

*Stats: Data and Models Ce / De Veaux et al.*

## **Note : No Test bank for Chapter 1**

### **Chapter 2 Data**

#### **2.1 Determine the W's for a Description of Data**

##### **Identify the W's for the description of data.**

1) A survey of bicycles parked outside student residences at a university recorded the style (mountain bike, ten speed, etc.), the brand, the color, and the age.

A) Who: Student residences.; Cases: Each student residence is a case; What: Type of student residence; When: Not specified; Where: A university; Why: Not specified; How: A survey was taken outside student residences.

B) Who: Bicycles parked on campus; Cases: Each bicycle is a case; What: Style, brand, color, and age of bicycle; When: Not specified; Where: A university; Why: Class Assignment; How: A survey was taken outside classrooms.

C) Who: Bicycles parked outside student residences.; Cases: Each bicycle is a case; What: Style, brand, color, and age of bicycle; When: Not specified; Where: A university; Why: Not specified; How: A survey was taken outside student residences.

D) Who: Bicycles parked outside student residences; Cases: Each bicycle is a case; What: Mountain bikes, ten speeds; When: Not specified; Where: A university; Why: Not specified; How: Students were asked about the bicycle they ride.

E) Who: Student residences.; Cases: Each student residences is a case; What: Size of student residence; When: During fall semester; Where: A university; Why: Not specified; How: A survey was taken outside student residences.

Answer: C

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

2) A university requires coaches to keep these records on all athletes: age, days absent, medical history, emergency contact, and any allergies the athlete may have.

A) Who: Athletes at the university; Cases: Each athlete is an individual case; What: Age, days absent, medical history, emergency contact, and allergy history; When: Current; Where: Not specified; Why: University requirement; How: Information is collected and stored as athletic records.

B) Who: The University; Cases: Each athlete is an individual case; What: Records; When: Current; Where: Not specified; Why: University requirement; How: Information is collected and stored as athletic records.

C) Who: Coaches at the university; Cases: Each team is an individual case; What: Age, days absent, medical history, emergency contact, and allergy history; When: Current; Where: Not specified; Why: University requirement; How: Information is collected and stored as athletic records.

D) Who: Athletes at the university; Cases: Each athlete is an individual case; What: Years played, sport played, and position played; When: Current; Where: Not specified; Why: University requirement; How: Information is collected and stored as athletic records.

E) Who: Athletes at the university; Cases: Each athlete is an individual case; What: Records; When: Current; Where: Not specified; Why: Helpful information; How: Ask the athlete.

Answer: A

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

3) In 2004, a soft drink company trying to find ways to boost sales over their competitors compiled these data about consumers: age, weekly consumption, diet vs. regular preference, cola vs non-cola preference, and geographical location.

A) Who: Soft drink companies; Cases: Each company is a case; What: Age, weekly consumption, diet vs. regular preference, cola vs. non-cola preference, and geographical location; When: June, 2004; Where: United States; Why: To find ways to boost sales.

B) Who: Consumers; Cases: Each consumer is a case; What: Age, weekly consumption, diet vs. regular preference, cola vs. non-cola preference, and geographical location; When: 2004; Where: Not specified; Why: To find ways to boost sales.

C) Who: Consumers; Cases: Each consumer is a case; What: Age; When: 2004; Where: Not specified; Why: To find ways to boost sales.

D) Who: Consumers; Cases: Each consumer is a case; What: Age, weekly consumption, and geographical location; When: 2004; Where: Not specified; Why: To develop new products.

E) Who: Soft drink companies; Cases: Each company is a case; What: Age, weekly consumption, diet vs. regular preference, cola vs. non-cola preference, and geographical location; When: 2004; Where: Not specified; Why: To find ways to boost sales.

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

4) A consumer reporting magazine published an article evaluating infant car seats in Canada. It listed 10 models, giving the brand, cost, age limit, weight limit, and overall safety rating.

A) Who: 10 infant car seat models; Cases: Each article is an individual case; What: Overall safety rating; When: Not specified; Where: Canada; Why: To provide information to readers; How: Survey new parents.

B) Who: Magazines; Cases: Each magazine is an individual case; What: Articles; When: Not specified; Where: Canada; Why: To provide information to readers; How: Not specified.

C) Who: Consumer reporting magazine; Cases: Each article; What: Infant car seat models; When: Not specified; Where: Canada; Why: To provide information to readers; How: Not specified.

D) Who: 10 infant car seat models; Cases: Each model is an individual case; What: Brand, cost, age limit, weight limit, and overall safety rating; When: Not specified; Where: Canada; Why: To provide information to readers; How: Not specified.

