Chapter1&0
(Business Statistics 107 Exercises and Summary)

1-A shop sells five different types of laptops to its customers. How would you classify "types of laptop sold" as a variable?
Explain your answer

Types of laptop sold is a **categorical** variable.

Which of the following statements justify your choice above?

A.The type of laptop sold is of this type of a variable because the values of the variable arise from counting processes

B.The type of laptop sold is of this type of a variable because the values of the variable represent quantities.

C.The type of laptop sold is of this type of a variable because the values of the variable can be placed into categories.

D. The type of laptop sold is of this type of a variable because the values of the variable arise from measuring process

2-Classify each of the following variables as categorical or numerical. If the variable is numerical, determine whether the variable is discrete or continuous.

a) Number of medical patients in a hospital waiting room

b) Weight of a package of Sun-Maid raisins

c) Car body styles

a) Number of medical patients in a hospital waiting room is what kind of variable?

A. Numerical, discrete

B. Numerical, continuous

C. Categorical

b) A weight of package of Sun-Maid raisins is what kind of variable?

A .Numerical, discrete

B .Numerical, continuous

C. Categorical

c) Car body styles is what kind of variable?

A .Numerical, discrete

B. Categorical

C. Numerical, continuous

3-Suppose that you measure the time it takes to download a video from the internet.
Explain why the download time is a continuous numerical variable.
Choose the correct answer below.
A. Download time is a continuous numerical variable because it has numerical values that arise from a counting process.
B. Download time is a continuous numerical variable because it has numerical values that arise from a measuring process.
Your answer is correct.
C. Download time is a continuous numerical variable because it has values that can only be placed into categories

4-Would you use a sample or a census to measure each of the following?
a) The make of the car driven by members of your study group
b) The make of the car driven by students in your university
c) The mean battery life of your laptop when it is in continuous use
d) The number of students in your statistics class who brought laptops to class today

(a) The make of the cars driven by members of your study group is a census.

(b) The make of the cars driven by students in your university is a sample.
(c) The mean battery life of your laptop when it is in continuous use is a sample.
(d) The number of students in your statistics class who brought laptops to class today is a census

5- You are conducting a study to find out the age group of people who prefer to watch action movies in a movie theatre. Fill in the blanks with the type of sample required in each case.

a) You survey the first 50 persons to emerge from the theatre hall. To do this, you will be using the Convenience sampling technique

.

b) You survey every fifth person to emerge from the theatre hall. Here the systematic sampling technique is required.

Column

Row	00000	00001	11111	11112	22222	22223	33333	33334
	12345	67890	12345	67890	12345	67890	12345	67890
28	06873	21440	75593	41373	49502	17972	82578	16364
29	12478	37622	99659	31065	83613	69889	58869	29571
30	57175	55564	65411	42547	70457	03426	72937	83792
31	91616	11075	80103	07831	59309	13276	26710	73000
32	78025	73539	14621	39044	47450	03197	12787	47709

Given a population of N = 68, starting in row 29 of the table of random numbers, and reading across the row, select a sample of n = 15

a. without replacement.

b. with replacement.

Click the icon to view the table of random numbers.

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a. Choose the correct answer below.

- A. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58, 86
- B. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89
- C. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- D. 12, 47, 22, 65, 10, 61, 36, 58, 57, 17, 55, 64, 41, 14, 25

b. Choose the correct answer below.

- A. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- B. 12, 47, 22, 65, 10, 65, 61, 36, 58, 57, 17, 55, 55, 64, 65
- C. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58, 86
- D. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89

Given a population of N = 87, starting in row 29 of the table of random numbers, and reading across the row, select a sample of n = 15

a. without replacement.
b. with replacement.

Click the icon to view the table of random numbers.

a. Choose the correct answer below.

- A. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- B. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89
- C. 12, 47, 83, 76, 22, 65, 10, 61, 36, 58, 86, 71, 57, 17, 55
- D. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58, 86

b. Choose the correct answer below.

