**Module 6**

**Database Design: Relationships**

Module Review Questions

Problems

1. Which of the following is *not* a technique that would be used in the process of developing a relational database?

a. Normalize the data.

b. Review existing data forms and reports.

c. Interview those who use the data to understand business rules.

d. Combine all attributes into one large table.

2. Which of the following relational database tools does not help you document the relationships between tables?

a. SQL

b. DBDL

c. E-R diagram

d. Entity relationship model

3. How do you identify the primary key field in DBDL notation?

a. with a circle

b. with an underline as well as the abbreviation PK

c. with a double underline

d. with a key symbol

4. Which of the following is *not* considered a type of E-R diagram?

a. DBDL

b. ERM

c. crow’s foot notation

d. Access Relationship window

5. The ERM emphasizes what part of a relational database?

a. attributes

b. relationships

c. primary key fields

d. foreign key fields

6. Which of the following statements is true about a one-to-many relationship?

a. Every primary key field participates on the “one” side.

b. Every foreign key field participates on the “one” side.

c. Every primary key field participates on the “many” side.

d. Every foreign key field participates on the “many” side.

7. Why might you not be able to enforce referential integrity on a one-to-many relationship?

a. The table on the “one” side doesn’t have a matching record(s) in the table on the “many” side.

b. The table on the “many” side doesn’t have primary key field.

c. The table on the “many” side has values in the foreign key field with no matching value in the primary key field of the table on the “one” side.

d. The table on the “many” side has many values in the foreign key field with one matching value in the primary key field of the table on the “one” side.

8. Which of the following is *not* a feature that Access uses to demonstrate and leverage the power of one-to-many relationships?

a. subdatasheets

b. Lookup properties

c. automatically refreshing related data in Query Datasheet View

d. Import wizards

9. Which of the following is true about a one-to-one relationship?

a. They are almost always a mistake.

b. They create Cartesian joins in queries.

c. They relate two tables using the primary key field in both tables.

d. They are only used to import and update data.

Critical Thinking Questions

1. What is the relationship between a table of Movies and a table of ActorsActresses and how might it be implemented in a relational database?

Given that one movie can have many actors or actresses and one actor or actress can star in many movies, the two entities have a many-to-many relationship. To implement this data in a relational database a third table, a junction table, would have to be established that was on the “many” side of a one-to-many relationship to both the Movies and ActorActresses tables. The junction table might be called Castings.

2. What types of business rules might determine the relationship between a table of Volunteers and a table of Activities at a nonprofit?

If every activity attracted a new set of volunteers, then the relationship would be a direct one-to-many relationship between the Activities and Volunteers table. If one activity had multiple volunteers and one volunteer could participate in multiple activities, a junction table would need to be established given Activities and Volunteers would be in a many-to-many relationship.

JC Consulting Case Exercises

The following exercises are based on the JC Consulting database used throughout Modules 1-5.

Problems

1. If management wanted to start tracking the date the entire project was closed, which table should the field be added to?

a. Clients

b. Projects

c. ProjectLineItems

d. TaskMasterList

2. Which field in the TaskMasterList table is a good candidate for Lookup properties that constrain it with a one-to-many relationship to a one-field table?

a. Description

b. Per

c. Estimate

d. TaskID

3. Which of the following best describes the Zips table in DBDL if City is often used for sorting?

a. Zips (City, Zip)

PK Zip

SK City

b. Zips (City, Zip)

PK Zip

c. Zips (City, Zip)

PK Zip

FK City

d. Zips (City, Zip)

FK Zip

FK City

4. In the Relationships window of the JC Consulting database, which primary key field does *not* participate in a one-to-many relationship?

a. ProjectLineItemID

b. ProjectID

c. TaskID

d. All primary key fields participate in one-to-many relationships.

5. What can you assume based on the existence of the “one” and infinity symbols on all relationships in the Relationships window of the JC Consulting database?

a. Referential integrity is applied.

b. Referential integrity with the cascade update and cascade delete constraints is applied.

c. The database has no many-to-many relationships.

d. There will never be a need for a one-to-one relationship in this database.

