Pearson

Berenson, Basic Business Statistics 5e

Chapter 1: Defining and collecting data

LO 1.1

1. A population is the totality of items or things under consideration.
   A. True
   B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

2. A sample is the portion of the universe that is selected for analysis.
   A. True
   B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

3. A statistic is usually used to provide an estimate for a usually unobserved parameter.
   A. True
   B. False
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

4. A statistic is usually unobservable while a parameter is usually observable.
   A. True
   B. False
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

5. A professor computing the sample average exam score of 20 students and using it to estimate the average exam score for the 1,500 students taking the exam is an example of inferential statistics.
   A. True
   B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

6. Compiling the number of registered voters who turned out to vote for the members of parliament in Victoria is an example of descriptive statistics.
   A. True
   B. False

Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

7. Using the number of registered voters who turned out to vote for the primary in Victoria to predict the number of registered voters who will turn out to vote in Tasmania's primary is an example of descriptive statistics.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

8. Managers need an understanding of statistics to be able to present and describe information accurately, draw conclusions about large populations based on small samples, improve processes, and make reliable forecasts.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

9. The process of using sample statistics to draw conclusions about true population parameters is called
A. sampling.
B. the scientific method.
C. statistical inference.
D. descriptive statistics.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

10. Those methods involving the collection, presentation, and characterisation of a set of data in order to properly describe the various features of that set of data are called
A. the scientific method.
B. sampling.
C. descriptive statistics.
D. statistical inference.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

11. The collection and summarisation of the socioeconomic and physical characteristics of the employees of a particular firm is an example of
A. a parameter.
B. inferential statistics.
C. descriptive statistics.
D. a statistic.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

12. The estimation of the population average family expenditure on food based on the sample average expenditure

of 1,000 families is an example of
A. inferential statistics.
B. a statistic.
C. descriptive statistics.
D. a parameter.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

13. The universe or 'totality of items or things' under consideration is called
A. a statistic.
B. a parameter.
C. a population.
D. a sample.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

14. The portion of the universe that has been selected for analysis is called
A. a parameter.
B. a frame.
C. a statistic.
D. a sample.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: D

15. A numerical measure that is computed to describe a characteristic from only a sample of the population is called
A. a census.
B. a parameter.
C. a statistic.
D. the scientific method.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

16. A numerical measure that is computed to describe a characteristic of an entire population is called
A. a statistic.
B. a census.
C. a parameter.
D. the scientific method.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

17. Which of the following is most likely a population as opposed to a sample?
A. Inhabitants of a town
B. Every fourth person to enter at the shopping centre
C. Participants in an online survey
D. Fifty voters selected from a town's voter rolls
Difficulty: Moderate

Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

18. Which of the following is most likely a parameter as opposed to a statistic?
    A. The proportion of trucks stopped yesterday that were found to be unroadworthy.
    B. The average height of people randomly selected from a database.
    C. The proportion of females registered to vote in a state.
    D. The average score of the first five students completing an assignment.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

19. Which of the following is NOT an element of descriptive statistical problems?
    A. Identification of patterns in the data.
    B. Tables, graphs, or numerical summary tools.
    C. An inference made about the population based on the sample.
    D. The population or sample of interest.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

20. A study is under way in the Otway National Park to determine the mature height of Mountain Ash gum trees. Specifically, the study is attempting to determine what factors aid a tree in reaching heights greater than 60 metres tall. It is estimated that the park contains 25,000 mature Mountain Ash gum trees. The study involves collecting heights from 250 randomly selected mature Mountain Ash gum trees and analysing the results. Identify the population from which the study was sampled.
    A. All Mountain Ash gum trees, of any age, in the park.
    B. The 25,000 mature Mountain Ash gum trees in the park.
    C. All the mature Mountain Ash gum trees taller than 60 metres.
    D. The 250 randomly selected mature Mountain Ash gum trees.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

