

COMPARING CATEGORIES - LAB ACT 3

DATA ANALYSIS AND VISUALIZATION (CS ELEC 3C)

Group 10 – 4CSD

Baylon, Karyle Zhienelle V.

Francisco, Leann Joy Y.

Magtanong, Ralph Daven M.

Inspect the dataset fields. List 2–3 questions you could answer by comparing categories. For each question, choose an initial chart type and encoding (stacked bar, dot/lollipop, Sankey diagram, unit charts, etc). Briefly justify your choice. Use Tableau to create the visualization. Show at least 5 types.

QUESTIONS:

1. Which year had the largest global average inflation (CPI %)?

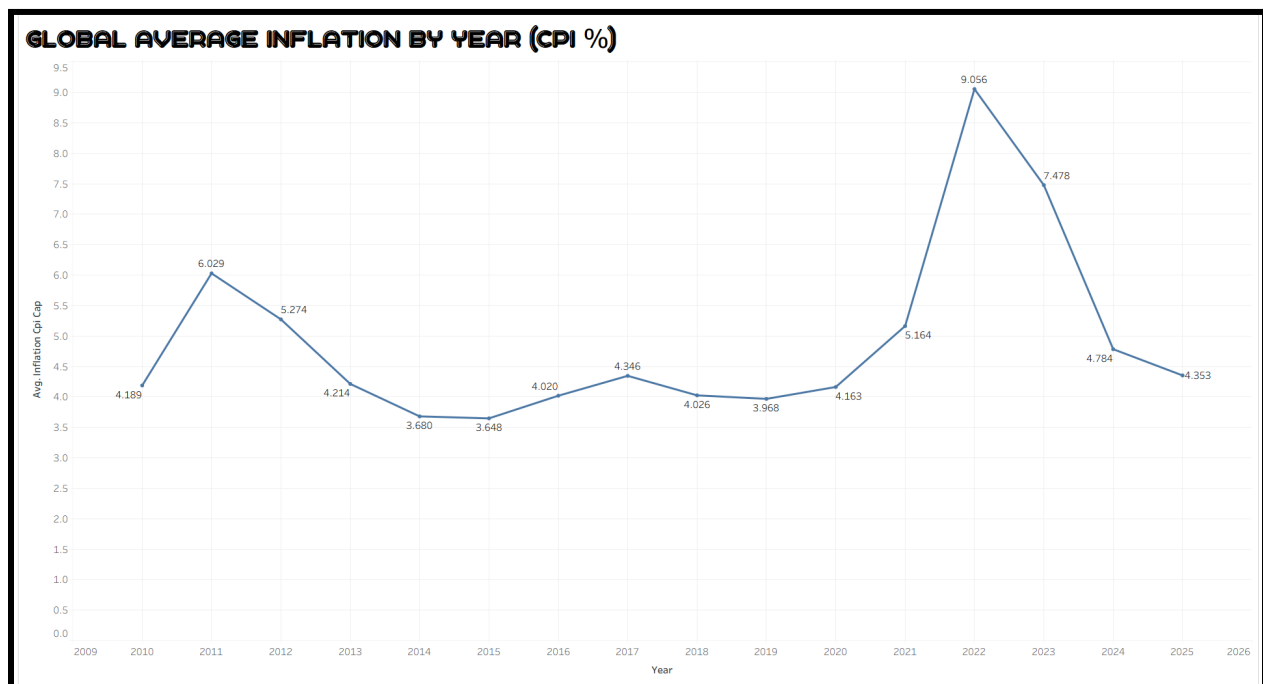


Chart type: Line Chart

Encoding:

- **Y-axis:** Average Inflation (CPI %) (quantitative)

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- **X-axis:** Year (continuous)
- **Color:** Blue
- **Label:** Actual global average inflation value

JUSTIFICATION: For *displaying trends over time*, a **line chart** works best. It enables us to track changes in global inflation, spot peaks and troughs, and determine whether inflation has been increasing or leveling off in recent decades. Compared to discrete bars, the line's continuous nature facilitates the perception of long-term economic cycles.

- What is the main takeaway in one sentence?
 - The line graph illustrates that the global average inflation rate, as determined by the CPI, fluctuated significantly between 2021 and 2022, peaking at 9.056% in 2022 and then falling to 4.353% by 2025.
- Name one design decision you made and why it improves understanding.
 - The key design or encoding decision that significantly improves the understanding of this line graph is the addition of labels with the actual global inflation value. This design provides precise data points along the line, making it easier to quickly grasp the exact inflation rates without needing to estimate from the axis.
- Identify one limitation or potential misinterpretation.
 - One drawback of the line chart itself is that by focusing on continuous trends, it may oversimplify complex data and conceal short-term fluctuations or outliers that might be easier to see in a box plot or scatter plot. This might cause users to ignore notable

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short-term fluctuations in inflation rates in favor of the larger trend.

