

**ACHARYA INSTITUTE OF TECHNOLOGY**  
**Acharya Dr. Sarvepalli Radhakrishnan Road, Soladevanahalli,**  
**Bengaluru, Karnataka 560107**

*(Affiliated to VTU, Jnana Sangama, Belagavi)*

**Department of Computer Science and Engineering (Data Science)**

**Data Analytics with Excel Laboratory**

B.E - III Semester, Computer Science and Engineering (Data Science)

[As per Choice Based Credit System (CBCS) scheme]

**Subject Code - BCS358A**



**Lab Manual – 2024-25**

Name : \_\_\_\_\_

USN: \_\_\_\_\_

Branch: \_\_\_\_\_ Section: \_\_\_\_\_

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**Prepared By:**

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Head of Department of AIML & Computer Science and Engineering ( Data Science ),  
AIT, Acharya, Bangalore -107

## ACHARYA INSTITUTE OF TECHNOLOGY MOTTO

*"Nurturing Aspirations Supporting Growth"*

### VISION

*"Acharya Institute of Technology, committed to the cause of sustainable value-based education in all disciplines, envisions itself as a global fountainhead of innovative human enterprise, with inspirational initiatives for Academic Excellence".*

### MISSION

*"Acharya Institute of Technology strives to provide excellent academic ambiance to the students for achieving global standards of technical education, foster intellectual and personal development, meaningful research and ethical service to sustainable societal needs."*

## Department of Computer Science and Engineering (Data Science)

### VISION

*To be recognized as the leader in the field of Artificial Intelligence and Machine Learning by nurturing and producing quality next-generation academicians and researchers with human values, who are creative, innovative, and versatile in this fast-growing field.*

### MISSION

*The Department of Artificial Intelligence and Machine Learning (AI and ML) @ Acharya Institute of Technology's mission is to produce quality students with a sound understanding of the fundamentals of the theory and practice of Artificial Intelligence and Machine Learning. The mission is also to enable students to be leaders in the industry and academia nationally and internationally. Finally, the mission is to meet the strong demands of the nation in the areas of Artificial Intelligence and Machine Learning.*

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## PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

**PEO1:** Students shall have a successful professional career in industry, academia, R & D organization or entrepreneur in specialized fields of Computer Science and Engineering (Data Science) and allied disciplines.

**PEO2:** Students shall be competent, creative and valued professionals in the chosen field.

**PEO3:** Engage in life-long learning and professional development.

**PEO4:** Become effective global collaborators, leading or participating to address technical, business, environmental and societal challenges.

## PROGRAM OUTCOMES (POs)

**PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to

assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**O9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

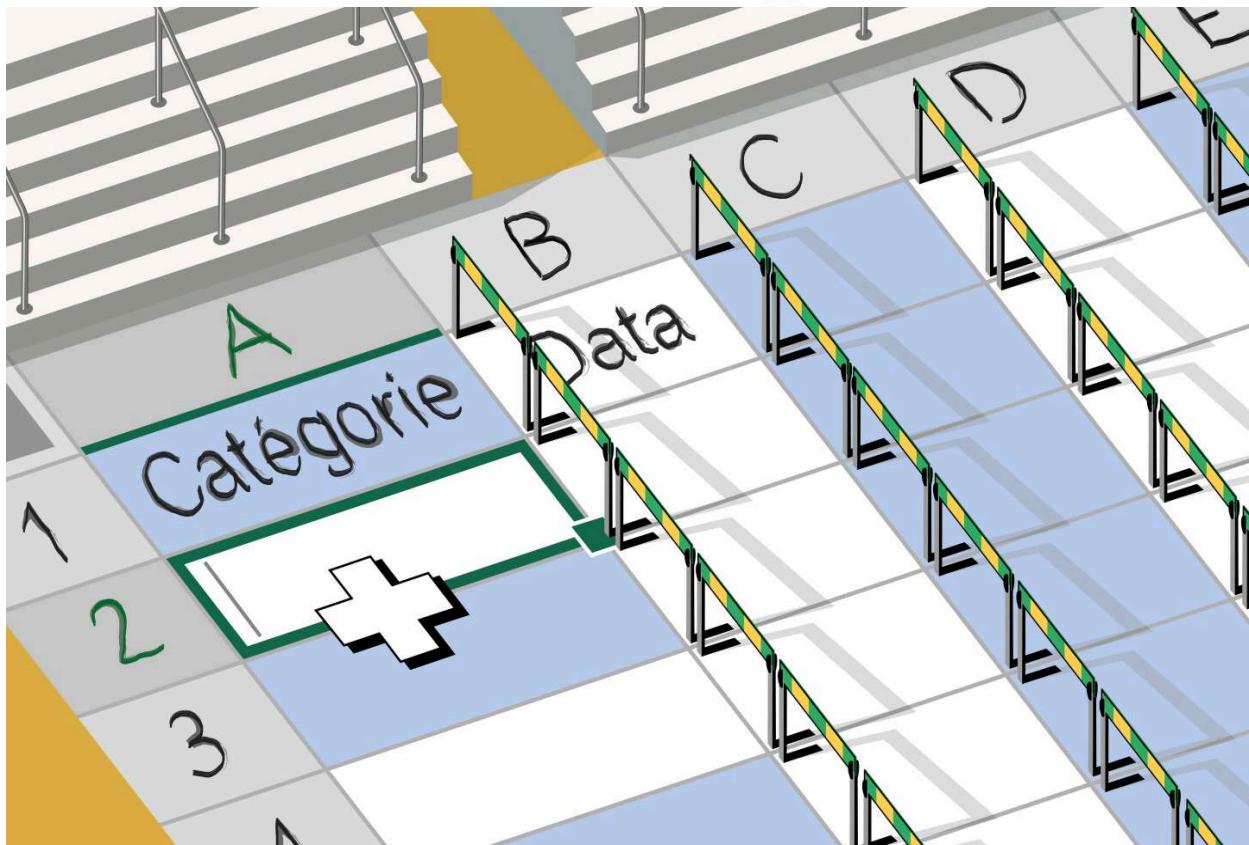
**PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## PROGRAM SPECIFIC OUTCOMES (PSOs)

Course Outcomes:		RBT Level
<b>After the completion of the course, Students will be able to:</b>		
CO1	• Use advanced functions and productivity tools to assist in developing worksheets.	L3
CO2	• Manipulate data lists using Outline and PivotTables.	L3
CO3	• Use Consolidation to summarize and report results from multiple worksheets.	L3
CO4	• Apply Macros and Autofilter to solve the given real world scenario.	L3

## Table of Contents

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**A) Course Details****i) Course Details:**

Course Title	Course Code	Core/Elective	Semester	Academic Year
<b>DATA ANALYTICS WITH EXCEL</b>	BCS358A	AEC	III A(DS)	2024-25

Contact Hours/week	Lecture	Tutorials	Practical
2	0	-	2

**ii) Course Administrator/Coordinator Details:**

DETAILS OF THE FACULTY CO-ORDINATORS/COURSE ADMINISTRATORS			
S.N	NAME OF THE FACULTY	DESIGNATION	DEPARTMENT
1.	Mr. Mohammad Tahir Mirji	Assistant Professor	CS(DS)

**iii) Course Related Specific details:**

List Of Prerequisites:	
1.	Basics of computer operations, Basics of mathematics

**v) Softwares to be used**

Softwares to be used:
MS Office/OpenOffice/Sheets

**vi. CO-PO-PSO Mapping:****Course Outcomes - Program Outcomes - Program Specific Outcomes mapping:**

COs	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	-	2	-	3	-	-	-	-	-	-	-	-	-	3
CO-2	3	-	2	-	3	-	-	-	-	-	-	-	-	-	3
CO-3	3	-	2	-	3	-	-	-	2	-	-	-	-	-	3
CO-4	3	-	2	-	3	-	-	-	-	-	-	2	-	-	3
CO-5	3	-	2	-	3	-	-	-	-	-	-	-	-	-	3

**vii. Course Outcomes/Program Outcomes assessment methods:****Course Assessment Procedure:**

Procedure for Internal Assessment : 2-IA-Tests + Records+Attendance

Maximum Marks for Internal Assessment : 50-Marks

Maximum Marks for Final Exam : 50-Marks

Assessment Tools			Weightage	Frequency	Responsibility
Direct Assessment	Continuous Internal Evaluation (CIE)	Lab Internal Assessment	50%	Twice in a semester	Department level
	Semester End Exam (SEE)		50%	Once in a semester	Department level

Course Outcome Attainment Computation

Marks scored by students	1% to 55%	56 % to 80 %	81% to 100%
Weightage	1	2	3

Target attainment = 75%

**viii) Do's and Don'ts in the lab****DO'S**

1. Please leave footwear outside the laboratory at the designated place.
2. Please keep your belongings such as bags in the designated place.
3. Turn off the respective systems and arrange the chairs before you leaving the laboratory.
4. Maintain Silence and Discipline inside the laboratory.
5. Wear your ID card & Carry observation and record while coming to the laboratory.

**DON'TS**

1. Don't use mobile cell phones during lab hours.
2. Do not eat food, chew gum in the laboratory.
3. Do not install, uninstall or alter any software on the computer.
4. Students are not allowed to work in a laboratory alone or without the presence of faculty or instructor.
5. Do not move any equipment from its original position.
6. We are not responsible for any belongings left behind.
7. Do not enter the laboratory without permission.

## B. Syllabus

<b>Data Analytics with Excel</b>		Semester	<b>3</b>
Course Code	<b>BCS358A</b>	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks	50
Credits	01	Exam Hours	100
Examination type (SEE)	Practical		

Course objectives:

- To Apply analysis techniques to datasets in Excel
- Learn how to use Pivot Tables and Pivot Charts to streamline your workflow in Excel
- Understand and Identify the principles of data analysis
- Become adept at using Excel functions and techniques for analysis
- Build presentation ready dashboards in Excel

<b>SL.NO</b>	<b>Experiments</b>
1	<b>Getting Started with Excel:</b> Creation of spread sheets, Insertion of rows and columns, Drag & Fill, use of Aggregate functions.
2	<b>Working with Data :</b> Importing data, Data Entry & Manipulation, Sorting & Filtering.
3	<b>Working with Data:</b> Data Validation, Pivot Tables & Pivot Charts.
4	<b>Data Analysis Process:</b> Conditional Formatting, What-If Analysis, Data Tables, Charts & Graphs.
5	<b>Cleaning Data with Text Functions:</b> use of UPPER and LOWER, TRIM function, Concatenate.
6	<b>Cleaning Data Containing Date and Time Values:</b> use of DATEVALUE function, DATEADD and DATEDIF, TIMEVALUE functions.
7	<b>Conditional Formatting:</b> formatting, parsing, and highlighting data in spreadsheets during data analysis.
8	<b>Working with Multiple Sheets:</b> work with multiple sheets within a workbook is crucial for organizing and managing data, perform complex calculations and create comprehensive reports.
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.
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.

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.
12	Generation of report & presentation using Autofilter &macro.

**Course outcomes (Course Skill Set):**

At the end of the course the student will be able to:

- Use advanced functions and productivity tools to assist in developing worksheets.
- Manipulate data lists using Outline and PivotTables.
- Use Consolidation to summarise and report results from multiple worksheets.
- Apply Macros and Autofilter to solve the given real world scenario.

**Assessment Details (both CIE and SEE)**

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

**Continuous Internal Evaluation (CIE):**

CIE marks for the practical course are **50 Marks**.

The split-up of CIE marks for record/journal and test are in the ratio **60:40**.

- Each experiment is to be evaluated for conduction with an observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments are designed by the faculty who is handling the laboratory session and are made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to **30 marks** (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct a test of 100 marks after the completion of all the experiments listed in the syllabus.
- In a test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability.
- The marks scored shall be scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and marks of a test is the total CIE marks scored by the student.

**Semester End Evaluation (SEE):**

- SEE marks for the practical course are 50 Marks.
- SEE shall be conducted jointly by the two examiners of the same institute, examiners are appointed by the Head of the Institute.
- The examination schedule and names of examiners are informed to the university before the conduction of the examination. These practical examinations are to be conducted between the schedule mentioned in the academic calendar of the University.

- All laboratory experiments are to be included for practical examination.
  - (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.
  - Students can pick one question (experiment) from the questions lot prepared by the examiners jointly.
  - Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.
  - General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)
- Change of experiment is allowed only once and 15% of Marks allotted to the procedure part are to be made zero.
- The minimum duration of SEE is 02 hours

**Suggested Learning Resources:**

- **Berk & Carey** - Data Analysis with Microsoft® Excel: Updated for Office 2007®, Third Edition, © 2010 Brooks/Cole, Cengage Learning, ISBN-13: 978-0-495-39178-4
- **Wayne L. Winston** - Microsoft Excel 2019: Data Analysis And Business Modeling, PHI, ISBN: 9789389347180
- **Aryan Gupta** - Data Analysis in Excel: The Best Guide. (<https://www.simplilearn.com/tutorials/excel-tutorial/data-analysis-excel>)

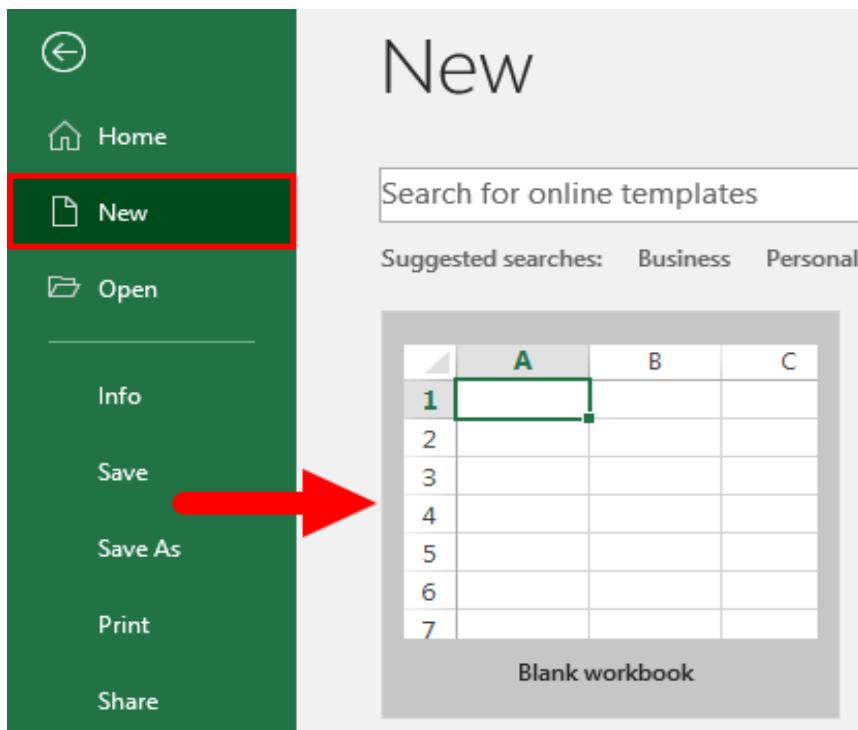
**C. LAB EXPERIMENTS****List of Experiment**

<b>Hr. No.</b>	<b>Exp.</b>	<b>Content</b>
1	1	Zero Session (Context Setting)
2	2	Getting Started with Excel: Creation of spreadsheets, Insertion of rows and columns, Drag & Fill, use of Aggregate functions.
3	3	Working with Data : Importing data, Data Entry & Manipulation, Sorting & Filtering.
4	4	Working with Data: Data Validation, Pivot Tables & Pivot Charts.
5	5	Data Analysis Process: Conditional Formatting, What-If Analysis, Data Tables, Charts & Graphs.
6	6	Cleaning Data with Text Functions: use of UPPER and LOWER, TRIM function, Concatenate.
7	7	Cleaning Data Containing Date and Time Values: use of DATEVALUE function, DATEADD and DATEDIF, TIMEVALUE functions.
8	8	Conditional Formatting: formatting, parsing, and highlighting data in spreadsheets during data analysis.
9	9	Working with Multiple Sheets: work with multiple sheets within a workbook is crucial for organizing and managing data, performing complex calculations and creating comprehensive reports.
10	10	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. Analyze the data using appropriate chart and report the data.
9	9	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. Analyze the data using appropriate chart and report the data.
10	10	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.
11	11	Generation of report & presentation using Autofilter and macro.
12	12	Create a dashboard for exercise 10,11,12 data and show the Total Gross Salaries, Number of products available, number of products expiring, and number of products sold category-wise.
13	13	Comprehensive Quiz with 1st,2nd 3rd Prize distribution

## Q1. Getting Started with Excel: Creation of spreadsheets, Insertion of rows and columns, Drag & Fill, use of Aggregate functions.

### Creating a Spreadsheet:

1. **Open Excel:**
  - o Launch Microsoft Excel on your computer.
2. **Blank Workbook:**
  - o Upon opening Excel, you'll see a blank workbook. This is where you can create your spreadsheet.
3. **Entering Data:**
  - o Click on a cell and start typing to enter data.

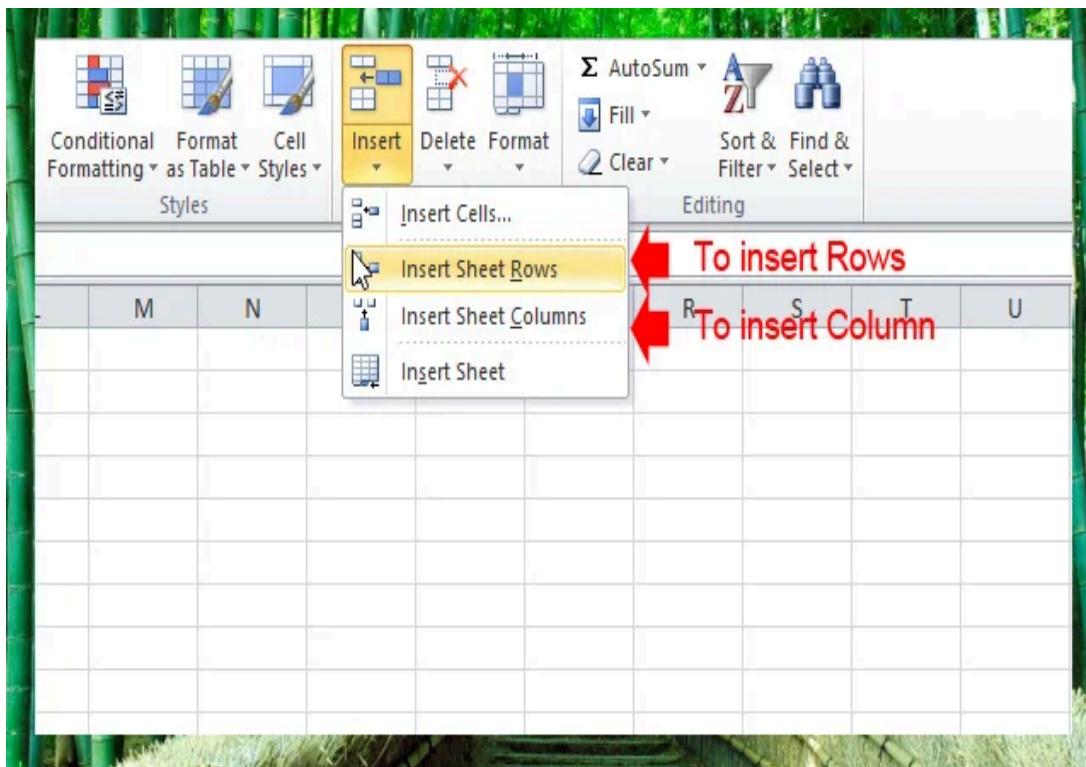


### Inserting Rows and Columns:

1. **Inserting Rows:**
  - o Right-click on the row number where you want to insert a new row.
  - o Choose "Insert" from the context menu.

## 2. Inserting Columns:

- Right-click on the column letter where you want to insert a new column.
- Choose “Insert” from the context menu.



## Drag & Fill:

### 1. AutoFill:

- o Enter a value in a cell.
- o Hover over the bottom-right corner of the cell until you see a small square (the fill handle).

- o Click and drag to fill adjacent cells with a series or pattern.

	A	B	C	D	E	F	G
1	Hello	Hello	Hello	Hello			
2	Hello	Hello	Hello	Hello			
3	Hello	Hello	Hello	Hello			
4	Hello	Hello	Hello	Hello			
5	Hello	Hello	Hello	Hello			
6							
7							
8							
9							
10							

## Aggregate Functions:

### 1. SUM Function:

- To add a range of cells, use the SUM function.
- Example: =SUM(A1:A10) adds up the values in cells A1 through A10.

1.

	A	B	C	D
1		Jan	Feb	
2	Entertainment			
3	Cable TV	52.98	52.98	
4	Video Rentals	7.98	11.97	
5	Movies	16.00	32.00	
6	CDs	18.99	29.99	
7	Totals	=SUM(B3:B6)		
8				

### 2. AVERAGE Function:

- To find the average of a range of cells, use the AVERAGE function.

- Example: =AVERAGE(B1:B5) calculates the average of cells B1 through B5.

The screenshot shows a Microsoft Excel spreadsheet. The formula bar at the top displays '=AVERAGE(B2:E2)'. The main table has columns labeled 'Trainer' (row 1), 'Pokeball' (row 2), 'Great ball' (row 2), 'Ultraball' (row 2), 'Master ball' (row 2), and 'Average' (row 2). Row 2 contains data for six trainers: Iva, Liam, Jenny, Ilben, Adora, and Kasper. The 'Average' cell (F2) contains the formula '=AVERAGE(B2:E2)'. A tooltip for the formula '=AVERAGE (number1; [number2]; ...)' is visible over the 'Average' cell.

	A	B	C	D	E	F	G	H
1	Trainer	Pokeball	Great ball	Ultraball	Master ball	Average		
2	Iva	10	4	1	1	=AVERAGE(B2:E2)		
3	Liam	12	3	0	1	AVERAGE (number1; [number2]; ...)		
4	Jenny	15	1	3	1			
5	Ilben	4	2	6	0			
6	Adora	10	4	1	1			
7	Kasper	9	2	1	0			

### 3. COUNT Function:

- To count the number of cells with numerical values, use the COUNT function.
- Example: =COUNT(C1:C8) counts the number of cells in C1 through C8 that contain numbers.

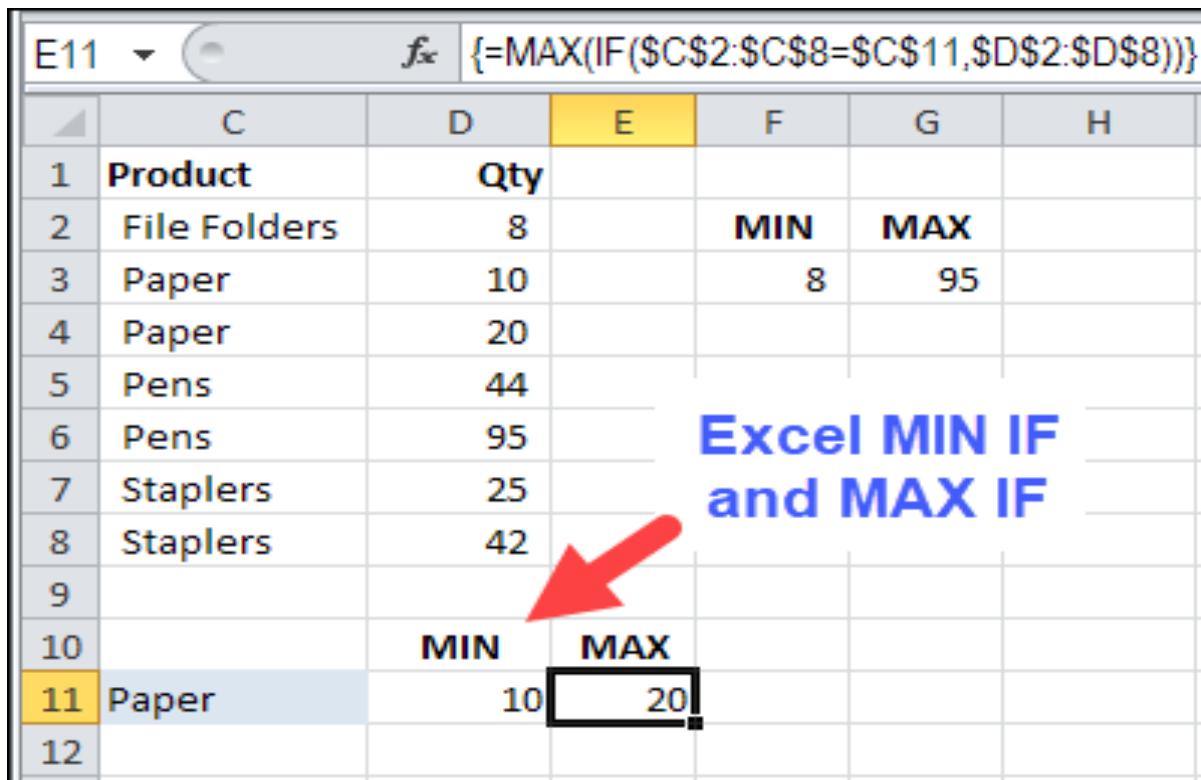
The screenshot shows a Microsoft Excel spreadsheet. The table has columns labeled 'Name' (row 1), 'Height(ft)' (row 1), and 'Age(Years)' (row 1). Rows 2 through 10 contain data for ten individuals: Donald, Marry, Jordan, Mahesh, Jai Shree, Jyoti, Manoj, Carry, and Patacia. The formula bar at the top displays '=COUNTIF(A2:A10,' followed by a dropdown menu showing 'COUNT Name' and '=COUNTIF(A2:A10,'. A tooltip for the formula '=COUNTIF(range, criteria)' is visible below the formula bar.