21. A study is under way in the Otway National Park to determine the mature height of Mountain Ash gum trees. Specifically, the study is attempting to determine what factors aid a tree in reaching heights greater than 60 metres tall. It is estimated that the park contains 25,000 mature Mountain Ash gum trees. The study involves collecting heights from 250 randomly selected mature Mountain Ash gum trees and analysing the results. Identify the variable of interest in the study.
    A. The age of a Mountain Ash gum tree in the Otway National Park.
    B. The height of a Mountain Ash gum tree in the Otway National Park.
    C. The species of trees in the Otway National Park.
    D. The number of Mountain Ash gum trees in the Otway National Park.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

22. A study is under way in the Otway National Park to determine the mature height of Mountain Ash gum trees. Specifically, the study is attempting to determine what factors aid a tree in reaching heights greater than 60 metres tall. It is estimated that the park contains 25,000 mature Mountain Ash gum trees. The study involves collecting heights from 250 randomly selected mature Mountain Ash gum trees and analysing the results. Identify the sample

in the study.
A. The 250 randomly selected mature Mountain Ash gum trees.
B. All the mature Mountain Ash gum trees taller than 60 metres.
C. All Mountain Ash gum trees, of any age, in the park.
D. The 25,000 mature Mountain Ash gum trees in the park.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

23. Most analysts focus on the cost of Higher Education Contribution Scheme (HECS) fees as the way to measure the cost of a university education. But incidentals, such as textbook costs, are rarely considered. A researcher at the University of Adelaide wishes to estimate the textbook costs of first-year students at the University. To do so, she monitored the textbook cost of 250 first-year students and found that their average textbook cost was $300 per semester. Identify the population of interest to the researcher.
A. All first-year University of Adelaide students.
B. All University of Adelaide students.
C. All university students.
D. The 250 students that were monitored.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

24. Most analysts focus on the cost of HECS fees as the way to measure the cost of a university education. But incidentals, such as textbook costs, are rarely considered. A researcher at the University of Adelaide wishes to estimate the textbook costs of first-year students at the University. To do so, she monitored the textbook cost of 250 first-year students and found that their average textbook cost was $300 per semester. Identify the variable of interest to the researcher.
A. The cost of incidental expenses of University of Adelaide students.
B. The age of University of Adelaide students.
C. The textbook cost of first-year University of Adelaide students.
D. The year in school of University of Adelaide students.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

25. Most analysts focus on the cost of HECS fees as the way to measure the cost of a university education. But incidentals, such as textbook costs, are rarely considered. A researcher at the University of Adelaide wishes to estimate the textbook costs of first-year students at the University. To do so, she monitored the textbook cost of 250 first-year students and found that their average textbook cost was $300 per semester. Identify the sample in the study.
A. All first-year University of Adelaide students.
B. The 250 students that were monitored.
C. All university students.
D. All University of Adelaide students.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

26. Researchers suspect that the average number of units passed per semester by university students is rising. A researcher at Brisbane University wishes to estimate the number of units passed by students during the second semester at Brisbane. To do so, he randomly selects 100 student transcripts and records the number of units each student passed in second semester. He found that the average number of semester units passed was 6.85 units per

student. Identify the population of interest to the researcher.
A. All university students.
B. All Brisbane University students enrolled in second semester.
C. All Brisbane University students.
D. All university students enrolled in second semester.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

27. The average number of units passed per semester by university students is suspected to be rising. A researcher at Brisbane University wishes to estimate the number of units passed by students during the second semester at Brisbane University. To do so, he randomly selects 100 student transcripts and records the number of units each student passed in second semester. Identify the variable of interest to the researcher.
A. The age of Brisbane University students enrolled in second semester.
B. The number of students enrolled at Brisbane University during second semester.
C. The number of units passed by Brisbane University students during second semester.
D. The average indebtedness of Brisbane University students enrolled in second semester.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

Instruction 1.1

The manager of the customer service division of a major consumer electronics company is interested in determining whether the customers who have purchased a wireless home security system made by the company over the past 12 months are satisfied with their products.

