VISVESVARAYA TECHNOLOGICAL UNIVERSITY

JNANASANGAMA, BELAGAVI-590018

Lab Report on

"DATA ANALYTICS WITH EXCEL"

Subject code: BCS358A

3rd sem "CSE:AI AND ML"

Submitted by

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LABORATORY CERTIFICATE

This is to certify that Mr./Ms ***ANKITH K R*** *USN* ***4KV22CI006*** *has satisfactorily completed course of experiments in* ***DATA ANALYTICS WITH EXCEL*** *prescribed by the Visvesvaraya technological University(VTU) for the* ***3rd*** *sem B.E course during the year 2023-24.*

Practical session assessment	
Max. Marks:	***Marks Awarded:***

Signature of staff in charge **Signature of HOD**

Particulars of the experiments performed

SL. NO	DATE	TITLE OF THE EXPERIMENT	PAGE NO	MARKS
1		Getting Started with Excel: Creation of spread sheets, Insertion of rows and columns, Drag & Fill, use of Aggregate functions.	1-2	
2		Working with Data : Importing data, Data Entry & Manipulation, Sorting & Filtering.	3-4	
3		Working with Data: Data Validation, Pivot Tables & Pivot Charts.	5-7	
4		Data Analysis Process: Conditional Formatting, What-If Analysis, Data Tables, Charts & Graphs	8-10	
5		Cleaning Data with Text Functions: use of UPPER and LOWER, TRIM function, Concatenate.	11	
6		Cleaning Data Containing Date and Time Values: use of DATEVALUE function, DATEADD and DATEDIF, TIMEVALUE functions.	12-13	
7		Conditional Formatting: formatting, parsing, and highlighting data in spreadsheets during data analysis.	14-15	
8		Working with Multiple Sheets: work with multiple sheets within a workbook is crucial for organizing and managing data, perform complex calculations and create comprehensive reports.	16-18	
9		Create worksheet with following fields: Empno, Ename, Basic Pay(BP), Travelling Allowance(TA), Dearness Allowance(DA), House Rent Allowance(HRA), Income Tax(IT), Provident Fund(PF), Net Pay(NP). Use appropriate formulas to calculate the above scenario. Analyse the data using appropriate chart and report the data	19-20	
10		Create worksheet on Inventory Management: Sheet should contain Product code, Product name, Product type, MRP, Cost after % of discount, Date of purchase. Use appropriate formulas to calculate the above scenario. Analyse the data using appropriate chart and report the data.	21-22	

11		Create worksheet on Sales analysis of Merchandise Store: data consisting of Order ID, Customer ID, Gender, age, date of order, month, online platform, Category of product, size, quantity, amount, shipping city and other details. Use of formula to segregate different categories and perform a comparative study using pivot tables and different sort of charts	23-26	
12		Generation of report & presentation using Autofilter &macro.	26-29	
		TOTAL MARKS		
		AVERAGE MARKS		

Average marks for conduction and report:	***Test:***	***Viva-voce:***

1. Getting Started with Excel: Creation of spread sheets, Insertion of rows and columns, Drag & Fill, use of Aggregate functions.

1. Creating Spreadsheets

- **Open Excel**: Launch Microsoft Excel on your computer.
- **New Spreadsheet**: Click on "File" and then "New" to create a new spreadsheet. You can also use a template if you prefer.
- **Enter Data**: Click on a cell and start typing to enter data. Press `Enter` or `Tab` to move to the next cell.

2. Inserting Rows and Columns

- **Insert Row**: Right-click on a row number and select "Insert." This adds a new row above the selected row.
- **Insert Column**: Right-click on a column letter and choose "Insert." This adds a new column to the left of the selected column.
- **Shortcut Keys**: Alternatively, use `Ctrl` + `+` (plus key) to insert rows or columns.

3. Drag & Fill

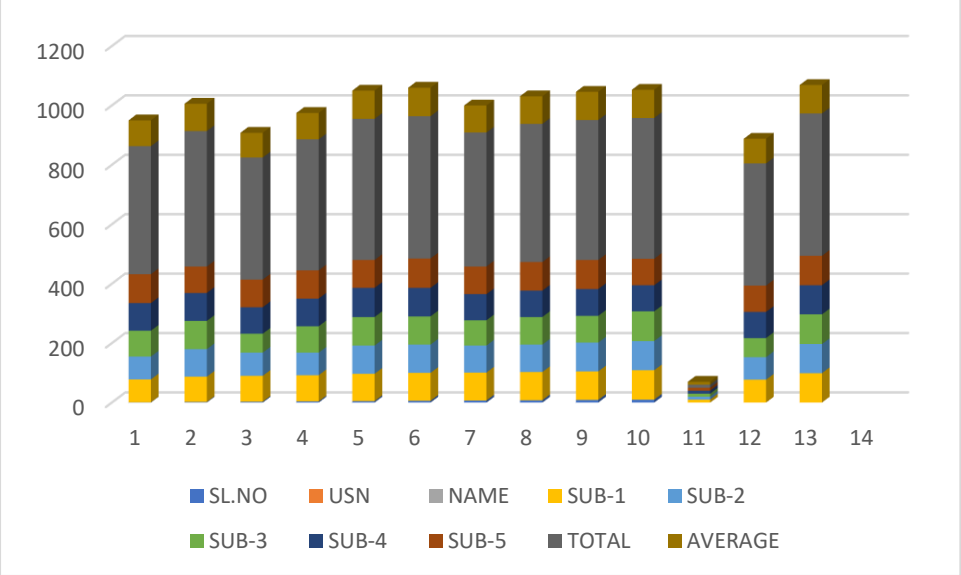
- **Use Autofill Handle**: Enter data in a cell or a series of cells. Then, hover over the bottom right corner of the cell or cell range until you see a small square (the fill handle).
- **Drag to Fill**: Click and drag the fill handle across or down the cells where you want to replicate or extend the data.
- **Auto-Complete Series**: Excel can auto-complete a series like dates, numbers, and even some custom lists.

4. Using Aggregate Functions

- **Basic Functions**: Familiarize yourself with functions like `SUM`, `AVERAGE`, `MIN`, `MAX`, `COUNT`.

- **Formula Bar**: To use a function, click on a cell and type in the formula bar. For example, **=SUM(A1:A10)** adds up the values from A1 to A10.
- **Function Wizard**: Use the "Insert Function" wizard for more complex functions. You can search for functions and get step-by-step guidance on how to use them.

SL.NO	USN	NAME	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5	TOTAL	AVERAGE
1	4KV22CS001	SAGAR	77	77	87	93	97	431	87
2	4KV22CS002	ANKITH	85	93	95	94	89	456	92
3	4KV22CS003	ATHMIK	87	78	64	89	93	411	83
4	4KV22CS004	BABITH	88	76	89	93	95	441	89
5	4KV22CS005	KEERTHAN	92	95	96	98	94	475	95
6	4KV22CS006	CHETAN	94	95	95	96	99	479	96
7	4KV22CS007	HARSHITH	94	91	85	88	93	451	91
8	4KV22CS008	KOWSHIK	95	92	93	89	96	465	93
9	4KV22CS009	KIRAN	96	97	90	90	98	471	95
10	4KV22CS010	SANJAN	99	98	100	88	89	474	95
		COUNT	10	10	10	10	10	10	10
		MIN	77	76	64	88	89	411	83
		MAX	99	98	100	98	99	479	96



2. Working with Data: Importing data, Data Entry & Manipulation, Sorting & Filtering.

1. Importing Data into Excel

- **From Text Files**: Go to `Data` > `Get External Data` > `From Text`. Browse for your text file (CSV, TXT) and follow the import wizard to import the data into Excel.
- **From Other Sources**: Excel allows importing from various sources like other Excel files, databases (SQL, Access), web pages, etc. Use `Data` > `Get External Data`, and select the appropriate source.
- **Copy-Paste Method**: You can also copy data from other sources and paste it directly into an Excel spreadsheet.

