

# Course Summary

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# Overview



**Summary of what we learnt in this course**

**Further resources**



# Thinking About Trust



# Thinking About Trust

*"The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value"*

**Don and Alex Tapscott : Blockchain Revolution**



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# Thinking About Trust

**Incorruptible**

**Digital ledger**

**Continuously growing list of records**

**Linked and secured using cryptography**



A father and son are playing outdoors on large, rounded boulders. The father, wearing a black t-shirt, stands on a boulder, reaching up towards his young son who is in mid-air, performing a cartwheel. The son is wearing a blue long-sleeved shirt and jeans. They are in a bright, sunlit environment with large rocks in the background.

TRUST



# Public vs. Private Blockchain

## Public Blockchain

Anyone can write to  
the blockchain

Every node contains  
a copy of the  
complete chain

Best security  
and trust  
between peers

Hashing puzzles are  
time consuming

Some enterprises  
nervous about  
public blockchain



# Public vs. Private Blockchain

## Private Blockchain

Private blockchains  
have been  
controversial

Enterprises favour a  
more controlled  
blockchain

An enterprise  
writes transactions

Doesn't have same  
decentralized security  
as public blockchain

The company decides  
who can read and  
verify blocks



# Storing Transactions in Blocks

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# .NET Standard 2.0 & .NET Core 2.0

Visual Studio 2017 on Windows  
Visual Studio for Mac  
JetBrains Rider  
Visual Studio Code





