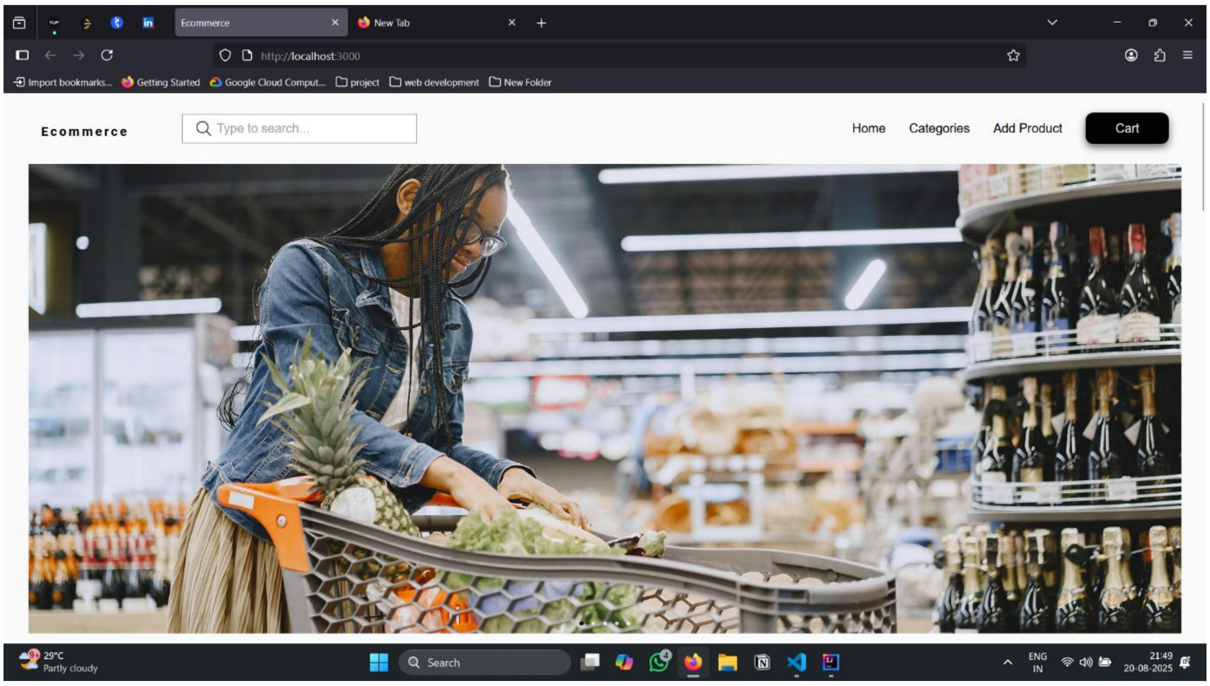
Tools & Technologies Used

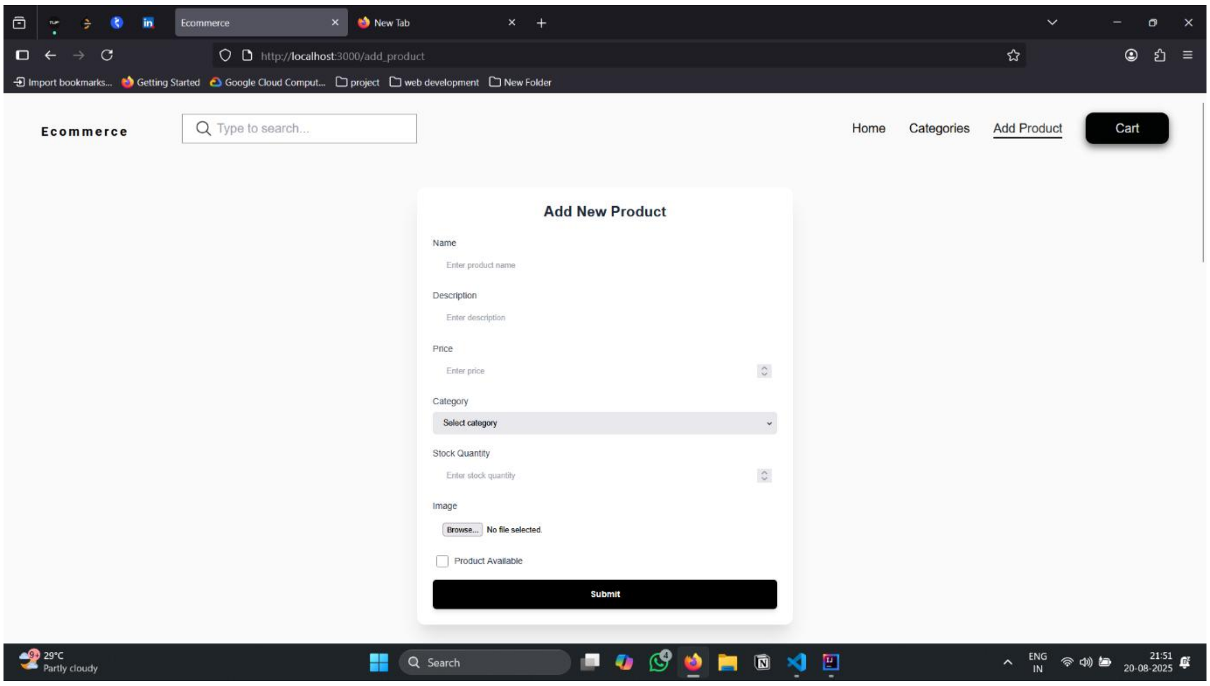
- **VS Code** – Used for developing the **frontend UI**.
- **IntelliJ IDEA** – Used for building the **backend server** integrated with MySQL.
- **React.js** – Renders the web pages with a responsive and user-friendly interface.
- **Tailwind CSS & External CSS** – Provide styling for components to make the UI visually appealing.
- **Spring Boot** – Implements the backend server using Tomcat and handles all CRUD operations.
- **MySQL Workbench** – Manages the relational database with multiple tables to organize products and categories.

