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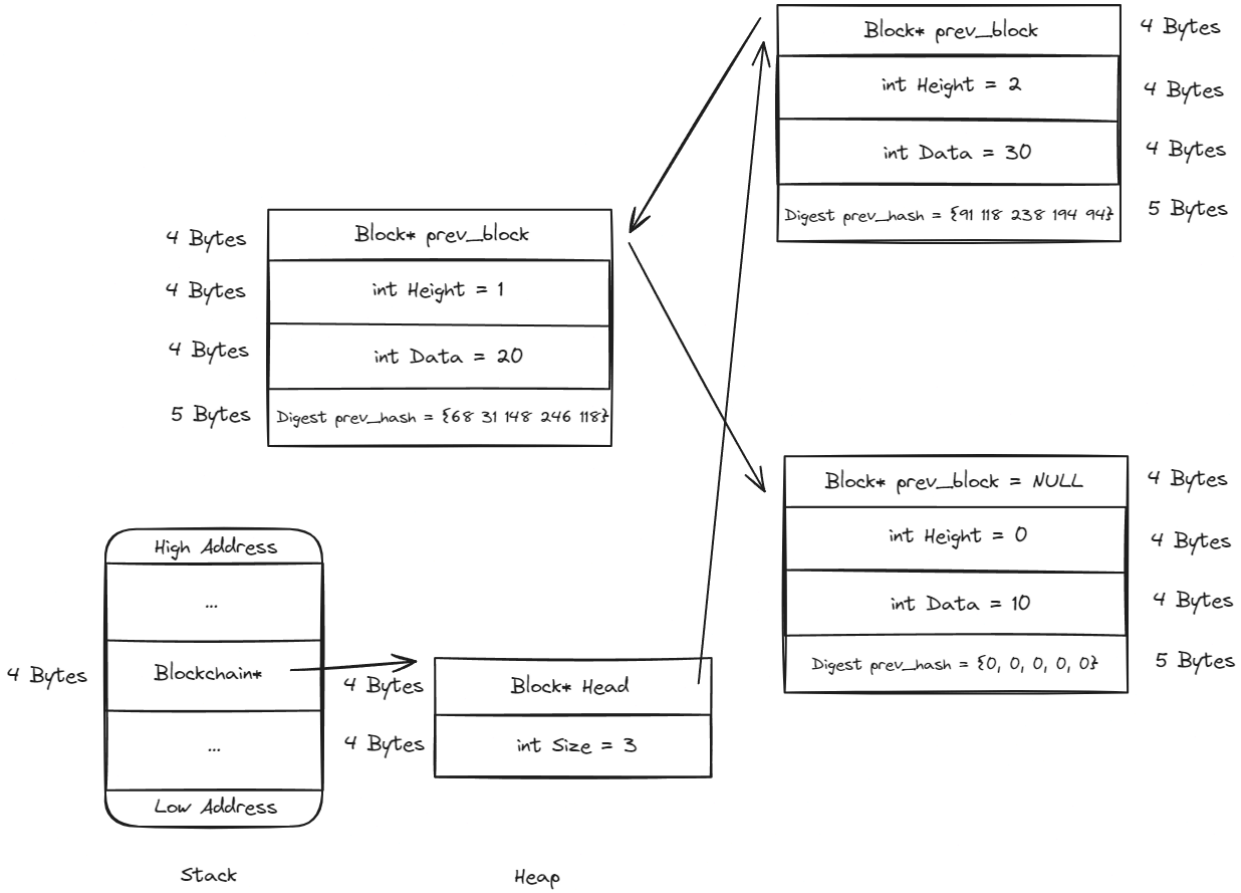
1. 

2. To detect this error, I would implement a second check in the current verify function. On a given block, I would verify that the hash stored in the prev_hash variable on the next block is equal to the hash of the previous block. This would take some work to implement, but would effectively detect this issue and solve the problem. If this error were to make it through testing and end up inside of a production system, the integrity of the entire blockchain would be compromised. Since the blockchain data structure entirely relies on the hashes of the blocks being accurate, the data structure would practically be unable to verify blocks of data. This would allow people to tamper and alter data without being detected by the blockchain verify functionality, since that functionality is broken.
3. An application that could benefit from distributed blockchain technology would be healthcare providers. Maintaining integrity is crucial for healthcare providers, and blockchain technology would help prevent unauthorized tampering which could potentially lead to severe consequences. Healthcare systems need more security than a traditional database because of these possible severe consequences, and blockchain technology again helps prevent tampering through the hashing checks. Also, the decentralized multi-system setup makes it harder for people to tamper with information,

especially with multiple independent organizations verifying the legitimacy of the blockchain code.

