

Q1: Understand the working of blockchain technology.

Visit the following Link: <https://anders.com/blockchain/hash.html> to explore the complexities of blockchain.

Perform the following operations:

(A) Hash: Observe the change in hash value by varying input the data field.

Input: Hello world

SHA256 Hash

Data:	Hello World
Hash:	a591a6d40bf420404a011733cfb7b190d62c65bf0bcda32b57b277d9ad9f146e

Input: Hello world!

SHA256 Hash

Data:	Hello World!
Hash:	7f83b1657ff1fc53b92dc18148a1d65dfc2d4b1fa3d677284add200126d9069

(B) Block:

1. Observe the hash value of the block. Suggest what does the unusual hash value signifies?

ANS: Hash value is randomly changes even one char or space gets change in Data.

2. Input any arbitrary data in the data field and observe the hash value of the block.

ANS: It looks unique and randomly changes. It used the SHA256 rule.

SHA256 Hash

Data:	Hello Michael <u>Jacson</u> !!!! See your tomorow! Thanks bye
Hash:	5ea1e4c1a0fc948df35b60bd8c465f58705d1cb9ada316d9434013e83d0d55d4

3. Mine the block and note the hash value.

Block

Block:

1

Nonce:

3352

Data:

Hello Tumbarika, What's app?

Hash:

000026edbfcc2a2344ecb4c24bb0c3eabadc5334a73eaa7154f0a2727a8eb189c

Mine

(C) Blockchain:

1. Study the blockchain
2. Try to input any information in the data field. Observe the change in hash
3. Now, try changing the information any block 2,3 or 4 and observe how the hash value changes in the subsequent blocks.

While entering input in block 1, Hash gets change but Prev Hash value has all 0 that means it just started. Block 2 has Prev Hash value of Block 1. Same as, Block 3 has Prev Hash value of Block 2 and Block 4 has Prev Hash value of Block 3. This shows they all linked by Hash values.

Blockchain

Block: # 1

Nonce: 11316

Data: Ram begin Transferring 1BTC to James

Prev: 00

Hash: 9f40da6ec40118c83a3309ae46a626faf64324a9e95baa3

Mine

Block: # 2

Nonce: 35230

Data: James transfers to Kevin 0.5 BTC

Prev: 9f40da6ec40118c83a3309ae46a626faf64324a9e95baa3

Hash: 7f3f8fe9cdf225dace67625d8e856ea0695ba1da3d3b1b7

Mine

Blockchain

Block: # 3

Nonce: 12937

Data: Kevin got 0.5 BTC from James

Prev: 7f3f8fe9cdf225dace67625d8e856ea0695ba1da3d3b1b7

Hash: a982c9d427f22e2c4460b30859c6ab4c064b50d15f50e45

Mine

Block: # 4

Nonce: 35990

Data: Kevin bought .1 BTC worth of ETH

Prev: a982c9d427f22e2c4460b30859c6ab4c064b50d15f50e45

Hash: 95af07920ad3f31de175843ac3ae21dd519d34c1de6566c

Mine

(D) Distributed Blockchain:

1. Study the distributed blockchain

2. Input any data in the data field of any block in peer A. Observe the change in hash value. Now mine the blocks and verify if the hash value of the blocks is same in every peer

Before Mining: It generates the Hash and change into Prev Hash to link each blocks

Distributed Blockchain

Peer A

Block: # 1

Nonce: 112757

Data: distributed 0 change

Prev: 00

Hash: d8015498955cf51d06e60da2ef08669103a65dc5578875

Mine

Block: # 2

Nonce: 24025

Data: distributed 0 ---- distributed 1 Change

Prev: d8015498955cf51d06e60da2ef08669103a65dc5578875

Hash: cc8728efefc40a467231cb9454d7c8d719c1ad73eb9a35

Mine

Block: # 3

Nonce: 119561

Data: distributed 1 ---- distributed 2

Prev: cc8728efefc40a467231cb9454d7c8d719c1ad73eb9a35

Hash: 5d1e18dc683dbca52e44eb8154f10

Mine

4. What does the change in hash value (after mining the blocks) signify?
After mining it change the Hash and subsequently changes into the Prev Hash.

