**Module 7**

**Database Management Systems Processes and Services**

Module Review Questions

Problems

1. Which of the following programming languages does the “P” in modern software solution stacks such as the LAMP, LAPP, and WAMP stacks *not* stand for:

a. PHP

b. Python

c. Perl

d. Pascal

2. Which of the following would *not* be an example of metadata found in a database catalog?

a. Values in a primary key field.

b. Table and view names.

c. Relationship descriptions.

d. Index definitions.

3. Data consistency means \_\_\_\_\_.

a. allowing two or more users to access the database at the same time

b. giving each user a consistent view of the data including changes

c. using properties such as the Validation Rule property to improve data entry accuracy

d. implementing offsite backups

4. Which feature potentially helps you recover data in an Access database?

a. journaling

b. incremental backups

c. two-step locking

d. compact and repair

5. Which SQL statement would give user cyclone1 the ability to select, insert, update, or delete records from the Students table?

a. GRANT SELECT, INSERT on STUDENTS to cyclone1

b. GRANT ALL on STUDENTS to cyclone1

c. GRANT GLOBAL on STUDENTS to cyclone1

d. GRANT cyclone1 TO STUDENTS

6. Which of the following is *not* a constraint on the primary key field for a table?

a. There may be no null values.

b. All values must be unique.

c. All values must have a matching value in the foreign key field of the table in which it has a one-to-many relationship.

d. All values must contain data within the data type assigned to that field.

7. Which of the following changes to a database would most likely require the most rework to existing programs and queries?

a. adding a new field to a table

b. creating a new index

c. changing relationships between tables

d. adding a new view

8. GitHub and BitBucket are popular websites for \_\_\_\_\_.

a. hosting projects that use the Git language for version control

b. completing full-stack web app projects

c. posting technical questions and receiving answers

d. reading about trends in the digital development industry

Critical Thinking Questions

1. Create a list of five practical and free precautions you can take to protect your Social Security number.

* If a business, healthcare provider, or other organization asks for your Social Security number, offer an alternate form of identification. Often, businesses ask for this for one reason only – debt collection. The SSN is *not* needed to file medical insurance claims.
* Do not carry your card with you. If your purse or wallet is stolen, the last thing you want is for the thief to get your SSN card too.
* Lock your SSN card in a safe at home. A fireproof safe will protect your card from a thief or fire in your home.
* Never use your SSN as a password.
* Shred any documents that have your SSN on them.
* Monitor your bank and credit card accounts.
* Check with the Social Security Administration on a regular basis to check your Social Security status (www.socialsecurity.gov).

1. Use Figure 7-5 to research a database service for an enterprise-level relational database and document three new key terms based on how that particular vendor handles that particular service. (Examples: Data security by Oracle, Data integrity by MySQL, Backups by SQL Server).

Answers are endless, but here are some examples. Make sure the answers include three new terms and that the definitions fully define the terms.

Data security by Oracle:

1. tablespace: enables you to separate user data from system data
2. tablespace quota: defines how much tablespace to provide for each user
3. QUOTA keyword: clause of the CREATE USER statement when assigning quotas

Data integrity by MySQL

1. NOT NULL constraint: a type of constraint that specifies that a column cannot contain any NULL values.
2. optimistic: a methodology that guides low-level implementation decisions for a relational database system that guide concurrency and consistency
3. ACID: an acronym that stands for atomicity, consistency, isolation, and durability, properties desirable in a database system and closely tied with transactions

Backups by SQL Server:

1. SQL Server Management Studio (SSMS): an integrated environment for managing any SQL infrastructure
2. Differential backup: a data backup that is based on the latest full backup of a complete or partial database or a set of data files or file groups (the differential base) and that contains only the data that has changed since that base
3. Log backup: a backup of transaction logs that includes all log records that were not backed up in a previous log backup

JC Consulting Case Exercises

For the following exercises, you address problems and answer questions for management at JC Consulting. Open and use the JCConsulting.accdb database to answer your questions.