Workflow

1. The **web page is first rendered** using React.



2. The **merchandiser can add categories and attributes** from the UI.



Add New Product

Name: Enter product name

Description: Enter description

Price: Enter price

Category: Select category

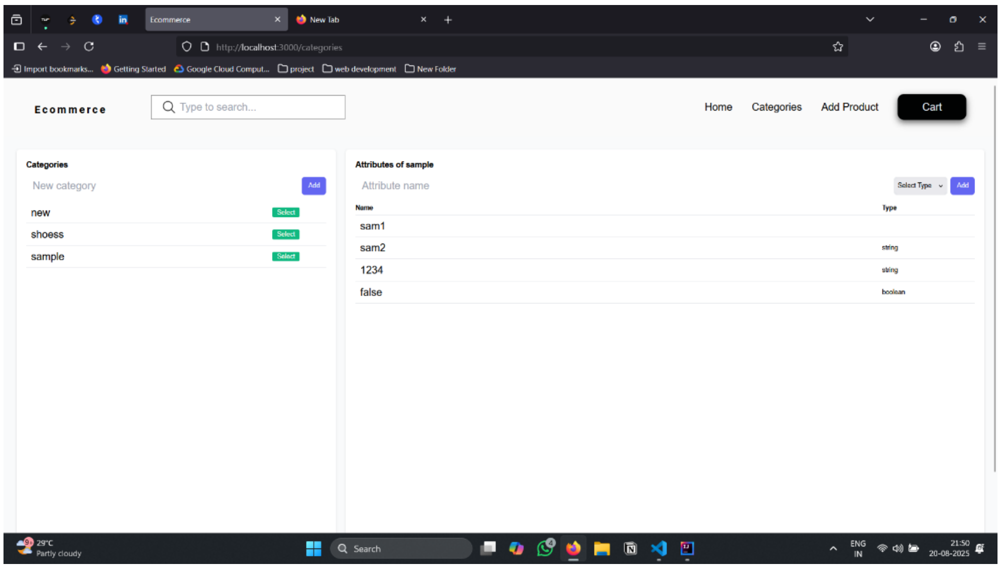
Stock Quantity: Enter stock quantity

Image: Browse... No file selected.

☐ Product Available

Submit

3. When adding a product, the user can **select a category** and fill in details like:

   - Product name
   - Description
   - Image
   - Stock quantity
   - Price
   - Availability
   - 

Categories

New category [Add]

