Bitcoin Mining -Simple Python Code

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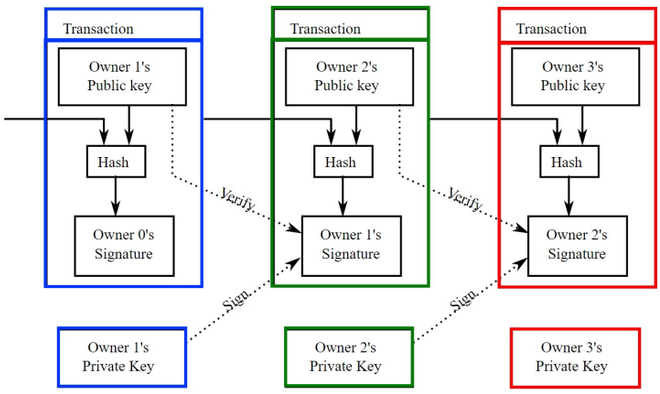
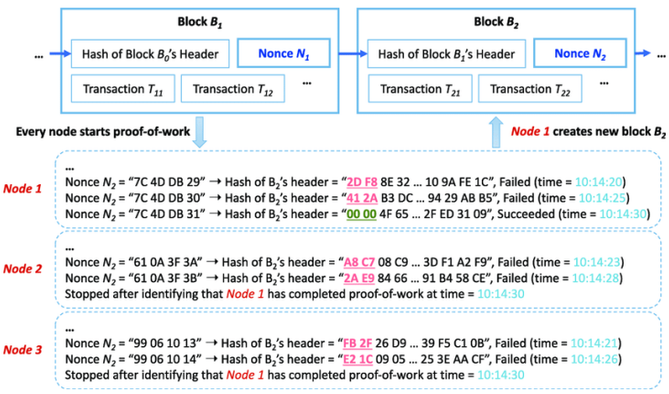
The process of using sophisticated computers to verify the legitimacy of bitcoin transactions and to enter new bitcoins into circulations.

In terms of coding simply, mining is the process of guessing a nonce that generates a hash with the first X number of zeros.

Sample Bitcoin Block:



Let's convert it into a bit Blockchain Block. Ref.



Let's read basic on Bitcoin Mining here and here then run this write and run this code.

```
from hashlib import sha256 # SHA 256 Hash Algorithm
MAX_NONCE = 100000000000

def SHA256(text):
    return sha256(text.encode("ascii")).hexdigest()

def mine(block_number, transactions, previous_hash, prefix_zeros):
    prefix_str = '0'*prefix_zeros
    for nonce in range(MAX_NONCE):
      #preparing the string along with Tx and other data
        text = str(block_number) + transactions + previous_hash + str(nonce)
        new_hash = SHA256(text)
        if new_hash.startswith(prefix_str):
            print(f"Successfully mined bitcoins with nonce value:{nonce}")
            return new_hash

    raise BaseException(f"Couldn't find correct has after trying {MAX_NONCE} times")

#Demo Bitcoin Transaction

if __name__=='__main__':
    transactions='''
    George->Brwon->100,
    Robin->Russel->300
    '''
    difficulty=4 # higher values increases the difficulty level
    import time
    start = time.time()
    print("start mining")
    new_hash = mine(5,transactions,'0000000xa036944e29568d0cff17edbe038f81208fecf9a66be9a2b8321c6ec7', difficulty)
    total_time = str((time.time() - start))
    print(f"end mining. Mining took: {total_time} seconds")
    print(new_hash)
```

Output (Google Colab):

```
start mining
Successfully mined bitcoins with nonce value:5693
end mining. Mining took: 0.015341043472290039 seconds
0000452860eaec3c9ee456db638b145f14adc177c3e33a0320ca75dd51986e4e
```

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