# Essential Chart Types

Why Use Charts?

Charts are an essential part of working with data, as they are a way to condense large amounts of data into an easy-to-understand format.

Visualizations of data can bring out insights to someone looking at the data for the first time, as well as convey findings to others who won't see the raw data.

Transforming data into an effective visualization or dashboard is the first step towards making your data make an impact.

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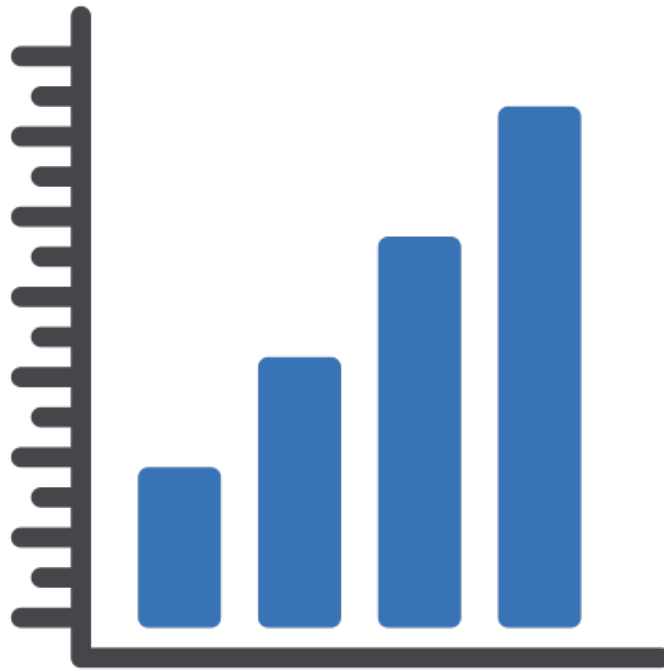
Bar Chart

Bar charts are used to **compare different categories of data**. They consist of a series of bars that represent the values of each category.

Bar charts can be used with a wide variety of data types, including numerical, categorical, and ordinal data. They can also be used to display data in different formats, such as stacked, grouped, or clustered bars.

Line Chart

Line charts are used to **display trends in data over time**. They are made up of a series of points connected by a line.

Line charts allow viewers to easily see how data values change over time, and how different trends may be related to each other such as monthly sales or weather patterns.
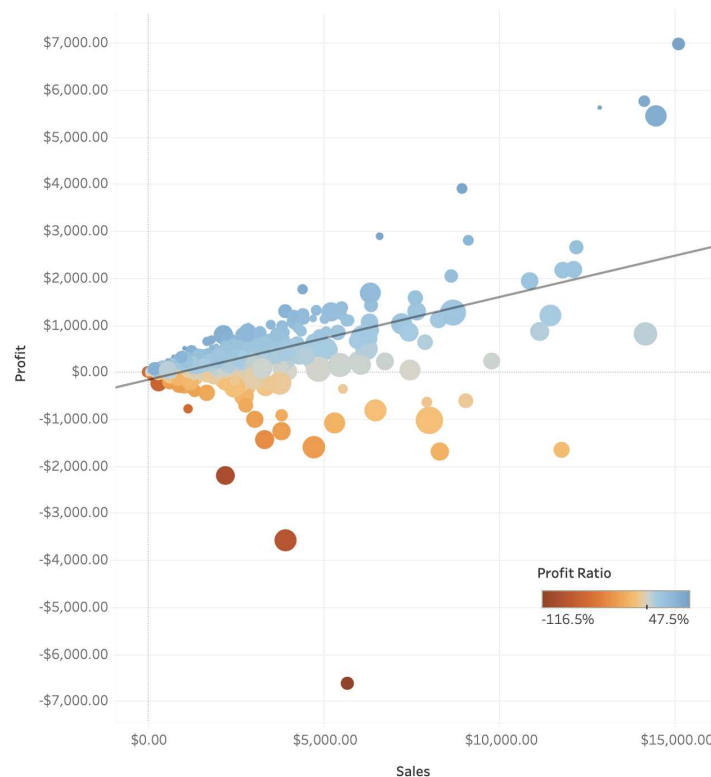
Pie Chart

Pie charts are used to **show how different parts make up a whole.** They consist of a circle divided into sections that represent the proportions of different parts.