E) Who: Consumers; Cases: Each consumer is an individual case; What: Consumer reporting magazine; When: Not specified; Where: Canada; Why: To provide information to readers; How: Not specified.

Answer: D

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

5) Nutritionists at a large university investigating the impact of dining hall food choices on freshman weight gain collected data (through weekly surveys) from 300 students throughout their freshman year. They kept track of the student's age, the number of times eating in the hall per week, the number of hours spent exercising per week, and the student's weight each week.

A) Who: Nutritionists; Cases: Each student is a case; What: Student's age, number of times eating in hall weekly, number of hours exercising weekly, and the student's weekly weight; When: Freshman year; Where: A large university; Why: To study the impact of dining hall choices on freshman weight gain; How: Weekly surveys.

B) Who: 300 freshman students; Cases: Each student is a case; What: Student's age, number of times eating in hall weekly, number of hours exercising weekly, and the student's weekly weight; When: During the student's freshman year; Where: A large university; Why: To study the impact of dining hall choices on freshman weight gain; How: Weekly surveys.

C) Who: A large university; Cases: Each student is a case; What: Student's age, number of times eating in hall weekly, number of hours exercising weekly, and the student's weekly weight; When: During the student's freshman year; Where: Dining hall; Why: To study the impact of dining hall choices on freshman weight gain; How: Weekly surveys.

D) Who: Nutritionists; Cases: Each nutritionist is a case; What: Student's age, number of times eating in hall weekly, number of hours exercising weekly, and the student's weekly weight; When: Freshman year; Where: A large university; Why: To study the impact of dining hall choices on freshman weight gain; How: Weekly surveys.

E) Who: 300 students; Cases: Each student is a case; What: Student's age; When: During the student's freshman year; Where: A large university; Why: To study the impact of dining hall choices on freshman weight gain; How: Phone surveys.

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

6) In an effort to improve profits, a major Canadian car rental company monitors all rentals for safety and customer satisfaction. For each rental the company must report the type of car, the age of the driver, whether the car was ready at the agreed upon time, and any mechanical problems.

A) Who: All car rentals; Cases: Each car rented is a separate case; What: Type of car, age of driver, whether the car was ready, and mechanical problems; When: Current; Where: Canada; Why: To improve profits; How: Data are collected from rental records.

B) Who: All car rentals; Cases: Each car rented is a separate case; What: Type of car, age of driver, whether the car was ready, and mechanical problems; When: Two years ago; Where: Not specified.; Why: To improve customer service; How: Not specified.

C) Who: All car rentals; Cases: Each car rental company is a separate case; What: Type of car; When: Current; Where: Canada; Why: To improve profits; How: Data are collected from rental records.

D) Who: Car rentals; Cases: Each agency is a separate case; What: Type of car, age of driver, whether the car was ready, and mechanical problems; When: Last year; Where: Canada; Why: To improve customer service; How: Data are collected from rental records.

E) Who: Car rental company; Cases: Each car rented is a separate case; What: Type of car, age of driver, whether the car was ready, and mechanical problems; When: Current; Where: Major car rental company.; Why: To improve profits; How: Data are collected from rental records.

Answer: A

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

7) In an effort to better inform its customers, Tim Hortons' web site gives nutrition facts for each type of doughnut they sell. This information includes the number of calories, total fat, sodium, sugar, and protein.

A) Who: Doughnut types sold at Tim Hortons. Cases: Each doughnut type is a separate case; What: Number of calories, total fat, sodium, sugar, and protein; When: Current; Where: Tim Hortons' web site; Why: To inform customers about the nutritional value of each doughnut; How: Not specified.

B) Who: Tim Hortons; Cases: Each store location is a separate case; What: Number of calories, total fat, sodium, sugar, and protein; When: Current; Where: Tim Hortons; Why: To inform customers about the nutritional value of each doughnut; How: Not specified.

C) Who: Customers; Cases: Each customer is a separate case; What: Type of doughnut preferred, number of calories, total fat, sodium, sugar, and protein; When: Current; Where: Tim Hortons; Why: To inform customers about the nutritional value of each doughnut; How: Not specified.

D) Who: Customers; Cases: Each customer is a separate case; What: Type of doughnut preferred, number of calories, total fat, sodium, sugar, and protein; When: Current; Where: Tim Hortons' web site; Why: To assess the favorite doughnut of customers; How: Not specified.

E) Who: Doughnut types sold at Tim Hortons; Cases: Each doughnut type is a separate case; What: Type of doughnut preferred; When: Current; Where: Tim Hortons; Why: To assess the favorite doughnut of customers; How: Not specified.

