

Internet and Information Technology

Lecture 10

ITC202

Microsoft Office: Excel

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Learning Objectives

- Explain
 - Basic spreadsheet concepts
 - Relative/Absolute addresses
 - Functions
 - Advanced formatting options
- Show how to:
 - Create, edit, print, and save spreadsheets using Excel

Concepts

- Spreadsheet is made up of rows and columns (cols), essentially a table
 - Excel calls this a worksheet
- Col(s) identified with a letter(s): A
- Row(s) identified with a number(s): 1
 - Intersection of row & col is a cell
 - Cells identified by col letter followed by the row number: A1

Concepts

- Cells hold the contents of the spreadsheet/worksheet
- Input is entered one cell at a time via the active cell
- To enter data, move the cursor to a cell (to make it the active cell) and start typing
- In Excel, multiple worksheets are stored in a single PC file with a file extension of .xlsx called a workbook

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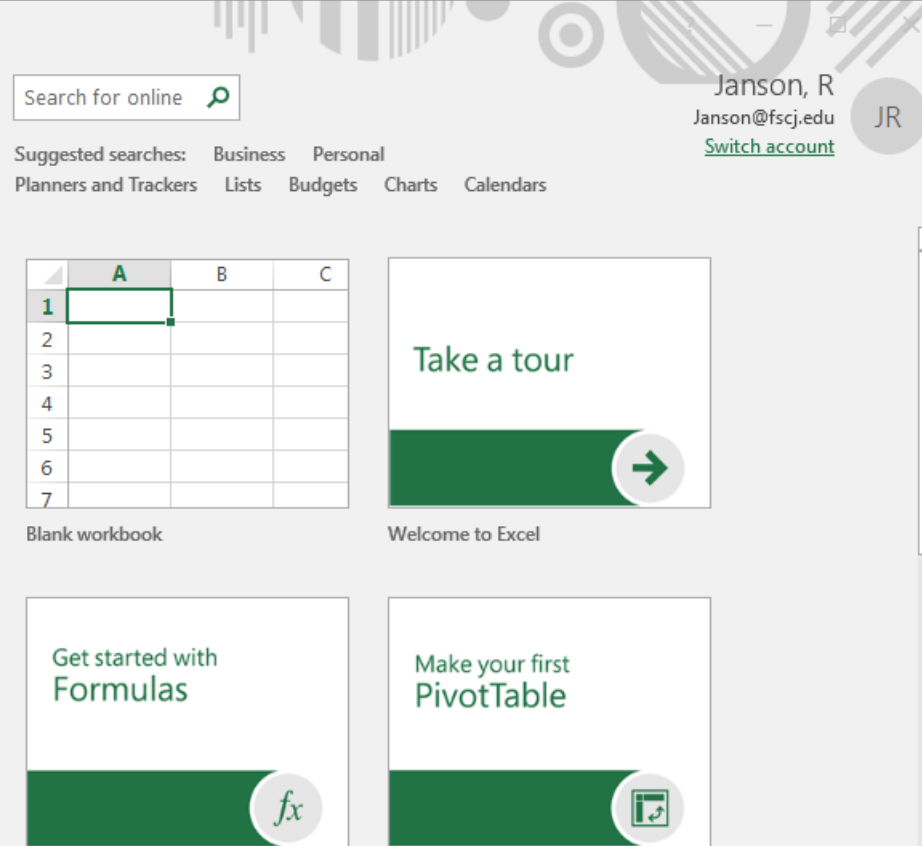
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Like Word, when Excel first started you can create from a template or create blank workbook

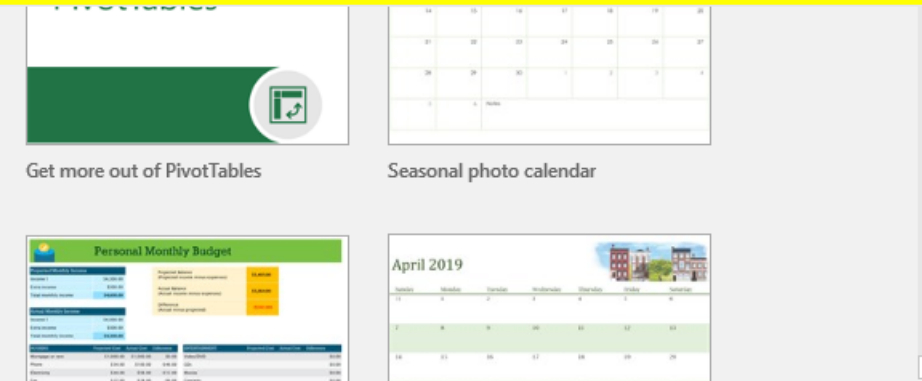
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20181 Fall Schedule Live 3_13_2017.xlsx
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 Open Other Workbooks

