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CHAPTER 2

The Data Analyst Workflow

Learning Objectives

- Summarize the steps included in the data analytics workflow
- Setup and introduce Google Sheets
- Work through the entire data analytics workflow

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AGENDA

- Data Analytics Workflow
- Step 1: Understanding the problem
- Step 2: Data collection
- Step 3: Data wrangling
- Step 4: Data Analysis
- Step 5: Documenting the Process
- Step 6: Sharing Insights
- Conclusion

Data Analytics Workflow

- Summarise the data analytics workflow
- Mention common tools used by analysts
- Setup a Google Sheets account

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Data Analytics Workflow

1. **Understand the problem and the desired outcome**
2. **Data collection**
   - Acquiring data that best serves the problem
3. **Data wrangling**
   - Optimising data for the task
4. **Data analysis and visualisation**
   - Look for insights
5. **Document the process**
   - Ensure process can be repeated
6. **Communicate insights to stakeholders**

➢ In this course we'll go through the entire workflow

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Software

- Spreadsheets
  - Easy to learn
  - Well documented
- Python
  - Open source with powerful libraries (NumPy, Pandas and Matplotlib)
- Tableau
  - Interactive data visualisation
  - Fast
  - Easy to use
  - Drag and drop features
  - Works well with huge datasets

How to pick a tool for analysis?

- Use case
- Infrastructure
- Team
- Ease of use

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Google Sheets

Spreadsheet program that is free, web-based and developed by Google. It is similar to Microsoft Excel.

Google Sheets

How to use Google Sheets?

Go to: sheets.google.com

Login or create an account

Start a new spreadsheet +

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Step 1: Understanding the Problem

- How to go through the first step of the data analytics workflow
- Introduce the task for Chapter 2 analysis

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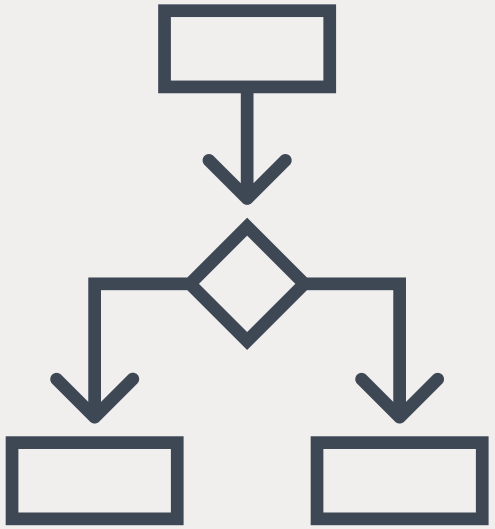
Understanding the problem and the desired outcome

Where you are

Where you want to be



- Ask questions!

What questions to ask?

- What is the problem?
- What is the desired outcome?
- Who are the stakeholders?
  - Manager? Investors? Government Agency?
  - What is important to them?
  - What are their expectations?
  - How are they impacted by the problem?
  - What's their role in the business?
- Is there data available?

Start your analysis with a question

- Know what to solve
- Not just analysis for the sake of analysis

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Your Task

- You are a freelancer hired to conduct an analysis on a collected dataset
- Dataset: Video Game Sales
  - Top 100 ever sold by volume
- Answer the following questions:
  1. What were the best and worst performing genres in total sales?
  2. Which game publisher was the most popular?
  3. What were the 5 most popular games in Japan?
  4. In which year were most of the games published?

Step 2: Data Collection

- What does data collection involve?
- Types of data sources
- Loading our data into Google Sheets
- Setting up the file ready for data wrangling

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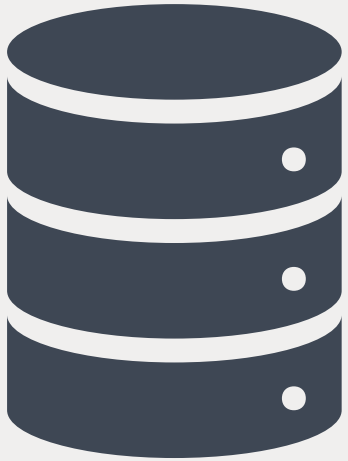
Data Collection

- Gathering and storing data
- For larger projects: need to make a plan for the data collection process.
- Consider:
  - Time
  - Volume
  - Source



