**Module 2**

**The Relational Model:**

**Introduction, QBE, and Relational Algebra**

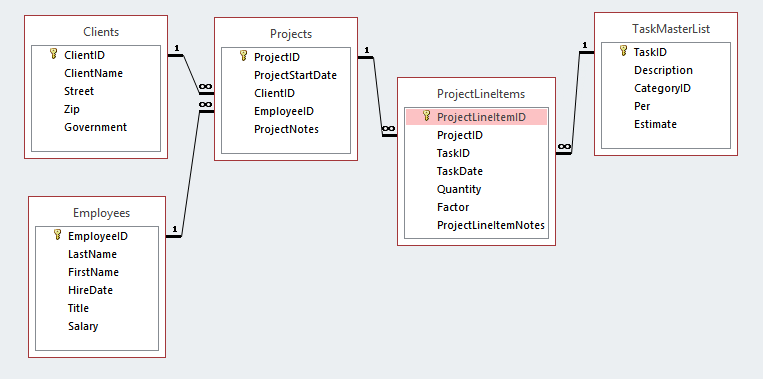
**Solutions**

Review Questions

1. Which of the following is *not* a characteristic of a healthy relation?
2. Each column has a distinct name (technically called the attribute name).
3. Each intersection of a row and column in a table may contain more than one value.
4. All values in a column are values of the same attribute (that is, all entries must match the column name).
5. The order of the rows and columns is not important.
6. Which of the following sentences explains how entities, attributes, and records work together?
7. A record contains a single attribute with many entities.
8. An entity can have only one attribute in a record.
9. A record contains all related entities and all of their attributes.
10. A record is all of the attribute values for one item in an entity.
11. The \_\_\_\_\_ contains values that uniquely identify each record in a table and serves as the linking field in the table on the “one” (parent) side of a one-to-many relationship.
12. primary key field
13. foreign key field
14. calculated field
15. natural field
16. What is the purpose of the foreign key field?
17. It is the linking field in the table on the “one” (parent) side of a one-to-many relationship.
18. It establishes the order of the records in a table.
19. It is the field in the table on the “many” (child) side of a one-to-many relationship.
20. It links two tables that do not have a common field.
21. In the query design grid in Access Query Design View, you place AND criteria on \_\_\_\_\_, and you place OR criteria on \_\_\_\_\_.
22. the same row, different rows
23. different rows, the same row
24. the Total row, the next blank Field row
25. the AND row, the OR row
26. With \_\_\_\_\_, only one criterion must evaluate true in order for a record to be selected and with \_\_\_\_\_, all criteria must be evaluate true in order for a record to be selected.
27. parameter criteria, double criteria
28. function criteria, IF criteria
29. simple criteria, complex criteria
30. OR criteria, AND criteria
31. Which of the following is an example of a computed field?
32. MonthlyRate = [AnnualRate] / 12
33. MonthlyRate: Annual Rate / 12
34. MonthlyRate: [AnnualRate] / 12
35. MonthlyRate: “AnnualRate” / 12
36. Which of the following describes an Access aggregate function?
37. An aggregate function performs a calculation that provides new information for each record.
38. An aggregate function determines all rows that are in table A but not in table B.
39. An aggregate function sums, averages, or counts, for example, the records in a group.
40. An aggregate function makes a specified change to all records satisfying the criteria in a query.
41. How do you sort data in Access Query Design View?
42. Use the Sort row and specify the sort fields in a left-to-right order.
43. Enter the sort order on the Criteria row of the query design grid.
44. Select a grouping field, and then use the Sort row to select a sort order.
45. In the Sort row, select “major sort key” or “minor sort key” for each field you want to sort.
46. What does it mean to enforce referential integrity on a one-to-many relationship?
47. You may not set a primary key in the “many” table.
48. You may not create orphan records by entering a phony foreign key field value in the “many” table.
49. You may not delete records in the “one” table that have no related records in the “many” table.
50. You may not create new records in the “one” table.
51. Which of the following types of queries does *not* change data in Access?
52. update
53. delete
54. select
55. make-table
56. \_\_\_\_\_ forms the foundational knowledge for SQL, Structured Query Language, which is the most popular way developers select, edit, and add data to a relational database.
57. Query algebra
58. Referential integrity
59. Entity diagramming
60. Relational algebra

Critical Thinking

1. Using the data for the JC Consulting database shown in Figure 2-1, identify the one-to-many relationships as well as the primary key fields and foreign key fields for each of the five tables.