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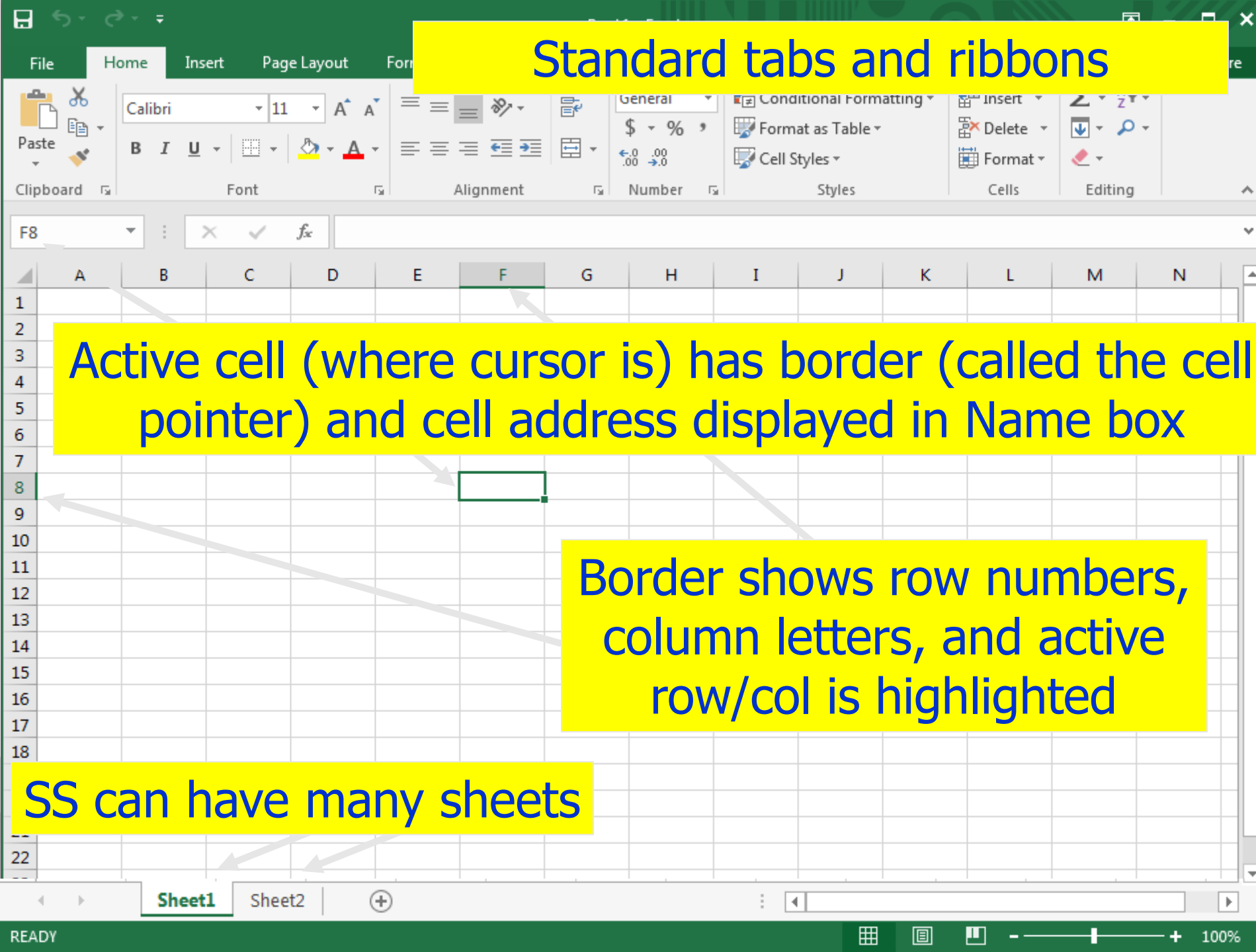


Standard tabs and ribbons

Active cell (where cursor is) has border (called the cell pointer) and cell address displayed in Name box

Border shows row numbers, column letters, and active row/col is highlighted

SS can have many sheets

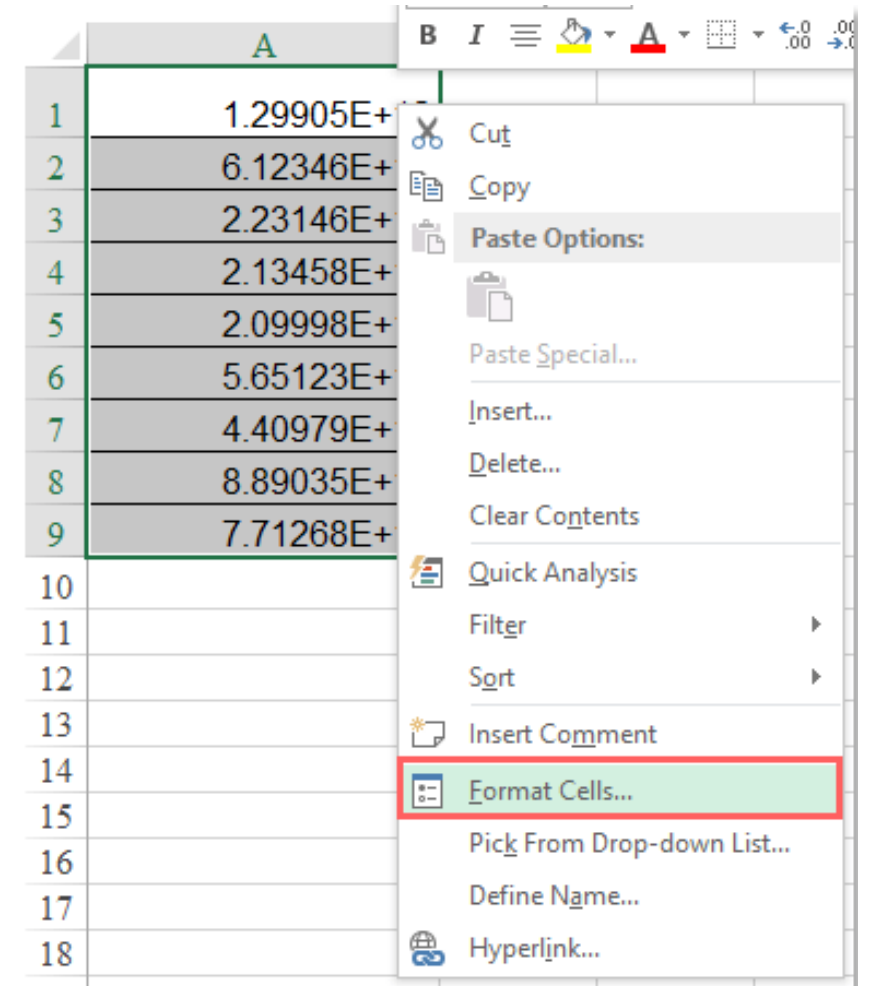


Moving In the Spreadsheet

- Up, down, right, and left arrows move one cell at a time
- When at the edge of the displayed portion of the spreadsheet, the arrows scroll one row/column at a time
- To AutoFit column width or AutoFit row height, double click on the border between the column / row name and the next one

