B. Tech Program First Year

Course: Experiential Learning

Course Code: DA1001

## “Showing a fictional Currency Transaction and generating hash - using blockchain technology”

by

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June, 2022

# Certificate

This is to certify that the project titled **“Depiction of Blockchain Technology”** is a record of the bona fide work done by **Ashnuta Upadhyaya** (Reg No:219301432) submitted for the partial fulfilment of the requirements for the completion of the Experiential Learning (DA1001) course in the **Department of Computer Sc. & Engineering** of **Manipal University Jaipur,** during the academic session February - June 2022.

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| *Signature of the mentor* |
| Harish Sharma,  Assistant Professor, (Senior)  Department of CSE, SCIT |

# Abstract

# The project work is primarily focused on the application of Blockchain Technology. It is a basic representation wherein the immutability of a blockchain is shown.

# The project centers upon the actual functionality of blockchain technology. I have tried to create a fictional currency transaction wherein the data is being provided by the user. This data is being stored in the different blocks created and the hash of each block is being generated in the output.

# The output contains the interlinking of each of the blocks and to further show the immutable characteristic of a blockchain additional output has been generated to show that even a minute change in the input changes all the hashes generated for each block hugely.

# It is a minor attempt at building a blockchain record and representing it, further depict how it works on the basic levels and how this extraordinary technology is being used in the larger fields of interest, in bigger industries and many other domains.

# Introduction

# Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. An asset can be tangible (a house, car, cash, land) or intangible (intellectual property, patents, copyrights, branding). Virtually anything of value can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved.

# **Why blockchain is important:** Business runs on information. The faster it’s received and the more accurate it is, the better. Blockchain is ideal for delivering that information because it provides immediate, shared and completely transparent information stored on an immutable ledger that can be accessed only by permissioned network members. A blockchain network can track orders, payments, accounts, production and much more. And because members share a single view of the truth, you can see all details of a transaction end to end, giving you greater confidence, as well as new efficiencies and opportunities.

#### **Distributed ledger technology**

All network participants have access to the distributed ledger and its immutable record of transactions. With this shared ledger, transactions are recorded only once, eliminating the duplication of effort that’s typical of traditional business networks.

#### **Immutable records**

No participant can change or tamper with a transaction after it’s been recorded to the shared ledger. If a transaction record includes an error, a new transaction must be added to reverse the error, and both transactions are then visible.

#### **Smart contracts**

To speed transactions, a set of rules — called a smart contract — is stored on the blockchain and executed automatically. A smart contract can define conditions for corporate bond transfers, include terms for travel insurance to be paid and much more.

# Literature review

# MORE ON BLOCKCHAIN

Operations often waste effort on duplicate record keeping and third-party validations. Record-keeping systems can be vulnerable to fraud and cyberattacks. Limited transparency can slow data verification. And with the arrival of IoT, transaction volumes have exploded. All of this slows business, drains the bottom line — and means we need a better way.

Therefore, shifting and acquiring blockchain can really bring upon this change in the following ways:

#### **Greater trust**

With blockchain, as a member of a members-only network, you can rest assured that you are receiving accurate and timely data, and that your confidential blockchain records will be shared only with network members to whom you have specifically granted access.

#### **Greater security**

Consensus on data accuracy is required from all network members, and all validated transactions are immutable because they are recorded permanently. No one, not even a system administrator, can delete a transaction.

#### **More efficiencies**

With a distributed ledger that is shared among members of a network, time-wasting record reconciliations are eliminated. And to speed transactions, a set of rules — called a smart contract — can be stored on the blockchain and executed automatically.

Blockchains can be of different types, and this has been further elaborated and discussed:-

#### **TYPES of Blockchain**

#### **Public blockchain networks**

A public blockchain is one that anyone can join and participate in, such as Bitcoin. Drawbacks might include substantial computational power required, little or no privacy for transactions, and weak security. These are important considerations for enterprise use cases of blockchain.