6. What is the benefit of using the same names for the primary and foreign key fields?

a. It allows you to enforce referential integrity on the relationship.

b. It allows you to create one-to-one relationships.

c. It clarifies the linking field between the tables.

d. It clarifies where Lookup properties have been applied.

7. What is true about the relationship link line in the Access Relationships window that isn’t true about generic E-R diagrams?

a. The link line can be curved.

b. The link line indicates where records in the “one” table exist that do not have matching records in the “many” table.

c. The link line uses crow’s foot notation.

d. The link line points specifically to the primary key field and foreign field.

8. Which value ties the records in the “many” table to the proper record in the “one” table?

a. the value of the surrogate key

b. the value of the primary key field in the “many” table

c. the value of the foreign key field in the “one” table

d. the value of the foreign key field in the “many” table

9. Many-to-many relationships \_\_\_\_\_.

a. are common in almost all relational databases

b. represent unnormalized data

c. create orphan records

d. can be directly implemented using two link lines in most relational database management systems

Critical Thinking Questions

1. Identify the steps you would take to create a one-field table named Titles that could be used to constrain the values in the Title field of the Employees table to the existing values in that field.

* Create a select query from the Employees table with only the Title field.
* Group the records by the Title field and set an ascending sort order on the Title field.
* Change the query into a make-table query to make a table named Titles, and then run the query.
* Open the Employees table and add Lookup properties to the Title field that constrain its values to the Title field in the Titles table.

2. The ProjectsAndLineItems query currently uses the ProjectID field from the Projects table. Explain why that field cannot be edited in Query Datasheet View.

The ProjectID field is the primary key field in the Projects table. As such, it cannot be modified in Query Datasheet View because doing so would orphan related records in the ProjectLineitems table. Furthermore, the ProjectID field is created with an AutoNumber data type, which doesn’t allow manual modifications in the first place.

Pitt Fitness Case Exercises

Problems

1. For the table Customers (CustomerID, LastName, FirstName, StreetAddress, City, State, ZipCode, EmailAddress, PhoneNumber, BirthDate), which field is the primary key field?
   1. LastName
   2. BirthDate
   3. PhoneNumber
   4. CustomerID
2. For the table Customers (CustomerID, LastName, FirstName, StreetAddress, City, State, ZipCode, EmailAddress, PhoneNumber, BirthDate), which field is a foreign key?
   1. LastName
   2. CustomerID
   3. There isn’t a foreign key.
   4. PhoneNumber
3. For the table Customers (CustomerID, LastName, FirstName, StreetAddress, City, State, ZipCode, EmailAddress, PhoneNumber, BirthDate), which of the following is a secondary key?
   1. LastName, FirstName
   2. BirthDate
   3. PhoneNumber
   4. CustomerID
4. What field(s) would be the most appropriate for a CustomerName index?
   1. LastName
   2. LastName and FirstName
   3. LastName, FirstName, and BirthDate
   4. CustomerID
5. What is the relationship between the tables Classes and Reservations?
   1. One to one
   2. One to many
   3. Many to many
   4. The tables aren’t related.
6. What is the relationship between the tables Instructors and Classes?
   1. One to one
   2. One to many
   3. Many to many
   4. The tables aren’t related.
7. What is the relationship between the tables Classes and Customers?
   1. One to one
   2. One to many
   3. Many to many
   4. The tables aren’t related.
8. Which of the following tables could be considered a composite entity in an ERM and a junction table in an E-R diagram?
   1. Classes
   2. Instructors
   3. Reservations
   4. Customers
9. Which of the following tables could be considered a composite entity in an ERM and a junction table in an E-R diagram?
   1. ClassInstructors
   2. Instructors
   3. Customers
   4. Classes
10. The Pitt Fitness program director wants to list customer last names and first names along with the classes they are taking. He creates a query using the Customers and Classes tables. In the query grid, he adds the LastName and FirstName fields from the Customers table and the ClassName field from the Classes table. What is most likely wrong with this query?
    1. You need the Reservations table to join the Customers and Classes tables together.
    2. The relationship between Customers and Classes is one to many.
    3. The relationship between the fields LastName and FirstName is one to one.
    4. There is nothing wrong with this query.