SHA-40 Test:

```
Rob Hash: 44 249 28 28 4
James Hash: 183 77 40 76 148
CSEC Hash: 72 243 238 24 26
Luke Hash: 214 85 72 44 218
Rob and Rob: 1
Rob and James: 0
```

Test #1:

```
Printing...
{height: 4, data: 50, prev_hash: 26 24 238 12 78}
{height: 3, data: 40, prev_hash: 37 114 130 226 156}
{height: 2, data: 30, prev_hash: 224 28 110 134 220}
{height: 1, data: 20, prev_hash: 68 31 148 246 118}
{height: 0, data: 10, prev_hash: 0 0 0 0 0}
Block 4 passed
Block 3 passed
Block 2 passed
Block 1 passed
Block 0 passed
All blocks have been verified
```

Test #2:

```
Printing...
{height: 4, data: 50, prev_hash: 142 77 150 14 82}
{height: 3, data: 40, prev_hash: 26 235 210 142 154}
{height: 2, data: 30, prev_hash: 217 192 130 194 220}
{height: 1, data: 20, prev_hash: 68 31 148 246 118}
{height: 0, data: 10, prev_hash: 0 0 0 0 0}
Block 4 passed
Block 3 passed
Block 2 passed
Block 1 passed
Block 0 passed
All blocks have been verified
Altering a block...
Block 2 altered containing now 300
Printing...
{height: 4, data: 50, prev_hash: 142 77 150 14 82}
{height: 3, data: 40, prev_hash: 26 235 210 142 154}
{height: 2, data: 300, prev_hash: 217 192 130 194 220}
{height: 1, data: 20, prev_hash: 68 31 148 246 118}
{height: 0, data: 10, prev_hash: 0 0 0 0 0}
Block 4 passed
Block 3 failed
```

Test #3:

```
Printing...
{height: 4, data: 50, prev_hash: 223 181 28 156 168}
{height: 3, data: 40, prev_hash: 216 45 52 116 42}
{height: 2, data: 30, prev_hash: 130 172 70 230 144}
{height: 1, data: 20, prev_hash: 68 31 148 246 118}
{height: 0, data: 10, prev_hash: 0 0 0 0 0}
Block 4 passed
Block 3 passed
Block 2 passed
Block 1 passed
Block 0 passed
All blocks have been verified
Altering two blocks...
Block 1 altered containing now 200
Block 2 altered too
Printing...
{height: 4, data: 50, prev_hash: 223 181 28 156 168}
{height: 3, data: 40, prev_hash: 216 45 52 116 42}
{height: 2, data: 30, prev_hash: 6 174 192 94 240}
{height: 1, data: 200, prev_hash: 68 31 148 246 118}
{height: 0, data: 10, prev_hash: 0 0 0 0 0}
Block 4 passed
Block 3 failed
```

Test #4:

```
Printing...
{height: 4, data: 50, prev_hash: 220 47 16 82 244}
{height: 3, data: 40, prev_hash: 89 103 210 42 82}
{height: 2, data: 30, prev_hash: 205 81 154 192 160}
{height: 1, data: 20, prev_hash: 68 31 148 246 118}
{height: 0, data: 10, prev_hash: 0 0 0 0 0}
Block 4 passed
Block 3 passed
Block 2 passed
Block 1 passed
Block 0 passed
All blocks have been verified
Deleting...
Block 1 deleted
Printing...
{height: 4, data: 50, prev_hash: 220 47 16 82 244}
{height: 3, data: 40, prev_hash: 89 103 210 42 82}
{height: 2, data: 30, prev_hash: 205 81 154 192 160}
{height: 0, data: 10, prev_hash: 0 0 0 0 0}
Block 4 passed
Block 3 failed
```