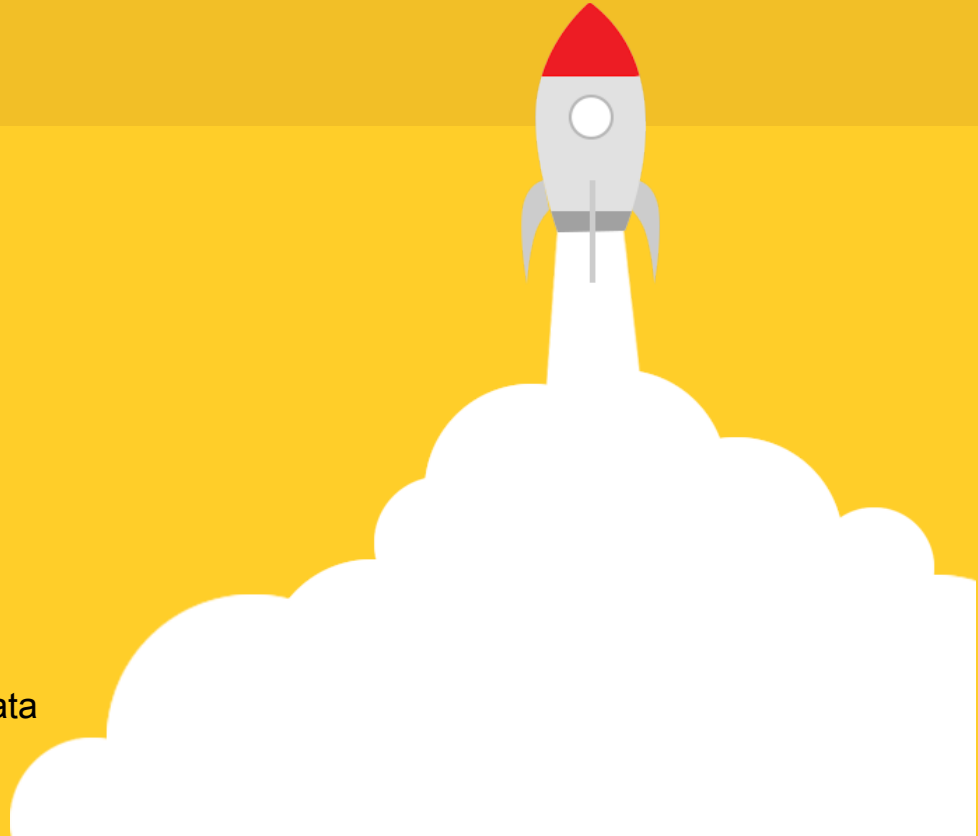
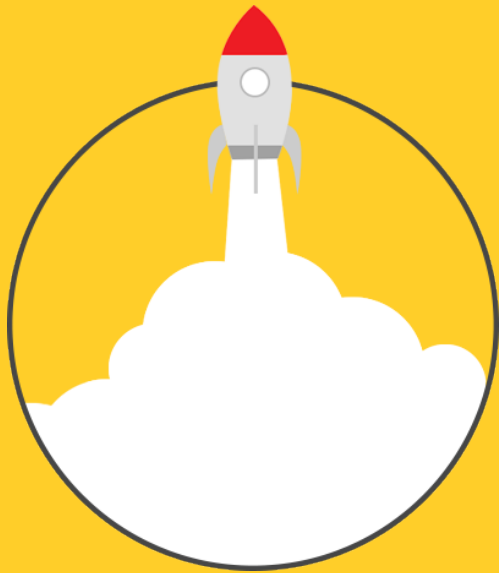


# Product Design of Data Science

User Experience, Visualization and Storytelling with data





# Before we start

Let's think about some experiences when analyzing data.

# Have you ever

- Developed perfect data science projects but **nobody needs**.
- Wanted to generate some **innovative** big data projects.



# What we do?



## **As a data scientist/engineer**

All of us are familiar with designing researches, processes, infrastructures and architectures.

We know a lot of math&statistic, computer science&programming skills and domain know-how.

And we develop some kick ass big data projects.



**What's next?**

# Maybe we can

- Fine tune hyperparameter
- Changing model
- Improving efficiency
- Enhancing stability





For me, I want my  
big data projects  
becoming **real**  
**applications.**



**Product means  
application/service that  
has needs.**



# How?

Is data science, the extremely **quantitative** methodology,  
can solve any real world problem?

I doubt.





**There must be other  
ways to solve problem.**

# MODERN DATA SCIENTIST

Data Scientist, the sexiest job of 21st century requires a mixture of multidisciplinary skills ranging from an intersection of mathematics, statistics, computer science, communication and business. Finding a data scientist is hard. Finding people who understand who a data scientist is, is equally hard. So here is a little cheat sheet on who the modern data scientist really is.

