CHAPTER 13: BUSINESS INTELLIGENCE AND DATA WAREHOUSES

1. Business intelligence is a framework that allows a business to transform data into information, information into knowledge, and knowledge into wisdom.
   a. True
   b. False

   ANSWER: True
   PTS: 1 DIF Difficulty: Easy REF: p.590
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
   KEY: Bloom's: Knowledge TOP: Business Intelligence

2. Business intelligence (BI) architecture is composed of data, people, processes, technology, and the management of such components.
   a. True
   b. False

   ANSWER: True
   PTS: 1 DIF Difficulty: Easy REF: p.592
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
   KEY: Bloom's: Knowledge TOP: Business Intelligence

3. A data store is used by data analysts to create queries that access the database.
   a. True
   b. False

   ANSWER: False
   PTS: 1 DIF Difficulty: Easy REF: p.593
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
   KEY: Bloom's: Knowledge TOP: Business Intelligence

4. Master data management's main goal is to provide a partial and segmented definition of all data within an organization.
   a. True
   b. False

   ANSWER: False
   PTS: 1 DIF Difficulty: Easy REF: p.595
   NAT: BUSPROG: Technology STATE: DISC: Information Technology
   KEY: Bloom's: Knowledge TOP: Business Intelligence

5. Operational data and decision support data serve the same purpose.
   a. True
   b. False

ANSWER: False
PTS: 1 DIF Difficulty: Easy REF: p.602
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Decision Support Data

6. Decision support data are a snapshot of the operational data at a given point in time.
   a. True
   b. False

ANSWER: True
PTS: 1 DIF Difficulty: Easy REF: p.603
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Decision Support Data

7. Queries against operational data typically are broad in scope and high in complexity.
   a. True
   b. False

ANSWER: False
PTS: 1 DIF Difficulty: Easy REF: p.604
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Decision Support Data

8. Data warehouse data are organized and summarized by table, such as CUSTOMER and ADDRESS.
   a. True
   b. False

ANSWER: False
PTS: 1 DIF Difficulty: Easy REF: p.608
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Data Warehouse

9. Relational data warehouses use multidimensional data schema support to handle multidimensional data.
   a. True
   b. False

ANSWER: False
PTS: 1 DIF Difficulty: Easy REF: p.610
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Data Warehouse

10. The data warehouse development life cycle differs from classical systems development.
    a. True
    b. False

ANSWER: True
PTS: 1 DIF Difficulty: Easy REF: p.610
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Data Warehouse

11. A data warehouse designer must define common business dimensions that will be used by a data analyst to narrow a search, group information, or describe attributes.
    a. True
    b. False

    ANSWER: False
    PTS: 1 DIF Difficulty: Moderate REF: p.612
    NAT: BUSPROG: Analytic STATE: DISC: Information Technology
    KEY: Bloom's: Comprehension TOP: Star Schemas

12. By default, the fact table's primary key is always formed by combining the superkeys pointing to the Dimension tables to which they are related.
    a. True
    b. False

    ANSWER: False
    PTS: 1 DIF Difficulty: Easy REF: p.617
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

13. Normalizing fact tables improves data access performance and saves data storage space.
    a. True
    b. False

    ANSWER: False
    PTS: 1 DIF Difficulty: Easy REF: p.619
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

14. Periodicity, usually expressed as current year only, previous years, or all years, provides information about the time span of the data stored in a table.
    a. True
    b. False

    ANSWER: True
    PTS: 1 DIF Difficulty: Easy REF: p.621
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

15. Multidimensional data analysis techniques include advanced computational functions.
    a. True
    b. False

    ANSWER: True
    PTS: 1 DIF Difficulty: Easy REF: p.622
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

16. Advanced OLAP feature become more useful when access to them is kept simple.
    a. True
    b. False

    ANSWER: True
    PTS: 1 DIF Difficulty: Easy REF: p.623
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

17. To provide better performance, some OLAP systems merge data warehouse and data mart approaches by storing small extracts of the data warehouse at end-user workstations.
    a. True
    b. False

    ANSWER: True
    PTS: 1 DIF Difficulty: Easy REF: p.625
    NAT: BUSPROG: Analytic STATE: DISC: Information Technology
    KEY: Bloom's: Comprehension TOP: Online Analytical Processing

