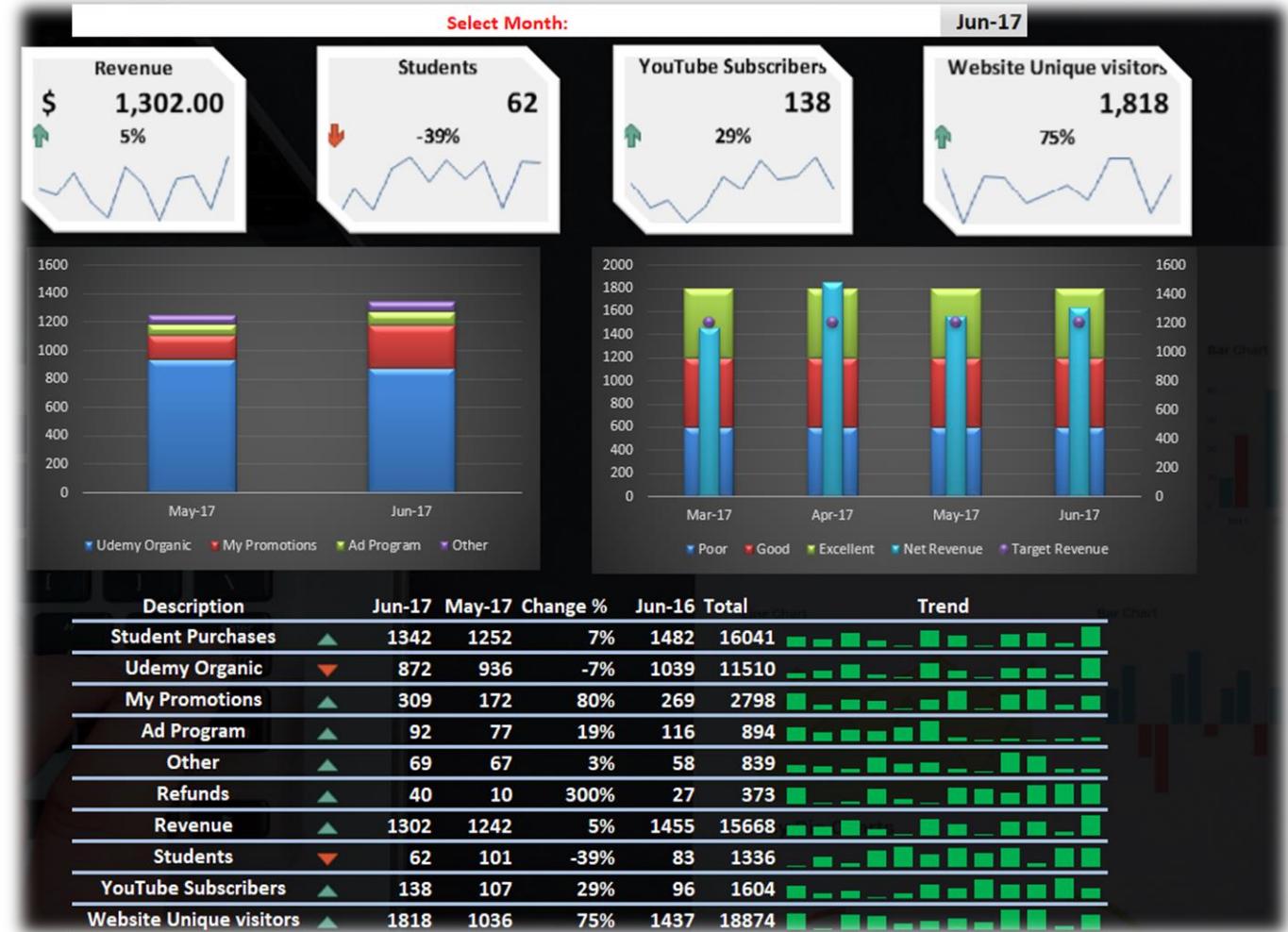




What is a  
Dashboard?

According to Stephen Few:

'A dashboard is a visual display of the most important information needed to achieve one or more objectives that fit entirely on a single computer screen, so that it can be monitored at a glance.'



# What is a Dashboard ?

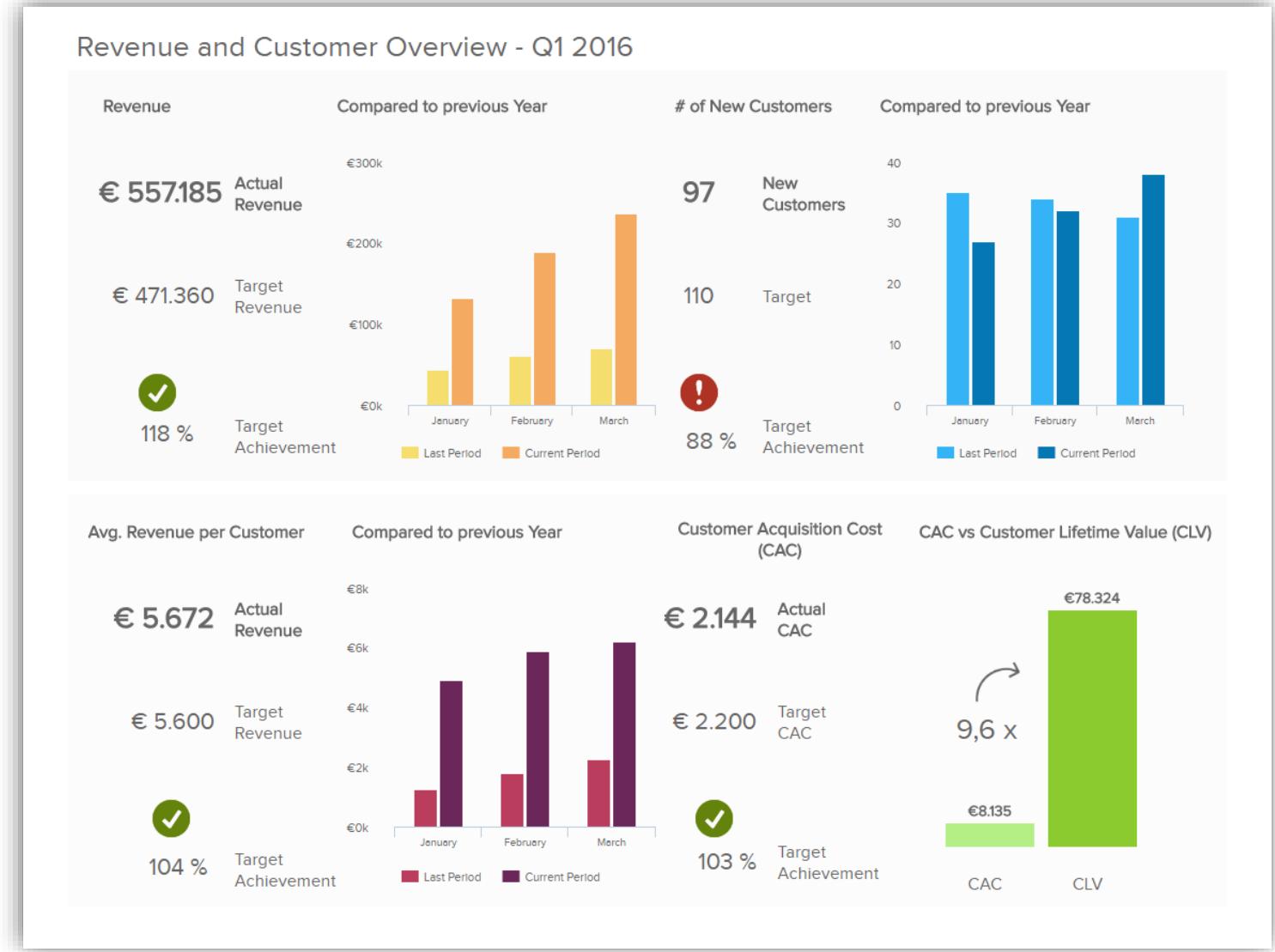
There are 4 general subtypes of dashboards:



1. Strategic - focused on long-term strategies and high-level metrics
2. Operational - shows shorter time frames and operational processes.
3. Analytical - contains vast amounts of data created by analysts.
4. Tactical - used by mid-management to track performance.

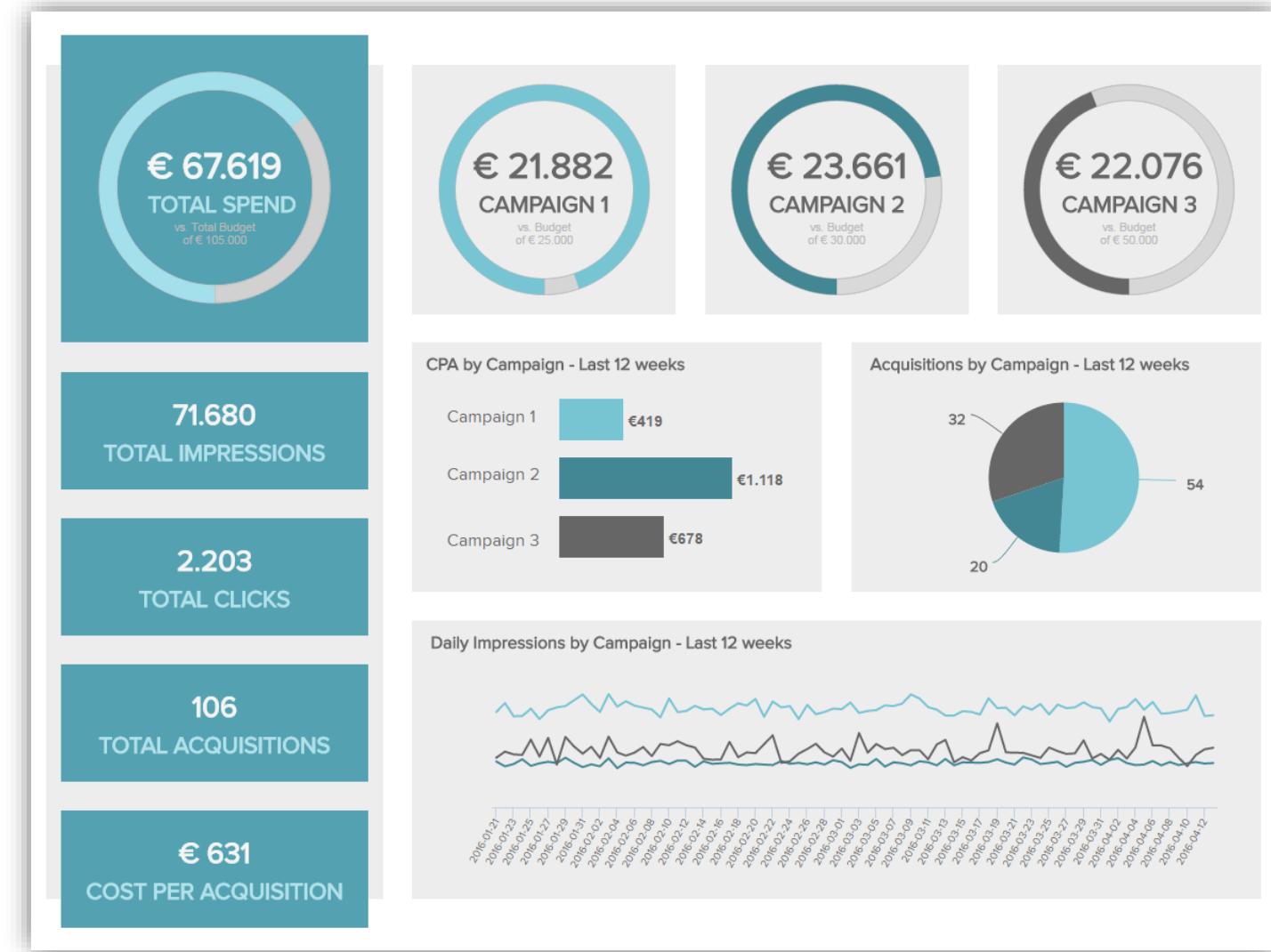
Subtypes of Dashboard

A strategic dashboard is a reporting tool for monitoring the long-term company strategy with the help of critical success factors.



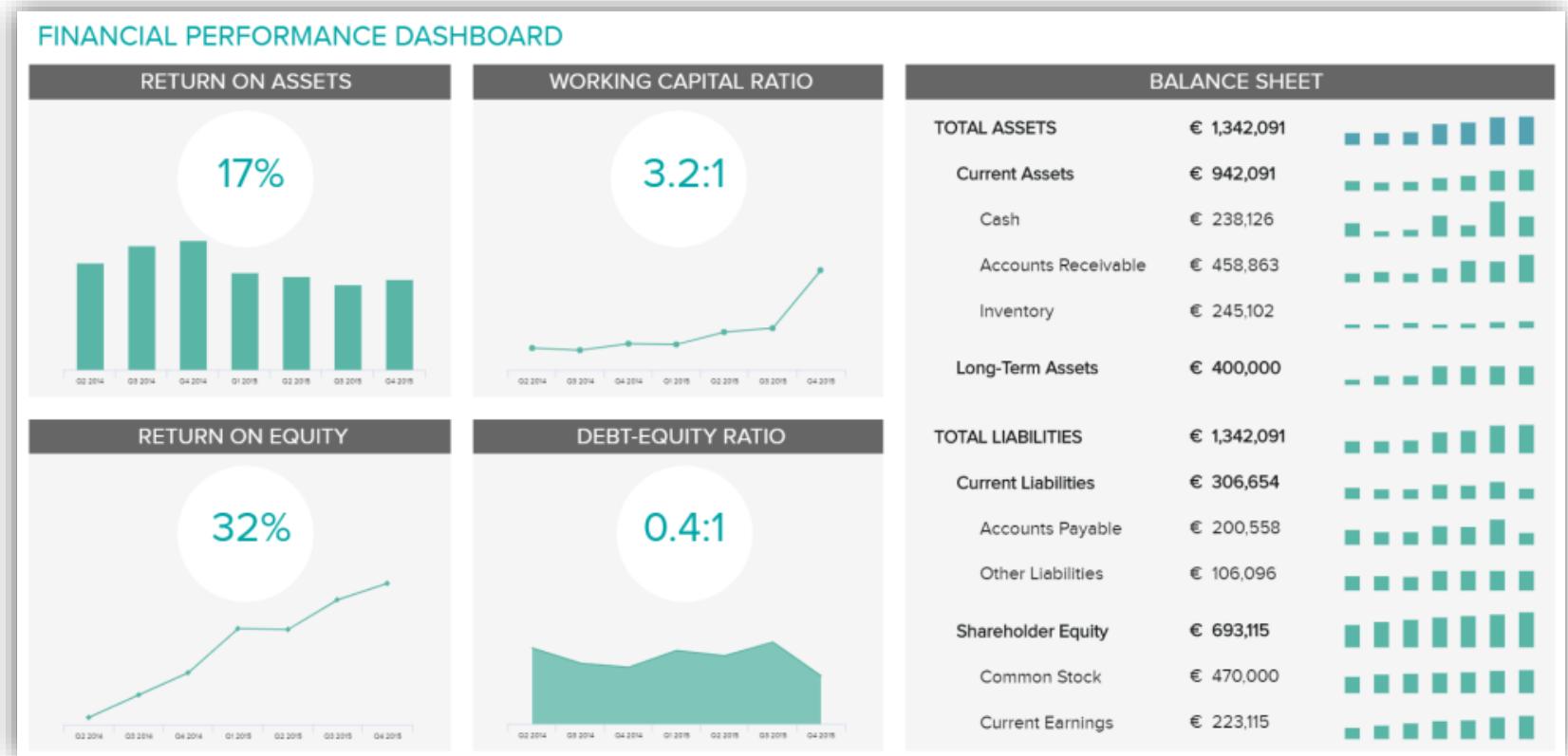
# Strategic Dashboard

An operational dashboard is one of the types of dashboards used for monitoring and managing operations that have a shorter time horizon.



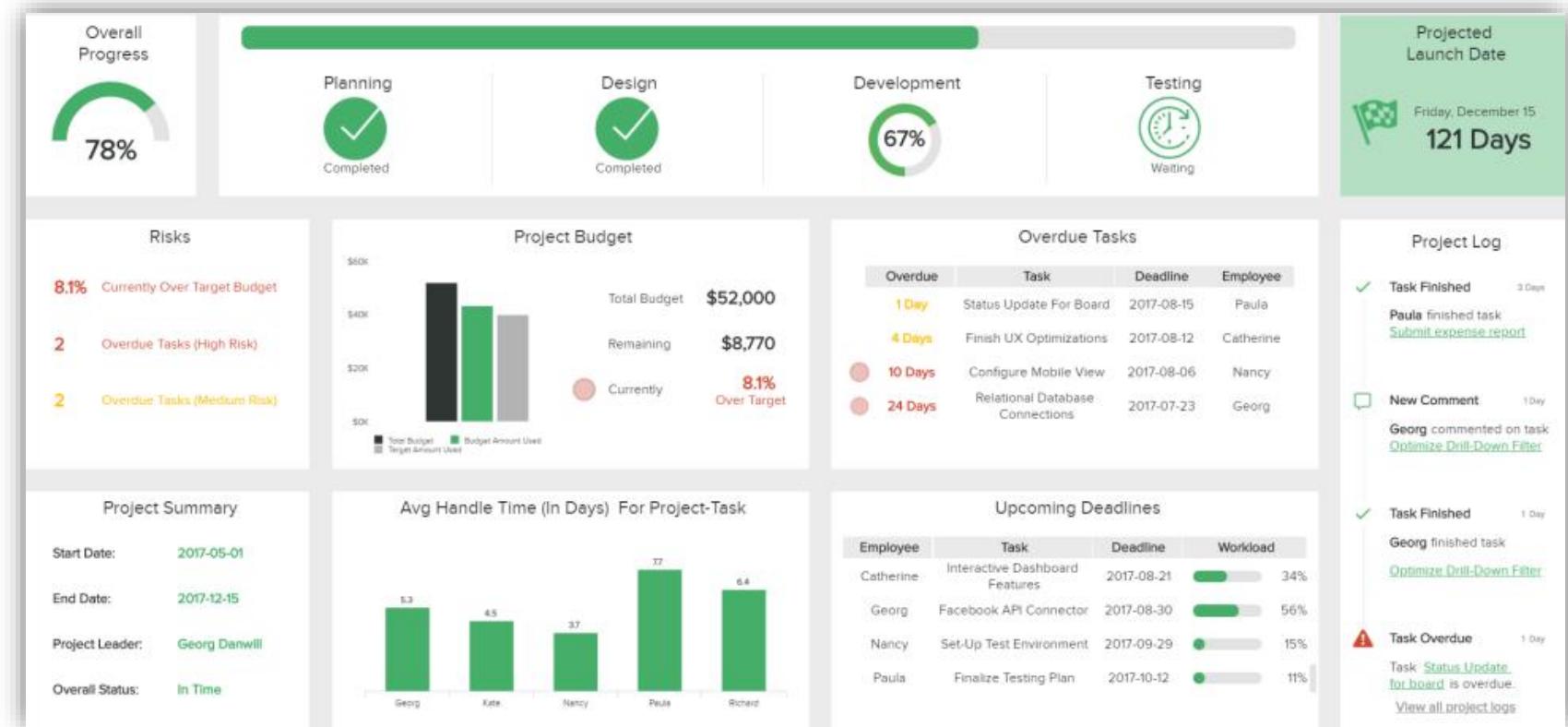
# Operational Dashboard

An analytical dashboard is a type of dashboard that contains a vast amount of data created and used by analysts to provide support to executives.



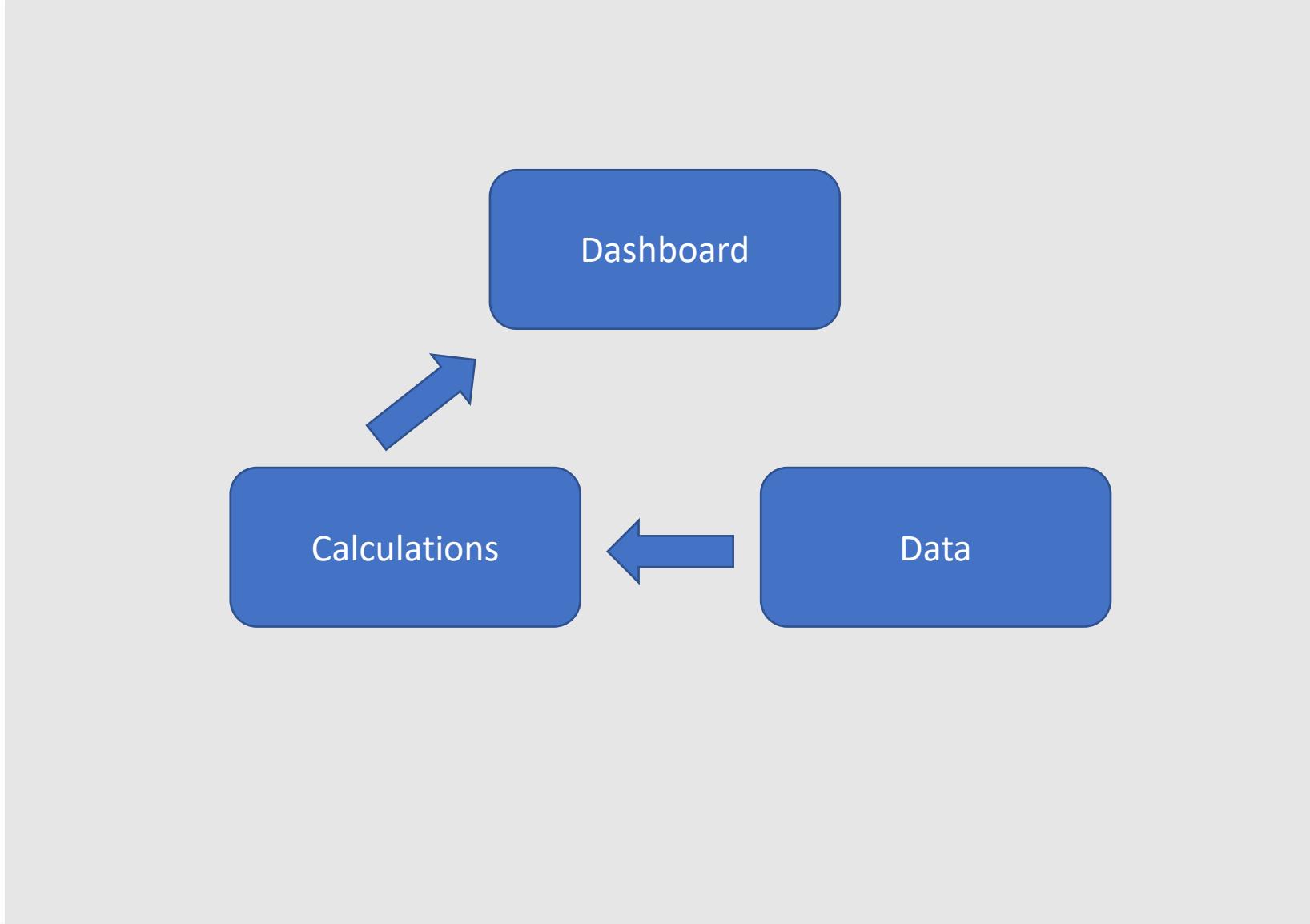
Analytical Dashboard

A tactical dashboard is utilized in the analysis and monitoring of processes conducted by mid-level management, emphasizing the analysis.



