DnA: Project Phase 3

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The Task!

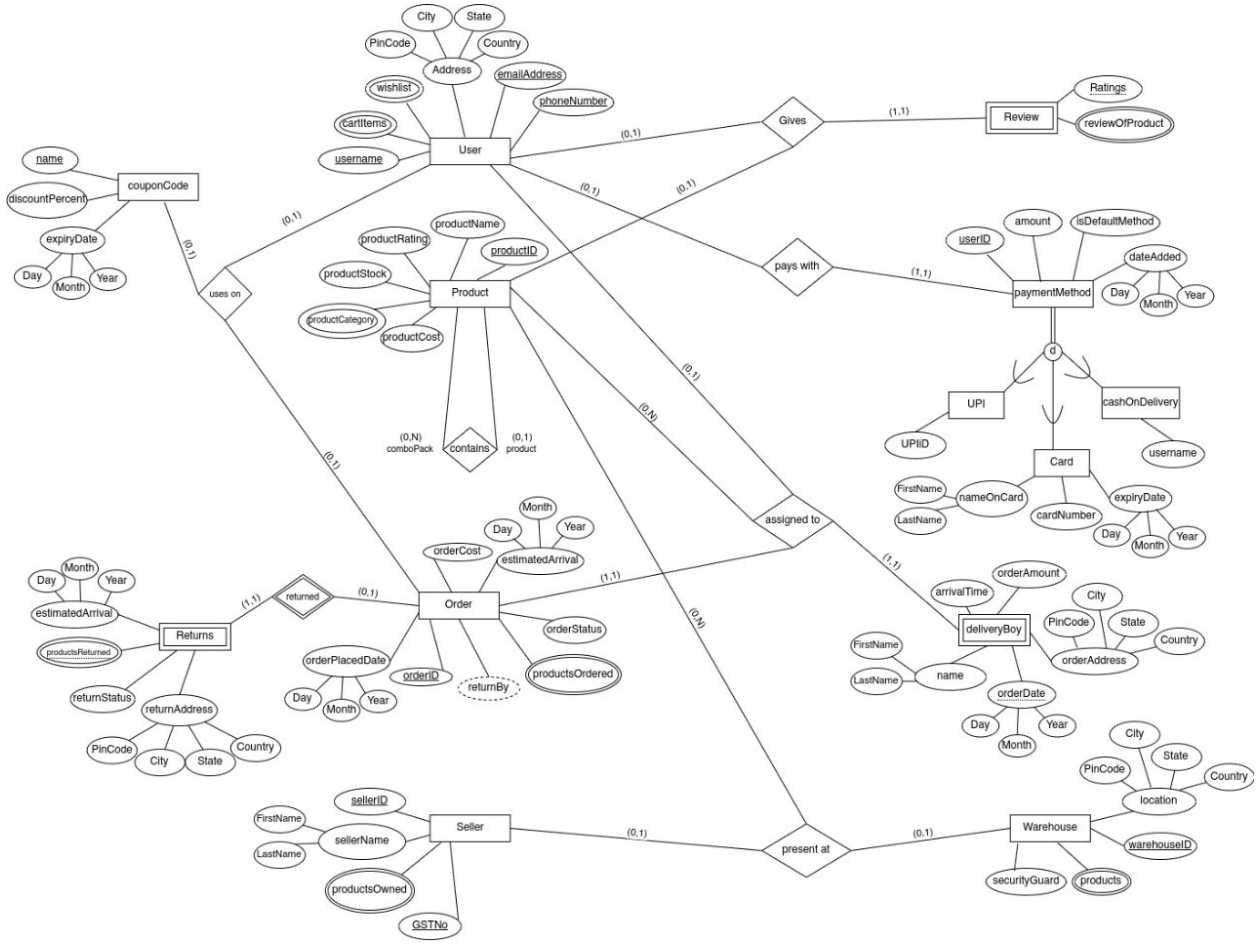
Convert the ER Diagram designed earlier to a relational model. Then, iteratively, convert this to first, second, and third normal forms respectively.