Answer: A

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

8) In an effort to improve the overall health and well-being of its employees, a large corporation distributed a written survey to each of its 1400 employees. Data collected included number of hours worked per week, number of hours spent exercising per week, number of hours spent enjoying hobbies per week, and number of hours spent with family/friends per week.

A) Who: 1400 employees; Cases: Each department is a separate case; What: Number of hours spent exercising per week.; When: Not specified; Where: Large corporation; Why: To devise a health club plan; How: Through a written survey.

B) Who: 1400 employees; Cases: Each employee is a separate case; What: Number of hours worked per week, number of hours spent exercising per week, number of hours spent enjoying hobbies per week, and number of hours spent with family/friends per week; When: Not specified; Where: Large corporation; Why: To improve the health and well-being of its employees; How: Through a written survey.

C) Who: Large corporations; Cases: Each employee is a separate case; What: Number of hours worked per week.; When: Not specified; Where: Large corporation; Why: To improve the health and well-being of its employees; How: Through a written survey.

D) Who: 1400 employees; Cases: Each employee is a separate case; What: Overall job satisfaction; When: Not specified; Where: Large corporation; Why: To improve the health and well-being of its employees; How: Through an oral survey.

E) Who: A large corporation; Cases: Each employee is a separate case; What: Overall job satisfaction; When: Not specified; Where: Large corporation; Why: To improve the health and well-being of its employees; How: Through a written survey.

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

9) As research for a science class, seventh graders at a grade school in Ontario collected data on weather patterns. For each day in January of 2011, they recorded the high and low temperatures, precipitation, humidity, and wind speed.

A) Who: All days in January of 2011; Cases: Each day is a separate case; What: High and low temperatures, precipitation, humidity, and wind speed; When: January 2011; Where: Ontario; Why: Research for a science class; How: Not specified.

B) Who: Seventh graders; Cases: Each student is a separate case; What: High and low temperatures, precipitation, humidity, and wind speed; When: January 2011; Where: Ontario; Why: Research for a science class; How: Not specified.

C) Who: All days in January of 2011; Cases: Each student is a separate case; What: High and low temperatures, precipitation, humidity, and wind speed; When: January 2011; Where: Ontario; Why: Research for a science class; How: Watching the weather channel.

D) Who: All days in January of 2011; Cases: Each day is a separate case; What: High and low temperatures; When: January 2011; Where: Ontario; Why: Research for a science class; How: Watching the weather channel.

E) Who: Teachers; Cases: Each day is a separate case; What: High and low temperatures, precipitation, humidity, and wind speed; When: January 2011; Where: Grade school; Why: Research for a science class; How: Reading the newspaper weather predictions.

Answer: A

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

10) The students at York University are concerned about rising costs at their university. They surveyed 2000 undergraduate students at 10 other Canadian universities and recorded the following data for the current semester: cost of tuition, book cost, and room and board cost.

A) Who: York University; Cases: Each student is a separate case; What: Cost of tuition for the semester; When: Not specified; Where: 10 Canadian universities; Why: Concerned about rising costs at their own university; How: Surveyed students.

B) Who: York University undergraduate students; Cases: Each student is a separate case; What: Cost of tuition, book cost, and room and board cost for the semester; When: Current; Where: 10 Canadian universities; Why: Concerned about rising costs at their own university; How: Telephoned each student and asked for the information.

C) Who: 2000 undergraduate students at Canadian universities; Cases: Each student is a separate case; What: Cost of tuition, book cost, and room and board cost for the semester; When: Current; Where: 10 Canadian universities; Why: Concerned about rising costs at their own university; How: Surveyed students.

D) Who: 2000 undergraduate students at Canadian universities; Cases: Each student is a separate case; What: Cost of tuition, book cost, and room and board cost for the semester; When: Current; Where: Canada; Why: Concerned about rising costs at their own university; How: Surveyed students.

E) Who: 2000 undergraduate students at Canadian universities; Cases: Each university is a separate case; What: Cost of tuition, book cost, and room and board cost for the semester; When: Not specified; Where: Canada; Why: Want to decide whether to attend a different university; How: Surveyed students.

Answer: C

Diff: 1 Type: BI

Objective: (2.1) Determine the W's for a Description of Data

## 2.2 Identify and Classify the Variables in a Description of Data

**Name the variables in each description of data, then tell whether they are quantitative or categorical. For each quantitative variable name its unit of measure.**

1) A Fortune 500 company concerned about the retirement investments made by its employees, collected the following data: age of employee, amount contributed monthly, and type of contribution.

