

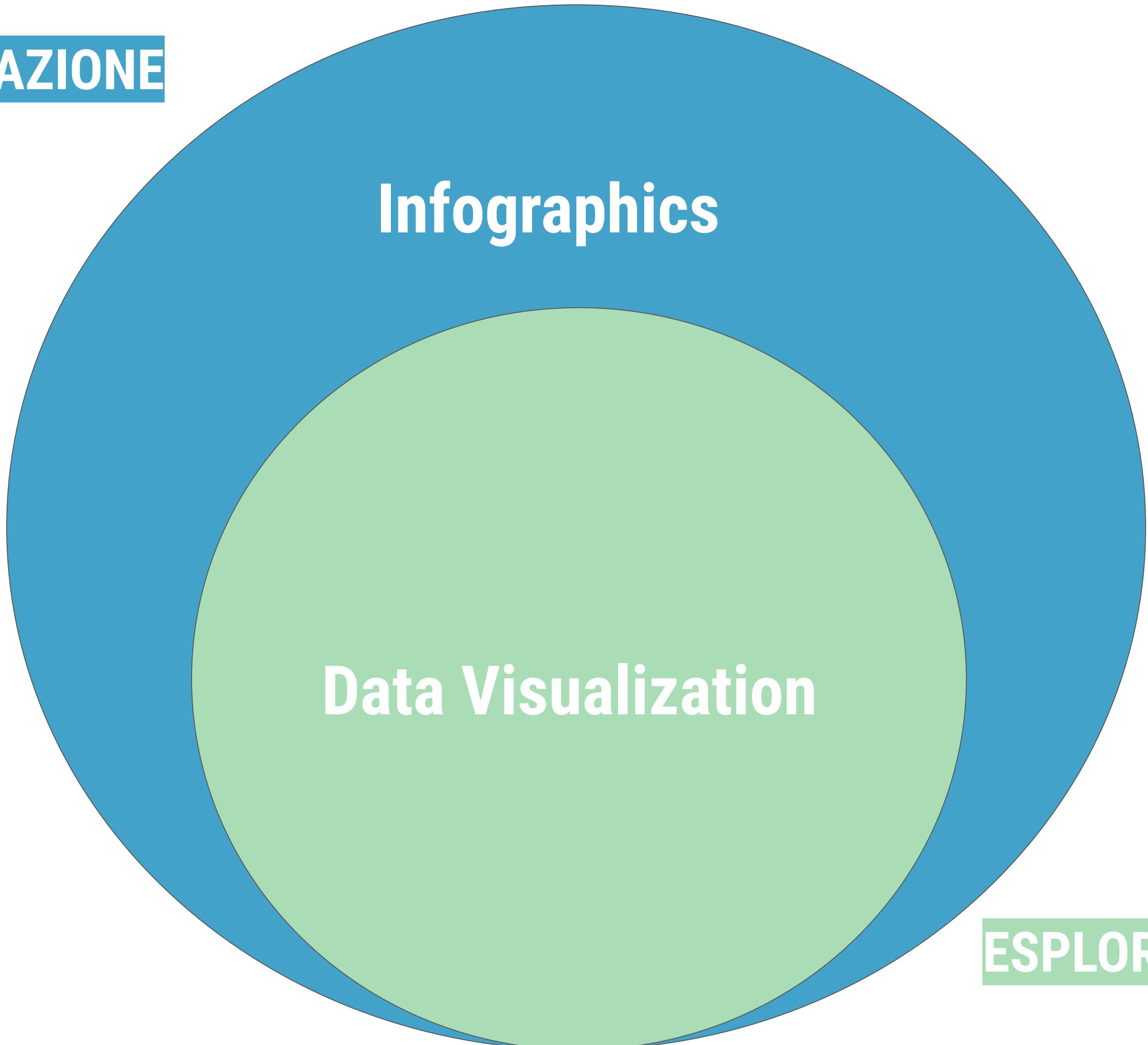
Suggerimenti e strumenti per la visualizzazione di dati

maurizio napolitano
<napolitano@fbk.eu>

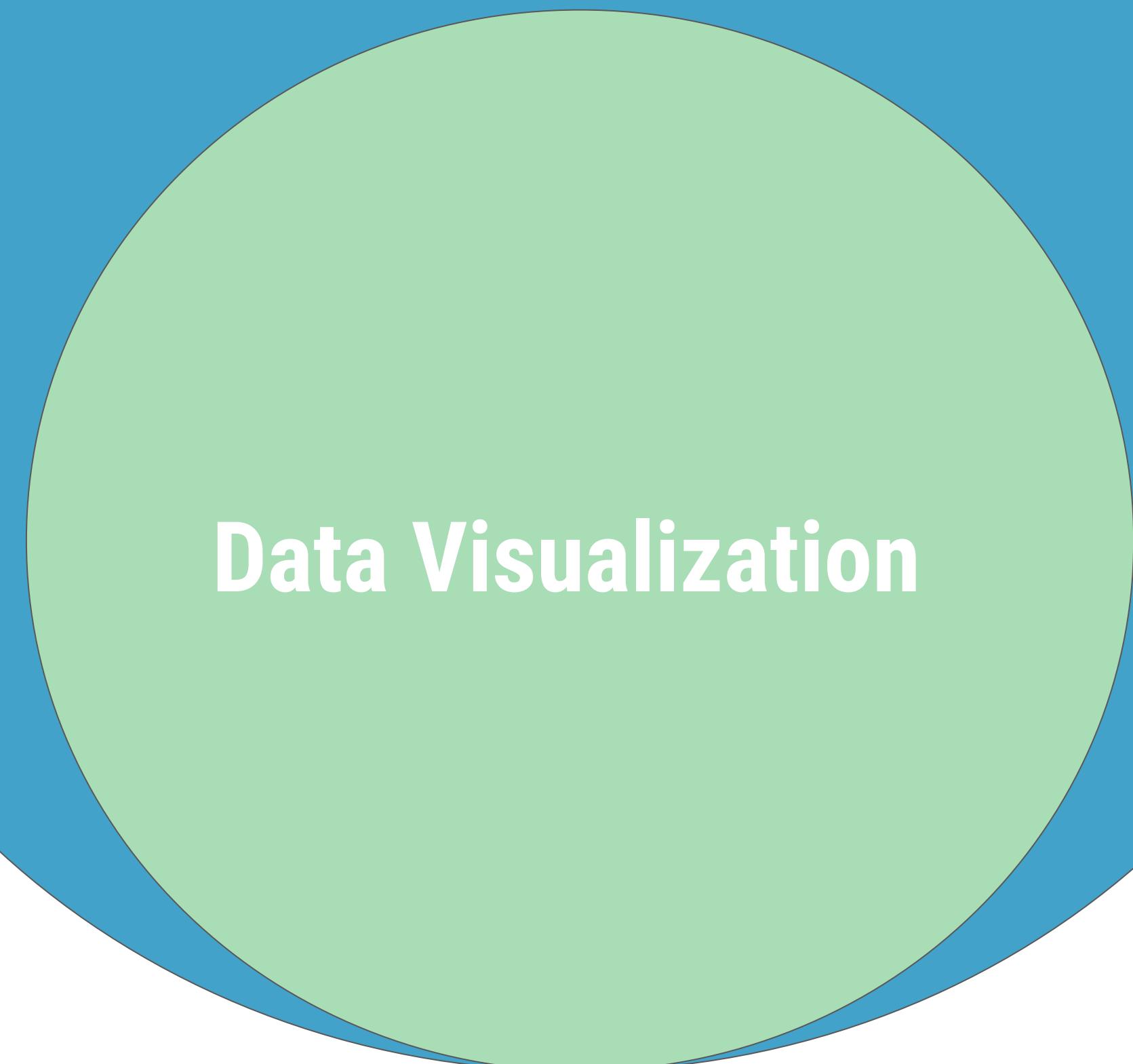


Finalità della lezione
capire come comunicare con i grafici
conoscere strumenti per la creazione di grafici

SPIEGAZIONE



Infographics

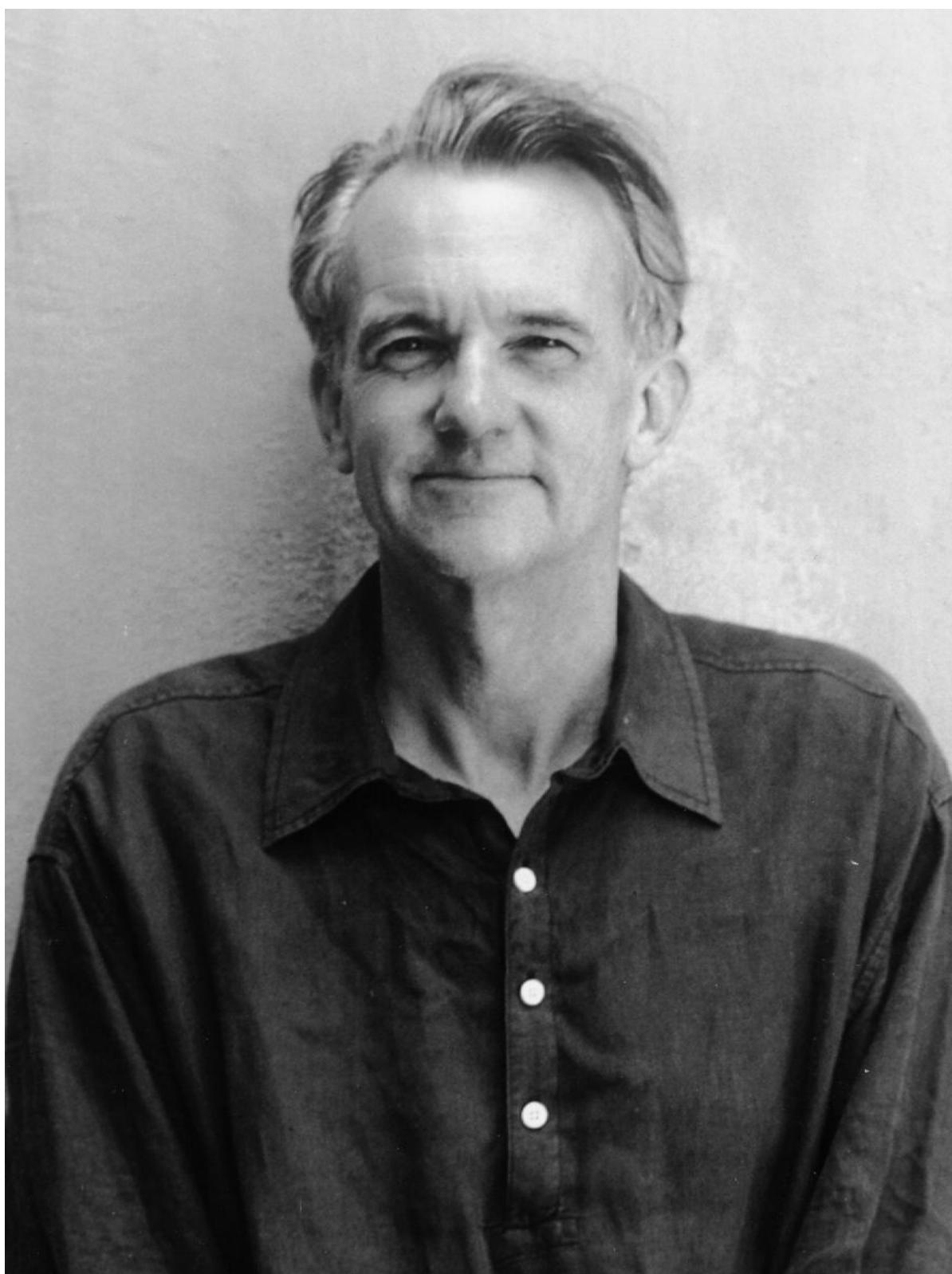


Data Visualization



ESPLORAZIONE

Edward Tufte



“una rappresentazione visuale di dati dovrebbe essere abbastanza semplice da stare sul portellone di un furgone”.
principio di Feynman-Tufte

28 day summary with change over previous period

Tweets

66 ↓21.4%



Tweet impressions

1.4M ↑5.1%



Profile visits

21.9K ↓9.1%



October 2015 • 3 days so far...

Inventore delle Sparkline
un piccolo e semplice grafico della grandezza di una parola, con risoluzione tipografica.

I COMPITI DI UNA BUONA VISUALIZZAZIONE DI DATI

- **Rispondere (o scoprire) domande**
- **Prendere decisioni**
- **Visualizzare i dati nel contesto**
- **Individuare ricorrenze**
- **Presentare argomenti**
- **Raccontare una storia**
- **Ispirare**

PERCHÈ VISUALIZZARE?

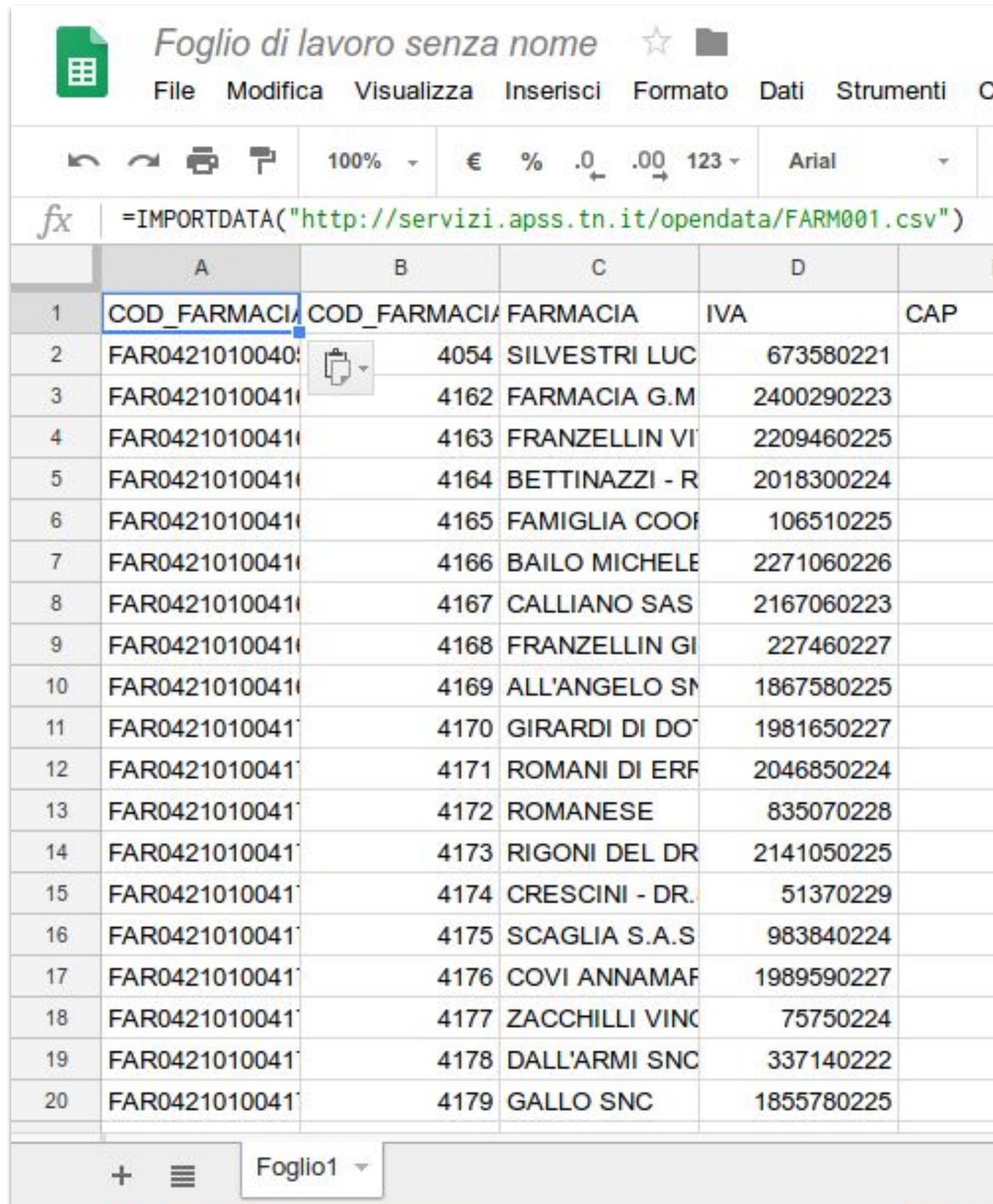
dati

statistiche

Farmacie del Trentino			
File	Modifica	Visione	Invia
Azione	Fornire	Dati	Risposte
1	COD FARMACI	COD FARMACI	FVA.
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
31	31	31	31
32	32	32	32
33	33	33	33
34	34	34	34
35	35	35	35
36	36	36	36
37	37	37	37
38	38	38	38
39	39	39	39
40	40	40	40
41	41	41	41
42	42	42	42
43	43	43	43
44	44	44	44
45	45	45	45
46	46	46	46
47	47	47	47
48	48	48	48
49	49	49	49
50	50	50	50
51	51	51	51
52	52	52	52
53	53	53	53
54	54	54	54
55	55	55	55
56	56	56	56
57	57	57	57
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105	105	105	105
106	106	106	106
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111	111	111	111
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152	152	152	152
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159	159	159	159
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162	162	162	162
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189	189	189	189
190	190	190	190
191	191	191	191
192	192	192	192
193	193	193	193
194	194	194	194
195	195	195	195
196	196	196	196
197	197	197	197
198	198	198	198
199	199	199	199
200	200	200	200
201	201	201	201
202	202	202	202
203	203	203	203
204	204	204	204
205	205	205	205
206	206	206	206
207	207	207	207
208	208	208	208
209	209	209	

da DATI

COME SI FA CON GOOGLE SPREADSHEET



The screenshot shows a Google Sheets interface with a single sheet named "Foglio di lavoro senza nome". The formula bar contains the formula `=IMPORTDATA("http://servizi.apss.tn.it/opendata/FARM001.csv")`. The spreadsheet has five columns labeled A through E. Column A is titled "COD_FARMACIA", column B is "COD_FARMACIA", column C is "FARMACIA", column D is "IVA", and column E is "CAP". Rows 1 through 20 show data from a CSV file, with the first row being the header. The data includes various farmacia codes and names along with their VAT numbers and zip codes.

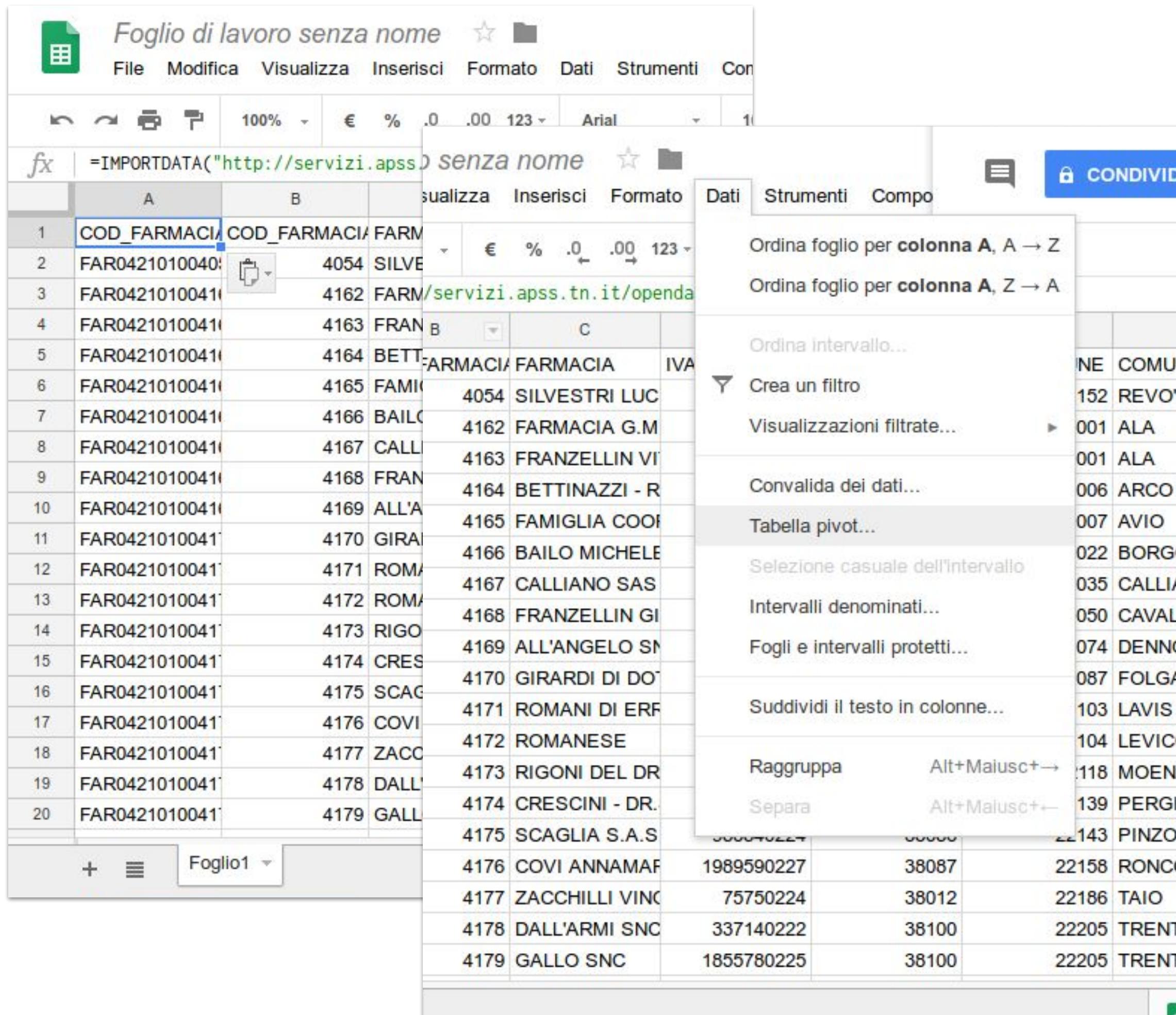
	A	B	C	D	E
1	COD_FARMACIA	COD_FARMACIA	FARMACIA	IVA	CAP
2	FAR0421010040	4054	SILVESTRI LUC	673580221	
3	FAR0421010041	4162	FARMACIA G.M	2400290223	
4	FAR0421010041	4163	FRANZELLIN VI	2209460225	
5	FAR0421010041	4164	BETTINAZZI - R	2018300224	
6	FAR0421010041	4165	FAMIGLIA COOP	106510225	
7	FAR0421010041	4166	BAILO MICHELE	2271060226	
8	FAR0421010041	4167	CALLIANO SAS	2167060223	
9	FAR0421010041	4168	FRANZELLIN GI	227460227	
10	FAR0421010041	4169	ALL'ANGELO SN	1867580225	
11	FAR0421010041	4170	GIRARDI DI DO	1981650227	
12	FAR0421010041	4171	ROMANI DI ERF	2046850224	
13	FAR0421010041	4172	ROMANESE	835070228	
14	FAR0421010041	4173	RIGONI DEL DR	2141050225	
15	FAR0421010041	4174	CRESCINI - DR.	51370229	
16	FAR0421010041	4175	SCAGLIA S.A.S	983840224	
17	FAR0421010041	4176	COVI ANNAMAF	1989590227	
18	FAR0421010041	4177	ZACCHILLI VINC	75750224	
19	FAR0421010041	4178	DALL'ARMI SNC	337140222	
20	FAR0421010041	4179	GALLO SNC	1855780225	

scrivere in A1

`=IMPORTDATA("http://servizi.apss.tn.it/opendata/FARM001.csv")`

da DATI

COME SI FA CON GOOGLE SPREADSHEET



The screenshot shows a Google Sheets interface with a table of data. The data consists of columns A through D, with rows 1 through 20. Column A contains codes like COD_FARMACIA, FAR0421010040, etc. Column B contains names like SILVE, FARM, FRAN, BETT, etc. Column C contains numbers like 4054, 4162, 4163, etc. Column D contains names like SILVESTRI LUC, FARMACIA G.M, FRANZELLIN VI, BETTINAZZI - R, etc.

The 'Dati' (Data) menu is open, and the 'Tabella pivot...' option is highlighted. Other options visible in the menu include 'ORDINA', 'FILTRA', 'VALIDA', 'PIVOT', 'INTERVALLO', 'SELEZIONA', 'INTERVALLO', 'FOLGARO', 'LAVIS', 'LEVICO', 'MOENA', 'PERGINE', and 'PINZOLCO'.

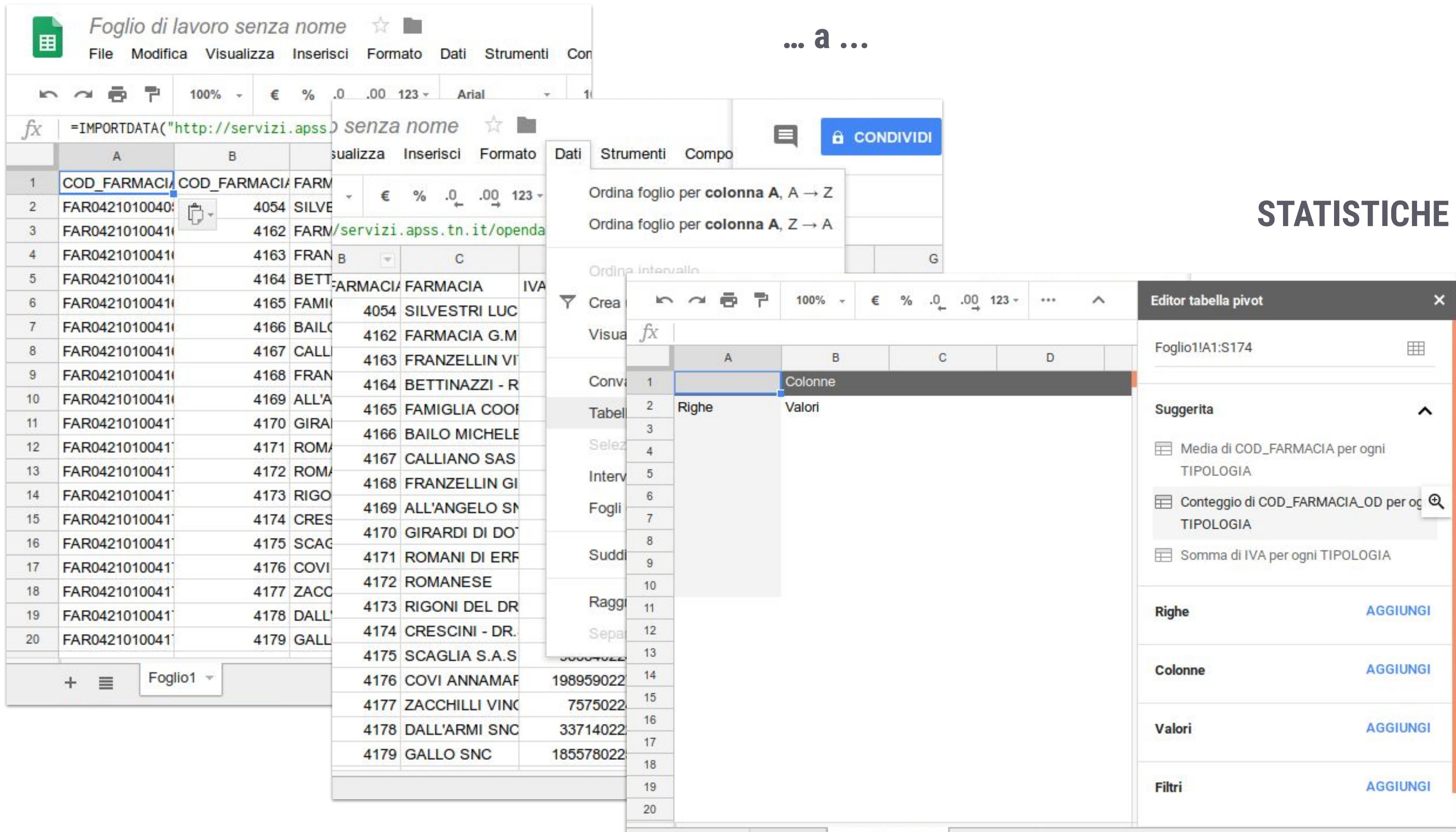
CREAZIONE TABELLA PIVOT

da DATI

COME SI FA CON GOOGLE SPREADSHEET

... a ...

STATISTICHE

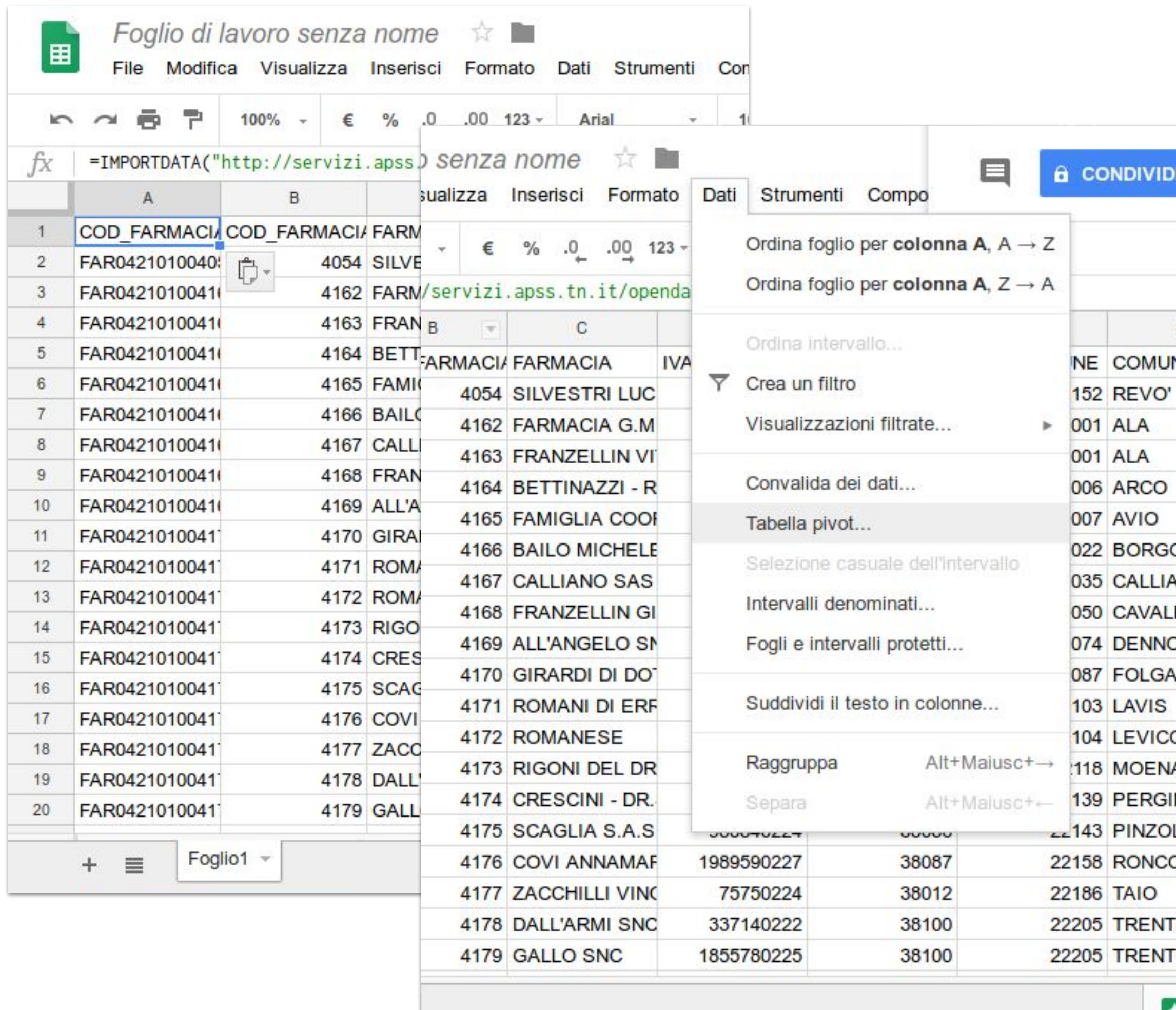


COD_FARMACIA	COD_FARMACIA_OD	TIPOLOGIA	IVA
FAR04210100401	4054	SILVE	
FAR04210100410	4162	FARM	
FAR04210100410	4163	FRAN	B
FAR04210100410	4164	BETT	FARMACIA
FAR04210100410	4165	FAMIG	FARMACIA
FAR04210100410	4166	BAILO	SILVESTRI LUC
FAR04210100410	4167	CALLI	FARMACIA G.M
FAR04210100410	4168	FRAN	FRANZELLIN VI
FAR04210100410	4169	ALL'A	BETTINAZZI - R
FAR04210100410	4170	GIRA	FAMIGLIA COOP
FAR04210100410	4171	ROMA	BAILO MICHELE
FAR04210100410	4172	ROMA	CALLIANO SAS
FAR04210100410	4173	RIGO	FRANZELLIN GI
FAR04210100410	4174	CRES	ALL'ANGELO SM
FAR04210100410	4175	SCAG	GIRARDI DI DO
FAR04210100410	4176	COVI	ROMANI DI ERF
FAR04210100410	4177	ZACC	ROMANESE
FAR04210100410	4178	DALL	RIGONI DEL DR
FAR04210100410	4179	GALL	CRESCINI - DR.