- A. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- B. 12, 47, 83, 76, 22, 65, 10, 65, 83, 61, 36, 58, 86, 71, 57
- C. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89
- D. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58, 86

Given a population of N = 93, starting in row 29 of the table of random numbers, and reading across the row, select a sample of n = 14

a. without replacement.
b. with replacement.

Click the icon to view the table of random numbers.

a. Choose the correct answer below.

- A. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89
- B. 12, 47, 83, 76, 22, 65, 93, 10, 61, 36, 89, 58, 86, 92
- C. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- D. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98

b. Choose the correct answer below.

- A. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89
- B. 12, 47, 83, 76, 22, 65, 93, 10, 65, 83, 61, 36, 89, 58
- C. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- D. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98

Click the icon to view the table of random numbers

	Column					
	00000	00001	11111	11112	22222	22223
Row	12345	67890	12345	67890	12345	67890
01	20584	66897	91505	13964	65953	31602
02	36871	50775	30592	57143	17381	68856
03	25853	35041	36871	50775	30592	57143
04	17381	68856	25853	35041	23913	48357
05	63308	16090	51690	54607	72407	55538
06	23913	48357	63308	16090	51690	54607
07	72407	55538	41377	25684	38012	79607
08	94713	97302	57085	86828	33706	05959
09	77301	85806	42414	63233	19270	54821
10	22047	33000	50843	92640	33545	44107

For a population of N = 900, starting from row 04 and column 01 of the accompanying table of random numbers, determine the number of rows required in order to select a sample of n = 10 without replacement.

Click the icon to view the table of random numbers.

It will require [redacted] row(s) and the last sample value will be [redacted]

For a population of N=901, starting from row 03 and cclumn 01 of the accompanying table of random numbers, determine the number of rows required in order to select a sample of n=10 without replacement

It will require 1 row(s) and the last sample value will be 143

For a population of N=902, starting from row 02 and column 01 of the accompanying table of random numbers, determine the number of rows required in order to select a sample of n= 10 without replacement

it will require 1 row(s) and the last sample value will be 856

For a population of N=909, starting from row 02 and column 01 of the accompanying table of random numbers, determine the number of rows required in order to select a sample of n= 10 without replacement

it will require row(s) and the last sample value will be

For a population of N=906, starting from row 02 and column 01 of the accompanying table of random numbers, determine the number of rows required in order to select a sample of n= 20 without replacement

it will require row(s) and the last sample value will be

For a population of N=904, starting from row 03 and column 01 of the accompanying table of random numbers, determine the number of rows required in order to select a sample of n= 10 without replacement

it will require ___ row(s) and the last sample value will be ___

For a population of N=909, starting from row 04 and column 01 of the accompanying table of random numbers, determine the number of rows required in order to select a sample of n= 15 without replacement

it will require 2 row(s) and the last sample value will be 690

For a population of N=903, starting from row 03 and column 01 of the accompanying table of random numbers, determine the number of rows required in order to select a sample of n= 20 without replacement

it will require ___ row(s) and the last sample value will be ___

Column

Row	00000	00001	11111	11112	22222	22223	33333	33334
	12345	67890	12345	67890	12345	67890	12345	67890
28	06873	21440	75593	41373	49502	17972	82578	16364
29	12478	37622	99659	31065	83613	69889	58869	29571
30	57175	55564	65411	42547	70457	03426	72937	83792
31	91616	11075	80103	07831	59309	13276	26710	73000
32	78025	73539	14621	39044	47450	03197	12787	47709

Given a population of N = 68, starting in row 29 of the table of random numbers, and reading across the row, select a sample of n = 16

a. without replacement.
b. with replacement.

Click the icon to view the table of random numbers.

a. Choose the correct answer below.