2. Data Entry & Manipulation

- **Data Entry**: Click on a cell and start typing to enter data. Use `Tab` to move horizontally and `Enter` to move vertically after entering data in a cell.
- **Fill Handle**: Use the fill handle (small square at the bottom-right corner of a cell) to drag and replicate data or to fill a series.
- **Formulas**: Use formulas for calculations and data manipulation. Start formulas with an equal sign (=) followed by your calculation (e.g., `=A2+B2`).
- **Flash Fill**: Excel's Flash Fill feature (Data > Flash Fill) can automatically fill in data based on a pattern you provide.

3. Sorting Data

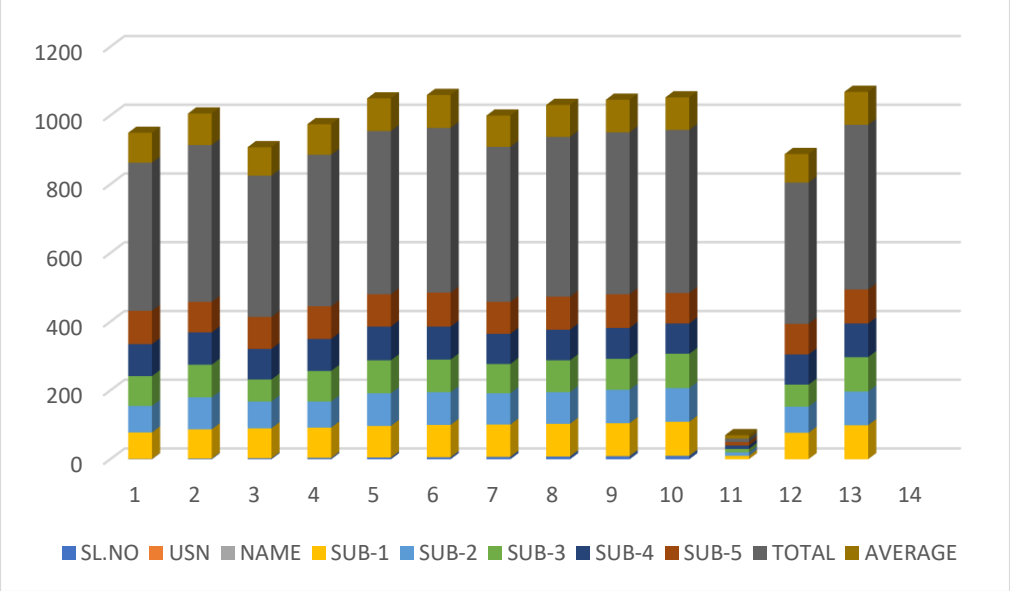
- **Basic Sorting**: Select the data range or column you want to sort. Then go to `Data` > `Sort`. Choose to sort by a specific column and select the sorting order (Ascending or Descending).
- **Custom Sort**: For more complex sorting, use the `Custom Sort` option where you can sort by multiple columns and define specific sorting criteria for each column.

4. Filtering Data

- **Applying Filters**: Click on `Data` > `Filter`. This will add drop-down arrows in the header row of your data set. Click these arrows to filter data based on values, text, dates, or use custom criteria.

- **Advanced Filtering**: For more complex filtering criteria, use the **Advanced Filter** option. This allows for setting up multiple criteria and can also copy filtered data to another location.

SL.NO	USN	NAME	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5	TOTAL	AVERAGE
1	4KV22CS003	ABHINAV	87	78	64	89	93	411	83
2	4KV22CS001	ANKITH	77	77	87	93	97	431	87
3	4KV22CS004	ATHMIK	88	76	89	93	95	441	89
4	4KV22CS007	DARSHAN	94	91	85	88	93	451	91
5	4KV22CS002	SRUJAN	85	93	95	94	89	456	92
6	4KV22CS008	KOWSHIK	95	92	93	89	96	465	93
7	4KV22CS009	KEERTHAN	96	97	90	90	98	471	95
8	4KV22CS010	SURESH	99	98	100	88	89	474	95
9	4KV22CS005	ADARSH	92	95	96	98	94	475	95
10	4KV22CS006	CHETAN	94	95	95	96	99	479	96



3. Working with Data: Data Validation, Pivot Tables & Pivot Charts.

1. Data Validation

Data Validation in Excel is used to control the type of data or the values that users can enter into a cell.

How to Use Data Validation:

- **Select the Cells**: First, select the cells where you want to apply data validation.
- **Set Validation Criteria**: Go to **Data** > **Data Validation**. In the Data Validation dialog box, under the 'Settings' tab, you can specify the criteria. For example, you can choose to allow only:
    - Whole numbers or decimal in a specific range.
    - Dates within a specific range.
    - A list of values (entered manually or referenced from a range on the sheet).
    - Text of a specific length.
- **Input Message and Error Alert**: Optionally, you can provide an input message that appears when the cell is selected, and an error message that appears when someone enters invalid data.

2. Pivot Tables

Pivot Tables are one of Excel's most powerful features, used to quickly summarize large amounts of data.

Creating a Pivot Table:

- **Select Your Data**: Click on any single cell in a data set.
- **Insert Pivot Table**: Go to **Insert** > **PivotTable**. Excel will automatically select the data for the PivotTable.
- **Choose Location**: Decide where you want the PivotTable report to be placed.
- **Arrange Fields**: Drag and drop fields from your dataset into the 'Row Labels', 'Column Labels', 'Values', and 'Filters' areas.
- **Customize and Analyze**: Use the PivotTable Field List to arrange your data, apply filters, and make any adjustments to get the view you need.

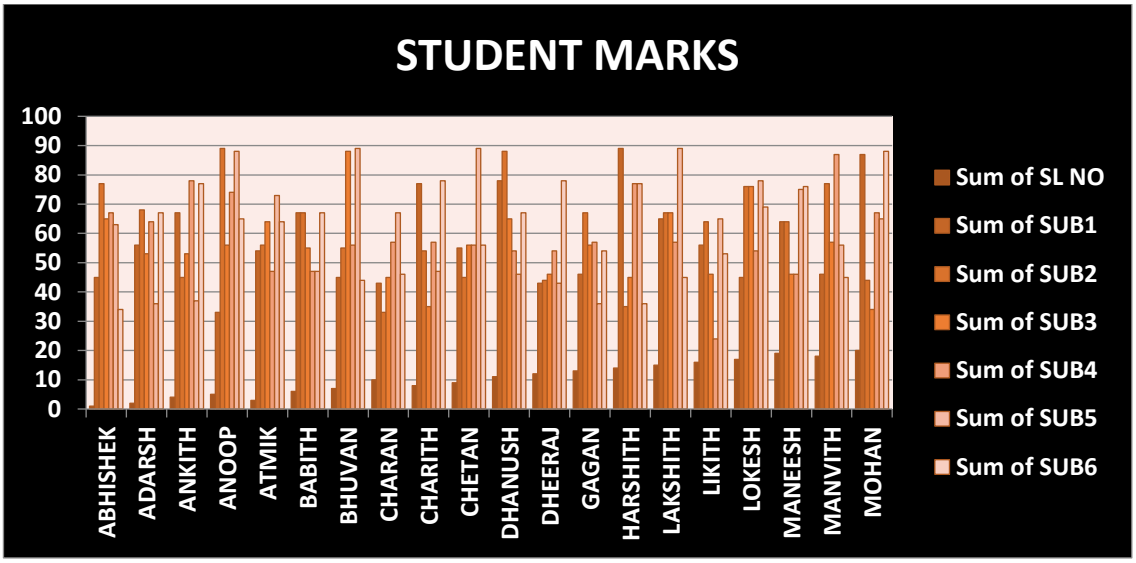
3. Pivot Charts

Pivot Charts are visual representations of Pivot Table data and are useful in making data more understandable.

