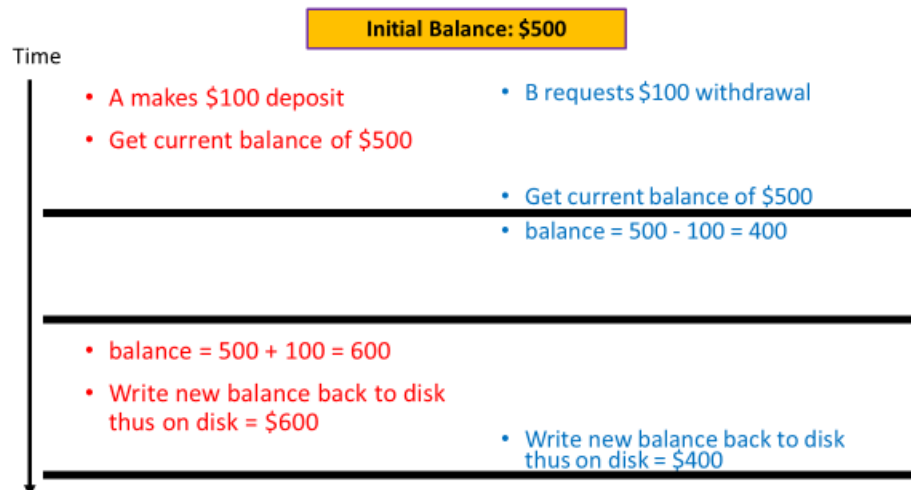There is a bank account that both user A and B can access, get the balance, make a deposit and request a withdrawal. The initial balance is $500. Now user A wants to make $100 deposit and B wants to request $100 withdrawal. Their operations roughly arrive at the same time.

Can you give an example that shows the final balance is NOT $500? Is there any solution you can think of to solve the problem?

Banking Example

Initial Balance: $500

Time

- A makes $100 deposit
- Get current balance of $500

- B requests $100 withdrawal

- Get current balance of $500
- balance = 500 - 100 = 400

- balance = 500 + 100 = 600
- Write new balance back to disk thus on disk = $600

- Write new balance back to disk thus on disk = $400

Final Answer?

Banking Example (Permission-based: Lock)

Initial Balance: $500

Time

- A makes $100 deposit
- Request and get AcctLock
- Get current balance of $500 from disk

- B requests $100 withdrawal

- Request AcctLock
- Wait(AcctLock)

- balance = 500 + 100 = 600
- Write back balance = $600
- Release AcctLock

- Get AcctLock
- Read balance = 600
- balance = 600 - 100 = 500
- Write back $500