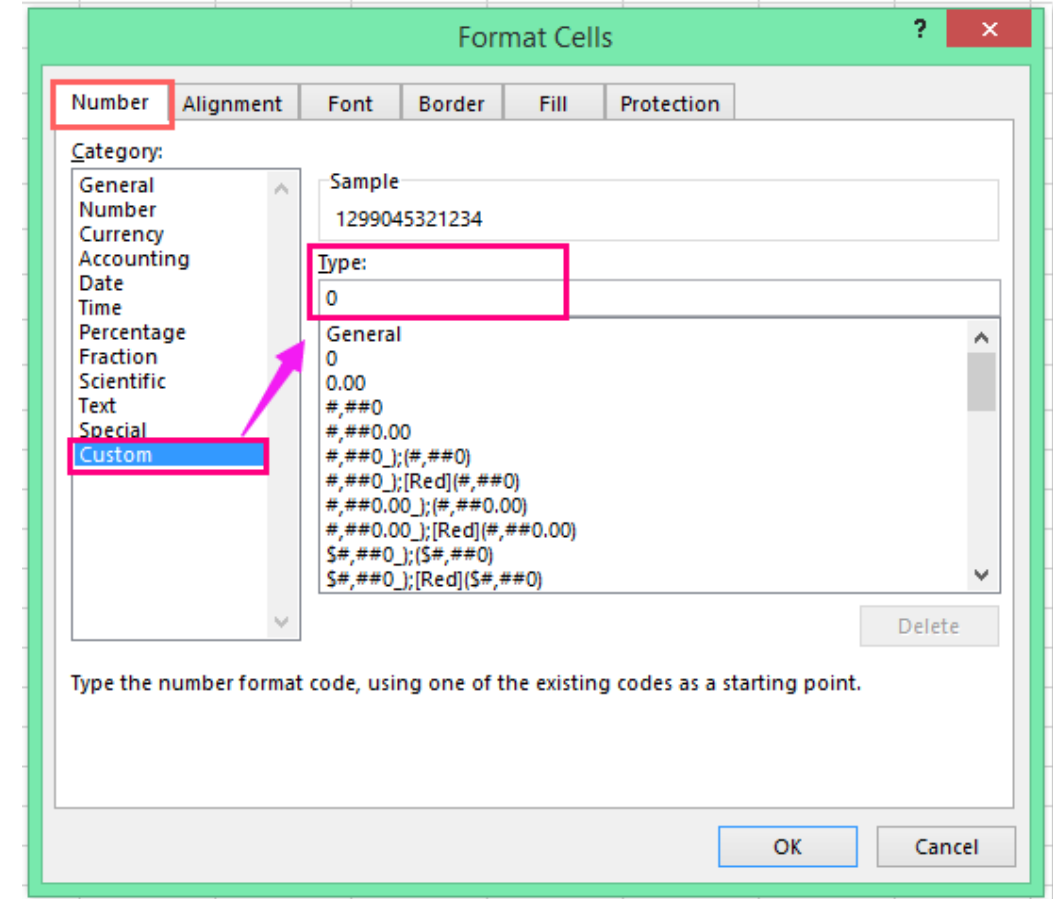
Convert Scientific Notation To Text

- If you have a lot of numbers which are displayed as the scientific notation, you can convert them with the **Format Cells** function in Excel.
- 1. Select the data range that you want to convert.
- 2. Right click, and choose **Format Cells** from the context menu



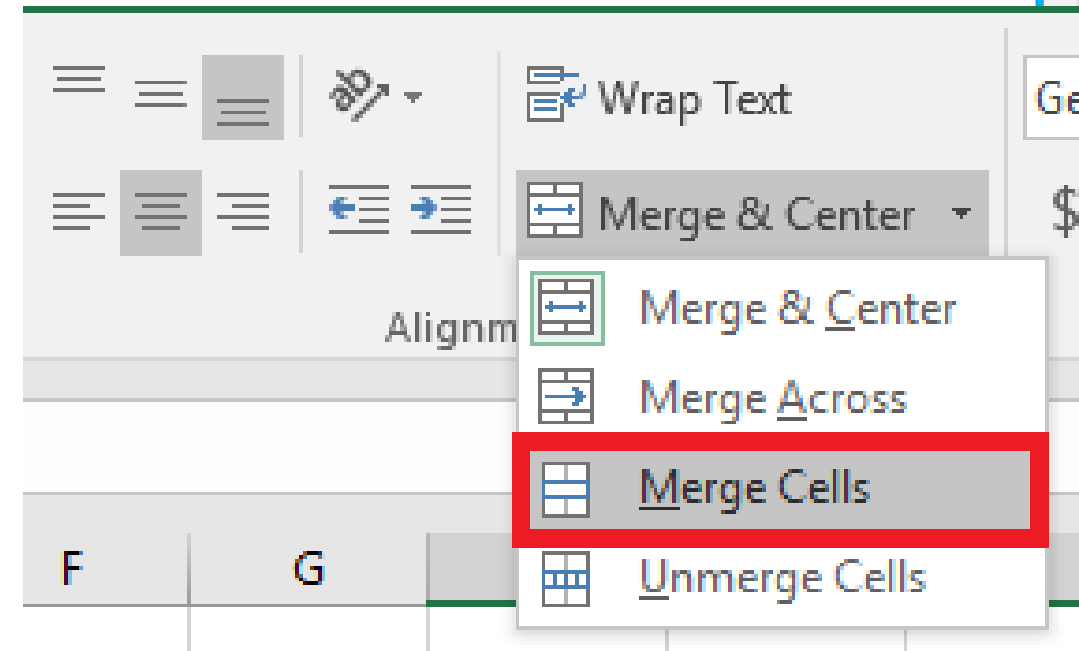
Convert Scientific Notation To Text

- 3. In the **Format Cells** dialog, under the **Number** tab, click **Custom** from the **Category** list box, input the number **0** into the Type box
- 4. Then click **OK** button, and the cell numbers which displayed as scientific notation have been converted to normal numbers.



