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Practice 3 - Backend

Account Transfer System with Balance Validation in Node.js

Objective: Learn how to implement a secure money transfer API in Node.js and MongoDB without using database transactions. This helps you understand dependent multi-document updates, balance validation, and proper error handling.

Concept Overview:

In financial systems, fund transfers require consistent updates to multiple user accounts. This exercise teaches logical validation and sequential updates to ensure accuracy without database transactions.

Steps / Procedure:

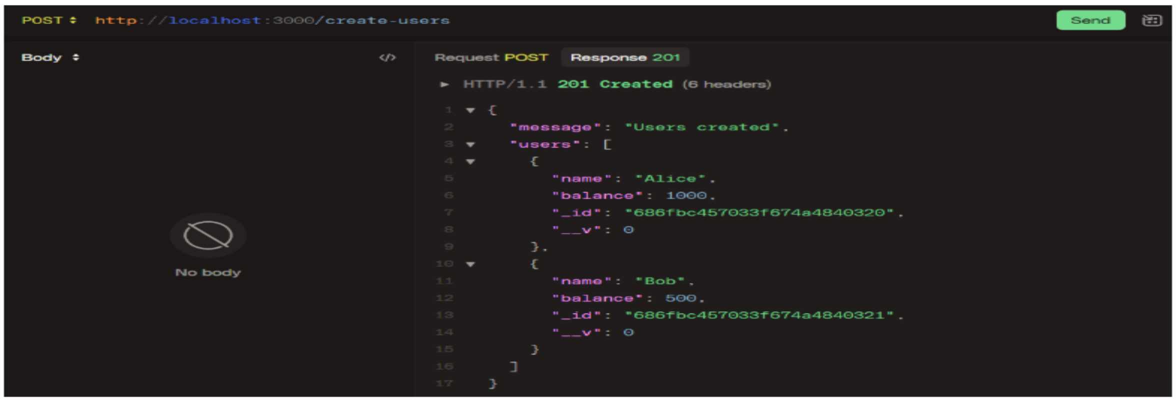
Step 1: Initialize Project

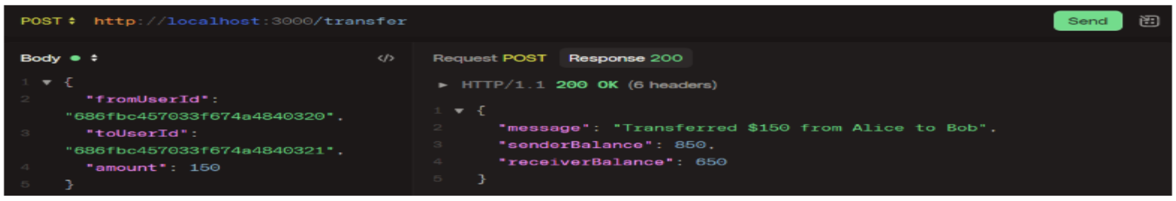
```
mkdir account-transfer-system
cd account-transfer-system
npm init -y
npm install express mongoose body-parser
```

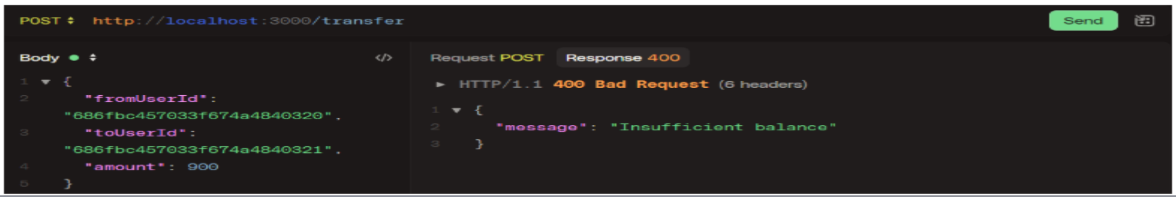
Step 2: Create server.js

```
const express = require('express');
const mongoose = require('mongoose');
const bodyParser = require('body-parser');
const app = express();
const PORT = 3000;

app.use(bodyParser.json());

mongoose.connect('mongodb://localhost:27017/bankDB', {
  useNewUrlParser: true,
  useUnifiedTopology: true
});

const userSchema = new mongoose.Schema({
  name: String,
  balance: Number
});

const User = mongoose.model('User', userSchema);

app.post('/create-users', async (req, res) => {
  try {
    await User.deleteMany({});
    const users = await User.insertMany([
      { name: 'Alice', balance: 1000 },
      { name: 'Bob', balance: 500 }
    ]);
    res.status(201).json({ message: 'Users created', users });
  } catch (err) {
    res.status(500).json({ message: 'Error creating users' });
  }
});

app.post('/transfer', async (req, res) => {
  try {
    const { fromUserId, toUserId, amount } = req.body;
    const sender = await User.findById(fromUserId);
    const receiver = await User.findById(toUserId);

    if (!sender || !receiver) {
      return res.status(404).json({ message: 'User not found' });
    }

    if (sender.balance < amount) {
      return res.status(400).json({ message: 'Insufficient balance' });
    }

    sender.balance -= amount;
    receiver.balance += amount;

    await sender.save();
    await receiver.save();

    res.status(200).json({
      message: `Transferred $${amount} from ${sender.name} to ${receiver.name}`,
      senderBalance: sender.balance,
      receiverBalance: receiver.balance
    });
  } catch (error) {
    res.status(500).json({ message: 'Transfer failed', error: error.message });
  }
});

app.listen(PORT, () => {
  console.log(`Server running on http://localhost:${PORT}`);
});
```

Expected Output:


```
POST  http://localhost:3000/create-users                                   Send

Body                              Request POST   Response 201

        No body                   ▸ HTTP/1.1 201 Created (6 headers)
                                  {
                                    "message": "Users created",
                                    "users": [
                                      {
                                        "name": "Alice",
                                        "balance": 1000,
                                        "_id": "686fbc457033f674a4840320",
                                        "__v": 0
                                      },
                                      {
                                        "name": "Bob",
                                        "balance": 500,
                                        "_id": "686fbc457033f674a4840321",
                                        "__v": 0
                                      }
                                    ]
                                  }
```


```
POST  http://localhost:3000/transfer                                       Send

Body ●                            Request POST   Response 200
{                                 ▸ HTTP/1.1 200 OK (6 headers)
    "fromUserId":                 {
  "686fbc457033f674a4840320",       "message": "Transferred $150 from Alice to Bob",
    "toUserId":                     "senderBalance": 850,
  "686fbc457033f674a4840321",       "receiverBalance": 650
    "amount": 150                 }
}
```


```
POST  http://localhost:3000/transfer                                       Send

Body ●                            Request POST   Response 400
{                                 ▸ HTTP/1.1 400 Bad Request (6 headers)
    "fromUserId":                 {
  "686fbc457033f674a4840320",       "message": "Insufficient balance"
    "toUserId":                   }
  "686fbc457033f674a4840321",
    "amount": 900
}
```

Result:

The system successfully transfers funds between users with proper validation and error handling. Logical checks ensure consistent data even without transactions.