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NPTEL (https://swayam.gov.in/explorer?ncCode=NPTEL) » Blockchain and its Applications (course)

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Course outline

About NPTEL ()

How does an NPTEL online course work? ()

Week 0 ()

Week 1 ()

Week 2 ()

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Week 4 : Assignment 4

Your last recorded submission was on 2025-02-19, 14:39 IST Due date: 2025-02-19, 23:59 IST.

1) ***1 point***

What is a "fork" in the context of Bitcoin?

a) A change in the Bitcoin protocol that leads to the creation of a new version of the blockchain
b) A new type of cryptocurrency that does not rely on blockchain technology
c) A collaborative process for miners to resolve conflicts in the blockchain
d) None of the above

- (●) a.
- ( ) b.
- ( ) c.
- ( ) d.

2) ***1 point***

Suppose a miner initially receives 100 bitcoins as a reward for successfully mining a block at time Jan, 2009. The reward for mining a block is halved approximately every four years (or after every 210,000 blocks). Based on this halving process, which of the following statements are correct? (Please note that once the reward is halved, it will remain the same until four years have been completed or after every 210,000 blocks.)

a) In Jan 2013, the miner will receive 50 bitcoins for adding a new block.
b) In Jan 2018, the miner will receive 25 bitcoins for adding a new block.
c) In Jan 2021, the miner will receive 12.5 bitcoins for adding a new block.
d) In Jan 2024, the miner will receive 6.25 bitcoins for adding a new block.

- [x] a.
- [x] b.
- [x] c.

☐ d.

3) ***1 point***

How does the Bitcoin network prevent double spending?

a) A centralized authority will be used to verify each transaction before it is added to the blockchain.
b) Relying on a proof-of-work consensus mechanism ensures that only one valid transaction is accepted.
c) All transactions are stored in a centralized database that tracks each Bitcoin's status.
d) By limiting Bitcoin transactions to one per user per day.

○ a.
◉ b.
○ c.
○ d.

4) ***1 point***

Which of the following is a challenge of the permissionless model in blockchain?

a) Ensuring that all participants trust a central authority
b) Reaching agreement (consensus) across a decentralized network of participants without a trusted third-party
c) Limiting the number of participants to improve scalability
d) Preventing participants from accessing the blockchain

○ a.
◉ b.
○ c.
○ d.

5) ***1 point***

Which of the following is not included in a block of a blockchain?

a) Transaction data
b) Hash
c) Timestamp
d) IP address of the miner

○ a.
○ b.
○ c.
◉ d.

6) ***1 point***

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Week 5 ()

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Which of the following is not a failure that blockchain tries to handle , as rather an attack that a blockchain can try to defend to ensure prevention?

a) Crash Fault
b) Double Spending
c) Byzantine Fault
d) Link Fault

- ○ a.
- ◉ b.
- ○ c.
- ○ d.

7) ***1 point***

Which of the following best describes **Safety** and **Liveness** in Bitcoin?

a) **Safety** ensures transactions are irreversible, while **Liveness** ensures transactions are eventually added.
b) **Safety** guarantees quick transaction confirmation, while **Liveness** prevents forks.
c) **Safety** prevents double-spending, while **Liveness** speeds up block creation.
d) **Safety** ensures blocks are always valid, while **Liveness** ensures no transaction delays.

- ◉ a.
- ○ b.
- ○ c.
- ○ d.

8) ***1 point***

What is the main purpose of the **Proof of Work** (PoW) mechanism in Bitcoin?

a) To validate transactions with the need for a central authority.
b) To speed up transaction processing times by reducing the time needed to add new blocks.
c) To make it easier for miners to add new blocks without computational work.
d) To secure the network and prevent fraudulent transactions through computational difficulty.

- ○ a.
- ○ b.
- ○ c.
- ◉ d.

9) ***1 point***

What is the correct order of events when adding a new block to the Bitcoin blockchain?

a) Block Mining → Block Propagation → Block Flooding → Transaction Flooding
b) Transaction Flooding → Block Mining → Block Propagation → Block Flooding
c) Transaction Flooding → Block Flooding → Block Propagation → Block Mining
d) Block Propagation → Block Mining → Block Flooding → Transaction Flooding

- ○ a.
- ◉ b.
- ○ c.
- ○ d.

10) ***1 point***

Which of the following statements is incorrect regarding **Proof of Work (PoW)** in the context of forks, attacks, and the monopoly problem?

a) PoW forks can occur when two miners independently solve the puzzle at the same time, leading to a brief divergence in the blockchain.
b) While PoW encourages miners to follow the longest chain, it does not prevent attacks like 51% attacks, where malicious miners can control the blockchain.
c) The Monopoly Problem refers to a situation where a single miner or group controls a majority of the network's hashing power, undermining decentralization.
d) Proof of Work ensures complete decentralization by preventing any miner from controlling the majority of the hashing power.

- ○ a.
- ○ b.
- ○ c.
- ◉ d.

You may submit any number of times before the due date. The final submission will be considered for grading.

Submit Answers