Data Sources

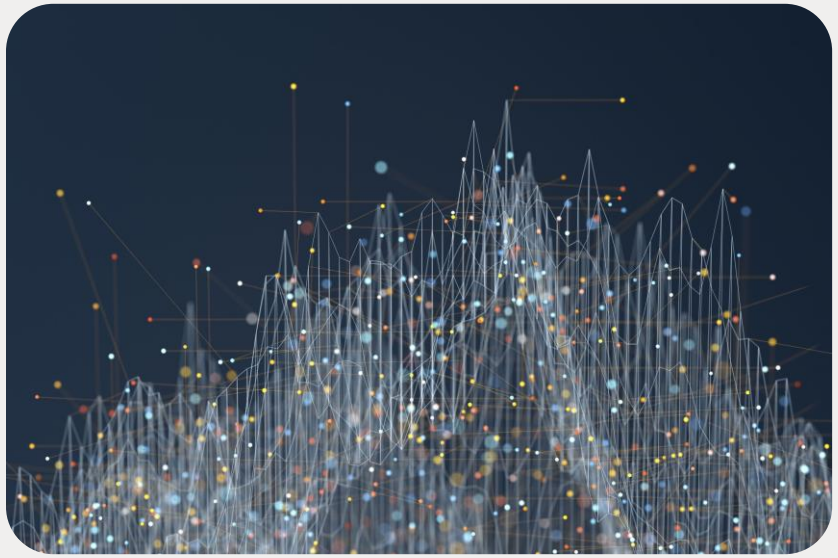
- Internal or external
  - Primary (original source)
  - Secondary (retrieved externally)
  - Tertiary (purchased)

Data Source Examples:

- The web
- Sensors
- Social Media

Security and Quality

- Data
- Source
- Collection method



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Essentially:

- Collect data
- Get it ready for processing
- Preparation step

For our task:

- Dataset already collected
- Download + import + prepare

Our dataset

CSV file (comma-separated-values)

- Comes with Metadata

Metadata is data that provides information about other data

NA – North America

EU – Europe

Data Collection in Google Sheets

- Download the csv file
- Open Google Sheets
- Import the file
- Prepare the file

Google Sheets

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Loading a file

- Go to File
- Import
- Upload
- Select a file from your device

Google Sheets

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Prepare the file

- Name the sheet
- Move to suitable folder
- Delete whitespaces
- Resize columns
- Format headers
- Add borders

Google Sheets

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Prepare the file

Video Game Sales Raw Data

File Edit View Insert Format Data Tools Extensions Help Last edit was seconds ago

G5 | 3.73

	A	B	C	D	E	F	G	H	I
1	Rank	Name	Platform	Year	Genre and Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales
2	72	Donkey Kong Country	SNES	1994	Platform Nintendo	4.36	1.71	3	0.23
3	79	Wii Party	Wii	2010	Misc Nintendo	1.79	3.53	2.49	0.68
4	34	Call of Duty: Black Ops 3	PS4	2015		5.77	5.81	0.35	2.31
5	32	Call of Duty: Black Ops	X360	2010	Shooter Activision	9.67	3.73	0.11	1.13
6	81	Mario Party 8	Wii	2007	Misc Nintendo	3.81	2.3	1.58	0.73
7	36	Call of Duty: Black Ops II	X360	2012	Shooter Activision	8.25	4.3	0.07	1.12
8	54	Super Mario 3D Land	3DS	2011	Platform Nintendo	4.89	2.99	2.13	0.78
9	53	Gran Turismo	PS	1997	Racing Sony Computer Entertainment	4.02	3.87	2.54	0.52
10	39	Grand Theft Auto III	PS2	2001	Action Take-Two Interactive	6.99	4.51	0.3	1.3
11	63	Halo: Reach	X360	2010	Shooter Microsoft Game Studios	7.03	1.98	0.08	0.78
12	59	Pokemon FireRed/Pokemon LeafGreen	GBA	2004	Role-Playing Nintendo	4.34	2.65	3.15	0.35
13	18	Grand Theft Auto: San Andreas	PS2	2004	Action Take-Two Interactive	9.43	0.4	0.41	10.57
14	50	Pokemon Omega Ruby/Pokemon Alpha Sapphire	3DS	2014	Role-Playing Nintendo	4.23	3.37	3.08	0.65

Google Sheets

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Step 3: Data Wrangling

- What does data wrangling involve?
- Preparing data for analysis in Google Sheets