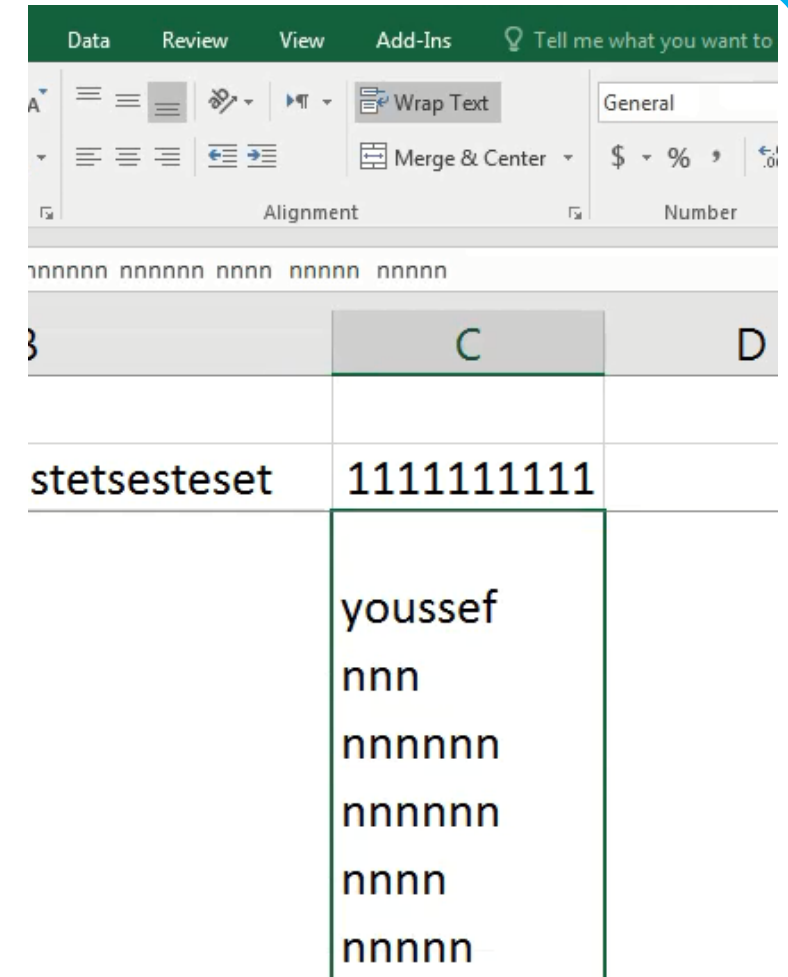
How to Merge Cells

- Highlight or select a range of cells.
- Right-click on the highlighted cells and select *Format Cells....*
- Click the *Alignment* tab and place a checkmark in the checkbox labeled *Merge cells*.
- you can also use the **Merge and Center** button on the Excel tool bar.



wrap the text in a cell

- Highlight or select a range of cells.
- use the **warp** button on the Excel tool bar.



Move or copy cells and cell contents

- Move cells by drag and dropping
- Select the cells or range of cells that you want to move or copy.
- Point to the border of the selection.
- When the pointer becomes a move pointer move pointer, drag the cell or range of cells to another location.

Insert or delete rows and columns

Insert or delete a column:

- Select any cell within the column, then go to **Home > Insert > Insert Sheet Columns** or **Delete Sheet Columns**.
- Alternatively, right-click the top of the column, and then select **Insert** or **Delete**.

Insert or delete a row

- Select any cell within the row, then go to **Home > Insert > Insert Sheet Rows** or **Delete Sheet Rows**.
- Alternatively, right-click the row number, and then select **Insert** or **Delete**.

How to Increment a Number in Excel

- Excel offers a numbering system to automatically create a series of incremented numbers.
- Enter any starting value in cell A1. Enter the next value in cell A2 to establish a pattern. Select those two cells and drag the bottom fill handle down the column to create a series of incremental numbers.
- As an example, entering 12 and 24 in cells A1 and A2 would create the series 12, 24, 36, 48, 60 when copied down to cell A5.

Sum , avearge functions

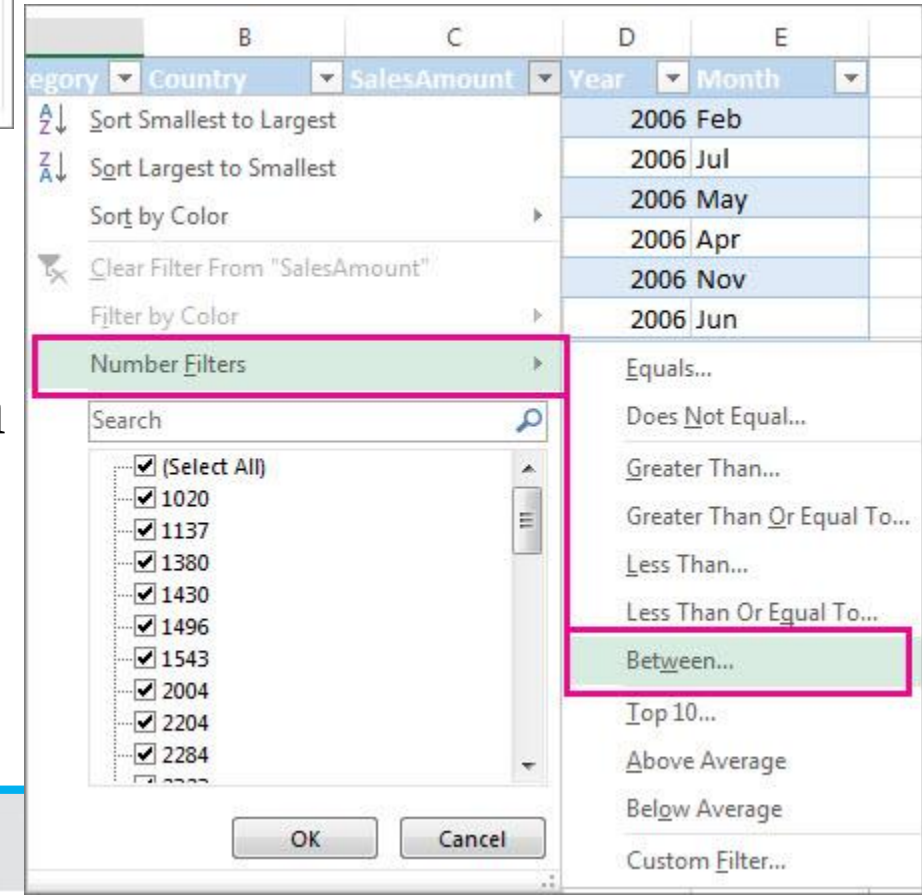
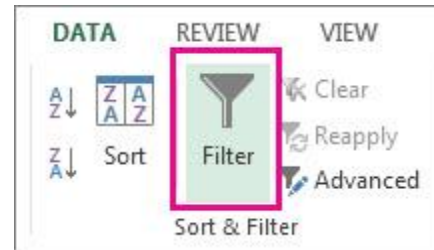
- **SUM** function adds values. You can add individual values, cell references or ranges or a mix of all three.