Problems

1. Which of the following types of Access objects may *not* be used for data entry?

a. ProjectEstimates report

b. Projects form

c. ProjectEstimates query

d. Projects table

2. Which of the following represents information that the Database Documenter feature *cannot* supply?

a. property information for tables

b. list of current unique values for fields

c. index information for tables

d. relationship information

3. What symbol does Access use to the left of a record when it is currently being edited and is therefore locked so that other users cannot currently update it?

a. lock

b. black right arrow

c. plus sign

d. pencil

4. Which Access tool helps you recover data in the current database?

a. Analyze Performance

b. Database Documenter

c. Compact and Repair Database

d. Backup Database

5. A database password in Access works at the \_\_\_\_ level.

a. record

b. user

c. file

d. group

6. What does Access automatically add to backup files?

a. current user’s name

b. current date

c. current time of day

d. backup sequential value

7. Which SQL statement would add a new field in the Employees table to a query?

a. SELECT ALL FROM EMPLOYEES

b. SELECT \* FROM EMPLOYEES

c. SELECT EACH FROM EMPLOYEES

d. SELECT FROM EMPLOYEES

8. Which process can you set to automatically occur when a database is closed?

a. compact

b. backup

c. document

d. analyze

Critical Thinking Questions

1. What type of backup schedule and process would you recommend for JC Consulting?

Given JC Consulting is a small business and uses Access, backups can only be made of the entire file when all current users of the database have closed the database. Therefore, they should be made in off-business hours, typically late at night or early in the morning. A backup for every day of the prior week and other key business dates, such as the first day of each quarter, should be saved. Backups should be stored in an offsite location and server different from the production database.

1. What type of compact and repair schedule would you recommend for JC Consulting?

I would recommend compacting and repairing the database every day using the “Compact on Close” feature that is automatically triggered when the last person exits the database at the end of the workday.

Pitt Fitness Case Exercises

Problems

1. The new DBA at Pitt Fitness is working on catalog services in Microsoft Access. This employee has published an internal report on the database schema, but the managers receiving this report are confused by the term “database schema.” What does the report contain?
   1. a model of the tables and relationships between the tables
   2. a new type of query output
   3. a newsletter on the status of the database
   4. the disk space the database consumes
2. The new IT person hired by Pitt Fitness is becoming familiar with the database and requests the database schema. How can you generate the schema from the current Access database?
   1. Click the All Relationships button (Database Tools tab | Relationships group).
   2. Click the Direct Relationships button (Database Tools tab | Relationships group).
   3. Click the Relationships button (Database Tools tab | Relationships group), and then click the Clear Layout button (Relationship Tools Design tab | Tools group).
   4. Click the Relationships button (Database Tools tab | Relationships group), and then click the Relationship Report button (Relationship Tools Design tab | Tools group).
3. Two clerks at Pitt Fitness need to update an address in the Access database for the customer Min Jee Choi. One clerk sees a note about updating the address and begins to edit Min Jee’s record. At the same time, another clerk receives a phone call from Min Jee about changing the address and opens the Customers table. She sees a pencil symbol next to the record for Min Jee Choi and cannot change the address. What is happening with the database?
   1. Min Jee’s record cannot be changed. Once you enter an address in the Customers table, it can never be altered or deleted.
   2. The record is locked from editing by any user except the first clerk. Only one person can edit a record at one time.
   3. The entire database is read-only because the first clerk is working on changing the record.
   4. The database has been corrupted because two people are working on the record at the same time.
4. Popular classes at Pitt Fitness fill up almost immediately. What database technique would work well to determine which people should be admitted into a popular class based on when they requested entry?
   1. two-phase locking
   2. timestamping
   3. phantom locking
   4. concurrent locking
5. Pitt Fitness’s IT person backs up the database every day at the end of business hours. After completing their evening classes, customers register for classes for the upcoming week. Assume that a thunderstorm made Pitt Fitness lose power 12 hours starting at midnight. What state would the database be in when the power was restored?
   1. All class registrations after business hours would be lost.
   2. All class registrations after business hours would be recorded.
   3. The database would be entirely corrupted.
   4. The database would become fragmented.
6. Suppose Pitt Fitness were using an enterprise-level DBMS when a thunderstorm caused a brief power loss to the database, stopping a class registration entry in midstream. When the power was fully restored, the database would not be in a valid state. What type of recovery is needed to undo the problem transaction?
   1. forward recovery
   2. backward recovery
   3. instant recovery
   4. timed recovery
7. The IT manager at Pitt Fitness is creating a backup of the company database. What is the best location for storing the backup?
   1. at the Downtown location
   2. next to the current database for easy access
   3. in the cloud
   4. Pitt Fitness is too small to have a backup.
8. Which of the following data integrity constraints would ensure Pitt Fitness has a consistent method to record customer phone numbers?
   1. format (Input Mask)
   2. legal values
   3. data type
   4. Validation Rule
9. Pitt Fitness is now routinely creating backups of their database. They store them on a server and have a number of backup files that need to be deleted. Which of the following files is the correct backup and should *not* be deleted?
   1. PittFitness\_2021-08-12
   2. PittFitness\_2021-09-30
   3. PittFitness\_2021-10-31
   4. PittFitness\_2021-11-27
10. The IT manager at Pitt Fitness wants to secure the database using a method that includes processing logic to periodically change and synchronize with passwords stored on the database. Which of the following choices would fit that requirement?
    1. fingerprint
    2. smart card
    3. facial recognition
    4. voice recognition

Critical Thinking Questions

1. Pitt Fitness would like to analyze their options for an in-house database versus a cloud database-as-a-service. What are the benefits to moving their database to the cloud?

