Fintech- Block Chain Technology in Finance

*Dr. Manoj Kumar **Sapna Saini
*Assistant Professor, School of Business Management and Commerce,
Desh Bhagat University Mandi Gobindgarh, Punjab
**Assistant Professor, Govt. P.G. College,
Naraingarh & Research Scholar, Desh Bhagat University, Punjab

Abstract
Block Chain is defined as an electronic ledger that records financial transactions in such a way that makes it impossible to change and hack the system. It is a database that stores data in the form of "blocks". The block store group of financial transactions. This research paper is descriptive and is based on secondary data. In this paper, we will discuss the concept of FinTech, Cryptocurrency, and block-chain, how blockchain works, why to use blockchain, and what's the problem with using blockchain. We concluded that this technology provides an online ledger that keeps a record of every piece of data permanently and protects it from hackers, unauthorized access, and fraudulent activities.

Keywords: [FinTech, Cryptographic Hashing, Decentralization, Bitcoin, Smart Contracts].

Introduction
Blockchain technology was first invented by Stuart Haber and W. Scott Stornetta in 1991. The aim of the researchers is to design a blockchain to implement such a system through which financial transactions are made securely and without alteration. An individual company or group of companies that know its participants can set up a business blockchain. They can collect funds from business blockchains without having to do with digital currencies. According to a MarketWatch report in 2018, the total investment in blockchain by the financial services sector and banking sector amounted to $2.3 billion. The report also forecasts that this investment will grow to $17.47 billion by the end of 2025, with a compounded growth rate of 33.6% from 2019 to 2025.

Journey of Blockchain
1. Blockchain technology was first invented by Stuart Haber and W. Scott Stornetta in 1991. After that, some inventions are happening to bring improvements to it. The following shows the brief journey of blockchain: -Blockchain technology was first invented by Stuart Haber and W. Scott Stornetta in 1991 with a cryptographically secured chain of blocks.
2. In 1998, Nick Szabo a computer scientist works on 'bit gold' which is a decentralized digital currency.
3. In 2000, Stefan Konst introduced new ideas for the implementation of blockchain with his theory of cryptographically secured chains.
4. In 2008, a group of researchers introduced a white paper for establishing the model for a blockchain under the pseudonym Satoshi Nakamoto.
5. In 2009, Nakamoto used the initial blockchain as the public ledger for transactions made with Bit-coin.
6. In 2014, a new version namely blockchain 2.0 is born. It separated blockchain technology from currency and also search for other use of it other than financial matters.

Concept of Blockchain
Blockchain means an electronic ledger that records the financial transaction in a way that makes it impossible to change and hack the system.

It is a database that stores data as "Blocks" which stores financial transactions in groups. Blockchain systems created a new block after filling one block automatically, without the intervention of human beings. That's why it creates a transparent system.

Definition:Blockchain, is defined as Distributed Ledger Technology (DLT) that prevents any digital asset from being unalterable and transparent through the use of decentralization and cryptographic hashing.

Important Terminology
FinTech
The "Fintech" was first introduced by New York banks in 1972. Still, there is no specific definition of Fintech, but Fintech stands for Financial Technology. It includes financial services like the online market hub, mobile app, mobile wallets, artificial learning machines, financing, foreign exchange, Investments, digital currency, insurance, biometrics, and wealth management, etc.