... e crea la tabella

da DATI

COME SI FA CON GOOGLE SPREADSHEET



The screenshot shows a Google Sheets interface with a table of data. The data consists of columns A, B, and C, with rows numbered from 1 to 20. Column A contains codes like COD_FARMACIA, FAR0421010040, etc. Column B contains names like SILVE, FARM, FRAN, BETT, etc. Column C contains descriptions like FARMACIA, FARMACIA, FARMACIA, etc. The 'Dati' (Data) menu is open, and the 'Tabella pivot...' option is highlighted.

	A	B	C
1	COD_FARMACIA	FARMACIA	FARMACIA
2	FAR0421010040	4054 SILVE	
3	FAR0421010041	4162 FARM	/servizi.apss.tn.it/openda
4	FAR0421010041	4163 FRAN	B
5	FAR0421010041	4164 BETT	FARMACIA
6	FAR0421010041	4165 FAMIGLIA	FARMACIA
7	FAR0421010041	4166 BAILO	IVANA LUC
8	FAR0421010041	4167 CALLIANO	SILVESTRI
9	FAR0421010041	4168 FRAN	FARMACIA G.M
10	FAR0421010041	4169 ALL'ANGELO	4164 FRANZELLIN VI
11	FAR0421010041	4170 ALL'ANGELO	4164 BETTINAZZI - R
12	FAR0421010041	4171 ROMANES	4165 FAMIGLIA COOP
13	FAR0421010041	4172 ROMANES	4166 BAILO MICHELE
14	FAR0421010041	4173 RIGO	4167 CALLIANO SAS
15	FAR0421010041	4174 CRES	4168 FRANZELLIN GI
16	FAR0421010041	4175 SCAGLIA	4169 ALL'ANGELO SM
17	FAR0421010041	4176 COVI	4170 GIRARDI DI DO
18	FAR0421010041	4177 ZACCHILLI	4171 ROMANI DI ERF
19	FAR0421010041	4178 DALL'ARMI	4172 ROMANESE
20	FAR0421010041	4179 GALL	4173 RIGONI DEL DR

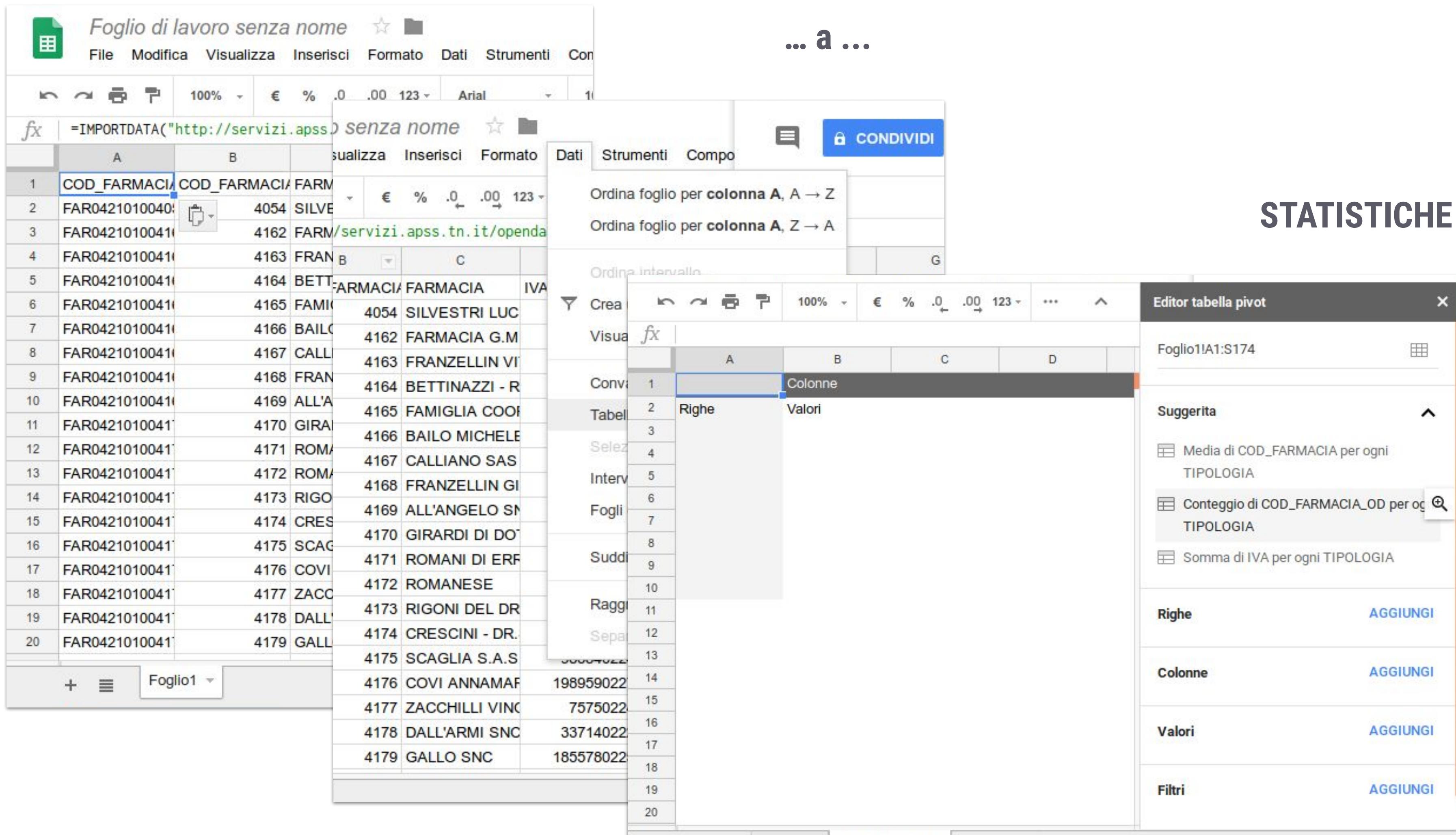
CREAZIONE TABELLA PIVOT

da DATI

COME SI FA CON GOOGLE SPREADSHEET

... a ...

STATISTICHE



	COD_FARMACIA	COD_FARMACIA_OD	TIPOLOGIA	IVA
1	FAR04210100401	4054	SILVE	
2	FAR04210100410	4162	FARM	/servizi.apss.tn.it/openda
3	FAR04210100410	4163	FRAN	B
4	FAR04210100410	4164	BETT	FARMACIA
5	FAR04210100410	4165	FAMIGLIA	FARMACIA
6	FAR04210100410	4166	BAILO	4054 SILVESTRI LUC
7	FAR04210100410	4167	CALLIANO	4162 FARMACIA G.M
8	FAR04210100410	4168	FRAN	4163 FRANZELLIN VI
9	FAR04210100410	4169	ALL'ANGELO	4164 BETTINAZZI - R
10	FAR04210100410	4170	GIRARDI	4165 FAMIGLIA COOP
11	FAR04210100410	4171	ROMANI	4166 BAILO MICHELE
12	FAR04210100410	4172	ROMANESE	4167 CALLIANO SAS
13	FAR04210100410	4173	RIGO	4168 FRANZELLIN GI
14	FAR04210100410	4174	CRES	4169 ALL'ANGELO SM
15	FAR04210100410	4175	SCAGLIA	4170 GIRARDI DI DO
16	FAR04210100410	4176	COVI	4171 ROMANI DI ERF
17	FAR04210100410	4177	ZACCHILLI	4172 ROMANESE
18	FAR04210100410	4178	DALL'ARMI	4173 RIGONI DEL DR
19	FAR04210100410	4179	GALLO	4174 CRESCINI - DR.
				4175 SCAGLIA S.A.S
				4176 COVI ANNAMAF
				198959022
				4177 ZACCHILLI VINC
				7575022
				4178 DALL'ARMI SNC
				33714022
				4179 GALLO SNC
				185578022

+ Foglio1

Foglio di lavoro senza nome

File Modifica Visualizza Inserisci Formato Dati Strumenti Con

100% € % .0 .00 123 Arial

=IMPORTDATA("http://servizi.apss.tn.it/openda")

Dati Strumenti Compo CONDIVIDI

Ordina foglio per colonna A, A → Z

Ordina foglio per colonna A, Z → A

Ordina intervallo

Creare

Visualizza fx

Converte

Tabella

Selezione

Intervallo

Fogli

Sudden

Raggruppamento

Separatore

Colonne

Righe

Valori

Foglio1!A1:S174

Suggerita

Media di COD_FARMACIA per ogni TIPOLOGIA

Conteggio di COD_FARMACIA_OD per ogni TIPOLOGIA

Somma di IVA per ogni TIPOLOGIA

Righe AGGIUNGI

Colonne AGGIUNGI

Valori AGGIUNGI

Filtri AGGIUNGI

... e crea la tabella

Remove *and move*
to improve
the **data tables** edition

Created by Darkhorse Analytics

www.darkhorseanalytics.com

<https://www.darkhorseanalytics.com/blog/clear-off-the-table>

TABELLE VS GRAFICI

L'uso di **grafici** laddove non sono necessari può portare a inutili **confusioni** / interpretazioni .

Più un **grafico** ha bisogno di una **spiegazione**, meno il **grafico** è **necessario**.

I **grafici** non sempre **trasmettono** le informazioni come fanno invece le **tabelle**.

https://en.wikipedia.org/wiki/Misleading_graph

ESERCIZIO

creare un grafico dalla tabella ottenuta

Farmacie del Trentino

	A	B
1	TIPOLOGIA	COUNTA di COD_FARMACIA_OD
2	DISPENSARIO	17
3	DISPENSARIO STAGION.	2
4	ORDINARIA	150
5	SUCCURSALE	4
6	Totale generale	173
7		

confrontiamo i risultati
e vediamo cosa dicono le buone pratiche

Farmacie del Trentino

Inserisci	Formato	Dati	Strumenti
Riga sopra			
Riga sotto			
Colonna a sinistra			
Colonna a destra			
Celle e sposta in basso			
Celle e sposta a destra			
Grafico			
Immagine ...			
Disegno...			
Modulo...			
Funzione			
Link... Ctrl+K			
<input checked="" type="checkbox"/> Casella di controllo NOVITÀ			
+ Commento Ctrl+Alt+M			
Nota Maiusc+F2			
Nuovo foglio Maiusc+F11			

PRINCIPI DI ECCELLENZA GRAFICA

(da E.Ruf Tufte)

Mostrare i dati

Indurre l'utente a riflettere sulla sostanza dei risultati

Evitare di alterare ciò che i dati hanno da dire

Presentare molti numeri in maniera efficiente

Incoraggiare l'occhio a confronto fra valori

Fornire diversi livelli di dettaglio (da una panoramica ad struttura precisa)

**Dare un obiettivo chiaro: descrizione, esplorazione, tabulazione,
decorazione**

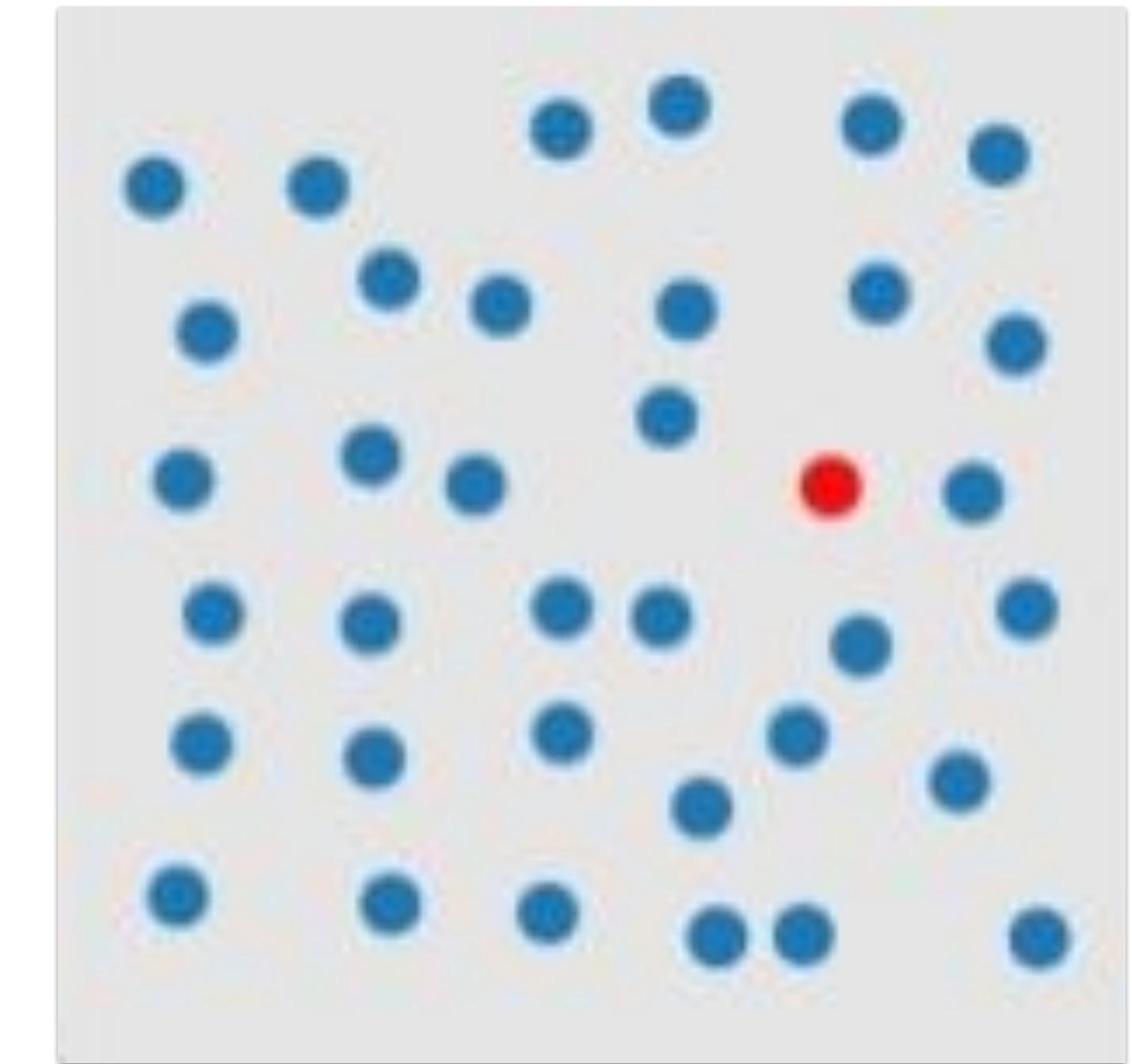
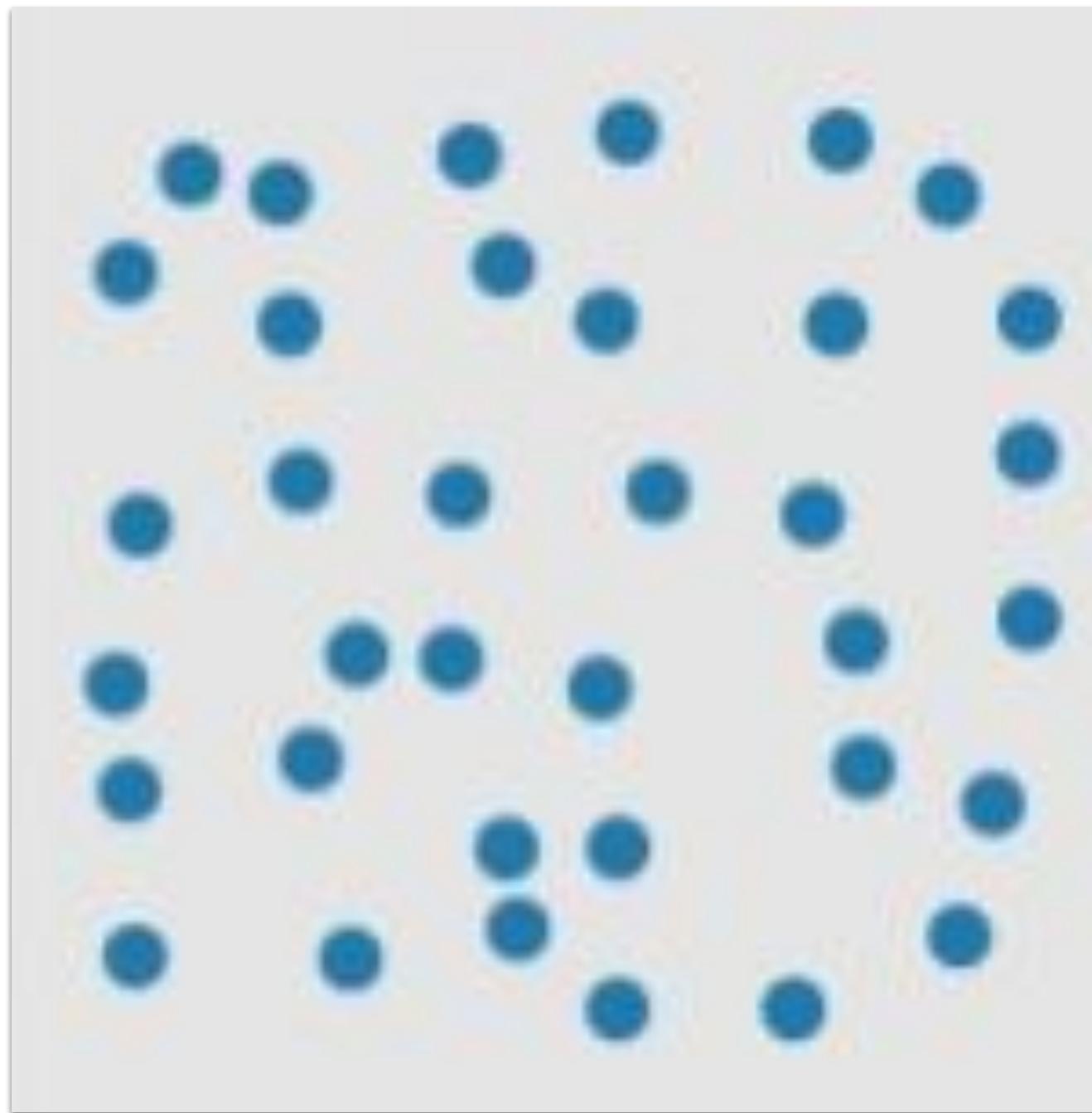
Le descrizioni dei dati devono essere integrate

E. R. Tufte. La visualizzazione visiva di informazioni quantitative. 2 ° ed. Graphics Press, Cheshire, Connecticut. 2001.

PRINCIPALI ERRORI

- ABUSO DEI COLORI
- TROPPA INFORMAZIONE
 - (usare un approccio Keep It Simple and Sexy)
- BELLO NON VUOL DIRE EFFICACE
- LE VISUALIZZAZIONI PARTONO DAI BUONI DATI

sapere usare bene i COLORI



Quante volte vedi il numero tre?

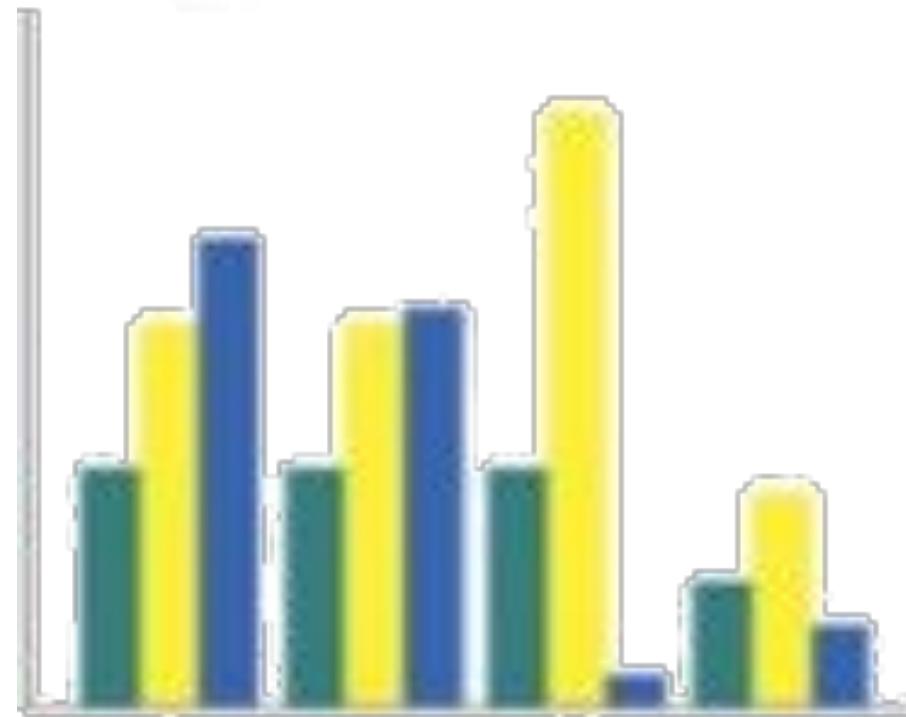
43242950445435485760908979421854090545409102048
05904390905476012209750907648624597665421199867
75439098550404031029047694421208540878542570

Quante volte vedi il numero tre?

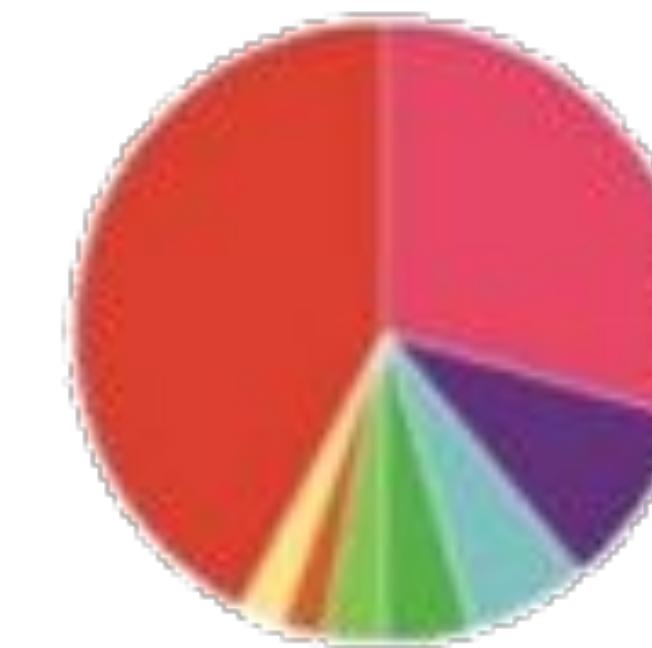
43242950445435485760908979421854090545409102048
05904390905476012209750907648624597665421199867
75439098550404031029047694421208540878542570

Accompagnare i colori

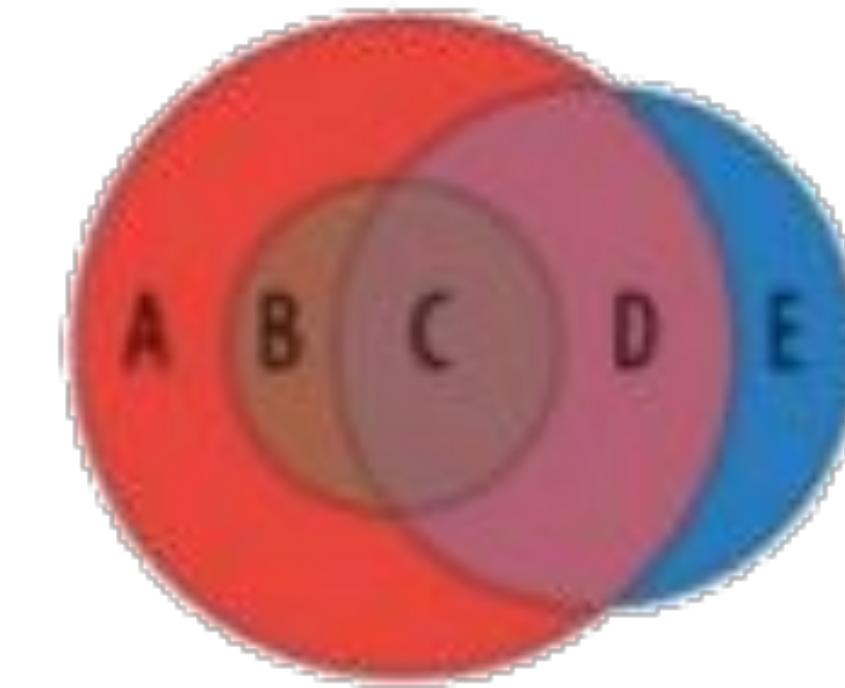
Un colore dominante



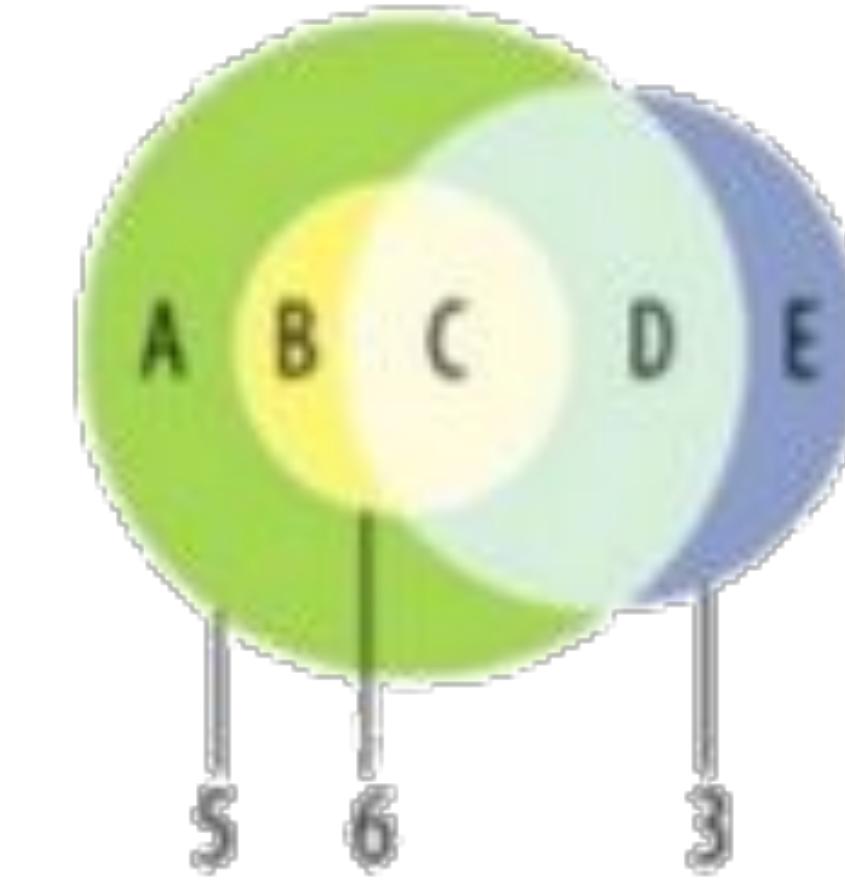
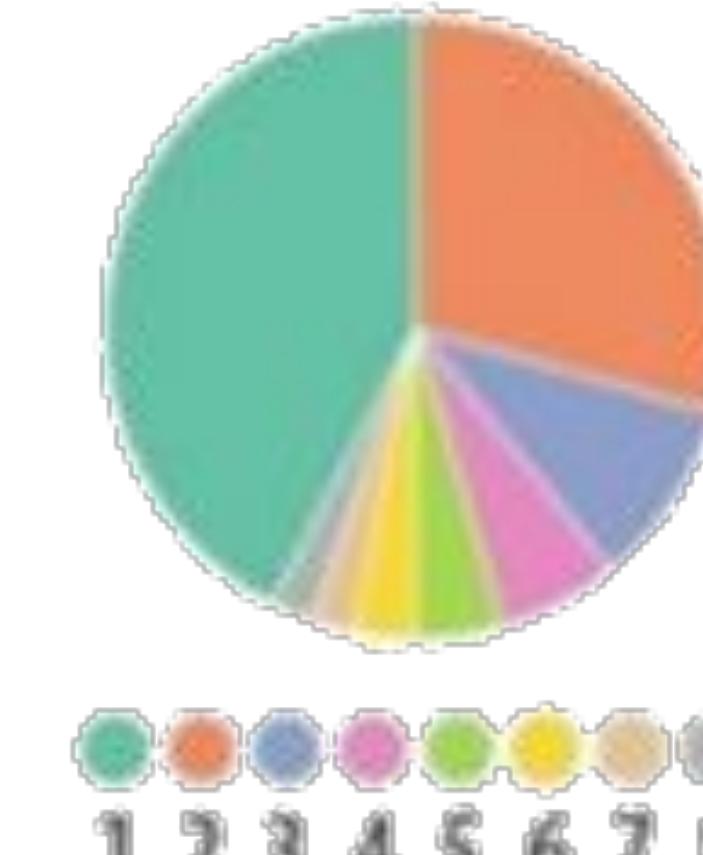
difficoltà nel distinguere