18. A star schema is designed to optimize data query operations rather than data update operations.
    a. True
    b. False

    ANSWER: True
    PTS: 1 DIF Difficulty: Easy REF: p.626
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

19. ROLAP and MOLAP vendors are working toward the integration of their respective solutions within a unified decision support framework.
    a. True
    b. False

    ANSWER: True
    PTS: 1 DIF Difficulty: Easy REF: p.629
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

20. The ROLLUP extension is used with the GROUP BY clause to generate aggregates by the listed columns, including the last one.
    a. True
    b. False

    ANSWER: False
    PTS: 1 DIF Difficulty: Moderate REF: p.630
    NAT: BUSPROG: Analytic STATE: DISC: Information Technology
    KEY: Bloom's: Technology TOP: SQL Extensions for OLAP

21. The CUBE extension enable you to get a grand total for each column listed in the expression
    a. True
    b. False

    ANSWER: False
    PTS: 1 DIF Difficulty: Easy REF: p.631
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

22. A_____is optimized for decision support and is generally represented by a data warehouse or a data mart.
    a. data store b. ETL tool
    c. data visualization d. data analysis tool

    ANSWER: a
    PTS: 1 DIF Difficulty: Easy REF: p.593
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Business Intelligence

23. _____are in charge of presenting data to the end user in a variety of ways.
    a. Data stores b. ETL tools
    c. Data visualization tools d. Data analysis tools

    ANSWER: c
    PTS: 1 DIF Difficulty: Easy REF: p.593
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Business Intelligence

24. _____ provide a unified, single point of entry for information Distribution.
    a. Decision support systems b. Portals
    c. Data warehouses d. Dashboards

    ANSWER: b
    PTS: 1 DIF Difficulty: Easy REF: p.594
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Business Intelligence

25. In business intelligence framework, data are captured from a production system and placed in the_____on a near real- time basis.
    a. decision support system b. portal
    c. data warehouse d. dashboard

    ANSWER: c
    PTS: 1 DIF Difficulty: Easy REF: p.594
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Business Intelligence

26. _____Tools focus on the strategic and tactical use of information.
    a. Business b. Relational database management
    c. Business intelligence d. Networking

ANSWER: c
PTS: 1 DIF Difficulty: Easy REF: p.595
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Business Intelligence

27. Which of the following is a personal analytics vendor for BI applications?
a. IBM b. Kognitio
c. Netezza d. MicroStrategy

ANSWER: d
PTS: 1 DIF Difficulty: Easy REF: p.602
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Decision Support Data

28. From a data analyst's point of view, decision support data differ from operational data in three main areas: time span, granularity, and____.
a. usability b. dimensionality
c. transaction processing d. sparsity

ANSWER: b
PTS: 1 DIF Difficulty: Easy REF: p.602
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Decision Support Data

29. Operational data are commonly stored in many tables, and the stored data represent information about a given _____only.
a. transaction b. database
c. table d. concept

ANSWER: a
PTS: 1 DIF Difficulty: Easy REF: p.604
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Decision Support Data

30. The_____schema must support complex (non-normalized) data representations.
a. snowflake b. online analytical processing
c. decision support database d. multidimensional database

ANSWER: c
PTS: 1 DIF Difficulty: Easy REF: p.605
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Decision Support Data

31. Data_____implies that all business entities, data elements, data characteristics, and business metrics are described in the same way throughout the enterprise.
a. visualization b. analytics
c. mining d. integration

ANSWER: d
PTS: 1 DIF Difficulty: Easy REF: p.607
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Data Warehouse

32. _____can serve as a test vehicle for companies exploring the potential benefits of data warehouses.
a. Data networks b. Data marts
c. Data cubes d. OLAPs

ANSWER: b
PTS: 1 DIF Difficulty: Easy REF: p.610
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Data Warehouse

33. Bill Inmon and Chuck Kelley created a set of 12 rules to define a(n)_____.
a. data warehouse b. multidimensional cube
c. OLAP tool d. star schema

ANSWER: a
PTS: 1 DIF Difficulty: Easy REF: p.610
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Data Warehouse

34. The basic star schema has four components: facts, _____, attributes, and attribute hierarchies.
a. keys b. relationships
c. cubes d. dimensions