A pie chart alone does not give the viewer a way to quickly and accurately compare information so we should use them alongside other charts and graphs to drill down into the data.
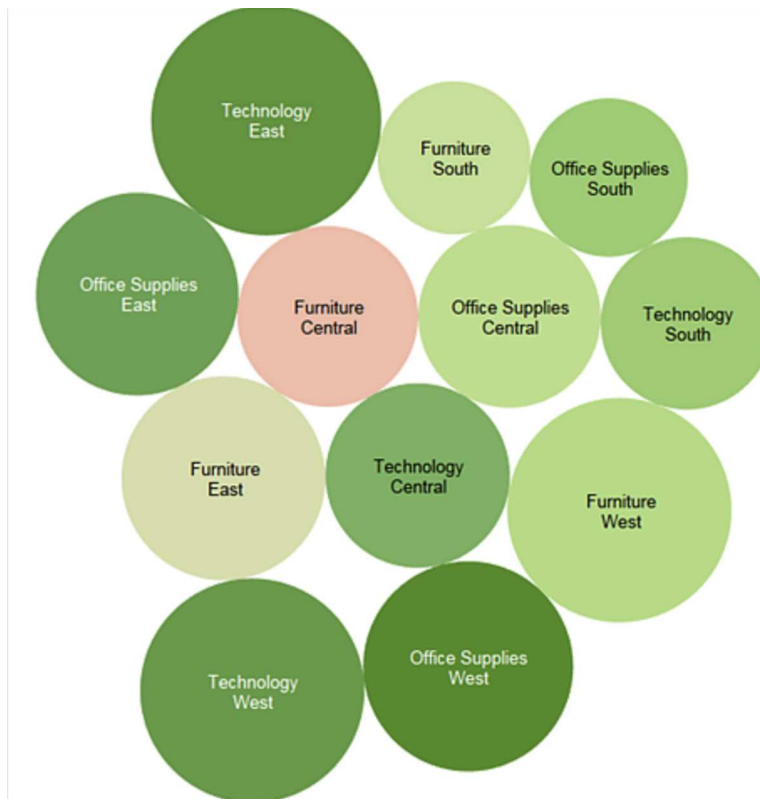
Scatter Plot

Scatter plots are used to **show the relationship between two variables**. They consist of a series of points on a graph, with each point representing a data point.

Scatter plots can help to identify patterns in data, such as clusters or outliers. They can also be used to investigate the correlation between two variables.
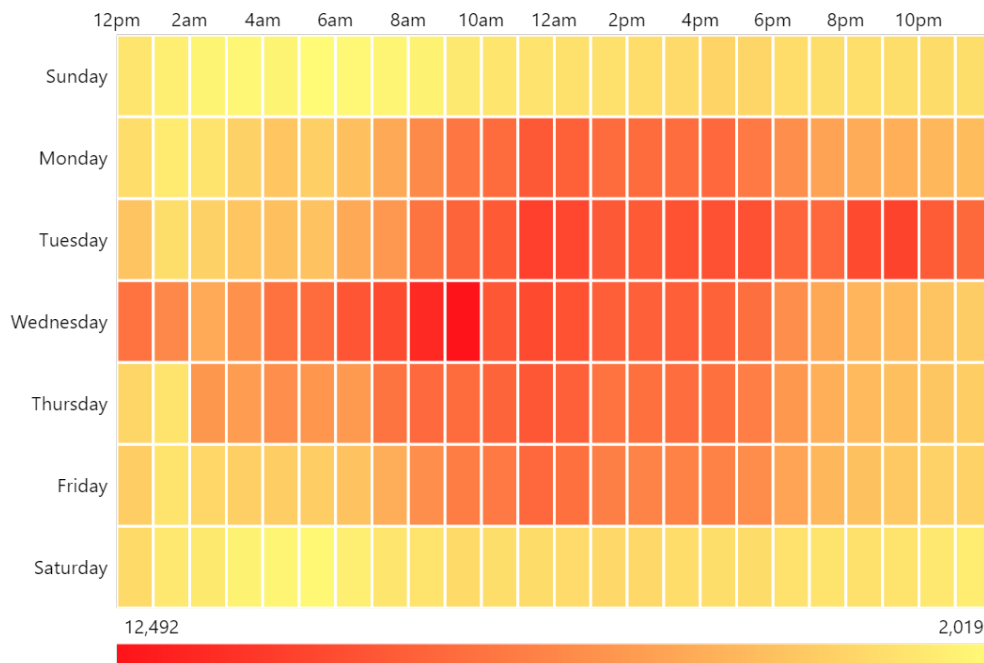
Bubble Chart