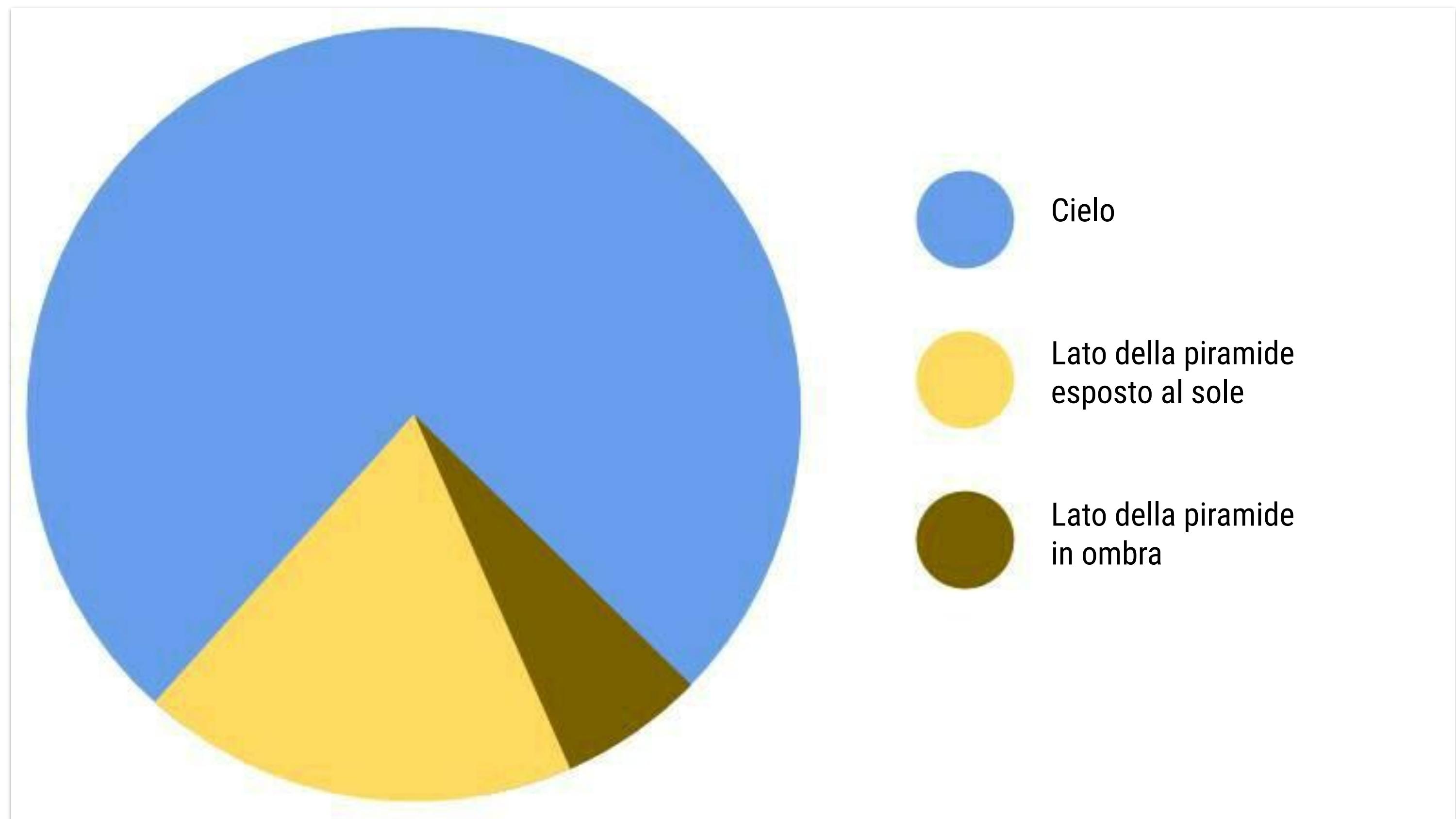
colori scuri



dopo essere stati su <http://colorbrewer2.org>



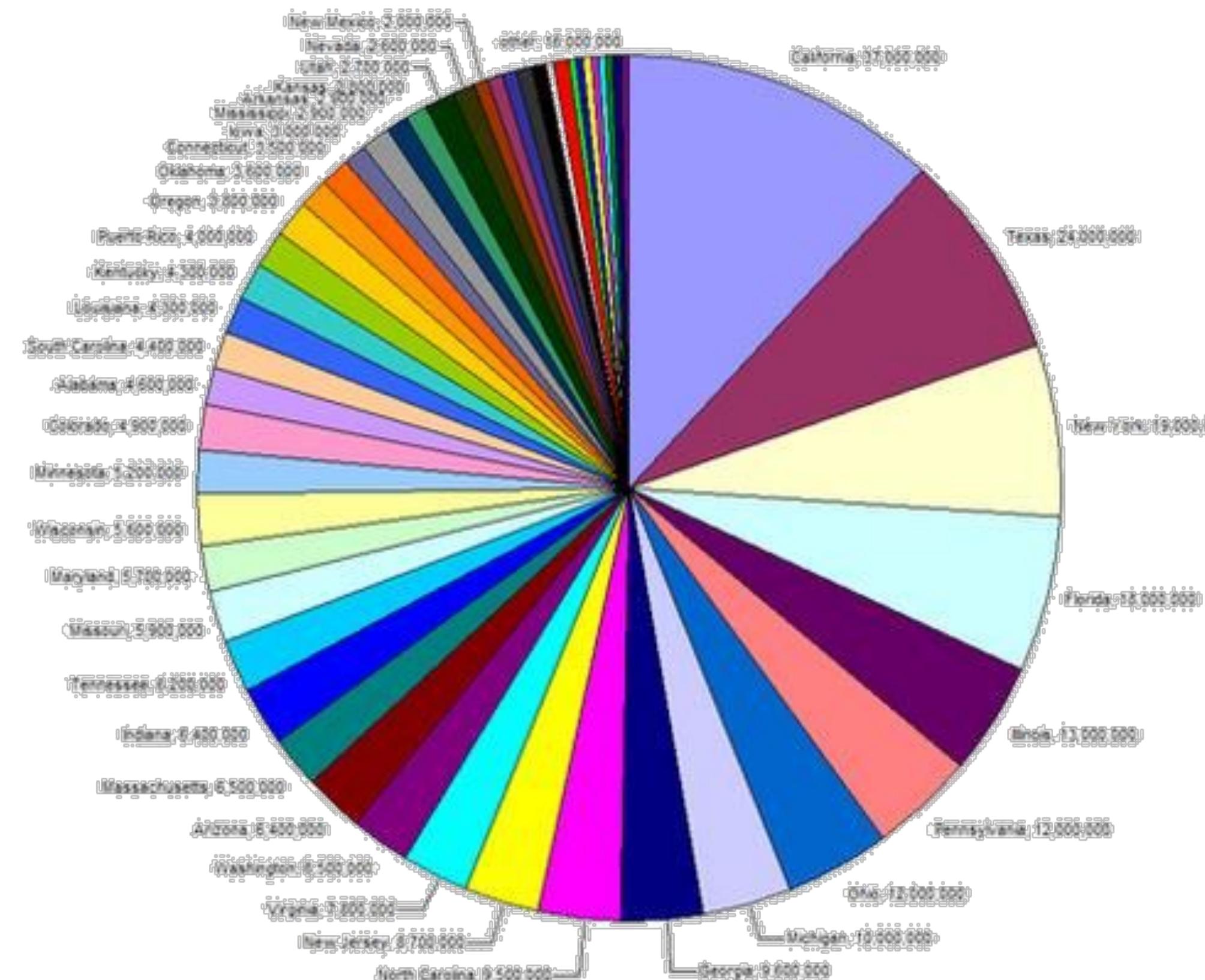
UN GRAFICO TORTA EGIZIANO



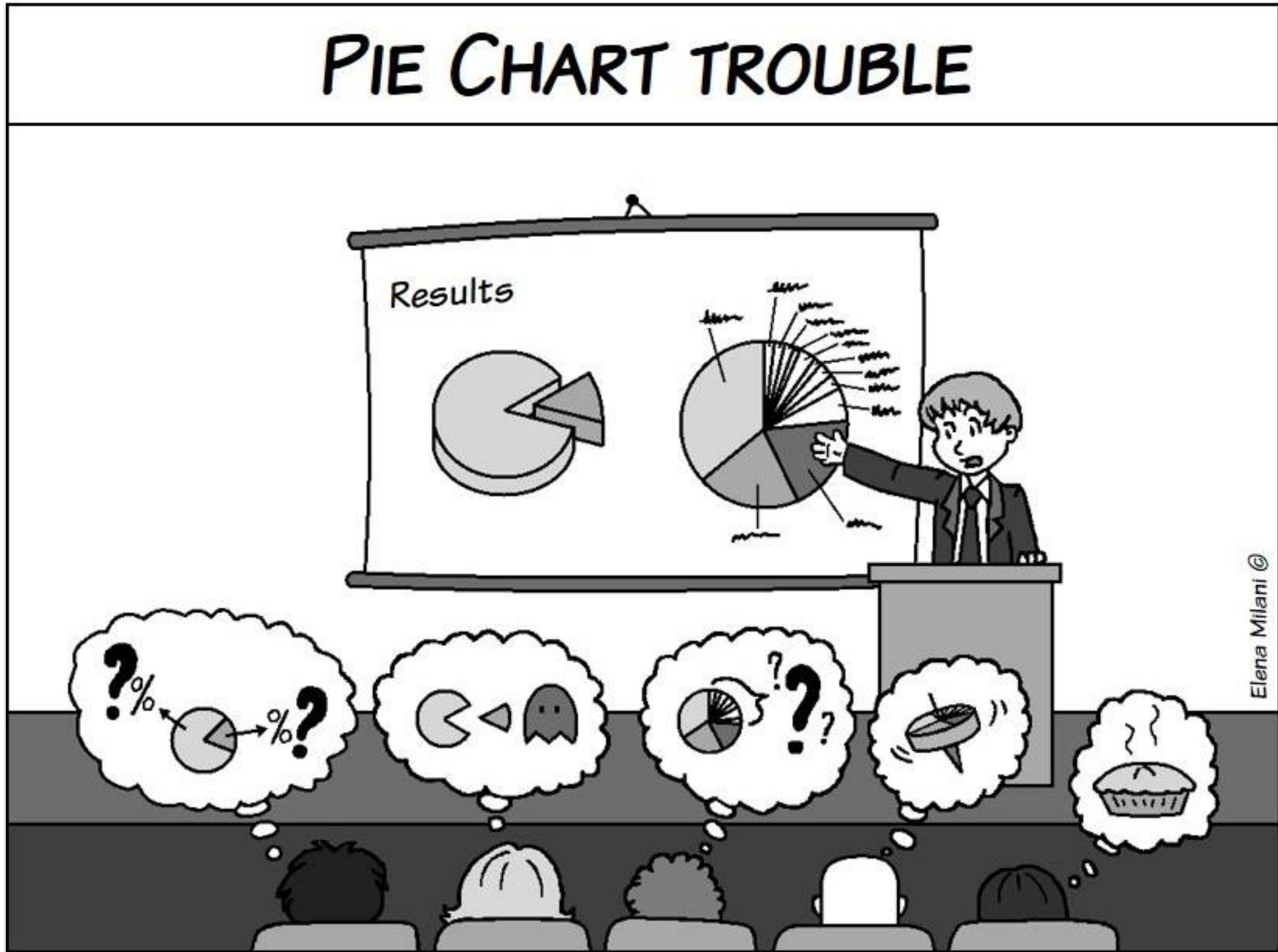
... o un binocolo puntato su una piramide?

ABUSO DI ETICHETTE

L'uso di parole rappresentate **distorte** o nel **titolo** del grafico o nelle etichette degli **assi** o nella **didascalia** potrebbe impropriamente **ingannare** il lettore



https://en.wikipedia.org/wiki/Misleading_graph

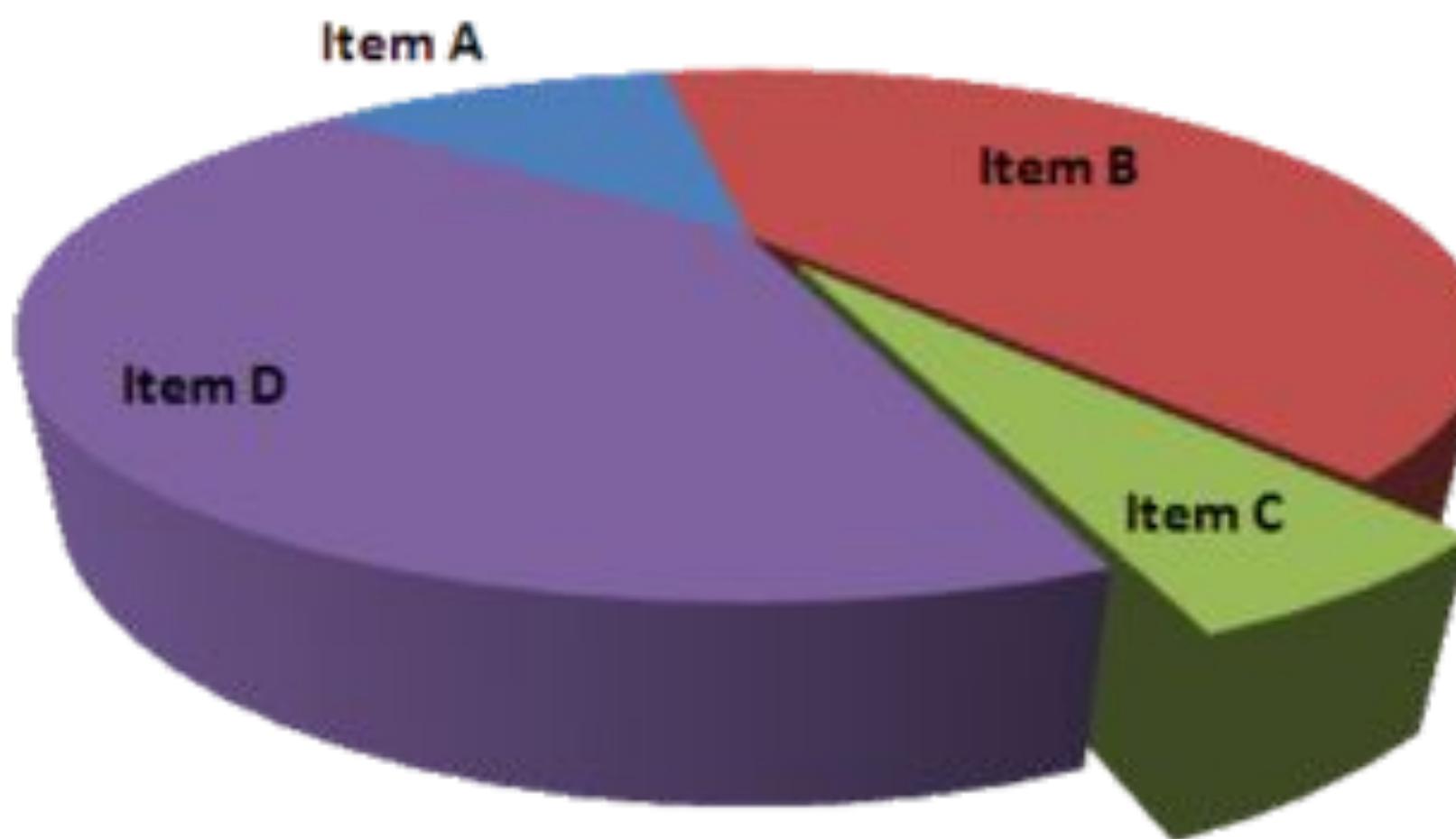


Quale è il colore con più M&M's ?



Quale è il colore con più M&M's ?

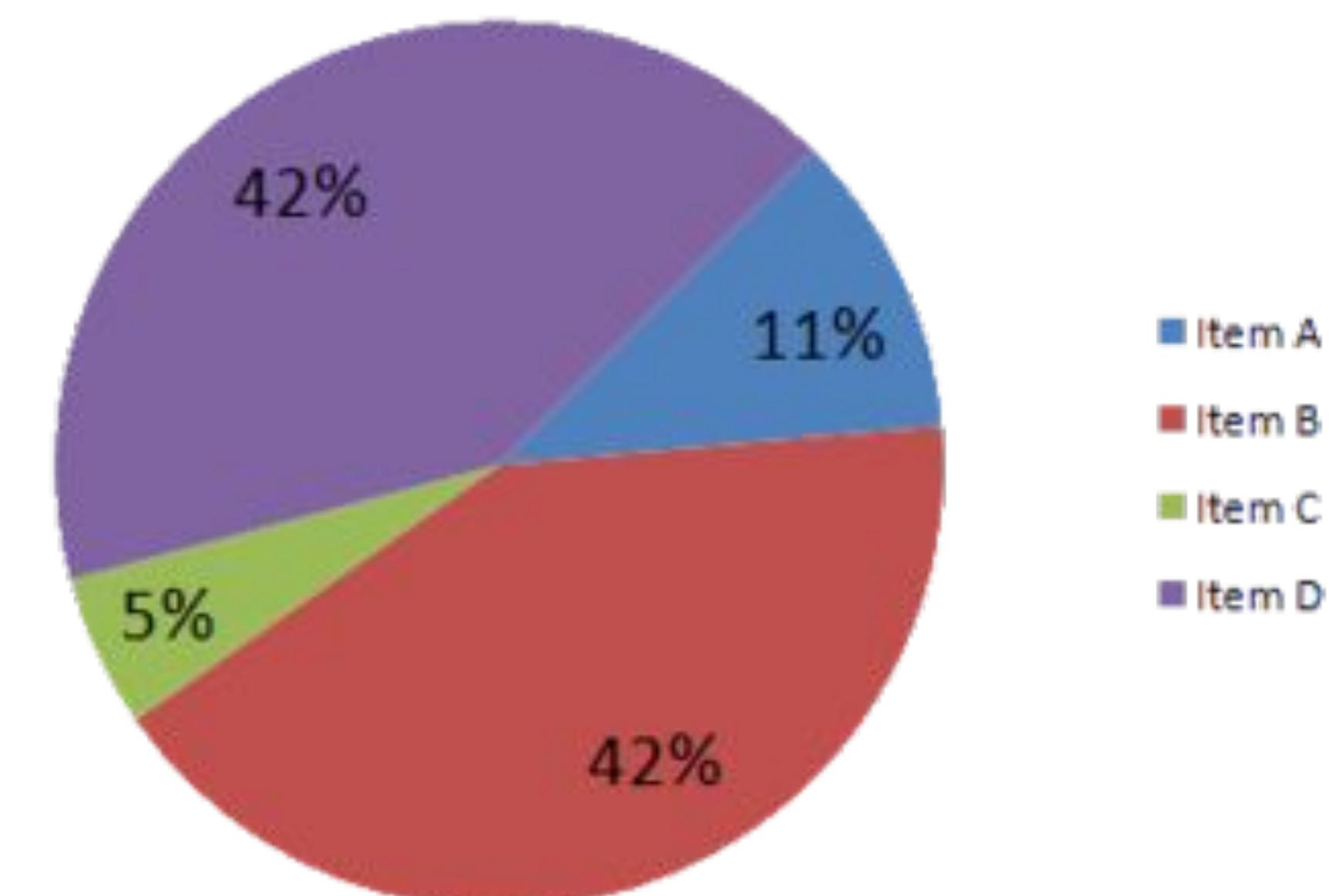




L'elemento C sembra essere grande almeno quanto l'elemento A, mentre in realtà, è meno della metà

https://en.wikipedia.org/wiki/Misleading_graph

LE BUGIE DEI GRAFICI TORTA



GRAFICI A TORTA

Il confronto fra **grafici a torta di diverse dimensioni** può essere spesso **fuorviante** perché le persone **non possono leggere con precisione l'area comparativa**.

L'uso di **fette sottili** sono **difficili** da distinguere e possono essere **difficile** da **interpretare**.

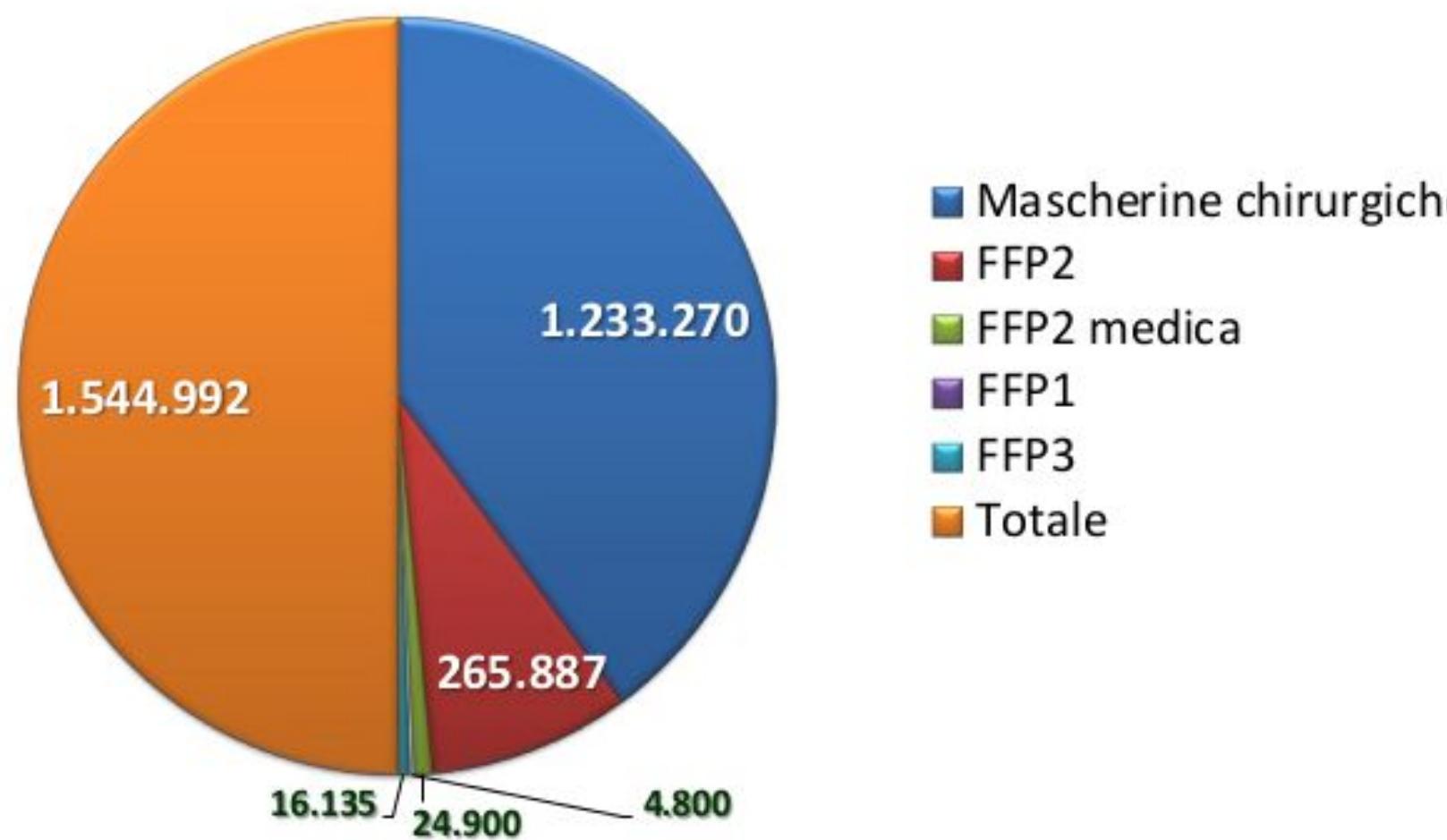
L'utilizzo di **percentuali** come etichette su un grafico a torta può essere **fuorviante** quando la **dimensione** del campione è **ridotta**.

Il grafico a torta in **3D** oppure in 2D aggiungendo una '**inclinazione**' rende **l'interpretazione** ancora più **difficile** a causa dell'**effetto distorto** della prospettiva.

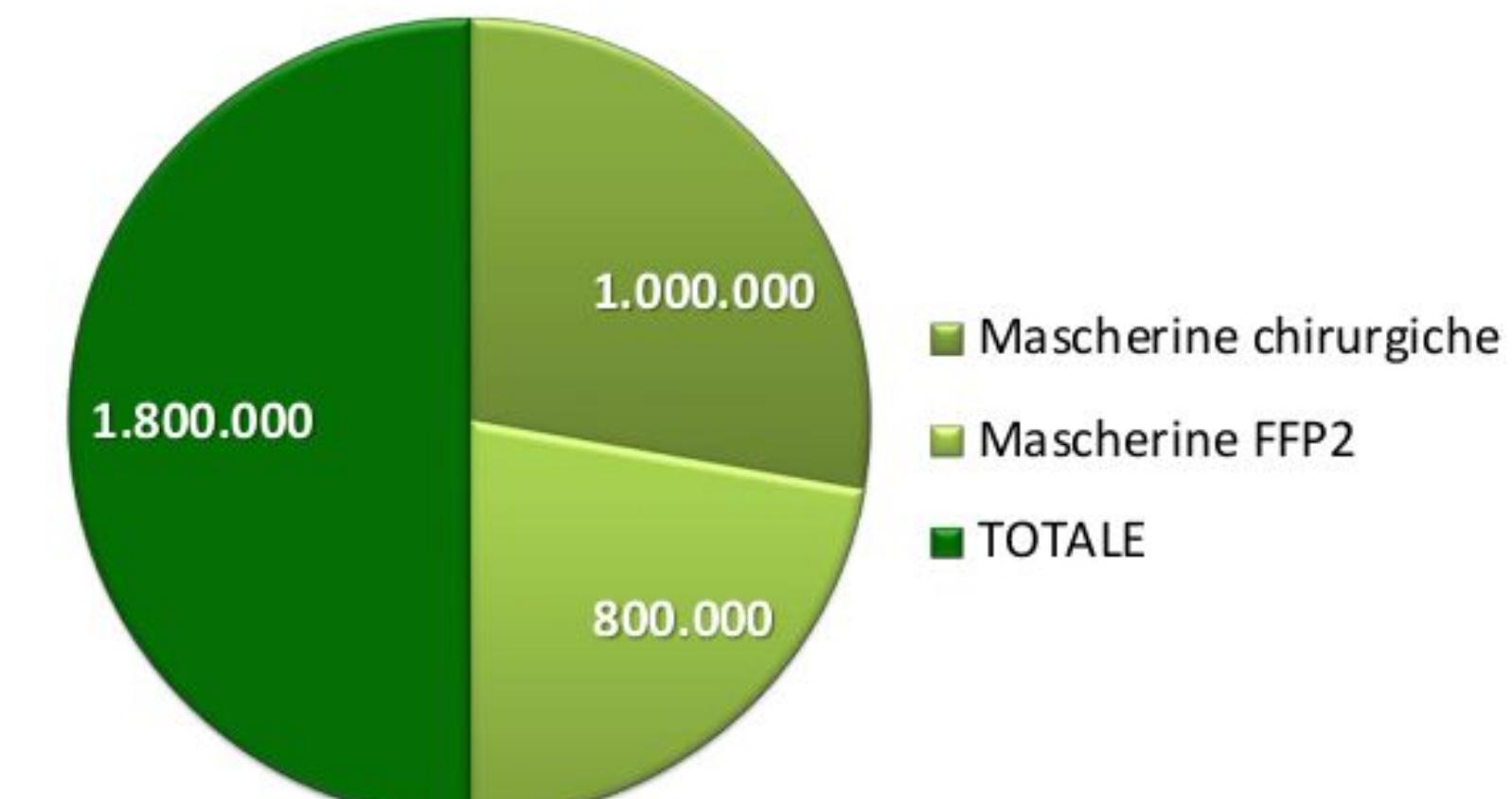
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COSA NON VA IN QUESTI GRAFICI?

**Mascherine fornite dal DPC
e distribuite dalla RAS**



**Mascherine acquistate
e distribuite dalla RAS**



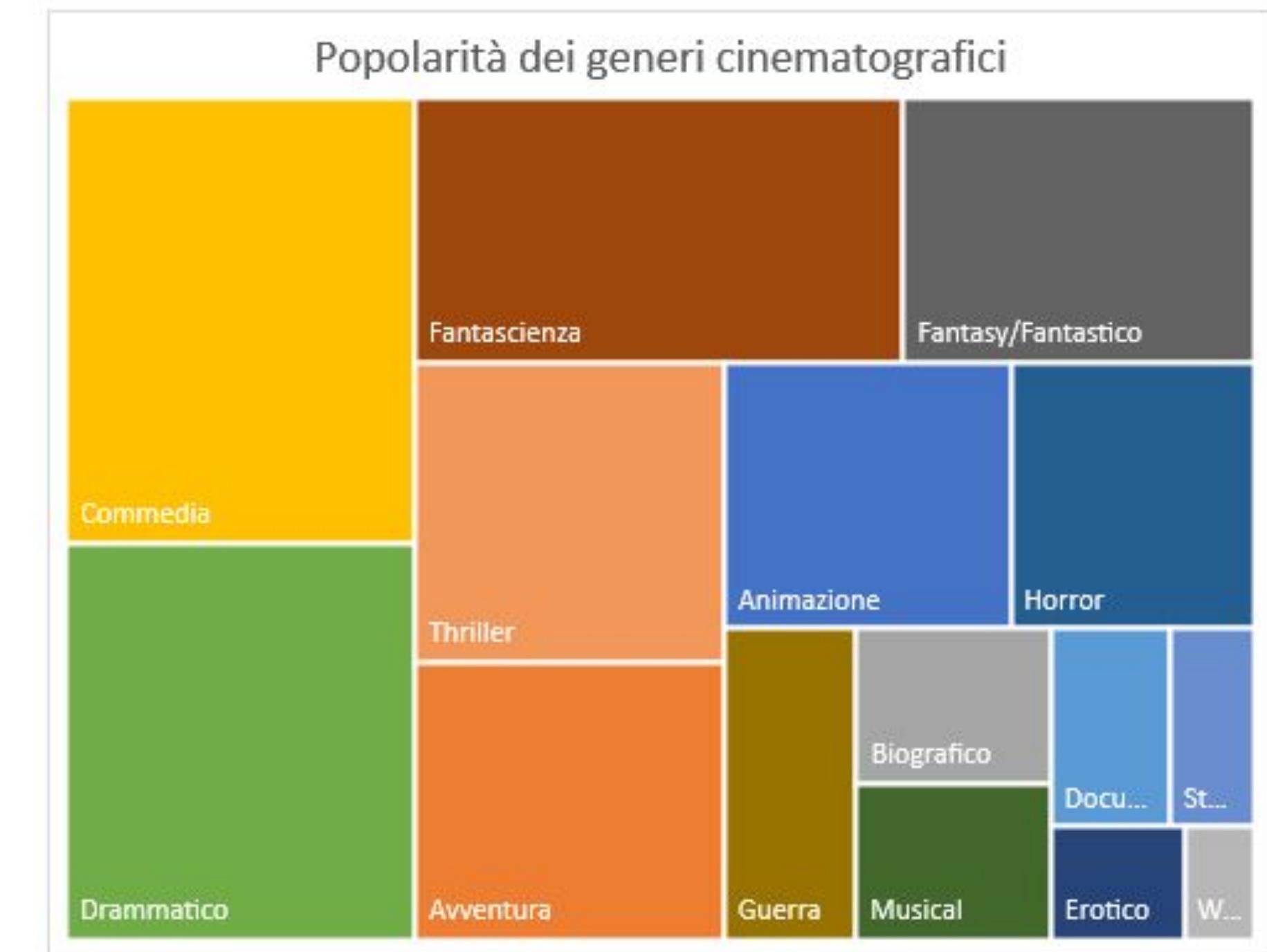
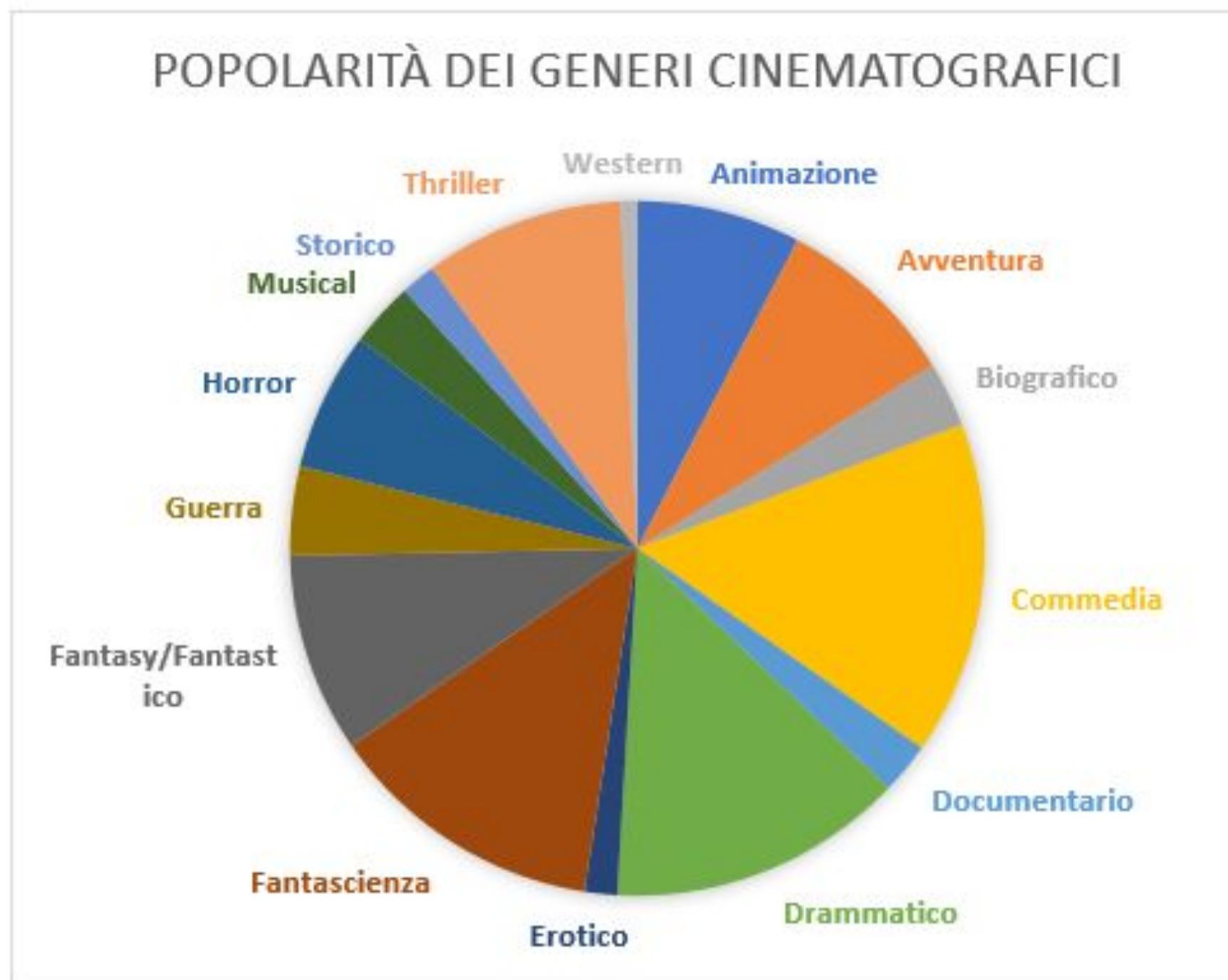
Remove to improve the **pie chart** edition

