BIOSTATISTICS & COMPUTER SCIENCE

INTRODUCTION

STATISTICS

Imposing form of mathematics
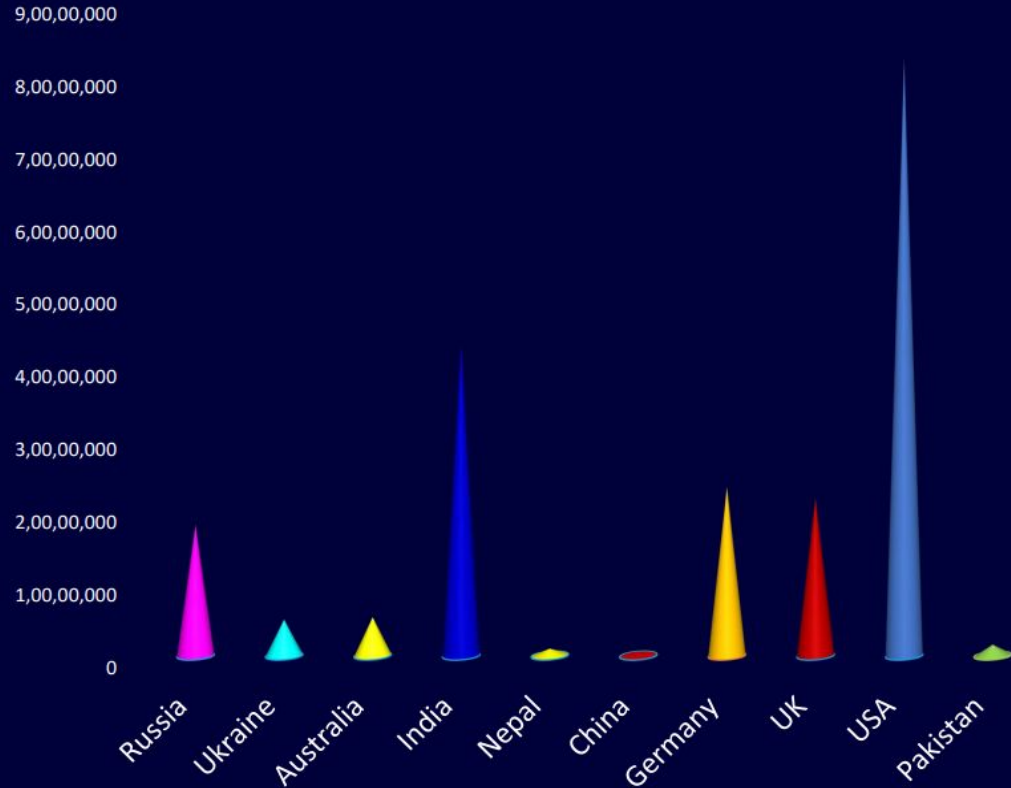
It Suggests: Tables, Figures, Charts/ Graphs

Commonly Found in: Newspapers, Journals, Books, Various reports, Speeches, Lectures, TV, Social Media.

STATISTICS

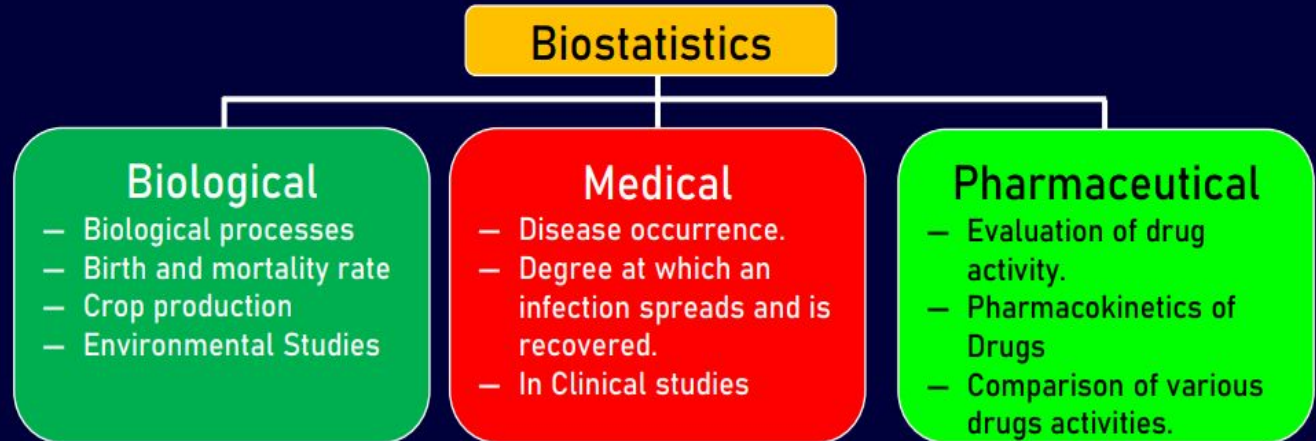| S. No.	Country	Total Cases
1	Russia	1,80,53,359
2	Ukraine	49,90,465
3	Australia	53,08,287
4	India	4,30,39,972
5	Nepal	9,78,648
6	China	1,74,868
7	Germany	2,32,77,316
8	UK	2,17,47,638
9	USA	8,22,52,965
10	Pakistan	15,26,952

