Session 4

Visualizations in practice

NLAB: *Data at Scale*

Dr. Evgeniya Lukinova

Today, Tableau demystified.

Key Concepts of Tableau

[Official guide online]
[Tableau Desktop PDF]
[Quick reference]

Six main things to know!

1) **Data sources**
2) Sheets & Dashboards
3) Shelves and cards
4) Continuous vs. Discrete
5) Measures vs Dimensions
6) Show me popup

Data sources contain the raw data and can be **tables / query results from a database**, excel files etc.

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Sheets are where you create **single graphs.**

Dashboards collect and display **previously created sheets**.

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Shelves and cards are **where you drag attributes**.

Attributes = measures or dimensions

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Shelves and cards are **where you drag attributes**.

Attributes = measures or dimensions

By placing fields on shelves or cards, you can **create** the rows and columns of a **data view**, **exclude data** from the view, create pages, and **control mark properties**

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By placing fields on shelves or cards, you can **create** the rows and columns of a **data view**, **exclude data** from the view, create pages, and **control mark properties**

The **different placement and combinations** of measures and dimensions, and whether the values are continuous or discrete, **dictate which graph Tableau shows**.

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Each data source (table) contains a set of attributes (columns).

Each attribute can be either **continuous** or a **discrete.**

Continuous attributes those with values along a number line (decimal numbers).

Discrete attributes are those with values that are "individually separate and distinct."

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When placed on the **columns** or **rows** shelves:

Continuous fields produce axes.

Discrete fields create headers.

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Each data source (table) contains a set of attributes (columns).

Each attribute is either a **measure** or a **dimension.**

Measures are numbers, they quantify the extent of something.

Dimensions are usually names, categorizing the "measure" in different kinds.

What is a measure and what is a dimension depends on the problem.

Am I measuring someone's weight, or do I care about a disease and am grouping people by weight (low/med/high) for my study?

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Attributes can be **converted between** being **measures** and **dimensions**.

Initially Tableau guesses.

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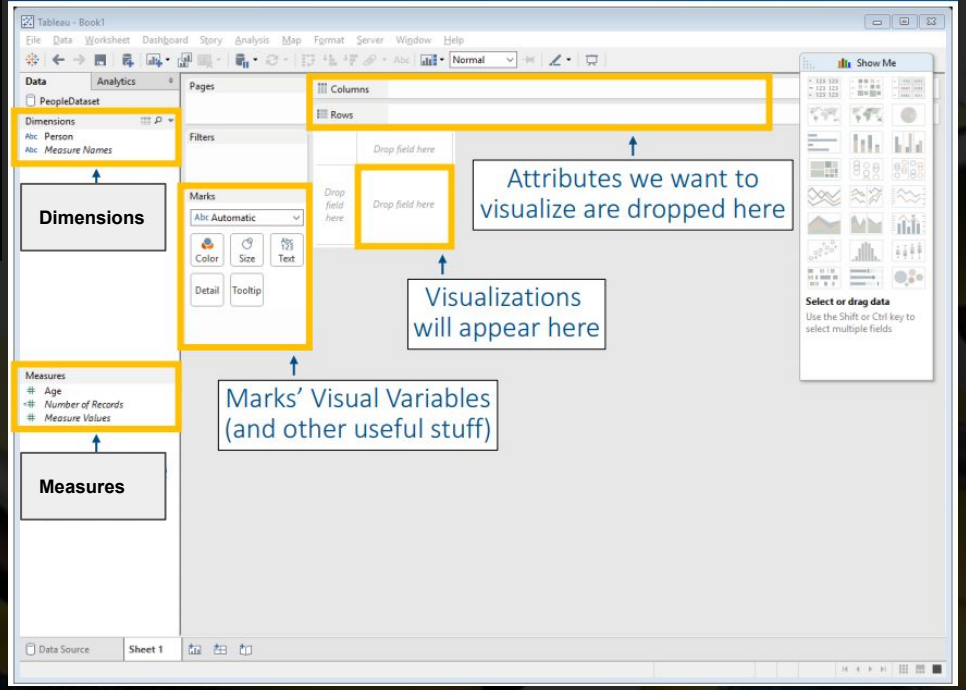
6) **Show me popup**

The show me popup helps you **see what graphs Tableau can make**.

Shows you what you need (dimensions, measures, etc) in order for Tableau to show the graph.

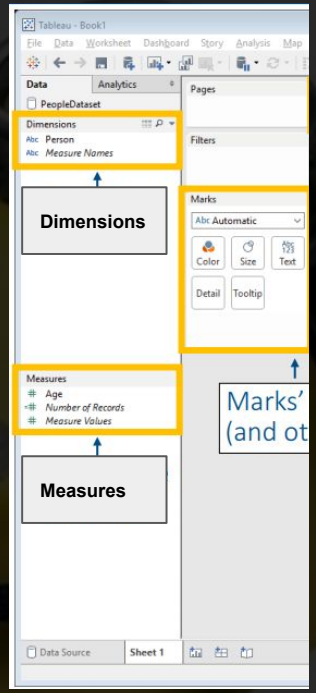
Main focus of today...

