**Are Lottery Numbers Random?**

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DSC 640 T301: Visualizing Relationships

Exercise – Lottery Numbers

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May 03, 2025

**Are Lottery Numbers Really Random?**

This project explores whether winning lottery numbers are truly random, based on an analysis of three public datasets: Mega Millions, Powerball, and New York Pick 10. The intended audience includes general-public and policy makers, particularly those with limited data literacy but have high interest in fairness and transparency in public gaming systems. The story avoids technical jargons and instead presents insights using intuitive and engaging visualizations.

**Medium:**

The project is presented through a Tableau dashboard, chosen for its ability to sequentially walk users through themes such as top drawn numbers, time-based trends, position-based frequencies, clustering patterns, and annual heatmaps. Some pages feature charts, designed for side-by-side comparison as well. This structure allows for layered storytelling while minimizing cognitive overload.

**Design choices were guided by Gestalt principles:**

* **Color:** Distinct palettes differentiate games (Mega Millions, Pick 10, Powerball) and help group similar data.
* **Text and Alignment:** Bold titles and consistent alignment guide the reader’s attention.
* **Size and Spacing:** Adequate white space separates chart and emphasize visual hierarchy, ensuring clarity across dashboards.

**Key Visualizations:**

* **Histogram and Smoothed Line Chart:** A screenshot of a graph

  AI-generated content may be incorrect.
* Bubble & Density plotA screenshot of a computer screen

  AI-generated content may be incorrect.
* Small Multiple Number Frequency – By Draw PositionA graph with numbers and a number

  AI-generated content may be incorrect.
* Heat Map (Year-wise number activity)A screenshot of a graph

  AI-generated content may be incorrect.These visual tools offer layered insights while complying with the project requirement to include at least four of the specified chart types.

**Ethical Considerations:**

The data was sourced from public lottery records. Modifications included reshaping the format, handling missing values, filtering out extreme outliers (such as overrepresentation in 2024), and binning for visual clarity. Any exclusions were documented, and charts were annotated to avoid misleading interpretations. The primary ethical risk is that viewers may misinterpret patterns as predictive, leading to false confidence in certain numbers. To mitigate this, the narrative clearly distinguishes correlation from causation and frames all findings as exploratory rather than prescriptive.

**Suggested Call to Action:**

The patterns uncovered across Mega Millions, Powerball, and Pick 10 suggest that lottery outcomes may not be entirely random. We recommend that lottery authorities conduct periodic audits of drawing algorithms and equipment to ensure fairness and transparency. At the same time, players should be educated on number distribution trends – not to game the systems, but to better understand it. It’s time to move from myth to data-driven awareness.

**Conclusion:**

In conclusion, this project reveals that while lotteries are designed to be random, patterns – intentional or not – may emerge over time. These patterns justify further investigation, public discussion, and regulatory review to uphold the fairness of games of chance.