**Module 9**

**Database Industry Trends**

Module Review Questions

Problems

1. Which of the following database architectures is most closely aligned with traditional, enterprise-level relational databases?

a. centralized

b. client/server

c. data warehouse

d. distributed

2. Which of the following best describes the concept of an OLAP cube?

a. Selected columns and rows from one or more tables.

b. A read-only snapshot of data organized in levels and hierarchies of categories.

c. An object-oriented key/value pair description of data.

d. A BLOB.

3. Big data typically does *not* include which of the following?

a. Clicks on webpages.

b. Images

c. Billing information

d. Keyword search data

4. Which of the following databases would probably be considered for a web app if your company had a significant commitment to JavaScript?

a. IBM Db2

b. Microsoft Access

c. Microsoft SQL Server

d. MongoDB

5. Which of the following types of databases would most likely be used for tracking connections between people?

a. document

b. relational

c. graph

d. flat file

6. Which file extension is a type of XML file?

a. xlsx

b. json

c. txt

d. dbf

7. Line charts are best used for which type of visualization?

a. comparing values

b. identifying relationships

c. showing trends over time

d. displaying cumulative totals

Critical Thinking Questions

1. Identify the characteristics of a new application that lends itself to the MEAN or MERN stack.

The MEAN and MERN stacks both use the MongoDB document database in an all-JavaScript software development mentality. The characteristics of the application would have to include access over the web, deep JavaScript knowledge, and unstructured versus relational data.

1. The term “big data” is trendy and means different things to different businesses. Ask five people in the Computer Science Department within your college what the term means to them, and organize the results.

Answers will of course vary, but students should show that they have indeed talked to at least five different people and have documented their thoughts.

JC Consulting Case Exercises

For the following exercises, you will answer problems and questions from management at JC Consulting. You do not need to use the JCConsulting database for any of these exercises.

Problems

1. Which of the following database architectures best describes how Access works when the database is stored on a file server and accessed by many users with personal computers?

a. centralized

b. client/server

c. data warehouse

d. distributed

2. If you wanted to evaluate Access data using Excel PivotTables and PivotCharts, what would be the first step?

a. Select the data you want to evaluate with a query.

b. Export all of your tables to text files.

c. Create OLAP cubes in Access.

d. Use the Database Business Intelligence Wizard in Access.

3. If JC Consulting used Google Analytics, what type of information might they learn?

a. What areas of the country had the most potential for their services.

b. Which employees were most productive.

c. Which customers were most profitable.

d. How long users were interacting with their website.

4. JC Consulting wants to upgrade some Access data to a larger, enterprise-scale database management system. Which is the most likely candidate?

a. MongoDB

b. Oracle

c. IBM Db2

d. SQL Server

5. Which of the following is a NoSQL database?

a. IBM Db2

b. Microsoft Access

c. Microsoft SQL Server

d. MongoDB

6. Which menu option on the More button of the External Data tab of the ribbon in Access do you use to export data to SQL Server?

a. ODBC Database

b. dBASE File

c. SQL Server

d. Relational

7. When creating a query in Access for data that you later want to analyze as a PivotTable or PivotChart in Excel, how many fields do you typically use in the visualizations?

a. 1

b. 2

c. 3

d. At least 4 or more

Critical Thinking

1. Identify the characteristics of the business problem that lends itself to an Access solution.

The data must be easily managed in a relational database. The number of users must be in the 1-10 range, and the application must be local. Access doesn’t scale well beyond a handful of current users nor does it provide for easy access over the Internet.

2. As JC Consulting grows, they may need to convert their Access application into technologies that can handle more users and locations. What solution stacks would you recommend they consider?

Given the company has an existing relational database, they probably want to stay with a software solution stack that includes a solid relational database for data management. If the company wants to stay with Microsoft products, the WINS stack that includes SQL Server as the database and the ASP.NET framework is a good bet. If the company wants to move away from proprietary Microsoft applications they should probably consider the tried and true LAMP stack with a PHP framework such as Laravel. The Ruby on Rails stack using MySQL is also a viable option.

Pitt Fitness Case Exercises

Problems

1. Pitt Fitness, having transitioned to a larger database system to accommodate their recent growth, is now considering moving their database to the cloud. However, management is concerned that they will be sharing the resources with other cloud clients. The cloud provider assures Pitt Fitness that they can maintain maximum power and efficiency for Pitt. How can the cloud provider do this?
   1. by creating a server farm
   2. by building a data center
   3. through a technique called virtualization
   4. as long as the provider is AWS, they can do this
2. Pitt Fitness stores their Access database on a centralized file server for usage by a few employees. What type of architecture are they using?
   1. client/server
   2. cloud-based
   3. LAN-based
   4. front end
3. Pitt Fitness has hired summer interns for data analysis. The interns are running complex queries that take enormous processing power. The clerks at Pitt Fitness have found that registering customers and classes has slowed to an unacceptable pace. What type of system does Pitt Fitness need to correct this slow registration problem?
   1. a cloud-based system
   2. a data warehouse
   3. an integrated system
   4. a split form
4. The summer interns at Pitt Fitness explain to management that they will be initially summarizing data in a crosstabular organization. What type of tool are the interns using to create these cubes of data?
   1. OLTPs
   2. scalables
   3. thin clients
   4. PivotTables
5. Considering that Pitt Fitness is a relatively new company, what types of computer programs does Pitt Fitness *not* have?
   1. legacy
   2. dinosaur
   3. JavaScript
   4. object-oriented
6. Managers at Pitt Fitness want developers to write back-end applications that interact with the centralized database. Which computer language should they use?
   1. Java Lite
   2. JavaScript
   3. Java
   4. JavaVB
7. Pitt Fitness has decided to employ Google Analytics to analyze traffic on their website. The first report has come in with a recording of the bounce rate. What does the bounce rate measure?
   1. a site visitor that views many pages on the site
   2. a site visitor from a mobile device
   3. a site visitor that posts the site on social media
   4. a site visitor that leaves the site
8. Pitt Fitness has hired a full-time data analyst to produce various data visualizations to help management better serve their customers. Which of the following tools could the new employee use for data visualization?
   1. Excel
   2. Power BI
   3. Tableau
   4. Excel, Power BI, and Tableau
9. The new data analyst at Pitt Fitness wants to create a chart that compares the monthly class registrations by displaying them in horizontal lines. What type of chart would be appropriate?
   1. Column
   2. Line
   3. Pie
   4. Bar
10. The data analyst at Pitt Fitness is creating a chart that displays the relationship between advertising expenses and new customers. What type of chart is she using?
    1. Bar
    2. Area
    3. XY Scatter
    4. Map

