Arkansas CTE

Oracle - Database Fundamentals: Grades 10, 11, 12

Adopted 2006

Introduction to Database Fundamentals

1.1 Define terminology

1. Prepare a list of terms with definitions `1.1.1`

1.2 Identify examples of jobs, salaries, and opportunities that could result from obtaining database certification

1. Create a report from the occupational outlook handbook with examples of jobs, salaries, and opportunities that could result from obtaining database certification `1.2.1`

1.3 List at least three key facts about the importance of a post-secondary education

1. Discuss with the class three key facts about the importance of a post-secondary education `1.3.1`

1.4 Discuss the history of computing

1. Using the Internet, research and illustrate the history of computing `1.4.1`

1.5 Enumerate key points in the history of Oracle Corporation and its database technologies

1. Identify key points in the history of Oracle Corporation and its database technologies `1.5.1`

1.6 Identify modern database applications used in everyday life

1. Research and discuss modern database applications used in everyday life `1.6.1`

1.7 Describe the evolution of the database

1. Create a timeline to show the evolution of a database `1.7.1`

1.8 Compare and contrast the concepts of data and information

1. Discuss examples of data and information `1.8.1`

1.9 Describe the database development process

1. Identify the steps of the database development process `1.9.1`

1.10 Identify specific areas of business that use database technology and explain how it is integral to their success

1. Identify business areas that use database technology `1.10.1`
2. Explain how database technology is integral to business success `1.10.2`

1.11 List the reasons for tracking and storing data

1. Create a list of reasons for tracking and storing data `1.11.1`

1.12 List the reasons for building a conceptual model

1. Create a list of reasons for building a conceptual model `1.12.1`

1.13 Compare and contrast logical and physical data models

1. Discuss examples of logical and physical data models `1.13.1`

Entities, Attributes, and Relationships

2.1 Define terminology

1. Prepare a list of terms with definitions `2.1.1`

2.2 Compare and contrast entities and instances of entities

1. Create sets of examples demonstrating differentiation of entities and instances of entities `2.2.1`

2.3 Identify those aspects of a business about which data must be known when given a brief description of the business

1. List the entities and attributes to be tracked about a business when given a written description of a business `2.3.1`

2.4 Identify and describe attributes for a given entity

1. Create a list of attributes for a given entity `2.4.1`

2.5 Identify sample values for an attribute to support its inclusion in a data model

1. Identify possible values for a given attribute and support the attributes inclusion in a data model `2.5.1`

2.6 Compare the difference between an attribute and its value

1. Categorize an item as either attribute or a value `2.6.1`

2.7 Identify how to apply the rule that an attribute can have only one value at a given point in time

1. Identify and explain violations of the rule that an attribute can have only one value at a given point in time `2.7.1`

2.8 Identify unique identifiers for a given entity

1. Determine which of an entity's attributes can be selected as its unique identifier `2.8.1`

2.9 Know the four goals of entity relationship modeling

1. Identify the four goals of entity relationship modeling `2.9.1`

2.10 Know the major types of databases

1. List and discuss the major types of databases `2.10.1`

2.11 Discuss and interpret relationship optionally

1. Explain the meaning of a given ERD containing various optionality `2.11.1`

2.12 Discuss and interpret relationship cardinality

1. Explain the meaning of a given ERD containing various cardinality `2.12.1`

2.13 Describe ER diagramming conventions

1. Demonstrate ER diagramming conventions `2.13.1`

2.14 List the ER diagramming conventions

1. Create an ER diagram that represents entities, attributes, and relationships according to diagramming conventions `2.14.1`