# Globomantics Data to Record

**Claim number**

**Settlement amount**

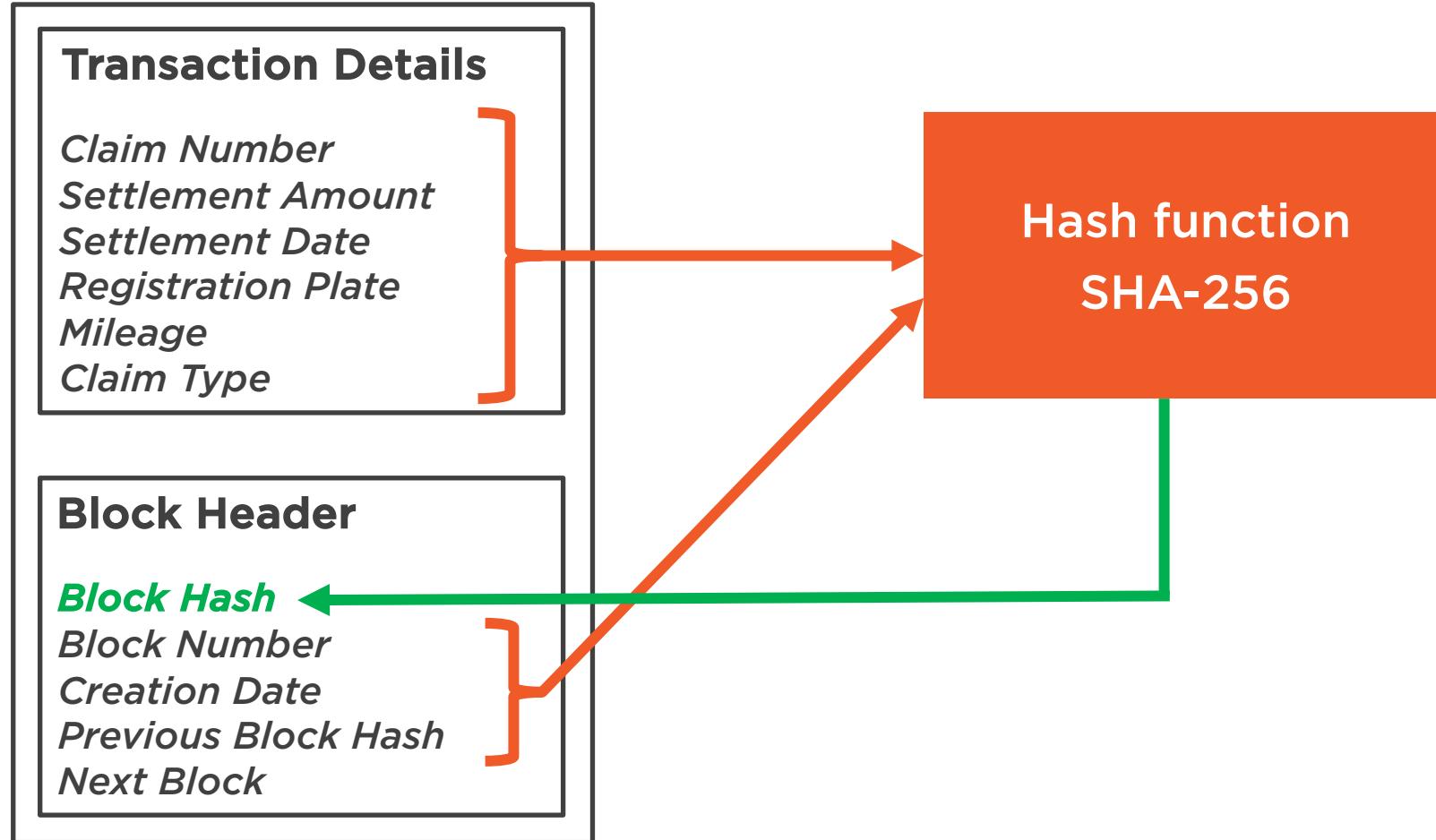
**Settlement date**

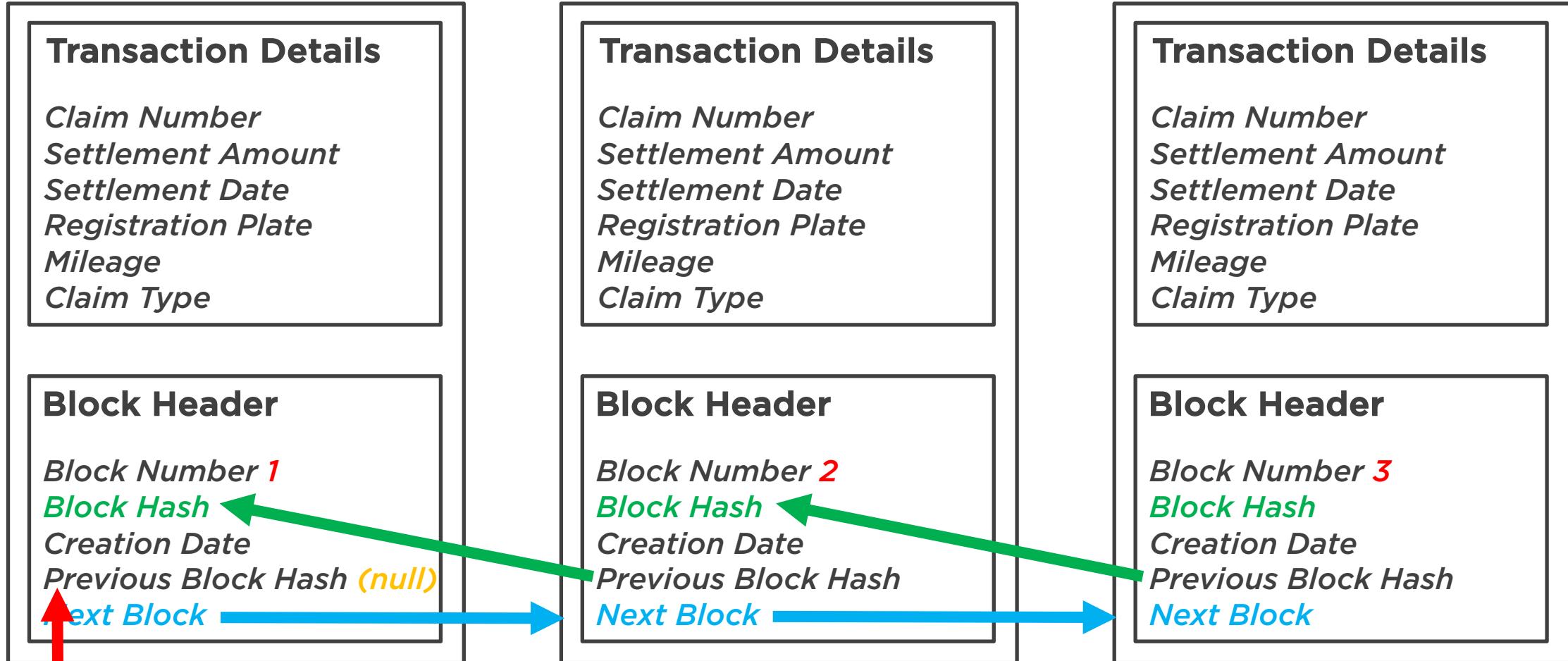