You are required to submit a snapshot of the relational model at the following stages:

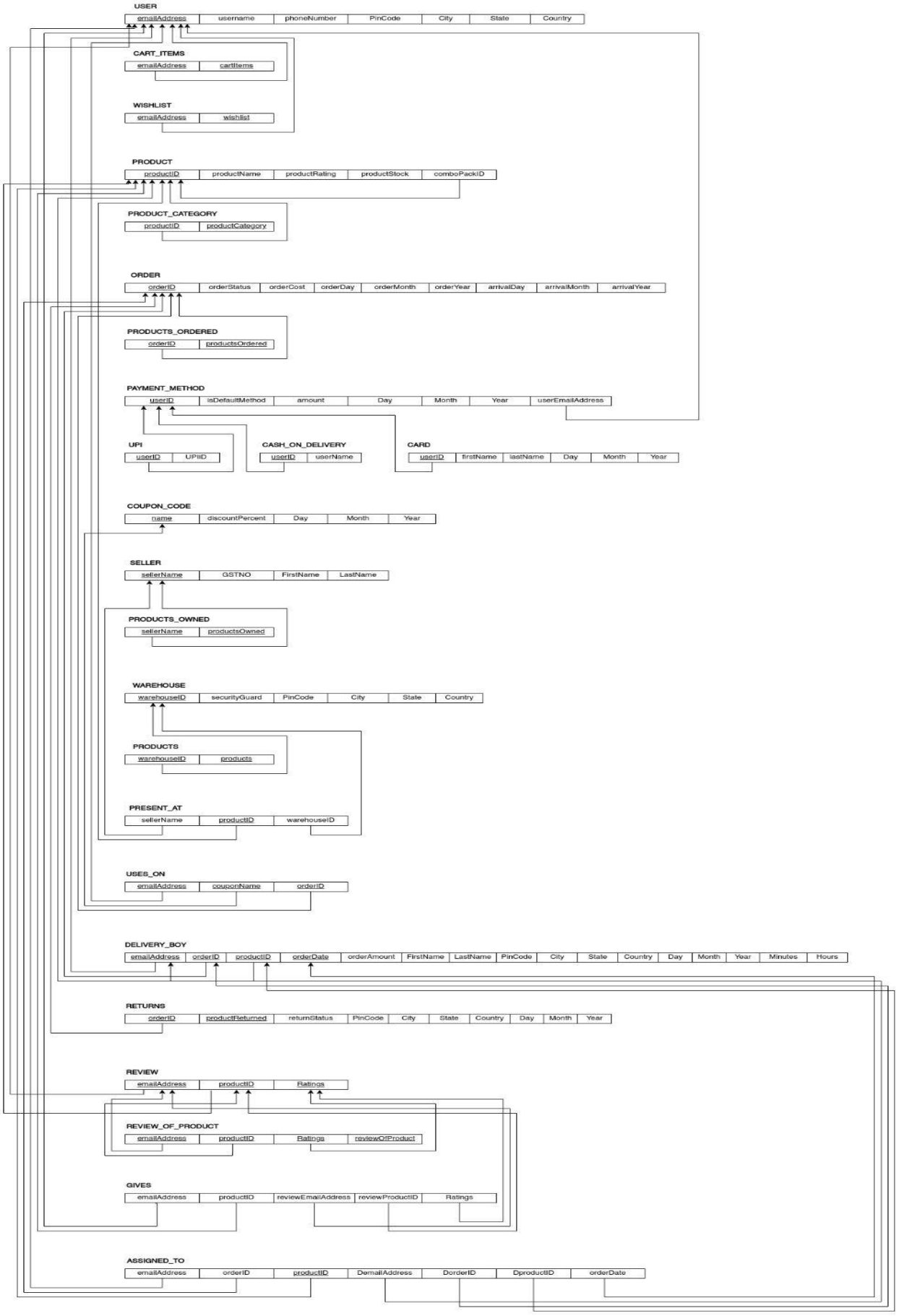
- After mapping ER to relational model
- Relational model after conversion to 1NF
- Relational model after conversion to 2NF
- Relational model after conversion to 3NF

If there is no need to convert to a certain normalized form, mention it in the submission document. In such cases, you are not required to submit the snapshot for that stage.

ER Diagram:



Step 1: Converting ER to Relational Model



Explanation:

- Only the simple attributes of the composite attributes in all the entity types have been represented in the relations
- A new relation has been created to represent each multivalued attribute present in an entity.
- Added an attribute comboPackID in PRODUCT entity type which is a foreign key referring to productID to represent “contains” relationship
- Added an attribute userEmailAddress in PAYMENT_METHOD entity type which is a foreign key referring to emailAddress in USER to represent “pays with” relationship.
- Added attributes emailAddress, orderID, productID to deliveryBoy which together combine with orderDate to form the primary key for the relation.
- Added attribute orderID to returns which together combine with productReturned to form the primary key for the relation.
- Added attributes emailAddress, productID to review which together combine with ratings to form the primary key for the relation.
- Relationship present_at is formed with the primary key of the entity type product: the productID. Foreign keys of other entity types are not included in the primary key as their cardinality constraint is 1. Similarly, other relationships are turned into relations.
- For binary relationships, primary key os one entity is added as the foreign key to the other entity’s relation