28. Referring to Instruction 1.1, the population of interest is
A. all the customers who have ever bought a wireless home security system made by the company.
B. all the customers who have bought a wireless home security system made by the company over the past 12 months.
C. all the customers who have used a wireless home security system over the past 12 months.
D. all the customers who have bought a wireless home security system made by the company and brought it in for repair over the past 12 months.
Difficulty: Complex
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

29. Referring to Instruction 1.1, the possible responses to the question 'How many wireless home security systems made by other manufacturers have you used?' are values from a
A. discrete random variable.
B. continuous random variable.
C. categorical random variable.
D. parameter.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

31. Referring to Instruction 1.1, the possible responses to the question 'Out of a 7 point scale with 7 being "extremely satisfied" and 1 being "extremely unsatisfied", what is your satisfaction level on the wireless home

security system that you purchased?' are values from a
A. discrete numerical random variable.
B. continuous numerical random variable.
C. categorical random variable.
D. parameter.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

31. Referring to Instruction 1.1, the possible responses to the question 'What is your annual income rounded to the nearest thousand?' are values from a
A. discrete numerical random variable.
B. continuous numerical random variable.
C. categorical random variable.
D. parameter.
Difficulty: Complex
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

32. Referring to Instruction 1.1, the possible responses to the question 'How much time do you use the wireless home security system every week on the average?' are values from a
A. continuous numerical random variable.
B. discrete numerical random variable.
C. categorical random variable.
D. parameter.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

33. The possible responses to the question 'How long have you been living at your current residence?' are values from a continuous variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

34. The possible responses to the question 'How many times in the past year have you visited a public library?' are values from a discrete variable.
A. True
B. False
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

35. A continuous variable may take on any value within its relevant range even though the measurement device may not be precise enough to record it.
A. True
B. False
Difficulty: Moderate

Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

36. Faculty rank (professor to associate lecturer) is an example of discrete numerical data.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

37. Student grades (A to D) are an example of continuous numerical data.
    A. True
    B. False
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

38. The amount of coffee consumed by an individual in a day is an example of a discrete numerical variable.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

39. The answer to the question 'What is your favourite food?' is an example of a continuous variable.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

40. The answer to the question 'How do you rate the quality of your business statistics course?' is an example of an ordinal scaled variable.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

41. The answer to the question 'How many minutes on average do you spend exercising per week?' is an example of a discrete variable.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

42. The answer to the question 'What is your sleeping bag temperature rating?' is an example of a categorical variable.

A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

43. The brand of smartphone one owns is an example of an ordinal scaled variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

44. Whether a university student is a full-fee student or a HECS student is an example of a nominal scaled variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

45. Whether a university student is a full-fee student or a HECS student is an example of a categorical variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

46. Marital status is an example of an ordinal scaled variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

47. Marital status is an example of a numerical variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

48. The grade level $(1–12)$ of a student is an example of a nominal scaled variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

49. The grade level $(1–12)$ of a student is an example of a numerical variable.

A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

50. The quality ('terrible', 'poor', 'fair', 'acceptable', 'very good' and 'excellent') of a day care centre is an example of a nominal scaled variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

51. The quality ('terrible', 'poor', 'fair', 'acceptable', 'very good' and 'excellent') of a day care centre is an example of a numerical variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

52. The amount of alcohol consumed by a person per week will be measured on an interval scale.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

53. The amount of alcohol consumed by a person per week is an example of a continuous variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

54. The number of defective apples in a single box will be measured on an interval scale.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

55. The number of defective apples in a single box is an example of a continuous variable.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

56. The amount of kilojoules contained in a 250 gram packet of cheese will be measured on a ratio scale.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

57. The amount of kilojoules contained in a 250 gram packet of cheese is an example of a discrete variable.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

58. The amount of time a student spent studying for an exam will be measured on a ratio scale.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

59. The amount of time a student spent studying for an exam is an example of a continuous variable.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

60. The date when a new factory becomes operational will be measured with a ratio scale.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

61. Data from a categorical variable can be measured on a ratio scale or on an interval scale, whilst data from a numerical variable are measured on a nominal scale or on an ordinal scale.
    A. True
    B. False
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

62.Which of the following is a discrete quantitative variable?
    A. The number of employees of an insurance company.
    B. The volume of water released from a dam.
    C. The S&P/ASX 200 stock index.
    D. The distance you drove yesterday.
Difficulty: Basic

Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

63. Which of the following is a continuous quantitative variable?
A. The colour of a student's hair.
B. The number of loaves of bread sold at the local grocery store yesterday.
C. The amount of eggs produced by a chicken in a one-month period.
D. The number of employees of a law firm.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

64. To monitor campus security, the campus security office is taking a survey of the number of students in a parking lot each 30 minutes of a 24-hour period with the goal of determining when patrols of the lot would serve the most students. If X is the number of students in the lot each period of time, then X is an example of
A. a categorical random variable.
B. a discrete random variable.
C. a continuous random variable.
D. a statistic.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

65. Researchers are concerned that the weight of the average Australian school student is increasing implying, among other things, that children's clothing should be manufactured and marketed in larger sizes. If X is the weight of school children sampled in a nationwide study, then X is an example of
A. a categorical random variable.
B. a discrete random variable.
C. a continuous random variable.
D. a parameter.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

66. The classification of student year of study (first year, second year, third year, honours) is an example of
A. a categorical random variable.
B. a discrete random variable.
C. a continuous random variable.
D. a parameter.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

67. The classification of student major (accounting, economics, management, marketing, other) is an example of
A. a categorical random variable.
B. a discrete random variable.
C. a continuous random variable.
D. a parameter.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge

Answer: A

68. The Vice Chancellor of a major university was concerned about alcohol abuse on her campus and wanted to find out the proportion of students at her university who visited the campus bar on the weekend before the final exam period. Her advisor took a random sample of 250 students. The total number of students in the sample who visited the campus bar on the weekend before the final exam period is an example of
A. a categorical random variable.
B. a discrete random variable.
C. a continuous random variable.
D. a parameter.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

69. The Vice Chancellor of a major university was concerned about alcohol abuse on her campus and wanted to find out the proportion of students at her university who visited the campus bar on the weekend before the final exam period. Her advisor took a random sample of 250 students and computed the portion of students in the sample who visited the campus bar on the weekend before the final exam. The portion of all students at her university who visited the campus bar on the weekend before the final exam period is an example of
A. a categorical random variable.
B. a discrete random variable.
C. a continuous random variable.
D. a parameter.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: D

70. The Vice Chancellor of a major university was concerned about alcohol abuse on her campus and wanted to find out the proportion of students at her university who visited the campus bar on the weekend before the final exam period. Her advisor took a random sample of 250 students. The portion of students in the sample who visited the campus bar on the weekend before the final exam period is an example of
A. a discrete random variable.
B. a parameter.
C. a statistic.
D. a categorical random variable.
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

71. The Vice Chancellor of a major university was concerned about alcohol abuse on her campus and wanted to find out the proportion of students at her university who visited the campus bar on the weekend before the final exam period. Her advisor took a random sample of 250 students. The answer on ‘are you likely to visit the campus bar on the weekend before the final exam period’ is an example of
A. a discrete random variable.
B. a categorical random variable.
C. a continuous random variable.
D. a parameter.
Difficulty: Complex
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

72. The numbers on football players' uniforms is an example of
A. an ordinal scale.
B. an interval scale.
C. a nominal scale.
D. a ratio scale.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: C

73. The rankings of teams in a rugby tournament is an example of
A. an ordinal scale.
B. an interval scale.
C. a nominal scale.
D. a ratio scale.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: A

74. The average salary of a University lecturer in Australian dollars is an example of
A. an interval scale.
B. a nominal scale.
C. an ordinal scale.
D. a ratio scale.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: D

75. The sports shoes for adults sold in Australia are often marked with sizes based on the US or UK system. In this case, shoe size is an example of
A. an ordinal scale.
B. an interval scale.
C. a nominal scale.
D. a ratio scale.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: B

76. The Talent Retention Officer of a large corporation wishes to develop employee newly expanded 'soft' benefits package for employee retention and recruitment purposes, and decides to select 500 employees from a list of all (N = 40,000) workers in order to study their preferences for possible perks to be included in the potential package. All the employees in the corporation constitute the [Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: population

77. The Talent Retention Officer of a large corporation wishes to develop employee newly expanded 'soft' benefits package for employee retention and recruitment purposes, and decides to select 500 employees from a list of all (N = 40,000) workers in order to study their preferences for possible perks to be included in the potential package. The 500 employees who will participate in this study constitute the [Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.