- A. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58, 86, 92
- B. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- C. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58, 86
- D. 12, 47, 22, 65, 10, 61, 36, 58, 57, 17, 55, 64, 41, 14, 25, 45

b. Choose the correct answer below.

- A. 12, 47, 22, 65, 10, 65, 61, 36, 58, 57, 17, 55, 55, 64, 65, 41
- B. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58, 86
- C. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- D. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58, 86, 92

6- You want to select a random sample of nequals1 from a population of three items (which are called A, B, and C). The rule for selecting the sample is as follows: Flip a coin; if it is heads, pick item A; if it is tails, flip the coin again; this time, if it is heads, choose B; if it is tails, choose C. Explain why this is a probability sample but not a simple random sample.

Choose the correct answer below.

A.This is a probability sample because the exact probability of each outcome is unknown, but it is not a simple random sample because it is known that there is a higher probability of picking item A than there is of picking item B or of picking item C.

B .This is a probability sample because the probability of each outcome is the same, but it is not a simple random sample because the N items in the frame were not partitioned into n groups of k items.

C. This is a probability sample because the probability of each outcome is known, but it is not a simple random sample because there is a higher probability of picking item A than there is of picking item B or of picking item C.

D.This is a probability sample because the probability of each outcome is the same, but it is not a simple random sample because you cannot flip the same coin both times

7- simple random sample of n equals 100 students have been selected from the university consisting of Upper N equals 500
students to understand their expenditure behavior.

a) Give an example of a possible coverage error.

b) Give an example of a possible non-response error.

c) Give an example of a possible measurement error

a) Which of the following is a correct example of a possible coverage error?

A. Ambiguous wording in questions asked on the questionnaire.
B. No attempt is made to contact non-respondents to urge them to reveal their expenditure behavior.
C. Only students in a specific division of the course have been sampled.
D. Sample statistic should be equal to the parameter of interest.

b) Which of the following is a correct example of a possible non-response error?

A. Ambiguous wording in questions asked on the questionnaire.
B. No attempt is made to contact non-respondents to urge them to reveal their expenditure behavior.
C. Only students in a specific division of the course have been sampled.
D. Sample statistic should be equal to the parameter of interest.

c) Which of the following is a correct example of a possible measurement error?

A. Ambiguous wording in questions asked on the questionnaire.
B. Only students in a specific division of the course have been sampled.
C. Sample statistic is equal to the parameter of interest.
D. No attempt is made to contact non-respondents to urge them to reveal their expenditure behavior.

Column

Row	00000	00001	11111	11112	22222	22223	33333	33334
	12345	67890	12345	67890	12345	67890	12345	67890
28	06873	21440	75593	41373	49502	17972	82578	16364
29	12478	37622	99659	31065	83613	69889	58869	29571
30	57175	55564	65411	42547	70457	03426	72937	83792
31	91616	11075	80103	07831	59309	13276	26710	73000
32	78025	73539	14621	39044	47450	03197	12787	47709

Given a population of N = 72, starting in row 29 of the table of random numbers, and reading across the row, select a sample of n = 14

a. without replacement.
b. with replacement.

Click the icon to view the table of random numbers.

a. Choose the correct answer below.

- A. 12, 47, 22, 65, 10, 61, 36, 58, 71, 57, 17, 55, 64, 41
- B. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89
- C. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- D. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98

b. Choose the correct answer below.

- A. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- B. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89
- C. 12, 47, 22, 65, 10, 65, 61, 36, 58, 71, 57, 17, 55, 55
- D. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98

Given a population of N = 87, starting in row 29 of the table of random numbers, and reading across the row, select a sample of n = 14

a. without replacement.
b. with replacement.

Click the icon to view the table of random numbers.

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a. Choose the correct answer below.

- A. 12, 47, 83, 76, 22, 65, 10, 61, 36, 58, 86, 71, 57, 17
- B. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98
- C. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89
- D. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58

b. Choose the correct answer below.