The main interface



Recall **Dimensions** and **Measures.**

Example: People Dataset



Know your data!

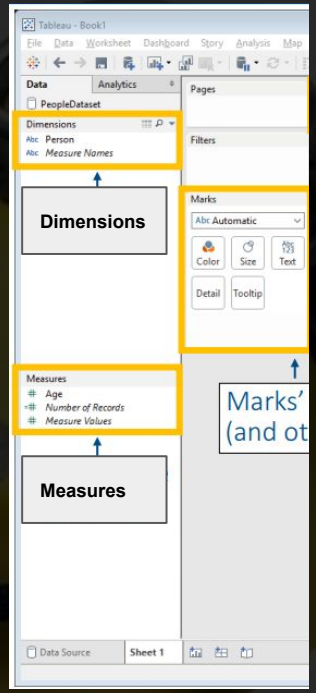
What was a measurement (**measure**)?

What was a label describing what was measured (**dimension**)?

Don't know? Why are you visualizing something you don't understand….

Recall **Dimensions** and **Measures.**

Example: People Dataset



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Why care? Tableau will enable options based on its understanding of the data.

Recall **Dimensions** and **Measures.**

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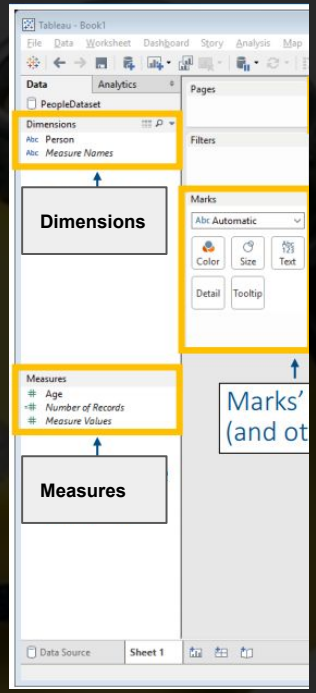


Know your data!

What was a measurement (**measure**)?

What was a label describing what was measured (**dimension**)?

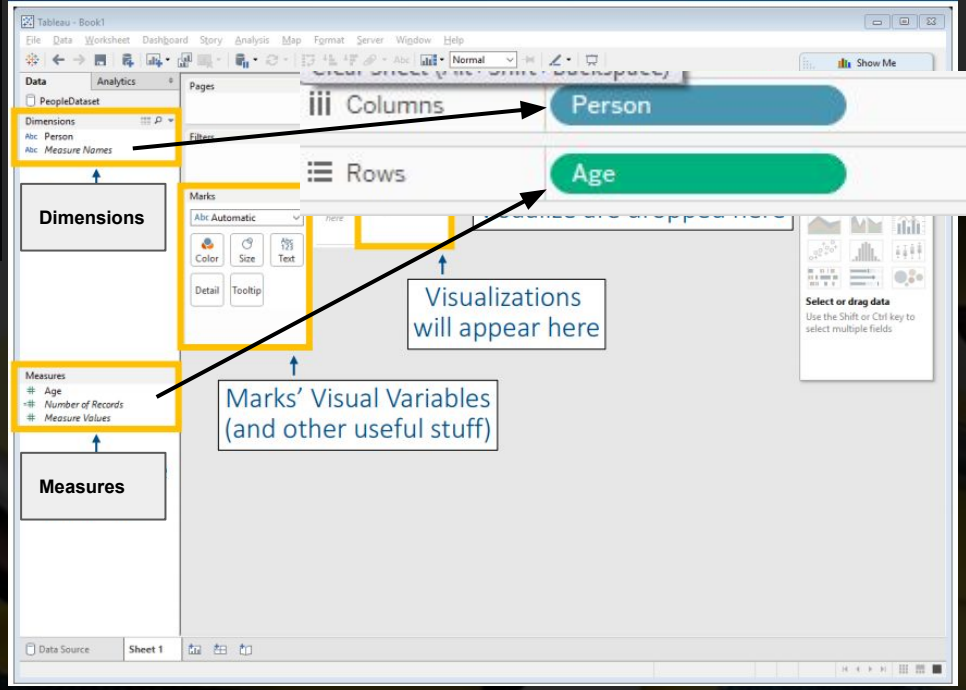
Don't know? Why are you visualizing something you don't understand….

Why care? Tableau will enable options based on its understanding of the data.

Want to predict the future of a label regarding a measurement? **Huh?!?**

Predict a measured value? **Sure!**

Creating visualizations



Move "Pills"

A note on "Pills"

Pill colour denote if an attribute is **discrete** or **continuous.**

Person

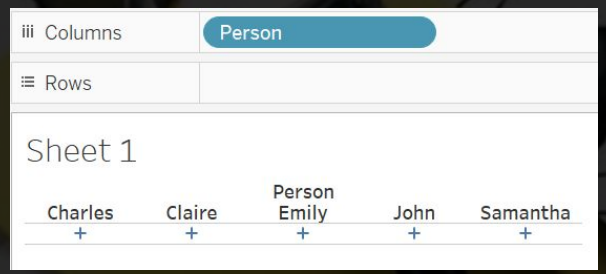
Blue pill: Discrete attributes.