Bubble charts are used to **show the relationship between three variables**. They consist of a series of bubbles on a graph, with the size and color of each bubble representing different variables.

Bubble charts can be visually engaging, particularly when you use bright colors or interesting shapes for the bubbles.
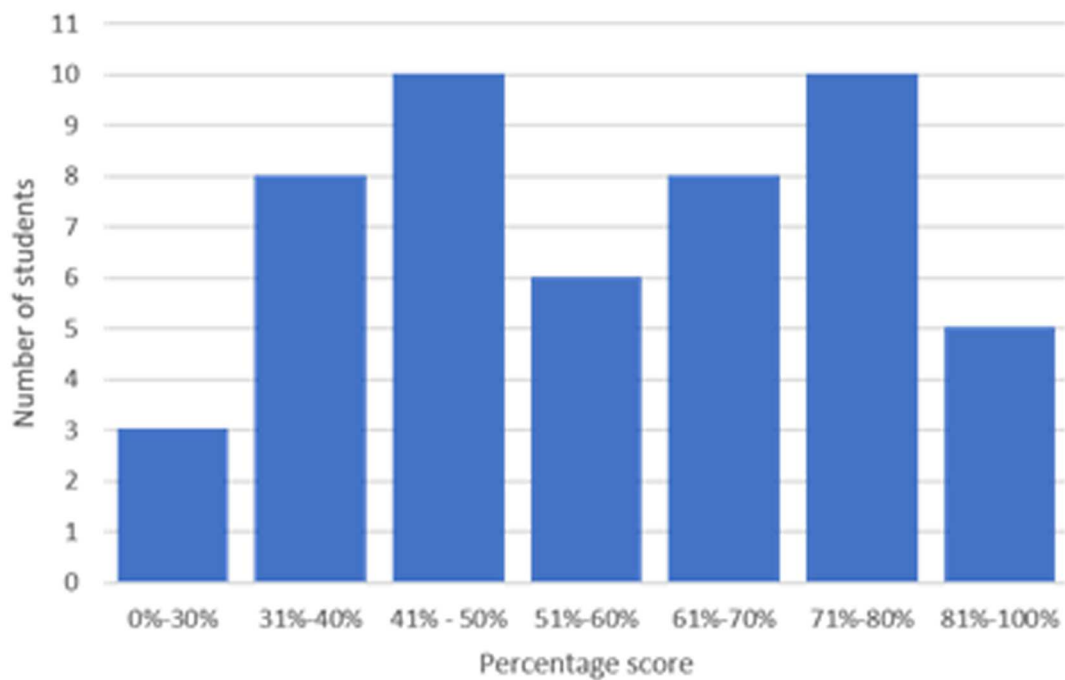
Heat Map

Heat maps are used to **show the density of data in a two-dimensional space**. They use colors to represent the density of data in different areas of the space.

