



Sampling Methods

Statistical Population

A set of **people** or **objects**

- that share one or more attributes
- and are relevant to the purpose of the research.

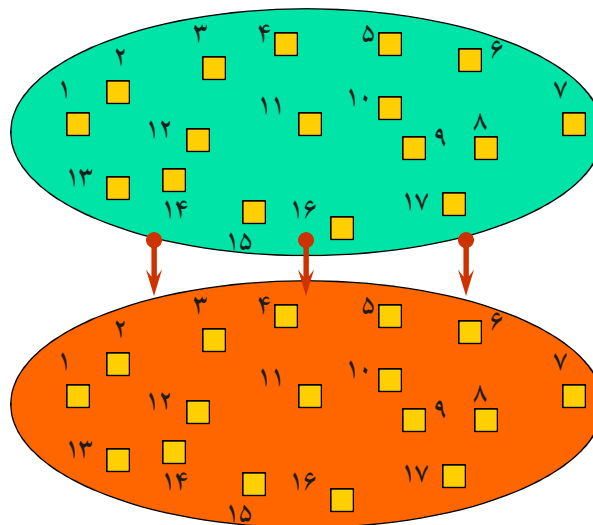
Data Collection Methods

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Census



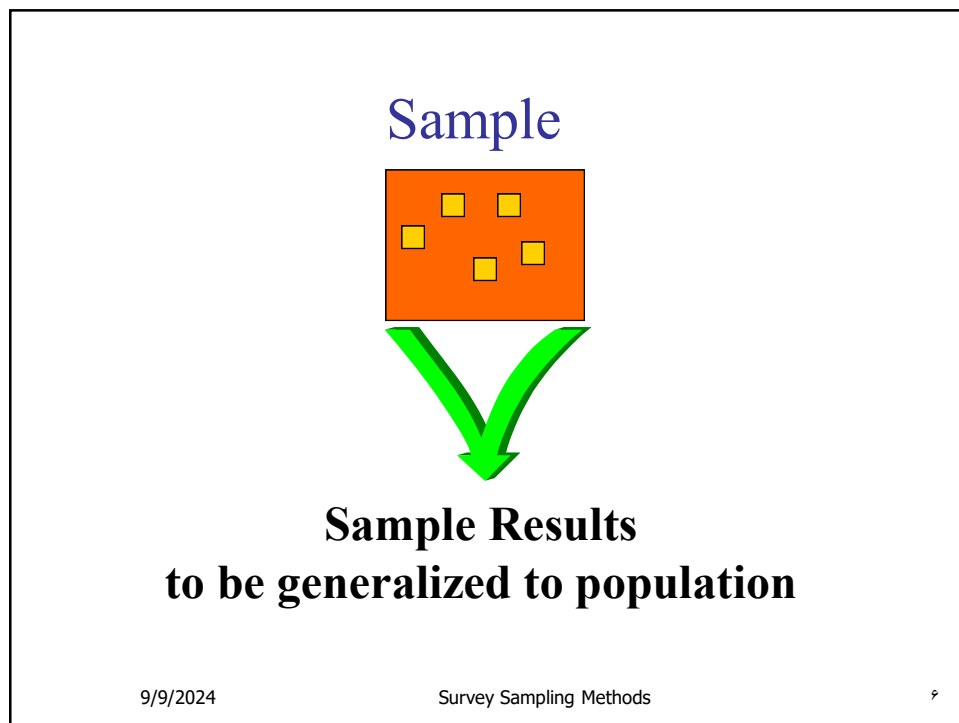
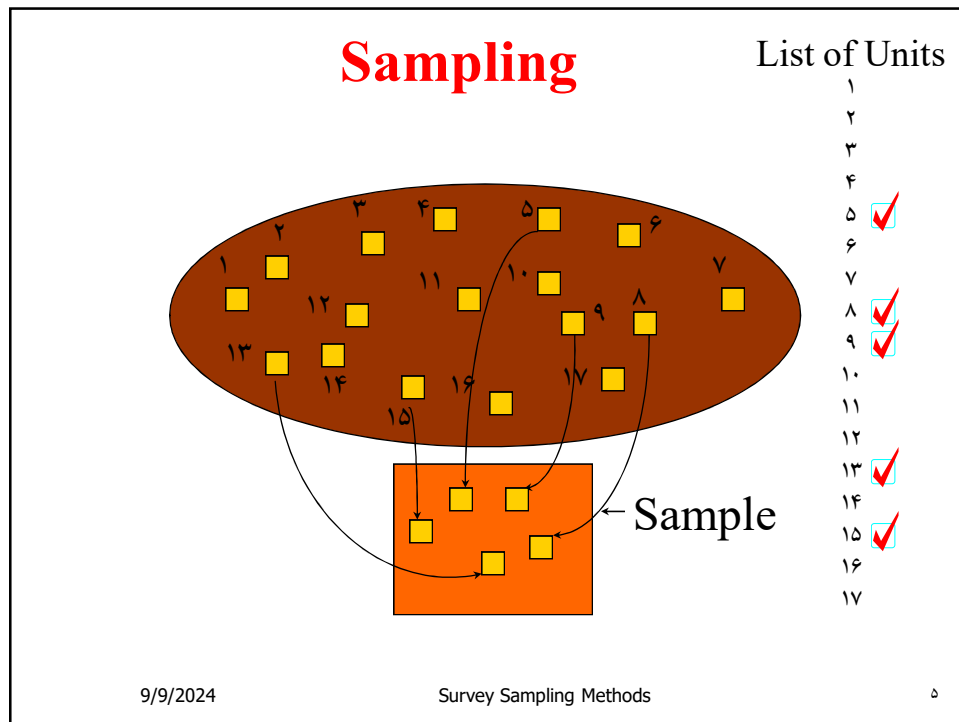
List of Units