ANSWER: d
PTS: 1 DIF Difficulty: Easy REF: p.610
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Star Schemas

35. Computed or derived facts, at run time, are sometimes called _____to differentiate them from stored facts.
a. schemas b. attributes
c. metrics d. dimensions

ANSWER: c
PTS: 1 DIF Difficulty: Easy REF: p.611
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Star Schemas

36. In a star schema, attributes are often used to search, filter, or classify_____.
a. tables b. sales
c. facts d. dimensions

ANSWER: c
PTS: 1 DIF Difficulty: Easy REF: p.612
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Star Schemas

37. The attribute hierarchy provides a top-down data organization that is used for two main purposes:_____ and drill-down/roll-up data analysis.
    a. decomposition b. de-normalization
    c. normalization d. aggregation

    ANSWER: d
    PTS: 1 DIF Difficulty: Easy REF: p.614
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

38. In star schema representation, a fact table is related to each dimension table in a_____relationship.
    a. many-to-one (M:1) b. many-to-many (M:M)
    c. one-to many (1:M) d. one-to-one (1:1)

    ANSWER: a
    PTS: 1 DIF Difficulty: Easy REF: p.616
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

39. Fact and dimension tables are related by_____keys.
    a. shared b. primary
    c. foreign d. linked

    ANSWER: c
    PTS: 1 DIF Difficulty: Easy REF: p.616
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

40. In a typical star schema, each dimension record is related to thousands of_____records.
    a. attribute b. fact
    c. key d. primary

    ANSWER: b
    PTS: 1 DIF Difficulty: Easy REF: p.617
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

41. A_____schema is a type of star schema in which dimension tables can have their own dimension tables.
    a. snowflake b. starflake
    c. dimension d. matrix

    ANSWER: a
    PTS: 1 DIF Difficulty: Easy REF: p.618
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

42. _____ splits a table into subsets of rows or columns and places the subsets close to the client computer to improve data access time.
    a. Normalization b. Meta modeling
    c. Replication d. Partitioning

    ANSWER: d
    PTS: 1 DIF Difficulty: Easy REF: p.620
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Star Schemas

43. The reliance on_____as the design methodology for relational databases is seen as a stumbling block to its use in OLAP systems.
    a. normalization b. denormalization
    c. star schema d. multidimensional schema

    ANSWER: a
    PTS: 1 DIF Difficulty: Easy REF: p.626
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

44. Decision support data tend to be non-normalized,_____, and pre-aggregated.
    a. unique b. duplicated
    c. optimized d. sorted

    ANSWER: b
    PTS: 1 DIF Difficulty: Easy REF: p.626
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

45. _____extends SQL so that it can differentiate between access requirements for data warehouse data and operational data.
    a. ROLAP b. OLAP
    c. DBMS d. BI

    ANSWER: a
    PTS: 1 DIF Difficulty: Easy REF: p.626
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

46. A_____index is based on 0 and 1 bits to represent a given condition.
    a. logical b. multidimensional
    c. normal d. bitmapped

    ANSWER: d
    PTS: 1 DIF Difficulty: Easy REF: p.627
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

47. Conceptually, MDBMS end users visualize the stored data as a three-dimensional cube known as a_____.
    a. multi-cube b. database cube
    c. data cube d. hyper cube

    ANSWER: c
    PTS: 1 DIF Difficulty: Easy REF: p.628
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

48. A multidimensional database management systems (MDBMS) uses proprietary techniques to store data in _____ n-dimensional arrays.
    a. table-like b. matrix-like
    c. network-like d. cube-like

    ANSWER: b
    PTS: 1 DIF Difficulty: Easy REF: p.628
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Online Analytical Processing

49. A _____ is a dynamic table that not only contains the SQL query command to generate the rows, but also stores the actual rows.
    a. SQL view b. materialized view
    c. star schema d. data cube

    ANSWER: b
    PTS: 1 DIF Difficulty: Easy REF: p.630
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: SQL Extension for OLAP

50. _____is a term used to describe a comprehensive, cohesive, and integrated set of tools and processes used to capture, collect, integrate, store, and analyze data with the purpose of generating and presenting information used to support business decision making.