	A	B	C	D	E
1	Name	Height(ft)	Age(Years)		COUNT Name
2	Donald	6.3	20		=COUNTIF(A2:A10,
3	Marry	7.1	12		
4	Jordan	4.3	14		
5	Mahesh	4.8	15		
6	Jai Shree	6	8		
7	Jyoti	5.2	9		
8	Manoj	4.9	12		
9	Carry	5	9		
10	Patacia	4.5	18		
11					

### 4. MAX and MIN Functions:

- To find the maximum or minimum value in a range, use the MAX and MIN functions.

- Example: =MAX(D1:D6) returns the highest value in cells D1 through D6.



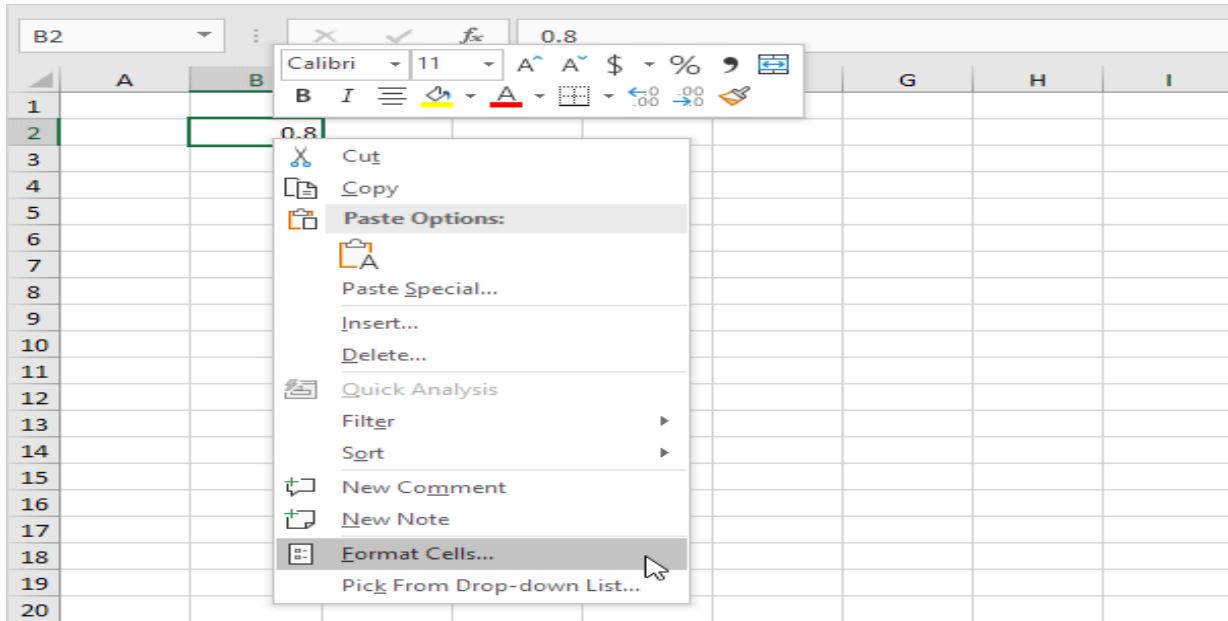
The screenshot shows an Excel spreadsheet with a table of products and their quantities. The table has columns for Product (C) and Qty (D). Row 11 contains the formula =MAX(IF(\$C\$2:\$C\$8=\$C\$11,\$D\$2:\$D\$8)). A red arrow points from the text "Excel MIN IF and MAX IF" to the cell containing the formula. The formula is also displayed in the formula bar above the table.

	C	D	E	F	G	H
1	Product	Qty				
2	File Folders	8		MIN	MAX	
3	Paper	10		8	95	
4	Paper	20				
5	Pens	44				
6	Pens	95				
7	Staplers	25				
8	Staplers	42				
9						
10			MIN	MAX		
11	Paper	10	20			
12						

## Formatting:

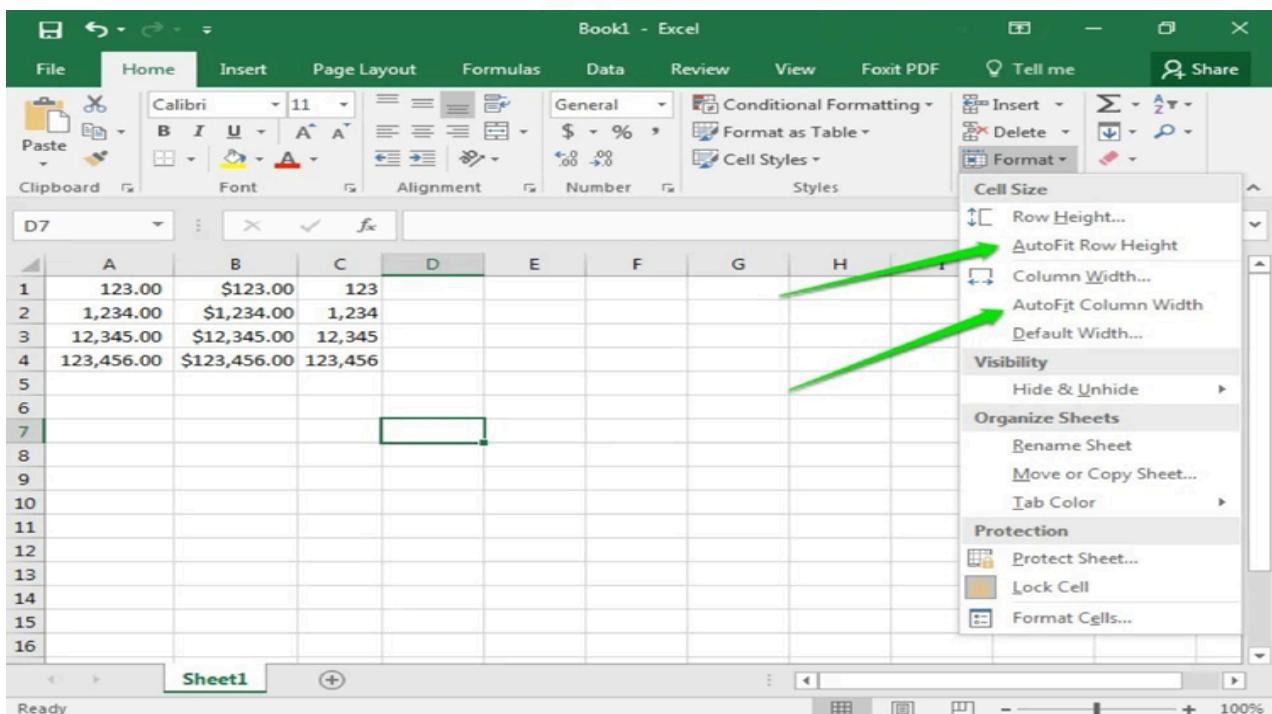
### 1. Cell Formatting:

- Highlight cells or ranges and use the formatting options in the toolbar to change font, color, and other formatting.



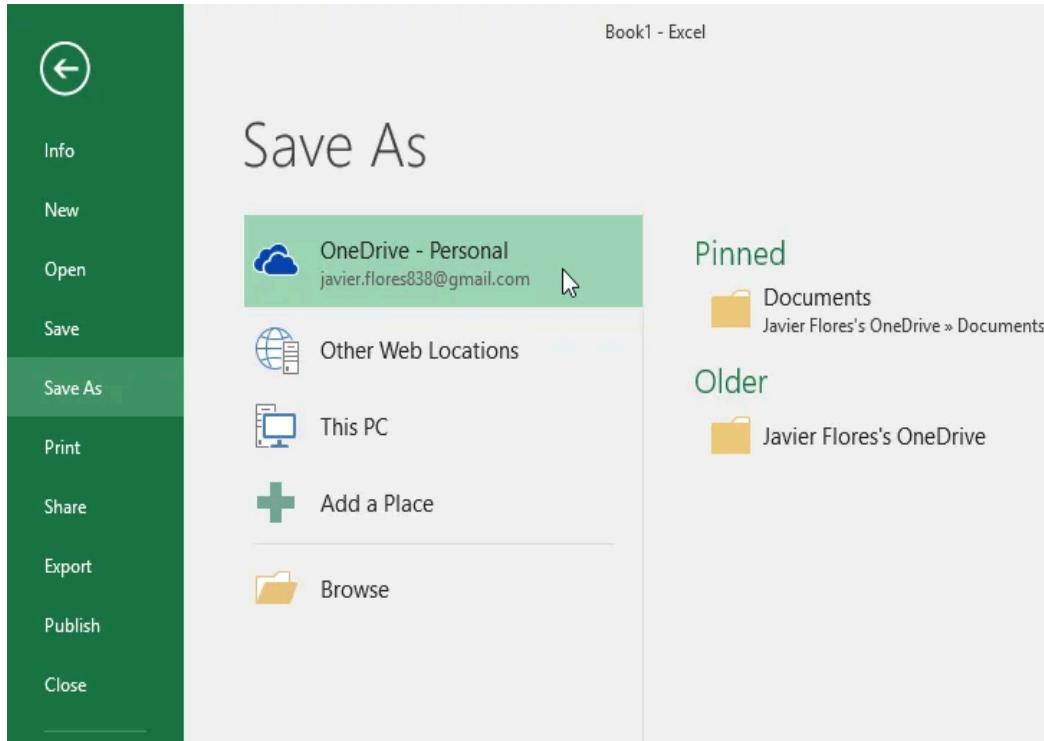
## 2. Column and Row Width:

- Adjust the width or height by placing the cursor on the border between column or row headers, click and drag.



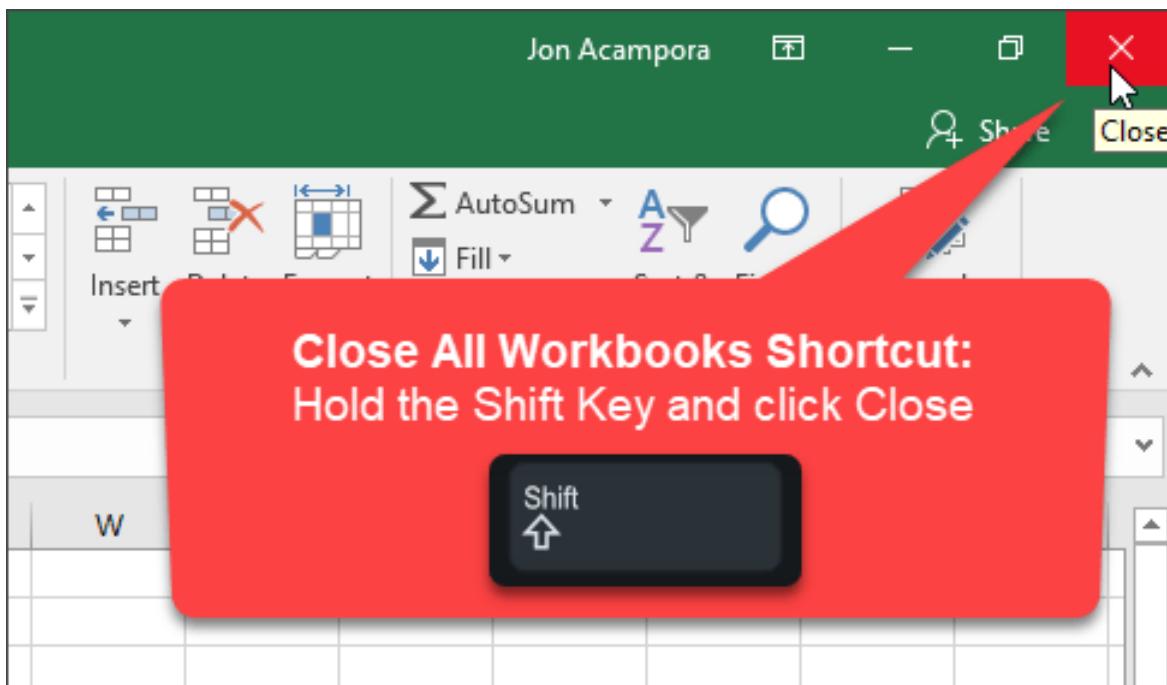
## Saving and Closing:

1. **Save Your Work:**
  - o Click on “File” and then “Save” to save your spreadsheet.



2. **Closing Excel:**

- Click on the “X” button at the top-right corner of the Excel window.



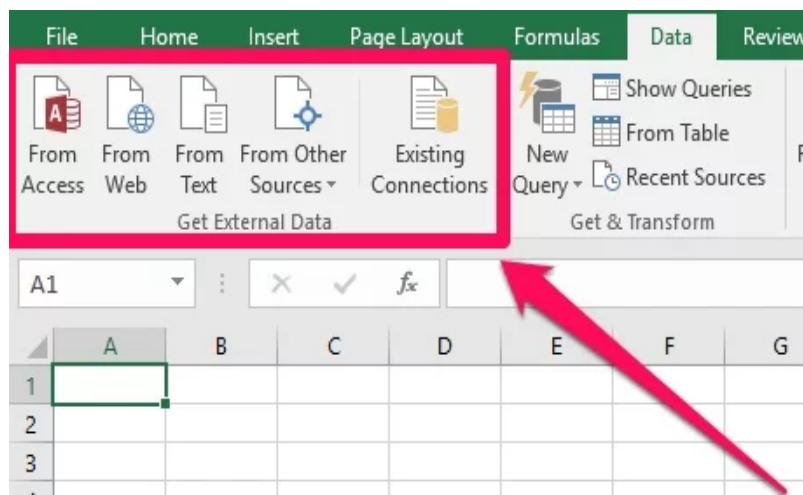
## Q2. Working with Data : Importing data, Data Entry & Manipulation, Sorting & Filtering.

### Importing Data:

#### 1. Importing External Data:

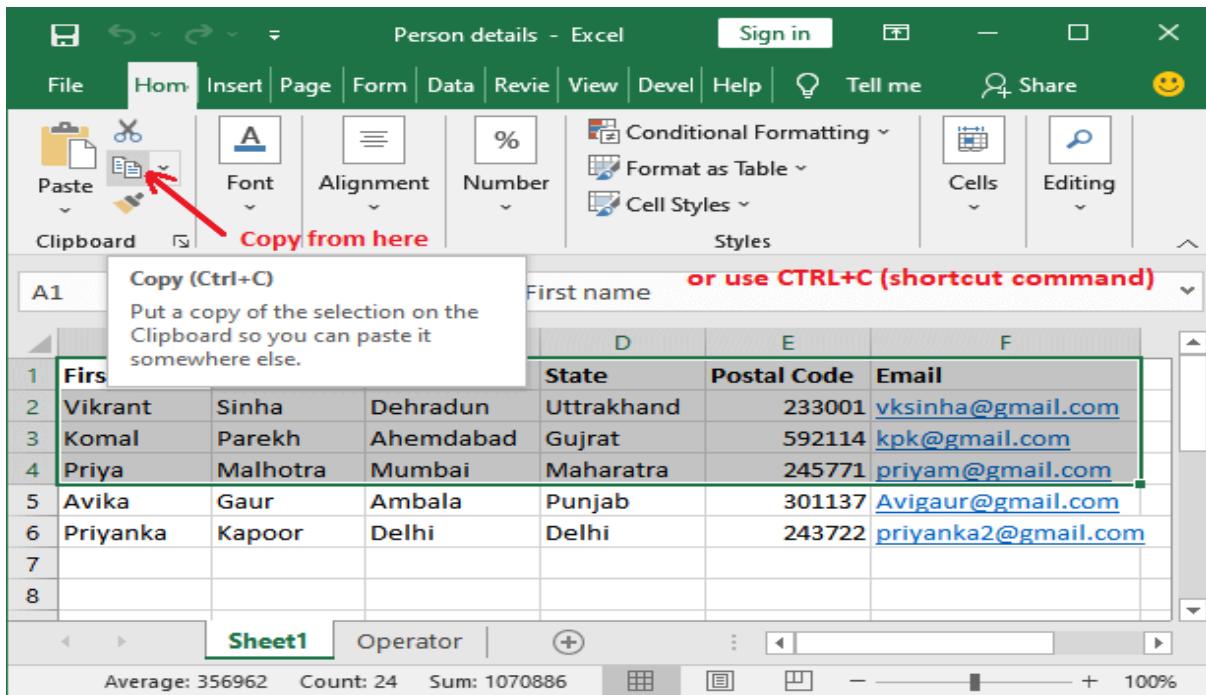
- Go to the “Data” tab on the Excel ribbon.
- Use options like “Get Data” or “From Text” to import data from external sources such as text files, CSV, databases, or online sources.

1.



#### 2. Copy-Paste:

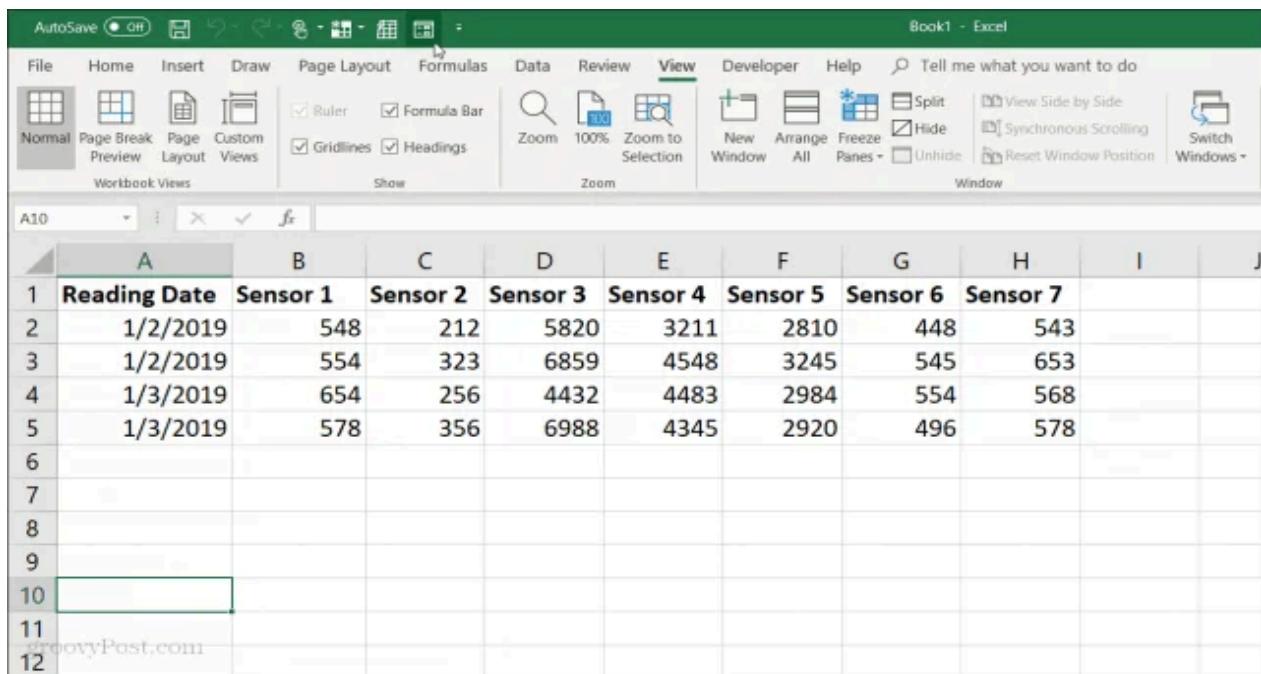
- Copy data from an external source (e.g., a website, another spreadsheet, or a text file).
- Paste it into Excel using “Ctrl + V.”



## Data Entry & Manipulation:

### 1. Entering Data:

- Click on a cell and type your data.
- Use the Tab key to move to the next cell or Enter key to move to the cell below.

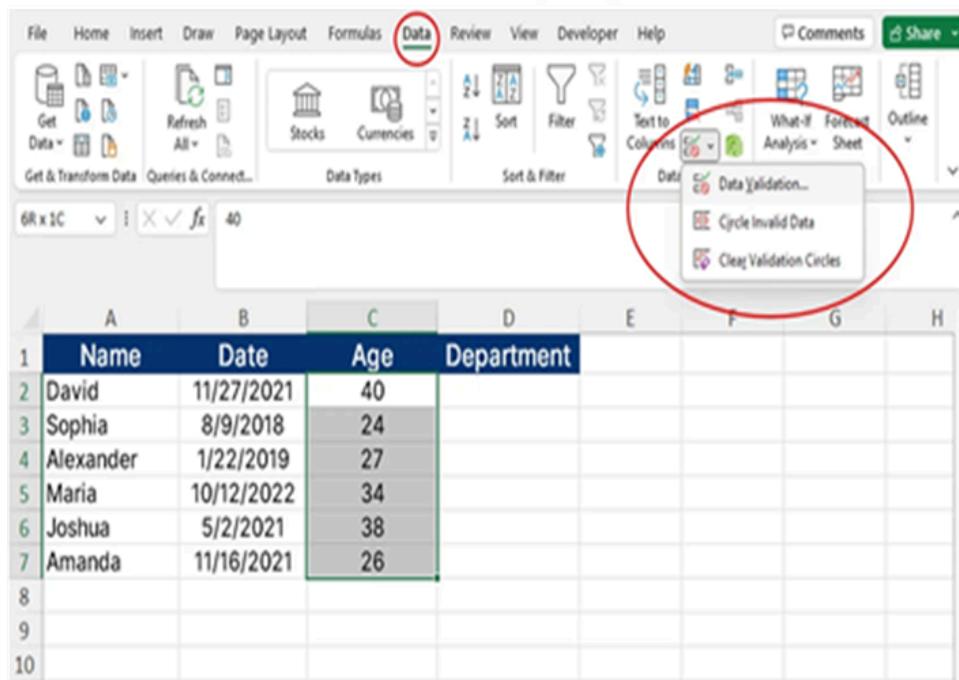


A screenshot of Microsoft Excel showing a data table. The table has columns labeled A through J. Row 1 contains the header "Reading Date" and "Sensor 1" through "Sensor 7". Rows 2 through 5 contain data points for each sensor. Row 10 is empty. Row 11 contains the URL "GroovyPost.com". The "Data" tab is selected in the ribbon.

	A	B	C	D	E	F	G	H	I	J
1	Reading Date	Sensor 1	Sensor 2	Sensor 3	Sensor 4	Sensor 5	Sensor 6	Sensor 7		
2	1/2/2019	548	212	5820	3211	2810	448	543		
3	1/2/2019	554	323	6859	4548	3245	545	653		
4	1/3/2019	654	256	4432	4483	2984	554	568		
5	1/3/2019	578	356	6988	4345	2920	496	578		
6										
7										
8										
9										
10										
11	GroovyPost.com									
12										

## 2. Data Validation:

- Use the “Data Validation” feature to control what data can be entered in a cell.