- 1 ✓
- 2 ✓
- 3 ✓
- 4 ✓
- 5 ✓
- 6 ✓
- 7 ✓
- 8 ✓
- 9 ✓
- 10 ✓
- 11 ✓
- 12 ✓
- 13 ✓
- 14 ✓
- 15 ✓
- 16 ✓
- 17 ✓

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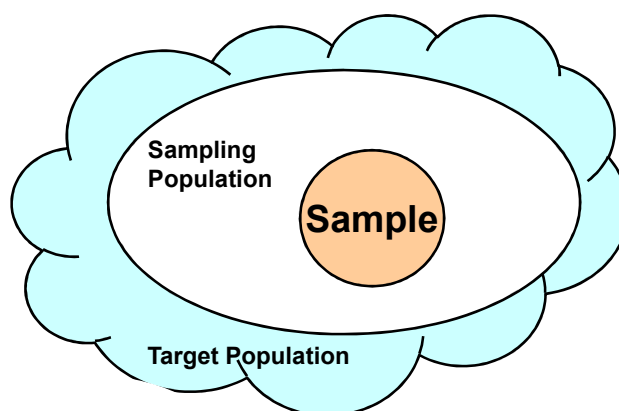
A good sample is
Representative
of the whole
population.

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Sampling and representativeness



Target Population → Sampling Population → Sample

Quality of a sampling estimate

■ Accuracy:

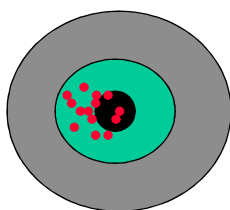
- How close a particular measure is to the true or correct value.

■ Precision:

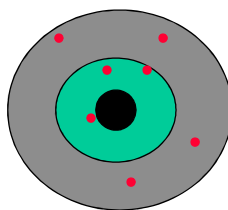
- How reproducible or how close replicate measurements become.

Quality of a sampling estimate

Precision & Accuracy

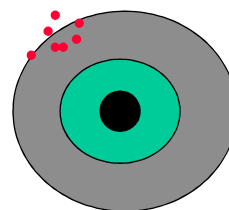


No precision



Random error

Precise but no accurate



Systematic error (bias)

■ Accuracy:

- How close a particular measure is to the true or correct value.

■ Precision:

- How reproducible or how close replicate measurements become.

Adequate sampling technique helps to ensure that sample measurements produce **accurate** and **precise** estimate of the population.