Distributed Blockchain

Peer A

[illegible]

(E) Tokens:

1. Study the Tokens
2. Observe what happens if you try to change any value of the tokens in any of the blocks

ANS: The Hash value gets change once any value of the tokens in any of the blocks get change. Subsequently it changes into the Prev Hash in the next linked block.

Tokens

Peer A

[illegible]

According to above example, I understood that each block may have multiple transaction.

(F) Coinbase

1. Study coinbase
2. What is coinbase transaction?

Coinbase transactions are the linked transactions.

Coinbase Transactions

Peer A

The image shows three sequential blocks in a blockchain simulation. Each block contains the following information:

- Block #**: The block number (1, 2, or 3).
- Nonce**: A unique value for each block (16651, 215458, or 146).
- Coinbase**: A transaction where \$100.00 is sent to 'Anders'.
- Tx**: A list of transactions. In Block 2, \$10.00 is sent to Sophia, \$20.00 to Lucas, \$15.00 to Emily, and \$15.00 to Madison. In Block 3, \$10.00 is sent to Emily, \$5.00 to Madiso, and \$20.00 to Lucas.
- Prev**: The previous block's hash.
- Hash**: The current block's hash.
- Mine**: A button to mine the block.

3. As demo shows that Anders get \$100 in coinbase transaction. Now he transfers some money to 5 people. Observe whether the transferred money is less than or equivalent to \$100

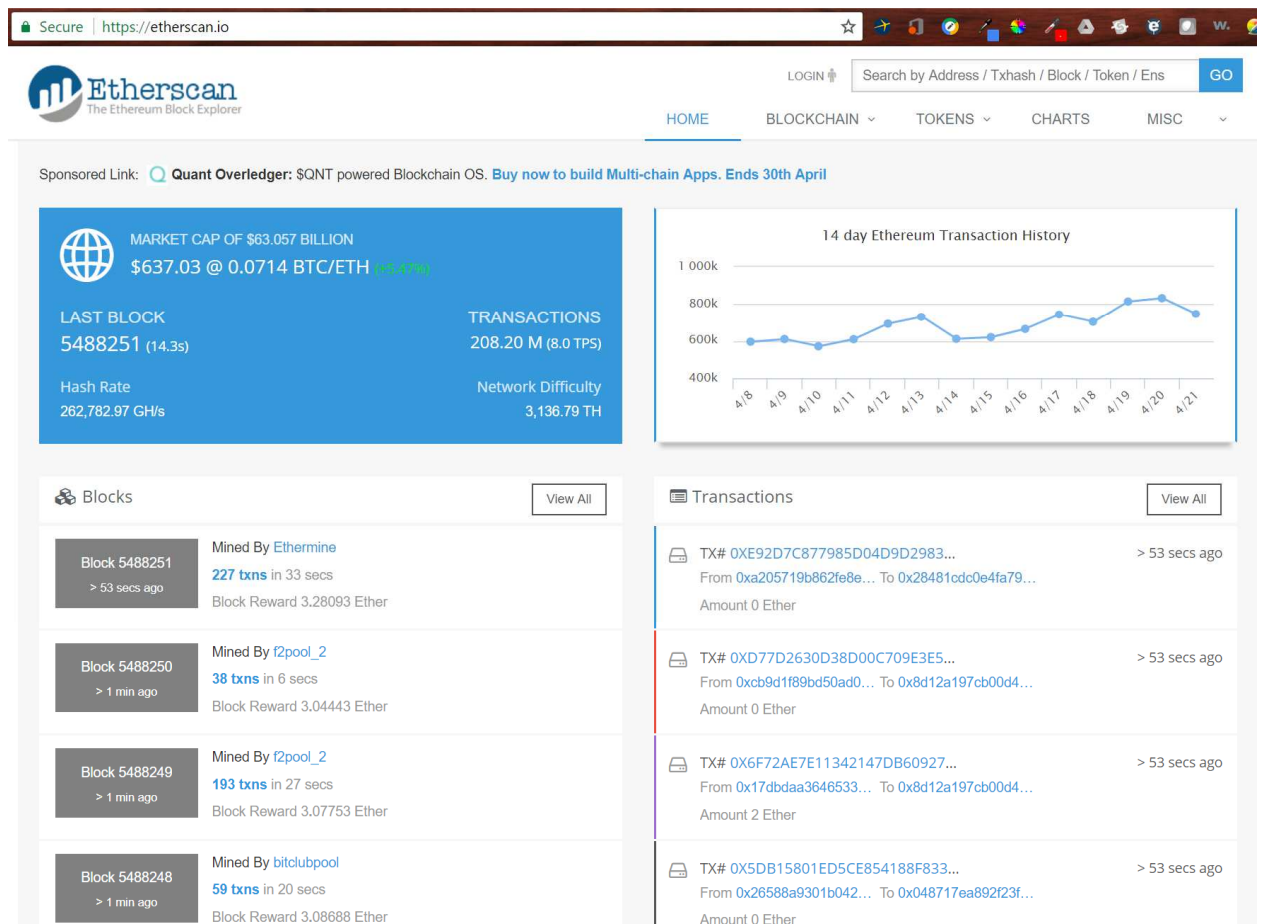
ANS: Transfer money is less than \$100.

