Analytics is a scientific process used to examine raw data to draw meaningful and logical conclusions.
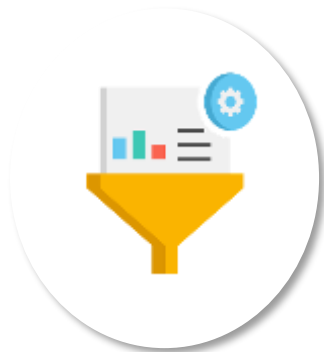
Types of Analytics

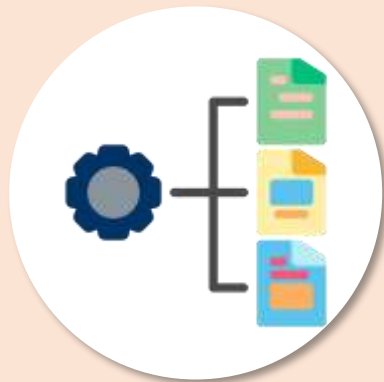|	
Descriptive	Predictive
Diagnostic	Prescriptive

The sort and filter functionalities are available to order or filter the data for further analysis.

Group by and ungroup allow data to group data by collapsing and expanding rows with similar content to create more compact and understandable views.

Formatting helps format the data using different techniques, making the data easy to read and analyze

Functions in Excel

Vlookup	Hlookup	And	If	Not	Rank	Quartile

Logical Functions

If	False	And	Or	Not	True

Lookup and Reference Functions

- If
- False
- And
- Or
- Not

Statistical Function Types

SUMIFS	COUNTIFS
PERCENTILE	QUARTILE
STANDARD DEVIATION	MEDIAN
RANK	MODE

Pivot tables are used to summarize, analyze, explore, and present the data in the form of a table.
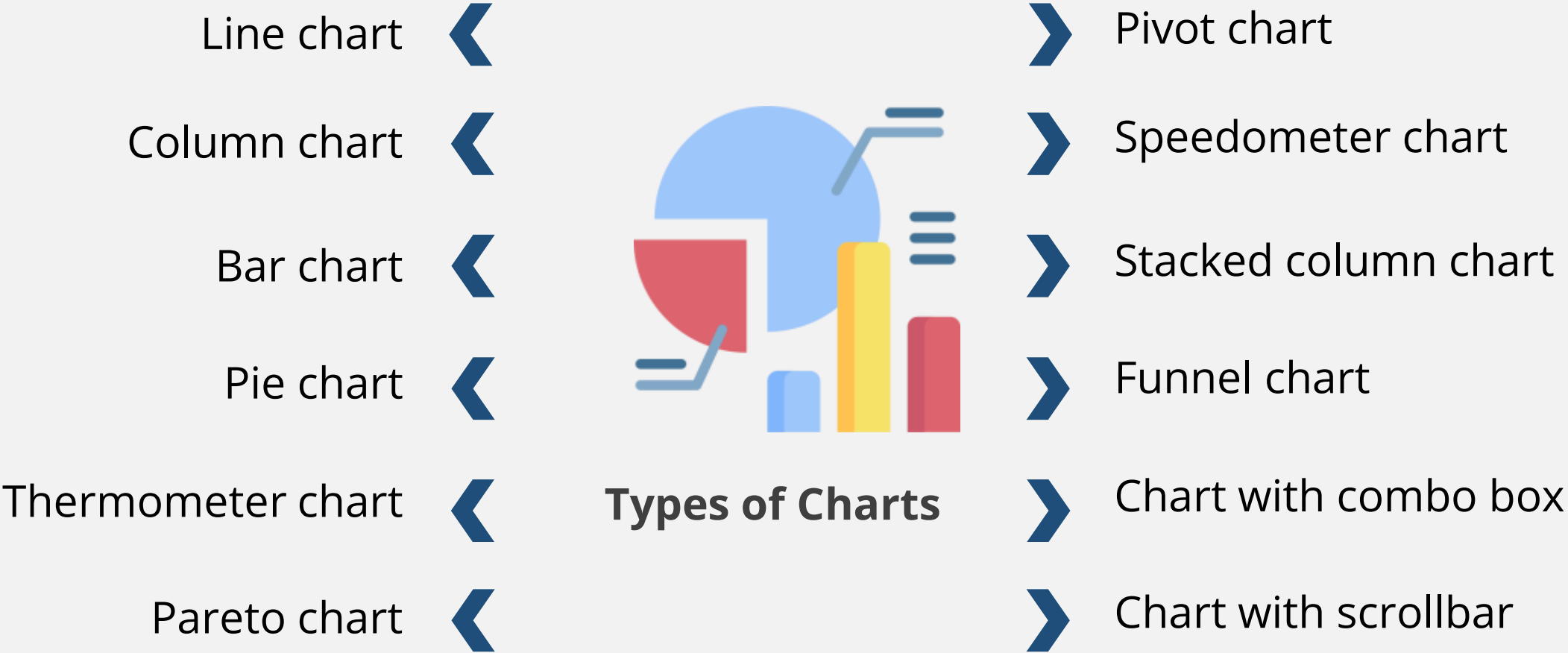
Slicer is a filtering component that allows narrowing down the data and extracting necessary information in the pivot table.