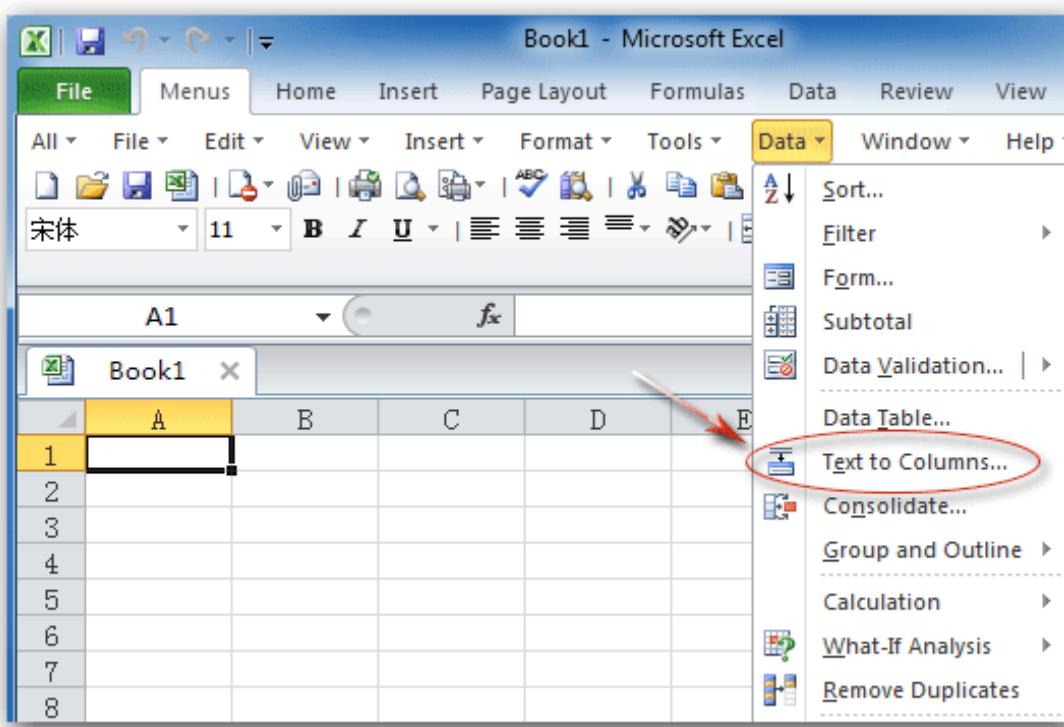


A screenshot of Microsoft Excel showing the "Data Validation" dialog box. The dialog box is circled in red. It contains three options: "Data Validation...", "Circle Invalid Data", and "Clear Validation Circles". The "Data Validation..." option is highlighted. The "Data" tab is selected in the ribbon. A table with columns "Name", "Date", "Age", and "Department" is visible below the dialog box.

Name	Date	Age	Department
David	11/27/2021	40	
Sophia	8/9/2018	24	
Alexander	1/22/2019	27	
Maria	10/12/2022	34	
Joshua	5/2/2021	38	
Amanda	11/16/2021	26	

### 3. Text to Columns:

- If data is separated by delimiters, use the “Text to Columns” feature to split it into separate columns.



### 4. Flash Fill:

- Excel’s Flash Fill feature can automatically fill in values based on patterns you establish.

The screenshot shows the Microsoft Excel ribbon with the 'Data' tab selected. In the 'Data Tools' group, the 'Flash Fill' button is highlighted with a red box. A red arrow points from this button to the 'Sort Oldest to Newest' option in the 'Sort & Filter' dropdown menu.

Full Name	Coruse Enrolled	Full Name	YEar
Reema Panda	Java	18-07-1997	1997
Joy Deep	C,C++	20-09-2000	2000
Meena Mangla	Excel, VBA	12-02-1999	1999
Himanshu Bhar	Excel, VBA	12-04-1997	1997
Leena Paul	C,C++	05-06-1990	1990
Raj Sharma	Excel, VBA	12-12-2001	2001

## Sorting & Filtering:

### 1. Sorting Data:

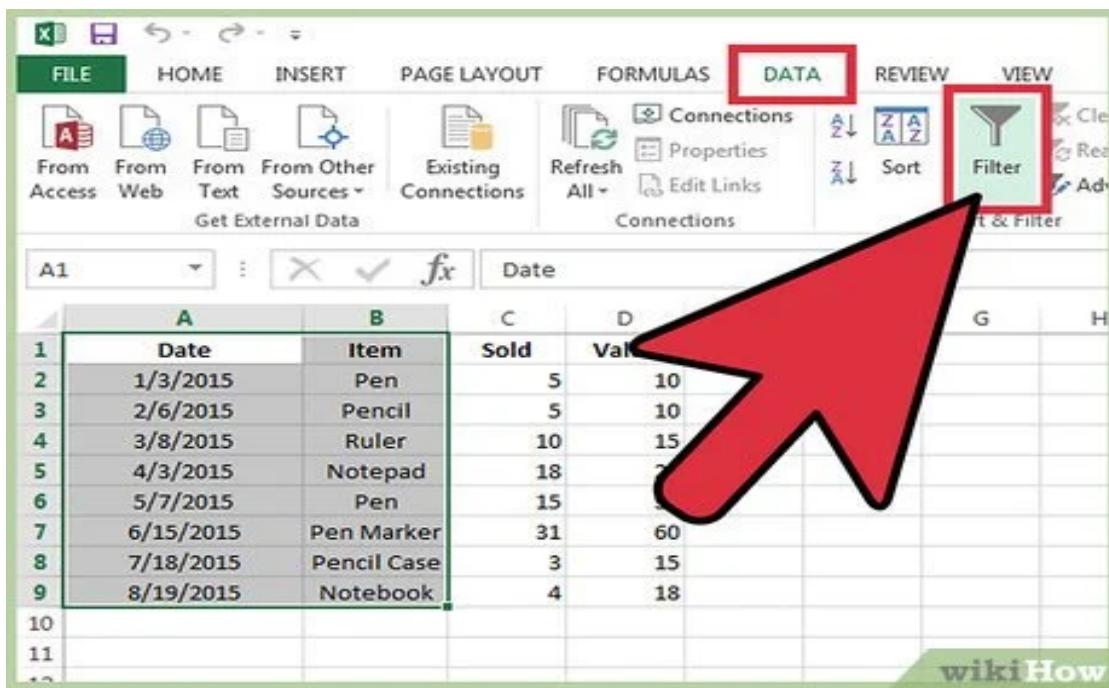
- Highlight the range of cells you want to sort.
- Go to the “Data” tab and use the “Sort” button.
- Choose the column by which you want to sort the data.

The screenshot shows the Microsoft Excel ribbon with the 'Data' tab selected. The 'Sort & Filter' button in the 'Clipboard' group is highlighted with a green box. A blue arrow points from the 'Order date' column header in the table below to the 'Sort Oldest to Newest' option in the 'Sort & Filter' dropdown menu.

Item	Qty.	Order date
Apples	10	5/1/2010
Grapes	15	5/12/2010
Lemons	20	7/2/2020
Oranges	12	4/18/2018
Peaches	14	6/1/2020
Pears	18	4/8/2018

## 2. Filtering Data:

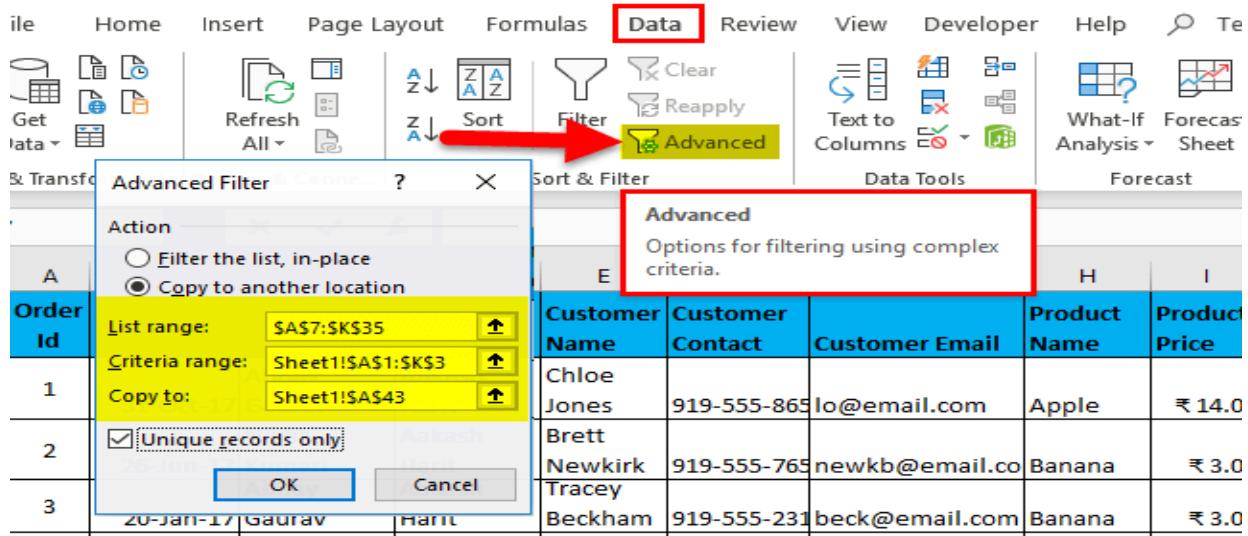
- Highlight the range of cells you want to filter.
- Go to the “Data” tab and click on “Filter.”
- Use the dropdown arrows in the column headers to filter data based on specific criteria.



## 3. Advanced Filter:

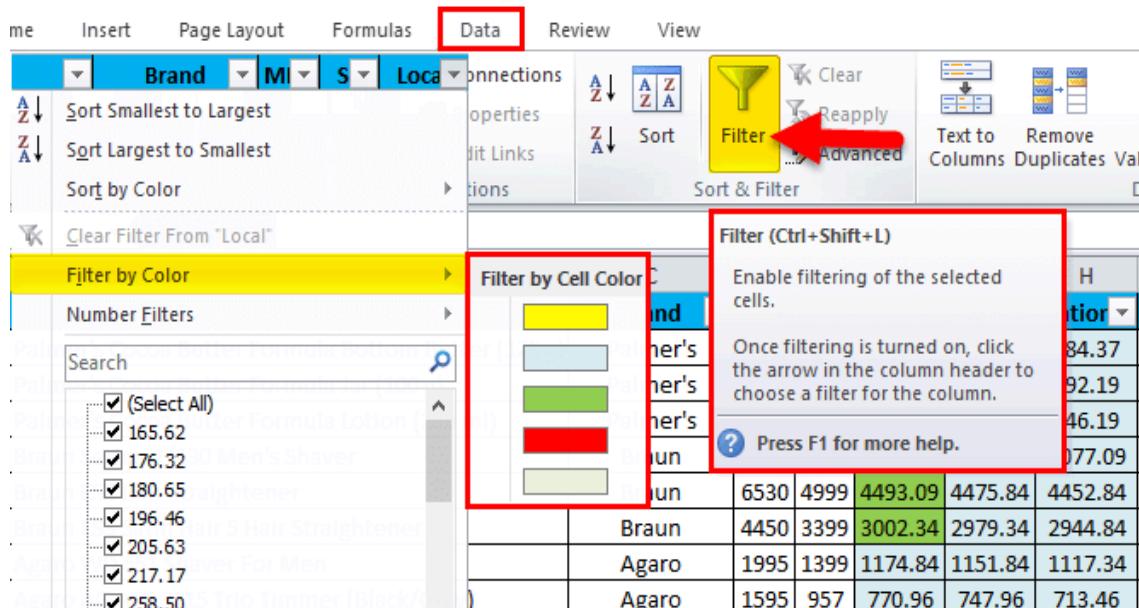
- For more complex filtering, you can use the “Advanced Filter” option.
- Go to the “Data” tab, click on “Advanced,” and set your criteria.

# Advanced Filter in Excel



## 4. AutoFilter:

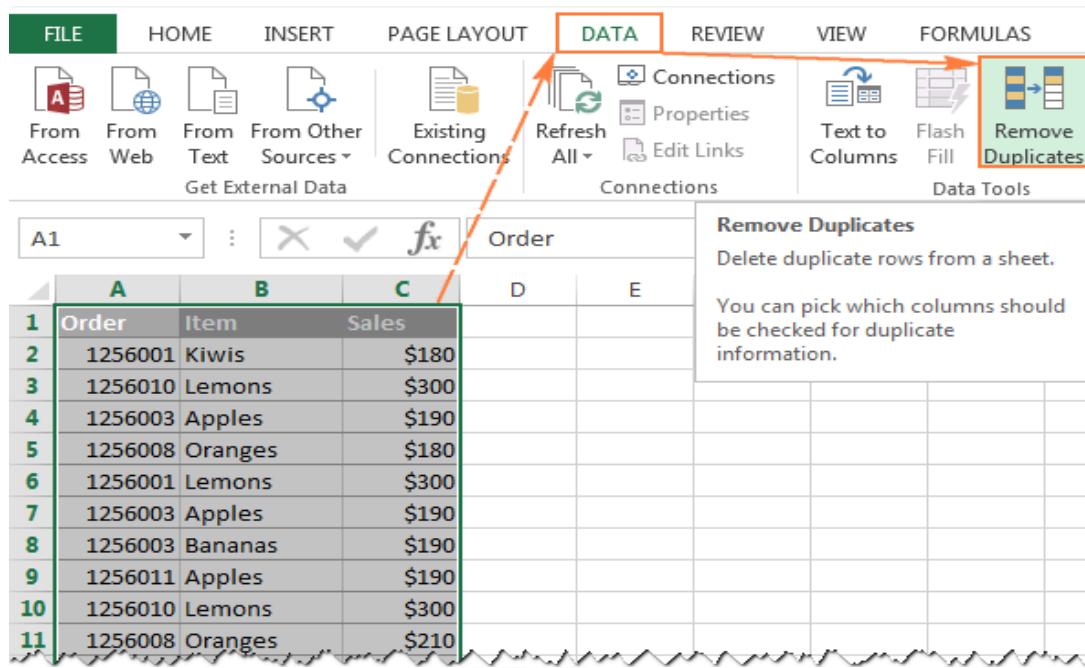
- Select your data range and click on the “Filter” button.
- Use the filter dropdowns in each column header to filter data.



## Additional Tips:

### 1. Remove Duplicates:

- Use the “Remove Duplicates” feature in the “Data” tab to eliminate duplicate values in a range.



### 2. Data Tables:

- If you have a large dataset, consider converting it into an Excel Table (Ctrl + T). Tables provide dynamic sorting and filtering options.

# Data Table in Excel

The screenshot shows a Microsoft Excel interface with the following details:

- File Tab:** Active.
- Home Tab:** Active.
- Insert Tab:** Available.
- Page Layout Tab:** Available.
- Formulas Tab:** Available.
- Data Tab:** Active (highlighted by a red box).
- Review Tab:** Available.
- View Tab:** Available.
- Developer Tab:** Available.
- Connections Group:** Contains 'Get External Data', 'Refresh All', 'Connections', and 'Edit Links'.
- Sort & Filter Group:** Contains 'Sort', 'Filter', and 'Advanced'.
- Data Group:** Contains 'Text to Columns', 'Remove Duplicates', 'Consolidate', 'Data Validation', 'What-If Analysis', 'Scenario Manager', and 'Goal Seek...'. A red arrow points to 'What-If Analysis'.
- Cells:** Row 1 contains 'M9' in the top-left cell. Row 2 is blank. Rows 3 through 6 contain data: Row 3 ('Loan Amount'), Row 4 ('Interest rate'), Row 5 ('Number of Monthly Mortgage'), and Row 6 ('Monthly Mortgage'). Row 6 is highlighted with a yellow background.
- Table:** A 'Data Table' dialog box is open, showing 'Row input cell:' and 'Column input cell:' fields. It has 'OK' and 'Cancel' buttons. A red box highlights the dialog box.
- Table Data:** To the right of the dialog box is a table with columns 'Rs. 75', '0,000.00', 'Rs. 75', '9.14554', '116€', '1.07525', '1183', '4.38928', '1201', '6.50%', '9756.077254', '10569.08369', '1219', '7%', '9900.14243', '10725.1543', '1237'.

### 3. Transpose:

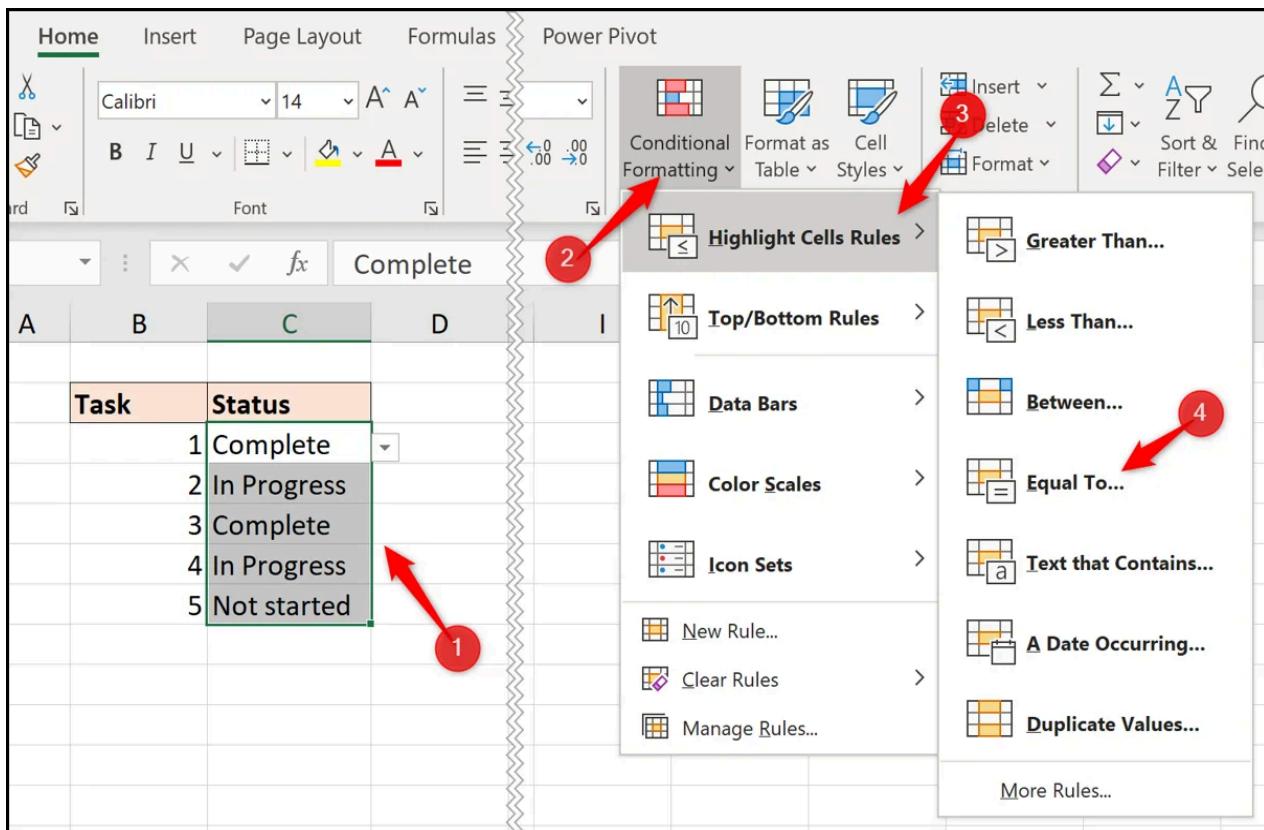
- Use the “Transpose” feature to switch rows and columns.

The screenshot shows a Microsoft Excel spreadsheet with the following details:

- Formula Bar:** Shows the formula `=TRANSPOSE(A1:B4)`.
- Cells A1 to D4:** Contain data: Jan (100), Feb (200), Mar (150), Apr (300). A callout bubble points to this area with the text "These are the original cells."
- Cells A6 to D7:** Contain data: Jan (100), Feb (200), Mar (150), Apr (300). This is the result of the TRANSPOSE function applied to the range A1:B4. A callout bubble points to this area with the text "These cells use the TRANSPOSE function."

### 4. Conditional Formatting:

- Apply conditional formatting to highlight specific cells or ranges based on certain criteria.



### Q3. Working with Data: Data Validation, Pivot Tables & Pivot Charts.

#### Data Validation:

Data validation is the process of ensuring that the data entered into a cell meets specific criteria.

##### 1. Setting Data Validation:

- Select the cell or range of cells where you want to apply data validation.
- Go to the “Data” tab and click on “Data Validation.”
- Choose the criteria (e.g., whole number, date, list) and set the validation rules.

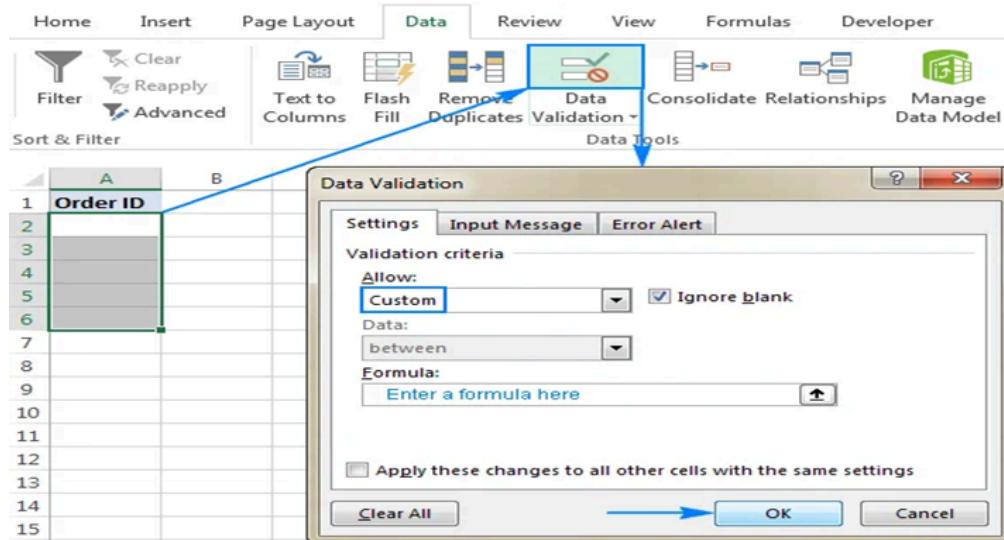
The screenshot shows a Microsoft Excel spreadsheet with the following data:

	Name	Date	Age	Department
1	David	11/27/2021	40	
2	Sophia	8/9/2018	24	
3	Alexander	1/22/2019	27	
4	Maria	10/12/2022	34	
5	Joshua	5/2/2021	38	
6	Amanda	11/16/2021	26	
7				
8				
9				
10				

The "Data" tab is circled in red at the top of the ribbon. The "Data Validation..." option in the Data group is also circled in red. A context menu is open over the selected range A1:D7, with the "Data Validation..." option highlighted.

##### 2. Custom Validation:

- Create custom validation rules using formulas to restrict data entry based on specific conditions.



### 3. Input Messages and Error Alerts:

- Provide helpful input messages and error alerts to guide users when entering data.



## Pivot Tables:

Pivot tables are powerful tools for summarizing and analyzing large amounts of data.

## 1. Creating a Pivot Table:

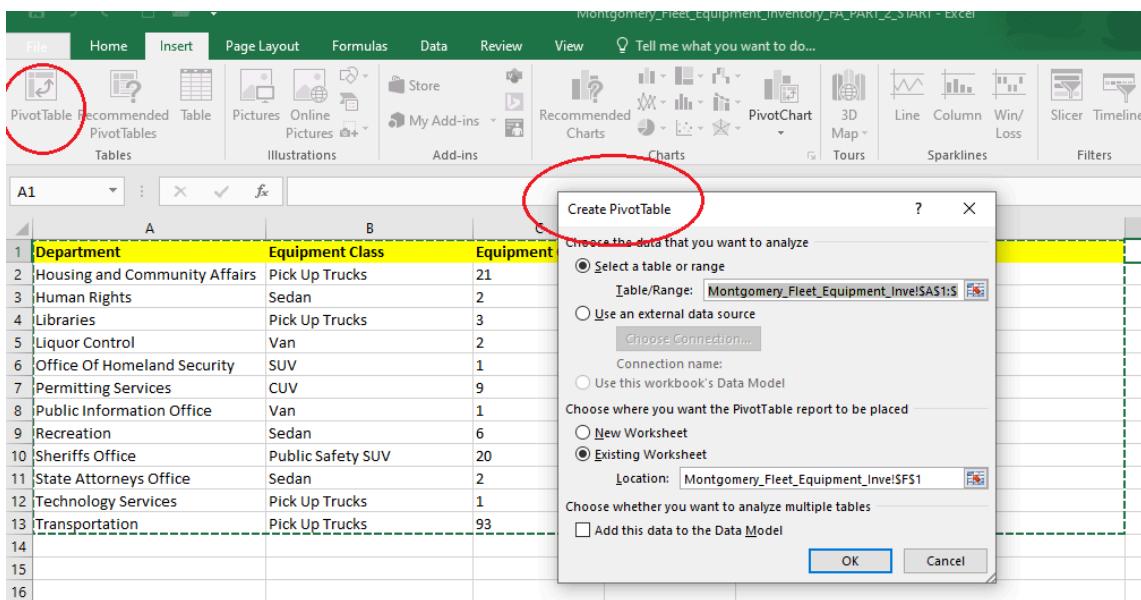
- Select the range of cells that contain your data.
- Go to the “Insert” tab and click on “PivotTable.”
- Choose where to place the pivot table (new worksheet or existing worksheet).

The screenshot shows the Microsoft Excel ribbon with the 'Insert' tab selected. Below the ribbon, a callout bubble highlights the 'PivotTable' icon in the 'Tables' group. The data range A1:E11 is selected, and the PivotTable wizard is open, showing options like 'PivotTable' and 'Recommended PivotTables'. The main table area shows data from HubSpot's blog, with columns for Clicks, Impressions, CTR, and Position.