Created by Darkhorse Analytics

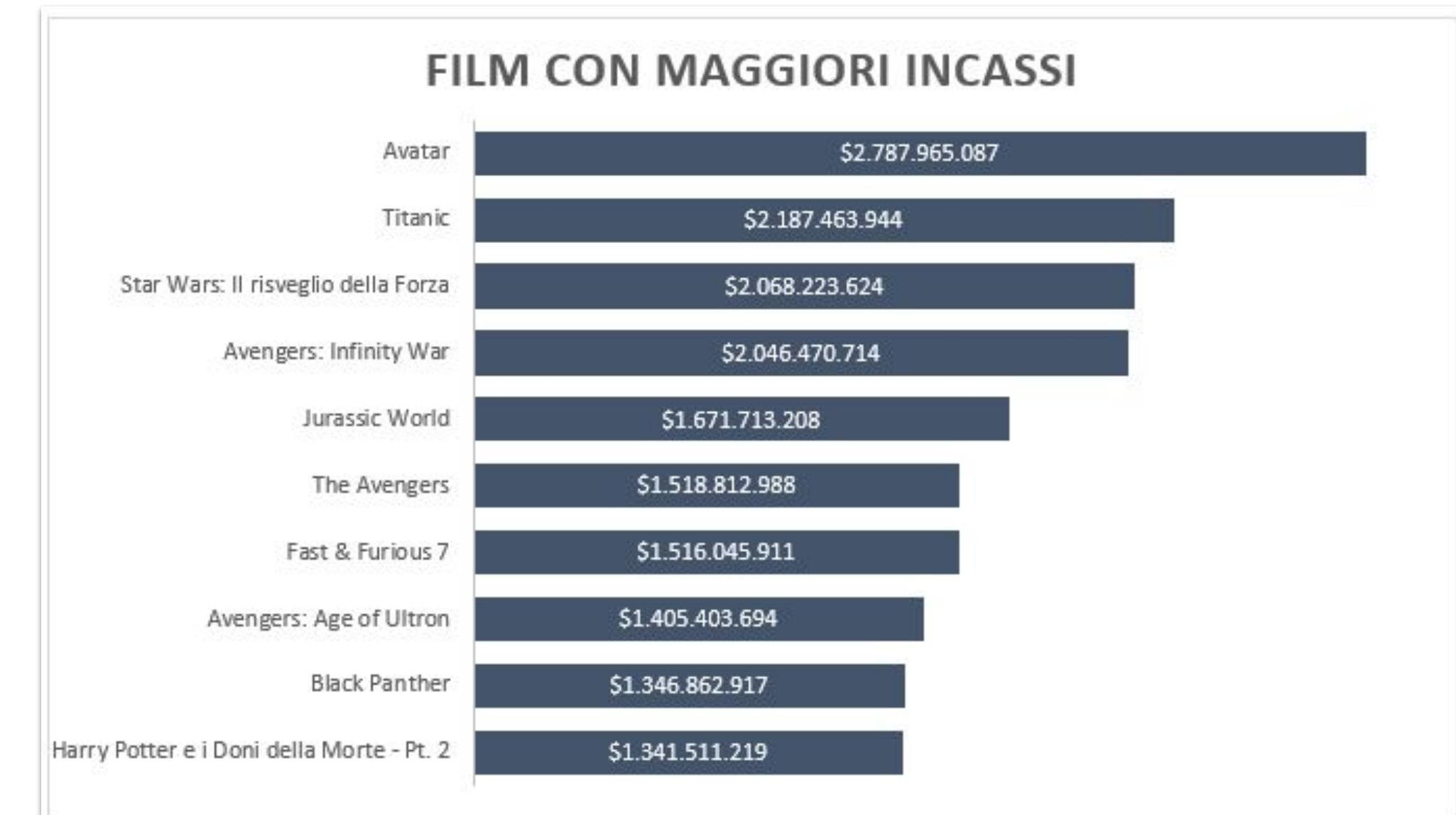
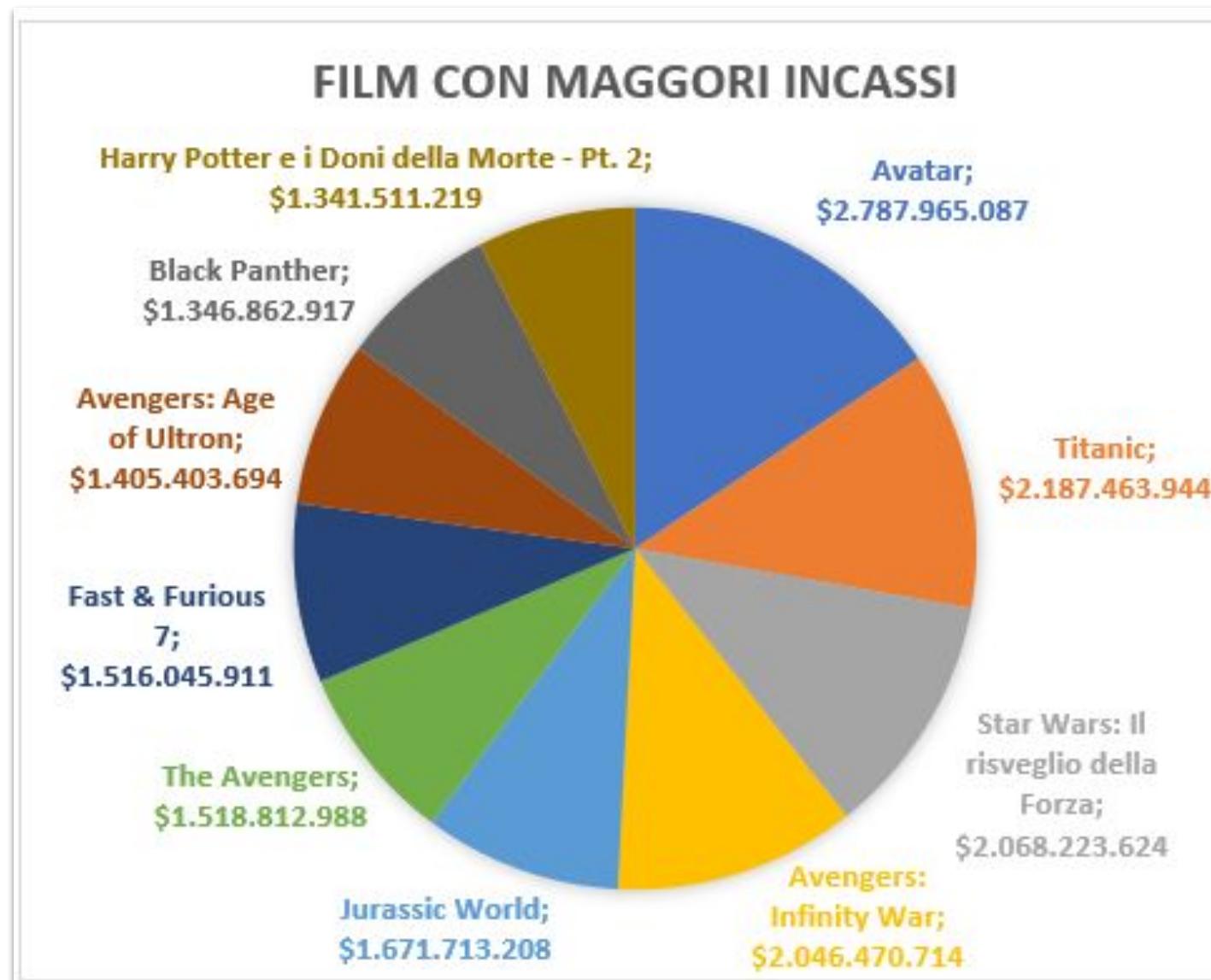
www.darkhorseanalytics.com

<https://www.darkhorseanalytics.com/portfolio/2016/1/7/data-looks-better-naked-pie-charts>

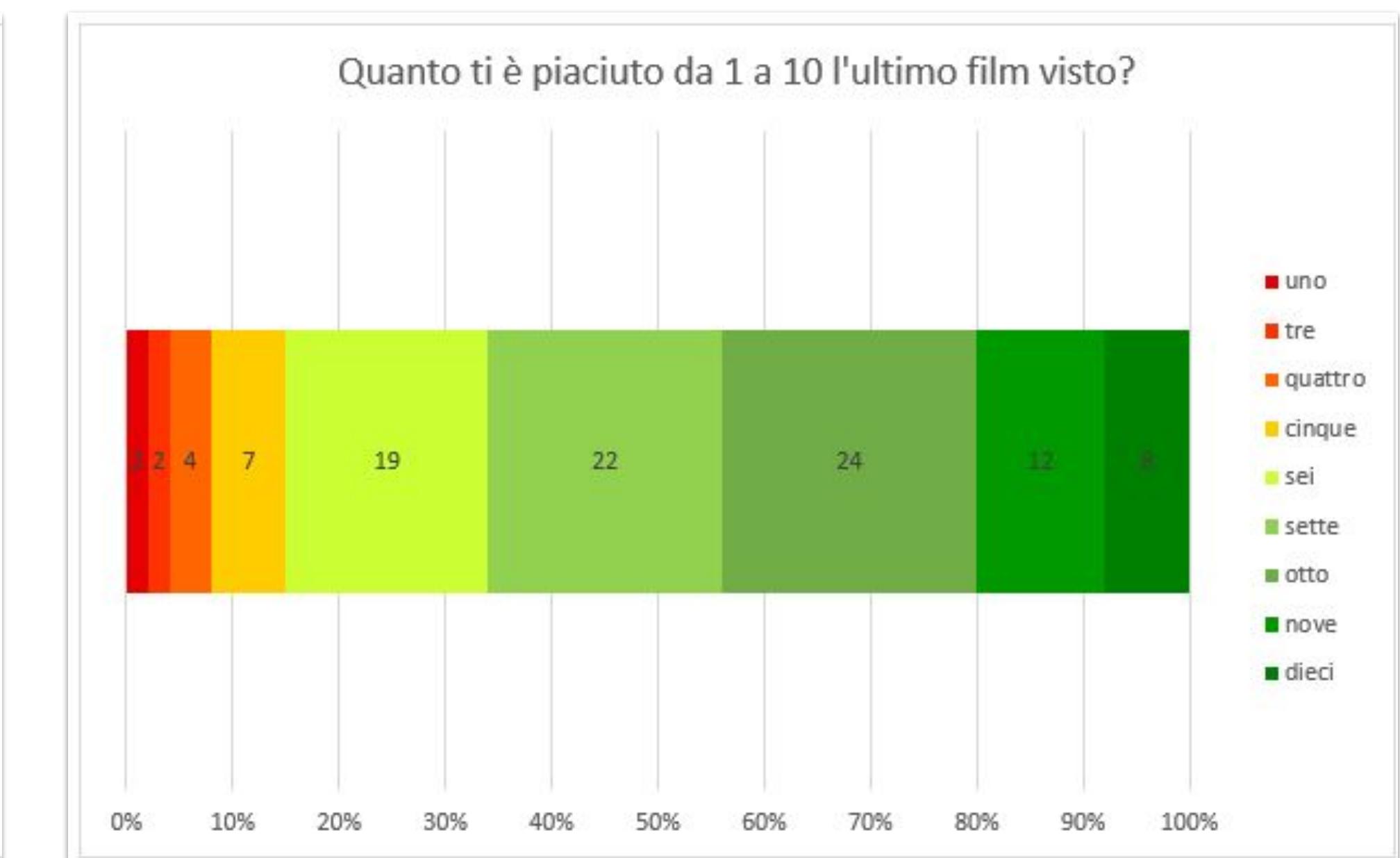
Alternative: grafici ad albero (treemap)



Alternative: grafici a barre



Alternative: grafico a barre orizzontali al 100%



GRAFICI TRONCATI

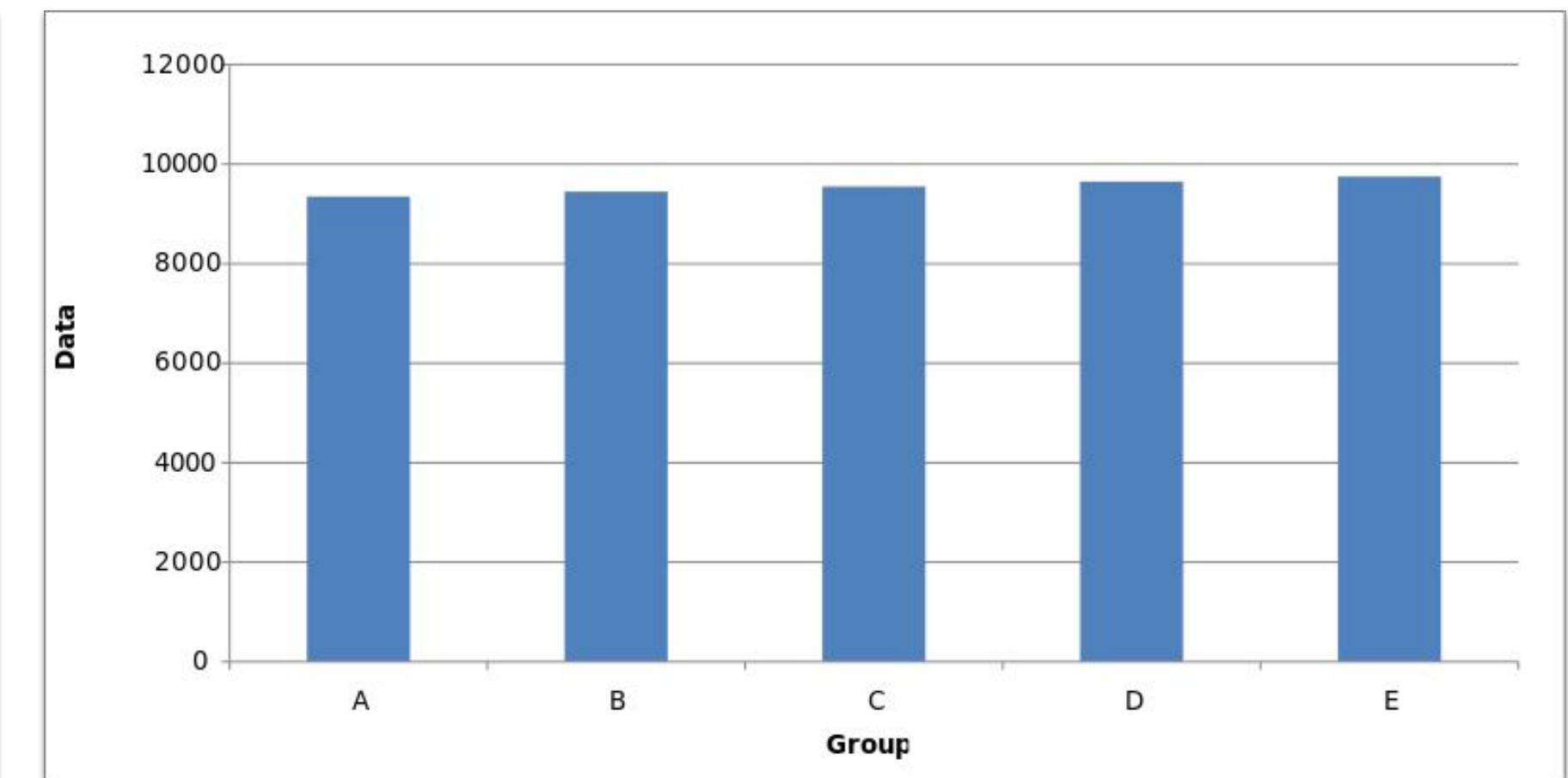
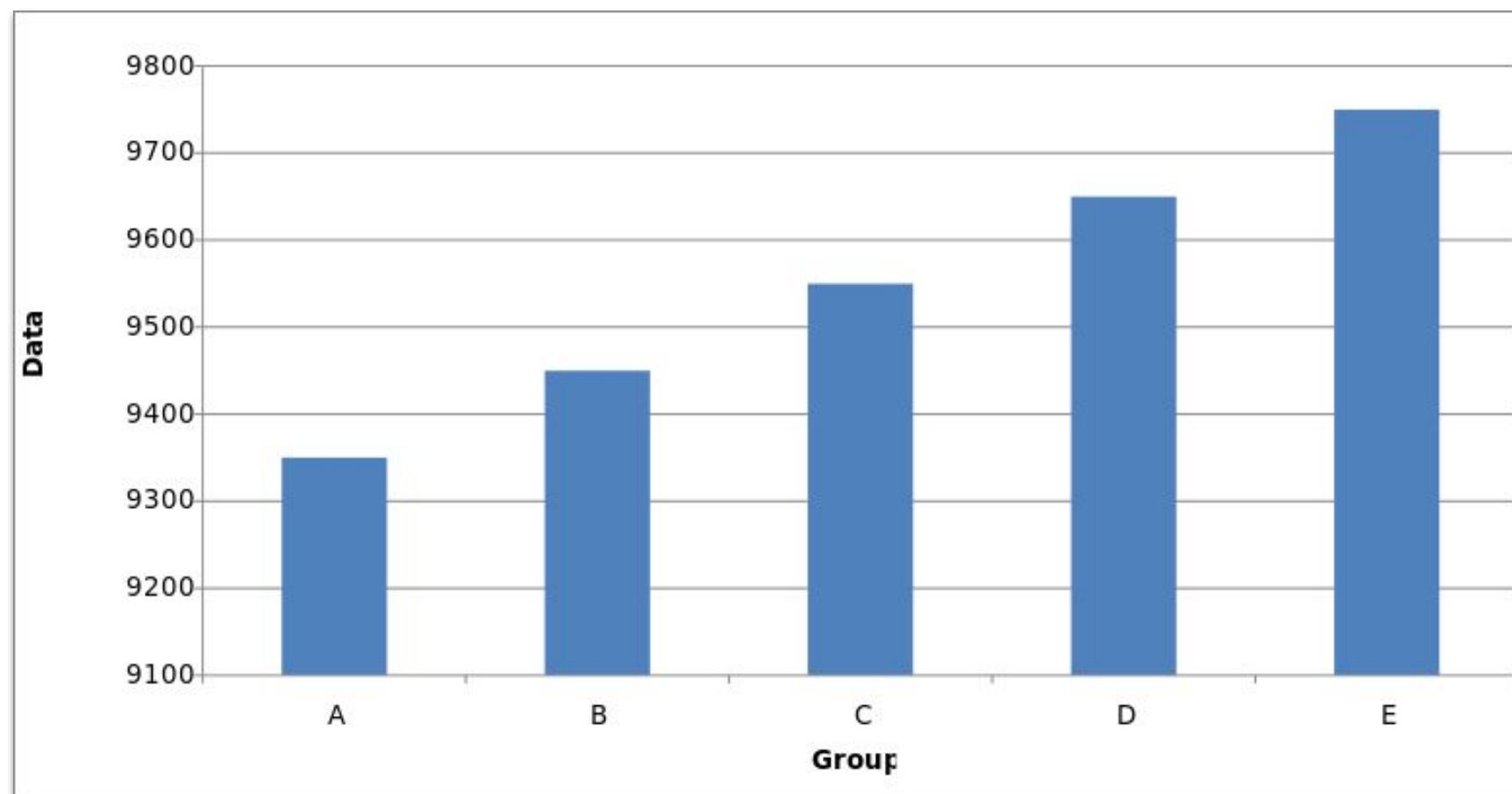
Un **grafico troncato** (noto anche come grafico strappato) ha un **asse Y** che **non parte da 0**.

Questi grafici **danno l'impressione di cambiamenti importanti** in cui vi è un cambiamento relativamente piccolo.

I grafici troncati sono utili per illustrare piccole differenze e possono anche essere usati per risparmiare spazio. MS Excel tende a troncare i grafici se i valori sono tutti entro un intervallo ristretto

https://en.wikipedia.org/wiki/Misleading_graph

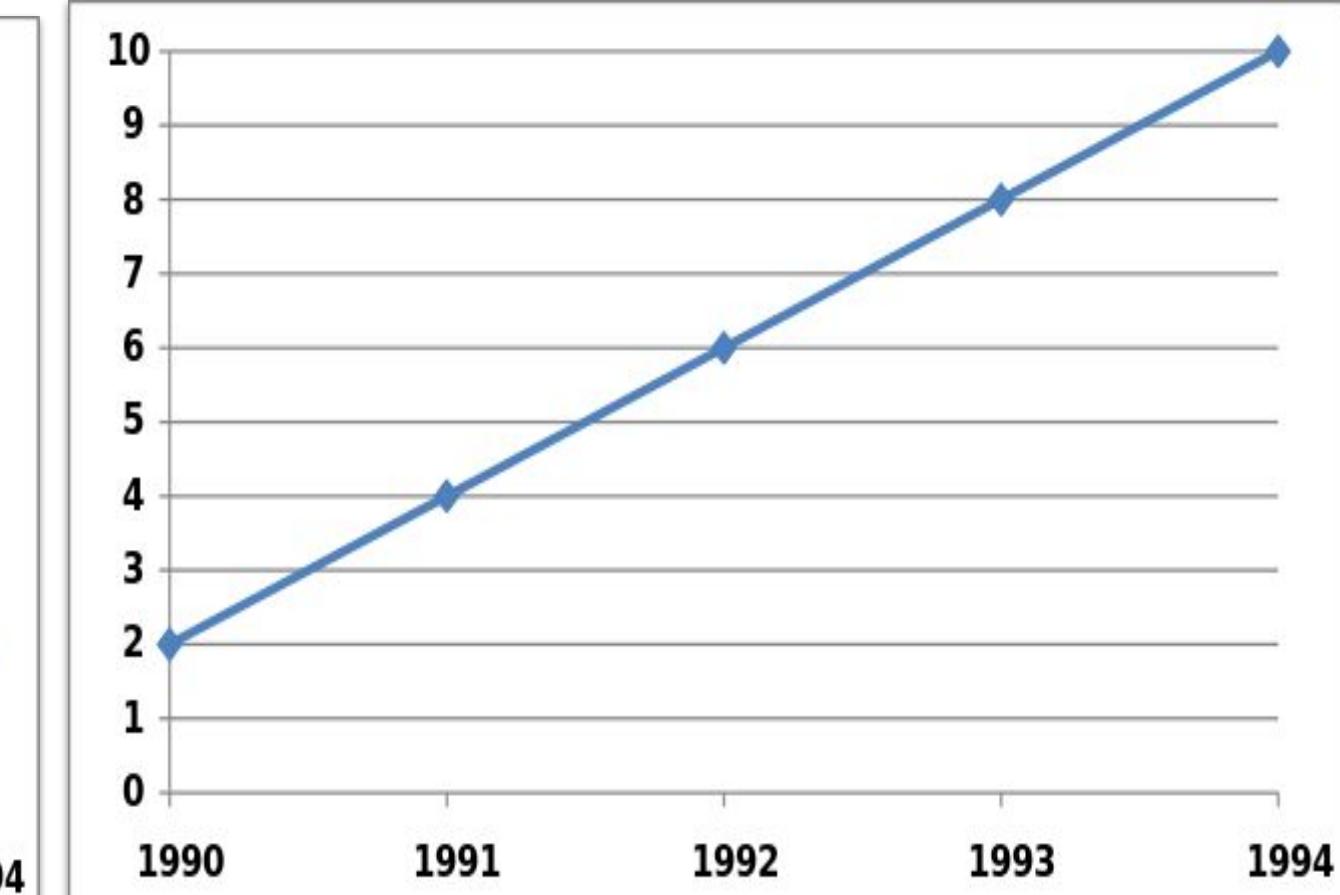
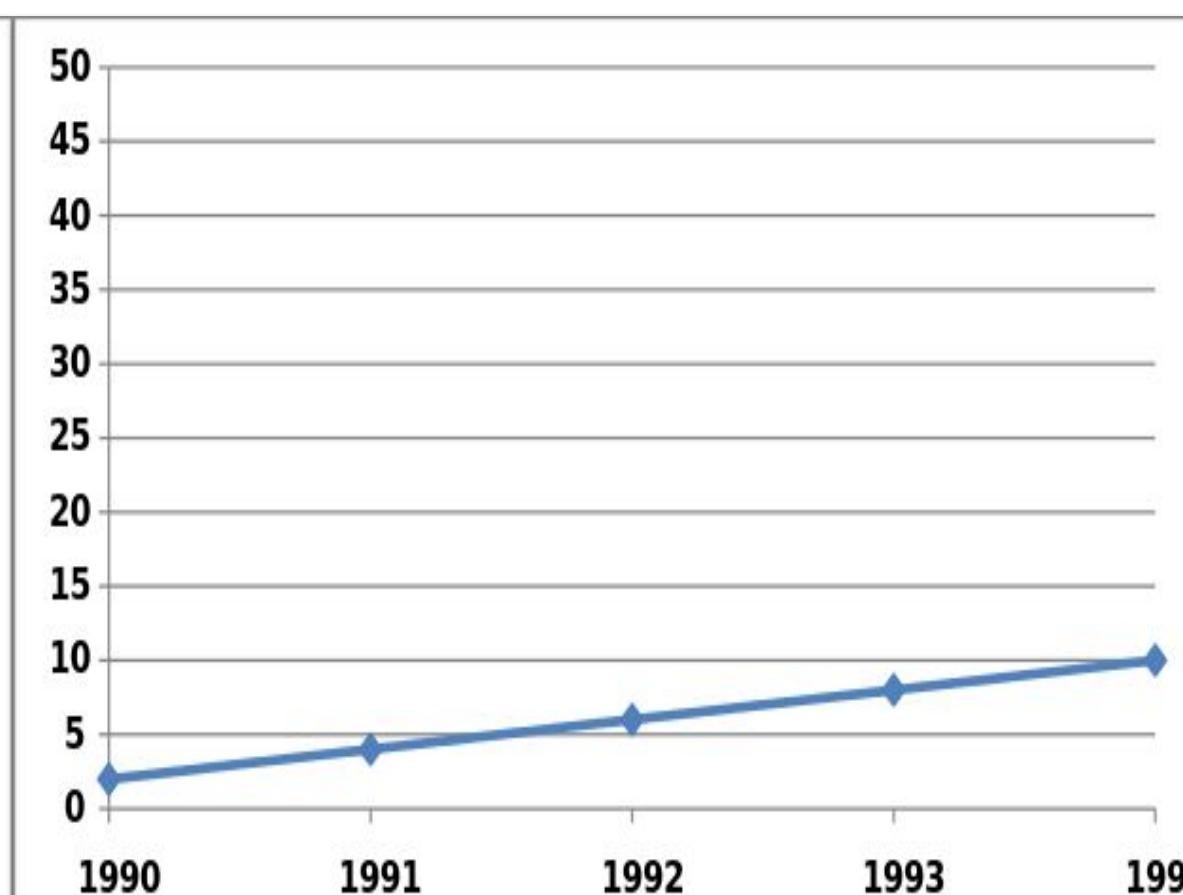
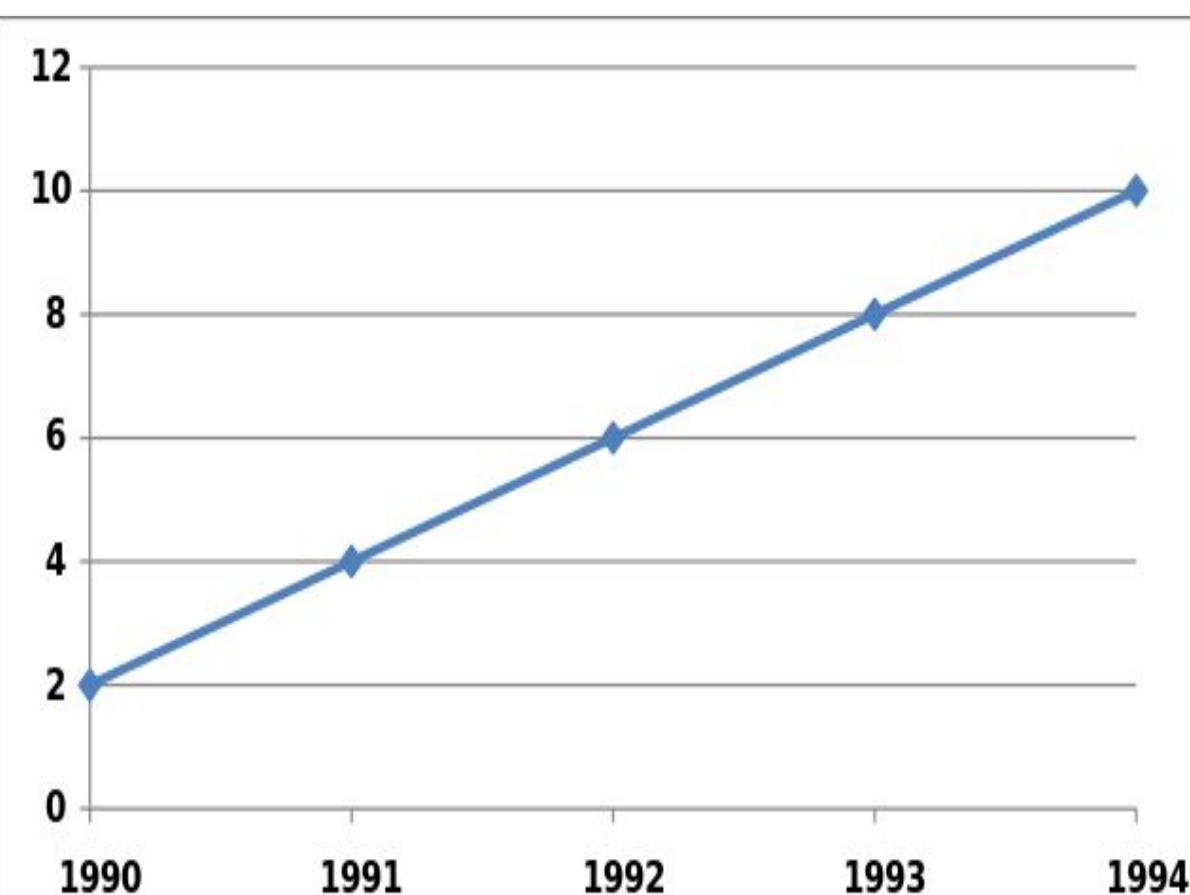
GRAFICI TRONCATI



I grafici mostrano dati identici
A sinistra: differenze significative
A destra: le differenze non sono così significative

https://en.wikipedia.org/wiki/Misleading_graph

CONFONDERE CAMBIANDO L'ASSE Y



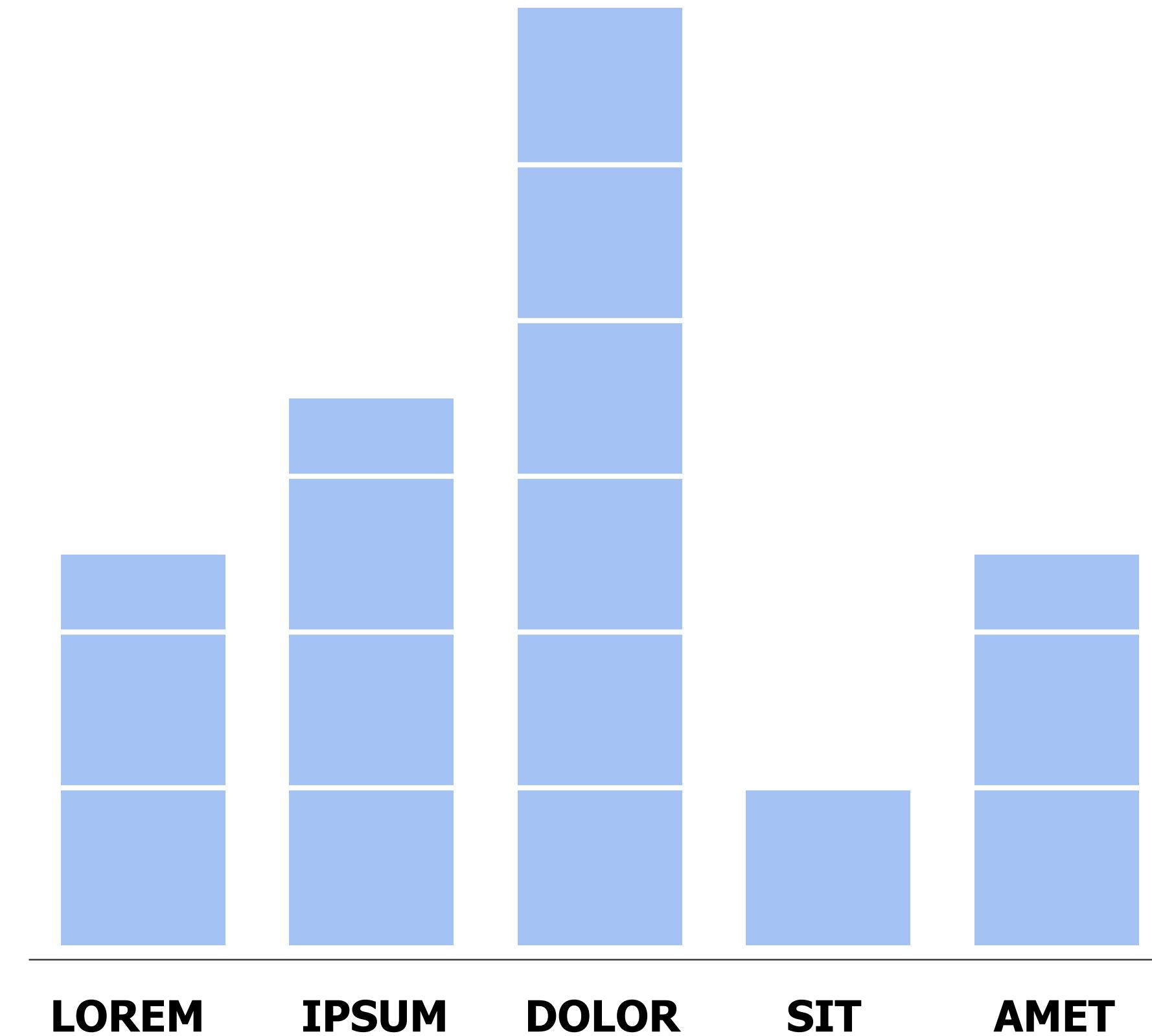
https://en.wikipedia.org/wiki/Misleading_graph

Remove to improve (the **data-ink** ratio)