new	Select
shoess	Select
sample	Select

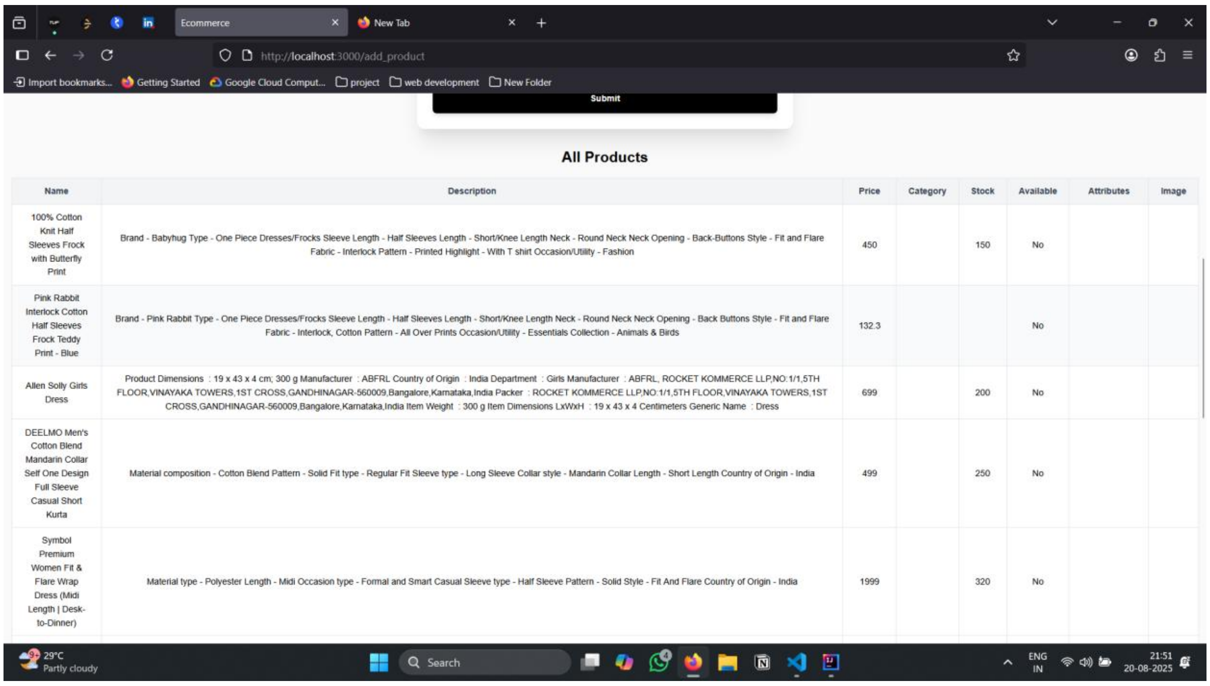
Attributes of sample

Attribute name [Select Type] [Add]