STATISTICS

❑ Numbers play an essential role in statistics.

❑ They provide raw data and information regarding the study.

❑ These numbers are refined and presented in a more understandable form.

❑ Statistics can be defined as:

❑ Collection

❑ Organization

❑ Summarization/Presentation

❑ Analysis and

❑ Appropriate Interpretation of the information.

Statistics was first used by Professor Gottfried Achenwall, a professor in University of Marburg in the year 1749.

Biostatistics

❏ When the tools of statistics are applied to analyze the Medical, Biological and Pharmaceutical sciences data, then it can be named as biostatistics.

❏ Biostatistics is contraction of biology and statistics.

❏ Sometimes "Biostatistics" is also referred as "Biometry" or "Biometrics."

Biostatistics

Biological
— Biological processes
— Birth and mortality rate
— Crop production
— Environmental Studies

Medical
— Disease occurrence.
— Degree at which an infection spreads and is recovered.
— In Clinical studies

Pharmaceutical
— Evaluation of drug activity.
— Pharmacokinetics of Drugs
— Comparison of various drugs activities.

Frequency Distribution

❑ A frequency distribution is a list, table (i.e.: frequency table) or graph (i.e.: bar plot or histogram) that displays the frequency of various outcomes in a sample

Frequency Distribution

Discrete Frequency Distribution
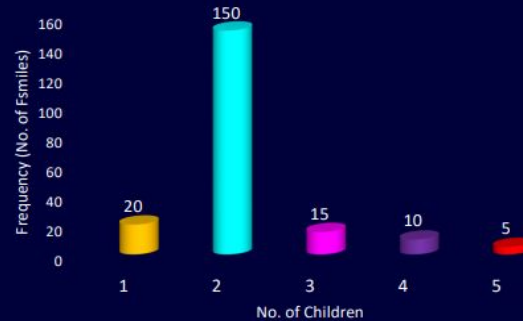— Two Elements
— The Variable &
— The Frequency

Continuous Frequency Distribution
— Two Elements
— The Variable
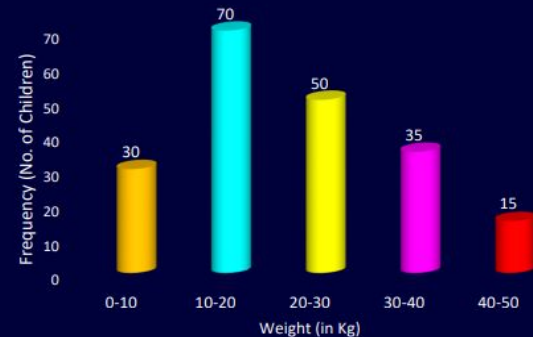— Class Limits, Class Intervals, Class Mid Point/Class Mark
— The Frequency

No. of Children	No. of Families
1	20
2	150
3	15
4	10
5	5

Weight (in Kg)	No. of Children
0-10	30
10-20	70
20-30	50
30-40	35
40-50	15

Frequency Distribution

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Frequency Distribution

Number of classes should be 5 to 15. (But no rigidity / - it may be 15+ Classes)
❑ One should avoid class intervals as 3, 7, 11, 26 etc. Preferable 5 or multiple of 5.
❑ The starting point/Lower limit should be 0 or 5 or multiple of 5

To ensure continuity and get correct intervals, we should adopt 'exclusive' method of classification. (Upper limit is Exclusive)
❑Some times inclusive method is adopted and needs correction

