```
npm install express-rate-limit
```

Apply Rate Limit to API Routes

```
const rateLimit = require('express-rate-limit');

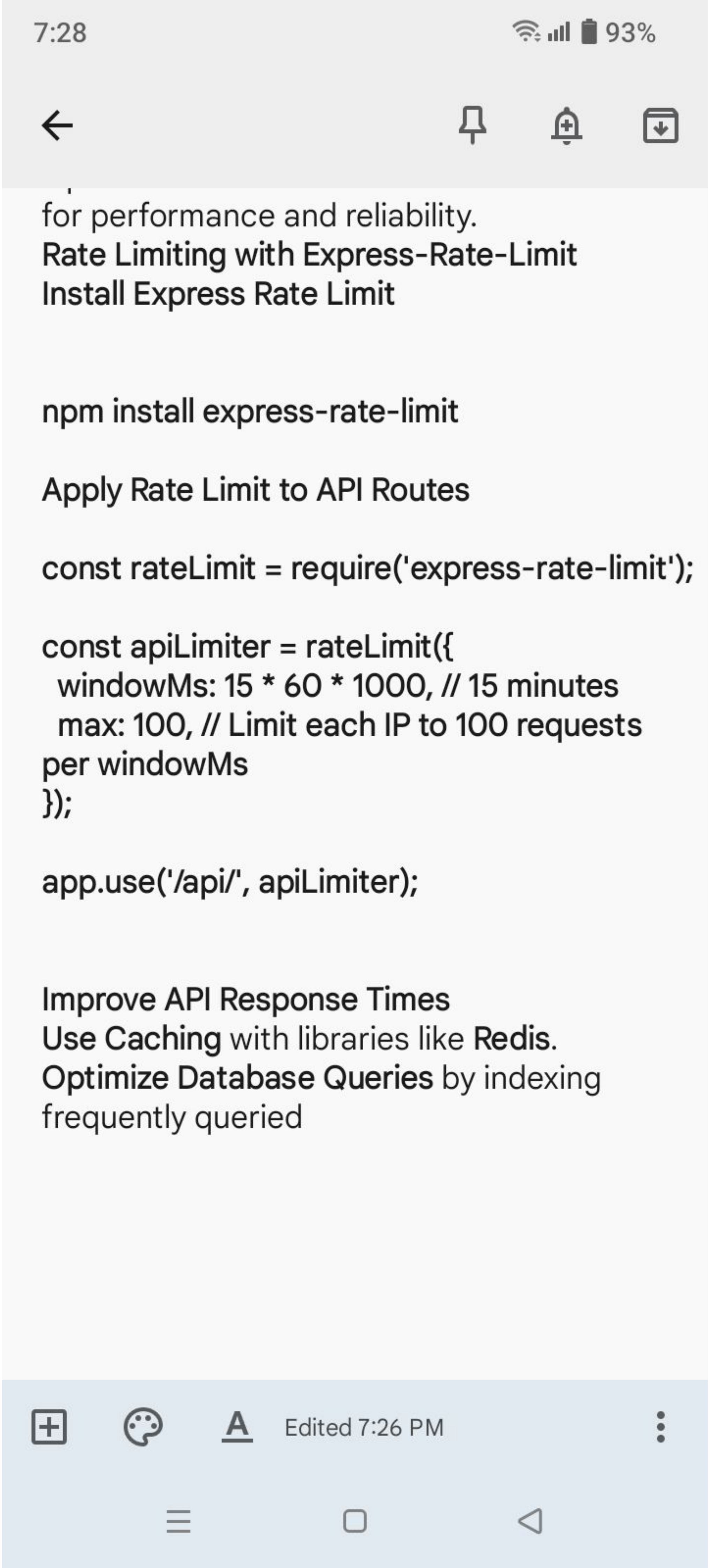
const apiLimiter = rateLimit({
  windowMs: 15 * 60 * 1000, // 15 minutes
  max: 100, // Limit each IP to 100 requests
per windowMs
});

app.use('/api/', apiLimiter);
```