5. Further, the people who received the money transfers some amount to other people's account. Check if they have money in their account to transfer.

ANS: Yes, they all have got the balance from previous block to transfer to another people's account.

Question 2: Understand and Visualize how Ethereum blockchain looks likes and identify various parameters and map them to the concepts learnt in the class.


1. Visit <https://etherscan.io/> Website




2. Browse through these sections

- Blockchain
 - View Transaction, Blocks and Uncles

Transactions

The Ethereum Block Explorer

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Transactions

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More than > 208195950 transactions found (showing the last 500k records)

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TxHash	Block	Age	From	To	Value	[TxFee]
0xbd2b7e84d45cf97...	5488258	39 secs ago	0xad68942a95fdd56...	 0x14bba24e85aba8...	0.000037068 Ether	0.000021
0x39835088ce296b...	5488258	39 secs ago	0x65da75e02c9cf98...	 0x61d4b663df99cfb...	0.9481583 Ether	0.000105
0xe2e9ee246d6969f...	5488258	39 secs ago	0x0e6c98e8c66b9cf...	  0xf35a3215e809854...	0 Ether	0.00017304
0x9c9846b9b42a27...	5488258	39 secs ago	0x41880a6c0bf00b0...	  0xb15657374327eb...	0 Ether	0.00017158
0x5ef2196fe341da6...	5488258	39 secs ago	0x29baf3e6aca0531...	  0xb15657374327eb...	0 Ether	0.00018941
0xc5474e28cb5a1c...	5488258	39 secs ago	0x0788455370060d...	  0x51c6a6ef1352578...	0 Ether	0.00003038
0x0844bae390f87c8...	5488258	39 secs ago	0x9caf7c27c80d78d...	  0x51c6a6ef1352578...	0 Ether	0.00004352
0xd8124fe50c0802f...	5488258	39 secs ago	0xb239d886ef615cd...	  0x51c6a6ef1352578...	0 Ether	0.00004352

Blocks

The Ethereum Block Explorer

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Blocks


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Showing Block (#5488270 to #5488246) out of 5488271 total blocks

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Height	Age	txn	Uncles	Miner	GasUsed	GasLimit	Avg.GasPrice	Reward
5488270	25 secs ago	159	2	0xcc16e3c00dbbe7...	7977373 (99.81%)	7992222	3.73 Gwei	3.21728 Ether
5488269	44 secs ago	19	0	Coinotron_2	577278 (7.22%)	8000029	50.90 Gwei	3.02938 Ether
5488268	54 secs ago	174	0	SparkPool	7977586 (99.77%)	7996144	1.13 Gwei	3.00904 Ether
5488267	59 secs ago	186	0	f2pool_2	7987735 (99.80%)	8003934	13.69 Gwei	3.10937 Ether
5488266	1 min ago	45	1	miningpoolhub_1	7998513 (99.98%)	8000029	2.57 Gwei	3.11427 Ether
5488265	1 min ago	166	2	f2pool_2	7995276 (99.89%)	8003883	11.31 Gwei	3.27793 Ether
5488264	1 min ago	131	0	Nanopool	7963703 (99.55%)	8000029	8.84 Gwei	3.07039 Ether
5488263	2 mins ago	199	0	Nanopool	7987829 (99.85%)	8000029	8.43 Gwei	3.06737 Ether
5488262	2 mins ago	186	0	Ethermine	7994408 (99.93%)	8000029	7.18 Gwei	3.0574 Ether
5488261	3 mins ago	223	0	f2pool_2	7972921 (99.66%)	8000000	6.98 Gwei	3.05566 Ether
5488260	3 mins ago	189	0	f2pool_2	7985484 (99.87%)	7996100	23.34 Gwei	3.1864 Ether