2.15 Identify relationships between pieces of data

1. Articulate relationships between disparate pieces of data `2.15.1`

2.16 Explain how to interpret and name entity relationships

1. Construct sentences that explain the relationship between two entities in an ERD `2.16.1`

2.17 Identify relationships using a matrix diagram

1. Create a matrix diagram indicating the relationships in a business description `2.17.1`

2.18 Identify key elements of source documents by identifying entities, attributes, and relationships

1. List the entities, attributes, and relationships found in a business document `2.18.1`

2.19 Describe a business represented by an entity relationship diagram

1. Create a written description of a business represented by an entity relationship diagram `2.19.1`

2.20 Explain an ERD based on an understanding of business needs

1. Present and defend an entity relationship model based on an understanding of the described business needs `2.20.1`

2.21 Identify examples of supertypes and subtypes

1. Demonstrate examples of supertypes and subtypes `2.21.1`

2.22 Discuss the rules relating to entities and subtypes

1. List the rules relating to entities and subtypes `2.22.1`

2.23 Identify inaccuracies in an ERD including supertypes and subtypes

1. Appraise the accuracy of an ERD including supertypes and subtypes `2.23.1`

2.24 Recall the rules of supertype and subtype and include them in a diagram

1. Create a diagram including supertype/subtype modeling based on a written description of a business `2.24.1`

2.25 Compare and contrast structural and procedural business rules

1. Create sets of examples demonstrating differentiation of structural and procedural business rules `2.25.1`

2.26 Discuss business rules that must be implemented through programming

1. Create business rules that must be implemented through programming `2.26.1`

2.27 Identify business rules that can be represented in an ER model

1. Create a diagram of business rules that can be represented in an ER model `2.27.1`

2.28 Describe and give an example of relationship nontransferability

1. Identify unique attributes for a record that cannot be transferred `2.28.1`

2.29 Illustrate the use of a One-to-One relationship

1. Design an ERD including a One-to-One relationship `2.29.1`

2.30 Illustrate the use of a One-to-Many relationship

1. Design an ERD including a One-to-Many relationship `2.30.1`

2.31 Illustrate the use of a Many-to-Many relationship

1. Design an ERD including a Many-to-Many relationship `2.31.1`

2.32 Identify a redundant relationship

1. Identify a redundant relationship in an entity relationship diagram `2.32.1`

2.33 Describe the steps to resolve a Many-to-Many relationship using an intersection entity

1. Demonstrate the steps to resolve a Many-to-Many relationship using an intersection entity `2.33.1`

2.34 Explain the UID of an intersection entity and how to locate it in an ERD

1. Identify the UID of an intersection entity and locate it in an ERD `2.34.1`

First, Second, and Third Normal Forms

3.1. Define terminology

1. Prepare a list of terms with definitions `3.1.1`

3.2 Discuss the purpose of normalization in database models

1. Illustrate the purpose of normalization in database models `3.2.1`

3.3 Explain the rule of first normal form

1. Apply the rule of first normal form `3.3.1`

3.4 Identify violations of the rule of first normal form

1. Analyze a non-normal entity and identify violations of the rule of first normal form `3.4.1`

3.5 Identify entities and relationships that fit the structure of an ERD based on context clues

1. Analyze a partially completed ERD and identify entities and relationships that fit the structure `3.5.1`

3.6 Identify entities, attributes, and relationships in source documents

1. Analyze a source document from a business and identify entities, attributes, and relationships `3.6.1`

3.7 Determine how to use meaning in source documents to create an ERD

1. Create a conceptual model from a source document. `3.7.1`

3.8 Explain the rule of second normal form

1. Demonstrate the rule of second normal form `3.8.1`

3.9 Describe violations of the rule of second normal form in a nonnormalized ERD

1. Identify violations of the rule of second normal form in a nonnormalized ERD `3.9.1`

3.10 Discuss how to resolve violations of the rule of second normal form

1. Apply the rule of second normal form to solve a violation in a data model `3.10.1`

3.11 Discuss the selection of an artificial UID, a composite UID, or a secondary UID based on business needs

1. Analyze business rules and justify the creation of an artificial UID, a composite UID, or a secondary UID 3.11.1

3.12 Discuss transitive dependencies in a data model

1. Identify transititve dependencies in a data model 3.12.1