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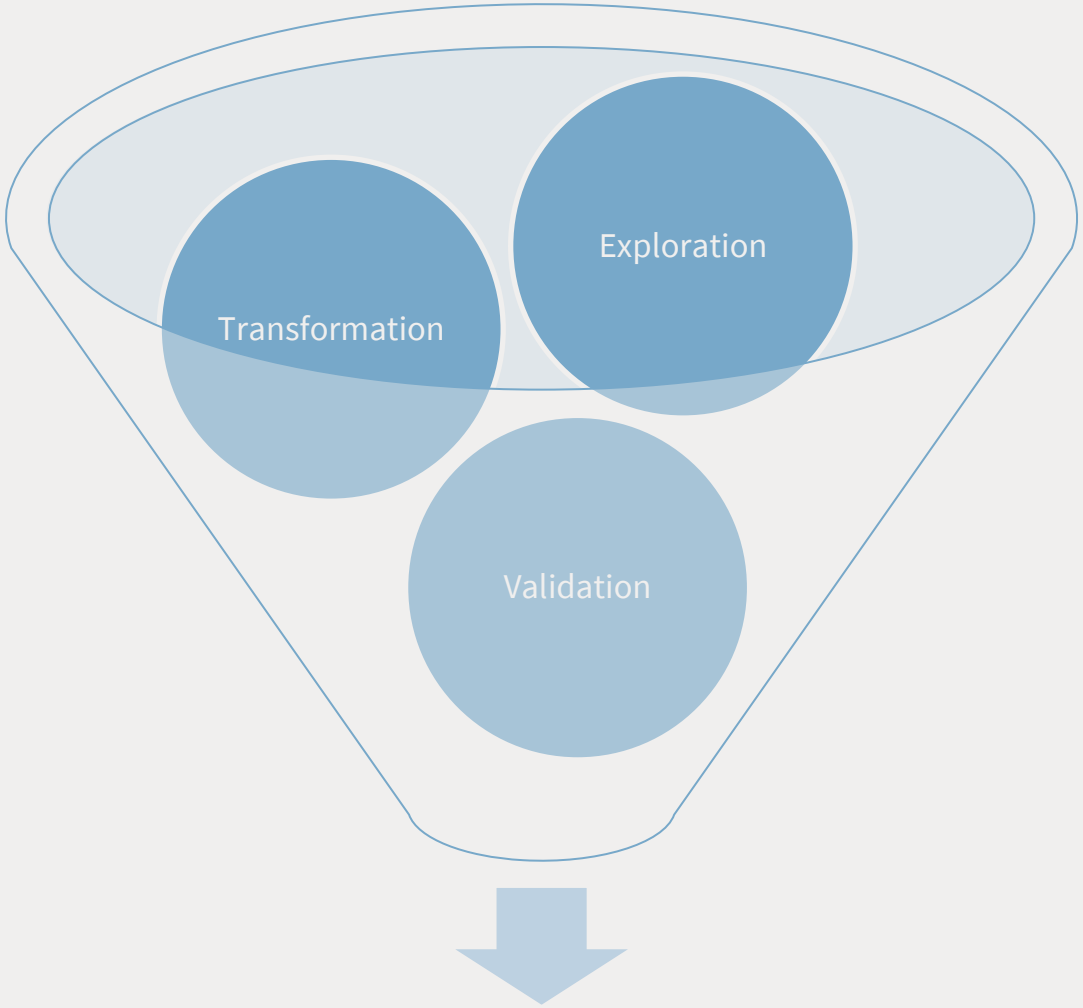
What does Data Wrangling involve?

- Iterative process



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Data exploration involves understanding what data you have and examining that data

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Understanding the data

- Looking at each column of data

Date	Coffee	Price	Quantity
1/1/2022	Latte	2.5	3
2/1/2022	Cappuccino	3	2
3/1/2022	Latte	2.5	4

- Numeric (871, 3.02)
- Categorical (Type of coffee, car brands, country)

Examining the data

Explore data to see what transformations are required

Look out for:

- Missing values
- Errors (typos, inconsistent data entry, white spaces)
- Duplicates
- Data type
- Outliers
- Measurement Units

Transformations

- Bulk of the process
- Data cleaning

Validation

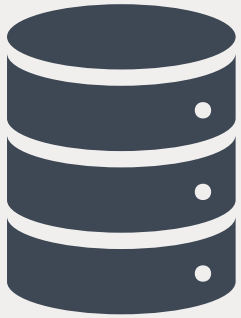
Assessing the quality of the data

Examining the data (iterative process)