Created by **Darkhorse Analytics** www.darkhorseanalytics.com

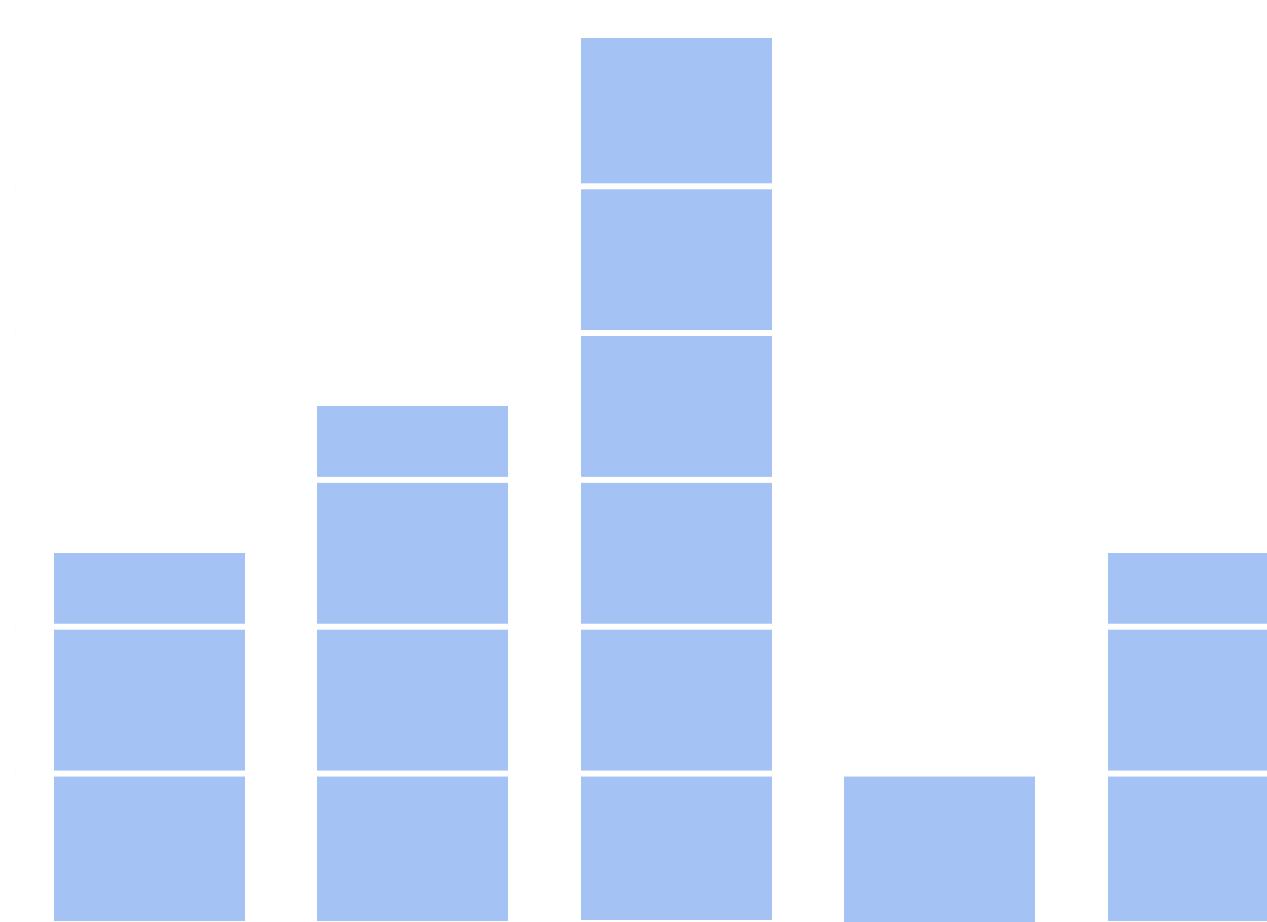
<https://www.darkhorseanalytics.com/blog/data-looks-better-naked>

Suggerimenti sui barchart

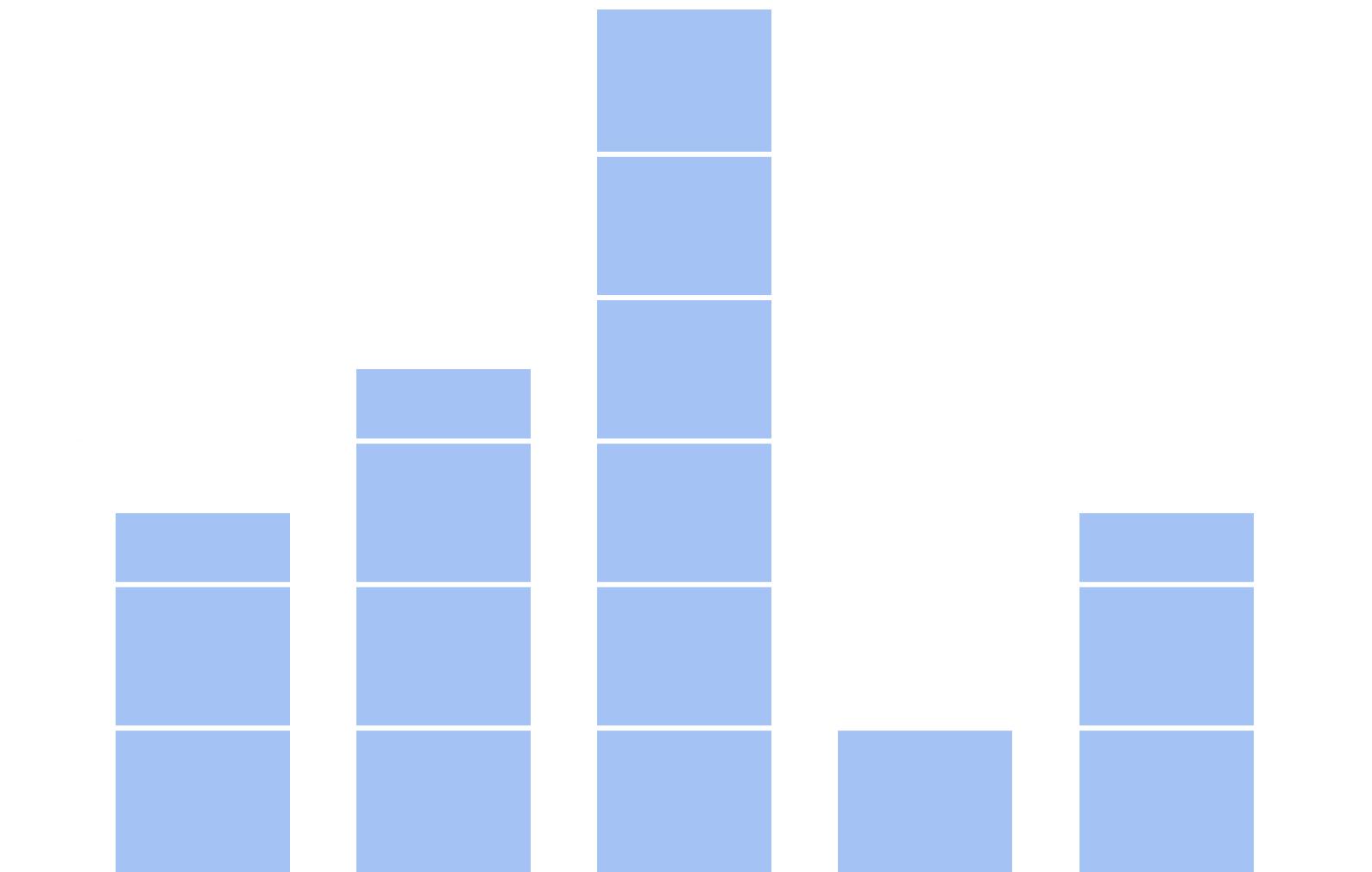




LE ETICHETTE ORIZZONTALI SONO PIÙ SEMPLICI DA LEGGERE



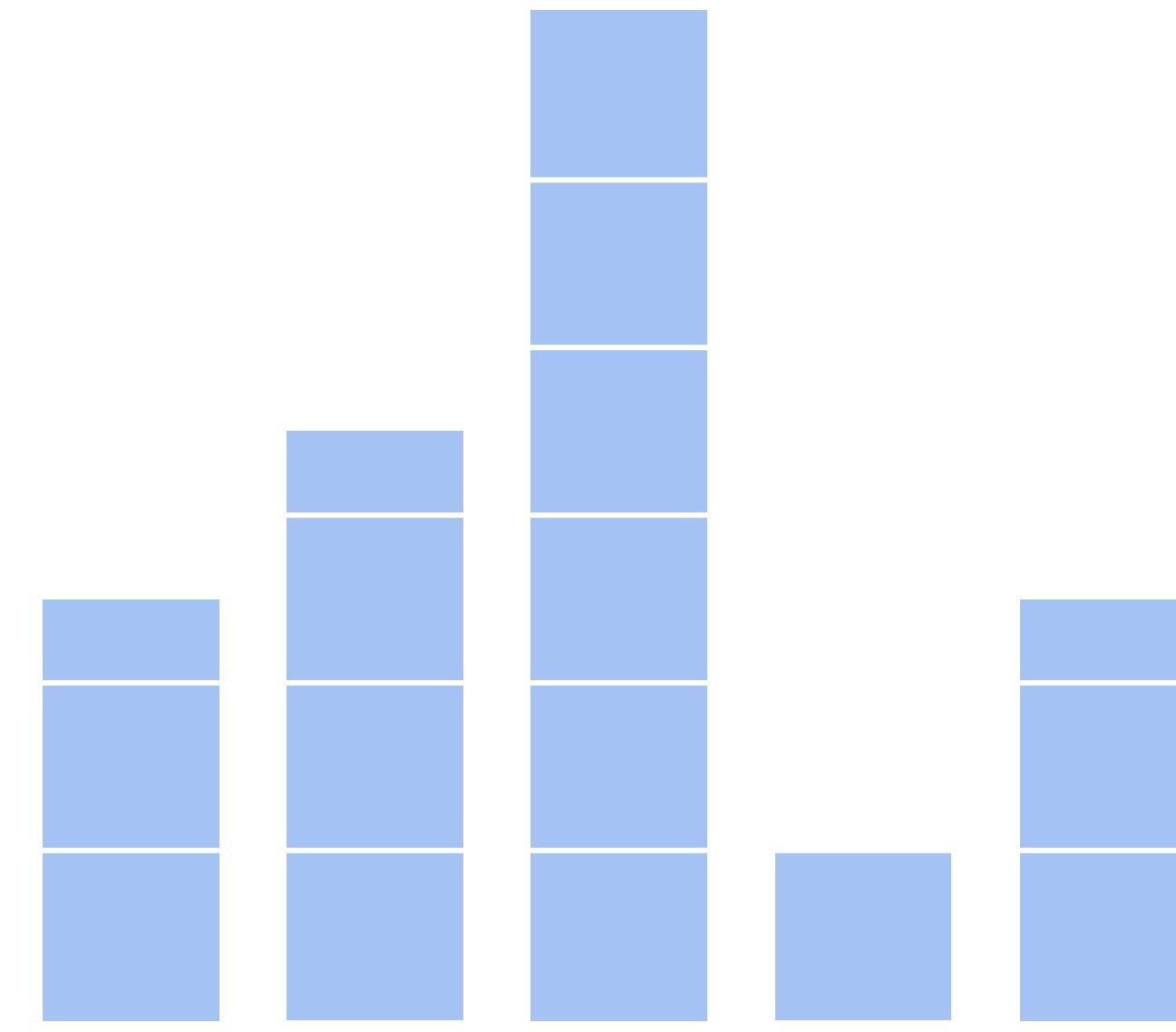
LOREM IPSUM DOLOR SIT AMET
CONSECTETUERADIPISCINGELI
NIBHEUISMODTINCIDUNT
DOLOR MAGNA ALIQUAM
ENIMADMINIMVENIAM



LOREM IPSUM DOLOR SIT AMET
CONSECTETUERADIPISCINGELI
NIBHEUISMODTINCIDUNT
DOLOR MAGNA ALIQUAM
ENIM AD MINIM VENIAM



LE ETICHETTE ORIZZONTALI SONO PIÙ SEMPLICI DA LEGGERE



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DOLORE MAGNA ALIQUAM
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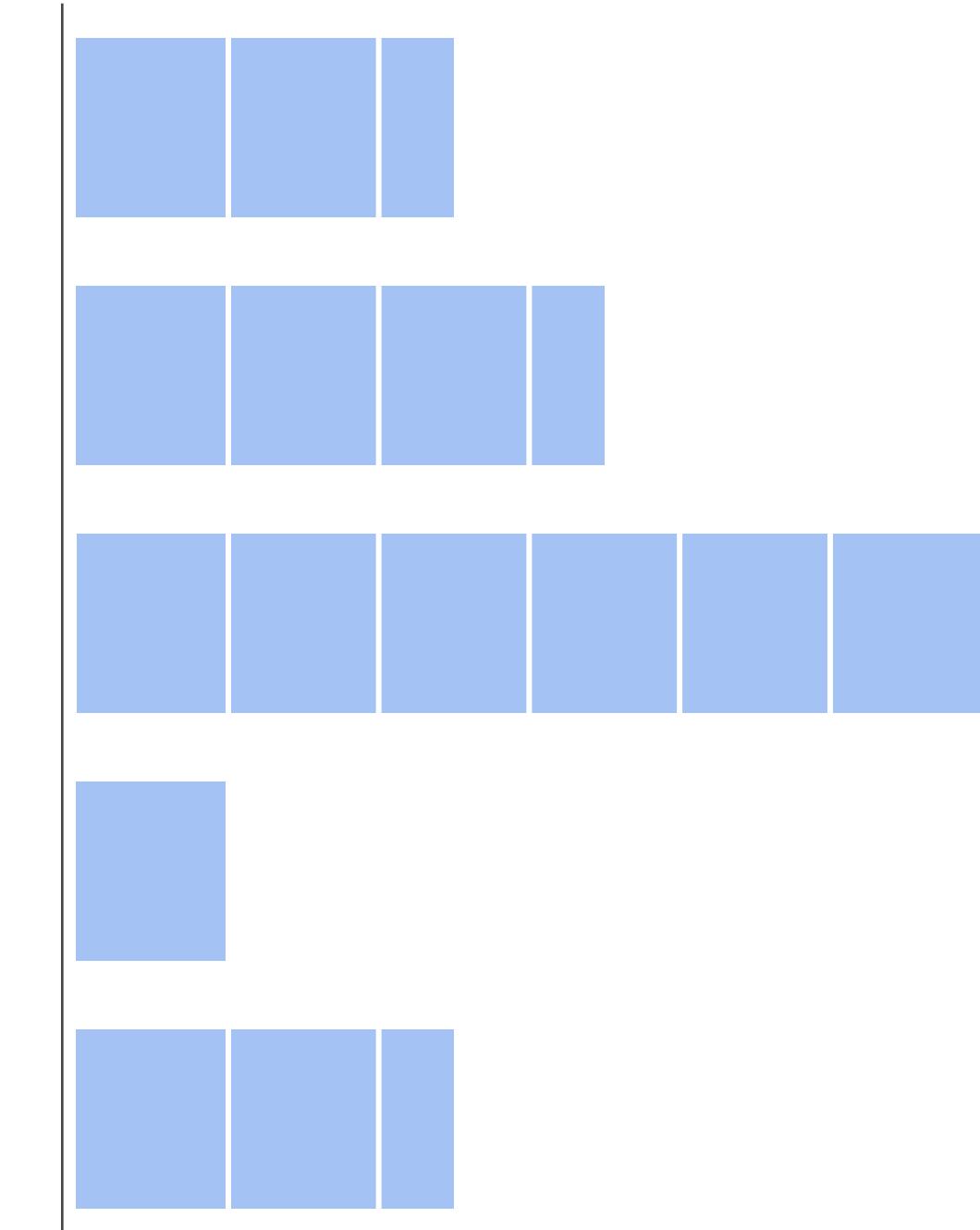
LOREM IPSUM DOLOR SIT AMET

CONSECTETUER ADIPISCING ELIT

NIBH EUISMOD TINCIDUNT

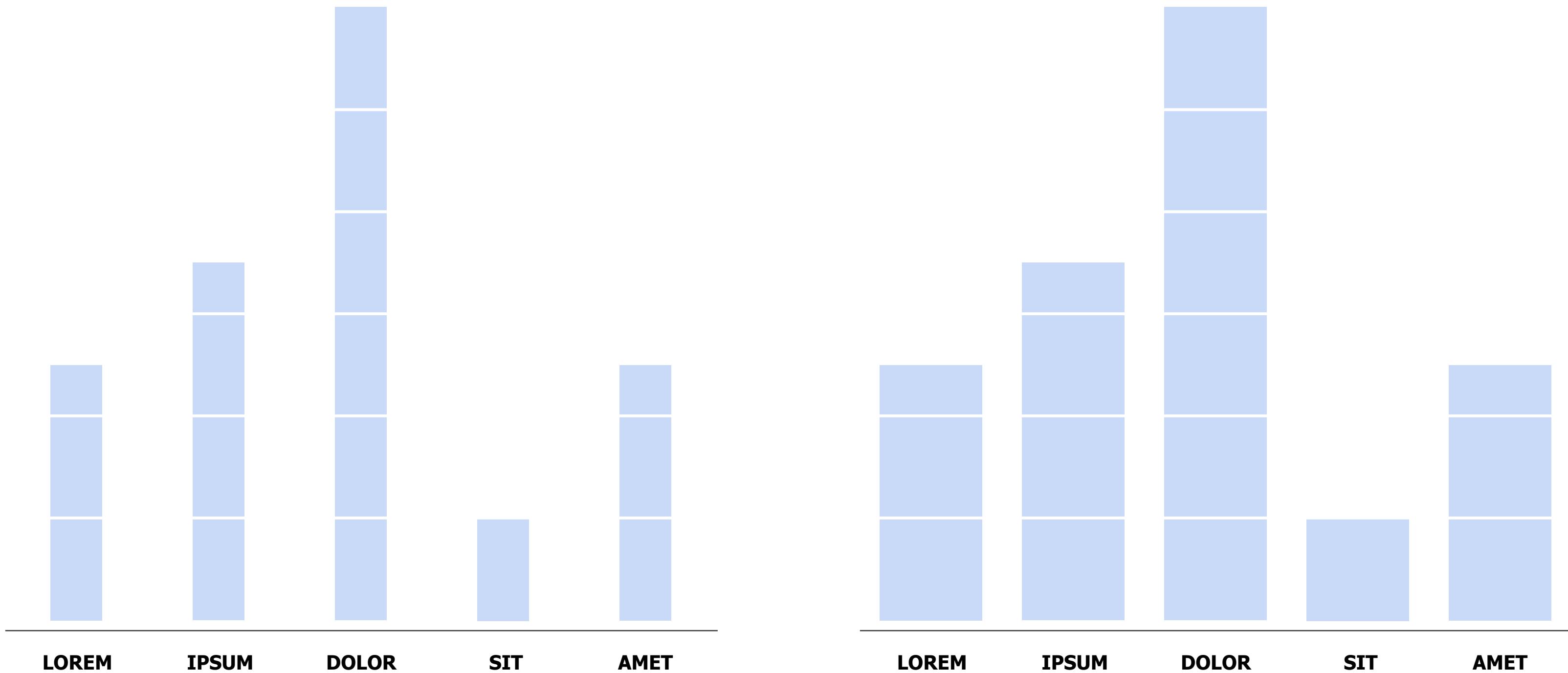
DOLORE MAGNA ALIQUAM

ENIM AD MINIM VENIAM





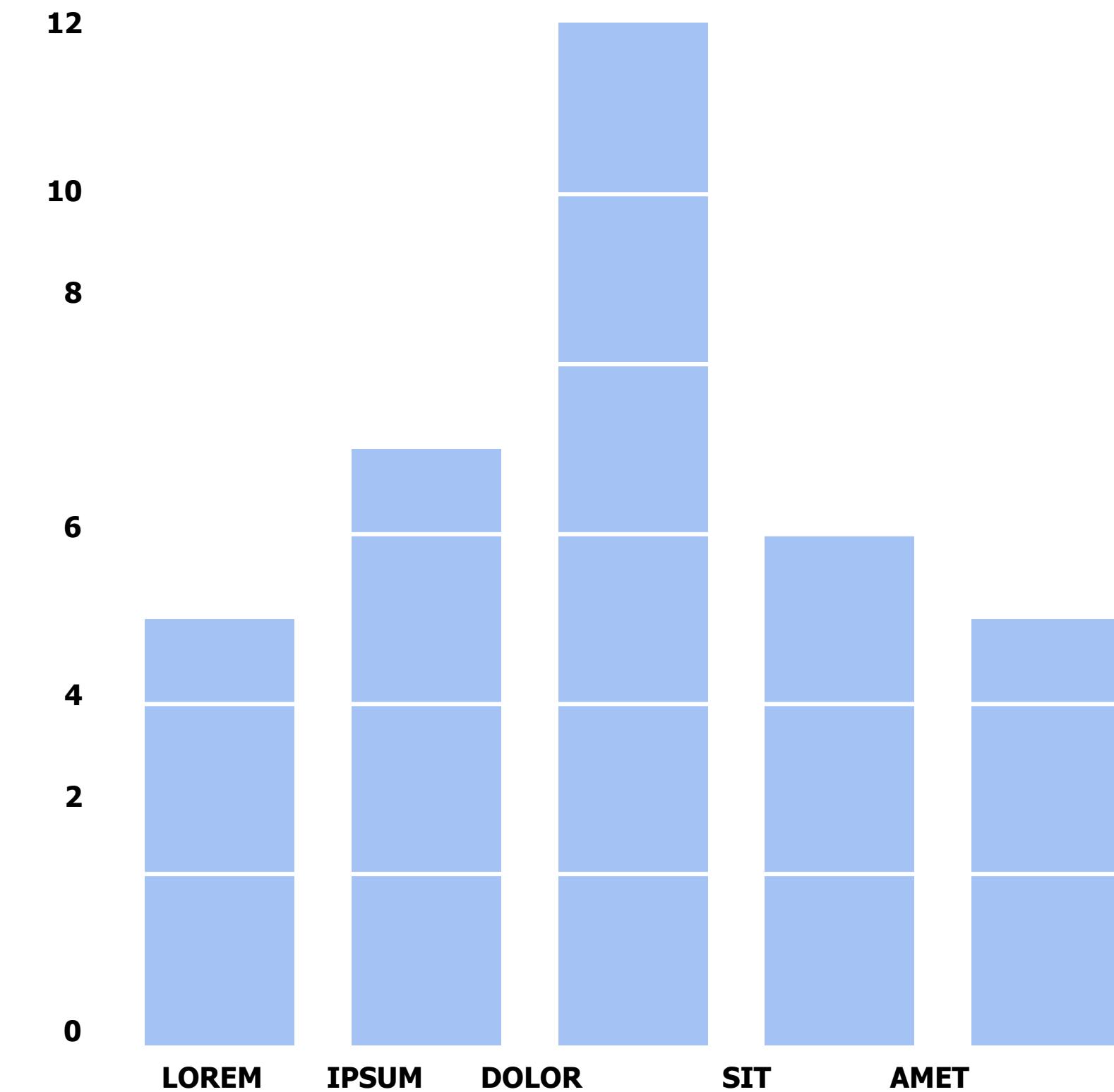
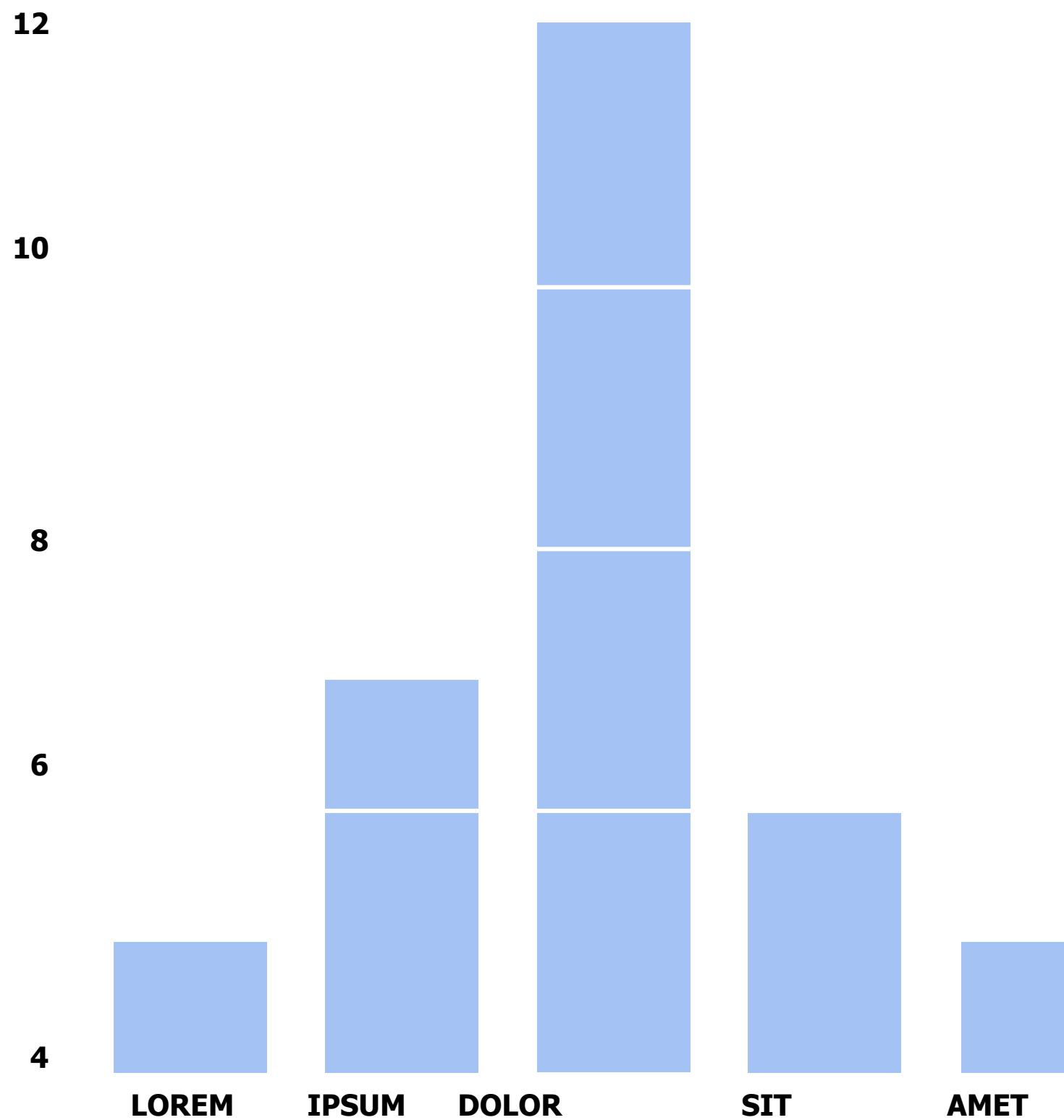
EQUILIBRARE CORRETTAMENTE LO SPAZIO TRA LE BARRE



SPAZIO 1/2 - 1/3 DELLA LARGHEZZA DELLA BARRA

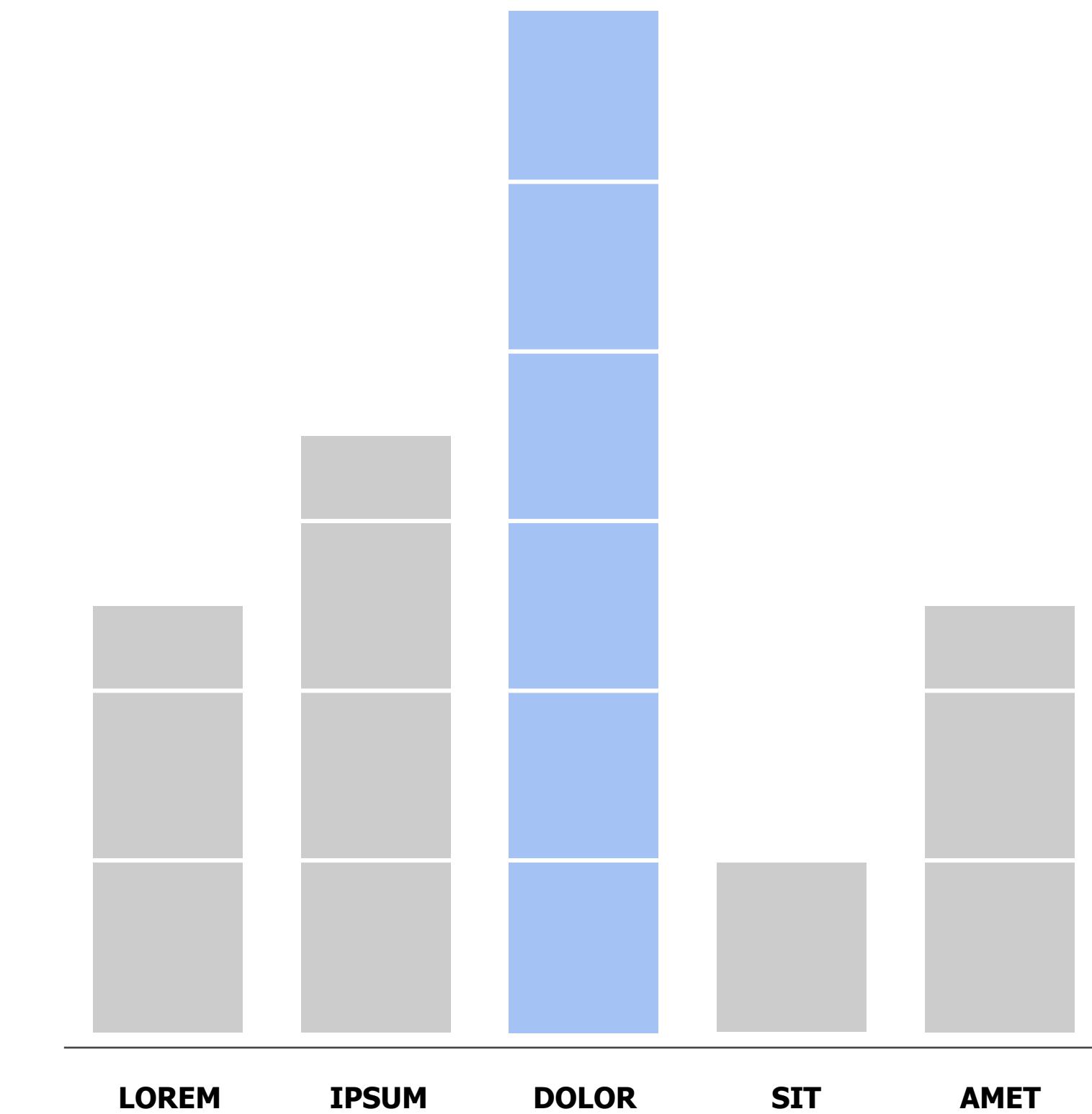
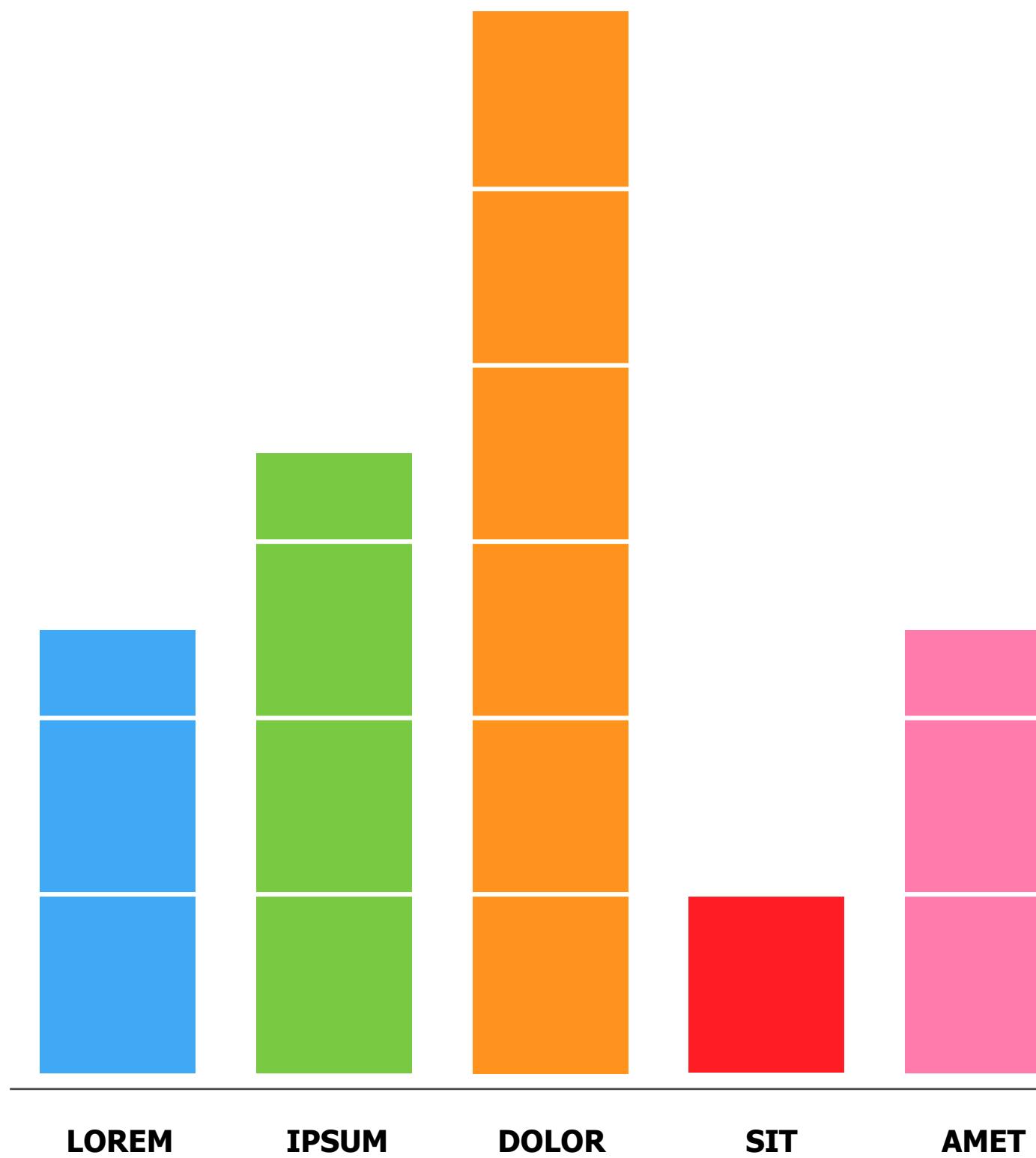