Tactical Dashboard

## 1. MVC Rule

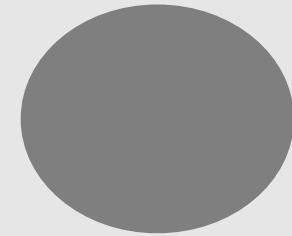


Dashboard Design Principles

## 1. MVC Rule

## 2. Contrast

Description	Jun-17	May-17	Change %
Student Purchases	▲ 1342	1252	7%
Udemy Organic	▼ 872	936	-7%
My Promotions	▲ 309	172	80%
Ad Program	▲ 92	77	19%
Other	▲ 69	67	3%
Refunds	▲ 40	10	300%
Revenue	▲ 1302	1242	5%
Students	▼ 62	101	-39%
YouTube Subscribers	▲ 138	107	29%
Website Unique visitors	▲ 1818	1036	75%

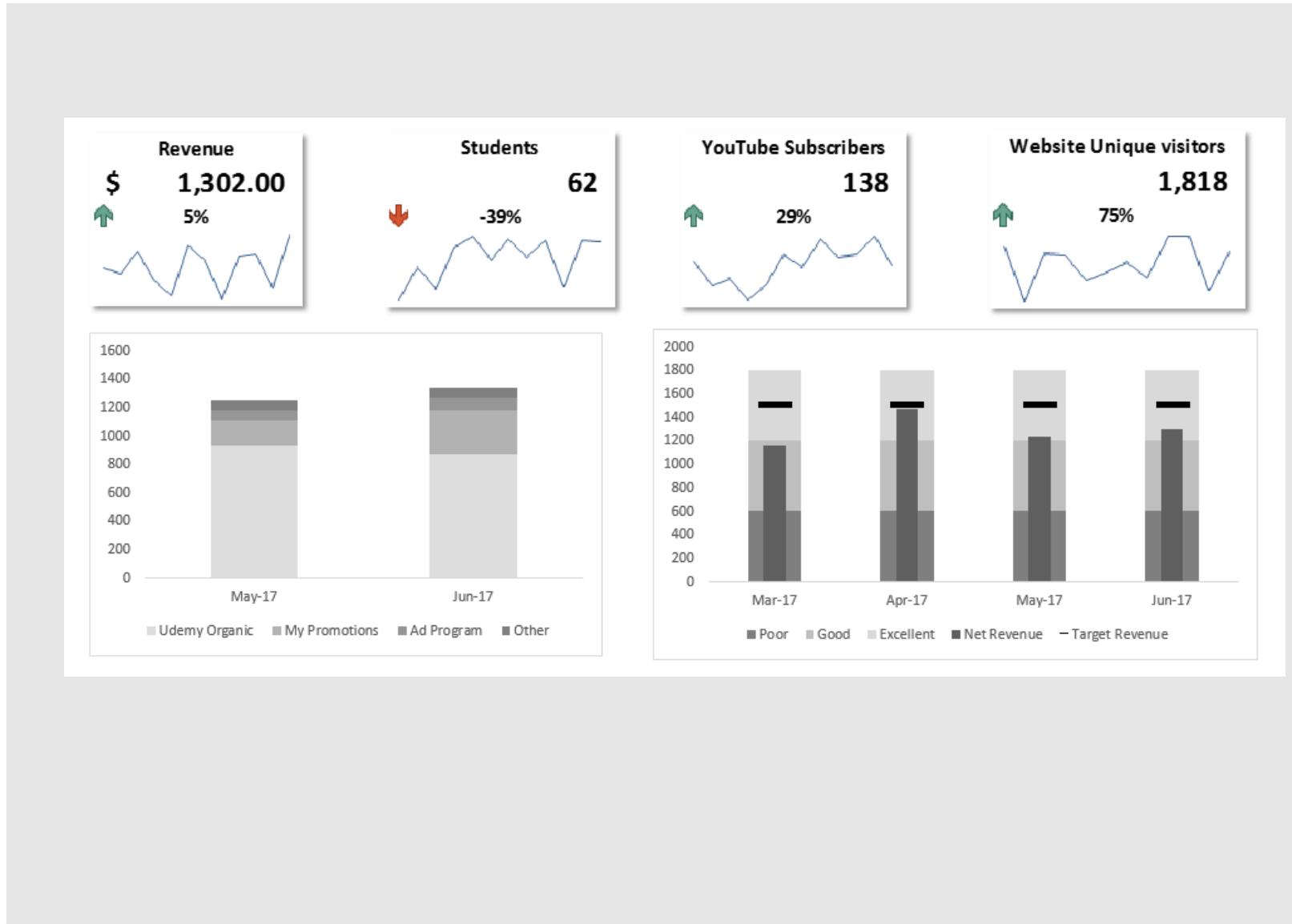


# Dashboard Design Principles

## 1. MVC Rule

## 2. Contrast

## 3. Repetition



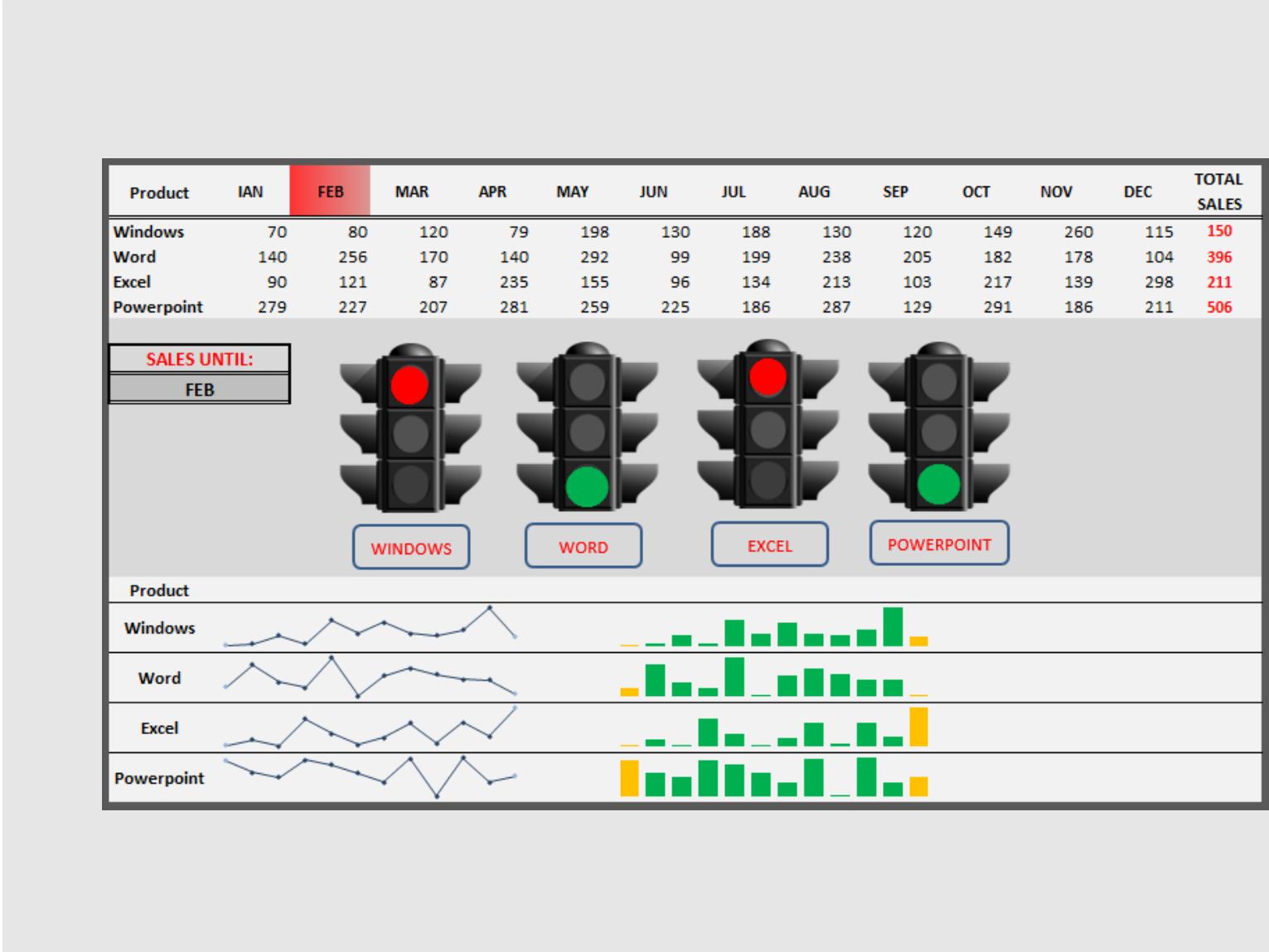
# Dashboard Design Principles

## 1. MVC Rule

## 2. Contrast

## 3. Repetition

## 4. Alignment



# Dashboard Design Principles

1. MVC Rule

2. Contrast

3. Repetition

4. Alignment

5. Proximity

Description	Jun-17	May-17	Change %	Jun-16	Total	Trend
Student Purchases	▲ 1342	1252	7%	1482	16041	
Udemy Organic	▼ 872	936	-7%	1039	11510	
My Promotions	▲ 309	172	80%	269	2798	
Ad Program	▲ 92	77	19%	116	894	
Other	▲ 69	67	3%	58	839	
Refunds	▲ 40	10	300%	27	373	
Revenue	▲ 1302	1242	5%	1455	15668	
Students	▼ 62	101	-39%	83	1336	
YouTube Subscribers	▲ 138	107	29%	96	1604	
Website Unique visitors	▲ 1818	1036	75%	1437	18874	

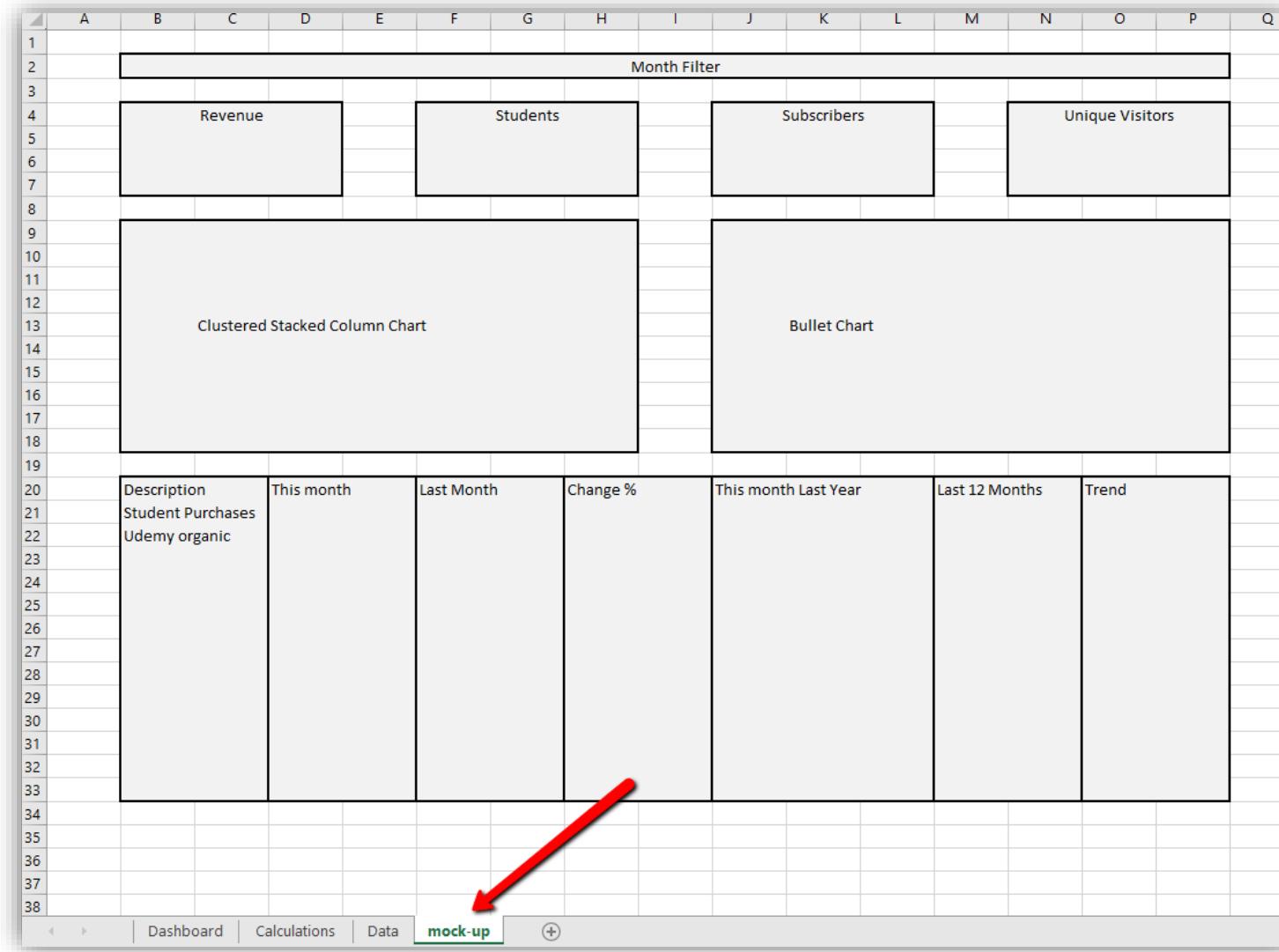
Dashboard Design Principles

# Dashboard Creation Process



- Why are you creating this Dashboard?
- Do you need to track certain KPIs ?
- Who needs to see the Dashboard ?
- Where will the Data come from ?
- How up to date does the Dashboard need to be ?
- What format does the Dashboard need to be in ?

## 1. Questions to Ask Yourself



## 2. MOCK-UP (A Sketch Of The Dashboard You Want To Design)

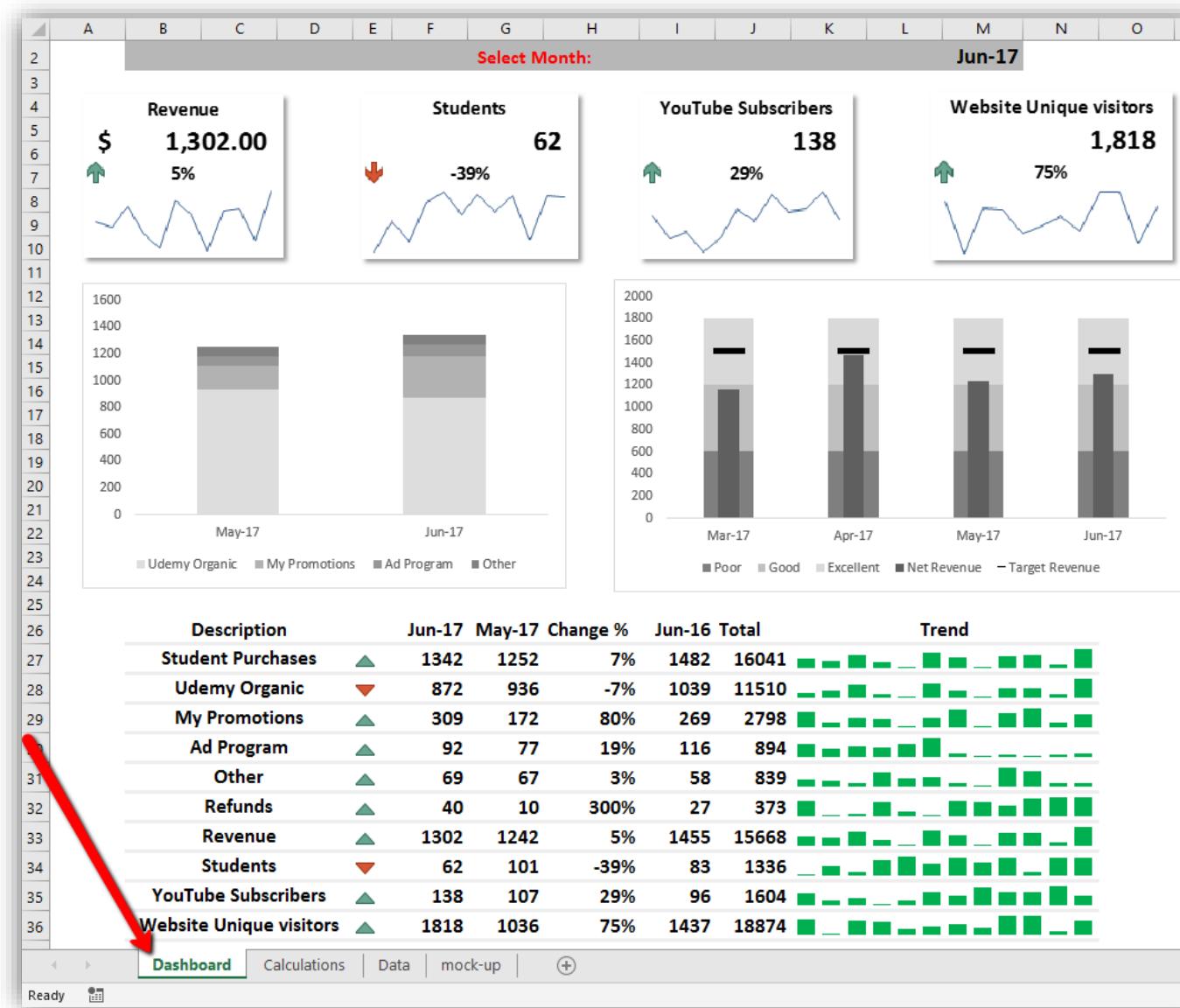
A	B	C	D	E	F	G	H	I	J	K	L
1											
2	Month	Student Purchases	Udemy Organic	My Promotions	Ad Program	Other	Refunds	Revenue	Students	YouTube Subscribers	Website Unique visitors
3	Jan-16	1460	1041	284	90	45	38	1422	77	151	1,286
4	Feb-16	1491	1196	143	62	90	24	1467	119	178	1,245
5	Mar-16	1082	769	158	81	74	43	1039	110	122	1,573
6	Apr-16	1497	1232	113	77	75	32	1465	117	130	1,279
7	May-16	1210	821	225	102	62	18	1192	58	121	1,961
8	Jun-16	1482	1039	269	116	58	27	1455	83	96	1,437
9	Jul-16	1707	1300	281	63	63	46	1661	132	132	1,740
10	Aug-16	1125	830	172	59	64	46	1079	133	172	1,191
11	Sep-16	1492	1006	350	54	82	44	1448	78	148	1,974
12	Oct-16	1459	1025	287	60	87	30	1429	133	144	1,971
13	Nov-16	997	771	115	53	58	37	960	113	168	1,375
14	Dec-16	1410	950	332	65	63	39	1371	134	131	1,587
15	Jan-17	1560	1146	230	112	72	11	1549	110	148	1,444
16	Feb-17	1005	732	110	92	71	19	986	139	110	1,330
17	Mar-17	1200	828	210	82	80	36	1164	125	89	1,700
18	Apr-17	1492	1114	230	85	63	15	1477	76	117	1,708
19	May-17	1252	936	172	77	67	10	1242	101	107	1,036
20	Jun-17	1342	872	309	92	69	40	1302	62	138	1,818
21	Jul-17	1331	928	275	76	52	50	1281	94	116	1,873
22	Aug-17	1399	977	226	108	88	28	1371	88	125	1,716
23	Sep-17	1272	802	280	108	82	25	1247	123	108	1,405
24	Oct-17	1049	817	120	60	52	30	1019	61	142	1,518
25	Nov-17	1157	820	158	96	83	17	1140	68	179	1,637
26	Dec-17	1572	1258	146	118	50	47	1525	103	123	1,224
27											
28											
29											
30											
31											
32											
33											
34											
35											
36											
37											