A dashboard is a real-time tool with an easy-to-use user interface that displays data in a graphical format.

Charts represent data graphically, making it easy to analyze comparisons and trends.

Types of Charts

Line chart ❮

Column chart ❮

Bar chart ❮

Pie chart ❮

Thermometer chart ❮

Pareto chart ❮

❯ Pivot chart

❯ Speedometer chart

❯ Stacked column chart

❯ Funnel chart

❯ Chart with combo box

❯ Chart with scrollbar

Form controls are objects that allow one to interact with their data in Excel.

The What-if analysis feature allows one to manipulate data with ease.

What-If Analysis Tools

Goal seek

Data table

Scenario manager

Solver

Descriptive statistics is a data analysis tool that produces a summary of the key statistics for a dataset.

Statistical analysis involves the collection, examination, summarization, manipulation, and interpretation of quantitative data to discover underlying causes, patterns, relationships, and trends.

Statistical Analysis Tools

Analysis TookPak

Correlation

Regression

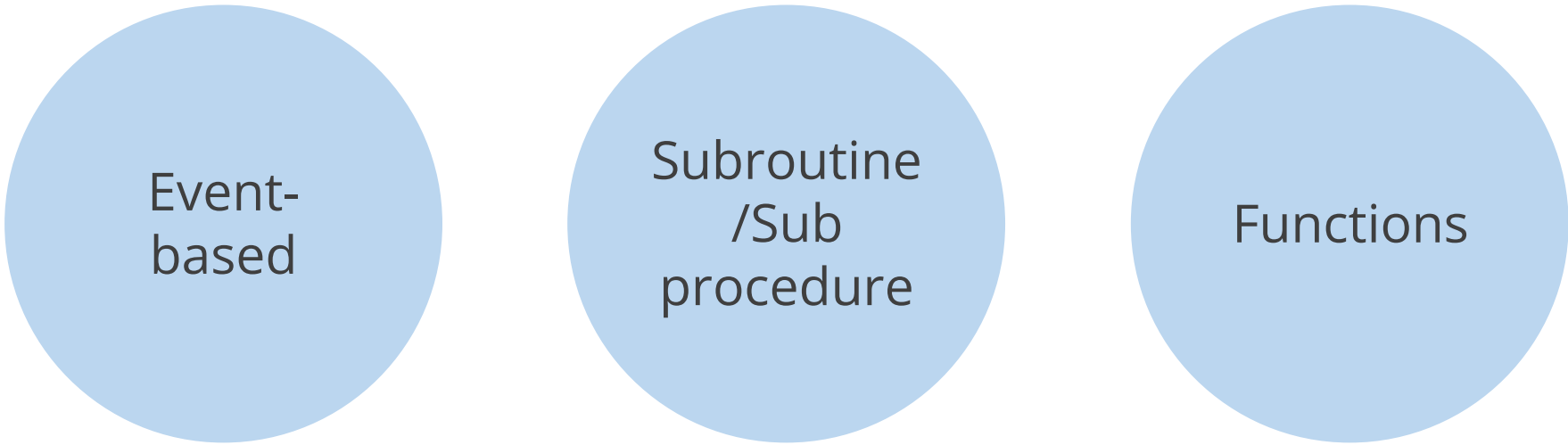Hypothesis testing