Creating a Pivot Chart:

- **Create a Pivot Table**: You need a Pivot Table as the basis for a Pivot Chart.
- **Insert Pivot Chart**: With the Pivot Table active, go to **Insert** > **Charts** > **PivotChart**.
- **Choose Chart Type**: Select the type of chart that best fits your data (like Column, Line, Pie, Bar, etc.).
- **Customize the Chart**: After the chart is created, you can customize it by changing its style, layout, and format. You can also filter the chart data using the field buttons on the chart.

Row Labels	Sum of SL NO	Sum of SUB1	Sum of SUB2	Sum of SUB3	Sum of SUB4	Sum of SUB5	Sum of SUB6
ABHISHEK	1	45	77	65	67	63	34
ADARSH	2	56	68	53	64	36	67
ANKITH	4	67	45	53	78	37	77
ANOOP	5	33	89	56	74	88	65
ATMIK	3	54	56	64	47	73	64
BABITH	6	67	67	55	47	47	67
BHUVAN	7	45	55	88	56	89	44
CHARAN	10	43	33	45	57	67	46
CHARITH	8	77	54	35	57	47	78
CHETAN	9	55	45	56	56	89	56
DHANUSH	11	78	88	65	54	46	67
DHEERAJ	12	43	44	46	54	43	78
GAGAN	13	46	67	56	57	36	54
HARSHITH	14	89	35	45	77	77	36
LAKSHITH	15	65	67	67	57	89	45
LIKITH	16	56	64	46	24	65	53
LOKESH	17	45	76	76	54	78	69
MANEESH	19	64	64	46	46	75	76
MANVITH	18	46	77	57	87	56	45
MOHAN	20	87	44	34	67	65	88
Grand Total	**210**	**1161**	**1215**	**1108**	**1180**	**1266**	**1209**



Row Labels	Sum of SUB1	Sum of SUB2	Sum of SUB3	Sum of SUB4	Sum of SUB5	Sum of SUB6	Sum of PROJECT	Sum of SEMINAR	Sum of TOTAL	Sum of AVERAGE
ABHISHEK	45	77	65	67	63	34	57	58	466	58.25
ADARSH	56	68	53	64	36	67	89	58	491	61.375
ANKITH	67	45	53	78	37	77	44	89	490	61.25
ANOOP	33	89	56	74	88	65	76	76	557	69.625
ATMIK	54	56	64	47	73	64	67	58	483	60.375
BABITH	67	67	55	47	47	67	78	67	495	61.875
BHUVAN	45	55	88	56	89	44	78	67	522	65.25
CHARAN	43	33	45	57	67	46	54	90	435	54.375
CHARITH	77	54	35	57	47	78	56	46	450	56.25
CHETAN	55	45	56	56	89	56	33	66	456	57
DHANUSH	78	88	65	54	46	67	77	76	551	68.875
DHEERAJ	43	44	46	54	43	78	45	86	439	54.875
GAGAN	46	67	56	57	36	54	55	86	457	57.125
HARSHITH	89	35	45	77	77	36	68	86	513	64.125
LAKSHITH	65	67	67	57	89	45	56	55	501	62.625
LIKITH	56	64	46	24	65	53	56	77	441	55.125
LOKESH	45	76	76	54	78	69	80	67	545	68.125
MANEESH	64	64	46	46	75	76	45	65	481	60.125
MANVITH	46	77	57	87	56	45	66	64	498	62.25
MOHAN	87	44	34	67	65	88	81	54	520	65
Grand Total	**1161**	**1215**	**1108**	**1180**	**1266**	**1209**	**1261**	**1391**	**9791**	**1223.875**

4. Data Analysis Process: Conditional Formatting, What-If Analysis, Data Tables, Charts & Graphs.

1. Conditional Formatting

Conditional Formatting in Excel allows you to automatically format cells based on their values, making it easier to visualize data trends and exceptions.

How to Use Conditional Formatting:

- **Select the Data**: Highlight the cells or range you want to format.
- **Apply Conditional Formatting**: Go to **Home** > **Conditional Formatting**. Here, you can choose from several options:
    - **Highlight Cell Rules**: For example, highlighting cells that are greater than a certain value.
    - **Top/Bottom Rules**: Such as highlighting the top 10%.
    - **Data Bars or Color Scales**: These add a visual element to your cells, reflecting the value's magnitude.
    - **Icon Sets**: Icons that vary based on the cell value.
- **Create Custom Rules**: Use **New Rule** for more specific or complex criteria.

2. What-If Analysis

What-If Analysis tools in Excel allow you to experiment with your data and analyze different scenarios.

Types of What-If Analysis Tools:

- **Goal Seek**: Adjusts a value in one cell to achieve a desired result in another cell. Useful for backward calculations. Found under **Data** > **What-If Analysis** > **Goal Seek**.
- **Data Tables**: Provides a way to view the results of changing one or two variables in your formulas. Particularly useful for sensitivity analysis.
- **Scenario Manager**: Lets you create and save different groups of input values and switch between these scenarios to view different results.

3. Data Tables

Data Tables are part of the What-If Analysis tools and are used for systematic analysis of various outcomes based on changing input values.

Creating a Data Table:

- **Set Up Your Base Data**: You should have a model or formula set up that you want to analyze.
- **Create the Data Table**: Enter the range of values for the input variables in a row or column near your model.
- **Go to Data > What-If Analysis > Data Table**: Specify the row or column input cell and Excel will calculate the model for each input value.

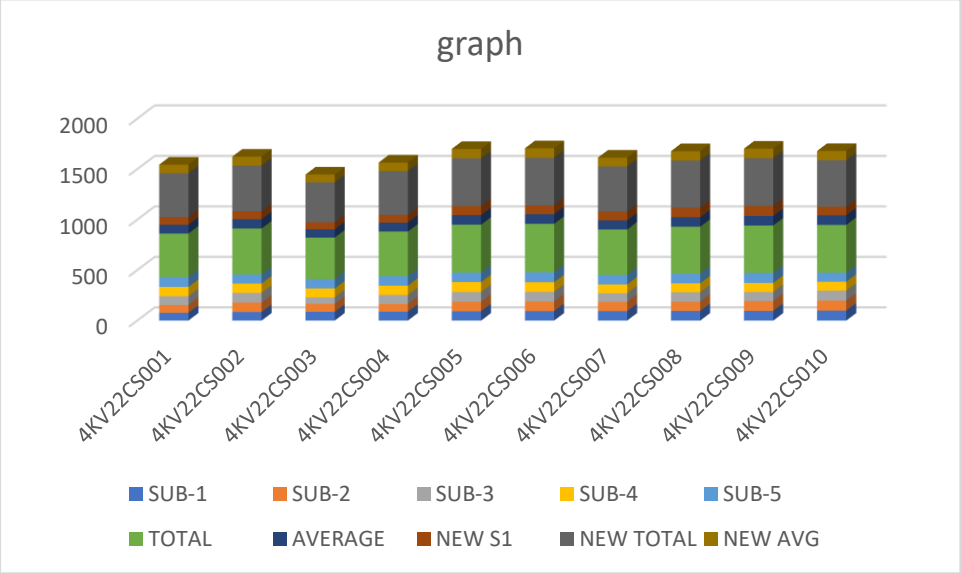
4. Charts & Graphs

Charts and Graphs are essential for visualizing data, making it easier to understand and communicate.

Creating Charts and Graphs:

- **Select Your Data**: Highlight the data that you want to include in the chart.
- **Choose Chart Type**: Go to **Insert** > **Charts**. Select the type of chart that best represents your data (Column, Line, Pie, Bar, etc.).
- **Customize Your Chart**: Add titles, change the chart style, and adjust the layout for clarity and better presentation.