    ANSWER: Business intelligence
    PTS: 1 DIF Difficulty: Easy REF: p.590
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Business Intelligence

51. _____functionality ranges from simple data gathering and transformation to very complex data analysis and presentation.

    ANSWER: BI
    business intelligence
    PTS: 1 DIF Difficulty: Easy REF: p.592
    NAT: BUSPROG: Technology STATE: DISC: Information Technology
    KEY: Bloom's: Knowledge TOP: Business Intelligence

52. _____ use web-based technologies to present key business performance indicators or information in a single integrated view, generally using graphics in a clear, concise, and easy to understand manner.

ANSWER: Dashboards

PTS: 1 DIF Difficulty: Easy REF: p.594
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Business Intelligence

53. Data _____ tools are tools that provide advanced statistical analysis to uncover problems and opportunities hidden within business data.

ANSWER: mining
PTS: 1 DIF Difficulty: Easy REF: p.594
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Business Intelligence

54. _____ are quantifiable measurements (numeric or scale based) that assess a company's effectiveness or success in reaching its strategic and operational goals.

ANSWER: Key performance indicators
KPI
KPIs
Key performance indicators (KPI)
PTS: 1 DIF Difficulty: Easy REF: p.595
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Business Intelligence

55. _____ is a collection of concepts, techniques, and processes for the proper identification, definition, and management of data elements within an organization.

ANSWER: Master data management
MDM
Master data management (MDM)
PTS: 1 DIF Difficulty: Easy REF: p.595
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Business Intelligence

56. _____ is a method or process of government.

ANSWER: governance
PTS: 1 DIF Difficulty: Easy REF: p.595
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Business Intelligence

57. _____. means to decompose data into more atomic components or data at lower levels of aggregation.

ANSWER: drill down
PTS: 1 DIF Difficulty: Easy REF: p.602
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Decision Support Data

58. To support a(n) _____ adequately, the DBMS might be required to support advanced storage technologies, and even more importantly, to support multiple-processor technologies, such as a symmetric multiprocessor (SMP)

or a massively parallel processor (MPP).

ANSWER: VLDB
very large database
very large database (VLDB)
PTS: 1 DIF Difficulty: Easy REF: p.607
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Decision Support Data

59. A(n) _____ is a read-only database optimized for data analysis and query processing.

ANSWER: data warehouse
PTS: 1 DIF Difficulty: Easy REF: p.608
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Data Warehouse

60. A data _____ is a centralized, consolidated database that integrates data derived from the entire organization and from multiple sources with diverse formats.

ANSWER: warehouse
PTS: 1 DIF Difficulty: Easy REF: p.607
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Data Warehouse

61. A data _____ is a small, single-subject data warehouse subset that provides decision support to a small group of people.

ANSWER: mart
PTS: 1 DIF Difficulty: Easy REF: p.610
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: The Data Warehouse

62. _____ are numeric measurements (values) that represent a specific business aspect or activity.

ANSWER: Facts
PTS: 1 DIF Difficulty: Easy REF: p.611
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Star Schemas

63. _____ are qualifying characteristics that provide additional perspectives to a given fact.

ANSWER: Dimensions
PTS: 1 DIF Difficulty: Easy REF: p.611
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Star Schemas

64. In multidimensional terms, the ability to focus on slices of the cube to perform a more detailed analysis is known as _____.

ANSWER: slice and dice
PTS: 1 DIF Difficulty: Easy REF: p.613
NAT: BUSPROG: Technology STATE: DISC: Information Technology

KEY: Bloom's: Knowledge TOP: Star Schemas

65. The_____hierarchy provides the capability to perform drill-down and roll-up searches in a data warehouse.

ANSWER: attribute
PTS: 1 DIF Difficulty: Easy REF: p.614
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Star Schemas

66. _____ makes a copy of a table and places it in a different location to improve access time.

ANSWER: Replication
PTS: 1 DIF Difficulty: Easy REF: p.620
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Star Schemas

67. The most distinctive characteristic of modern OLAP tools is their capacity for _____ analysis.

ANSWER: multidimensional
PTS: 1 DIF Difficulty: Easy REF: p.621
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Star Schemas

68. To deliver efficient decision support, OLAP tools must have advanced data_____features.

ANSWER: access
PTS: 1 DIF Difficulty: Easy REF: p.623
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Star Schemas

69. OLAP systems are designed to use both operational and data _____ data.

ANSWER: warehouse
PTS: 1 DIF Difficulty: Easy REF: p.625
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Online Analytical Processing

70. _____ online analytical processing provides OLAP functionality by using relational databases and familiar relational query tools to store and analyze multidimensional data.