Green pill: Continuous attributes.

Age

Creating visualizations

Abc PeopleDataset.c... Person	# PeopleDataset.c... Age
Emily	45
John	31
Charles	38
Claire	51
Samantha	65



Placing discrete attributes creates "headers".
Value existence is then plotted.

Creating visualizations

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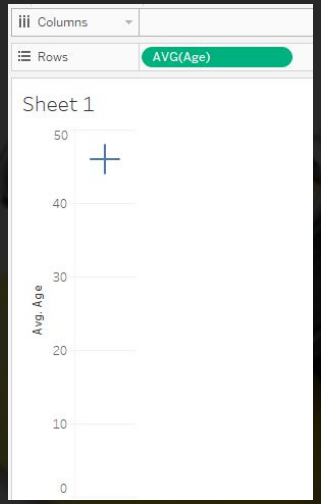

Placing continuous attributes creates "plotted **aggregate** values" **on an axis.**

Dragging and dropping continuous attributes by default creates **single point aggregate** measures.

However: Measures can be returned to a set of values as per the original data.

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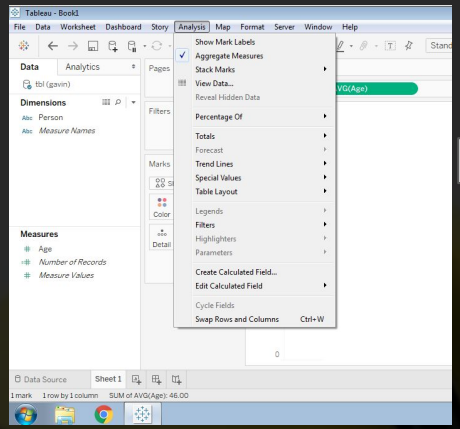
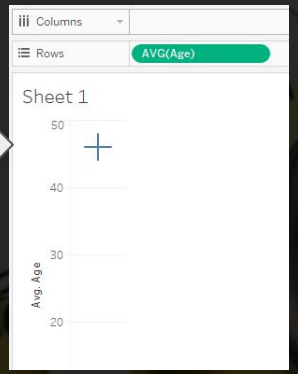
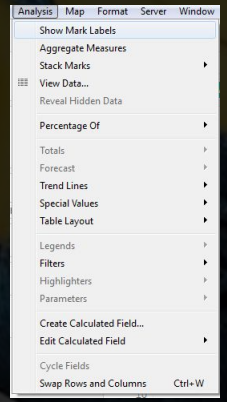
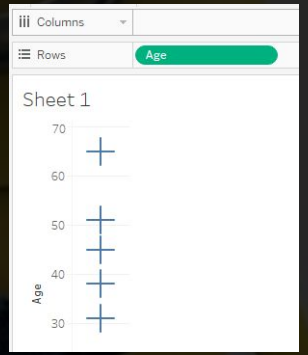




Placing continuous attributes creates "plotted **aggregate** values" **on an axis.**

Or one can select to not aggregate…





Abc PeopleDataset.c... Person	# PeopleDataset.c... Age
Emily	45
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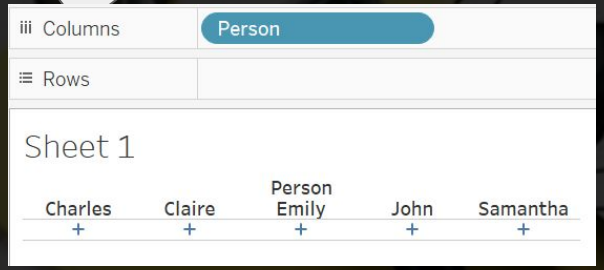
Adding Person to columns gave us headers.



By placing attributes in **rows** and **columns** we can build basic graphs.

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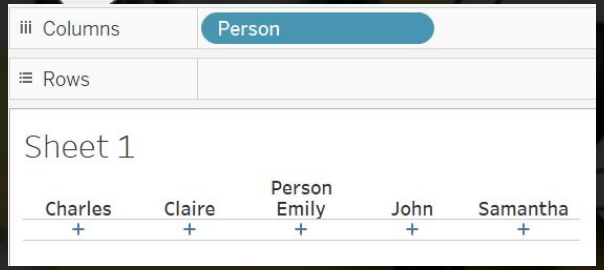

By placing attributes in **rows** and **columns** we can build basic graphs.

By combining 1 dimension and 1 measure we can build basic graphs.

Let’s update our data!