Name	Type
sam1	
sam2	string
1234	string
false	boolean

○

4. After saving, the product is displayed in a **table view**.

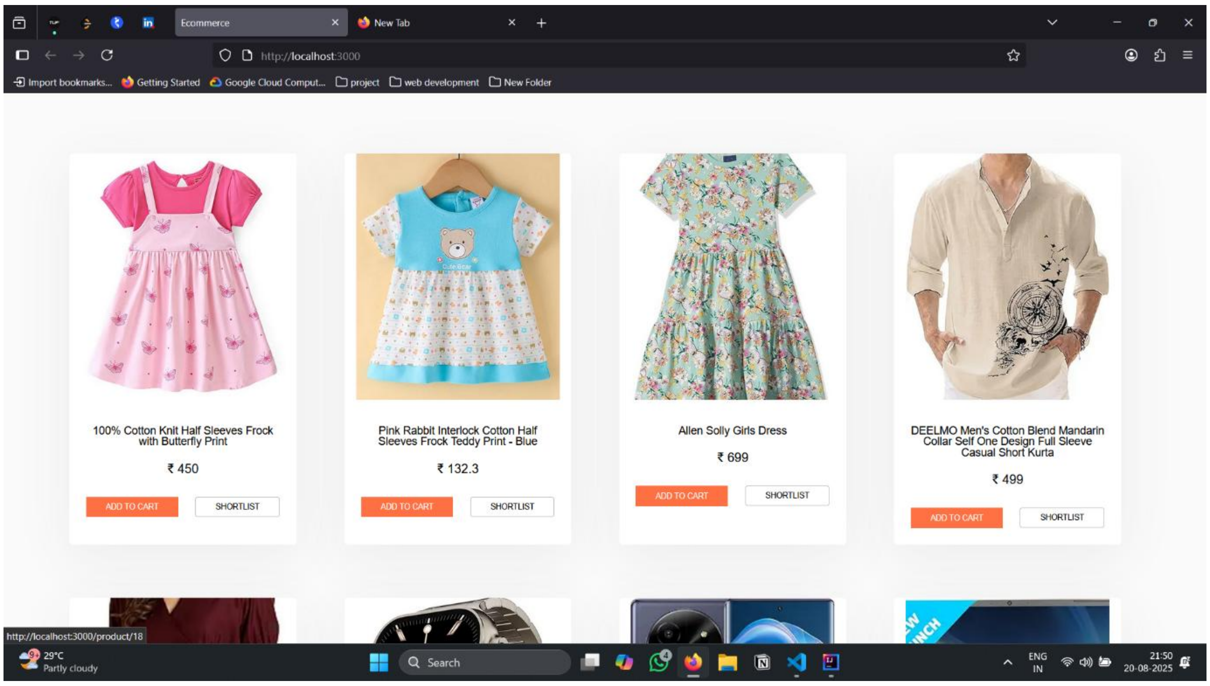


Submit

All Products

Name	Description	Price	Category	Stock	Available	Attributes	Image
100% Cotton Knit Half Sleeves Frock with Butterfly Print	Brand - Babyhug Type - One Piece Dresses/Frocks Sleeve Length - Half Sleeves Length - Short/Knee Length Neck - Round Neck Neck Opening - Back-Buttons Style - Fit and Flare Fabric - Interlock Pattern - Printed Highlight - With T shirt Occasion/Utility - Fashion	450		150	No		
Pink Rabbit Interlock Cotton Half Sleeves Frock Teddy Print - Blue	Brand - Pink Rabbit Type - One Piece Dresses/Frocks Sleeve Length - Half Sleeves Length - Short/Knee Length Neck - Round Neck Neck Opening - Back Buttons Style - Fit and Flare Fabric - Interlock, Cotton Pattern - All Over Prints Occasion/Utility - Essentials Collection - Animals & Birds	132.3			No		
Allen Solly Girls Dress	Product Dimensions : 19 x 43 x 4 cm; 300 g Manufacturer : ABFRL Country of Origin : India Department : Girls Manufacturer : ABFRL, ROCKET KOMMERCE LLP,NO:1/1,5TH FLOOR,VINAYAKA TOWERS,1ST CROSS,GANDHINAGAR-560009,Bangalore,Karnataka,India Packer : ROCKET KOMMERCE LLP,NO:1/1,5TH FLOOR,VINAYAKA TOWERS,1ST CROSS,GANDHINAGAR-560009,Bangalore,Karnataka,India Item Weight : 300 g Item Dimensions LxWxH : 19 x 43 x 4 Centimeters Generic Name : Dress	699		200	No		
DEELMO Men's Cotton Blend Mandarin Collar Self One Design Full Sleeve Casual Short Kurta	Material composition - Cotton Blend Pattern - Solid Fit type - Regular Fit Sleeve type - Long Sleeve Collar style - Mandarin Collar Length - Short Length Country of Origin - India	499		250	No		
Symbol Premium Women Fit & Flare Wrap Dress (Midi Length | Desk-to-Dinner)	Material type - Polyester Length - Midi Occasion type - Formal and Smart Casual Sleeve type - Half Sleeve Pattern - Solid Style - Fit And Flare Country of Origin - India	1999		320	No		

5. On the main page, products appear as **grid cards**.



100% Cotton Knit Half Sleeves Frock with Butterfly Print
₹ 450
ADD TO CART SHORTLIST

Pink Rabbit Interlock Cotton Half Sleeves Frock Teddy Print - Blue
₹ 132.3
ADD TO CART SHORTLIST

Allen Solly Girls Dress
₹ 699
ADD TO CART SHORTLIST

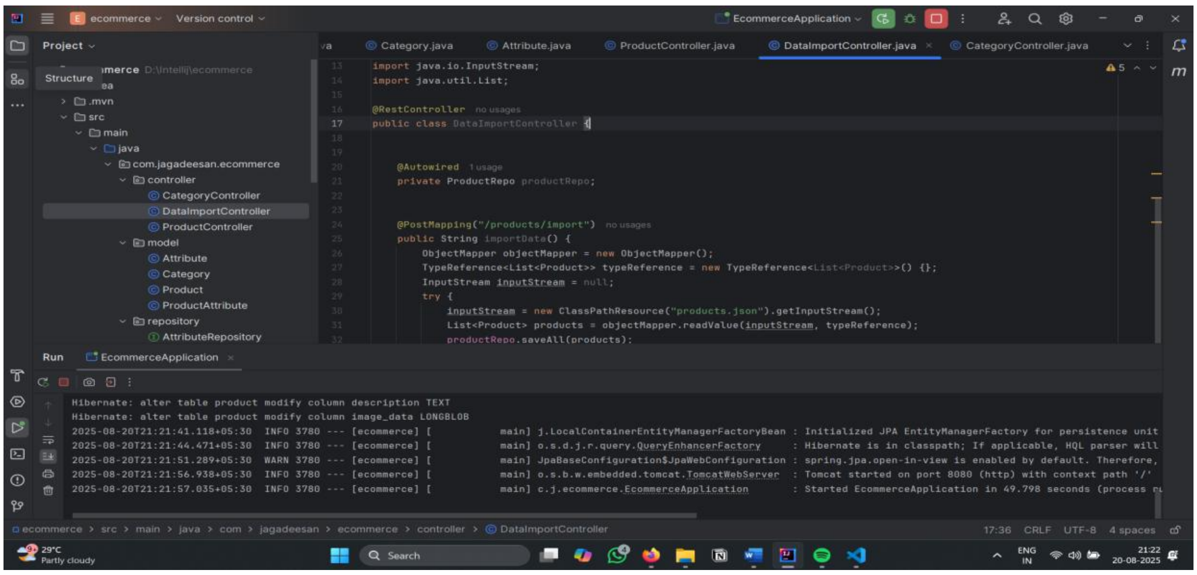
DEELMO Men's Cotton Blend Mandarin Collar Self One Design Full Sleeve Casual Short Kurta
₹ 499
ADD TO CART SHORTLIST

http://localhost:3000/product/18

6. Clicking a product card opens a **detailed product page** showing the image and all information. From there, the product can also be **updated or edited in the future**.

