K. J. Somaiya College of Engineering, Mumbai-77

Department of Computer Engineering

Batch: BCT_1	**Roll No.: 1911027**
Experiment No. 1	

Title: Block chain demo and Block explorer – Bitcoin and Ethereum and Test Networks

Objective: To explore the contents of blocks in blockchain, get insights into the working of blockchain using online blockchain creation platforms and also access the test networks.

Expected Outcome of Experiment:

CO	Outcome
CO1	**Build your own Blockchain businesses with acquired knowledge.**

Books/ Journals/ Websites referred:

1) **https://en.wikipedia.org/wiki/Blockchain**
2) **https://www.simplilearn.com/tutorials/blockchain-tutorial/blockchain-technology**
3) **https://www.investopedia.com/terms/b/blockchain.asp**
4) **https://en.wikipedia.org/wiki/Bitcoin**
5) **https://www.geeksforgeeks.org/advantages-and-disadvantages-of-blockchain/**

Abstract:-

A blockchain is a type of Digital Ledger Technology (DLT) that consists of growing list of records, called blocks, that are securely linked together using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data (generally represented as a Merkle tree, where data nodes are represented by leaf's). The timestamp proves that the transaction data existed when the block was created. Since each block contains information about the block previous to it, they effectively form a chain (compare linked list data structure), with each additional block linking to the ones before it. Consequently, blockchain transactions are irreversible in that, once they are recorded, the data in any given block cannot be altered retroactively without altering all subsequent blocks.

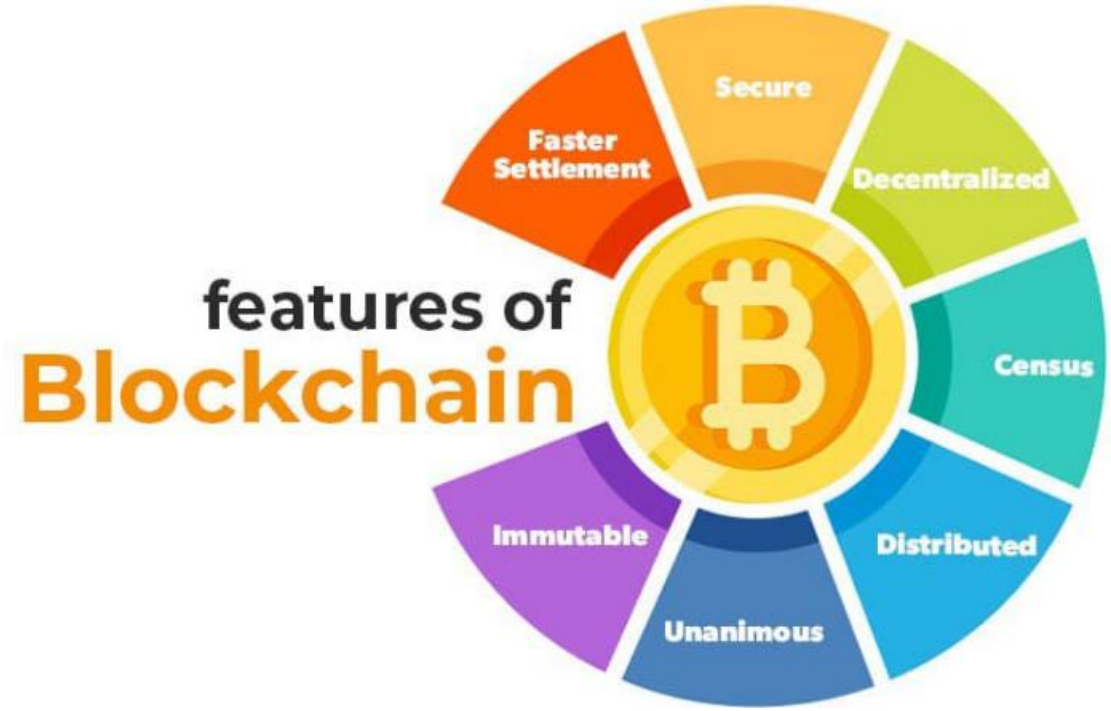
Related Theory: -

Blockchain is a method of recording information that makes it impossible or difficult for the system to be changed, hacked, or manipulated. A blockchain is a distributed ledger that duplicates and distributes transactions across the network of computers participating in the blockchain. Blockchain technology is a structure that stores transactional records, also known as the block, of the public in several databases, known as the "chain," in a network connected through peer-to-peer nodes. Typically, this storage is referred to as a 'digital ledger.' Every transaction in this ledger is authorized by the digital signature of the owner, which authenticates the transaction and safeguards it from tampering. Hence, the information the digital ledger contains is highly secure. In simpler words, the digital ledger is like a Google spreadsheet shared among numerous computers in a network, in which, the transactional records are stored based on actual purchases. The fascinating angle is that anybody can see the data, but they can't corrupt it.

Suppose you are transferring money to your family or friends from your bank account. You would log in to online banking and transfer the amount to the other person using their account number. When the transaction is done, your bank updates the transaction records. It seems simple enough, right? There is a potential issue which most of us neglect. These types of transactions can be tampered with very quickly. People who are familiar with this truth are often wary of using these types of transactions, hence the evolution of third-party payment applications in recent years. But this vulnerability is essentially why Blockchain technology was created. Technologically, Blockchain is a

digital ledger that is gaining a lot of attention and traction recently. But why has it become so popular? Well, let's dig into it to fathom the whole concept. Record keeping of data and transactions are a crucial part of the business. Often, this information is handled in house or passed through a third party like brokers, bankers, or lawyers increasing time, cost, or both on the business. Fortunately, Blockchain avoids this long process and facilitates the faster movement of the transaction, thereby saving both time and money.

Features of Blockchain:



1) **Immutable:** Immutability means that the blockchain is a permanent and unalterable network. Blockchain technology functions through a collection of nodes. Every node in the network has a copy of the digital ledger. To add a transaction every node checks the validity of the transaction and if the majority of the nodes think that it is a valid transaction then it is added to the network. This means that without the approval of a majority of nodes no one can add any transaction blocks to the ledger.

2) **Distributed:** All network participants have a copy of the ledger for complete transparency. A public ledger will provide complete information about all the participants on the network and transactions. The distributed computational power across the computers ensures a better outcome. Distributed ledger is one of the important features of blockchains due to many reasons like: In distributed ledger tracking what's happening in the ledger is easy as changes propagate

really fast in a distributed ledger. Every node on the blockchain network must maintain the ledger and participate in the validation.

3) **Decentralized:** The blockchain network is decentralized which means that there is no central governing authority that will responsible for all the decisions. Rather a group of nodes makes and maintain the network. Each and every node in the blockchain network has the same copy of the ledger. Decentralization property offers many advantages in the blockchain network: As a blockchain network does not depend on human calculations it is fully organized and fault-tolerant.

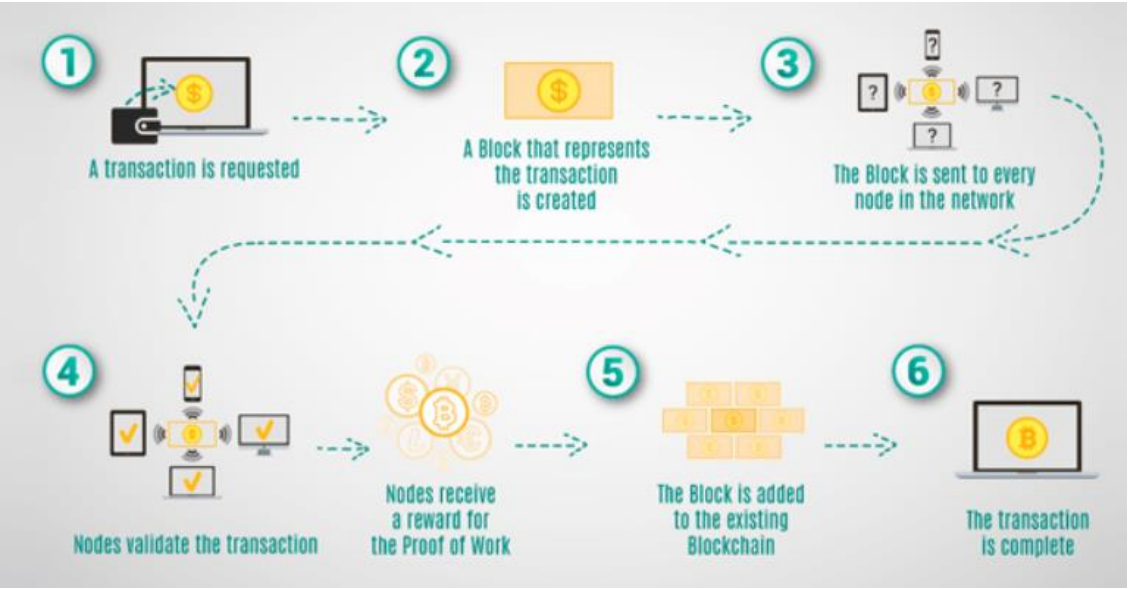
4) **Secure:** All the records in the blockchain are individually encrypted. Using encryption adds another layer of security to the entire process on the blockchain network. Since there is no central authority, it does not mean that one can simply add, update or delete data on the network. Every information on the blockchain is hashed cryptographically which means that every piece of data has a unique identity on the network. All the blocks contain a unique hash of their own and the hash of the previous block. Due to this property, the blocks are cryptographically linked with each other.

5) **Consensus:** Every blockchain has a consensus to help the network to make quick and unbiased decisions. Consensus is a decision-making algorithm for the group of nodes active on the network to reach an agreement quickly and faster and for the smooth functioning of the system. Nodes might not trust each other but they can trust the algorithm that runs at the core of the network to make decisions. There are many consensus algorithms available each with its pros and cons. Every blockchain must have a consensus algorithm otherwise it will lose its value.

6) **Unanimous:** All the network participants agree to the validity of the records before they can be added to the network. When a node wants to add a block to the network then it must get majority voting otherwise the block cannot be added to the network. A node cannot simply add, update, or delete information from the network. Every record is updated simultaneously and the updations propagate quickly in the network. So it is not possible to make any change without consent from the majority of nodes in the network.

7) **Faster Settlement:** Traditional banking systems are prone to many reasons for fallout like taking days to process a transaction after finalizing all settlements, which can be corrupted easily. On the other hand, blockchain offers a faster settlement compared to traditional banking systems. This blockchain feature helps make life easier.

How Does Blockchain Technology Work?

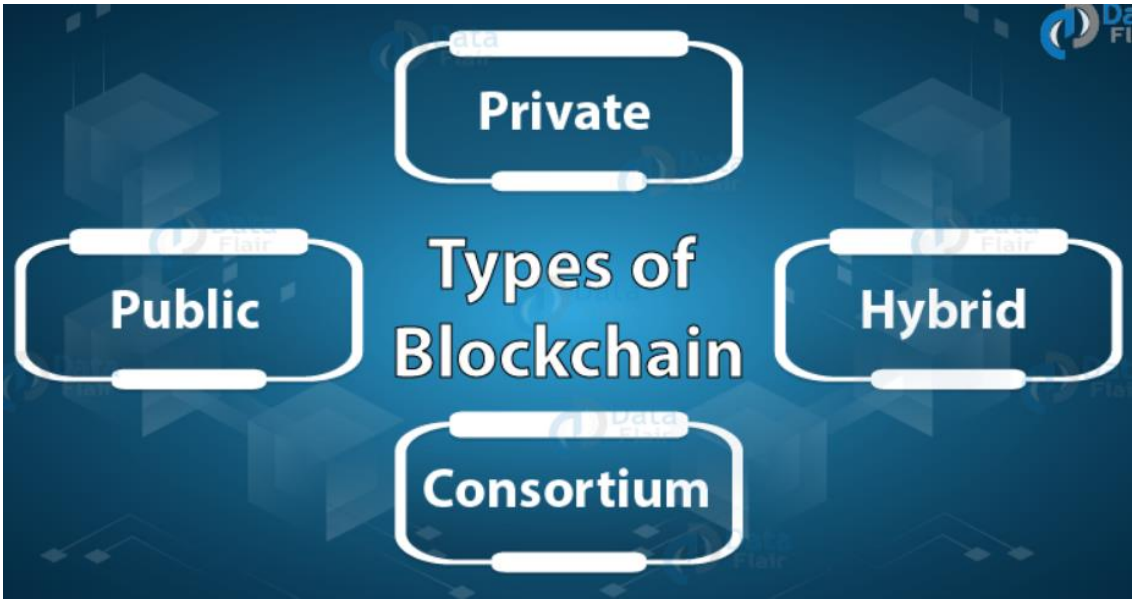


Blockchain is a combination of three leading technologies:

- Cryptographic keys
- A peer-to-peer network containing a shared ledger
- A means of computing, to store the transactions and records of the network

Cryptography keys consist of two keys – Private key and Public key. These keys help in performing successful transactions between two parties. Each individual has these two keys, which they use to produce a secure digital identity reference. This secured identity is the most important aspect of Blockchain technology. In the world of cryptocurrency, this identity is referred to as 'digital signature' and is used for authorizing and controlling transactions. The digital signature is merged with the peer-to-peer network; a large number of individuals who act as authorities use the digital signature in order to reach a consensus on transactions, among other issues. When they authorize a deal, it is certified by a mathematical verification, which results in a successful secured transaction between the two network-connected parties. So to sum it up, Blockchain users employ cryptography keys to perform different types of digital interactions over the peer-to-peer network.

Types of Blockchain:



- **Private Blockchain:** Private blockchains operate on closed networks, and tend to work well for private businesses and organizations. Companies can use private blockchains to customize their accessibility and authorization preferences, parameters to the network, and other important security options. Only one authority manages a private blockchain network.

- **Public Blockchain:** Bitcoin and other cryptocurrencies originated from public blockchains, which also played a role in popularizing distributed ledger technology (DLT). Public blockchains also help to eliminate certain challenges and issues, such as security flaws and centralization. With DLT, data is distributed across a peer-to-peer network, rather than being stored in a single location. A consensus algorithm is used for verifying information authenticity; proof of stake (PoS) and proof of work (PoW) are two frequently used consensus methods.

- **Hybrid Blockchain:** A hybrid blockchain is a unique type of blockchain technology that amalgamates components of both public and private blockchain or tries to utilise the ideal part of both public and private blockchain solutions. Transactions and records in a hybrid blockchain are made private but can be verified when entailed, such as by enabling access through a smart contract. Private information is kept inside the network but is still verifiable.

- **Consortium Blockchains:** Similar to permissioned blockchains, consortium blockchains have both public and private components, except multiple organizations will manage a single consortium blockchain network. Although these types of blockchains can initially be more complex to set up, once they are

running, they can offer better security. Additionally, consortium blockchains are optimal for collaboration with multiple organizations.

Challenges:

- **Platform:** Standards or protocols are needed to govern scalability (block size versus average bandwidth enjoyed by users), energy consumption, stability (switching from proof or work to proof of stake), and robustness of the network infrastructure in order to assure the long-term success.
- **Applications:** Some oversight is needed to ensure user-friendly interfaces and how to increase the pool of skilled developers.
- **Legal structure for stewardship:** The ecosystem needs a governance body to coordinate on matters such as interoperability, privacy, security, protection of identity, and actions to reduce the amount of legal uncertainty surrounding emergent technologies. They need to spur more investments in research and confront incoming challenges from legacy operators and hackers that exploit open source coding to commit terrorist acts.

Advantages:

- **Verifiable:** Blockchain technology is used to store information in a decentralized manner so everyone can verify the correctness of the information by using zero-knowledge proof through which one party proves the correctness of data to another party without revealing anything about data.
- **Permanent:** Records or information which is stored using blockchain technology is permanent means one needs not worry about losing the data because duplicate copies are stored at each local node as it is a decentralized network that has a number of trustworthy nodes.
- **Free from Censorship:** Blockchain technology is considered free from censorship as it does not have control of any single party rather it has the concept of trustworthy nodes for validation and consensus protocols that approve transactions by using smart contracts.
- **Tighter Security:** Blockchain uses hashing techniques to store each transaction on a block that is connected to each other so it has tighter security. It uses SHA 256 hashing technique for storing transactions.

Disadvantages:

- **Scalability:** It is one of the biggest drawbacks of blockchain technology as it cannot be scaled due to the fixed size of the block for storing information. The

block size is 1 MB due to which it can hold only a couple of transactions on a single block.

- **Immaturity:** Blockchain is only a couple-year-old technology so people do not have much confidence in it, they are not ready to invest in it yet several applications of blockchain are doing great in different industries but still it needs to win the confidence of even more people to be recognized for its complete utilization.

- **Energy Consuming:** For verifying any transaction a lot of energy is used so it becomes a problem according to the survey it is considered that 0.3 percent of the world's electricity had been used by 2018 in the verification of transactions done using blockchain technology.

- **Time-Consuming:** To add the next block in the chain miners need to compute nonce values many times so this is a time-consuming process and needs to be speed up to be used for industrial purposes.

Applications:

- **Financial Services:** Bitcoin is the first and most prominent application of block chain technology as an e-payment system. Bitcoin was created in January 2009 by Satoshi Nakamoto as a digital currency independent of any central authority, transferable electronically, and with very low transaction costs. A stable and widely accepted crypto currency stands to revolutionize e-commerce, money transfers, and even letters of credit. Cryptocurrency poses a challenge to traditional banking.

- **Retail and Services:** It can be used in retail and services. Any merchant who accepts digital money as payment can exchange their goods and services. Persons and companies involved in a supply value chain can use private block chains to reduce transaction costs in their business relationships and make payments and transfers along the chain as well as pass information in a very transparent manner.

- **Digital Identity:** Identity theft is emerging as a bane of the digital age. Currently taking precautions against identify theft and attempting to restore identity after it has been compromised is an $18.5 billion annual business and growing yearly according to Distil Networks. Using blockchain technologies would make the tracking and managing of digital identities both secure, efficient and low-cost.

- **Digital Voting:** Two of the biggest hurdles to electronic poll place machines and online voting is the fear that security can be breached and that votes can be manipulated. Using blockchain, a voter could verify if his or her vote was

successfully transited and remain anonymous and because of the distributed ledger technology it would not be possible to alter a vote once cased.

Bitcoin:

There are a number of currencies in this world used for trading amenities. Rupee, Dollar, Pound Euro and Yen are some of them. These are printed currencies and coins and you might be having one of these in your wallet. But bitcoin is a currency you cannot touch, you cannot see but you can efficiently use to trade amenities. It is an electronically stored currency. It can be stored in your mobiles, computers or any storage media as a virtual currency. Bitcoin is an innovative and digital payment system. It is an example of a cryptocurrency and the next big thing in finance.

How Bitcoin Transactions work?

Bitcoin transactions are digitally signed for security. Everyone on the network gets to know about a transaction. A transaction contains 3 pieces of information . The first part contains the bitcoin wallet address of the sender, the second part contains the amount that has been sent, and the third part contains the bitcoin wallet address of the recipient. A bitcoin can also be considered as an invisible currency with only the transaction records between different addresses. Every transaction ever made using Bitcoin is stored in a public ledger called a Blockchain.

Components Of Bitcoin:

There are four basic components of bitcoin:

- Software

- Cryptography
- Hardware
- Miners(Gaming Theory)

1. Software: Bitcoin is, at its heart, a piece of software that defines what a bitcoin is and how it is transmitted. Checking of validity or who is allowed or not allowed to be within bitcoin etc. Type of the regulations of a legitimate bitcoin is established via it. Everything is run by software, which in this case is the bitcoin program. The bitcoin program is always available 24 hours a day, seven days a week.

2. Cryptography: Cryptography and bitcoin as a cryptocurrency are at the heart of the software. Bitcoin regulates both the transfer of bitcoin between parties and the production of new bitcoin units using encryption. Bitcoin would not be conceivable without cryptography. So, we've established that this software use cryptography to regulate bitcoin transfers across the internet. Cryptography is a mathematical approach that can only be solved by machines, not people. Cryptography is required to safeguard the data.

3. Hardware: Cryptography demands a lot of hardware to run and solve. This gear has been created specifically for mining, i.e. detecting Nonce to validate blocks and hashes. To accomplish a simple activity on the bitcoin blockchain, a lot of CPU power is required. If one tries to mine bitcoin with a smartphone or home computer right now, you'll lose your computer and rack up a large electric bill.

4. Miners(Gaming Theory): Game theory studies rational decision-making behaviour in humans. Game theory allows interactions between two or more players in a system where the participant's outcome is based on the actions of the others. Every participant's aim is to maximize his gain. The game theory is used by bitcoin to ensure that rational individuals align their interests in a certain way. They impact the network's miners' interactions and behaviour in particular.

Implementation Details:

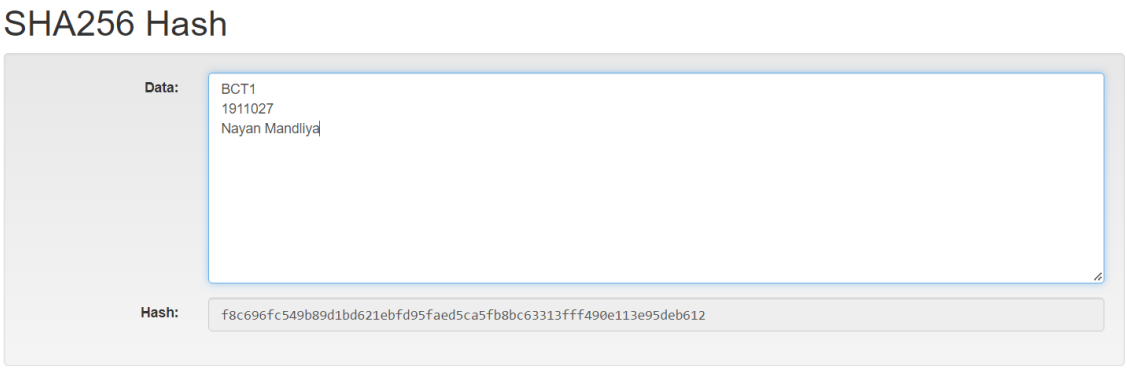
1. Enlist all the Steps followed and various options explored

➔ **Steps:**

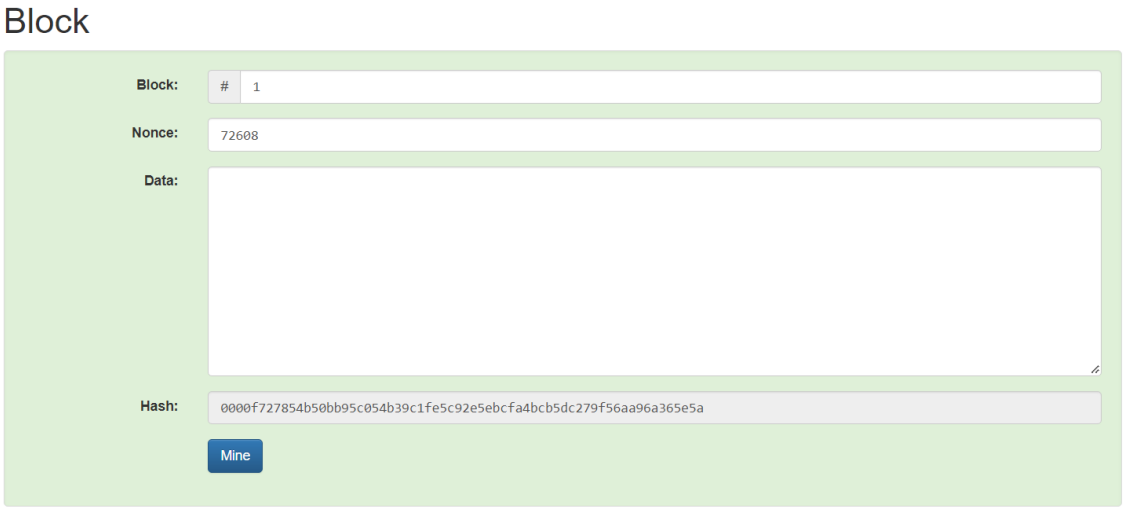
Blockchain demo: Link

1) Important concept related to blockchain is the integrity and it can be preserved using hashes. SHA256 algorithm is one of the most extensively used algorithm in blockchain applications.

2) As seen from the image given above there are 2 sections, first one is the data and the second one is the hash of the data. Now if we change data the hash will be recomputed using SHA256 algorithm.

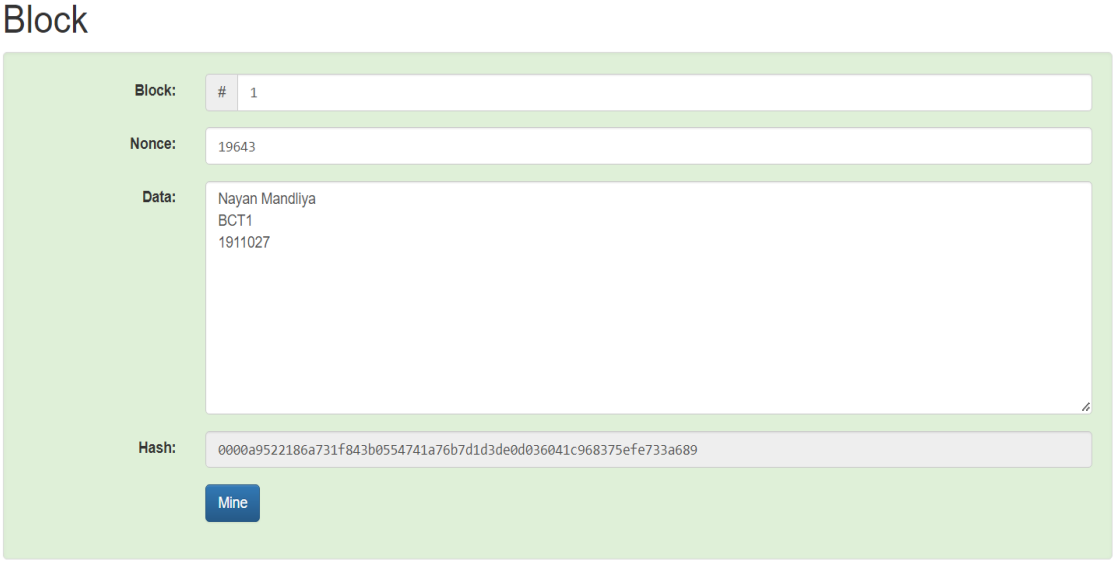


3) At the top layer a block in the blockchain consists of block number, nonce (used for verification), data and hash of the current block.

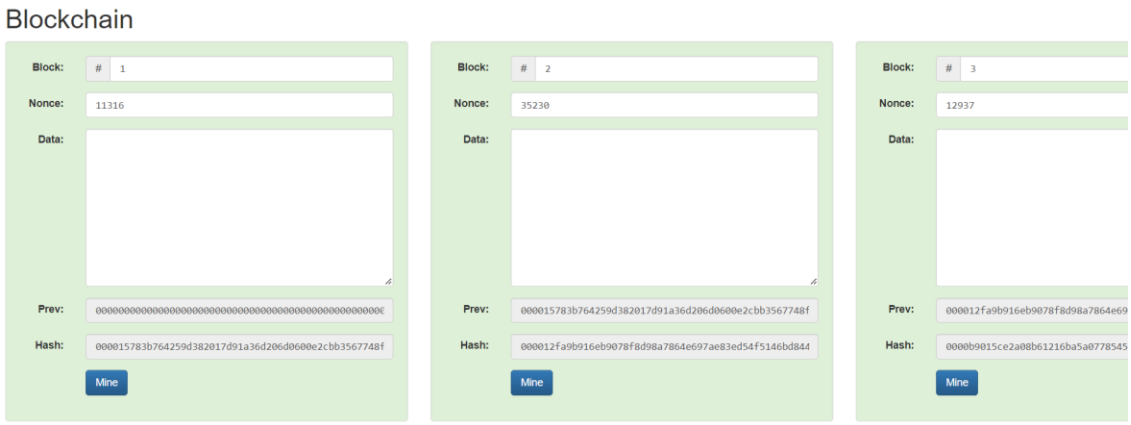


4) Whenever any of the above fields are changed blocks become invalid and that block has to be remined so that it can become valid and can be added in the blockchain. When any of the fields of the block is changed then nonce has to be recomputed to match the difficulty level in hash (proof of work, 4 leading 0's in this case).

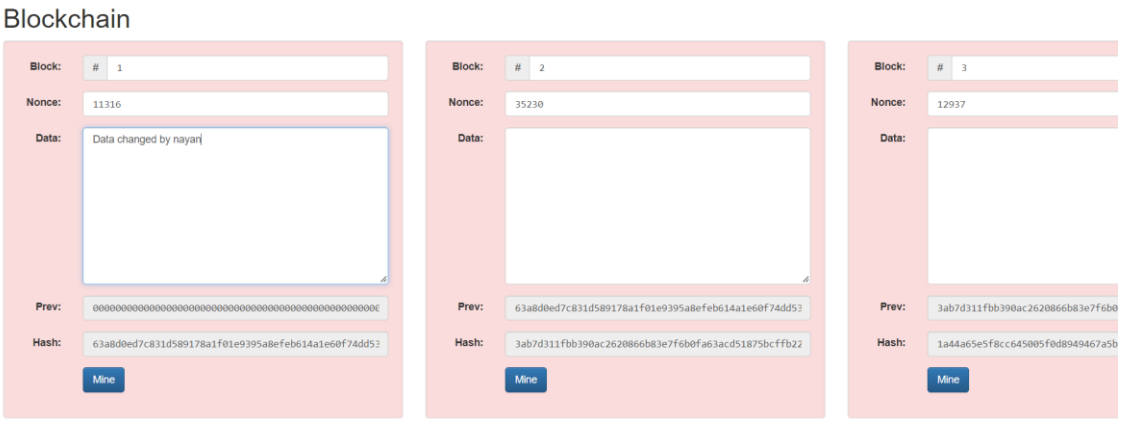
5) The block becomes red as the data is changed and hash is not defining proof of work so this block again has to be mined to become valid (recomputation of nonce to satisfy proof of work).



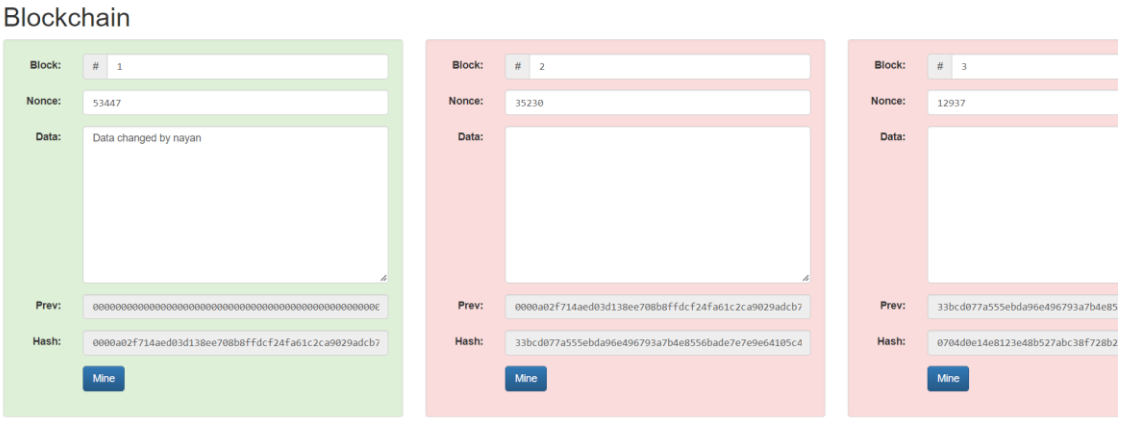
6) Blockchain as a whole is just the connection of blocks in the linked list manner. All the blocks contains some amount of data as defined in above steps. All the links blocks will have copy of data of everyother block in the blockchain. Whenever any other block is added to the blockchain all the existing nodes in the blockchain will be informed about that and if 51% of blocks gives their confirmation that newly added block is valid then only new block will be added to the blockchain and its information will be provided to all the other blocks in the blockchain.



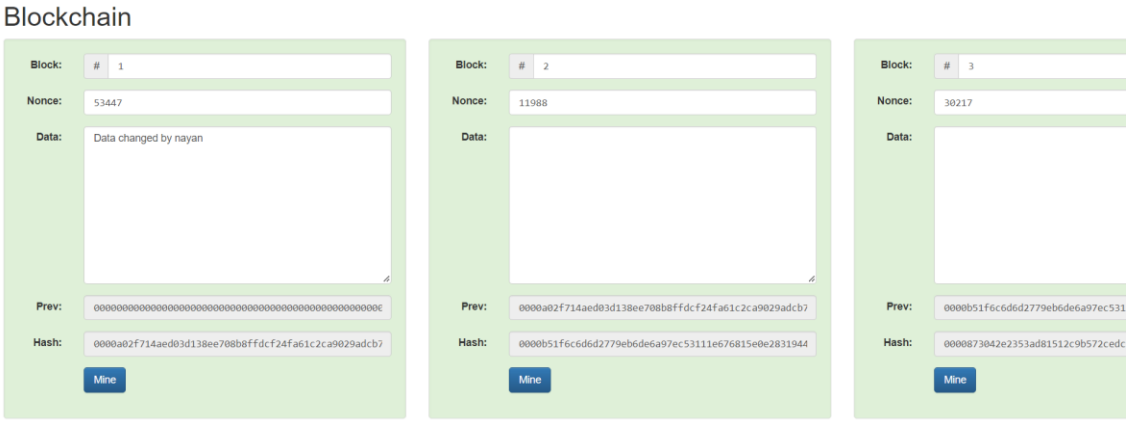
7) Now we have changed the data of block1 and it can be seen that all the blocks have turned red, i.e. all the blocks are now invalid in this block chain.