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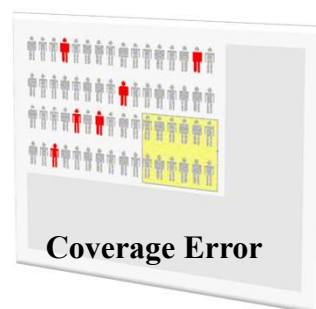
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Some Possible Errors

Non-Response Error

- **Individual**
- **Item**



Coverage Error

Coding Error

Measurement Error

Data Cleaning

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Sampling Methods

- **Non-Random** (Non-Probabilistic)
- **Random** (Probabilistic)

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Non-Random Sampling

- **Convenient Sampling**
- **Quota Sampling**

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• Quota Sampling

Area	Population size	Proportion	Sample size	Sampling fraction
Urban	7000	70%	$1000 \times 0.7 = 700$	10 %
Rural	3000	30%	$1000 \times 0.3 = 300$	10 %
Total	10000		1000	

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Random Sampling

In random sampling, each person of the statistical population has definite and **non-zero chance To be selected in the sample.**

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Random Sampling

Therefore, based on the results of the sample, the parameters of the community can be estimated with measurable confidence.

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Random Sampling Types

- **Simple Random Sampling**
- **Stratified Sampling**
- **Cluster Sampling**
- **Systematic Sampling**
- **Multistage Sampling**

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Simple Random Sampling

At each stage of the sampling:

1. All people has the **same chance** for being selected



2. Samples are **independent** of each other.

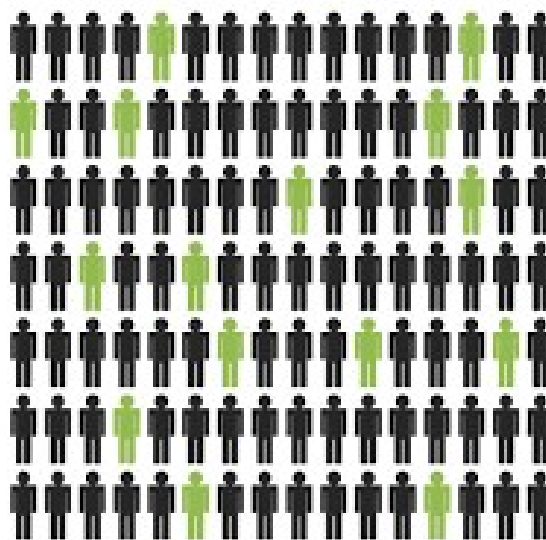
i.e. Selection of one person should not be affected by selection of any other persons.

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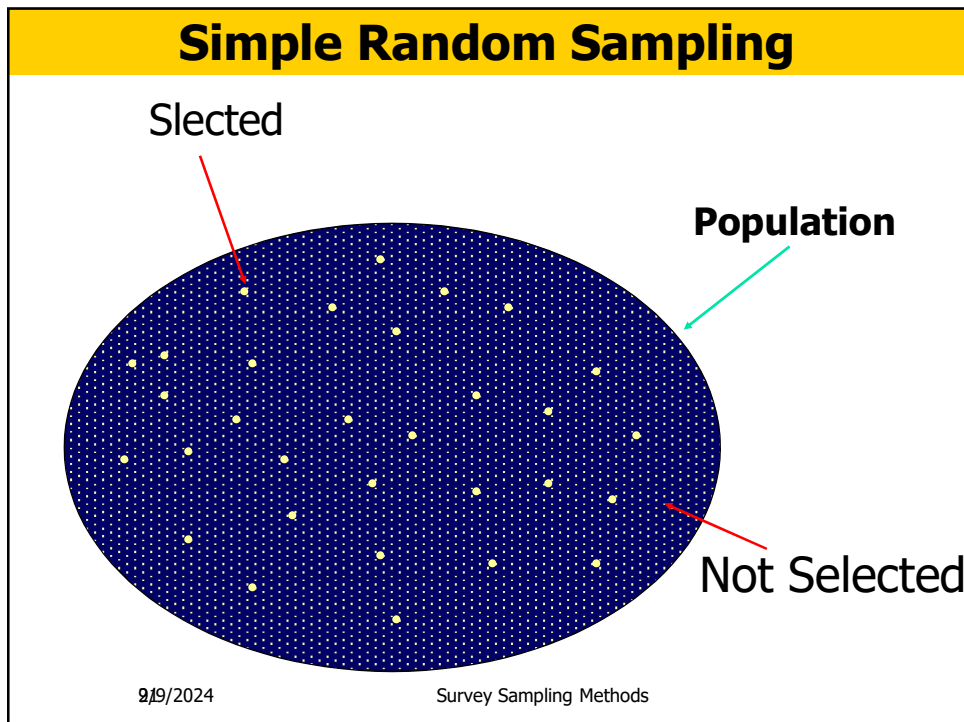
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■ Population ■ Sample