Clients (ClientID, ClientName, Street, Zip, Government)

Employees (EmployeeID, LastName, FirstName, HireDate, Title, Salary)

Projects (ProjectID, ProjectStartDate, ClientID, EmployeeID, ProjectNotes)  
ClientID and EmployeeID are foreign key fields

ProjectLinkItems (ProjectLineItemID, ProjectID, TaskID, TaskDate, Quantiy, Factor, ProjectLinkItemNotes)  
ProjectID and TaskID are foreign key fields

TaskMasterList (TaskID, Description, CategoryID, Per, Estimate)

2. Using the data for the JC Consulting database shown in Figure 2-1 and your answers from the previous question, which tables would need to be involved if you wanted to create a query that showed the EmployeeID and LastName fields from the Employees table as well as all TaskID and Description fields from the TaskMasterList table that were related to that employee?

You would need the Employees, TaskMasterList, Projects, and ProjectListItem tables.

**Note:** The following answers indicate how to perform the specified task in Microsoft Access. The process for other database management systems would be different, although it should be similar. Data and solution files are available at the Cengage website. Data files consist of copies of the JC Consulting, Pitt Fitness, and Sports Physical Therapy databases that are usable in Access 2010, Access 2013, Access 2016, and Access 2019, and script files to create the tables and data in these databases in other systems, such as MySQL.

# **Answers to JC Consulting Case Exercises: QBE**

1. Select the LastName, ProjectID, and ClientName fields for all records for the employee with the last name of Novak. Which of the following ProjectID values is *not* associated with Novak?

1. 1
2. 17
3. 26
4. 4

| **Review1** | | |
| --- | --- | --- |
| **LastName** | **ProjectID** | **ClientName** |
| Novak | 1 | Tri-Lakes Realtors |
| Novak | 3 | Midstates Auto Auction |
| Novak | 4 | Bretz & Hanna Law Firm |
| Novak | 8 | Midstates Auto Auction |
| Novak | 16 | Harper State Bank |
| Novak | 17 | MarketPoint Sales |
| Novak | 19 | SecureCom Wireless |
| Novak | 25 | Wu Electric |

2. Select the ProjectID, ProjectStartDate, ClientName, and Government fields for all records where the Government field value is True. Which of the following clients are included in the results?

1. Project Lead The Way and The HELPCard
2. Tri-Lakes Realtors and Midstates Auto Auction
3. Bretz & Hanna Law Firm and Bounteous
4. Harper State Bank and MarketPoint Sales

| **Review2** | | | |
| --- | --- | --- | --- |
| **ProjectID** | **ProjectStartDate** | **ClientName** | **Government** |
| 7 | 9/2/2019 | Project Lead The Way | Yes |
| 15 | 12/21/2020 | The HELPCard | Yes |

3. Select the ProjectID, ProjectStartDate, ClientName, TaskID, and Description fields for TaskID TEST01 and a ProjectStartDate after 1/1/2020. Sort the records in ascending order by ProjectStartDate. What are the ProjectStartDate and ClientName values in the first record of the results?