### 3. Raw Data

A	B	C	D	E	F	G	H
2 Current Month	Jun-17						
3 Previous Month	May-17						
4 Current Month Last Year	Jun-16						
5							
6		Current Month	Previous Month	Change	Last year Current Month		
7		Jun-17	May-17	%	Jun-16	Total	Jun-17
8	Student Purchases	1342	1252	7%	1482	16041	1342
9	Udemy Organic	872	936	-7%	1039	11510	872
10	My Promotions	309	172	80%	269	2798	309
11	Ad Program	92	77	19%	116	894	92
12	Other	69	67	3%	58	839	69
13	Refunds	40	10	300%	27	373	40
14	Revenue	1302	1242	5%	1455	15668	1302
15	Students	62	101	-39%	83	1336	62
16	YouTube Subscribers	138	107	29%	96	1604	138
17	Website Unique visitors	1818	1036	75%	1437	18874	1818
18							
19		Udemy Organic	My Promotions	Ad Program	Other		
20		Jun-17	309	92	69		
21		May-17	172	77	67		
22							
23							
24		Jun-17	May-17	Apr-17	Mar-17		
25	Poor	600	600	600	600		
26	Good	600	600	600	600		
27	Excellent	600	600	600	600		
28	Target Revenue	1500	1500	1500	1500		
29	Net Revenue	1302	1242	1477	1164		
30							
31							
32		Revenue					
33	\$	1,302.00					
34	5%						
35							
36			<b>Calculations</b>	Data	mock-up		
	Ready						

## 4. Calculation Sheet

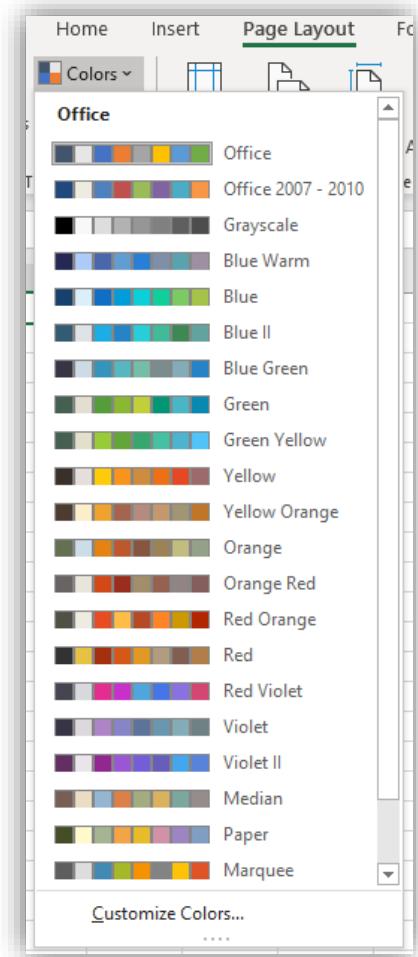


# 5. Making the Dashboard

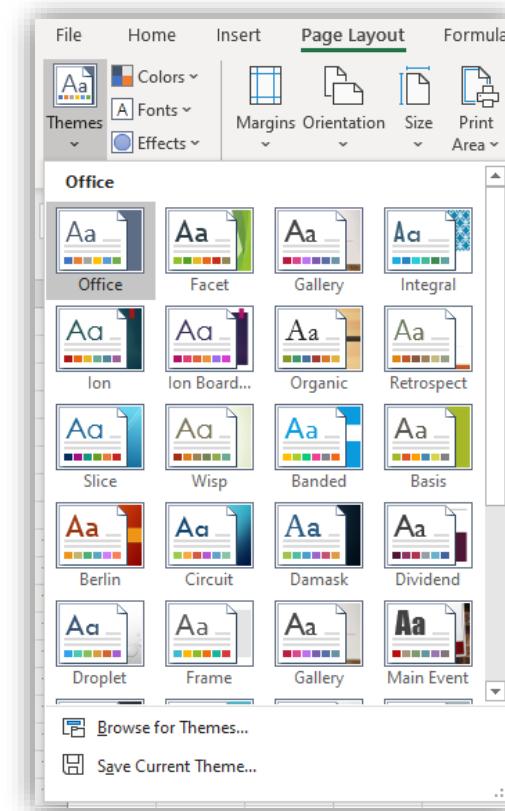
# Color Tips & Layouts



# Color Palette

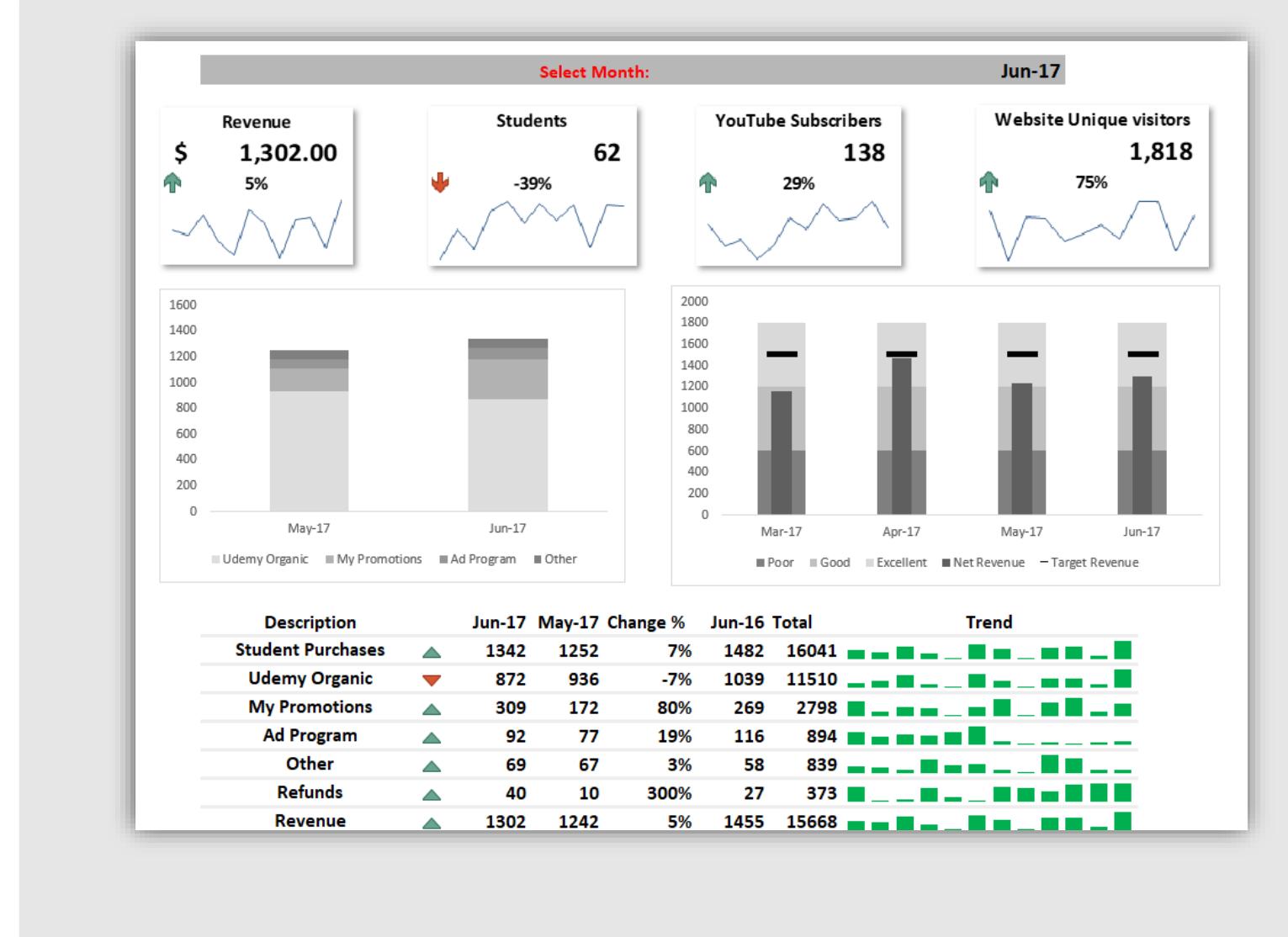


# Themes



Color Tips & Layouts

# 1. Grey is my friend



## Color Tips & Layouts

2. Add color only where needed to bring out the message

	Jan	Feb	Mar	Apr	May	Jun
Widgets	Yellow	Green	Green	Green	Green	Red
Thingies	Yellow	Red	Red	Yellow	Yellow	Red
Bits n Bobs	Green	Green	Green	Red	Red	Green
Odd Bits	Green	Green	Yellow	Yellow	Red	Green

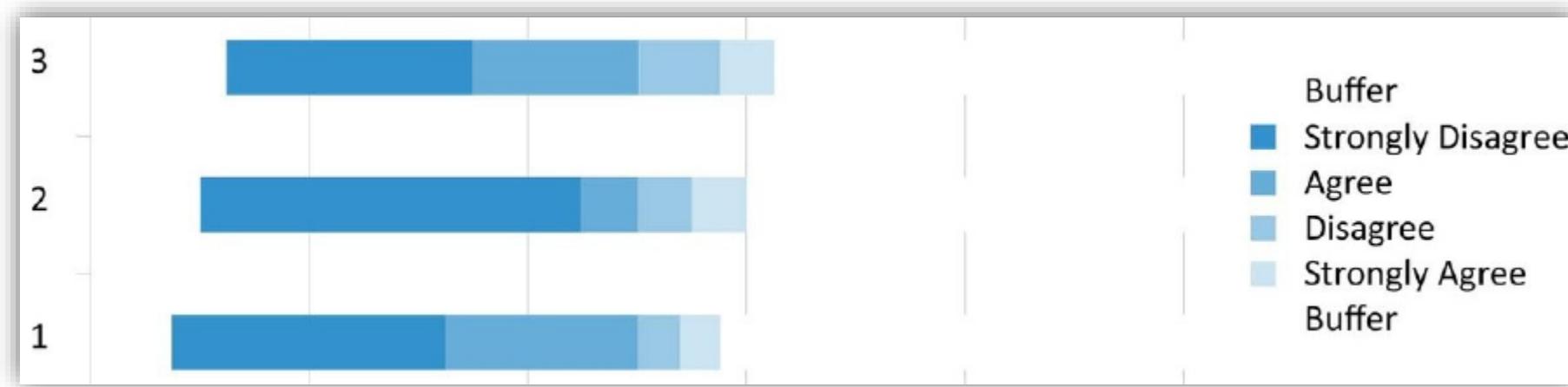


	Jan	Feb	Mar	Apr	May	Jun
Widgets						Red
Thingies		Red	Red			Red
Bits n Bobs				Red	Red	
Odd Bits					Red	



Color Tips & Layouts

### 3. Humans can distinguish between 4 shades of the same color



Color Tips & Layouts

#### 4. Select a base color, then use complementary colors

[www.colorlovers.com](http://www.colorlovers.com)

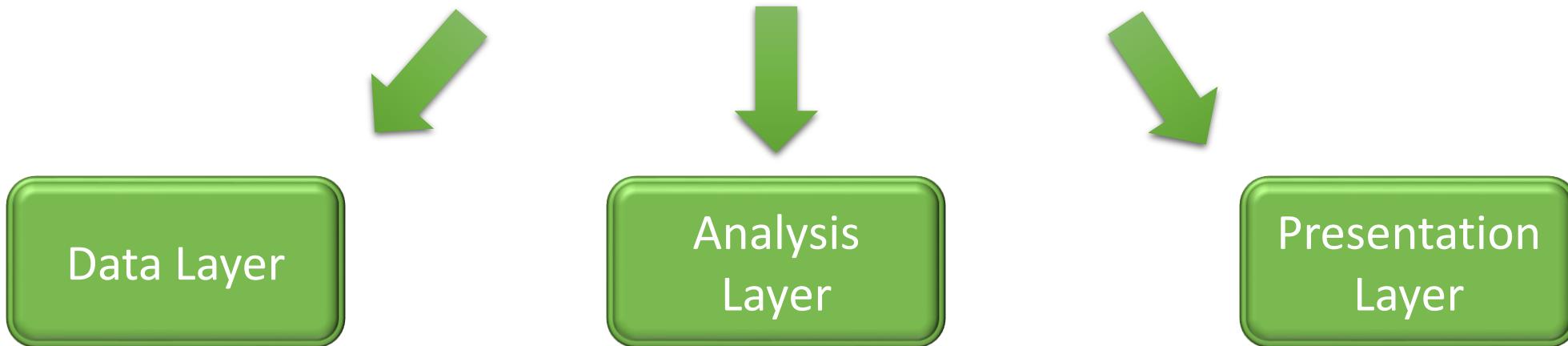
<https://color.adobe.com/create/color-wheel>

Color Tips & Layouts

# Building an Effective Data Model



# Data Model



Building an Effective Data Model

## Signs of a Flat Data Table:

- Column labels are on one row.
- Columns for time periods (weeks, months, years) or other summary levels like regions, departments, etc.
- No blank rows or columns.
- No rows containing subtotals and or a Total.

	A	B	C	D	E	F	G
1	Region	Country	Product	Q1 2015 Sales	Q2 2015 Sales	Q3 2015 Sales	Q4 2015 Sales
2	North America	USA	TV	15,678	15,681	17,613	12,478
3	North America	Canada	Smartphones	11,452	12,286	16,364	12,855
4	North America	USA	Smartphones	11,205	11,799	16,634	12,602
5	Europe	Germany	TV	11,041	17,572	10,971	14,616
6	Europe	Germany	Smartphones	11,049	12,117	12,727	11,912
7	Europe	France	TV	14,439	13,698	14,661	12,747
8	Europe	Spain	TV	15,467	10,604	15,859	12,642
9	Europe	Spain	Smartphones	13,477	10,505	12,934	12,412
10	Europe	Greece	Smartphones	16,402	13,445	15,696	17,258
11	Europe	UK	TV	14,891	12,783	14,416	11,149
12	Europe	UK	Smartphones	14,945	15,373	15,602	11,514
13	Asia	Japan	TV	16,249	10,136	12,968	14,074
14	Asia	Japan	Smartphones	14,560	16,881	11,284	16,004
15	Asia	China	TV	14,523	16,106	17,463	17,512
16	Asia	China	Smartphones	15,709	12,962	11,213	12,390
17	Asia	India	TV	15,718	12,078	10,085	15,297
18	Asia	India	Smartphones	15,068	17,118	14,278	10,037
19							

# Flat Data Tables

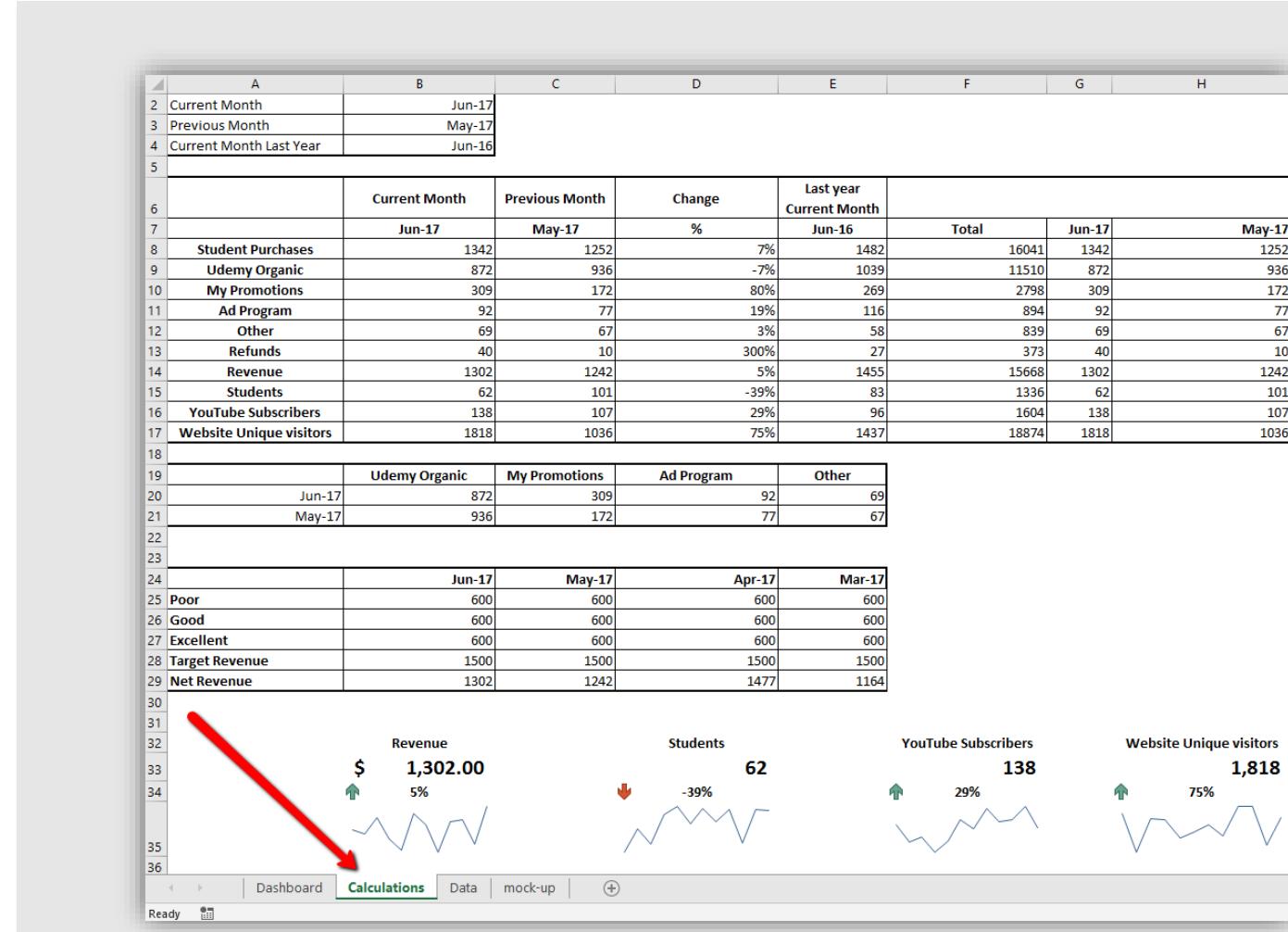
## The rules for tabular data:

- Every record is housed in one row.
- Each Column contains a type of data e.g., date, order number, quantity, amount, salesperson, region, etc.
- There are no blank rows or columns. Note: blank rows aren't the end of the world, but they will make your life more difficult than it needs to be.
- Column labels are in one cell per column and located on the first row. Note: they don't have to be on the first row, but they need to be in one row only. i.e., not split over multiple rows.
- There are no subtotals interspersed in the data.

	A	B	C	D	E
1	Region	Country	Product	Period	Sales
2	North America	USA	TV	Q1 2015	\$ 12,543
3	North America	USA	TV	Q2 2015	\$ 18,148
4	North America	USA	TV	Q3 2015	\$ 12,367
5	North America	USA	TV	Q4 2015	\$ 14,175
6	North America	Canada	Smartphones	Q1 2015	\$ 18,854
7	North America	Canada	Smartphones	Q2 2015	\$ 18,721
8	North America	Canada	Smartphones	Q3 2015	\$ 17,460
9	North America	Canada	Smartphones	Q4 2015	\$ 16,459
10	North America	USA	Smartphones	Q1 2015	\$ 18,430
11	North America	USA	Smartphones	Q2 2015	\$ 10,661
12	North America	USA	Smartphones	Q3 2015	\$ 13,579
13	North America	USA	Smartphones	Q4 2015	\$ 18,984
14	Europe	Germany	TV	Q1 2015	\$ 10,704
15	Europe	Germany	TV	Q2 2015	\$ 16,594
16	Europe	Germany	TV	Q3 2015	\$ 18,791
17	Europe	Germany	TV	Q4 2015	\$ 15,978
18	Europe	Germany	Smartphones	Q1 2015	\$ 11,047
19	Europe	Germany	Smartphones	Q2 2015	\$ 18,488
20	Europe	Germany	Smartphones	Q3 2015	\$ 11,831
21	Europe	Germany	Smartphones	Q4 2015	\$ 13,209
22	Europe	France	TV	Q1 2015	\$ 10,602
23	Europe	France	TV	Q2 2015	\$ 11,312
24	Europe	France	TV	Q3 2015	\$ 16,602
25	Europe	France	TV	Q4 2015	\$ 13,488