**Car registration**

**Mileage**

**Claim type**



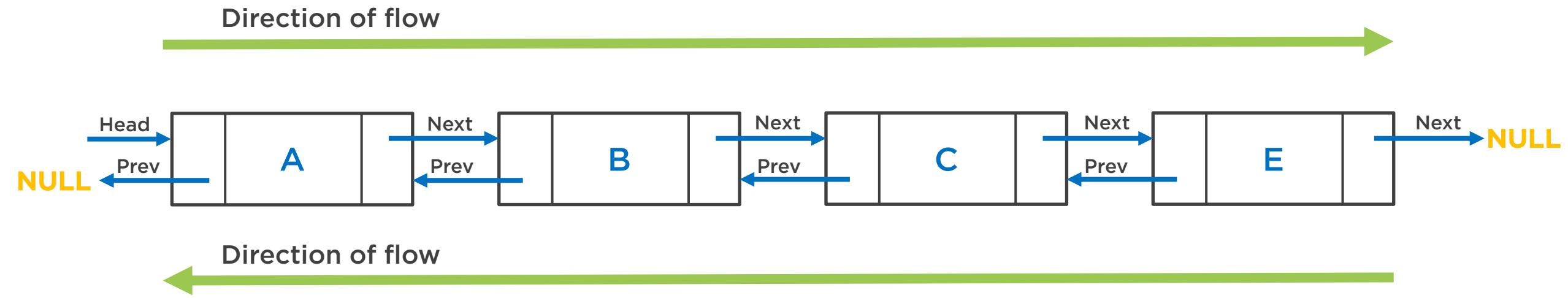




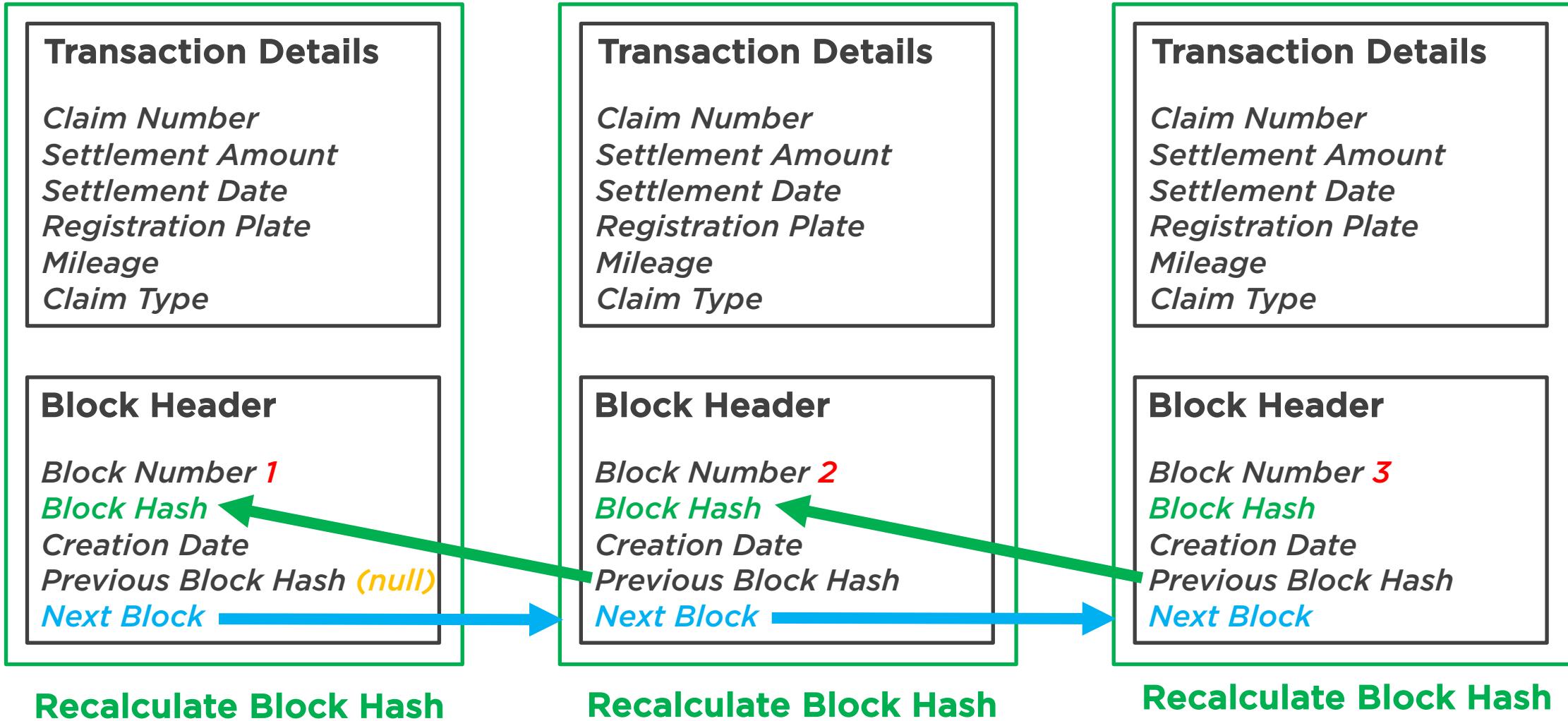