1. 1/6/2020, Midstates Auto Auction
2. 2/7/2019 Jobot Developers
3. 4/10/2020, Bretz & Hanna Law Firm
4. 1/14/2022, SkyFactor

| **Review3** | | | | |
| --- | --- | --- | --- | --- |
| **ProjectID** | **ProjectStartDate** | **ClientName** | **TaskID** | **Description** |
| 4 | 4/10/2020 | Bretz & Hanna Law Firm | TEST01 | Test technology |
| 13 | 11/30/2020 | Jobot Developers | TEST01 | Test technology |
| 14 | 12/9/2020 | Jillian Henry & Associates | TEST01 | Test technology |
| 15 | 12/21/2020 | The HELPCard | TEST01 | Test technology |
| 17 | 2/15/2021 | MarketPoint Sales | TEST01 | Test technology |
| 22 | 9/30/2021 | Juxly Engineering | TEST01 | Test technology |
| 24 | 1/14/2022 | SkyFactor | TEST01 | Test technology |

4. Select the ProjectID, ClientName, TaskID, and Description fields for TaskIDs TEST01 or TEST02. Sort the records in ascending order by ProjectID and then by TaskID. What are the ProjectID and TaskID values of the first two records in the results?

1. 2, TEST01 and 4, TEST01
2. 2, TEST01 and 2, TEST02
3. 4, TEST01 and 22, TEST01
4. 17, TEST01 and 17, TEST02

| **Review4** | | | |
| --- | --- | --- | --- |
| **ProjectID** | **ClientName** | **TaskID** | **Description** |
| 2 | Jobot Developers | TEST01 | Test technology |
| 2 | Jobot Developers | TEST02 | Test performance |
| 4 | Bretz & Hanna Law Firm | TEST02 | Test performance |
| 4 | Bretz & Hanna Law Firm | TEST01 | Test technology |
| 7 | Project Lead The Way | TEST01 | Test technology |
| 7 | Project Lead The Way | TEST02 | Test performance |
| 13 | Jobot Developers | TEST01 | Test technology |
| 14 | Jillian Henry & Associates | TEST01 | Test technology |
| 14 | Jillian Henry & Associates | TEST02 | Test performance |
| 15 | The HELPCard | TEST02 | Test performance |
| 15 | The HELPCard | TEST01 | Test technology |
| 17 | MarketPoint Sales | TEST01 | Test technology |
| 17 | MarketPoint Sales | TEST02 | Test performance |
| 22 | Juxly Engineering | TEST02 | Test performance |
| 22 | Juxly Engineering | TEST01 | Test technology |
| 24 | SkyFactor | TEST02 | Test performance |
| 24 | SkyFactor | TEST01 | Test technology |

5. Select the EmployeeID, LastName, HireDate, and Salary fields for employees hired on or before 1/1/2020. Create a calculated field named Bonus that is calculated as 50 percent of their monthly salary, which is stored in the Salary field. What is the bonus amount for Lopez?

1. 2500
2. 12,400
3. 6200
4. 3100

| **Review5** | | | | |
| --- | --- | --- | --- | --- |
| **EmployeeID** | **LastName** | **HireDate** | **Salary** | **Bonus** |
| 19 | Kohn | 1/1/2020 | $5,000.00 | 2500 |
| 52 | Novak | 1/1/2019 | $8,000.00 | 4000 |
| 53 | Anad | 1/1/2019 | $5,300.00 | 2650 |
| 54 | Allen | 1/1/2019 | $7,000.00 | 3500 |
| 56 | Reddy | 9/1/2019 | $6,200.00 | 3100 |
| 58 | Young | 1/1/2019 | $5,500.00 | 2750 |
| 59 | Santana | 1/1/2019 | $4,800.00 | 2400 |
| 60 | Lu | 3/1/2019 | $7,900.00 | 3950 |
| 61 | Smirnov | 10/1/2019 | $6,000.00 | 3000 |
| 63 | Geller | 1/1/2019 | $8,100.00 | 4050 |
| 64 | Lopez | 1/1/2019 | $6,200.00 | 3100 |
| 68 | Patel | 4/1/2019 | $6,500.00 | 3250 |
| 73 | Safar | 2/1/2019 | $4,100.00 | 2050 |

6. Find the total, average, and count of the Salary field for all employees grouped by title. Sort the records in ascending order by title. What is the average of the salaries for the first title in the results?