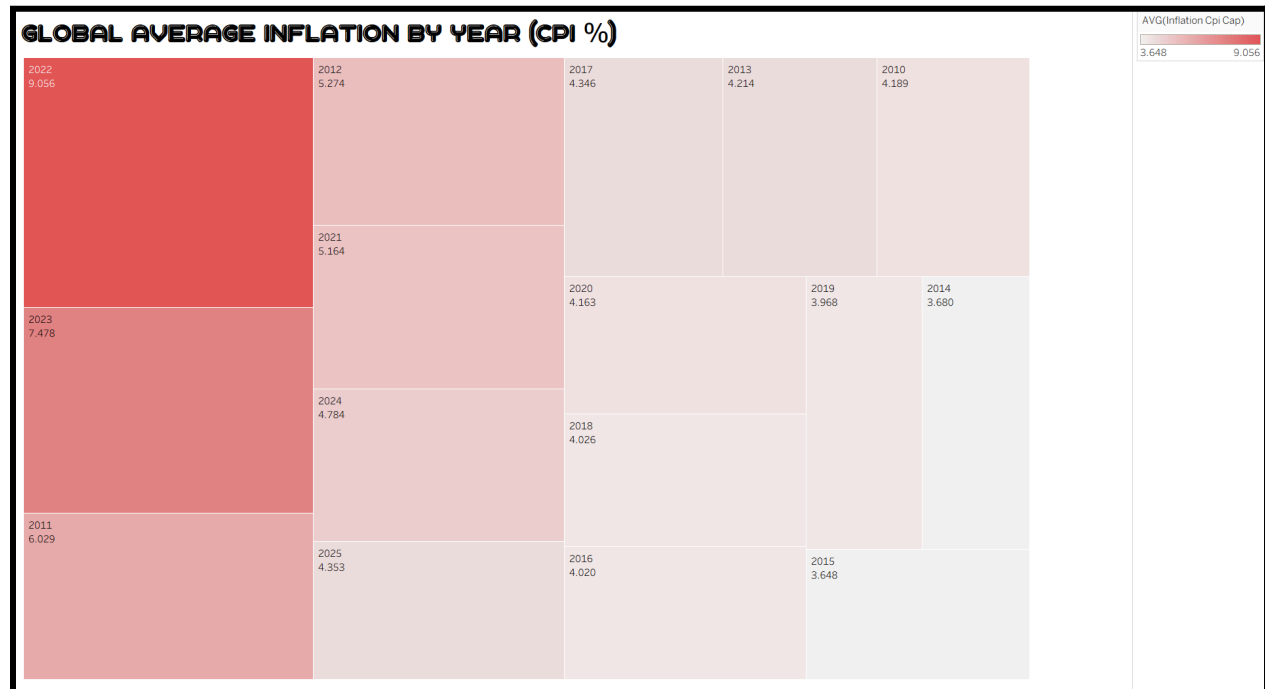


Chart type: Treemap

Encoding:

- **Size:** Average Inflation (CPI %) (quantitative, by year)
- **Color:** Gradient scale of red (light = low inflation, dark = high inflation)
- **Label:** Year and Avg Inflation (CPI %)

JUSTIFICATION: In this case, a **tree map** makes it simple to *identify the top year by assigning greater regions to years with higher average inflation*. This is further reinforced by the use of color, which makes the result visually clear and instantly recognizable by darkening the highest inflation values. The viewer's eye is naturally drawn to the most prominent and most opaque block in this design, instantly telling you which year stood out the most.

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- What is the main takeaway in one sentence?
 - The tree map reveals that 2022 has the highest average inflation rate at 9.056%, its dominant size and darker shading make it immediately stand out from other years, clearly emphasizing how unusual that spike was compared to surrounding years.
- Name one design decision you made and why it improves understanding.
 - The size and color intensity made the difference in the design decision. It improves understanding by letting viewers quickly identify the peak year while still being able to gauge the relative scale of other years at a glance.
- Identify one limitation or potential misinterpretation.
 - One of its cons is that although the Tree Map clearly shows the peak year, it can make it more difficult to compare mid-range years because the block sizes and colors may seem too similar and fail to appropriately capture subtle differences.