ANOVA

t-Test

Covariance
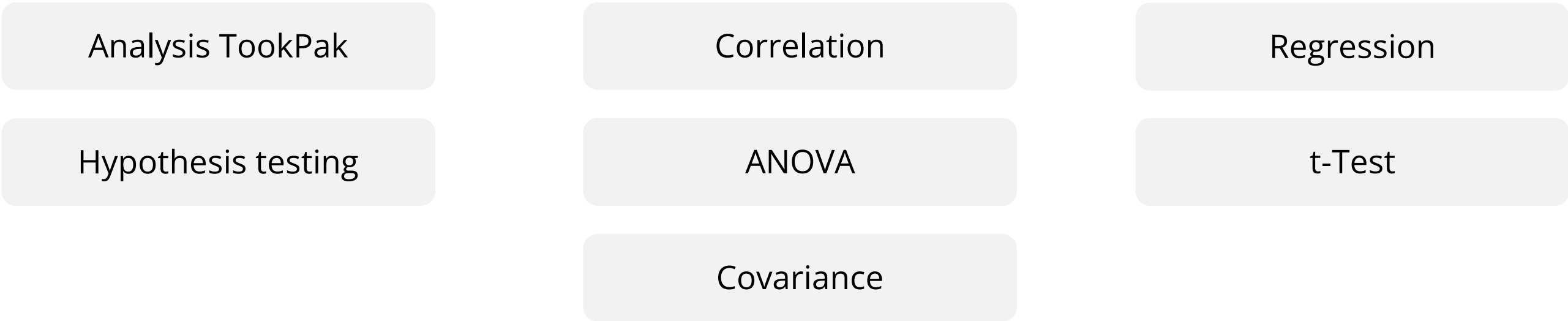
Macros is an important feature in Excel that permits to do VBA programming within the Excel workbook.
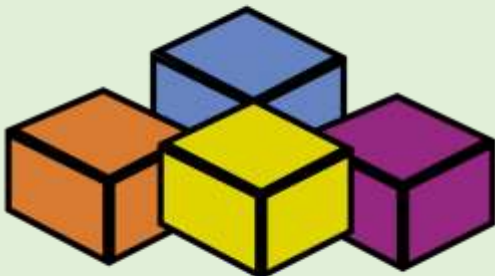
Visual Basic for Applications (VBA) allows a programmable interface to Excel.

Types of Macros

- Event-based
- Subroutine/Sub procedure
- Functions

Mean is defined as the sum of values in a data set divided by the number of values in the data set.

Values of Five Point Summary

- Minimum value
- 25th percentile value (Q1)
- 50th percentile value (Median or Q2)
- 75th percentile value (Q4)
- Maximum value

Simple Linear Regression (SLR)

$$y = function(x)$$

Multiple Linear Regression (MLR)

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_i x_i + e$$

Where:
y: dependent or resultant variable
x1, x2, x3,...,xi: independent variables
β_0: constant term in the equation
β_i: slope coefficients to each independent variable
e: error term

Logistic Regression

$$P(Y=1) = 1 / (1 + e^{-(\beta 0 + \beta 1 x 1 + \beta 2 x 2 + ... + \beta n x n)})$$