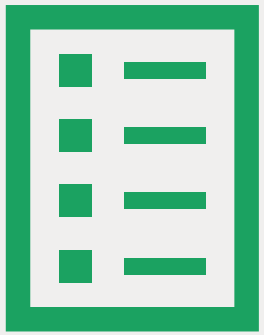
Output

Saved

Exported



Backed up



Documented

Data Wrangling in Google Sheets

- Examine every column
- Transform the data

Google Sheets

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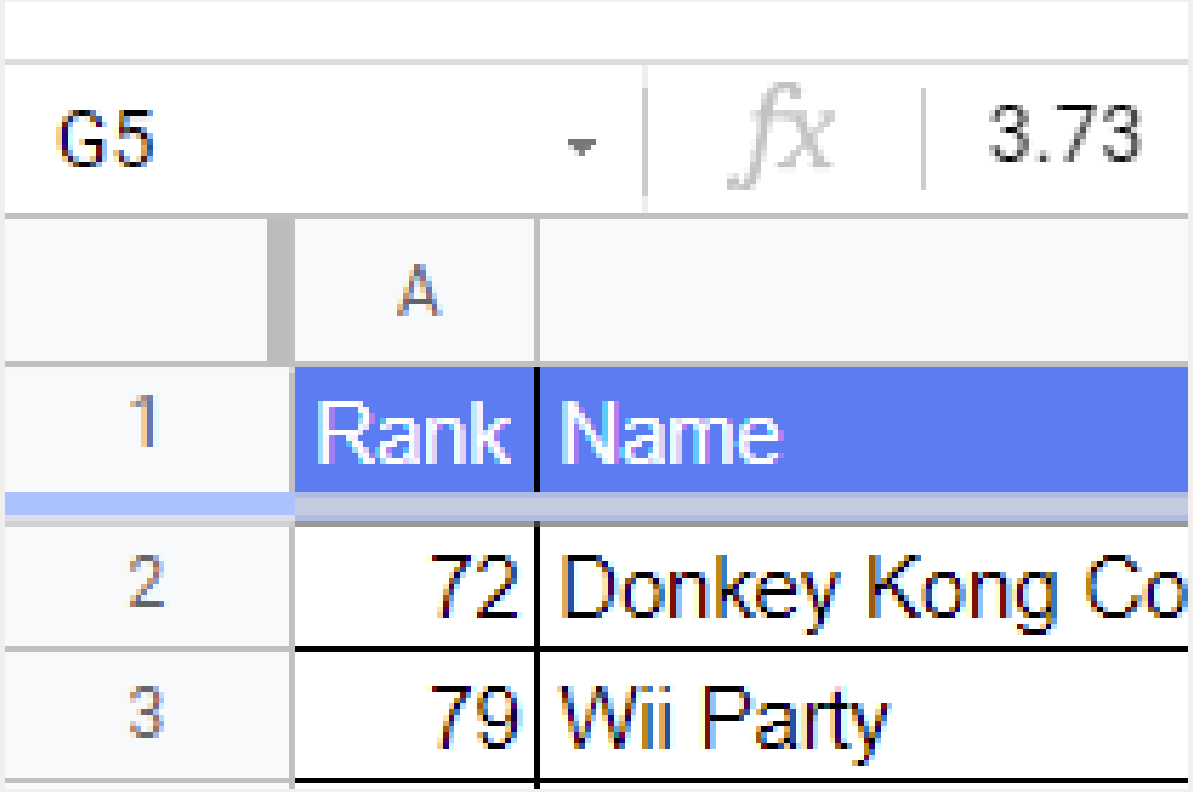
Data Wrangling in Google Sheets

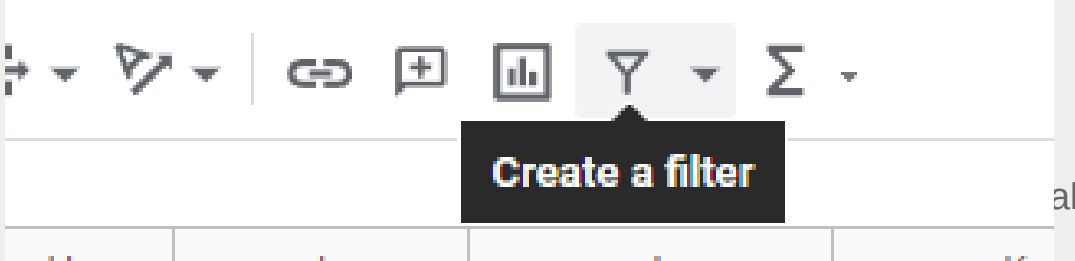
- Make header row (drag slider)