	A	B	C	D	E
		Clicks	Impressions	CTR	Position
1	/blog.hubspot.com/sales/famous-quotes	1026357	29679820	3.46%	5.45
3	https://blog.hubspot.com/sales/small-business-ideas	685091	12847519	5.33%	8.91
4	https://blog.hubspot.com/marketing/instagram-best-time-post	330548	6119298	5.40%	4.06
5	https://blog.hubspot.com/sales/business-name-ideas	291512	4693144	6.21%	9.53
6	https://blog.hubspot.com/marketing/post-to-instagram-from-comp	290584	3181539	9.13%	5.35
7	https://blog.hubspot.com/marketing/instagram-captions	287172	15258895	1.88%	7.91
8	https://blog.hubspot.com/sales/please-find-attached	272861	3563986	7.66%	12.36
9	https://blog.hubspot.com/marketing/professional-bio-examples	242311	2758974	8.78%	5.78
10	https://blog.hubspot.com/marketing/inspiring-company-mission-st	199199	3202086	6.22%	7.08
11	https://blog.hubspot.com/marketing/free-email-accounts	187233	4459481	4.20%	11.74

## 2. Building Pivot Table:

- Drag and drop fields into the Rows and Columns areas to arrange data.
- Drag numeric fields into the Values area to perform calculations (e.g., sum, average).



### 3. Filtering and Grouping:

- Use the filter and grouping options within the pivot table to focus on specific data.

DATA tab selected

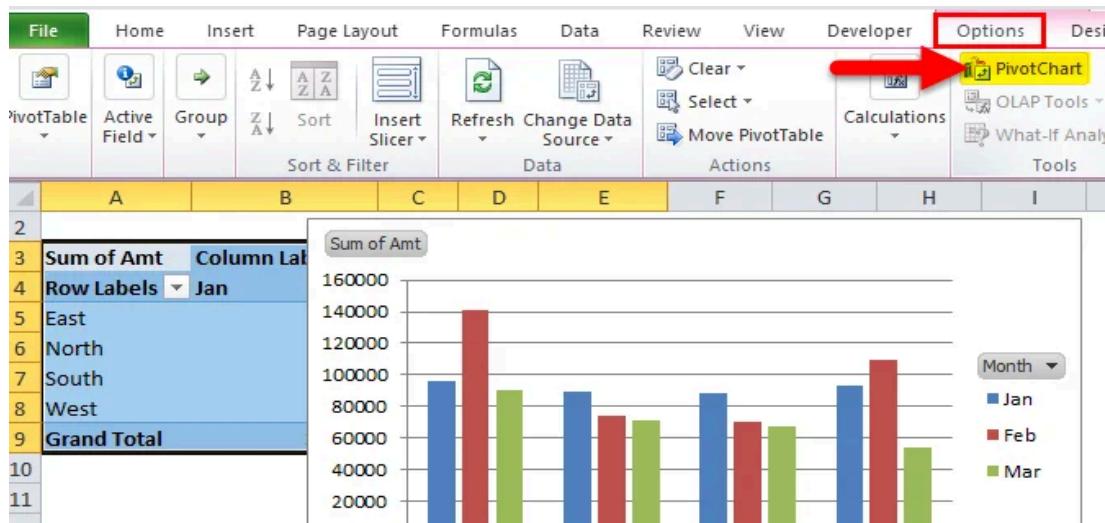
S/N	Name	Gender	Score
1	Jane	Female	80
2	Juanita	Female	63
3	Jones	Male	50
4	Jonathan	Male	89
5	John	Male	70
6			

## Pivot Charts:

Pivot charts are visual representations of data created from a pivot table.

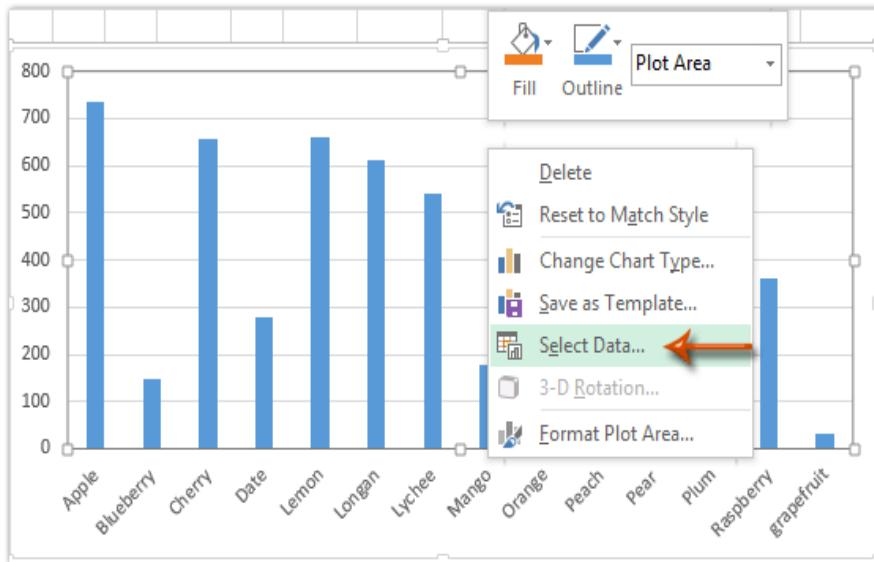
### 1. Creating a Pivot Chart:

- After creating a pivot table, select any cell in the pivot table.
- Go to the “Insert” tab and click on “PivotChart.”
- Choose the chart type you want.=



### 2. Customizing Pivot Charts:

- Modify the chart layout, styles, and colors.
- Use the “Filter” and “Slicer” options to interactively control the data displayed in the chart.



## Additional Tips:

### 1. Refreshing Data:

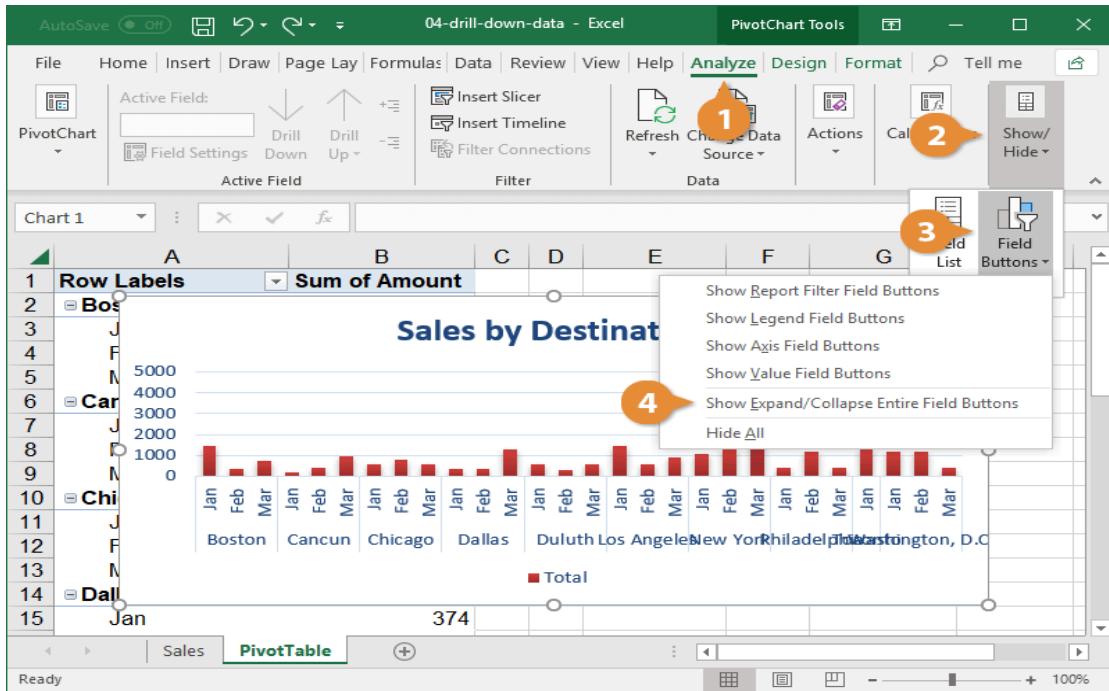
- If your data changes, refresh the pivot table to update the results.

## Refresh Pivot Table in Excel

A screenshot of Microsoft Excel showing a PivotTable in the background. The PivotTable shows data for countries: Canada, France, Germany, Mexico, United States of America, and India, with a Grand Total of 10,558,303. A context menu is open over the PivotTable, with the 'Data' tab highlighted by a red arrow. A secondary callout arrow points to the 'Refresh data when opening the file' checkbox in the 'PivotTable Options' dialog box, which is also highlighted by a red box. The 'PivotTable Options' dialog box includes tabs for Layout & Format, Totals & Filters, Display, Printing, and Data (which is selected).

## 2. Drilling Down:

- Double-clicking on a cell in a pivot table can allow you to drill down into the underlying data.



## 3. Calculations in Pivot Tables:

- Add calculated fields or items to perform custom calculations within the pivot table.

# Pivot Table Formula in Excel

The screenshot shows the Microsoft Excel ribbon with the 'Analyze' tab selected, indicated by a red box. A context menu is open over a PivotTable, specifically over a cell in the 'Calculated Field...' section. The menu options include 'Clear', 'Select', 'Move PivotTable', 'Fields, Items, & Sets...', 'Calculated Field...', 'Calculate', 'Insert Calculated', and 'Solve Order...'. Below the ribbon, a PivotTable is displayed with data for Canada, Germany, Mexico, and USA. The USA row is selected, and its formula is shown in the 'Calculated Field...' dialog box.

	A	B	C	D	E	F
1	Row Labels	Sum of Gross Sales	Sum of COGS	Sum of Total Profit	Sum of Profit Percentage	\$
2	Canada	7634462	6223269.624	1,411,192	18.485%	
4	Germany	7674259	6350564.598	1,323,694	17.248%	
5	Mexico	8253420	7408320.378	755,001	9.149%	
6	USA	Calculated Field			15.881%	
7	Grand Total	Solve Order	Field	Formula	14.225%	
8			1 Total Profit	=Gross Sales'-COGS		
9			2 Profit Percentage	=Total Profit'/Gross Sales'		

## 4. Pivot Table Timeline:

- If your data includes dates, use a timeline in the pivot table to filter data based on date ranges.

The screenshot shows a Microsoft Excel spreadsheet titled '07-timelines - Excel'. The ribbon is visible at the top. A PivotTable is displayed in the main area, showing data for various names and their destination cities. A timeline filter is applied to the 'Date' field, which is set to 'All Periods' for the year 2014, covering the months from JAN to JUL. An orange circle with the number 6 highlights the timeline control.

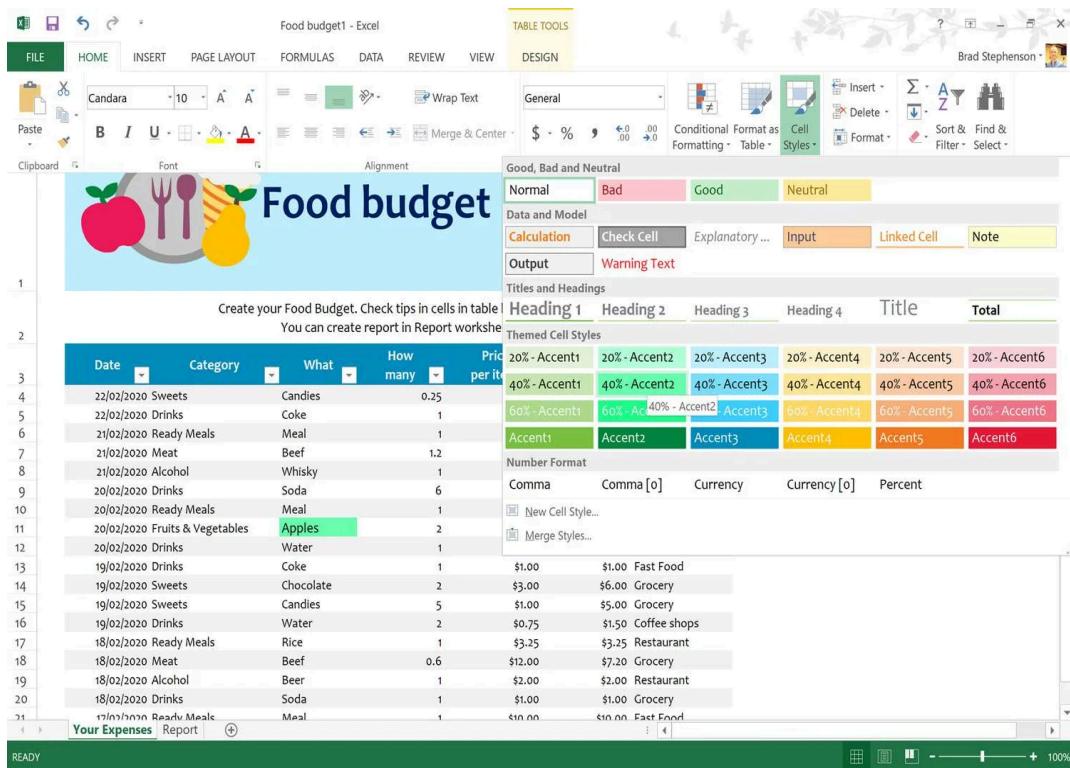
	A	B	C	D	E	F	G	H
1	Sum of Amount	Destination	Cancun	Chicago	Dallas	Duluth	Los Angeles	New York
2	Name	Boston						
3	Aaron Burr				199			
4	Alice Lindgram				199			
5	Amy Thomas							
6	Amy Wu							
7	Anna Torkleson							
8	Anne Olson							
9	Antonio Rommero							
10	Bernice Young							
11	Brett Hill							
12	Brian Samuels							
13	Bruce Thorgood			199	187		295	349
14	Gayle Youngquist							349

#### **Q4. Data Analysis Process: Conditional Formatting, What-If Analysis, Data Tables, Charts & Graphs.**

## Conditional Formatting:

## 1. Highlighting Cells:

- Use conditional formatting to highlight cells based on certain criteria (e.g., values greater than or less than a specific number).



## 2. Color Scales and Icon Sets:

- Apply color scales to visualize data distribution.
  - Use icon sets to represent data trends or rankings.

The screenshot shows a Microsoft Excel spreadsheet titled "Data Bars, Color Scales & Icons". The spreadsheet contains a table with columns for CUSTOMER and years 2013, 2014, and 2015, showing numerical values. The Conditional Formatting ribbon tab is selected, and the "Color Scales" option is highlighted with a yellow box. A dropdown menu for "Color Scales" is open, displaying various color scale templates.

CUSTOMER	2013	2014	2015
Acme, inc.	£85,030	£25,263	£113,918
Demo Company	£113,799	£13,964	£106,826
Widget Corp	£129,462	£68,797	£94,378
Foo Bars	£53,522	£31,176	£85,607
123 Warehousing	£66,826	£49,562	£75,088
Fake Brothers	£66,663	£164,248	£43,216
Smith and Co.	£80,369	£77,384	£41,632
ABC Telecom	£67,320	£108,285	£14,659

### 3. Data Bars:

- Represent data values using data bars within cells.

The screenshot shows two side-by-side tables comparing city populations. The left table, titled "Gradient Fill Data Bars", displays a gradient of green bars where the length corresponds to the population value. The right table, titled "Solid Fill Data Bars", displays solid blue bars for the same data. Both tables have columns for Rank, City, and Population.

Rank	City	Population
1	Tokyo	37,468,000
2	Delhi	28,514,000
3	Shanghai	25,582,000
4	São Paulo	21,650,000
5	Mexico City	21,581,000
6	Cairo	20,076,000
7	Mumbai	19,980,000
8	Beijing	19,618,000
9	Dhaka	19,578,000
10	Osaka	19,281,000

Rank	City	Population
1	Tokyo	
2	Delhi	
3	Shanghai	
4	São Paulo	
5	Mexico City	
6	Cairo	
7	Mumbai	
8	Beijing	
9	Dhaka	
10	Osaka	

## What-If Analysis:

What-If Analysis allows you to explore different scenarios by changing input values and observing the impact on calculated results.

## 1. Scenario Manager:

- Define different scenarios with specific input values.
- Use the Scenario Manager to switch between scenarios and view the results.

# Scenario Manager Excel

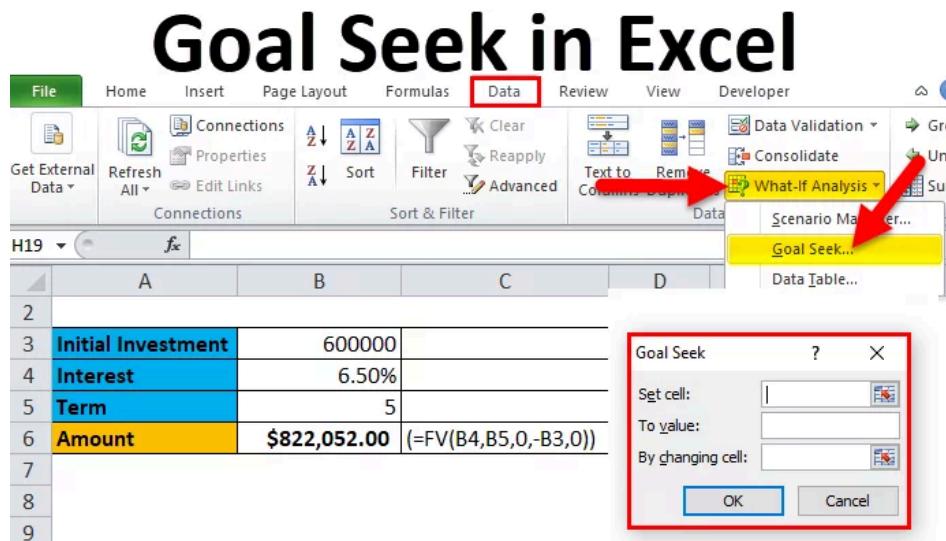
The screenshot shows the Microsoft Excel ribbon with the 'Data' tab selected. In the 'Data' tab's ribbon group, there is a 'What-If Analysis' button, which is highlighted with a yellow box and has a red arrow pointing to its 'Scenario Manager...' option in the dropdown menu. Below the ribbon, a 'Scenario Summary' dialog box is open, displaying a table of current values, changing cells, and result cells across three scenarios: Actual Budget, Plan 2, and Plan 3.

	Current Values:	Actual Budget	Plan 2	Plan 3
<b>Created by:</b>		Family Head	Created by Jeevan A Y on 16-10-2018	Family Head
<b>Changing Cells:</b>	\$B\$15 \$B\$13	10,000 15,000	7,500 7,500	10,000 10,000
<b>Result Cells:</b>	\$B\$13 \$B\$15 \$B\$19	10,000 10,000 15,550	15,000 15,000 5,550	7,500 7,500 20,550

Notes: Current Values column represents values of changing cells at

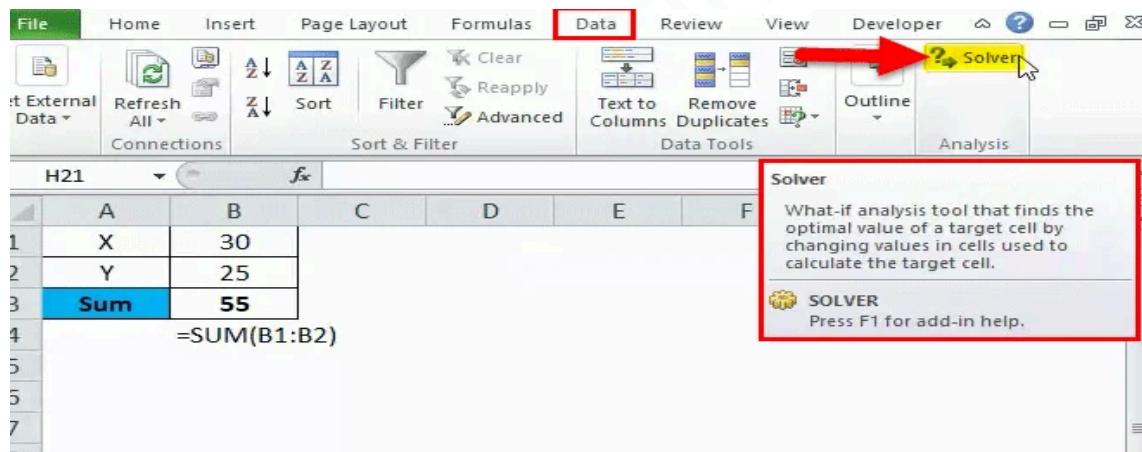
## 2. Goal Seek:

- Set a specific goal for a calculated value.
- Use Goal Seek to determine the required input value to achieve the goal.



### 3. Solver:

- Solver is an [Excel](#) add-in that allows you to optimize solutions by changing variable values within certain constraints.



## Data Tables:

Data Tables help you analyze the impact of changing one or two variables on a formula or set of formulas.

### 1. One-Variable Data Table:

- Analyze how changing one input variable affects the results of a formula.
- Set up a data table with different values for the input variable.

### One Variable Data Table in Excel

The screenshot shows a Microsoft Excel interface. The 'Data' tab is highlighted in red. A dropdown menu from the 'What-If Analysis' button is shown, with 'Data Table...' highlighted in green. A 'Data Table' dialog box is overlaid on the worksheet. The worksheet contains a table with columns labeled 'Length' and 'Breadth'. Row 46 is labeled 'Example 1:' and row 51 is labeled 'Area of rectangle'. The formula in cell B51 is =Length\*Breadth. To the right of the table, there is a preview of the data table results for Length values 5, 10, 15, 20, and 25.

	Length	5	10	15	20	25
50	50	100	150	200	250	

### 2. Two-Variable Data Table:

- Extend the analysis to two input variables by creating a two-variable data table.

### Two-Variable Data Table in Excel

The screenshot shows a Microsoft Excel interface. The 'Data' tab is highlighted in red. A dropdown menu from the 'What-If Analysis' button is shown, with 'Data Table...' highlighted in yellow. A 'Data Table' dialog box is overlaid on the worksheet. The worksheet contains a table with two columns. The first column has values like 19,095, 12.50%, 13.50%, etc. The second column has values like 2.00, 23,654, 23,889, etc. The dialog box shows 'Row input cell:' and 'Column input cell:' fields, and 'OK' and 'Cancel' buttons.

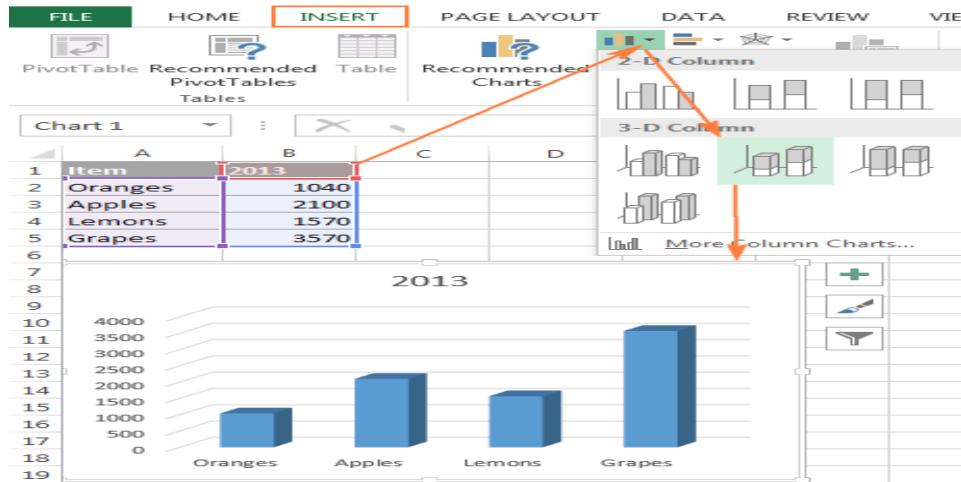
	No., of Years
19,095	2.00
12.50%	23,654
13.50%	23,889
14.50%	24,125
15.50%	24,362
16.50%	24,601
17.50%	24,841
18.50%	25,083

## Charts & Graphs:

Charts and graphs are powerful tools for visualizing data patterns and trends.