Uncles



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Uncles

Showing Uncle (#5488269 to #5488156) out of 554113 total uncles

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Block Height	UncleNumber	Age	Miner	Reward
5488270	5488269	1 min ago	Nanopool	2.625 Ether
5488270	5488269	1 min ago	SparkPool	2.625 Ether
5488266	5488264	2 mins ago	Nanopool	2.25 Ether
5488265	5488264	2 mins ago	f2pool_2	2.625 Ether
5488265	5488264	2 mins ago	Ethermine	2.625 Ether
5488259	5488258	4 mins ago	0xfa927f196a46067...	2.625 Ether
5488251	5488250	6 mins ago	Nanopool	2.625 Ether
5488246	5488244	8 mins ago	Nanopool	2.25 Ether
5488241	5488237	10 mins ago	Nanopool	1.5 Ether


- Account

- Check types of Accounts

- Look at Smart Contract parameters

All accounts (External address and contract address)



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A total of more than > 1999999 accounts found (98,985,593.749 Ether)
 Displaying the last 10000 records only

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Rank	Address	Balance	Percentage	TxCount
1	0x281055afc982d96fab65b3a49cac8b878184cb16	1,538,422.731668043 Ether	1.55418852%	494
2	0xf6f46cf5569aefa1acc1009290c8e043747172d89	1,510,065.606605753037298732 Ether	1.52554079%	480
3	0x90e63c3d53e0ea496845b7a03ec7548b70014a91	1,507,810.416658365151596003 Ether	1.52326249%	442
4	 0xab7c74abc0c4d48d1bdad5dcb26153fc8780f83e	1,500,000.011363125364129408 Ether	1.51537204%	306
5	0x53d284357ec70ce289d6d64134dfac8e511c8a3d	1,378,754.093067888911481302 Ether	1.39288359%	14989
6	0xfe9e8709d3215310075d67e3ed32a380ccf451c8	865,281.335846501340927996 Ether	0.87414876%	13115
7	0xe853c56864a2ebe4576a807d26fdc4a0ada51919 Kraken_3	801,159.261933372094865 Ether	0.80936956%	125
8	0xfbb1b73c4f0bda4f67dca266ce6ef42f520fbb98 Bittrex	716,542.310689731642685612 Ether	0.72388545%	5694284
9	 0xd1edcdf5bb737adffe5043706e7c5bb1f1a56eea	710,000.00001 Ether	0.71727609%	90



Smart Contract Parameters


The Ethereum Block Explorer


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 Contract Address  0xDB2f9f086561D378D8d701feDd5569B515F9e7f7 Home / Contract Accounts / Address

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Contract Overview 

Misc  More Options 


ETH Balance: 0 Ether


ETH USD Value: \$0

No Of Transactions: 1 txn


Address Watch Add To Watch List

Contract Creator [0xa6528eb6737f421...](#) at [txn 0x579c5eea61f2321...](#)


Transactions Code  **Read Contract** Events Comments

 Read Contract Information [Reset]


1. > owners Query

 address


2. > isOwner Query

 bool

3. > confirmations , Query

 bool

4. > getTransactionCount , Query


 count




• Token

Identify tokens


Token Transfer

Etherscan
The Ethereum Block Explorer

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Token Tracker Home / Tokens


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Ethereum Tokens Market Capitalization
A total of 76506 ERC20 Token Contracts found