AACSB: Application of Knowledge
Answer: sample

78) The Talent Retention Officer of a large corporation wishes to develop employee newly expanded 'soft' benefits package for employee retention and recruitment purposes, and decides to select 500 employees from a list of all (N = 40,000) workers in order to study their preferences for possible perks to be included in the potential package. The Director will use the data from the sample to compute [Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: statistics

79. The Talent Retention Officer of a large corporation wishes to develop employee newly expanded 'soft' benefits package for employee retention and recruitment purposes, and decides to select 500 employees from a list of all (N = 40,000) workers in order to study their preferences for possible perks to be included in the potential package. Information obtained from the sample will be used to draw conclusions about the true population [Blank][Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: parameters

80. The Talent Retention Officer of a large corporation wishes to develop employee newly expanded 'soft' benefits package for employee retention and recruitment purposes, and decides to select 500 employees from a list of all (N = 40,000) workers in order to study their preferences for possible perks to be included in the potential package. In this study, methods involving the collection, presentation, and characterisation of the data are called [Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: descriptive statistics/methods

81. The Talent Retention Officer of a large corporation wishes to develop employee newly expanded 'soft' benefits package for employee retention and recruitment purposes, and decides to select 500 employees from a list of all (N = 40,000) workers in order to study their preferences for possible perks to be included in the potential package. In this study, methods that result in decisions concerning population characteristics based only on the sample results are called [Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: inferential statistics/methods

82. The oranges grown on commercial farms in Victoria were damaged by some unknown fungi a few years ago. Suppose the manager of a large orchard wanted to study the impact of the fruit flies on the orange crops on a daily basis over a six-week period. On each day a random sample of orange trees were selected from within a random sample of acres. The daily average number of damaged oranges per tree and the proportion of trees having damaged oranges were calculated. The two main measures calculated each day (i.e., average number of damaged oranges per tree and proportion of trees having damaged oranges) are called [Blank].
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: statistics

83. The oranges grown on commercial farms in Victoria were damaged by some unknown fungi a few years ago. Suppose the manager of a large orchard wanted to study the impact of the fruit flies on the orange

crops on a daily basis over a six-week period. On each day a random sample of orange trees were selected from within a random sample of acres. The daily average number of damaged oranges per tree and the proportion of trees having damaged oranges were calculated. The two main measures calculated each day (i.e., average number of damaged oranges per tree and proportion of trees having damaged oranges) may be used on a daily basis to estimate the respective true population [Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: parameters

84. The oranges grown on commercial farms in Victoria were damaged by some unknown fungi a few years ago. Suppose the manager of a large orchard wanted to study the impact of the fruit flies on the orange crops on a daily basis over a six-week period. On each day a random sample of orange trees were selected from within a random sample of acres. The daily average number of damaged oranges per tree and the proportion of trees having damaged oranges were calculated. In this study, drawing conclusions on any one day about the true population characteristics based on information obtained from the sample is called [Blank].
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: inferential statistics/methods

85. The oranges grown on commercial farms in Victoria were damaged by some unknown fungi a few years ago. Suppose the manager of a large orchard wanted to study the impact of the fruit flies on the orange crops on a daily basis over a six-week period. On each day a random sample of orange trees were selected from within a random sample of acres. The daily average number of damaged oranges per tree and the proportion of trees having damaged oranges were calculated. In this study, the presentation and characterisation of the two main measures calculated each day (i.e., average number of damaged oranges per tree and proportion of trees having damaged oranges) is called [Blank].
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: descriptive statistics/methods

86. The Quality Assurance Department of a large urban hospital is attempting to monitor and evaluate patient satisfaction with hospital services. Prior to discharge, a random sample of patients is asked to fill out a questionnaire to rate such services as medical care, nursing, therapy, laboratory, food, and cleaning. The Quality Assurance Department prepares weekly reports that are presented at the Board of Directors meetings and extraordinary/atypical ratings are easy to flag. Values computed from the sample results each week are called [Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: statistics

