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Practice 2 - Backend

Title: JWT Authentication for Secure Banking API Endpoints

Objective:
Learn how to implement secure authentication in an Express.js application using JSON Web Tokens (JWT). This task helps you understand how to generate tokens, verify them in middleware, and protect sensitive API routes to ensure only authorized users can access banking operations.

Concept Overview:
JWT (JSON Web Token) is a compact and self-contained way for securely transmitting information between a client and server. Tokens are signed using a secret key and can be verified to ensure authenticity. Middleware is used to protect routes that should only be accessed by authenticated users.

Steps / Procedure:

Step 1: Initialize Project

```
mkdir jwt-banking-api
cd jwt-banking-api
npm init -y
npm install express jsonwebtoken body-parser
```

Step 2: Create server.js

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

app.use(bodyParser.json());

const USER = { username: 'user1', password: 'password123' };
const SECRET_KEY = 'myjwtsecret';
let balance = 1000;

app.post('/login', (req, res) => {
  const { username, password } = req.body;
  if (username === USER.username && password === USER.password) {
    const token = jwt.sign({ username }, SECRET_KEY, { expiresIn: '1h' });
    res.json({ token });
  } else {
    res.status(401).json({ message: 'Invalid credentials' });
  }
});

function verifyToken(req, res, next) {
  const authHeader = req.headers['authorization'];
  if (!authHeader) return res.status(403).json({ message: 'Token missing' });

  const token = authHeader.split(' ')[1];
  jwt.verify(token, SECRET_KEY, (err, decoded) => {
    if (err) return res.status(403).json({ message: 'Invalid or expired token' });
    req.user = decoded;
    next();
  });
}

app.get('/balance', verifyToken, (req, res) => res.json({ balance }));

app.post('/deposit', verifyToken, (req, res) => {
  const { amount } = req.body;
  balance += amount;
  res.json({ message: `Deposited $${amount}`, newBalance: balance });
});

app.post('/withdraw', verifyToken, (req, res) => {
  const { amount } = req.body;
  if (amount > balance) return res.status(400).json({ message: 'Insufficient funds' });
  balance -= amount;
  res.json({ message: `Withdrew $${amount}`, newBalance: balance });
});

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

Step 3: Run the Server

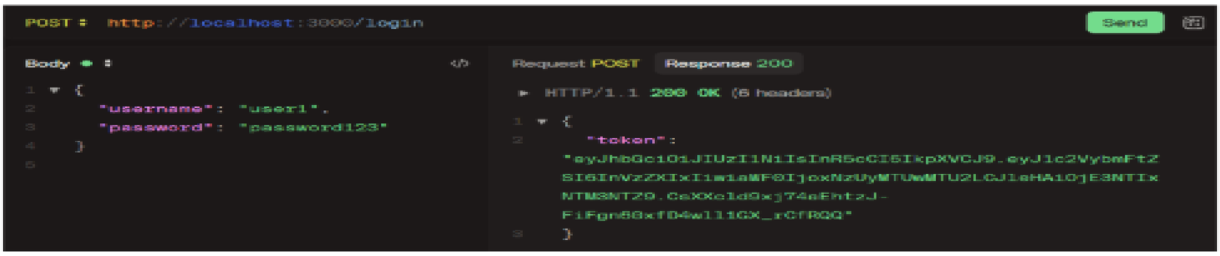
```
node server.js
```

Step 4: Test the API using Postman or curl

```
1■■ Login (POST /login)
2■■ Access /balance without token
3■■ Access /balance with valid token
4■■ Deposit money
5■■ Withdraw money
```

Expected Output:

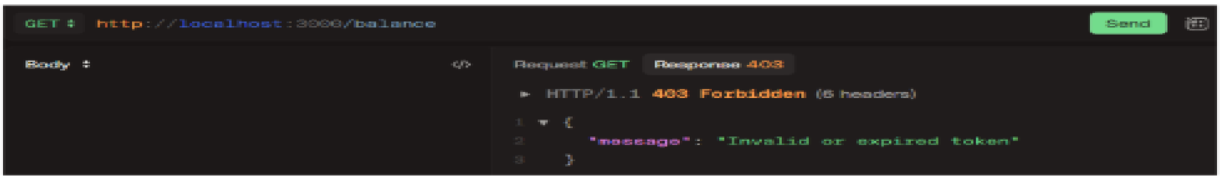
Expected Output



```
POST http://localhost:3000/login
```