1. $6,650.00
2. $6,000.00
3. $6,375.00
4. $4,366.67

| **Review6** | | | |
| --- | --- | --- | --- |
| **Title** | **SumOfSalary** | **AvgOfSalary** | **CountOfSalary** |
| Customer Support Specialist | $13,100.00 | $4,366.67 | 3 |
| Database Developer | $15,700.00 | $7,850.00 | 2 |
| Front End Developer | $24,600.00 | $4,920.00 | 5 |
| Network Specialist | $14,000.00 | $7,000.00 | 2 |
| Programmer | $48,400.00 | $6,050.00 | 8 |
| Project Manager | $21,100.00 | $7,033.33 | 3 |
| Quality Assurance Engineer | $12,750.00 | $6,375.00 | 2 |
| UI Designer | $13,300.00 | $6,650.00 | 2 |

7. Select the records in the TaskMasterList table with a CategoryID field value of Database, and then create an update query to update their Estimate field values by 10 percent. How many records are updated, and what is the highest updated Estimate field value?

1. 5 and $1,100
2. 5 and $1,000
3. 40 and $1,100
4. 40 and $1,000

After running the update query, 5 records are updated as shown below:

| **Review7** | |
| --- | --- |
| **CategoryID** | **Estimate** |
| Database | $1,100.00 |
| Database | $137.50 |
| Database | $550.00 |
| Database | $550.00 |
| Database | $440.00 |

8. Delete all of the records in the ProjectLineItems table with a ProjectID field value of 11. How many records were deleted?

1. 1
2. 0
3. 7
4. 145

These 7 records should be deleted from the ProjectLineItems table:

| **Review8** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **ProjectLineItemID** | **ProjectID** | **TaskID** | **TaskDate** | **Quantity** | **Factor** | **ProjectLineItemNotes** |
| 17 | 11 | MEET00 | 30-Apr-20 | 1 | 1.00 |  |
| 18 | 11 | PLAN01 | 30-Apr-20 | 1 | 1.00 |  |
| 201 | 11 | DB04 | 13-May-20 | 1 | 1.00 |  |
| 202 | 11 | CODE04 | 20-May-20 | 40 | 1.00 |  |
| 203 | 11 | SUPP03 | 27-May-20 | 8 | 1.00 |  |
| 204 | 11 | SUPP02 | 01-Jun-20 | 4 | 1.00 |  |
| 205 | 11 | SUPP04 | 08-Jun-20 | 12 | 1.00 | 12-month minimum |

9. Make a table with the ClientName, ProjectID, ProjectStartDate, and TaskID fields for all projects with a TaskID field value of MEET00. Sort the records in ascending order by the ProjectStartDate field. Twenty-four records should be selected. Name the table InitialMeetings. What is the ClientName value of the first record in the InitialMeetings table?

1. Bounteous
2. Tri-Lakes Realtors
3. Morales Group
4. Jobot Developers

These 24 records should be present in a new InitialMeetings table:

| **Review9** | | | |
| --- | --- | --- | --- |
| **ClientName** | **ProjectID** | **ProjectStartDate** | **TaskID** |
| Tri-Lakes Realtors | 1 | 2/6/2019 | MEET00 |
| Jobot Developers | 2 | 2/7/2019 | MEET00 |
| Midstates Auto Auction | 3 | 3/11/2019 | MEET00 |
| Project Lead The Way | 7 | 9/2/2019 | MEET00 |
| Midstates Auto Auction | 8 | 1/6/2020 | MEET00 |
| Bounteous | 9 | 2/10/2020 | MEET00 |
| Tri-Lakes Realtors | 31 | 3/1/2020 | MEET00 |
| Bretz & Hanna Law Firm | 4 | 4/10/2020 | MEET00 |
| Jobot Developers | 13 | 11/30/2020 | MEET00 |
| Jillian Henry & Associates | 14 | 12/9/2020 | MEET00 |
| The HELPCard | 15 | 12/21/2020 | MEET00 |
| Harper State Bank | 16 | 1/4/2021 | MEET00 |
| MarketPoint Sales | 17 | 2/15/2021 | MEET00 |
| Bounteous | 18 | 4/14/2021 | MEET00 |
| SecureCom Wireless | 19 | 6/4/2021 | MEET00 |
| Pediatric Group | 21 | 8/31/2021 | MEET00 |
| Juxly Engineering | 22 | 9/30/2021 | MEET00 |
| NuCamp | 23 | 11/12/2021 | MEET00 |
| SkyFactor | 24 | 1/14/2022 | MEET00 |
| Wu Electric | 25 | 2/17/2022 | MEET00 |
| Revature Motors | 27 | 5/3/2022 | MEET00 |
| Talent Sensations | 28 | 5/10/2022 | MEET00 |
| Carta Training | 29 | 6/2/2022 | MEET00 |
| Morales Group | 30 | 6/3/2022 | MEET00 |

Critical Thinking

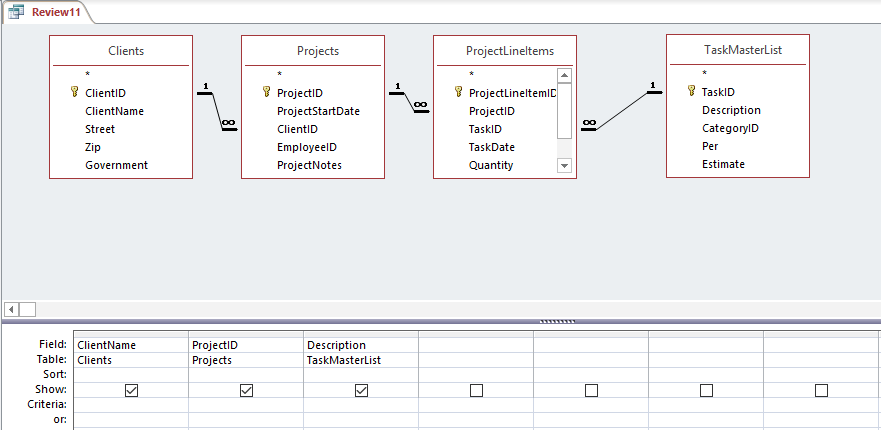
1. Select the ClientName, ProjectStartDate, and TaskID fields for all records that have a project start date in the year 2020 and have a task ID of MEET00 or MEET01. Sort the records by client name then task ID.

This question requires students to use both AND and OR criteria in one query. The ProjectStartDate must be >1/1/2020 and < 1/1/2021 for TaskID MEET00 or MEET01.

| **Review10** | | |
| --- | --- | --- |
| **ClientName** | **ProjectStartDate** | **TaskID** |
| Bounteous | 2/10/2020 | MEET00 |
| Bretz & Hanna Law Firm | 4/10/2020 | MEET00 |
| Jillian Henry & Associates | 12/9/2020 | MEET00 |
| Jillian Henry & Associates | 12/9/2020 | MEET01 |
| Jobot Developers | 11/30/2020 | MEET00 |
| Midstates Auto Auction | 1/6/2020 | MEET00 |
| The HELPCard | 12/21/2020 | MEET00 |
| The HELPCard | 12/21/2020 | MEET01 |
| Tri-Lakes Realtors | 3/1/2020 | MEET00 |
| Tri-Lakes Realtors | 3/1/2020 | MEET01 |
| Tri-Lakes Realtors | 3/1/2020 | MEET01 |

1. An employee of JC Consulting created the query shown in Figure 2-48. He wants to list the client name, project ID, and task description for each task assigned to the projects for that client. Will this query be successful? If not, what needs to change in order for this query to work correctly?