Has no parent so equals null



# Double Linked List



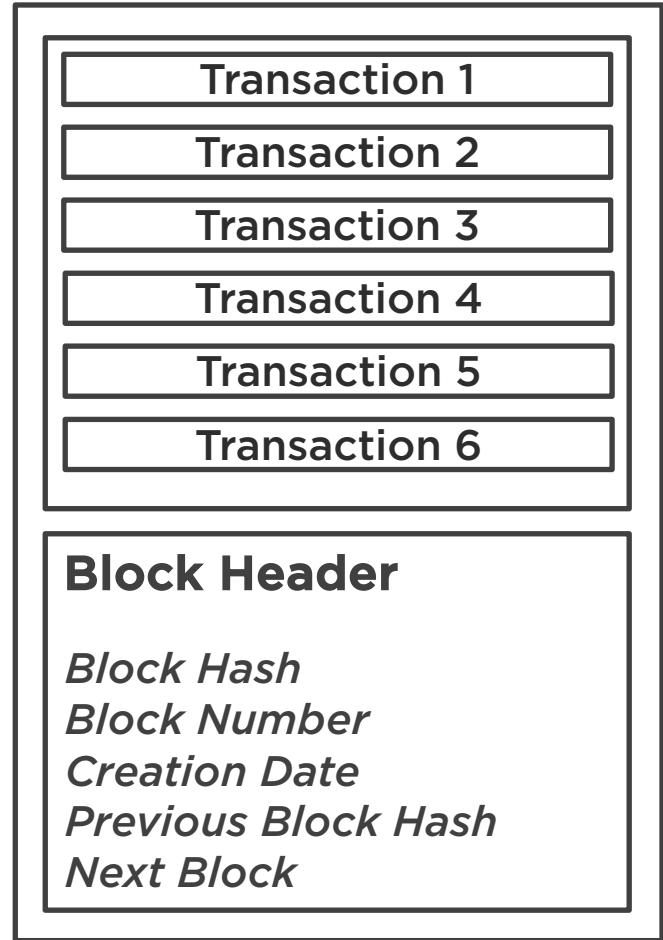
# Happy Path

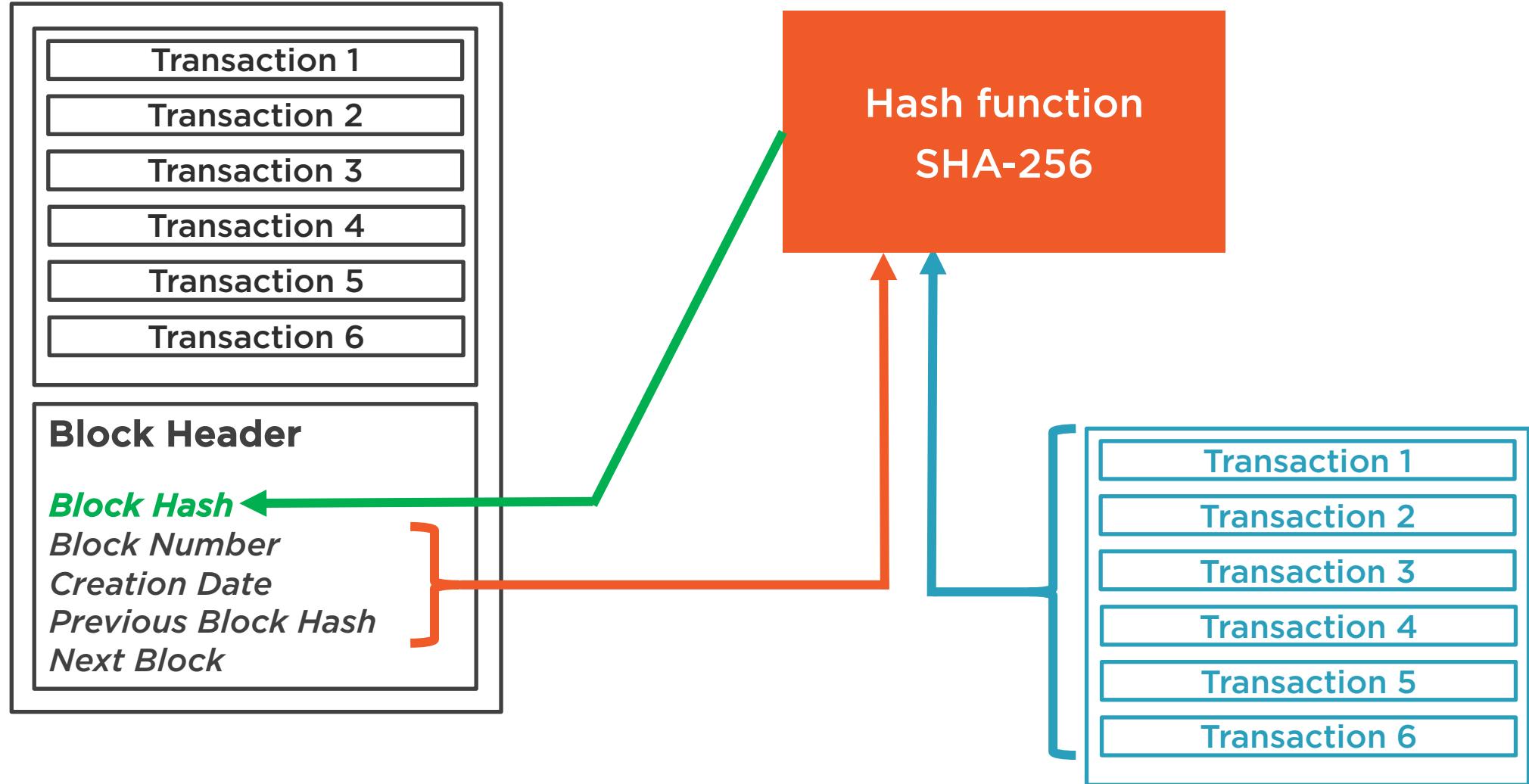


