

There are four rules for decentralized consensus:

1. Independent verification of each transaction

Each transaction is verified then a full node will propagate the new transaction and add them to the memory pool where it waits until it can be mined into a candidate block by a mining node.

2. Independent aggregation of transaction into candidate blocks

Mining nodes will mine transactions into new candidate blocks through the computation of a Proof-of-Work algorithm.

3. Independent verification of each block

A node will verify new candidate blocks and assemble these into a blockchain.

4. Independent selection of blockchain

A node will select a blockchain through Proof-of-Work.

Three dice decentralized consensus algorithm question:

The questions below use the second rule for decentralized consensus, independent aggregation of transaction into candidate blocks. Keep in mind that two dices will be used, each has values of one through six, and the maximum win probability is 36/36

1. Simple target: What is the probability of win if the target is 12?

The player must throw 11 or less in order to win.

In order to get the win probability, each number resulting in at least 12 must be listed.

| Dice 1 | Dice 2 | Count |
|--------|--------|-------|
| 6 | 6 | 1 |

Deduct 1 from the maximum win probability = $(36 - 1)/36 = 35/36$.

The final answer to the question is 35/36.

2. Difficult target: What is the probability of win if the target is 5?

The player must throw 4 or less in order to win.

In order to get the win probability, each number resulting in maximum of 4 must be listed. Simple target lists the opposite values. It will still have the same result however it will be time consuming.

| Dice 1 | Dice 2 | Count |
|--------|--------|-------|
| 1 | 1 | 1 |
| 1 | 2 | 2 |
| 1 | 3 | 3 |
| 2 | 1 | 4 |
| 2 | 2 | 5 |
| 3 | 1 | 6 |

The final answer to the question is 6/36.