1. **Think of a scenario where a dashboard would not be the right tool to visualize the results of your analysis. Create a new document (e.g., Google Docs, Pages, MS Word) and write 3 to 5 sentences describing this scenario and the tool you would use instead.**

   A scenario where a dashboard would not be appropriate would be a medical research study on drug efficacy. In this scenario, a pharmaceutical company would conduct a clinical trial to analyze the long and short-term effects of a new drug on a patient's health. In a study like this, there would be regulatory and ethical constraints where sensitive data should not be shared or distributed via dashboard. Additionally, a dashboard would not be the right platform for in-depth explanations. Instead, a peer-reviewed journal would be a better alternative for sharing explanations and methodologies. A study like this could involve regression analysis or hypothesis testing, and both could be presented in a dashboard, but a scientific paper would be preferred for extensive explanation and analysis.

3. **Find an example of a polished and interactive dashboard and explain why this dashboard is successful. https://mahmoud2227.pythonanywhere.com/**
   a. The bar chart utilizes visualizations, like bar charts, line graphs, tree maps, and box and whisker plots. These different types of visualizations make the dashboard engaging and not monotonous. The movie and series recommendations are a nice touch, but the series recommendation needs some calibration as the recommendations don't seem to relate to the inputted series that well.
   b. The dashboard has a clean layout with distinct sections, making it rather intuitive. The consistent color schemes are a nice touch, but would seem a bit too bright for some users in my opinion. The spacing and alignment of the visuals are a nice feature, making it visually appealing and intuitive.
   c. The dashboard provides quick insights into movie / series trends where you can easily identify popular genres, top-rated films / shows, and patterns over time. This allows for data-driven decision-making, which could be helpful for TV enthusiasts. I personally like the metrics displayed above the graphs (work, language, etc.), but seem a little misleading as one could think they are clickable however they are not.
   d. The dashboard is flexible, where you can click between the top sections easily enough. However, I do not think it is that interactive. The only interactivity is where you can hover over data points for additional insights, but it can be improved by adding features like a search functionality or a multiple comparison view.

4. Research the existing Python libraries for dashboards and make a comparison between them.

Criteria	Streamlit	Dash (Plotly)	Panel
Ease of Use	Very Easy – minimal coding and ideal for quick dashboards.	Moderate – requires knowledge of backend routing (had to look this up, it is defining URLs for different pages) and knowledge of 'Callbacks' which will essentially provide interactive visuals.	Moderate – more complex that Streamlit, but easier than Dash.
Scalability	Low – best suited for small applications rather than large – scale dashboards.	High – it can build complex, multipage dashboards.	High – it can handle large datasets and knowledge of building interactive dashboards and visuals.
Integration	Supports Pandas, Matplotlib, and basic ML models.	Supports plotly, pandas, flask, and other ML python tools.	Automatically integrates with Jupyter, Bokeh, and HoloViews.
Interactivity	Moderate – built-in interactivity but limited in complexity.	High – fully interactive UI components such as dropdowns and sliders.	High – supports widgets, filters, and interactive visualizations.
Best For	Quick prototyping and internal data apps.	Complex web applications with high interactivity.	Jupyter-based dashboards and data scientists.