Changes Made:

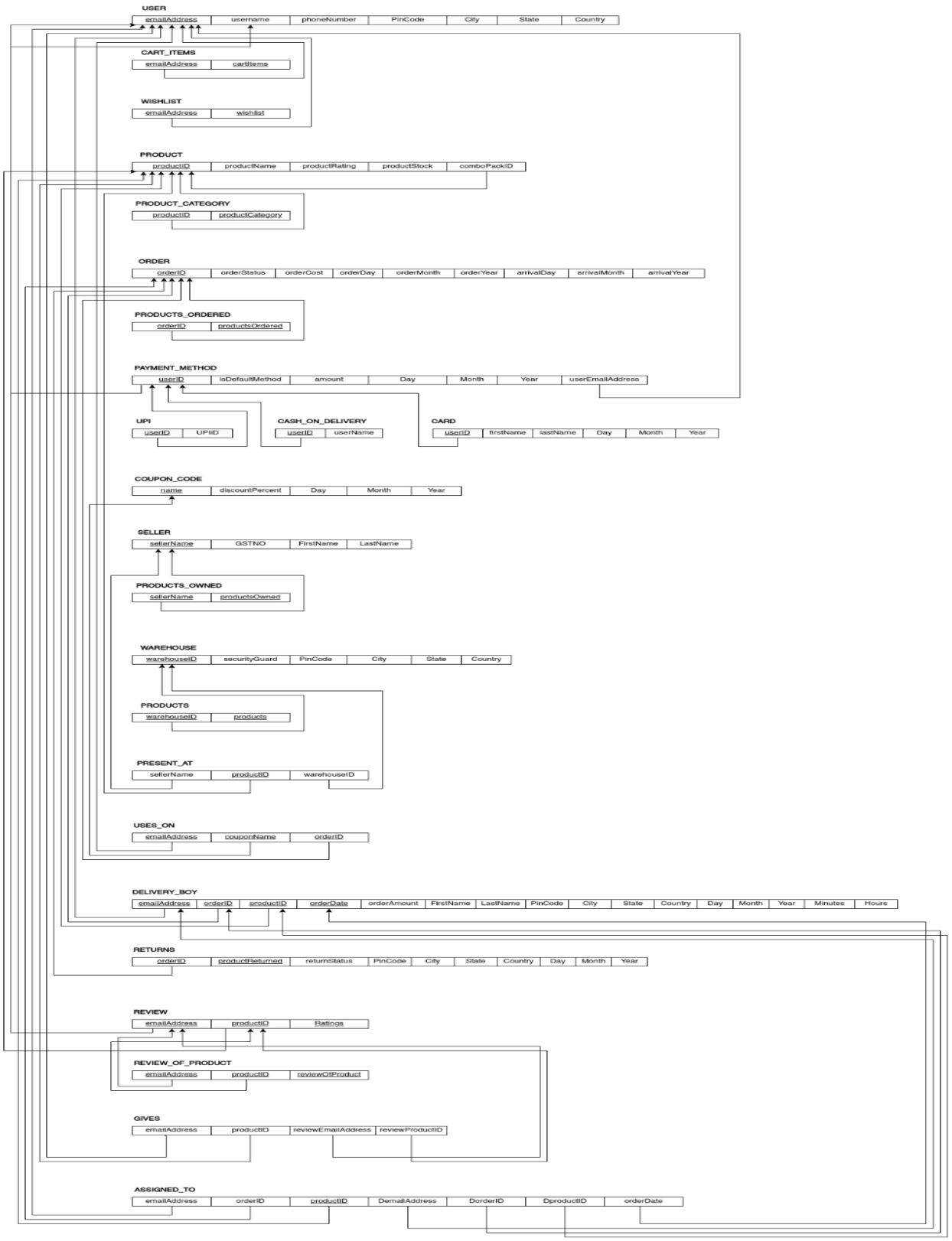
- The orderDate attribute in the weak entity type “DeliveryBoy” is changed from a composite attribute to a simple attribute
- The products returned in the weak entity type “Returns” is changed from a multivalued attribute to a simple attribute