For example: **=SUM(A2:A10)** Adds the values in cells A2:10.

- **AVERAGE** function returns the average (arithmetic mean) of the arguments. For example, if the range A1:A20 contains numbers, the formula **=AVERAGE(A1:A20)** returns the average of those numbers.

Filter a range of data

- select any cell within the range.
- Select **Data > Filter**.
- Select the column header arrow Filter arrow.
- Select Text Filters or Number Filters, and then select a comparison, like Between.



The Order of Operator Precedence in Excel Formulas

- It's important to understand that when you create a formula with several operators, Excel evaluates and performs the calculation in a specific order. For instance, Excel always performs multiplication before addition. This order is called the *order of operator precedence*. You can force Excel to override the built-in operator precedence by using parentheses to specify which operation to evaluate first.

The Order of Operator Precedence in Excel Formulas

The order of operations for Excel is as follows:

- Evaluate items in parentheses.
- Perform negation (-).
- Perform exponentiation (^).
- Perform multiplication (*) and division (/), which are of equal precedence.
- Perform addition (+) and subtraction (-), which are of equal precedence.

Reference cell in another sheet in Excel

- To reference a cell or range of cells in another worksheet in the same workbook, put the worksheet name followed by an exclamation mark (!) before the cell address.
- In other words, in an Excel reference to another worksheet, you use the following format:

Sheet_name!Cell_address

PROPER Function

- The Excel PROPER function capitalizes each word in a given text string. Numbers, punctuation, and spaces are not affected.

C5		✕ ✓ fx		=PROPER(B5)	
	A	B	C	D	E
1					
2	PROPER function				
3					
4	Input		Output		
5	apple		Apple		
6	APPLE		Apple		
7	ben franklin		Ben Franklin		
8	apples, PEARS		Apples, Pears		
9	def-202-yyt		Def-202-Yyt		
10	to be or not to be		To Be Or Not To Be		// all words capitalized
11	12345		12345		
12	\$1,000.00		1000		
13	25-Jun-21		44372		

// all words capitalized
// number unaffected
// number formatting lost
// date formatting lost

IF function

- The IF function runs a logical test and returns one value for a TRUE result, and another for a FALSE result. For example, to "pass" scores above 70:
=IF(A1>70,"Pass","Fail").

D6 =IF(C6>=70,"Pass","Fail")

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

IF function
Run a test. Return one result if TRUE, another if FALSE.

Name	Score	Result
Anderson	92	Pass
Bautista	85	Pass
Block	65	Fail
Burrows	79	Pass
Chandler	69	Fail
Colby	95	Pass
Crosby	90	Pass
Dove	70	Pass
Frantz	96	Pass
Gonzalez	93	Pass
Humphrey	75	Pass

Passing score: 70

EXACT Function

- The Microsoft Excel EXACT function compares two strings and returns TRUE if both values are the same. Otherwise, it will return FALSE.
- EXACT(text1, text2)
- **Returns**
- The EXACT function returns TRUE if the two strings are the same.
The EXACT function returns FALSE if the two strings are different.

&

- &: Connects, or concatenates, two values to produce one continuous text value.
- ="North"&"wind"

LEN function

- The Excel LEN function returns the length of a given text string as the number of characters. LEN will also count characters in numbers, but number formatting is not included.

C5					
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

LEN function		
Input	Output	
Apple	5	// 5 characters
Apple	6	// hidden trailing space
APPLE	5	// case doesn't matter
San Diego, CA	13	// space and comma included
	0	// empty cell is zero
1000	4	// 4 digits
\$1,000.00	4	// 4 digits; formatting does not count
25-Jun-21	5	// date is 5-digit serial number
107.99	6	// decimal counts
3.141592654	16	// underlying number is longer
-1.75	5	// negative symbol counts

REPT Function

- The Excel REPT function repeats characters a given number of times. For example, =REPT("x",5) returns "xxxxx".

TRIM function

- The TRIM function is used to “normalize” all spacing. TRIM automatically strips space at the start and end of a given string and leaves just one space between all words inside the string. It takes care of extra spaces caused by empty cells.
- =TRIM(" A stitch in time. ") returns "A stitch in time."

LEFT function

- The Excel LEFT function extracts a given number of characters from the left side of a supplied text string. For example:
- LEFT("apple",3) returns "app".

C5 X ✓ fx =TRIM(B5)

	A	B	C
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

TRIM function

Input	Output
Perfect is the enemy of good.	Perfect is the enemy of good.
A stitch in time saves nine.	A stitch in time saves nine.
Lost Time is never found again.	Lost Time is never found again.
The devil makes work for idle hands.	The devil makes work for idle hands.
Measure twice, cut once.	Measure twice, cut once.
A Penny Saved is a Penny Earned.	A Penny Saved is a Penny Earned.
Penny wise, pound foolish.	Penny wise, pound foolish.