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Random Digits

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Random Digits

01703	49894	57579	98505	85008	98681	56862	41860
87556	95669	39885	31669	31460	96413	84398	31562
84254	60541	73290	54685	80208	77044	14771	33378
12429	43566	32578	38935	75460	98133	18386	12417
63055	26768	63609	92424	50808	95416	12795	50787
18348	79628	05778	72095	90754	90430	00791	38023
19827	95727	02372	23485	54372	89732	67768	72151
30236	52309	99971	44890	28522	92140	40703	16888
32160	42795	04959	73840	99110	07527	73725	19291
14832	30334	18047	38712	32931	85481	15378	25011
21151	02668	44154	95153	63213	70014	67531	52581
89677	82090	42211	75118	36233	25131	13314	33063
67129	12388	41678	51286	80948	91599	52652	02519
27808	23807	25424	35877	96308	45847	88287	88419
24646	88222	66395	24060	98186	81741	08675	36931
10030	79086	89464	28282	89252	14777	02033	42852

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Example:

We want to randomly select a sample of size $n=10$ from 70 students in a class.

First, we assign a number from 01 to 70 to each student (Because the last person is a two-digit number)

01 02 03 ... 09 10 11 69 70

Then we select ten two-digit numbers from random digits table.

Obviously, numbers **greater than seventy** and also **duplicates** will not be considered .

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Random Digits



01703	49894	57579	98505	85008	98681	56862	41860
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Selected Sample: 48, 28, 52, 29, 21, 40, 70, 31, 68, 32

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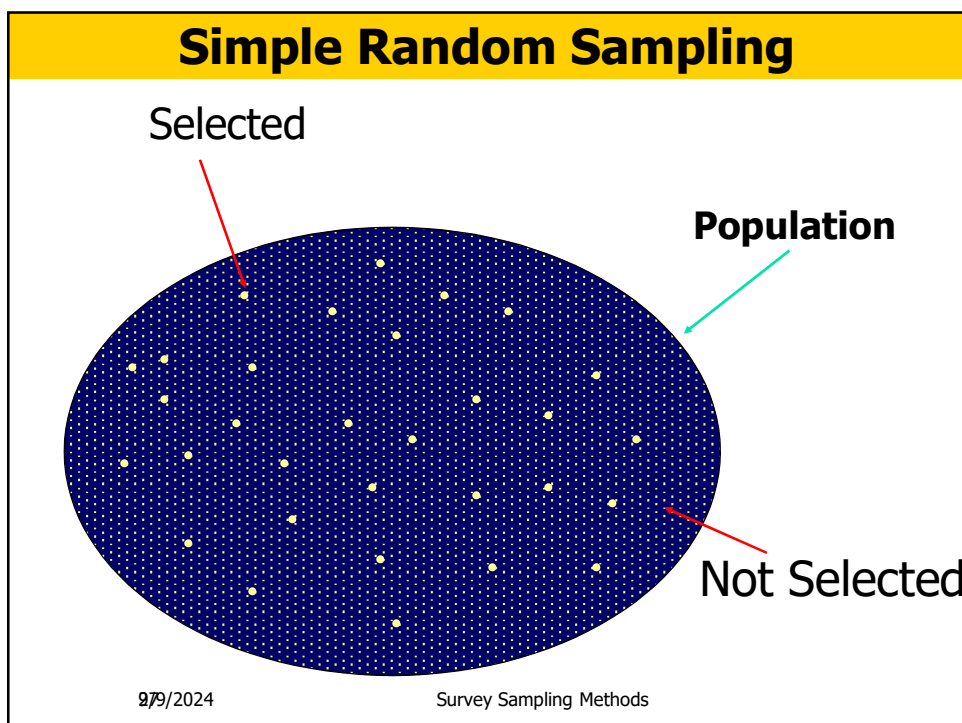
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Sample Selection using EXCEL

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Note:

Simple Random Sampling is the base
of all random sampling methods

BUT

in most situations it is very difficult
to be implemented in practice.
Therefore other sampling procedures
have been developed.

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- **In next session we will talk on:**

- **Stratified Sampling**
- **Cluster Sampling**
- **Systematic Sampling**
- **Multistage Sampling**

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