

- **Entity integrity** is a constraint that states that in a base relation no attribute of a primary key can be **null**. **Referential integrity** states that foreign key values must match a candidate key value of some tuple in the home relation or be wholly null. Apart from relational integrity, integrity constraints include required data, domain, and multiplicity constraints; other integrity constraints are called **general constraints**.
- A **view** in the relational model is a **virtual** or **derived relation** that is dynamically created from the underlying base relation(s) when required. Views provide security and allow the designer to customize a user's model. Not all views are updatable.

## Review Questions

- 4.1 Discuss each of the following concepts in the context of the relational data model:
  - (a) relation
  - (b) attribute
  - (c) domain
  - (d) tuple
  - (e) intension and extension
  - (f) degree and cardinality.
- 4.2 Describe the relationship between mathematical relations and relations in the relational data model.
- 4.3 Describe the differences between a relation and a relation schema. What is a relational database schema?
- 4.4 Discuss the properties of a relation.
- 4.5 Discuss the differences between the candidate keys and the primary key of a relation. Explain what is meant by a foreign key. How do foreign keys of relations relate to candidate keys? Give examples to illustrate your answer.
- 4.6 Define the two principal integrity rules for the relational model. Discuss why it is desirable to enforce these rules.
- 4.7 What is a view? Discuss the difference between a view and a base relation.

## Exercises

The following tables form part of a database held in a relational DBMS:

Hotel (hotelNo, hotelName, city)  
 Room (roomNo, hotelNo, type, price)  
 Booking (hotelNo, guestNo, dateFrom, dateTo, roomNo)  
 Guest (guestNo, guestName, guestAddress)

where Hotel contains hotel details and hotelNo is the primary key;

Room contains room details for each hotel and (roomNo, hotelNo) forms the primary key;

Booking contains details of bookings and (hotelNo, guestNo, dateFrom) forms the primary key;

Guest contains guest details and guestNo is the primary key.

- 4.8 Identify the foreign keys in this schema. Explain how the entity and referential integrity rules apply to these relations.
- 4.9 Produce some sample tables for these relations that observe the relational integrity rules. Suggest some general constraints that would be appropriate for this schema.
- 4.10 Analyze the RDBMSs that you are currently using. Determine the support the system provides for primary keys, alternate keys, foreign keys, relational integrity, and views.
- 4.11 Implement the previous schema in one of the RDBMSs you currently use. Implement, where possible, the primary, alternate, and foreign keys, and appropriate relational integrity constraints.