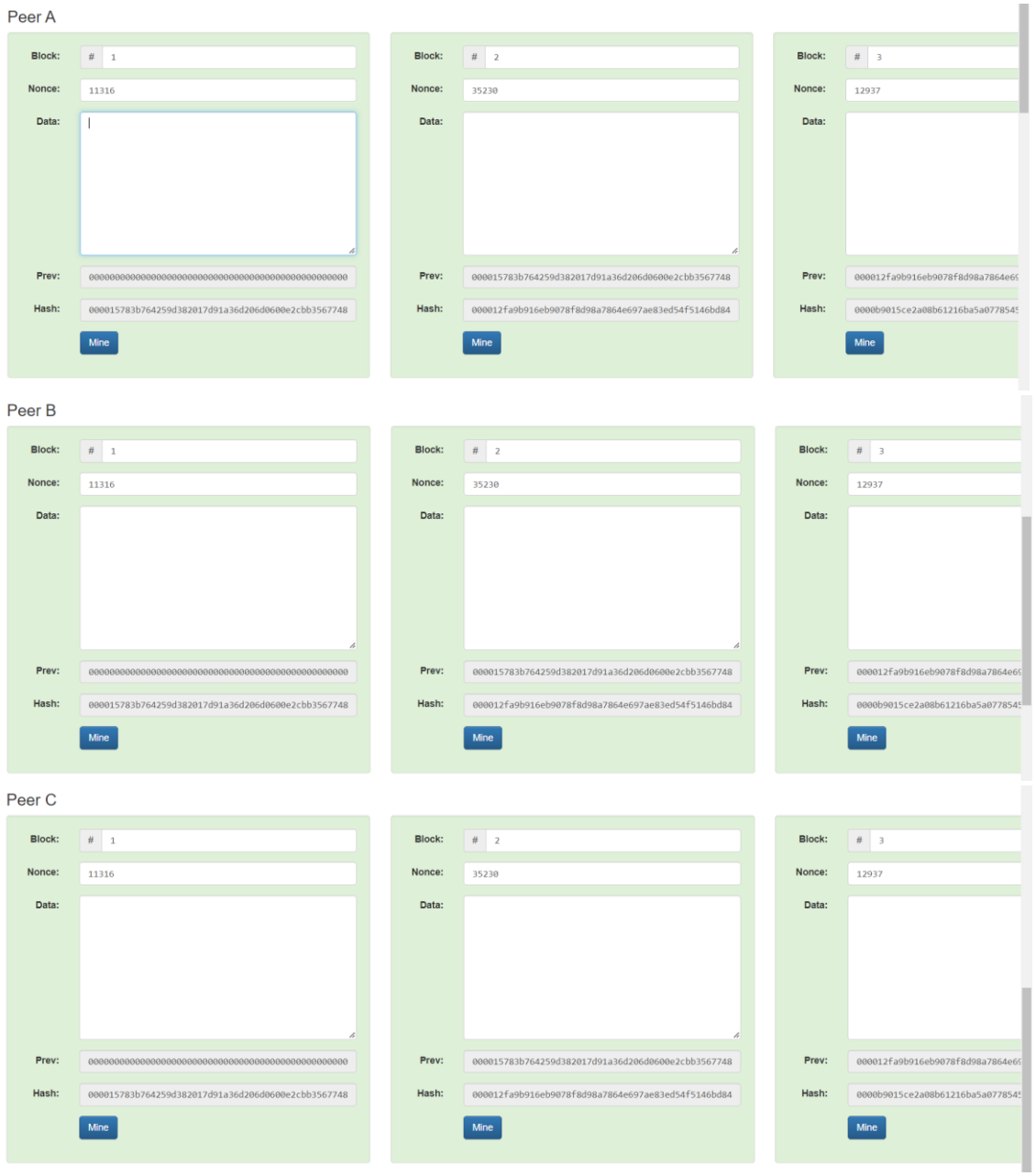
8) In real scenario data in the blocks of the blockchain can't be changed. Now to make blocks again valid we have to first mine the block after which all the blocks are invalid (block number 1 in our case).



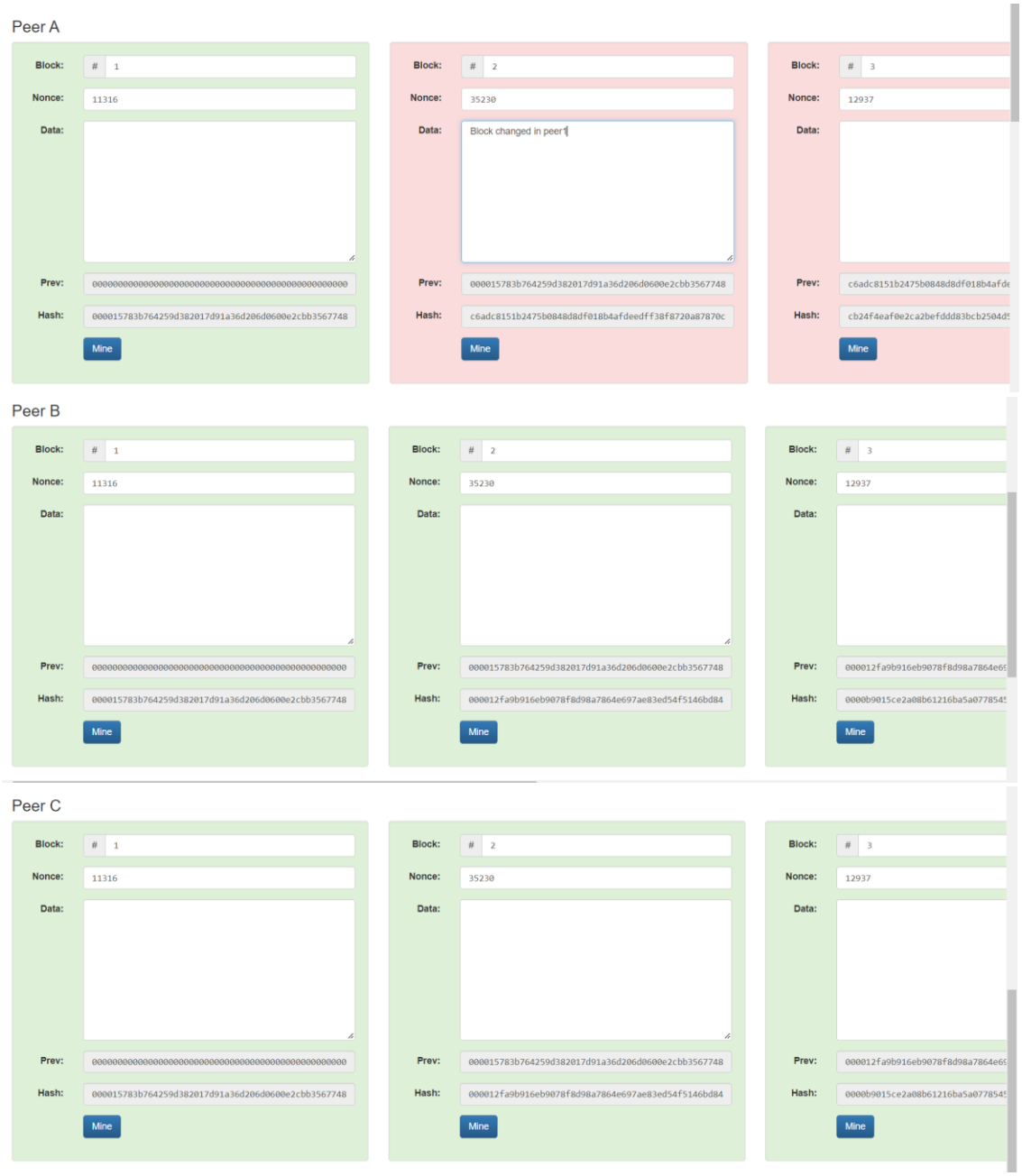
9) First block is now validated now similarly we have to mine all the other blocks in the blockchain.



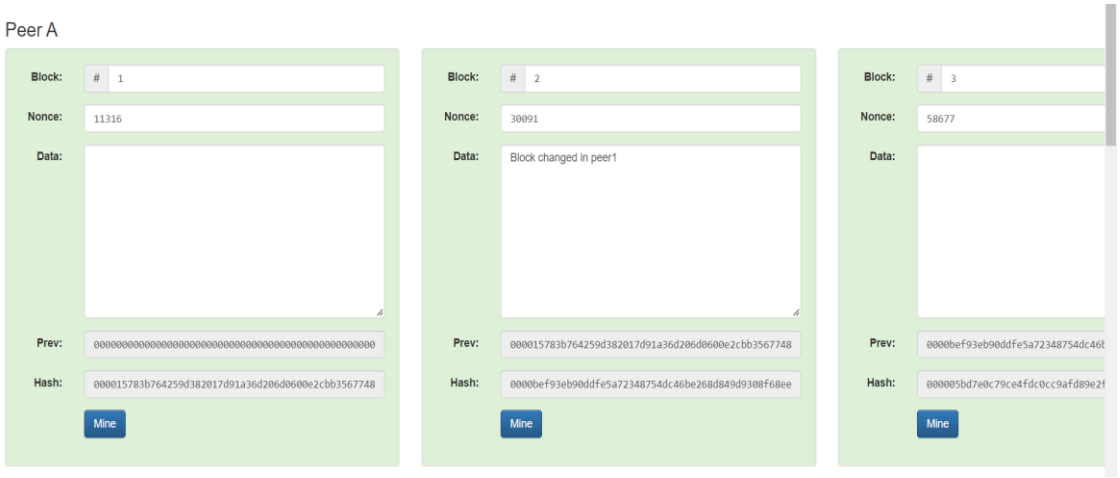
10) We know that blockchain is a peer to peer network so now consider 3 peers having some blocks in their respective blockchains.



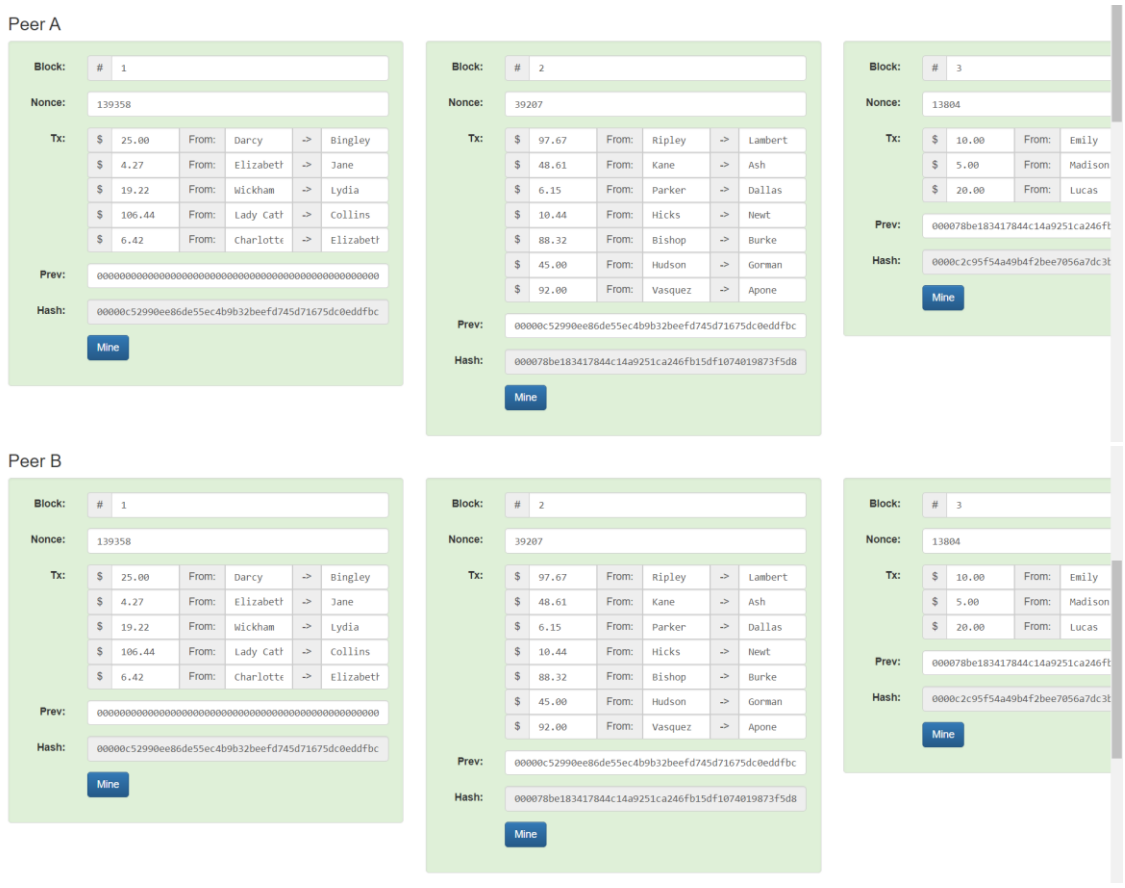
11) Now if data of any of the blocks in any of the peers is changed that particular peers blockchain will be affected not others. It will take some time to broadcast this change to all the other peers.

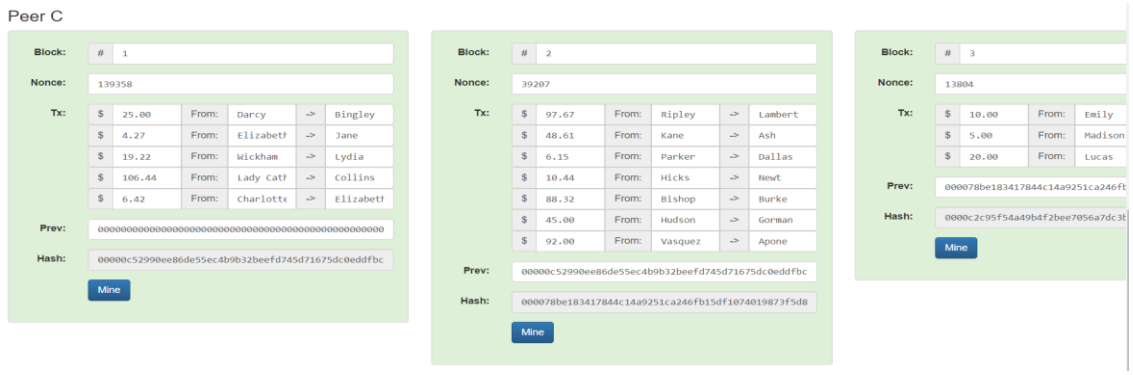


12) As seen from above images when data of block 2 of peer A is changed only that blockchain is affected and not others. Now to make that blockchain again valid we have to mine the blocks.



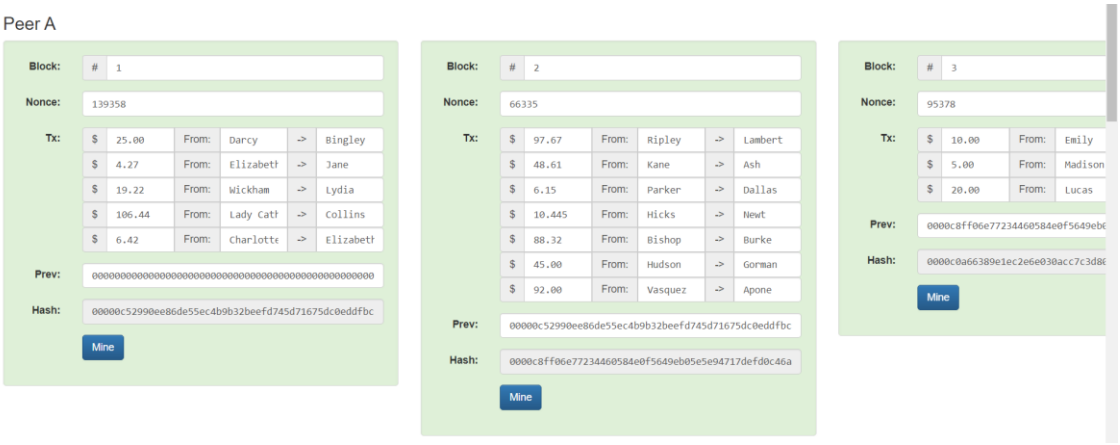
13) One of the most used application of blockchain technology is cryptocurrency or transfer of digital assets. The entity which is at the core of any of the mentioned applications is tokens. Tokens are digital assets defined by a project or smart contract and built on a specific blockchain. We have 3 peers A, B and C respectively, having blockchain and some transactions in the blocks.



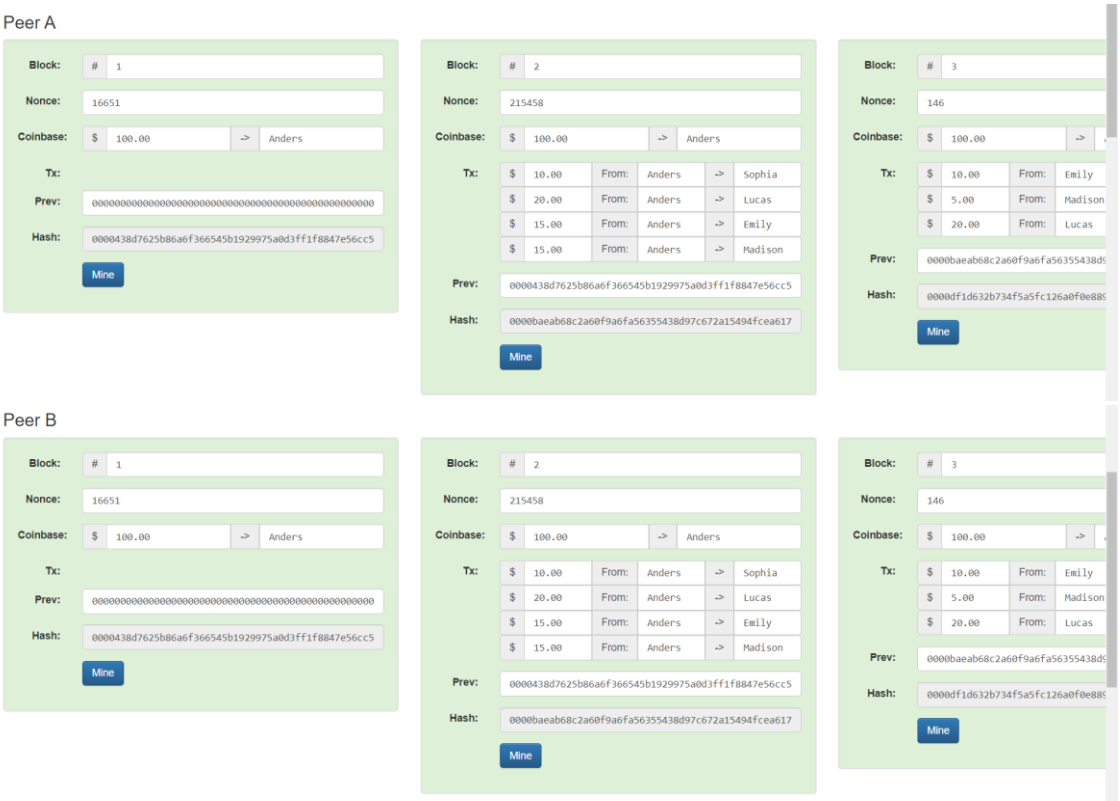


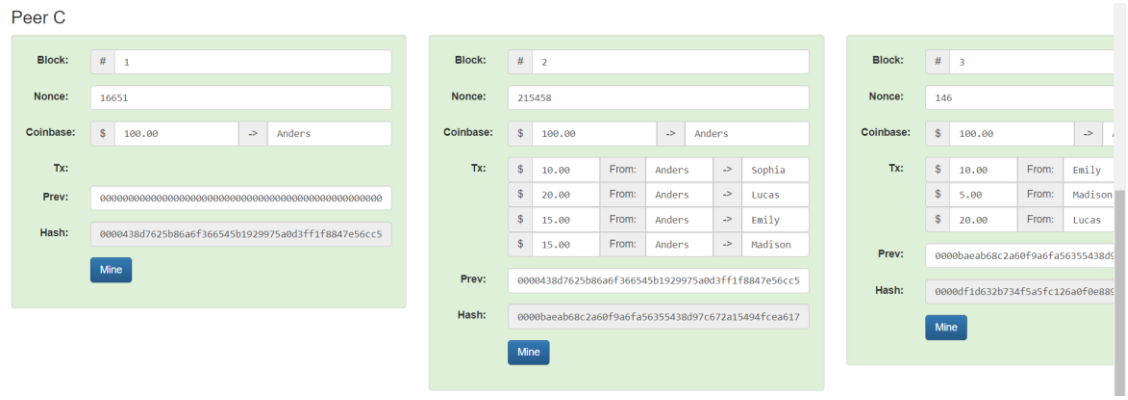
14) Now if we alter any of the transactions in any of the given blocks then blocks after invalid block will become invalid. Another peers won't get affected (This will not happen in real scenarios).

15) To make peer A blockchain valid all the invalid blocks has to be mined again.

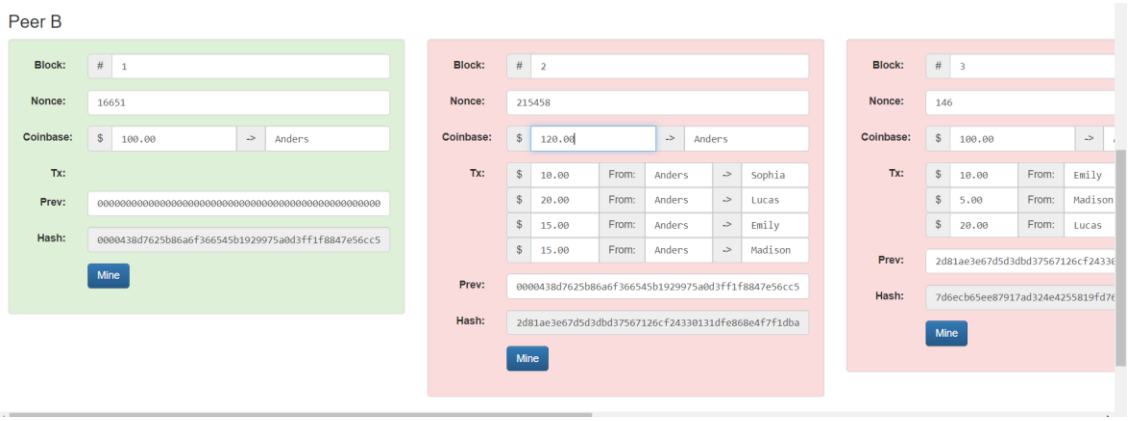


16) All transactions that take place on the cryptocurrency network are not the result of payment between two people. Some transactions are a little bit different. The first transaction that took place was in Bitcoin. It was a special transaction that formatted reward transactions for miners inside the genesis block (the very first block of a blockchain). Such reward transactions are specially allocated to the miner for their work. This type of transaction is known as a Coinbase transaction. These type of transactions generates new currencies that have never been spent.

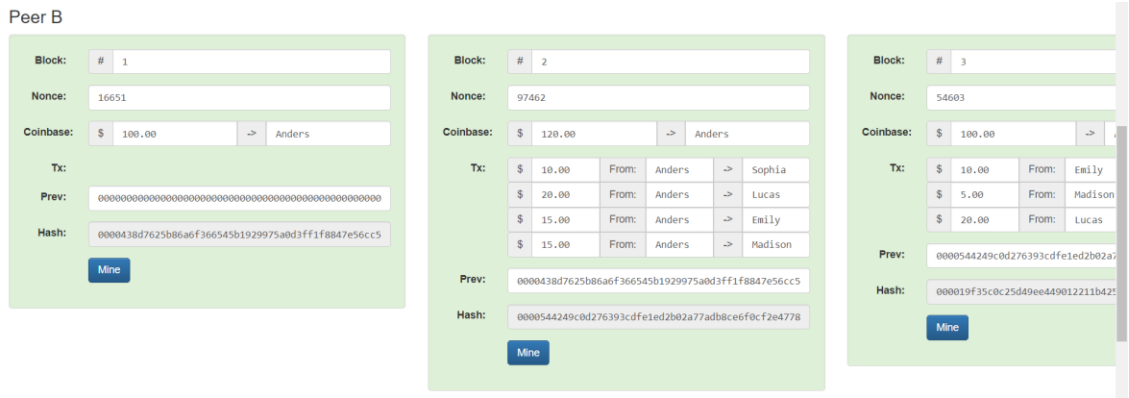




17) This coinbase transactions also follows the properties of immutability.

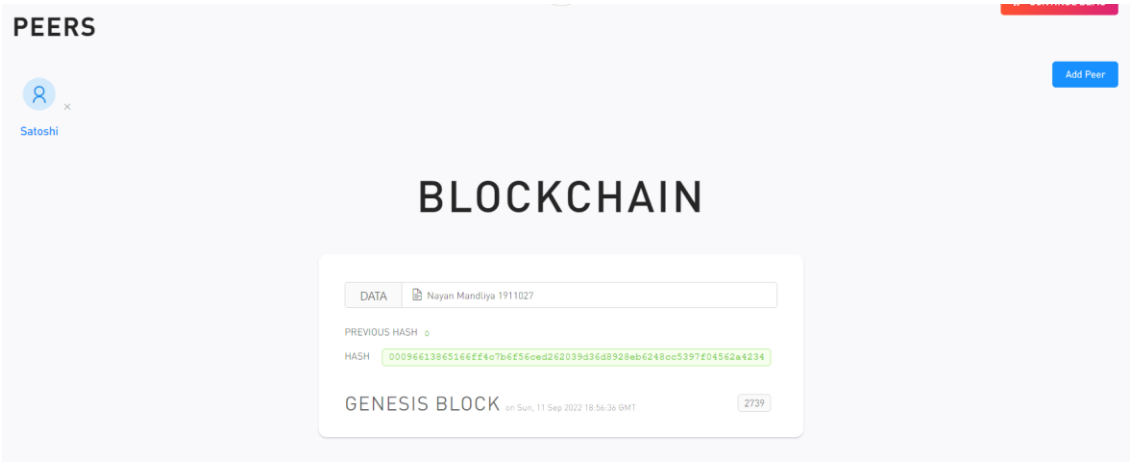


18) Make blocks valid by mining the invalid blocks again.

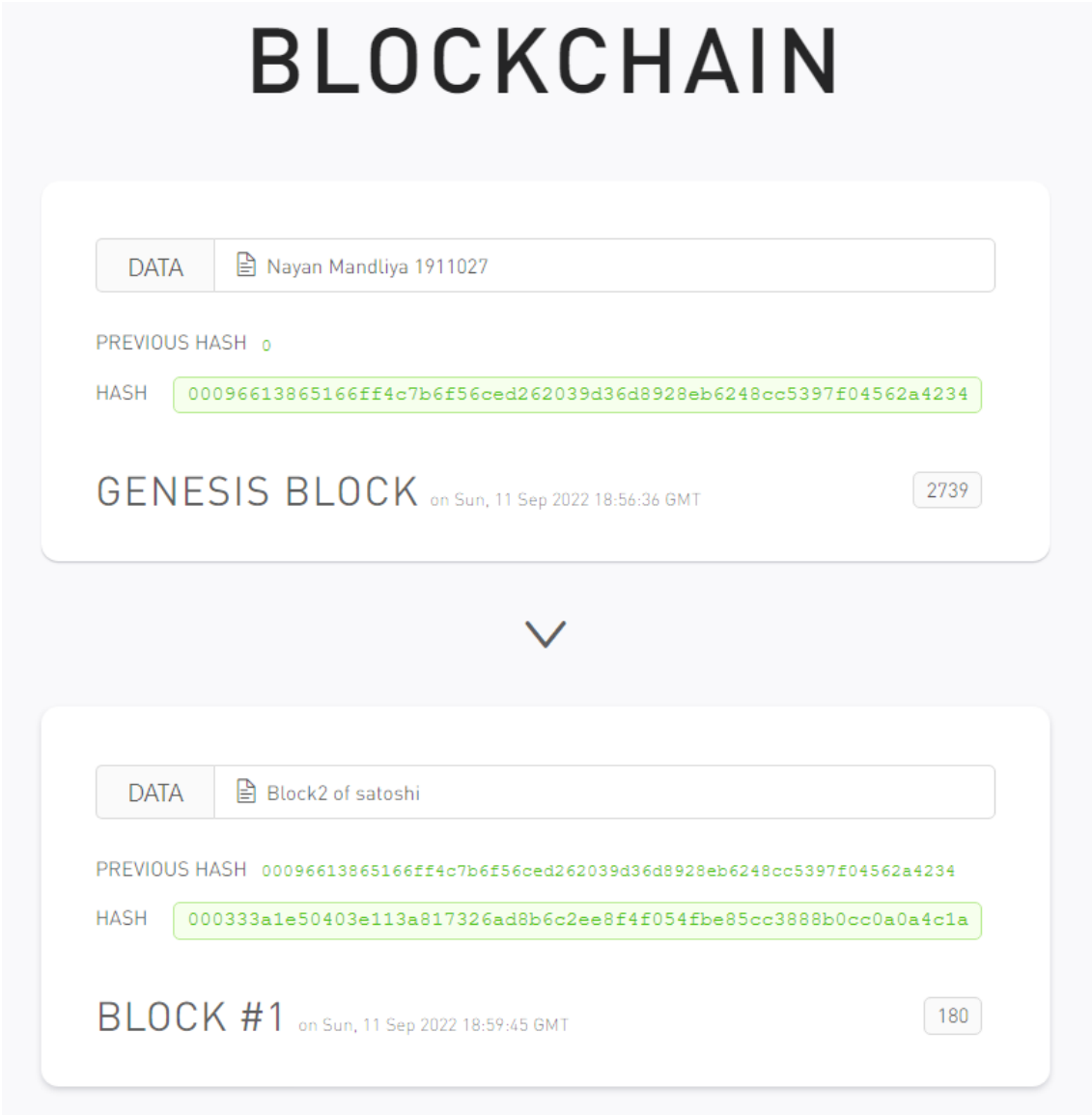


Blockchain demo2: Link

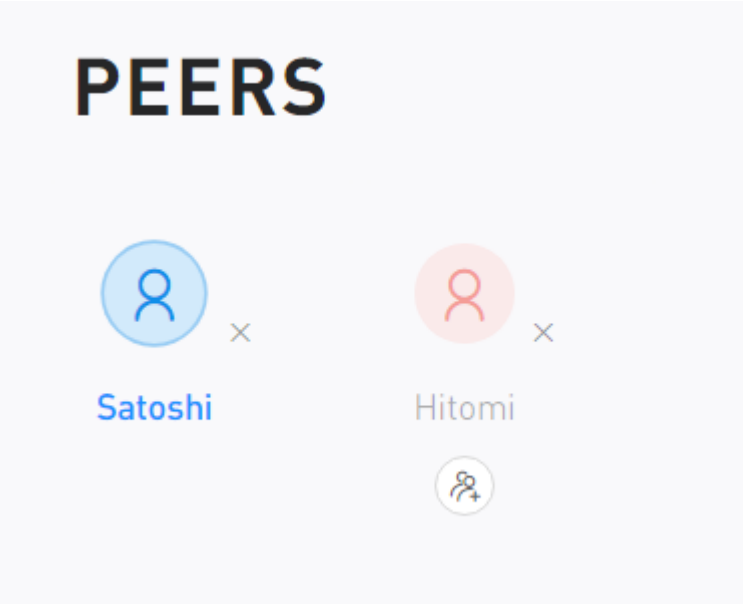
1) Blockchain is basically a peer to peer network. Every block in the blockchain has the information of every other block in the blockchain. Now to demonstrate peer to peer nature of block chain we have another tool (link mentioned in the title). First block in the blockchain is called as the genesis block. Name of the peer (Satoshi) can be seen on top. We can add block in to the existing blockchain as well as we can add another peers. Peers can also be connected using the tool described.



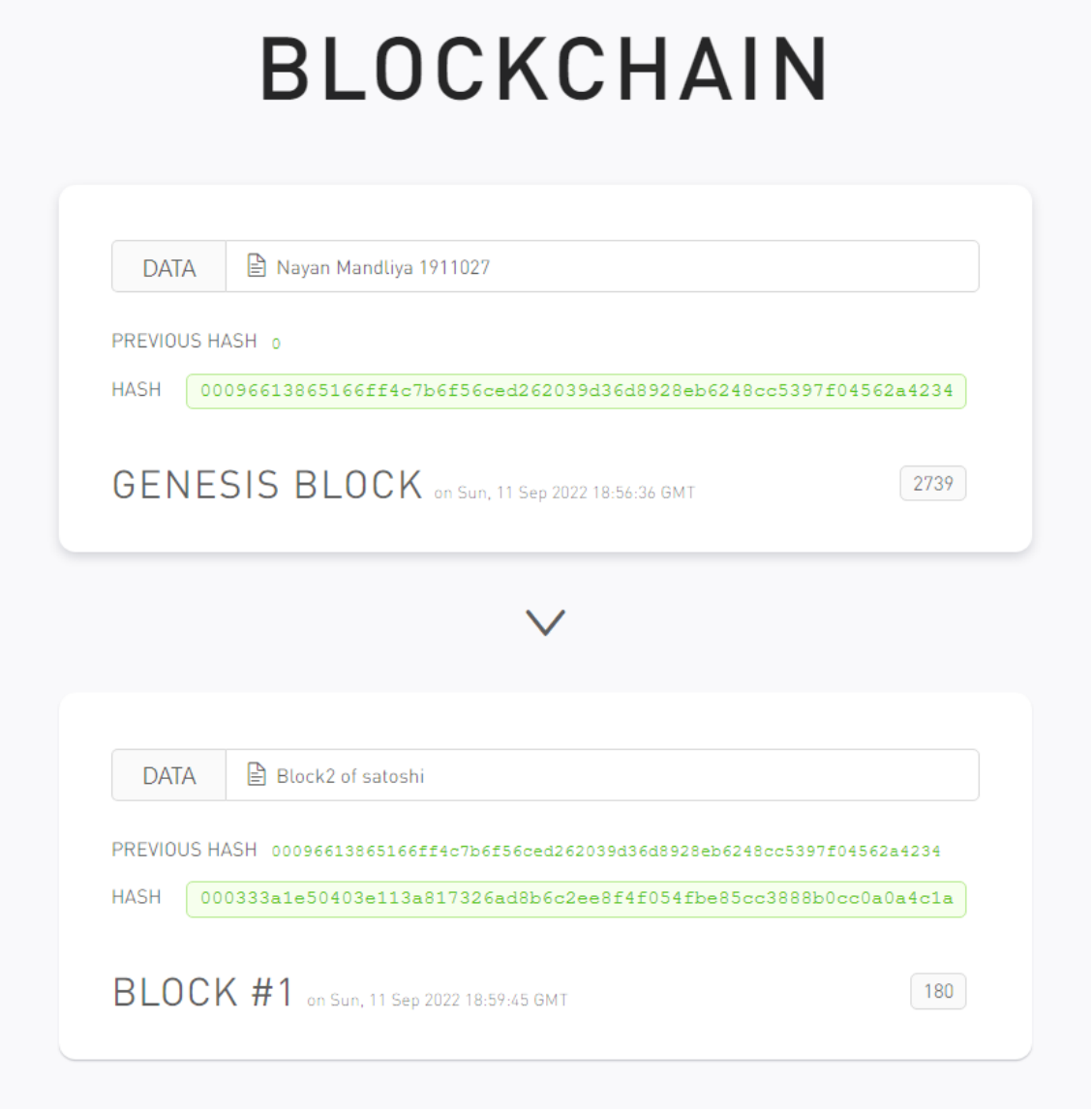
2) Now we will add a block in the Satoshi's blockchain.