## MATH & STATISTICS

- ☆ Machine learning
- ☆ Statistical modeling
- ☆ Experiment design
- ☆ Bayesian inference
- ☆ Supervised learning: decision trees, random forests, logistic regression
- ☆ Unsupervised learning: clustering, dimensionality reduction
- ☆ Optimization: gradient descent and variants

## PROGRAMMING & DATABASE

- ☆ Computer science fundamentals
- ☆ Scripting language e.g. Python
- ☆ Statistical computing package e.g. R
- ☆ Databases SQL and NoSQL
- ☆ Relational algebra
- ☆ Parallel databases and parallel query processing
- ☆ MapReduce concepts
- ☆ Hadoop and Hive/Pig
- ☆ Custom reducers
- ☆ Experience with xaaS like AWS

## DOMAIN KNOWLEDGE & SOFT SKILLS

- ☆ Passionate about the business
- ☆ Curious about data
- ☆ Influence without authority
- ☆ Hacker mindset
- ☆ Problem solver
- ☆ Strategic, proactive, creative, innovative and collaborative

## COMMUNICATION & VISUALIZATION

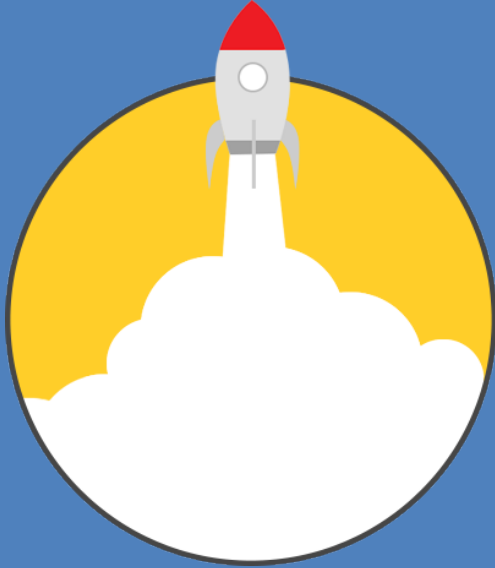
- ☆ Able to engage with senior management
- ☆ Story telling skills
- ☆ Translate data-driven insights into decisions and actions
- ☆ Visual art design
- ☆ R packages like ggplot or lattice
- ☆ Knowledge of any of visualization tools e.g. Flare, D3.js, Tableau

Storytelling

UX

Visualization





# User Experience

# User Experience

qualitative methodology

## UX Research

A domain to find user demands, even find needs that user don't know they need. E.g, shadowing, focus group conversation, field research, ethnography...etc.

**UX Research**

**UX Design**

## UX Design

Based on user demand to develop usability, accessibility and pleasure products. E.g, visual design, interaction design, service design...etc.

**UX Testing**

## UX Testing

Methods designed to heed all of the key variables of UX design. E.g, A/B test, usability test...etc.



# User Experience



## User Oriented

User oriented means empathy and standing with user, not sympathy.

## User Needs

Finding what users want, even they don't know they they want.





**Data science  
is the same.**





There are some connections between these two,  
user oriented, creativity and innovation.



**Quantitative**  
Data Science



**Qualitative**  
User Experience

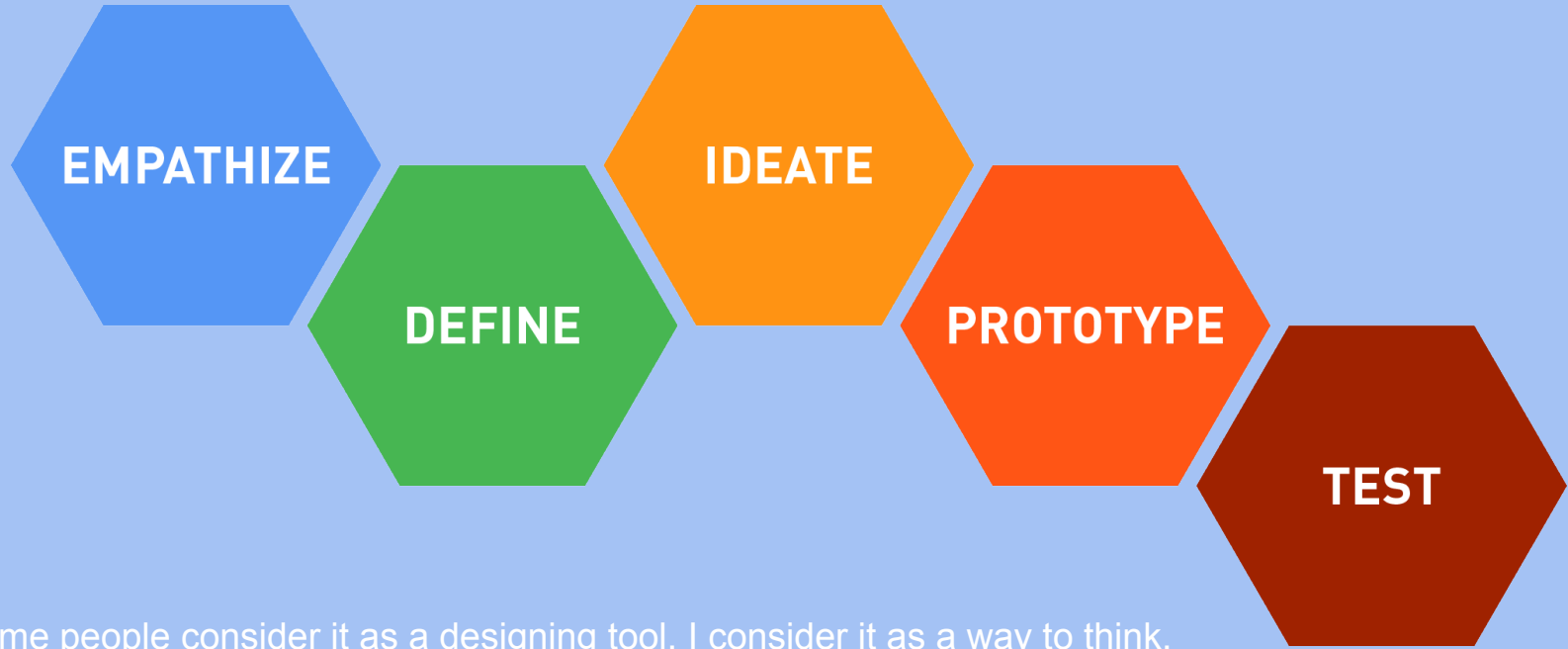
There must be some ways to integrate both ends of  
the balance scales.



