Cycle Pricing Engine - Project Analysis

Project Structure

1. Main Application:

   - CyclePricingEngineApplication.java (Spring Boot starter class)

2. Configuration:

   - SecurityConfig.java, SecurityUtil.java (Security setup)

   - SwaggerConfig.java (API documentation using Swagger)

3. Controllers (API Endpoints):

   - BrandController.java (Brand management)

   - ItemController.java (Item CRUD operations)

   - PricingController.java (Cycle pricing calculation)

4. DTOs (Data Transfer Objects):

   - ActiveStatus.java, ItemRequest.java, ItemResponse.java (API data formats)

5. Entities (Database Tables):

   - Brands.java (Brands table mapping)

   - Items.java (Items table mapping)

6. Exception Handling:

   - BrandNotFound.java, DuplicateBrand.java, ItemNotFound.java (Custom exceptions)

   - GlobalExceptionHandler.java (Centralized error handling)

7. Repositories (Database Layer - JPA):

   - BrandRepository.java, ItemRepository.java (Database queries)

8. Services (Business Logic Layer):

   - BrandService.java, ItemService.java (Business logic implementation)

Technology Stack Used

- Spring Boot - Backend framework

- Spring Data JPA - Database handling

- Spring Security - Authentication and Authorization

- JWT - Token-based authentication

- Swagger - API documentation

- ExecutorService - Manages multithreading for bulk processing

- MySQL - Database for brands, items, and pricing history

Application Execution Flow

1. User sends a request to calculate cycle pricing (/cycle-pricing/calculate-multiple).

2. Request goes to PricingController where validation happens.

3. If bulk request, it is handed over to CyclePricingExecutor.

4. Multithreading is managed using ExecutorService.

5. PricingService retrieves item prices from MySQL based on requestedDate.

6. The final price breakdown is generated and sent as a JSON response.

Key Features

1. Inventory Management:

   - CRUD operations for brands and items.

   - Price tracking with validity periods.

   - Real-time search and pagination.

2. Cycle Configuration:

   - Select components like frame, wheels, brakes, and seating.

3. Price Estimation:

   - Real-time price calculation with GST (18%).

   - Component-wise price breakdown.

- Saves pricing estimates for future reference.

4. User Management:

  - Role-based access control (Admin, Manager, User).

  - Secure login and user profile management.

  - History of saved estimates.

5. Responsive Design:

  - Mobile-friendly and adaptive layout.

  - Interactive UI with smooth navigation.