Odds of event (E) is defined as the probability of E happening divided by the probability of E not happening.

$$odds(E) = P(E)/1-P(E)$$

Sigmoid Equation

$$P(E) = 1 / (1 + e^{-x})$$

Correlation Coefficient

$$r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

Formulas and Functions Used in Excel

Arithmetic Operations

Addition (`+`): `=A1+B1` adds the values in cells A1 and B1.
Subtraction (`-`): `=A1-B1` subtracts the value in B1 from the value in A1.
Multiplication (`*`): `=A1*B1` multiplies the values in cells A1 and B1.
Division (`/`): `=A1/B1` divides the value in A1 by the value in B1.

SUM: The SUM function adds up a range of cells. For example, `=SUM(A1:A10)` adds up all the numbers in cells A1 through A10.

AVERAGE: The AVERAGE function calculates the average of a range of cells. For example, `=AVERAGE(A1:A10)` calculates the average of the numbers in cells A1 through A10.

COUNT: The COUNT function counts the number of cells in a range that contain numbers. For example, `=COUNT(A1:A10)` counts the number of cells with numbers in cells A1 through A10.

MAX and MIN: The MAX and MIN functions find the highest and lowest numbers in a range, respectively. For example, `=MAX(A1:A10)` finds the highest number and `=MIN(A1:A10)` finds the lowest number in cells A1 through A10.

IF: The IF function performs a logical test and returns one value for a TRUE result, and another for a FALSE result. For example, `=IF(A1>10, "Over 10", "10 or less")` checks if the number in cell A1 is greater than 10, and returns "Over 10" if true, or "10 or less" if false.

VLOOKUP: The VLOOKUP function looks for a certain value in the leftmost column of a table, and then returns a value in the same row from a column you specify. For example, `=VLOOKUP("Apple", A1:C10, 3, FALSE)` looks for "Apple" in cells A1 through A10 and returns the corresponding value from the third column (C1 through C10).

SUMIFS: This function adds up cells that meet multiple conditions. For example, `=SUMIFS(A1:A10, B1:B10, "Apple", C1:C10, ">20")` will add the values in A1:A10 where the corresponding value in B1:B10 is "Apple" and in C1:C10 is greater than 20.

COUNTIFS: This function counts the number of cells in a range that meet multiple conditions. For example, `=COUNTIFS(A1:A10, "Apple", B1:B10, ">20")` will count the instances where "Apple" appears in cells A1:A10 and the corresponding value in B1:B10 is greater than 20.

AVERAGEIFS: This function calculates the average of cells that meet multiple conditions. For example, `=AVERAGEIFS(A1:A10, B1:B10, "Apple", C1:C10, ">20")` will calculate the average of values in A1:A10 where "Apple" is in B1:B10 and the corresponding value in C1:C10 is greater than 20.

IFERROR: This function is used to handle errors in your formulas. For example, `=IFERROR(A1/B1, "Error")` will return "Error" if the division operation (A1 divided by B1) results in an error.

INDEX MATCH: This is a powerful combination used to perform lookups. It is more flexible than VLOOKUP. `=INDEX(B1:B10, MATCH("Apple", A1:A10, 0))` will return the value in B1:B10 where "Apple" appears in A1:A10.

Concatenate: This function combines text from two or more cells into one cell. For example, `=CONCATENATE(A1, " ", B1)` will combine the text in cells A1 and B1 with a space between them.

LEFT, RIGHT, MID: These functions extract a specific number of characters from a text string from the left, right, or middle. For example, `=LEFT(A1, 5)` will give you the first 5 characters from the left in cell A1.

Logical Functions: AND, OR, NOT are logical functions that can be combined with other functions to increase their power. For example, the formula `=IF(AND(A1>10, B1>20), "Yes", "No")` will return "Yes" only if A1 is greater than 10 and B1 is greater than 20; otherwise, it will return "No".