Coursework Description Sheet

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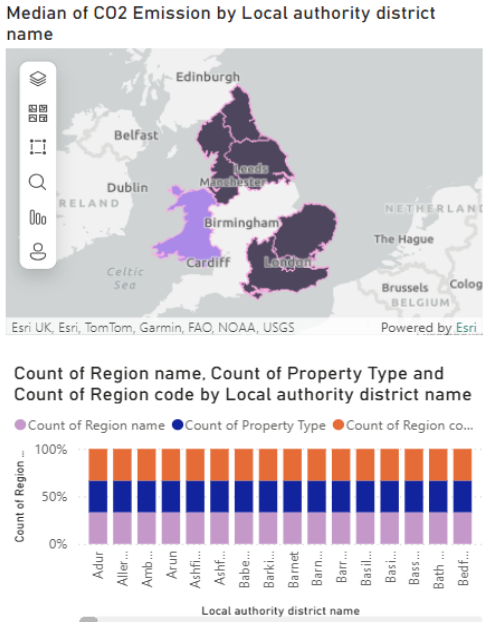
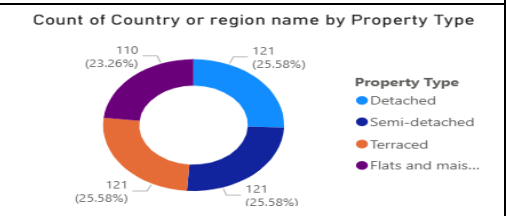
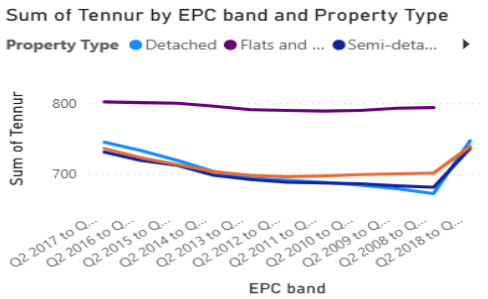
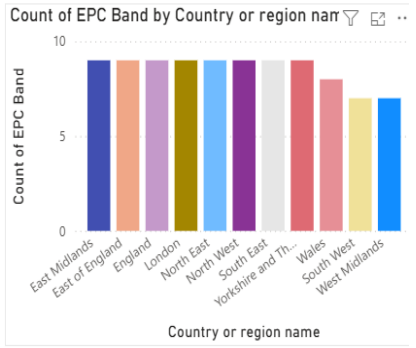
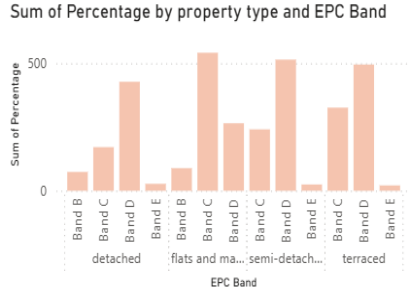
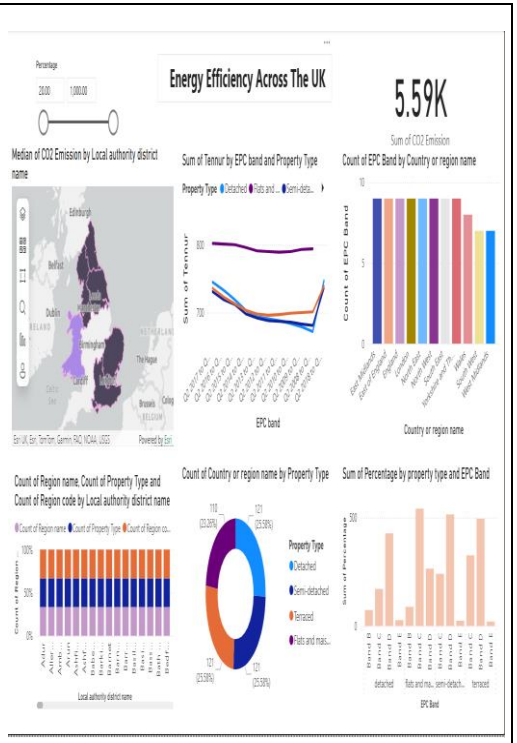
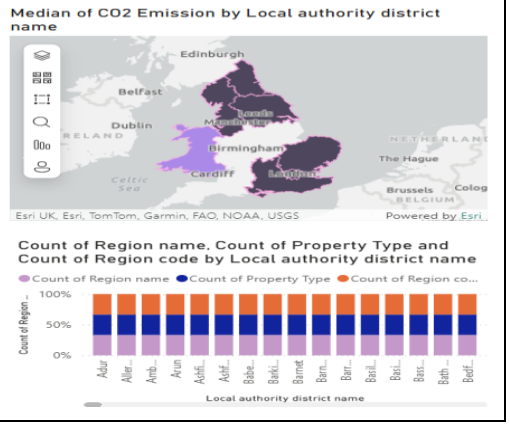
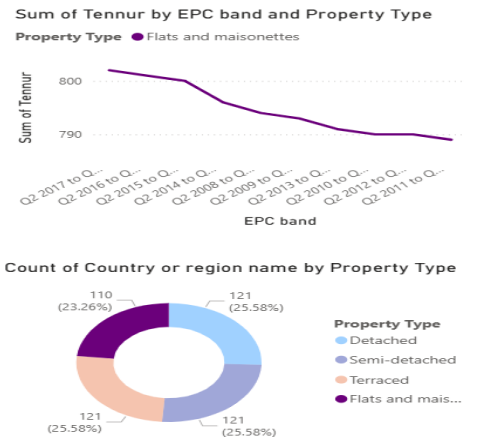
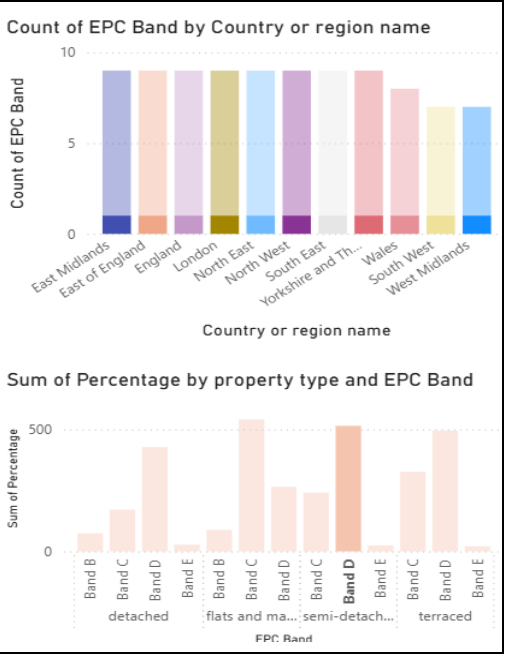
Question	Description	Figure
Fit to Task/User needs		
Location task - How does the visualisation allow users to access the spread of carbon dioxide emission across the UK based on the property type?	*The implementation uses* ***ArcGIS*** *for the Power BI as the visual, which is the most suitable method for representing the map uses the Local Authority District name to plot accurate geographical primary boundaries, where the CO2 magnitude is visually encoded by colour saturation: a darker hue signifies higher median emissions., leveraging pre-attentive processing to instantly highlight emission hotspots By selecting a specific category, such as '****Detached****' or '****Flats*** *and maisonettes,' the map instantly cross-filters the data to display the geographic distribution of* ***CO2 emissions*** *only for that selected housing type. This interactive capability supports the 'Filter' component of the visual information-seeking mantra: Overview, Zoom and Filter, then Details-on-demand. This bar chart initially displays the national or regional average emission levels for each property type, allowing users to quickly assess the inherent differences in CO2 contributions before interacting with the map. Furthermore, if a user clicks on a high-emission Local Authority on the map, the Bar Chart cross-filters to display the breakdown of property types contributing to that specific location's high reading.This synergistic design, therefore, allows for a comprehensive and dynamic exploration of the multi-variate data.*	
Time task - How does the visualization allow user to understand the evolution of energy efficiency based on the property type, and location?	The **donut chart** and **line chart** work together interactively, the **donut chart** displays the total count and percentage of properties by type—such as *Detached*, *Semi-detached*, *Terraced*, and *Flats and maisonettes*—giving users a clear overview of how each property type is represented in the dataset, for example by clicking on "Detached" homes, the **line chart** responds by filtering the data to show the trend	