SL.NO	USN	NAME	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5	TOTAL	AVERAGE	NEW S1	NEW TOTAL	NEW AVG
1	4KV22CS001	SAI RAM	77	77	87	93	97	431	86.2	78	432	86.4
2	4KV22CS002	SRUJAN	85	93	95	94	89	456	91.2	80	451	90.2
3	4KV22CS003	NISHMITHA	87	78	64	89	93	411	82.2	70	394	78.8
4	4KV22CS004	DARSHAN	88	76	89	93	95	441	88.2	78	431	86.2
5	4KV22CS005	NIMITHA	92	95	96	98	94	475	95	89	472	94.4
6	4KV22CS006	CHETAN	94	95	95	96	99	479	95.8	87	472	94.4
7	4KV22CS007	HARSHITHA	94	91	85	88	93	451	90.2	88	445	89
8	4KV22CS008	KOWSHIK	95	92	93	89	96	465	93	96	466	93.2
9	4KV22CS009	KEERTHI	96	97	90	90	98	471	94.2	99	474	94.8
10	4KV22CS010	SANJANA	99	98	100	88	89	474	94.8	85	460	92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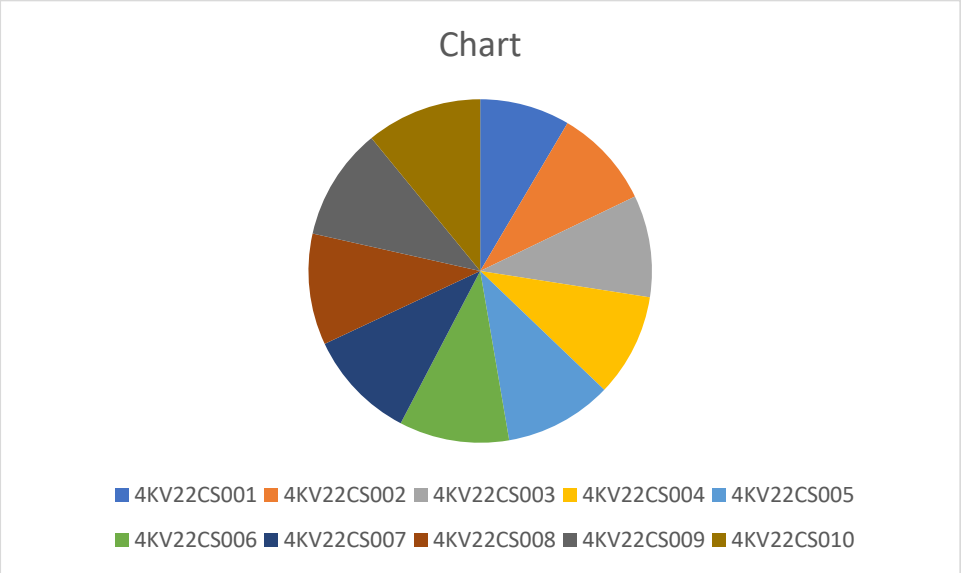
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4KV22CS004
4KV22CS005
4KV22CS006
4KV22CS007
4KV22CS008
4KV22CS009
4KV22CS010

5. Cleaning Data with Text Functions: use of UPPER and LOWER, TRIM function, Concatenate.

1. **UPPER Function**: This function converts all letters in a text string to uppercase. It's useful for standardizing text data, such as names or titles.

   Syntax: **=UPPER(text)**
   Example: If cell A1 has the text "excel Data", **=UPPER(A1)** will return "EXCEL DATA".

2. **LOWER Function**: This function converts all letters in a text string to lowercase. It's used for creating uniformity, especially when data comes from different sources.

   Syntax: **=LOWER(text)**
   Example: If cell A1 has the text "Excel DATA", **=LOWER(A1)** will return "excel data".

3. **TRIM Function**: The TRIM function removes all spaces from text except for single spaces between words. It's useful for cleaning up data that contains irregular spacing, especially data imported from other sources.

   Syntax: **=TRIM(text)**
   Example: If cell A1 has the text " Excel Data ", **=TRIM(A1)** will return "Excel Data" (with single spacing).

4. **CONCATENATE Function** (or **CONCAT** in newer versions of Excel): This function combines two or more text strings into one string. It's useful for merging data from different columns.

   Syntax: **=CONCATENATE(text1, [text2], ...)**
   Example: If cell A1 has "Excel" and cell B1 has "Data", **=CONCATENATE(A1, " ", B1)** will return "Excel Data".

STRING 1	STRING 2	CONCATENATE	TRIM	UPPER	LOWER
kvg College	sulia	kvg Collegesulia	kvg Collegesulia	KVG COLLEGESULIA	kvg collegesulia
my name is	abhinav	my name is abhinav	my name is abhinav	MY NAME IS ABHINAV	my name is abhinav
hello world	java	hello world java	hello world java	HELLO WORLD JAVA	hello world java
string	concanetate	string concanetate	string concanetate	STRING CONCANETATE	string concanetate

6. Cleaning Data Containing Date and Time Values: use of DATEVALUE function, DATEADD and DATEDIF, TIMEVALUE Functions.

1. **DATEVALUE Function**: The DATEVALUE function in Excel is used to convert a date in the form of text to a date serial number that Excel recognizes as a date. The syntax is **DATEVALUE(date_text)**. This is particularly useful when you're dealing with dates that Excel doesn't automatically recognize as date formats.

   Example: **=DATEVALUE("2024-01-31")** would return the serial number for January 31, 2024.

2. **DATEADD Function**: There isn't a DATEADD function in Excel. However, you can perform similar operations using other functions like **EDATE** for adding months to a date or using simple addition for adding days. For adding years, months, or days to a date, you can use the formula **DATE(year, month, day) + number_of_days**.

   Example: **=DATE(2024, 1, 31) + 30** would add 30 days to January 31, 2024.

3. **DATEDIF Function**: The DATEDIF function calculates the difference between two dates. The syntax is **DATEDIF(start_date, end_date, "unit")**, where "unit" is a code that specifies the time unit to use (e.g., "Y" for years, "M" for months, "D" for days).

   Example: **=DATEDIF("2024-01-01", "2024-01-31", "D")** would calculate the number of days between January 1, 2024, and January 31, 2024.

4. **TIMEVALUE Function**: The TIMEVALUE function converts a time in the form of text to a decimal number representing the time in Excel. The syntax is **TIMEVALUE(time_text)**.

   Example: **=TIMEVALUE("13:45:00")** would return the decimal number representing 1:45 PM in Excel.

DATE1	DATE2	DAYS BETWEEN	MONTHS BETWEEN	YEARS BETWEEN
02-01-2004	02-01-2024	7305	240	20
19-02-2005	19-02-2007	730	24	2
06-05-2004	05-07-2006	790	25	2
10-03-2010	25-03-2010	15	0	0
18-10-2003	18-12-2003	61	2	0

DATE TEXT	DATE VALUE	TIME TEXT	TIME VALUE
02-01-2004	37988	9 AM	0.375
19-02-2005	38402	10:30 PM	0.9375
06-05-2004	38113	6:45 AM	0.28125
10-03-2010	40247	7 AM	0.291666667
18-10-2003	37912	5 AM	0.208333333

DATE	ADD 5 DAYS	ADD 5 MONTHS	ADD 5 YEARS
02-01-2004	07-Jan-04	02-06-2004	02-01-2009
19-02-2005	24-Feb-05	19-07-2005	19-02-2010
06-05-2004	11-May-04	06-10-2004	06-05-2009
10-03-2010	15-Mar-10	10-08-2010	10-03-2015
18-10-2003	23-Oct-03	18-03-2004	18-10-2008

7. Conditional Formatting: formatting, parsing, and highlighting data in spreadsheets during data analysis.

Basics of Conditional Formatting

- **What it Does**: Conditional formatting changes the appearance of cells in a spreadsheet based on specific conditions or criteria. For example, you can set rules to change the background color, font color, or apply other formatting styles to cells if they meet certain conditions.
- **Criteria**: You can base conditions on a variety of criteria, such as specific values, text, dates, the outcome of formulas, or even comparison with other cells.