87. The Quality Assurance Department of a large urban hospital is attempting to monitor and evaluate patient satisfaction with hospital services. Prior to discharge, a random sample of patients is asked to fill out a questionnaire to rate such services as medical care, nursing, therapy, laboratory, food, and cleaning. The Quality Assurance Department prepares weekly reports that are presented at the Board of Directors meetings and extraordinary/atypical ratings are easy to flag. True population characteristics estimated from the sample results each week are called [Blank].
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: parameters

88. The Department of Health in Western Australia wanted to study malpractice litigation in Western

Australia. A sample of 31,000 medical records was drawn from a population of 850,000 patients who were discharged during the year 2011. The proportion of malpractice claims filed from the sample of 31,000 patients is a [Blank].
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: statistic

89. The Department of Health in Western Australia wanted to study malpractice litigation in Western Australia. A sample of 31,000 medical records was drawn from a population of 850,000 patients who were discharged during the year 2011. The true proportion of malpractice claims filed from the population of 850,000 patients is a [Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: parameter

90. The Department of Health in Western Australia wanted to study malpractice litigation in Western Australia. A sample of 31,000 medical records was drawn from a population of 850,000 patients who were discharged during the year 2011. Using the information obtained from the sample to predict population characteristics with respect to malpractice litigation is an example of [Blank].
Difficulty: Moderate
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: inferential statistics

91. The Department of Health in Western Australia wanted to study malpractice litigation in Western Australia. A sample of 31,000 medical records was drawn from a population of 850,000 patients who were discharged during the year 2011. The collection, presentation, and characterisation of the data from patient medical records are examples of [Blank].
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: descriptive statistics/methods

92. One of the 'big four' Australian banks is conducting research in order to understand the banking needs of Australian residents. Using data collected by the Australian Bureau of Statistics is an example of a [Blank] source.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: secondary

93. An insurance company evaluates many numerical variables about a person before deciding on an appropriate rate for automobile insurance. The number of claims a person has made in the last 3 years is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: discrete

94. An insurance company evaluates many numerical variables about a person before deciding on an appropriate rate for automobile insurance. The distance a person drives in a year is an example of a [Blank] variable.
Difficulty: Basic

Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: continuous

95. An insurance company evaluates many numerical variables about a person before deciding on an appropriate rate for automobile insurance. A person's age is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: continuous

96. An insurance company evaluates many numerical variables about a person before deciding on an appropriate rate for automobile insurance. How long a person has been a licensed driver is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: continuous

97. An insurance company evaluates many numerical variables about a person before deciding on an appropriate rate for automobile insurance. The number of tickets a person has received in the last three years is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: discrete

98. In purchasing a motor vehicle, there are a number of variables to consider. The body style of the car (sedan, coupe, wagon, etc.) is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: categorical

99. In purchasing a motor vehicle, there are a number of variables to consider. The classification of the car as a subcompact, compact, standard, or luxury size is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: categorical

100. In purchasing a motor vehicle, there are a number of variables to consider. The colour of the car is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: categorical

101. Most universities admit students based on their achievements in a number of different areas. The grade obtained in English in their final year of high school (A, B, C, D, or F) is an example of a [Blank] variable.
Difficulty: 2
Section: 1.4 Types of Variables
AACSB: Application of Knowledge
Answer: categorical

102. Most universities admit students based on their achievements in a number of different areas. The total

university entrance score achieved by a student is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: discrete

103. The Dean of Students conducted a survey on campus. The gender of the student is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: categorical

104. The Dean of Students conducted a survey on campus. Class designation (first year, second year, third year, honours) is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: categorical

105. The Dean of Students conducted a survey on campus. Major area of study is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: categorical

106. The Dean of Students conducted a survey on campus. Grade point average (GPA) is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: continuous

107. The Dean of Students conducted a survey on campus. The number of units currently enrolled for is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: discrete

108. The Dean of Students conducted a survey on campus. The number of clubs, groups, teams, and organisations affiliated with on campus is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: discrete

109. A personal computer user survey was conducted. The computer brand primarily used is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: categorical