È PIÙ CORRETTO FAR INIZIARE LA SCALA DAL VALORE 0



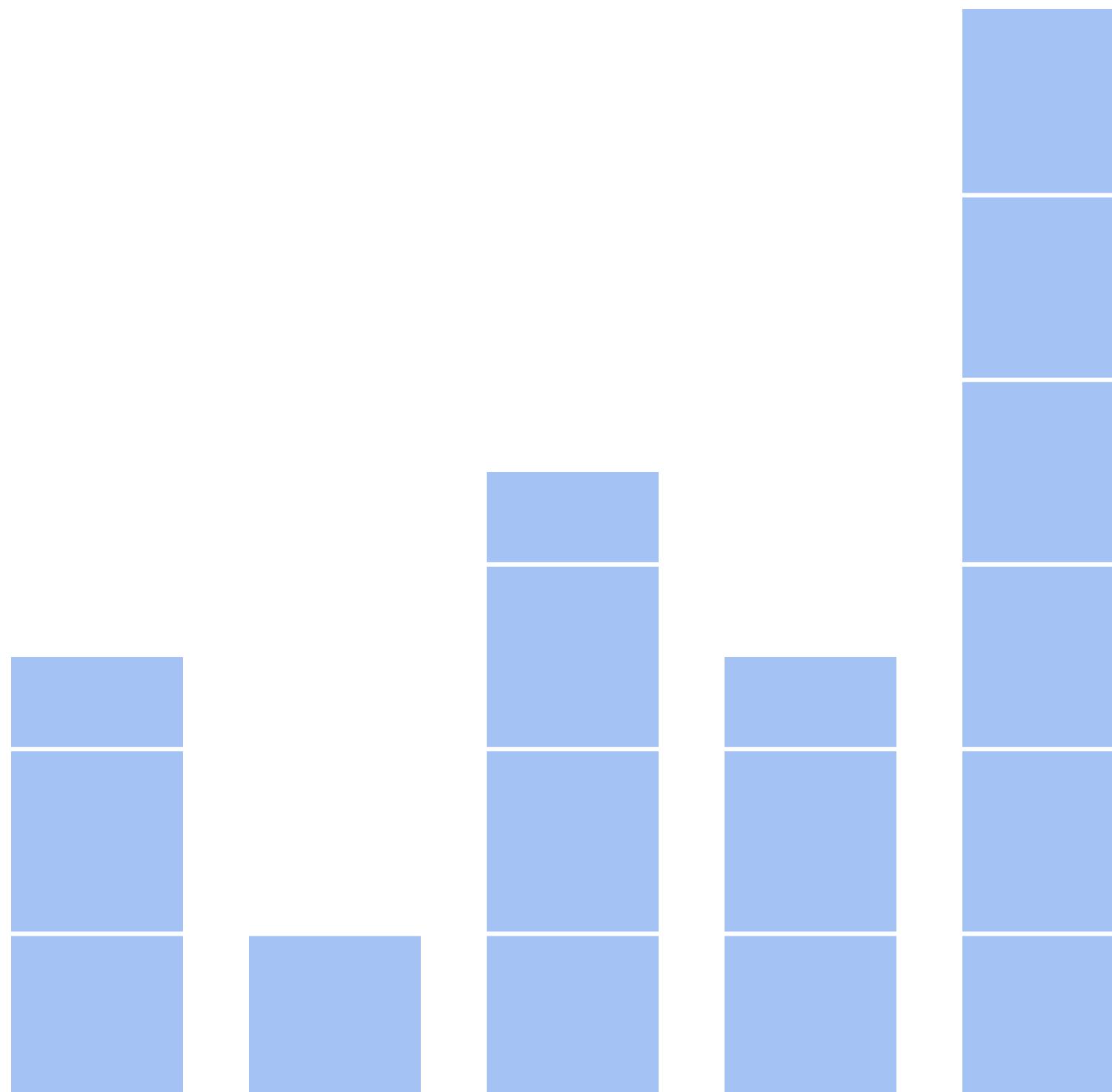


UTILIZZARE UN SOLO COLORE PER BAR CHART, UN SECONDO COLORE PUÒ ESSERE UTILE PER EVIDENZIARE UN DATO





ORDINARE LE CATEGORIE: ALFABETICAMENTE



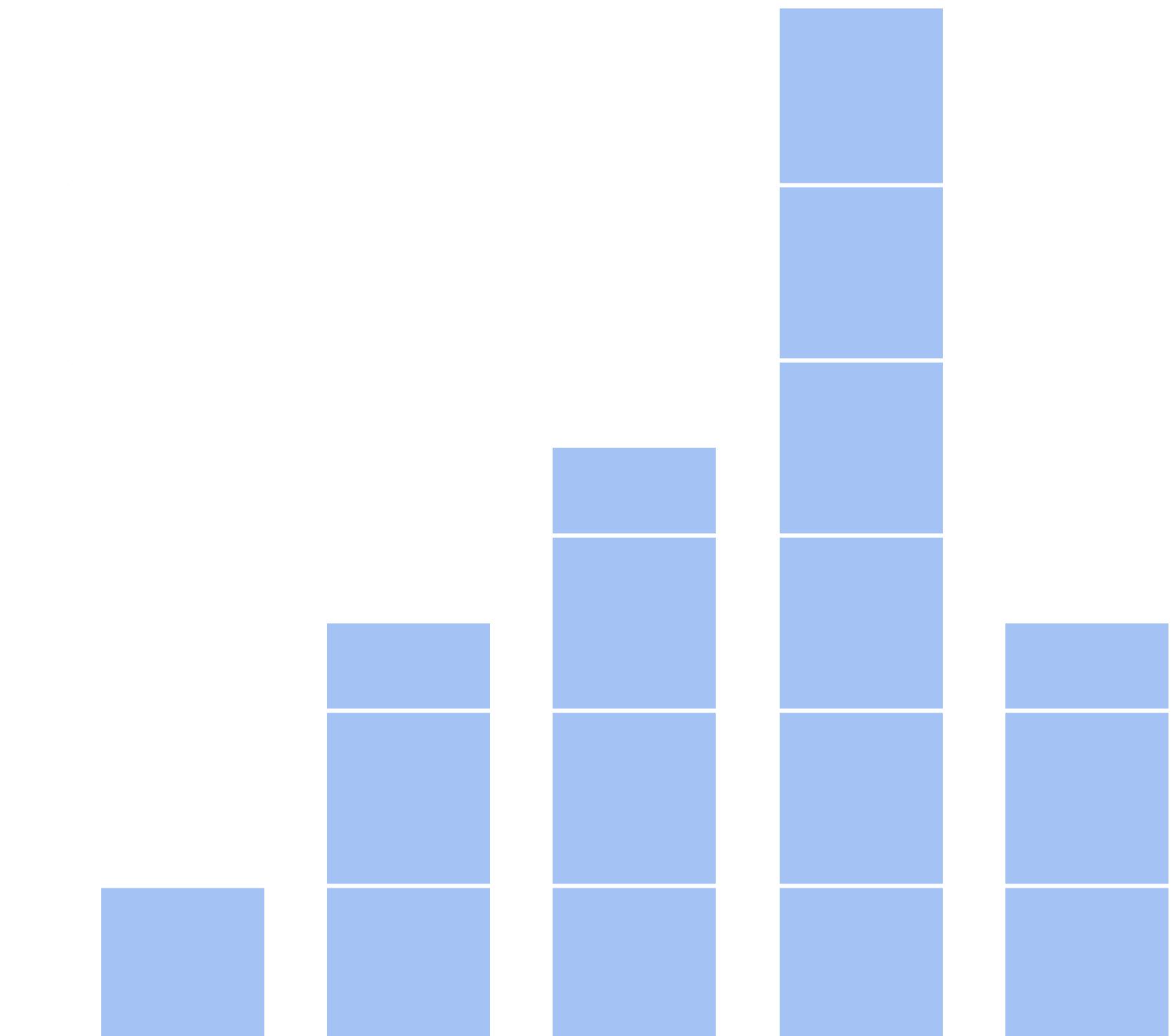
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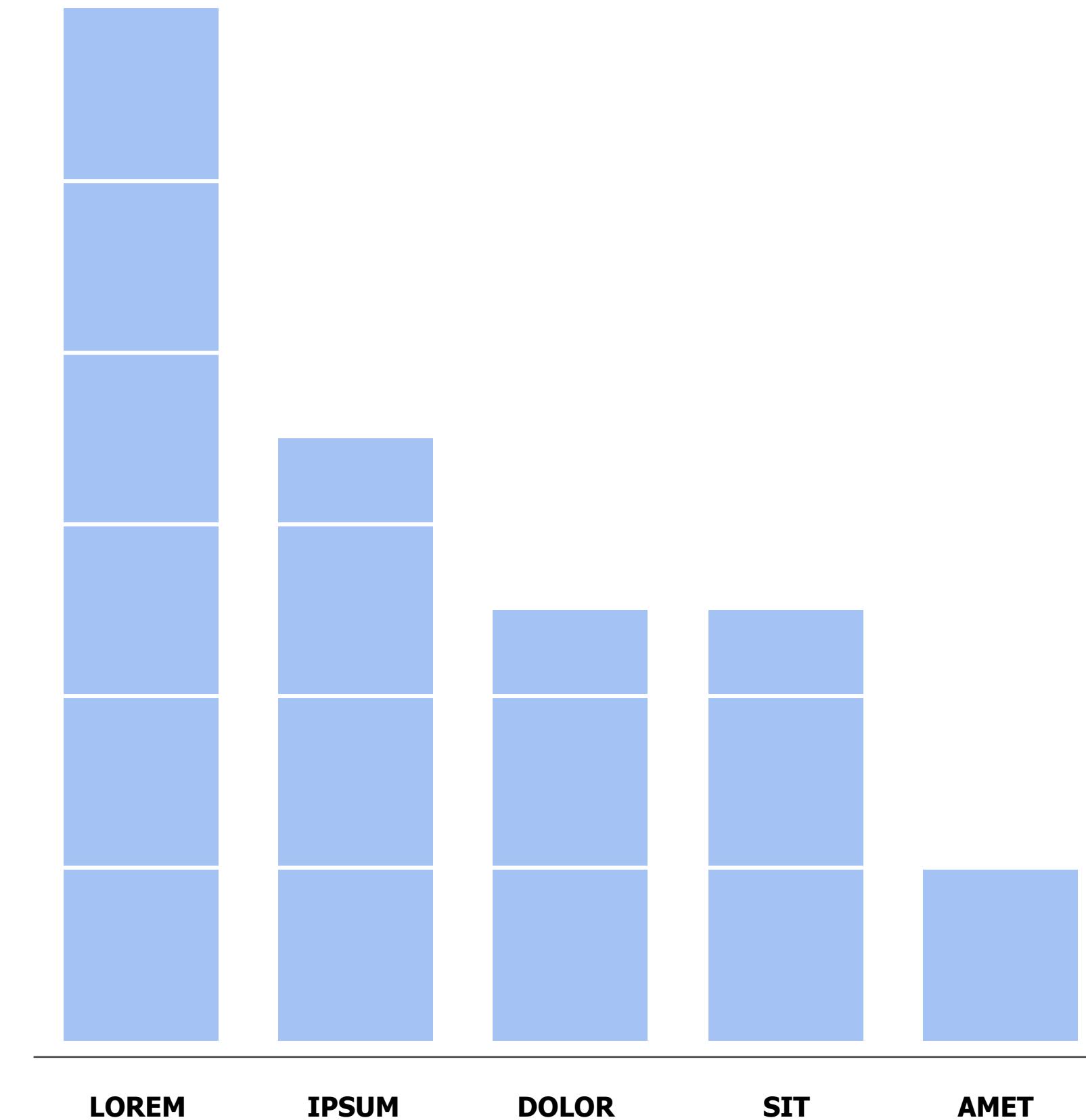
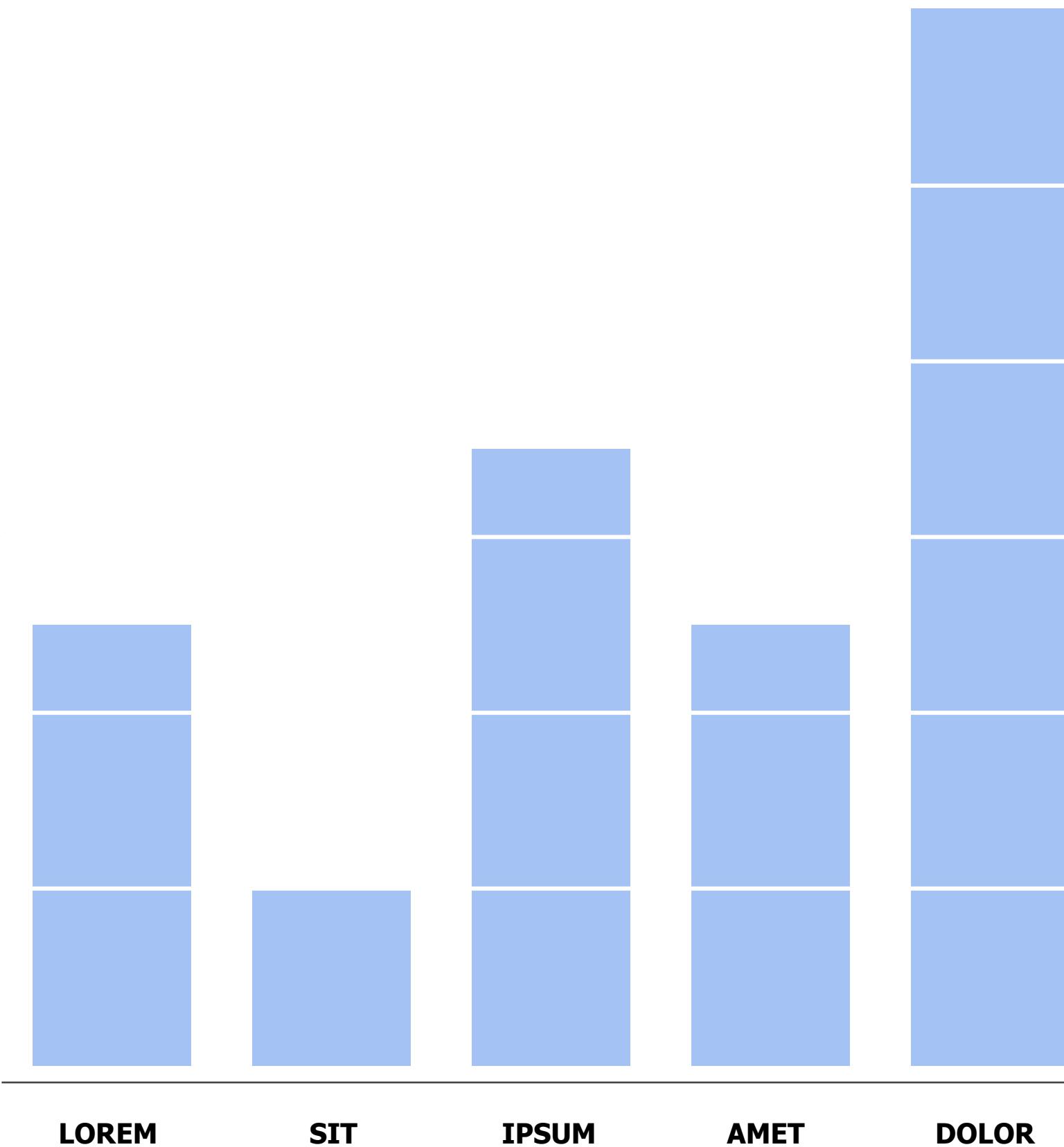
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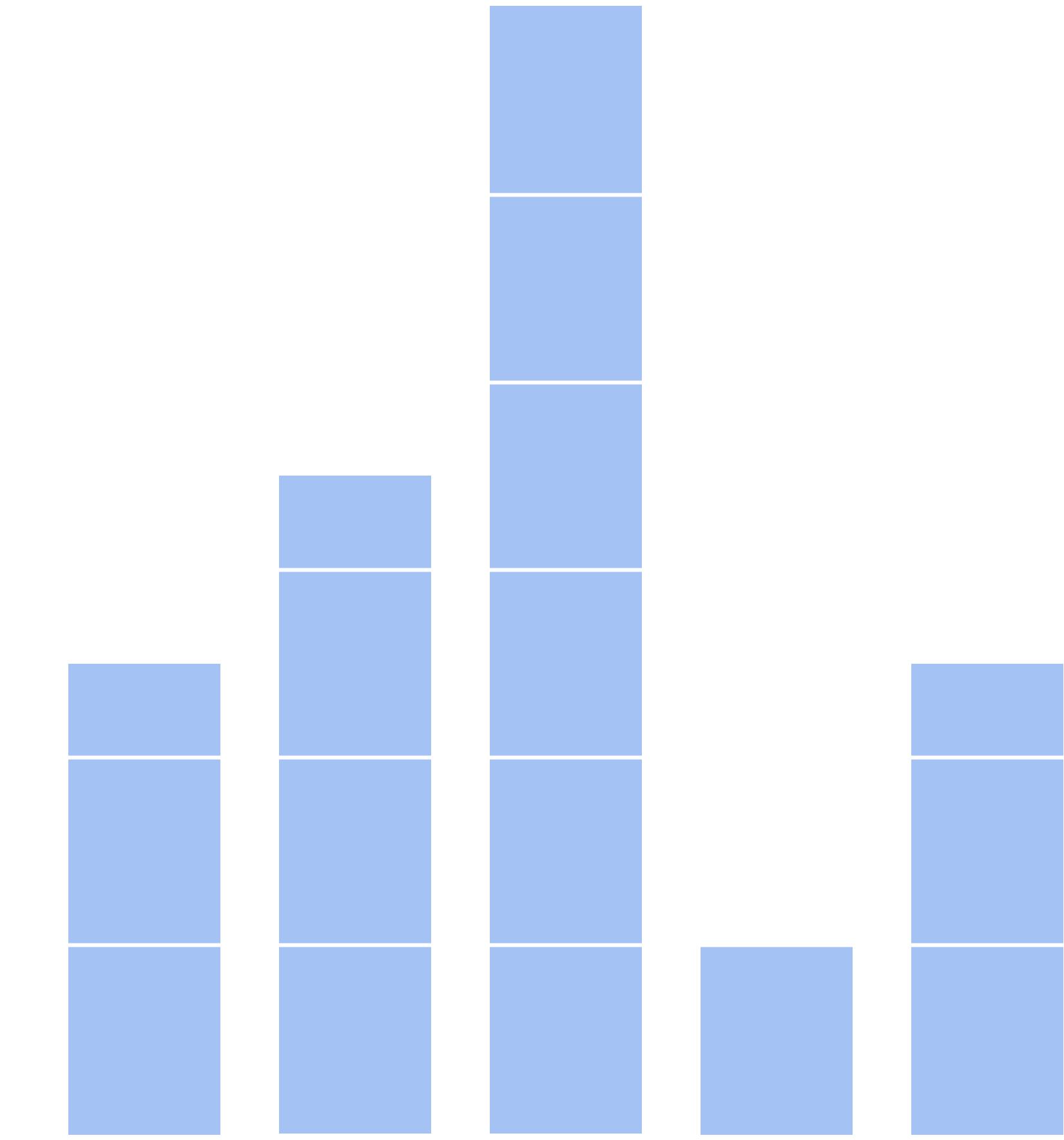
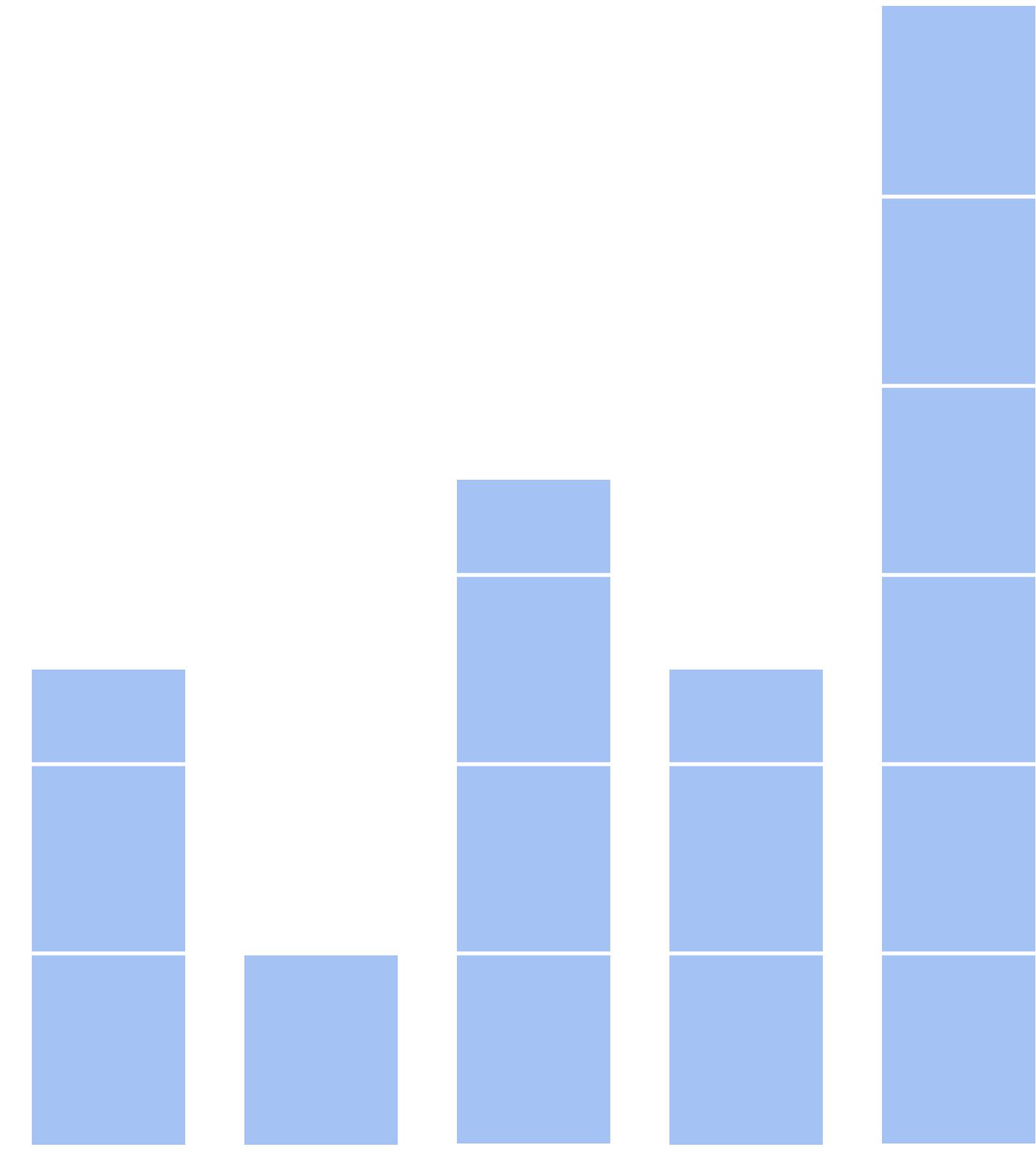


ORDINARE LE CATEGORIE: PER VALORE





ORDINARE LE CATEGORIE: PER SIGNIFICATO



LOREM

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IPSUM

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DOLOR

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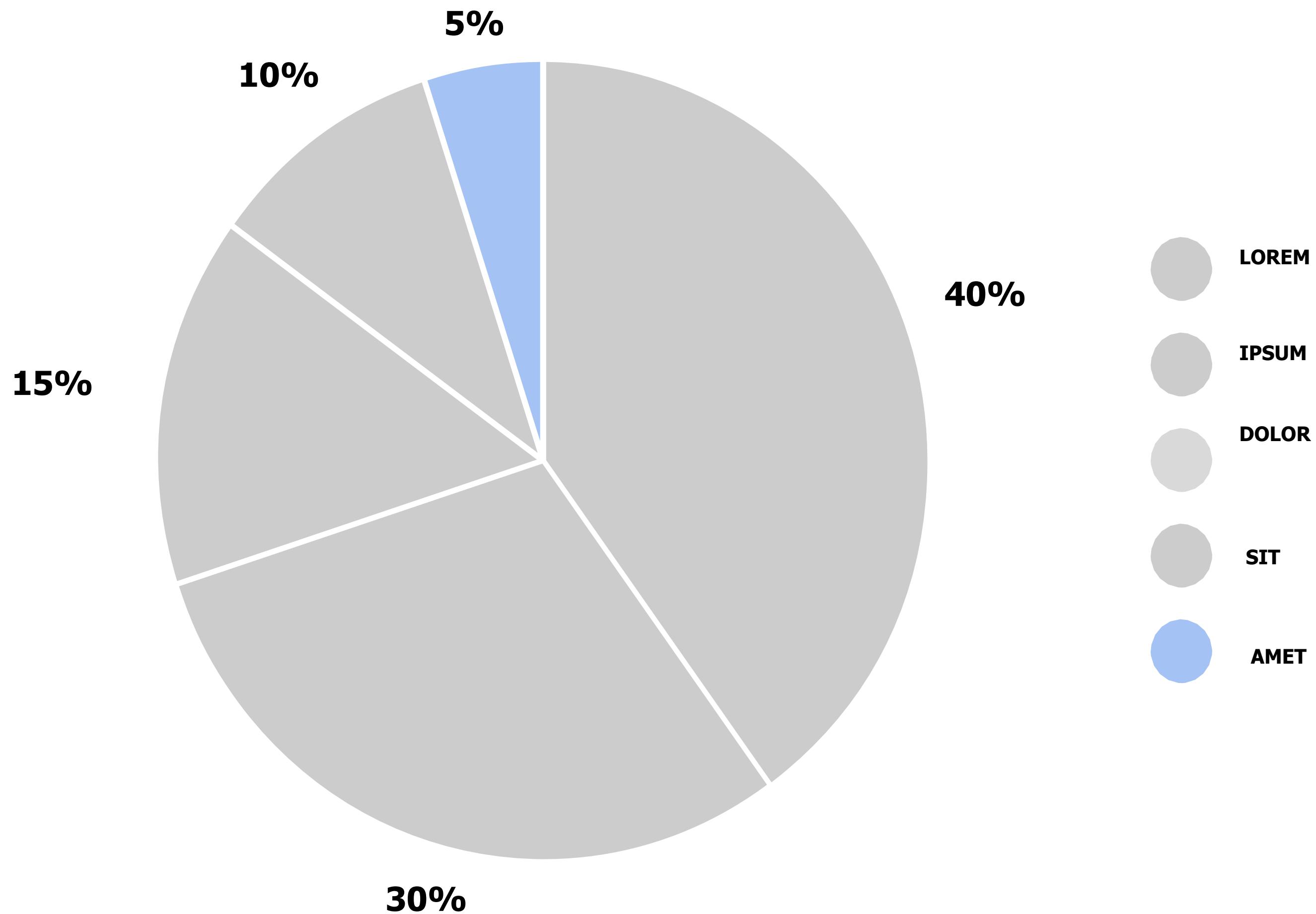
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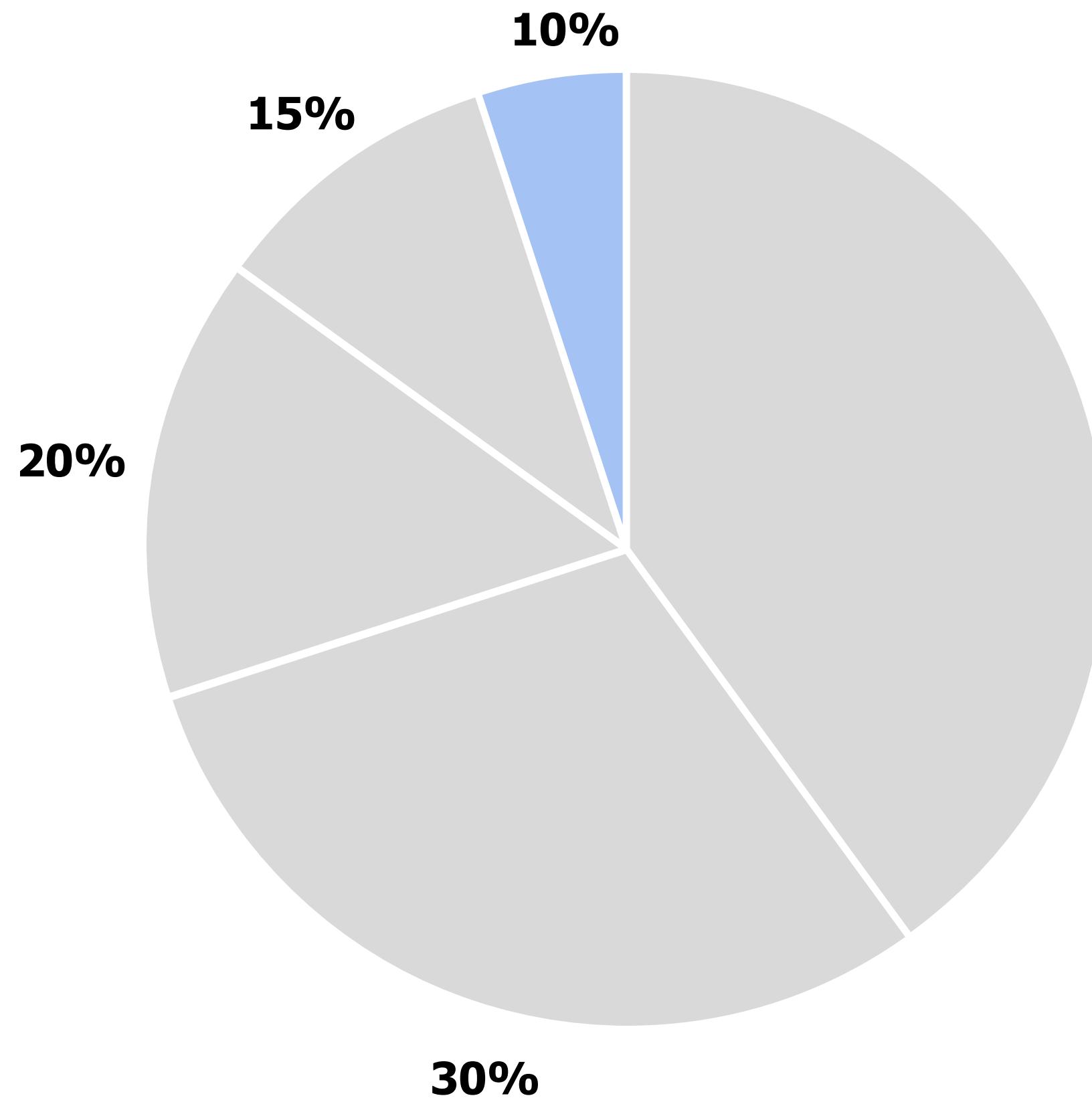
AMET

