lecture 1: introduction

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(N) **population**: (universe) is the collection of all items unde considerstions. set of all the observstions uou make.

(n) **sample**: subset of populations. selected set which will be used in decision making

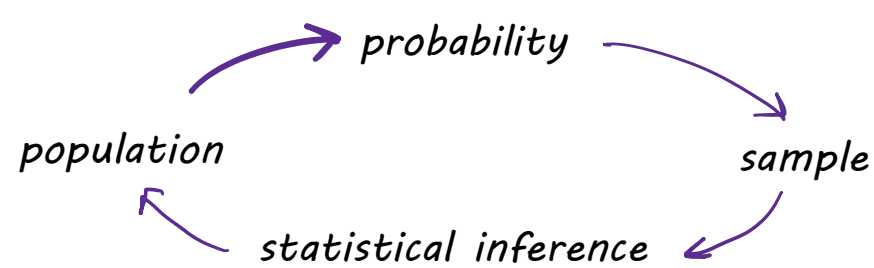**parameters**: describes characteristics of the populations.

statistic: summary measure computed from a sample to describe a characteristic of the population. values computed from sample data.

descriptive statistics: collecting, summarizing, describing data

inferential statistic: drawing conclusions from statistics

collect data	→	present data	→	summarize

inference is the process of drawing conclusions or making decisions about a population basedon sample results

types of samples used

nonprobability sample: chosen regardless of their probabilities.

probability sample: items in the sample are chosen regarding the known probabilities

simple random samples: every item has an equal chance of being selected.

with replacement:if the chosen items are put back to the pool.

without replacement: if you remove the chosen items from the pool.

systematic sampling

sample size =n

frame of N individuals into groups of k individuals. k=N/n

stratified samples

divide population into subgroups(strata) according to common characteristics. then, simple random samples are selected from the stratas.

cluster samples

divide the population into several clusters. then, simple random of clusters is selected

data are the source of information. information is extracted from the data.

methods of collecting data:

1- **retrospective study:** using data collected in the past

2- **observational study:** data collected by a passive observer

3- **designed experiment**: data collected in response to provess input changes.

discrete data: distinct numbers with gaps between. (like number of students in a class)

continous data: any number in a given range. (time, weight)

SCALES:

nominal data: categories with no order, like sex.

ordinal data: ordered categories, rankings, scaling, like heights of people, mumber of siblings: 0-2, 2-4, 6+, letter grades A, B, C...

interval data: you may have negative numbers, there are also zero but no true zero, like temperature

ratio data: no negative values, true zero exists, like price of an item.