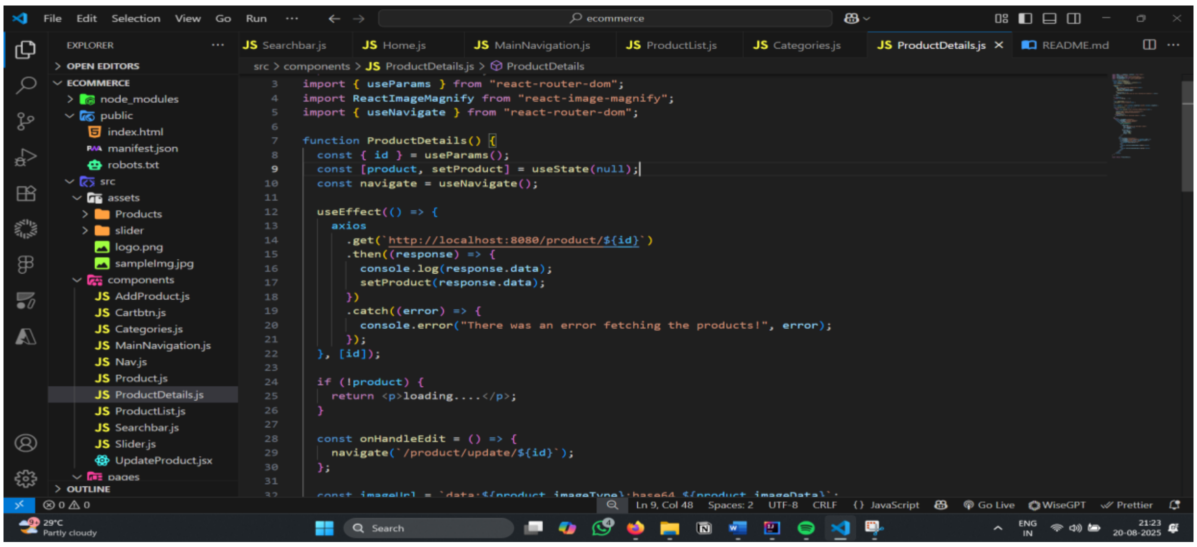
Step-by-Step Setup

1. **Frontend (VS Code)**
    - Open VS Code.
    - Install the required **npm packages**.
    - All necessary React libraries for the frontend are managed through npm.
2. **Backend (IntelliJ IDEA)**
    - Open IntelliJ IDEA.
    - Implement services to handle requests and responses in **JSON format**.
    - Add all backend dependencies inside the **pom.xml file** (Maven will automatically download the required libraries).