- A. 12, 47, 83, 76, 22, 65, 10, 65, 83, 61, 36, 58, 86, 71
- B. 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89, 58
- C. 12, 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98
- D. 47, 83, 76, 22, 99, 65, 93, 10, 65, 83, 61, 36, 98, 89

Questions of the book

Problems for Section (Chapter 1 ,2 ,3)

Chapter	Question
Chapter 1	4-5-6-7-8-17-18-19-26-27

APPLYING THE CONCEPTS

1.4 For each of the following variables, determine whether the variable is categorical or numerical. If the variable is numerical, determine whether the variable is discrete or continuous.

a. Number of cellphones in the household

b. Whether the cellphone owned in the household is a smartphone

c. Distance (in miles) from a person's house to the nearest store

1.5 The following information is collected from students as they exit the campus bookstore during the first week of classes.

a. Number of computers owned
b. Nationality
c. Height
d. Dorm hall of residence

Classify each of these variables as categorical or numerical. If the variable is numerical, determine whether the variable is discrete or continuous.

1.6 For each of the following variables, determine whether the variable is categorical or numerical. If the variable is numerical, determine whether the variable is discrete or continuous.

a. Number of students in a class
b. Volume of water in gallons used by an individual showering per week
c. Name of a household's cable television provider

1.7 For each of the following variables, determine whether the variable is categorical or numerical. If the variable is numerical, determine whether the variable is discrete or continuous.

a. Number of shopping trips a person made in the past month
b. A person's preferred brand of coffee
c. Time a person spent on exercising in the past month

1.8 Suppose the following information is collected from Simon Walter on his application for a home mortgage loan.

a. Annual personal income: $216,370
b. Number of times married: 1
c. Ever convicted of a felony: No
d. Own a second car: No

1.17 For a population containing $N = 902$ individuals, what code number would you assign for

a. the first person on the list?
b. the fortieth person on the list?
c. the last person on the list?

1.18 For a population of $N = 902$, verify that by starting in row 05, column 01 of the table of random numbers (Table E.1), you need only six rows to select a sample of $N = 60$ *without* replacement.

1.19 Given a population of $N = 93$, starting in row 29, column 01 of the table of random numbers (Table E.1), and reading across the row, select a sample of $N = 15$

a. *without* replacement.
b. *with* replacement.

APPLYING THE CONCEPTS

1.26 A survey indicates that the vast majority of college students own their own personal computers. What information would you want to know before you accepted the results of this survey?

1.27 A simple random sample of $n = 300$ full-time employees is selected from a company list containing the names of all $N = 5{,}000$ full-time employees in order to evaluate job satisfaction.

a. Give an example of possible coverage error.
b. Give an example of possible nonresponse error.
c. Give an example of possible sampling error.
d. Give an example of possible measurement error.

Summary of chapter 0&1

To Properly Apply Statistics You Should Follow A Framework To Minimize Possible Errors :

In this book we will use DCOVA

Define the data you want to study in order to solve a problem or meet an objective

Collect the data from appropriate sources

Organize the data collected by developing tables

Visualize the data by developing charts

Analyze the data collected to reach conclusions and present results .

Definition Of Some Terms :

