Assignment 1 :-

Q. What is Mining and explain its significance with respect to bitcoin ? How much computational power is required for it ?

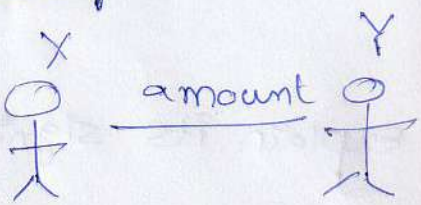
Ans :- **Bitcoin Mining** :- Bitcoin Mining refers to Ensuring that transcations are valid and added to Bitcoin blockchain correctly using global network of computers running the Bitcoin code. The process of Mining is also the means by which new Bitcoins are created.

- The process of bitcoin mining involves of new transcations against the Bitcoin network, which results in the production of new bitcoins

- Bitcoin mining is the process by which Bitcoin transcations are validated digitally on the Bitcoin network and added to the blockchain ledger

- It is done by solving complex cryptoglaphic hash puzzles to verify blocks of transcations that are updated on the decentralized blockchain ledger.

Example Mining :-



(peer-to-peer)

for example X wants to transfer some amount of money to Y interms of bitcoins it indicates that we are done with this process but why will not able get bit coin immediately things are not conformed. there is a place mempool i.e it contains all unconformed transcations.

Mempool :- A mempool or a memory pool is a mechanism to store information on unconformed transcations. Theese transcations are verified but not included in the Blockchain. Mempool helpminers to pick up transcations based on priority which can canbe helpful when there is alot of traffic on the network.

If you want to become a miner inee need high computational power

Who is having high computational power — they are successful miner

How will generate high Computational power

some machines required to generate higher Computational power in order to do successful Mining

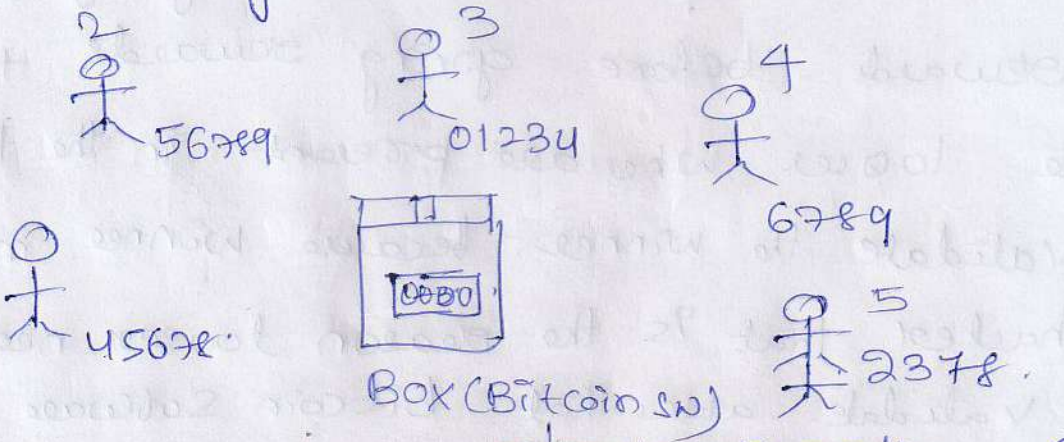
Eg:- There are three Miners

average block size.
1 MB

1 to 5000 transactions

Miners who want to participate in mining process having Empty blocks - these miners will go to Mempool they are going to pick unformed transactions put it inside respective blocks once its done they Enter into mining process there is no limit (1 to 5000) to take unformed transactions. they will take within the range of 1 to 5000 transactions

How Mining works :-



creates puzzle

Miners Ensures that they find Nonce appropriately

NONCE :- Number used once

by using Nonce they will crack key

Bitcoin software sets puzzle Miners going to crack key using Nonce

It Miners having more Computational Power more chances to win in process

Proof of work :- In block chain Mining, miners validate transcations by solving difficult mathematical puzzle called proof of work. To do that, the primary objective of the miner is to determine the nonce value and that nonce value is the mathematical puzzle that miners are required to solve to generate a hash that is less than the target defined by network for a particular block.

In this process winner is going get some rewards before going rewards to miners the loosers who are present in the process validate the winner. because winner may be hacker that is the reason loosers needs to validate. after that bitcoin software gives rewards.

Among validation atleast 51% of loosen it they approve bit coin software gives rewards to miner.

Block Reward :-

The block reward is how much Bitcoin is rewarded for each block that is solved and added to the blockchain. The block reward is to "have" for every 2016 block mined. It is called the halving process and happens every 4 years

historical block rewards.

2012	25.00 BTC
2016	12.50 BTC
2020	6.25 BTC

With each block of Bitcoin being mined in 10 minutes per block

Miners are responsible for creating blocks in Block chain

in blockchain transactions present in the block are Conformed.

Significance of Mining in bitcoin

Wallet :- This where any Bitcoin you Earn as result of your mining Efforts will be stored A wallet is an Encrypted online account that allows you to store, transfer and accept Bitcoin or other cryptocurrencies.

Mining software :- There are number providers of Mining Software, many of which are free to download and can run on windows and Mac computers. once the software is connected to necessary hardware, you will be able to mine Bitcoin.

Computer Equipment :- The most cost-prohibitive aspect of Bitcoin Mining involves the hardware you will need a powerful Computer that uses an Enormous amount of Electricity in order to Successfully mine Bitcoin.

Mining pool or solo mining

Mining Bitcoins in a pool with Combined power also promotes Efficient mining with reduced Mining difficulty to solve a block.

More Miners = Reliable + more secured network

Mining profitability factors

factors which have the substantial impact on the mining profitability

- Hash tree
- Block rewards
- Mining difficulty
- Electricity and consumption changes
- Mining pool fees
- Bitcoins market price

Computational power required for mining

One bit coin transcation takes 1449 Kwh to comple or the equivalent of approximately 50 days of power ofor the average threshold.