Many years ago, human recorded information by carving on different materials like leather and bamboo. The information stored was limited in terms of both amount and complexity. Later when people started to record information on paper, more and more information could be recorded in a tidy way. With the invention of computer, people could store even more complex data in a more organized way. Depending on different requirements including size, cost, privacy and security etc, different data structures are implemented to fit different use cases.

The globalization of different industries in our world has connected people from different countries. At the same time, huge amount of data are generated through the interaction of different people. In general, data of the same kind within a company are handled in a centralized way. However, some data (e.g. transaction data) is deemed more important and required special handling to ensure its validity, confidentiality and immutability. At the same time, putting all eggs in the same box is always not desirable for risk management. People are eager to having a way that could ensure safety, security and validity for such data processing.

Blockchain is a solution.

Blockchain is a complex data structure. Like a linked list, data are stored in blocks that are connected one after another sequentially to form a chain. More than a linked list, the name of each block is a serial of code that are generated from some hash function according to the data it contains, which combines with the name of the previous block it is connected to, forms the header of the block. With this property, any changes, even a small change of single character, could be easily detected by looking at the header only. This makes anyone who want to change the data secretly impossible.

Another feature of blockchain is decentralization. In general, if the data is deemed private and confidential, it should be handled locally and secretly that no one could reach except the authorized one. However, blockchain goes the other way. Thanks to the implementation of cryptography, even though the blockchain is distributed to all nodes in a network, the privacy of the people who are involved in the data transaction is maintained. When a new data recorded that requires validation, the nodes in the network will try to do the work simultaneously. The one who complete the job first would have some reward and once the job is done, it will be added to the active block of the blockchain. A new block will be added when the active block reached a certain amount of data and at the same time, the updated blockchain will be copied to all nodes within the network. This makes malicious alteration of data nearly impossible as it would require more than half of the nodes within the network to make the same change.

When blockchain was first introduced in 1991, due to the limitation of computation power, no one could make use of this revolutionary idea. Not until the introduction of bitcoin in 2008, people started to realize its power and importance for this digital age. The technology is now being used in various sectors including finance, medical and supply chain etc. Nevertheless, there are still many challenges during the implementation that make it still an immature technology. Like many other technological innovations, it would take a long period for people to learn, adopt and realize its benefits. When more and more people realize its power and the underlined benefits surpass the traditional ways, the challenges will be solved eventually. Blockchain will only become more popular and more important. As a citizen of this world of digital age, there is no reason for not learning this.