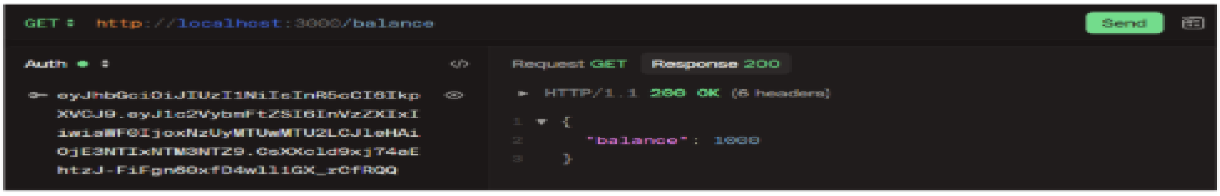
```
{
    "username": "user1",
    "password": "password123"
}
```

```
HTTP/1.1 200 OK (6 headers)
{
    "token":
"eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJ1c2VybmFtZSI6InVzZXIxIiwiaWF0IjoxNzUyMTUwMTU2LCJleHAiOjE3NTIxNTM3NTZ9.CsXXcld9xj74aEhtzJ-FiFgn60xfD4wl11GX_rCfRQQ"
}
```



```
GET http://localhost:3000/balance
```

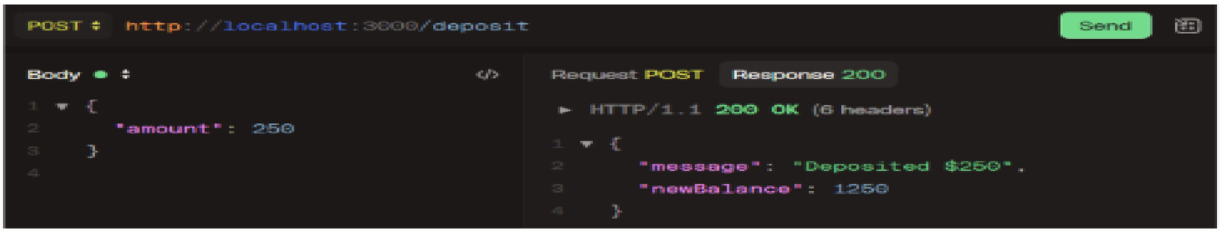
```
HTTP/1.1 403 Forbidden (6 headers)
{
    "message": "Invalid or expired token"
}
```



```
GET http://localhost:3000/balance
```

```
eyJhbGciOiJIUzI1NiIsInR5cCI6Ikp
XVCJ9.eyJ1c2VybmFtZSI6InVzZXIxI
iwiaWF0IjoxNzUyMTUwMTU2LCJleHAi
OjE3NTIxNTM3NTZ9.CsXXcld9xj74aE
htzJ-FiFgn60xfD4wl11GX_rCfRQQ
```

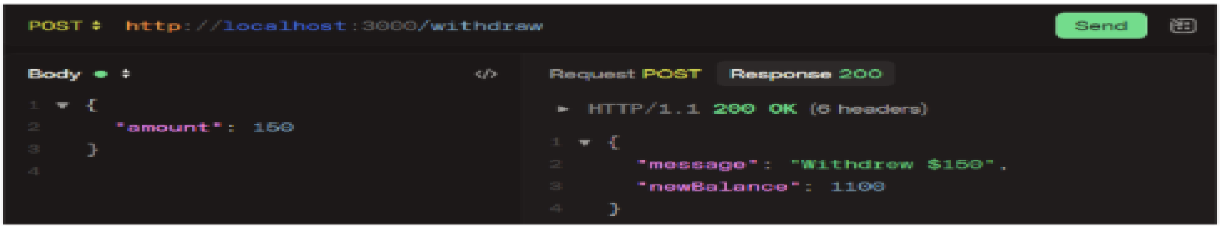
```
HTTP/1.1 200 OK (6 headers)
{
    "balance": 1000
}
```



```
POST http://localhost:3000/deposit
```

```
{
    "amount": 250
}
```

```
HTTP/1.1 200 OK (6 headers)
{
    "message": "Deposited $250",
    "newBalance": 1250
}
```



```
POST http://localhost:3000/withdraw
```

```
{
    "amount": 150
}
```

```
HTTP/1.1 200 OK (6 headers)
{
    "message": "Withdrew $150",
    "newBalance": 1100
}
```

Result:
- JWT successfully secures API routes.
- Unauthorized requests are blocked.
- Users can deposit and withdraw money only after authentication.
- Token verification ensures secure access to banking data.