(Sorted by MarketCap value in DESC Order) First Prev Page 1 of 9 Next Last

	Token	Price	%Change	Volume (24h)	MarketCap
1	 EOS (EOS) Infrastructure for Decentralized Applications	\$11.5252 0.00129948 Btc 0.018164 Eth	▲ 5.60%	\$996,011,000	\$9,341,535,393
2	 Tronix (TRX) TRON is a blockchain-based decentralized protocol that aims to construct a worldwide free content entertainment system with the blockchain and distributed storage technology.	\$0.0535 0.00000603 Btc 0.000084 Eth	▲ 1.71%	\$327,461,000	\$3,515,590,979
3	 VeChain (VEN) VeChain aims to connect blockchain technology to the real world by providing a comprehensive governance structure, a robust economic model as well as advanced IoT integration.	\$3.8893 0.00043853 Btc 0.006130 Eth	▲ 1.85%	\$86,771,900	\$2,044,904,938
4	 OmiseGO (OMG) OmiseGO (OMG) is a public Ethereum-based financial technology for use in mainstream digital wallets	\$15.4875 0.00174624 Btc 0.024409 Eth	▲ 1.88%	\$56,715,700	\$1,580,384,020
5	 BNB (BNB) Binance aims to build a world-class crypto exchange, powering the future of crypto finance.	\$13.0040 0.00146622 Btc 0.020495 Eth	▼ -0.78%	\$87,625,500	\$1,482,992,937





















Etherscan
The Ethereum Block Explorer

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Token (ERC20) Transfers Home / ERC20 Trar

A total of more than > 10,000,000 transactions found (showing the last 500k records only) First Prev Page 1 of 20000

TxHash	Age	From	To	Value	Token
0xa90caccbe72d97...	1 min ago	0xaf43636394355ad...	 0xb39d9ba0f11f73a...	34,016	 Erc20 (SDA)
0x0d472aeca1ec6e...	1 min ago	0x000000000000000...	 0x28228c0639b0d9...	890	 Erc20 (BBC)
0x454f3cef76195bb...	1 min ago	0x000000000000000...	 0x0aebd4a8bf21f5fc...	798	 Erc20 (BBC)
0x7e01cfd588f5791...	1 min ago	0x000000000000000...	 0x5e8d2fbab6bcc98...	888.5	 Erc20 (BBC)
0x6129332610ddae...	1 min ago	IDEX_1	 0xe9fa79be157c08e...	1,495.530262650476540542	 Horse
0x70c13d0d5a7448...	1 min ago	0x000000000000000...	 0x3223658f509f5e0...	1,000	 Erc20 (BBC)
0x0c46053b039b94...	1 min ago	IDEX_1	 0xd4dd2d285374dd...	1,248.14006437450228782	 TE-FOOD
0x38e157a92faec65...	1 min ago	0x000000000000000...	 0x73207ee3717006...	396	 Erc20 (BBC)
0xdf5178e1016530a...	1 min ago	0x6cc5f688a315f3d...	 0x644b0906af38151...	0.598	 Walton
0xc951e2b3b95310...	1 min ago	Bitfinex_Wallet4	 0xffe4525ebca5048...	24.83019	 EOS

Question 3: Understand and compare Bitcoin with Ethereum

1. Visit <https://blockchain.info/> website
2. Identify the differences and compare Ethereum with Bitcoin

SN	Bitcoin	Ethereum
1.	Symbol for trading and currency is BTC	Symbol for trading and currency is ETH
2.	1MB Blocksize but increase 2MB after using segwit2x	Ethereum has GAS than blocksize
3.	Block Reward 12.5BTC	Block Reward 5ETH
4.	Every 4 years the reward will be by half	Every time reward is 5 ether, it doesn't decrease like Bitcoin after 4 years
5.	Bitcoin is only used as digital currency	Ethereum is using as digital currency and also as platform as world computer to use for different DApps
6.	Bitcoin doesn't have any concept of smart contract	Ethereum has the concept of Smart Contract which run in Ethereum Virtual Machine (EVM)
7.	It uses the Proof of work	Currently it is using the Proof of Work (POW) algorithm but moving to Proof of Stake algorithm