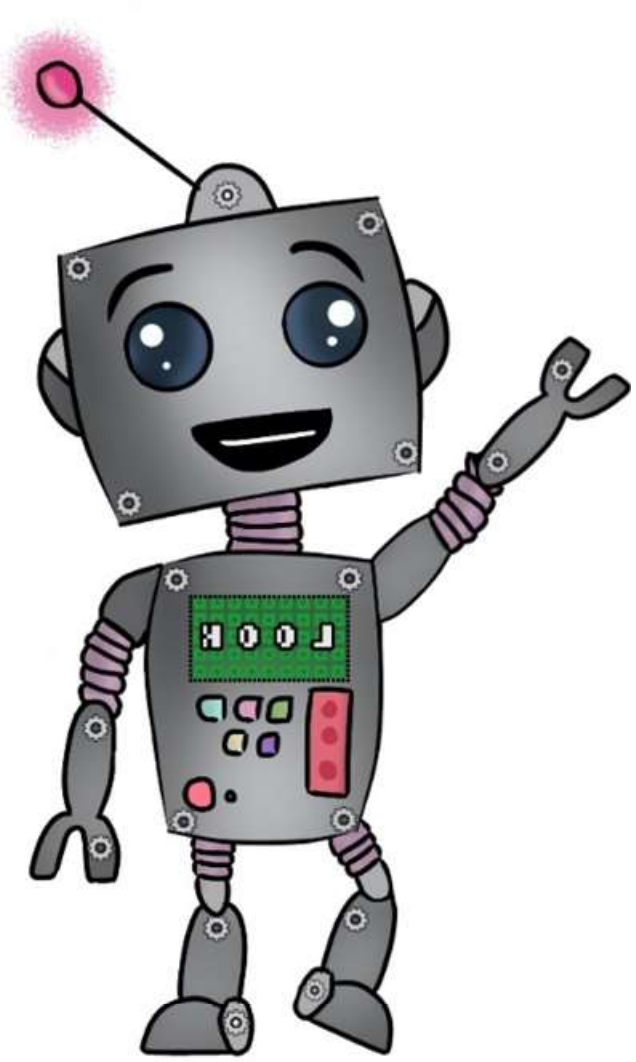


But that process can be complicated, so FinTech is using a technology called **biometrics** to make it easier.

Instead of having to have a username, password and identity authentication, you can just look at your screen or put your hand on a screen, and these will give you access to your money.

Biometrics is a big area of security, and it can be based upon reading your fingers, your eyes, the way you walk or even the way you smile!

What does *authentication* mean?



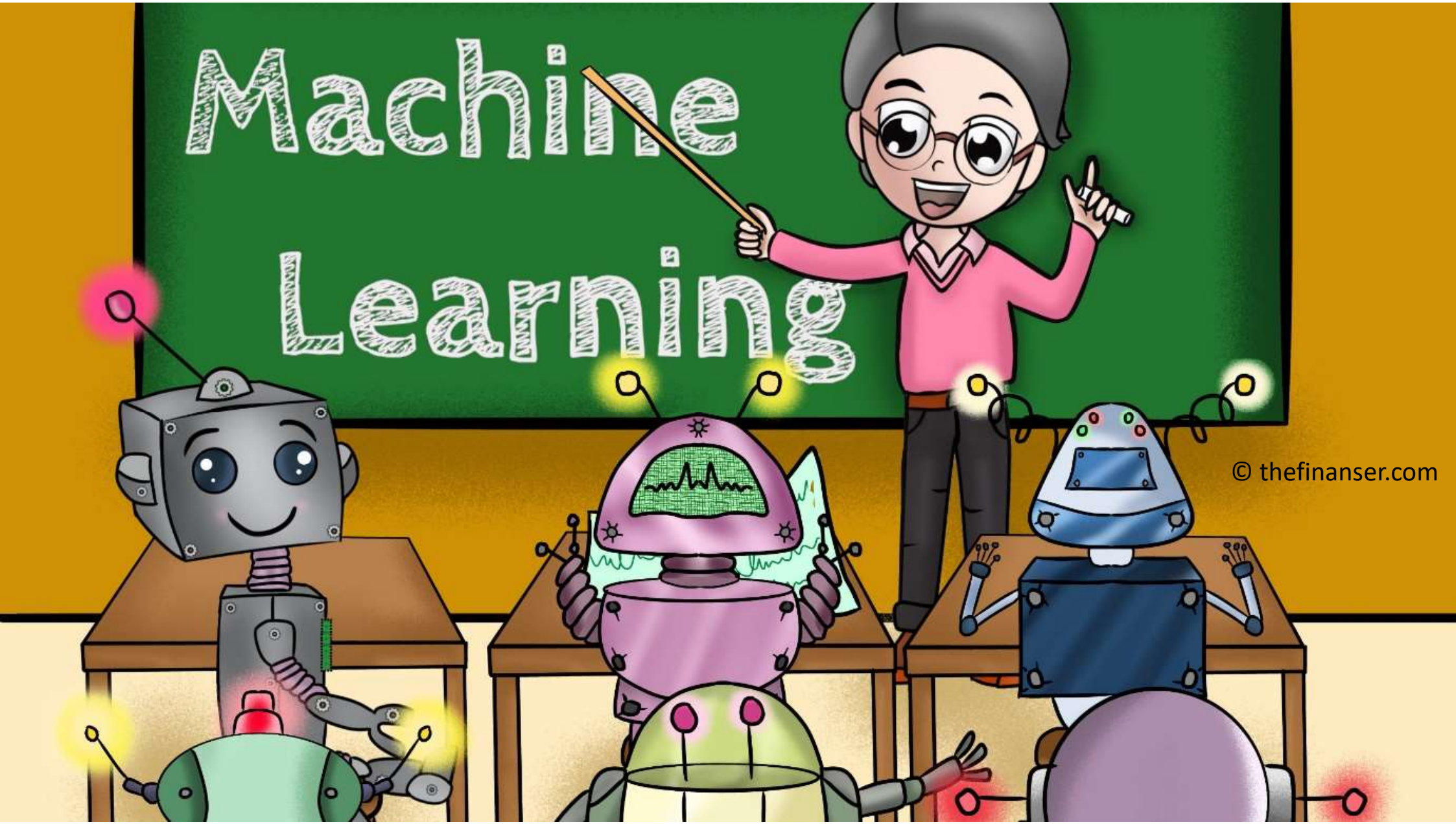
Thanks for all that explaining Bill. Phew, it's complicated. Luckily, I get to do the last bit and I think it's the funnest bit.