Google Sheets

Data Wrangling in Google Sheets

- Sort a column:
  - Right click selected column and choose ‘Sort Sheet’
- Remove duplicates:
  - Data > Data clean-up > Remove duplicates
- Filter values
  - Select row(s) to filter > press filter shortcut



Google Sheets

Data Wrangling in Google Sheets

- Split one column in two
  - Select column > Data > Split text to columns
  - Use LEFT and RIGHT functions
- Conditional formatting
  - Highlight cells to format > Format > Conditional Formatting

Google Sheets

Step 4: Data Analysis and Visualisation

- Useful analysis features in Google Sheets
- Analyse our prepared dataset

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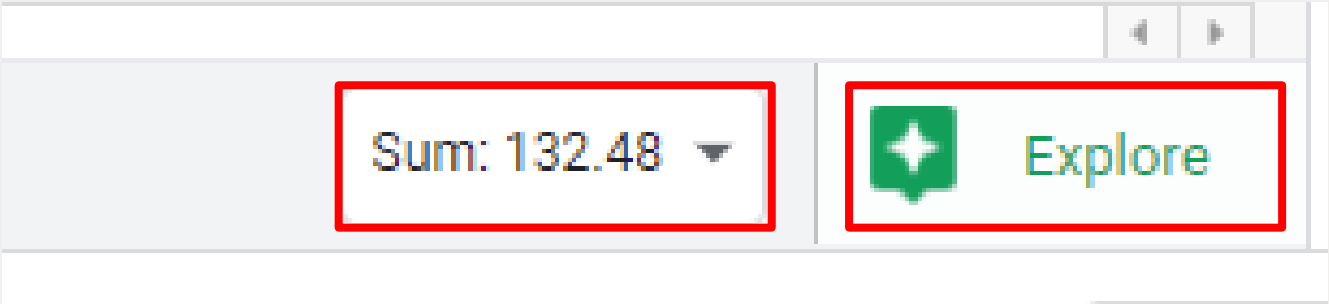
Data Analysis in Google Sheets

- Quick insights and machine learning generated suggestions bottom right of Sheets



- Search Sheet shortcut: Ctrl + F

  (or Command + F on Mac)

Google Sheets

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Data Analysis in Google Sheets

Pivot Tables:

- Select whole dataset
  - Insert > Pivot table

Charts:

- Select data > Insert chart

Google Sheets

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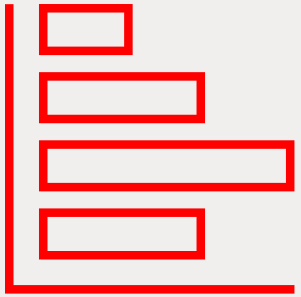
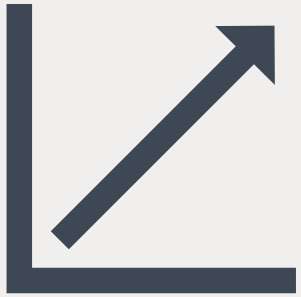
Common Types of Charts

Column

Pie



Bar



Line

1. What were the best and worst performing genres in total sales?
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Step 5: Documenting the Process

- Why is documenting important?
- What should be documented?

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Why is it important?

- Future reference
- Ensure process repeatable

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What to document?

- What is the problem?
- How was the data source collected?
  - Metadata
- How did you transform the data for analysis?
- What analysis was carried out?
- What were the conclusions?

- What were the considerations behind each decision?

Step 6: Sharing Insights

- Why reporting your analysis is important to get right
- How to share your insights