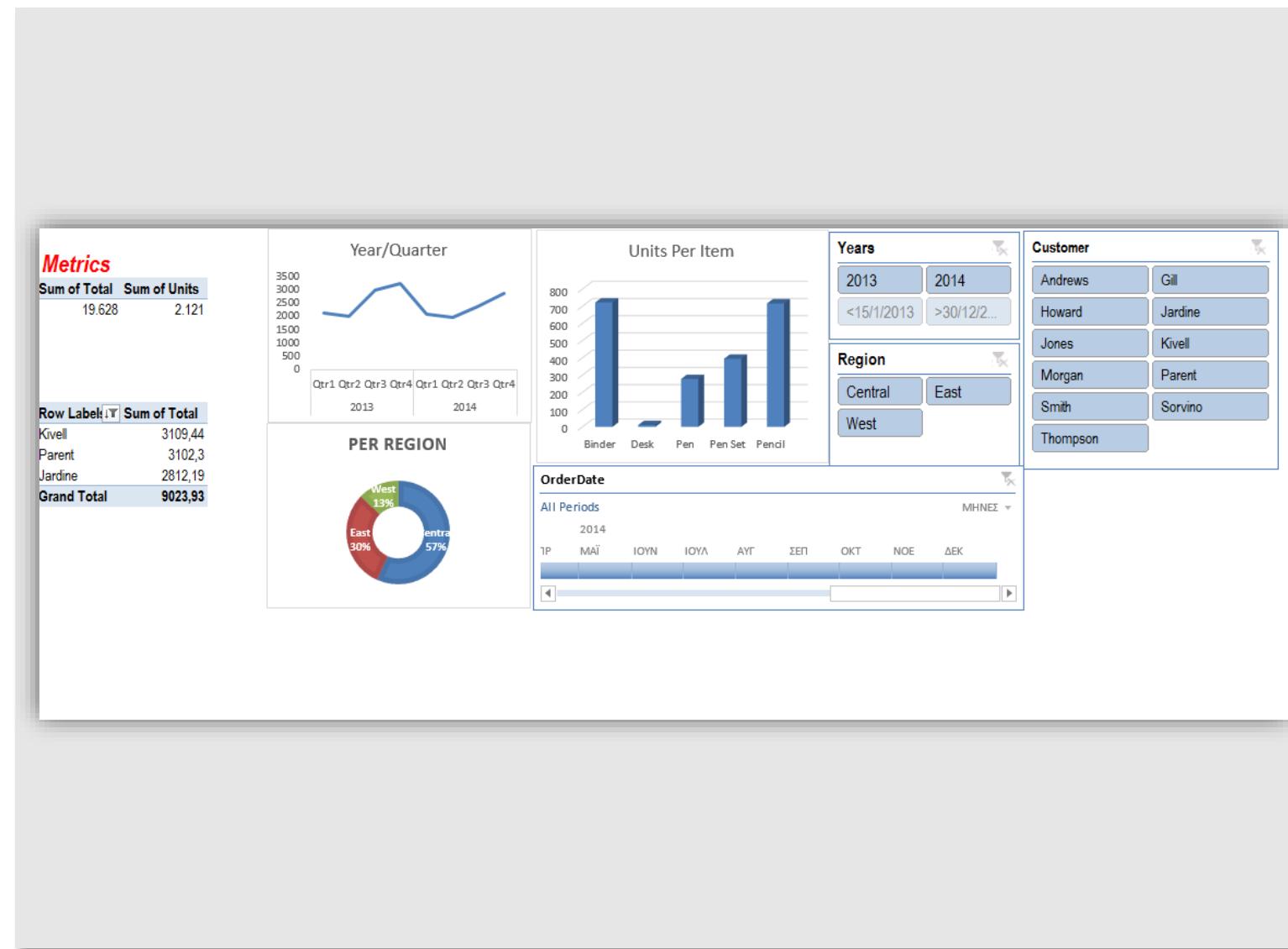
# Tabular Data Set

## Analysis Layer



# The Analysis Layer

# Presentation Layer



# The Presentation Layer



# Useful Keyboard Shortcuts & Tips

Excel  
**2019**

TASK	KEY COMBINATION			
Insert A New Line Within A Cell	Alt	+	Enter	
Undo	Ctrl	+	z	
Quickly Insert A New Row Or Column	Ctrl	+		
Quickly Delete A New Row Or Column	Ctrl	+		
Move Quickly To The Next Or Previous Sheet	Ctrl	+	Page ↓	<b>OR</b> Ctrl +  Page ↑
Move To The Last Line Of A Table	Ctrl	+		
Select The Entire Range Of A Table (First Click Inside The Table)	Ctrl	+	A	
Convert A Data Range Into A Table	Ctrl	+	T	
Save The Workbook	Ctrl	+	S	
Preview The Worksheet Before Printing It	Ctrl	+	F2	
Quickly Find Anything In Your Sheet	Ctrl	+	F	
Repeats The Last Formatting Action	F4			
Copy Attributes And Format Of An Object	Ctrl	+	Shift	+  T <b>OR</b> Ctrl +  Shift +  T
Opens The Format Dialog Box	Ctrl	+	1	
The Chart Snaps Into The Column Borders	Shift	+		

Useful Keyboard Shortcuts & Tips – with Excel 2019

# Importing External Data into Dashboard



# Examples of External Data Sources



Text/CSV Files



Access Tables



SQL Server  
Tables



Excel Tables

Dashboard Source Data

# Two Options To Get The Data Into An Excel Worksheet



Copying & Pasting  
Data



Establishing a  
Connection

Dashboard Source Data

The **MATCH** function returns the position of a specific value within a column or row

Syntax of **MATCH** function:

=MATCH(**lookup\_value**, **lookup\_array**, [**match\_type**])

What value are you trying to find the position of?

In which row or column are you looking? (must be a 1-dimensional array)

Are you looking for the exact value (0), or anything close?

A screenshot of Microsoft Excel demonstrating the **MATCH** function. The formula bar shows =MATCH(D6,B6:B14,0). The spreadsheet contains a table of fruits from row 6 to 14 in column B. A lookup value 'Peach' is entered in cell D6. The result of the formula, 5, is displayed in cell E6. A yellow arrow points from the formula bar to the value 5 in cell E6.

	A	B	C	D	E
1					
2					
3					
4					
5					
6		Fruit		Lookup	Result
7		Apple	1	Peach	5
8		Pear	2		
9		Grape	3		
10		Lemon	4		
11		Peach	5		
12		Lime	6		
13		Kiwi	7		
14		Mango	8		
15		Pineapple	9		
16					

# MATCH Function

The **INDEX** function returns the value of a specific cell within an array

Syntax of **INDEX** function:

=INDEX(array, row\_num, column\_num)

What range of cells are you looking at?

How many rows down is the value you want?

How many columns over is the value you want?

A screenshot of Microsoft Excel demonstrating the INDEX function. The formula bar shows =INDEX(\$B\$2:\$D\$6, G1, G2). The worksheet contains a data table with products and weekly sales. Column A lists products from Product 1 to Product 5. Columns B, C, and D represent Week 1, Week 2, and Week 3 respectively, with numerical values like 42, 18, and 47. Row 1 is a header row. Row 2 starts with 'Product 1'. Row 3 starts with 'Product 2' and has a green background. Row 4 starts with 'Product 3'. Row 5 starts with 'Product 4' and has a red border around the cell. Row 6 starts with 'Product 5'. To the right of the table, there are three cells labeled 'Product:', 'Week:', and 'Items:' with corresponding values 4, 3, and 19. The formula =INDEX(\$B\$2:\$D\$6, G1, G2) is entered into cell G3, which has a green background. The cell G2 contains the value 3, which corresponds to the row index in the formula. The cell G1 contains the value 4, which corresponds to the column index in the formula. The formula uses absolute references (\$B\$2:\$D\$6) to refer to the entire range of data.

	A	B	C	D	E	F	G
1		Week 1	Week 2	Week 3			
2	Product 1	42	18	47			
3	Product 2	39	25	21			
4	Product 3	37	16	18			
5	Product 4	44	50	19			
6	Product 5	21	31	42			

Product: 4  
Week: 3  
Items: 19

INDEX Function

The **OFFSET** function is similar to **INDEX**, but can return either the value of a cell within an array (like INDEX) or a specific range of cells

Syntax of **OFFSET** function:

```
=OFFSET(reference, rows, columns, [height], [width])
```

What's your starting point?

How many rows down should you move?

How many columns over should you move?

If you want to return a multidimensional array, how tall and wide should it be?

# OFFSET Function

All Logical Operators in Excel are based on simple “IF/THEN” statements:

“**IF** today is Monday, I'll wear a black shirt, otherwise I'll wear a brown shirt

=IF(logical\_test, [Value if True], [Value if False])



Any test that  
results in either  
TRUE or FALSE



Value returned  
if logical test is  
TRUE



Value returned  
if logical test is  
FALSE

IF and NESTED IF Formulas

By using Nested IF Statements, you can include multiple logical tests within a single formula:

**IF** it's Monday, I wear a black shirt; **IF** it's Tuesday, I wear a brown shirt; **IF** it's Wednesday, I wear a red shirt; **IF** it's Thursday or Friday, I wear jeans, otherwise stay home

```
=IF(today is Monday, black shirt, IF(today is Tuesday, brown shirt,  
IF(today is Wednesday, red shirt, IF(OR(today is Thursday, today is  
Friday), jeans, stay home))))
```

Excel's **AND** and **OR** statements allow you to include multiple logical tests at once:

**AND**

```
=IF(AND(B2="delivered", C2<>""), "Closed", "Open")
```

	A	B	C	D
1	Order no.	Progress	Delivery date	Status
2	101	Delivered	9/1/2018	Closed
3	102	In transit		Open
4	103	Unknown		Open
5	104	Delivered		Open
6	105	Delivered	9/12/2018	Closed
7	106	In transit		Open
8	107	Delivered	10/2/2018	Closed

**OR**

```
=IF(OR(B2="delivered", B2="paid"), "Closed", "Open")
```

	A	B	C	D	E
1	Order no.	Progress	Status		
2	101	Delivered	Closed		
3	102	In transit	Open		
4	103	Delivered	Closed		
5	104	Delivered	Closed		
6	105	Paid	Closed		
7	106	In transit	Open		
8	107	Cancelled	Open		

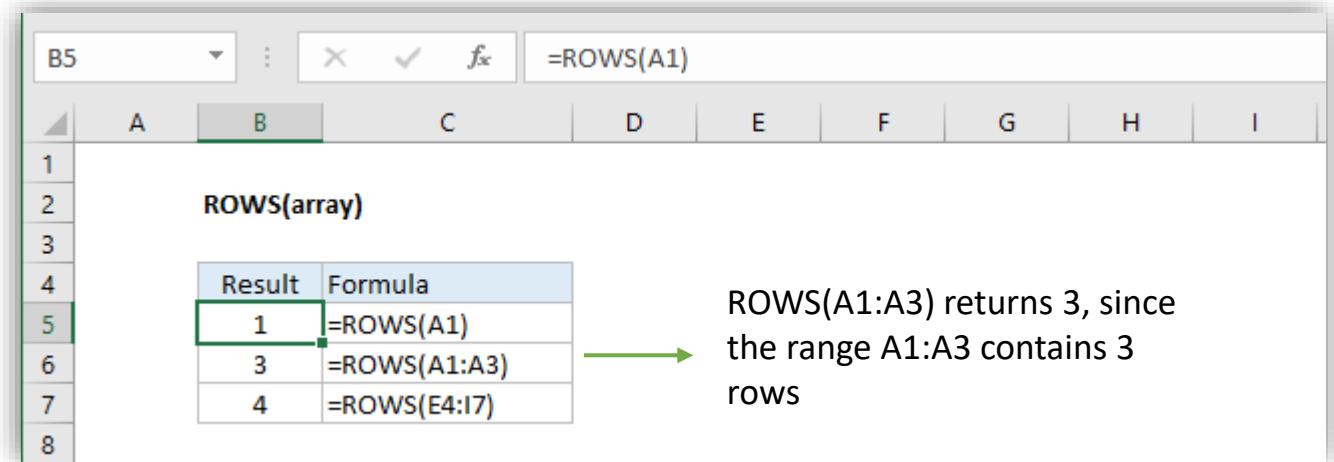
IF and NESTED IF Formulas

The **ROW** function returns the row number of a given reference, while the **ROWS** function returns the number of rows in a given array or array formula

Syntax of **ROW/ROWS** functions:

=ROW([reference])

=ROWS(array)



A screenshot of Microsoft Excel demonstrating the use of the ROWS function. The formula `=ROWS(A1)` is entered into cell B5. The formula bar shows `=ROWS(A1)`. The cell B5 contains the value 1. To the right, a table titled "ROWS(array)" shows three rows of data:

Result	Formula
1	=ROWS(A1)
3	=ROWS(A1:A3)
4	=ROWS(E4:I7)

An arrow points from the text "ROWS(A1:A3) returns 3, since the range A1:A3 contains 3 rows" to the third row of the table.

ROW/ROWS Functions

The **COLUMN** function returns the column number of a given reference, while the **COLUMNS** function returns the number of columns in a given array or array formula

Syntax of **COLUMN/COLUMNS** functions:

=COLUMN([reference])

=COLUMNS(array)

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

- The active cell is B5, with the formula =COLUMN(A1) displayed in the formula bar.
- The spreadsheet has columns A through I and rows 1 through 8.
- A callout box labeled "COLUMN(array)" points to a table titled "Result" and "Formula".
- The table contains three rows:
  - Result: 1, Formula: =COLUMN(A1)
  - Result: 3, Formula: =COLUMN(A1:C1)
  - Result: 5, Formula: =COLUMN(E4:I7)
- An arrow points from the text "COLUMNS(A1:C3) returns 3, since the range A1:C3 contains 3 columns." to the third row of the table.

COLUMN/COLUMNS Functions

The **LEFT**, **MID**, and **RIGHT** functions return a specific number of characters from a location within a text string, and **LEN** returns the total number of characters

```
=LEFT(text, [num_chars])  
=RIGHT(text, [num_chars])  
=MID(text, start_num, num_chars)
```

	A	B	C	D	E	F	G	H
1	Name	City	LEFT	RIGHT	MID	LEN	MID & FIND	
2	Cooper	Oslo,Norway	C	per	oo	6	Norway	
3	Philip	Lisbon,Portugal	P	lip	hi	6	Portugal	
4	Porter	Copenhagen,Denmark	P	ter	or	6	Denmark	
5	Micah	Valencia,Spain	M	cah	ic	5	Spain	
6	Kieran	Cork,Ireland	K	ran	ie	6	Ireland	
7	Warren	Rome,Italy	W	ren	ar	6	Italy	
8	Ferdinand	Zurich,Switzerland	F	and	er	9	Switzerland	
9	Emerson	Athens,Greece	E	son	me	7	Greece	
10	Brandon	Stockholm,Sweden	B	don	ra	7	Sweden	
11								

# LEFT/MID/RIGHT/LEN Functions

Text functions can be used to standardize formatting, particularly the **TRIM**, **UPPER**, **LOWER**, and **PROPER** functions:

```
=TRIM (text)  
=UPPER(text)  
=LOWER (text)  
=PROPER (text)
```

	Name	City	TRIM	LOWER	UPPER	PROPER
1	Cooper	Oslo,Norway		cooper	COOPER	
2	Philip	Lisbon,Portugal		philip	PHILIP	
3	Porter	Copenhagen,Denmark	Andreas	porter	PORTER	
4	Micah	Valencia,Spain	is the	micah	MICAH	
5	Kieran	Cork,Ireland	instructor	kieran	KIERAN	Andreas Is The Instructor
6	Warren	Rome,Italy	of this	warren	WARREN	Of This Course
7	Ferdinand	Zurich,Switzerland	course	ferdinand	FERDINAND	
8	Emerson	Athens,Greece		emerson	EMERSON	
9	Brandon	Stockholm,Sweden		brandon	BRANDON	

TRIM/UPPER/LOWER/PROPER Functions

**CONCATENATE** allows you to combine text, cell values, or formula outputs into a single text string

Note: Rather than typing “=CONCATENATE(Text1, Text2...)”, you can simply separate each piece of the resulting text string with an ampersand (“&”)

	Name	City	CONCATENATE
1	Cooper	Oslo,Norway	Cooper Oslo,Norway
2	Philip	Lisbon,Portugal	Philip Lisbon,Portugal
3	Porter	Copenhagen,Denmark	Porter Copenhagen,Denmark
4	Micah	Valencia,Spain	Micah Valencia,Spain
5	Kieran	Cork,Ireland	Kieran Cork,Ireland
6	Warren	Rome,Italy	Warren Rome,Italy
7	Ferdinand	Zurich,Switzerland	Ferdinand Zurich,Switzerland
8	Emerson	Athens,Greece	Emerson Athens,Greece
9	Brandon	Stockholm,Sweden	Brandon Stockholm,Sweden
10			

CONCATENATE Function

The **TEXT** function converts a numeric value to text and assigns a particular format

Syntax of **TEXT** function:

=TEXT(value, format\_text)



Numeric value,  
formula that evaluates  
to a numeric value, or  
reference to a cell  
containing a numeric  
value



Numeric format as a  
text string enclosed in  
quotes (i.e.,  
“m/d/yyyy”, “\$0.00” or  
“#,##0.00”)

A	B	C	D	E
1	Sales	Profit		
2	Cell Phones	2800	Profit for Cell Phones is 2,800	
3	Batteries	1350		
4	Cables	990		
5	Monitors	3400		
6				
7				

TEXT Function

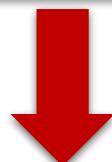
The **SMALL/LARGE** functions return the nth smallest/largest values within an array

Syntax of **SMALL** function:

=SMALL (array, n)



A range of cells from which to extract smallest values



An integer that specifies the position from the smallest value, i.e. the nth position.

Syntax of **LARGE** function:

=LARGE (array, n)



The array from which you want to select the kth largest value.



An integer that specifies the position from the largest value, i.e. the nth position.

SMALL and LARGE Functions

## Syntax of **VLOOKUP** reference function:

```
=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])
```



This is the value  
that you are  
trying to match in  
the table array



This is where you  
are looking for  
the lookup value



Which column  
contains the data  
you're looking  
for?



Are you trying to  
match the exact  
lookup value (0),  
or something  
similar (1)?

VLOOKUP Function

The **SUMPRODUCT** formula multiplies corresponding cells from multiple arrays and returns the sum of the products (Note: all arrays must have the same dimensions)

Syntax of **SUMPRODUCT** function:

=SUMPRODUCT(array1, array2... array\_N)



The first array argument whose components you want to multiply and then add.



Array arguments 2 to 255 whose components you want to multiply and then add.

A screenshot of Microsoft Excel. The formula bar at the top shows the formula =SUMPRODUCT((B2:B7=B10)\*(C2:C7=C10)\*D2:D7). Below the formula bar is a table with four columns: Item, Size, Sold, and Total. The rows contain data points for items X, Y, and Z in different sizes (S, M, L). The last row is a summary row with Item, Size, and Total columns. The formula in the Total cell is =SUMPRODUCT((B2:B7=B10)\*(C2:C7=C10)\*D2:D7), which calculates the total sold for size M across all items.

	A	B	C	D	E	F
1		Item	Size	Sold		
2		X	S	45		
3		Y	M	21		
4		Z	L	25		
5		X	L	20		
6		Y	M	41		
7		Z	S	19		
8		Item	Size	Total		
9						
10		Y	M	62		
11						

# SUMPRODUCT Function

**SUMIFS, AVERAGEIFS** and **COUNTIFS** are used when you want to evaluate a sum, average or count based on multiple conditions or criteria

Syntax of **SUMIFS, AVERAGEIFS** and **COUNTIFS** functions:

```
=SUMIFS(sum_range, criteria_range1, criteria1, criteria_range2, criteria2...)
```

```
=AVERAGEIFS(average_range, criteria_range1, criteria1, criteria_range2, criteria2...)
```

```
=COUNTIFS(criteria_range1, criteria1, criteria_range2, criteria2...)
```

SUMIFs, AVERAGEIFs and COUNTIFs Functions

The **CHOOSE** function in Excel is designed to return a value from the list based on a specified position

Syntax of **CHOOSE** function:

**CHOOSE(index\_num, value1, [value2], ...)**

The position of the value to return. It can be any number between 1 and 254, a cell reference, or another formula.

A list of up to 254 values from which to choose. Value1 is required, other values are optional. These can be numbers, text values, cell references, formulas, or defined names.

The screenshot shows a Microsoft Excel spreadsheet. In cell D2, the formula =CHOOSE(D1, A2, A3, A4, A5) is entered. The formula bar also displays this formula. To the left, under the heading 'Lottery players', there is a list of names: Mike, Sally, Amy, and Neal. The cell D1 contains the value 3. The cell D2, which contains the formula result, is highlighted with a green border and contains the name Amy. The column headers are A, B, C, and D. The row headers show the numbers 1 through 5. The cell A1 is labeled 'Lottery players'. The cell D3 is labeled 'Random pick' and contains the value 3. The cell D4 is labeled 'Winner' and contains the value Amy.

	A	B	C	D
1	Lottery players		Random pick	3
2	Mike		Winner	Amy
3	Sally			
4	Amy			
5	Neal			

# CHOOSE Function

**CHOOSE** is a very plain function and you will hardly run into any difficulties implementing it in your worksheets.

If the result returned by your **CHOOSE** formula is unexpected or not the result you were looking for, it may be because of the following reasons:

1. The number of values to choose from is limited to 254.
2. If index number is less than 1 or greater than the number of values in the list, the value error is returned.
3. If the index number argument is a fraction, it is truncated to the lowest integer.

**MOD** returns the remainder after number is divided by divisor. The result has the same sign as divisor.

Syntax of **MOD** function:

**MOD(number, divisor)**



The number for which you want to find the remainder.



The number by which you want to divide number.

Syntax of **INT** function:

**INT(number)**



The real number you want to round down to an integer.