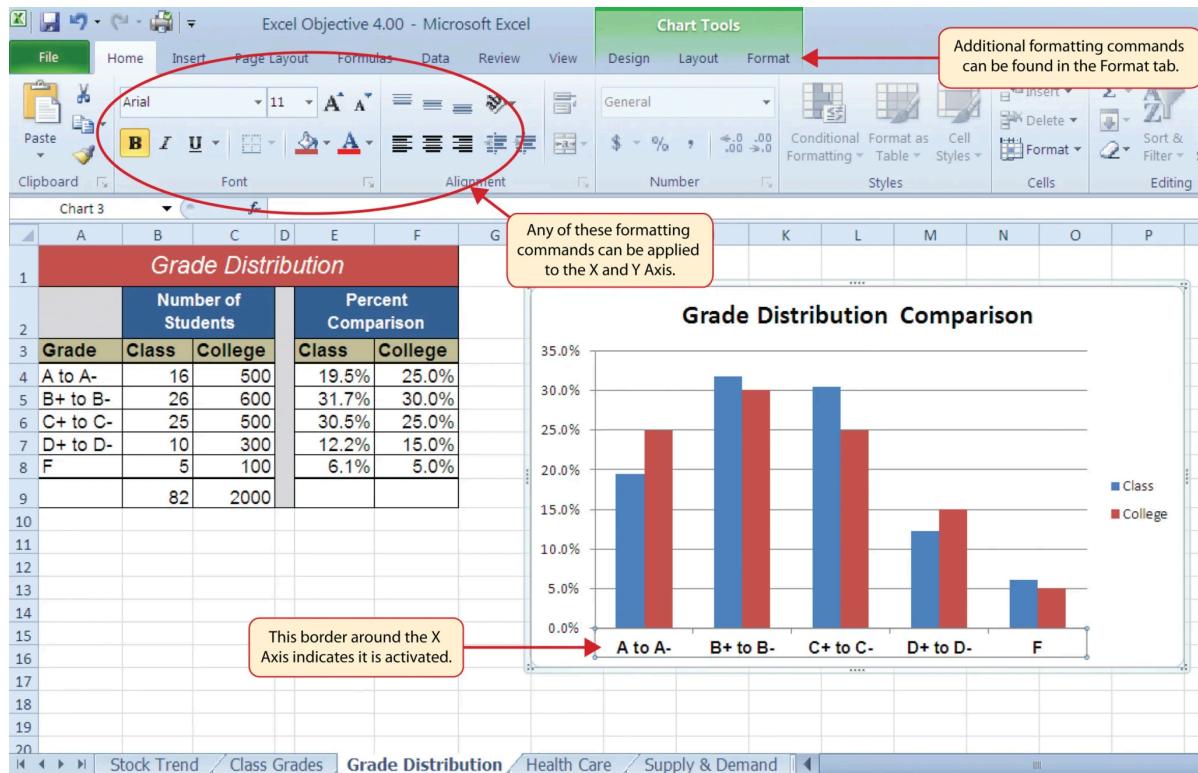
### 1. Creating Charts:

- o Select the data you want to visualize.
- o Go to the “Insert” tab and choose the desired chart type (e.g., bar chart, line chart, pie chart).



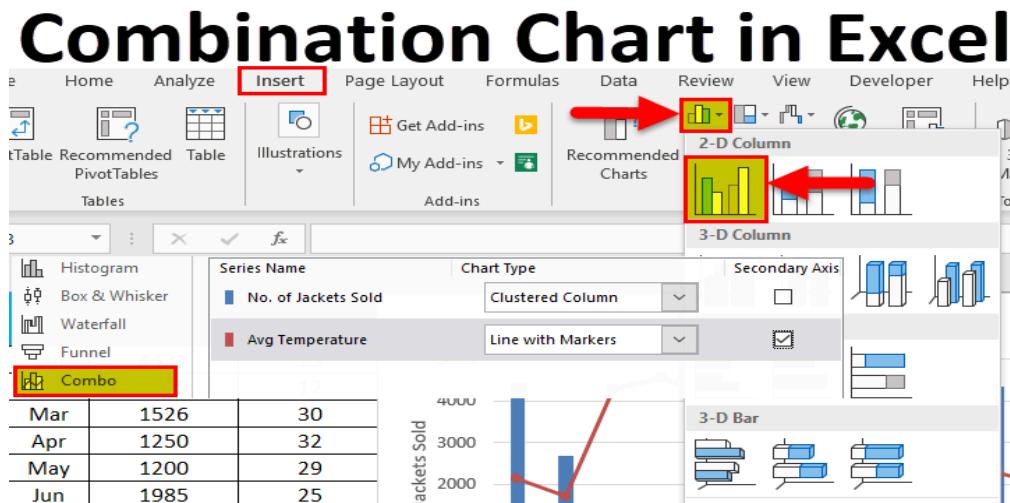
### 2. Formatting Charts:

- Customize chart elements, colors, and styles to enhance readability.



### 3. Combination Charts:

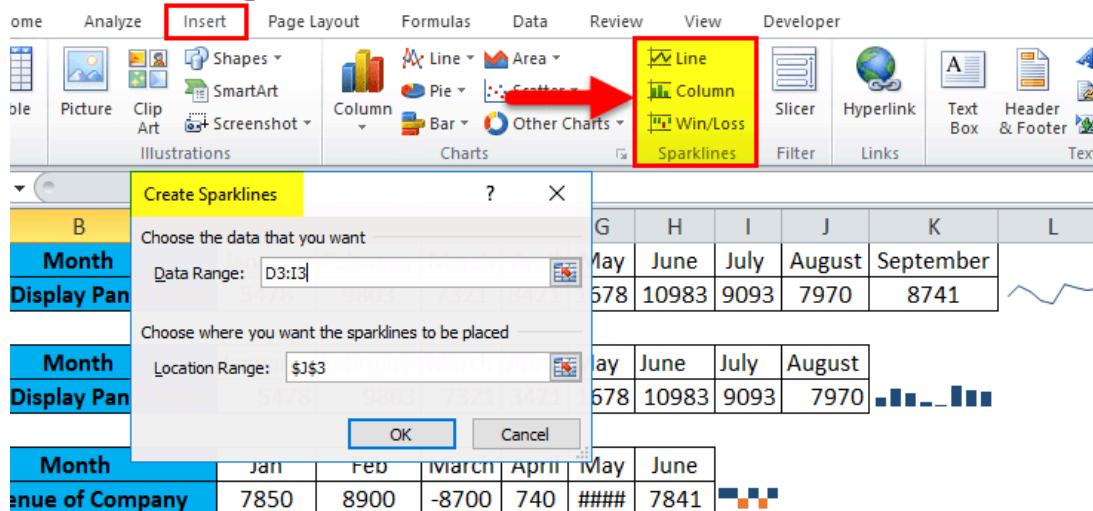
- Combine different chart types within the same chart to represent multiple data series.



### 4. Sparklines:

- Use sparklines to create small, in-cell charts that provide a visual representation of trends.

# Sparklines in Excel

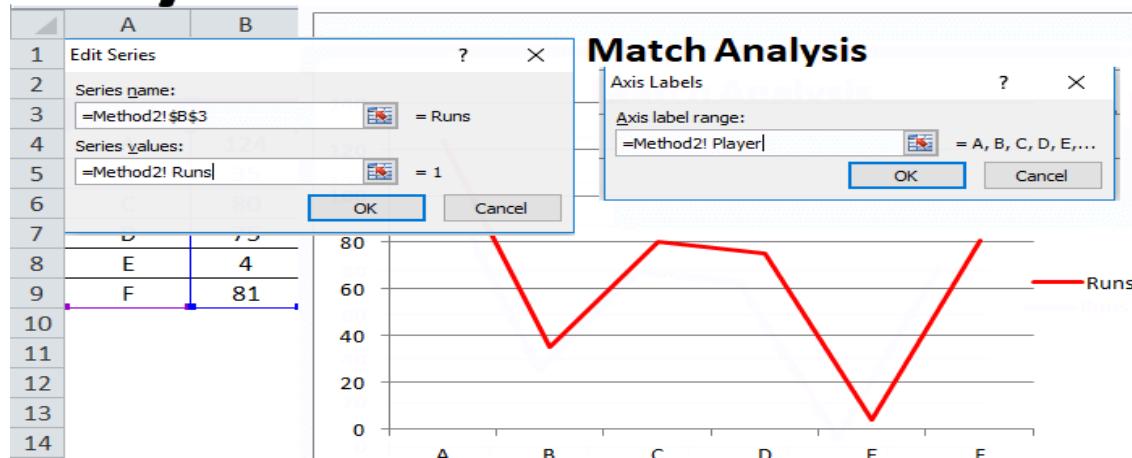


## Additional Tips:

### 1. Dynamic Charts:

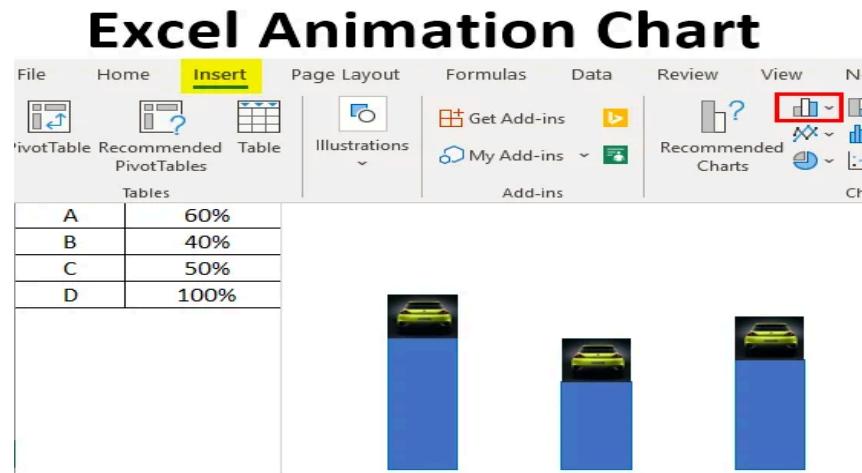
- Make your charts dynamic by using named ranges or tables for the data source.

# Dynamic Chart in Excel



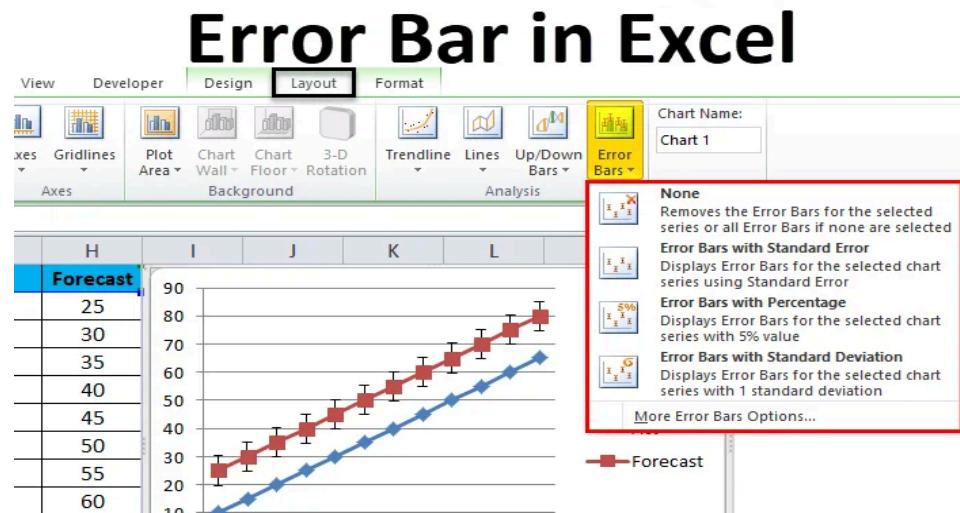
### 2. Chart Animations:

- Add animations to charts to enhance the presentation of data changes over time.



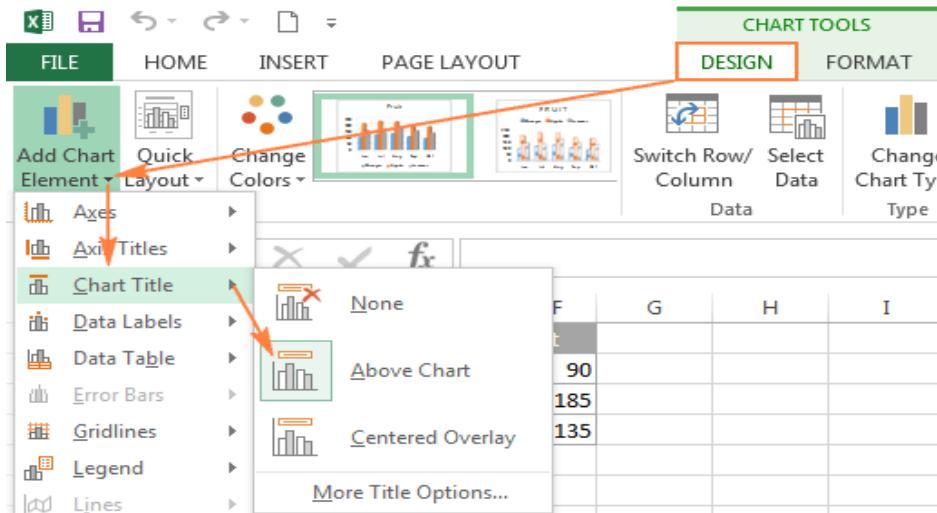
### 3. Error Bars:

- Include error bars in charts to show the margin of error or variability in data.



#### 4. Chart Titles and Labels:

- Ensure your charts have descriptive titles and labels for clarity.

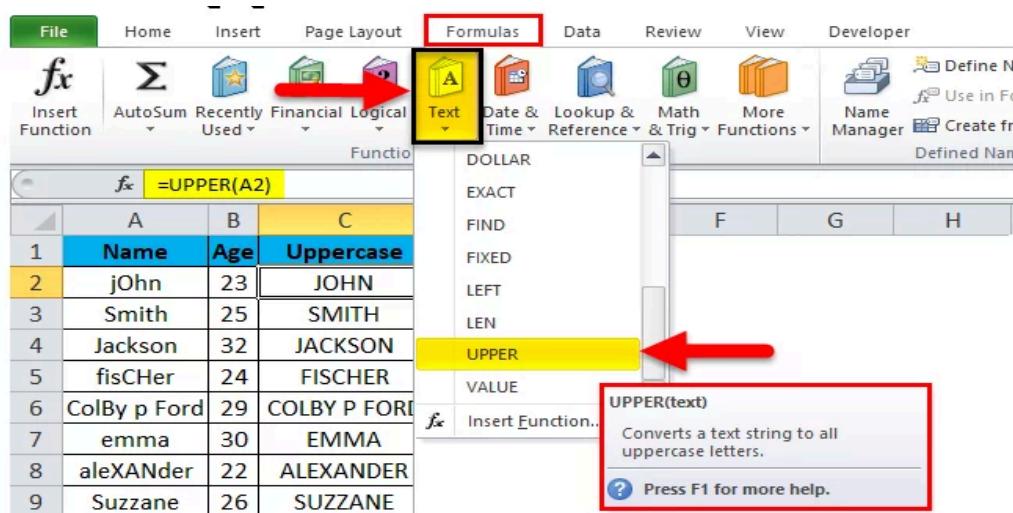


## Q5. Cleaning Data with Text Functions: use of UPPER and LOWER, TRIM function, Concatenate.

### UPPER and LOWER Functions:

#### 1. UPPER Function:

- Converts text to uppercase.
- Syntax: =UPPER(text)
- Example: =UPPER(A1) converts the text in cell A1 to uppercase.



#### 2. LOWER Function:

- Converts text to lowercase.
- Syntax: =LOWER(text)
- Example: =LOWER(B1) converts the text in cell B1 to lowercase.

# Lower Case in Excel

The screenshot shows a Microsoft Excel spreadsheet with data in columns A and B. Column A contains words in various cases: Verbs, EAT, WRITE, SING, PC, MAN, LIST, HE, and W. Column B contains the results of applying the LOWER function: Lower Case, eat, write, sing, Lower Case, function library, defined names, formula auditing, and calculation. A callout bubble labeled "Excel Function" points to the formula bar which displays =LOWER(A2). Another callout bubble labeled "Command Button" points to a button labeled "Convert To Lower Case" in the ribbon's Formula tab. A third callout bubble labeled "Flash Fill" points to a context menu that includes "Accept suggestions". The ribbon also shows the "Groups in Formula Tab" section.

## TRIM Function:

### 1. TRIM Function:

- Removes extra spaces from text, except for single spaces between words.
- Syntax: =TRIM(text)
- Example: =TRIM(C1) removes extra spaces from the text in cell C1.

The screenshot shows the Microsoft Excel ribbon with the "Formulas" tab selected. In the formula bar, the text =TRIM( is entered. A callout bubble points to the "Text" section of the ribbon's dropdown menu, specifically highlighting the "TRIM" option. A larger callout bubble points to the tooltip for the TRIM function, which reads: "Removes all spaces from a text string except for single spaces between words." The tooltip also includes a note to "Press F1 for more help."

## CONCATENATE Function:

### 1. CONCATENATE Function:

- o Combines multiple text strings into one.
- o Syntax: =CONCATENATE(text1, [text2], ...)
- o Example: =CONCATENATE(A1, " ", B1) combines the text in cells A1 and B1 with a space in between.

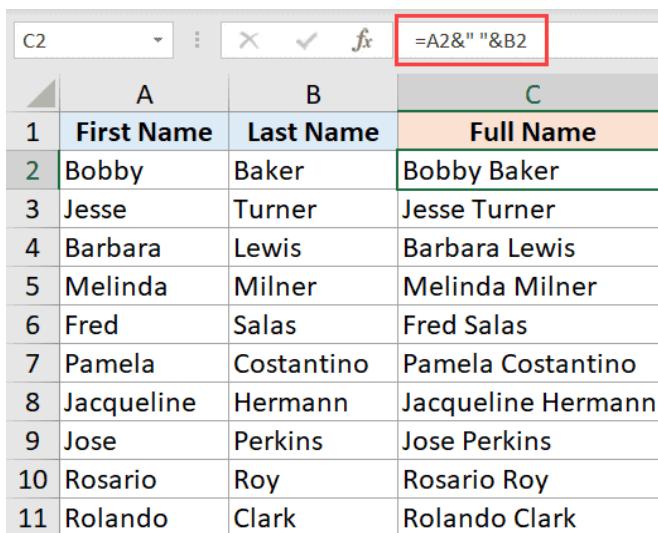
**EXAMPLE WORKSHEET**

B	C	D	E	F
t Name	MI	Client Last Name	EMAIL	
E	Sorensen		Karen.E.Sorensen@myawesomecompany.com	
N	Berry		=CONCATENATE(A3,".",B3,".",C3,"@companyname.com")	
P	Biel			
R	Clarkson			
T	Clooney			
G	Crow			
S	Harmon			
G	Jackson			
N	Kardashian			
V	Maguire			
B	Vergara			
R	Gaga			
E	Lopez			
Y	Moore			

## Combining Text Functions:

### 1. Example – Creating Full Names:

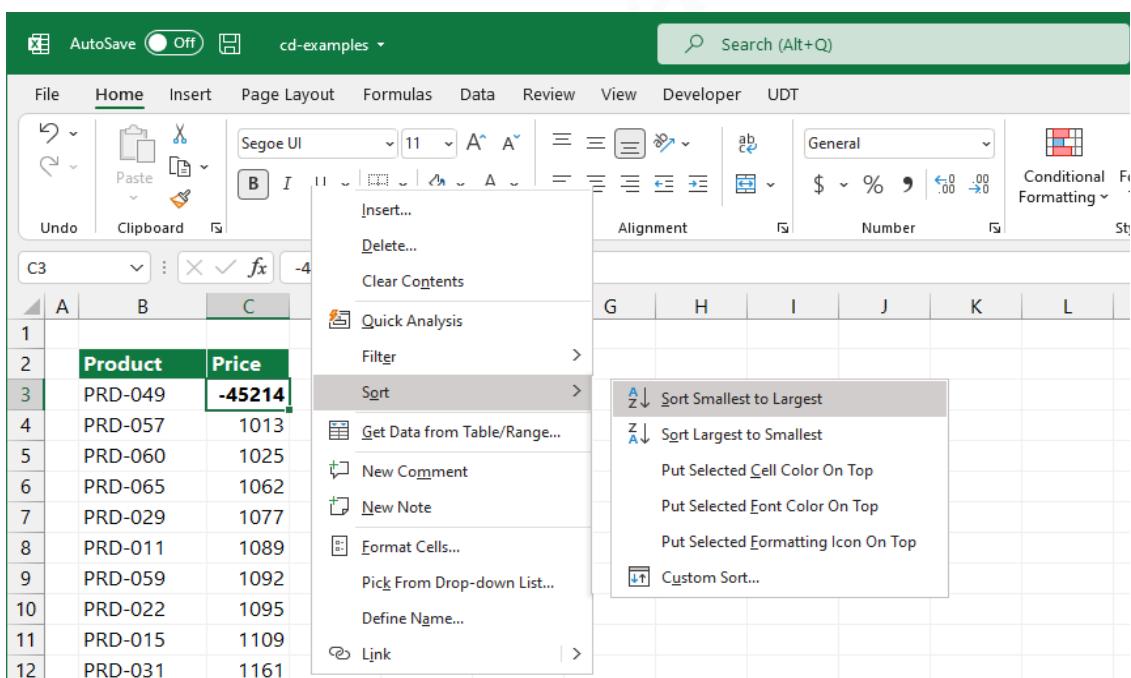
- Assuming you have first names in column A and last names in column B.
- In cell C1, you can use =CONCATENATE(UPPER(A1), " ", UPPER(B1)) to create a full name in uppercase with a space in between.



	A	B	C
1	First Name	Last Name	Full Name
2	Bobby	Baker	Bobby Baker
3	Jesse	Turner	Jesse Turner
4	Barbara	Lewis	Barbara Lewis
5	Melinda	Milner	Melinda Milner
6	Fred	Salas	Fred Salas
7	Pamela	Costantino	Pamela Costantino
8	Jacqueline	Hermann	Jacqueline Hermann
9	Jose	Perkins	Jose Perkins
10	Rosario	Roy	Rosario Roy
11	Rolando	Clark	Rolando Clark

## 2. Example – Cleaning Data:

- If you have text data in column D with extra spaces and mixed cases, you can clean it using `=TRIM(UPPER(D1))` in a new column.



	A	B	C
1			
2	Product	Price	-45214
3	PRD-049	1013	
4	PRD-057	1025	
5	PRD-060	1062	
6	PRD-065	1077	
7	PRD-029	1089	
8	PRD-011	1092	
9	PRD-059	1095	
10	PRD-022	1109	
11	PRD-015	1161	
12	PRD-031		

## Additional Tips:

### 1. & Operator for Concatenation:

- Instead of CONCATENATE, you can use the & operator. Example: =A1 & " " & B1 achieves the same result as =CONCATENATE(A1, " ", B1).

	A	B	C	D	E	F
1	First Name	Last Name	Name			
2	David	White	David White			
3	Ronnie	Anderson				
4	Tom	Boone				
5	Sally	Brooke				
6	Jeremy	Hill				
7	Robert	Furlan				
8	Mattias	Waldau				
9	Robert	Brown				

### 2. TEXT Function:

- The TEXT function allows you to format a value as text with a specified format. Example: =TEXT(DateCell, "yyyy-mm-dd") formats a date as "yyyy-mm-dd".

## Excel Text with Formula

	A	B	C	D	E	F	G
1	Name of student	Static MID	First Name	Last name	Name of student	Left	
2	Adii Malik	Adi	" ,A2,1)-1)	Malik	Adii Malik	Adii	
3	Yusuf Huty	Yus	Yusuf	Huty	Yusuf Huty	Yusu	
4	Jasmie Farnadi	Jas	Jasmie	Farnadi	Jasmie Farnadi	Jasm	
5	Elizabeth Fardal	Eli	Elizabeth	Fardal	Elizabeth Fardal	Eliz	
6	Yair Sekh	Yai	Yair	Sekh	Yair Sekh	Yair	
7	John Martin	Joh	John	Martin	John Martin	John	

### 3. MID, LEFT, RIGHT Functions:

- Use MID, LEFT, and RIGHT functions to extract specific portions of text from a cell.

The screenshot shows an Excel spreadsheet titled "LEFT.RIGHT.MID". The data consists of 15 rows of names and their lengths. Column A contains fullnames, column B contains the length of the first name, column C contains the length of the middle name, and column D contains the length of the last name. Columns E and F show the extracted parts using the MID function. A callout box highlights the formula =MID(A2,B2+1,C2-(B2+1)) with three colored boxes below it labeled "1st", "2nd", and "3rd" corresponding to the arguments of the MID function.

	A	B	C	D	E	F	G
1	Fullname	1st Blank	2nd Blank	Firstname	MiddleName	Lastname	
2	Andy George West	5	12	Andy	=MID(A2,B2+1,C2-(B2+1))		
3	Lester Thomas Hark	7	24	Lester			
4	Roger Max Port	6	10	Roger			
5	Max Andrew Syphar	4	11	Max			
6	Arnie Peter Peters	6	12	Arnie			
7	Jason David Sharp	6					
8	Peter George Thompson	6					
9	Bob Roger Ashton	4	10	Bob			
10	Gregg Michael Cunningham	6	14	Gregg	1st	2nd	3rd
11	Archie Thomas Wilson	7	14	Archie			
12	John Frederick Williams	5	15	John			
13	Andrew William Miles	7	15	Andrew			
14	Josh Peter Hanson	5	11	Josh			
15	Tony David Long	5	11	Tony			
16							

### 4. SEARCH and REPLACE Functions:

- The SEARCH function helps find the position of a substring within a text. The REPLACE function allows you to replace a specific part of the text.