VARIABLE

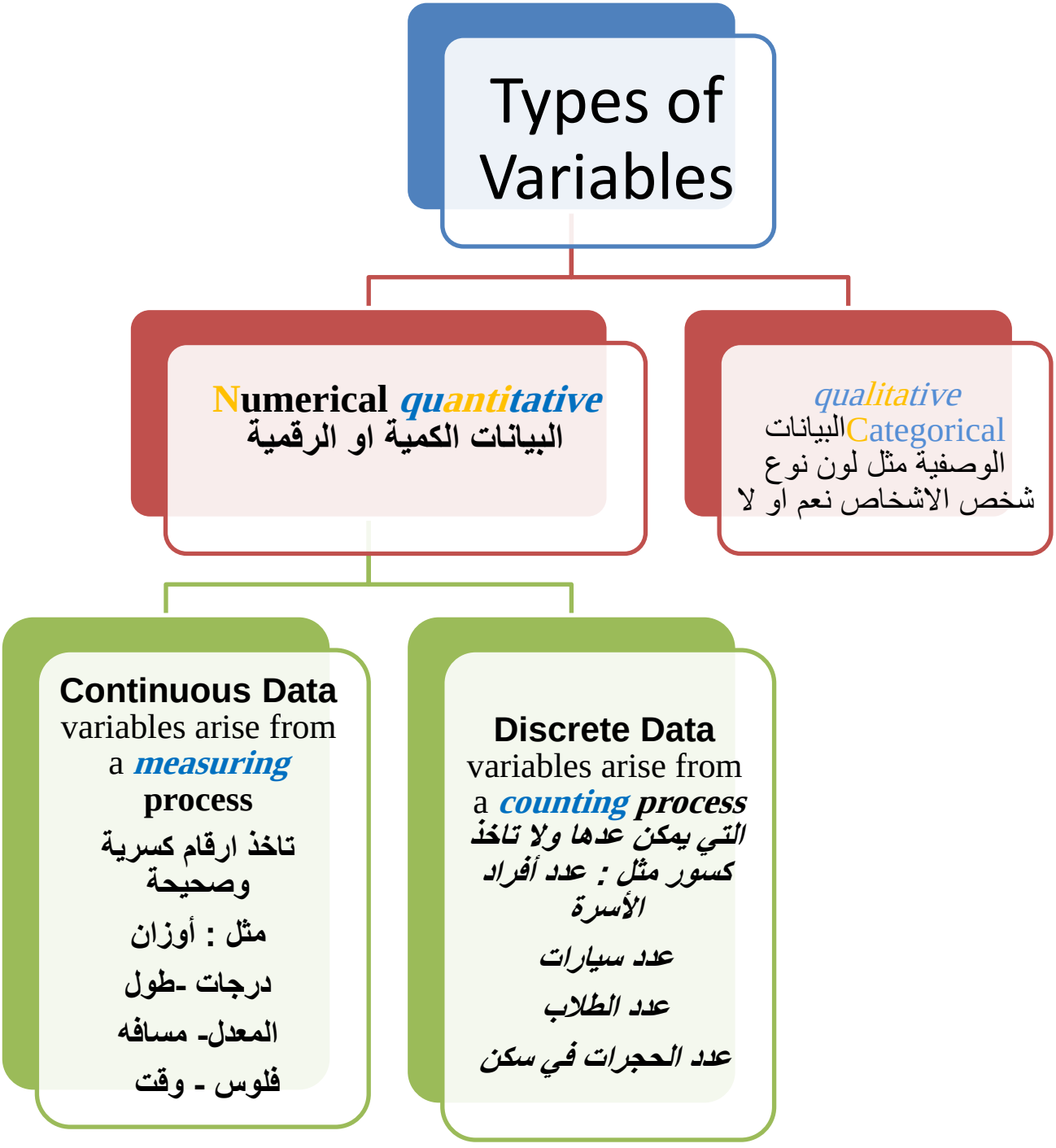
A characteristic of an item or individual.

DATA

The set of individual values associated with a variable.

STATISTICS

The methods that help transform data into useful information for decision makers.