Critical Thinking Questions

1. Pitt Fitness would like to enhance their web presence and enable the exchange of data on the web. What type of markup language should they use and why?

Answer: Extensible Markup Language, XML, stores identified data. Unlike HTML, which only presents data, XML tags each piece of data so fields and records can be identified like a database.

1. Describe some of the big data that Pitt Fitness might collect and find useful.

Answer: Fitness blog postings, reviews of classes and facilities, webpage clicks, tweets on fitness, Instagram images of customers exercising at Pitt Fitness.

Sports Physical Therapy Case Exercises

Problems

1. When physical therapists are scheduled to see a patient, they ask the clerk for a “hard copy” to view what is needed for that day’s session with the specific treatments. What are the physical therapists referring to when they request a hard copy?
   1. a poster board with the daily schedule
   2. a printed paper
   3. a tablet with the session information
   4. an electronic hard screen
2. The Sports Physical Therapy clinic is considering moving their database to the cloud. Which of the following is the current market leader in cloud storage, and therefore would be a safe bet for the organization?
   1. IBM
   2. Oracle
   3. Microsoft
   4. AWS
3. The Sports Physical Therapy clinic’s Access database is stored on a centralized computer for usage by a few trusted colleagues. They are therefore running a \_\_\_\_\_\_ application.
   1. client/server
   2. back/end
   3. front/end
   4. crowdsourced
4. As the Sports Physical Therapy clinic grows, management is considering moving to a larger database management system, where the clients perform the presentation functions, a database server performs the database functions, and separate centralized computers perform the business functions as well as serve as an interface between clients and the database server. What type of architecture is management considering?
   1. Oracle
   2. nonvolatile
   3. three-tier
   4. thin client
5. The Sports Physical Therapy clinic has an Access database for patients, therapists, and appointments. The clinic also has other systems that record information such as insurance details, accounting of payments, and miscellaneous employee data. The IT manager at the organization wants to consolidate and summarize the data from these systems to produce management reports. What type of system is needed to accomplish this?
   1. data warehouse
   2. PivotTables
   3. client/server
   4. split database
6. The IT manager at the Sports Physical Therapy clinic created a system to consolidate and summarize data from its Access database and other insurance, accounting, and employee systems to produces management reports. What database technology optimizes data for querying, analyzing, and reporting?
   1. online analytical processing (OLAP)
   2. online transaction processing (OLTP)
   3. online database processing (OLDP)
   4. online integrated processing (OLIP)
7. The summer intern at Sports Physical Therapy clinic has been using Excel to analyze some data. The intern is displaying a crosstabular organization of the data with the session date as the row heading, the therapist ID as the column heading, and the session number as a counted value. What Excel tool is this summer intern using?
   1. Scenario Manager
   2. Solver
   3. PivotTable
   4. regression
8. The Sports Physical Therapy clinic is not a large business, but management still would like to analyze their “big data” using a moderately priced service. Which of the following would be appropriate for this task?
   1. Hadoop
   2. Amazon Web Services
   3. IBM
   4. Google Analytics
9. The summer intern at Sports Physical Therapy clinic would like to do data visualizations that are more sophisticated than the software Excel can provide. Which of the following solutions would be the best to use?
   1. Microsoft Access
   2. Microsoft Power BI
   3. Microsoft Project
   4. Microsoft OneNote
10. The summer intern at Sports Physical Therapy clinic is using Excel to create some interesting charts of the activities at the clinic. The intern would like to show trends over time based on a cumulative group of sessions. Which of the following chart types would be appropriate?
    1. XY Scatter
    2. Map
    3. Pie
    4. Area

Critical Thinking Questions

1. The Sports Physical Therapy clinic is considering centralizing their database operations. What are their options for this centralized computing?

Answer: The clinic can centralize their architecture by creating an internal data center. However, most organizations now are moving their data centers to the cloud. Cloud computing means that programs and services are accessed via the Internet versus through a traditional network managed within the clinic itself.

1. The Sports Physical Therapy clinic is having trouble with the performance of their Access database. They would like to split the database between front end and back end to improve performance. How would they do this?

Answer: Close all open objects; click the Database Tools tab on the ribbon; click the Access Database button (Database Tools tab | Move data group); click Split Database; select the location and enter the name for the back-end database; click Split in the Create Back-End Database dialog box.