This is something those entering the cryptocurrency ecosystem wish to understand, how are cryptocurrencies created, following which they want to know whether it’s possible for them to start creating their own cryptocurrencies.

In this lecture we’re going to focus down on a specific cryptocurrencies creation, that cryptocurrency will be bitcoin. This will ensure you understand how the process works,

So Bitcoin is compared to Gold for many reasons, the main comparison being made between them is that they’re both a store of value. Albeit, Bitcoin being a digital store of value.

However the similarities go further than that, it actually starts right back in the creation process. Both assets are created through a process known as mining, however, that mining process couldn’t be any more different. Gold mining is far more physical, on the other hand, Bitcoin mining is more digital in its approach.

This mining process is a decentralised process which will be explained in more detail later in the course, it’s a very competitive task, for which dedicated hardware is needed. The more miners that join the network, the more difficult it becomes for each to mine a block hence profit from their operations. The Bitcoin Protocol was constructed in such a way where new Bitcoins are created at a fixed rate, hence why the mining process is such a competitive process.

Let me dive a little deeper here. So approximately every ten minutes, these Mining Machines collate the pending transactions in the network, and work on solving the mathematical puzzle that’s presented. The first Bitcoin Miner to find that solution then broadcasts it out to the network, from where other miners verify whether the mathematical solution has been correctly solved. If approved, that Block is then added onto the Blockchain, and the miner is granted the freshly minted Bitcoin as a reward which currently stands at 12.5 Bitcoins, and halves approximately every four years. On top of that, they are granted all the transaction fees.

By the way, the mathematical puzzle mentioned is by no means easy to solve for the Mining Hardware, it takes billions, if not trillions of guesses for the Hardware to find a match. Which naturally makes it resource intensive.

But as you’ll be able to tell, the creation of new Bitcoins is incentivised. In order for fresh Bitcoins to be minted, and distributed into the ecosystem via miners, they must process transactions in the network in order to do so.

Let dive further now and specifically talk about what the purpose and function of mining is.

Mining is the process of adding transaction records to Bitcoin's public ledger of past transactions, and the term Blockchain comes from this, as it’s the ledger of previous Bitcoin transactions which is a chain of blocks. On top of that, it’s the process in which Bitcoins are added into the network, and the current reward is 12.5 Bitcoins for solving a block, which halves every 4 years.

As a process, mining Bitcoins is an extremely intensive one. Hence, can’t be managed by your home computer anymore, it requires specialised mining equipment, known as ASIC Machines.

But, back to the blocks in the Blockchain for a moment, these blocks must contain a proof of work in order to be valid, and to ensure they’re valid, it’s checked by other nodes in the network.

Mining ensures Bitcoin Nodes reach a secure, tamper-resistant consensus!

The mining algorithm Bitcoin uses is SHA-256.

Now in order to successfully mine Bitcoins using this algorithm, you often need hash rates well into the gigahashes per second, and generally higher.

Hence, why it’s impossible to mine Bitcoins profitability using your home computer, the serious miners nowadays use dedicated ASIC mining machines, which are setup to do one thing, and one thing only - that’s mine Bitcoins.

Let me highlight the four most popular mining hardwares for you now.

It’ll help you grasp why some hardwares previously used for mining are now obsolete.

The first piece of hardware you need to be aware of, is the CPU hardware. So when Bitcoin was starting out, CPU hardware was the only type you could use to mine Bitcoin. Of course mining has moved on pretty fast, so CPU hardware is now very unheard of to use. Let me put it like this, you could mine for decades on your laptop without earning a single Bitcoin.

Next up we have GPU hardware. This was created about a year and a half after Bitcoin started. GPU stands for Graphical Processing Unit. Miners found these graphics cards to mine efficiently. To put it in perspective, GPU’s allowed for 50 to 100 times increase in mining power, with less power use overall. So as it stands GPU mining is still an option, but once again it’s not the best out there to mine with.

Moving on from those two, we have FPGA mining, which stands for Field Programmable Gate Array. At this stage we started seeing hardware manufactured specifically for Bitcoin mining. When FPGA’s came along it allowed so called bitcoin mining farms to be started at a profit. Now in regards to power increase, FPGA’s were about five tomes more powerful than GPU’s, and on top of that they were more efficient and easy to use.

Lets forward to this day now where we have ASIC’s, which stands for Application Specific Integrated Circuit miners. ASIC’s are designed for one thing and one thing only, that’s mining. One purpose. There’s a huge hashing increase of like 100 times with ASIC’s, and they use less power.

So if you ever wanted to make your Bitcoin mining profitable this is the machine for you. They aren’t cheap, but they do have a good period of life well over two years if maintained.

But if you’re a hobbyist, is bitcoin and in general cryptocurrency mining profitable. To put this simply. No.

You see, unless you’re planning on building out a full scale operation, unfortunately mining won’t be profitable for you. Reason being, it is so resource intensive at the current difficulty level. This is especially true of the case with Bitcoin.

In the early days of Bitcoin it was possible to mine Bitcoin using nothing but your laptop. But, Bitcoin has the difficulty level of mining hard-wired in, hence, laptop mining just couldn’t keep up. You could setup a Laptop Bitcoin Miner, and not gain anything in return for your lifetime!

If you wanted to start mining Bitcoin now, and have any chance at solving a block. You’d need to invest in an ASIC Machine, which let me tell you, isn’t cheap. It’s a significant upfront investment!

On top of purchasing the ASIC Machine, you then have to power it, and cool it. Which is going to consume a large amount of electricity, as they need to be running 24/7. Genesis Mining are estimated to spend $1 Million Plus, on electricity alone! Of course, Genesis Mining is a huge, huge, huge operation. But it does help picture, and put into context the costs involved.

Bitcoin Mining really isn’t for hobbyists anymore, it’s for those who have significant funds to invest to setup a large scale operation. Naturally, it tends to be companies setting up large farms.

Of course, there are other coins you can mine, such as Ethereum. These can be mined by using GPU’s, not the more expensive ASIC Machines. But then again, you need to factor in your electricity costs to see where your break even point is. A great site to use for these calculations is: whattomine.com. Naturally, there are other similar sites out there as well. These calculator sites will help you assess your profitability, before you invest in such expensive hardware.

But that’s everything on cryptocurrency creation, as you can see it’s not as black and white as it initially seems. Our next lecture is all about what gives cryptocurrencies value, see you there!