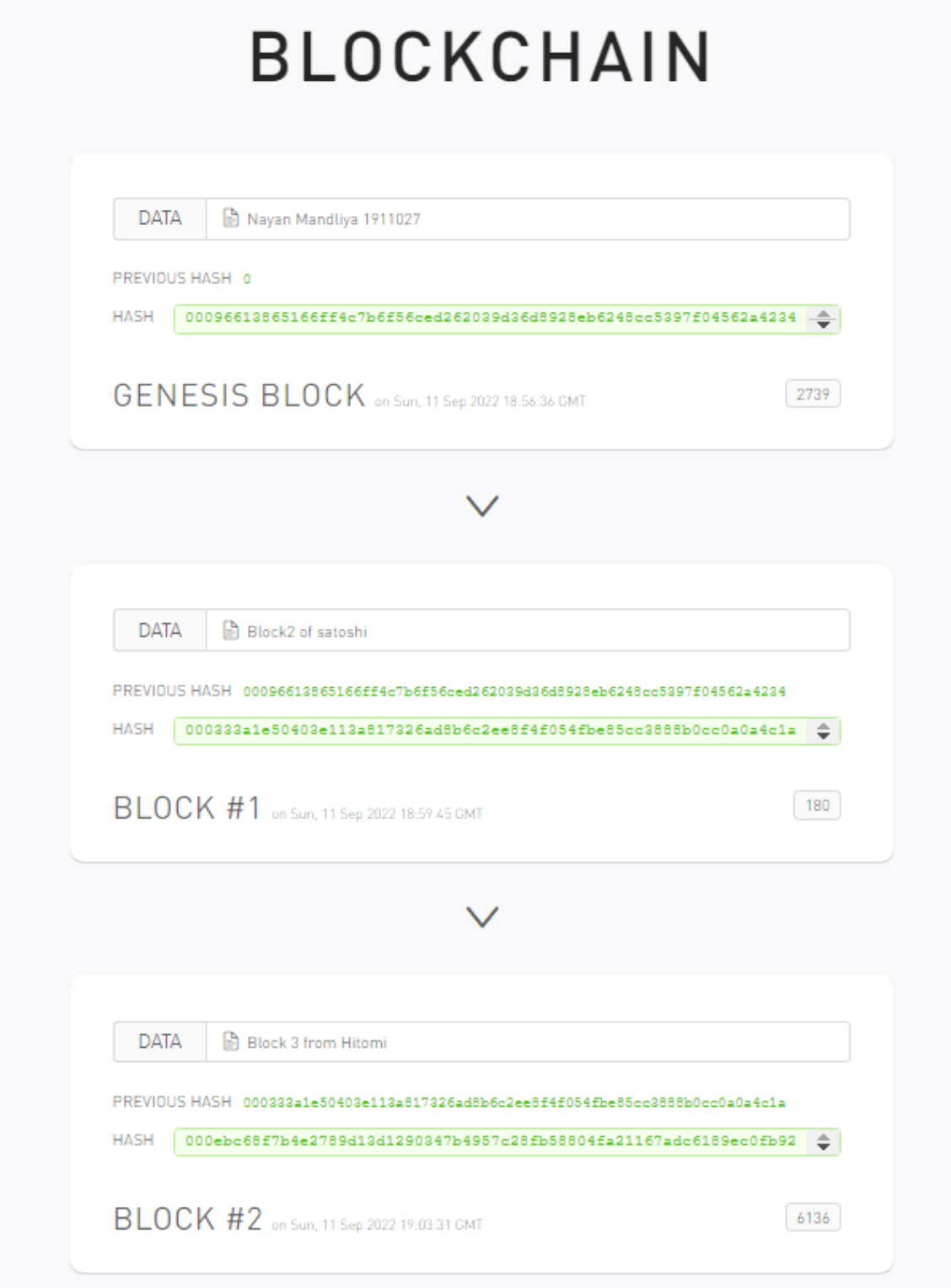
3) We can also create another peer by "add peer" button present on top right corner.



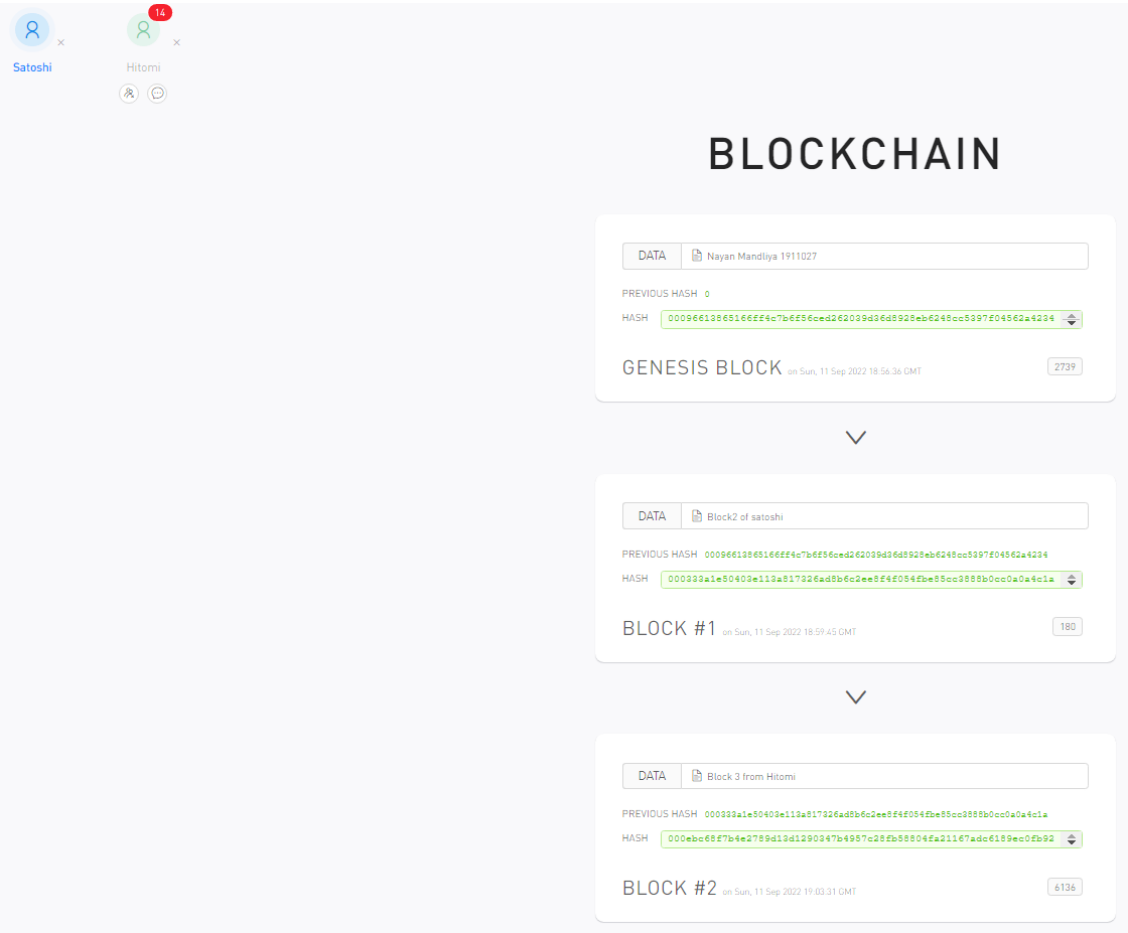
4) We can also connect the peers (click the + icon at the bottom of Hitomi).



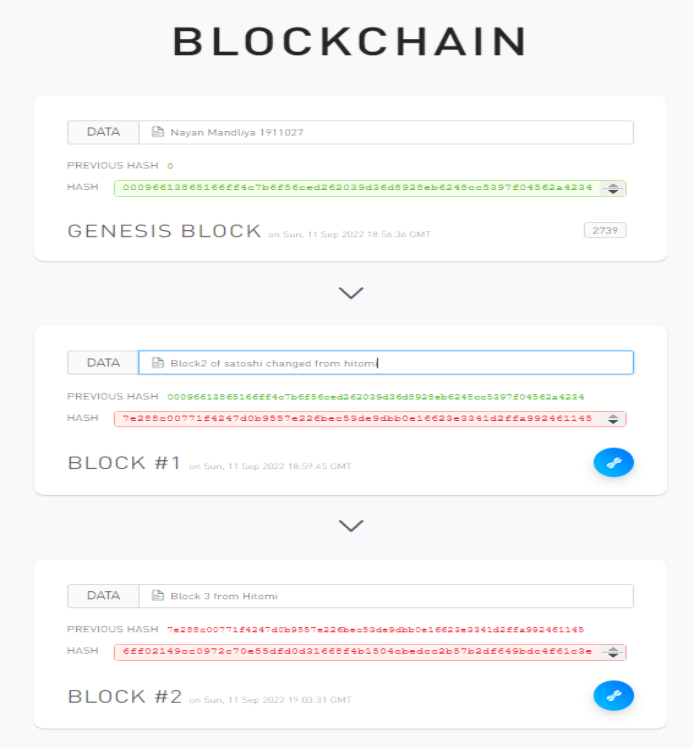
5) As seen from the image given above when we connected both the peers entire blockchain of peer 1 is available to peer 2 also. Now we will add a block in peer2 blockchain.



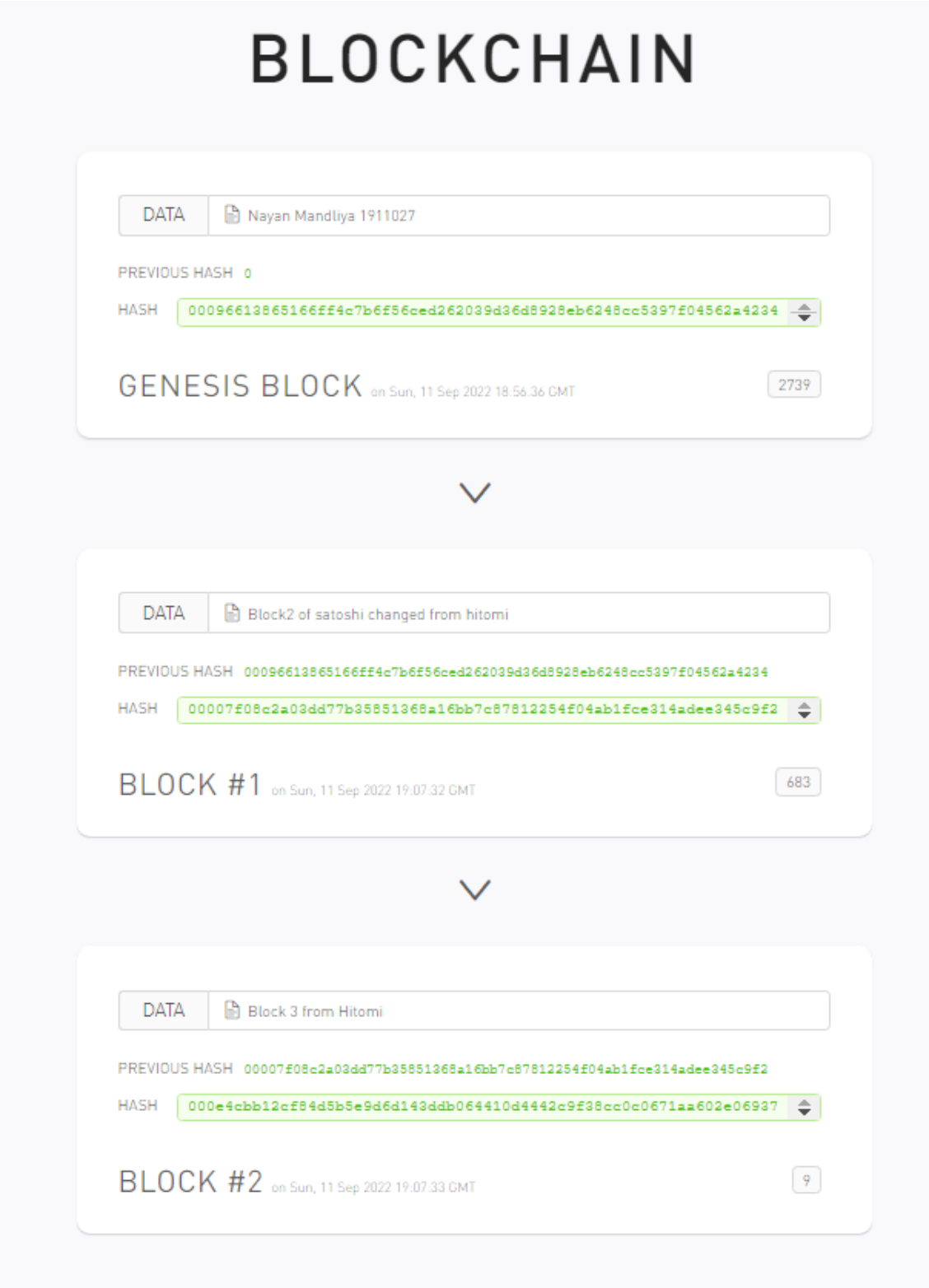
6) This block will also get added to the peer 1 blockchain.



7) Now as data of block #1 is changed so all the blocks after block #1 (including block #1) has to be mined again.



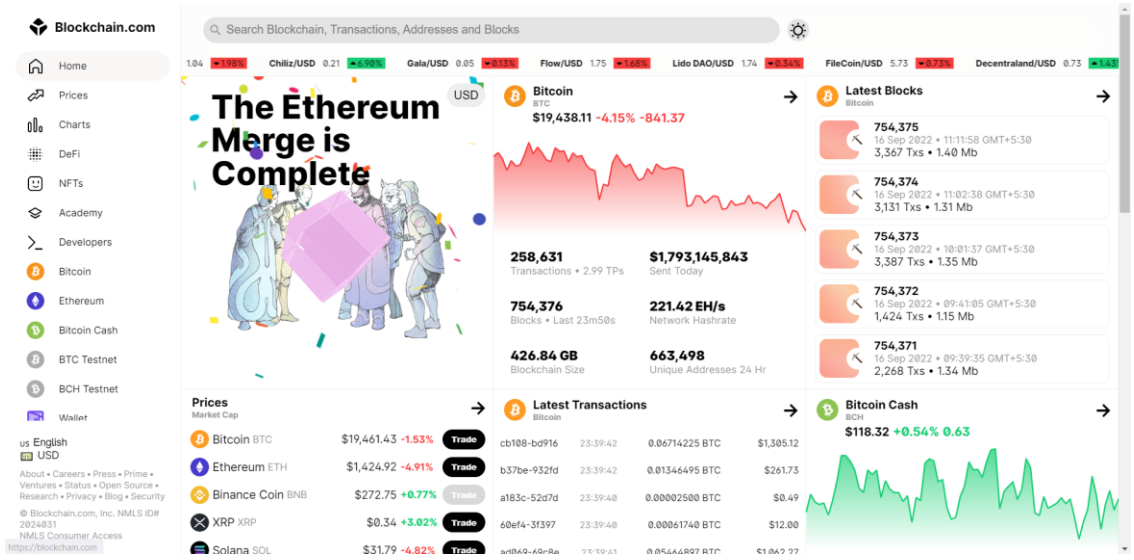
8) After mining, the blockchain again becomes valid.



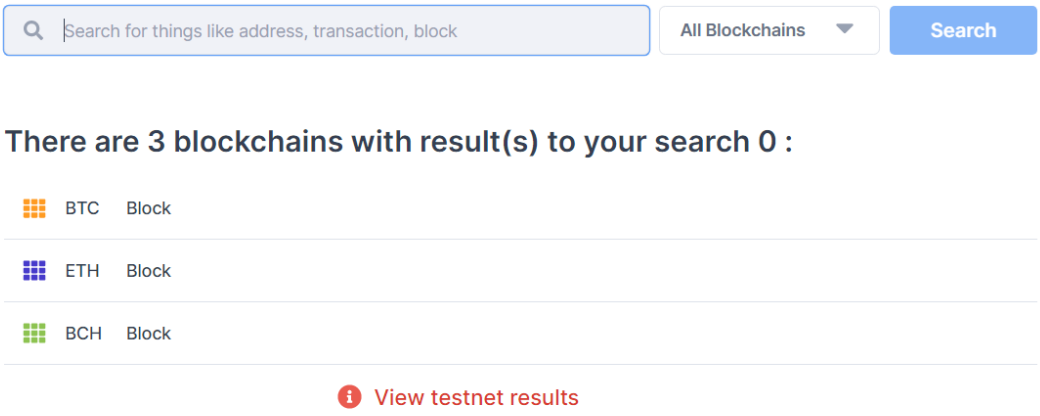
Block explorer – Bitcoin: Link

1) Bitcoin blockchain is a very wide network consists of thousands of block linked one after another. Despite of this huge network every information related to a particular

block is easily using block explorers. Transactions, block numbers, bitcoins transferred, etc everything can be easily checked by usign the blockchain explorers available.



2) On the top of the page you can search for any valid block numbers in the bitcoin blockchain. Now let us look at the genesis block(block number 0) of the bitcoin blockchain



3) As seen from the results of the search the description of block number 0 is visible. The date when it is added to the chain and by whom it is added is also seen in the description. It also contains the number of blocks added in the chain after the first i.e. the genesis block. Reward received by the miner after adding this block in the bitcoin network is also available with the description of amount transferred to miners address.

4) A table will be displayed at the bottom containing more information related to the block that is searched. Hash shows the has of the block header, confirmations shows the number of blocks added after the block, timestamps shows the time at which the block is inserted, height shows the number of blocks before this block, name of the

miner, number of transations, nonce used to calculate block hash to satisfy proof of work, block reward, etc.

Hash	000000000019d6689c085ae165831e934ff763ae46a2a6c172b3f1b60a8ce26f
Confirmations	754,376
Timestamp	2009-01-03 23:45
Height	0
Miner	Unknown
Number of Transactions	1
Difficulty	1.00
Merkle root	4a5e1e4baab89f3a32518a88c31bc87f618f76673e2cc77ab2127b7afdeda33b
Version	0x1
Bits	486,604,799
Weight	1,140 WU
Size	285 bytes
Nonce	2,083,236,893
Transaction Volume	0.00000000 BTC
Block Reward	50.00000000 BTC

5) At the bottom of the page all the transactions present in the block can be seen. As seen from the information given some bitcoins are transferred from one address to another. Green symbol besides amount shows that the bitcoin are unspent and can be used for making another transactions.

Block Transactions

Fee	0.00000000 BTC (0.000 sat/B - 0.000 sat/WU - 204 bytes)		50.00000000 BTC
Hash	4a5e1e4baab89f3a32518a88c31bc87f618f76673e2cc77ab2127b7afdeda33b		2009-01-03 23:45
	COINBASE (Newly Generated Coins)	1A1zP1eP5QGefi2DMPTfTL5SLmv7DivfNa	50.00000000 BTC

6) By navigating to any of the address information related to the account (address) can be easily found. As seen qr code associated with the address, format, number of transactions, total amount of bitcoins received, total amount of bitcoin sent and the final balance.

Address USD BTC

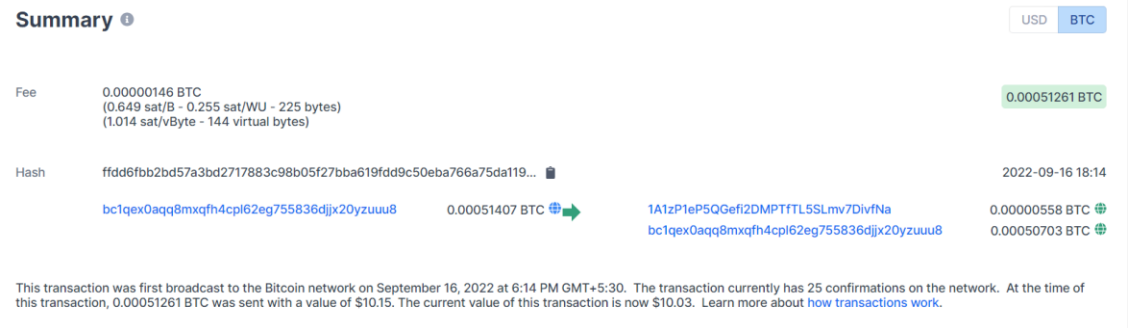
This address has transacted 3,453 times on the Bitcoin blockchain. It has received a total of 68.55312301 BTC ($1,332,866.03) and has sent a total of 0.00000000 BTC ($0.00). The current value of this address is 68.55312301 BTC ($1,332,866.03).

Address	1A1zP1eP5QGefi2DMPTfTL5SLmv7DivfNa
Format	BASE58 (P2PKH)
Transactions	3,453
Total Received	68.55312301 BTC
Total Sent	0.00000000 BTC
Final Balance	68.55312301 BTC

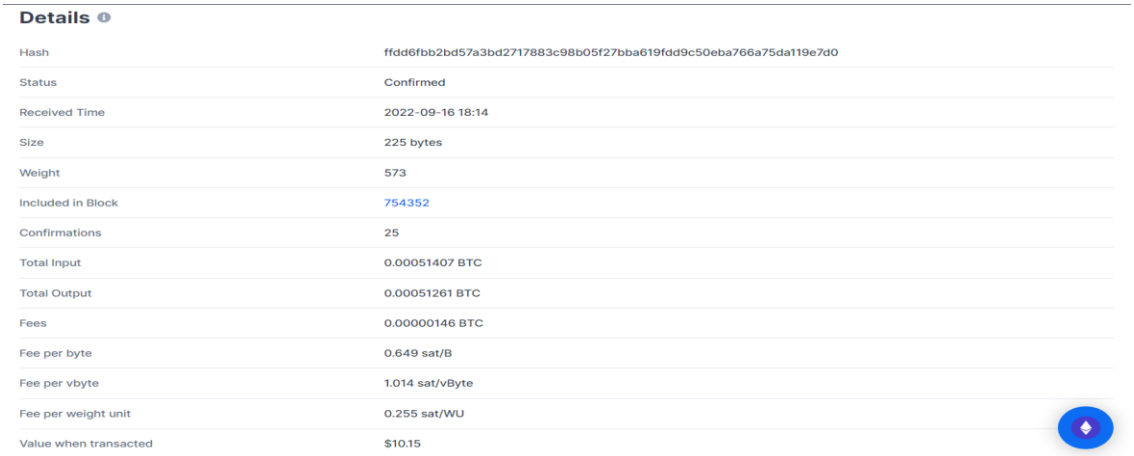
Total amount received from this address over time

7) All the transactions related to this address can also been at the bottom of the page. All the transactions with its transaction fees, amount of btc's transferred, from and to address of the transaction and the date of the transation can also be visible.

8) Information related to any transaction can also be seen by navigating to any of the transaction hashes. Transaction fees, amount of btc's transferred, addresses of transactions, date, the number of confirmations on this transaction, etc.

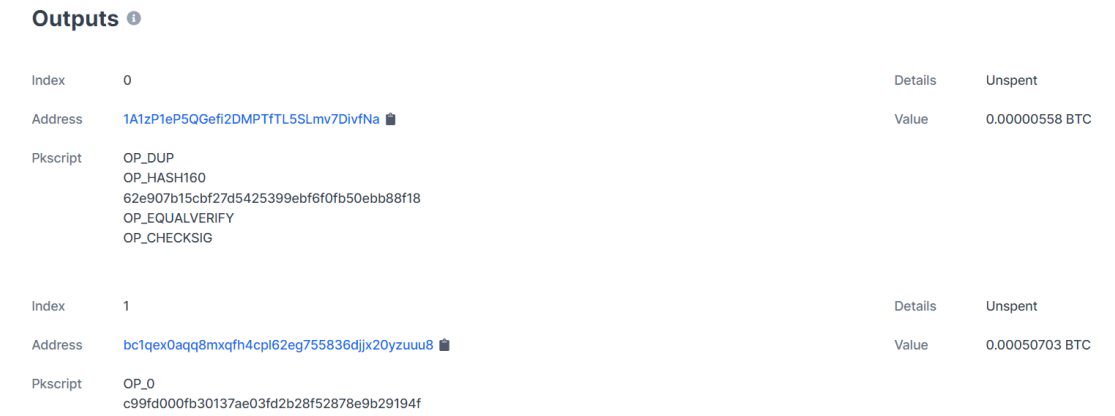


9) Other details can also be seen at the bottom including size, status, value of the transaction when it was made, etc.

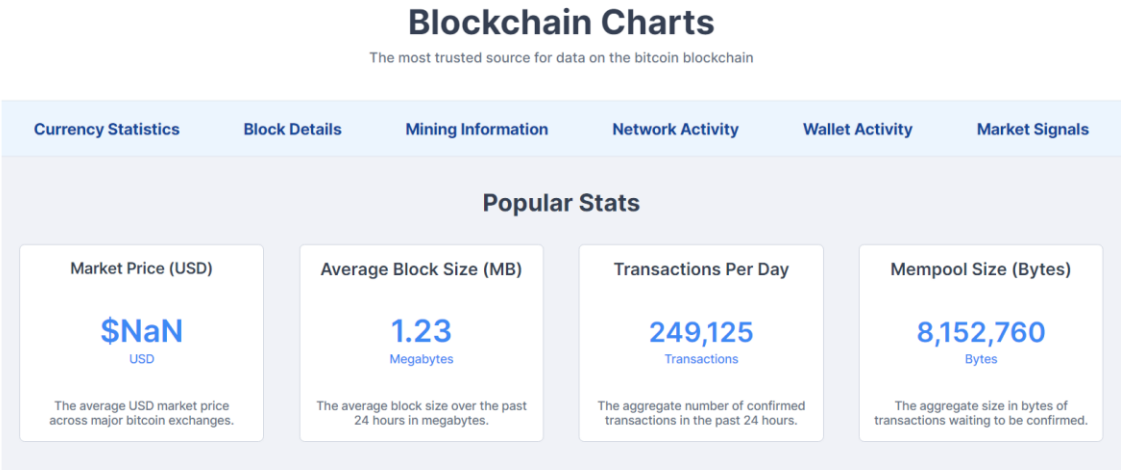


10) Input associated with the transaction and the output can also be seen at the end of the page.

11) Output contains addresses, public key scripts and the amount of bitcoints spent/unspent.

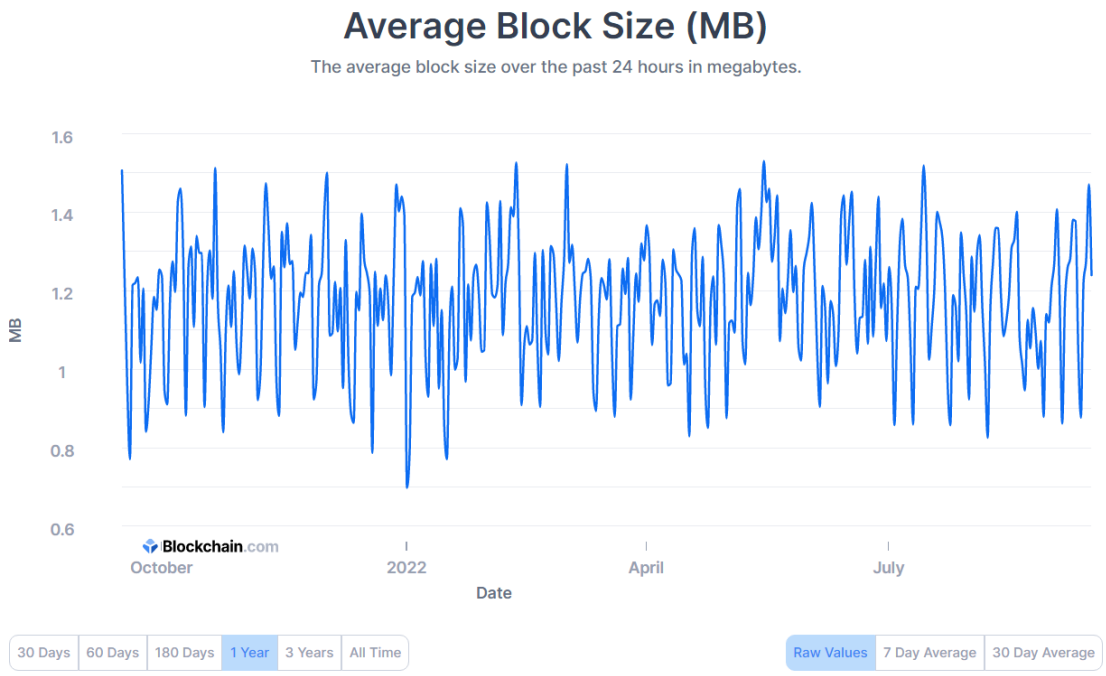


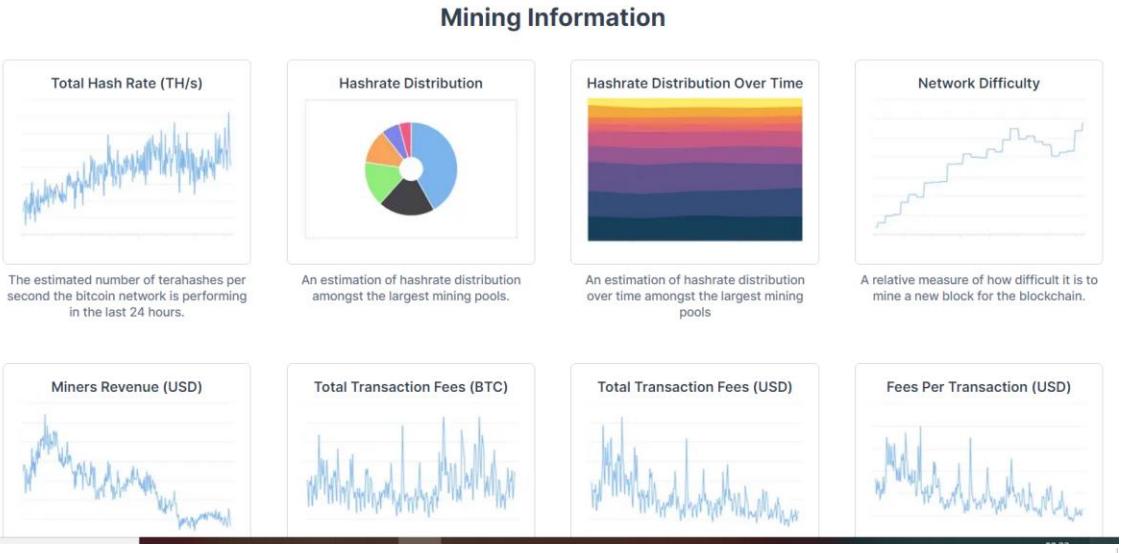
12) Historical price trends, mining trends, network activity, etc can also be seen in charts section.

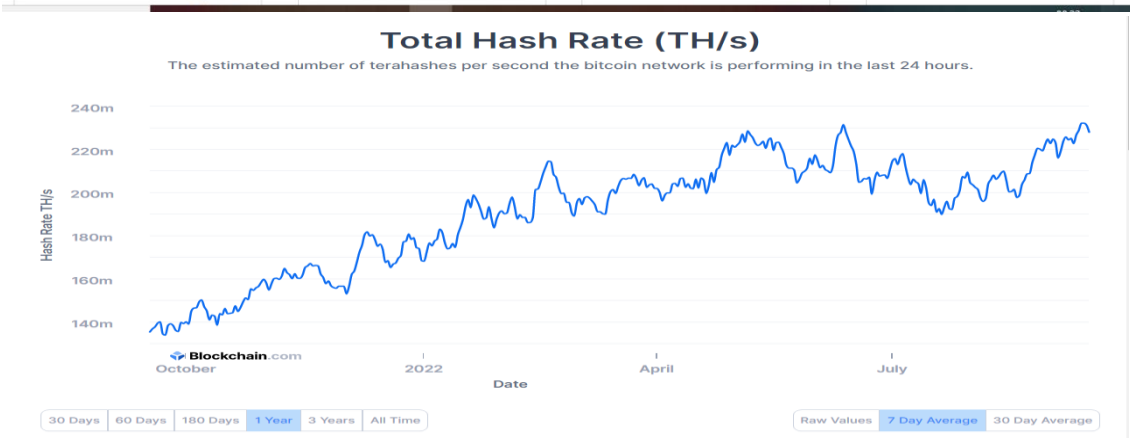


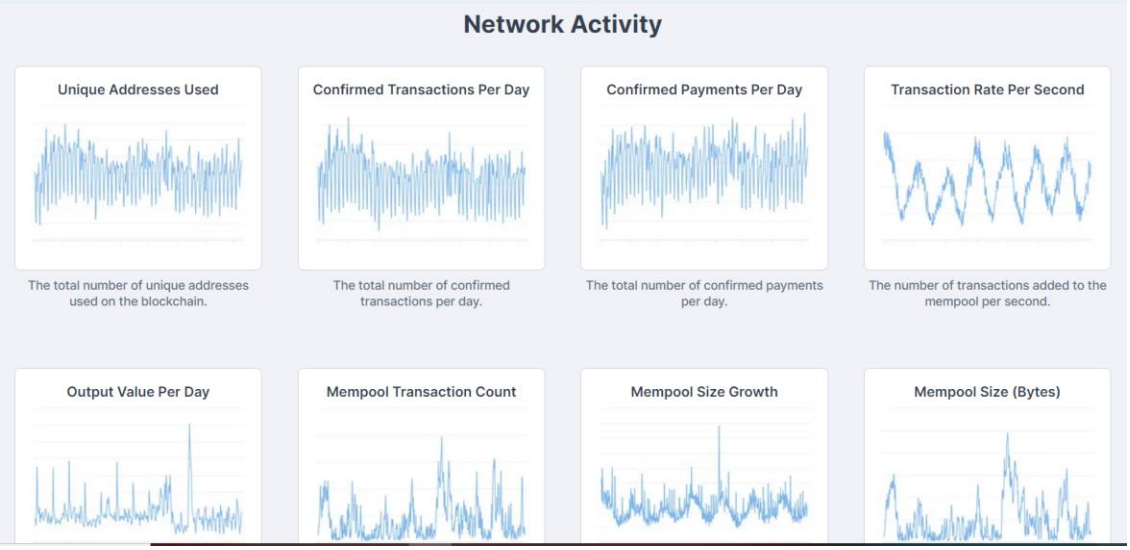
13) Overview of the current statistics containts the price related information related to the bitcoin. Individual charts can also be seen by navigating to any of the available charts.

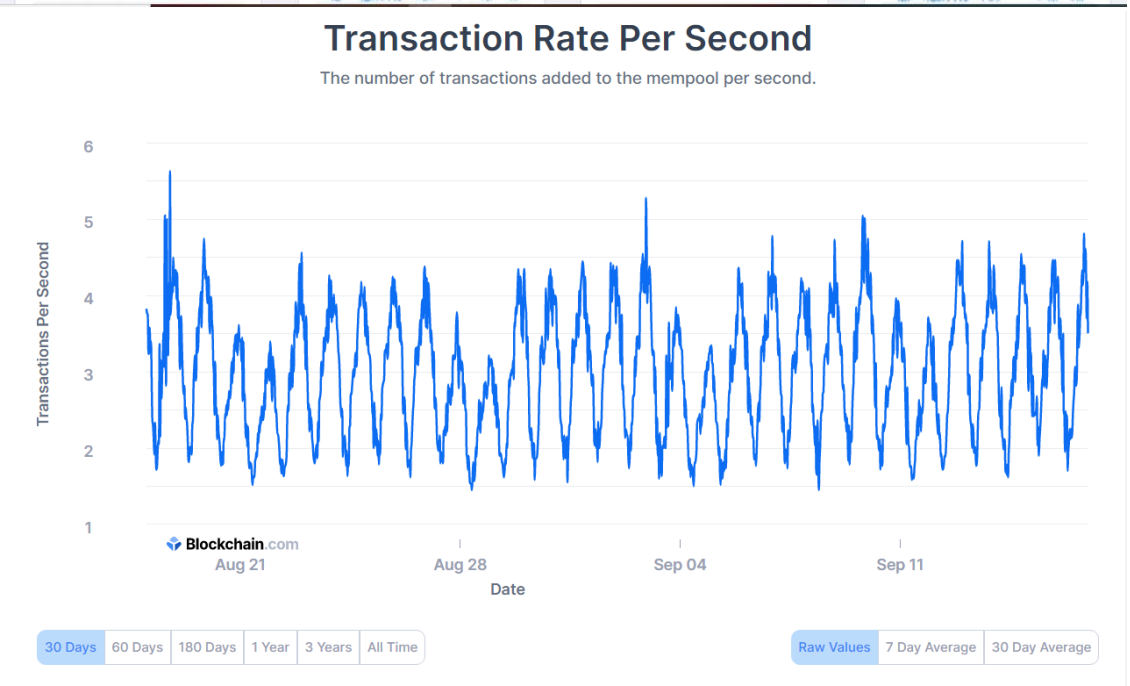
14) Following are all the charts which are available on the bitcoin explorer.