This query will not result in the correct answer because the relationship between the TaskMasterList table and the other two tables in the query is not established. When relationships are not clear, they result in a Cartesian join in which every related record from Clients and Projects will join with every record in the TaskMasterList table. To fix this problem, the ProjectLineItems table needs to be added to Query Design View to clarify how the records in the TaskMasterList table relate to the rest of the relational database.



# **Answers to JC Consulting Case Exercises: Relational Algebra**

In the following exercises, you will use the data in the JC Consulting database shown in Figure 2-1. In each step, indicate how to use relational algebra to obtain the desired results.

1. Complete the following statement to list the employee ID, first name, and last name of all employees.

\_\_\_\_\_EMPLOYEES OVER (EmployeeID, LastName, FirstName) GIVING Answer

1. PROJECT
2. JOIN
3. INTERSECTION
4. SELECT
5. Complete the following statement to list all information from the TaskMasterList table for task ID CODE05.

SELECT TaskMasterList WHERE \_\_\_\_\_ GIVING Answer

1. TaskID = CODE05
2. TaskID = 'CODE05'
3. CODE05 = 'TaskID'
4. (TaskID, CODE05)
5. Complete the following statements to list the project ID, project start date, client ID, and client name for each project.

JOIN Projects Clients WHERE \_\_\_\_\_ GIVING Temp1

PROJECT Temp1 OVER (ProjectID, ProjectStartDate, ClientID, ClientName) GIVING Answer

1. ClientID.Projects = ClientID.Clients
2. Projects.ProjectID = Clients.ProjectID
3. Projects.ClientID = Clients.ClientID
4. Projects.ProjectID = Clients.ClientID
5. Complete the following statements to list the project ID, project start date, client ID, and client name for each project created for the employee with the last name of Winter.

\_\_\_\_\_ Projects Clients WHERE Projects.ClientID = Clients.ClientID GIVING Temp1

JOIN Temp1 Clients WHERE Temp1.EmployeeID = Employees.EmployeeID GIVING Temp2

SELECT Temp2 WHERE Employees.LastName = 'Winter' GIVING Temp3

PROJECT Temp3 OVER (ProjectID, ProjectStartDate, ClientID, ClientName) GIVING Answer

1. SELECT
2. PROJECT
3. UNION
4. JOIN
5. Complete the following statements to list the project ID and project start date of all projects that were placed by client ID 5.

JOIN Projects Clients WHERE Projects.ClientID = Clients.ClientID GIVING Temp1

PROJECT Temp1 OVER (ProjectID, ProjectStartDate, ClientID) GIVING Temp2

SELECT Temp2 \_\_\_\_\_ GIVING Temp3

PROJECT Temp3 OVER (ProjectID, ProjectStartDate) GIVING Temp4

1. WHERE ClientID = 5
2. OVER ClientID = 5
3. WHERE Projects.ClientID = Clients.ClientID
4. AND ClientID = 5
5. Complete the following statements to list the project ID and project start date of all projects that were created for client ID 5 or 6.

JOIN Projects Clients WHERE Projects.ClientID = Clients.ClientID GIVING Temp1

PROJECT Temp1 OVER (ProjectID, ProjectStartDate, ClientID) GIVING Temp2

SELECT Temp2 WHERE ClientID = 5 GIVING Temp3

PROJECT Temp3 OVER (ProjectID, ProjectStartDate) GIVING Temp4

SELECT Temp2 WHERE ClientID = 6 GIVING Temp5

PROJECT Temp5 OVER (ProjectID, ProjectStartDate) GIVING Temp6

\_\_\_\_\_ Temp5 WITH Temp6 GIVING Answer

1. JOIN
2. UNION
3. OR
4. INTERSECTION
5. Complete the following statements to list the project ID and project start date of all projects with a project start date of 3/1/2020 but *not* for client ID 7.