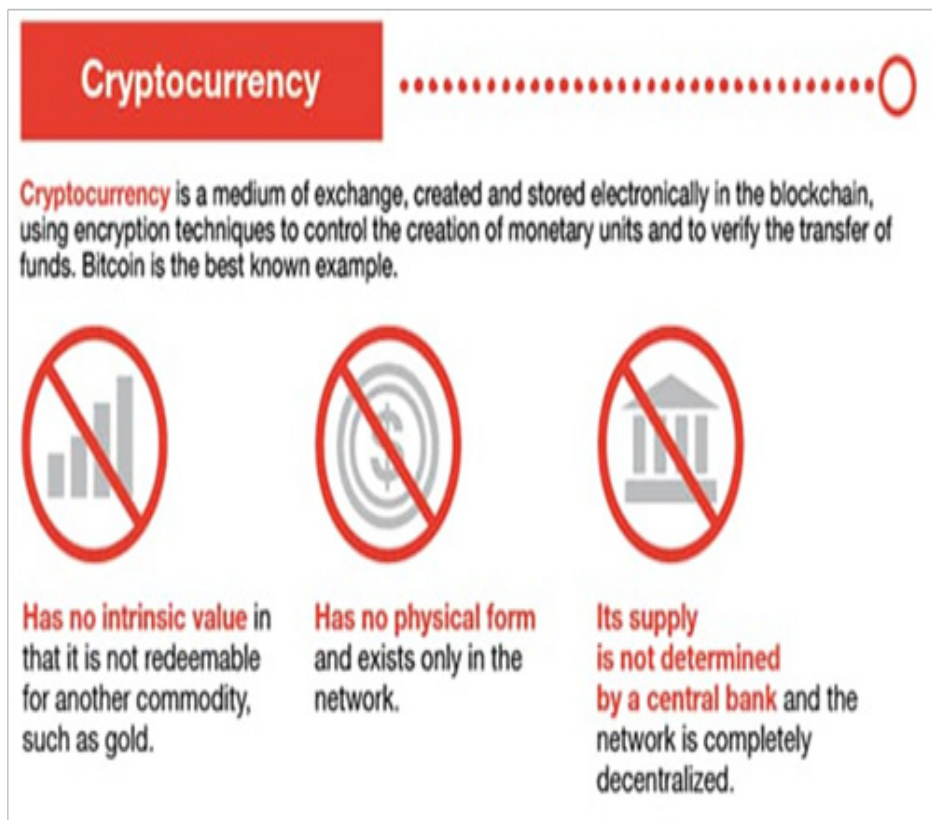### Cryptocurrency
For understanding the term of cryptocurrency, one

should divide it into two parts "Crypto+ Currency".
For understanding the term cryptocurrency, one should divide it into two parts "Crypto+ Currency".
Here term Crypto means "secret" and currency (The money used in a particular country is referred to as its currency) means "Money that is used in a particular country". So, cryptocurrency means secret money or digital money that can be used to purchase goods and services online. The working of cryptocurrency depends on "Blockchain" technology.

According to Oxford Dictionary, "Cryptocurrency is defined as a digital currency in which transactions are verified and records maintained by a decentralized system using cryptography, rather than by a centralized authority.

Any investor can purchase cryptocurrency through crypto exchanges like Coinbase, Cash app, and more.

Cryptographic Hashing
Hashing is a method of cryptography that converts any form of data into a unique string of text that validates data and ensures the security of the data.
Decentralization
A decentralization database means no superior or someone that has accountability.
In the sense of blockchain: it is a decentralized database that is based on block which cannot be replaceable and free from human biases.

Bitcoin
Bitcoin can be defined as cryptocurrency, virtual or digital currency that is not issued by any banks or government bodies.
The invention of Bitcoin is the result of the global crisis of 2008. It was generated by Satoshi Nakamoto in 2008 and first-time used between Nakamoto and an early adopter of Bitcoin in January 2009.

Bitcoin was legal in developed countries like the U.S., U.K., Japan, etc. from June 2021. But in India, RBI banned it in India 2018 and the Supreme Court of India lifted the 2018 RBI ban in 2020. So, The Indian government still isn't very sure about how to deal with Bitcoin.
Note: Sometimes bitcoin is treated as equal to the blockchain. The following difference clear the fact "blockchain and bitcoin are not same": -
Blockchain is not Bitcoin, but Bitcoin is an application of blockchain technology.
Bitcoin is the digital currency and blockchain is the ledger to keep records or track digital tokens, transactions, or information.
You can't use Bitcoin without blockchain, but you can use blockchain without Bitcoin.
Smart contracts
The smart contract is a simple oracle program stored

on the blockchain that is executed automatically after fulfilling "if/then/ when…" conditions. This is mainly used to send information to all participants without the intermediary's involvement and loss of time.