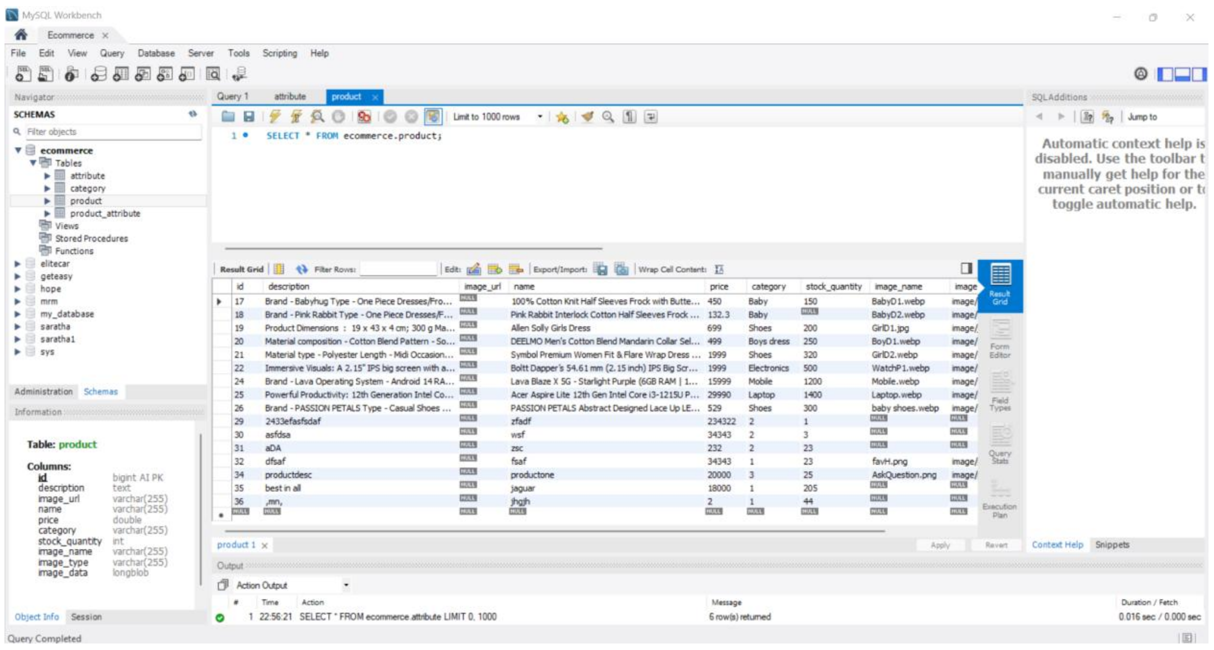


```java
import java.io.InputStream;
import java.util.List;

@RestController  no usages
public class DataImportController {


    @Autowired  1 usage
    private ProductRepo productRepo;


    @PostMapping("/products/import")  no usages
    public String importData() {
        ObjectMapper objectMapper = new ObjectMapper();
        TypeReference<List<Product>> typeReference = new TypeReference<List<Product>>() {};
        InputStream inputStream = null;
        try {
            inputStream = new ClassPathResource("products.json").getInputStream();
            List<Product> products = objectMapper.readValue(inputStream, typeReference);
            productRepo.saveAll(products);
```

```
Hibernate: alter table product modify column description TEXT
Hibernate: alter table product modify column image_data LONGBLOB
2025-08-20T21:21:41.118+05:30  INFO 3780 --- [ecommerce] [           main] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence unit
2025-08-20T21:21:44.471+05:30  INFO 3780 --- [ecommerce] [           main] o.s.d.j.r.query.QueryEnhancerFactory     : Hibernate is in classpath; If applicable, HQL parser will
2025-08-20T21:21:51.289+05:30  WARN 3780 --- [ecommerce] [           main] JpaBaseConfiguration$JpaWebConfiguration : spring.jpa.open-in-view is enabled by default. Therefore,
2025-08-20T21:21:56.938+05:30  INFO 3780 --- [ecommerce] [           main] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat started on port 8080 (http) with context path '/'
2025-08-20T21:21:57.035+05:30  INFO 3780 --- [ecommerce] [           main] c.j.ecommerce.EcommerceApplication       : Started EcommerceApplication in 49.798 seconds (process ru
```



```javascript
import { useParams } from "react-router-dom";
import ReactImageMagnify from "react-image-magnify";
import { useNavigate } from "react-router-dom";

function ProductDetails() {
  const { id } = useParams();
  const [product, setProduct] = useState(null);
  const navigate = useNavigate();

  useEffect(() => {
    axios
      .get(`http://localhost:8080/product/${id}`)
      .then((response) => {
        console.log(response.data);
        setProduct(response.data);
      })
      .catch((error) => {
        console.error("There was an error fetching the products!", error);
      });
  }, [id]);

  if (!product) {
    return <p>loading....</p>;
  }

  const onHandleEdit = () => {
    navigate(`/product/update/${id}`);
  };

  const imageUrl = `data:${product.imageType};base64,${product.imageData}`;
```



```
SELECT * FROM ecommerce.product;
```

id	description	image_url	name	price	category	stock_quantity	image_name	image
17	Brand - Babyhug Type - One Piece Dresses/Fro...	NULL	100% Cotton Knit Half Sleeves Frock with Butte...	450	Baby	150	BabyD1.webp	image/
18	Brand - Pink Rabbit Type - One Piece Dresses/F...	NULL	Pink Rabbit Interlock Cotton Half Sleeves Frock ...	132.3	Baby	NULL	BabyD2.webp	image/
19	Product Dimensions : 19 x 43 x 4 cm; 300 g Ma...	NULL	Allen Solly Girls Dress	699	Shoes	200	GirlD1.jpg	image/
20	Material composition - Cotton Blend Pattern - So...	NULL	DEELMO Men's Cotton Blend Mandarin Collar Sel...	499	Boys dress	250	BoyD1.webp	image/
21	Material type - Polyester Length - Midi Occasion...	NULL	Symbol Premium Women Fit & Flare Wrap Dress ...	1999	Shoes	320	GirlD2.webp	image/
22	Immersive Visuals: A 2.15" IPS big screen with a...	NULL	Boltt Dapper's 54.61 mm (2.15 inch) IPS Big Scr...	1999	Electronics	500	WatchP1.webp	image/
24	Brand - Lava Operating System - Android 14 RA...	NULL	Lava Blaze X 5G - Starlight Purple (6GB RAM | 1...	15999	Mobile	1200	Mobile.webp	image/
25	Powerful Productivity: 12th Generation Intel Co...	NULL	Acer Aspire Lite 12th Gen Intel Core i3-1215U P...	29990	Laptop	1400	Laptop.webp	image/
26	Brand - PASSION PETALS Type - Casual Shoes ...	NULL	PASSION PETALS Abstract Designed Lace Up LE...	529	Shoes	300	baby shoes.webp	image/
29	2433efasfsdaf	NULL	zfadf	234322	2	1	NULL	NULL
30	asfdsa	NULL	wsf	34343	2	3	NULL	NULL
31	aDA	NULL	zsc	232	2	23	NULL	NULL
32	dfsaf	NULL	fsaf	34343	1	23	favH.png	image/
34	productdesc	NULL	productone	20000	3	25	AskQuestion.png	image/
35	best in all	NULL	jaguar	18000	1	205	NULL	NULL
36	,mn,	NULL	jhgjh	2	1	44	NULL	NULL
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Table: product