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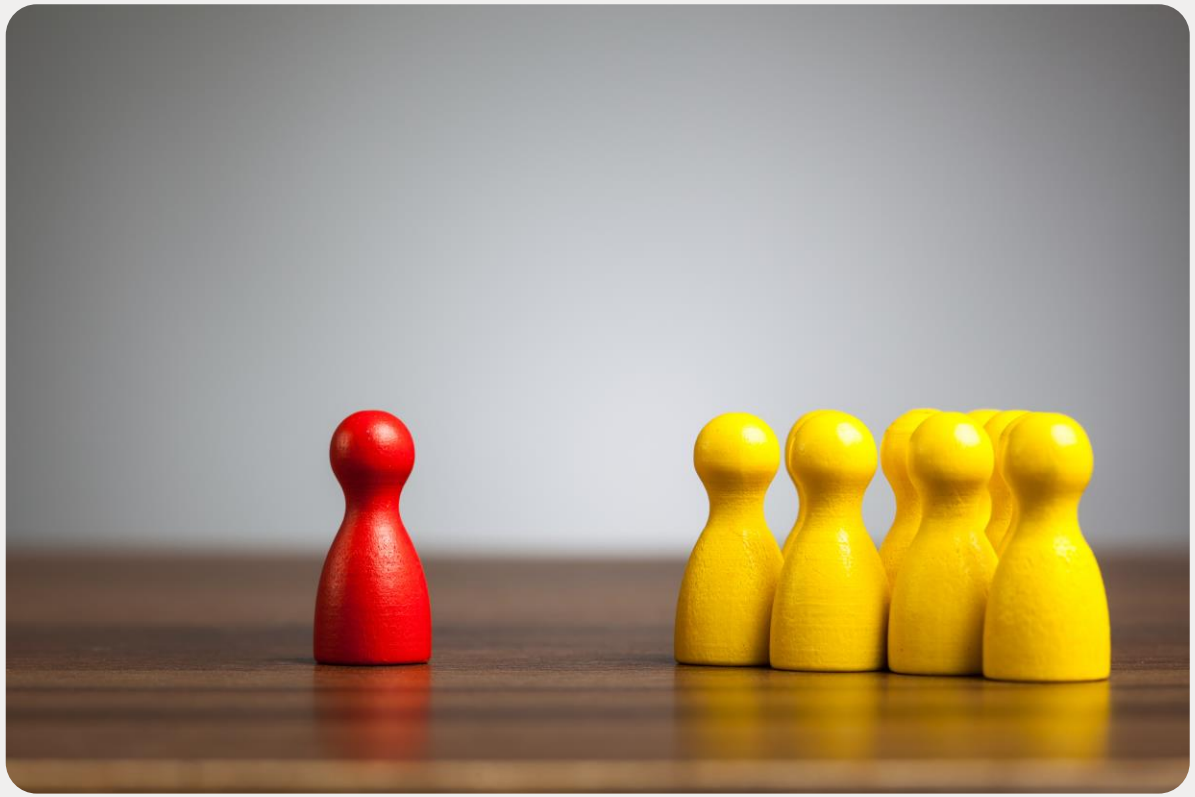
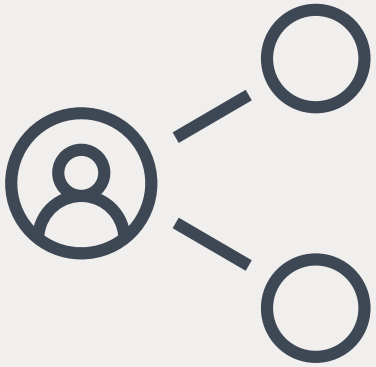
Why reporting your analysis is important to get right

- Stakeholders make **decisions**
- Informs decision making



How to share your insights

- What are the expectations?
  - Visualisation? Dashboard? Detailed report?
- Presentation is not a data dump
  - Story: Present the process
  - Include relevant information only
  - Visualisation – effective communication tool
- Use domain language of the industry



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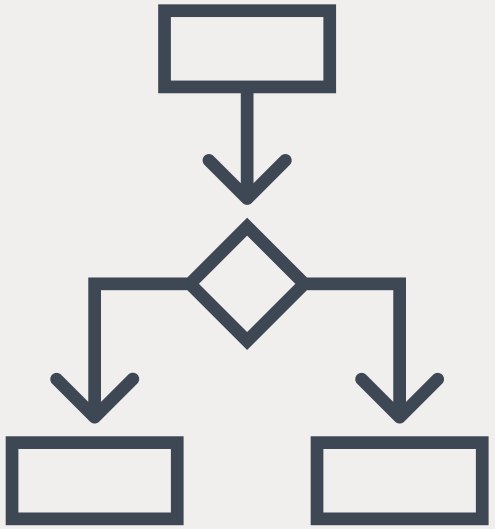

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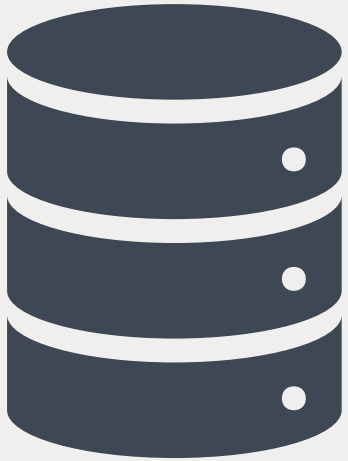