Improve API Response Times

Use Caching with libraries like **Redis.**

Optimize Database Queries by indexing frequently queried



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Rate Limiting with Express-Rate-Limit
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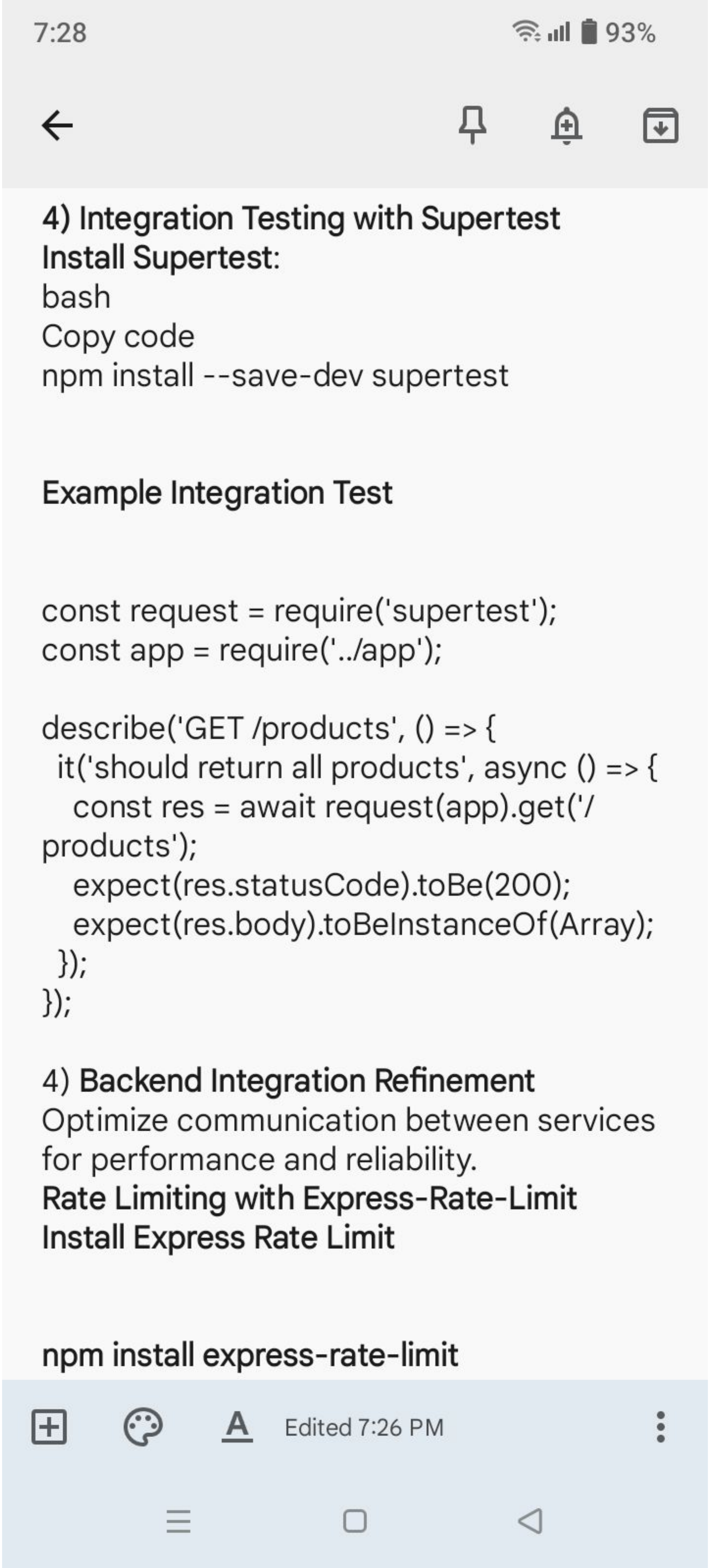

4) Integration Testing with Supertest
Install Supertest:
bash
Copy code
```
npm install --save-dev supertest
```

Example Integration Test

```
const request = require('supertest');
const app = require('../app');

describe('GET /products', () => {
  it('should return all products', async () => {
    const res = await request(app).get('/products');
    expect(res.statusCode).toBe(200);
    expect(res.body).toBeInstanceOf(Array);
  });
});
```

4) **Backend Integration Refinement**
Optimize communication between services for performance and reliability.
Rate Limiting with Express-Rate-Limit
Install Express Rate Limit