SELECT Projects WHERE ProjectStartDate ='3/1/2020' GIVING Temp1

PROJECT Temp1 OVER (ProjectID, ProjectStartDate) GIVING Temp2

SELECT Temp2 WHERE ClientID = 7 GIVING Temp3

PROJECT Temp3 OVER (ProjectID, ProjectStartDate) GIVING Temp4

\_\_\_\_\_ Temp4 FROM Temp2 GIVING Answer

1. UNION
2. PRODUCT
3. SUBTRACT
4. DELETE

Pitt Fitness Case Exercises

The owner of Pitt Fitness knows that the power of the company’s database is in running queries to find out important information for making good business decisions. In the following exercises, you use the data in the Pitt Fitness database shown in Figures 1-15 through 1-19 in Module 1. When you use Microsoft Access to respond to these exercises, make a copy of the original database to create the queries. In each step, use QBE to obtain the desired results.

1. Which customer lives on Negley Avenue?
2. Gregor
3. Aboud
4. Agnew
5. Sanchez
6. How many customers were born from 2001 onward?
7. 5
8. 3
9. 10
10. 2
11. Which instructors live in zip code 15217?
12. Juan Varlano, Michael Nguyen
13. Robert Sisto, Neda Tahan
14. Vicki Pegues, Raymond Stein
15. No instructors live in this zip code.
16. Which classes (by name) have the highest number of reservations?
17. Intense Cycle, Barre
18. Combination, Bootcamp
19. Yoga
20. Aqua Calm, Yoga Balance
21. How many customers have registered for a class on Wednesdays?
22. 10
23. 7
24. 6
25. 5
26. What are the three most popular class names on Saturday?
27. Cycle, Combination, Agility for Seniors
28. Zumba, Cycle, Combination
29. Bootcamp, Zumba, Cycle
30. Maturity Endurance and Strength, Intense Cycle, Bootcamp
31. How many classes did Pablo Brough sign up for?
32. 5
33. 2
34. 1
35. 0
36. How many customers have signed up for a class on January 8, 2021?
37. 0
38. 1
39. 3
40. 10
41. Which customers prefer the 45-minute class length?
42. Glenn Spencer, Sharon Smith
43. Debby Thorn, Juan Barry
44. Tamara Lara, Albert Cornett
45. Min Jee Choi, Ramiro Sanchez
46. Which instructor teaches the most classes?
47. Raymond Stein
48. Memo Said
49. Michael Nguyen
50. Maria D’Angelo
51. Which instructor teaches Zumba?
52. Neda Tahan
53. Juan Varlano
54. Megan Kobinski
55. Robert Sisto
56. Of all reservations for classes containing the word Cycle, which customer does not owe another fee besides the class price? (*Note*: this field is called “OtherFees.”) Create a calculated field to total both costs.
57. Gene Shaffer
58. Philip Benavides
59. Tony Waldron
60. Juan Barry
61. According to the reservations so far, how much money will the Combination classes generate?
62. $9
63. $18
64. $36
65. $0
66. Instructor Michael Nguyen is injured and has to cancel his class on Wednesday. Delete that record and count how many classes he has left to teach.
67. 6
68. 2
69. 5
70. 10
71. Which instructor will customer Margo Patterson get for her HIIT class?
72. Raymond Stein
73. Vicki Pegues
74. Megan Kobinski
75. Neda Tahan
76. How many classes are offered on Tuesday at 6 am and last 45 minutes?
77. 3
78. 2
79. 1
80. 0
81. Which day of the week has the most classes?
82. Monday
83. Tuesday
84. Wednesday
85. Thursday

Critical Thinking

1. Suppose you want to list information on all the classes that Pitt Fitness offers, including the day of the week, time, location, and length of class. To do this, you could create a query. What table(s) should you add to the query? If you use only the Classes table instead of all the tables together, does it make a difference to the output? What if someone had never reserved a specific class?