110. A personal computer user survey was conducted. The number of personal computers owned is an

example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: discrete

111. A personal computer user survey was conducted. The number of years using a personal computer is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: continuous

112. A personal computer user survey was conducted. The hours of personal computer use per week is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: continuous

113. A personal computer user survey was conducted. The primary word processing package used is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: categorical

114 A personal computer user survey was conducted. The number of computer magazine subscriptions is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: discrete

115. A telecommunications provider conducted a survey on mobile phone usage in Australia. The number of mobile phones owned per household is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: discrete

116. A telecommunications provider conducted a survey on mobile phone usage in Australia. The number of years using a mobile phone is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: continuous

117. A telecommunications provider conducted a survey on mobile phone usage in Australia. The length (in minutes) of the longest call made per month is an example of a [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: continuous

118. A telecommunications provider conducted a survey on mobile phone usage in Australia. The responses

on ‘whether all mobile phones in the household use the same telecommunications provider’ is an example of a [Blank] variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: categorical

119. A telecommunications provider conducted a survey on mobile phone usage in Australia. The amount of time spent surfing the Internet per week is an example of [Blank] numerical variable.
Difficulty: Basic
Learning Outcome: 1.1 Identify the types of data used in business.
AACSB: Application of Knowledge
Answer: continuous

LO 1.2

120. When collecting data to manage a business effectively, the most common technique to ensure proper representation is to use a [Blank].
Difficulty: Moderate
Learning Outcome: 1.2 Identify how statistics is used in business
AACSB: Application of Knowledge
Answer: random sample

121. In data collection, the most common technique to ensure proper representation of the population is to use a random sample.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.2 Identify how statistics is used in business.
AACSB: Application of Knowledge
Answer: A

122. To manage a business effectively, collecting appropriate data is necessary.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.2 Identify how statistics is used in business.
AACSB: Application of Knowledge
Answer: A

LO 1.3

123. Data collected and distributed by the Australia Bureau of Statistics to be used for analysis by an organisation or individual can be classified as primary data.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: B

124. A researcher is investigating which publishing companies have experienced financial growth within the last three financial years. To do so, he gathers information on annual performance figures from a database online to which publishing companies had submitted earnings and other pieces of financial data. Which of the four methods of data collection was he using?
A. Data distributed by an organisation or an individual.
B. A designed experiment.
C. A survey.
D. An observational study.
Difficulty: Moderate
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: A

125. A marketing research analyst needs to assess the effectiveness of a new social media campaign. To collect appropriate data, she has provided a questionnaire instrument that can be answered on one's computer, tablet, or smartphone. Which of the four methods of data collection is she using?
A. Data distributed by an organisation or an individual.
B. A survey.
C. A designed experiment.
D. An observational study.
Difficulty: Moderate
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: B

126. A marketing research firm, in conducting a comparative taste test, provided five types of hummus to a sample of households randomly selected within a city. Which of the four methods of data collection is involved when people are asked to compare the five types of hummus?
A. Data distributed by an organisation or an individual.
B. A designed experiment.
C. A survey.
D. An observational study.
Difficulty: Moderate
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: B

127. Tim was planning for a meeting with his boss to discuss a raise in his annual salary. In preparation, he wanted to use the Consumer Price Index to determine the percentage increase in his real (inflation-adjusted) salary over the last three years. Which of the four methods of data collection was involved when he used the Consumer Price Index?
A. Data distributed by an organisation or an individual.
B. A designed experiment.
C. A survey.
D. An observational study.
Difficulty: Moderate
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: A

128. Which of the four methods of data collection is involved when a person counts the number of joggers running by designated locations in Melbourne's Princes Park?
A. Data distributed by an organisation or an individual.
B. A designed experiment.
C. A survey.
D. An observational study.