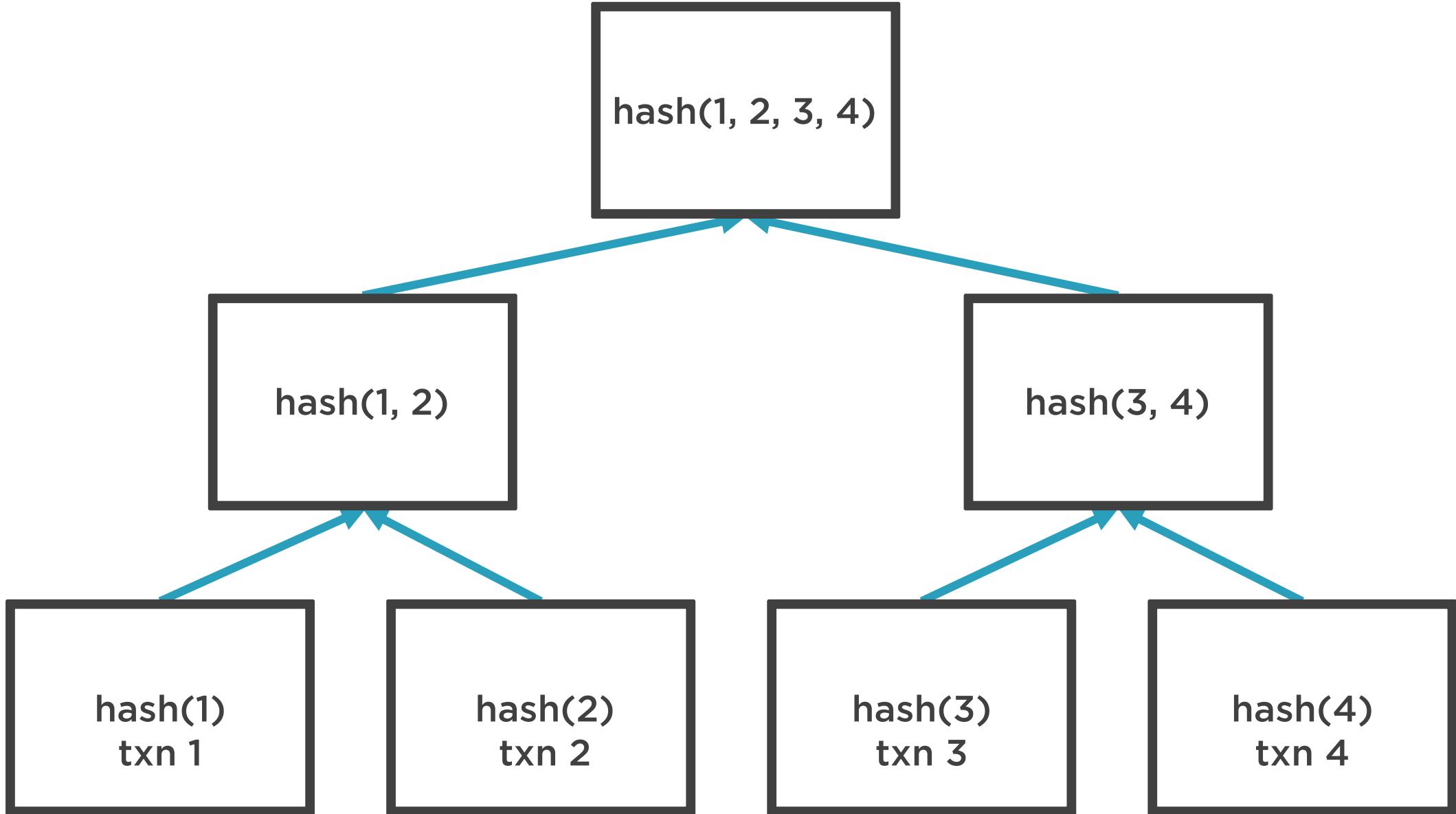
# Blocks with Multiple Transactions

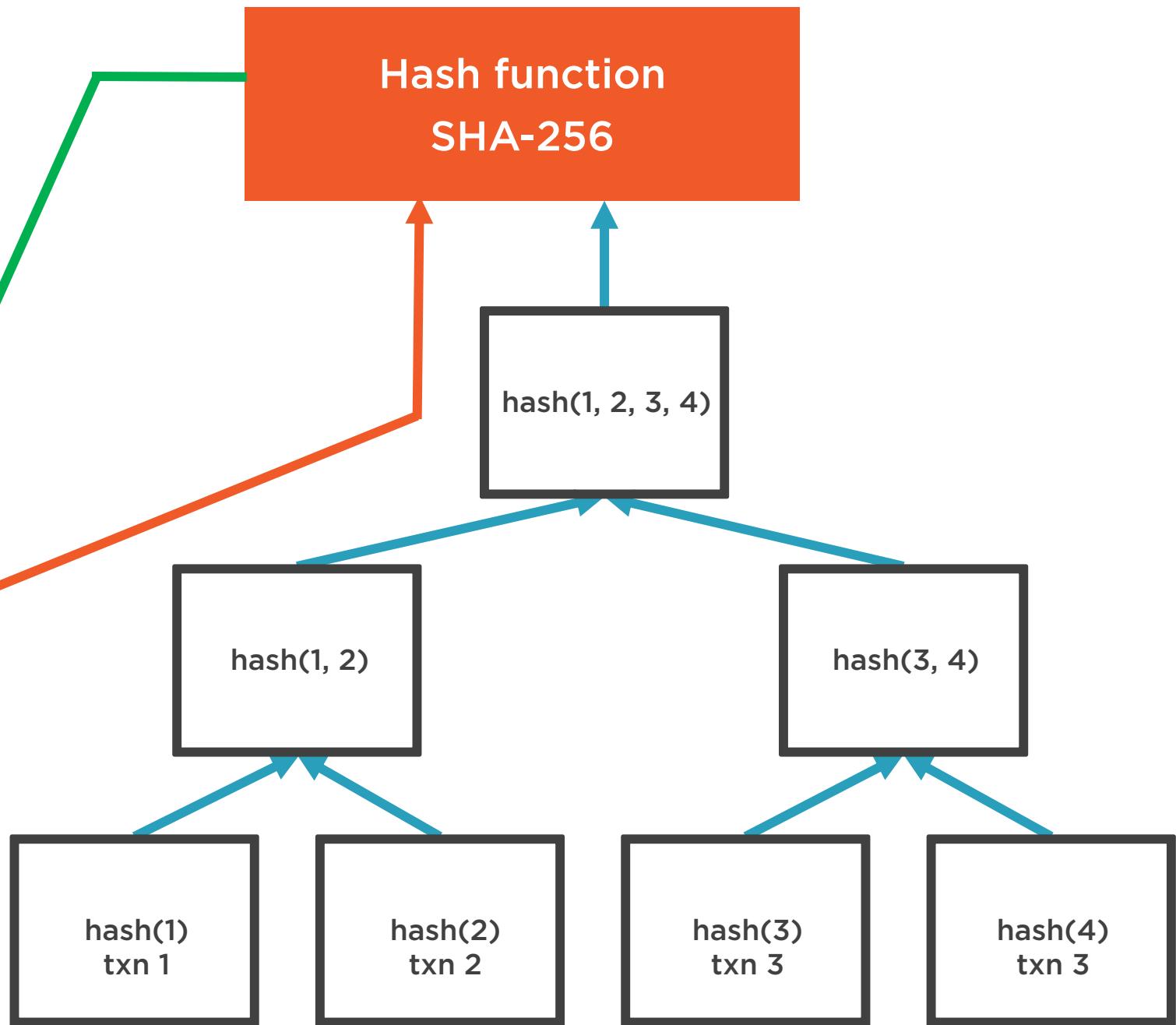
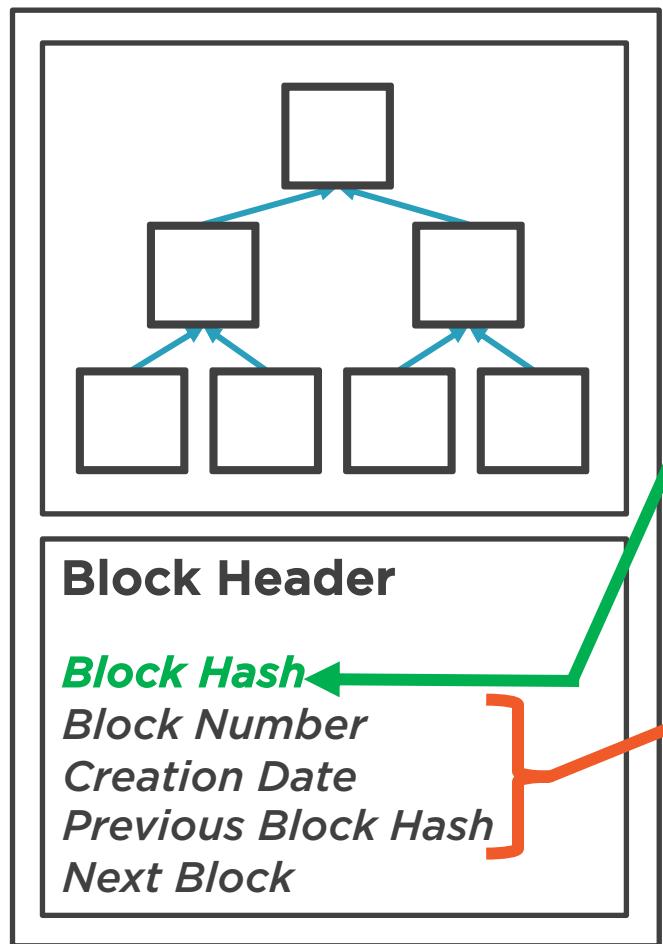
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# Proof of Work

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# What About Immutability?