Answer: Database-as-a-service is becoming more popular because the service is high-performance, reliable, scalable, and secure. Using a database-as-a-service would release Pitt Fitness from needing to locally manage the database and its storage system. The database would then be managed by the service company remotely. The downside for a small company like Pitt Fitness might be the cost as they are charged a monthly fee.

1. Create a data integrity constraint for the Pitt Fitness database that only allows a user to enter one of the three fitness locations into the Classes table.

Answer: Convert the Location field to a lookup field. See Pitt Fitness solution file.

Sports Physical Therapy Case Exercises

Problems

1. If Sports Physical Therapy had an enterprise DBMS, the IT manager might look at the journal log if a record seemed wrong. Which log entry would indicate that a transaction was completed successfully?
   1. Start
   2. Commit
   3. Insert
   4. Update
2. If Sports Physical Therapy had an enterprise DBMS and the IT manager looked at the journal log, which log entry would indicate a change of a record?
   1. Start
   2. Commit
   3. Insert
   4. Update
3. Security is especially important for Sports Physical Therapy because the medical information stored on the database must be kept private by law. What is the federal law that protects medical records and other personal health information?
   1. FERPA
   2. FDA
   3. HIPAA
   4. FDIC
4. The IT manager at Sports Physical Therapy would like to secure the database with an authentication method that identifies users by physical or behavioral characteristics. What type of authentication fits that requirement?
   1. password
   2. biometric
   3. smart card
   4. key fob
5. The IT manager at Sports Physical Therapy would like to incorporate a data integrity constraint to ensure accuracy and consistency to the database. Specifically, the manager wants to consider a legal value for the UnitOfTime field in the Therapies table. What is a reasonable legal value constraint for this field?
   1. >15
   2. <15
   3. <=60
   4. >=0
6. Which of the following fields in the Patient table in the Sports Physical Therapy database would be appropriate for an Access input mask?
   1. LastName
   2. FirstName
   3. Address
   4. State
7. How can Sports Physical Therapy ensure that if an unauthorized user attempts to gain access to the database, they see only an indecipherable version of the database?
   1. Set a strong password.
   2. Encrypt the database.
   3. Authenticate the database.
   4. Ensure the server room has a good lock on the door.
8. What type of concurrent update occurs when two physical therapists are trying to update the record of the same patient at the same time?
   1. record-level locking
   2. read-only locking
   3. stateless locking
   4. data concurrent locking
9. What is the property of the Sports Physical Therapy database that lets the users change the database structure without requiring changes to all the programs that might access that database?
   1. clean data
   2. updated data
   3. data independence
   4. separated data
10. The IT manager at Sports Physical Therapy finds it useful to identify all objects that depend on a particular table, query, form, or report. How can that be accomplished in Access?
    1. Double click the object, and then click the Database Documenter button (Database Tools tab | Analyze group).
    2. Click the object, and then click the Analyze Table button (Database Tools tab | Analyze group).
    3. Click the object, and then click the Object Dependencies button (Database Tools tab | Relationships group).
    4. Click the object, and then click the Relationships button ( Database Tools tab | Relationships group).

Critical Thinking Questions

1. The IT manager at Sports Physical Therapy finds it useful to identify all objects that are dependent on a particular table, query, form, or report. List the tables that the Session table depends on.

Answer: Patient, Therapies, and Therapist tables.

1. The IT manager at Sports Physical Therapy needs to know all the relationships in the database. Use Access to create a Relationship report for the Sports Physical Therapy database for your own reference. Use Database Design Language to identify the relationships in the database.

Patient (PatientNum, LastName, FirstName, Address, City, State, ZipCode, Balance)

SK LastName, FirstName

Therapies (TherapyCode, Description, UnitOfTime)

SK Description

Session (SessionNum, SessionDate, PatientNum, LengthOfSession, TherapistID, TherapyCode)

FK PatientNum 🡪 Patient

FK TherapistID 🡪 Therapist

Therapist (TherapistID, LastName, FirstName, Street, City, State, ZipCode)

SK LastName, FirstName