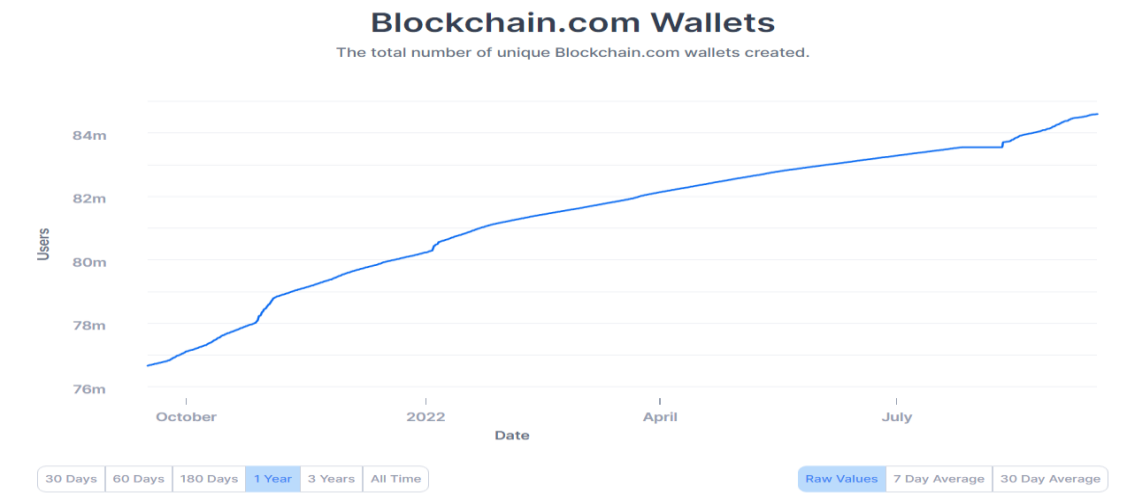

Average Block Size (MB)
The average block size over the past 24 hours in megabytes.
1.6
1.4
1.2
1
0.8
0.6
MB
Blockchain.com
October
2022
April
July
Date
30 Days
60 Days
180 Days
1 Year
3 Years
All Time
Raw Values
7 Day Average
30 Day Average

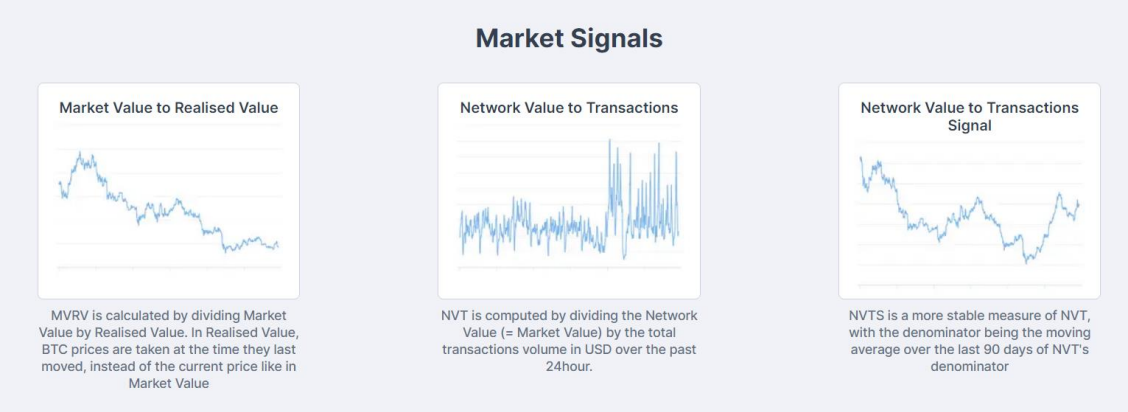

Mining Information
Total Hash Rate (TH/s)
The estimated number of terahashes per second the bitcoin network is performing in the last 24 hours.
Hashrate Distribution
An estimation of hashrate distribution amongst the largest mining pools.
Hashrate Distribution Over Time
An estimation of hashrate distribution over time amongst the largest mining pools
Network Difficulty
A relative measure of how difficult it is to mine a new block for the blockchain.
Miners Revenue (USD)
Total Transaction Fees (BTC)
Total Transaction Fees (USD)
Fees Per Transaction (USD)

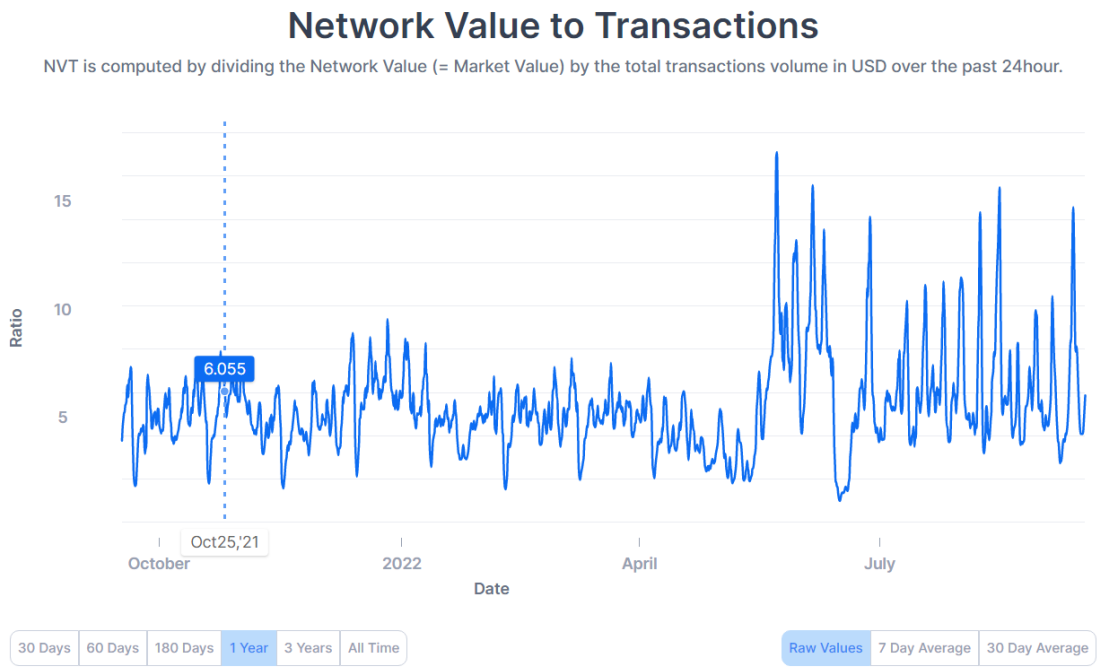

Total Hash Rate (TH/s)
The estimated number of terahashes per second the bitcoin network is performing in the last 24 hours.
240m
220m
200m
180m
160m
140m
Hash Rate TH/s
Blockchain.com
October
2022
April
July
Date
30 Days
60 Days
180 Days
1 Year
3 Years
All Time
Raw Values
7 Day Average
30 Day Average


Network Activity
Unique Addresses Used
The total number of unique addresses used on the blockchain.
Confirmed Transactions Per Day
The total number of confirmed transactions per day.
Confirmed Payments Per Day
The total number of confirmed payments per day.
Transaction Rate Per Second
The number of transactions added to the mempool per second.
Output Value Per Day
Mempool Transaction Count
Mempool Size Growth
Mempool Size (Bytes)


Transaction Rate Per Second
The number of transactions added to the mempool per second.
Transactions Per Second
6
5
4
3
2
1
Blockchain.com
Aug 21
Aug 28
Sep 04
Sep 11
Date
30 Days
60 Days
180 Days
1 Year
3 Years
All Time
Raw Values
7 Day Average
30 Day Average

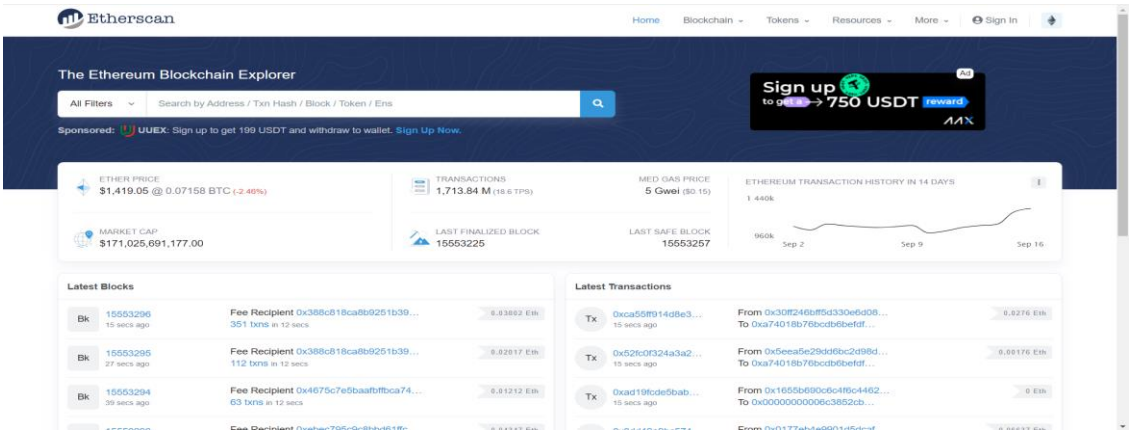

Blockchain.com Wallets
The total number of unique Blockchain.com wallets created.
Users
84m
82m
80m
78m
76m
October
2022
April
July
Date
30 Days
60 Days
180 Days
1 Year
3 Years
All Time
Raw Values
7 Day Average
30 Day Average



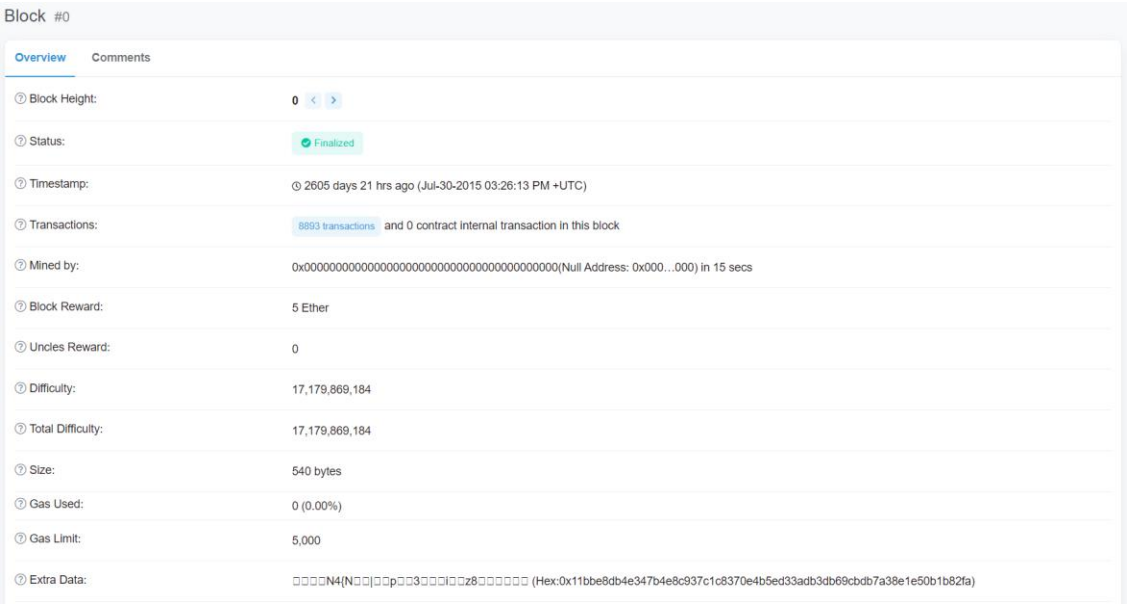


Block explorer – Ethereum: [Link]

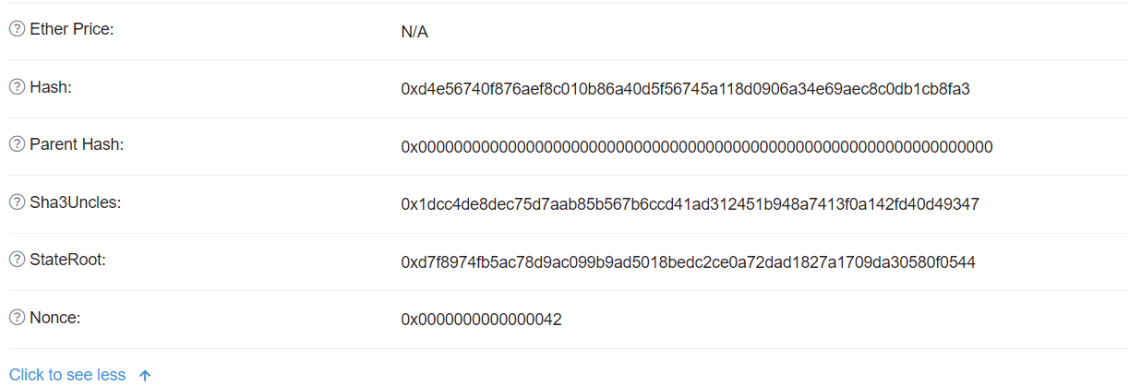
1) Out of bunch of cryptocurrencies available in market, most of the cryprocurrencies internal details can be easily seen with the help of block explorers. Like bitcoin ethereum blocks information can also be seen with the help of link mentioned above.



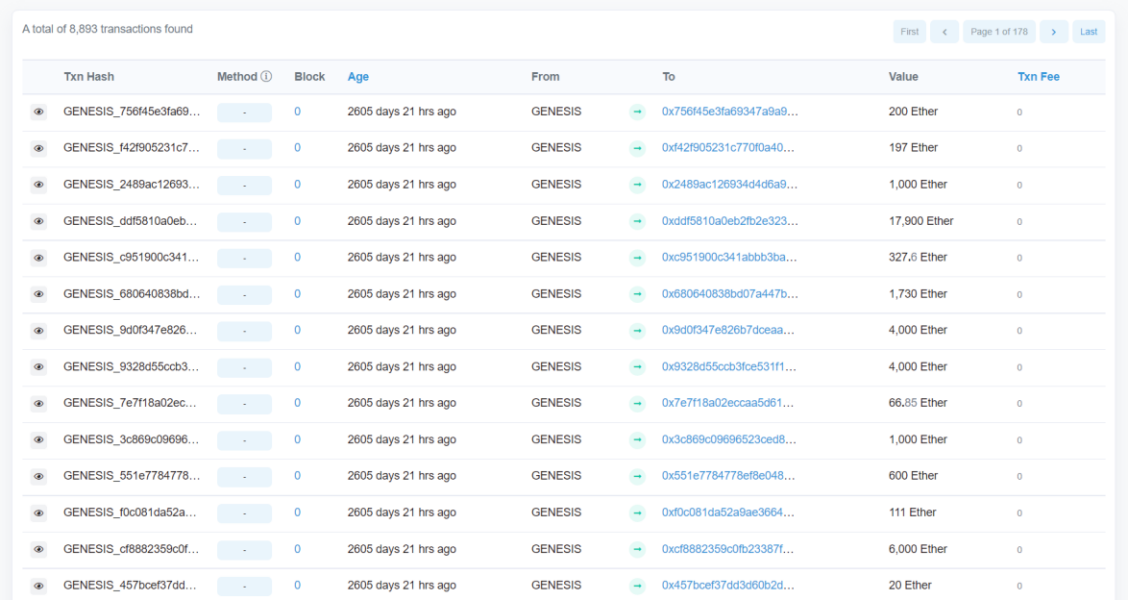
2) Ethers blockchain contains some similar fields like bitcoin such as height, timestamp, transactions, mined by, block reward, etc but it also contains other fields like uncles reward which is obtained if 2 miners are mining the same transactions, difficulty level (proof of work now changed to proof of stake), gas used which is the amount of energy required to insert the block into the ethereum main net.



3) Other information such as the price of the ether when this block was mined, hash of the block, hash of the parent block (block before this) as block under consideration is genesis block so parent hash is all 0's, the combined hash of all uncles for a given parent defining the Sha3Uncles, StateRoot – The root hash of Merkle trie which stores the entire state of the system and the nonce – A value used to demonstrate proof-of-work for a block by the miner.



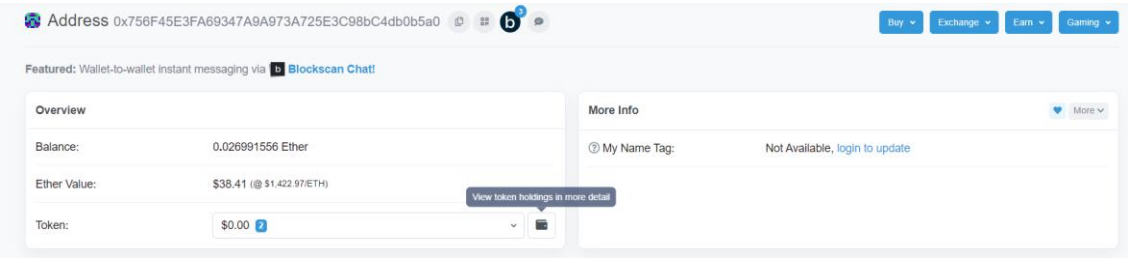
4) By navigating to all the transactions inside the block we can see all the information related to all the transactions in the block under consideration. From and to addresses of transfer of ether are also available with the number of ethers transferred.



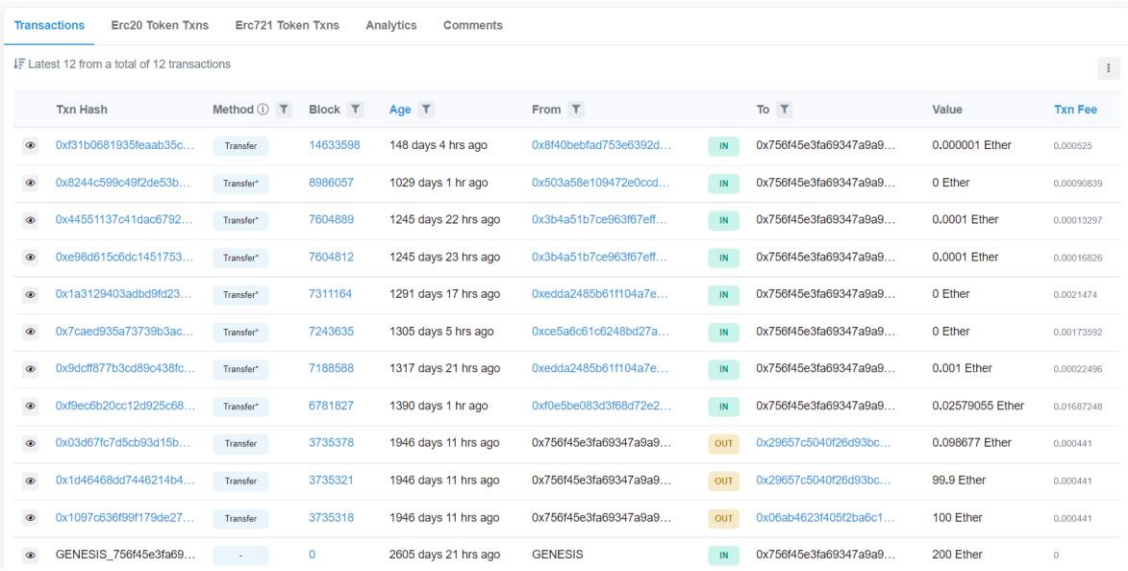
A total of 8,893 transactions found

Txn Hash	Method	Block	Age	From	To	Value	Txn Fee
GENESIS_756f45e3fa69…	-	0	2605 days 21 hrs ago	GENESIS	0x756f45e3fa69347a9a9…	200 Ether	0
GENESIS_f42f905231c7…	-	0	2605 days 21 hrs ago	GENESIS	0xf42f905231c770f0a40…	197 Ether	0
GENESIS_2489ac12693…	-	0	2605 days 21 hrs ago	GENESIS	0x2489ac126934d4d6a9…	1,000 Ether	0
GENESIS_ddf5810a0eb…	-	0	2605 days 21 hrs ago	GENESIS	0xddf5810a0eb2fb2e323…	17,900 Ether	0
GENESIS_c951900c341…	-	0	2605 days 21 hrs ago	GENESIS	0xc951900c341abbb3ba…	327.6 Ether	0
GENESIS_680640838bd…	-	0	2605 days 21 hrs ago	GENESIS	0x680640838bd07a447b…	1,730 Ether	0
GENESIS_9d0f347e826…	-	0	2605 days 21 hrs ago	GENESIS	0x9d0f347e826b7dceaa…	4,000 Ether	0
GENESIS_9328d55ccb3…	-	0	2605 days 21 hrs ago	GENESIS	0x9328d55ccb3fce531f1…	4,000 Ether	0
GENESIS_7e7f18a02ec…	-	0	2605 days 21 hrs ago	GENESIS	0x7e7f18a02eccaa5d61…	66.85 Ether	0
GENESIS_3c869c09696…	-	0	2605 days 21 hrs ago	GENESIS	0x3c869c09696523ced8…	1,000 Ether	0
GENESIS_551e7784778…	-	0	2605 days 21 hrs ago	GENESIS	0x551e7784778ef8e048…	600 Ether	0
GENESIS_f0c081da52a…	-	0	2605 days 21 hrs ago	GENESIS	0xf0c081da52a9ae3664…	111 Ether	0
GENESIS_cf8882359c0f…	-	0	2605 days 21 hrs ago	GENESIS	0xcf8882359c0fb23387f…	6,000 Ether	0
GENESIS_457bcef37dd…	-	0	2605 days 21 hrs ago	GENESIS	0x457bcef37dd3d60b2d…	20 Ether	0

5) By navigating to a particular address all the information associated with that address can also be seen such as balance, value in terms of dollars, tokens and name if available.



6) All the transactions associated with the particular address can also be seen at the bottom of the page with fields such as the method, transaction hash, block numbers, age (time elapsed from the time transaction has made to now), from and too addresses, amount of ethers transferred and the transaction fees applied while making the transactions.

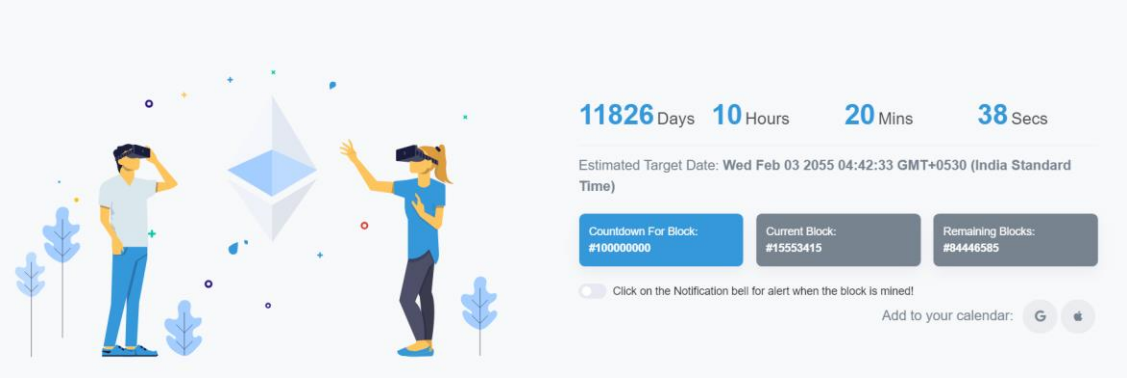


Transactions | Erc20 Token Txns | Erc721 Token Txns | Analytics | Comments

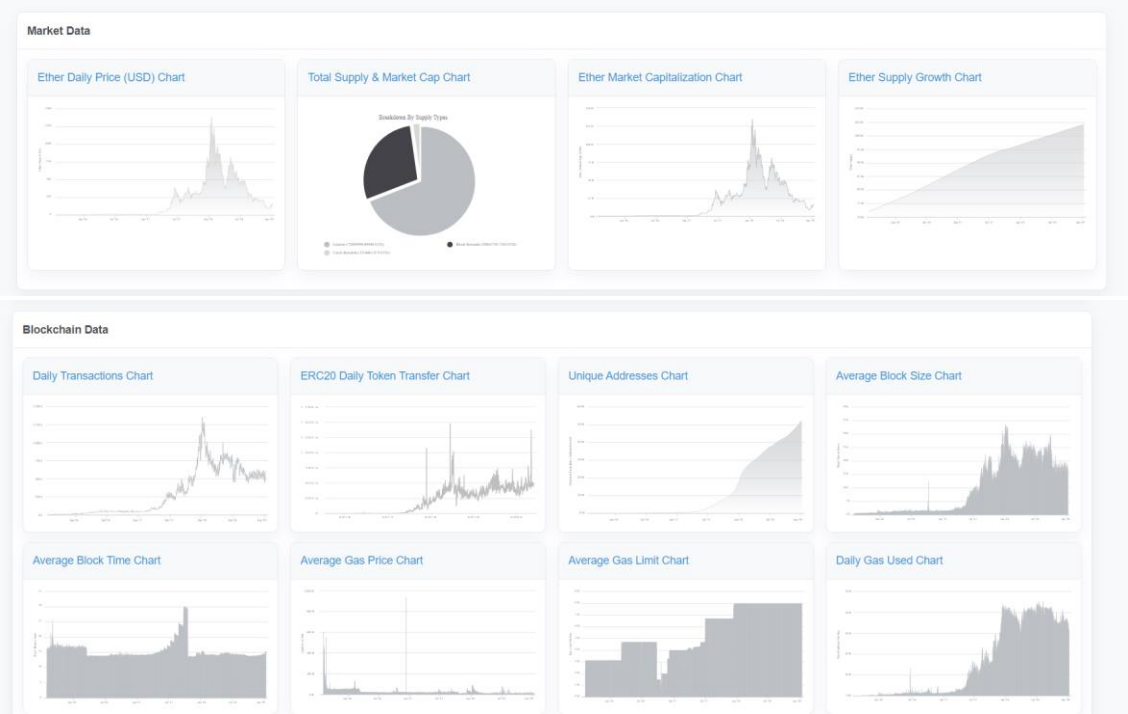
Latest 12 from a total of 12 transactions

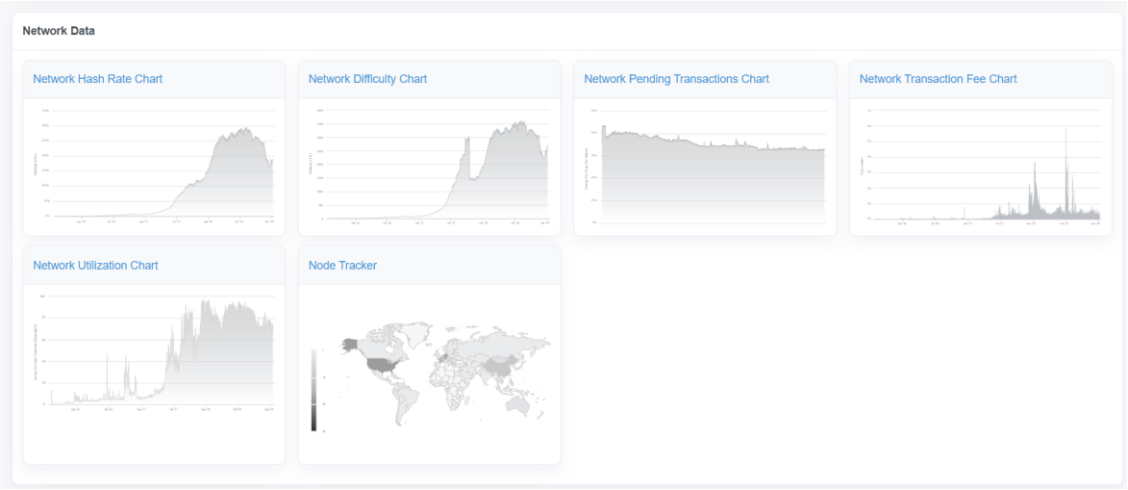
Txn Hash	Method	Block	Age	From		To	Value	Txn Fee
0xf31b0681935feaab35c…	Transfer	14633598	148 days 4 hrs ago	0x8f40bebfad753e6392d…	IN	0x756f45e3fa69347a9a9…	0.000001 Ether	0.000525
0x8244c599c49f2de53b…	Transfer*	8986057	1029 days 1 hr ago	0x503a58e109472e0ccd…	IN	0x756f45e3fa69347a9a9…	0 Ether	0.00090839
0x44551137c41dac6792…	Transfer*	7604889	1245 days 22 hrs ago	0x3b4a51b7ce963f67eff…	IN	0x756f45e3fa69347a9a9…	0.0001 Ether	0.00013297
0xe98d615c6dc1451753…	Transfer*	7604812	1245 days 23 hrs ago	0x3b4a51b7ce963f67eff…	IN	0x756f45e3fa69347a9a9…	0.0001 Ether	0.00016826
0x1a3129403adbd9fd23…	Transfer*	7311164	1291 days 17 hrs ago	0xedda2485b61f104a7e…	IN	0x756f45e3fa69347a9a9…	0 Ether	0.0021474
0x7caed935a73739b3ac…	Transfer*	7243635	1305 days 5 hrs ago	0xce5a6c61c6248bd27a…	IN	0x756f45e3fa69347a9a9…	0 Ether	0.00173592
0x9dcff877b3cd89c438fc…	Transfer*	7188588	1317 days 21 hrs ago	0xedda2485b61f104a7e…	IN	0x756f45e3fa69347a9a9…	0.001 Ether	0.00022496
0xf9ec6b20cc12d925c68…	Transfer*	6781827	1390 days 1 hr ago	0xf0e5be083d3f68d72e2…	IN	0x756f45e3fa69347a9a9…	0.02579055 Ether	0.01687248
0x03d67fc7d5cb93d15b…	Transfer	3735378	1946 days 11 hrs ago	0x756f45e3fa69347a9a9…	OUT	0x29657c5040f26d93bc…	0.098677 Ether	0.000441
0x1d46468dd7446214b4…	Transfer	3735321	1946 days 11 hrs ago	0x756f45e3fa69347a9a9…	OUT	0x29657c5040f26d93bc…	99.9 Ether	0.000441
0x1097c636f99f179de27…	Transfer	3735318	1946 days 11 hrs ago	0x756f45e3fa69347a9a9…	OUT	0x06ab4623f405f2ba6c1…	100 Ether	0.000441
GENESIS_756f45e3fa69…	-	0	2605 days 21 hrs ago	GENESIS	IN	0x756f45e3fa69347a9a9…	200 Ether	0

7) This is a special feature available in ethereum block explorer which is the amount of time required to make number of blocks which is mentioned by the user. If the block number enterd by the user is greater than the number of blocks in the blockchain then this explorer will give you the details of when the particular block will be available in the ethereum mainnet.

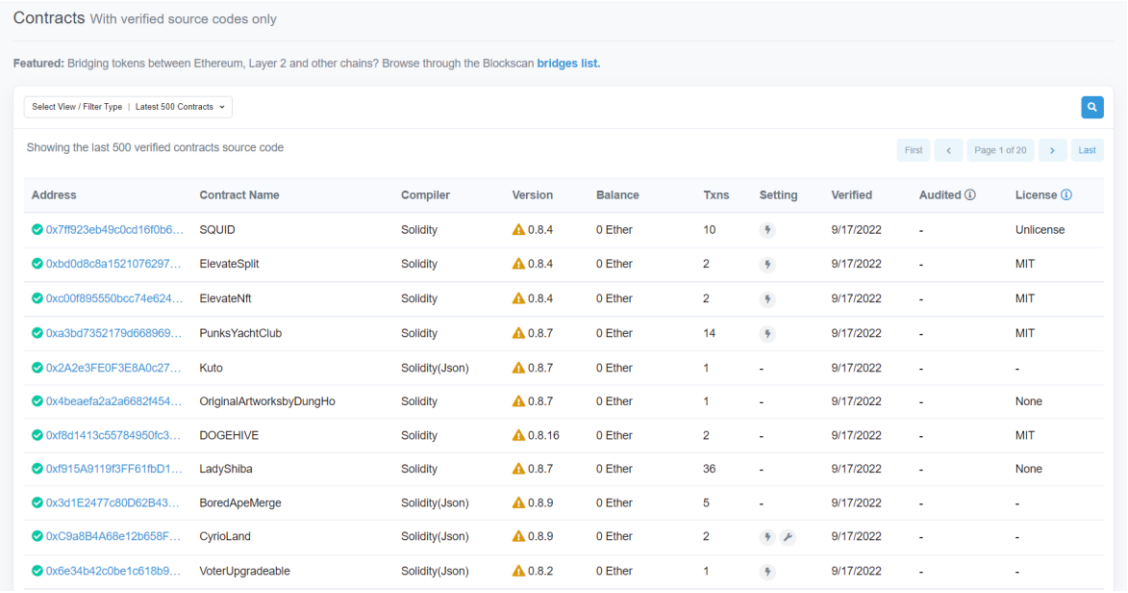


8) Like bitcoin, ethereum block explorer also provides the hsitorical data of the ethereum in terms of charts which can be seen in the charts section. Market data, Blockchain data, network data, etc are available in the charts section.





9) There is a concept of smart contracts (A smart contract is a computer program or a transaction protocol that is intended to automatically execute, control or document legally relevant events and actions according to the terms of a contract or an agreement) in ethereum, information related to that is also available with the name of the compiler, version, balance, transactions, date of verification, license, etc.