Heat maps are particularly useful for displaying large datasets, as they can show patterns that would be difficult to see in a table or other data visualization tool.
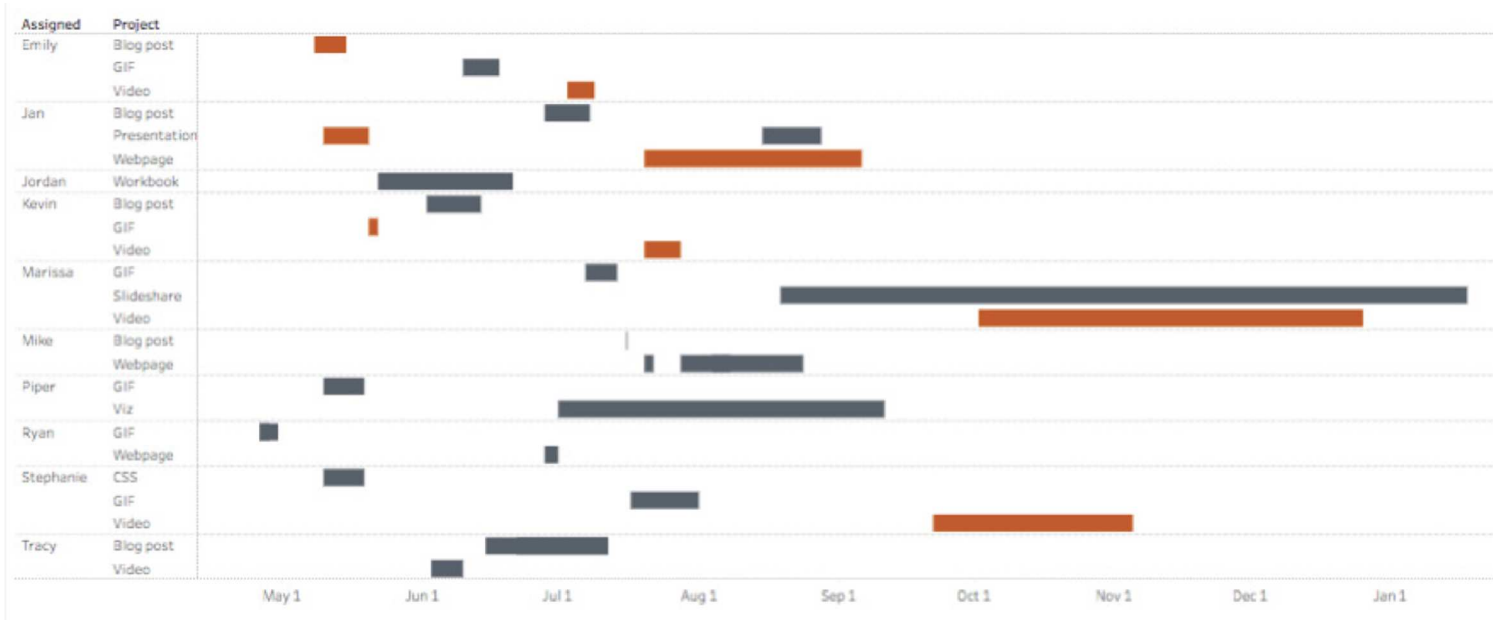
Histogram

Histograms are used to **show the distribution of a dataset**. They consist of a series of bars that represent the frequency of data within certain intervals.

Histograms can be used to visualize things like the number of customers by company size, student performance on an exam, or frequency of a product defect.