Types of Variables
Numerical quantitative
البيانات الكمية او الرقمية
qualitative
البياناتCategorical
الوصفية مثل لون نوع
شخص الاشخاص نعم او لا
Continuous Data
variables arise from
a measuring
process
تاخذ ارقام كسرية
وصحيحة
مثل : أوزان
درجات -طول
المعدل- مسافه
فلوس - وقت
Discrete Data
variables arise from
a counting process
التي يمكن عدها ولا تاخذ
كسور مثل : عدد أفراد
الأسرة
عدد سيارات
عدد الطلاب
عدد الحجرات في سكن

Sources of Data

Primary Sources: The data collector is the one using the data for analysis

- Data from a political survey
- Data collected from an experiment
- Observed data

Secondary Sources: The person performing data analysis is not the data collector

- Analyzing census data
- Examining data from print journals or data published on the internet

Data Is Collected From Either A Population or A Sample :

POPULATION

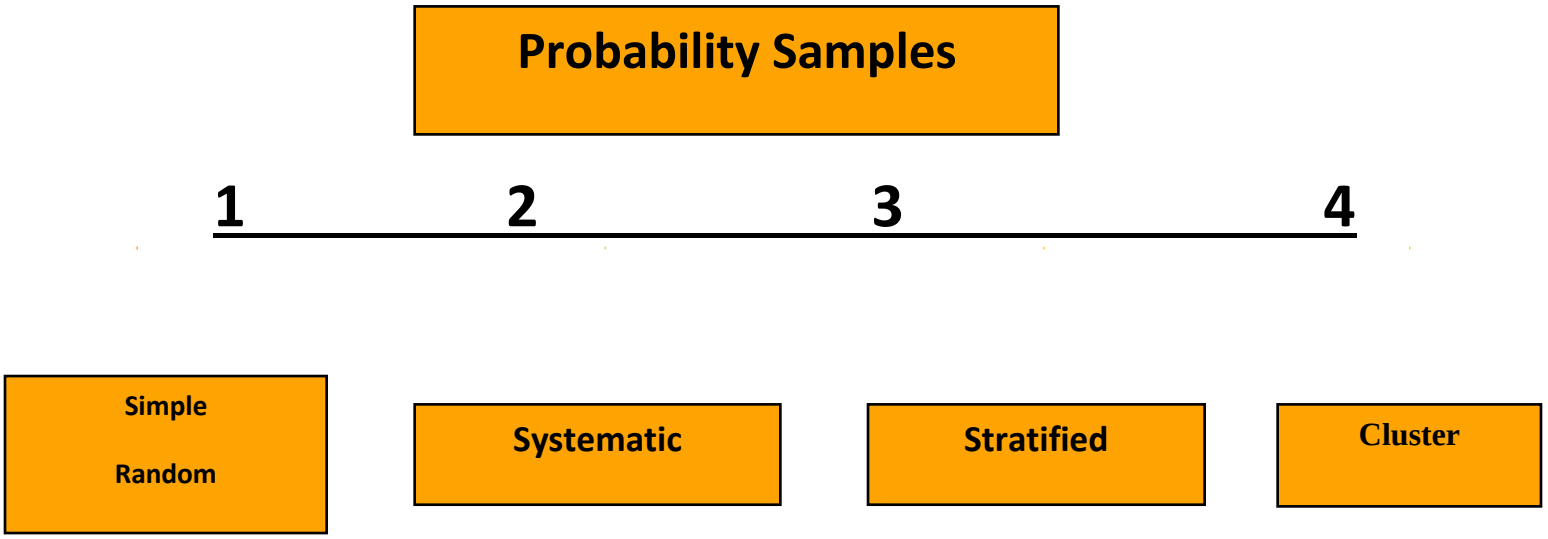
A population consists of all the items or individuals about which you want to draw a conclusion. The population is the “large group”