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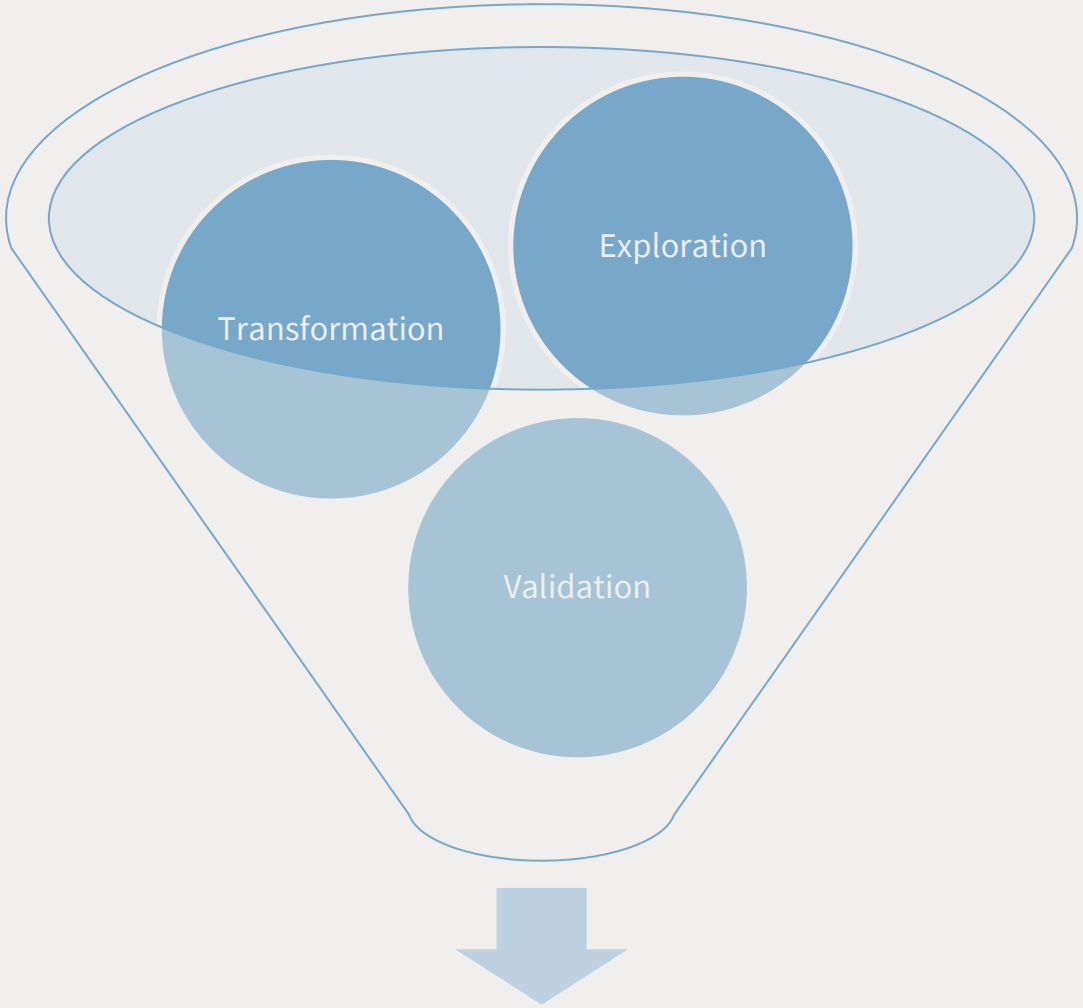

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Data Wrangling in Google Sheets

- Examine every column
- Transform the data

Google Sheets

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Data Analysis in Google Sheets

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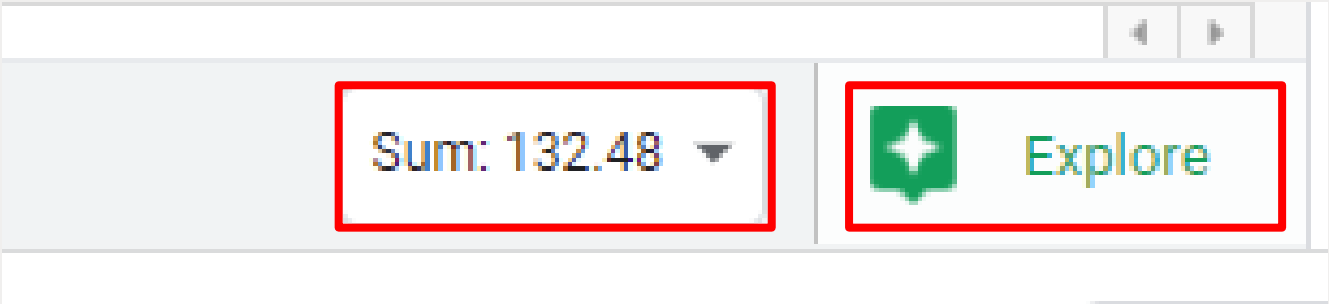