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Gantt Chart

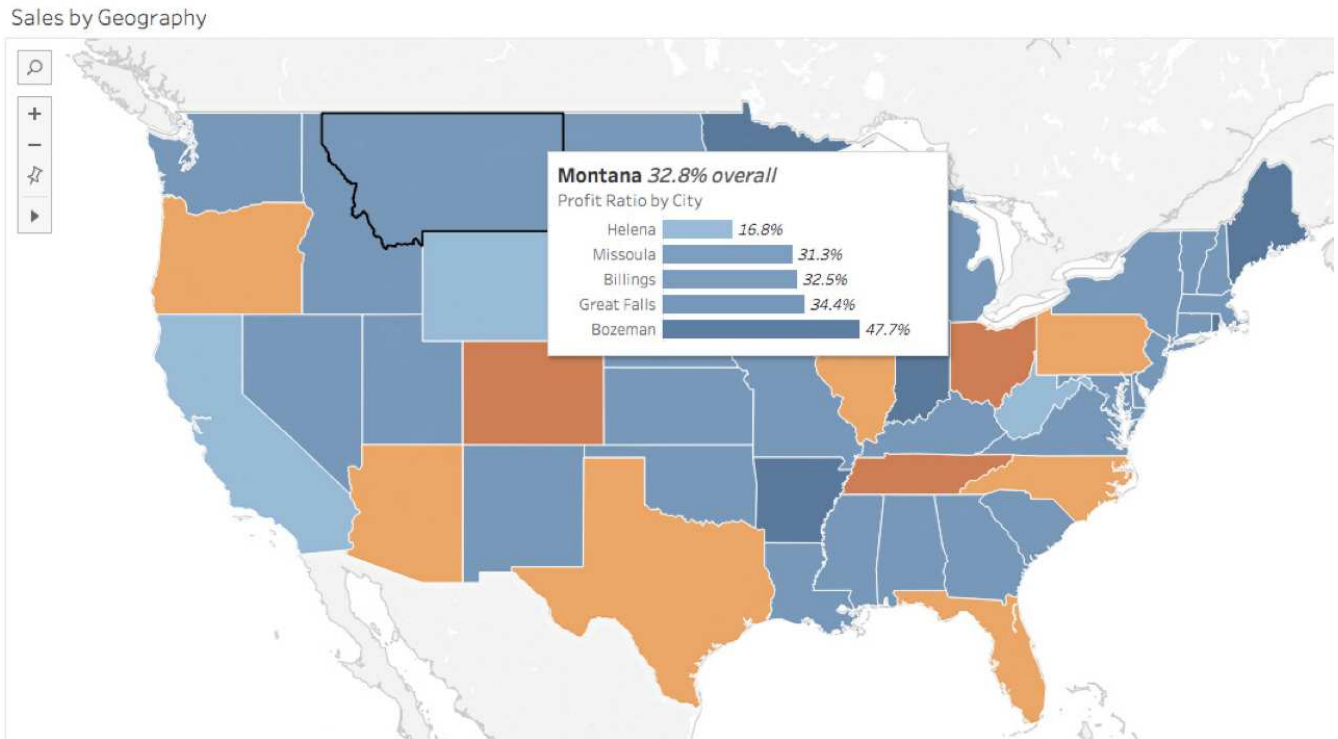Gantt charts are used to **show the progress of a project over time**. They consist of a horizontal bar chart that represents the timeline of the project and the tasks that need to be completed.

Gantt charts can also be used to represent any data related to a time series like the duration of a machine's use or the availability of players on a team.

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Map

Sales by Geography

Montana *32.8% overall*
Profit Ratio by City

Helena	16.8%
Missoula	31.3%
Billings	32.5%
Great Falls	34.4%
Bozeman	47.7%

If you have **geographic information associated with your data**, maps are a simple and compelling way to show how location correlates with trends in your data.

For example, sales by city, product export destinations by country, and car accidents by state.

Bullet Chart

Sales Performance vs Target

October	Consumer	
	Corporate	
	Home Office	
November	Consumer	
	Corporate	
	Home Office	
December	Consumer	
	Corporate	
	Home Office	