Abc PeopleDataset_f.c... Person	# PeopleDataset_f.c... Age
Emily	45
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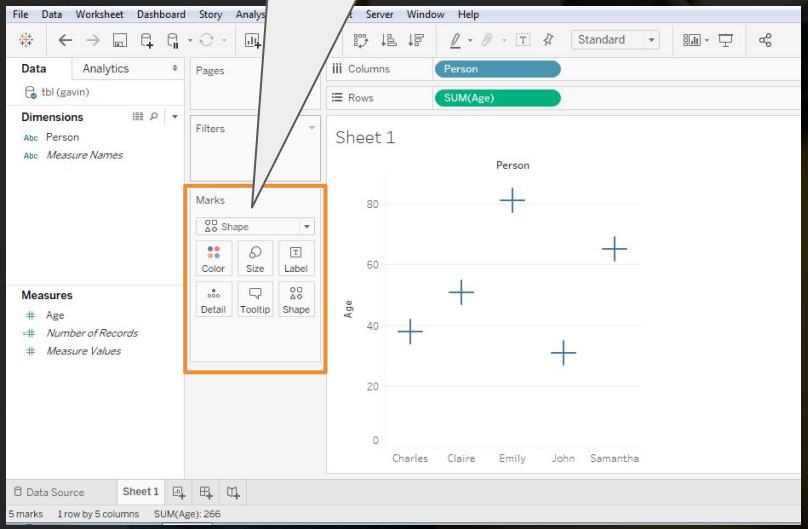
Claire	51
Samantha	65
Emily	18
Emily	18

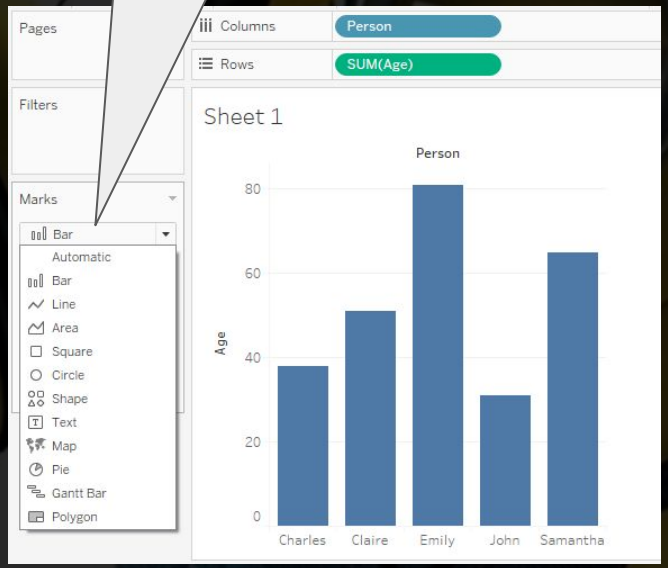
By combining 1 dimension and 1 measure we can build basic graphs.

Note: No aggregation

The "mark" drawn for the graph can be selected

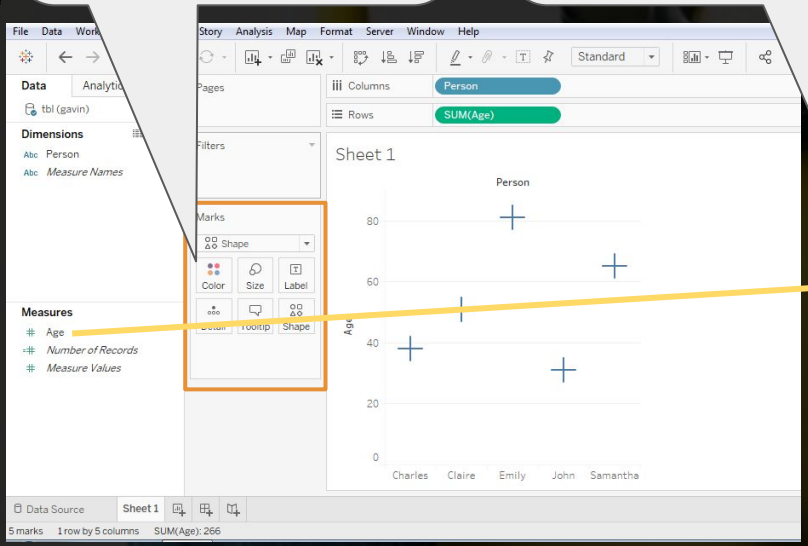


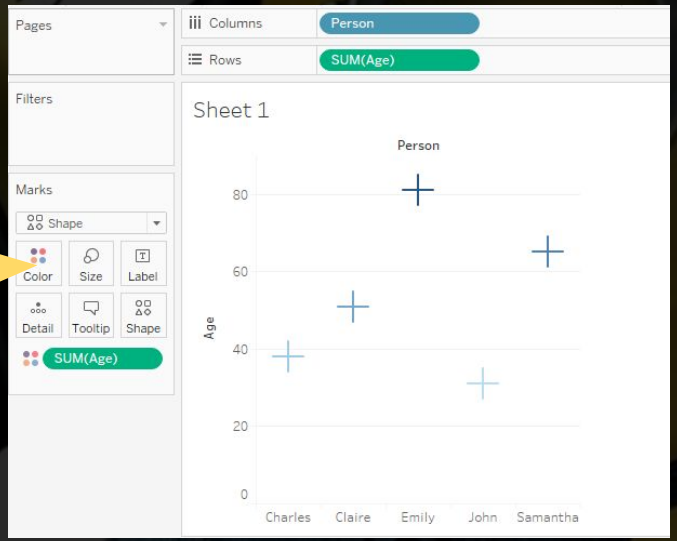
Here "bar" has now been selected.