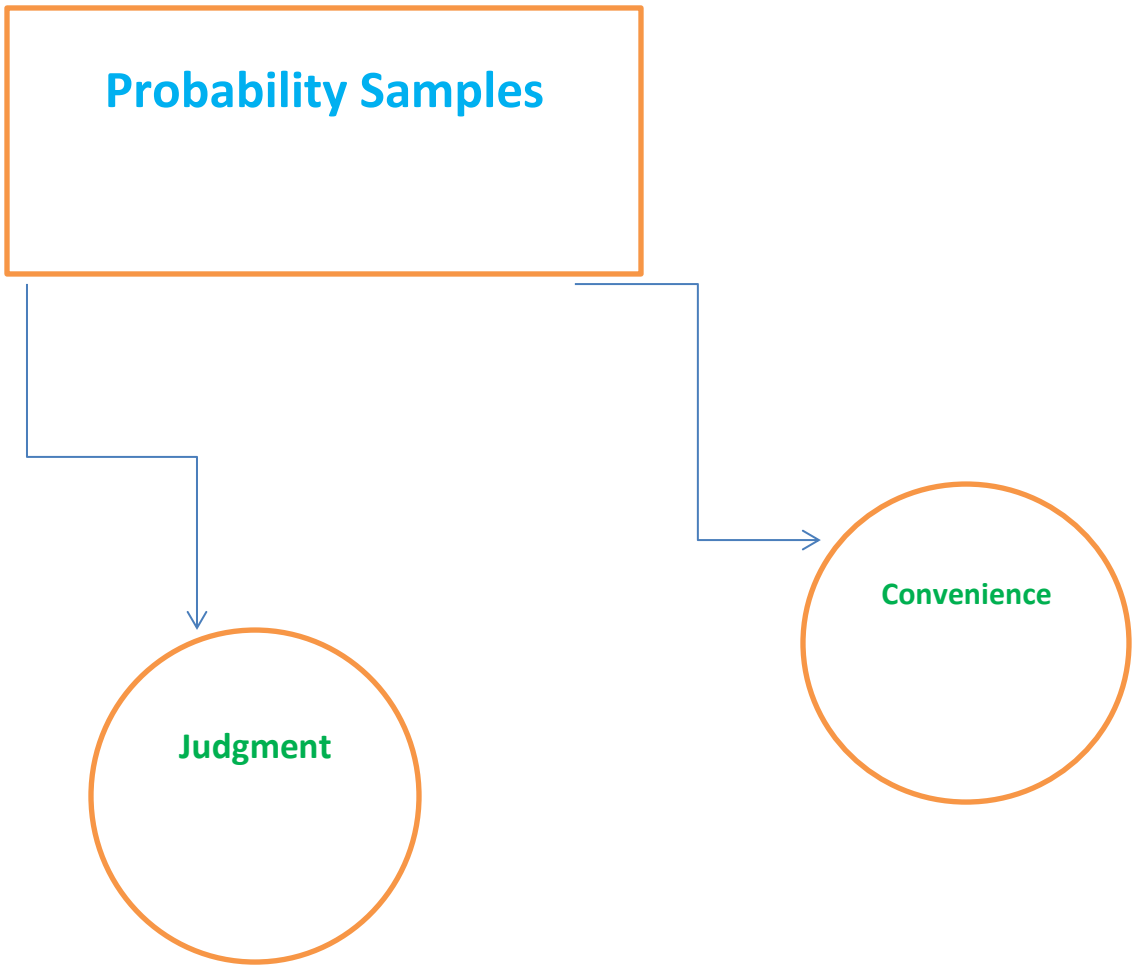
SAMPLE

A sample is the portion of a population selected for analysis. The sample is the “small group”

Types of Samples:

Probability Sample




Probability Samples
Convenience
Judgment

Probability Sample:
Comparing Sampling Methods

Simple random sample and Systematic sample

Simple to use

May not be a good representation of the population's underlying characteristics

Stratified sample

Ensures representation of individuals across the entire population

Cluster sample

More cost effective

Less efficient

(need larger sample to acquire the same level of precision)

Types of Survey Errors

Coverage error or selection bias

Exists if some groups are excluded from the frame and have no chance of being selected

Nonresponse error or bias

People who do not respond may be different from those who do respond

Sampling error

Variation from sample to sample will always exist

Measurement error

Due to weaknesses in question design and / or respondent error