**LivingSpaces – Decor and More**

**Overview**

**LivingSpaces: Decor and More** is an e-commerce platform designed to sell furniture, lighting, and home decor items. The platform offers **customizable products** where users can select attributes such as fabric, wood finish, or dimensions. It also includes features like advanced filtering by style (e.g., Modern, Vintage) and visual tools to help users preview items in their room settings.

**Core Functionalities**

1. **Category Management**
   * Hierarchical categories such as **Furniture**, **Lighting**, and **Home Decor**.
   * Subcategories like **Chairs**, **Tables**, and **Ceiling Lamps**.
2. **Product Type Management**
   * Define **Product Types** to standardize attributes for similar products (e.g., material, dimensions, style).
   * Customizable attributes like fabric, finish, or dimensions are associated with specific product types.
3. **Product Management**
   * Create and manage products, including their brand, custom attributes, and default options.
   * Products can have multiple **variants** for different customization options.
4. **Product Variant Management**
   * Each product variant has attributes like **dimensions, finish, or fabric**.
   * Variants are identified with unique **SKUs** for inventory management.
5. **Customization Management**
   * Allow customers to choose options for customizable products (e.g., sofa fabric or table wood finish).
6. **Advanced Filtering and Search**
   * Filter by attributes like **style, material, dimensions**, and **price**.
   * Enable sorting by popularity, ratings, or price.
7. **Visual Tools**
   * Provide APIs to integrate visual tools for previewing items in a virtual room setting.

**Entity Relationships**

| **Entity** | **Relationships** |
| --- | --- |
| **Category** | One-to-Many: A category can have multiple subcategories, and products belong to one category. |
| **ProductType** | One-to-Many: A product type defines attributes for multiple products. |
| **Product** | One-to-Many: A product can have multiple variants and belongs to one category and one product type. |
| **ProductVariant** | Many-to-One: A product variant belongs to one product. |
| **Customization** | Many-to-Many: Customization options can apply to multiple products, and products can have multiple options. |

**Entity Descriptions**

**1. Category**

* Represents a hierarchical structure for browsing decor and furniture items.
* **Attributes**:
  + id: Unique identifier.
  + name: Category name (e.g., Furniture, Lighting).
  + parentCategory: Reference to the parent category for hierarchy.
  + description: Description of the category.

**2. ProductType**

* Defines a template for products with reusable attributes.
* **Attributes**:
  + id: Unique identifier.
  + name: Name of the product type (e.g., Sofa, Lamp).
  + attributes: List of attributes (e.g., Material, Dimensions, Style).

**3. Product**

* Represents a specific product linked to a category and product type.
* **Attributes**:
  + id: Unique identifier.
  + name: Product name (e.g., Modern Sofa).
  + price: Base price of the product.
  + brand: Brand name (e.g., IKEA).
  + description: Product description.
  + categoryId: Reference to the category.
  + productTypeId: Reference to the product type.
  + customizable: Boolean indicating whether the product supports customization.

**4. ProductVariant**

* Represents specific variations of a product (e.g., different fabrics or finishes).
* **Attributes**:
  + id: Unique identifier.
  + sku: Unique SKU for the variant.
  + variantAttributes: Attributes specific to the variant (e.g., Fabric: Cotton, Finish: Matte).
  + stock: Stock quantity for the variant.
  + additionalPrice: Price adjustment for this variant.

**5. Customization**

* Represents options for customizing products.
* **Attributes**:
  + id: Unique identifier.
  + name: Customization name (e.g., Fabric, Finish).
  + options: List of available options (e.g., Leather, Cotton, Matte Finish).

**API Requirements**

**1. Category Management**

**1.1 Create Category**

* **Endpoint**: POST /categories
* **Request Body**:

json

Copy code

{

"name": "Furniture",

"parentCategoryId": null,

"description": "All types of furniture items."

}

* **Response**:

json

Copy code

{

"id": 1,

"name": "Furniture",

"parentCategoryId": null,

"description": "All types of furniture items."

}

**2. Product Type Management**

**2.1 Create Product Type**

* **Endpoint**: POST /product-types
* **Request Body**:

json

Copy code

{

"name": "Sofa",

"attributes": [

{ "name": "Material", "type": "Text" },

{ "name": "Dimensions", "type": "Text" },

{ "name": "Style", "type": "Enum", "allowedValues": ["Modern", "Vintage", "Rustic"] },

{ "name": "Customizable", "type": "Boolean" }

]

}

* **Response**:

json

Copy code

{

"id": 1,

"name": "Sofa",

"attributes": [

{ "name": "Material", "type": "Text" },

{ "name": "Dimensions", "type": "Text" },

{ "name": "Style", "type": "Enum", "allowedValues": ["Modern", "Vintage", "Rustic"] },

{ "name": "Customizable", "type": "Boolean" }

]

}

**3. Product Management**

**3.1 Create Product**

* **Endpoint**: POST /products
* **Request Body**:

json

Copy code

{

"name": "Modern Sofa",

"categoryId": 1,

"productTypeId": 1,

"price": 800.00,

"brand": "IKEA",

"description": "A comfortable and stylish modern sofa.",

"customizable": true,

"variants": [

{

"variantAttributes": { "Fabric": "Cotton", "Finish": "Matte" },

"stock": 10,

"additionalPrice": 50,

"sku": "SOFA-COTTON-MATTE"

},

{

"variantAttributes": { "Fabric": "Leather", "Finish": "Glossy" },

"stock": 5,

"additionalPrice": 100,

"sku": "SOFA-LEATHER-GLOSSY"

}

]

}

* **Response**:

json

Copy code

{

"id": 101,

"name": "Modern Sofa",

"category": "Furniture",

"price": 800.00,

"brand": "IKEA",

"description": "A comfortable and stylish modern sofa.",

"customizable": true,

"variants": [

{

"id": 201,

"variantAttributes": { "Fabric": "Cotton", "Finish": "Matte" },

"stock": 10,

"additionalPrice": 50,

"sku": "SOFA-COTTON-MATTE"

},

{

"id": 202,

"variantAttributes": { "Fabric": "Leather", "Finish": "Glossy" },

"stock": 5,

"additionalPrice": 100,

"sku": "SOFA-LEATHER-GLOSSY"

}

]

}

**4. Customization Management**

**4.1 Add Customization Options**

* **Endpoint**: POST /customizations
* **Request Body**:

json

Copy code

{

"name": "Fabric",

"options": ["Cotton", "Leather", "Velvet"]

}

* **Response**:

json

Copy code

{

"id": 1,

"name": "Fabric",

"options": ["Cotton", "Leather", "Velvet"]

}