Review of Literature

Pimpalkhute and Network (2022) said that blockchain helps in increasing demand for consumers, employees, investors, suppliers, retailers, and wholesalers because it presents a transparent and visible system in the entire supply chain management. In the energy sector, it creates services for its clients through microgrids and opens the avenue of incentivizing sustainable energy.

(Yao and Qin 2021) this research paper titled "Block Chain Based Supply Chain Financial Risk Management", said that there are four types of risk i.e., authenticity risk, payback risk, operational risk, and contingency risk in supply chain management. These can be controlled by employing actual physical sensors to respond to and monitor the data in real time, increasing the supply chain's effectiveness through risk management.

Kumar et al.(2020) said that this technology provides a good network of big data, the Internet of Things, and machine learning. It is beneficial for improving our lifestyle and maintaining proper records of assets and transactions. It also improves the GDP of a nation and improves economic infrastructure.

Emmanuel et al. (2022) concluded that a blockchain is fruitful for keeping date-wise records of price, location, quality of product, and other relevant information in the supply chain. That's why it increases the traceability of material, reduces the chance of counterfeit loss, and improves transparency over outsourced contract manufacturing.

Mehrotra and Kandpal (2019) determined that customers will be less inclined to adopt new technology due to their faith and trust in the conventional banking system. New technologies will not be successful until customers are satisfied with the privacy and security variable. It also requires some time to earn confidence among the customers even though it is easier and cheaper than the traditional methods.

Vijai (2019) said that the Indian fintech software market is forecasted to touch USD 2.4 billion by 2020 from a current USD 1.2 billion, as per NASSCOM. It is an emerging concept in the financial industry. Financial services can be offered at lower costs because of fintech. The Indian government also focuses on and encourages the fintech industry and promotes new ideas and innovations referring to the fintech industry. Ganapathy (2018) said in his article that the Indian financial services sector is making gradual progress to match steps with global peers just as the US, UK, Israel, Singapore, Hong Kong, and Sydney reflecting the growing importance of fintech across the international level. For financial inclusion, Financial Technology can be implemented anywhere. Importance needs to be taken to ensure the security of transactions.

Research Methodology

This research paper presents a conceptual framework for Blockchain in India. The research design of the study is descriptive that is based on secondary data. The secondary data is collected from different national and international research journals and various websites.

Objectives of the Study

The following are the objectives of the present study: -
1. To study the conceptual framework of FinTech, Cryptocurrency, and blockchain.
2. To discuss how the blockchain system works,
3. To study the uses of blockchain in India.
4. To study the problems faced by people while using blockchain technology.
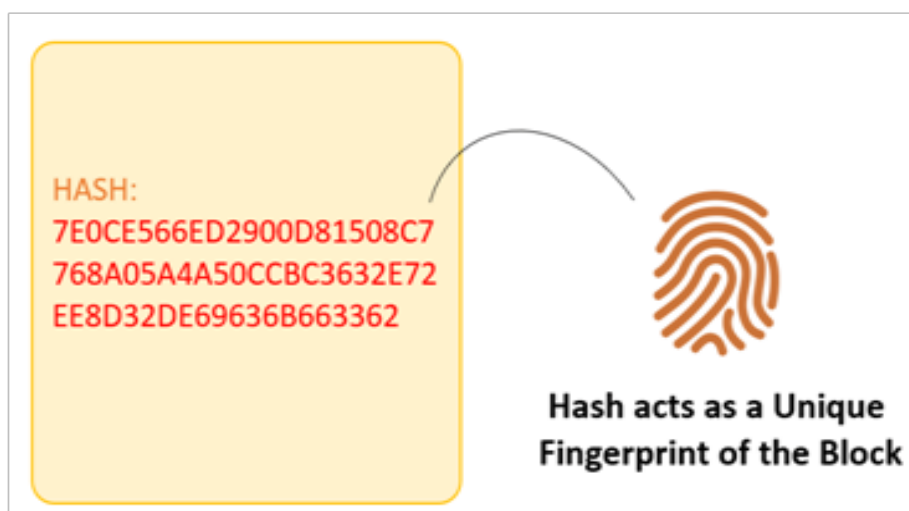
Working of Blockchain