**We are not a designer,  
but we can  
think like a designer.**



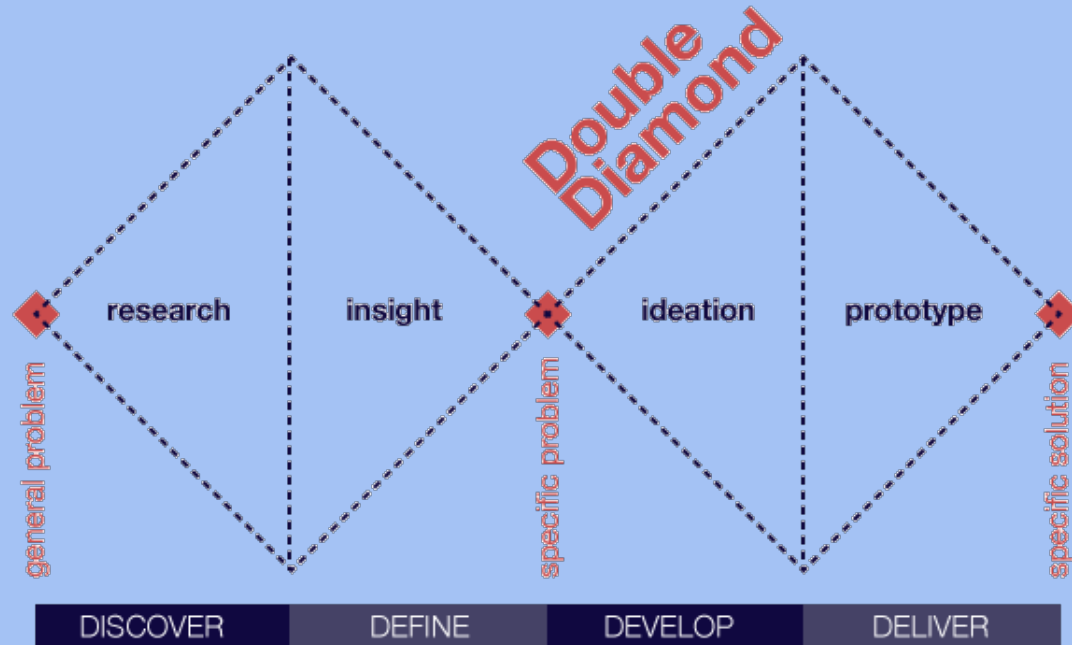
# Design Thinking process



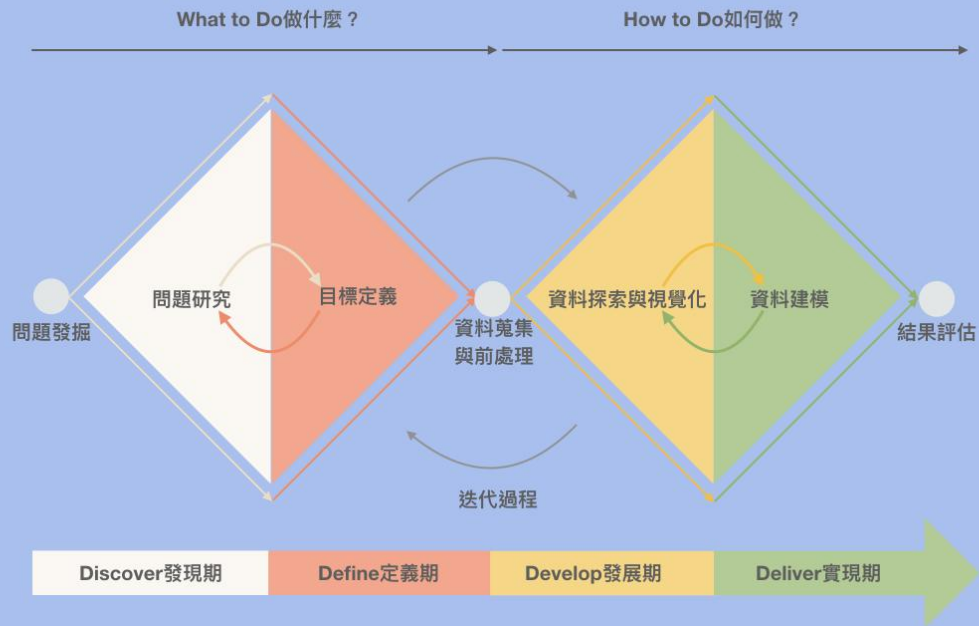
Some people consider it as a designing tool, I consider it as a way to think.



# Double Diamond model



# What I found



# Three level of good design

01

## Visceral experience(視覺)

Concerns itself with appearances.  
Shapes, colors, styles.