## INT and MOD Functions

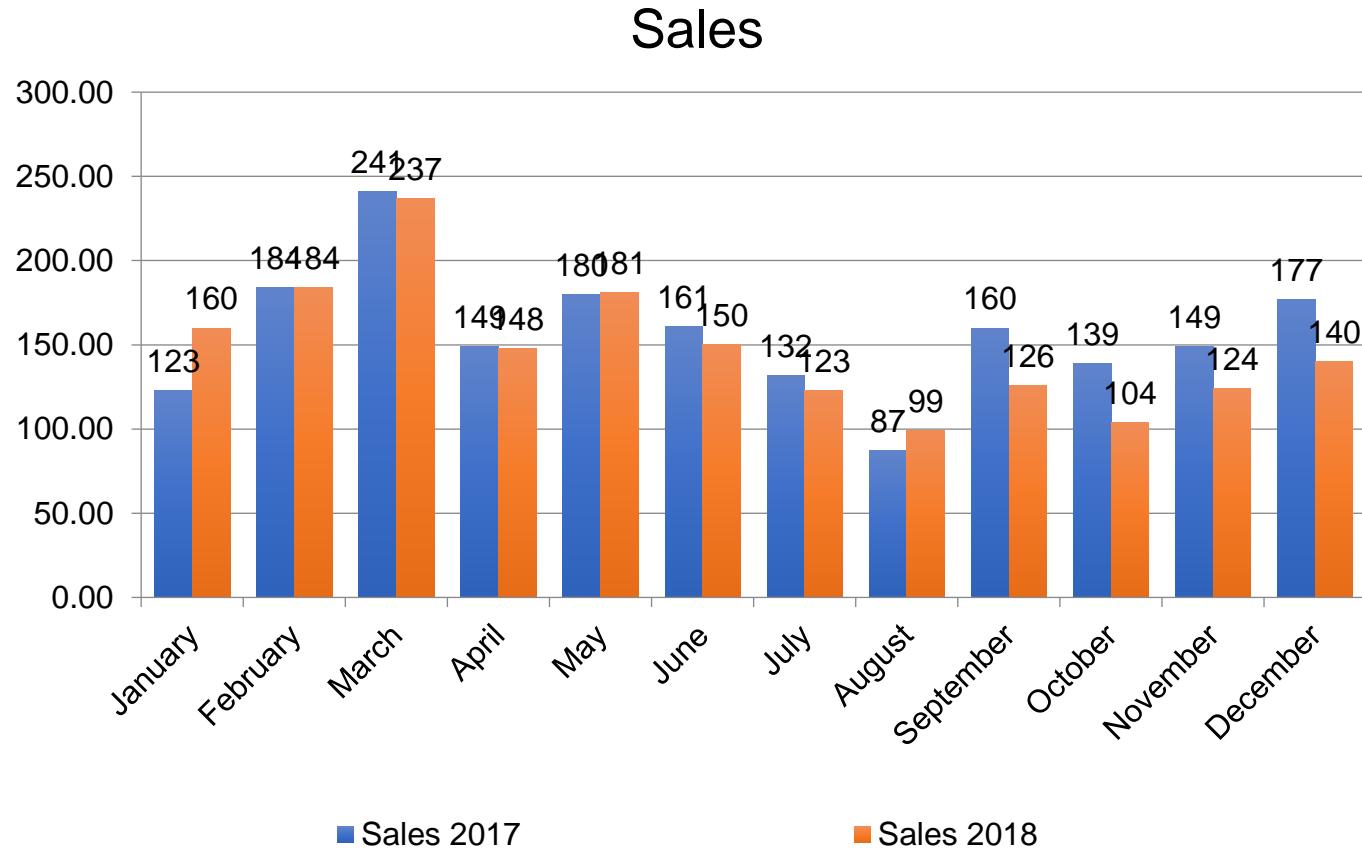
# Making the Right Chart



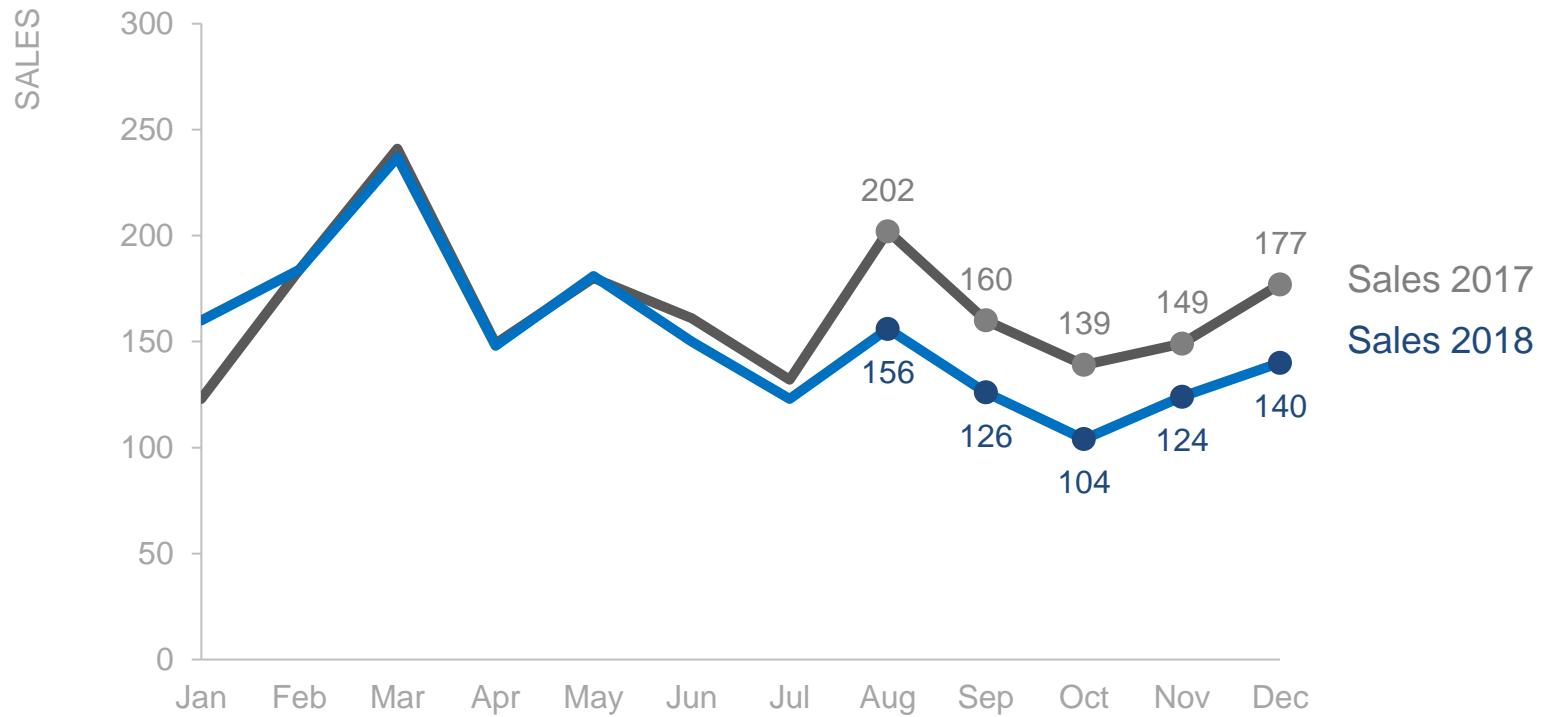
# DATA

Sales	January	February	March	April	May	June	July	August	September	October	November	December
Sales 2017	123	184	241	149	180	161	132	87	160	139	149	177
Sales 2018	160	184	237	148	181	150	123	99	126	104	124	140

# BEFORE



# AFTER



## 4-Step Process



**Understand the context**



**Arrange your Data**



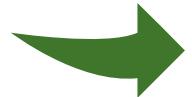
**Choose an Effective Visual**



**Remove the Clutter**



1



## Understand the context

Who is your audience?

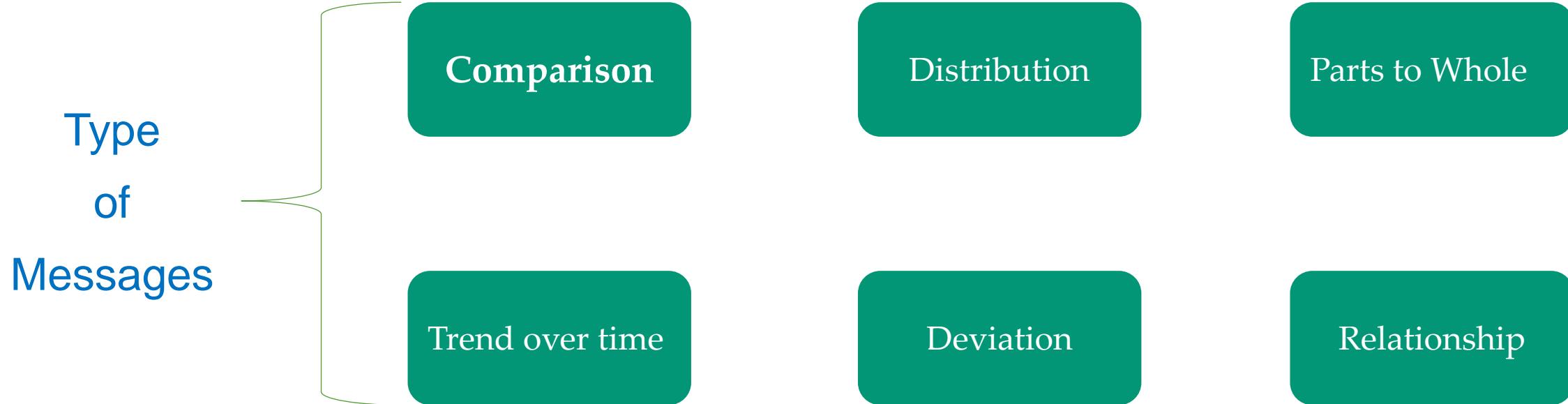
What do you need them to know or do?

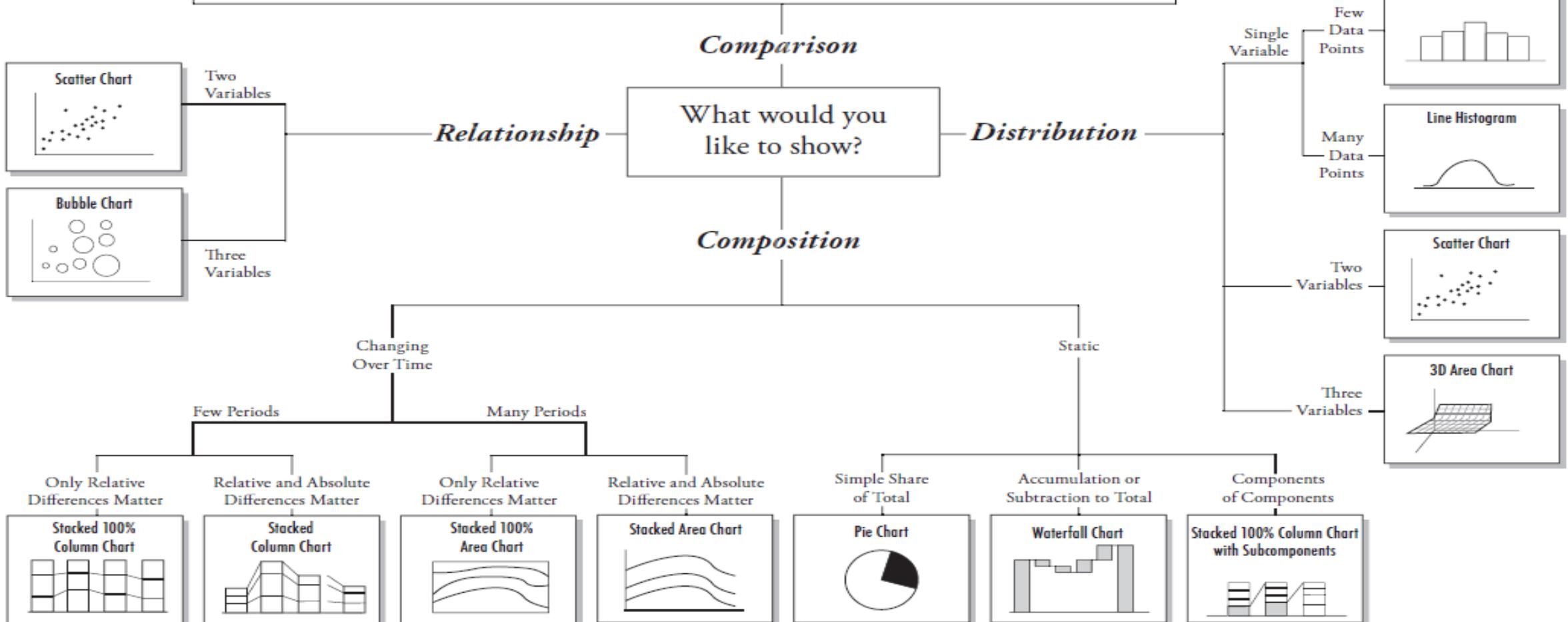
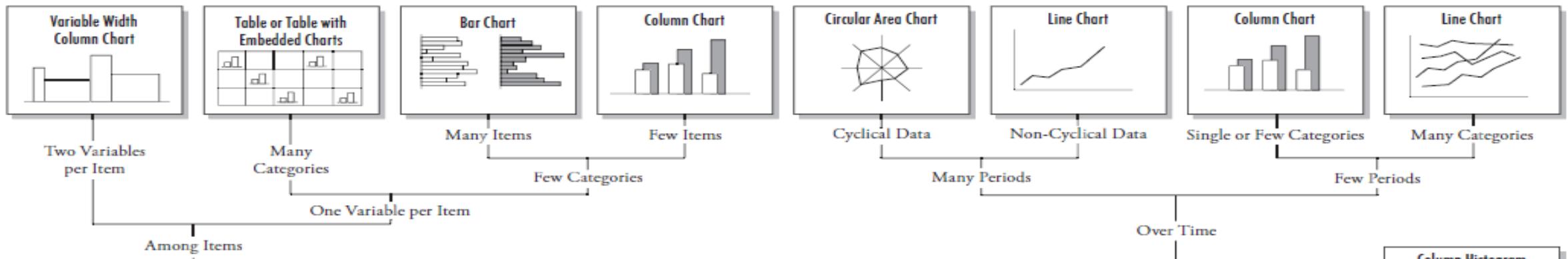
What data is available that will help make my point?

1



## Understand the context

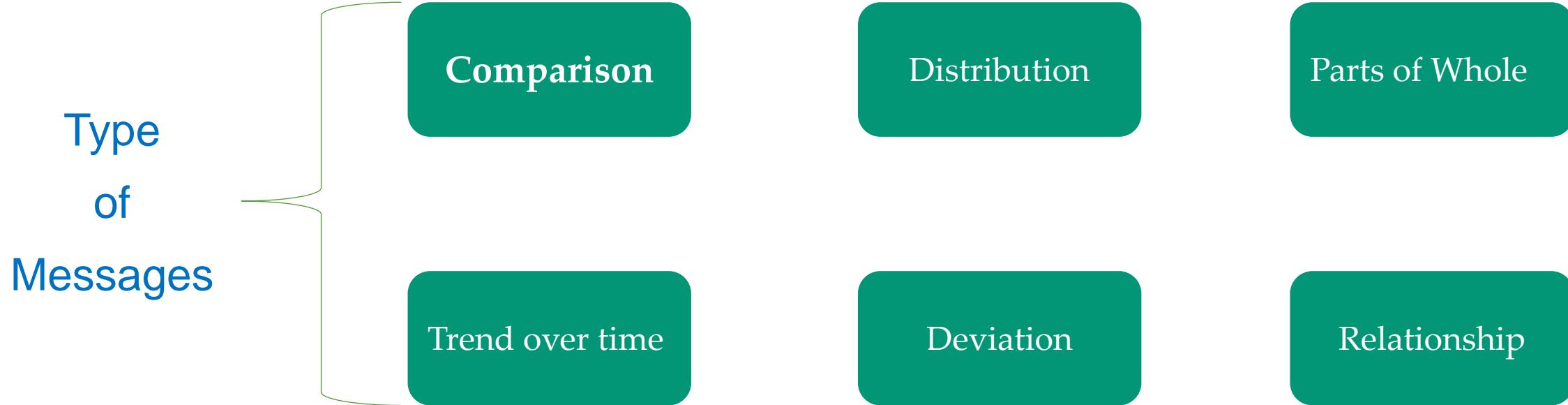




1



## Understand the context



2



## Arrange your Data

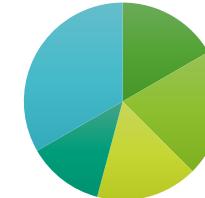
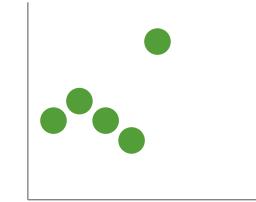
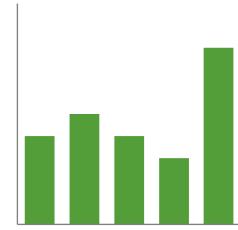
- ✓ Re-arrange your Data
- ✓ Cleaning up the Data
- ✓ Use Excel Tables
- ✓ Use Pivot Tables

3



## Choose an Effective Visual

Comparison



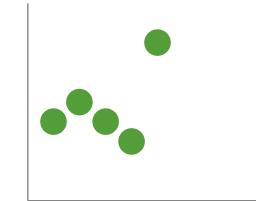
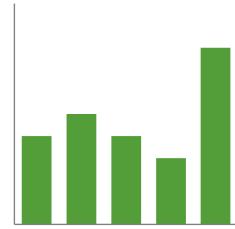
	A	B	C
Category 1	15%	22%	42%
Category 2	40%	36%	20%
Category 3	35%	17%	34%
Category 4	30%	29%	26%
Category 5	55%	30%	58%
Category 6	11%	25%	49%

3



## Choose an Effective Visual

Distribution



1

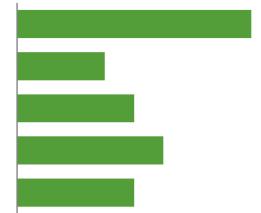
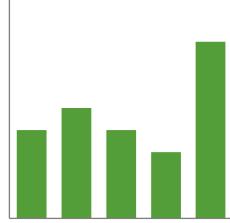


3

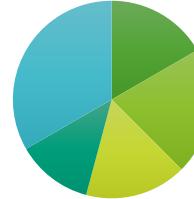


## Choose an Effective Visual

Parts of Whole



	A	B	C
Category 1	15%	22%	42%
Category 2	40%	36%	20%
Category 3	35%	17%	34%
Category 4	30%	29%	26%
Category 5	55%	30%	58%
Category 6	11%	25%	49%

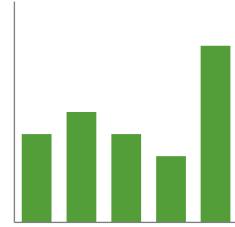


3



## Choose an Effective Visual

Trend over time



	A	B	C
Category 1	15%	22%	42%
Category 2	40%	36%	20%
Category 3	35%	17%	34%
Category 4	30%	29%	26%
Category 5	55%	30%	58%
Category 6	11%	25%	49%

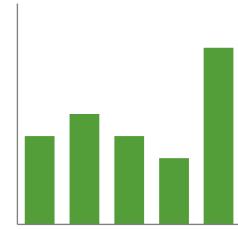


3



## Choose an Effective Visual

Deviation



	A	B	C
Category 1	15%	22%	42%
Category 2	40%	36%	20%
Category 3	35%	17%	34%
Category 4	30%	29%	26%
Category 5	55%	30%	58%
Category 6	11%	25%	49%

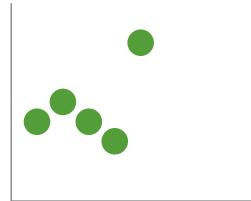


3



## Choose an Effective Visual

Relationship



	A	B	C
Category 1	15%	22%	42%
Category 2	40%	36%	20%
Category 3	35%	17%	34%
Category 4	30%	29%	26%
Category 5	55%	30%	58%
Category 6	11%	25%	49%





4



## Remove the Clutter

- ✓ Remove Gridlines or Make Subtle Gridlines
- ✓ Remove Chart Border
- ✓ Use Simple Colors
- ✓ Add Descriptive and Bold Titles
- ✓ Add Labels for Important Points
- ✓ Push the x- and y- Axis Lines and Labels to the Background

Chart Chooser brought  
to you by Juice Analytics



Need more juice?  
Check out Juicebox —  
a new kind of tool for  
presenting data.

SCHEDULE A DEMO

LEARN MORE

## Welcome to Chart Chooser — our favorite tool for improved Excel and PowerPoint charts.

Use the filters below to find the right chart type for your needs, then download as Excel or PowerPoint templates and insert your own data.

Learn more about the origins of Chart Chooser [here](#).

What type of visualization do you need for your data?:

Viewing 17 of 17

All

Comparison

Distribution

Composition

Trend

Relationship

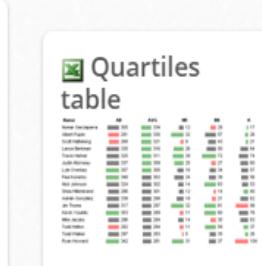
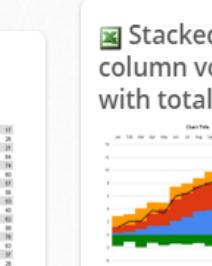
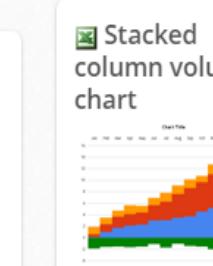
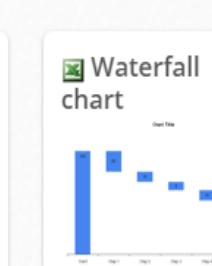
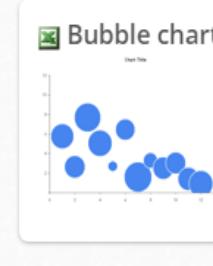
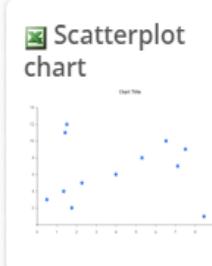
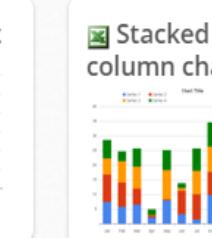
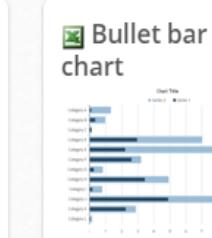
Table

Powerpoint

Excel

Share

+



Groupings table

Row	AB	BC	CD	DE	EF
Albert Hayes	201	120	52	47	38
Joe Thomas	211	207	52	41	38
John Williams	202	120	52	47	38
Adam Davis	241	245	50	73	113
Frank Morris	203	211	29	72	74
Mike Johnson	204	205	29	72	74
Laura Bernardo	205	213	26	50	64
Julie Morales	206	206	26	50	64
David Hernandez	207	207	26	50	64
Albert Hernandez	208	208	26	50	64
Patricia Martinez	209	209	26	50	64
Carlo Dominguez	210	205	24	50	64
Erica Soto	211	204	24	50	64
Ricardo Gutierrez	201	224	19	50	64
Albert Hernandez	202	209	18	52	62
Patricia Martinez	203	209	17	50	64
Carlo Dominguez	204	201	17	50	64
Erica Soto	205	201	17	50	64
Ricardo Gutierrez	206	201	17	50	64
Albert Hernandez	207	201	17	50	64
Patricia Martinez	208	201	17	50	64
Carlo Dominguez	209	201	17	50	64
Erica Soto	210	201	17	50	64
Ricardo Gutierrez	211	201	17	50	64

<http://labs.juiceanalytics.com/chartchooser/index.html>

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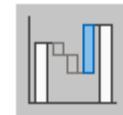
Making the Right Chart – with Excel 2019



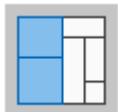
# New Chart Types



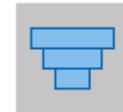
Filled Map



Waterfall



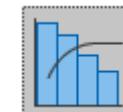
Treemap



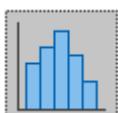
Funnel



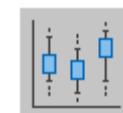
Sunburst



Pareto



Histogram

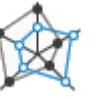


Box and Whisker

Introducing Excel Charts

There are a lot of **useless charts**, that I do not recommend using them.