- A) Age of employee, quantitative, years; amount contributed monthly, quantitative, dollars; type of contribution, quantitative, dollars.
- B) Age of employee, quantitative, years; amount contributed monthly, categorical; type of contribution, categorical;
- C) Age of employee, quantitative, years; amount contributed monthly, quantitative, dollars; type of contribution, categorical; Fortune 500 companies, categorical.
- D) Age of employee, quantitative, years; amount contributed monthly, quantitative, dollars; type of contribution, categorical.
- E) Age of employee, quantitative, years; amount contributed monthly, quantitative, dollars.

Answer: D

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

2) An Ontario hospital concerned about the rising number of low birth weight babies collected data from 300 births over a five year time span. They recorded the mother's age, the mother's prepregnancy weight, the level of prenatal care (none, minimal, adequate), and whether the mother used drugs during pregnancy (cigarettes, alcohol, etc.).

- A) Mother's age, quantitative, years; mother's prepregnancy weight, quantitative, kilograms; level of prenatal care, categorical; mother's drug use, quantitative, weeks.
- B) Mother's age, quantitative, years; mother's prepregnancy weight, quantitative, kilograms.
- C) Mother's age, quantitative, years; mother's prepregnancy weight, categorical; level of prenatal care, categorical; mother's drug use, categorical.
- D) Mother's age, quantitative, years; mother's prepregnancy weight, quantitative, kilograms; level of prenatal care, categorical; mother's drug use, categorical.
- E) Mother's age, quantitative, years; mother's prepregnancy weight, quantitative, kilograms; level of prenatal care, categorical.

Answer: D

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

3) A Consumer Reports article about 116 HDTVs list each set's manufacturer, cost, screen size, and type (LCD or plasma).

- A) Manufacturer, categorical; cost, quantitative, dollars; screen size, quantitative, inches; type, categorical.
- B) Manufacturer, categorical; cost, categorical; screen size, quantitative, inches; type, categorical.
- C) Manufacturer, categorical; cost, quantitative, dollars; screen size, categorical; type, categorical.
- D) Manufacturer, categorical; cost, quantitative, dollars; screen size, quantitative, inches.
- E) Manufacturer, quantitative, year; cost, quantitative, dollars; screen size, categorical.

Answer: A

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

4) A Ph.D. candidate is collecting data about women in mathematics careers. She interviewed 200 female mathematicians and recorded the following data: number of years attending university, math classes taken in high school (algebra, geometry, etc.), gender of high school math teacher, and high school average (in %).

A) Number of years attending university, quantitative, years; math classes taken in high school, categorical; gender of high school math teacher, quantitative, male or female; high school average, categorical.

B) Number of years attending university, quantitative, years; math classes taken in high school, categorical; gender of high school math teacher, categorical; high school average, quantitative, percentage.

C) Number of years attending university, quantitative, days; math classes taken in high school, categorical; gender of high school math teacher, categorical; high school average, quantitative, percentage.

D) Number of years attending university, quantitative, years; math classes taken in high school, categorical; high school average, quantitative, categorical.

E) Number of years attending university, quantitative, months; math classes taken in high school, quantitative, class; gender of high school math teacher, categorical; high school average, quantitative, percentage.

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

5) A TSN analyst collected data relating to the free throw percentage of 400 basketball players. He recorded average number of free throws taken per game, height of player, position played (guard, centre, etc.), and what routine they follow before shooting (dribble once, spin ball on hand, etc.).

A) Average number of free throws per game, quantitative, number of games; height of player, quantitative, centimetres; routine before shooting, categorical.

B) Average number of free throws per game, quantitative, number of free throws; height of player, quantitative, centimetres; position played, categorical; routine before shooting, quantitative, number of habits.

C) Average number of free throws per game, quantitative, number of free throws; height of player, quantitative, centimetres; position played, categorical; routine before shooting, categorical.

D) Average number of free throws per game, quantitative, number of free throws; height of player, quantitative, centimetres; position played, categorical.

E) Average number of free throws per game, quantitative, number of free throws; height of player, quantitative, centimetres; position played, quantitative, position; routine before shooting, categorical.

Answer: C

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

6) A biologist studying hatchery fish released into rivers recorded several characteristics including length (centimetres), weight (kilograms), and life span.

A) Length, quantitative, centimetres; life span, quantitative, years.

B) Length, quantitative, centimetres; weight, quantitative, kilograms.

C) Length, quantitative, inches; weight, quantitative, pounds; life span, quantitative, years.

D) Length, quantitative, centimetres; weight, quantitative, kilograms; life span, quantitative, years.

E) Length, quantitative, inches; weight, quantitative, kilograms; life span, categorical.

Answer: D

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

7) When determining the batting average for a baseball player you must have data on the number of hits in the season, and the number of at-bats in the season.