Blockchain is "Block + Chain" which means a chain of blocks that store information and a new block is generated one after one (after filling one block) automatically, without the intervention of human beings. (Soze, 2017)

A Bitcoin block, for example, has data on the sender, the recipient, and the number of bitcoins that have been transferred. Before discussing the working of blockchain, discuss the working of Blocks.

Due to Block 0, the first block in the blockchain is called the Genesis block. It is also called an ancestor block because each new block is linked to the previous block with its Hash code.

A block has Data, Hash, and Hash of the previous block: -

- **Data:** Data of the transactions.
- **Hash:** A block has a hash which is a unique code just like a fingerprint. This large number must start from zero (i.e., must be very small). The hash is a 256-bit number that is associated with a nonce. It identifies a block and its unique code and all other contents. It helps to protect information from alterations.

HASH:
7E0CE566ED2900D81508C7
768A05A4A50CCBC3632E72
EE8D32DE69636B663362

Hash acts as a Unique Fingerprint of the Block

- **Hash code of the previous block:** Hash code of the previous block: In a blockchain, a new block has the hash code of the previous block after the Genesis block. In the following figure, there are 3 blocks.

Block1 is the genesis block, hence it does not have the hash code of the previous block. Block 2 has the hash code of block 1 and block 3 has block 2 and so on.

Figure: 3
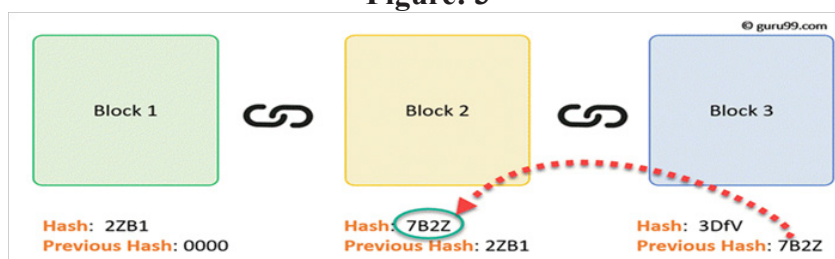
Purpose of consists Hash code of the previous block: its main purpose is to keep transactions secure.
Understand it's working with an example- lets a hacker wants to change the data that is stored on block 2 and is successfully able to change the hash of block 2. But,

block 3 still has the old hash code of block 2. Hence block 3 and all other succeeding blocks give invalid messages due to incorrect previous hash code just like shown in the following figure: -

Figure: 4
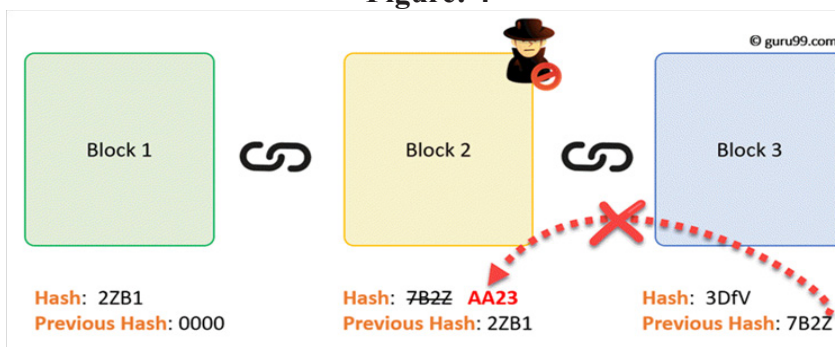
How blockchain works: -
Let's one person transfer money to another person following things will happen
Step 1: firstly, the request for fund transfer shows on the block itself online.
Step 2: After receiving information from the block, it sends it to the participants of blockchain users.