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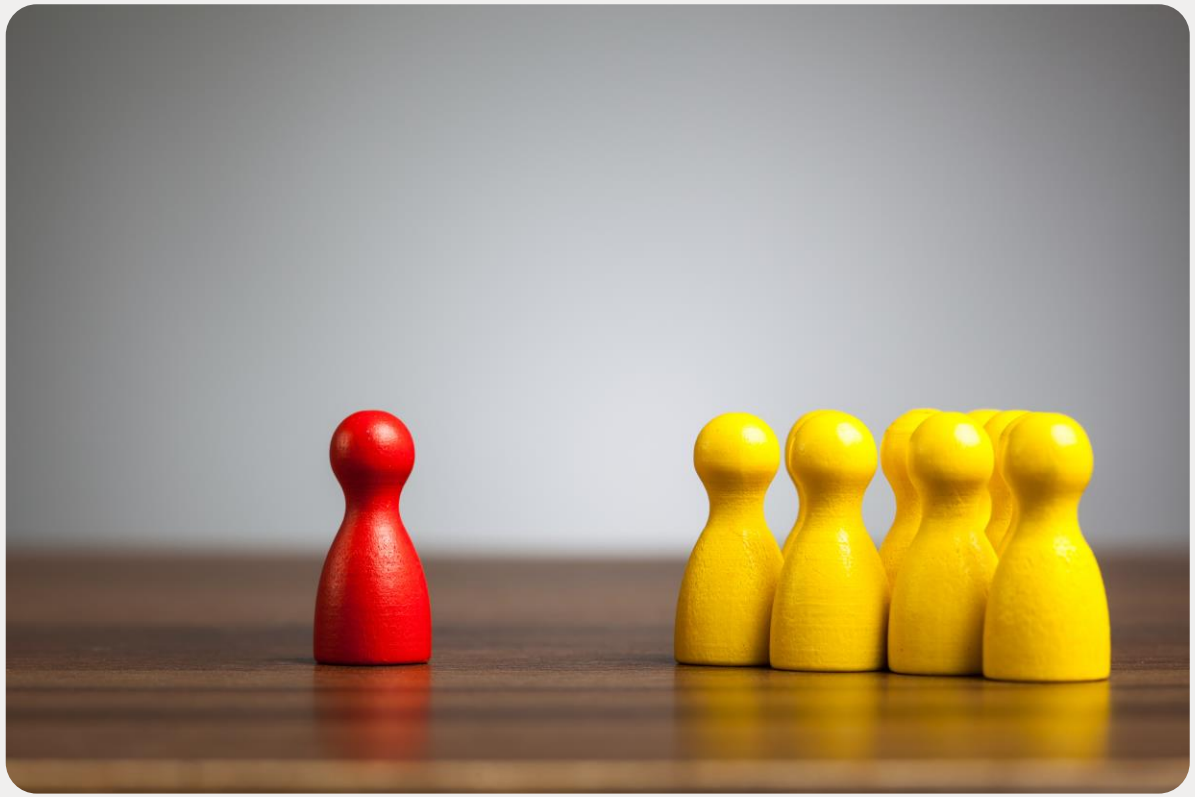

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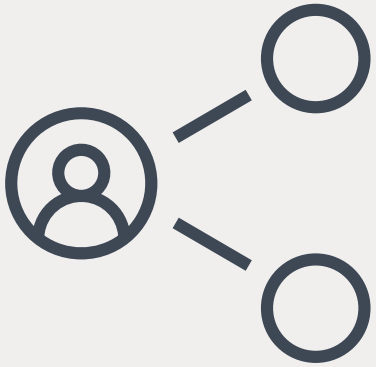

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Next Chapter

Google Analytics

Assignment

- First **five** questions are **theory** based.
- Next **five** questions are a continuation of the **analysis** in Google Sheets of the Video Game Sales dataset that we cleaned in this chapter.