ANSWER: Relational
PTS: 1 DIF Difficulty: Easy REF: p.626
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Online Analytical Processing

71. _____ is a measurement of the density of the data held in the data cube and is computed by dividing the total number of actual values in the cube by the total number of cells in the cube.

ANSWER: Sparsity
PTS: 1 DIF Difficulty: Easy REF: p.628
NAT: BUSPROG: Technology STATE: DISC: Information Technology
KEY: Bloom's: Knowledge TOP: Online Analytical Processing

72. What is data visualization? Name different techniques of data visualization.

ANSWER: Data visualization is the abstracting of data to provide information in a visual format that enhances a user's ability to effectively comprehend the meaning of the data. The goal of data visualization is to allow the user to see the big picture in the most efficient way possible. Data visualization aggregates the data into a format that provides at-a-glance insight into overall trends and patterns. Data visualization techniques can range from simple to very complex and include pie charts, line graphs, bar charts, scatter plots, Gantt charts, and heat maps.

PTS: 1 DIF Difficulty: Moderate REF: p.596
NAT: BUSPROG: Analytic STATE: DISC: Information Technology
KEY: Bloom's: Comprehension TOP: Business Intelligence

73. What is the difference between decision support data and operational data from the point of view of data analyst?

ANSWER: From a data analyst's point of view, decision support data differ from operational data in three main areas: time span, granularity, and dimensionality.

Time span: Operational data cover a short time frame. In contrast, decision support data tend to cover a longer time frame.

Granularity (level of aggregation): Decision support data must be presented at different levels of aggregation, from highly summarized to nearly atomic.

Dimensionality: Operational data focus on representing individual transactions rather than the effects of the transactions over time. In contrast, data analysts tend to include many data dimensions and are interested in how the data relate over those dimensions.

PTS: 1 DIF Difficulty: Moderate REF: p.602-603
NAT: BUSPROG: Analytic STATE: DISC: Information Technology
KEY: Bloom's: Comprehension TOP: Business Intelligence

74. Describe the use of SQL in relation to ROLAP.

ANSWER: Most decision support data requests require the use of multiple-pass SQL queries or multiple nested SQL statements. To answer this criticism, ROLAP extends SQL so that it can differentiate between access requirements for data warehouse data (based on the star schema) and operational data (normalized tables). A ROLAP system therefore can generate the SQL code required to access the star schema data. Query performance is also improved because the query optimizer is modified to identify the SQL code's intended query targets. For example, if the query target is the data warehouse, the optimizer passes the requests to the data warehouse. However, if the end user performs drill-down queries against operational data, the query optimizer identifies that operation and properly optimizes the SQL requests before passing them to the operational DBMS.

PTS: 1 DIF Difficulty: Moderate REF: p.626-627
NAT: BUSPROG: Analytic STATE: DISC: Information Technology
KEY: Bloom's: Comprehension TOP: Online Analytical Processing

75. What is the ROLLUP extension to the GROUP BY clause? Provide the syntax for this extension.

ANSWER: The ROLLUP extension is used with the GROUP BY clause to generate aggregates by different dimensions. As you know, the GROUP BY clause will generate only one aggregate for each new value combination of attributes listed in the GROUP BY clause. The ROLLUP extension goes one step further; it enables you to get a subtotal for each column listed except for the last one, which gets a grand total instead. The syntax of the GROUP BY ROLLUP command sequence is as follows:

```
SELECT column1 [, column2, ...], aggregate_function(expression)
FROM table1 [, table2, …]
[WHERE condition]
GROUP BY ROLLUP (column1 [, column2, ...])
[HAVING condition]
[ORDER BY column1 [, column2, …]]
```

PTS: 1 DIF Difficulty: Moderate REF: p.630
NAT: BUSPROG: Analytic STATE: DISC: Information Technology
KEY: Bloom's: Comprehension TOP: Online Analytical Processing