Or colour, size, label, detail, tooltip or shape changed **based on the value** by a **pill value** (drag & drop)

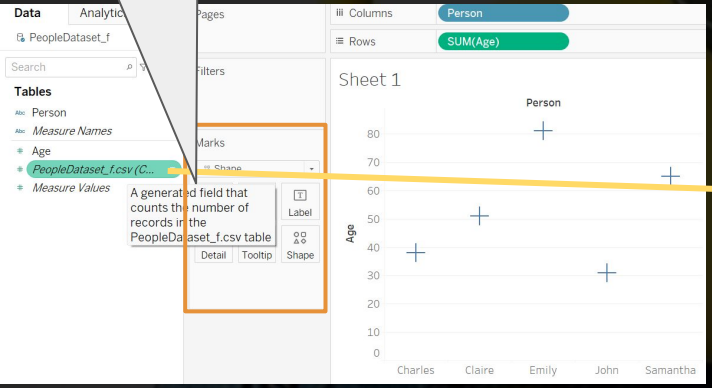
E.g. Dragging "Age" to "Colour"

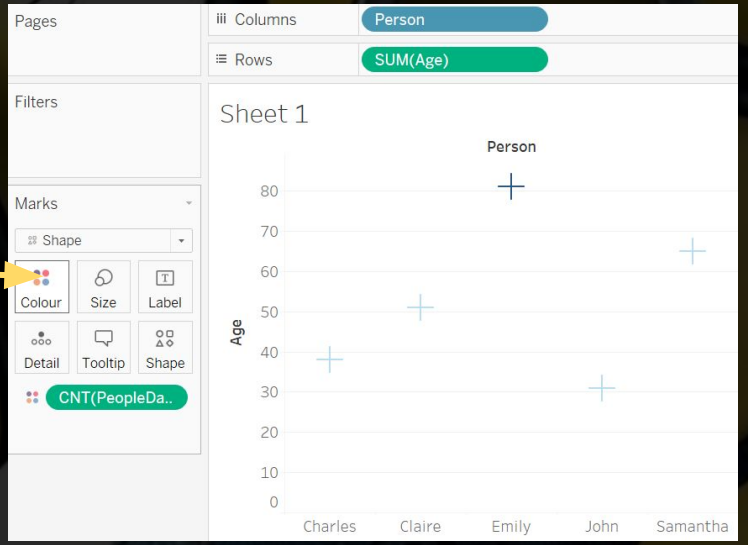




Or colour, size, label, detail, tooltip or shape changed **based on the value** by a **pill value** (drag & drop)

E.g. Dragging number of records (or "Count") to "Colour"
(remember Emily appears x3)





Person	Age
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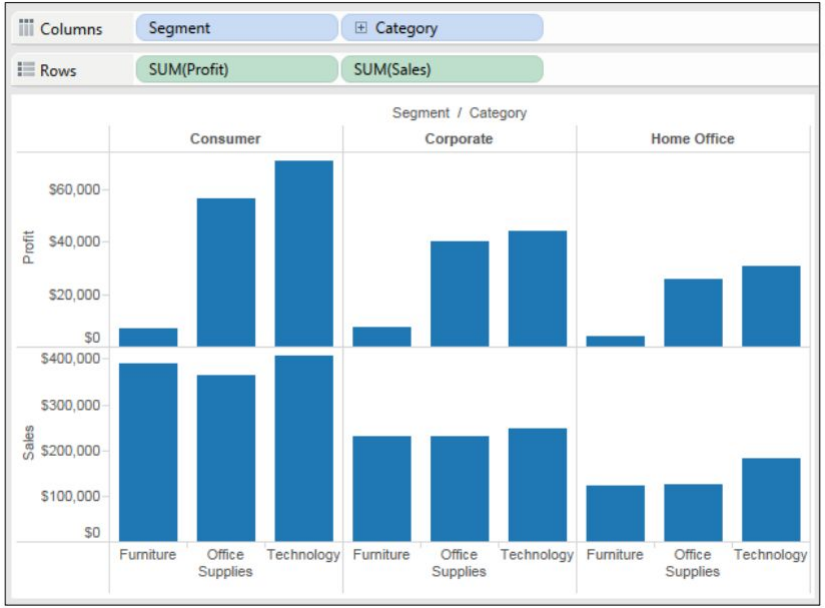
Adding more attributes to the *Rows* and *Columns* shelves adds more rows, columns, and panes to the table.



Dimensions (labels of the measurements) combine ("nest") to show the measure values for all possible label combinations.

