In an Online Inventory Management System , we'll have various entities and relationships to consider.

Below, I'll outline some of the key entities, their relationships, and related attributes while also considering normalization rules:

Entities:

1. \*\*Product\*\*

- Attributes: ProductID (Primary Key), ProductName, Description, Price, QuantityInStock, Manufacturer, DateAdded

2. \*\*Category\*\*

- Attributes: CategoryID (Primary Key), CategoryName

3. \*\*Supplier\*\*

- Attributes: SupplierID (Primary Key), SupplierName, ContactName, ContactEmail, ContactPhone

4. \*\*Order\*\*

- Attributes: OrderID (Primary Key), CustomerID (Foreign Key), OrderDate, Status

5. \*\*OrderItem\*\*

- Attributes: OrderItemID (Primary Key), OrderID (Foreign Key), ProductID (Foreign Key), QuantityOrdered, PricePerUnit

6. \*\*Customer\*\*

- Attributes: CustomerID (Primary Key), FirstName, LastName, Email, Phone, ShippingAddress

7. \*\*Employee\*\*

- Attributes: EmployeeID (Primary Key), FirstName, LastName, Email, Phone, Position

Relationships:

1. \*\*Belongs To\*\*

- Description: Products belong to specific categories.

- Cardinality: Many-to-One (M:1)

- Attributes: None

2. \*\*Supplies\*\*

- Description: Suppliers supply products.

- Cardinality: Many-to-Many (M:N)

- Attributes: SupplyPrice

3. \*\*Places Order\*\*

- Description: Customers place orders.

- Cardinality: One-to-Many (1:N)

- Attributes: None

4. \*\*Manages\*\*

- Description: Employees manage orders.

- Cardinality: One-to-Many (1:N)

- Attributes: None

Normalization Rules:

1. \*\*First Normal Form (1NF): Ensure all attributes have atomic values, and each row is unique.

- Product, Category, Supplier, Order, OrderItem, Customer, and Employee entities should be in 1NF.

2. \*\*Second Normal Form (2NF): Non-key attributes should be fully functionally dependent on the primary key.

- Review each entity for 2NF compliance, addressing any partial dependencies.

3. \*\*Third Normal Form (3NF): Non-key attributes should not transitively depend on the primary key.

- Examine the entities to eliminate transitive dependencies.

4. \*\*Fourth and Fifth Normal Forms (4NF and 5NF): Depending on your specific requirements, consider further normalization steps, especially if dealing with multi-valued or join dependencies.

Normalization helps structure your database efficiently, ensuring data integrity and reducing redundancy. The above entities and relationships provide a foundation for an Online Inventory Management System, but you may need to adapt and extend them to suit your project's specific needs.