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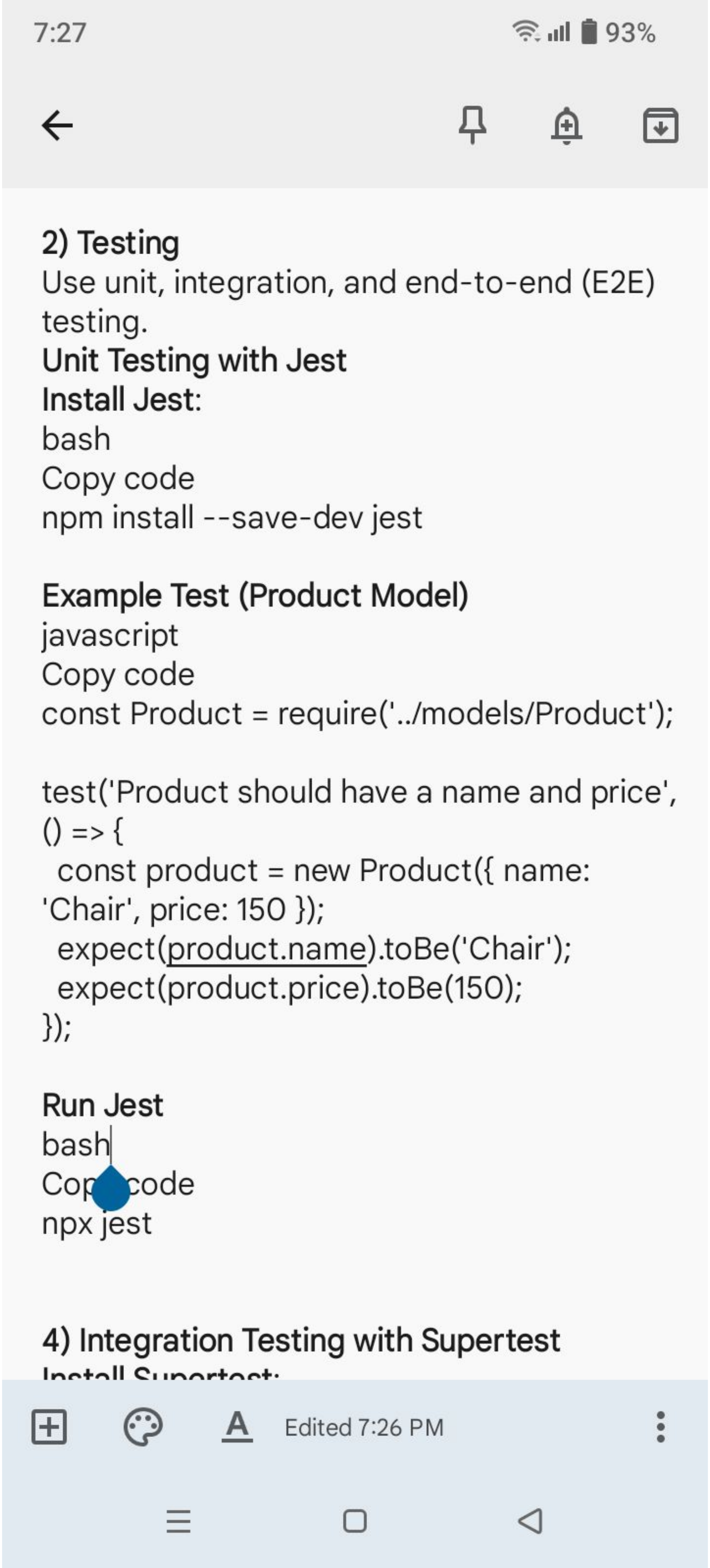
```



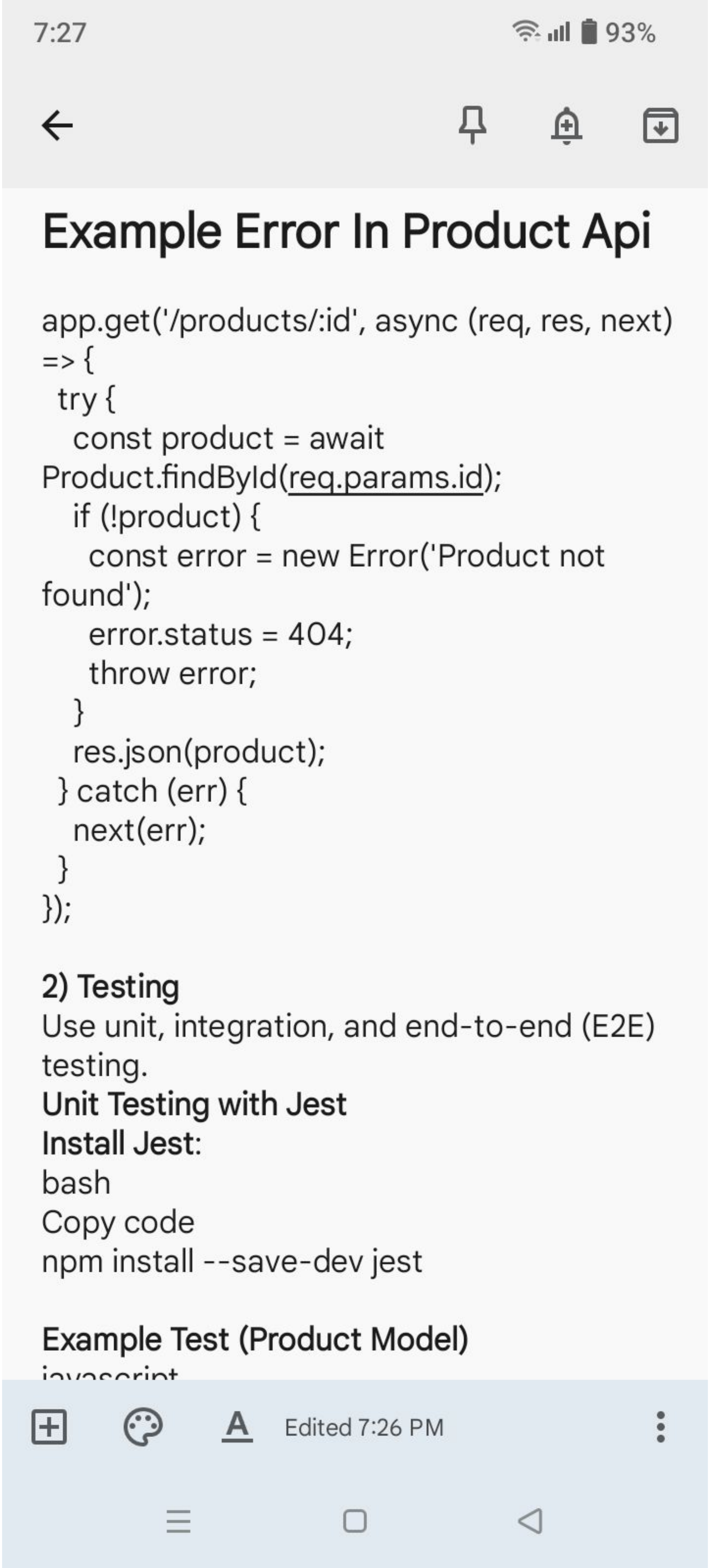
2) Testing
Use unit, integration, and end-to-end (E2E) testing.
Unit Testing with Jest
Install Jest:
bash
Copy code
```
npm install --save-dev jest
```

Example Test (Product Model)
javascript
Copy code
```
const Product = require('../models/Product');