Here are some examples:



Radar charts (Leave the radar charts for Spidermen)



Donut Charts (Don't show, just eat your donuts)



3D Line charts (Don't add dimensions to your lines)



Pie charts (If one Pie is bad, two of them is worst)

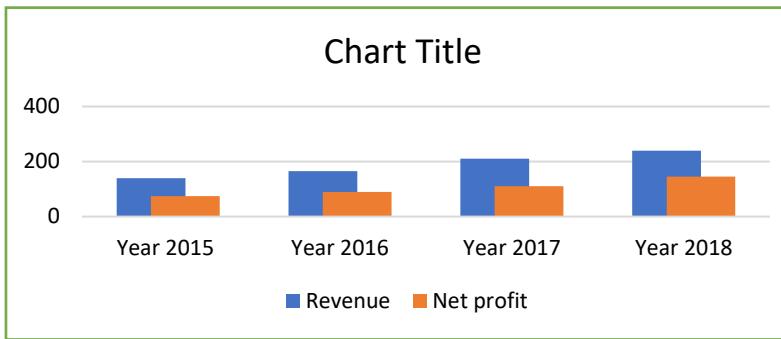


3D column and bar charts (Don't make your charts look like downtown)



3D unstacked area charts (Save the unstacked area charts till we have x-ray vision)

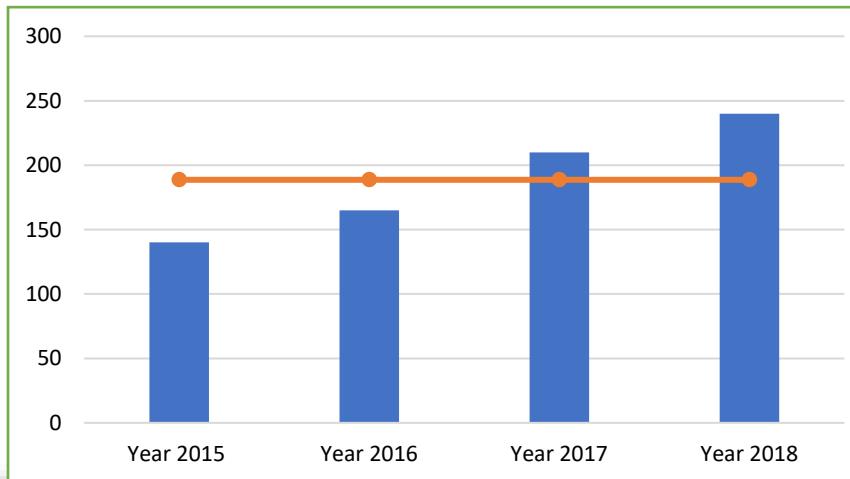
## Overlapped bar charts and Series Gaps



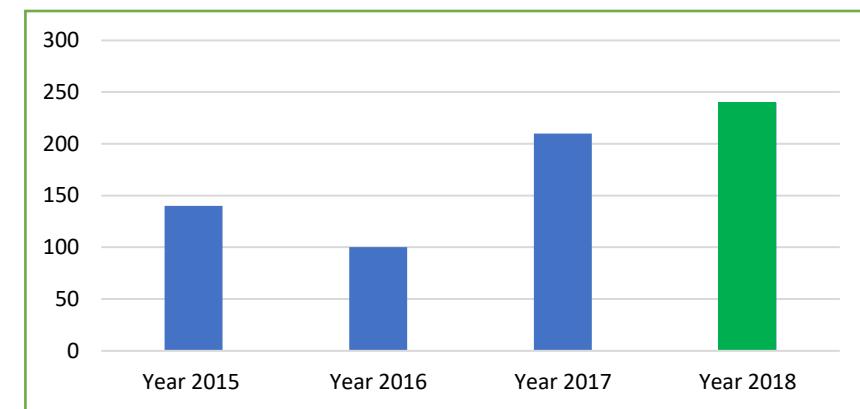
## Negative bars



## Adding an average line to a chart



## Highlighting the maximum or minimum item automatically



Advanced Charting and Formatting Techniques

Here are a **few ways** to go beyond the basics and use the Camera tool  
to enhance your dashboards and reports:

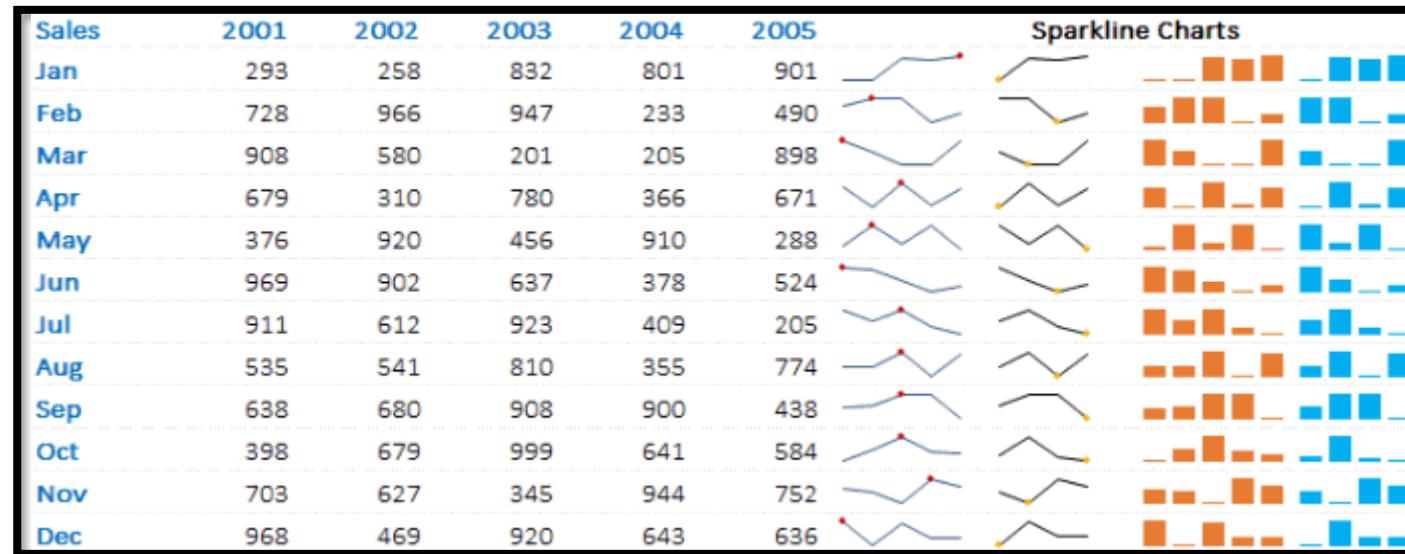
- Consolidate disparate ranges into one print area
- Rotate objects to save time
- Create small charts



Camera Tool

**Sparklines** are mini word-size charts placed in and among the textual data in tables.

**Sparklines** enable you to see at a glance, trends and patterns within your data.



Sparklines and Win/Loss Charts

# Excel supports three types of **Sparklines**: Line, Column, and Win Loss.



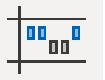
Line

Similar to a line chart, the Line type of sparkline can appear with or without a marker for each data point.



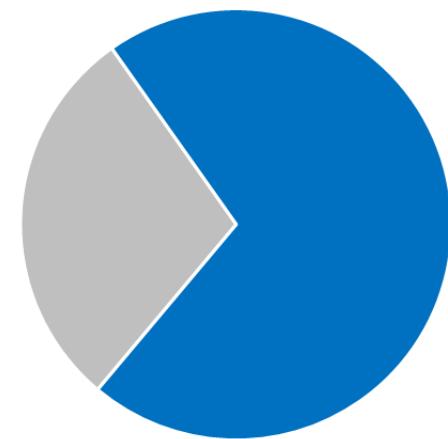
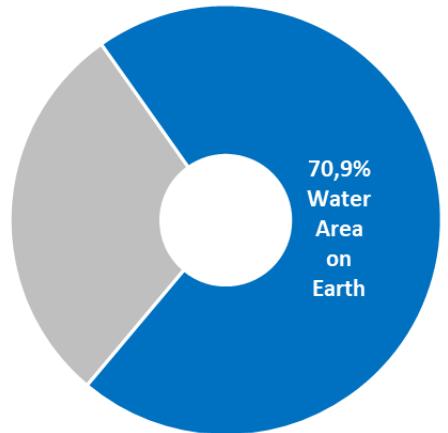
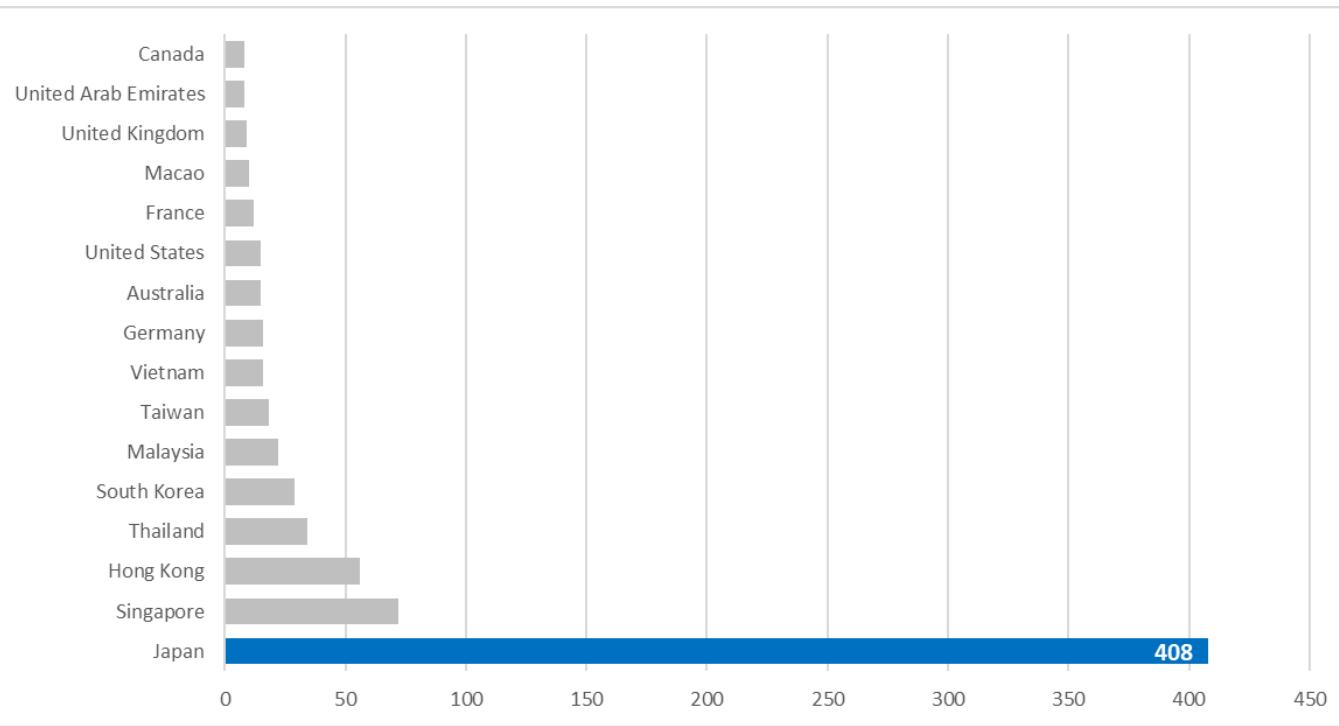
Column

Similar to a column chart, the second group shows the same data with Column sparklines.



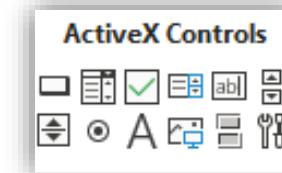
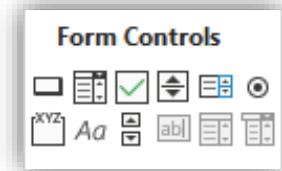
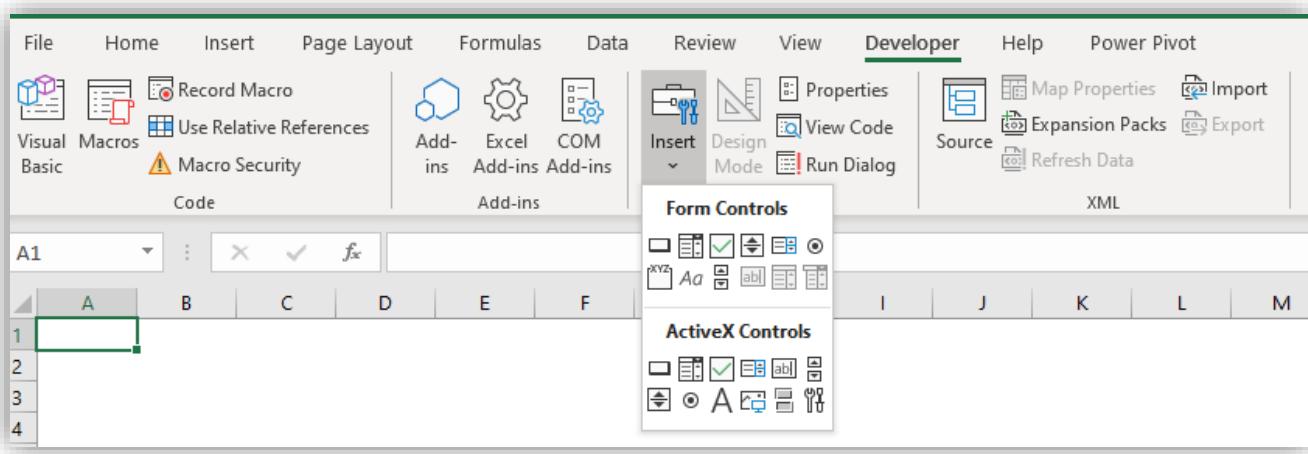
Win/  
Loss

A Win Loss sparkline is a binary-type chart that displays each data point as a high block or a low block.



Emphasizing & Mark Significant Events

# Form Controls enable you to add interactivity into your presentations.



Button

List Box

Group Box

Combo Box

Spin Button

Scroll Bar

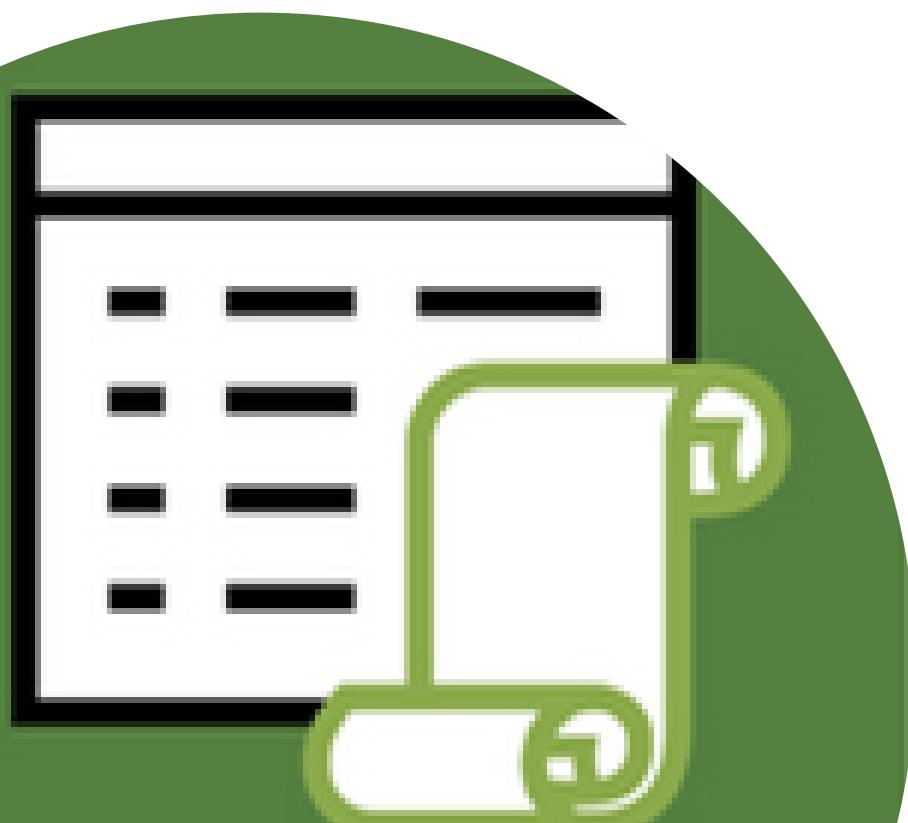
Check Box

Option Button

Label

# Form Controls

# Macros



A macro is essentially a set of instructions or code that you create to tell Excel to execute any number of actions

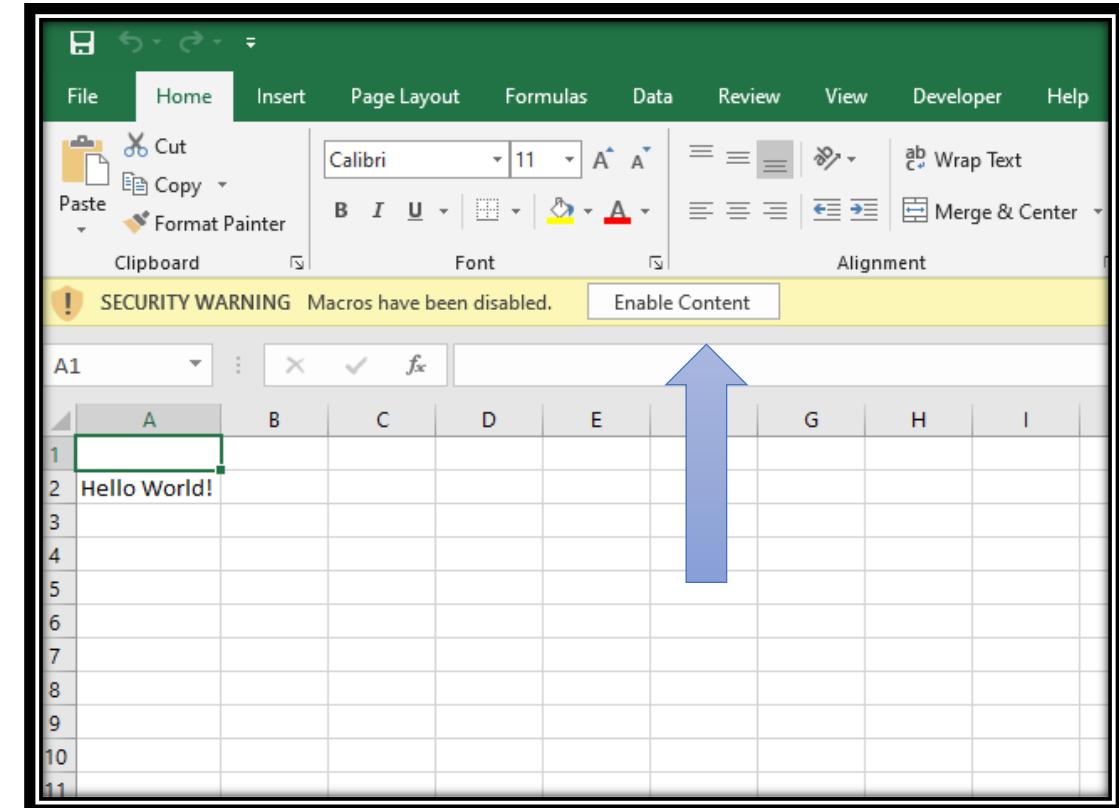
# How to Record a Macro:

- a) Click on the record macro button at the bottom left-hand side
  - b) Use shortcut key Alt + T + M + R
  - c) Go to Developer tab – Record macro
  - d) Go to View tab – Record macro
- 
- Name your Macro, assign a shortcut key & decide where to store it (workbook or personal macro workbook)
  - Run through the steps the macro needs to do and Stop the macro

MACRO-CHARGED DASHBOARDING

# Open an Excel File with Macros:

- Press the Enable Content button
- Open the Visual Basic Editor (VBE) :
  1. Alt + F11
  2. Developer tab /Visual Basic
  3. View / Macros /View Macros, then Edit
  4. Right-mouse click on sheet /View Code



MACRO-CHARGED DASHBOARDING

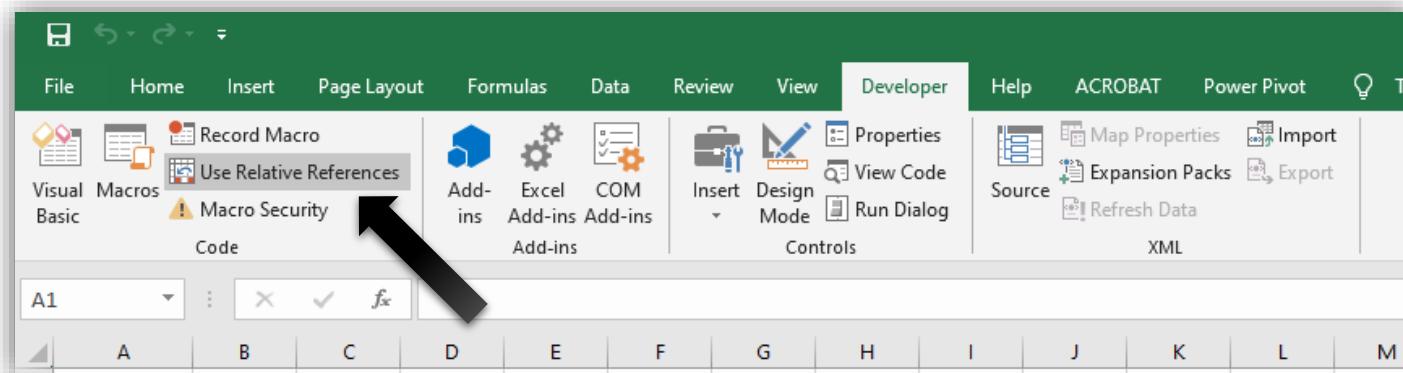
# How to Run a Macro:

1. a) Go to Tab Developer / Macros  
b) Go to Tab View / Macros
2. Add the Macro to the Quick Access Toolbar (For active workbook only)
3. Insert any shape or image and assign the macro to it (Right-mouse click, Assign Macro)
4. Insert a Form Control button from Developer tab, Insert, Form Controls
5. Use the shortcut key you assigned

MACRO-CHARGED DASHBOARDING

# Relative OR Absolute Method?

- If you use absolute recording mode, Excel records actual cell references.
- If you use the relative recording, Macros are recorded with actions relative to the initial selected cell.
- You can change how Excel records your actions by clicking the Use Relative References button in the Code group of the Developer tab. This button is a toggle button. When the button appears highlighted in a different color, the recording mode is relative. When the button appears normally, you're recording in absolute mode. You can change the recording method at any time, even in the middle of the recording.