SUGGERIMENTI SUI GRAFICI TORTA





VERIFICARE SEMPRE CHE LA SOMMA DELLE FETTE SIA 100%



45%

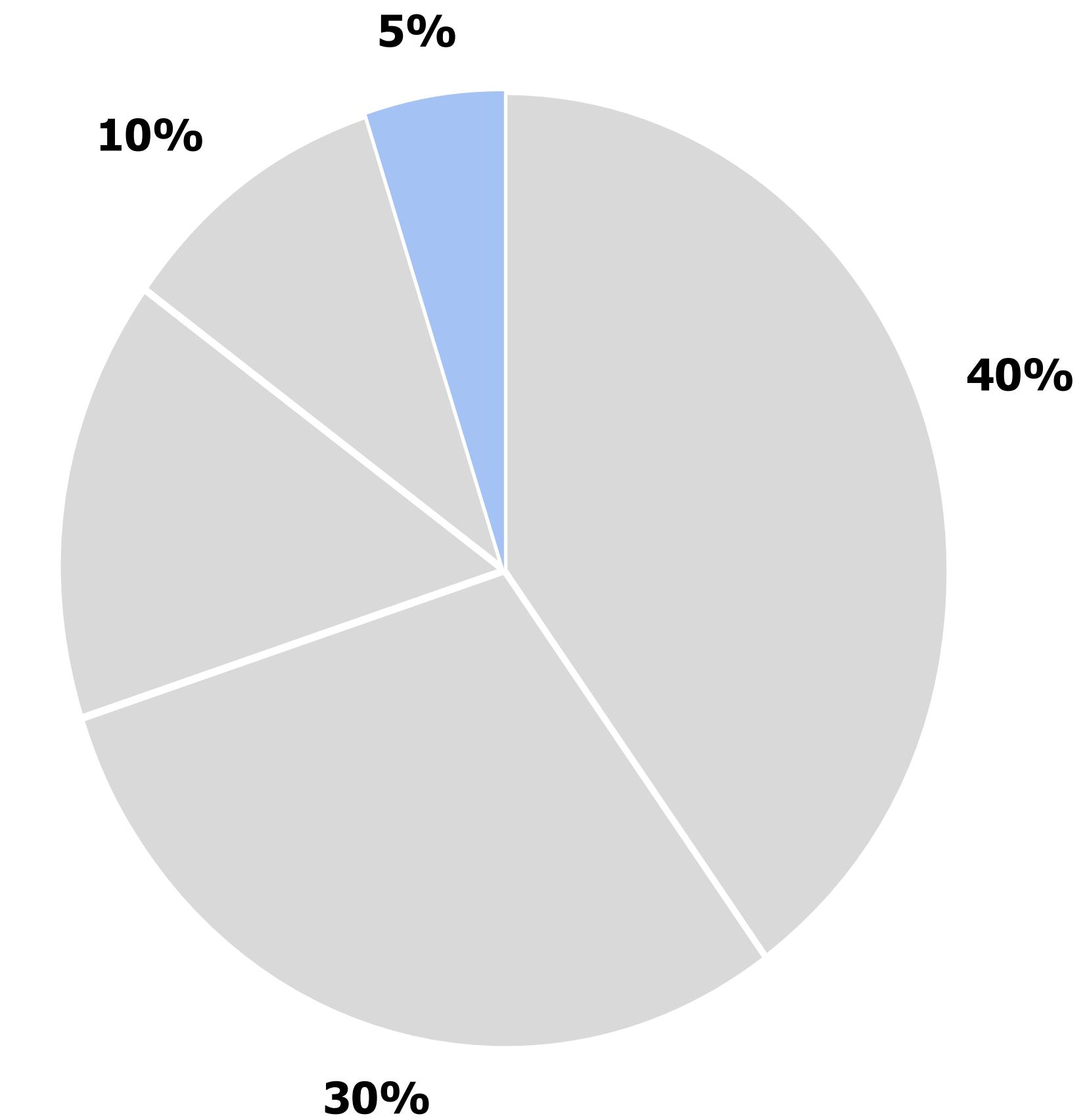
15%

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20%



40%

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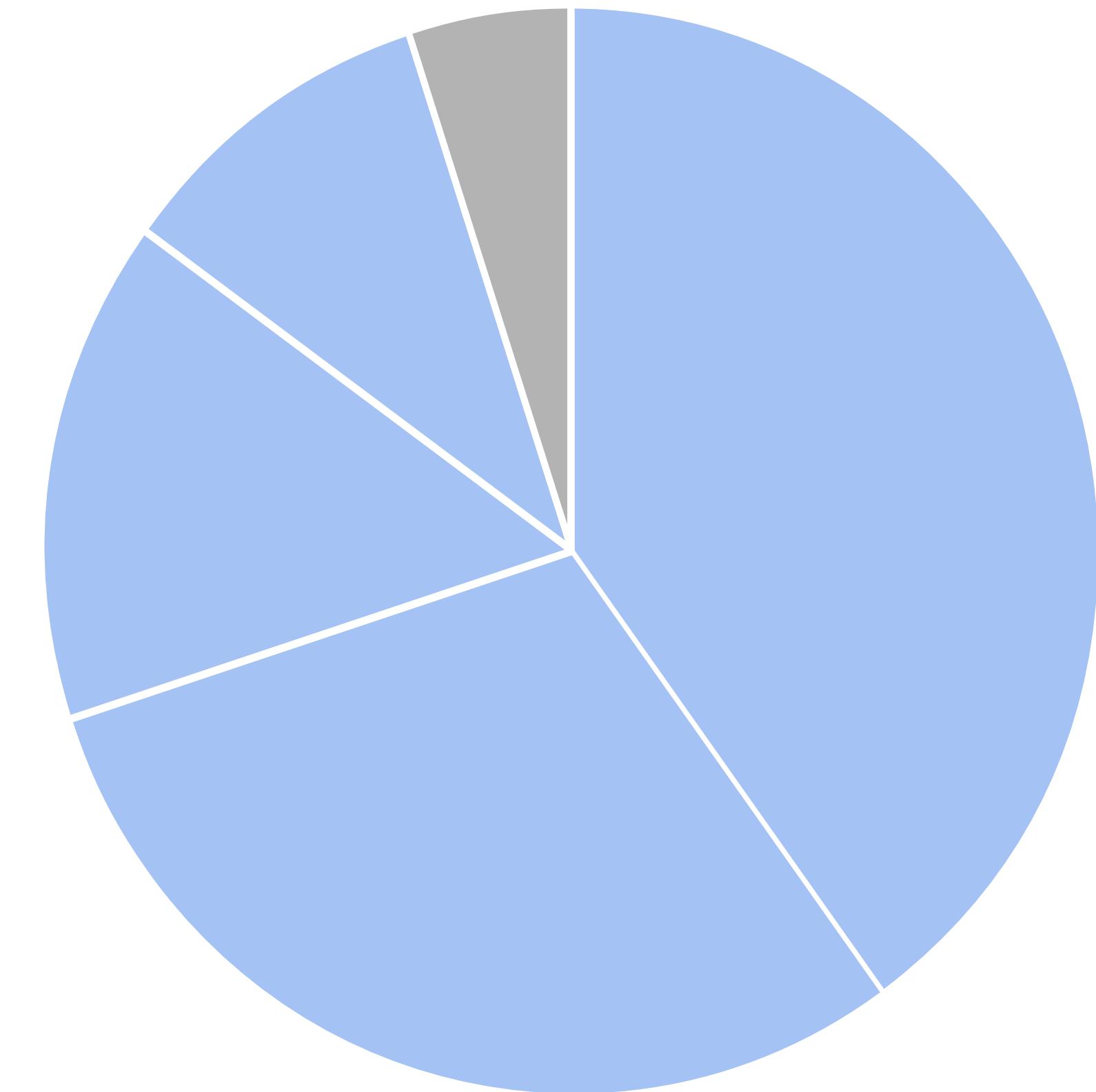
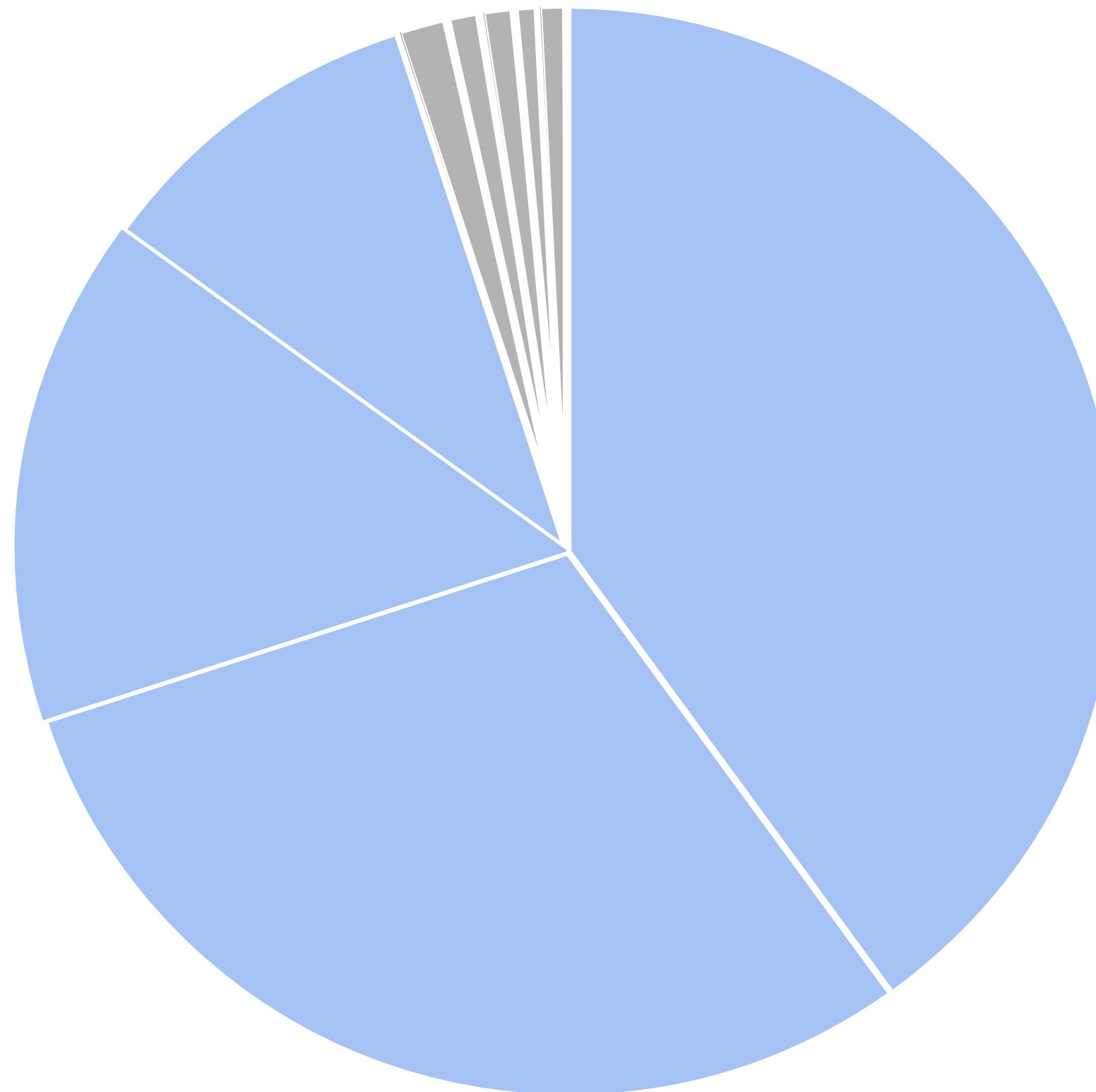
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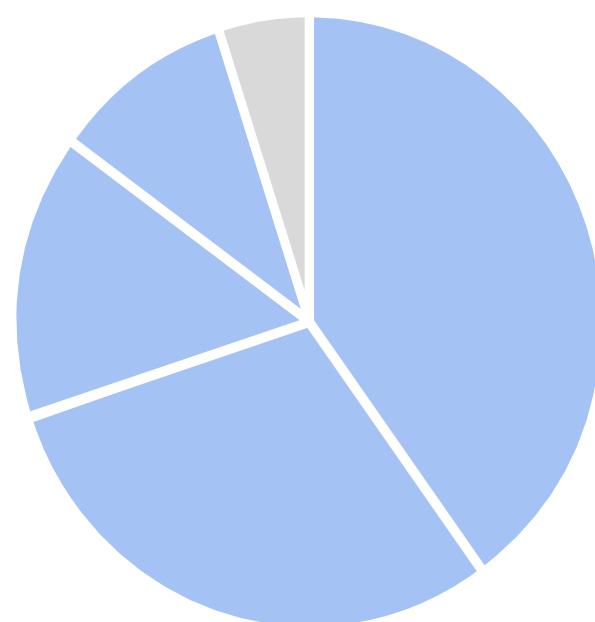


RAGGRUPPATE LE FETTE PIÙ PICCOLE DENTRO UN GENERICO “ALTRO” ✓

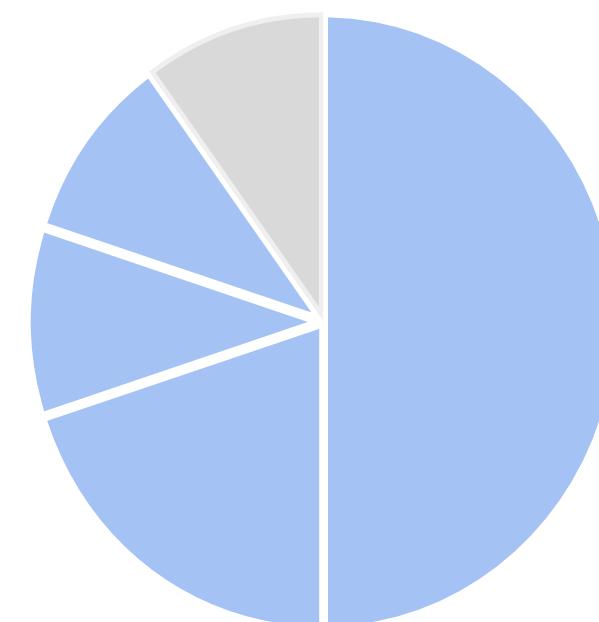




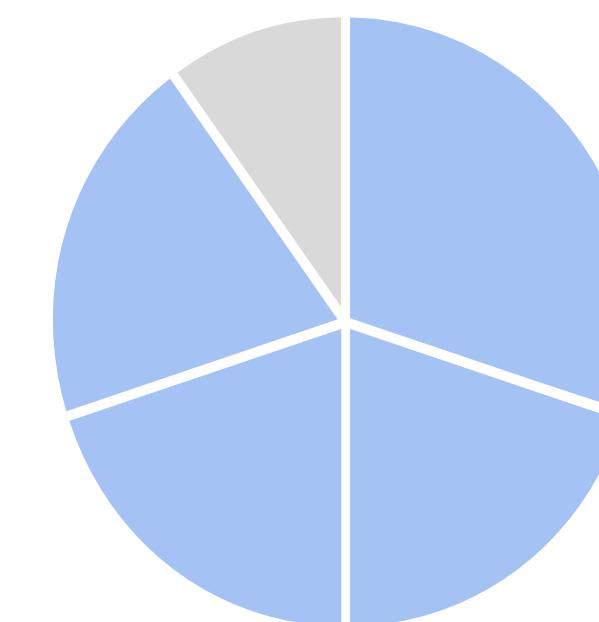
PER FARE CONFRONTI TRA PERCENTUALI LO STACKED BAR CHART È PIÙ INDICATO



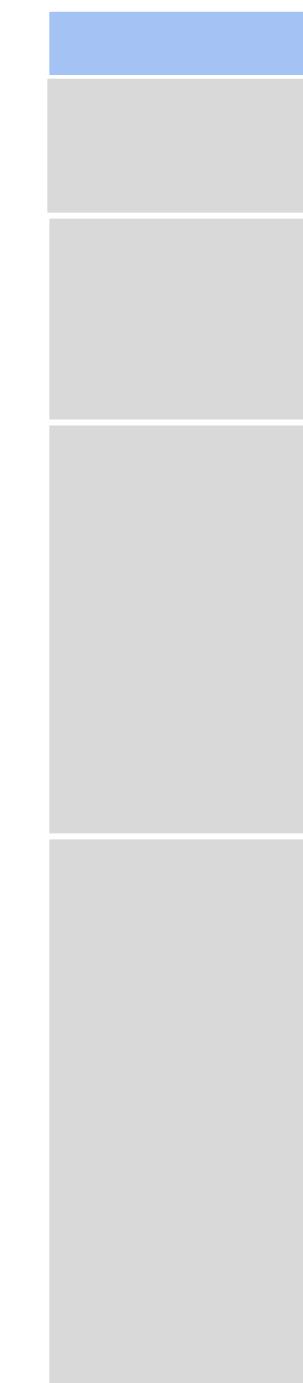
LOREM



IPSUM



DOLOR



LOREM



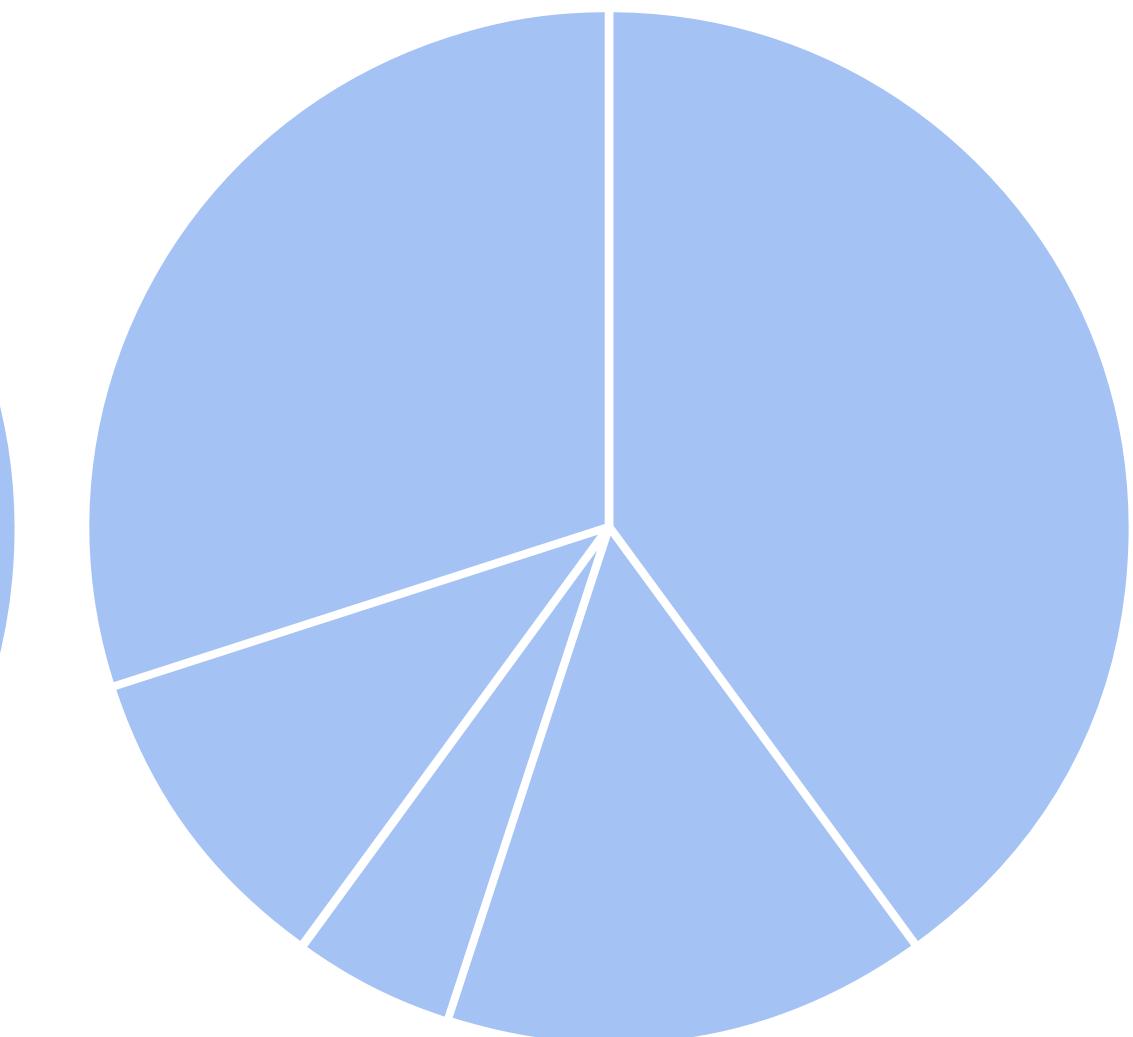
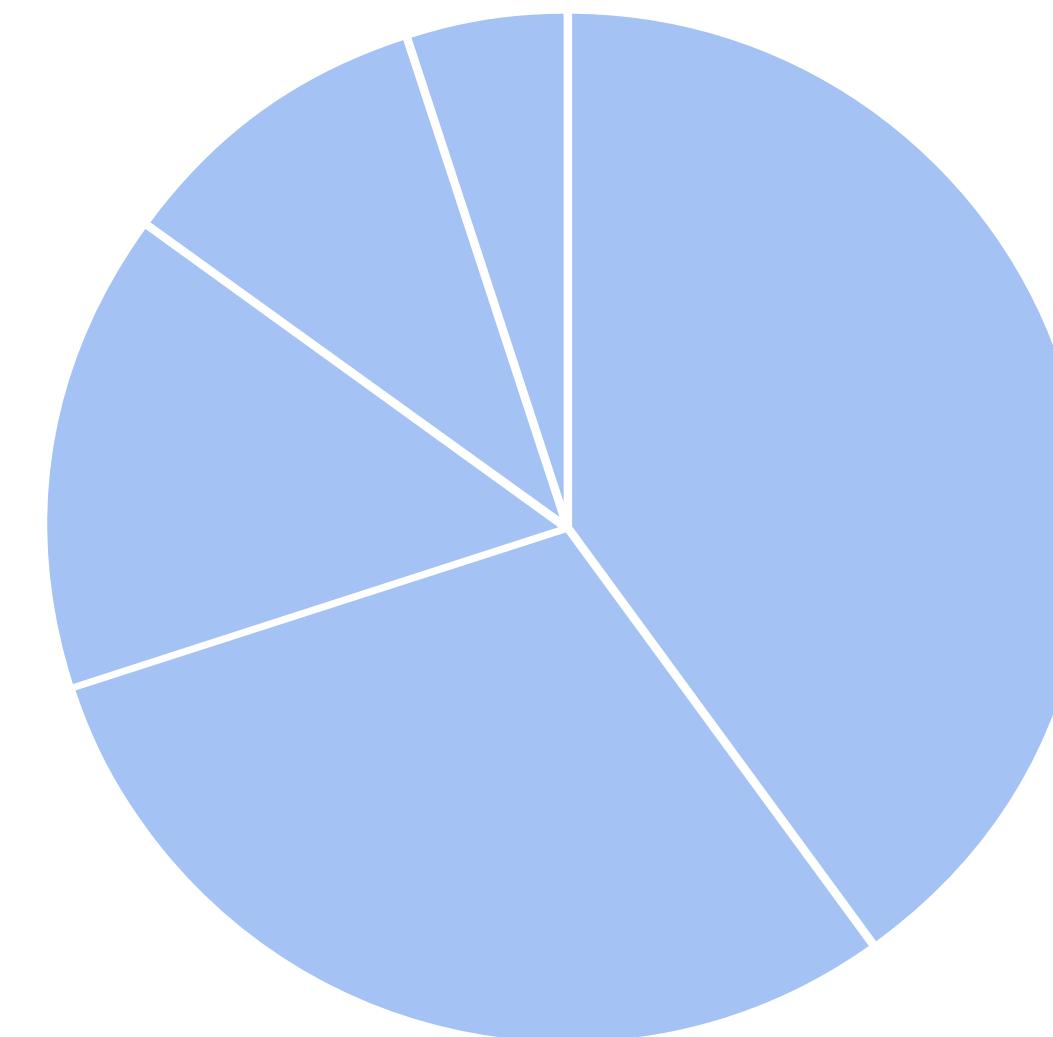
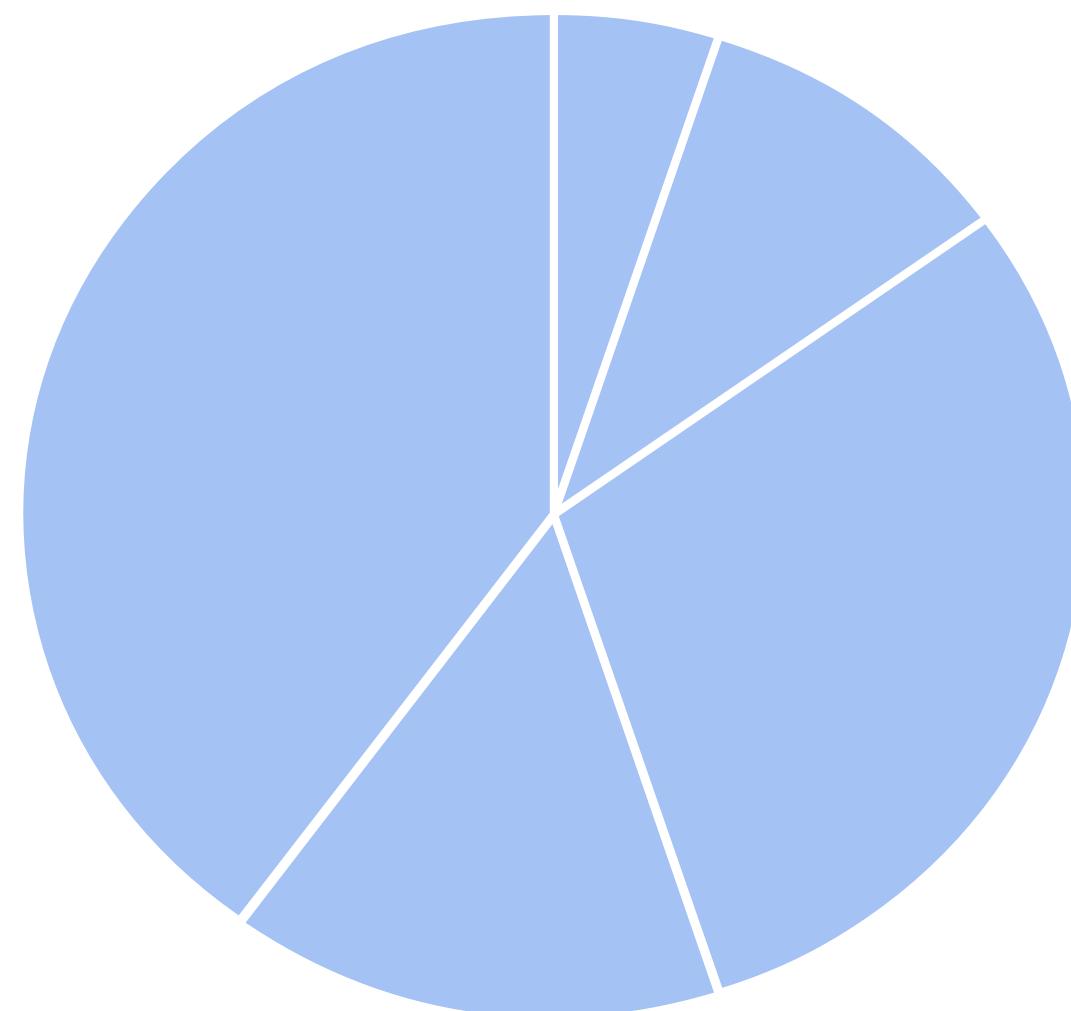
IPSUM



DOLOR



ORDINARE CORRETTAMENTE LE FETTE



IN SENSO ORARIO A PARTIRE DALLA FETTA PIÙ GROSSA IN ORDINE
DECRESCENTE

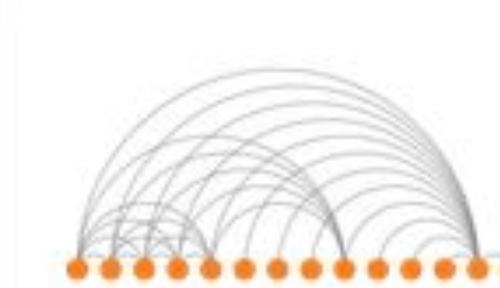
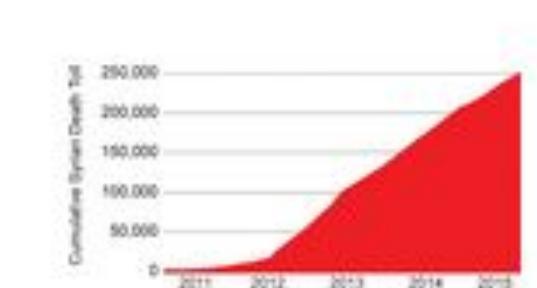
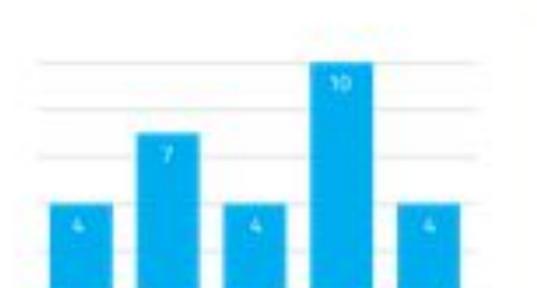
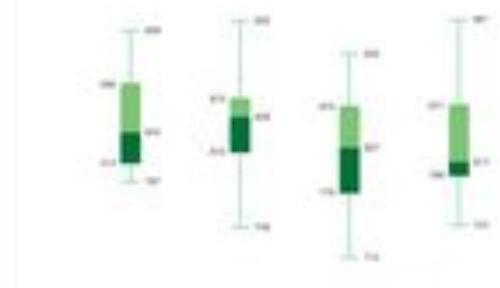
LE DUE FETTE MAGGIORI NELLA PARTE SUPERIORE E LE RESTANTI
NELLA PARTE INFERIORE

VARI TIPI DI GRAFICI

DATA VISUALIZATION & HUMAN RIGHTS KIT PROJECTS RESOURCES LESSONS ABOUT

Gantt Chart
Heat Map
Histogram
Illustration
Line Graph
Marimekko Chart
Mind Map
Multi-Set Bar Chart
Network Diagram
Pictogram Chart
Pie Chart
Population Pyramid
Proportional Area
Radar Chart
Sankey Diagram
Satellite Image
Scatter Plot
Span Chart
Stacked Area
Stacked Bar Graph
Stream Graph

For additional visualization types, visit [The Data Visualisation Catalogue](#).

		
Arc Diagram	Area Graph	Bar Chart
		
Box & Whisker Plot	Bubble Chart	Bubble Map
		
Calendar	Chord Diagram	Choropleth Map

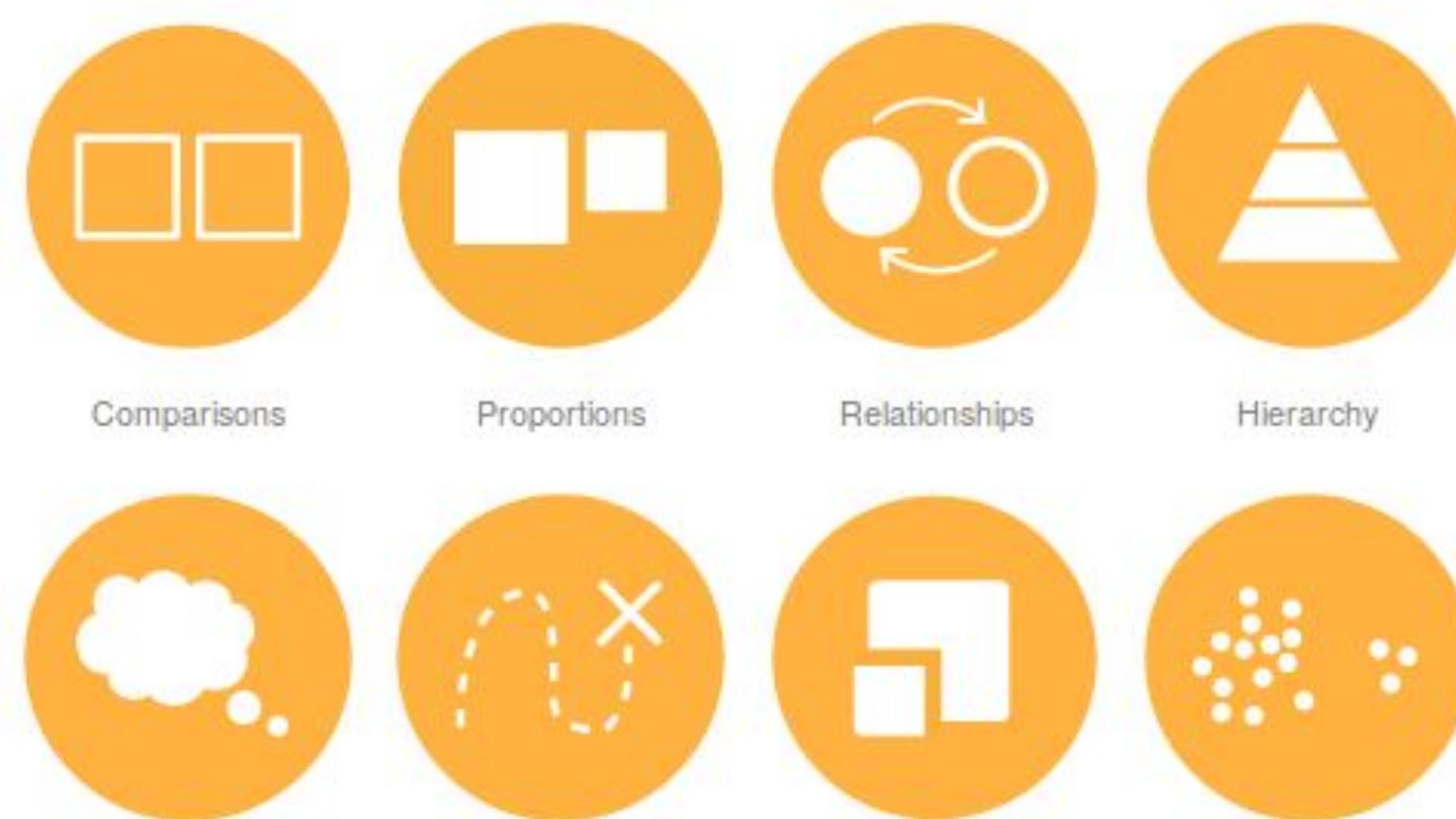
QUALE GRAFICO USARE?