Contracts With verified source codes only

Featured: Bridging tokens between Ethereum, Layer 2 and other chains? Browse through the Blockscan **bridges list.**

Select View / Filter Type | Latest 500 Contracts

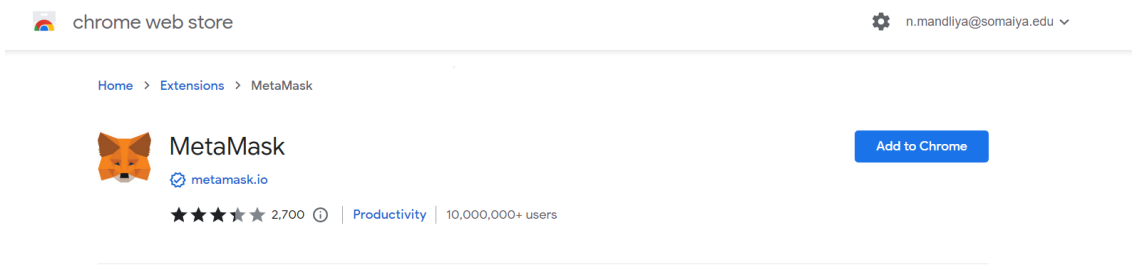
Showing the last 500 verified contracts source code

First | Page 1 of 20 | Last

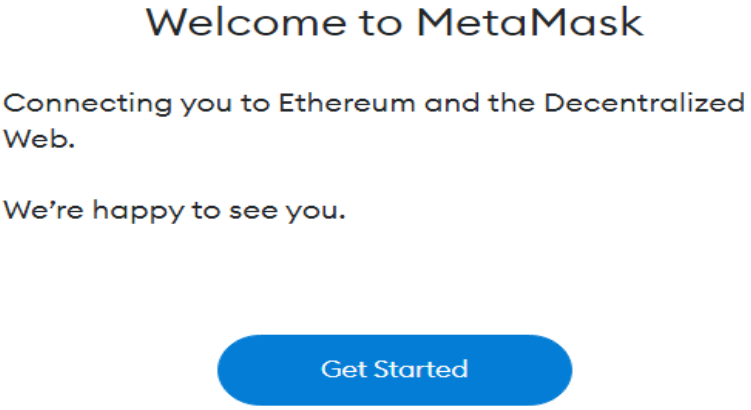
Address	Contract Name	Compiler	Version	Balance	Txns	Setting	Verified	Audited	License
0x7ff923eb49c0cd16f0b6...	SQUID	Solidity	0.8.4	0 Ether	10		9/17/2022	-	Unlicense
0xbd0d8c8a1521076297...	ElevateSplit	Solidity	0.8.4	0 Ether	2		9/17/2022	-	MIT
0xc00f895550bcc74e624...	ElevateNft	Solidity	0.8.4	0 Ether	2		9/17/2022	-	MIT
0xa3bd7352179d668969...	PunksYachtClub	Solidity	0.8.7	0 Ether	14		9/17/2022	-	MIT
0x2A2e3FE0F3E8A0c27...	Kuto	Solidity(Json)	0.8.7	0 Ether	1	-	9/17/2022	-	-
0x4beaefa2a2a6682f454...	OriginalArtworksbyDungHo	Solidity	0.8.7	0 Ether	1	-	9/17/2022	-	None
0xf8d1413c55784950fc3...	DOGEHIVE	Solidity	0.8.16	0 Ether	2	-	9/17/2022	-	MIT
0xf915A9119f3FF61fbD1...	LadyShiba	Solidity	0.8.7	0 Ether	36	-	9/17/2022	-	None
0x3d1E2477c80D62B43...	BoredApeMerge	Solidity(Json)	0.8.9	0 Ether	5	-	9/17/2022	-	-
0xC9a8B4A68e12b658F...	CyrioLand	Solidity(Json)	0.8.9	0 Ether	2		9/17/2022	-	-
0x6e34b42c0be1c618b9...	VoterUpgradeable	Solidity(Json)	0.8.2	0 Ether	1		9/17/2022	-	-

Testnetworks: Link

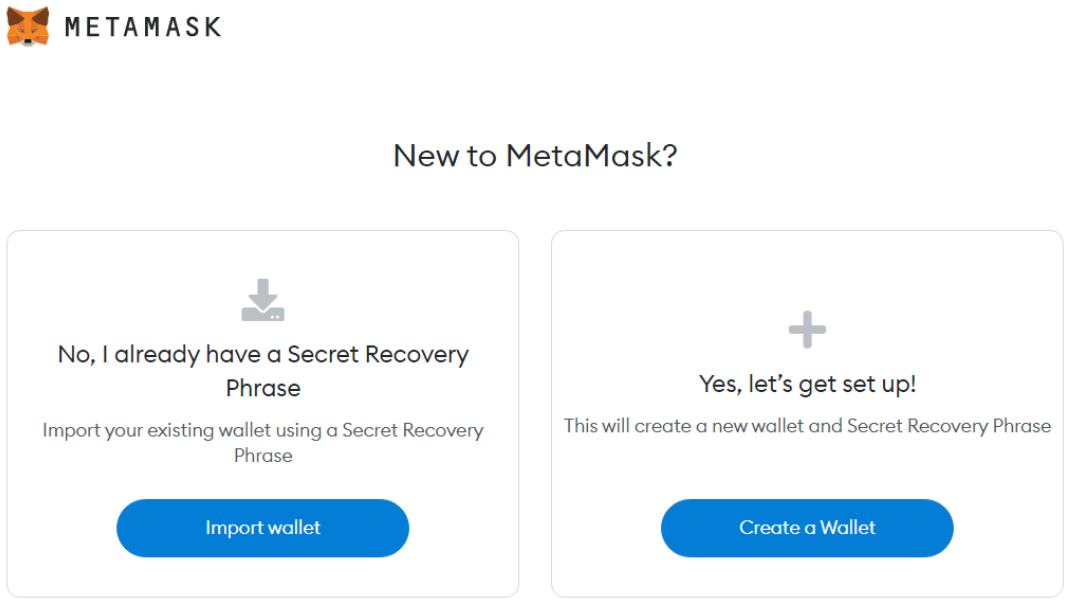
1) Besides the main network of the cryprocurrencies, test networks are provided so that developers can test their blockchains on these networks. For using a testnetwork we must have a wallet which will be storing the list of test networks available with the account and the amount of cryptocurrencies in the respective test networks. For creating a cryptocurrency wallet metamask is used which is used as a browser extension.



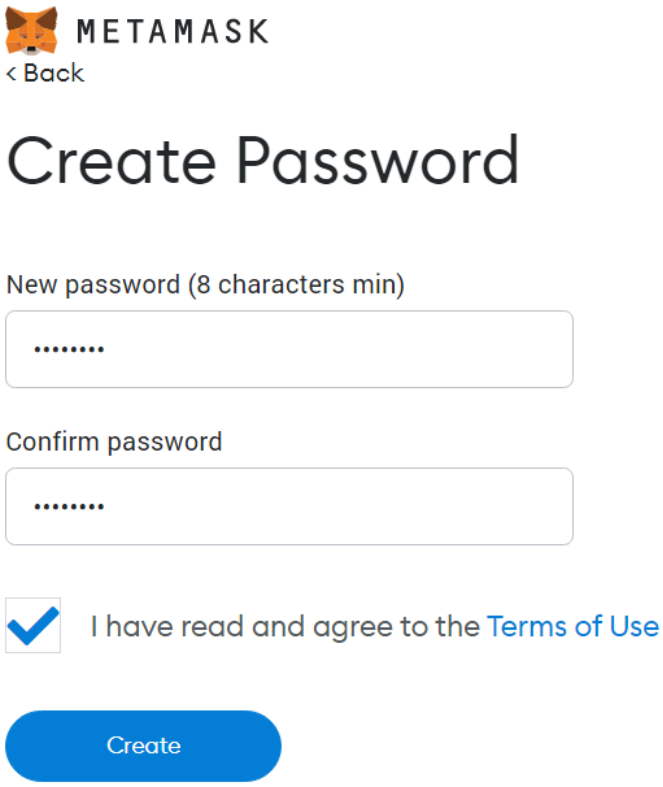
2) Just add metamask to chrome and on the right of the search bar of chrom in the extensions section just enable the metamask extension.



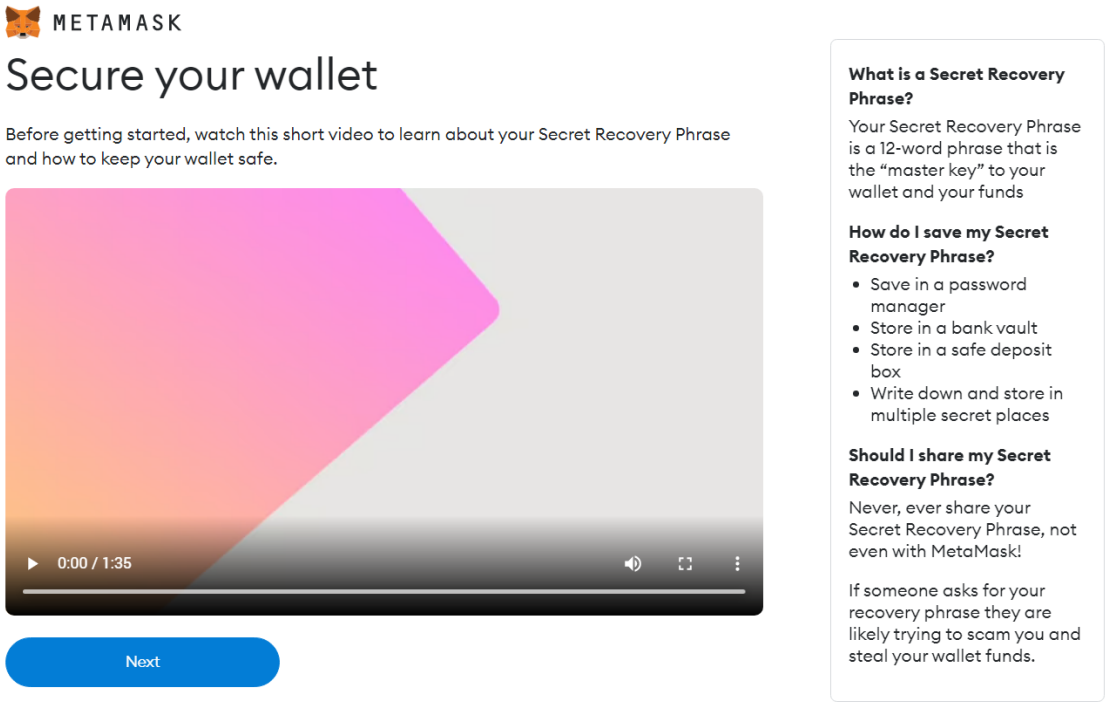
3) Click on get started, and create a wallet by selection the particular option.



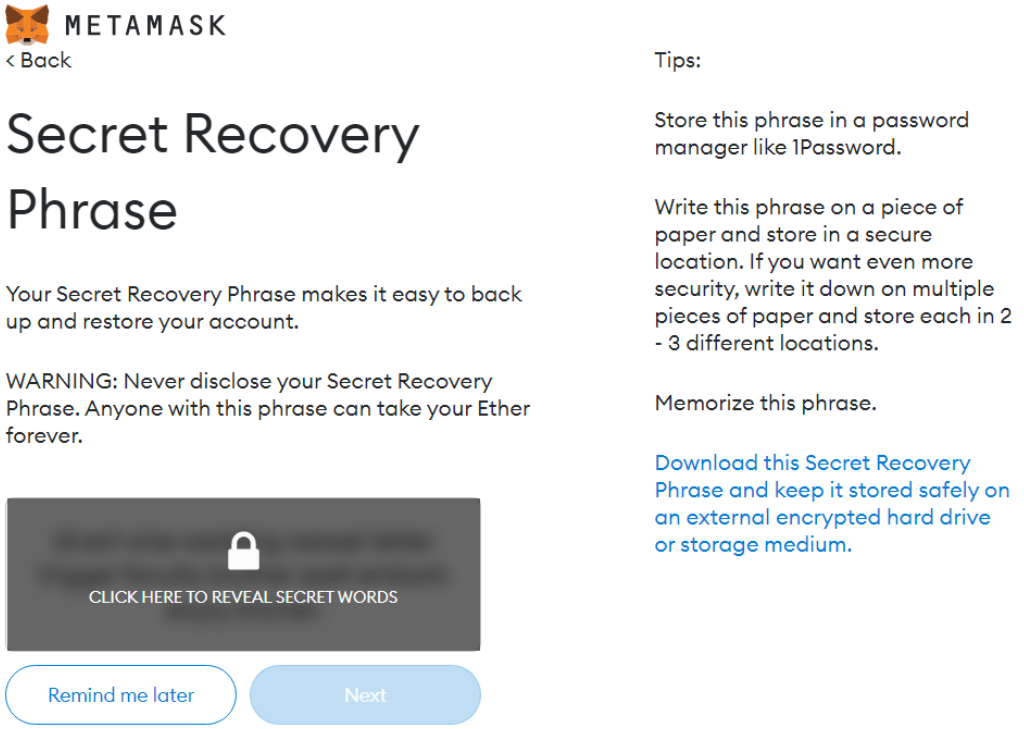
4) Metamask will ask for a password for account, enter the password and click create wallet.



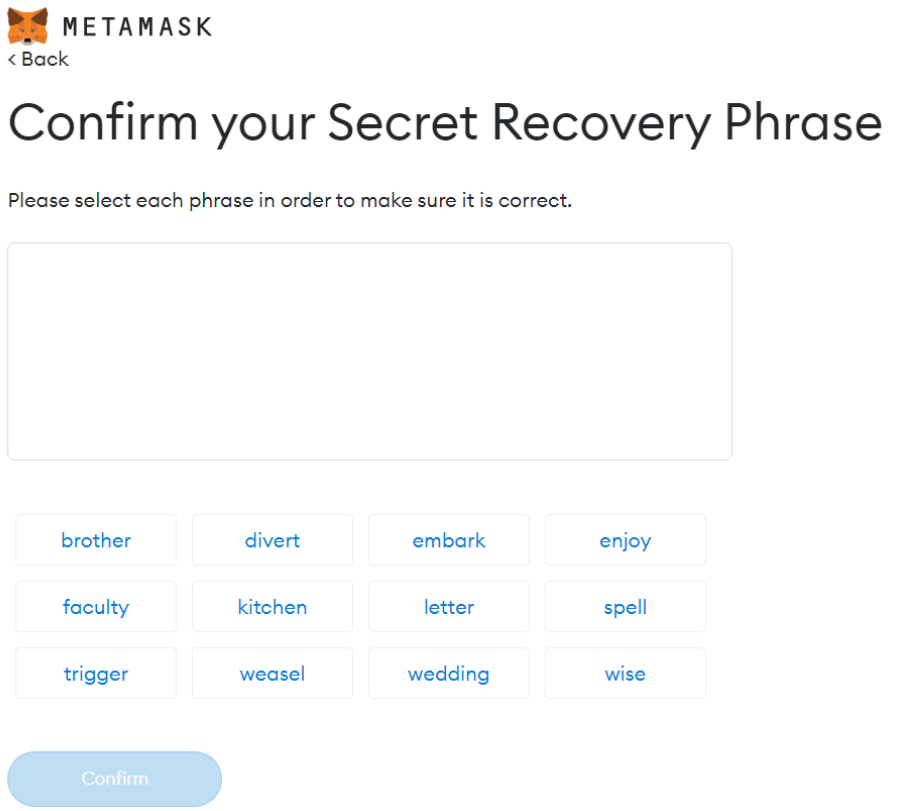
5) A demo video on how to use wallet and security policy is shown click on next to go to next screen.



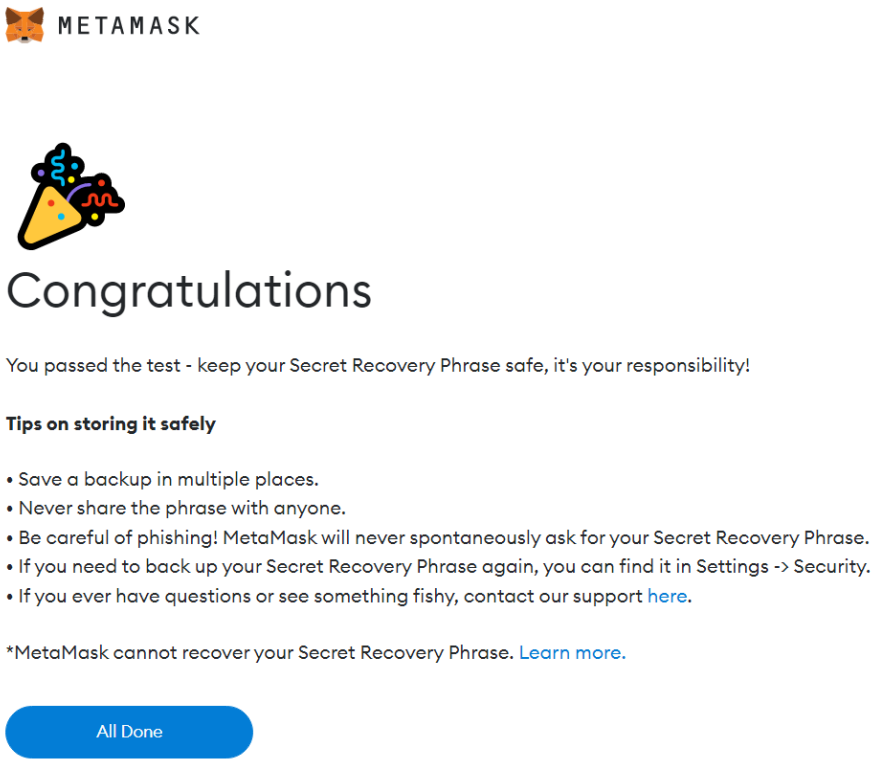
6) A secret revcovery phrase is available with the account and which is unique for every account, store the shown security phase because it will be used in future.



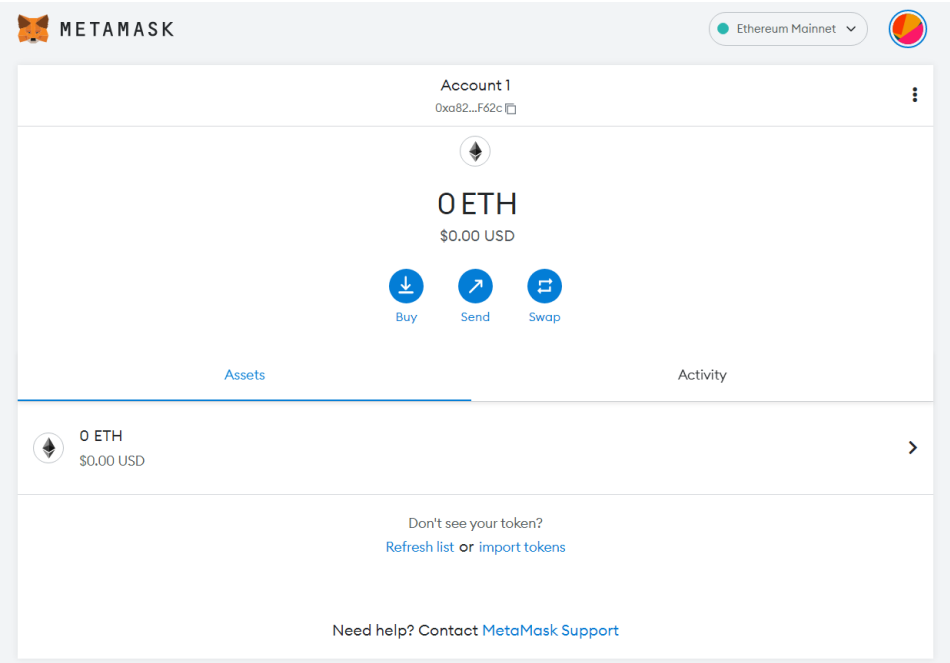
7) Choose the words according to the secret phase shown in the previous step.

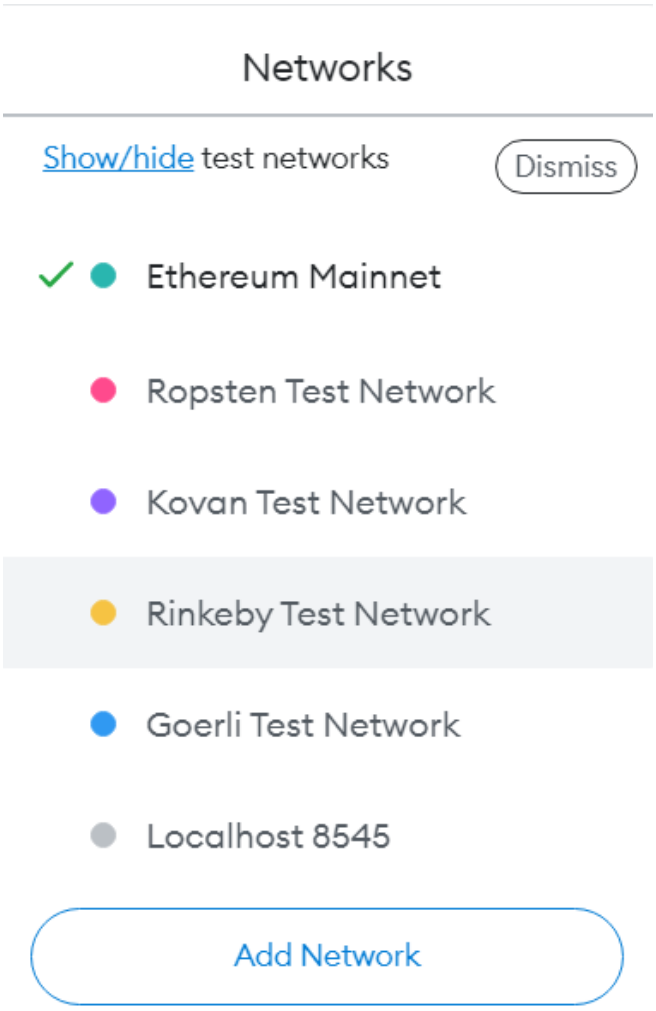


8) Your metamask account is now all set to use.

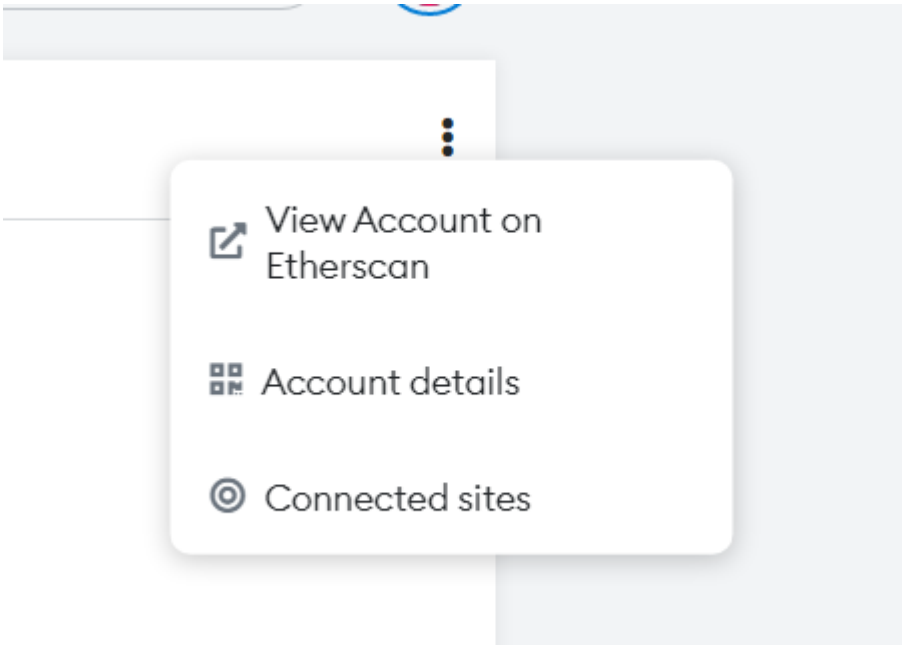


9) After the wallet is created home page will show the amount of cryptocurrency available in the wallet, account adress, activity and assets associated with the account and at the top of the screen there is dropdown which shows the the number of test networks associated with the account.

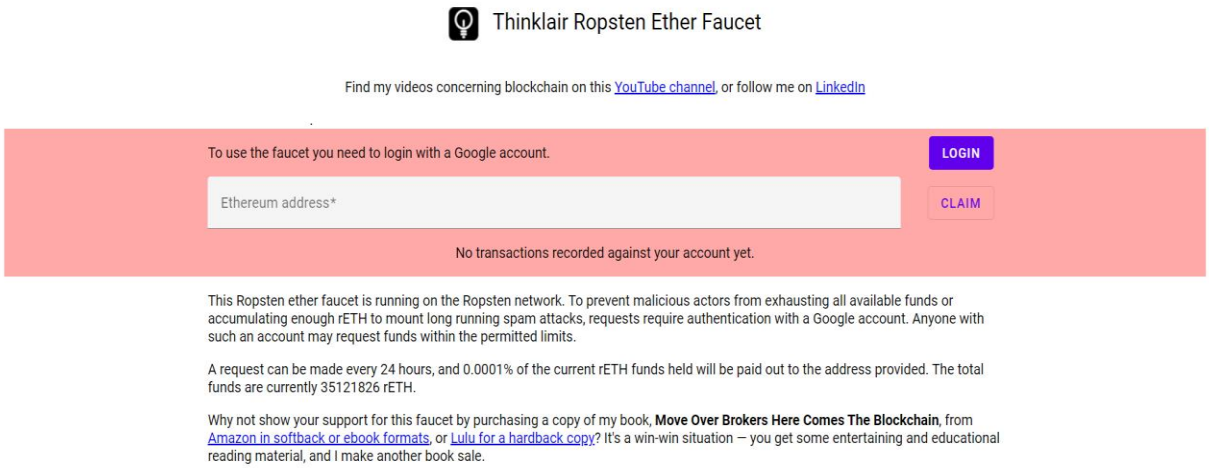


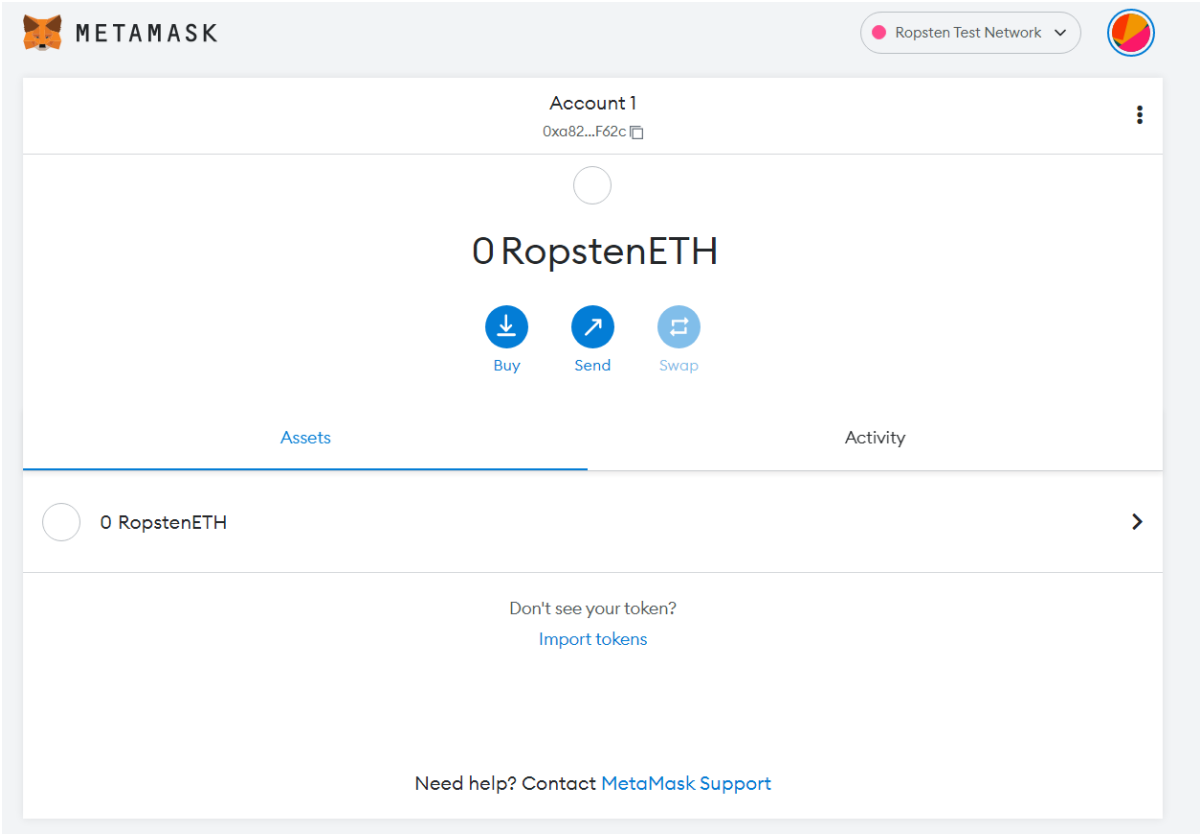


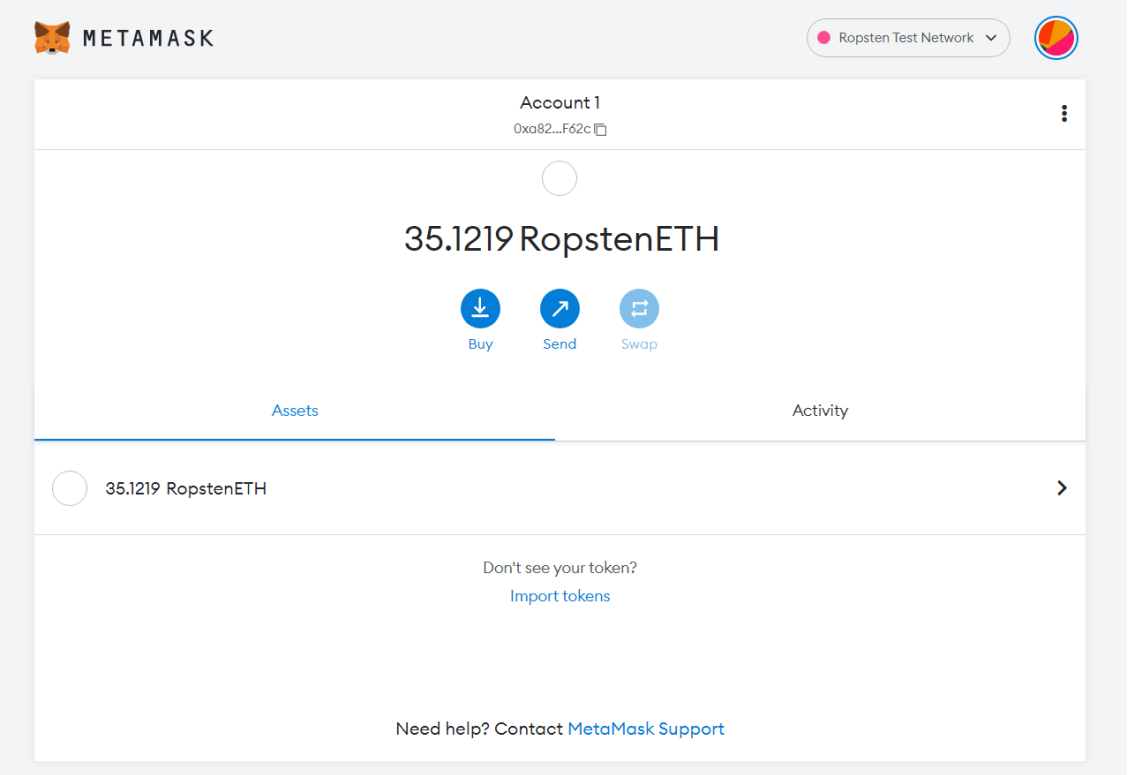
10) These are the options that are available with respect to any account created on metamask.



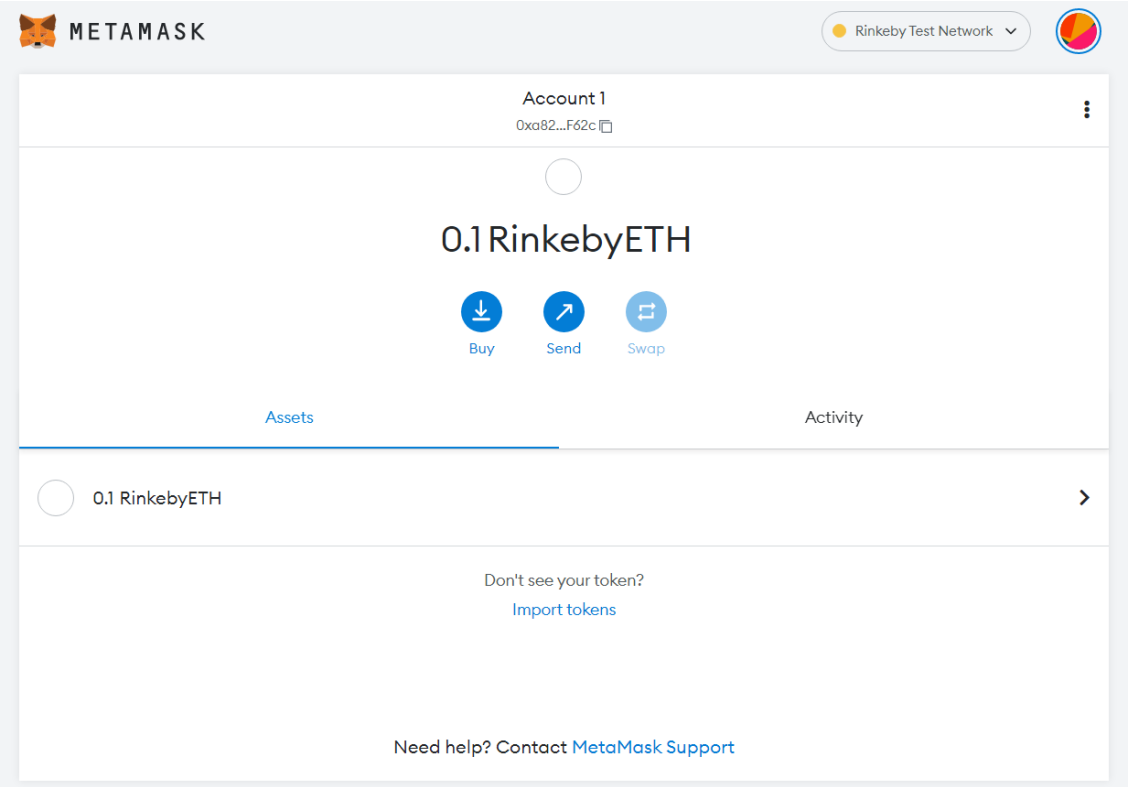
11) There are a number of faucets available which will provide with fake cryptocurrencies. Moonborrow is a faucet which will provide the ropsten ethers. For taking the fake ethers from moonborrow, enter address of the wallet in the input section and click on claim.