02

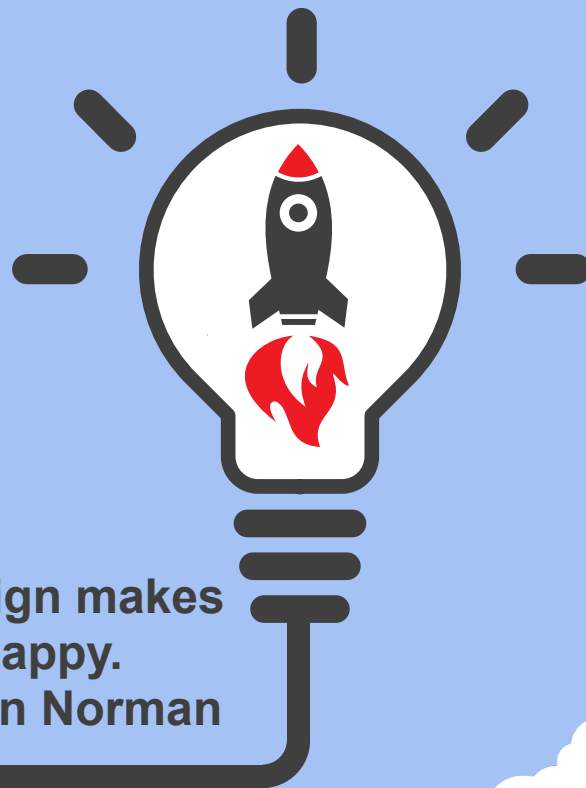
## Behavioral level(行為)

Has to do with the pleasure,  
effectiveness and usability of use.

03

## Reflective experience(投射)

Can I tell a story about it? Does it appeal  
to my self-image, to my pride? The  
highest level of emotional design.



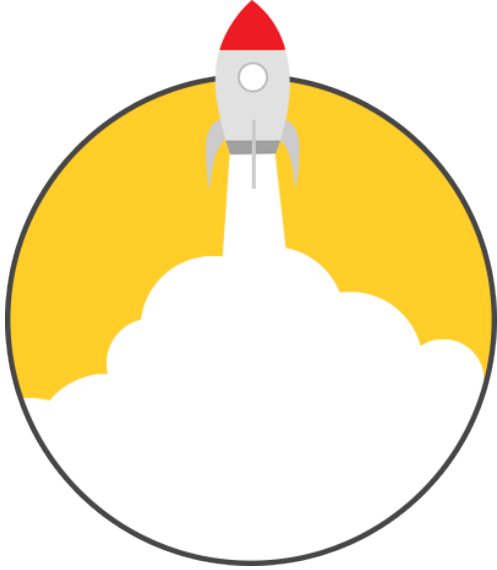
Good design makes  
you happy.  
-Don Norman



# UX for data scientist

Using data to find what users need,  
then solve the issues by data.





Visualization



# Data Visualization

To explore and to realize



Visualization is a way to help us **finding user needs** and **exploring insights of data**.

We have to realize our data as more as possible before developing any application.

# Data Vis Processes

1

Define intent with users

2

Understand and clean data

3

Model data and check for visual validity

4

Structure and style

5

Test and iterate

6

Refine and implement



# Human-Centered Reflection



## Purpose

- Where are you starting from—a user need, a data set, a request from a manager or exec?
- What problem will data visualization help to solve it?
- What goals do you hope to accomplish with the vis?
- What is the nature of your intention—to make a point, tell a story, provide deep exploration?



## Data

- Do you have a usable data set?
- Are you designing mock-ups with real data?
- Will the visualization need to get periodically updated?
- What is your plan to make the visualization accessible?
- What is your strategy for language support?



## Audience

- Who is the target user for your data vis?
- What does your user want to do with their data?
- What cultural, domain, or industry-specific needs does your user have for the visualization?
- What user outcomes will indicate you've been successful?