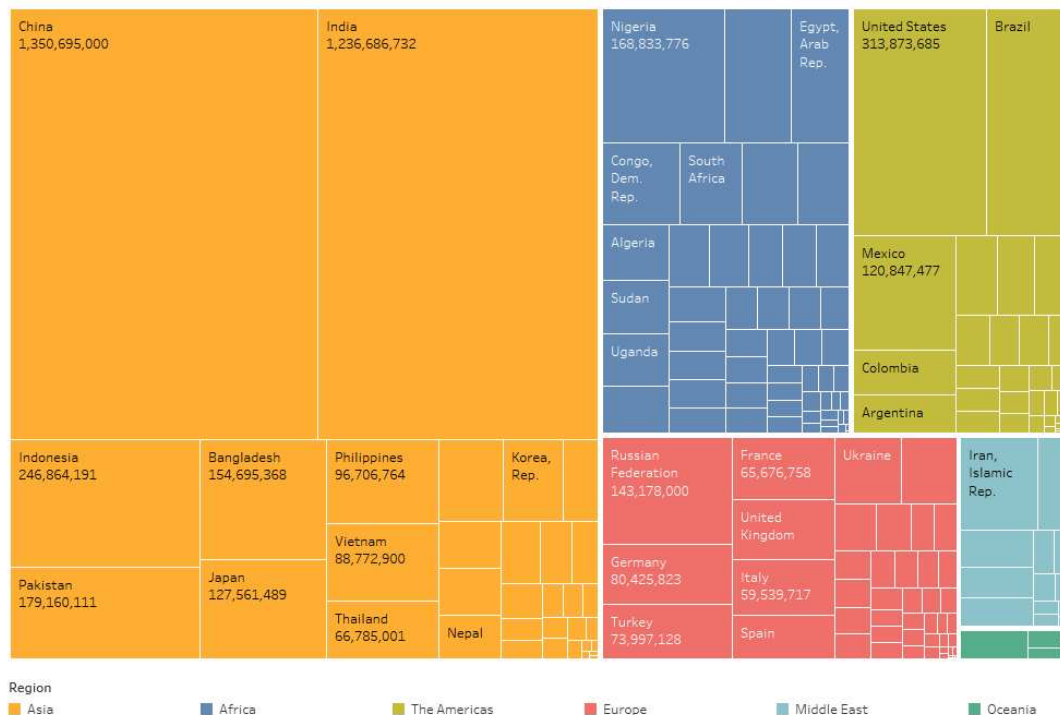$0 $10,000 $20,000 $30,000 $40,000 $50,000

Bullet charts allow you to **quickly compare progress against a goal**.

A bullet chart is a variation of a bar chart. A bullet chart shows more information and provides more points of comparison while using less space. Because it doesn't display history, this chart is best suited for quick "how are we doing" dashboards, rather than deep analysis.

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Treemap

World Poplation in 2012

Region					
■ Asia	■ Africa	■ The Americas	■ Europe	■ Middle East	■ Oceania

Treemaps **relate different segments of your data to the whole**.

As the name of the chart suggests, each rectangle in a treemap is subdivided into smaller rectangles, or sub-branches, based on its proportion to the whole. They make efficient use of space to show the percent total for each category.

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Box-and-Whisker Plot
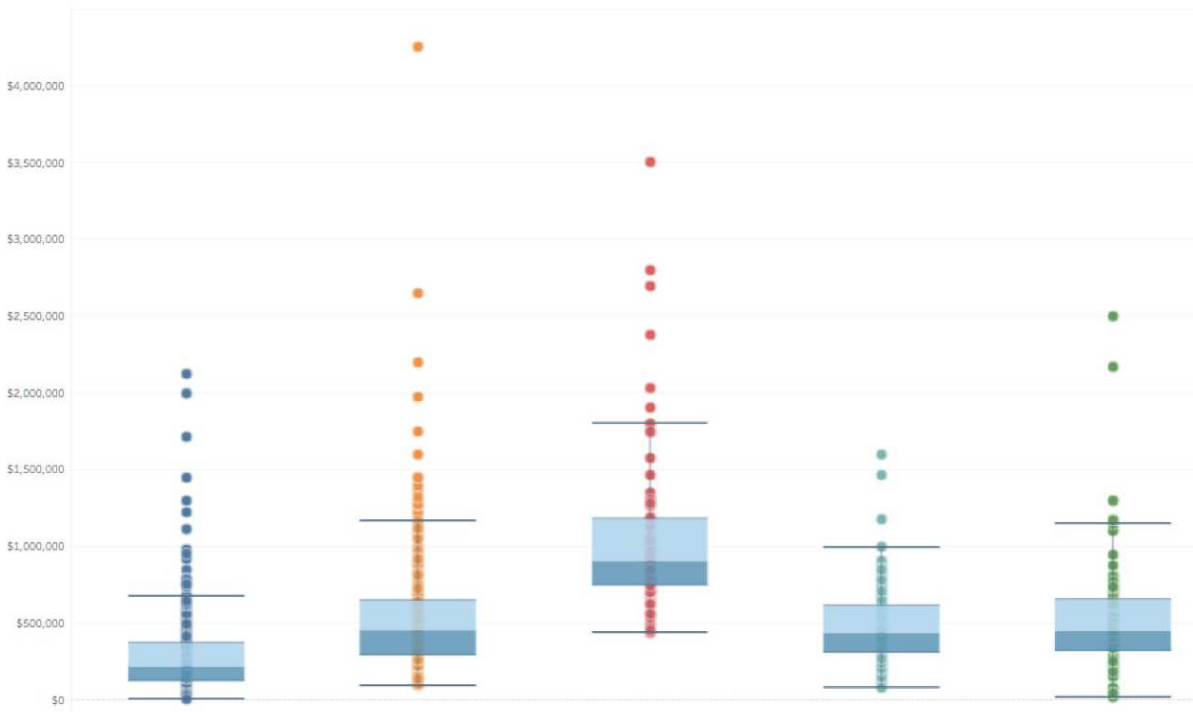
Box-and-whisker plots, or boxplots, are a common way to **show distributions of data**.