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2. Which country has the highest total GDP per capita?

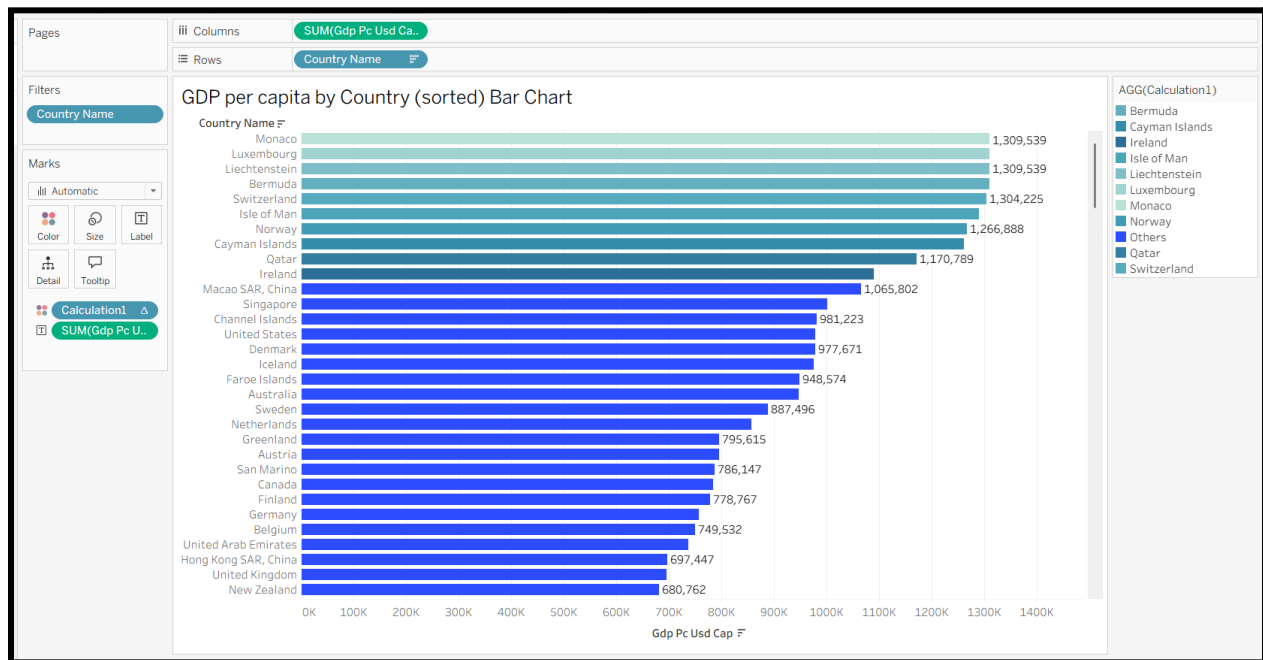


Chart type: Bar Chart

Encoding:

- **Y-axis:** Country names (nominal)
- **X-axis:** GDP per Capita (quantitative)
- **Color:**
 - **Gradient** = Top 10 countries with the Highest GDP per capita
 - **Blue** = Countries that are below the top 10
- **Label:** GDP per capita

JUSTIFICATION: We chose a **bar chart** because it is ideal to represent the values across countries since it shows clear differences between their lengths. Making it easy to understand the data and to rank the countries based on their GDP per capita. When sorting the bars, this ensures that the wealthiest countries are shown and visible at the top, which makes the comparison quick and shows global inequality in economic output.

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- What is the main takeaway in one sentence?
 - According to the graph and data, countries such as Monaco, Luxembourg, and Liechtenstein have the highest GDP per capita, which shows that it has economic dominance other than most countries.
- Name one design decision you made and why it improves understanding.
 - We sorted the bars in descending order of the GDP per capita, because it improves or helps me understand the data better. Making it easy to immediately identify the countries without scanning in unordered values.
- Identify one limitation or potential misinterpretation.
 - Sometimes the GDP per Capita doesn't account for the income or population size of the country. Small, wealthy countries may appear disproportionately to have economic dominance over big and diverse economies.