SUBSTITUTE function

- The Excel SUBSTITUTE function replaces text in a given string by matching. For example `=SUBSTITUTE("952-455-7865","-","")` returns "9524557865"; the dash is stripped. SUBSTITUTE is case-sensitive.

C6					<code>=SUBSTITUTE(B6,"t","b")</code>
	A	B	C	D	E
1					
2			SUBSTITUTE function		
3			SUBSTITUTE (text, old_text,new_text, [instance_num])		
4					
5					
6					
7					
8					
9					

Input	Output	Formula	Notes
tuttle	bubble	<code>=SUBSTITUTE(B6,"t","b")</code>	All instances replaced
tuttle	buttle	<code>=SUBSTITUTE(B7,"t","b",1)</code>	First instance only replaced
Cat, cat	Cat, dog	<code>=SUBSTITUTE(B8,"cat","dog")</code>	Substitute IS case sensitive
##cash##	cash	<code>=SUBSTITUTE(B9,"#","")</code>	Replace with nothing

- Excel interface showing the REPLACE function results:

	A	B	C
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

REPLACE function results table:

Input	Output
XRT-2017-001	XRT-2018-001
XRT-2017-002	XRT-2018-002
XRT-2017-003	XRT-2018-003
AAB-2017-001	AAB-2018-001
AAB-2017-002	AAB-2018-002
NAR-2017-001	NAR-2018-001
NAR-2017-002	NAR-2018-002
NAR-2017-003	NAR-2018-003
MID-2017-001	MID-2018-001
MID-2017-002	MID-2018-002
MID-2017-003	MID-2018-003

TODAY Function

- The Excel TODAY function returns the current date, updated continuously when a worksheet is changed or opened. The TODAY function takes no arguments.

COUNTBLANK function

- The Excel COUNTBLANK function returns a count of empty cells in a range. Cells that contain text, numbers, errors, spaces, etc. are *not* counted. Formulas that return empty text are counted.
- =COUNTBLANK(B5:B15) // returns 3

E6		fx		=COUNTBLANK(B5:B15)	
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

COUNTBLANK function	
Value	
apple	
orange	
100	
	// empty cell
30%	
	// empty cell
0.5	
	// space character
	// empty string =""
#N/A	
6-Oct-2021	

Count **3**

COUNTA Function

- The Excel COUNTA function returns the count of cells that contain numbers, text, logical values, error values, and empty text (""). COUNTA does not count empty cells.
- Examples**
- `=COUNTA(B5:B15)` // returns 9

E6		fx		=COUNTA(B5:B15)	
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					

COUNTA function	
Value	
1 puppy	
2 apple	
3 100	
4 30%	
5 0.5	
6 28-Oct-2022	
7 8:30 AM	
8 #N/A	// error included
9 00120	

Count	9
-------	---

COUNT Function

- The Excel COUNT function returns a count of values that are numbers. Numbers include negative numbers, percentages, dates, times, fractions, and formulas that return numbers. Empty cells and text values are ignored.
- **Examples**
- =COUNT(B5:B15) // returns 6

E6	:	X	✓	<i>fx</i>	=COUNT(B5:B15)
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					

COUNT function

	Value	
	puppy	
	apple	
1	100	
2	20%	
3	30%	
		// empty cell
4	0.5	
5	28-Oct-2022	// dates are numbers
6	8:30 AM	// times are numbers
	100	// number as text
	00120	// number as text

Count 6

CONVERT function

- The Excel CONVERT function converts a number in one measurement system to another. For example, you can use CONVERT to convert feet into meters, pounds into kilograms, Fahrenheit to Celsius, gallons into liters, and for many other unit conversions.

exceljet_convert.xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

F5 fx =CONVERT(E5,"gal","lt")

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

CONVERT (number, from_unit, to_unit)

Start	Finish	Miles	Gallons	Liters
San Fransisco	Reno	218	8.7	33.0
Reno	Salt Lake City	518	20.7	78.4
Salt Lake City	Denver	519	20.8	78.6
Denver	Omaha	536	21.4	81.2
Omaha	Chicago	471	18.8	71.3
Chicago	Cleveland	345	13.8	52.2
Cleveland	New York	463	18.5	70.1

Sheet1

Ready 100%

PI Function

- The Excel PI function returns the value of the geometric constant π (pi).

C5		✕ ✓ <i>fx</i>		=PI()	
	A	B	C		
1					
2	PI function				
3					
4	Formula		Value		
5	=PI()		3.141593		
6					

CEILING function

- The Excel CEILING function rounds a number up to a given multiple.
The multiple to use for rounding is provided as the *significance* argument. If the number is already an exact multiple, no rounding occurs and the original number is returned.
- The CEILING function takes two arguments, *number*, and *significance*.
- Number* is the numeric value to round up.
- The *significance* argument is the multiple to which *number* should be rounded.

D5 $\times$ $\checkmark$ f_x =CEILING(B5,C5)