3.13 Explain the rules of third normal form

1. Demonstrate the rule of third normal form 3.13.1

3.14 Identify violations of the rule of third normal form in a nonnormalized ERD

1. Identify violations of the rule of third normal form in a nonnormalized ERD 3.14.1

3.15 Discuss how to resolve violations from the rule of third normal form

1. Apply the rule of third normal form to solve a violation in the model 3.15.1

Refining ERDs: Modeling Change Over Time

4.1 Define terminology

1. Prepare a list of terms with definitions 4.1.1

4.2 Identify an exclusive OR relationship in a business scenario

1. Analyze a given set of relationships and identify those which are mutually exclusive 4.2.1

4.3 Illustrate the relationship between arcs and an exclusive OR relationship

1. Create a diagram of an arc constraint to represent an exclusive OR relationship 4.3.1

4.4 Distinguish between the use of an arc and a subtype in a data model

1. Create an ERD using subtypes from an ERD written in arc form 4.4.1

4.5 Identify an example of a hierarchical relationship

1. Categorize a given relationship as hierarchical 4.5.1

4.6 Explain how to diagram the UID relationships in a hierarchal model

1. Create a diagram of the UID relationships in a hierarchical model 4.6.1

4.7 Identify business examples of recursive relationships

1. Create an ERD from a given business scenario involving recursive relationships 4.7.1

4.8 Compare and contrast hierarchical modeling and recursive modeling

1. Create a model using both recursion and hierarchies to express the same conceptual meaning 4.8.1

4.9 Identify the need to track data changes over time

1. Justify the need to track changes over time 4.9.1

4.10 Discuss how to model change over time

1. Create ERD models that incorporate elements of data over time 4.10.1

4.11 Explain the UID of an entity that stores historical data

1. Identify the UID of an entity that stores historical data 4.11.1
2. Explain and justify the choice of UID 4.11.2

4.12 Explain a data model to an audience

1. Interpret and present a data model to an audience 4.12.1

4.13 Identify required elements in written documentation that accompanies an ERD

1. Create written documentation to accompany the oral presentation of an ERD 4.13.1

4.14 Discuss the role of a consultant

1. Summarize the role of a consultant 4.14.1

Transforming from the Conceptual to the Physical

5.1 Define terminology

1. Prepare a list of terms with definitions 5.1.1

5.2 Identify entity relationship models and database models

1. Contrast entity relationship models and database models 5.2.1

5.3 Compare and contrast the conceptual and physical data models

1. Describe the terminology mapping between a conceptual model and a relational database model 5.3.1

5.4 Discuss the rule of basic mapping to transform an entity into a table

1. Apply the rule of basic mapping to transform an entity into a table 5.4.1

5.5 Recall the rule of Oracle naming conventions for tables and columns used in relational models

1. Apply the rule of Oracle naming conventions for tables and columns used in relational models 5.5.1

5.6 Recall the rule of relationship mapping to correctly transform One-to-Many and barred relationships

1. Apply the rule of relationship mapping to correctly transform One-to-Many and barred relationship `5.6.1`

5.7 Recall the rule of relationship mapping to correctly transform Many-to-Many relationships

1. Apply the rule of relationship mapping to correctly transform Many-to-Many relationships `5.7.1`

5.8 Recall the rule of relationship mapping to correctly transform One-to-One relationships

1. Apply the rule of relationship mapping to correctly transform One-to-One relationships `5.8.1`

5.9 Recall the rule of relationship mapping to correctly transform relationships in an arc

1. Apply the rule of relationship mapping to correctly transform relationships in an arc `5.9.1`

5.10 Recall the table, column, identifiers, relationship, and integrity constraint rules for mapping supertype implementations

1. Apply and state the table, column, identifiers, relationship, and integrity constraint rules for mapping supertype implementations `5.10.1`

5.11 Recall the table, column, identifiers, relationship, and integrity constraint rules for mapping subtype implementations

1. Apply and state the table, column, identifiers, relationship, and integrity constraint rules for mapping subtype implementations `5.11.1`

5.12 Recall the table, column, identifiers, relationship, and integrity constraint rules for mapping supertype and subtype arc implementations

1. Apply and state the table, column, identifiers, relationship, and integrity constraint rules for mapping super and subtype arc implementations `5.12.1`

