***4) IT Technologies:***

**I) Blockchain and cryptocurrencies:**

1. The state of the art:

* Blockchain is a system of data, in this system, these data are decentralized and spread throughout the network. Moreover, these datas are difficult to change or hack by each participant . Each block of the system contains data records about every transaction and this information is added by every participant in the system, this is called Distributed Ledger Technology (DLT) and DLT is built based on a peer to peer network.
* Cryptocurrency is a medium of money that can be used for trading and doing transactions online. There are a variety of cryptocurrencies, which is up to 15000 cryptos and the total value is $2,3 trillion in December 2021. One more interesting fact about crypt is that some companies have their own crypto. And crypto works based on the blockchain system.

1. How is blockchain used?

* We are living in a world where everything is encrypted, major business operations are switched from offline to online. With the invention of blockchain and crypto, traders can do many transactions without being hacked or stolen. As data in a blockchain system is decentralized, it’s much more secure for doing transactions on blockchain than doing transactions in a traditional way. It turns out that blockchain can be reliable and more trustworthy, many companies have used blockchain technology to support their business operations such as Walmart, Pfizer and other companies… The applications of blockchain are used widely in any fields of economy:
* Smart contract: According to investopedia.com, the term of smart contract is a “*self-executing contract with the terms of the agreement between buyer and seller being directly written into lines of code.*” A key feature of smart contracts which is different from traditional contracts is that they don’t need a third party as an intermediary between participants in the contract, the blockchain system executes the contract by itself.
* Financial Services: As we mentioned above, blockchain is being used widely in business operations, and financial services are benefiting from blockchain technology. With the invention of blockchain technology, more and more transactions are being done thanks to blockchain Distributed Ledger Technology. Moreover, it’s more secure to do transactions with the support of blockchain, trading record data is much easier to trace and faster.
* Supply chains: In the production process, blockchain plays as a ledger to track the production, distribution, quality of the product and transaction information. Thanks to the blockchain system, quality assurance can prevent low-quality products and counterfeits on the market.

1. The future of blockchain and cryptocurrency:

* ***“It looks like blockchain is here to stay, I think it’s going to be a powerful technology for modern society.”* – Reid Hoffman, Co-Founder & Executive Chairman, LinkedIn.**
* According to a forecast which was made by A Gartner Trend Inside Report:
* The value of blockchain business will grow slightly to more than $176 billion in 2025 and it will likely reach $3,1 trillion by 2030.
* Enterprises built on blockchain technology will be worth $10 billion in 2022
* Government's documents will be likely to be encrypted with the help of DLT, this will replace traditional paper documents.
* Cryptocurrency will likely become more popular than fiat currency because they are easy to trace and more efficient. Some countries will accept crypto as their national currency. For example, El Salvador has adopted bitcoin as their national currency since September 2021. India today explained how bitcoin can solve El Salvador financial problems: **“*With the widespread use of Bitcoin within the country, the El Salvador government is wishing to tackle two major financial problems. One, it hopes that the use of cryptocurrency will provide banking access to more citizens than ever before. Since Bitcoin is decentralised, it is not dependent on any particular institution to be made available to the public. Anyone can join in and trade Bitcoins through an internet-enabled device.” (***<https://www.indiatoday.in/technology/news/story/el-salvador-becomes-world-s-first-country-to-make-bitcoin-an-official-currency-1850171-2021-09-07>)

1. The impact of blockchain and cryptocurrency:

\_ As the economy is becoming encrypted, we can see the importance of blockchain in many aspects of economy and society, especially in the fourth industrial revolution, which eases the border between physical and cyber pace. Blockchain has created a type of business in which every data is secure, decentralized. and distributed to all participants in the blockchain system.

* **Impact on business:** No one can deny the fact that blockchain has deeply affected the business market in many different ways:
* Cybercrime has caused a large damage to many enterprises and companies, which can be up to millions of dollars. For this reason, many enterprises have used blockchain systems as their new business models. Because blockchain systems based on DLT and blockchain store data by using sophisticated math and software that is impossible for attackers to steal or sabotage.
* Cutting out the third party in contracts may be the greatest advantage that blockchain brings to us. Traditional contracts require a third party to enforce all of the agreements between participants in the contract, this can lead to higher cost for companies or individuals when trading assets. However, in the smart contract, the blockchain system plays as an intermediate by operating some mathematical operations and this can reduce the expense for each participant in the contract.
* **Impact on supply chain management:**
* Some big corporations such as Walmart or Pfizer have used blockchain technology in their supply chain. With blockchain, the company can keep record about their production process and distribution. Blockchain also takes responsibility in verifying products, which can enforce the quality of the product when it comes to the user and prevent low - quality products and counterfeits. In the meantime, humans cannot control all the processes of the supply chain. Sometimes, they will miss out on low - quality products.
* Impact on the society:
* Since Satoshi Nakamoto invented the term blockchain and cryptocurrency, blockchain technology is becoming more and more well - known to everybody, including me. I heard that blockchain is the new technology that solves a problem for hundreds of years - if there's a contract which does not require an intermediate, which can reduce the cost for the contract. As everyone knows, the intermediate has a mission to build trust among participants in the contract, the most familiar of which is the country law. But with blockchain, blockchain plays as an intermediate based on algorithms and maths, which reduce the cost in the contract.
* Bitcoin is the most familiar example of cryptocurrency. Sometimes, I have an interest in the bitcoin market by looking at crypto diagrams every day. Moreover, I also have an interest in bitcoin mining, which has been very popular in recent years because of its high profit. For this reason, thousands of bitcoin miners come to China or Alaska to dig bitcoin.

1. Impact of blockchain on myself and my family:

* Blockchain appears in my everyday life, for example:
* Shopping online is the most familiar example of blockchain. Some shopping online platforms use smart contracts to do transactions with the client, this can help me to do payment by doing online transactions. Especially in COVID 19, online shopping is more and more familiar to me, when going shopping in the supermarket is challenging. Online shopping platforms use blockchain technology to control the process of manufacturing and distribution. For this reason, shopping online provides me with the status of my product, which can help me trace the origin of the product and the progress of shipping.
* In the fourth industrial revolution, many countries have launched online health insurance, which is very convenient for the patient. In the pandemic era, health declaration í a must when I come to the public area. PC Covid, one of the online health apps, is very useful for the Vietnamese in doing health declarations and providing vaccination status.

: