

## **Important Instructions:**

- 1) Open this MS-Word document and start writing answers below each respective question given on page 2.**
- 2) Answers the question in the same sequence in which they appear.**
- 3) Provide to the point and concrete answers. Some of the questions are open ended and therefore must be answered using your own opinion and thoughts but backed with logical reasons.**
- 4) First read the questions and understand what is required of you before writing the answer.**
- 5) Attempt the paper yourself and do not copy from your friends or the Internet. Students with exactly similar answers or copy paste from the Internet will not get any marks for their assignment.**
- 6) You can contact me for help if you have any doubt in the above instructions or the assignment questions.**
- 7) All questions must be attempted.**
- 8) Do not forget to write your name, university ID, class and section information.**
- 9) Rename you answer file with your university ID# before uploading to SIC.**
- 10) When you are finished with writing your answers and are ready to submit your answer, convert it to PDF and upload it to SIC unzipped, before the deadline mentioned on SIC.**

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**Mid Semester Assignment**  
**Course: - Distributed Computing**

**Deadline: - Mentioned on SIC**

**Marks: - 30**

**Program: - MS (CS)**

**Dated: 20 April 2020**

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**Class and Section: Fall-18**

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**Question1: Provide an example of a modern Distributed System not discussed in the course; discuss how this system solves certain challenges by employing distributed architecture. (5)**

**Answer:** Block chain is a distributed ledger technology where participants can perform transaction without the use of centralized system/authority.

Block chain has many features by which we can conclude that it will solve challenges of distributed computing.

**Transparency:** The main advantage of block chain actually is its transparency. Since every transaction is recorded on a block and across multiple copies of the ledger that are distributed over many nodes (computers), it is highly transparent. All the information you need is stored in one place that is easy to access. Everyone on the block chain can see the chain of ownership for an asset: records on the block chain cannot get erased, which is essential for a transparent supply chain.

**Security** Block chain security is very efficient and scalable as there is no central authority over the whole system.it use cryptographic hash function in which an input of any length entered into the block chain and giving an output of a fixed length.

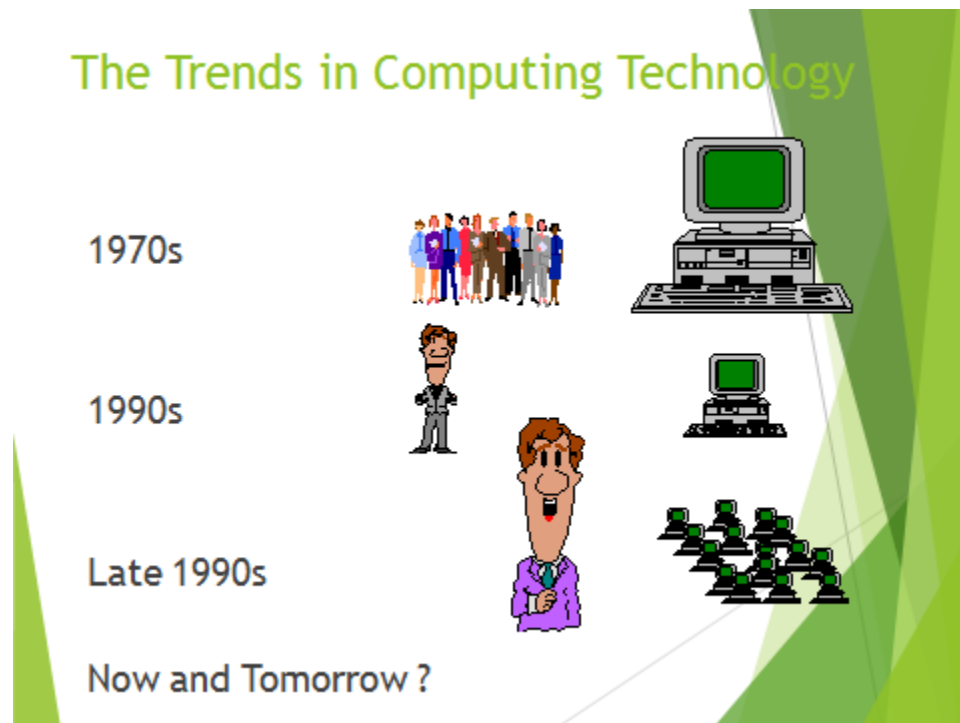
**Immutability** in block chain, immutability means that once data has been entered into the block chain, it cannot be tampered with.

Some other features which make block chain more powerful are as under.

- The hacking threats against our business will be reduced to a great extent.
- As block chain offers a decentralized platform, there is no need to pay for centralized entities or intermediaries' services.
- Organizations can do faster transactions with the help of block chain.
- The transactions done are transparent and hence, easy to track.

**Question2:** Among the trends of Distributed Systems discussed in C1-Lec2, which trend in your opinion will be most dominant in the future and why? (4)

**Answer:**



Things are getting smaller in size with the passage of time. In old days computer size was very large and used by many peoples but with passage of time these big screen computer are converted into small laptops, personal computer etc.

Now, Mobile computing is when you bring the computer with you. Example smartphones, prisoner anklets. Ubiquitous computing is wherever you go; there is a computer you can use. Example internet cafe, mainframe terminals.

**In my point of view** mobile and ubiquitous computing will be the most dominant in the future because of the following reasons.

- ▶ Invisible technology
- ▶ Integration of virtual and physical worlds
- ▶ Throughout desks, rooms, buildings, and life
- ▶ Take the data out of environment, leaving behind just an enhanced ability to act

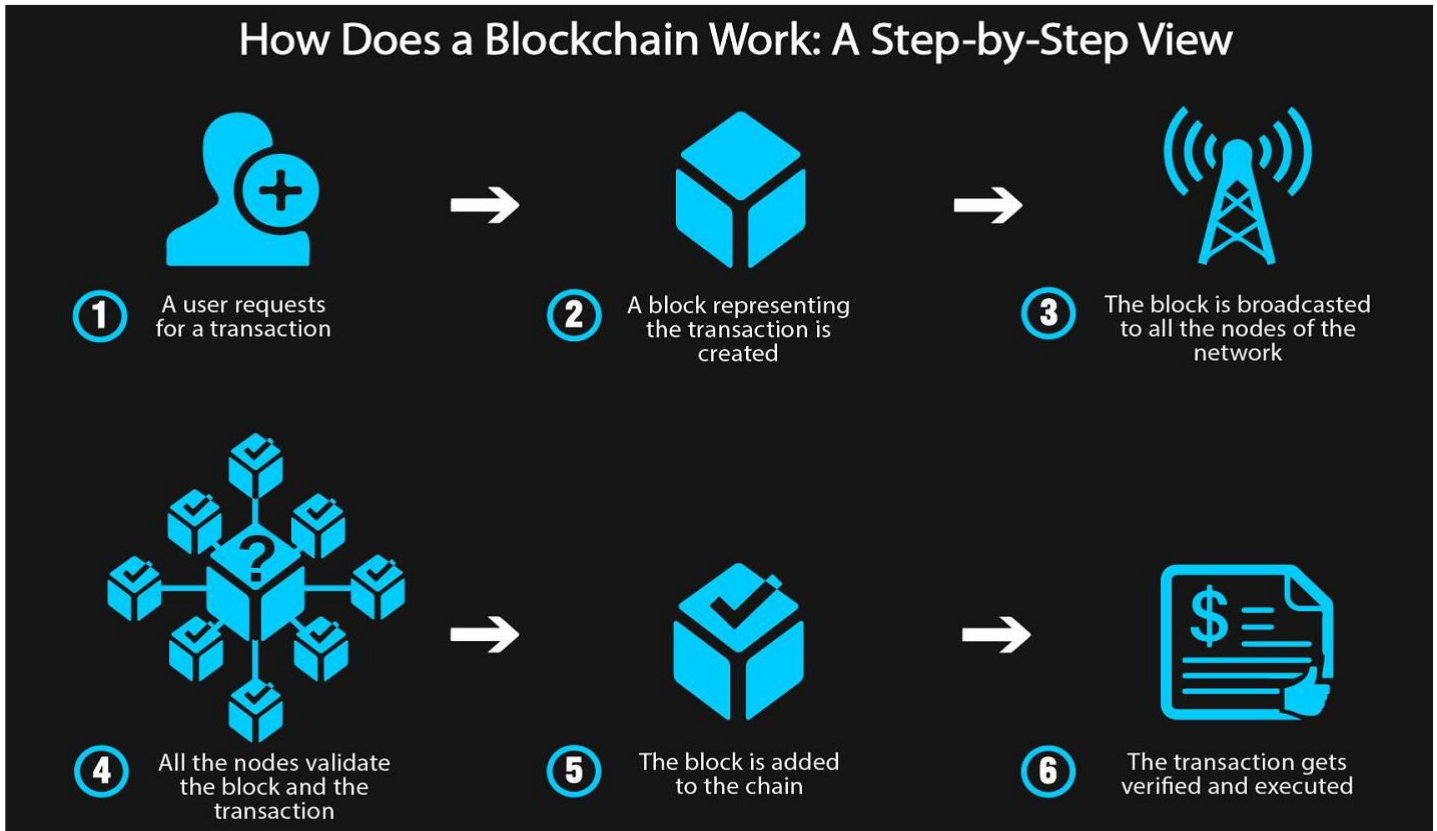
**Question3:** Among the challenges of Distributed Systems discussed in C1-Lec2, which problem in your opinion will accompany distributed systems into the future and why? (3)

**Answer:** To me **Failure handling** will accompany distributed system into the future too, because as we know that distributed system is decentralized system means that there is no central authority and the entire data share through the entire network and we access them from every system with in the network.

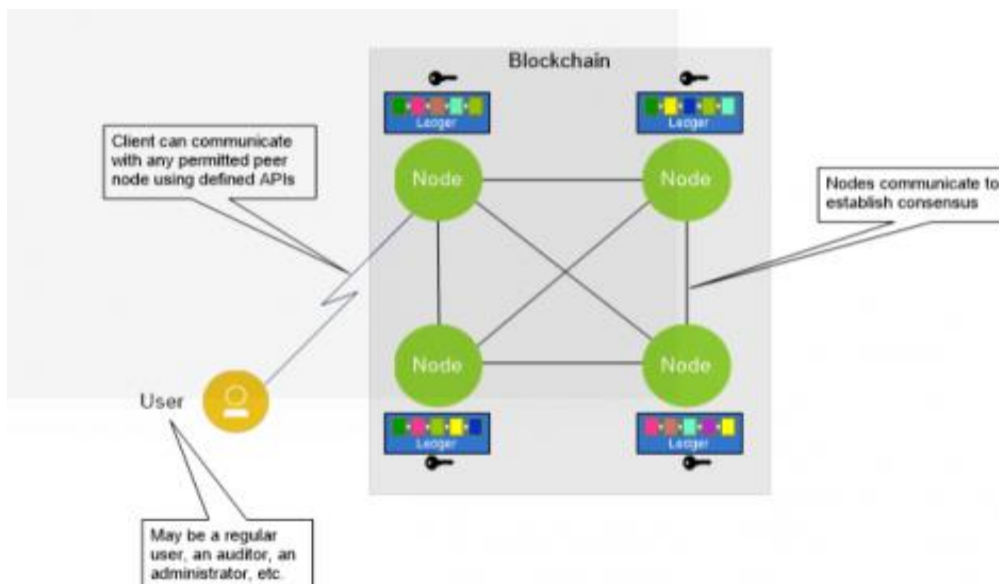
**So** whenever failures occur in the network, for example a server down then we cannot come to know that which server is down because we access our data from the server.

**Question4:** The design of distributed systems can be described and discussed in three ways i.e Physical Model, Architectural Model and Fundamental Model. Describe the example of distributed system in Question1 with respect to these three models. (5)

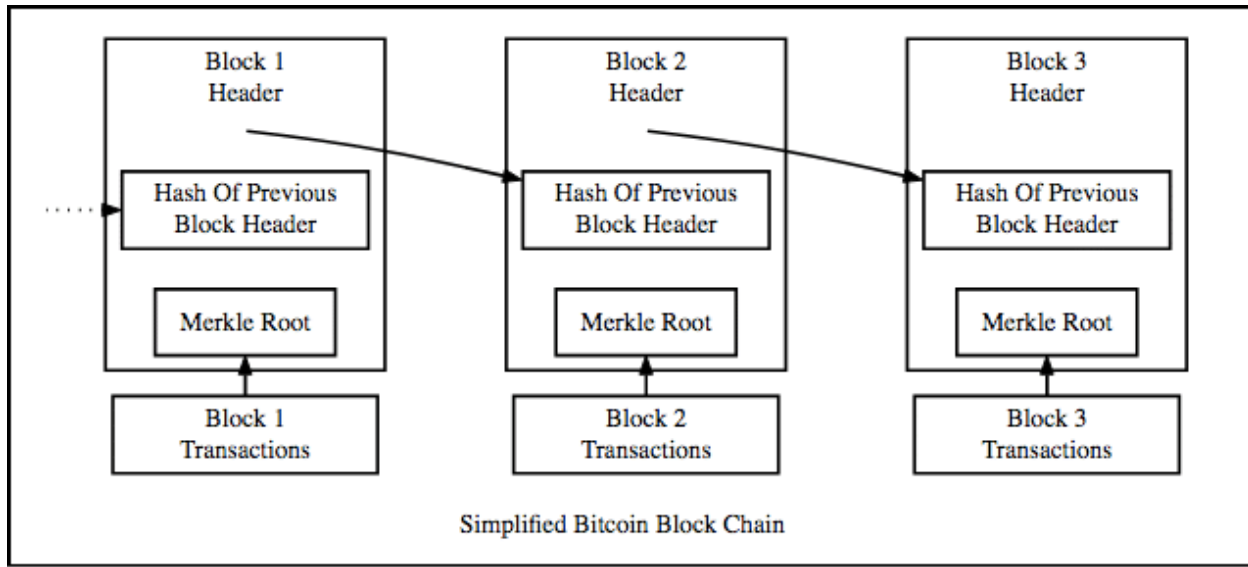
**Answer:** Physical Model



### Architecture Model



## Fundamental Model



**Question5:** What is the purpose of Inter Process Communication (IPC) in distributed systems? Given the choice which protocol out of UDP and TCP will you use for your own distributed system and why? (5)

**Answer:** Purpose of distributed system is:

- Information Sharing
- Resource sharing
- Computational speed up
- Synchronization
- Modularity
- Convenience

I will give preference to TCP over UDP because it is a reliable and connection oriented protocol so if I didn't sending or receiving data from some time, TCP will reestablish the connection and sending and receiving of data will start again.

**Question6:** The following are some of the threats and attacks on Distributed Systems. Provide potential solutions as how may be these threats and attacks be mitigated? (8)

1. **Leakage** Prevention against leakage are:

- Identify critical data
- Monitor access and activity
- Utilize encryption
- Lock down the network
- End point security

2. **Tampering** There are two ways to prevent Tampering

A. **Firewall** As we know that firewalls are capable of control and manage incoming and outgoing traffic in a network, by using firewall we can prevent our data from Tampering.

- B. Authorization** As authorization is the process to find whether a user has access to particular resources. In organizations specific peoples are allowed to specific tasks.
- 3. Vandalism** The best defense against Vandalism is by installing and maintaining the latest version of Anti-virus and firewall software.
- 4. Eavesdropping** We can prevent our data from Eavesdropping by using Encryption.