

To satisfy the conditions of 1st level of Data Normalization the data must meet the following requirements.

1. Every cell in a table will have only one value - all my tables meet this criteria
2. Every record must be unique - Every record in my tables is unique and there is no duplicate data in those tables.
3. It is not permitted to mix different data types in a column - all my tables are predefined with data types that go under the column preventing data type mismatch.
4. Every table must have a primary key - In my database Room has RoomId, Guest has GuestId, Booking has BookingId and Payment has PaymentId as primary keys.

To satisfy the conditions of 2nd level of Data Normalization the data must meet the following requirements.

1. Must satisfy 1NF - which is already justified.
2. No partial dependencies - In my tables, there are no composite primary keys. Each table has a single-column primary key. Every non-key column in a table is fully dependent on the particular primary key. For example, in the booking table, Booked From, Booked Till, Paid, checked in and total Cost depends on Booking ID. Another example is, 2 different guests can have the exact same first name and last name, yet they can be distinguished by different guest IDs which is the primary key for the guest table.

To satisfy the conditions of 3rd level of Data Normalization the data must meet the following requirements.

1. Must satisfy 1NF - which is already justified.
2. Must satisfy 2NF - which is also justified.
3. No transitive functional dependencies allowed - a non-key attribute cannot depend on another non-key attribute. In my database All non-key attributes depend only on the primary key of their respective table. For example, In the Guest table, Country and Email depend on GuestId, but they do not depend on another non-key attribute. Another example is, in the Booking table, TotalCost is calculated from RoomID, BookedFrom, and BookedTill, but it is still functionally dependent on BookingId.

In conclusion, we can state that MY ERD diagram satisfies all the requirements of 3NF as,

- It avoids partial dependencies (no column is dependent on just part of a primary key).
- It avoids transitive dependencies (all columns depend only on the primary key and not on other non-key columns).
- Relationships between tables follow proper normalization rules.