## Find and Replace in Excel

A screenshot of an Excel spreadsheet and the 'Find and Replace' dialog box. The spreadsheet has columns A, B, C, and D. Row 1 contains headers: Company Name, zip, City, and Country. Row 2 contains data: 5 Sept Etiquette, 84350, Courthezon, France. The 'Find and Replace' dialog box is open, showing 'Find what: 5 Sept Etiquette'. The 'Find All' button at the bottom left of the dialog box is highlighted with a red box.

**Q6. Cleaning Data Containing Date and Time Values: use of DATEVALUE function, DATEADD and DATEDIF, TIMEVALUE functions.**

### 1. DATEVALUE Function:

- **Purpose:** Converts a date string to a serial number that represents the date.
- **Example ([Excel](#)):** =DATEVALUE("2024-01-05")
- **Usage:** Convert text representations of dates into a format that can be used for calculations.

A screenshot of Excel demonstrating the DATEVALUE function. The formula bar shows the beginning of the formula: '=DATEVALUE('. A callout box is displayed over the formula, providing the following description: 'Converts a date in the form of text to a number that represents the date in Microsoft Excel date-time code.' The 'Formulas' tab in the ribbon is highlighted with a red arrow, and the 'Date & Time' icon in the Function Library is also highlighted with a red arrow.

## 2. TIMEVALUE Function:

- **Purpose:** Converts a time string to a serial number that represents the time.
- **Example (Excel):** =TIMEVALUE("12:30 PM")
- **Usage:** Convert text representations of times into a format suitable for calculations.

The screenshot shows a Microsoft Excel spreadsheet with two columns: 'Data' and 'Result'. The 'Data' column contains time strings and a date-time string. The 'Result' column contains the corresponding decimal serial numbers. A blue arrow points from the 'Data' column to the 'Result' column, indicating the conversion process. The formula bar at the top shows the formula =TIMEVALUE(B3) for cell D3.

	A	B	C	D	E
1					
2		Data		Result	
3		10:30 PM		0.9375	
4		12:50 PM		0.534722222	
5		16:50:12		0.701527778	
6		00:20:35		0.014293981	
7		12/25/2018 10:08		0.422222222	
8					

## 3. DATEADD Function:

- **Purpose:** Adds a specified time interval to a date.
- **Example (SQL):** DATEADD(day, 7, '2024-01-05')
- **Usage:** Useful for adding or subtracting days, months, or years from a given date.

The screenshot shows a Microsoft Excel spreadsheet and the Microsoft Visual Basic for Applications (VBA) editor.

**Excel Worksheet:**

interval	number	date	Formula Expression	Result
Year	2	1/1/2022	DateAdd("yyyy", 2, Range("D5"))	1/1/2024
Arguments				

**VBA Editor:**

```

Sub DateAdd_Years()
    Range("F5") = DateAdd("yyyy", 2, Range("D5"))
End Sub

```

#### 4. DATEDIF Function:

- Purpose:** Calculates the difference between two dates in years, months, or days.
- Example (Excel):** =DATEDIF(A1, B1, "d")
- Usage:** Determine the duration between two dates, useful for age calculation or tracking time intervals.

The screenshot shows a Microsoft Excel spreadsheet with two tables illustrating the DATEDIF function.

**Table 1: Counts No. of Days**

A	B	C
Start Date	End Date	Difference
01-May-18	05-Jun-18	35
12-May-19	18-Aug-19	98

**Table 2: Counts No. of Months**

A	B	C
Start Date	End Date	Difference
01-May-18	05-Jun-18	1
12-May-19	18-Aug-19	3
03-Nov-18	17-Aug-	9
01-Jun-18	18-Aug-	14
12-Sep-19	12-Oct-	1
03-Dec-18	03-Jan-	1

#### Example Scenario (Using Excel Functions):

Let's say you have a dataset with a column containing date and time values in text format. You want to clean this data and perform some calculations.

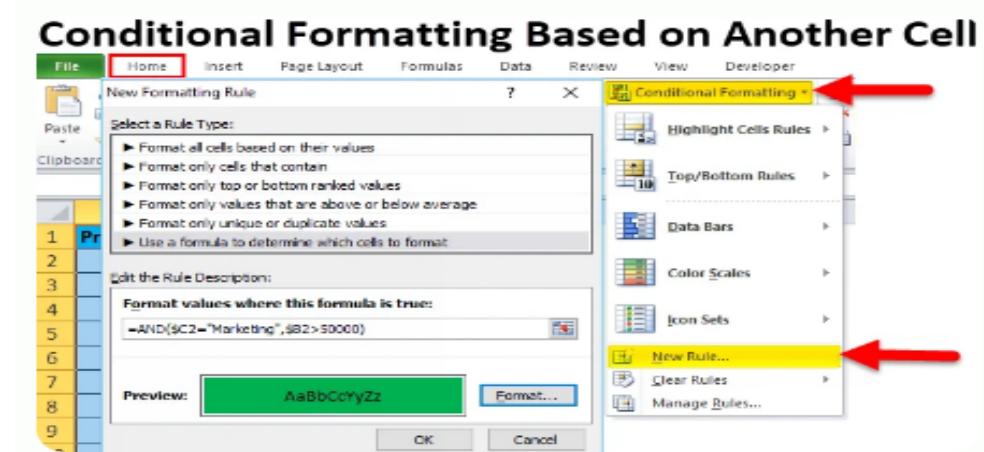
Assuming your date and time values are in column A and the format is “yyyy-mm-dd hh:mm:ss”:

1. **Separate Date and Time:**
  - o In column B, use the formula `=DATEVALUE(A1)` to extract the date.
  - o In column C, use the formula `=TIMEVALUE(A1)` to extract the time.
2. **Add Days to Date:**
  - o In column D, use the formula `=DATEADD(B1, 7)` to add 7 days to the date.
3. **Calculate Time Difference:**
  - o In column E, use the formula `=DATEDIF(C1, C2, "h")` to calculate the time difference in hours between two time values.

## Q7. Conditional Formatting: formatting, parsing, and highlighting data in spreadsheets during data analysis.

### 1. Highlighting Cells Based on Values:

- **Example (Excel):**
- Select the range of cells you want to format.
- Go to the “Home” tab, click on “Conditional Formatting,” and choose “Highlight Cells Rules.”
- Set rules such as “Greater Than,” “Less Than,” or “Equal To” and define the criteria.



### 2. Color Scales for Gradient Highlighting:

- **Example (Google Sheets):**
- Select the range.
- Click on “Format” in the menu, choose “Conditional formatting.”
- Select “Color scale” and choose the appropriate color scale.

A screenshot of the Microsoft Excel ribbon showing the 'Conditional Formatting' dropdown menu. The 'Icon Sets' option is highlighted with a pink box and a callout arrow pointing to it from the text below.

City	Jan	Apr	Jul	Oct
Ankara	0.4	11.3	23.6	13
Athens	10.2	16.9	29.3	20.1
Berlin	0.6	10.2	20.3	10.5
Cairo	13.6	21.2	27.6	23.3
Cracow	-1	9.8	20	9.2
Helsinki	-3.9	3.9	17.8	6.6
London	5.2	9.9	18.7	12
Oslo	-4.3	4.5	16.4	6.3
Prague	-1.4	8.4	18.2	8.5
Rome	7.5	12.6	24.1	16.4
Seoul	-2.4	12.5	24.9	14.8
Tallinn	-2.9	4.8	17.6	6.5
Tokyo	5.2	13.9	25	17.5
Vienna	0.3	10.7	20.8	10.2

### 3. Icon Sets for Visual Indicators:

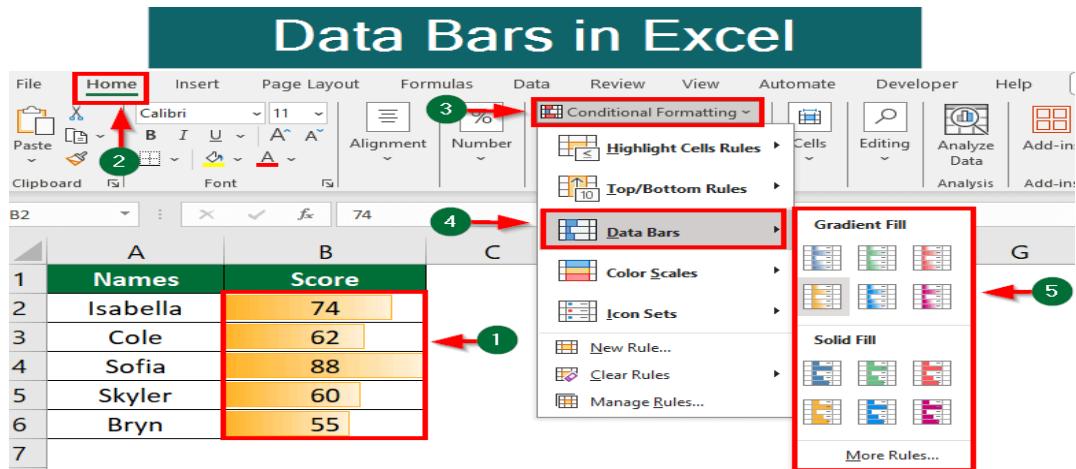
- **Example (Excel):**
- Apply icon sets to cells based on conditions (e.g., arrows indicating value trends).
- Go to “Conditional Formatting,” choose “Icon Sets,” and select the set you want.

A screenshot of the Microsoft Excel ribbon showing the 'Conditional Formatting' dropdown menu. The 'Icon Sets' option is highlighted with a red box and a callout arrow pointing to it from the text below.

	Value	Month	Icon Sets
2	81	May-18	Down
3	1075272	May-18	Up
4	6100	May-18	Down
5	6478	May-18	Down
6	45919	May-18	Up
7	25769	May-18	Down

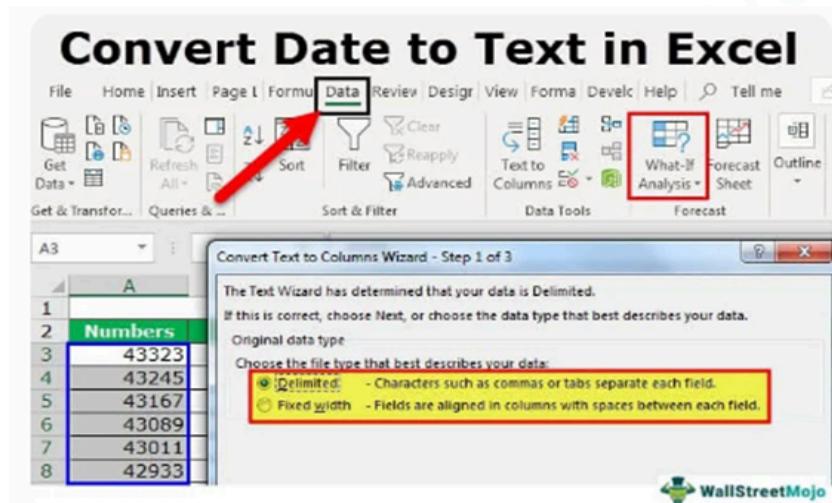
### 4. Data Bars and Color Gradients:

- **Example (Excel):**
- Apply data bars to visualize the magnitude of values in a cell.
- Go to “Conditional Formatting,” choose “Data Bars,” and pick the desired format.



## 5. Text and Date Formatting:

- **Example (Google Sheets):**
- Change text or date color based on conditions.
- Use “Custom formula is” option in conditional formatting to apply rules.



## 6. Top/Bottom Rules:

- **Example (Excel):**
- Highlight the top or bottom percentage/values in a range.
- Go to “Conditional Formatting,” choose “Top/Bottom Rules,” and set the criteria.

A screenshot of the Microsoft Excel ribbon interface. The 'Conditional Formatting' tab is selected. A red arrow points from the top of the page to the 'Top/Bottom Rules' option in the dropdown menu. Another red box highlights the 'Top/Bottom Rules' option itself. The main area shows a sample student marksheet with columns for NAME, ENGLISH, SCIENCE, MATHS, SPORTS, TOTAL MARKS, and DATE.

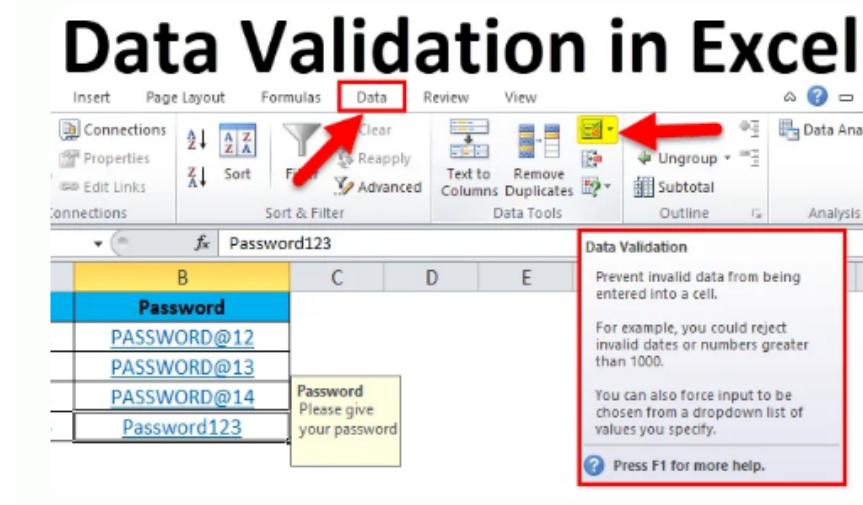
## 7. Formula-Based Formatting:

- **Example (Excel):**
- Create custom rules using formulas.
- Use a formula to determine which cells to format” option in conditional formatting.

A screenshot of the 'Conditional Formatting Based on Another Cell' dialog box. The 'Home' tab is selected in the ribbon. A red arrow points to the 'Conditional Formatting' button in the ribbon. Another red arrow points to the 'New Rule...' button in the right-hand pane. The dialog box shows a rule description: 'Format values where this formula is true: =AND(\$C2="Marketing", \$B2>50000)'.

## 8. Data Validation and Input Formatting:

- **Example (Google Sheets):**
- Set up data validation rules to control data input.
- Use formatting options to visually guide users on acceptable data.



## 9. Dynamic Formatting with Pivot Tables:

- **Example (Excel):**
- Dynamically format cells based on changes in data using PivotTable conditional formatting.

The screenshot shows the Microsoft Excel ribbon with the 'Home' tab selected. A red arrow points to the 'Conditional Formatting' button in the Home tab's ribbon. Another red arrow points to the 'Less Than...' option in the Conditional Formatting dropdown menu. A callout box highlights the 'Manage Rules...' option in the Conditional Formatting dialog box, which is used to edit existing rules. The status bar at the bottom indicates 'B5'.

## 10. Conditional Formatting in Programming (VBA or Google Apps Script):

- Example ([Excel VBA](#)):
- Use VBA to apply conditional formatting based on complex rules or dynamic conditions.

### VBA Conditional Formatting

The screenshot shows the Microsoft Excel VBA editor. The code in the 'Worksheet' module is as follows:

```
Private Sub Worksheet_SelectionChange(ByVal Target As Range)
    Dim MyRange As Range
    Set MyRange = Worksheets("Sheet1").Range("A1:B8")
    For Each Cell In MyRange
        If Cell.Value Like "1" Then
            Cell.Interior.ColorIndex = 6
        ElseIf Cell.Value Like "2" Then
            Cell.Interior.ColorIndex = 4
        ElseIf Cell.Value Like "A" Then
            Cell.Interior.ColorIndex = 6
        ElseIf Cell.Value Like "B" Then
            Cell.Interior.ColorIndex = 4
        Else
        End If
    Next Cell
End Sub
```

A red box highlights the conditional logic within the loop. A dashed arrow points from this highlighted code to a data table on the right. The data table has columns A and B, and rows 1 through 8. The values are color-coded according to the VBA logic:

	A	B
1	1	A
2	2	B
3	1	A
4	2	B
5	1	A
6	2	B
7	1	A
8	2	B

## Q8. Working with Multiple Sheets: work with multiple sheets within a workbook is crucial for organizing and managing data, performing complex calculations and creating comprehensive reports.

Working with multiple sheets within a workbook is a fundamental aspect of spreadsheet software like Microsoft Excel or Google Sheets. Here are some key benefits and functionalities of working with multiple sheets:

- 1. Organizing Data:** You can segment your data into different sheets based on categories, time periods, or any other relevant criteria. This helps keep your workbook tidy and makes it easier to locate specific information.

The screenshot shows a Microsoft Excel interface. The 'Data' tab is active in the ribbon. In the 'Sort & Filter' section of the ribbon, a red box highlights the 'Sort & Filter' button. Below the ribbon, a table titled 'Applying Filter Option to Organize Important Data' is shown. The table has columns: Product ID, Category, Quantity, Unit Price, and Cost. The entire table is highlighted with a red border. The table data is as follows:

Product ID	Category	Quantity	Unit Price	Cost
G-1245	Air Condition	35	\$ 2,022.00	\$ 70,770.00
H-453	Mobile	54	\$ 6,582.00	\$ 355,428.00
I-0987	Furniture	45	\$ 156.00	\$ 7,020.00
K-64567	Cricket Bat	73	\$ 400.00	\$ 29,200.00
U-75646	Shoe	85	\$ 70.00	\$ 5,950.00
T-56774	Electronics	15	\$ 351.00	\$ 5,265.00
C-001458	Furniture	95	\$ 254.00	\$ 24,130.00
D-562314	Television	82	\$ 313.00	\$ 25,666.00
F-652154	Transportation	25	\$ 25.00	\$ 625.00
A-201458	Electronics	19	\$ 55.00	\$ 1,045.00
C-125433	Housing	75	\$ 2,500.00	\$ 187,500.00

- 2. Managing Data:** With multiple sheets, you can manage large volumes of data more efficiently. You can use features like sorting, filtering, and grouping within each sheet to organize and manipulate your data as needed.

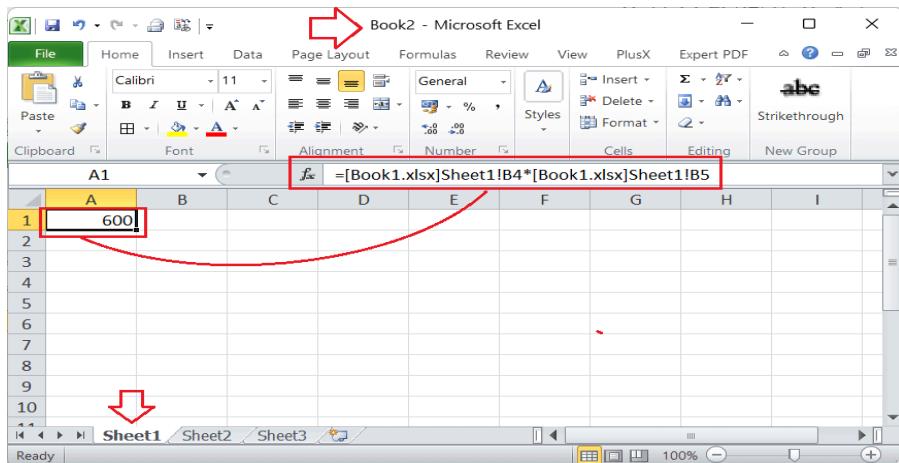
A	B	C	D	E
<b>College Enrollment 2016 - 2017</b>				
2	Student ID	Last Name	Initial	Age
3	ST348-245	White	R.	21
4	ST348-246	Wilson	P.	19
5	ST348-247	Thompson	A.	18
6	ST348-248	Holt	R.	23
7	ST348-249	Armstrong	J.	37
8	ST348-250	Graham	S.	20
9	ST348-251	McFadden	H.	26
10	ST348-252	Jones	S.	22
11	ST348-253	Russell	W.	20
12	ST348-254	Smith	L.	19
13				
14				
15				
16				

**3. Performing Complex Calculations:** By spreading your calculations across multiple sheets, you can break down complex problems into smaller, more manageable parts. This can make it easier to understand and debug your formulas.

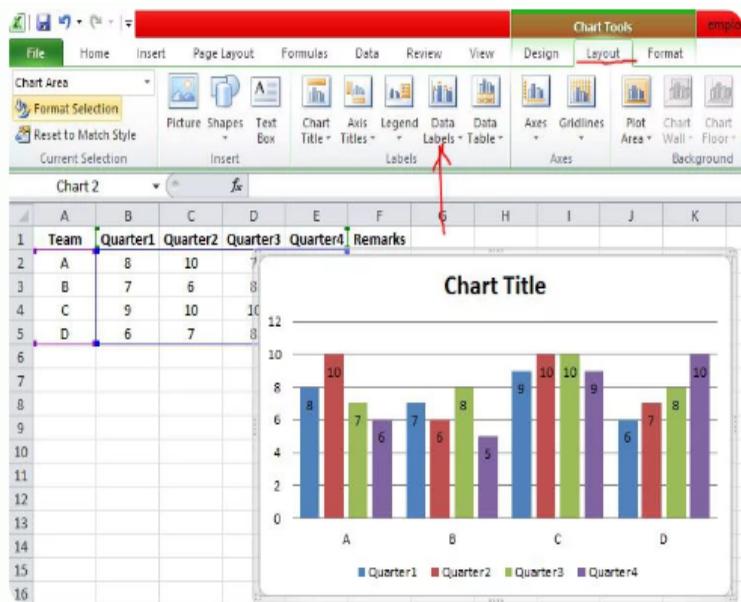
## Complex Formulas in Excel

	D2	=VLOOKUP("= "&C2&" ", \$A\$2:\$A\$8, 1, 0)
	A	B
1	Lookup Table	Lookup Values
2	Infosys Ltd	Infosys
3	IBM Ltd	IBM
4	ICICI Ltd	
5	Wipro Ltd	
6	Flipkart.com	
7	House Keeping Store	
8	Kirani Store	
	C	D
		VLOOKUp Result
		Infosys Ltd
		IBM Ltd
	E2	=VLOOKUP(D2, CHOOSE({1,2}, B2:B11, A2:A11), 2, 0)
	A	B
1	Sales	Month
2	266	Jan
3	370	Feb
4	326	Mar
5	353	Apr
6	399	May
	C	D
		Month
		Sales
		Apr
		353

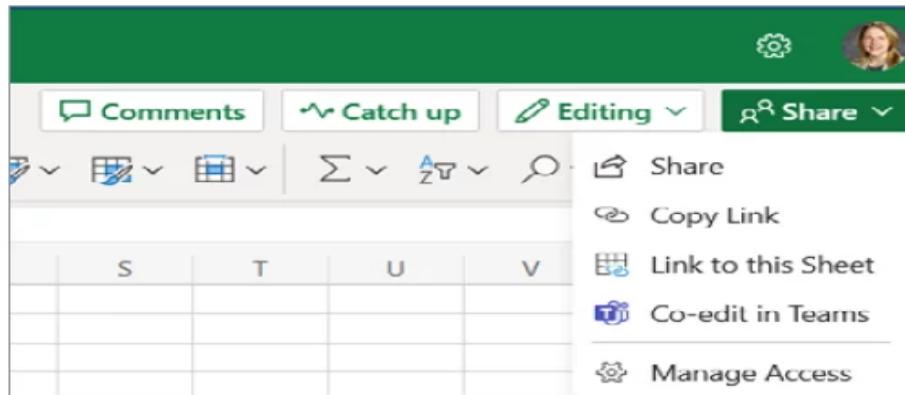
**4. Cross-Sheet References:** You can reference data from one sheet to another, allowing you to create relationships between different sets of data within your workbook. This is particularly useful for building summary reports or performing analysis across multiple datasets.



**5. Data Analysis and Visualization:** You can use different sheets to store raw data, intermediate calculations, and final results. This allows you to analyze your data step by step and create comprehensive reports with charts, graphs, and pivot tables.



**6. Collaboration:** When working with teams, you can assign different sheets to different team members or departments. This enables parallel work on different aspects of a project while keeping all the data within the same workbook.



**7. Data Protection:** You can protect certain sheets within your workbook by setting permissions or passwords. This helps prevent unauthorized access or accidental modification of sensitive data.