Common Use Cases

1. **Highlighting Cells**: Changing the background or text color of cells based on their values is one of the most common uses. For example, highlighting cells in red if they contain values below a certain threshold.
2. **Data Bars or Color Scales**: These visual aids fill cells with a gradient or bar, reflecting the cell's value in comparison to others in the range. Higher values might get a deeper color or longer bar.
3. **Icon Sets**: Adding icons (like arrows or flags) to cells to represent data categories or value ranges, making it easy to visualize data status or trends.
4. **Duplicate Values**: Identifying and marking duplicate values within a range to easily spot and remove or analyze them.
5. **Top/Bottom Values**: Highlighting the top or bottom N values or percentages in a dataset to focus on outliers or significant data points.

How to Implement Conditional Formatting

While the exact steps can vary slightly between spreadsheet applications (e.g., Microsoft Excel, Google Sheets), the basic process is generally the same:

1. **Select the Range**: First, select the cells or range of cells you want to apply conditional formatting to.
2. **Find Conditional Formatting**: Look for the 'Conditional Formatting' option in the menu. In Excel, it's under the 'Home' tab, and in Google Sheets, it's under 'Format'.

3. **Set the Rule**: Choose the type of rule you want to apply (e.g., greater than, less than, between, equal to, text that contains, date is, etc.). You can also use custom formulas for more complex conditions.
4. **Choose the Formatting**: Select the formatting style (e.g., color fill, text color, data bars) you want to apply when the condition is met.
5. **Apply and Review**: After setting the rule and formatting, apply it to check the results. Adjust the rule or formatting as necessary.

SL.NO	USN	NAME	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5	TOTAL	AVERAGE
1	4KV22CS001	SAI RAM	77	77	87	93	97	431	86.2
2	4KV22CS002	SRUJAN	85	93	95	94	89	456	91.2
3	4KV22CS003	NISHMITHA	87	78	64	89	93	411	82.2
4	4KV22CS004	DARSHAN	88	76	89	93	95	441	88.2
5	4KV22CS005	NIMITHA	92	95	96	98	94	475	95
6	4KV22CS006	CHETAN	94	95	95	96	99	479	95.8
7	4KV22CS007	HARSHITHA	94	91	85	88	93	451	90.2
8	4KV22CS008	KOWSHIK	95	92	93	89	96	465	93
9	4KV22CS009	KEERTHI	96	97	90	90	98	471	94.2
10	4KV22CS010	SANJANA	99	98	100	88	89	474	94.8

8. Working with Multiple Sheets: work with multiple sheets within a workbook is crucial for organizing and managing data, perform complex calculations and create comprehensive reports.

Organizing Data Across Sheets

1. **Logical Grouping**: Use separate sheets to categorize data logically. For example, you might have individual sheets for different types of expenses, months, departments, or geographic regions.
2. **Template Sheets**: Create template sheets for repetitive data structures. This is useful for monthly reports, where each sheet follows the same format but contains different data.

Linking Data Between Sheets

- **Cell References**: You can reference cells on other sheets to perform calculations or aggregate data. For example, `=Sheet2!A1` references cell A1 on Sheet2. This is useful for summarizing data from multiple sheets onto a master sheet.
- **3D References**: In some spreadsheet applications like Excel, you can use 3D references to perform calculations across the same cell or range in multiple sheets. For example, `=SUM(Sheet1:Sheet3!A1)` sums the values in cell A1 across Sheet1, Sheet2, and Sheet3.

Complex Calculations and Data Analysis

- **Pivot Tables**: Use pivot tables to analyze and summarize complex datasets stored across multiple sheets. You might need to consolidate the data into a single range or use external data connections, depending on the application.
- **Lookup Functions**: Functions like `VLOOKUP`, `HLOOKUP`, `INDEX`, and `MATCH` can retrieve and correlate data across sheets. For instance, you can look up a product price on a "Pricing" sheet and use it in a calculation on a "Sales" sheet.

Comprehensive Reporting

- **Dashboard Sheets**: Create dashboard sheets that pull key metrics and summaries from other sheets. Use charts, conditional formatting, and summary statistics to provide at-a-glance insights.
- **Dynamic Charts**: Charts can source data from multiple sheets to visualize trends, comparisons, and patterns in a unified manner.

EmpNo.	Ename	BASIC	DA	HRA	TA	TOTAL
1	SAI RAM	100000	10000	10000	3000	123000
2	SUDEEP	90000	9000	10000	3000	112000
3	KOWSHIK	80000	8000	10000	3000	101000
4	PAVAN	75000	7500	10000	3000	95500
5	NAVEEN	75000	7500	10000	3000	95500
6	ROOPA	80000	8000	10000	3000	101000
7	NIMITHA	80000	8000	10000	3000	101000
8	NIKITHA	70000	7000	10000	3000	90000
9	HARSHA	70000	7000	10000	3000	90000
10	CHETAN	70000	7000	10000	3000	90000

EmpNo.	Ename	BASIC	DA	HRA	TA	TOTAL	INCOME TAX
1	SAI RAM	100000	10000	10000	3000	123000	14760
2	SUDEEP	90000	9000	10000	3000	112000	13440
3	KOWSHIK	80000	8000	10000	3000	101000	12120
4	PAVAN	75000	7500	10000	3000	95500	11460
5	NAVEEN	75000	7500	10000	3000	95500	11460
6	ROOPA	80000	8000	10000	3000	101000	12120
7	NIMITHA	80000	8000	10000	3000	101000	12120
8	NIKITHA	70000	7000	10000	3000	90000	10800
9	HARSHA	70000	7000	10000	3000	90000	10800
10	CHETAN	70000	7000	10000	3000	90000	10800

EmpNo.	Ename	BASIC	DA	HRA	TA	TOTAL	PF
1	SAI RAM	100000	10000	10000	3000	123000	5000
2	SUDEEP	90000	9000	10000	3000	112000	5000
3	KOWSHIK	80000	8000	10000	3000	101000	5000
4	PAVAN	75000	7500	10000	3000	95500	5000
5	NAVEEN	75000	7500	10000	3000	95500	5000
6	ROOPA	80000	8000	10000	3000	101000	5000
7	NIMITHA	80000	8000	10000	3000	101000	5000
8	NIKITHA	70000	7000	10000	3000	90000	5000

9	HARSHA	70000	7000	10000	3000	90000	5000
10	CHETAN	70000	7000	10000	3000	90000	5000

EmpNo.	Ename	BASIC	DA	HRA	TA	TOTAL	LIC
1	SAI RAM	100000	10000	10000	3000	123000	6150
2	SUDEEP	90000	9000	10000	3000	112000	5600
3	KOWSHIK	80000	8000	10000	3000	101000	5050
4	PAVAN	75000	7500	10000	3000	95500	4775
5	NAVEEN	75000	7500	10000	3000	95500	4775
6	ROOPA	80000	8000	10000	3000	101000	5050
7	NIMITHA	80000	8000	10000	3000	101000	5050
8	NIKITHA	70000	7000	10000	3000	90000	4500
9	HARSHA	70000	7000	10000	3000	90000	4500
10	CHETAN	70000	7000	10000	3000	90000	4500

EmpNo.	Ename	BASIC	DA	HRA	TA	TOTAL	NET
1	SAI RAM	100000	10000	10000	3000	123000	97090
2	SUDEEP	90000	9000	10000	3000	112000	87960
3	KOWSHIK	80000	8000	10000	3000	101000	78830
4	PAVAN	75000	7500	10000	3000	95500	74265
5	NAVEEN	75000	7500	10000	3000	95500	74265
6	ROOPA	80000	8000	10000	3000	101000	78830
7	NIMITHA	80000	8000	10000	3000	101000	78830
8	NIKITHA	70000	7000	10000	3000	90000	69700
9	HARSHA	70000	7000	10000	3000	90000	69700
10	CHETAN	70000	7000	10000	3000	90000	69700

9. Create worksheet with following fields: Empno, Ename, Basic Pay(BP), Travelling Allowance(TA), Dearness Allowance(DA), House Rent Allowance(HRA), Income Tax(IT), Provident Fund(PF), Net Pay(NP). Use appropriate formulas to calculate the above scenario. Analyse the data using appropriate chart and report the data.