#### **Private blockchain networks**

A private blockchain network, similar to a public blockchain network, is a decentralized peer-to-peer network. However, one organization governs the network, controlling who is allowed to participate, execute a consensus protocol and maintain the shared ledger. Depending on the use case, this can significantly boost trust and confidence between participants. A private blockchain can be run behind a corporate firewall and even be hosted on premises.

#### **Permissioned blockchain networks**

Businesses who set up a private blockchain will generally set up a permissioned blockchain network. It is important to note that public blockchain networks can also be permissioned. This places restrictions on who is allowed to participate in the network and in what transactions. Participants need to obtain an invitation or permission to join.

#### **Consortium blockchains**

Multiple organizations can share the responsibilities of maintaining a blockchain. These pre-selected organizations determine who may submit transactions or access the data. A consortium blockchain is ideal for business when all participants need to be permissioned and have a shared responsibility for the blockchain.

# Methodology

#### As each transaction occurs, it is recorded as a “block” of data

Those transactions show the movement of an asset that can be tangible (a product) or intangible (intellectual). The data block can record the information of your choice: who, what, when, where, how much and even the condition — such as the temperature of a food shipment.

#### Each block is connected to the ones before and after it

These blocks form a chain of data as an asset moves from place to place or ownership changes hands. The blocks confirm the exact time and sequence of transactions, and the blocks link securely together to prevent any block from being altered or a block being inserted between two existing blocks.

#### Transactions are blocked together in an irreversible chain: a blockchain

Each additional block strengthens the verification of the previous block and hence the entire blockchain. This renders the blockchain tamper-evident, delivering the key strength of immutability. This removes the possibility of tampering by a malicious actor — and builds a ledger of transactions you and other network members can trust.

# Results and Discussions

# My project shows the basic functioning and working of Blockchain.

# The code commences with a hash generating algorithm followed by an input which requires the user to add values to the transaction being made of the predefined fictional currency and finally each block’s unique hash is generated.

# The first block returns to an initial string and does not contain any previous block’s hash, thus known as the Genesis Block.

# Each subsequent block where the transaction record is being stored contains its own unique hash along with the hash of the previous block making it a representative example of a blockchain.

# Conclusions

# Finally, when the code is run, and output is generated the interlinking of the blocks is visible.

# In addition to this, the focus is on the fact that as soon as any minute change occurs in the input transaction records the hash of the block drastically changes showing a visible difference.

# This technology is being highly used nowadays due to its safety, authenticity and reliability. Hence this minor project was just a basic representation of blockchain using a fictional currency transaction.

# Future prospects

Industry leaders are using Blockchain to remove friction, build trust and unlock new values.

Blockchain has already started to gain momentum and is being used in the present times, with this it has a lost of scope in the future. Some of the domains have been listed below:

* Cryptocurrency - Bitcoin is the name of the best-known cryptocurrency, the one for which blockchain technology was invented.
* [Supply chain](https://www.ibm.com/in-en/blockchain/supply-chain)
* [Healthcare](https://www.ibm.com/in-en/blockchain/industries/healthcare)
* [Government](https://www.ibm.com/in-en/blockchain/industries/government)
* [Retail](https://www.ibm.com/in-en/blockchain/industries/retail)
* [Media and advertising](https://www.ibm.com/in-en/blockchain/industries/advertising-media)
* [Oil and gas](https://www.ibm.com/in-en/blockchain/industries/oil-gas)
* [Telecommunications](https://www.ibm.com/blockchain/resources/telco-smartpaper/)
* [Manufacturing](https://www.ibm.com/in-en/blockchain/industries/manufacturing)
* [Insurance](https://www.ibm.com/in-en/blockchain/industries/insurance)
* [Financial services](https://www.ibm.com/blockchain/industries/financial-services)
* [Travel and transportation](https://www.ibm.com/downloads/cas/JXGEZ0KB)

# References

# IBM for information on Blockchain

# Visme for Flowchart generation

# Acknowledgements

I would really like to thank my mentor Mr. Harish Sharma under whom I was able to complete my minor project. He enlightened me with the necessary information which encouraged me to explore and think and complete this project successfully.

Also, all of the accessible information really made it possible for me to properly finish this project.