The name refers to the two parts of the diagram: the box, which contains the median of the data along with the 1st and 3rd quartiles (25% greater and less than the median), and the whiskers, which typically represent data within 1.5 times the interquartile range (the difference between the 1st and 3rd quartiles).

The right type of chart for your analysis

Selecting the right type of chart for your data is important, as it can help you to effectively communicate your message to your audience. Here are some steps you can follow to select the right type of chart.

By following these steps, you can choose a chart type that effectively communicates your message and engages your audience

The right type of chart for your analysis

1. Identify your message: The first step in selecting the right type of chart is to identify the message you want to convey with your data. Do you want to compare values, show trends over time, or display proportions? The answer to this question will help you to select the most appropriate chart type.

2. Consider your data: The type of data you have will also influence the type of chart you select. For example, if you have categorical data, a bar chart or pie chart might be appropriate, while if you have continuous data, a line chart or scatter plot might be better.

3. Evaluate the chart types: Once you have identified your message and considered your data, evaluate different chart types to see which one best communicates your message.

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The right type of chart for your analysis

4. Test your chart: Once you have selected a chart type, test it with your data to see how it looks and whether it effectively communicates your message. Make any necessary adjustments to the chart to ensure that it is clear and effective.

5. Consider your audience: Finally, consider your audience when selecting a chart type. Think about their level of familiarity with the data and their preferences for different types of visualizations. Choose a chart type that will be easily understood by your audience and that they will find engaging.
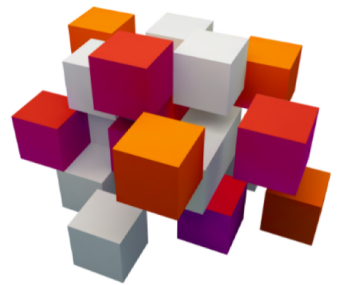
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Data Analysis Steps

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Data Cleaning Steps

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Common data fallacies to watch out for...

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What is Supervised Learning?

2+2=4

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Regression Analysis

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Clustering

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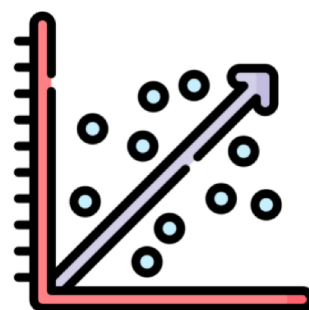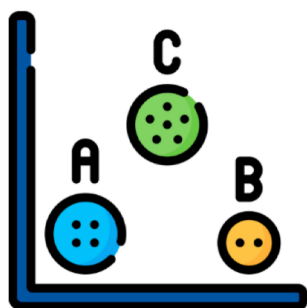
Principal Component Analysis

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t-Distributed Stochastic Neighbour Embedding (t-SNE)

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