Expensive to calculate

Easy to verify



**5000 blocks at 10 minutes per block**

**833 hours effort**

**35 days**



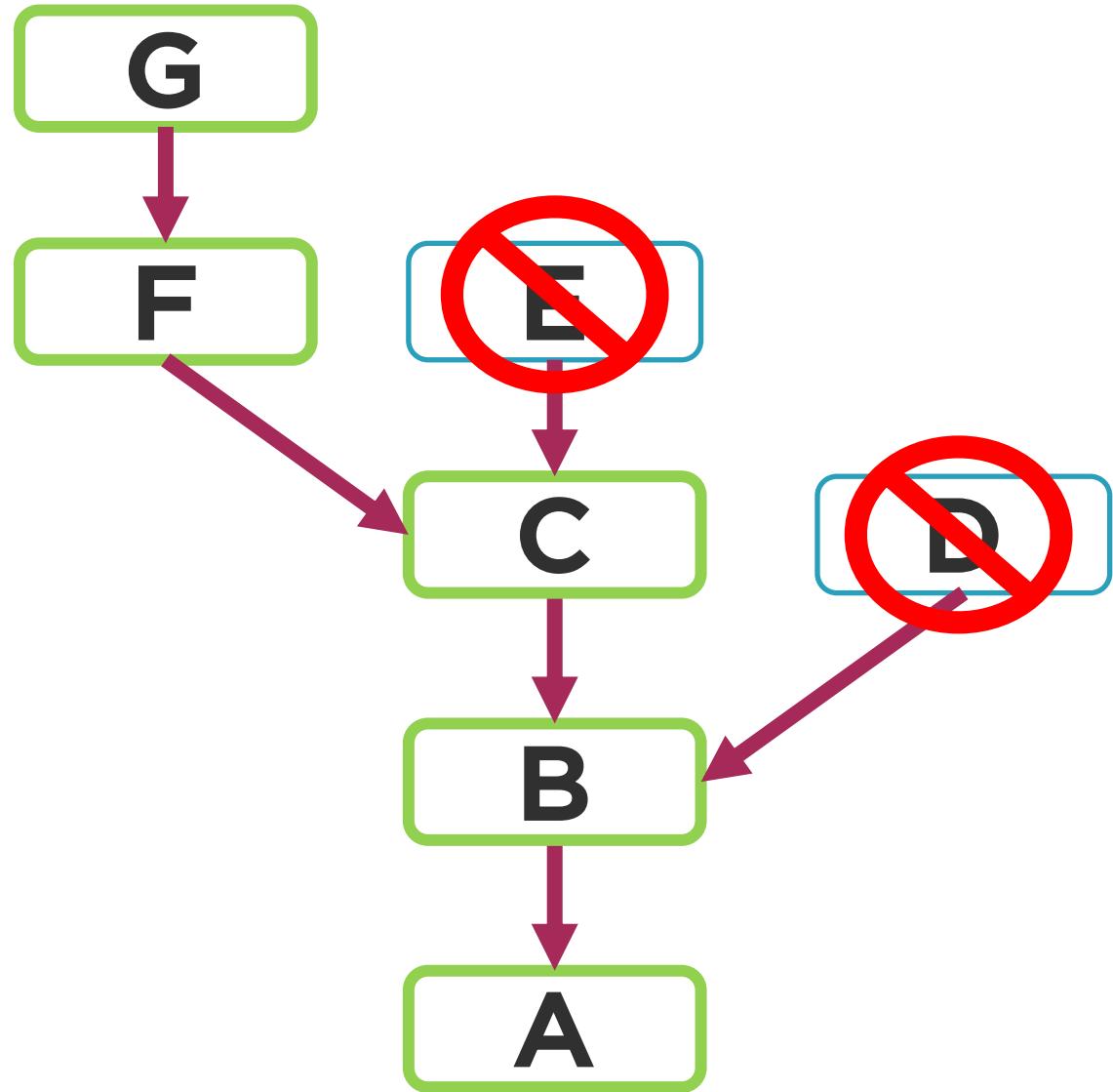
stephenhaunts — ProofOfWorkTest.dll — dotnet + bash -c clear; cd "/Applications/Visual Studio.app/Contents/Resources/li..."