Columns:

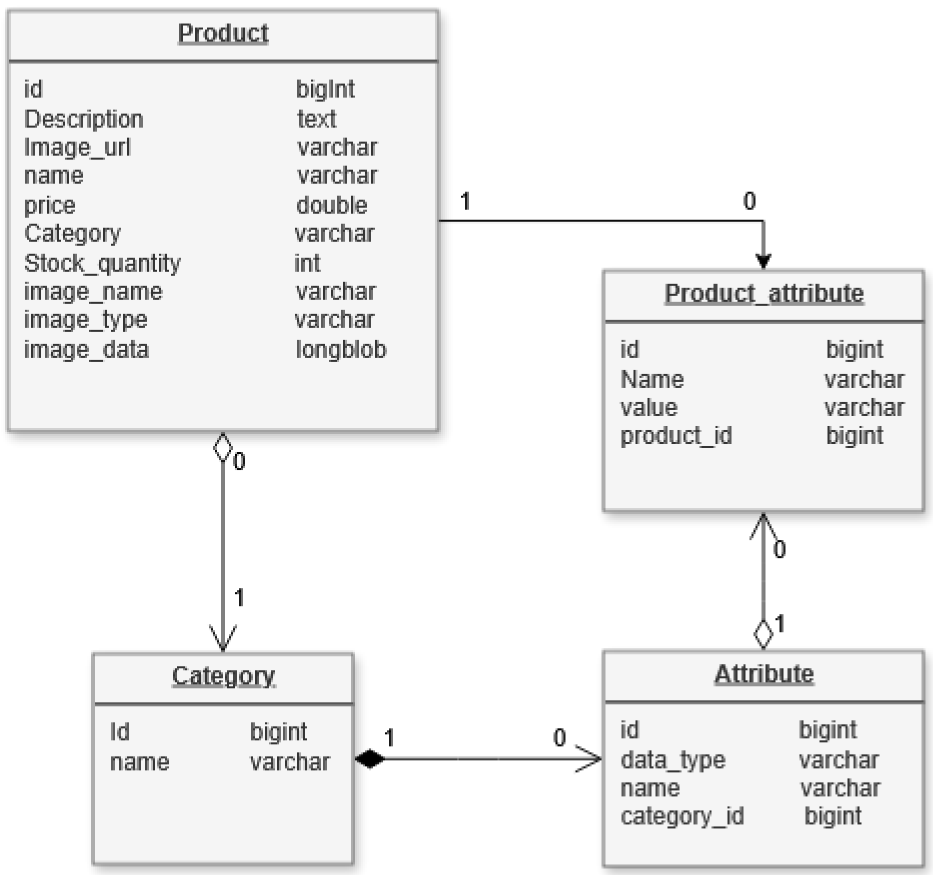
id	bigint AI PK
description	text
image_url	varchar(255)
name	varchar(255)
price	double
category	varchar(255)
stock_quantity	int
image_name	varchar(255)
image_type	varchar(255)
image_data	longblob

```
#  Time      Action                                           Message            Duration / Fetch
1  22:56:21  SELECT * FROM ecommerce.attribute LIMIT 0, 1000  6 row(s) returned  0.016 sec / 0.000 sec
```

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Query Completed

ERD DIAGRAM



1. **Product Table**
   - Stores basic product details like:
     - name, description, price, image, stock_quantity