Step 3: the participants analyzed and approve the request for transfer.
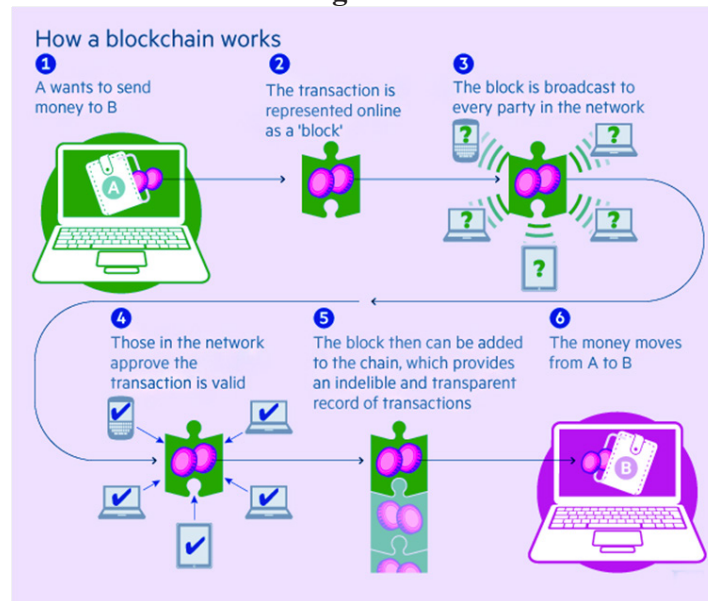**Step 4:** new block will be added to the blockchain after getting approval from participants.
Step 5: Money is successfully transferred to the second party when this block is added.
The following figure also shows how blockchain works:

Figure: 5

(https://data-flair.training/blogs/working-of-block-chain/)

Advantages of using Blockchain

Blockchain provides various benefits to businesses whether they are public or private or government institutions. It is used by businesses to share data and prepare an unaltered ledger that can be accessed only by authorized persons. It provides trust information without the intervention of human beings. The following are the main benefits of blockchain: -

1. Trustworthy Network: Blockchain is sometimes referred to as a "trusted" network, due to its ability to increase security, traceability, and transparency.Secondly, the data under blockchain is stored on blocks that are generated automatically by the system without the intervention of human beings. That's why, there is no chance of human error and everyone can trust the information.

2. Decentralized structure: Blockchain is a decentralized structure, which has no boss and no one whom we could hold responsible or award. Blockchain runs on all computers and its process of generating blocks is unstoppable and free from human interventions. For example, all participants of the supply chain such as suppliers, manufacturers, wholesalers, and retailers need necessary information regarding their goods and no one in this chain provides reliable information about it. With the decentralized nature of blockchain, this type of problem can solve.

3. Enhanced security and privacy: The security and privacy of data is another benefit of blockchain. Blockchain used Cryptographic Hashing which improves the security of transactions. It also used a digital ledger to keep a record of the transaction that is unalterable with end-to-end encryption, which prevents unauthorized access and fraudulent activities. Furthermore, it makes it impossible to hack from hacking activities by storing data on a computer network instead of stored on servers. Traditional computers store data together in servers that due to which the possibility of hacking increases.

4. Reduced costs: Blockchain is a more efficient process transactions as compared to a manual recording system. It reduces manual tasks such as collecting, recording, arranging, preparing reports, and auditing process. In addition, it reduces the cost by eliminating the role of vendors, middlemen, agents, and other third parties that have more processing cost and time which leads to inefficiency.