Difficulty: Moderate
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: D

129. A statistics student found a reference in the campus library that contained the official poverty rate for all Australian states and territories. She would report her data as being collected using
A. a designed experiment.
B. a published source.
C. a random sample.
D. observational data.
Difficulty: Moderate
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: B

130. The personnel director at a large company studied the types of foods that employees purchased from the company's food vending machines. The director noted the frequency with which employees purchased pre-packaged snack foods, fresh fruit, or dairy products. The goal of the study was to improve the availabilities of the types of food most commonly purchased. This type of data collection would best be considered as
A. a designed experiment.
B. an observational study.
C. a quota sample.
D. a random sample.
Difficulty: Moderate
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: B

131. A study attempted to estimate the proportion of Queensland residents who were willing to spend more tax dollars on solar-powered lighting for streets and public parks. Twenty-five hundred Queensland residents were surveyed. What type of data collection procedure was most likely used to collect the data for this study?
A. A designed experiment.
B. A random sample.
C. Observational data.
D. A published source.
Difficulty: Moderate
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: B

132. One of the 'big four' Australian banks is conducting research in order to understand the banking needs of Australian residents. Another option is to collect data using focus groups which is an example of [Blank][Blank] research.
Difficulty: Moderate
Learning Outcome: 1.3 Recognise the sources of data used in business.
AACSB: Application of Knowledge
Answer: qualitative

LO 1.4

133. A list of the items in the population of interest is known as the frame.
A. True

B. False
Difficulty: Basic
Learning Outcome: 1.4 Distinguish between different survey sampling methods.
AACSB: Application of Knowledge
Answer: A

134. A sample that involves selection being based on known probabilities is known as a non-probability sample.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.4 Distinguish between different survey sampling methods.
AACSB: Application of Knowledge
Answer: B

135. Convenience sampling involves using a method that is easy or inexpensive.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.4 Distinguish between different survey sampling methods.
AACSB: Application of Knowledge
Answer: A

136. The opinions of preselected experts are sought in a non-probability sample.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.4 Distinguish between different survey sampling methods.
AACSB: Application of Knowledge
Answer: B

137. When conducting a simple random sample, you should use N to represent the sample size and n to represent the frame size.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.4 Distinguish between different survey sampling methods.
AACSB: Application of Knowledge
Answer: B

138. In a systematic sample, you select the first element randomly but then, afterward, choose every kth element.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.4 Distinguish between different survey sampling methods.
AACSB: Application of Knowledge
Answer: A

139. Separate subpopulations composed of items with similar characteristics are known as [Blank].
A. clusters
B. strata
C. frames
D. judgments
Difficulty: Basic

Learning Outcome: 1.4 Distinguish between different survey sampling methods.
AACSB: Application of Knowledge
Answer: B

140. Simple random sampling is more efficient than stratified sampling.
A. True
B. False
Difficulty: Moderate
Learning Outcome: 1.4 Distinguish between different survey sampling methods.
AACSB: Application of knowledge
Answer: B

141. Selecting items based only on the fact that they are easy or inexpensive occurs in [Blank] sampling.
Difficulty: Basic
Learning Outcome: 1.4 Distinguish between different survey sampling methods.
AACSB: Communication abilities
Answer: convenience

LO 1.5

142. Problems may arise when statistically unsophisticated users who do not understand the assumptions behind the statistical procedures or their limitations are misled by results obtained from computer software.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.5 Evaluate the quality of surveys.
AACSB: Ethical Understanding and Reasoning
Answer: A

143. If all items in a frame do not have an equal chance of being selected, then non-response error occurs.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.5 Evaluate the quality of surveys.
AACSB: Application of knowledge
Answer: B

144. Non-response bias is caused when all items in a frame do not have an equal chance of being selected.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.5 Evaluate the quality of surveys.
AACSB: Application of knowledge
Answer: B

145. The difference in results for different samples of the same size is known as sampling error.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.5 Evaluate the quality of surveys.

AACSB: Application of knowledge
Answer: A

146. Ambiguous wording of questions, the halo effect and respondent error are sources of measurement error.
A. True
B. False
Difficulty: Basic
Learning Outcome: 1.5 Evaluate the quality of surveys.
AACSB: Application of knowledge
Answer: A

147. If all items in a frame do not have an equal chance of being selected, then [Blank] error occurs, causing selection bias.
Difficulty: Basic
Learning Outcome: 1.5 Evaluate the quality of surveys.
AACSB: Communication abilities
Answer: coverage