## Context

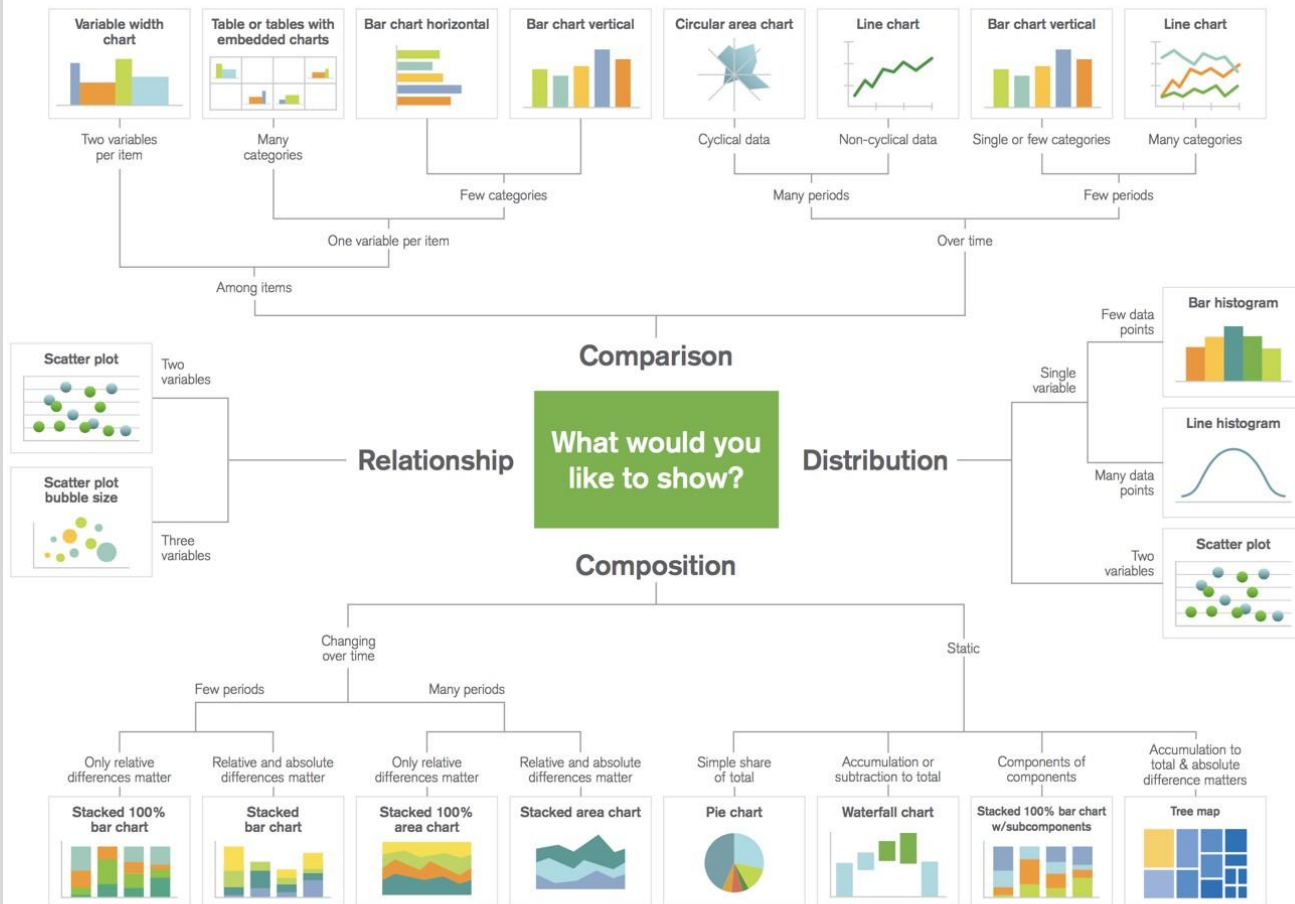
- Where will the data vis live — in software or a website, a report or presentation, an article or blog post?
- Where will your user be when viewing or exploring the data vis?
- Is it going to be static or dynamic, passively consumed or interactive?



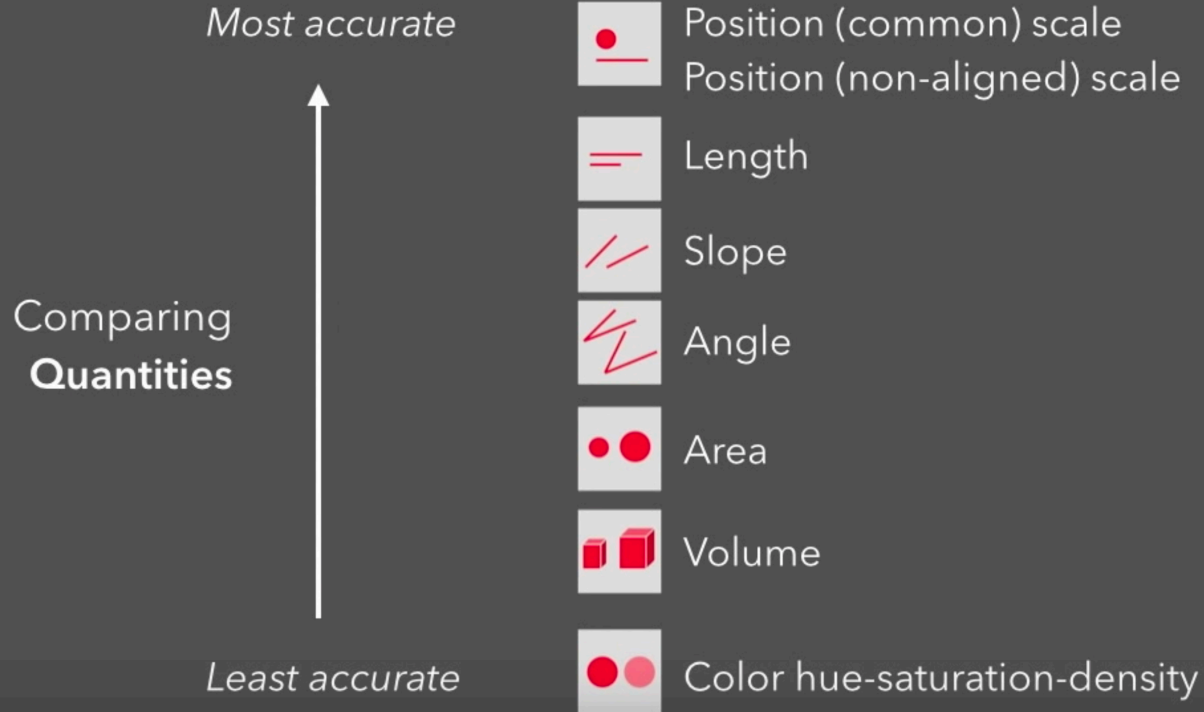
# Categories of Visualization

- Comparison (比較)
- Distribution (分佈)
- Relationship (關係)
- Composition (組成)