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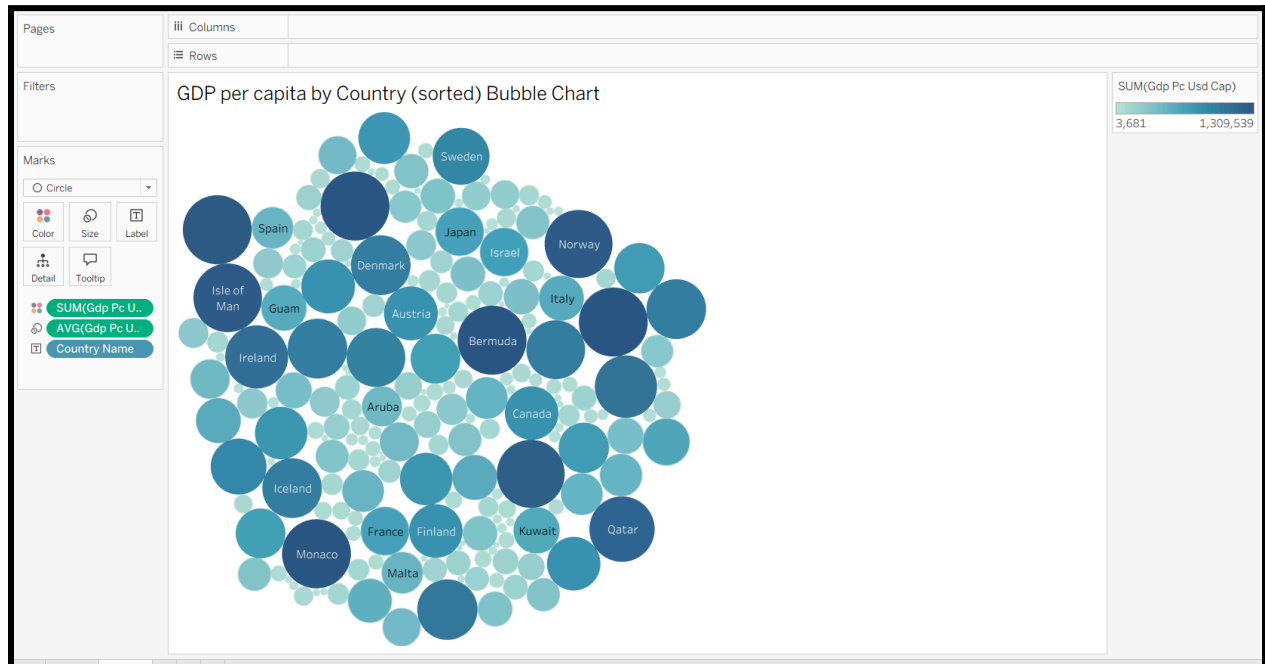


Chart type: Bubble Chart

Encoding:

- **Labels:** Country names (nominal)
- **Sizes:** GDP per Capita (larger bubble = higher GDP per capita). (quantitative)
- **Color:** Gradient blue color = The darker it is, the higher the GDP per capita
- **Label:** Country name

JUSTIFICATION: A **bubble chart** was chosen to represent GDP per Capita because it provides a visual comparison of GDP per capita of the countries. Using the bubble size and color to emphasize the magnitude of the differences between each country.

- What is the main takeaway in one sentence?
 - Countries with the highest GPA are Monaco, Luxembourg, and Qatar stand out with much larger bubbles. This highlights that it

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has a significantly higher GDP per capita compared to other countries.

- Name one design decision you made and why it improves understanding.
 - I applied a color gradient and size linked to GPA per Capita, which improves the visualization of data and understanding by reinforcing size differences and making it easier to spot the country with top performance at a glance.
- Identify one limitation or potential misinterpretation.
 - The one limitation or potential misinterpretation of a bubble chart is that it cannot really compare the exact values and can be misinterpreted. The viewer or interpreter can misjudge the differences in the area.

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3. How does the unemployment rate compare across countries?



Chart type:

Encoding:

- **Y-axis:** Country Name (nominal)
- **X-axis:** Year (time)
- **Color:** Unemployment rate (blue = lower, red = higher)
- **Label:** Country Name

JUSTIFICATION: A **heatmap** is appropriate because it visually encodes unemployment rates using color, enabling quick comparisons across many countries and years at once. This makes it easier to detect

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patterns over time, such as consistently high or low unemployment, as well as outliers or sudden shifts in specific countries.

- What is the main takeaway in one sentence?
 - Unemployment rates vary significantly across countries, but some nations consistently show high unemployment over the years, while most remain relatively stable.
- Name one design decision you made and why it improves understanding.
 - Using a diverging color scale (blue to red) makes high unemployment stand out clearly against lower values, helping viewers immediately identify problem countries and years.
- Identify one limitation or potential misinterpretation.
 - The dense grid of countries can be overwhelming and difficult to read, and without numerical values, it's hard to gauge the exact unemployment rates. Hence, viewers may misinterpret the severity of differences based solely on color intensity.