5.13 Discuss how to create a table in HTMLDB using a provided SQL script

1. Demonstrate the process of entering a provided SQL script `5.13.1`

5.14 Describe how to enter sample data into an existing table using a provided SQL script

1. Modify a given script to insert requested data into an existing table `5.14.1`

5.15 Explain how to query a table to view data using a provided SQL script

1. Create a query to recall previously-entered information from a table using a provided SQL script `5.15.1`

Introduction to Database Programming

6.1 Define terminology

1. Prepare a list of terms with definitions 6.1.1

6.2 Illustrate the Integrity rule as it relates to database tables

1. Hypothesize why a given query that violates the integrity rule fails when run 6.2.1

6.3 Discuss table, row, column, primary key, unique key, and foreign key

1. Identify table, row, column, primary key, unique key, and foreign key given a diagram containing them 6.3.1

6.4 Identify violations of data-integrity rules

1. Correct violations of data-integrity rules 6.4.1

6.5 Recall the rules of SQL to display all columns of a table

1. Apply the rules of SQL to display all columns of a table 6.5.1

6.6 Recall the rules of SQL to display a subset of the columns of a table specified by criteria

1. Apply the rules of SQL to display a subset of the columns of a table specified by criteria 6.6.1

6.7 Discuss how to add new data to a table containing four columns

1. Apply the rules of SQL to add new data to a table containing four columns 6.7.1

6.8 Discuss how to add a new column to an existing table

1. Apply the rules of SQL to add a new column to an existing table 6.8.1

6.9 Discuss the applications of DELETE and ALTER TABLE

1. Apply the DELETE and ALTER TABLE commands to revise a table 6.9.1

6.10 Identify a data-modeling project to solve a business information need

1. Develop a business scenario to solve business information needs based on research 6.10.1

6.11 Identify solutions to business problems using database technology

1. Within groups, develop solutions to business problems using database 6.11.1

6.12 Present a database solution to a business problem

1. Create and present a database solution to a business problem 6.12.1

6.13 Explain the different stages of the system development lifecycle

1. List and describe the different stages of the system development lifecycle 6.13.1

6.14 Recall how to implement tables from an ERD

1. Demonstrate the use of HTMLDB to implement tables from an ERD `6.14.1`

6.15 Recall how to issue SQL queries in HTMLDB

1. Create a query output using HTMLDB `6.15.1`

6.16 Explain the features and benefits that Oracle Database Environment provides for businesses

1. Discuss the features and benefits that Oracle Database Environment provides for businesses `6.16.1`

6.17 Compare and contrast application software and system software

1. Identify key differences between application software and system software `6.17.1`

6.18 Identify the appropriate SOL functions to perform projection, selection and join

1. Describe which sections of a SQL statement are responsible for projection, selection and join `6.18.1`

6.19 Discuss the correct syntax to perform arithmetic expressions on the columns of a query

1. Demonstrate the correct syntax to perform arithmetic expressions on the columns of a query `6.19.1`

6.20 Recall correct operator precedence to display desired results

1. Create queries using correct operator precedence to display desired results `6.20.1`

6.21 Compare and contrast the concepts of null, zero, and an empty string

1. Categorize the concepts of null, zero, and an empty string `6.21.1`

6.22 Recall the effect null values have in arithmetic expressions

1. Demonstrate the effect null values have in arithmetic expressions `6.22.1`

6.23 Identify when and how to use a column alias

1. Construct a query using a column alias `6.23.1`

6.24 Recall how to use the concatenation operator

1. Apply the concatenation operator to link column values and expressions to create a character expression `6.24.1`

6.25 Discuss the use of literal values of type character, number, and date

1. Apply literal values of type character, number, and date in a SQL SELECT statement `6.25.1`

6.26 Define and use DISTINCT to eliminate duplicates in query results

1. Apply DISTINCT to eliminate duplicates in query results `6.26.1`

6.27 Display the structure of a table using DESCRIBE

1. Create a query to display the structure of a table using DESCRIBE `6.27.1`

6.28 Illustrate the use of HTMLDB to run, edit, and save SQL statements

1. Create a query to edit, execute, and save SQL statements in HTMLDB `6.28.1`

6.29 Know how to use WHERE clause to restrict rows returned in a SQL query

1. Apply the WHERE clause to restrict rows returned in a SQL query `6.29.1`

6.30 Explain why it is important to be able to easily limit data retrieved from a table

1. Justify the use of a WHERE clause used to limit data retrieved from a table `6.30.1`

6.31 Explain the use of logical comparisons to restrict the rows returned based on two or more conditions

1. Evaluate logical comparisons to restrict the rows returned based on two or more conditions `6.31.1`

6.32 Explain the rules of precedence by which expressions are evaluated and calculated

1. Apply the rules of precedence to determine the order in which expressions are evaluated and calculated `6.32.1`

6.33 Identify a query to sort a result set in ascending or descending order

1. Construct a query to sort a result set in ascending or descending order `6.33.1`

6.34 Identify a query to order a result set using a column alias

1. Construct a query to order a result set using a column alias `6.34.1`

6.35 Identify a query to order a result set for single or multiple columns

1. Construct a query to order a result set for single or multiple columns `6.35.1`

6.36 Identify appropriate applications of single-row functions in query statements

1. Create queries using single-row functions when given an appropriate business scenario `6.36.1`

6.37 Identify a function as a single row or multiple row function

1. Categorize a function as a single row or multiple row function `6.37.1`

6.38 Compare and contrast the results returned by single row and multiple row functions

1. Categorize the results returned by a function as single row or multiple row `6.38.1`