5. Speedily transactions: Due to the involvement of human beings in a manual   processing system is more time-consuming. But now traditional method (paper-based) is replaced by blockchain that can proceed with transactions within seconds. However, the timing of processing depends on various factors of the blockchain-based systems. The transactions are stored automatically with details on a blockchain system which reduce the time of creating multiple ledgers, keeping records on them, clearing & settling the transaction, and exchange of papers. For example, Walmart used this technology to trace the source of sliced mangoes in seconds which process had previously taken seven days.

6. Traceability: Blockchain used a digital ledger that

records every transaction and exchange of goods. So, an auditor can trace the location of goods and from where the good came. It also helps to verify the authentication of traded assets of a business. Due to this benefit, it is used by medicine manufacturing industries to trace the supply chain from manufacturer to distributor. Similarly, Walmart's company used blockchain for inventory management, tracking the location of products and checking the history of its products.

7. Immovability: Immovability means that cannot move i.e., can't be reversible. In the sense of blockchain, a transaction that is recorded on the blockchain cannot be altered or deleted. Blockchain keeps a record of transactions chronologically i.e., transactions are recorded at the same time and date at that time they perform. No one cannot change it. This feature enhances the security and reliability of the information. For example, Sweden uses the blockchain to keep an online record of real estate so that property titles can track even as they sell the property.

8. Individual control over data: According to Michela Menting (A research director at ABI Research), at present data is a valuable asset and every individual or organization wants to secure or protect their data from unknown or unauthorized persons or activities. With the blockchain's smart contract technology, individuals and organization can convert their data into digital form and can decide to whom and how long they share data.

Limitations or Problem faced while using Blockchain

Since blockchain is a technology and every technology has some implementation issues as well as other challenges. The following is the problem that is faced with blockchain: -

1. Storage capacity: As you know blockchain stored all data on the network. The size of the online database increases, with the increasing number of transactions. There is no way to store these data on a personal computer. This is the big problem that creates hurdles to implementing blockchain.

2. Slow processing: No doubt, blockchain performs transactions within seconds, but when there is a large number of transactions on the network its processing slows down. It can handle seven transactions per second but Hyperledger can handle 10,000 and Visa 24,000. All participants of the blockchain need to verify and approve each transaction which is time-consuming. Because of the time-consuming process, the practical use of blockchain becomes difficult to use it.

3. Privacy: Blockchain stores all data authorless on the network. All participants of blockchain have the right to access this data. When any person does transactions with this network, anyone could track the identification of a person. Therefore, blockchain does not 100 % guarantee of privacy of the data on the network.

4. Security issue: Bitcoin is the popular application of blockchain. Satoshi Nakamoto said that "51% attack' when he launched Bitcoin. The attack can be simply put like this – if 51% of the nodes in a network lie, the lie will have to be accepted as truth." Presently, blockchain technology also suffers from double sending of data.

5. Implementation cost: blockchain technology is implemented in the form of personal or rental networks. In addition to it, the cost of initial infrastructure such as computing, license, etc. is borne by the business or institution itself. The maintenance cost is also associated with blockchain technology. Hence, institutes or businesses that have no funds or budget or small size organizations cannot think about the implementation of blockchain technology.

6. Competent staff: to implement blockchain technology and work with this, need competent and knowledgeable staff. To train employees, they also need to arrange training programs which is costly and time-consuming. Further, if you need blockchain developers and experts, they are harder to find and will demand higher fees as compared to traditional developers.