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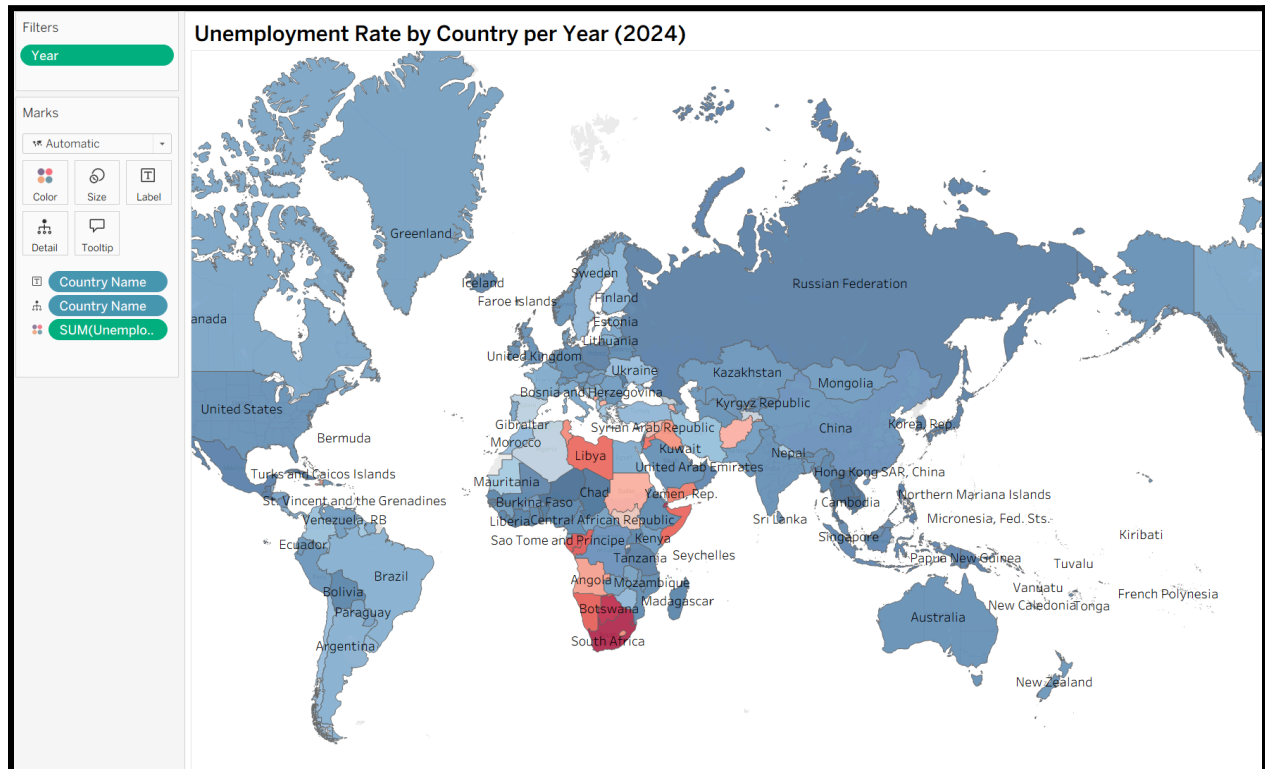


Chart type: Filled Map

Encoding:

- **Color:** Unemployment rate (blue = lower, red = higher)
- **Label:** Country Name

JUSTIFICATION: A **filled map** is appropriate because it provides a clear geographical comparison of unemployment rates across countries, making regional patterns easy to identify. The use of spatial context allows viewers to quickly spot clusters of high unemployment and contrast them with areas of lower rates.

- What is the main takeaway in one sentence?
 - Most countries show relatively low unemployment in 2024, but significant hotspots appear in Southern Africa, North Africa, and parts of the Middle East.

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- Name one design decision you made and why it improves understanding.
 - Using a color gradient from blue (low) to red (high) effectively emphasizes countries with extreme unemployment rates, improving quick visual recognition of problem areas.
- Identify one limitation or potential misinterpretation.
 - The map does not show exact unemployment values, so viewers may misinterpret the severity of differences between countries, especially in mid-range unemployment rates where color shades are subtle.