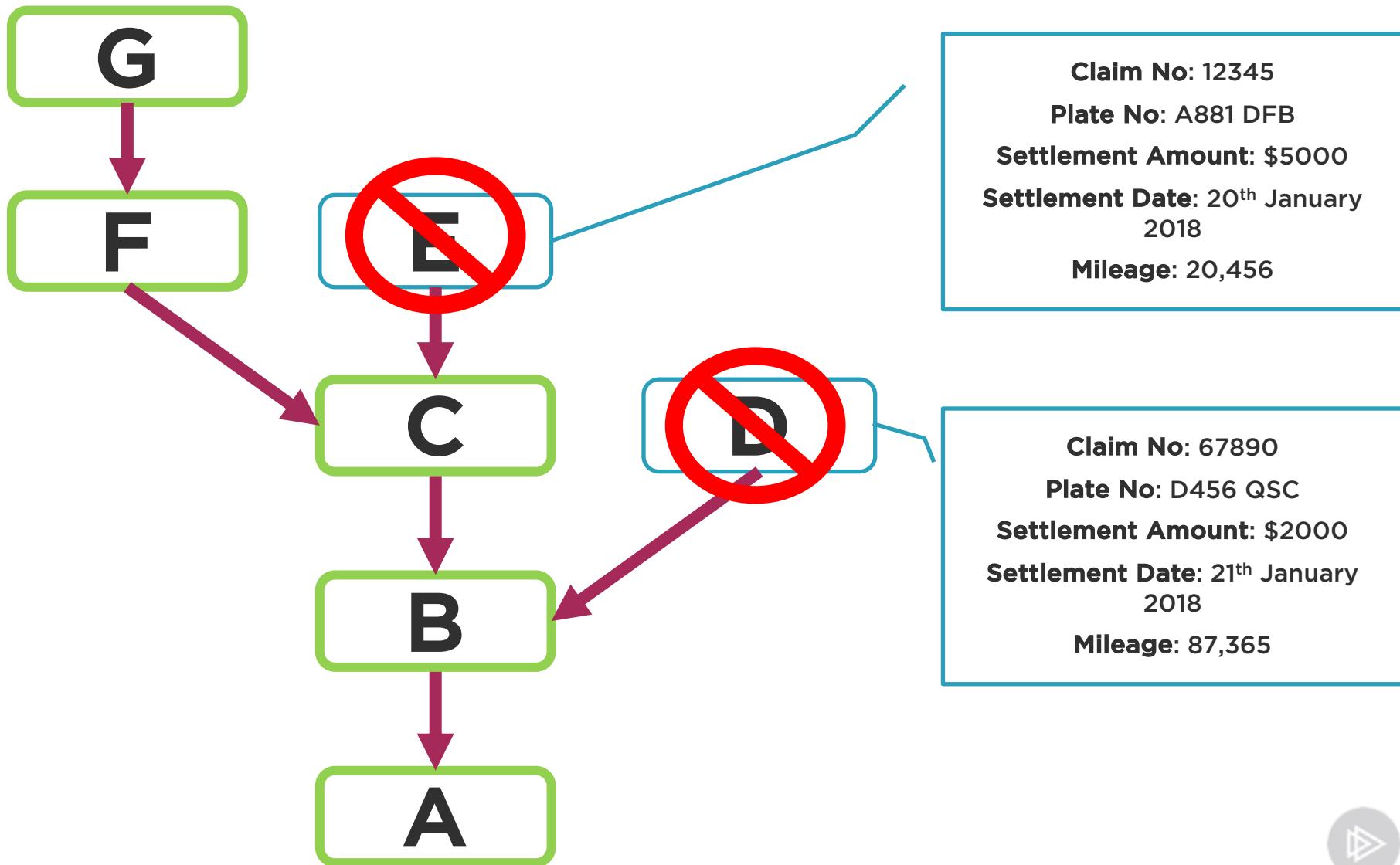
```
Difficulty Level 0 - Nonce = 0 - Elapsed = 00:00:00.03 - EYEd2NqKf57Cna1I2rk9UCprZTCrhiT3QcRhS1BQJhA=
Difficulty Level 1 - Nonce = 24 - Elapsed = 00:00:00.00 - 0NboeG5IAZduTUQ2WmALzrfNlFoRDg5nLZN8Vhgmgmg=
Difficulty Level 2 - Nonce = 9478 - Elapsed = 00:00:00.01 - 00Ln0xLQjZuZjuZrw14ne2T3R4niaydfrazohLoLxlk=
Difficulty Level 3 - Nonce = 93521 - Elapsed = 00:00:00.12 - 000FtlmdNXKvBYFiAeKGPaLMBIkECs9nIbskXiln4og=
Difficulty Level 4 - Nonce = 2286428 - Elapsed = 00:00:03.10 - 00007D4cJR6eYzCvW82UPRAC/dkxEsV55v7+9bVRH/A=
Difficulty Level 5 - Nonce = 380372972 - Elapsed = 00:08:25.45 - 0000032c57uM3MYWkrnzHNv+efN7SJULrrnzRgDrXXQ=
```

# Maintaining Concensus

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# What Next?

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# Practical Cryptography in .NET

By Stephen Haunts

<https://app.pluralsight.com/library/courses/practical-cryptography-dotnet>





# Play by Play : Enterprise Data Encryption in Azure Revealed

By Stephen Haunts

<https://app.pluralsight.com/library/courses/play-by-play-enterprise-data-encryption-with-azure-revealed>





# Introduction to BitCoin and Decentralized Technology

By Scott Driscoll

<https://app.pluralsight.com/library/courses/bitcoin-decentralized-technology/table-of-contents>





# Blockchain Fundamentals

By Jan-Erik Sandberg

<https://app.pluralsight.com/library/courses/blockchain-fundamentals/table-of-contents>





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