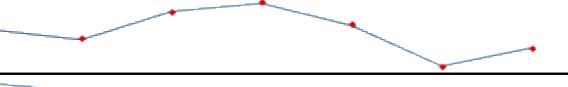
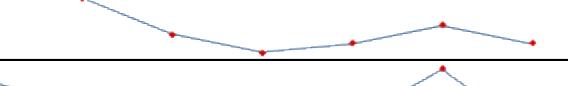
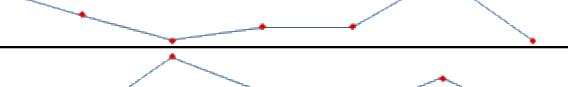
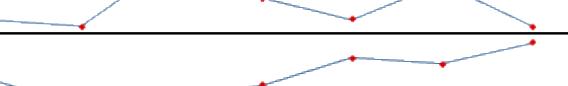
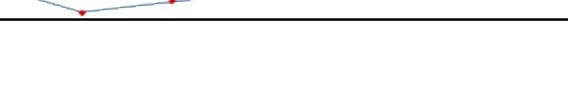
MACRO-CHARGED DASHBOARDING

# Dashboards



## Social Media Trends

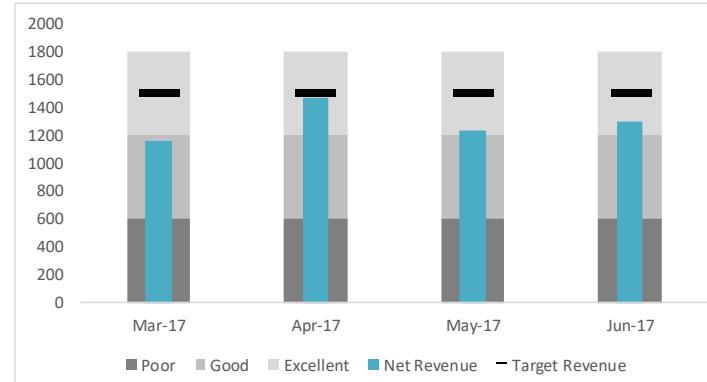
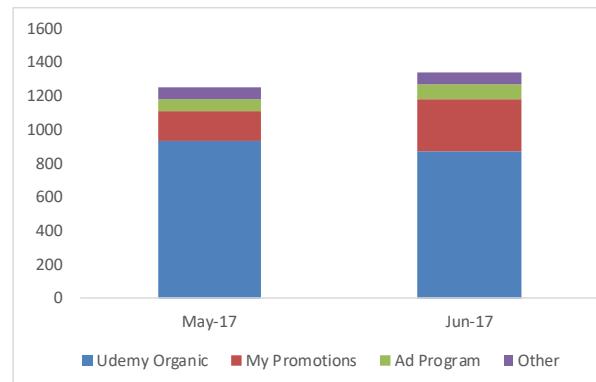
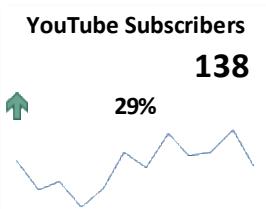
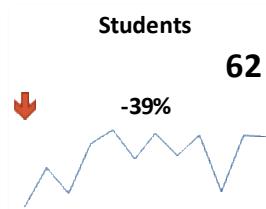
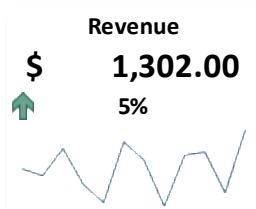
DAILY VIEWS DAY 

MEDIUM	1/1/2021	1/2/2021	1/3/2021	1/4/2021	1/5/2021	1/6/2021	1/7/2021	TREND
Facebook	10	23	9	7	10	22	24	
Instagram	24	22	28	30	25	16	20	
LinkedIn	10	9 	5 	3 	4	6 	4	
Reddit	12	10	8	9	9	13	8	
Tumblr	 5 	4	13	8 	5	10 	4	
Twitter	10 	5	7	9	14	13	17	
TOTAL	71	73	70	66	67	80	77	

# Social Media Dashboard

Select Month:

Jun-17



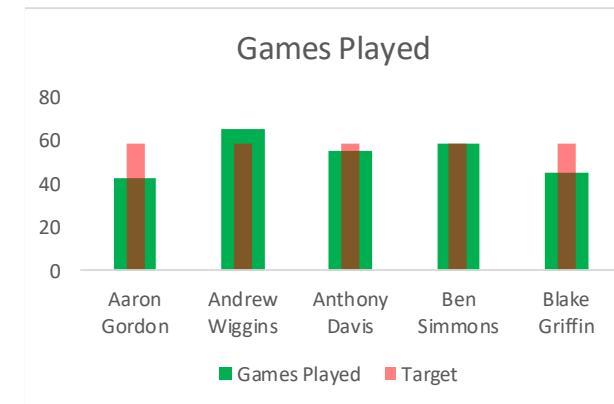
Description	Jun-17	May-17	Change %	Jun-16 Total	Trend
Student Purchases	▲ 1342	1252	7%	1482 16041	
Udemy Organic	▼ 872	936	-7%	1039 11510	
My Promotions	▲ 309	172	80%	269 2798	
Ad Program	▲ 92	77	19%	116 894	
Other	▲ 69	67	3%	58 839	
Refunds	▲ 40	10	300%	27 373	
Revenue	▲ 1302	1242	5%	1455 15668	
Students	▼ 62	101	-39%	83 1336	
YouTube Subscribers	▲ 138	107	29%	96 1604	
Website Unique visitors	▲ 1818	1036	75%	1437 18874	

# Sales Dashboard

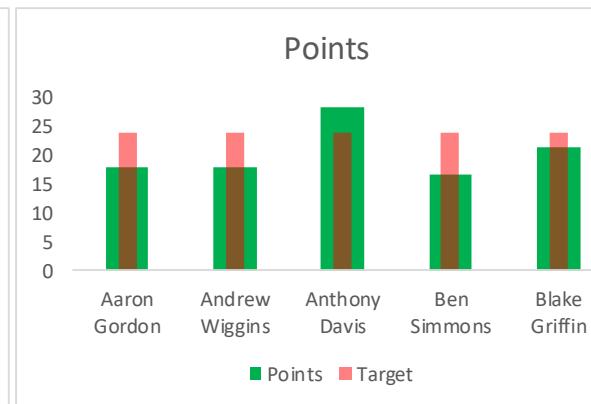
Sort By -->

#	Player	Games Played		Points		Rebounds		Assists	
1	Aaron Gordon	▼	43	18	8.2	2.3			
2	Andrew Wiggins	▲	65	17.8	4.1	1.8			
3	Anthony Davis	▼	55	28.1	11.1	2.4			
4	Ben Simmons	▬	59	16.6	7.7	7.4			
5	Blake Griffin	▼	45	21.5	7.6	5.4			
6	Bradley Beal	▲	62	23.4	4.5	4.5			
7	Brandon Ingram	▼	57	16.2	5.4	3.9			
8	Carmelo Anthony	▲	60	17	5.9	1.3			
9	Chris Paul	▼	43	18.8	5.7	8.2			
10	CJ McCollum	▲	61	21.6	3.8	3.1			

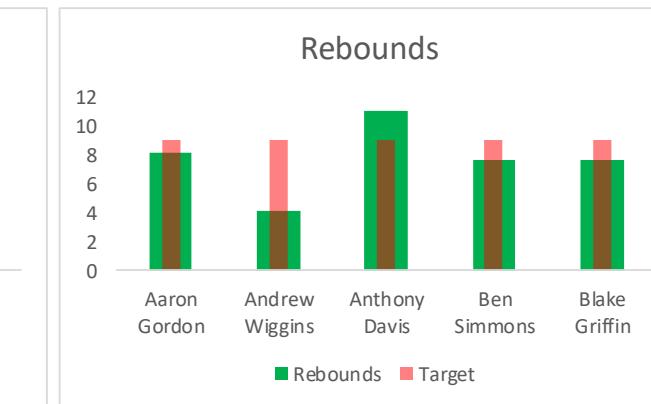
Games Played



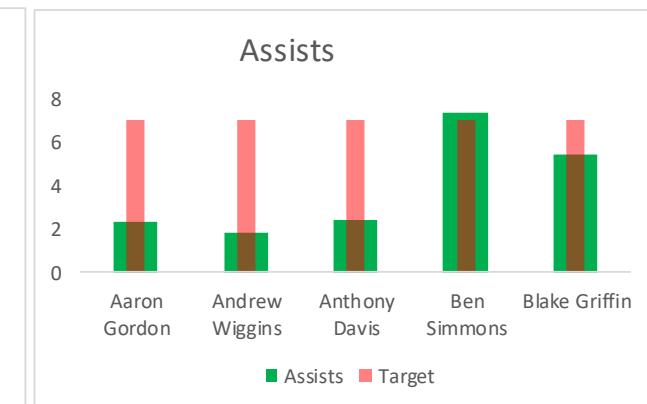
Points



Rebounds



Assists



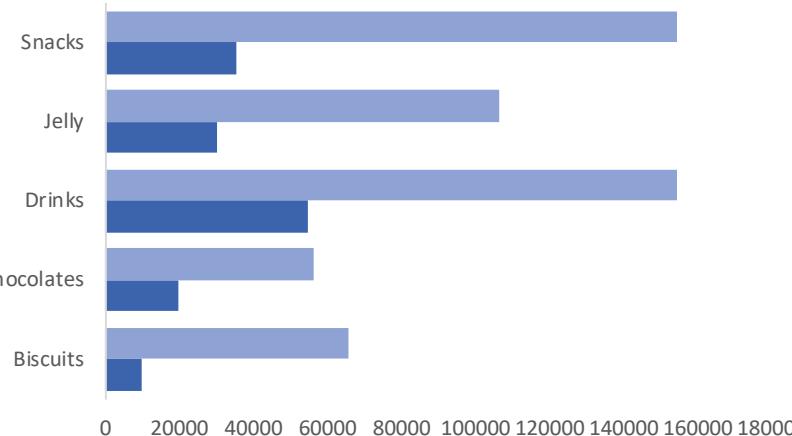
KPI Dashboard

# Snack Sales Dashboard

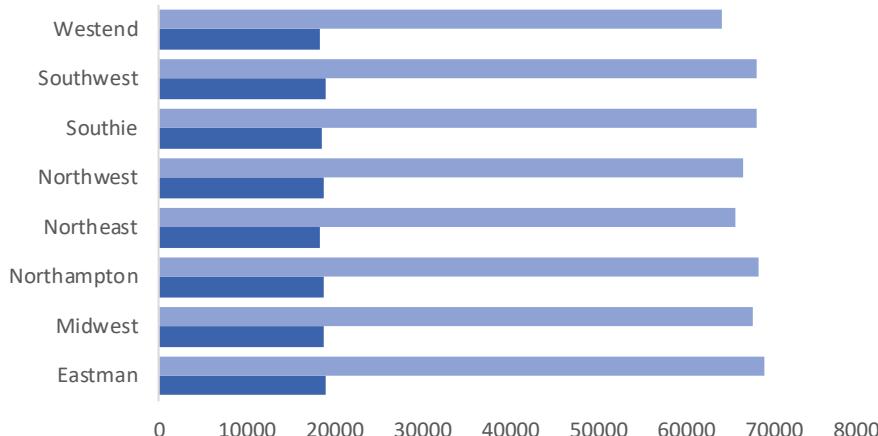
Sum of Quantity

Sum of Amount

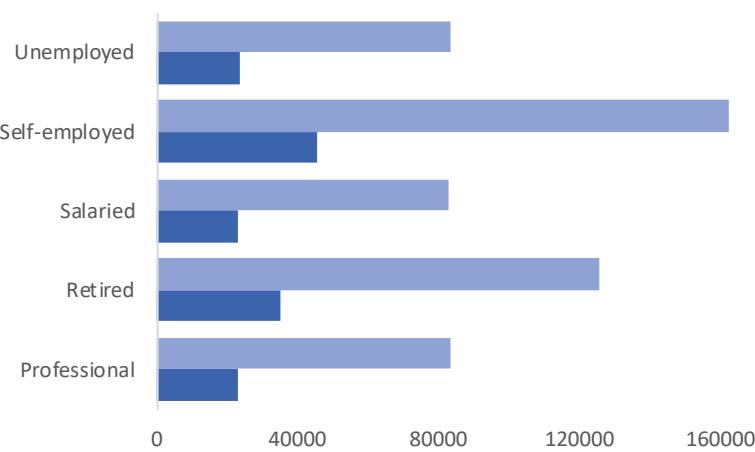
### Break-down by Product Category



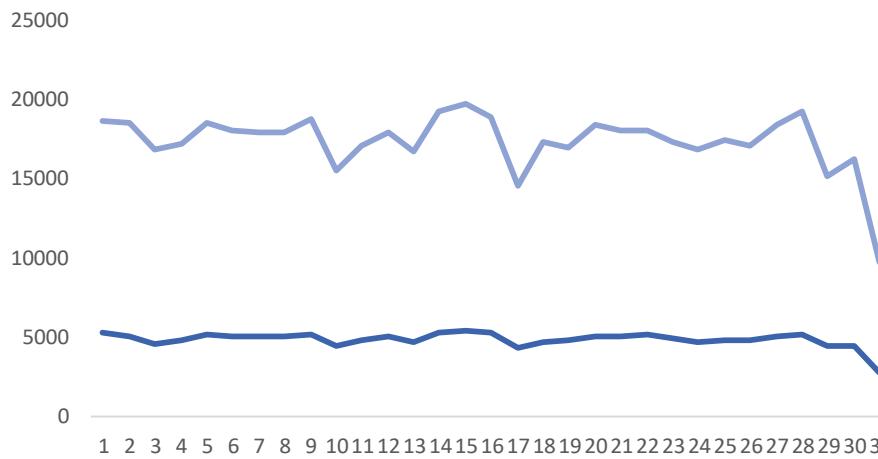
### Break-down by Store



### Break-down by Profession



### Break-down by Day of Month



### Month name

April	August
December	February
January	July
June	March
May	November
October	September

### Manager

Cynthia
Jackie
Sam

### Size

Large
Medium
Small

### Gender

Female
Male

# Snacks Sales Dashboard

Product	IAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL SALES
Windows	70	80	120	79	198	130	188	130	120	149	260	115	70
Word	140	256	170	140	292	99	199	238	205	182	178	104	140
Excel	90	121	87	235	155	96	134	213	103	217	139	298	90
Powerpoint	279	227	207	281	259	225	186	287	129	291	186	211	279

**SALES UNTIL:**

IAN	WINDOWS	WORD	EXCEL	POWERPOINT
-----	---------	------	-------	------------

Product

Windows	70	80	120	79	198	130	188	130	120	149	260	115	70
Word	140	256	170	140	292	99	199	238	205	182	178	104	140
Excel	90	121	87	235	155	96	134	213	103	217	139	298	90
Powerpoint	279	227	207	281	259	225	186	287	129	291	186	211	279

# Traffic Lights Dashboard

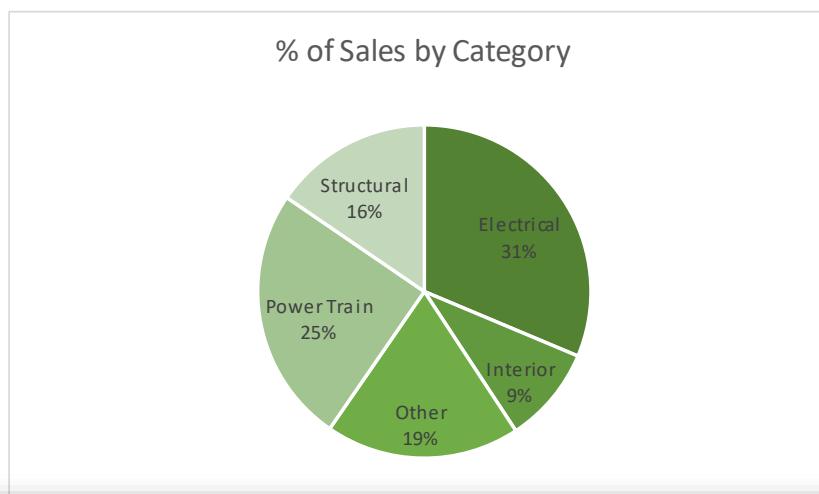
# Monthly Auto Parts Sales Dashboard



Data from:

January-20 June-20

Regions		% of Goal		Sales by category	Employees below 5% of Goal		Employees above 5% of Goal		Trend			
			99%			7		4				
Regions	SALES_\$	SALES_\$	PLAN_\$	Category	SALES_\$	Employee	+/-GOAL	Employee	+/-GOAL	Month	SALES_\$	+/- LAST MN'
Central	\$ 7,271	\$ 37,160	\$ 37,500	Electrical	\$ 11,641	Simpson, Helen	-9%	Smith, John	8%	<1/31/2020		
East	\$ 6,931			Interior	\$ 3,499	Perry, Chloe	-8%	Patterson, Clara	8%	Jan	\$ 6,181	
North	\$ 7,859			Other	\$ 7,013	Long, Elenor	-8%	Ross, Drake	8%	Feb	\$ 6,211	0.5%
South	\$ 7,596			Power Train	\$ 9,262	Becker, Sam	-8%	Powell, Victor	7%	Mar	\$ 6,196	-0.2%
West	\$ 7,503			Structural	\$ 5,745	Russell, Penelop	-8%			Apr	\$ 6,174	-0.4%
Total	<b>37160</b>			<b>Total</b>	<b>\$ 37,160</b>	Bennett, Lucy	-7%			May	\$ 6,202	0.5%
						Williams, Jasmin	-7%			Jun	\$ 6,196	-0.1%



