- Entity integrity is a constraint that states that in a base relation no attribute of a primary key can be dull-Referential integrity states that foreign key values must match a candidate key value of some tuple in the home relation of be wholly holl. 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. Wiews provide sectiffly and allow the designer to customaze a user's model. Not all views are alpdatable; me restantive entities and are allowed and all views are alpdatable; me restantive entities and are allowed and all views are alpdatable; me restantive entitles and all views are alpdatable; me restantive entities and all views are all views are all views and all views are all views are all views and all views are all vi

New Aberrasen make permuted changes to the view, these changes to

Classes of views have been defined instruct their each men application, then are

defer atability of hor views are defined actional and all

be found in Furrado and Casanova (1982).

Review Questions and reduced subtraction and reduced to the second bounds are reached to deglettyse relation and romanning legises the same are on a can come

- 4.1 Discuss each of the following concepts in the context of the relational data model: . Updates are not allowed through views invision aggregation or promine
 - (a) relation
 - (b) attribute
 - (c) domain
 - (d) tuple
 - (e) intension and extension an
 - (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.

This converte represents the record generation of DR

4.7 What is a view? Discuss the difference between a view and a base relation.

Exercises A mathematical relation is a subset of the Canopen product of two or more sets, in database septial

a any subset of the Categan product of the domains of the authories. A relation is normally written as a kel of The following tables form part of a database held in a relational DBMS: 217 months as the most selection of adjusted to a lateral transfer of the selection of

Hotel (hotelNo, hotelName, city) standard and one and ask of the same on viscosing and application

Room (roomNo, hotelNo, type, price)

Booking (hotelNo suestNo dateFrom dateTo, roomNo) in any number of the adult to are trunt of I

Guesti (questivio, questiviame, questividaress) is amore may tuo matrice exigut eti ila ritim notici marti masdellib

where Hatel contains togel details and hotel No is the primary keys southout lead the encoded executed to encoder Room contains room details for each hotel and (roomNo, hotelNo) forms the primary key; applied and roomNo, hotelNo) forms the primary key; Booking contains details of bookings and (hotelNo, guestNo, dateFrom) forms the primary key; look on me

Guest contains guest details and guest No is the primary key.

- 4.8 Dentify 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. That is a visit of the no in visit of the in visit of the income of the constraints that would be appropriate for this schema.
- 4.10 Ahalyze the RDBMSs that you are currently using. Determine the support that 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 föreign keys, and appropriate relational integrity constraints.

Exercises

For the following exercises use the Hotel schema defined at the start of the Exercises at the end of Chapter A. Lander et al.

5.8 Describe the relations that would be produced by the following relational algebra operations:

(a) $\Pi_{\text{hotelNo}}(\sigma_{\text{price}}^2 > so(\text{Floorii}))$

- (b) of house loss to the first the f
- (c) II hotel MHotel MHotel hotelite = Room hotelite (Option > 80(Room)))
- be (d) Question (Garage 2 , Garage (Booking)) as in new or sent case and research at beauty suicible, tending a set of
 - (e) Hoteles with the four (construction) outsite and gate between our rate routers on account of sources and
 - (f) Hydroniano, house, (Booking Management companies Guest) + Hydronia (Goty Lander) (Hotel))
- 5.9 Provide the equivalent tuple relational calculus and domain relational calculus expressions for each of the relational algebra queries giventina Exercise 5,8 outre por l'incitation a repair en attende de l'aventina de l'algebra queries giventina de l'aventina de l'algebra queries giventina de l'aventina de la company de la compan

Charger Summary

5.10 Describe the relations that would be produced by the following tuple relational calculus expressions:

(a) (H.hotelName | Hotel(H) \times H.city = "London")

- (b) (H.hotelName: Hotel(H) A (ER) (Room(R) W H.hotelNo = R.hotelNo W.R.price > 80)) also is related with
- (c) (H.hotelName I Hotel(H) A (B) (B) (Bboking(B) A Quest(Q) AH.hotelNo = B:hotelNo A closes become the B.guestNo = G.guestNo \ G.guestName = 'John Smith')}
- (d) (H.hotelName, G.guestName, B1.dateFrom, B2.dateFrom | Hotel(H) \(\Lambda \) Guest(G) \(\Lambda \) Booking(B1) \(\Lambda \) Booking(B2) A H.hotelNo = B1.hotelNo A G.guestNo = B1.guestNo A B2.hotelNo = B1.hotelNo A B2.guestNo = B1.guestNo A B2.dateFrom ≠ B1.dateFrom}
- giational calculus don 5.11 Provide the equivalent domain relational calculus and relational algebra expressions for each of the tuple relational calculus expressions given in Exercise 5.10.
- 5.12 Generate the relational algebra, tuple relational calculus, and domain relational calculus expressions for the following quelies denubascration to lambuscray as be priented graphical fearth generation of filtlegeneration
 - (a) List all hotels.
 - (b) List all single rooms with a price below £20 per night.
 - (c) List the names and cities of all guests.
 - (d) List the price and type of all rooms at the Grosvenor Hotel.
 - (e) List all guests currently staying at the Grosvenor Hotel.
 - (f) List the details of all rooms at the Grosvenor Hotel, including the name of the guest staying in the room, if the room is occupied.
 - (g) bist the guest details (guestNo, guestName, and guestAddress) of all guests staying at the Grosvenor Hotel
- 5.13 Using relational algebra, create a view of all rooms in the Grosvenor Hotel, excluding price details. What are the advantages of this view?

The following tables form part of a database held in an RDBMS:

(empNo, fName, IName, address, DOB, sex, position, deptNo) **Employee** Department (deptivo, deptivame, mgrEmpNo) Project (projNo, projName, deptNo)

WorksOn at CempNo: projNo; dateWorked, hoursWorked) and set and attended to the set and set are set at the set and set are set at the set and set are set at the set

contains employee details and empNo is the key. where **Employee** discuss the distinc Department 2

restrains department détails and deptNo is the key, mgrEmpNo identifies the employee who is the manager of the department. There is only one manager for

contains details of the projects in each department and the key is projNo (no han example Disoussinow to two departments can run the same project).

contains details of the hours worked by employees on each project, and empNo/ prolNo/dateWorked form the key.

Project

and WorksOn

relations colculus.