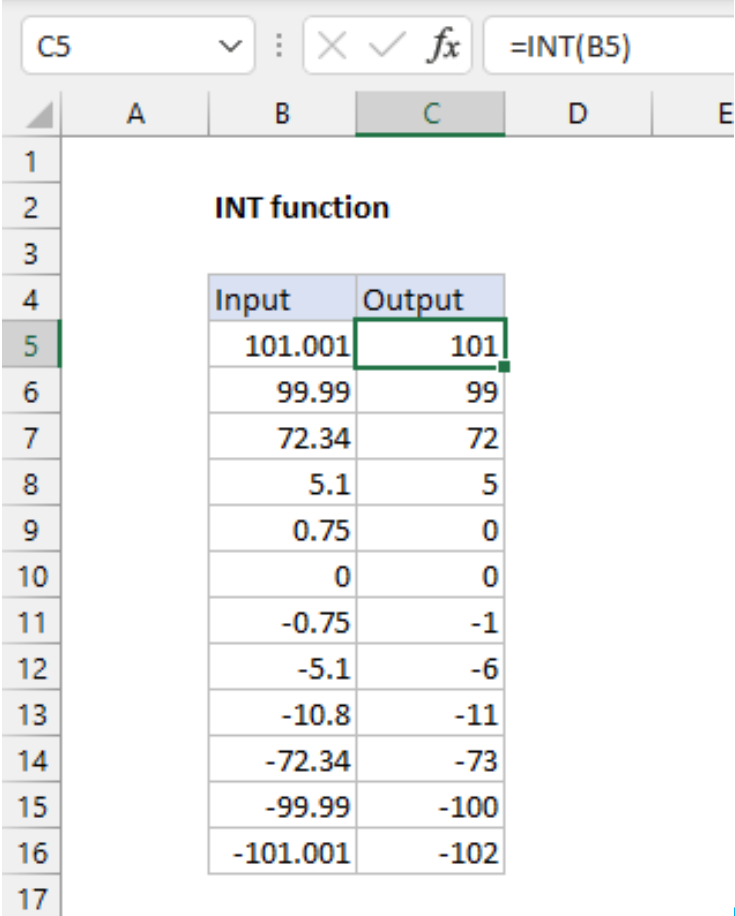
	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

CEILING function

Number	Multiple	Result	
10	3	12	// round up to nearest 3
36	7	42	// round up to nearest 7
309	25	325	// round up to nearest 25
610	100	700	// round up to nearest 100
5.37	0.05	5.40	// round up to nearest 0.05
5.37	1	6.00	// round up to nearest 1
-5.4	1	-5	// round toward zero
-5.4	-1	-6	// round away from zero

INT Function

- The Excel INT function returns the integer part of a decimal number



INT function	
Input	Output
101.001	101
99.99	99
72.34	72
5.1	5
0.75	0
0	0
-0.75	-1
-5.1	-6
-10.8	-11
-72.34	-73
-99.99	-100
-101.001	-102

TRUNC function

- The Excel TRUNC function returns a truncated number based on an (optional) number of digits. For example, TRUNC(4.9) will return 4, and TRUNC(-3.5) will return -3. The TRUNC function does no rounding, it simply truncates as specified.

D5 =TRUNC(B5)

	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							

TRUNC function

Value	Digits	Result
4.9		4
-3.5		-3
3.141593	1	3.1
3.141593	2	3.14
3.141593	3	3.141
3.141593	4	3.1415
999.99	-2	900
999.99	-1	990
999.99	0	999
999.99	1	999.9
999.99	2	999.99

// digits default to zero
// no rounding

ROUND function

- The Excel ROUND function returns a number rounded to a given number of digits. The ROUND function can round to the right or left of the decimal point.

D5 X ✓ fx =ROUND(B5,C5)				
	A	B	C	D
1				
2	ROUND function			
3				
4		Number	Digits	Result
5		5.7845	1	5.8
6		5.7845	2	5.78
7		5.7845	3	5.785
8		23542.5	0	23543
9		23542.5	-1	23540
10		23542.5	-2	23500
11		23542.5	-3	24000
12		23542.5	-4	20000

// round to 1 decimal place
 // round to 2 decimal places
 // round to 3 decimal places
 // round to nearest whole number
 // round to nearest 10
 // round to nearest 100
 // round to nearest 1000
 // round to nearest 10000

FV function

- The Excel FV function is a financial function that returns the future value of an investment. You can use the FV function to get the future value of an investment assuming periodic, constant payments with a constant interest rate.

File Home Insert Page Layout Formulas Data Rev					
C10		fx		=FV(C6/C8,C7*C8,0,-C5)	
	A	B	C	D	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

FV(rate, nper, pmt, [pv], [type])	
FV for compound interest paid monthly	
Present value	\$1,000
Interest rate	5.00%
Term (years)	10
Compounding periods per year	12
Future value	\$1,647

PV function

- The Excel PV function is a financial function that returns the present value of an investment. You can use the PV function to get the value in today's dollars of a series of future payments, assuming periodic, constant payments and a constant interest rate.
- `=PV (rate, nper, pmt, [fv], [type])`
- **rate** - The interest rate per period.
- **nper** - The total number of payment periods.
- **pmt** - The payment made each period.
- **fv** - [optional] A cash balance you want to attain after the last payment is made. If omitted, assumed to be zero.
- **type** - [optional] When payments are due. 0 = end of period, 1 = beginning of period. Default is 0.

PMT function

- The Excel PMT function is a financial function that returns the periodic payment for a loan. You can use the PMT function to figure out payments for a loan, given the loan amount, number of periods, and interest rate.

The screenshot shows an Excel spreadsheet with the following data and formula:

	A	B	C	D
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

The formula bar shows: `=PMT(C6/12,C7,-C5)`

PMT (rate, nper, pv, [fv], [type])
Using PMT to determine loan payment amount

Loan amount	\$5,000
Interest rate	4.50%
Periods (term in months)	60
Compounding periods per year	12
Monthly payment	\$93.22