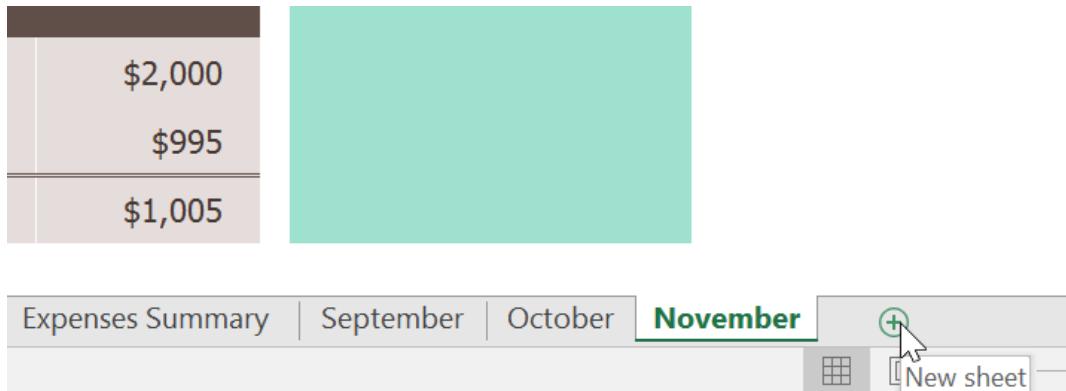
The screenshot shows a Microsoft Excel spreadsheet titled "2014-01 Excel.data.protection.xlsx [Compatibility Mode]". The "Review" tab is active. In the "Comments" section of the ribbon, the "Protect Sheet" button is circled in red. A "Protect Sheet" dialog box is displayed, containing the following settings:

- Protect worksheet and contents of locked cells
- Password to unprotect sheet: (empty field)
- Allow all users of this worksheet to:
  - Select locked cells
  - Select unlocked cells
  - Format cells
  - Format columns
  - Format rows
  - Insert rows
  - Insert hyperlinks
  - Delete columns
  - Delete rows

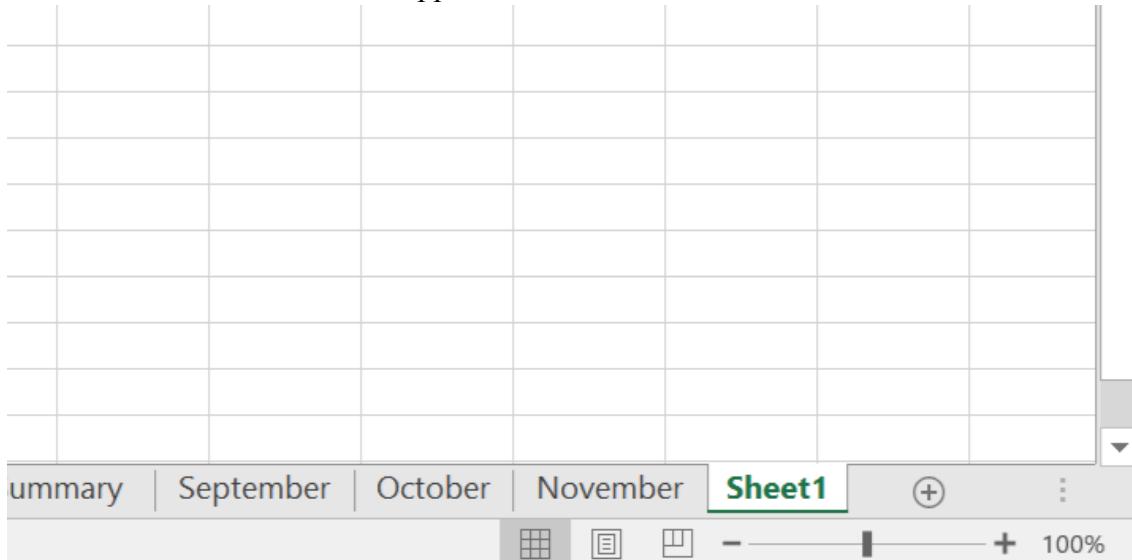
Overall, leveraging multiple sheets within a workbook enhances the flexibility, efficiency, and organization of your data management and analysis processes.

**Q9. Working with Multiple Sheets: work with multiple sheets within a workbook is crucial for organizing and managing data, performing complex calculations and creating comprehensive reports.**

1. Locate and select the New sheet button near the bottom-right corner of the Excel window.



2. A new blank worksheet will appear.

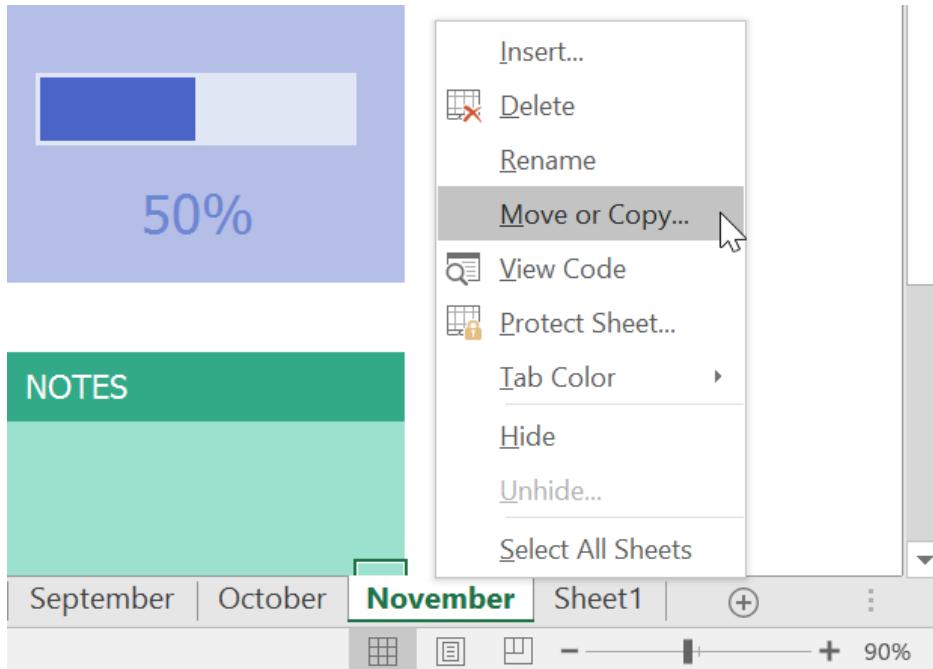


3. By default, any new workbook you create in Excel will contain one worksheet, called Sheet1. To change the default number of worksheets, navigate to Backstage view, click Options, then choose the desired number of worksheets to include in each new workbook.

4. To copy a worksheet:

If you need to duplicate the content of one worksheet to another, Excel allows you to copy an existing worksheet.

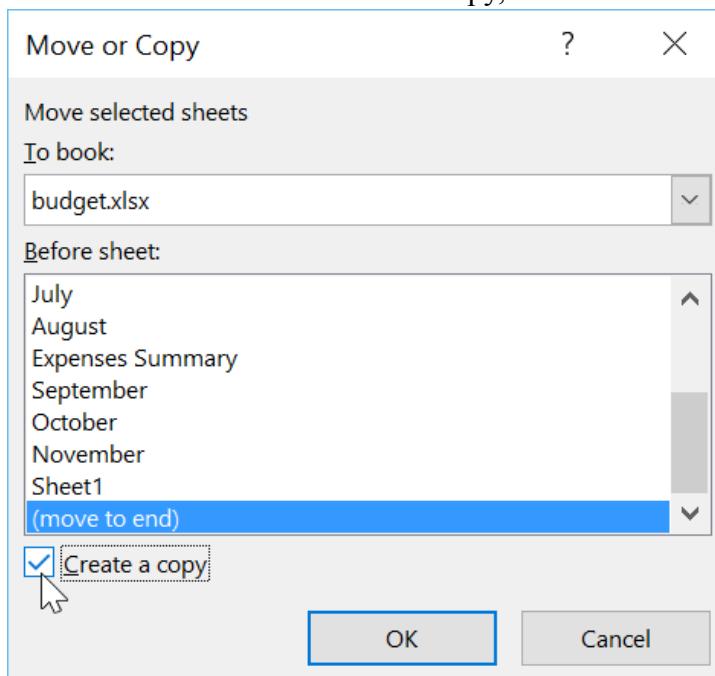
5. Right-click the worksheet you want to copy, then select Move or Copy from the worksheet menu.



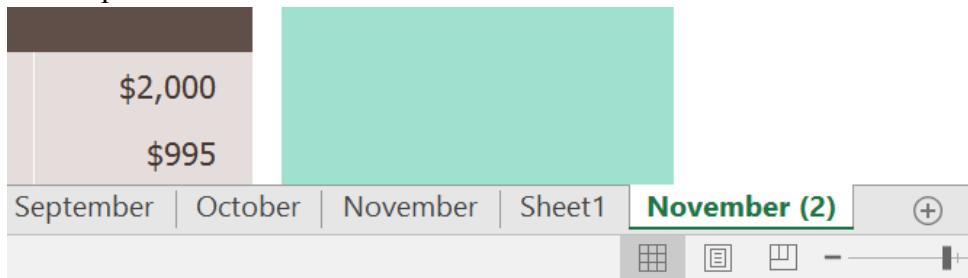
6. The Move or Copy dialog box will appear. Choose where the sheet will appear in the Before sheet: field.

In our example, we'll choose (move to end) to place the worksheet to the right of the existing worksheet.

7. Check the box next to Create a copy, then click OK.



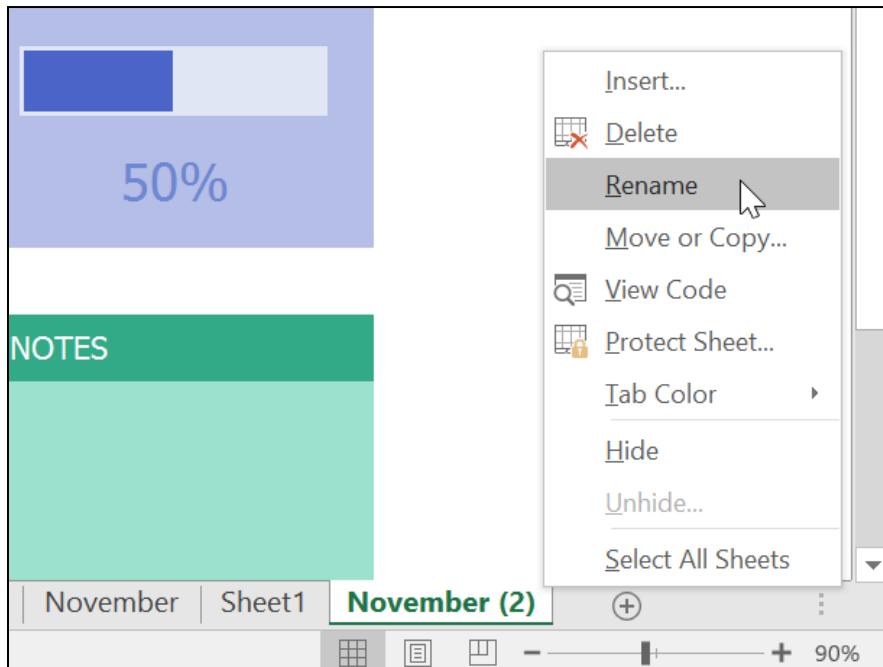
8. The worksheet will be copied. It will have the same title as the original worksheet, as well as a version number. In our example, we copied the November worksheet, so our new worksheet is named November (2). All content from the November worksheet has also been copied to the new worksheet.



9. You can also copy a worksheet to an entirely different workbook. You can select any workbook that is currently open from the To book: drop-down menu.

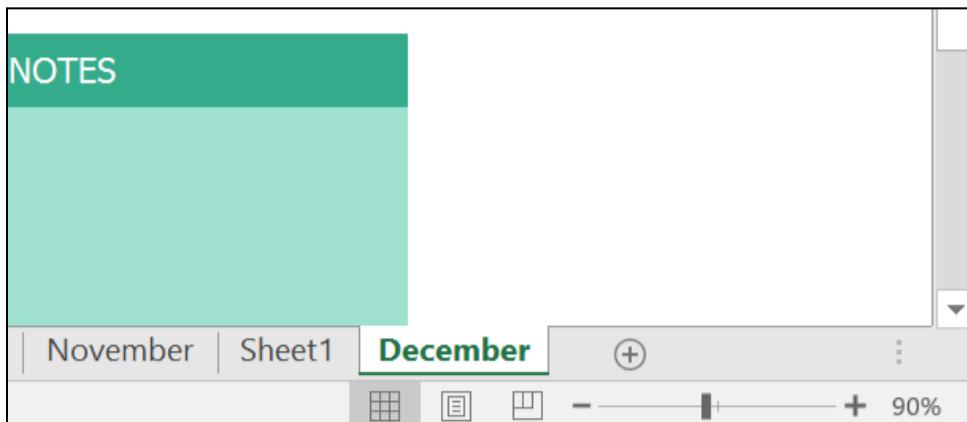
10. To rename a worksheet:

Right-click the worksheet you want to rename, then select Rename from the worksheet menu.



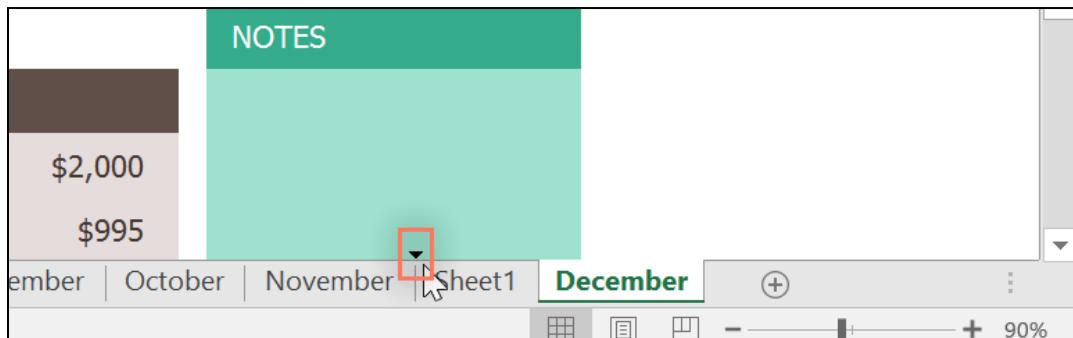
11. Type the desired name for the worksheet.

Click anywhere outside the worksheet tab, or press Enter on your keyboard. The worksheet will be renamed.

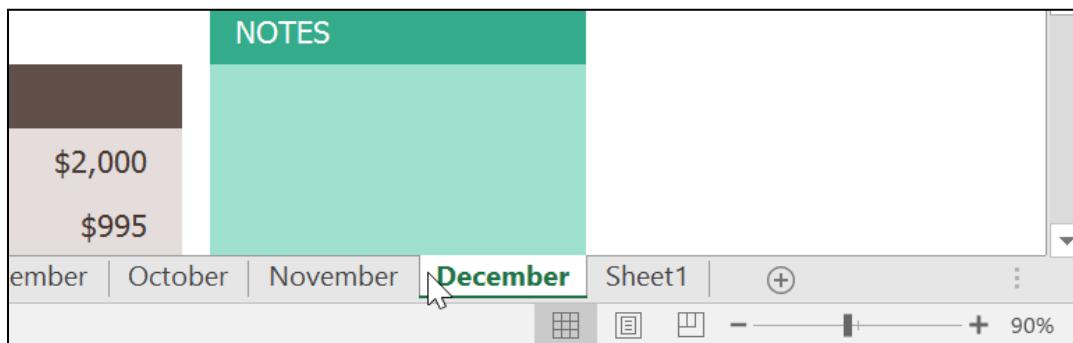


11. To move a worksheet:

Click and drag the worksheet you want to move until a small black arrow appears above the desired location.



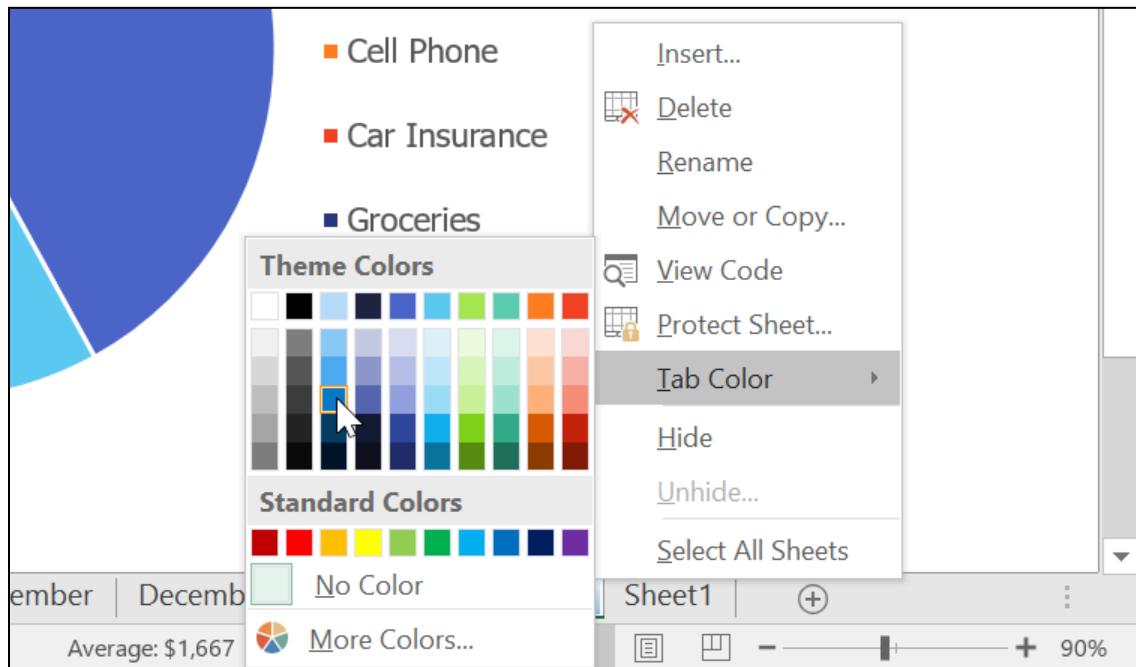
Release the mouse. The worksheet will be moved.



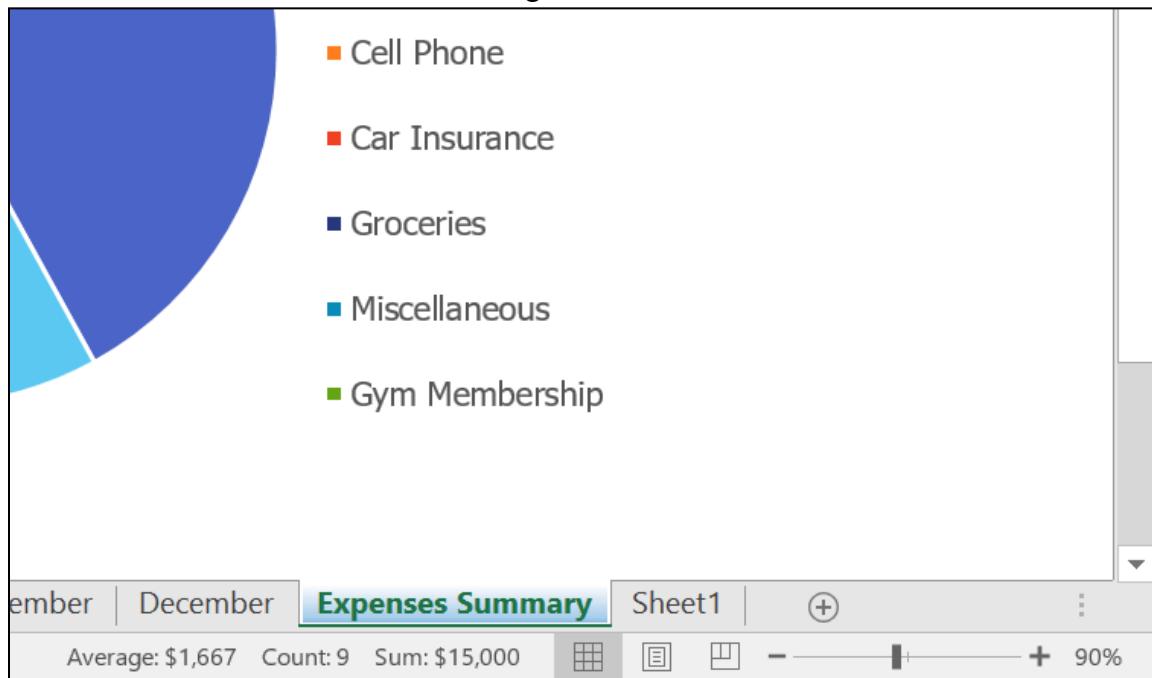
12. To change the worksheet tab color:

Right-click the desired worksheet tab, and hover the mouse over Tab Color. The Color menu will appear.

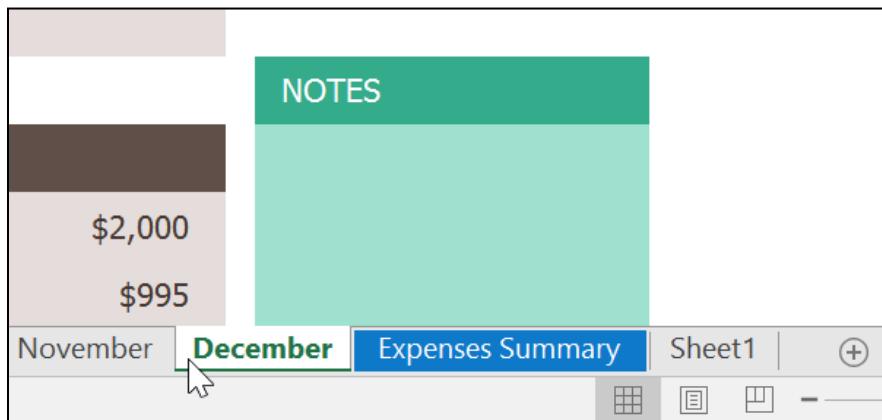
Select the desired color.



13. The worksheet tab color will be changed.

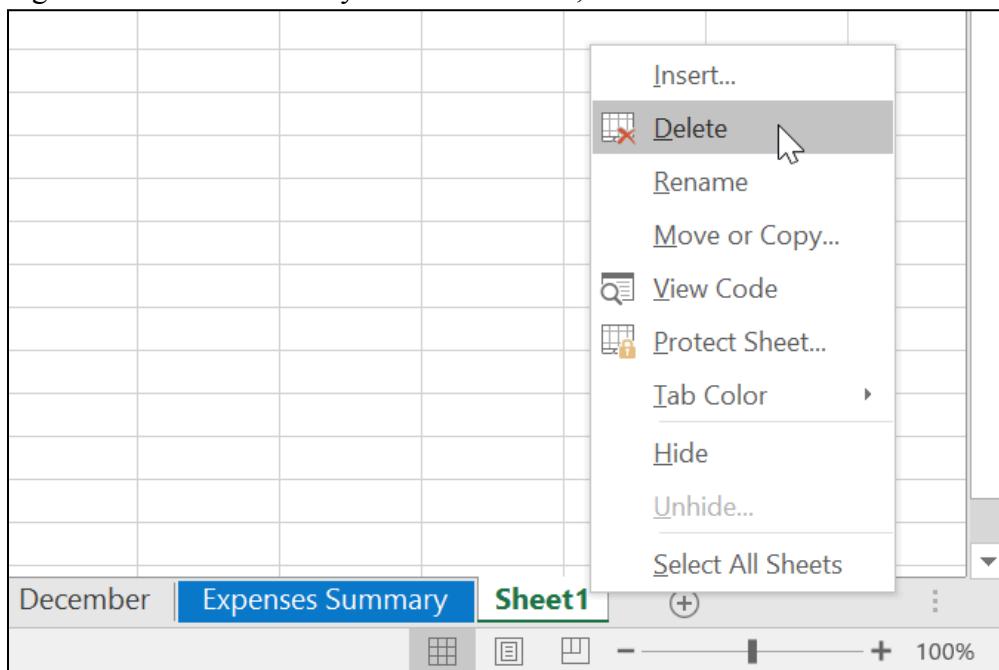


14. The worksheet tab color is considerably less noticeable when the worksheet is selected. Select another worksheet to see how the color will appear when the worksheet is not selected.