Fields and Formulas

1. **Empno**: Employee number, a unique identifier for each employee.
2. **Ename**: Employee name.
3. **Basic Pay (BP)**: The base salary for an employee. This is usually a fixed amount.
4. **Travelling Allowance (TA)**: Often calculated as a percentage of BP or a fixed amount.
5. **Dearness Allowance (DA)**: Typically a percentage of BP, intended to offset the impact of inflation.
6. **House Rent Allowance (HRA)**: Usually a percentage of BP, varies by location (urban vs rural).
7. **Income Tax (IT)**: Calculated based on total income and tax slabs. This requires a more complex formula that considers tax rates at different income levels.
8. **Provident Fund (PF)**: Generally a fixed percentage of BP, deducted at source.
9. **Net Pay (NP)**: Calculated as **BP + TA + DA + HRA - IT - PF**.

Sample Calculations

Let's assume the following percentages for simplicity (these should be adjusted according to actual policies):

- **TA**: 10% of BP
- **DA**: 15% of BP
- **HRA**: 20% of BP
- **PF**: 12% of BP
- Income Tax (IT) calculation will be skipped here due to its complexity and variability.

Given these, the formulas in the spreadsheet context (assuming the first employee's data starts in row 2) would look like this:

- **TA**: **=B2*10%**
- **DA**: **=B2*15%**

- **HRA**: =B2*20%
- **PF**: =B2*12%
- **NP**: =B2 + (B2*10%) + (B2*15%) + (B2*20%) - (Calculated IT) - (B2*12%)

Implementing in a Spreadsheet

1. Enter the employee details and basic pay in the respective columns from **A2** (Empno) to **C2** (BP).
2. Fill in the formulas for TA, DA, HRA, and PF in columns D, E, F, and H, respectively, starting from row 2.
3. Calculate IT based on your region's tax slabs and include it in column G.
4. Use the formula for NP in column I starting from row 2.

Empno	Ename	Basic Pay (BP)	Travelling Allowance (TA)	Dearness Allowance (DA)	House Rent Allowance (HRA)	Income Tax (IT)	Provident Fund (PF)	Net Pay (NP)
1	John Doe	50,000	5000	7500	10000	5,000	6000	61,500
2	Jane Smith	55,000	5500	8250	11000	5,000	6600	68,150
3	Alex Johnson	60,000	6000	9000	12000	5,000	7200	74,800
4	Smith	70,000	7000	10500	14000	5,000	8400	88,100
5	David	85,000	8500	12750	17000	5,000	10200	1,08,050

10. Create worksheet on Inventory Management: Sheet should contain Product code, Product name, Product type, MRP, Cost after % of discount, Date of purchase. Use appropriate formulas to calculate the above scenario. Analyse the data using appropriate chart and report the data.

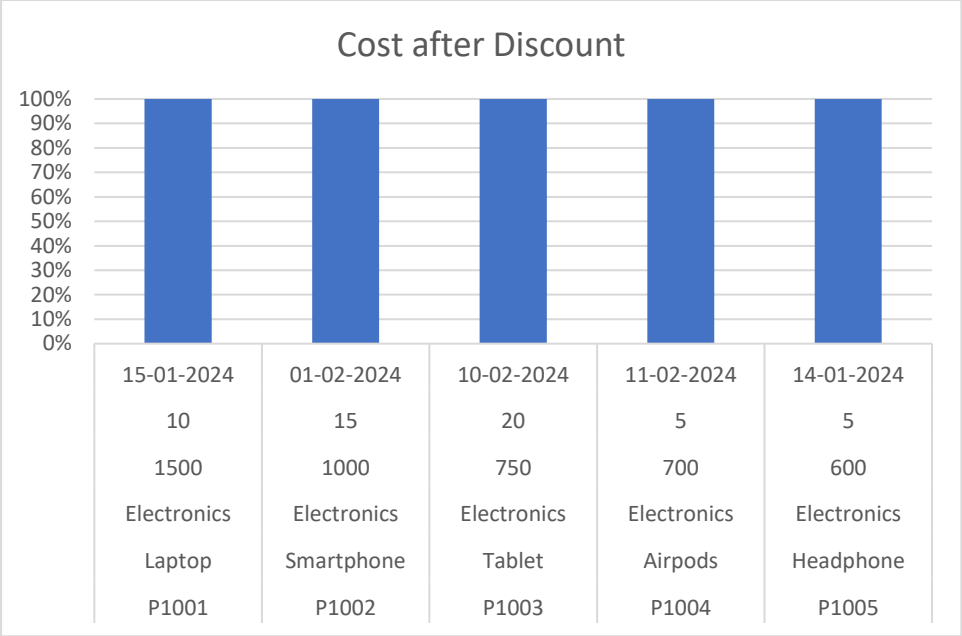
1. **Trend Analysis**: Look at the cost after discount over time to see if there's a trend in pricing changes or discount strategies.
2. **Product Type Analysis**: Since all products are from the Electronics category in this example, you could expand this by adding more product types and analyzing sales or stock levels by category.
3. **Discount Impact**: Analyze how different discount levels affect the final selling price and potentially, the sales volume.

Creating a Chart for Analysis

A simple chart that could provide insights might be a bar chart showing the MRP and Cost after Discount for each product. This visual comparison can quickly highlight the impact of discounts on pricing.

1. **Data Selection**: Select the data including Product Name, MRP, and Cost after Discount.
2. **Chart Type**: Use a grouped bar chart to represent each product's MRP and Cost after Discount side by side.

Product Code	Product Name	Product Type	MRP	Discount (%)	Date of Purchase	Cost after Discount
P1001	Laptop	Electronics	1500	10	15-01-2024	1350
P1002	Smartphone	Electronics	1000	15	01-02-2024	850
P1003	Tablet	Electronics	750	20	10-02-2024	600
P1004	Airpods	Electronics	700	5	11-02-2024	665
P1005	Headphone	Electronics	600	5	14-01-2024	570


Cost after Discount
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
15-01-2024
10
1500
Electronics
Laptop
P1001
01-02-2024
15
1000
Electronics
Smartphone
P1002
10-02-2024
20
750
Electronics
Tablet
P1003
11-02-2024
5
700
Electronics
Airpods
P1004
14-01-2024
5
600
Electronics
Headphone
P1005

11.Create worksheet on Sales analysis of Merchandise Store: data consisting of Order ID, Customer ID, Gender, age, date of order, month, online platform, Category of product, size, quantity, amount, shipping city and other details. Use of formula to segregate different categories and perform a comparative study using pivot tables and different sort of charts.

Step 1: Setting Up the Data Structure

Start by creating a table in Excel with the following columns to record each sale:

1. **Order ID**
2. **Customer ID**
3. **Gender**
4. **Age**
5. **Date of Order**
6. **Month** (This can be derived from the Date of Order)
7. **Online Platform**
8. **Category of Product**
9. **Size**
10. **Quantity**
11. **Amount** (Total amount for the order)
12. **Shipping City**

Step 2: Populating the Data

Enter your sales data into this table. Each row should represent a unique order.

Step 3: Using Formulas

- **Month Calculation**: If your Date of Order is in column E, use the formula `=TEXT(E2, "mmmm")` to extract the month name into the Month column.
- **Category Segregation**: You can use PivotTables (explained below) to segregate and analyze data by categories, so no immediate formula is needed for segregation here.

