**Blockchain Technology**

Blockchain is a new technological concept that utilizes a cluster of computers to ensure safe transactions of digital assets by storing the transactions’ information in a way that is almost impossible to corrupt or hack. A blockchain system consists of a ledger and a network of computers or nodes, each containing an exact copy of the ledger. The ledger is a database that stores all the transaction records, each represented by a block containing a hash, a timestamp, the transaction data, and the hash of the previous block. Hashes are unique and serve as fingerprints for each specific block since the cryptographic hash function that generates them never gives the same hash for different blocks and produces the hashes in a completely random way. Since each block also holds the preceding block’s hash, the structure inside the ledger forms a chain, hence the name “blockchain.”

Whenever a transaction occurs, some of the network’s nodes, called “miners,” perform a process called “mining.” The miners’ job is to validate the transaction and to create a hash for it. The ledger then updates the existing chain with the new block on all the nodes. In order to generate hashes, the mining process solves complex math problems that require immense computation power. Due to the importance of mining in the blockchain operation and the extensive work required for it, miners usually receive rewards whenever they generate a hash for a transaction.

The properties that distinguish the blockchain include being decentralized, transparent, and immutable. Decentralization means all transactions in a blockchain system take place between the entities without a third-party trust organization managing the transactions. For example, banks are the trust organizations at the center of any money transaction, thus resulting in a centralized system. By decentralizing, transactions can be made faster, cheaper, and immune to third-party problems. Transparency of blockchains comes from the fact that every person in the network has a full record of everyone else’s transactions and account values stored in the ledger. Blockchain’s structure is also almost impossible to change and completely secure from hacking or tampering, since changing only one block requires changing the whole chain in the ledger at all nodes in the network which will also require the approval of the majority of the nodes. With these properties in mind, a tremendous amount of computation and research resources have been allocated to improve blockchain algorithms and to design hardware suitable for mining.

With blockchain’s appealing characteristics, numerous professionals believe in its potential and predict that it will soon be essential for all applications dealing with highly sensitive data transfers. Advertised at the beginning as an underlying technology, cryptocurrencies like Bitcoin and Ethereum initially used the blockchain to enable the transfer of digital money from one entity to another securely with the economic incentive to remove the dependency on centralized systems like banks and governments. Then, people started looking into applying the same concept in applications like filing taxes and transferring property ownership certificates, where information like social security number and residence address are used and are at high risk of being leaked when going through intermediate parties. Another application would be to use blockchain in the voting and censuses systems. Because blockchain allows data transfer without regulations from the government or any external entity, the possibility of manipulating the votes or the counts is almost impossible. So, despite the blockchain being in its early stages and the lack of efficient hardware for large-scale implementation, the blockchain is predicted to be able to help preserve properties, information, and rights of people all over the world soon.

**Self-Grading Sheet for Gadget Exercise**

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| **Item** | **Description** | **Compliance** |
| 1 | Word Count | 597 |
| 2 | Underline all topic sentences | Checked |
| 3 | No personal pronouns | Checked |
| 4 | No passive voice sentences | Checked |
| 5 | No use of "very" | Checked |
| 6 | All paragraphs with at least 3 sentences | Checked |