Sheet1

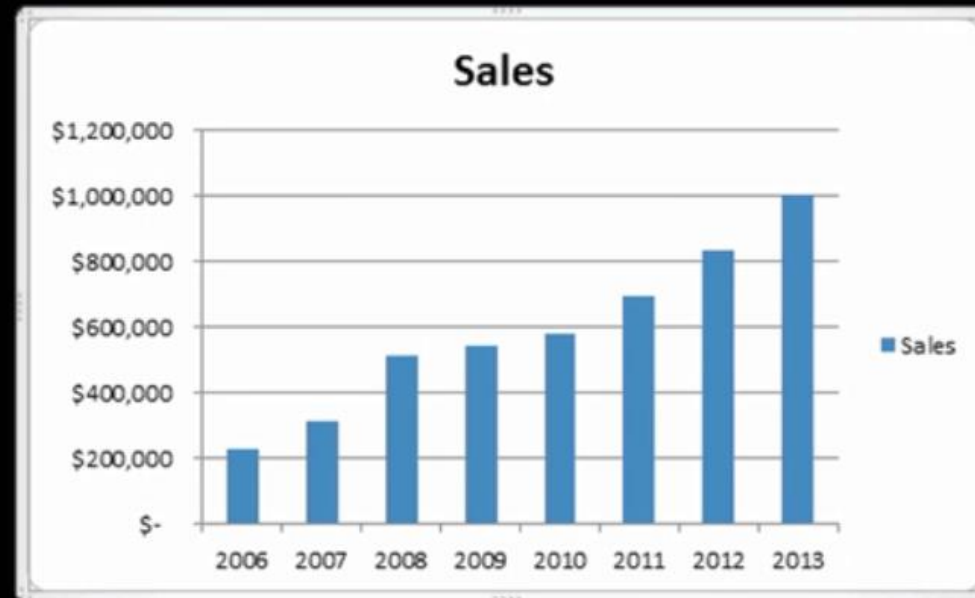
Charts

- **How to create a basic chart**
- The charting system in Excel is flexible and deep. You can create charts with very little effort, and you have the power to customize almost every aspect of a chart.
- if we have annual sales for a small company. We'll use this data to build a basic column chart. The first step in creating a chart in Excel is to prepare the data. Charting works best if the data is structured in a simple grid that doesn't include blank rows or columns.

Charts

How to create a basic chart

	A	B	C	D
1				
2		Year	Sales	
3		2006	\$225,400	
4		2007	\$314,123	
5		2008	\$509,434	
6		2009	\$542,450	
7		2010	\$579,210	
8		2011	\$695,040	
9		2012	\$834,023	
10		2013	\$1,000,858	
11		Total	\$4,700,538	
12				



Charts

- First, select the data you'd like to chart. If your data includes totals, don't include these in your selection. However, you should include data labels, if they exist, so that Excel can use them in the chart.
- Next, click the Insert tab on the ribbon; then click Column, to see a list of column chart styles. All Excel charts have several variations. For Column charts, you'll see options for 2-D columns, 3-D columns, cylinders, cones, and pyramids.
- For this example, we're going to stick with a basic 2-D column. When you select a chart option, Excel will immediately create a chart in that style. With the chart selected, Excel highlights the cells used to create the chart on the worksheet. You'll see this highlighting only when the chart is selected.

Case Study: How Starbucks Uses Excel for Store Performance and Managerial Decision-Making

Introduction

- In 2024, Starbucks continued expanding globally while facing rising operational costs and changing customer behavior.
- Store managers needed fast, simple, and flexible tools to evaluate performance and support day-to-day decisions.
- Despite advanced BI systems, Excel remained a core decision-support tool at the managerial level.

Case Study: How Starbucks Uses Excel for Store Performance and Managerial Decision-Making

The Management Problem

- Uneven performance across branches
- Difficulty identifying low-performing stores early
- Rising operational costs affecting profitability
- Need for quick comparison between branches and regions

Case Study: How Starbucks Uses Excel for Store Performance and Managerial Decision-Making

Objectives

- Compare monthly sales across branches
- Identify stores with declining performance
- Analyze profit contribution per branch
- Support decisions related to staffing, promotions, and cost control

Case Study: How Starbucks Uses Excel for Store Performance and Managerial Decision-Making

Solution Using Excel

Store managers used Excel to consolidate branch data including:

- Store ID
- Monthly Sales
- Operating Costs
- Number of Transactions
- Employees per Store

Excel was used locally by area managers without requiring IT support.

Case Study: How Starbucks Uses Excel for Store Performance and Managerial Decision-Making

- **Key Excel Analysis**

Key Calculations:

- Profit per Store = Sales – Operating Costs
- Sales per Employee = Sales / Number of Employees
- Average Transaction Value = Sales / Number of Transactions

Conditional Formatting:

Highlight low-profit stores in red

Highlight high sales-per-employee stores in green

Case Study: How Starbucks Uses Excel for Store Performance and Managerial Decision-Making

Scenario & What-If Analysis

Managers used Excel What-If Analysis to test:

- Impact of reducing staff by 1 employee
- Effect of a 5% price increase on profitability
- Impact of promotional discounts on transaction volume

This supported data-driven managerial decisions at branch level

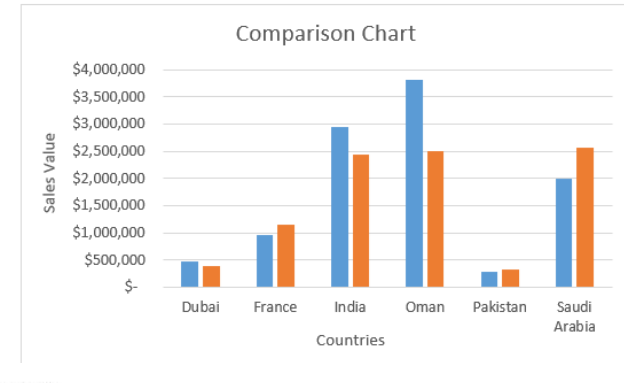
Case Study: How Starbucks Uses Excel for Store Performance and Managerial Decision-Making

Visualization for Management

Using Excel Charts:

- Column charts to compare branch performance
- Line charts to monitor monthly trends
- Simple dashboards for area managers

Comparison Chart in Excel



These visuals helped managers communicate insights to top management.

Case Study: How Starbucks Uses Excel for Store Performance and Managerial Decision-Making

Managerial Impact

- ✓ **Faster decision-making**
- ✓ **Better branch-level control**
- ✓ **Reduced operational inefficiencies**
- ✓ **Excel proved as a strategic managerial tool, not just a spreadsheet**

Reference

15th Edition

Understanding Computers

Today and Tomorrow

Comprehensive



Deborah Morley