Step 4: Creating a Pivot Table for Comparative Study

1. **Select your data range** and go to `Insert` > `PivotTable`.
2. **Choose what to analyze**: Place "Category of Product" in the Rows area, "Month" in the Columns area, and "Amount" in the Values area. This setup helps analyze sales by product category across different months.

3. You can also add "Gender", "Age", or "Online Platform" to the Rows area to further break down the sales data.

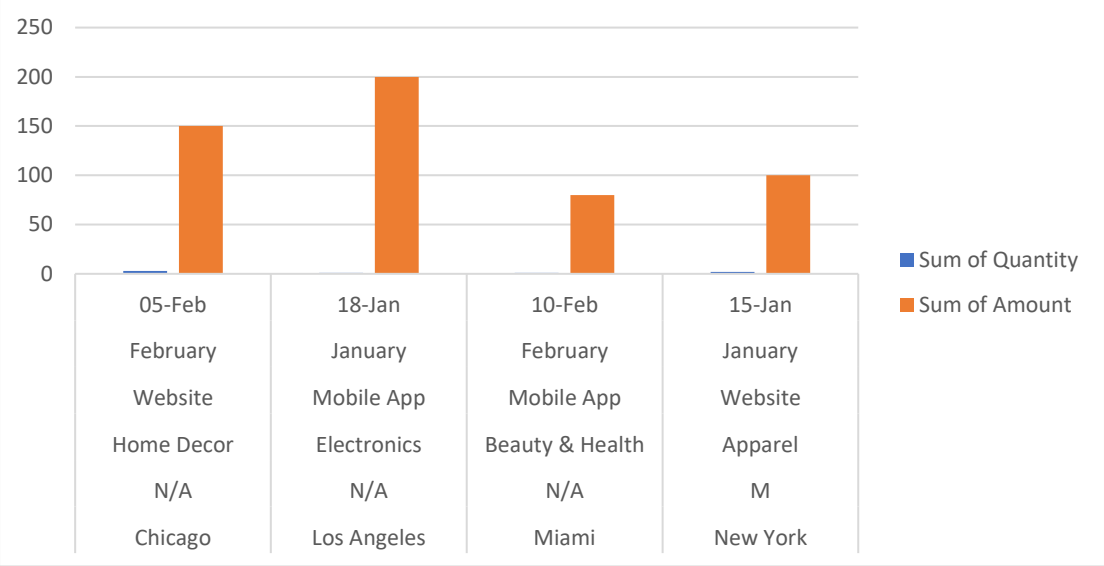
Step 5: Using Pivot Charts for Visualization

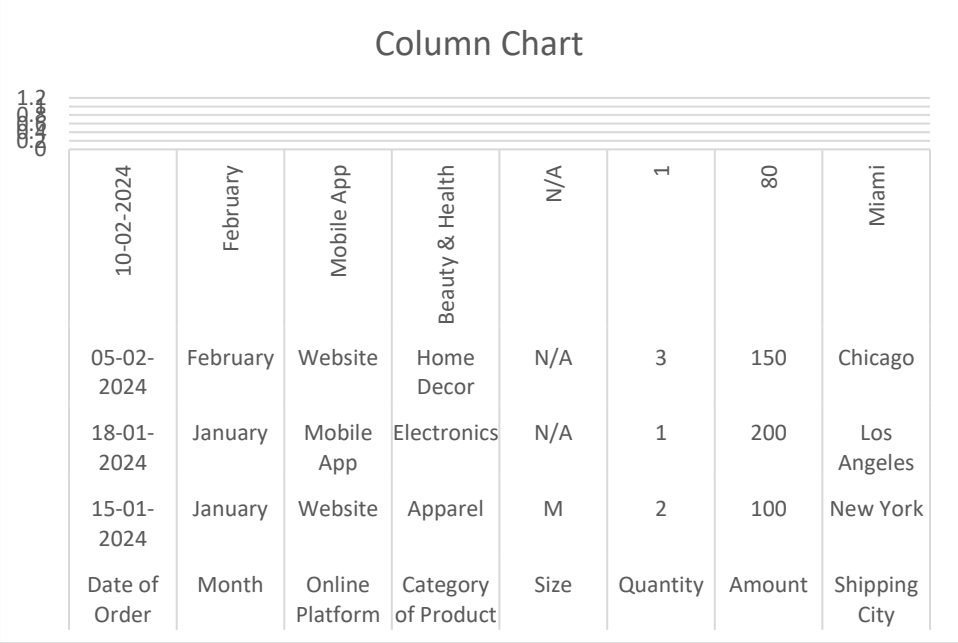
1. With your PivotTable selected, go to **PivotTable Analyze** > **PivotChart** to select a chart type that best suits your analysis.
2. **Column Charts** are great for comparing sales across categories.
3. **Line Charts** can illustrate sales trends over months.
4. **Pie Charts** can show the distribution of sales by category, gender, or online platform.

Customer ID	Gender	Age	Date of Order	Month	Online Platform	Category of Product	Size	Quantity	Amount	Shipping City
C1001	M	28	15-01-2024	January	Website	Apparel	M	2	100	New York
C1002	F	32	18-01-2024	January	Mobile App	Electronics	N/A	1	200	Los Angeles
C1003	M	24	05-02-2024	February	Website	Home Decor	N/A	3	150	Chicago
C1004	F	29	10-02-2024	February	Mobile App	Beauty & Health	N/A	1	80	Miami

Row Labels	Sum of Order ID	Sum of Age	Sum of Quantity	Sum of Amount
C1001	**1**	**28**	**2**	**100**
M	**1**	**28**	**2**	**100**
Jan	1	28	2	100
C1002	**2**	**32**	**1**	**200**
F	**2**	**32**	**1**	**200**
Jan	2	32	1	200
C1003	**3**	**24**	**3**	**150**
M	**3**	**24**	**3**	**150**
Feb	3	24	3	150
C1004	**4**	**29**	**1**	**80**
F	**4**	**29**	**1**	**80**
Feb	4	29	1	80
(blank)				
(blank)				
<15-01-2024				

Grand Total	**10**	**113**	**7**	**530**





12. Generation of report & presentation using Auto-filter &macro.

1. **Apply AutoFilter**:
   - Click on any cell within your dataset.
   - Go to the **Data** tab and click on **Filter**. This will add dropdown arrows to each column header, allowing you to filter the data.
2. **Filter Data**:
   - Click on the dropdown arrow in the column header to see filtering options.
   - Choose your criteria (e.g., specific values, ranges, or conditions) to view only the rows that meet those criteria.
3. **Analyze Filtered Data**:
   - With data filtered, you can perform analysis, create charts, or summarize findings directly from the filtered dataset.

Automating Report Generation with Macros

Macros in Excel can automate tasks by recording a sequence of actions. For report generation, you might create a macro to apply filters, perform calculations, and generate charts automatically.

1. **Enable Developer Tab**:
   - Go to **File** > **Options** > **Customize Ribbon**, and check the **Developer** checkbox.
2. **Record a Macro**:
   - On the **Developer** tab, click **Record Macro**.

- Assign a name to the macro, specify a shortcut key if desired, and click **OK**.
- Perform the actions you want to automate, such as applying filters, copying data to a report template, or creating charts.
- Click **Stop Recording** when done.

3. **Run the Macro**:
   - Execute the macro by pressing the assigned shortcut key or by going to the **Developer** tab, clicking **Macros**, selecting your macro, and clicking **Run**.