- A) Number of hits, categorical; number of at-bats, quantitative, at-bats; players, categorical.
- B) Number of hits, quantitative, hits; number of at-bats, quantitative, at-bats.
- C) Number of hits, quantitative, games; number of at-bats, quantitative, at-bats; player, categorical.
- D) Number of hits, categorical; number of at-bats, quantitative, at-bats.
- E) Number of hits, quantitative, hits; number of at-bats, categorical.

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

8) A study on the spending habits of 100 middle income families in Ontario recorded the following data: monthly mortgage bill, monthly utilities bill, monthly food and gas bills, money spent monthly on entertainment, and monthly miscellaneous bills.

- A) Monthly mortgage bill, quantitative, dollars; monthly utilities bill, quantitative, dollars; monthly food and gas bill, categorical; money spent on entertainment, quantitative, dollars; miscellaneous bills, categorical.
- B) Monthly mortgage bill, quantitative, dollars; monthly utilities bill, quantitative, dollars; monthly food and gas bill, quantitative, dollars; money spent on entertainment, quantitative, dollars; miscellaneous bills, quantitative, dollars.
- C) Monthly mortgage bill, quantitative, money; monthly utilities bill, quantitative, dollars; monthly food and gas bill, quantitative, dollars; money spent on entertainment, categorical; miscellaneous bills, quantitative, dollars; families, categorical.
- D) Monthly mortgage bill, quantitative, dollars; monthly food and gas bill, quantitative, dollars; money spent on entertainment, categorical; miscellaneous bills, quantitative, dollars.
- E) Monthly mortgage bill, quantitative, dollars; monthly utilities bill, quantitative, dollars; monthly food and gas bill, quantitative, dollars.

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

9) A weight loss program records the following information for each participant at the start of the program: gender, age, weight, and body fat percentage.

- A) Gender, categorical; age, categorical; weight, quantitative, kilograms; body fat percentage, percentage.
- B) Gender, categorical; age, quantitative, years; weight, quantitative, kilograms; body fat percentage, kilograms.
- C) Gender, quantitative, male or female; age, quantitative, years; weight, quantitative, kilograms; body fat percentage, percentage.
- D) Gender, categorical; age, quantitative, years; weight, quantitative, kilograms; body fat percentage, percentage.
- E) Gender, categorical; age, quantitative, years; weight, quantitative, kilograms; body fat percentage, categorical.

Answer: D

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

10) An article comparing the value of several popular Caribbean resorts collected the following data: price per night, amenities (pool, weight room, etc.), whether the resort was all inclusive or not, location (beach, inland, etc.), average room size (square feet), and resort size (acres).

A) Price per night, quantitative, dollars; amenities, categorical; all inclusive or not, categorical; location, categorical; average room size, quantitative, square feet; resort size, quantitative, acres.

B) Price per night, quantitative, dollars; amenities, categorical; all inclusive or not, quantitative, yes or no; location, categorical; average room size, quantitative, square feet.

C) Price per night, quantitative, dollars; amenities, categorical; all inclusive or not, categorical; location, categorical.

D) Amenities, categorical; all inclusive or not, categorical; location, quantitative, feet; average room size, quantitative, square feet; resort size, quantitative, acres.

E) Price per night, categorical; amenities, categorical; all inclusive or not, categorical; location, categorical; average room size, quantitative, square feet; resort size, categorical.

Answer: A

Diff: 1 Type: BI

Objective: (2.1) Identify and Classify the Variables in a Description of Data

### 2.3 Classify Variable as Categorical or Quantitative

#### **Classify the variable as categorical or quantitative.**

1) The number of people on a jury

A) Quantitative

B) Categorical

Answer: A

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative

2) The verdict of a jury

A) Quantitative

B) Categorical

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative

3) The colour of your house

A) Quantitative

B) Categorical

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative

4) A monthly electric bill in dollars

A) Categorical

B) Quantitative

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative

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5) A person's height in centimetres

- A) Categorical
- B) Quantitative

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative

6) A person's political affiliation

- A) Categorical
- B) Quantitative

Answer: A

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative

7) The speed of a car in kilometres per hour

- A) Categorical
- B) Quantitative

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative

8) A person's gender

- A) Quantitative
- B) Categorical

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative

9) The outcome of tossing a coin

- A) Categorical
- B) Quantitative

Answer: A

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative

10) The waiting time at a bus stop in minutes

- A) Categorical
- B) Quantitative

Answer: B

Diff: 1 Type: BI

Objective: (2.1) Classify Variable as Categorical or Quantitative