Answer: To answer the question correctly, you would need only the Classes table. If you used all the tables in the query and some classes had not been reserved, you might be missing some of that output.

1. The owner of Pitt Fitness is considering whether to consolidate his clubs and offer classes in only one location to ensure profitability. To explore his question, what query or queries would you create to answer this business strategy question?

Answer: First, create a query that counts the number of classes offered at each location. Next, create a query that counts the number of reservations at each location. Finally, to refine the answer, you could create a query that counts the number of reservations for each specific class at the low-enrollment location and compare that to the other locations.

Sports Physical Therapy Case Exercises

In the following exercises, you use data in the Sports Physical Therapy database shown in Figures 1-21 through 1-24 in Module 1. When you use Microsoft Access to answer these questions, make a copy of the original database to create the queries to answer these questions. In each step, use QBE to obtain the desired results.

1. Which patient has the highest balance?
2. Latisha Culling
3. Andre Marino
4. Tammy Wilson
5. Isaiah Venable
6. How many patients and therapists live in Georgetown, TX?
7. One patient and one therapist
8. Three therapists
9. Two patients
10. No one lives in Georgetown, TX.
11. Which patient has a therapy session on October 12, 2021?
12. Robbie Koehler
13. Tobey Short
14. Ben Odepaul
15. Tierra Falls
16. Which therapist has a session on October 12, 2021?
17. Saritha Nair
18. Anthony Shields
19. Bridgette McClain
20. Jonathan Risk
21. Which patient has booked the most therapies?
22. Brianna Waggoner
23. Tammy Wilson
24. Andre Marino
25. Joseph Baptist
26. Who are the busiest therapists?
27. Wilder, Shields
28. Risk, Nair
29. McClain, Shields
30. Wilder, Nair
31. Which patients live in the same town as their therapist?
32. Culling, Marino
33. Venable, Koehler
34. King, Falls
35. Baptist, Short
36. How many patients are receiving ultrasound therapy?
37. 1
38. 2
39. 3
40. 0
41. Which therapist has the longest single session?
42. Bridgette McClain
43. Saritha Nair
44. Steven Wilder
45. Anthony Shields
46. Create a calculated field that figures the amount each therapist earns assuming they charge $100 per hour and the length of the session is the correct amount of time each therapy takes. How much money does Saritha Nair earn?
47. $100
48. $150
49. $300
50. $225
51. Which therapist works with a patient’s speech?
52. Jonathan Risk
53. Anthony Shields
54. Saritha Nair
55. Steven Wilder
56. How many therapies refer to pain in their description?
57. 3
58. 1
59. 4
60. 0
61. How many therapies have a designated 15-minute unit of time?
62. 5
63. 10
64. 15
65. 30
66. Which patient has the longest single session?
67. Latisha Culling
68. Brianna Waggoner
69. Joseph Baptist
70. Robbie Koehler
71. Which therapists are scheduled for October 11, 2021?
72. McClain, Shields
73. Risk, Shields
74. Nair, Shields
75. Wilder, Shields
76. Which therapist works the least, in terms of hours in sessions?
77. Jonathan Risk
78. Steven Wilder
79. Bridgette McClain
80. Anthony Shields
81. A surcharge is being placed on any patient whose balance is greater than $1,000. That surcharge is 5 percent addition to a patient’s current balance. Create an update query to perform the calculation. What is the highest balance now?
82. $1,939.09
83. $2,053.17
84. $2,116.07
85. $2,087.93

Critical Thinking

1. If you want to find out which therapist is meeting a particular patient on a specific day, what tables do you need for your query? If you also want to know the description of the therapy, does that change your query design? If so, how?

Answer: The first question needs the Patient, Session, and Therapist tables. The second question would also need the Therapies table.

1. If you made a mistake on the update query in question 17 to add a 5 percent surcharge to accounts with balances greater than $1,000, how would you undo the change?

Answer: Modify the update query to divide by 1.05 and run the query.