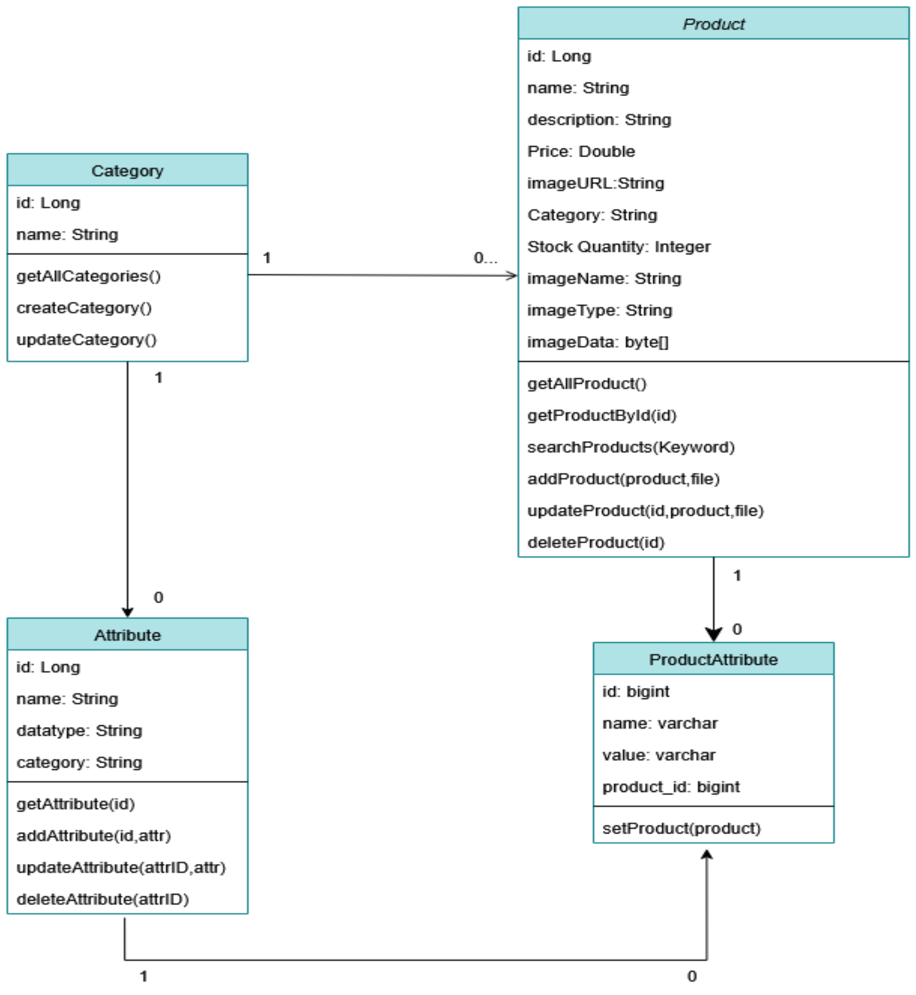
- Each product belongs to a **Category**.
- Each product can have multiple **Attributes** (like color, size, etc.).

2. **Category Table**
   - Defines product categories (e.g., Electronics, Clothing).
   - Each category can have multiple **Attributes** associated with it.
   - Linked to the Product table via category_id.

3. **Attribute Table**
   - Lists all possible attributes for a category.
   - Example: For "Clothing", attributes might be "Size", "Color".
   - Includes:
   - name (e.g., "Color")
   - data_type (e.g., "varchar", "int")
   - Linked to Category via category_id.

4. **Product_attribute Table**
   - Stores actual values of attributes for each product.
   - Example: For a T-shirt product, it might store:
     - Color = Red
     - Size = Medium
   - Linked to both Product and Attribute.

CLASS DIAGRAM



1. **Product Class**

Represents a product in your system.

- **Attributes (Data Members):**
  - id: Unique identifier
  - name, description, price, imageURL, imageName, imageType, imageData
  - stockQuantity: Number of items in stock
  - category: The category this product belongs to
- **Methods (Functions):**
- getAllProduct(): Fetches all products
- getProductById(id): Gets a product by its ID
- searchProduct(keyword): Searches products by keyword

- addProduct(product, file): Adds a new product with image
- updateProduct(product, file): Updates product details
- deleteProduct(id): Deletes a product by ID

2. **Category Class**

Represents a product category (e.g., Electronics, Clothing).

- **Attributes:**
    - id: Unique identifier
    - name: Category name
- **Methods:**
- getAllCategories(): Fetches all categories
- getCategoryById(id): Gets a category by ID
- updateCategory(): Updates category info

3. **Attribute Class**

Defines an attribute that belongs to a category (e.g., "Color", "Size").

- **Attributes:**
    - id: Unique identifier
    - name: Attribute name
    - dataType: Type of data (e.g., String, Integer)
    - category: The category this attribute belongs to
- **Methods:**
- getAllAttributes(): Fetches all attributes
- updateAttribute(attrId): Updates an attribute by ID
- deleteAttribute(attrId): Deletes an attribute by ID

4. **ProductAttribute Class**

Stores the actual value of an attribute for a specific product.

- **Attributes:**
    - id: Unique identifier
    - name: Attribute name (e.g., "Color")
    - value: Actual value (e.g., "Red")

    - product_id: ID of the product this attribute belongs to

- **Methods:**
- setProductAttribute(): Assigns an attribute value to a product