Measures of Central Tendency (Average)
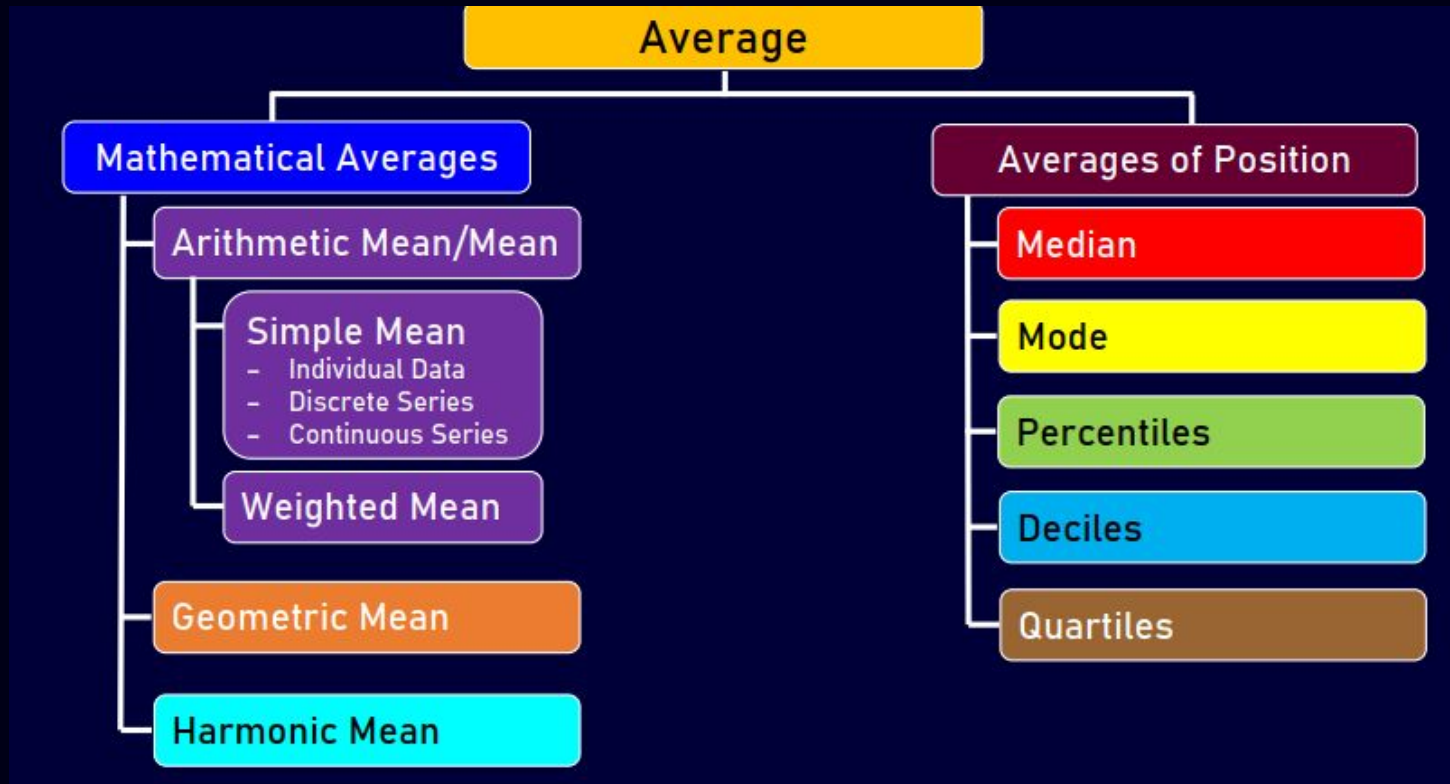
Measures of Central Tendency (Average)

Objectives of Average

- To get a single value that describes the characteristics of entire group.
- To facilitate comparison measures of central value.
- It offer the base for computing other measures like Variation/Dispersion, Skewness, Kurtosis etc.

Measures of Central Tendency (Average)

Arithmetic Mean/Mean (Simple Mean)

	Normal Formula	**Short Cut Method**
Individual Data	$\bar{X} = \dfrac{X_1 + X_2 \ldots + X_n}{N} = \dfrac{\Sigma X}{N}$	$\bar{X} = A + \dfrac{\Sigma d}{N}$ Here, d= (X-A)
Discrete Series	$\bar{X} = \dfrac{\Sigma fX}{N}$	$\bar{X} = A + \dfrac{\Sigma fd}{N}$
Continuous Series	$\bar{X} = \dfrac{\Sigma fm}{N}$	$\bar{X} = A + \dfrac{\Sigma fd}{N}$ here, d=(m-A)

Weighted Mean (Arithmetic Mean)

$$\overline{X_w} = \frac{W_1 X_1 + W_2 X_2 \ldots + W_n X_n}{W_1 + W_2 + \cdots Wn}$$

$$\overline{X_w} = \frac{\Sigma WX}{\Sigma W}$$