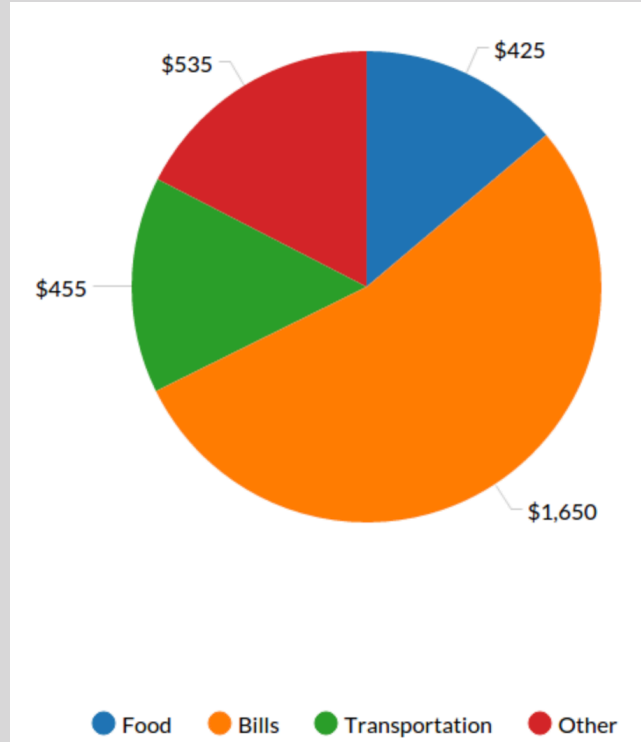




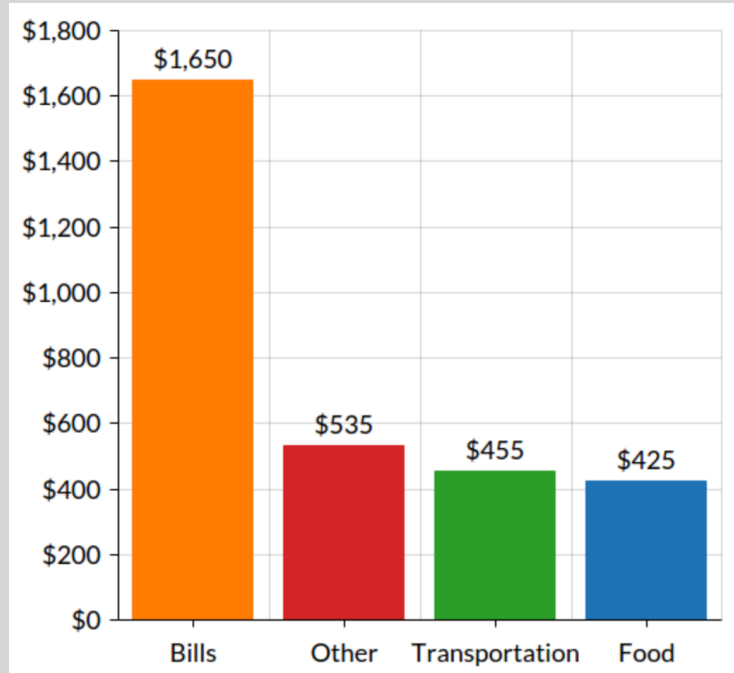
# Ranking Visual Encodings



# Which one is larger?

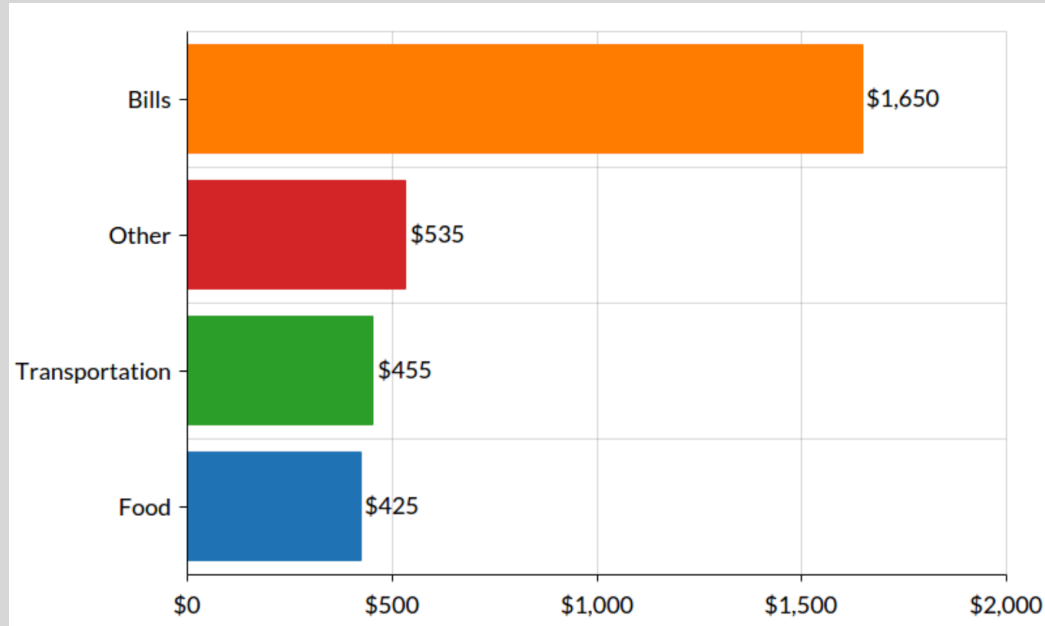


# Which one is larger?

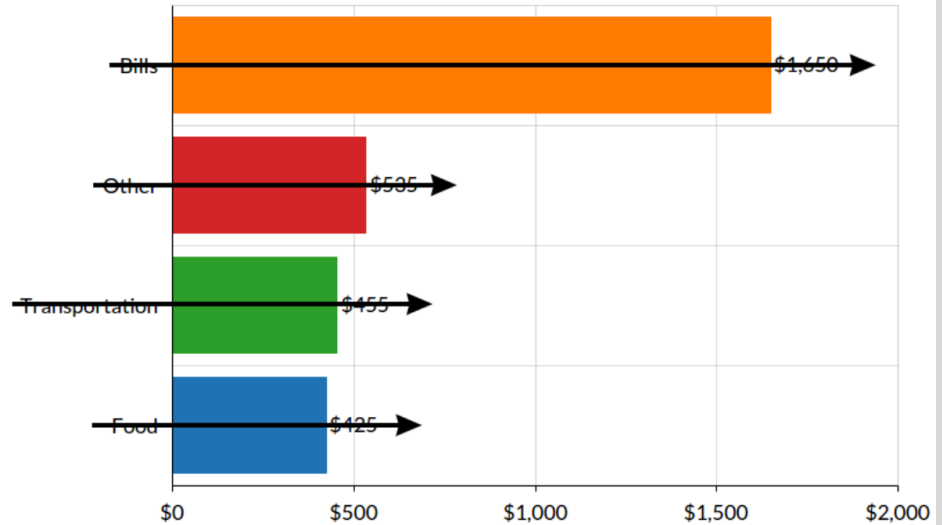