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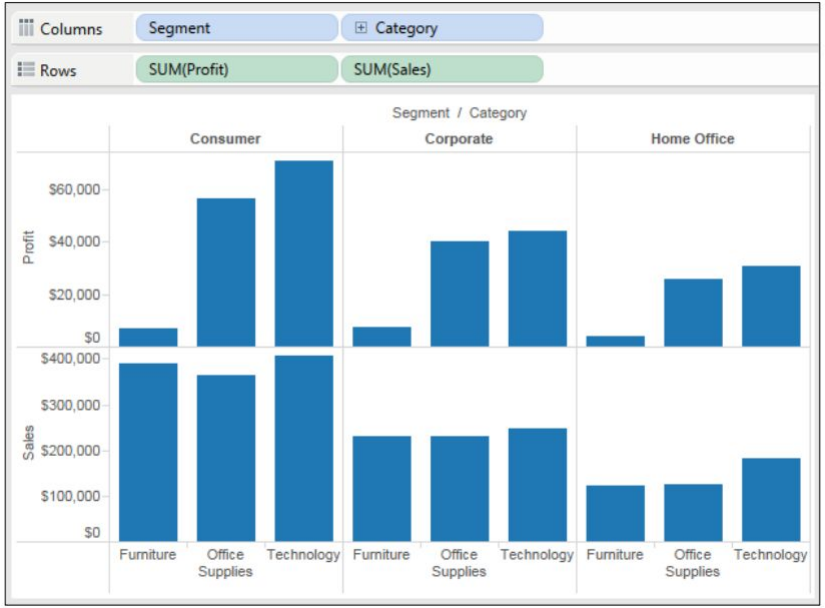

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Measures have created axis and plotted values.

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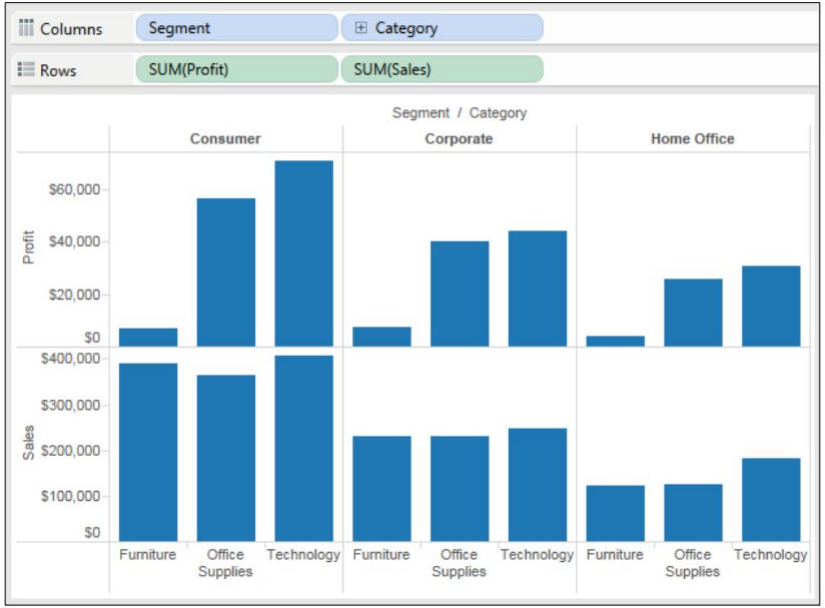


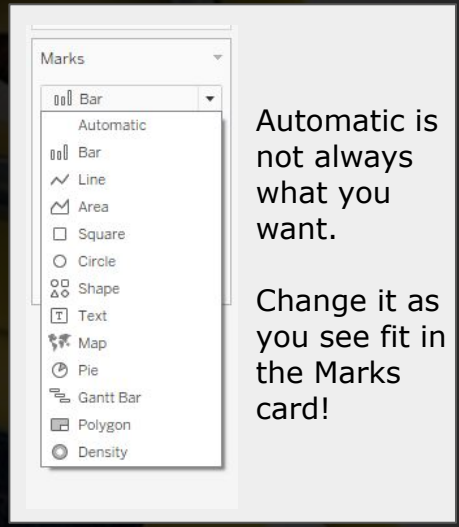
Dimensions (labels of the measurements) combine ("nest") to show the measure values for all possible label combinations.

Measures have created axis and plotted values.

Measures GO AFTER dimensions on a shelf.

Adding more attributes to the *Rows* and *Columns* shelves adds more rows, columns, and panes to the table.

Inner attributes determine an automatic **mark type**. Here: Bar.



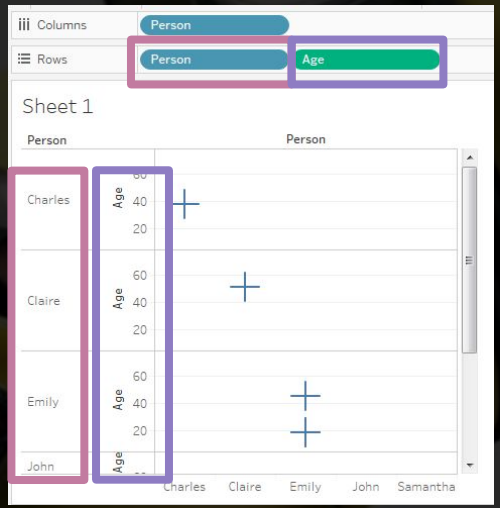
Automatic is not always what you want.

Change it as you see fit in the Marks card!