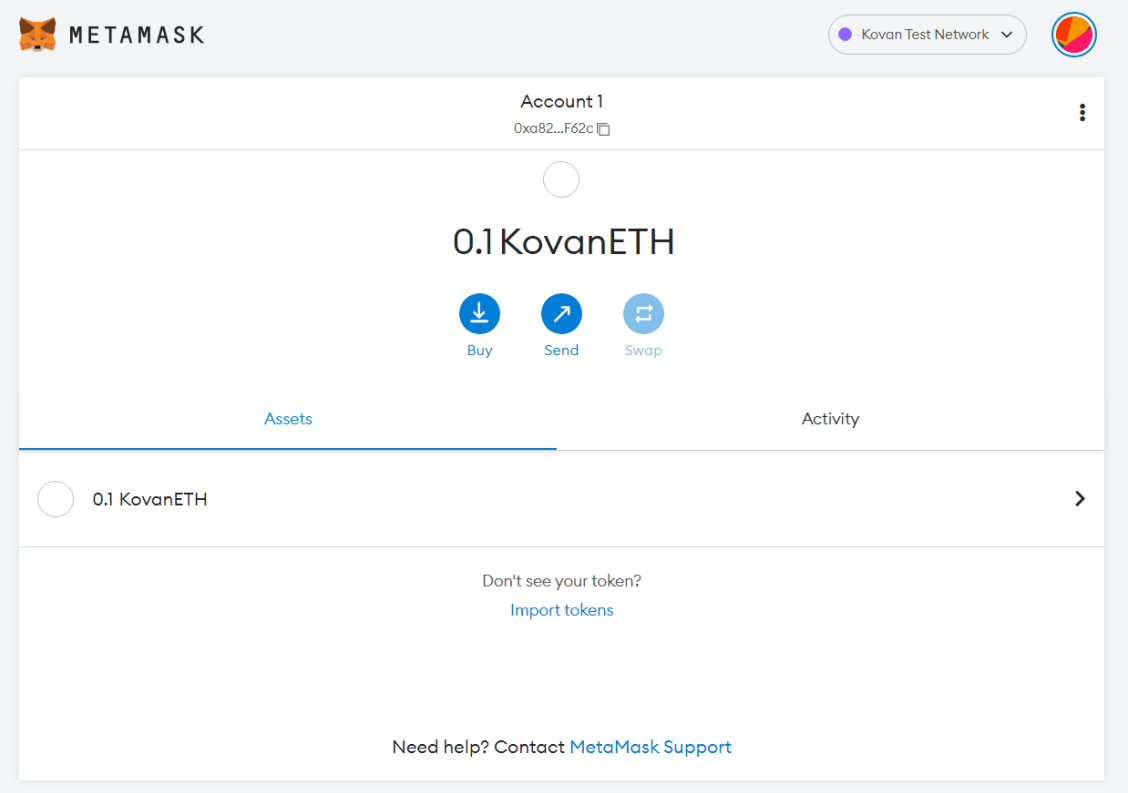






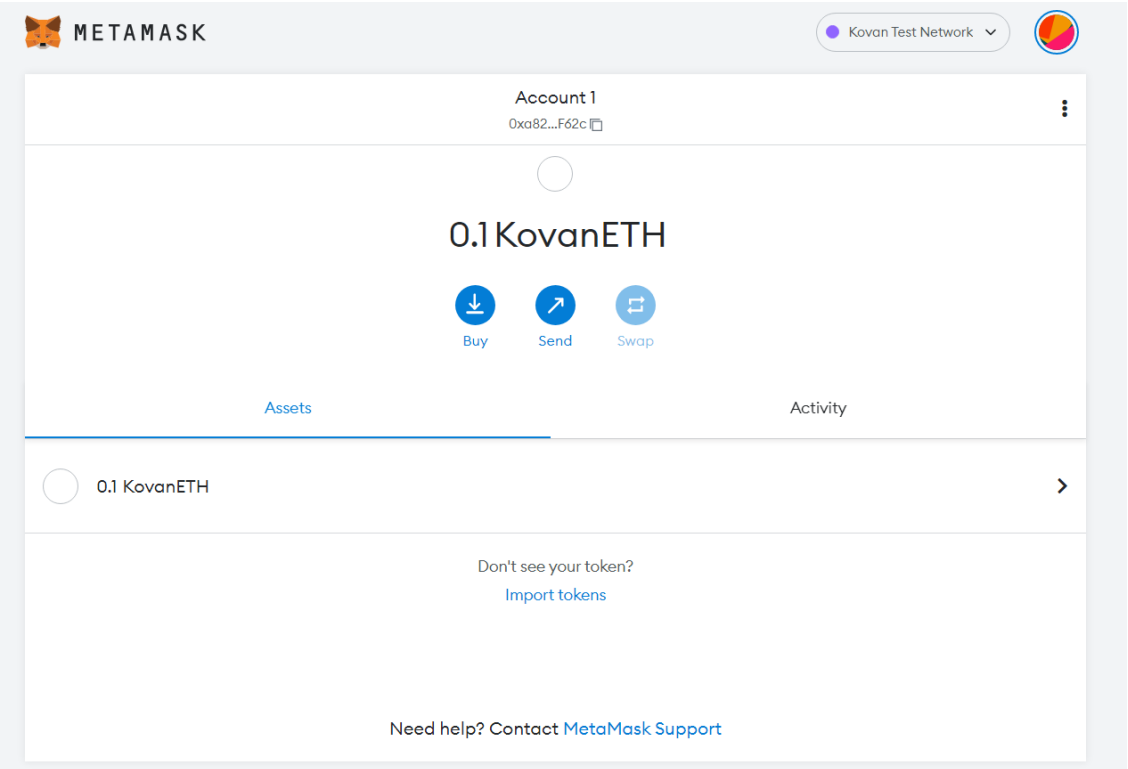
12) Like ropsten we can also get other fake cryptocurrencies.



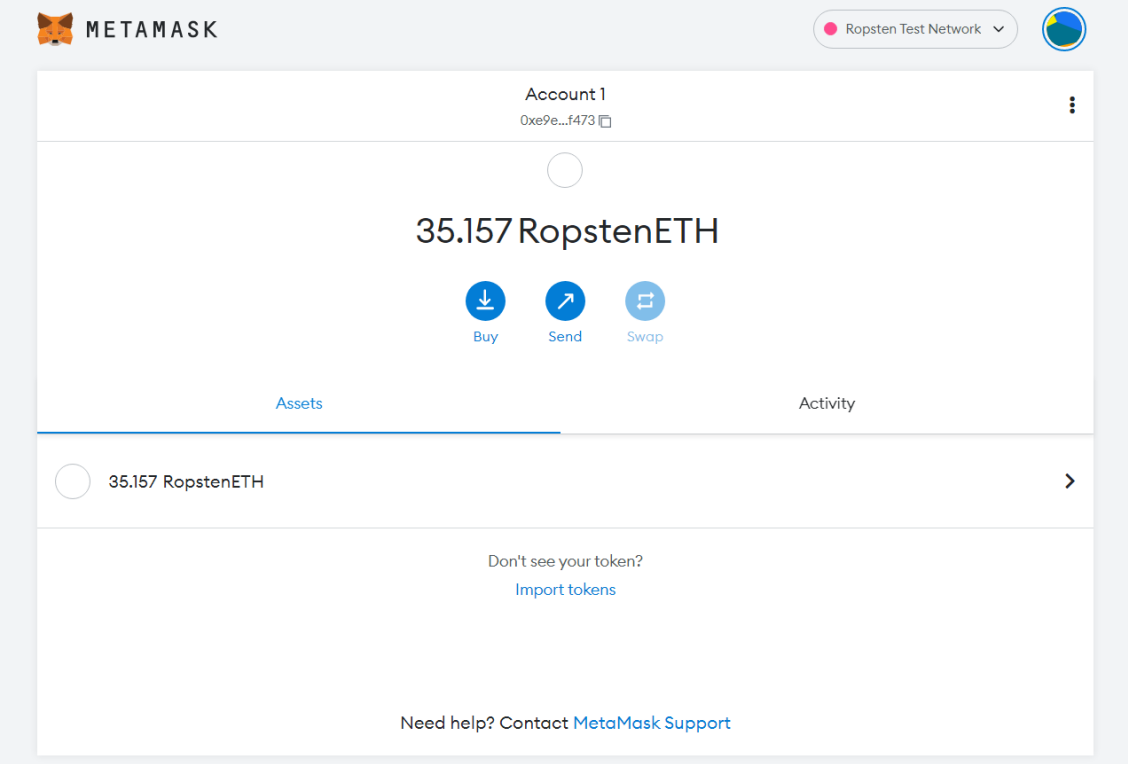


13) Tranferring of cryptocurrency is also possible with the help of metamask but for that we need another wallet addres.

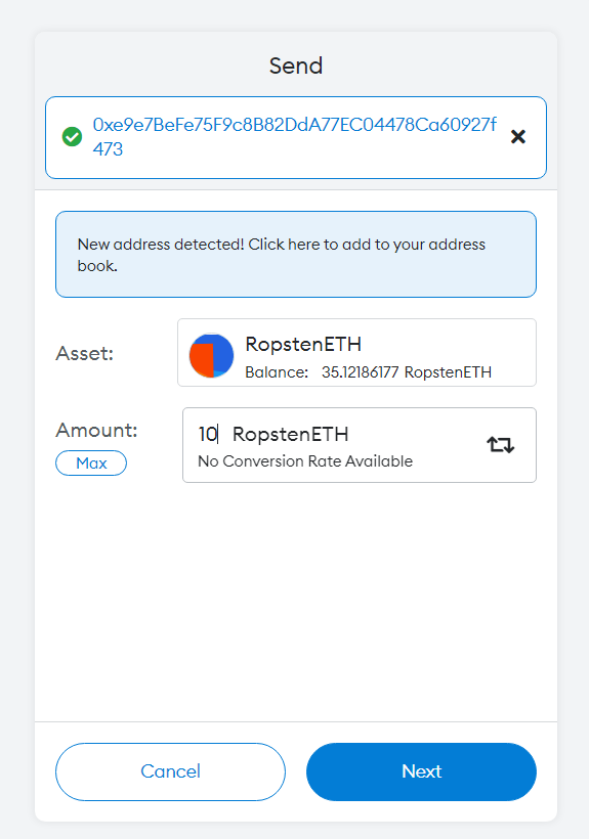
Account 1:



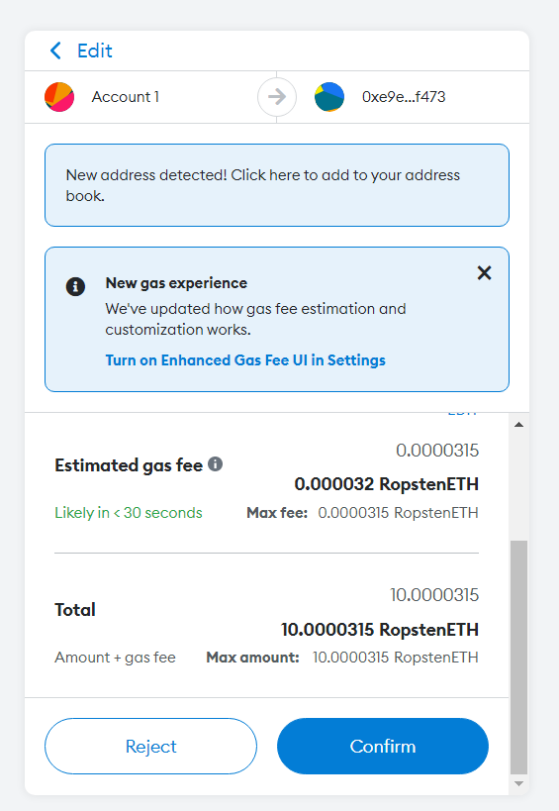
Account 2:



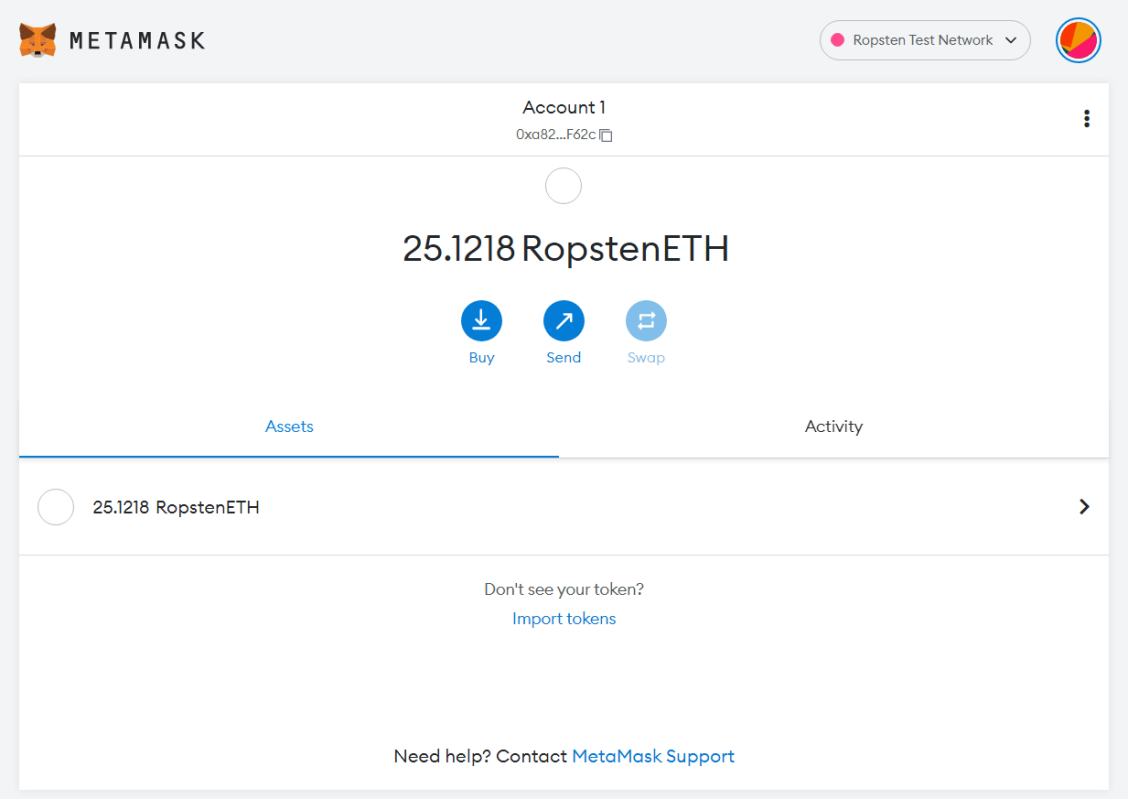
14) Now click on send in any of the available accounts. Enter the number of coins to be transferred from one account to another.

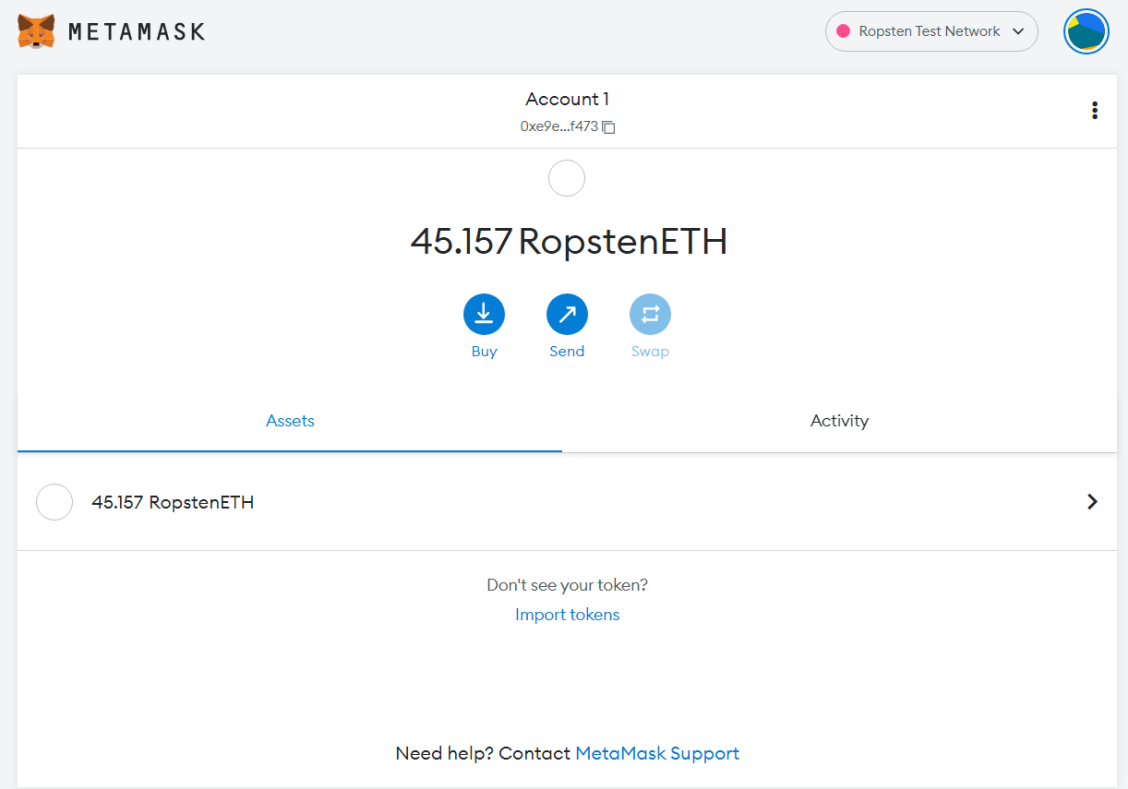


15) After pressing next in previous screen overview of the entire transaction will be available click on confirm to initiate the transaction.

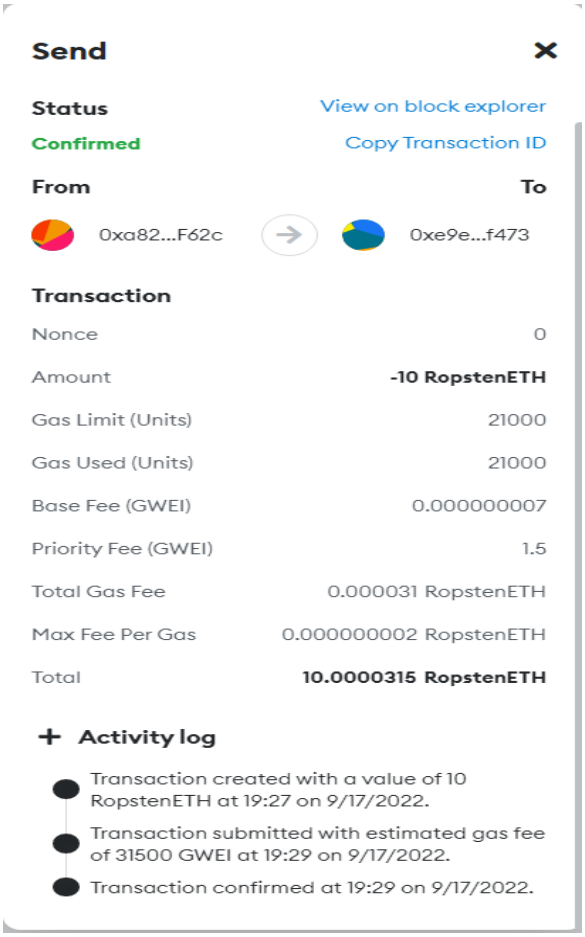


16) After the transaction is made, one account will be debited and another account will be credited.





17) In the activity section overview of the entire transaction will be available.



2. Explain your program logic, classes and methods used.

➔ The methods used internally in the blockchain are as follows:

1) Hashing: A hash is a mathematical function that converts an input of arbitrary length into an encrypted output of a fixed length. Thus regardless of the original amount of data or file size involved, its unique hash will always be the same size. Moreover, hashes cannot be used to "reverse-engineer" the input from the hashed output, since hash functions are "one-way" (like a meat grinder; you can't put the ground beef back into a steak). Still, if you use such a function on the same data, its hash will be identical, so you can validate that the data is the same (i.e., unaltered) if you already know its hash. Hashing is also essential to blockchain management in cryptocurrency.
2) Authenticating the transaction: This is the first step that takes place in the process. Authenticating a transaction is an important step that forms the building block. Although blockchain networks are free from government control, the transactions are still authenticated using cryptographic keys. Users are required to enter “passwords” for proceeding with the transactions. Cryptographic keys provide access to the account and wallet system. These keys work like unique passwords and serve the purpose of strengthening security.
3) Authorising the transaction: Post transaction agreement, the blocks are authorised prior to their addition in the blockchain network. Public blockchains follow the voting process. Before finally letting a block in, a message is sent to different blockchains in the public network. When the majority of nodes agree for the new transaction a new block is thus added. The main owners of the blockchain network verify the transactions via “proof of work”. Proof of work refers to the cash rewards that owners of the blockchain provide miners for solving the hash code.
4) Validation: A group of miners collectively share their rewards that they have obtained via solving the mathematical problems. As the network size increases it becomes even more difficult to add blocks. The equation keeps on expanding in size and further validation keeps getting complex too. Every new block is then validated multiple times before making them a part of the chain. The monopoly soon starts taking in and a lot of blocks are refrained from entering. Power of mining also becomes concentrated in the hands of a few.

3. Explain the Importance of the approach followed by you

➔ Blockchain technology is something that cannot be understood without actually watching a demo of its working, so online platforms providing these services are of great importance while working with blockchain. Some other advantages include:

- Online platforms for learning blockchain provide good UI/UX, which is very useful for any beginner to begin learning blockchain.

- Some platforms also provide some kind of demo in video format to make users comfortable with the use of the platform. All the platforms used to complete this experiment contain a demo in video format.
- To test any blockchain network, we need some fake entities to test the blockchain, and online platforms provide that also.
- Before learning blockchain, the concepts used under blockchain have to be learned first. All the prerequisite information can also be gathered from the platforms used above.
- To explore all the things possible with blockchain, we need to go through tonnes of websites, but platforms describing blockchain contain all the information related to blockchain.

Conclusion:- Understood the concept of blockchain and its working. The internal contents of the blocks of the blockchain are also explored using various block explorers. I also tried different test networks with the help of metamask and fake cryptocurrencies built on Ethereum. Explored virtual labs to get more insights into the components and workings of the blockchain.

Virtual labs:

Virtual lab 1 – Three Pillars of Blockchain: Link

Pre Test

What is a blockchain?

- a : A type of cryptocurrency
- b : A distributed ledger on a peer to peer network
- c : An exchange
- d : A centralized ledger

Who created Bitcoin?

- a : Samsung
- b : John Mcafee
- c : Satoshi Nakamoto
- d : None of the above

What is a miner?

- a : Computers that validate and process blockchain transactions
- b : A person doing calculations to verify a transaction
- c : A type of blockchain
- d : An algorithm that predicts the next part of the chain

What is a genesis block?

- a : A famous block that hardcoded a hash of the Book of Genesis onto the blockchain
- b : The 2nd transaction of a blockchain
- c : The first block of a Blockchain
- d : None of the above

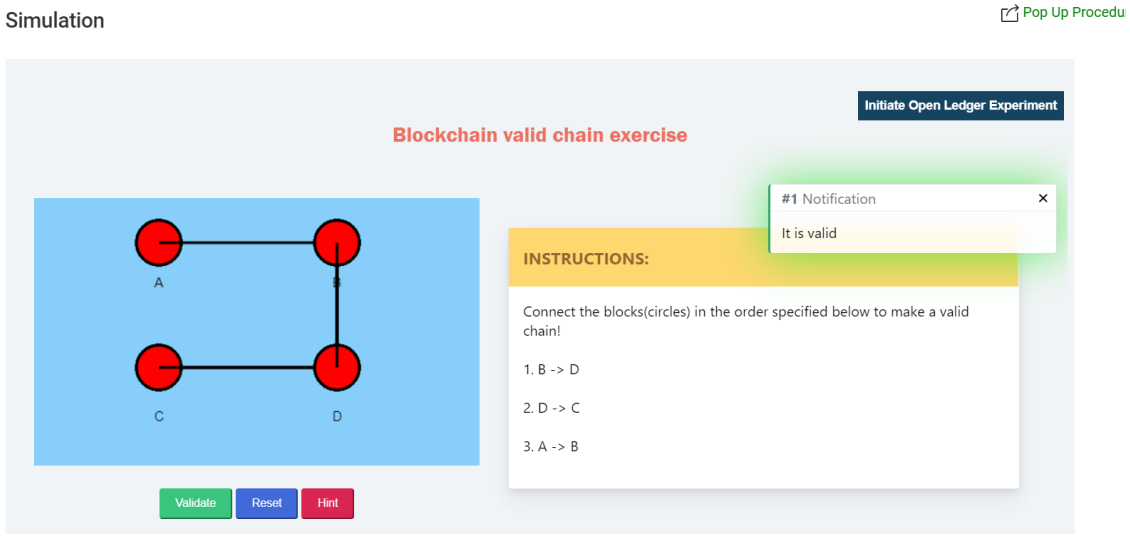
According to the blockchain mechanism, which statement is true?

- a : All the people receive transactions simultaneously
- b : Only the person receives the transaction
- c : Both are correct
- d : None of these

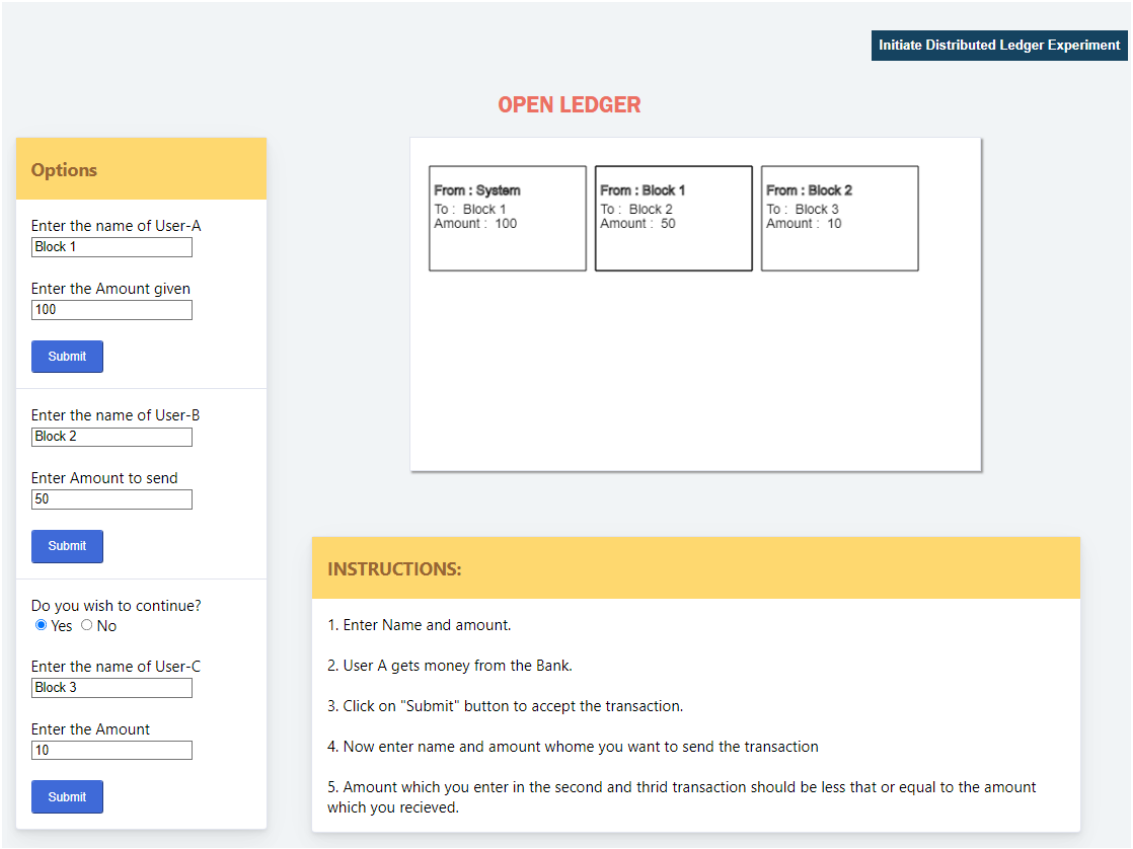
Submit Quiz

5 out of 5

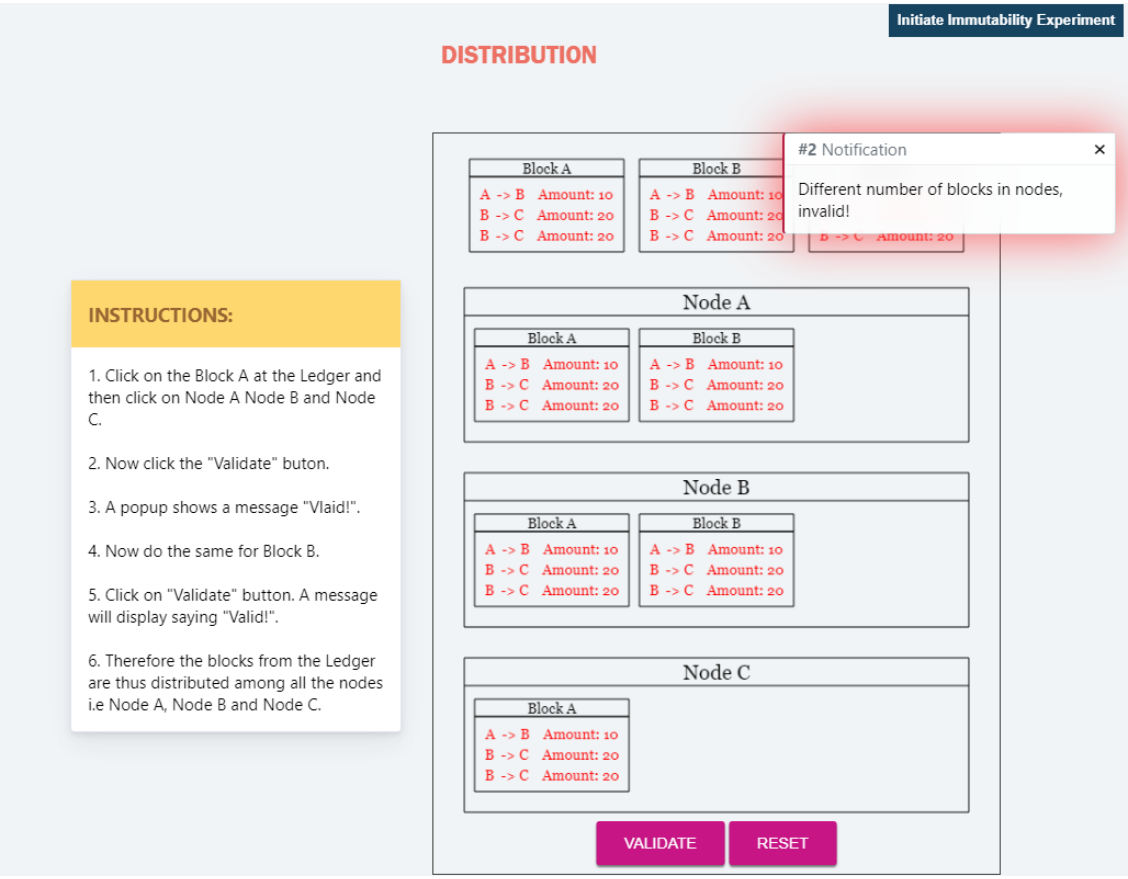
1) Blockchain valid chain:

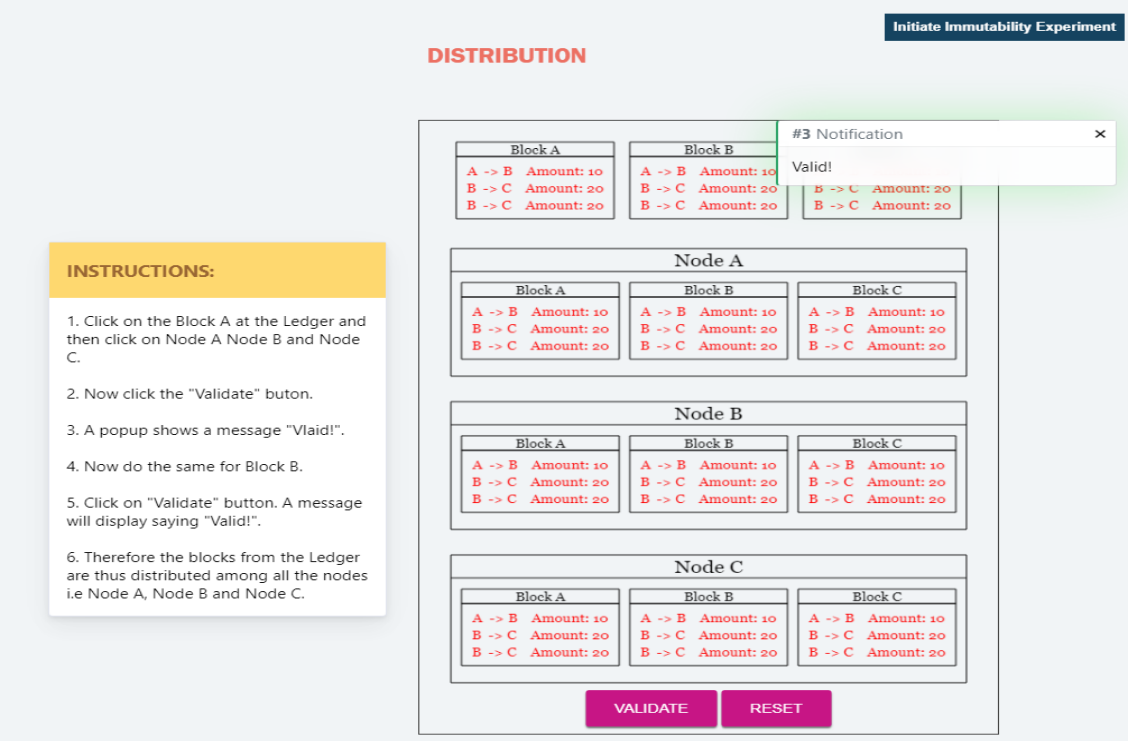


2) Open ledger:

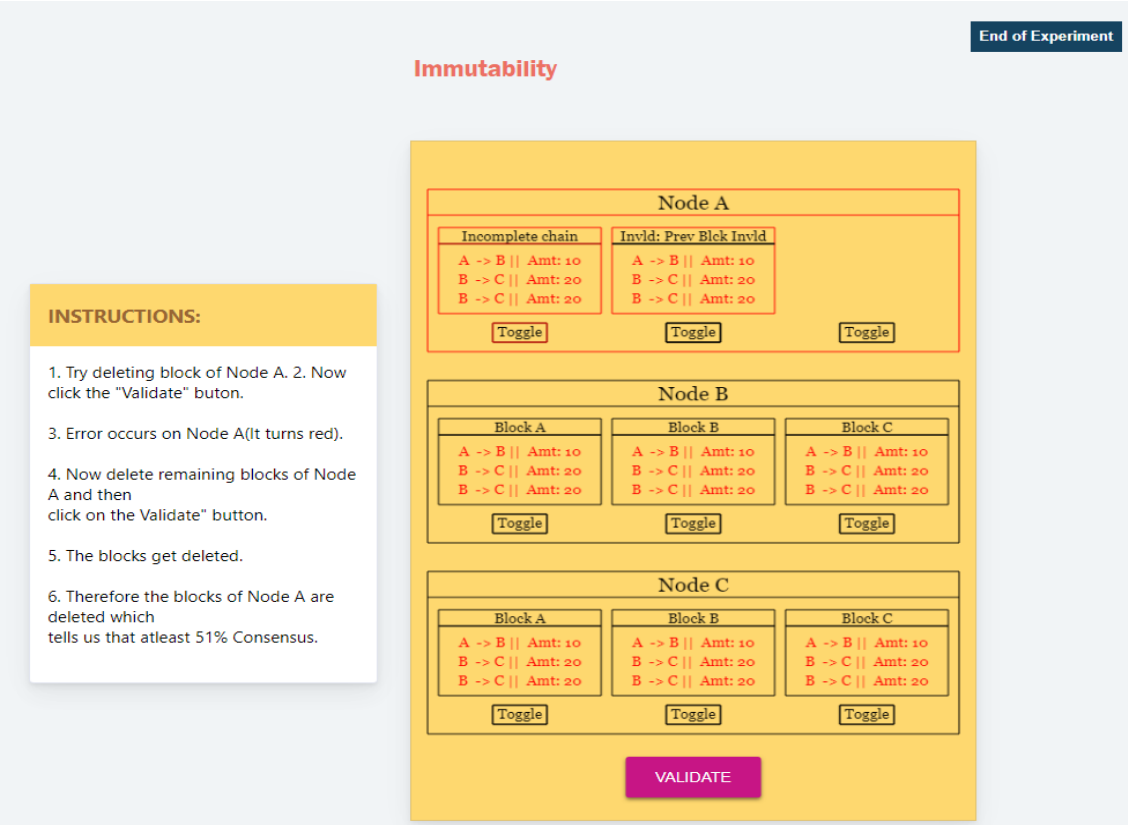


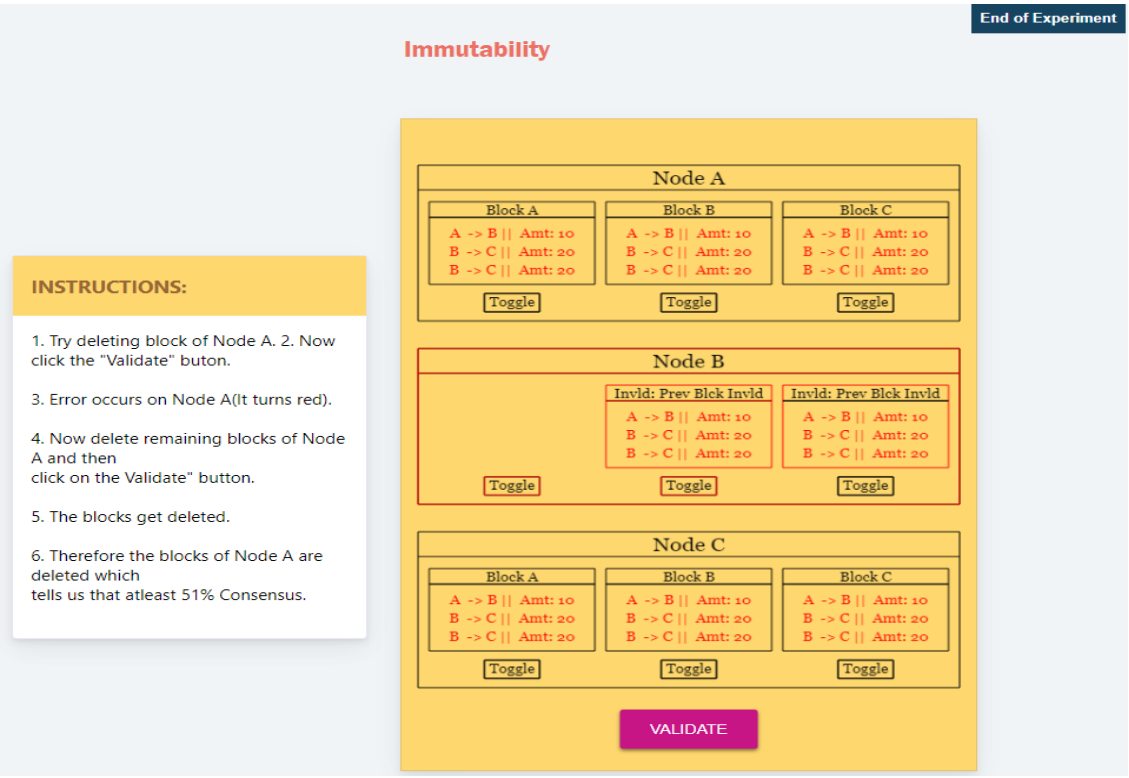
3) Distributed ledger:

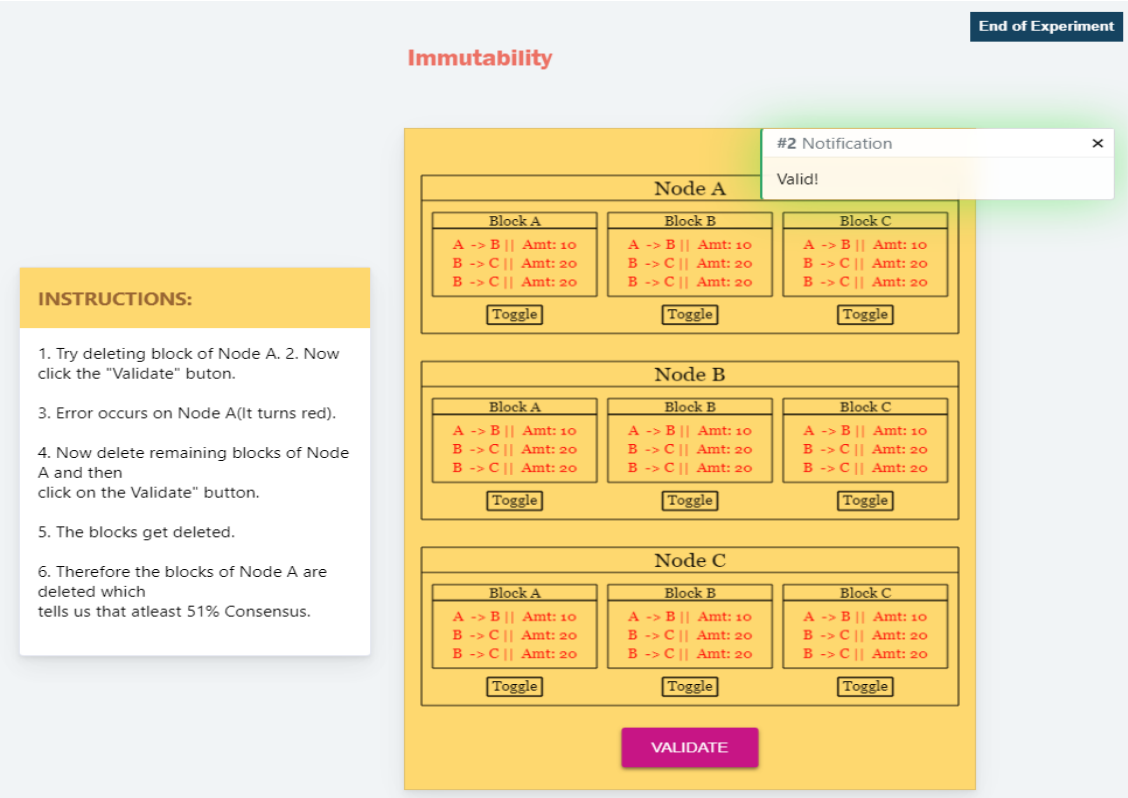




4) Immutability:







Post Test

Which of these statements are true for open ledger?
- a : Every one has copy of ledger.
- b : Ledger can be viewed by anyone.
- c : Ledger is mutable.
- d : None Of these

Which of the following is true for distributed ledger?
- a : Everyone has a copy of ledger
- b : There is one copy of the ledger
- c : Ledger is mutable.
- d : None of these

A miner has completed the mining what will be the next step?
- a : Wait for second miner to complete
- b : Wait for all members to complete
- c : Validate the transaction and add it to the ledger
- d : None of the above

What is not a ledger type in blockchain?
- a : Distributed Ledger
- b : Open Ledger
- c : Both a and b
- d : None of these

How can a user successfully modify a blockchain?
- a : It is immutable
- b : By simply deleting the block
- c : By use of consensus algorithm
- d : None of the above

Submit Quiz

5 out of 5

Virtual lab 2 – Mining in Blockchain: Link

Mining in Blockchain

Aim

In this experiment, the user will learn about mining in blockchain i.e. how a transaction is validated and added into a blockchain. He/she will learn how the process of hashing helps in validation of a block.He/she will also get to know which miner is rewarded when a block is validated and added to the blockchain.

Pre Test

Which key is used for Asymmetric Cryptography?
- a : Public Key
- b : Private Key
- c : Both public and private keys
- d : None of the above

The full form of SHA is?
- a : Social Hash Algorithm
- b : Secure Hash Algorithm
- c : System Hash Algorithm
- d : None of the above

Which of the following is a full form of P2P?
- a : Peer to Peer
- b : Public key to Public key
- c : Private key to Public key
- d : None of the above

Where can you reserve your cryptocurrrency?
- a : Rerserve Bank of India
- b : Wallet
- c : Compact Disk (CD)
- d : Both (a) and (b)

Identify the correct statement?
- a : Blockchain is centralized
- b : Blockchain is mutable
- c : Both a and b
- d : None of these

What is a miner?
- a : A type of blockchain
- b : An algorithm that predicts the next part of the chain
- c : A person doing calculations to verify a transaction
- d : Computers that validate and process blockchain transactions

What is the process of creating new bitcoins popularly known as?
- a : Finding
- b : Panning
- c : Sourcing
- d : Mining

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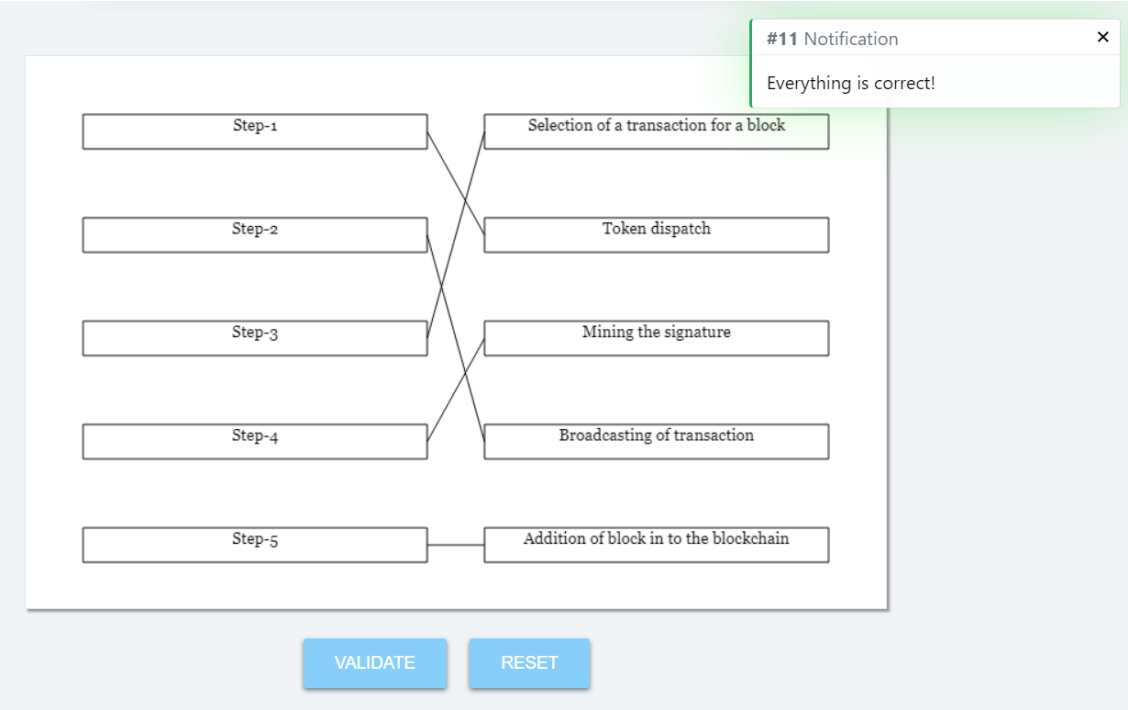
7 out of 7



Instructions:

1. Enter the name of User-A(Sender) and User-B(Reciever) to send transaction.

2. Now click on the button "ADD TO BLOCK".

3. The details you entered will appear on the block.

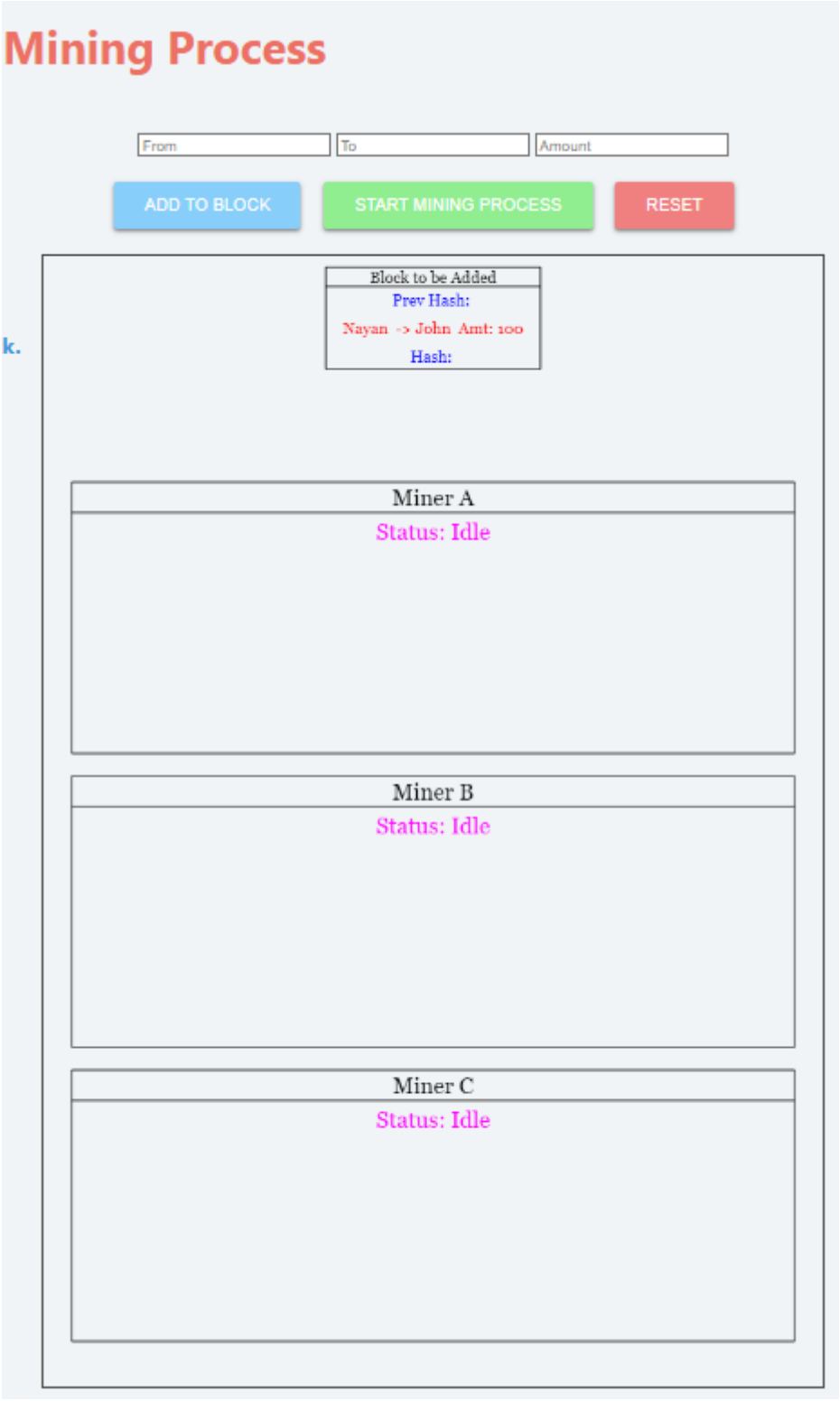
4. Now click on the button "START MINING PROCESS".

5.Mining process will start. Miner A,Miner B and Miner C will start calculating the proper Hash .

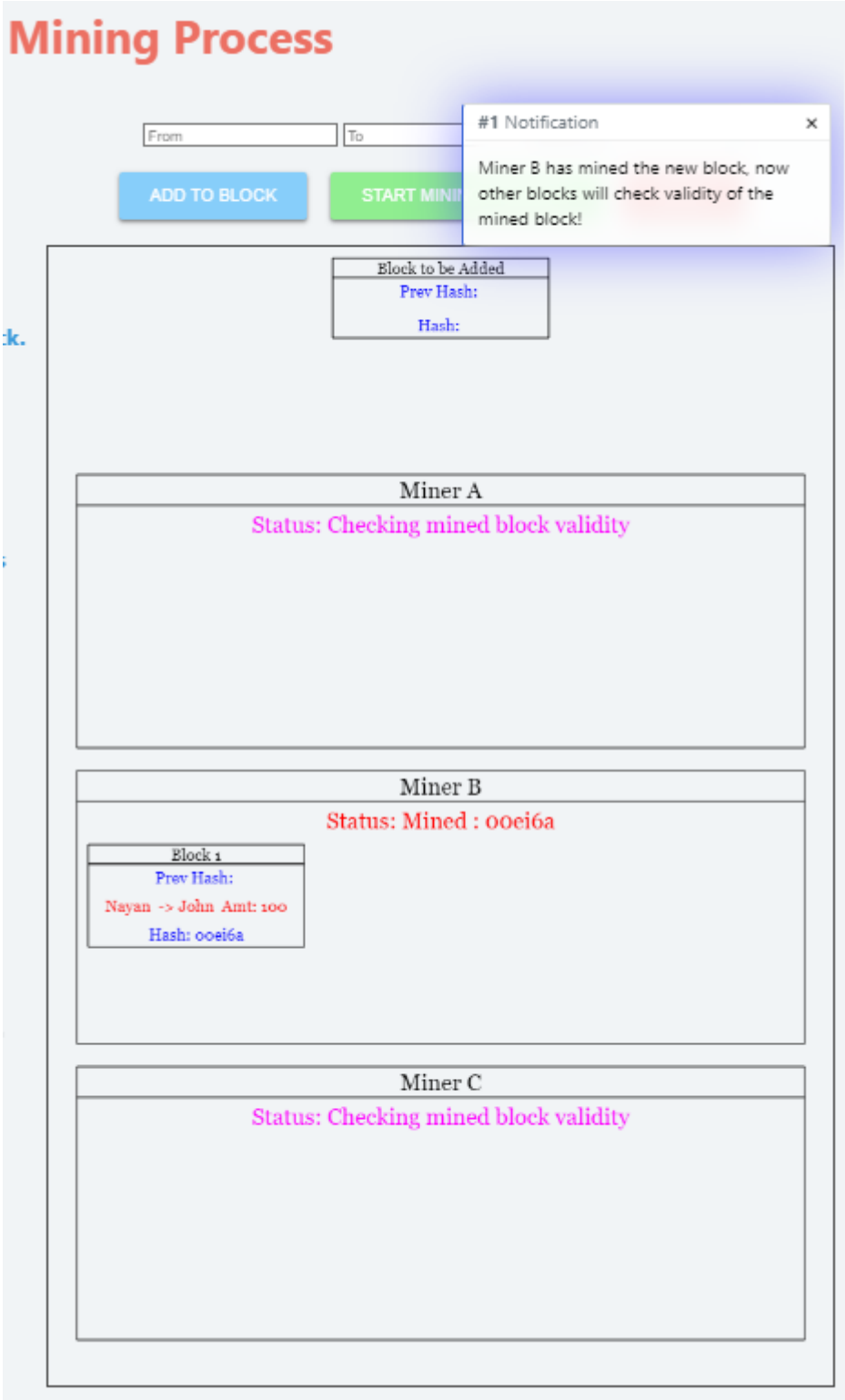
6.One of the miner completes the mining process and other miners confirm the hash calculated.

7. Click on "RESET" button to do the experiment again.

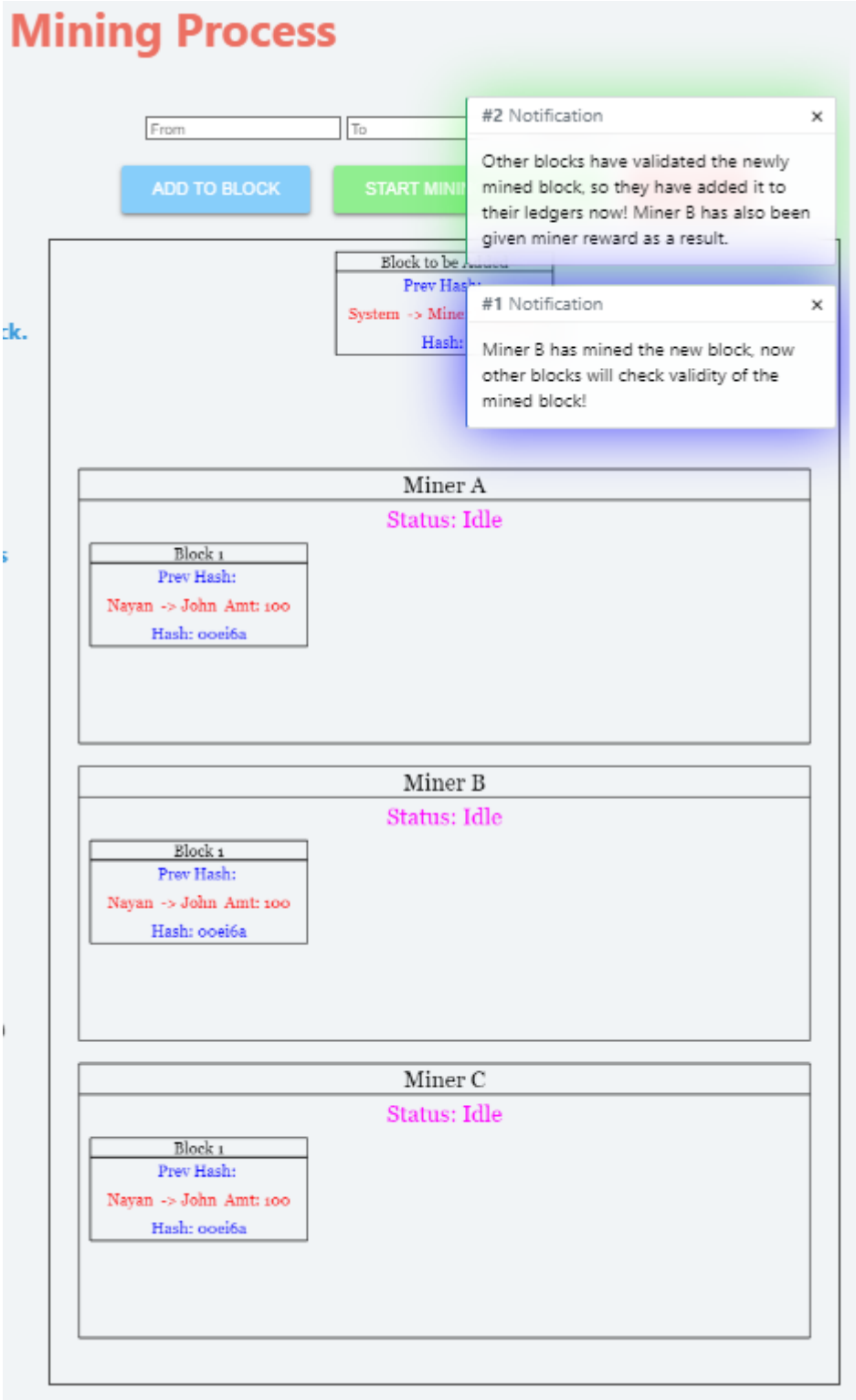
Before mining:



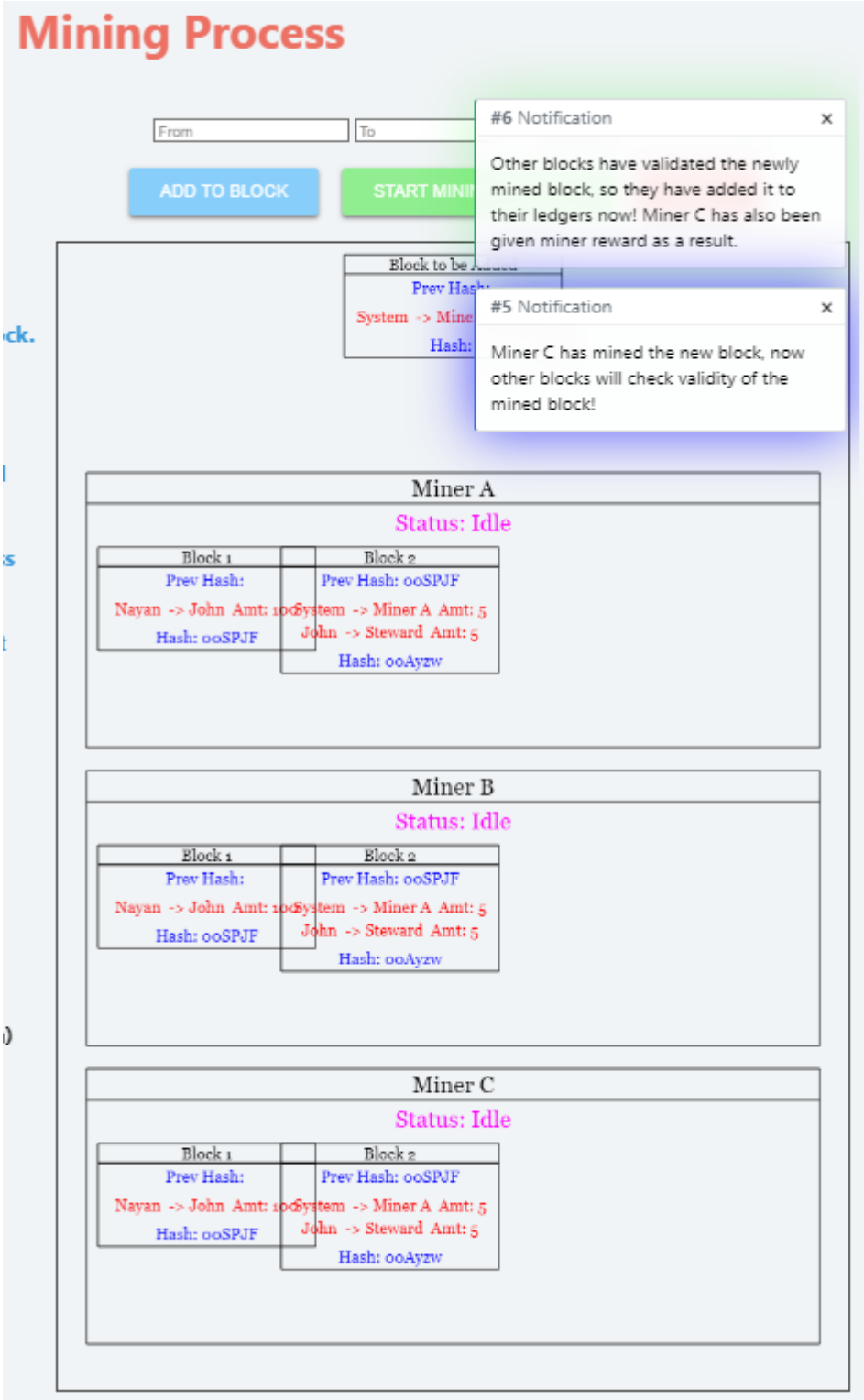
After mining (hash calculated by one of the miners):

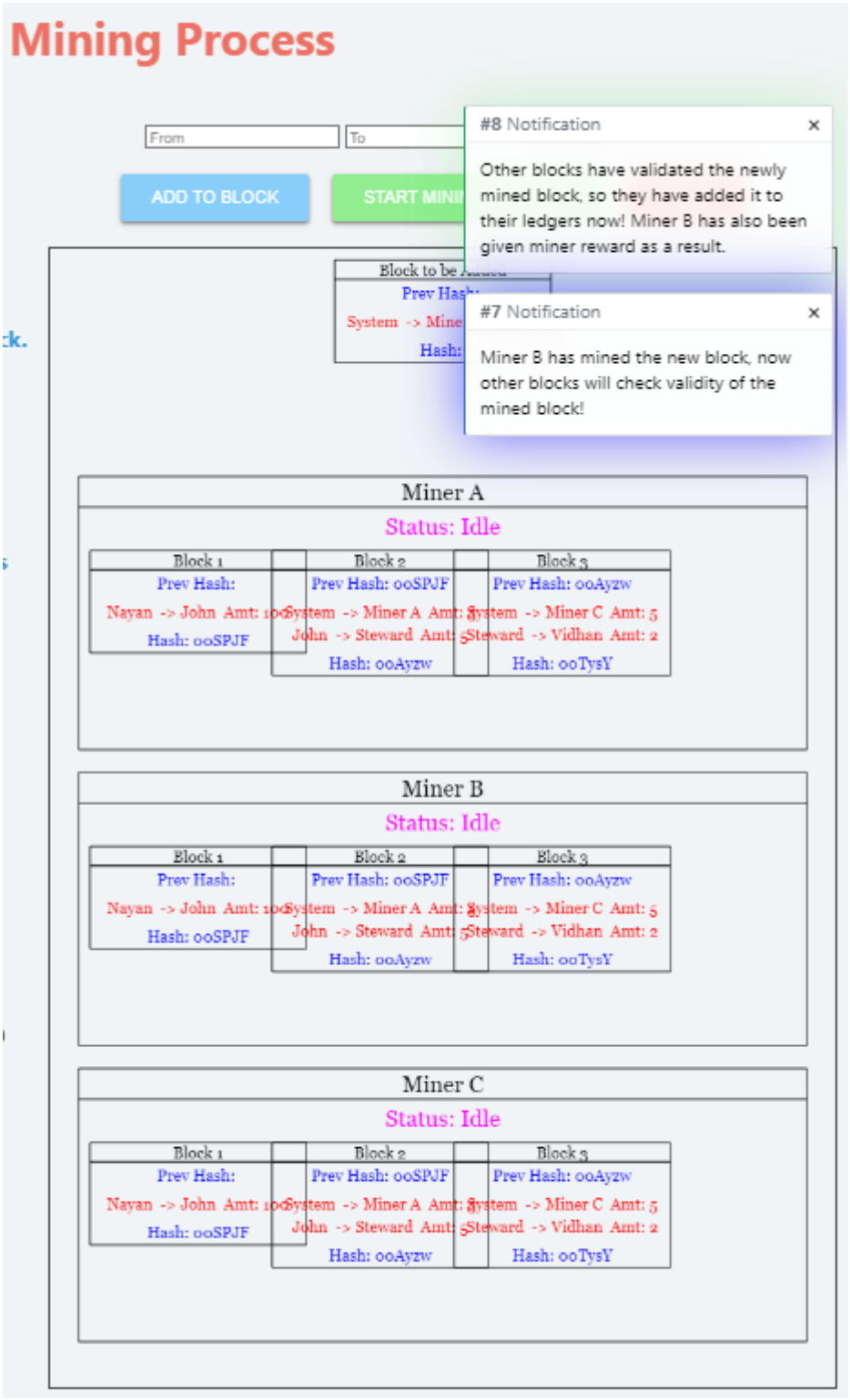


After mining (block published to all):



Another transaction:




Mining Process
From
To
ADD TO BLOCK
START MINI
#8 Notification
Other blocks have validated the newly mined block, so they have added it to their ledgers now! Miner B has also been given miner reward as a result.
#7 Notification
Miner B has mined the new block, now other blocks will check validity of the mined block!
Block to be
Prev Hash:
System -> Mine
Hash:
Miner A
Status: Idle
Block 1
Prev Hash:
Nayan -> John Amt: 10
Hash: ooSPJF
Block 2
Prev Hash: ooSPJF
System -> Miner A Amt: 8
John -> Steward Amt: 5
Hash: ooAyzw
Block 3
Prev Hash: ooAyzw
System -> Miner C Amt: 5
Steward -> Vidhan Amt: 2
Hash: ooTysY
Miner B
Status: Idle
Block 1
Prev Hash:
Nayan -> John Amt: 10
Hash: ooSPJF
Block 2
Prev Hash: ooSPJF
System -> Miner A Amt: 8
John -> Steward Amt: 5
Hash: ooAyzw
Block 3
Prev Hash: ooAyzw
System -> Miner C Amt: 5
Steward -> Vidhan Amt: 2
Hash: ooTysY
Miner C
Status: Idle
Block 1
Prev Hash:
Nayan -> John Amt: 10
Hash: ooSPJF
Block 2
Prev Hash: ooSPJF
System -> Miner A Amt: 8
John -> Steward Amt: 5
Hash: ooAyzw
Block 3
Prev Hash: ooAyzw
System -> Miner C Amt: 5
Steward -> Vidhan Amt: 2
Hash: ooTysY

Post Test

Which statement is correct?

- a : Mining is a process of adding transactions in a ledger
- b : SHA-256 is the only cryptographic algorithm used in blockchain
- c : Both a and b
- d : None Of the above

Which is not an advantage of blockchain technology?

- a : Anonymity & Privacy
- b : Mutability
- c : Low transaction cost
- d : Digital freedom and decntralization

Initial miner has completed the mining process, what will be the next step?

- a : Wait for the next miner to complete
- b : Terminate the process
- c : Validate the transaction and add it to the ledger
- d : None of the above

Which of the following listed is not involved in mining?

- a : Hash Value
- b : Hash function
- c : Sender and Reciever
- d : None of the above

Which statement is not correct?

- a : Mining is not done in blockchain
- b : Ledger is related to the process of mining
- c : Both a and b
- d : None of the above

The block in the blockchain consist of?

- a : A hash pointer to the previous block
- b : Timestamp
- c : List of transactions
- d : All of the above

The main advantage of immutability is_____.

- a : Scalability
- b : Improved Security
- c : Tamper Proof
- d : Increased Efficiency

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7 out of 7

Virtual lab 3 – Proof of Work (PoW) & Proof of Stake (PoS): Link

Proof of Work (PoW) & Proof of Stake (PoS)

Aim

In this experiment, the user will learn about Proof of Stake and Proof of Work. The simulator will demonstrate the working of both these algorithms by one short example of each concept. Apart from that, he/she will also be able to recall concepts with the help of a Fill in the Blanks exercise.