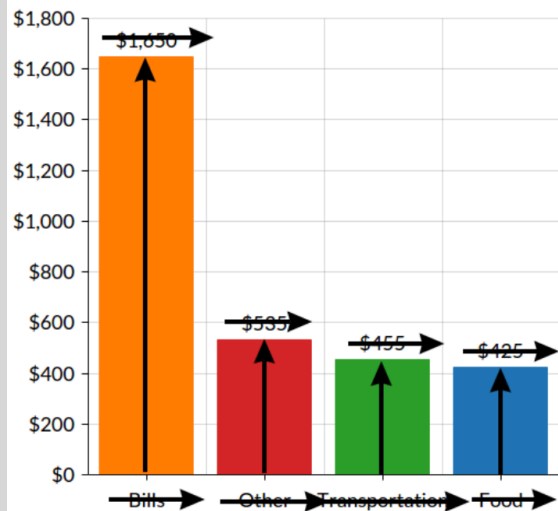




# Which one is larger?



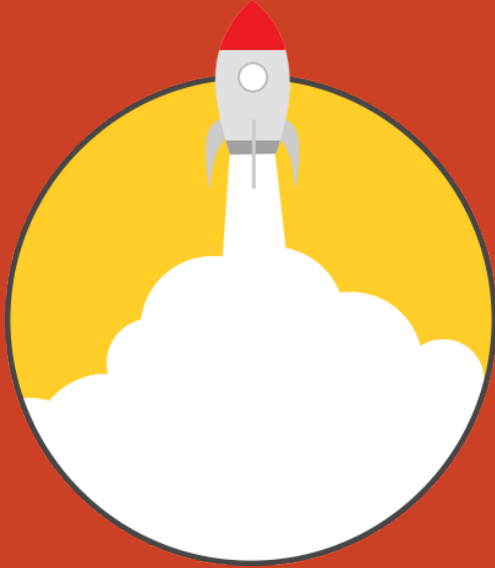
# Which one is better?



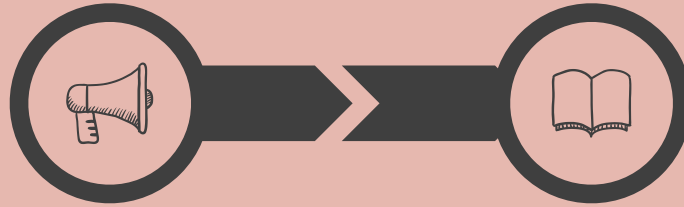
# Other Examples

- [IBM Design Language](#)
- [Where science meet art](#)