Meaningless graphs to show pill combinations

outer

inner



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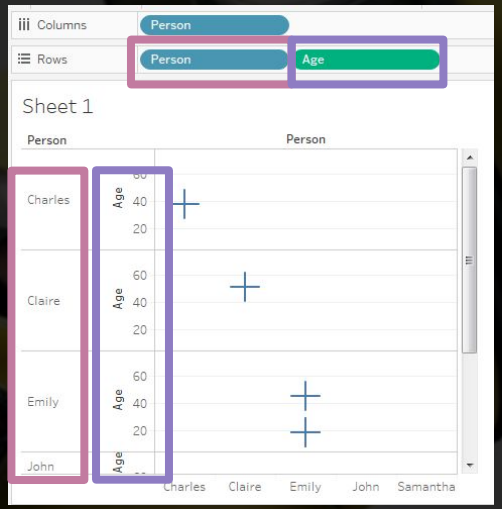

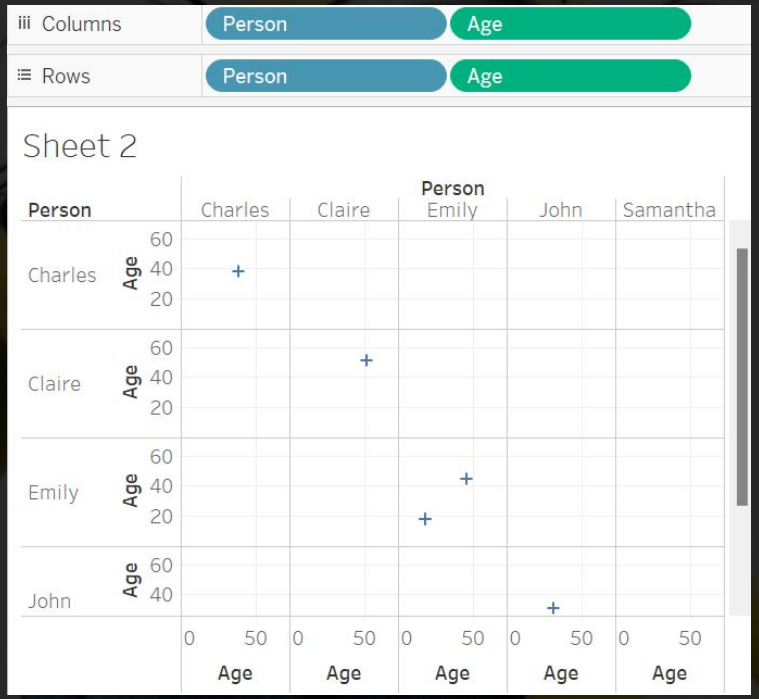

A small problem for context.

Data: Every week, the Minions are busy across their different activities…

…, i.e. managing banana supplies, plotting evil plans, working in the lab, causing mischief, training, and cleaning up the mess afterward.

Now being a data guy, what does Gru do?

A small problem for context.

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Now being a data guy, what does Gru do?

Well that's simple, he counts them.
Gru keeps track of how their energy is distributed across these activities over 10 weeks.

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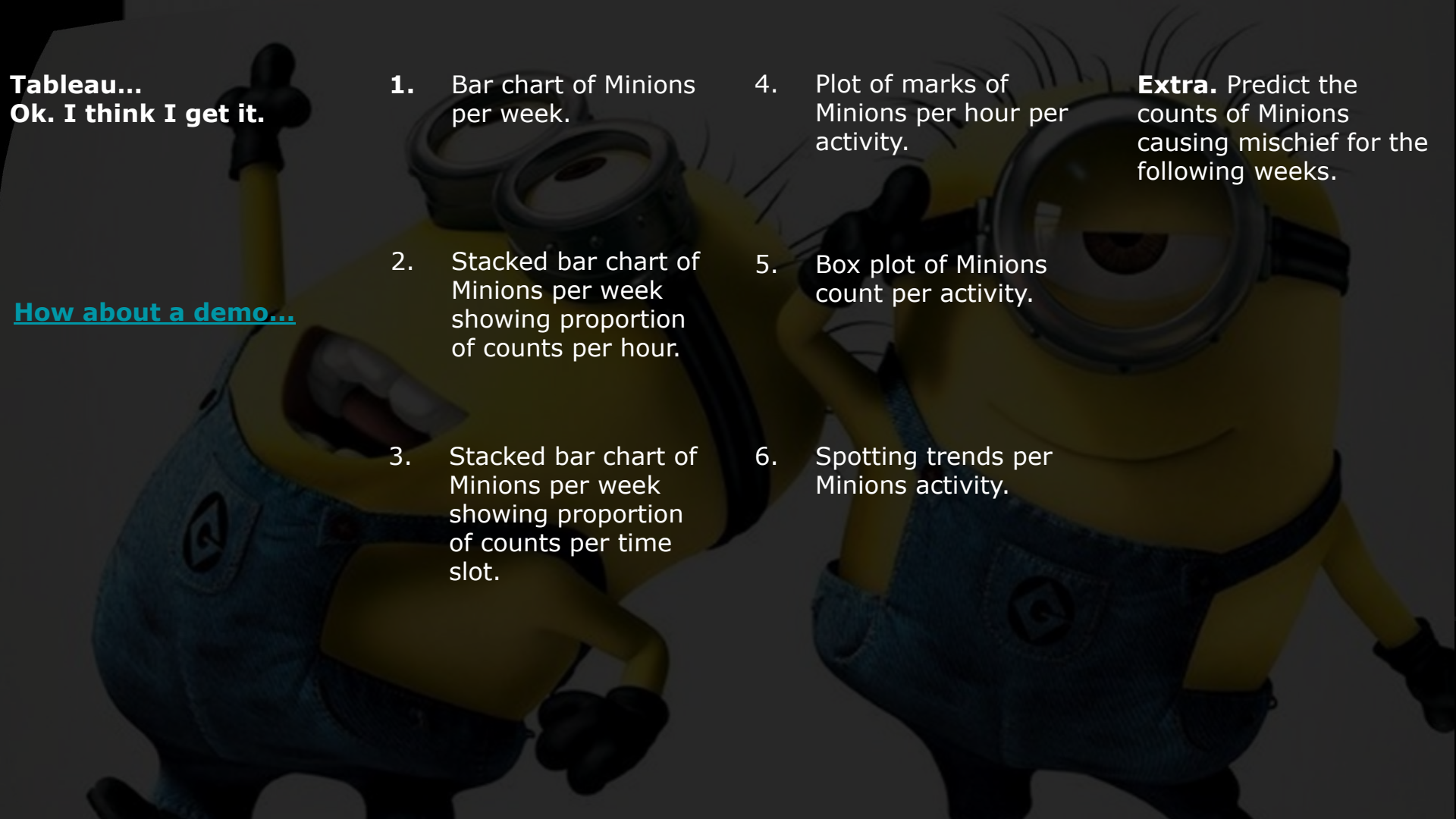
The Data is very simple.