	in EPC-related values only for that selected **property type**. This interactive relationship between the two users can easily compare energy efficiency trends across different property types by switching selections in the donut chart. Additionally, if geographic filters are available, users can narrow the analysis by region or location to examine localized energy performance trends. Their interaction enables users to focus on specific housing categories and observe how their energy performance has evolved over time, enhancing the analytical depth and usability of the visualization	
Multi-dimentional data task - How does the visualization allow user to identify correlation amongst at least three of the following parameters: property type, tenure, location, energy efficiency, and carbon dioxide emission?	The visualization enables users to identify correlations among multiple parameters—specifically **property type**, **location**, and **energy efficiency**, and potentially **tenure** and **CO2**—through the use of coordinated, interactive charts that filter and display data across multiple dimensions. The **bar chart** titled *"Count of EPC Band by Country or region name"* shows the distribution of energy performance certificate **(EPC) bands** across different **geographic regions**, with the Y-axis representing the count of EPC bands and the X-axis representing various regions such as East Midlands, London, and the West Midlands. This allows users to compare how energy efficiency varies by **location**. When this chart is used interactively—such as clicking on a specific region like *London*—it filters the underlying dataset, which in turn affects other visual elements This interaction enables the user to analyse **which property types are associated with which EPC ratings within a given location**, revealing potential patterns of energy efficiency across the housing stock. Additionally, if tenure and carbon dioxide emissions are included in the dataset and visualized in related charts (as suggested by previous visuals), the user can further explore whether certain **types of tenure property types** in specific **regions** tend to produce **higher or lower emissions**, and whether these patterns correlate with **EPC ratings.**	 
Visualisation Principles		