# Storytelling



## Presentation

- Clear
- Abundant content

## Storytelling

- Reflective, inspiring
- Feeling the same feeling



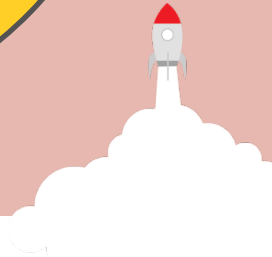
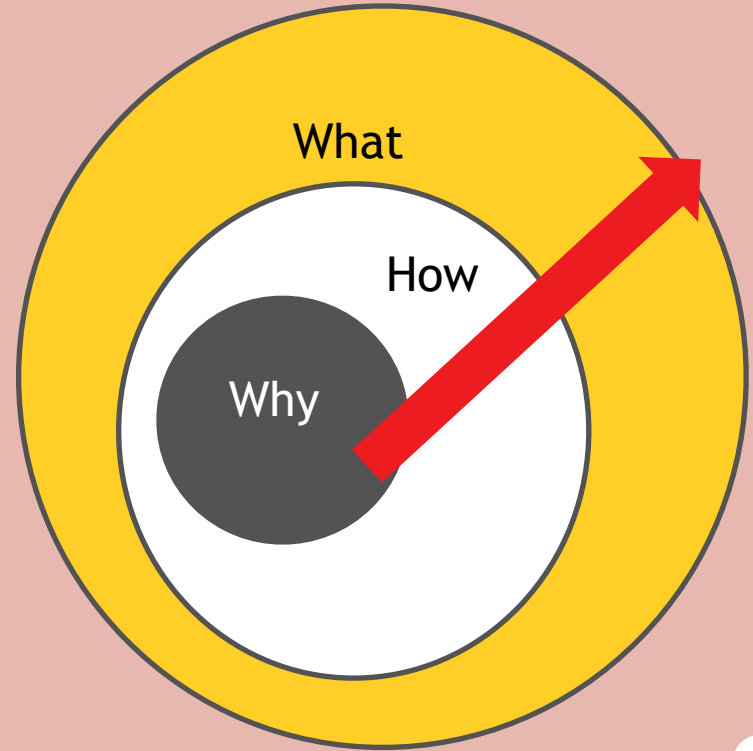
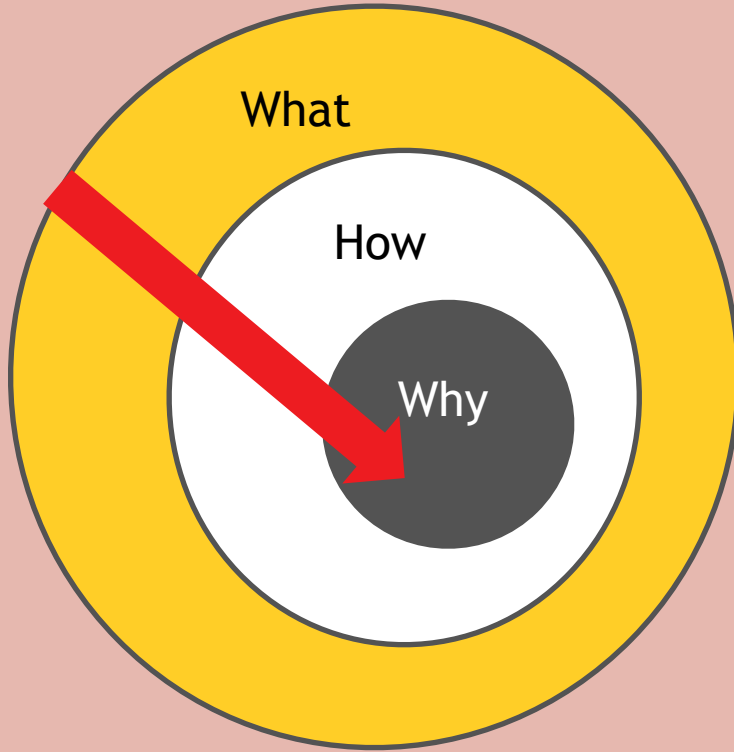
Office DEPOT

why

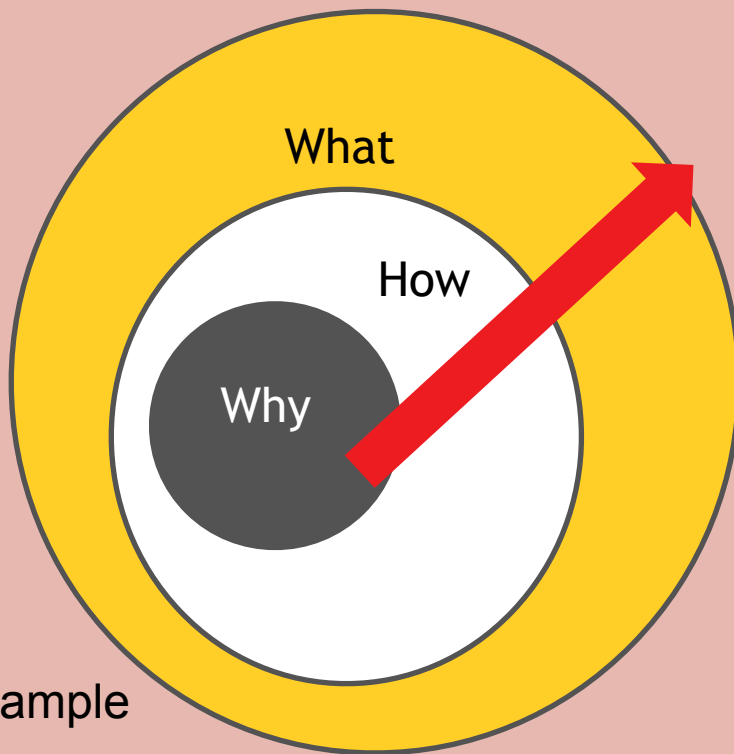


# How to tell a story?

Golden circle from Simon Sinek



# Even designing a data science project



Take our dashboard as Example





*“Design is not just what it looks like and feels like.  
Design is how it works.”*

*-Steve Jobs*



Becoming an user-oriented  
data scientist together!