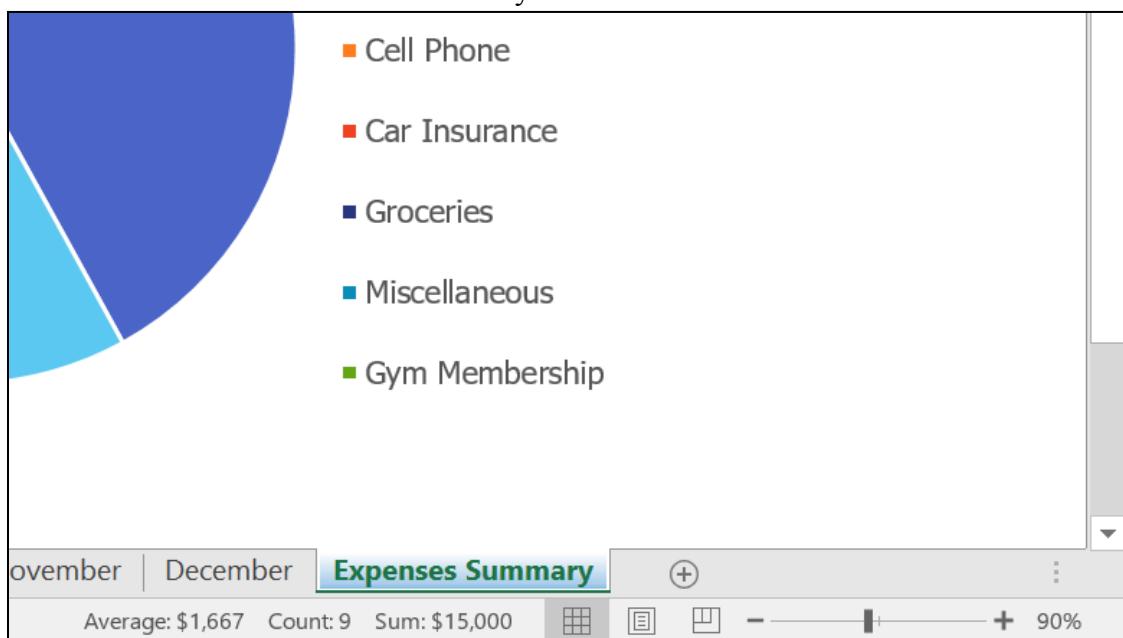


15. To delete a worksheet:

Right-click the worksheet you want to delete, then select Delete from the worksheet menu.



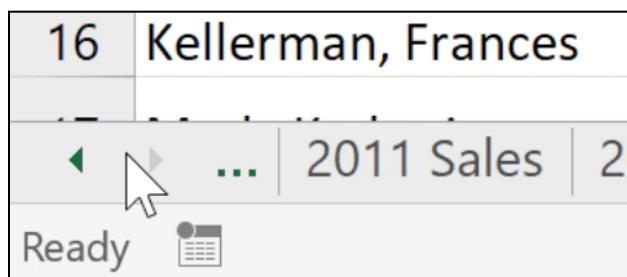
16. The worksheet will be deleted from your workbook.



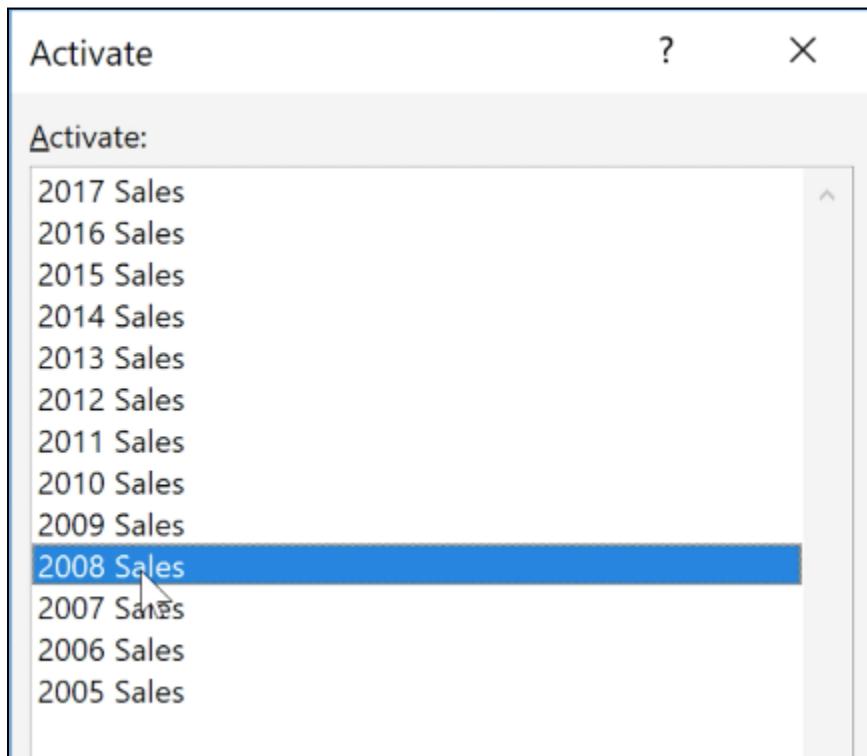
If you want to prevent specific worksheets from being edited or deleted, you can protect them by right-clicking the desired worksheet and selecting Protect Sheet from the worksheet menu.

17. Switching between worksheets

If you want to view a different worksheet, you can simply click the tab to switch to that worksheet. However, with larger workbooks this can sometimes become tedious, as it may require scrolling through all of the tabs to find the one you want. Instead, you can simply right-click the scroll arrows in the lower-left corner, as shown below.



A dialog box will appear with a list of all of the sheets in your workbook. You can then double-click the sheet you want to jump to.



**Q10. 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. Analyze the data using appropriate charts and report the data.**

To create a worksheet that calculates employee net pay based on various allowances, taxes, and deductions. Use Excel formulas for automated calculations, analyze the data using charts, and generate a report.

#### **Step 1: Create a Worksheet Layout**

1. Open a new Excel file.
2. Label the columns as follows in **Row 1**:
  - A1: **Empno** (Employee Number)
  - B1: **Ename** (Employee Name)
  - C1: **Basic Pay (BP)**
  - D1: **Travelling Allowance (TA)**
  - E1: **Dearness Allowance (DA)**
  - F1: **House Rent Allowance (HRA)**
  - G1: **Income Tax (IT)**
  - H1: **Provident Fund (PF)**
  - I1: **Net Pay (NP)**

#### **Step 2: Enter Employee Data**

1. In the rows below the headers, input data for each employee, including employee number, name, and their **Basic Pay (BP)**.

#### **Step 3: Apply Formulas for Allowances and Deductions**

1. **Travelling Allowance (TA):**
  - Formula: TA = 10% of Basic Pay (BP)
  - Example formula for cell D2:  
$$= C2 * 0.10$$
2. **Dearness Allowance (DA):**
  - Formula: DA = 20% of Basic Pay (BP)
  - Example formula for cell E2:  
$$= C2 * 0.20$$
3. **House Rent Allowance (HRA):**
  - Formula: HRA = 15% of Basic Pay (BP)
  - Example formula for cell F2:  
$$= C2 * 0.15$$
4. **Income Tax (IT):**

- Formula:  $IT = 12\% \text{ of Basic Pay (BP)}$
  - Example formula for cell G2:  
 $= C2 * 0.12$
5. **Provident Fund (PF):**
- Formula:  $PF = 5\% \text{ of Basic Pay (BP)}$
  - Example formula for cell H2:  
 $= C2 * 0.05$

#### Step 4: Calculate Net Pay (NP)

1. **Net Pay (NP):**
- Formula:  $NP = \text{Basic Pay} + TA + DA + HRA - IT - PF$
  - Example formula for cell I2:  
 $= C2 + D2 + E2 + F2 - G2 - H2$

#### Step 5: Copy the Formulas for All Employees

1. Select the calculated cells (D2 to I2) and drag downwards to apply the formulas to all employees.

#### Step 6: Analyze the Data Using Charts

1. **Create a Bar Chart:**
  - Highlight the column headers and values for **Employee Name** and **Net Pay**.
  - Go to the **Insert** tab → **Charts Group** → Select **Bar Chart**.
  - Customize the chart to show employee-wise Net Pay.
2. **Create a Pie Chart:**
  - Highlight the data related to the **Components of Salary** (Basic Pay, TA, DA, HRA, IT, PF) for any specific employee.
  - Go to the **Insert** tab → **Charts Group** → Select **Pie Chart**.
  - This chart will illustrate the distribution of salary components.

#### Step 7: Generate a Data Report

1. Use **Pivot Tables** to summarize data like total salaries, average allowances, etc.
  - Go to the **Insert** tab → **Pivot Table**.
  - Select the data range and analyze fields such as **Basic Pay**, **Net Pay**, and **Deductions**.
2. Use **AutoFilter** to view and organize data based on specific allowances or net pay ranges.
  - Select the data range.
  - Go to the **Data** tab → **Sort & Filter** → **Apply Filter**.
  - Filter the data based on allowances, pay, or any field.

**Q11. 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. Analyze the data using appropriate charts and report the data.**

To create a worksheet that manages inventory data, calculates cost after applying discounts, and analyzes the data using appropriate charts. This experiment will help automate calculations and visualize the inventory data.

### Step 1: Create a Worksheet Layout

1. Open a new Excel file.
2. Label the columns as follows in **Row 1**:
  - A1: **Product Code** (Unique code for each product)
  - B1: **Product Name** (Name of the product)
  - C1: **Product Type** (Category/type of product)
  - D1: **MRP** (Maximum Retail Price)
  - E1: **Discount %** (Discount percentage applied)
  - F1: **Cost After Discount** (Calculated price after applying discount)
  - G1: **Date of Purchase** (Purchase date of the product)

### Step 2: Enter Inventory Data

1. In the rows below the headers, input sample data for each product, including product code, name, type, and MRP.

### Step 3: Apply Formulas for Calculations

1. **Cost After Discount:**
  - Formula: Cost After Discount = MRP - (MRP \* Discount %)
  - Example formula for cell F2:  
 $= D2 - (D2 * E2 / 100)$
2. Copy the formula for all products by dragging the formula down from cell F2 to other rows.

### Step 4: Format the Date of Purchase Column

1. Input the **Date of Purchase** in column G using the correct date format.
2. Select the column and format it to display the date in a preferred format.
  - Right-click → Format Cells → Select **Date**.

### Step 5: Analyze the Data Using Charts

1. **Create a Bar Chart:**

- Highlight the column headers and values for **Product Name** and **Cost After Discount**.
  - Go to the **Insert** tab → **Charts Group** → Select **Bar Chart**.
  - Customize the chart to show product-wise cost after discount.
2. **Create a Line Chart:**
- Highlight the data related to **MRP** and **Cost After Discount**.
  - Go to the **Insert** tab → **Charts Group** → Select **Line Chart**.
  - This chart will show the relationship between the original price and discounted price for each product.

### Step 6: Use Pivot Tables for Data Analysis

1. Insert a **Pivot Table** to analyze the following:
  - Total value of inventory after discount.
  - Number of products under each category.
  - Comparison of MRP vs. discounted cost for various products.
  - Go to the **Insert** tab → **Pivot Table** → Select the data range.
  - Analyze fields like **Product Type**, **Cost After Discount**, and **MRP**.

### Step 7: Generate a Report

1. Summarize the data analysis results:
  - Total inventory value.
  - Product-wise and category-wise discounts.
  - Trends in product pricing and discounting.
2. Use **AutoFilter** to organize and filter the data based on product type, discount percentage, or date of purchase.
  - Select the data range.
  - Go to the **Data** tab → **Apply Filter**.

**Q12. 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.**

To create a worksheet for analyzing sales data of a merchandise store, including various details such as customer demographics, product categories, and sales amount. The analysis will be done using formulas, pivot tables, and visualized through different types of charts.

### Step 1: Create a Worksheet Layout

1. Open a new Excel file.
2. Label the columns as follows in **Row 1**:
  - A1: **Order ID** (Unique identifier for each order)
  - B1: **Customer ID** (Unique identifier for each customer)
  - C1: **Gender** (Customer's gender)
  - D1: **Age** (Customer's age)
  - E1: **Date of Order** (The date when the order was placed)
  - F1: **Month** (The month in which the order was placed)
  - G1: **Online Platform** (Platform where the order was placed, e.g., website, app)
  - H1: **Category of Product** (Category of merchandise, e.g., clothing, electronics)
  - I1: **Size** (Size of the product, if applicable)
  - J1: **Quantity** (Number of units ordered)
  - K1: **Amount** (Total amount for the order)
  - L1: **Shipping City** (City where the order is shipped)

### Step 2: Enter Sales Data

1. Enter sample sales data in rows below the headers for each order. Include details for various orders placed on different platforms, with varying categories, sizes, and quantities.

### Step 3: Apply Formulas for Data Segregation

1. **Segregate Orders by Category:**
  - Use **IF** formulas to separate data by product categories.
  - Example: To segregate "Clothing" products, enter the following in a new column:  
`=IF(H2="Clothing", "Clothing", "Other")`
2. **Calculate Total Sales per Month:**
  - Use the **SUMIF** formula to calculate the total sales for each month.
  - Example: For January, enter:  
`=SUMIF(F:F, "January", K:K)`

## Step 4: Analyze Data Using Pivot Tables

1. **Insert a Pivot Table:**
  - Select the entire data range.
  - Go to the **Insert** tab → Select **Pivot Table** → Choose a new worksheet or place it in the existing one.
2. **Perform Comparative Study:**
  - Drag **Category of Product** to the **Rows** section.
  - Drag **Amount** to the **Values** section to analyze the total sales for each category.
  - Drag **Gender** and **Month** to compare the sales based on customer demographics and time period.
  - Use the pivot table to explore:
    - Which product category has the highest sales.
    - Sales distribution across different online platforms and cities.
    - Comparative study of customer preferences based on gender and age.

## Step 5: Visualize Data with Charts

1. **Bar Chart for Sales by Category:**
  - Highlight the data showing **Category of Product** and **Total Sales** from the pivot table.
  - Go to **Insert** tab → Choose **Bar Chart**.
  - Customize it to show sales performance by product category.
2. **Line Chart for Monthly Sales:**
  - Highlight data showing **Month** and **Total Sales**.
  - Go to the **Insert** tab → Choose **Line Chart**.
  - This will display sales trends over the months.
3. **Pie Chart for Gender-wise Sales Distribution:**
  - Highlight **Gender** and **Total Sales** data.
  - Go to the **Insert** tab → Choose **Pie Chart**.
  - This chart will represent the sales distribution based on gender.

## Step 6: Use Advanced Filters

1. Apply **Advanced Filters** to isolate specific data, such as:
  - Orders placed only through the app.
  - Sales from specific product categories, e.g., "Electronics."
2. To apply a filter:
  - Go to the **Data** tab → Click on **Filter**.
  - Select criteria such as **Online Platform** or **Category of Product** to filter the dataset.

### Step 7: Generate Reports and Insights

1. Summarize the findings in a report, focusing on:
  - Key insights into customer demographics (e.g., age and gender).
  - Popular product categories and the platforms generating the most sales.
  - Month-wise sales trends and performance.
2. Provide charts and pivot tables as part of the report to support the analysis.

### Q13. Generation of report & presentation using Autofilter and macro.

To use Excel's Autofilter and Macro features to create a dynamic report and automate repetitive tasks, such as filtering data and generating a presentation from the analyzed data.

#### Step 1: Create a Dataset for Reporting

1. **Open a new Excel worksheet.**
2. **Enter the following data fields:**
  - **Order ID:** Unique identifier for each order.
  - **Customer Name:** The name of the customer.
  - **Product Category:** The category of products, such as Electronics, Clothing, Accessories, etc.
  - **Order Date:** The date when the order was placed.
  - **Sales Amount:** The total sales amount for the order.
  - **Shipping City:** The city where the product was shipped.
  - **Status:** The current status of the order (Delivered, Pending, Cancelled, etc.).

#### Step 2: Apply Autofilter

1. **Select the dataset** by highlighting all the cells containing data.
2. **Go to the Data tab** in the Excel ribbon.
3. Click on **Filter** under the **Sort & Filter** group.
4. **Autofilter** will now be applied to the dataset:
  - You will see dropdown arrows appear next to each column header.
  - Use these arrows to filter the data by specific criteria.
5. **Filter Data Based on Specific Conditions:**
  - For example, filter orders that belong to the "Electronics" category:
    - Click the dropdown arrow on the **Product Category** column.
    - Uncheck all categories except for **Electronics**.
  - Apply other filters such as **Order Date** and **Shipping City** to narrow down the dataset further.

#### Step 3: Record a Macro

1. **Record a Macro to Automate Filtering:**
  - Go to the **View tab** → Click on **Macros** → Select **Record Macro**.
  - Name the macro as **FilterSalesData**.
  - Assign a shortcut key if necessary.
  - **Click OK** to start recording.
2. **Perform the Desired Actions:**
  - Use the Autofilter to filter the data by different product categories, date ranges, or cities.

- Once done, **stop the macro** by going to the **View tab** → **Macros** → **Stop Recording**.
- 3. Test the Macro:**
- Clear the filters.
  - Use the shortcut key or go to **Macros** → **View Macros** → Select **FilterSalesData** → Run it.
  - The macro will now automatically apply the filters as recorded.

## Step 4: Generate a Report

- 1. Summarize Filtered Data:**
  - Once you've filtered the data, summarize the important metrics such as:
    - Total sales amount.
    - Number of orders per category.
    - Top-performing cities or regions.
- 2. Use Formulas to Calculate Key Metrics:**
  - Use the **SUMIF** formula to calculate total sales for specific categories: `=SUMIF(Product Category, "Electronics", Sales Amount)`.
  - Use **COUNTIF** to count the number of orders for specific statuses: `=COUNTIF(Status, "Delivered")`.
- 3. Create Charts for Visual Representation:**
  - Create a bar chart for **sales by product category**.
  - Create a pie chart for **status distribution** (Delivered, Pending, etc.).
  - Insert these charts into the worksheet or in a new sheet.

## Step 5: Automate Report Generation with Macros

- 1. Record Another Macro to Automate the Report Generation:**
  - Go to **View tab** → **Macros** → **Record Macro**.
  - Name this macro **GenerateReport**.
  - Perform the following actions while the macro is recording:
    - Apply the filters.
    - Create the charts.
    - Move the charts to a new worksheet.
  - **Stop recording** once done.
- 2. Test the Report Generation Macro:**
  - Run the **GenerateReport** macro to automate the entire report generation process.

## Step 6: Create a Presentation with the Report

- 1. Export Charts to PowerPoint:**
  - Right-click on each chart → Select **Copy**.
  - Open **PowerPoint** → **Paste** the charts into individual slides.
- 2. Create a Slide Presentation:**
  - Create a title slide with the report title (e.g., **Sales Analysis Report**).

- Include additional slides for each data chart:
  - Sales by Category.
  - Order Status Distribution.
  - Sales by Shipping City.
- 3. **Automate PowerPoint Export Using Macros** (Optional):
  - Advanced users can record a macro to automate the process of copying charts and pasting them into PowerPoint using VBA.

### Step 7: Conclusion and Report

1. Save the Excel file containing the **Autofiltered data, generated reports, and macros**.
2. Save the PowerPoint presentation with all the charts and summaries.
3. Submit both files as part of your lab report.

## **Q14. Create a dashboard for exercise 10,11,12 data and show the Total Gross Salaries, Number of products available, number of products expiring, and number of products sold category-wise.**

You have to create an interactive dashboard in Excel that summarizes key data from three worksheets: employee salary data, inventory management, and sales analysis. The dashboard will display the **Total Gross Salaries**, **Number of Products Available**, **Number of Products Expiring**, and **Number of Products Sold** by category.

### **Step 1: Consolidate Data**

1. Open a new Excel workbook and create three separate worksheets based on the data provided in Exercises 10, 11, and 12:
  - **Worksheet 1 (Exercise 10): Employee Salary Data**  
Fields: Empno, Ename, BP, TA, DA, HRA, IT, PF, NP
    - Ensure the **Net Pay (NP)** column is correctly calculated using the formula:  
$$NP = BP + TA + DA + HRA - IT - PF$$
  - **Worksheet 2 (Exercise 11): Inventory Management**  
Fields: Product Code, Product Name, Product Type, MRP, Cost after % Discount, Date of Purchase
    - Add an additional column to calculate **Expiration Status** based on the date of purchase. Use conditional formulas to check if a product is expiring within a specific period (e.g., next 6 months).
  - **Worksheet 3 (Exercise 12): Sales Analysis**  
Fields: Order ID, Customer ID, Gender, Age, Date of Order, Month, Online Platform, Category, Size, Quantity, Amount, Shipping City
    - Ensure the **Quantity Sold** and **Amount** columns are properly populated for each category.

### **Step 2: Calculate Key Metrics**

1. **Total Gross Salaries (Exercise 10):**
  - In the Employee Salary worksheet, create a formula to calculate the total gross salaries.  
Use:  
$$=SUM(NP)$$
  
This will give you the total net pay (gross salaries) for all employees.
2. **Number of Products Available (Exercise 11):**
  - In the Inventory Management worksheet, use a **COUNTIF** formula to count the number of products available for each product category.  
Use:

`=COUNTIF(Product Type, "<>")`

This will give you the total number of products available in the inventory.

### 3. Number of Products Expiring (Exercise 11):

- Create a column that uses a formula to determine whether products are expiring soon (based on the Date of Purchase).

Use:

`=IF(TODAY()-[Date of Purchase] > 180, "Expiring", "Available")`

Then, use:

`=COUNTIF(Expiration Status, "Expiring")`

This will give you the number of products that are expiring.

### 4. Number of Products Sold Category-Wise (Exercise 12):

- In the Sales Analysis worksheet, use **PivotTables** to summarize the number of products sold for each category.

Drag the **Product Category** into Rows and **Quantity Sold** into Values.

This will give you the total number of products sold for each category.

## Step 3: Create PivotTables for the Dashboard

### 1. Create PivotTables for each of the key metrics:

- **Total Gross Salaries:** Use a summary pivot table to display the sum of the **NP (Net Pay)** column.
- **Number of Products Available:** Use a PivotTable to count the number of products in each category.
- **Number of Products Expiring:** Use a PivotTable to count products marked as "Expiring."
- **Number of Products Sold Category-Wise:** Use a PivotTable to summarize products sold by category.

## Step 4: Create Charts for Data Visualization

### 1. Insert Charts for Better Visualization:

- **Total Gross Salaries:** Use a simple **Bar Chart** to display the total salaries of employees.
- **Number of Products Available and Expiring:** Use a **Pie Chart** to show the proportion of available and expiring products.
- **Number of Products Sold Category-Wise:** Use a **Column Chart** to show the number of products sold in each category.

## Step 5: Create the Dashboard Layout

1. **Add a New Worksheet** and name it **Dashboard**.
  2. **Insert PivotTables and Charts** from the previous steps into this worksheet.
  3. Use **Slicers** to add interactivity. For example, use slicers for:
    - Product Categories
    - Date of Order (for sales)
    - Employee Name (for salary data)
  4. Arrange the charts and slicers in a neat and presentable format to create an interactive dashboard.
- 

### **Step 6: Final Presentation**

1. **Design the Dashboard** with proper titles for each section:
  - **Total Gross Salaries**.
  - **Products Available and Expiring**.
  - **Products Sold by Category**.
2. Add any additional formatting, such as colors or data labels, to make the dashboard visually appealing.
3. Review the dashboard and ensure that all filters and slicers work properly.

## **14. 1 Flipped class session:**

**Students will explain the flow of the inter sheet communication and data access with dashboard visualization.**

### **Instructions**

1. Students will be presenting this exercise based on the topics assigned.
2. Student teams should ensure that you are well-prepared and ready to engage in the class activities.

## Comprehensive Quiz with 1st,2nd 3rd Prize distribution



### Details:

**Number of Questions:** 50 Questions

**Duration:** 1 Hour Time

**Venue:** Class / Alive platform

### Prizes:

**1st** - Student profile addition to department magazine with Certificates from the Department as Expert in Excel.

**2nd** - Certificates from the Department as Expert in Excel.

**3rd** - Certificates from the Department as Beginners in Excel.

## References:

<b>Recommended References:</b>	
<b>1.</b>	Berk & Carey - Data Analysis with Microsoft® Excel: Updated for Office 2007®, Third Edition, © 2010 Brooks/Cole, Cengage Learning, ISBN-13: 978-0-495-39178-4
<b>2.</b>	Wayne L. Winston - Microsoft Excel 2019: Data Analysis And Business Modeling, PHI, ISBN: 9789389347180
	Aryan Gupta - Data Analysis in Excel: The Best Guide. ( <a href="https://www.simplilearn.com/tutorials/excel-tutorial/data-analysis-excel">https://www.simplilearn.com/tutorials/excel-tutorial/data-analysis-excel</a> )

## Reference book for excel:

[https://drive.google.com/file/d/1UQaPwrDva\\_GMX1ZT8kyJ1uqKjDsUROT7/view?usp=sharing](https://drive.google.com/file/d/1UQaPwrDva_GMX1ZT8kyJ1uqKjDsUROT7/view?usp=sharing)

<b>WEB REFERENCES</b>		
<b>S.N</b>	<b>WEB URL</b>	<b>TOPIC REFERRED TO</b>
<b>1.</b>	<a href="https://youtu.be/_g5roKHj95o">https://youtu.be/_g5roKHj95o</a>	Practice
<b>2.</b>	<a href="https://youtu.be/310z5K14JXw">https://youtu.be/310z5K14JXw</a>	Theory