Use of colour - How does the use of colour in this dashboard enhance the readability and effectiveness of the data presentation?	For **readability**, distinct, non-related colours are used for **Property Types** in the **Donut Chart**. This categorical colour coding allows viewers to instantly connect a chart segment to its label and understand proportional shares, eliminating confusion and facilitating quick comparisons across categories. Colours also segment data by **Country/Region** in other charts to track trends. **Sequential Colour Schemes** For **effectiveness**, the **ArcGIS** map uses a sequential colour **scheme** (light to dark purple) to encode the magnitude of Median of **CO2 Emission** by Local authority district**.** Light shades signify lower emissions, and darker shades represent higher emissions. This powerful technique lets users **quickly identify geographical hotspots** without needing to read individual numerical data. **Emphasis and Consistency** Colour enhances readability and effectiveness by providing **visual consistency** and **emphasis**. The chart colours **highly contrast** with the neutral grey background, making data points stand out and increasing overall readability. Crucially, the Key Performance Indicator **(KPI)** value **"5.59K"** is displayed in a large, dark font, effectively drawing the eye and providing **visual emphasis** to the main summary metric of the dataset.	
Use of graphic design principles - How does the application of graphic design principles enhance the clarity and effectiveness of the data presentation in this dashboard?	The dashboard applies **graphic design principles** by focusing on **layout,** contrast, and consistency to enhance clarity and effectiveness. The overall **grid layout** cleanly separates charts, like the map of **CO2 Emission** (Practical 3) and the **stacked bar chart** (Practical 2), which organizes the data logically on the screen. **High contrast** between the dark data elements (like the deep purple on the map and the coloured bars and the neutral grey background ensures that the data is the main focus and is easy to read. Consistent use of typography for titles, axis labels, and legends creates visual hierarchy, making it clear which elements are headers (like "Median of CO2 Emission") and which are supporting details. Finally, **consistent color-coding** for categories lows for quick	

	recognition and efficient cross-chart comparison, effectively reducing cognitive load for the user.	
Use of interaction - How does the use of interactive design elements improve the user's ability to explore and interpret data on this dashboard?	The effective use of **text and legends** significantly contributes to the dashboard's clarity and user understanding by employing clear, descriptive **chart titles** (like "Median of CO2 Emission") and well-defined **axis labels** (such as "Sum of Tenure"), which immediately establish context and prevent ambiguity regarding the data being presented. Simultaneously, **legends** are consistently used to provide a **visual key** that explicitly links colours to their corresponding **categorical data**(like property types), allowing users to quickly and accurately interpret the visual encoding and understand the data's breakdown without guesswork. Finally, the strategic use of **large text** for the **Key Performance Indicator (KPI)** value **"5.59K"** emphasizes the dashboard's most critical summary metric, immediately drawing the user's attention to the overall total CO2 Emission.	
Use of text and legend - How do the use of text and legends contribute to the clarity and user comprehension of the data presented in this dashboard?	Every visual employs **clear, descriptive titles** such as "Count of EPC Band by Country or region name," which immediately establishes the chart's purpose and the relationship being examined. The use of concise **axis labels**, like "Count of EPC Band" and "Sum of Percentage," prevents ambiguity regarding the measurement scales, enabling users to read the data precisely. Furthermore, the dashboard utilizes **embedded legends** in the clustered bar chart (e.g., the subtle color blocks at the bottom of the top bars), which act as a key to distinguish various categories like property types, although the visibility could be improved. The labels beneath the bottom chart clearly denote **Property Types** such as "detached" and "terraced," logically grouping the EPC band data. Finally, the **large, prominent text** used for the Key Performance Indicator (KPI) **"5.59K"** (Sum of CO2 Emission) effectively emphasizes the most crucial summary metric, immediately directing the user's focus to the highest level of aggregation. These textual elements work together to ensure that the user can quickly transition from observing the visual patterns to accurately interpreting the underlying data values and categories.	

References

- *The central **5.59K CO2 Emission KPI** provides the baseline metric for the whole analysis (a foundational visualization task from Practical 2).*
- *The **Map Visual** utilizes the **Choropleth Map** method, a core skill focus of **Practical 3 (Time Series and Maps)**, to display spatial variation in emissions.*
- *The **Line Chart** addresses the **Time Series** analysis component required in **Practical 3** by tracking Sum of Tenure over different periods.*
- *Data preparation for complex dimensions like **Property Type** and **EPC Band** involved **Power Query** steps like Flattening tables and splitting columns detailed in **Practical 2**.*
- *The **Clustered Bar Chart** and **Donut Chart** fulfill Practical 2's requirement to clearly visualize categorical data distribution across regions and property types.*
- *The **100% Stacked Bar Chart** specifically applies normalization techniques to compare the **proportional property mix**within different local authorities.*
- *The report effectively links location (Map) with housing demographics (100% Stacked Chart) for targeted, localized policy intervention.*
- *The final **Bar Chart** connects Property Type and EPC Band to provide the most actionable insight, fully aligning with the assessment goal of analyzing efficiency.*