Pre Test

Which statement is not correct?
- a : Mining is related to PoW
- b : Mining is related to PoS
- c : PoS is an alternative to PoW
- d : None of the above

Which statement are correct?
- a : Ledger is a component of Mining
- b : Ledger is not a concept of Mining
- c : Hashing is related to ledger
- d : PoW is Proof of work

How mining is done?
- a : Through Hashing
- b : Through Adding to blocks, Hashing
- c : Through Adding of blocks, Hash of current block, Hash of Previous block
- d : None of the above

Full form of PoS is?
- a : Privacy of Stake
- b : Proof of Stack
- c : Proof of Stake
- d : None of the above

Pillars of blockchain are?
- a : Centralization, Mutability, Transparency
- b : Decentralization, Immutability, Transparency
- c : Confidentiality, Integrity, availability
- d : None of these

What is a hash?
- a : A type of blockchain
- b : An algorithm that predicts the next part of the chain
- c : Function that convert input string into encrypted output
- d : None of the above

What is the process of creating new bitcoins popularly known as?
- a : Finding
- b : Panning
- c : Mining
- d : None of the above

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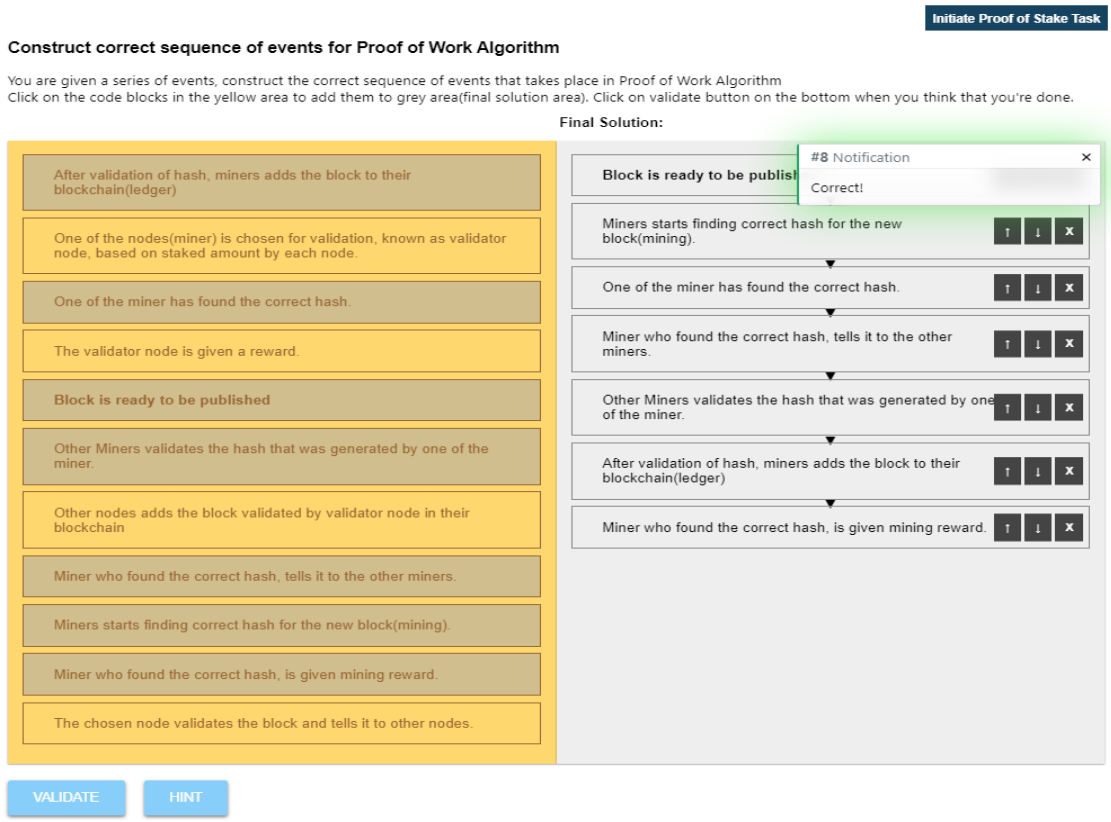
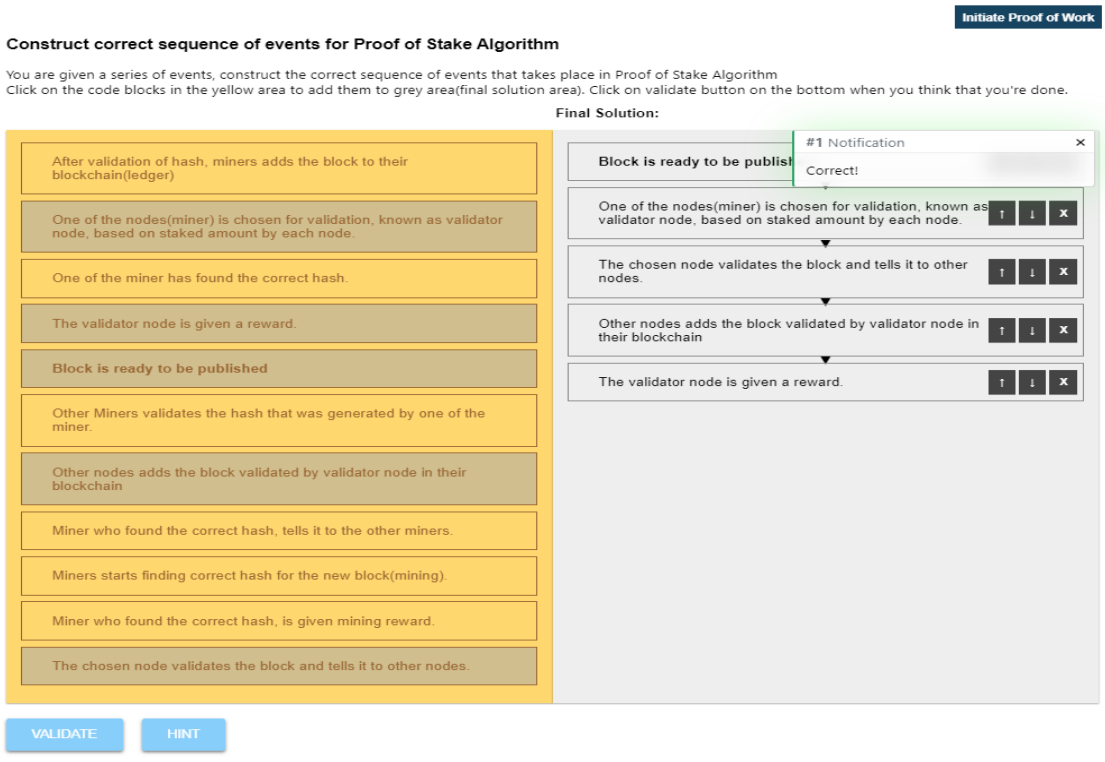
Proof of work puzzle:

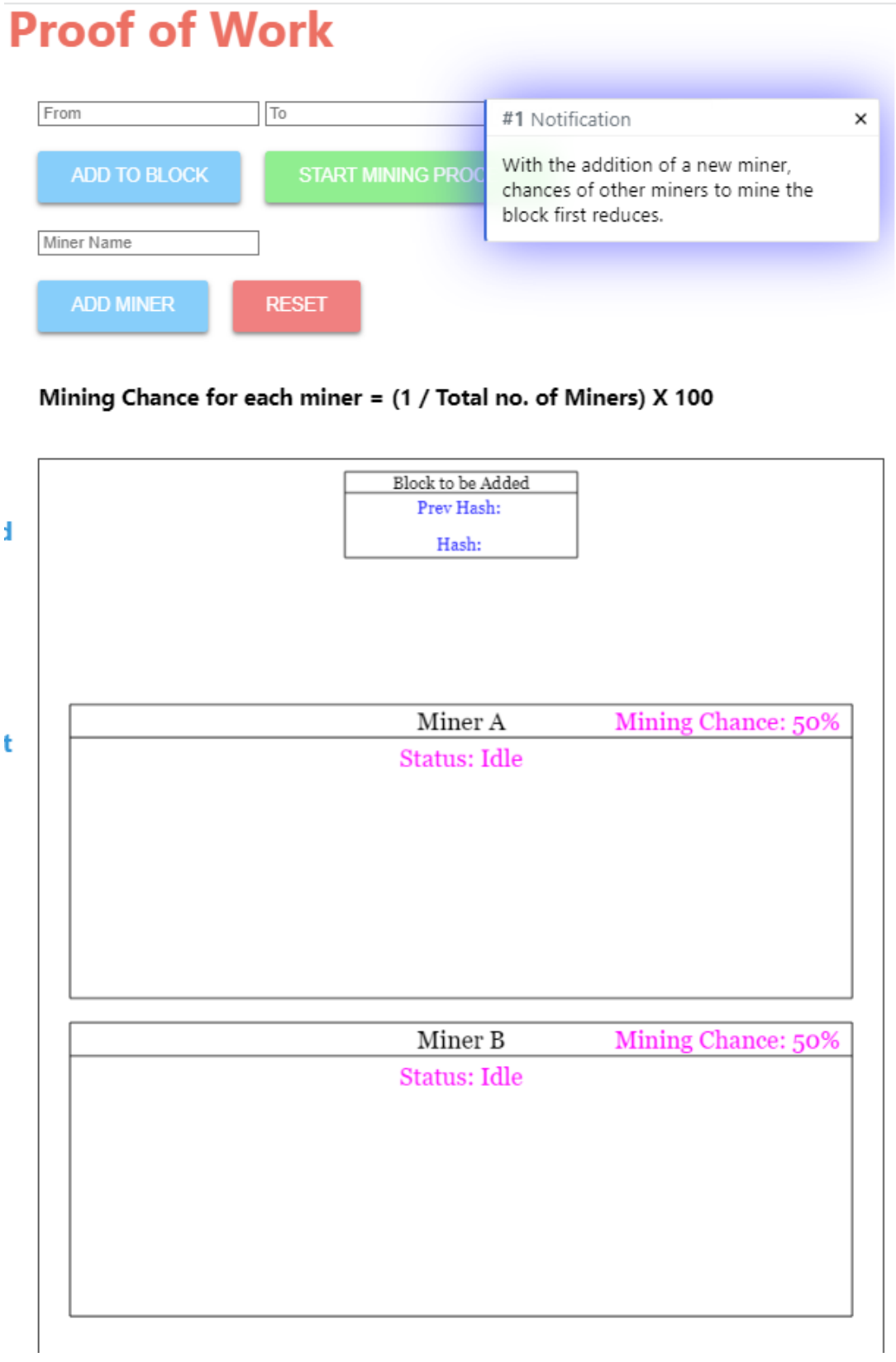


Proof of stake puzzle:

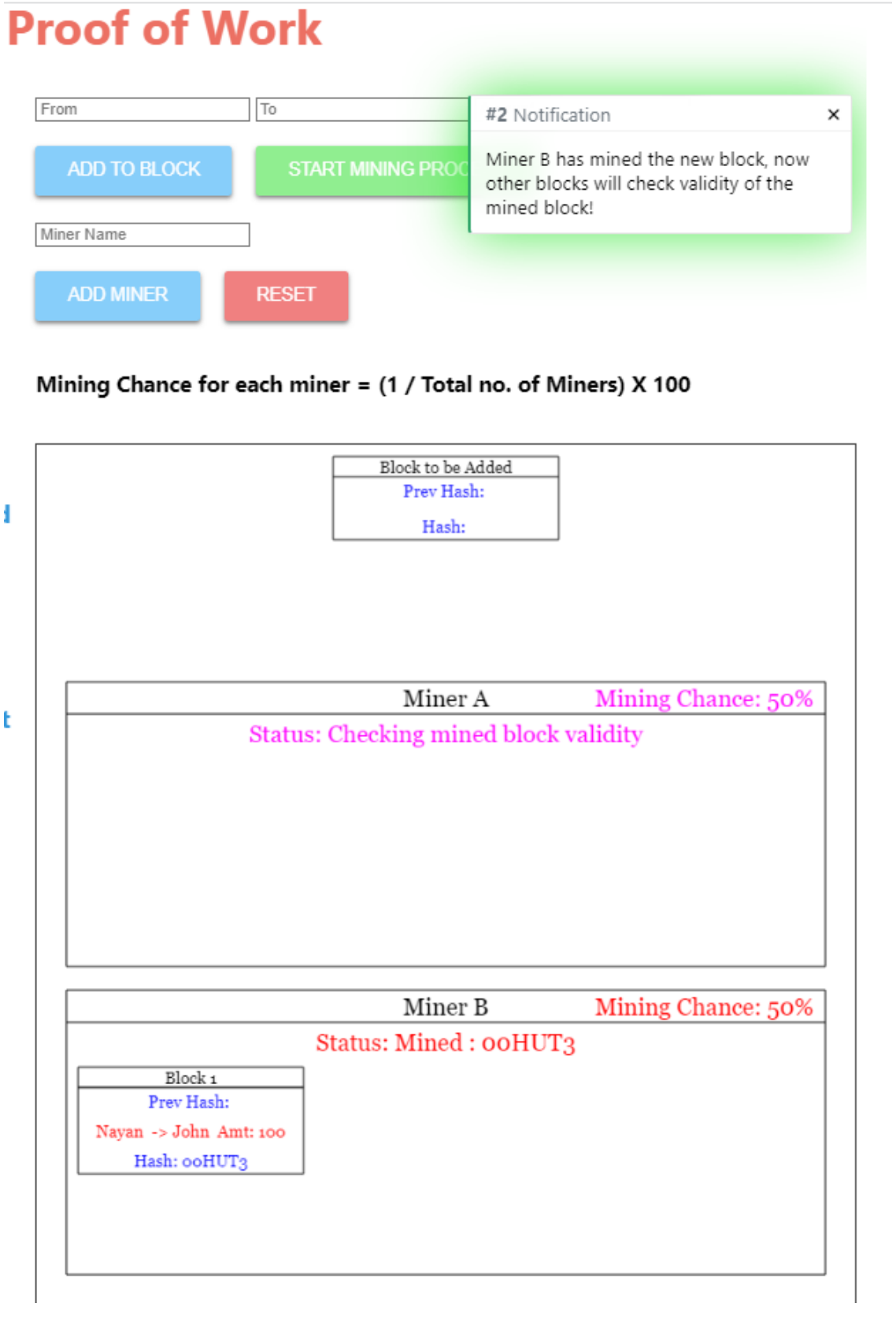


Proof of work activity:

1) Miner B added:

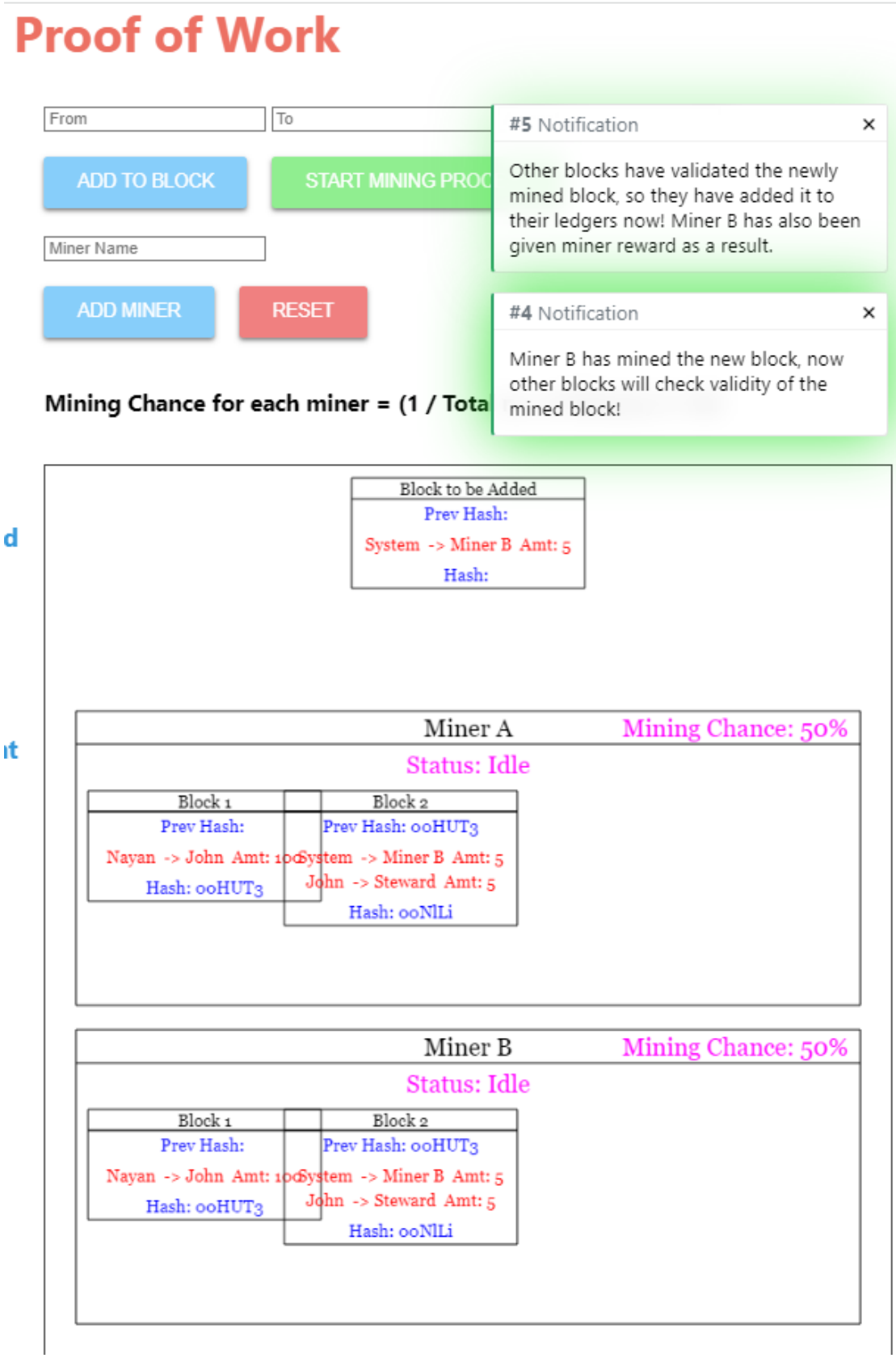


2) New block to be added will be staged and one of the miners will calculate the hash.



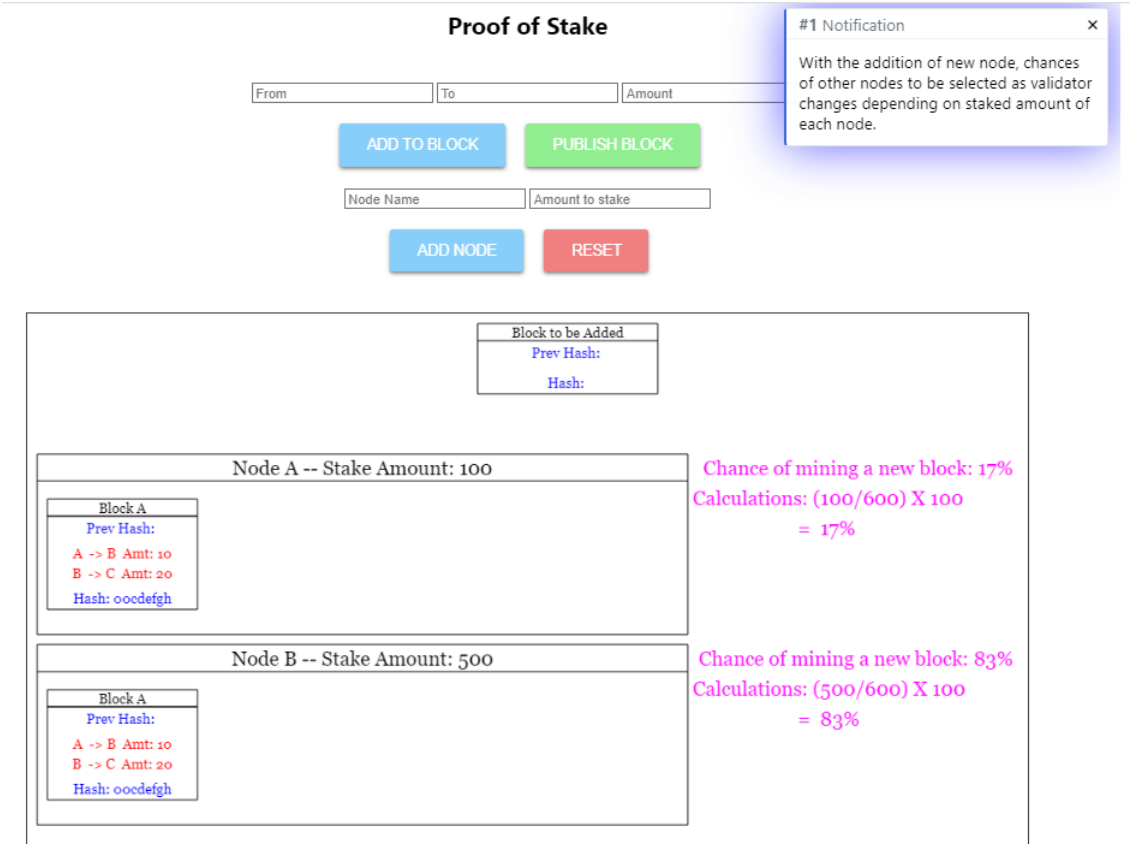
3) Block announced to all the miners.

4) Another block added.

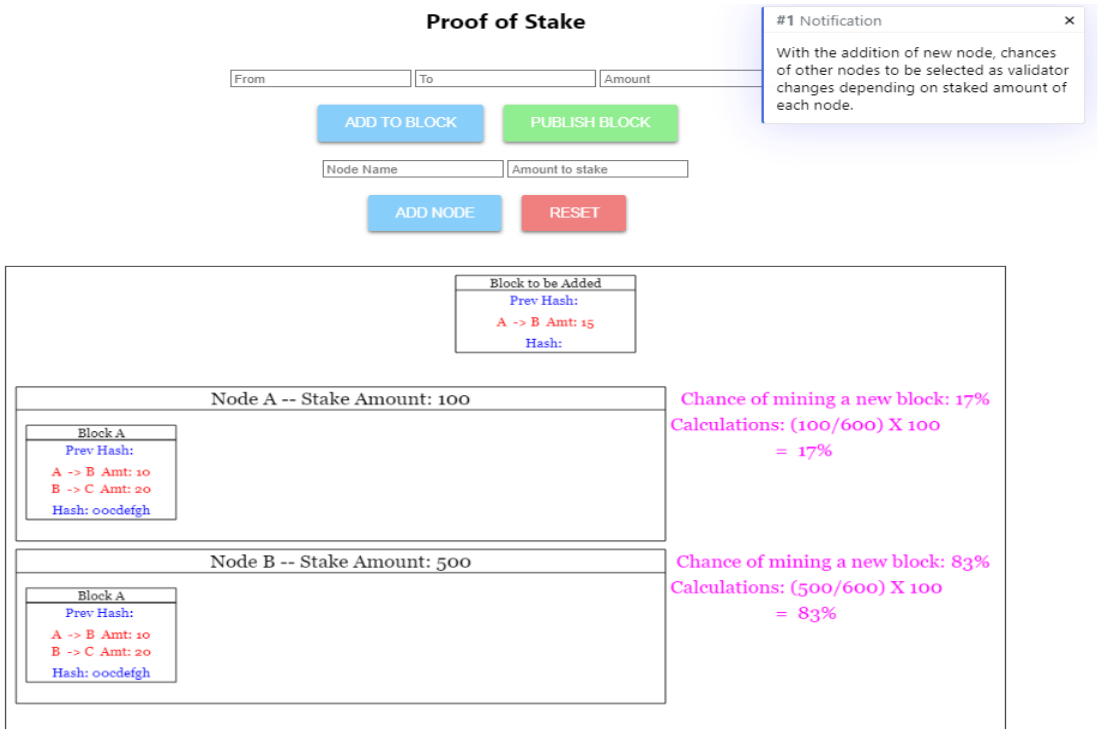


Proof of stake activity:

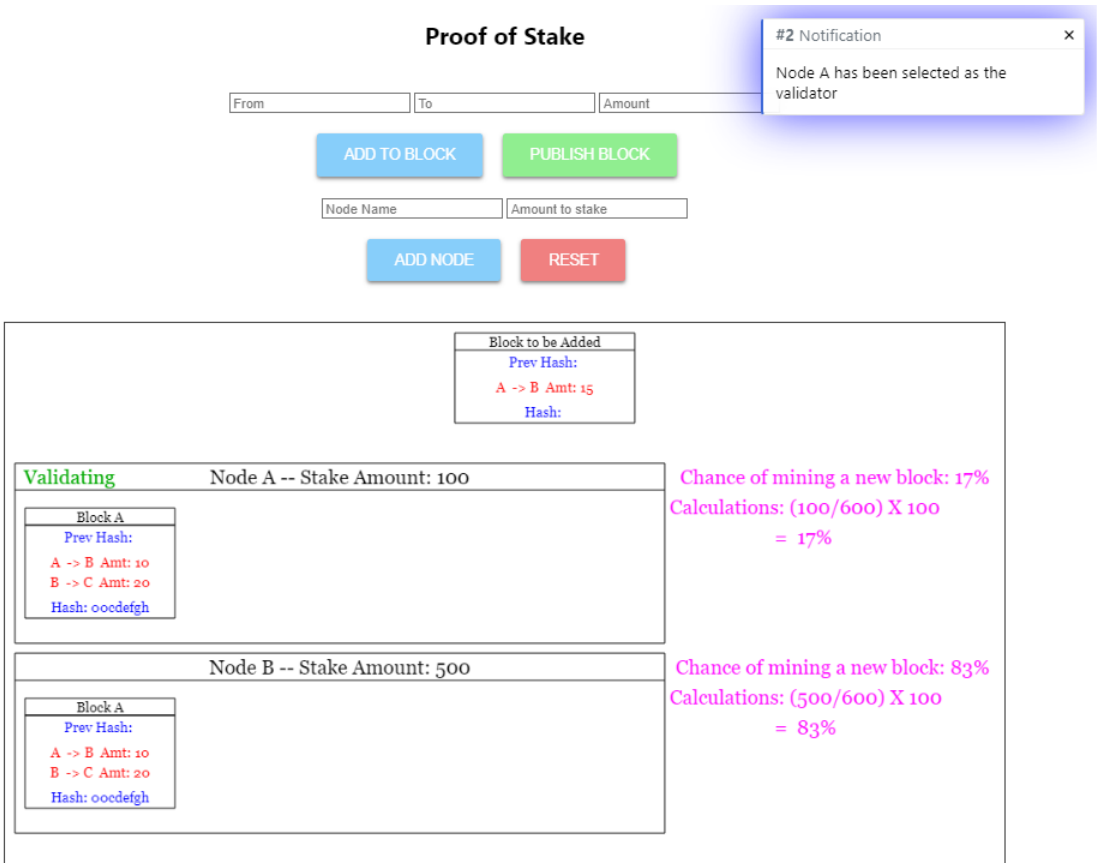
1) Node B added to the chain:



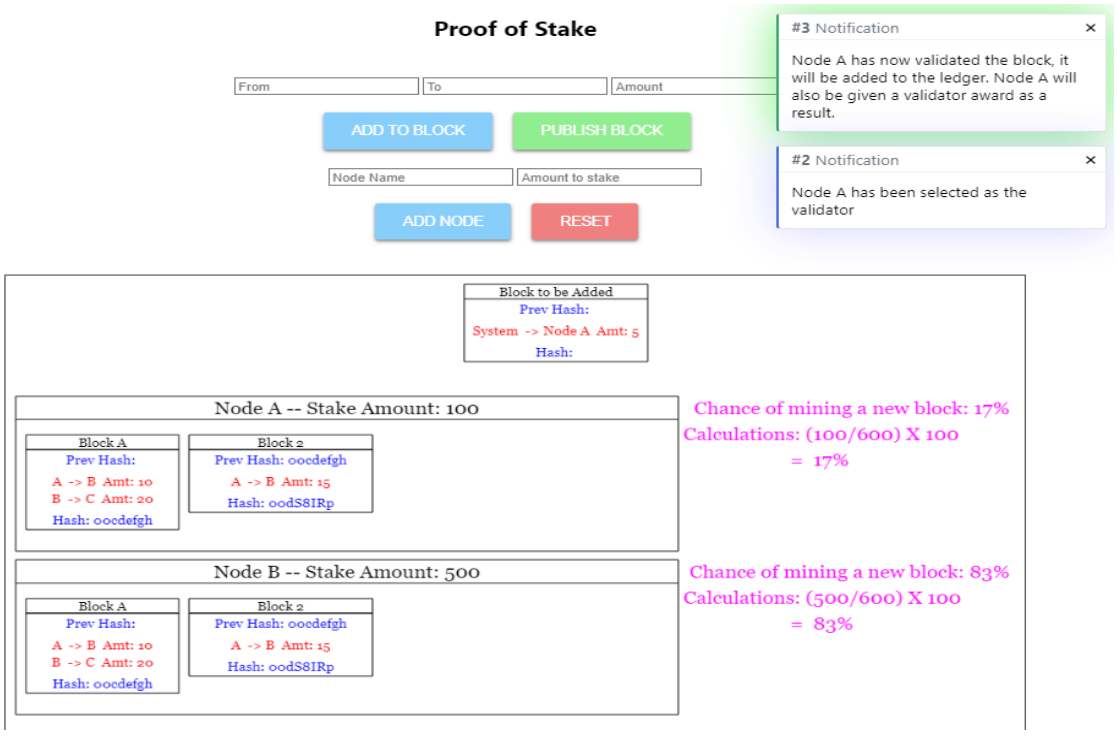
2) New block added (transaction from A to B, amount = 15):



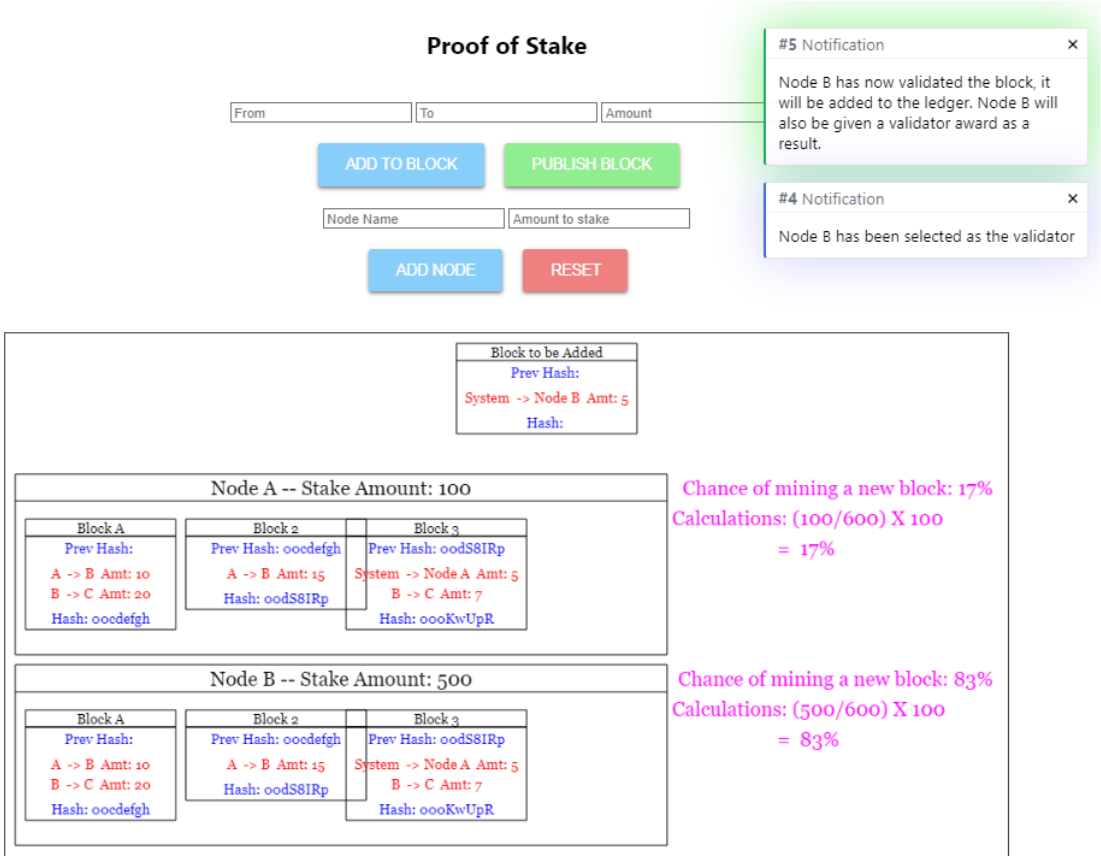
3) Node A selected as validator node.



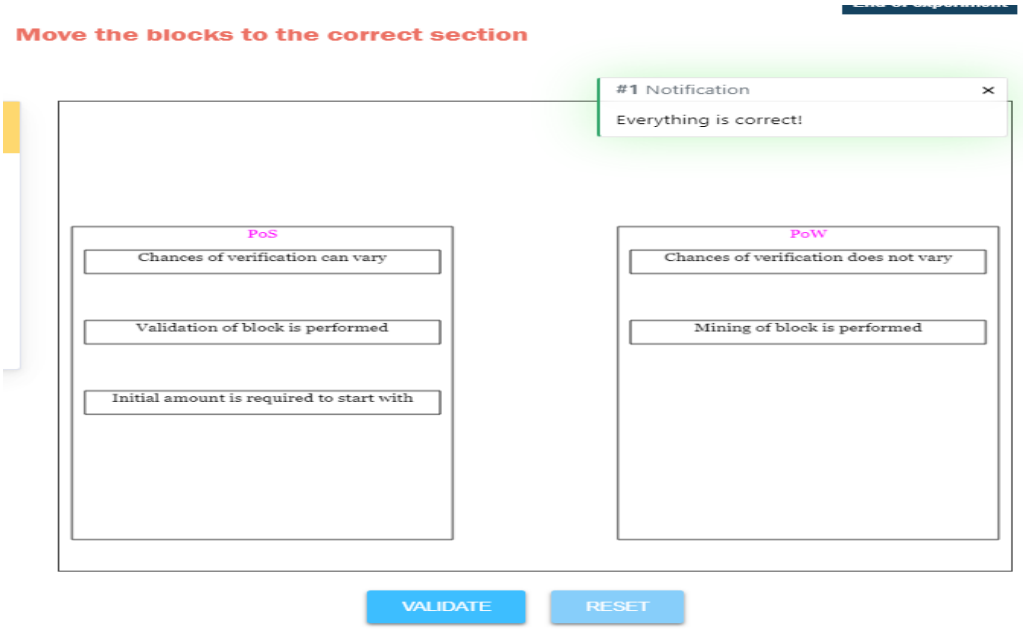
4) Block published to another node.



5) Another block added to the chain.



Difference between proof of work and proof of stake activity:



Post Test

What is Proof of Stake?

- a : A timestamp
- (●) b : A Consensus protocol
- c : A Cryptographic dimension
- d : None Of the above

What is Proof Of work?

- a : A timestamp
- (●) b : A Consensus protocol
- c : A Cryptographic dimension
- d : None of these

What role does consensus algorithm play in mining?

- a : Validation
- b : Adding of blocks
- (●) c : Both a and b
- d : None of the above

Is there, a better algorithm for PoW than SHA-256?

- (●) a : Yes
- b : No
- c : Can't say

Pos is an alternative measure of?

- (●) a : PoW
- b : PoA
- c : PoB
- d : PoC

Which statement is correct?

- a : Mining is a mutable option in blockchain
- (●) b : SHA-256 is the only cryptographic algorithm used in blockchain
- c : Both A and B
- d : None of the above

Which is not an advantage of blockchain technology?

- (●) a : Anonymity & Privacy
- b : Mutability
- c : Both A and B
- d : None of the above

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7 out of 7