Critical Thinking Questions

1. Write the Pitt Fitness database in DBDL notation.

Customers (CustomerID, LastName, FirstName, StreetAddress, City, State, ZipCode, EmailAddress, PhoneNumber, BirthDate)

SK LastName, FirstName

Classes (ClassID, ClassName, Room, Location, LengthofTime, MaxSize, TypeofClass, Day, Time, Description)

SK ClassName

Instructors (InstructorID,InstructorLastName, InstructorFirstName, InstructorStreetAddress, InstructorCity, InstructorState, InstructorZipCode, InstructorEmailAddress, InstructorPhoneNumber)

SK InstructorLastName, InstructorFirstName

ClassInstructors (ClassID, InstructorID)

Reservations (ReservationID, ClassID, ClassDate, ClassPrice, OtherFees, CustomerID)

SK ClassID

FK CustomerID Customers

1. What prevents a user from entering a reservation for a customer who has not yet been registered in the Customers table?

Because the relationship between the Customers table and the Reservations table is one to many with referential integrity, it means that the record in the parent table, the “one” table, must be established before a record in the child table, the “many” table, can be entered.

Sports Physical Therapy Case Exercises

Problems

1. What would be a possible alternative key field for the Session table?
   1. There isn’t a good choice for an alternative key field.
   2. SessionDate
   3. PatientNum
   4. TherapyCode
2. What is a good choice for a secondary key in the Therapist table?
   1. Street
   2. LastName, FirstName
   3. FirstName
   4. City
3. Identify the foreign key(s) in the Session table.
   1. SessionDate
   2. PatientNum, TherapyCode
   3. PatientNum, TherapistID
   4. PatientNum, TherapyCode, TherapistID
4. What is the relationship between the tables Patient and Session?
   1. One to one
   2. One to many
   3. Many to many
   4. There isn’t a relationship.
5. What is the relationship between the tables Patient and Therapies?
   1. One to one
   2. One to many
   3. Many to many
   4. There isn’t a relationship.
6. What is the relationship between the tables Therapist and Therapies?
   1. One to one
   2. One to many
   3. Many to many
   4. There isn’t a relationship.
7. What is the relationship between the tables Therapist and Session?
   1. One to one
   2. One to many
   3. Many to many
   4. There isn’t a relationship.
8. Which of the following tables is a junction table?
   1. Patient
   2. Therapies
   3. Session
   4. Therapist
9. Which of the following fields in the Therapist table would have the highest cardinality?
   1. TherapistID
   2. LastName
   3. FirstName
   4. Street
10. Assume that PatientNum 1021 is entered into a record in the table Session. However, PatientNum 1021 does not appear in the Patient table. What type of record would this be (in the Session table)?
    1. Hanging record
    2. Nonfield record
    3. Orphan record
    4. Distinct record

Critical Thinking Questions

1. Create a query in Access that uses two tables, the Patient table and the Session table. Add the LastName, FirstName, and SessionDate fields to the query grid. Run the query. How many records are displayed? Delete the join line between the field lists in Query Design View. Rerun the query. How many records are now displayed? Why are the results different? You do not need to save the queries.

When the tables are joined, there are 12 records in the output. When the tables are not joined, 144 records are displayed in the output. When two tables are in a query without any instructions as to how to join the tables together, each record in one table joins with each record in the other table (a Cartesian join). This is a mistake in this case. The tables should be joined to obtain the correct output to the query.

1. Enter an additional record in the Session table with the PatientNum 1022. What happens when you try to move onto another record? What is the error message? Why?

When you type in the record and try to move to a new record, you receive a dialog box that has a warning message that says “You cannot add or change a record because a related record is required in the table ‘Patient’“. This is because there is a one to many relationship with referential integrity between the tables Patient and Session. This prevents an entry of a new PatientNum in the Session table without first having that PatientNum recorded in the Patient table.