Week	Banana Supply	Evil Plans	Lab Work	Mischief	Training	Cleanup
Week 1	101	67	56	18	49	35
Week 2	90	60	56	29	38	23
Week 3	86	40	39	37	31	21
Week 4	75	51	57	40	42	32
Week 5	69	65	57	51	39	18
Week 6	65	61	45	57	44	39
Week 7	50	68	44	62	22	28
Week 8	46	51	59	76	24	32
Week 9	39	64	59	82	38	23
Week 10	29	56	44	86	26	35



Tableau…
Ok. I think I get it.

How about a demo…

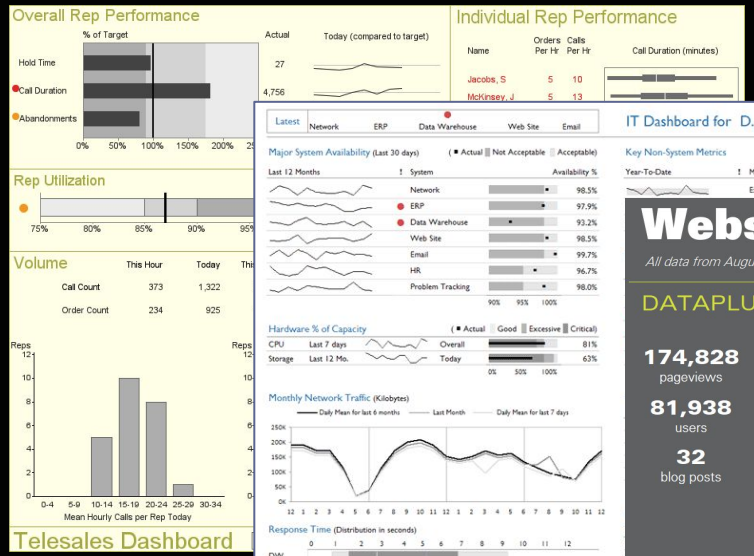
1. Bar chart of Minions per week.
2. Stacked bar chart of Minions per week showing proportion of counts per hour.
3. Stacked bar chart of Minions per week showing proportion of counts per time slot.
4. Plot of marks of Minions per hour per activity.
5. Box plot of Minions count per activity.
6. Spotting trends per Minions activity.

Extra. Predict the counts of Minions causing mischief for the following weeks.

Dashboards *are* part of real world data analytics
(at least until you can get someone else to do it)

Presentation:

- **clearly stated messages**
- **concise (data to ink ratio)**
- **direct**
- **customized to goals**
- **consistent layout - data changes over time, not layout**

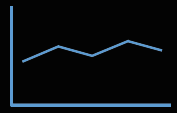


N/LAB: *Data at Scale*

Comparing data across categories

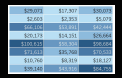
Showing / understanding the distribution of your data

Viewing trends in data over time



Investigating the relationship between different variables

Showing the relationship between two factors.

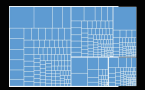


Showing geocoded (located) data

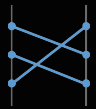
Displaying things in use over time.

Evaluating performance of a metric against a goal

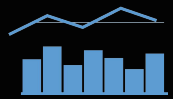
Showing hierarchical data as a proportion of a whole



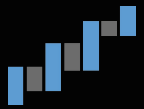
Showing a comparison of rank (typically between two time periods)



Show general trends / overall information, add extra context



Showing the gradual transition (+/-) in the quantitative value.



N LAB: *Data at Scale*

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