test('Product should have a name and price', () => {
  const product = new Product({ name: 'Chair', price: 150 });
  expect(product.name).toBe('Chair');
  expect(product.price).toBe(150);
});
```

Run Jest
bash
Copy code
```
npx jest
```

4) Integration Testing with Supertest
Install Supertest:



Example Error In Product Api

```
app.get('/products/:id', async (req, res, next)
=> {
  try {
    const product = await
Product.findById(req.params.id);
    if (!product) {
      const error = new Error('Product not
found');
      error.status = 404;
      throw error;
    }
    res.json(product);
  } catch (err) {
    next(err);
  }
});
```

2) Testing
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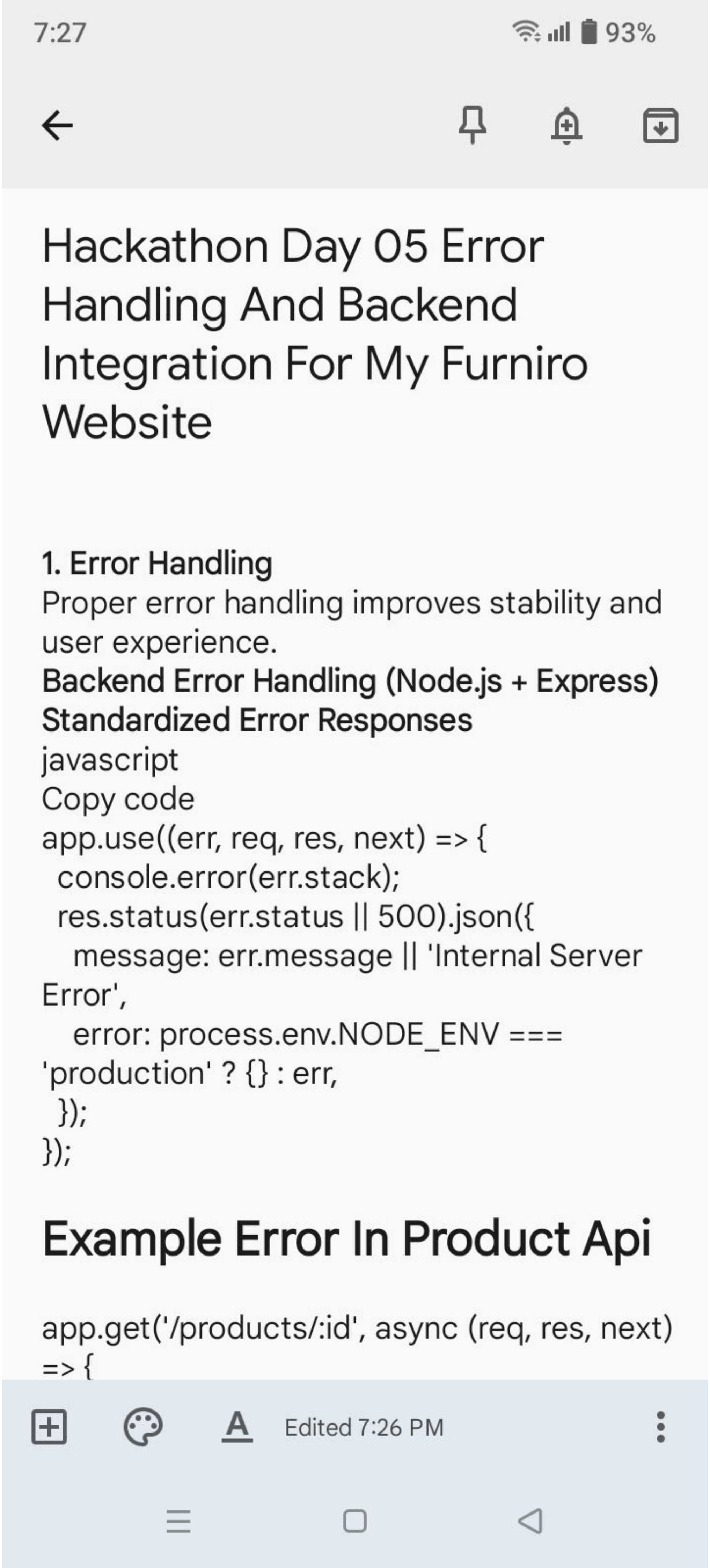

Hackathon Day 05 Error Handling And Backend Integration For My Furniro Website

1. Error Handling
Proper error handling improves stability and user experience.
Backend Error Handling (Node.js + Express)
Standardized Error Responses
javascript
Copy code

```javascript
app.use((err, req, res, next) => {
  console.error(err.stack);
  res.status(err.status || 500).json({
    message: err.message || 'Internal Server Error',
    error: process.env.NODE_ENV === 'production' ? {} : err,
  });
});
```

Example Error In Product Api

```javascript
app.get('/products/:id', async (req, res, next) => {
```