**Luxury Watch Dataset Analysis**

**Introduction**:  
The objective of this analysis is to explore the differences and similarities between luxury, mid-range, and non-luxury watches, focusing on the materials used and the complications present in these categories. We analysed data from a comprehensive watch dataset, segmenting brands into these three categories based on a consensus of luxury status. Using statistical tools, we aimed to understand patterns in case materials, bracelet materials, lunette materials, and complications across these segments. I used the 20 most popular brands within the dataset covering the 3 price ranges. Within the luxury brands I used 25% of Rolex watches as they were too dominant across the range thus eliminating skewed data.

**Methodology**:  
We segmented the dataset into three categories: **Luxury**, **Mid-Range**, and **Non-Luxury**. Brands such as Rolex, Patek Philippe, and Audemars Piguet were classified as luxury, while brands like Omega and TAG Heuer were considered mid-range. Non-luxury watches included lesser-known or lower-priced brands. Our analysis primarily focused on four key attributes: **Lunette Material**, **Case Material**, **Bracelet Material**, and **Complication** (e.g., automatic, hand-wound, quartz). Chi-square tests were conducted to determine if there were statistically significant differences between the watch categories for each attribute.

**Results**:  
Visualizations were created to highlight the distribution of materials and complications across luxury, mid-range, and non-luxury watches. Some key findings include:

* **Lunette Material**: Luxury watches favoured high-end materials such as **White Gold** (13.5%) and **Yellow Gold** (18.6%), while **Steel** was predominant in all categories but most common in **Non-Luxury** watches (70.4%). Surprisingly, **Ceramic** was common across all categories, with mid-range watches using it the most (17.8%).
* **Case Material**: **Steel** was overwhelmingly dominant across all categories, with **Luxury** watches showing more variety, using materials like **Gold/Steel** and **Platinum**. However, **Mid-Range** and **Luxury** watches both utilized **Titanium** and **Rose Gold**, revealing a surprising overlap in material choices.
* **Bracelet Material**: Again, **Steel** was the most common bracelet material, but **Luxury** watches distinguished themselves with materials like **Platinum** and **Rose Gold**. Interestingly, mid-range watches also frequently used materials like **Crocodile-Leather**, a feature typically associated with luxury.
* **Complications**: **Automatic** movements dominated in the **Luxury** (95.9%) and **Mid-Range** (78.9%) categories. **Quartz** movements were much more common in **Non-Luxury** watches (17.3%) but also appeared in a small portion of mid-range watches (10.2%).

**Statistical Insights**:  
We performed Chi-square tests to statistically analyse the differences between the categories for each of the four attributes:

* **Lunette Material**: The Chi-square value was **19,765** with a **p-value of 0.0**, indicating significant differences between the categories. However, the use of **Ceramic** across all categories was a notable similarity.
* **Case Material**: The Chi-square value was **13,547**, also with a **p-value of 0.0**, demonstrating significant differences. Still, **Steel** was highly favoured across all segments, especially in mid-range and non-luxury watches.
* **Bracelet Material**: This attribute showed the greatest variety, with a Chi-square value of **30,150**. Although **Steel** was the most common material, the luxury category showed more diversity with **Platinum** and **White Gold**.
* **Complications**: The test resulted in a Chi-square value of **11,735**, with luxury and mid-range watches favouring **automatic** movements. However, a larger percentage of **Quartz** movements in mid-range watches was an unexpected finding.

**Conclusion**:  
The analysis revealed distinct material preferences among luxury, mid-range, and non-luxury watches, with luxury watches unsurprisingly favouring precious materials like **Gold** and **Platinum**. However, mid-range watches showed surprising overlaps with luxury watches, particularly in the use of materials like **Ceramic**, **Titanium**, and **Crocodile-Leather**. These findings suggest that mid-range brands are increasingly adopting luxury elements, potentially blurring the lines between the two segments. Despite these overlaps, **Quartz** movements remain a key differentiator for non-luxury watches, while **automatic** movements dominate the higher-end categories.