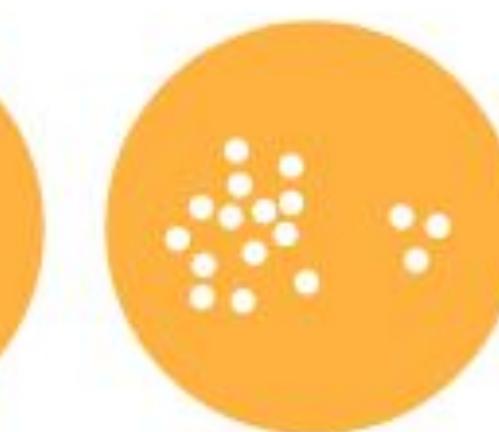
The Data Visualisation Catalogue

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What do you want to show?

Here you can find a list of charts categorised by their data visualization functions or by what you want a chart to communicate to an audience. While the allocation of each chart into specific functions isn't a perfect system, it still works as a useful guide for selecting chart based on your analysis or communication needs.



Comparisons	Proportions	Relationships	Hierarchy
			
Concepts	Location	Part-to-a-whole	Distribution
			

DAL FINANCIAL TIMES

Deviation	Correlation	Ranking	Distribution	Change over Time	Magnitude	Part-to-whole	Spatial	Flow
Deviation Emphasise variations ($\pm x$) from a fixed reference point. Typically the reference point is zero but it can also be a target or a long-term average. Can also be used to show sentiment (good/mixed/negative).	Correlation Show the relationship between two or more variables. Be mindful that unless you tell them otherwise, many readers will assume the relationships you show there are causal (i.e. one causes the other).	Ranking Use where an item's position in an ordered list is more important than its absolute or relative value. Don't be afraid to highlight the points of interest.	Distribution Show values in a dataset and how often they occur. Be the shape (or 'skew') of a distribution can be a memorable way of highlighting the lack of uniformity or equality in the data.	Change over Time Give emphasis to changing trends. These can be short (intra-day) movements or extended series traversing decades or centuries. Choosing the correct time period is important to provide suitable context for the reader.	Magnitude Show size comparisons. These can be relative (just being able to see larger/bigger) or absolute (need to see fine differences). Usually these show a countable number of items, barrels, dollars or people) rather than a magnitude-type chart instead.	Part-to-whole Show how a single entity can be broken down into its component elements. If the reader's interest is solely in the size of the components, consider a magnitude-type chart instead.	Spatial Aside from locator maps only used when precise locations or geographical patterns in data are more important to the reader than anything else.	Flow Show the reader volumes or intensity of movement between two or more states or conditions. These might be logical sequences or geographical locations.
Example FT uses Trade surplus/deficit, climate change	Example FT uses Inflation & unemployment, income & life expectancy	Example FT uses Wealth, deprivation, league tables, constituency election results	Example FT uses Income distribution, population (age/sex) distribution	Example FT uses Share price movements, economic time series	Example FT uses Commodity production, market capitalisation	Example FT uses Fiscal budgets, company structures, national election results	Example FT uses Population density, natural resource locations, natural disaster risk/impact, catchment areas, variation in election results	Example FT uses Movement of funds, trade, migrants, lawsuits, information, relationship graphs.
Diverging bar A simple standard bar chart that can handle both negative and positive magnitude values.	Scatterplot The standard way to show the relationship between two continuous variables, each of which has its own axis.	Ordered bar Standard bar charts display the ranks of values much more easily when sorted into order.	Histogram The standard way to show a statistical distribution - keep the gaps between bars equal and the bins small to highlight the 'shape' of the data.	Line The standard way to show a changing time series. If data are sparse, consider using markers to represent data points.	Column The standard way to compare the sizes of things. Must always start at 0 on the axis.	Stacked column A simple way of showing part-to-whole relationships but can be difficult to read with more than a few components.	Basic choropleth (rate/ratio) The standard approach for putting data on a map - should always be accompanied by a legend and use a sensible base geography.	Sankey Shows changes in flows from one condition to at least one other: good for showing the outcome of a complex process.
Diverging stacked bar Perfect for presenting survey results which involve sentiment (eg disagree/neutral/agreed).	Column + line timeline A good way of showing the relationship between an amount (columns) and a rate (line).	Ordered column See above.	Dot plot A simple way of showing the range or range (min/max) of data across multiple categories.	Dot Column works well for showing change over time - but usually best with only one series of data at a time.	Bar See above. Good when the data are not time series and labels have long category names.	Marimekko A good way of showing the size and proportion of data at the same time - as long as the categories are not too complicated.	Proportional symbol (count/magnitude) Use for totals rather than rates - it may be easier if small differences in data will be hard to see.	Waterfall Designed to show the sequencing of data through a flow process, typically budgeting or trade +/- components.
Spine Spins a single value into two contrasting components (eg male/female).	Connected scatterplot Usually used to show how the relationship between 2 variables has changed over time.	Ordered proportional symbol Use when there are big variations between values and keeping fine differences between data is not so important.	Dot strip plot Good for showing individual values in a distribution, can be a problem when too many dots have the same value.	Barcode plot Like dot strip plots, good for displaying all the data in a table, they work best when highlighting individual values.	Slope Good for showing changing data as long as the data can be summarised in 2 or 3 points without missing a key part of story.	Paired bar See above.	Pie A common way of showing proportions. Note that it's difficult to accurately compare the size of the segments.	Chord A complex but powerful diagram which can illustrate 2-way flows (and net winner) in a matrix.
Surplus/deficit filled line The shaded area of these charts allows a balance to be shown - either against a baseline or between two series.	Bubble Like a scatterplot but adds additional detail by sizing the circles according to a third variable.	Dot strip plot Dots placed in order on a strip are a space-efficient way of laying out ranks across multiple categories.	Boxplot Like a box plot but more visually appealing, shows standard deviation and can also show rank and value effectively.	Slope Perfect for showing how ranks have changed over time or vary between categories.	Area chart Summarise multiple distributions by showing the median (centre) and range of the data.	Marimekko A good way of showing the size and proportion of data at the same time - as long as the data are not too complicated.	Equalised cartogram Covering each unit on a map to a similar and equally-sized shape - good for representing voting regions with equal value.	Network Used for showing the strength and inter-connectedness of relationships of varying types.
XY heatmap A good way of showing the patterns between 2 categories of data, less good at showing fine differences in amounts.	Lollipop Lollipops draw more attention to the data value than standard bar/column and can also show rank and value effectively.	Violin plot Similar to a box plot but more visually appealing, shows complex distributions (data that cannot be summarised with simple averages).	Candlestick Usually focused on day-to-day volatility, they also show opening/closing and high/low points of each day.	Fan chart (projection) Use to show the uncertainty in future projections - usually this grows the further forward to projection.	Isotype (pictogram) Excellent solution in some instances - use only with whole numbers and do not slice off an arm to represent a decimal!	Treemap Use for hierarchical part-to-whole relationships can be difficult to read when there are many small segments.	Scaled cartogram (value) Stretching and shrinking a map so that each area is sized according to a particular value.	
Bump Effective for showing changing rankings across multiple datasets. For large datasets, consider using lines using colour.	Population pyramid A standard way for showing the age and sex breakdown of a population distribution, effectively back to back histograms.	Cumulative curve A good way of showing how unequal a distribution is: x axis is always cumulative frequency, x axis is always a measure.	Connected scatterplot A good way of showing changing data for two variables whenever there is a relatively clear pattern of progression.	Calendar heatmap A great way of showing temporal patterns (daily/weekly/monthly) at the expense of showing precision in quantity.	Lollipop Lollipops draw more attention to the data value than standard bar/column - does not have to start at zero (but preferable).	Radar A space-efficient way of showing value of multiple variables - but make sure they are organised in a way that makes sense to reader.	Dot density Used to show the location of individual events/locations - make sure to annotate any patterns the reader should see.	
Frequency polygons For displaying multiple distributions of data.	Priestley timeline Great when date and duration are key elements of the story in the data.	Circle timeline Good for showing discrete values of varying size across multiple categories (eg earthquakes by continent).	Vertical timeline Presents time on the y axis. Good for displaying detailed timelines that work especially well when scrolling on mobile.	Parallel coordinates An alternative to radar charts - again, the arrangement of the variables is important. Usually benefits from high-gravity values.	Bullet Good for showing a measurement against the context of a target or performance range.	Venn Generally only used for schematic representation.	Heat map Grid-based data visualised with an intensity colour scale. As choropleth map - but not snapped to an admin/political unit.	
Seismogram Another alternative to the circle timeline for showing series where there are big variations in the data.	Grouped symbol An alternative to bar/column charts when being able to count data and highlight individual elements is useful.						FT 	

Designing with data

There are so many ways to visualise data - how do we know which one to pick? Use the categories across the top to decide which data relationship is most important in your story, then look at the different types of chart within the category to form some initial ideas about what might work best. This list is not meant to be exhaustive, nor a wizard, but is a useful starting point for making informative and meaningful data visualisations.

FT graphic: Alan Smith; Chris Campbell; Ian Bott; Liz Faunce; Graham Parish; Billy Ehrenberg; Paul McCalman; Martin Stabb
Inspired by the Graphic Continuum by Jon Schwabish and Steven Ricossa

ft.com/vocabulary

<https://github.com/ft-interactive/chart-doctor/blob/master/visual-vocabulary/Visual-vocabulary.pdf>

VERSIONE WEB

Visual Vocabulary | Deviation | Correlation | Ranking | Distribution | Change-over-Time | Magnitude | Part-to-whole | Spatial | Flow | FullList

Visual Vocabulary - Vega Edition

Inspired by Financial Times's Visual Vocabulary & Andy Kriebel's ft. Click any section below to view the charts 

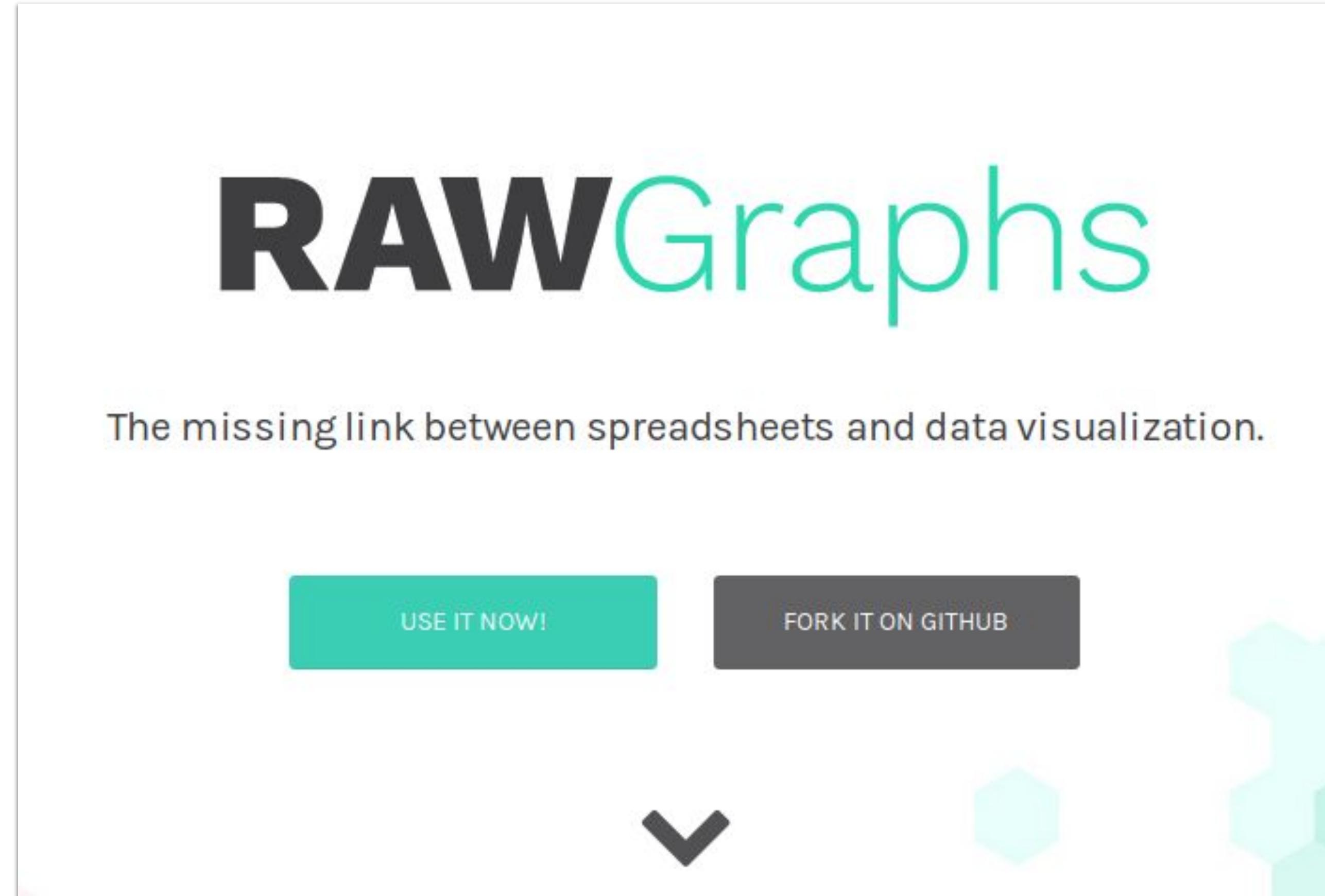
There are so many ways to visualise data - how do we know which one to pick? Click on a category below to decide which data relationship is most important in your story, then look at the different types of charts within the category to form some initial ideas about what might work best. This list is not meant to be exhaustive, nor a wizard, but is a useful starting point for making informative and meaningful data visualisations.

Deviation Emphasise variations (+/-) from a fixed reference point. Typically the reference point is zero but it can also be a target or a long-term average. Can also be used to show sentiment (positive/neutral/negative)	Correlation Show the relationship between two or more variables. Be mindful that, unless you tell them otherwise, many readers will assume the relationships you show them to be causal (i.e. one causes the other)	Ranking Use where an item's position in an ordered list is more important than its absolute or relative value. Don't be afraid to highlight the points of interest.
Distribution Show values in a dataset and how often they occur. The shape (or skew) of a distribution can be a memorable way of highlighting the lack of uniformity or equality in the data	Change-over-Time Give emphasis to changing trends. These can be short (intra-day) movements or extended series traversing decades or centuries: Choosing the correct time period is important to provide suitable context for the reader	Magnitude Show size comparisons. These can be relative (just being able to see larger/bigger) or absolute (need to see fine differences). Usually these show a 'counted' number (for example, barrels, dollars or people) rather than a calculated rate or per cent
Part-to-whole Show how a single entity can be broken down into its component elements. If the reader's interest is solely in the size of the components, consider a magnitude-type chart instead	Spatial Used only when precise locations or geographical patterns in data are more important to the reader than anything else.	Flow Show the reader volumes or intensity of movement between two or more states or conditions. These might be logical sequences or geographical locations

CREATED BY
Pratap Vardhan | @PratapVardhan

CREDITS
Vega Authors & Community, Gramener
<https://gramener.github.io/visual-vocabulary-vega/>
<https://github.com/gramener/visual-vocabulary-vega/>

INSPIRED BY
Andy Kriebel | @VizWizBI (design / data)
FT Graphics: Alan Smith; Chris Campbell; Ian Bott; Liz Faunce; Graham Parish; Billy Ehrenberg-Shannon; Paul McCallum; Martin Stabe
Visual Vocabulary: ft.com/vocabulary 

The image shows the main landing page of the RAWGraphs website. At the top, the word "RAW" is in large, bold, dark gray letters, and "Graphs" is in large, green letters. Below the title is a subtitle: "The missing link between spreadsheets and data visualization." Two buttons are present: a teal button on the left labeled "USE IT NOW!" and a dark gray button on the right labeled "FORK IT ON GITHUB". A large, dark gray downward-pointing arrow is positioned below the buttons. To the right of the arrow, there are several light green hexagonal shapes of varying sizes.

<http://rawgraphs.io>

Datawrapper

River Blog Academy FAQ > Dashboard

Enrich your stories with charts, in seconds.

Evolutie vastgoedprijzen

Gemiddelde huizengroepen

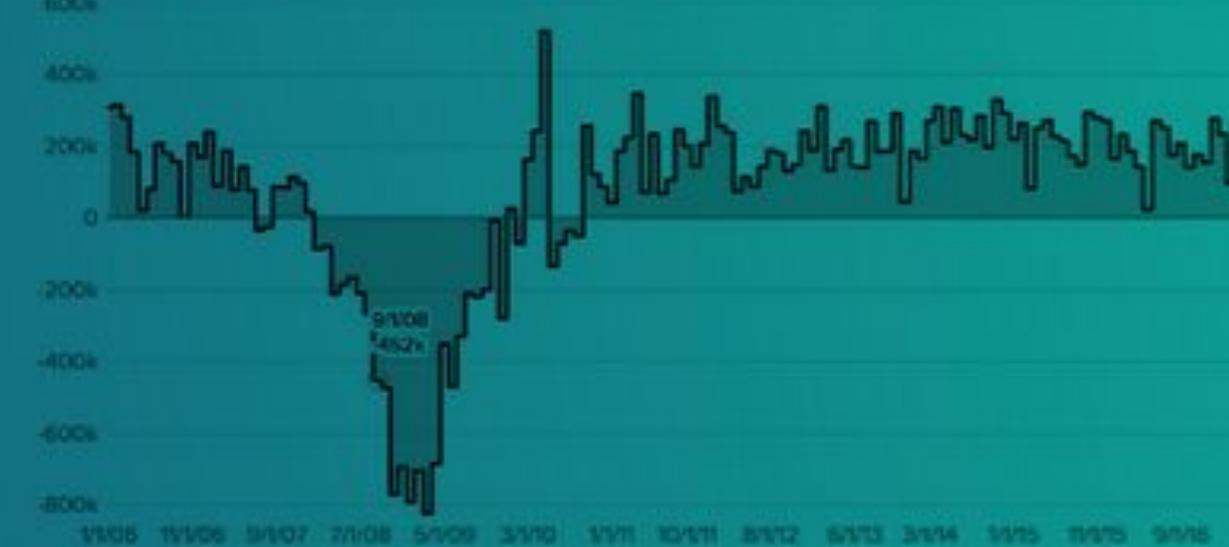
Woonsoort	< 100.000	< 150.000	< 200.000	< 250.000	> 250.000
Villa's	+	+	+	+	+
Appartementen	+	+	+	+	+

De prijsstijging in de eerste jaarhelft is in elk geval opmerkelijk. De vastgoedprijzen gaan sinds 2010 in stijgende lijn, maar wel golvend. De gelede prijsstijging bij woonhuizen hebben we de jongste twee jaar nog niet gezien; levensgroot men bij de FGO Economie, én niet alleen klassieke woonhuizen werden flink duurder, ook villa's (+5,3 procent) en in mindere mate appartementen (+1,7 procent). In deze categorieën hebben we de jongste jaren wel sterke prijsstijgingen gezien, maar voor villa's is het toch weer een grote sprong!, geleden van 2010, zegt de FGO Economie, een verklaring heeft men niet.

CREATE A CHART

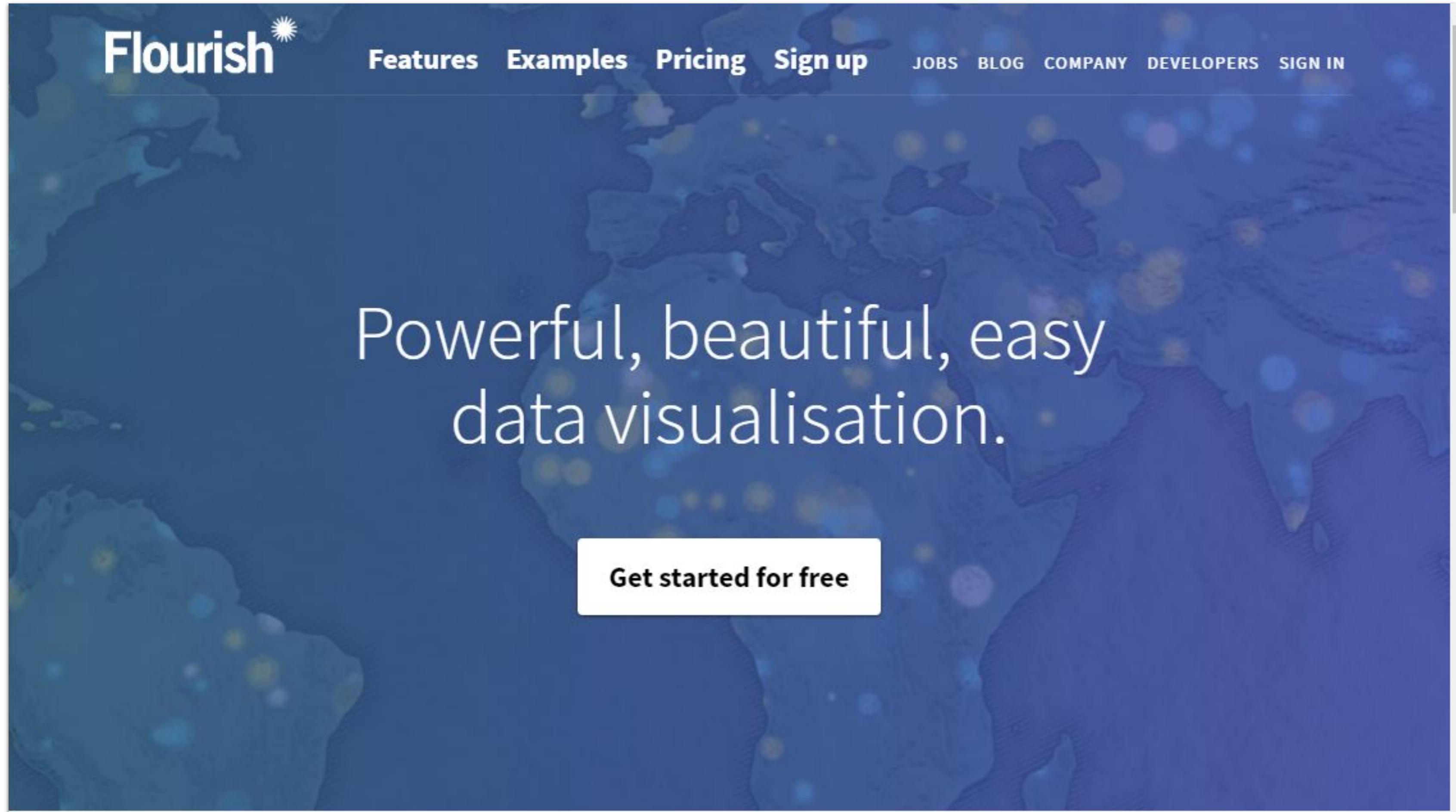
CREATE A MAP

Monthly Changes in U.S. Employment (Non-Farm), 2006-2017



Source: Bureau of Labor Statistics | Get The Data | Embed

3. An interest-rate hike in June now looks more likely.



The image shows the homepage of the Flourish website. The background features a world map with glowing blue and yellow dots representing data points. At the top left is the Flourish logo with a sun icon. The top navigation bar includes links for Features, Examples, Pricing, Sign up, JOBS, BLOG, COMPANY, DEVELOPERS, and SIGN IN. The main headline reads "Powerful, beautiful, easy data visualisation." Below the headline is a white button with the text "Get started for free".

Flourish

Features Examples Pricing Sign up JOBS BLOG COMPANY DEVELOPERS SIGN IN

Powerful, beautiful, easy data visualisation.

Get started for free



 Log In  Register

RECOMMENDATION-DRIVEN DATA EXPLORATION

Turn your **data into stories** without writing code. Our system integrates **semi-automated visualization and statistical analysis** features into a unified workflow.

DIVE is a **publicly available** (free as in beer) and **open source** research project from the MIT Media Lab.

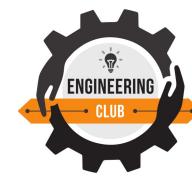
 Upload Data



<https://dive.media.mit.edu/>

CONTEST DI DATA DRIVEN

A.A. 2020-2021 - Marzo-Maggio 2021

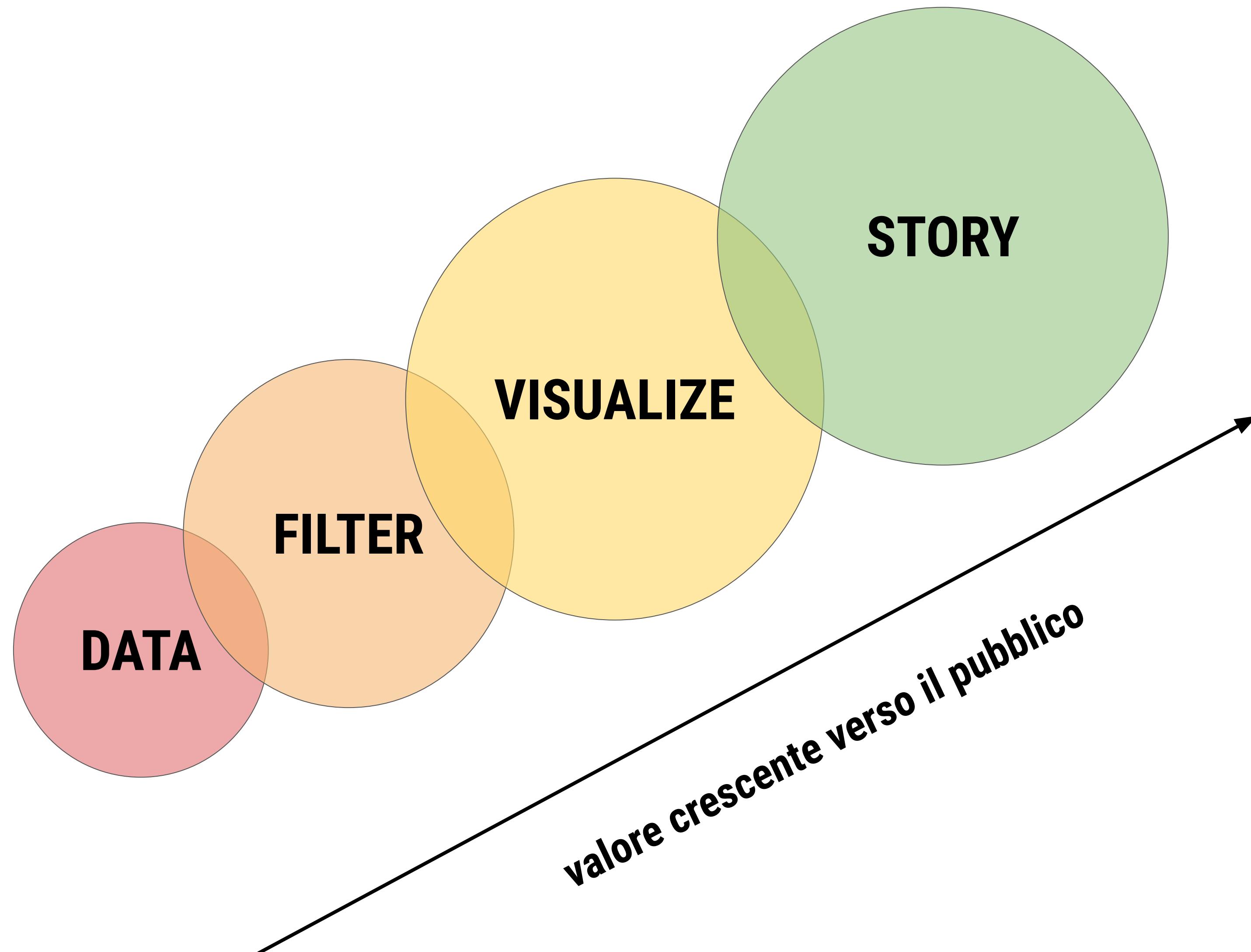


campus

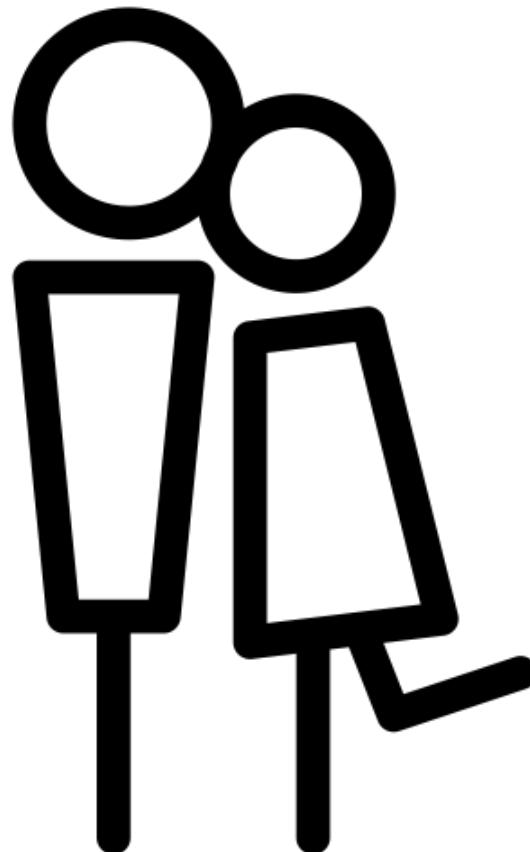
College



<http://infogram.com>

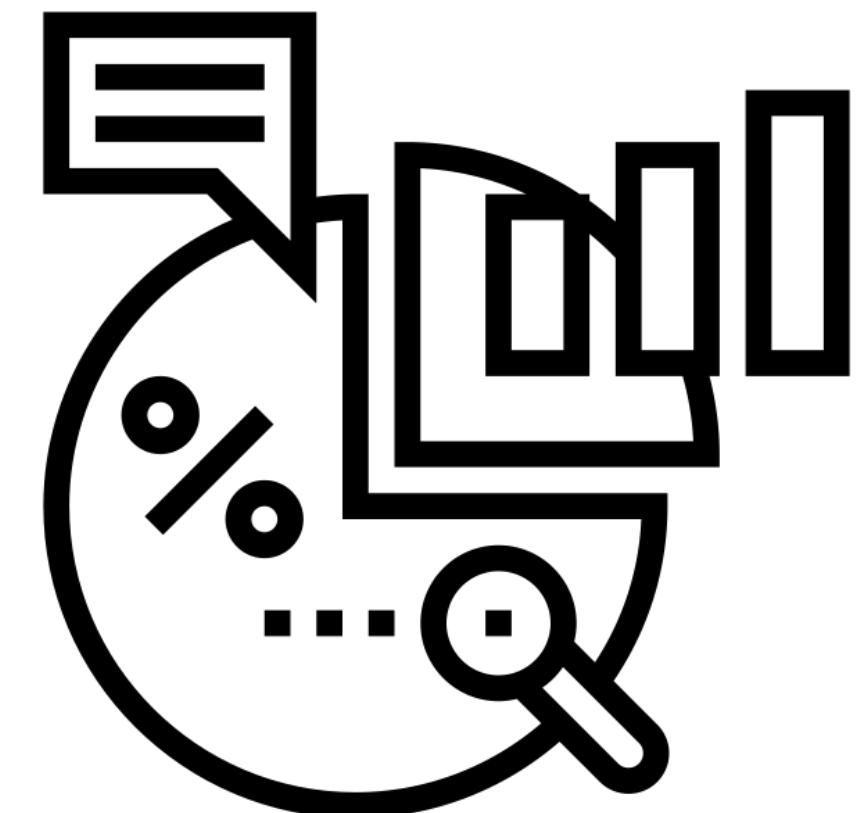


In conclusione



KISS

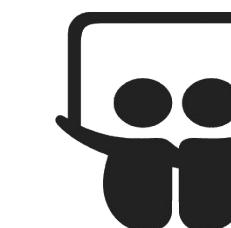
Keep It Simple and Sexy



Per contatti



Maurizio Napolitano



<http://slideshare.net/napo>



napolitano@fbk.eu



@napo

Ringraziamenti

- The Nounproject per le icone
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