Time Frame

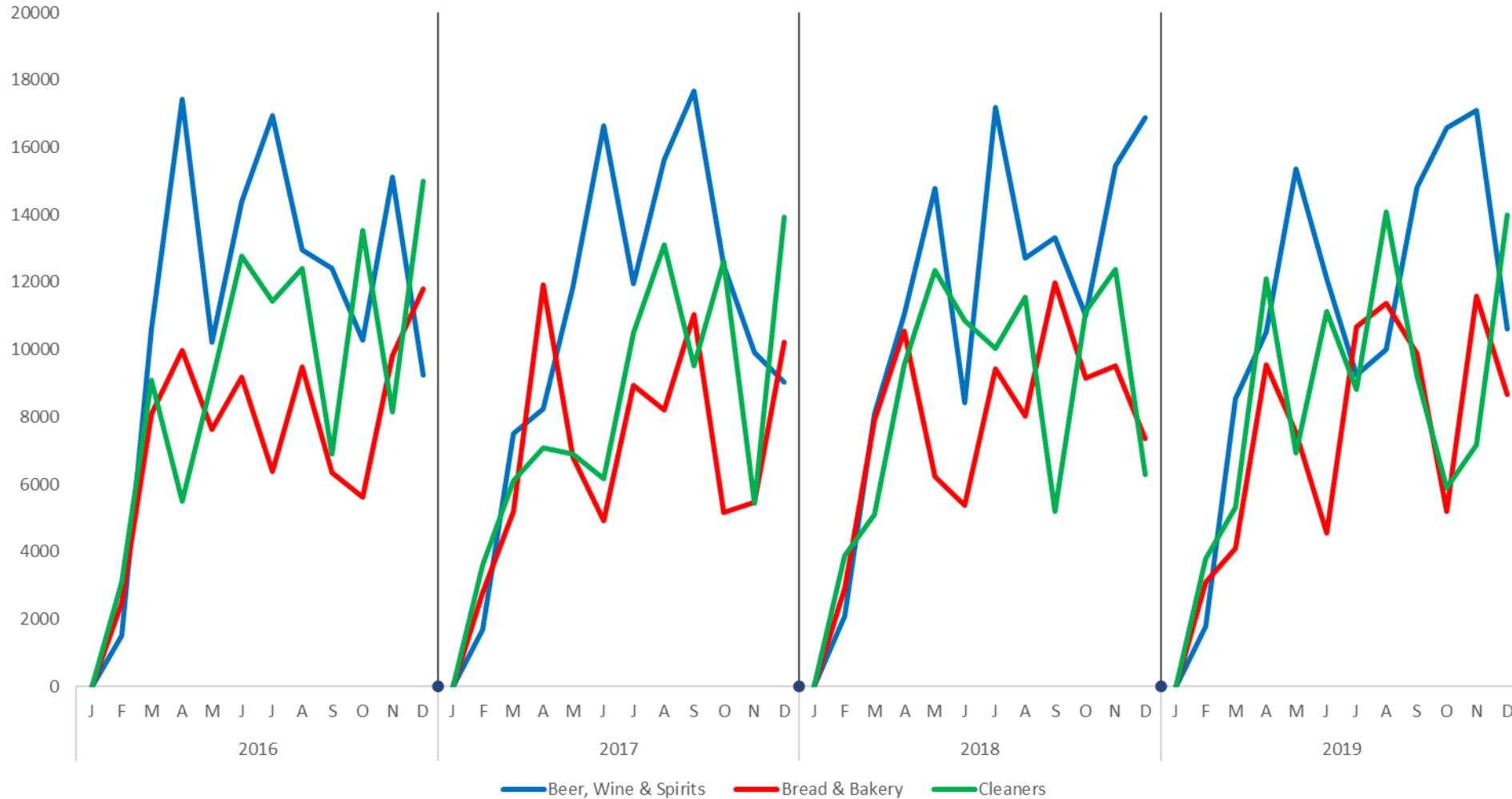
All Periods MONTHS ▾

2020

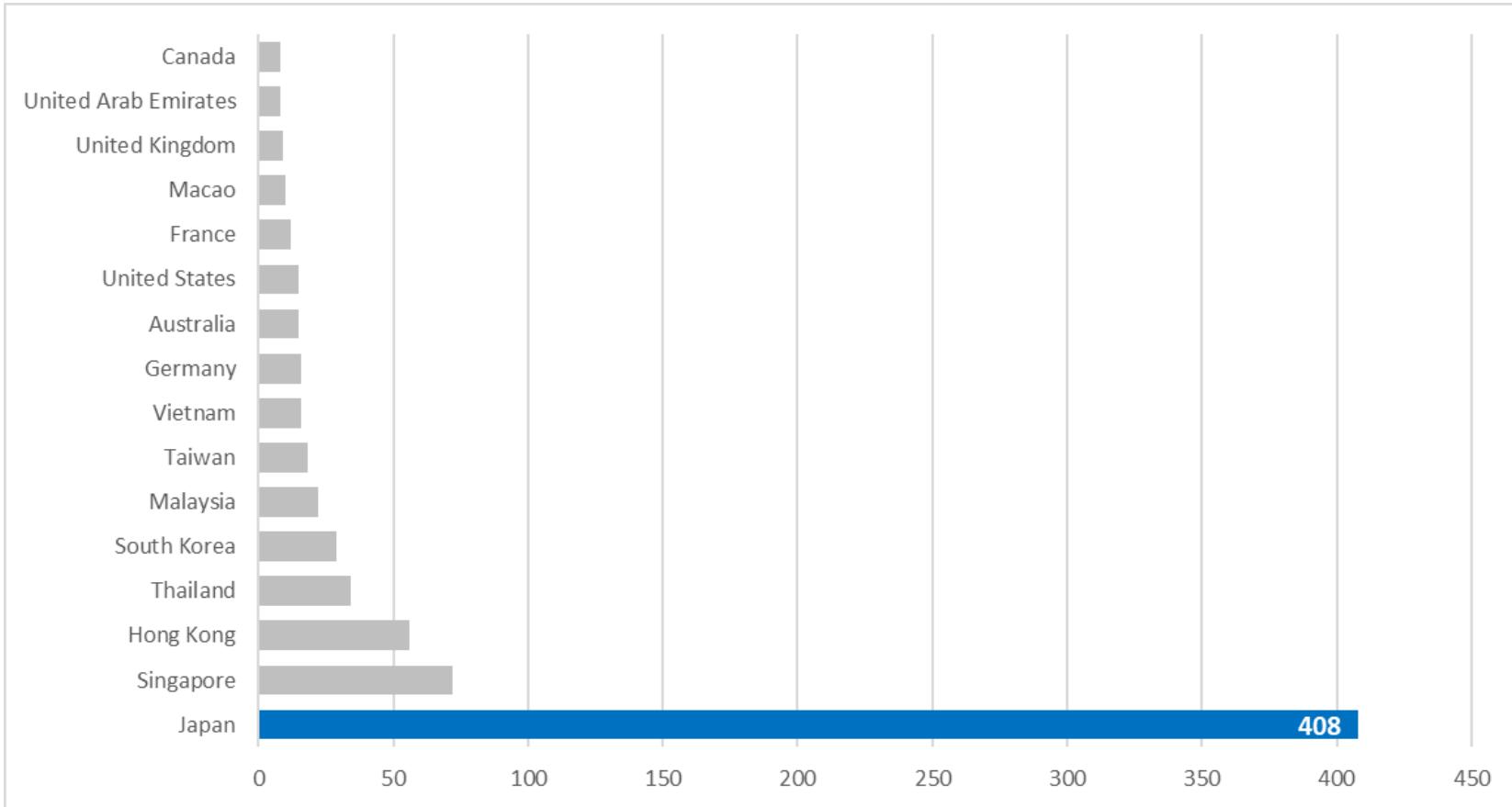
JAN FEB MAR APR MAY JUN JUL AUG

◀ ▶

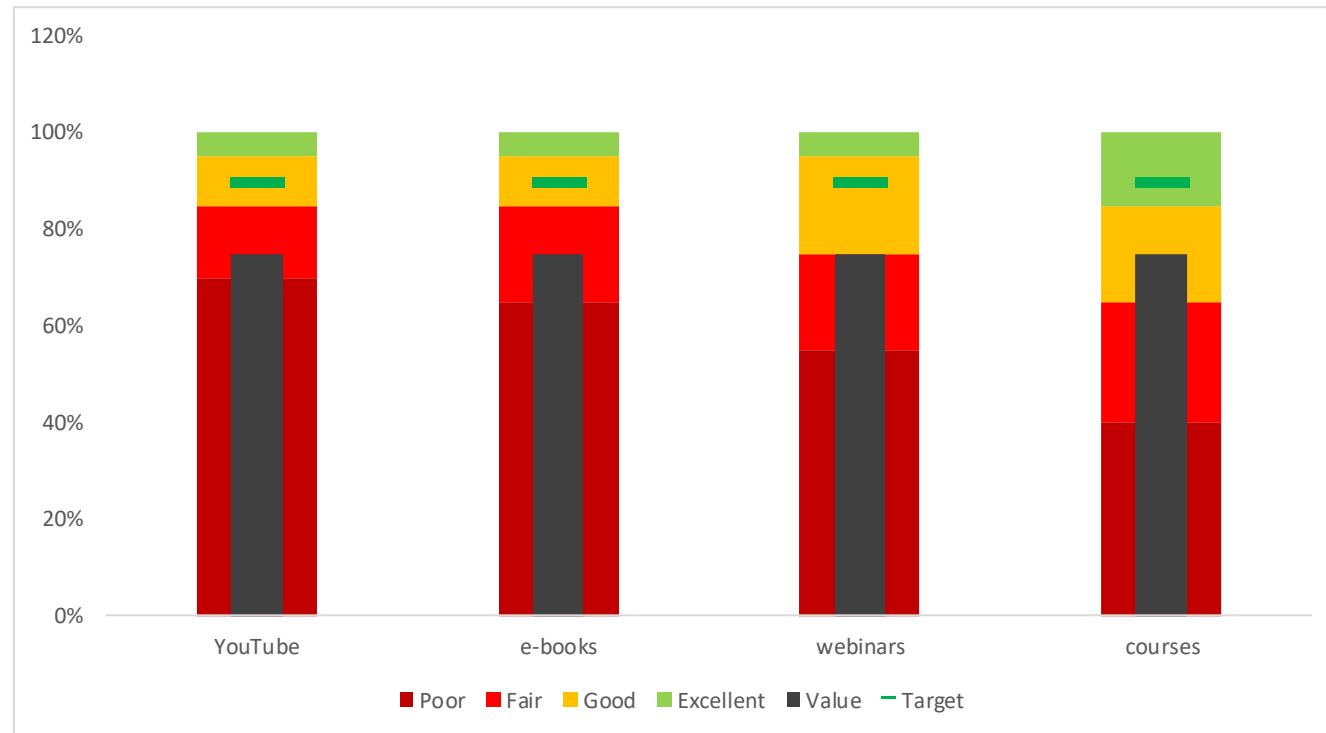
# Auto Parts Sales Dashboard



Panel Chart

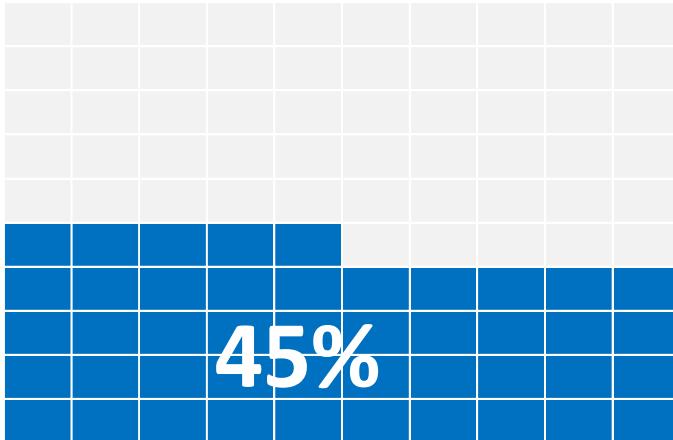


Bar Graph

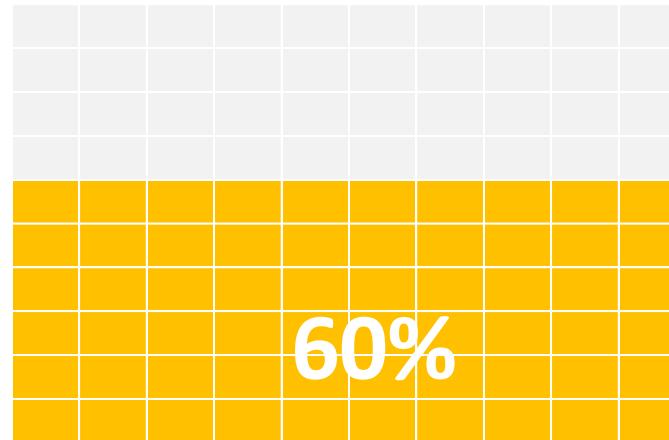


# Bullet Graph

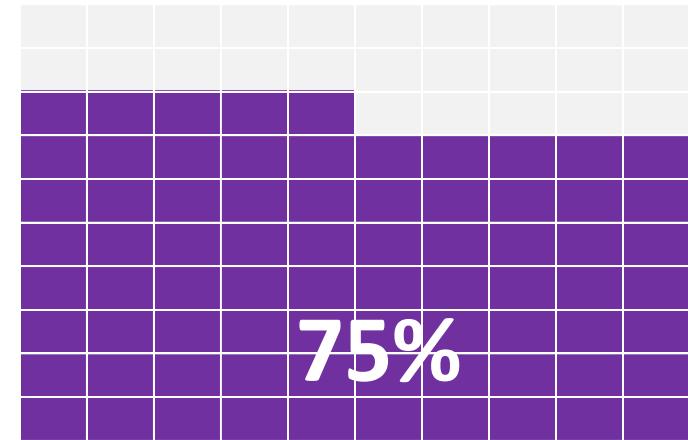
**Metric 1**



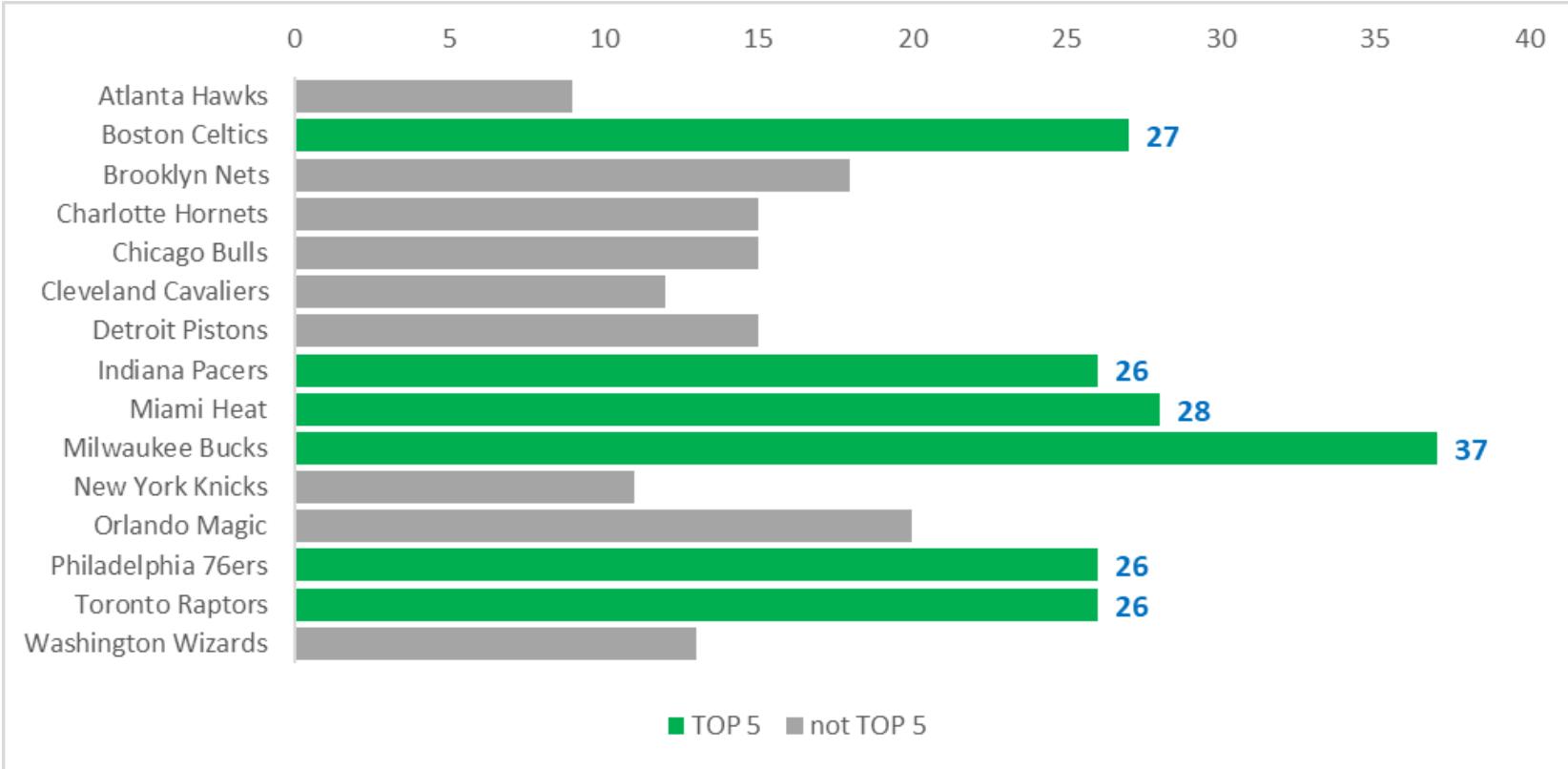
**Metric 2**



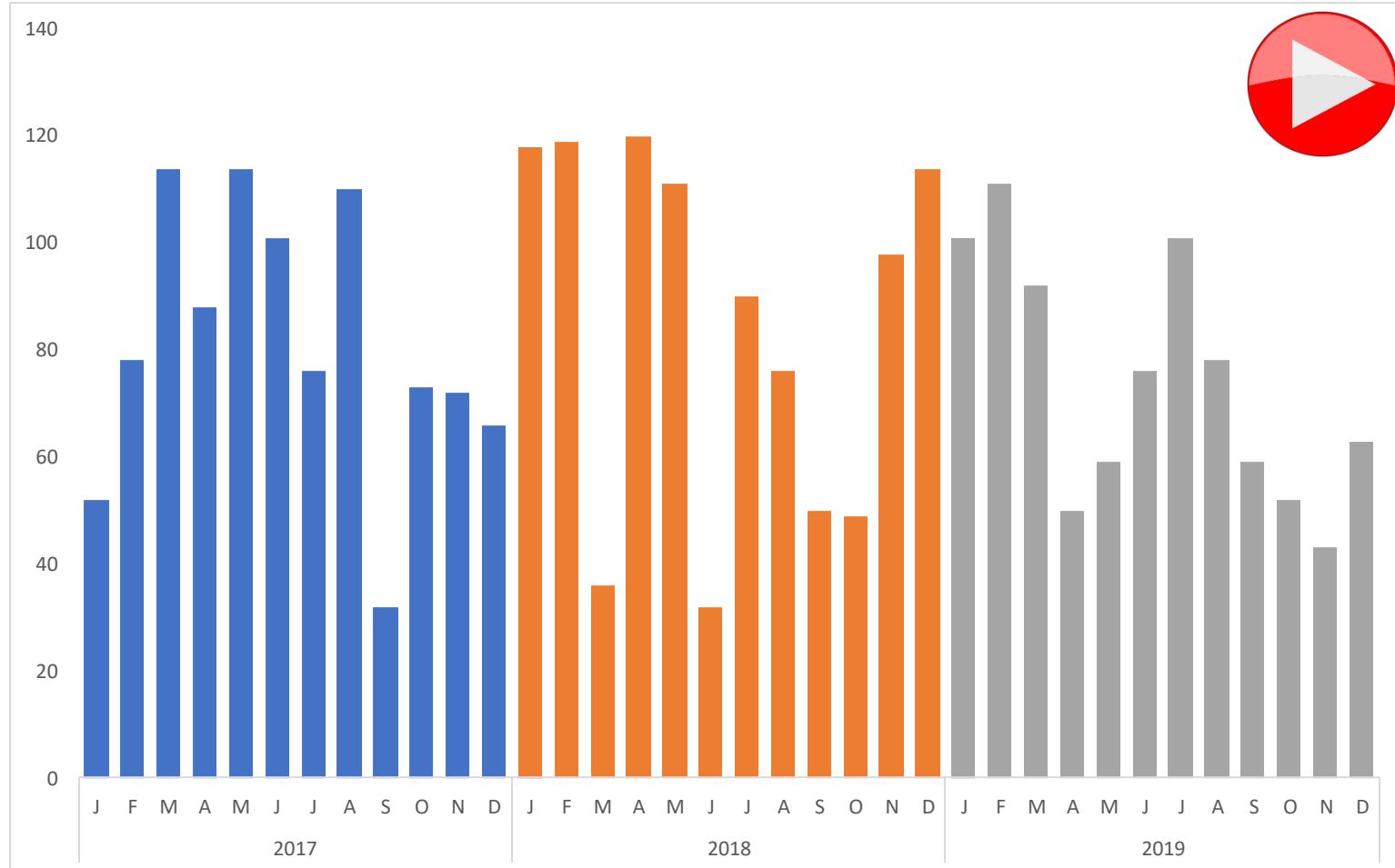
**Metric 3**



Waffle Chart



Top-Bottom Chart



Animated Chart (VBA)

## Products Review Rating

Product	Rating	Star Rating					1	2	3	4	5	Total Reviews
		1	2	3	4	5						
Alice Mutton	2.62	★	★	★	★	★	6	1	1	2	3	13
Aniseed Syrup	3.67	★	★	★	★	★	1	0	1	2	2	6
Boston Crab Meat	2.94	★	★	★	★	★	4	2	6	3	3	18
Camembert Pierrot	2.68	★	★	★	★	★	3	7	4	3	2	19
Carnarvon Tigers	2.70	★	★	★	★	★	2	2	3	3	0	10
Chai	2.75	★	★	★	★	★	6	1	3	3	3	16
Chang	3.86	★	★	★	★	★	2	1	1	3	7	14
Chartreuse verte	3.00	★	★	★	★	★	2	2	3	4	1	12
Chef Anton's Cajun Seasoning	3.50	★	★	★	★	★	0	2	3	3	2	10
Chef Anton's Gumbo Mix	3.50	★	★	★	★	★	0	0	1	1	0	2
Chocolade	3.00	★	★	★	★	★	1	1	1	1	1	5
Côte de Blaye	2.89	★	★	★	★	★	2	1	3	2	1	9
Escargots de Bourgogne	2.57	★	★	★	★	★	3	0	2	1	1	7
Filo Mix	3.50	★	★	★	★	★	1	2	5	1	5	14

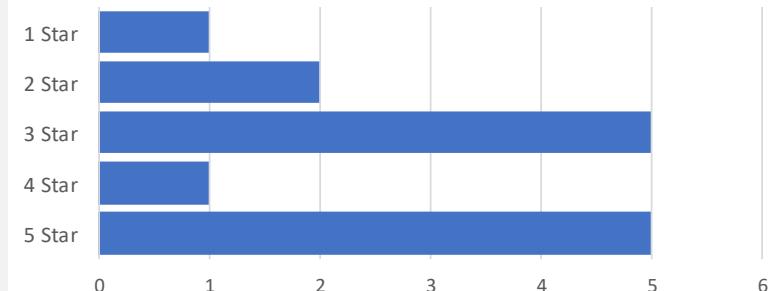
14 Filo Mix

1 2 5 1 5

14 Total Reviews For Filo Mix

Alice Mutton  
Aniseed Syrup  
Boston Crab Meat  
Camembert Pierrot  
Carnarvon Tigers  
Chai  
Chang  
Chartreuse verte  
Chef Anton's Cajun Seasoning  
Chef Anton's Gumbo Mix  
Chocolade  
Côte de Blaye  
Escargots de Bourgogne  
Filo Mix

14 Total Reviews For Filo Mix



# Rating Chart (Rollover Method)