Testing Policy Document

Introduction

This testing policy aims to guarantee the Coffee-Shop-Manager (Koffieblik) system's continued reliable operation, maintainability, and resilience to bugs. By utilizing GitHub Actions for continuous integration and automated test execution, testing is integrated into the development lifecycle. This lowers the possibility of issues in production by guaranteeing that bug fixes and new features have been tested before deployment.

Automated Testing Strategy

Types of Tests

- **Unit Tests**
  Implemented with Jest, unit tests validate isolated functions.
- **Integration Tests**
  Validate interactions between API endpoints, database operations, and middleware components.
- **API Tests**
  Automated Postman collections (executed via Newman) test API endpoints both locally (in Docker) and against the deployed production API.
- **End-to-End (E2E) Tests**
  Playwright is used to simulate real-world workflows (e.g., placing orders, checking out, managing inventory) in the web interface.
- **Load and Stress Tests**
  Implemented with K6, defined in /load-tests and /load_stress_testing to verify system behavior under realistic and peak usage.

Continuous Integration with GitHub Actions

We automate deployment and testing with GitHub Actions. In .github/workflows/koffieblik_ci.yml, the pipeline is defined.

Workflow Overview

1. **Trigger**
   Runs automatically on:
   - Pushes to the main branch.
   - Pull requests targeting main.
2. **Setup**
   - Node.js v18 with caching of dependencies.
   - API and Koffieblik dependencies installed using npm ci.

- Production .env file securely loaded from GitHub Secrets.

3. **Environment Startup**
    - The production environment is started locally using Docker Compose (ENV_FILE=.env.prod docker compose up).
    - The workflow waits until the API responds on the health-check endpoint.
4. **Automated Test Execution**
    - API Tests:
        - Run against local API using Newman.
        - Run against production API.
    - Playwright E2E Tests:
        - Run make test in the koffieblik directory.

Testing Procedure

1. **Development**
   Developers write Jest unit tests and Playwright E2E tests for each feature.
2. **Local Verification**
   Developers run npm test and make test locally before committing.
3. **Continuous Integration**
   On each push or pull request:
    - GitHub Actions runs the full test pipeline.
    - Reports are uploaded for review.
4. **Review & Deployment**
    - Code reviews require all tests to pass.
    - If successful, code may be deployed to production.

Tools Justification

- Jest = Chosen for fast unit/integration testing and strong TypeScript support.
- Newman (Postman CLI) = Automates API collection testing both locally and against production.
- Playwright = Provides reliable, modern E2E testing for Next.js applications across browsers.
- GitHub Actions = Fully integrated with our GitHub repo, making it easier and more secure to manage CI/CD than external services like Travis CI.

Repository & Reports

6. **Test Cases:**
    - Unit and E2E tests: /koffieblik/tests/
    - API Postman tests: /API/tests/
    - Load tests /koffieblik/load-tests/
    - Stress tests /koffieblik/load_stress_testing/
7. **Reports:**
    - HTML and CLI reports: /koffieblik/test-results/
    - GitHub Actions artifacts available under each workflow run.

- CI Configuration:
  .github/workflows/koffieblik_ci.yml defines the full pipeline.