My name is Robbie the robot, and I've been learning in a classroom for a long time to be intelligent. Because I am a machine they call it **machine learning**, and because I am not human they call it **artificial intelligence.**

In the future, there will be lots of robots like me. Some robots will do just one job, like clean your room, and others might do lots of jobs. In fact, people believe robots in the future will possible seem to be human.

This is dependent upon artificial intelligence getting better and better until we have what is called **super** artificial intelligence. At that point, robots will be as clever as you are!

They can only be clever if they learn things though so, like you, machines have to go to classes.


Machine
Learning
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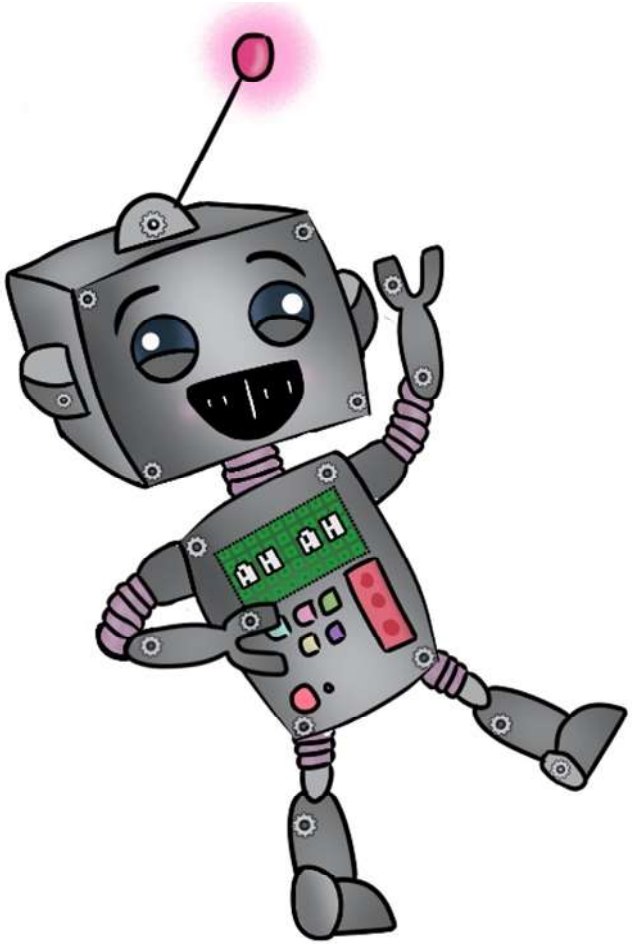
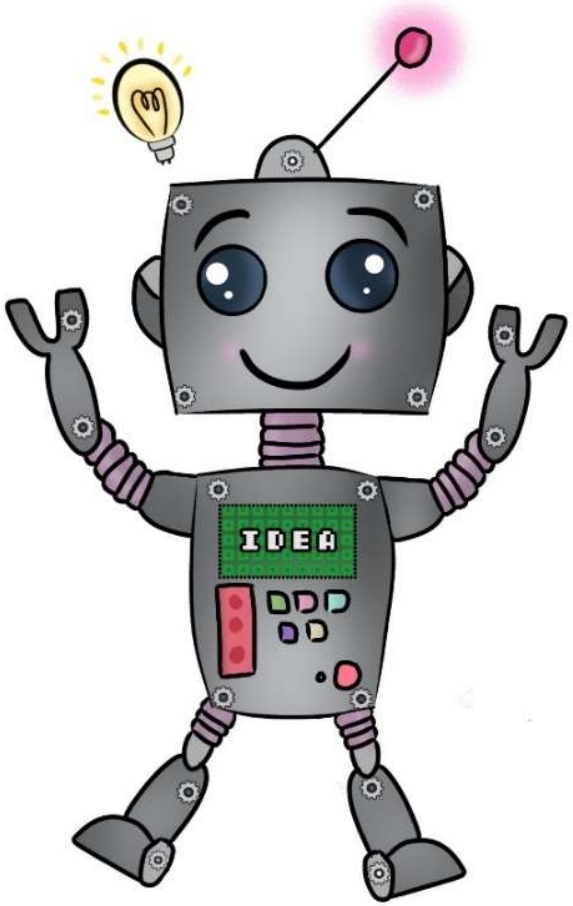


Well done! You've reached the end. You've also learned a lot of key words and concepts including:

- demand and supply
- trade and economics
- buying and selling
- markets and marketplaces
- money and banking
- digital currencies and bitcoin
- payments, lending and remittances
- debits and credits
- ledgers, distributed ledgers and blockchain
- biometrics, authentication and identity
- the internet of things
- cloud computing
- server farms
- Open Finance
- Application Program Interfaces
- peer-to-peer networking
- *The Network Effect*
- Artificial Intelligence, robots and machine learning

You should now discuss these areas with your class and see how well you understand them!



Did you find this useful?
How did you do?
What else would you like to know?

And can I ask you a question?

Will you be Robbie's friend?