Conclusions

Today every human being is poor of time. That's why each wants to get information quickly and accurately and blockchain technology fulfill this requirement. Blockchain provides the facility for online storage of data or transactions and the online exchange of goods and services. This technology provides an online ledger that keeps a record of every piece of data permanently and protects it from hackers, unauthorized access, and fraudulent activities. It helps in tracking any transactions, orders, accounts, products, or other things. It affects every individual as well as industries such as retailing, manufacturing, banking, transportation, insurance companies, Walmart, Nestle, Google, IBM, Microsoft,

and Intel, etc., Although, there are some limitations of blockchain technology that are discussed above. The above-discussed problems can be minimized or eliminated with the use of Hyperledger, Proof-of-Stake (PoS), and so on.

References

Emmanuel, A. A., Serwaa, E., Koomson, B., & Kwaku, E. (2022). The Impact of Synchronizing Procurement and Supply Chain Management Through Block Chain Technology, *African Journal of Procurement, Logistics & Supply Chain Management*, 3(April), 0–16.

Ganapathy V. (2018). FinTech in India: Revolutionising Access to Finance, *Journal of Advanced Research in Humanities and Social Science,* 5(4), 10–13. Retrieved from https://science.adrpublications.in/index.php/Journal-Humanities-SocialScience/article/view/845

Gurung, S. (2018). Fintech: a Messiah for the Ailing Banking Industry in India, *Book Chapter*, 5(10), 159–164. Retrieved from www.jetir.org

Kandpal, V., & Mehrotra, R. (2019). Financial inclusion: The role of fintech and digital financial services in India, *Indian Journal of Economics and Business*, 18(1), 95–104.

Krishna Priya, P., & Anusha, K. (2019). Fintech issues and challenges in India, *International Journal of Recent Technology and Engineering*, 8(3), 904–908. https://doi.org/10.35940/ijrte.C4087.098319

Kumar, D., Singh, R. K., & Layek, A. (2020). Block Chain and Its Application. *Chapter*, (February 2021), 113–127. https://doi.org/10.1007/978-3-030-46425-7_6

Pimpalkhute, P. U. (2022). *Block chain and sustainability*. (June), 1–6. Retrieved from https://www.researchgate.net/publication/361207637

Vijai, C. (2019). Fintech in India – Opportunities And Challenges, SAARJ *Journal on Banking & Insurance Research*, 8(3), 17–27. Retrieved from https://ssrn.com/abstract=3354094

Yao, F., & Qin, Z. (2021). Block Chain Based Supply Chain Financial Risk Management Research, *Journal of Physics: Conference Series*, 1744(2), 1–6. https://doi.org/10.1088/1742-6596/1744/2/022027

Website:

- https://www.investopedia.com/terms/b/blockchain.asp
- https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Finance/gx-ft-crunch-time-blockchain-finance.pdf
- https://builtin.com/blockchain
- https://www.icaew.com/technical/technology/blockchain/blockchain-articles/what-is-blockchain/history
- https://www.devteam.space/blog/5-examples-of-blockchain-uses-in-financial-services/#1
- https://www.investopedia.com/terms/b/blockchain.asp
- https://www.ibm.com/in-en/topics/smart-contracts
- https://builtin.com/blockchain
- https://www.collinsdictionary.com/dictionary/english/currency
- http://timesofindia.indiatimes.com/articleshow/85390449.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
- https://www.investopedia.com/ask/answers/121515/bitcoin-legal-us.asp)
- https://data-flair.training/blogs/working-of-blockchain/
- https://www.guru99.com/blockchain-tutorial.html
- https://www.pwc.com/us/en/industries/financial-services/fintech/bitcoin-blockchain-cryptocurrency.html
- https://searchcio.techtarget.com/feature/Top-10-benefits-of-blockchain-technology-for- business
- https://www.ibm.com/blogs/blockchain/2018/02/top-five-blockchain-benefits-transforming-your-industry/
- https://marutitech.com/benefits-of-blockchain/#Drawbacks_of_Blockchain)
- https://searchcio.techtarget.com/feature/Top-10-benefits-of-blockchain-technology-for-business
- https://101blockchains.com/disadvantages-of-blockchain/.