Step 2: Relational Model after 1NF Conversion

The relational model is already in 1NF form as it does not contain any multivalued attributes, composite attributes and their combinations. The

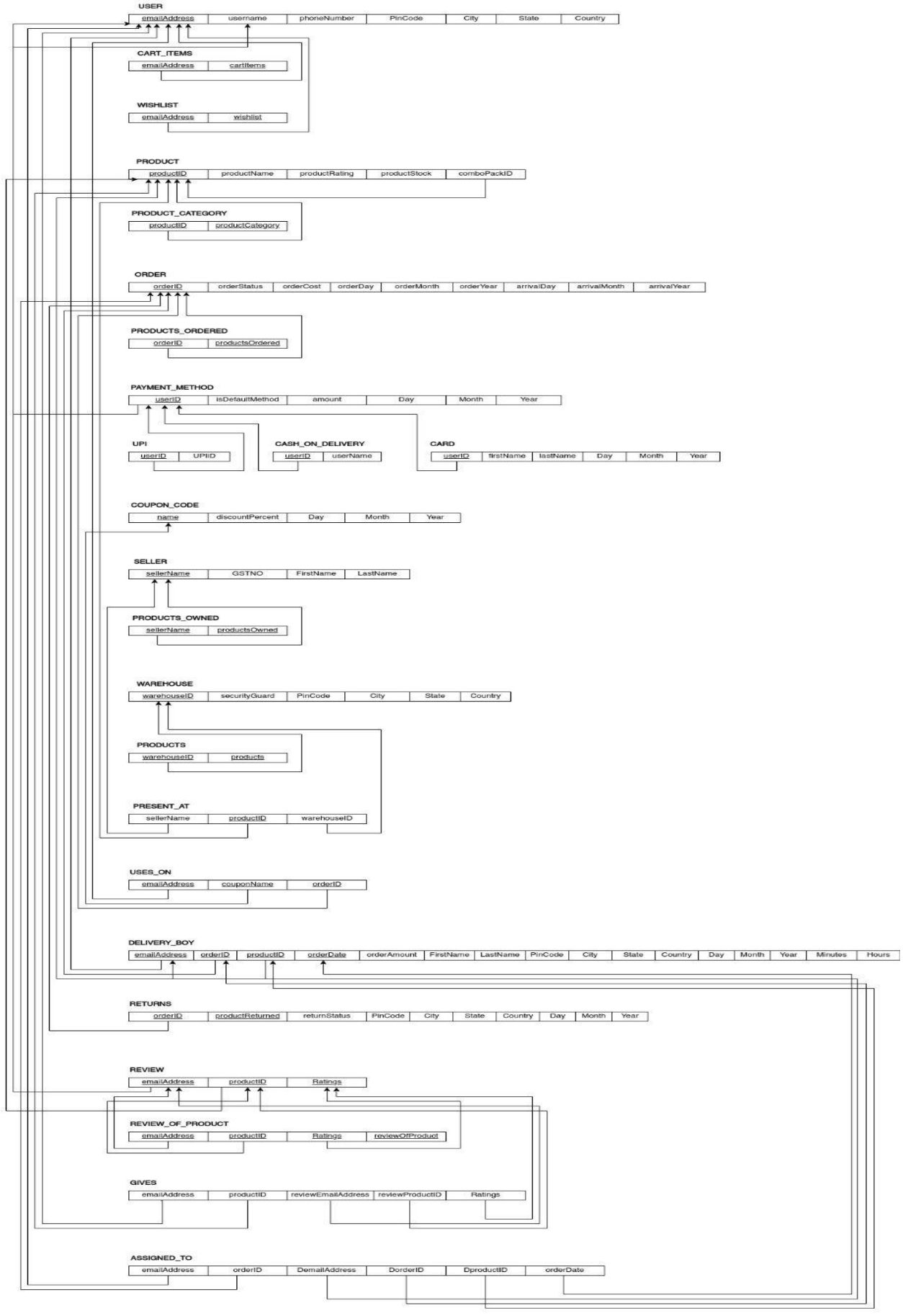
model only contains attribute values that are single atomic (indivisible) values.

Step 3: Relational Model after 2NF Conversion



Removed ratings attribute from gives and review_of_product, as ratings is a dependent attribute and is already stored in the review table.
Removed userEmailAddress from paymentMethod , as we already have access to the user's email address via their username.

Step 4: Relational Model after 3NF Conversion



Removed productID from assignedTo, as productIDs for any given entry in the assignedTo is accessible via orderID and Products_Ordered table.