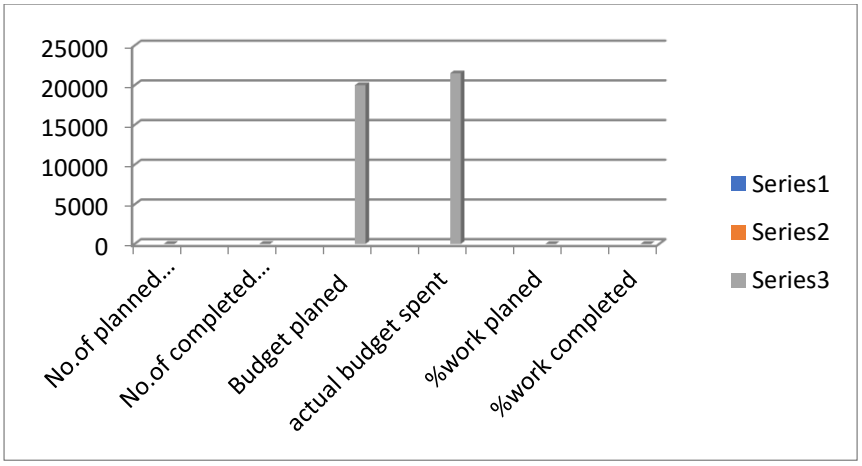
Preparing Presentations with Macros

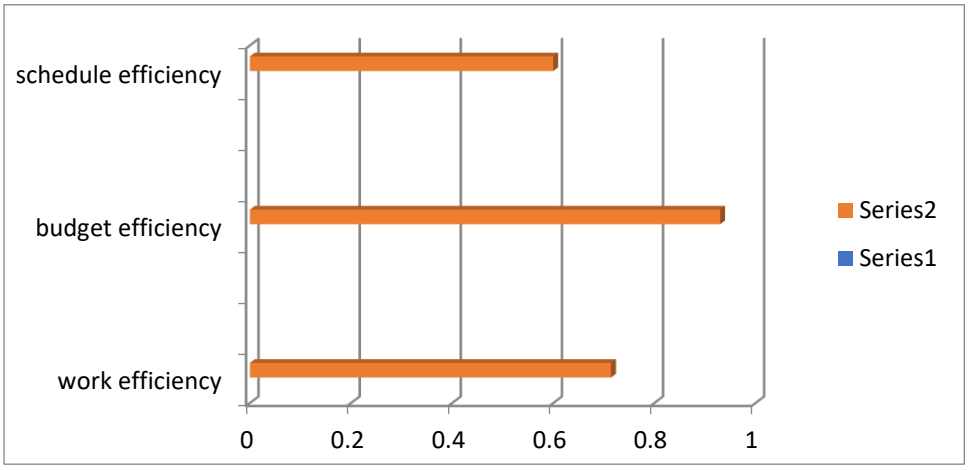
For presentations, you might use macros to format data into a presentation-friendly format, such as creating summary tables or charts that can be easily copied into PowerPoint slides.

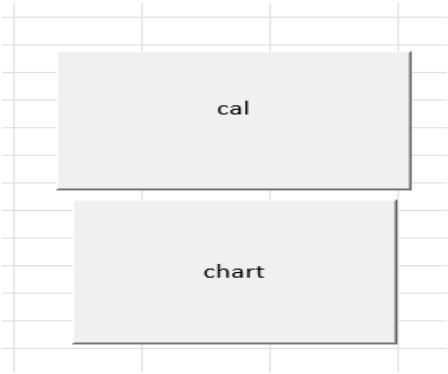
1. **Create a Presentation Macro**:
   - Record a macro that formats your data, creates summary tables, and generates charts tailored for presentation.
   - Consider automating the setup of a dashboard-like summary sheet that can be directly referenced during presentations.

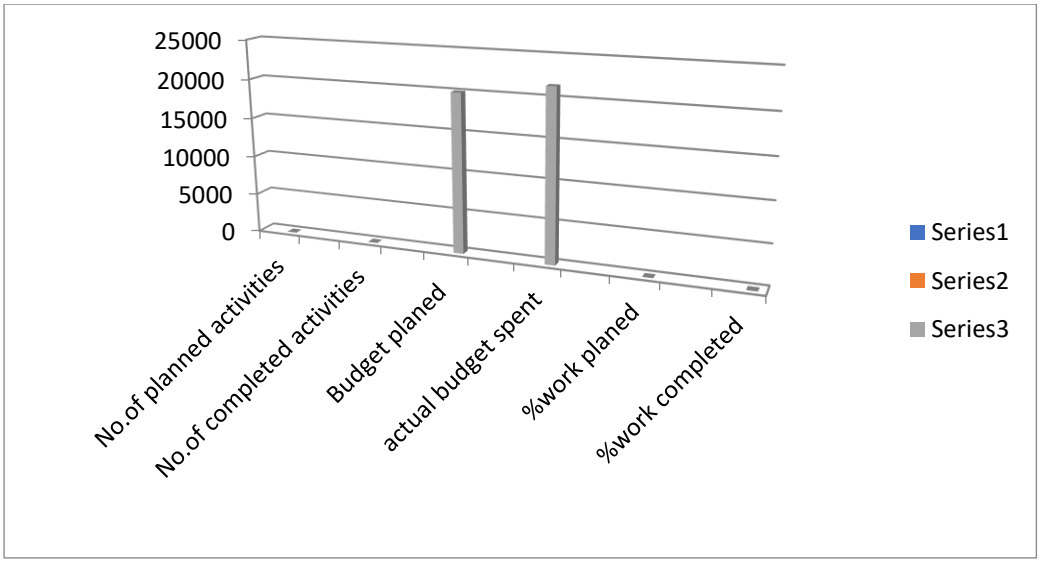
No.of planned activities	7
No.of completed activities	5
Budget planed	20000
actual budget spent	21500
%work planed	5%
%work completed	3%

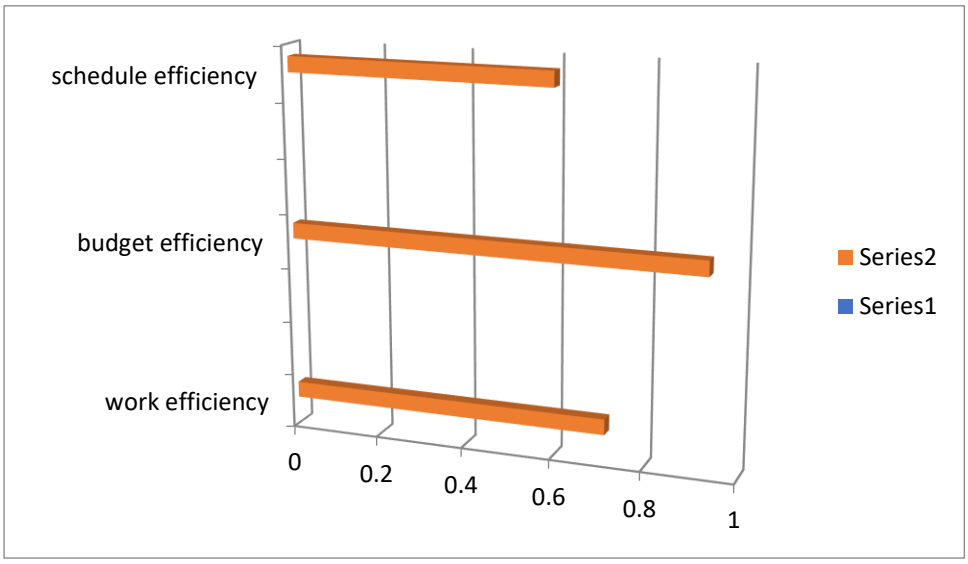
work efficiency	71%
budget efficiency	93%
schedule efficiency	60%


25000
20000
15000
10000
5000
0
No.of planned...
No.of completed...
Budget planed
actual budget spent
%work planed
%work completed
Series1
Series2
Series3


schedule efficiency
budget efficiency
work efficiency
0
0.2
0.4
0.6
0.8
1
Series2
Series1


cal
chart


25000
20000
15000
10000
5000
0
No.of planned activities
No.of completed activities
Budget planed
actual budget spent
%work planed
%work completed
Series1
Series2
Series3


schedule efficiency
budget efficiency
work efficiency
0
0.2
0.4
0.6
0.8
1
Series2
Series1