PPA COURSEWORK 4-: LONDON PROPERTY MARKETPLACE (REPORT)

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A description of your GUI, including the functionalities provided by the GUI.

- Our GUI is called the 'TechnoWiz Property Viewer' and is used to view a range of available Airbnb properties across London.
- The GUI is simple and intuitive to use. Instructions on how to use the GUI and the features it provides are shown on the welcome panel, the first thing that the user will be able to see.
- The GUI is ideal for two uses. One is viewing the Airbnb listings across London to find a property specific to the users need and second to add their own Airbnb listing to the database in the case they were looking to join Airbnb themselves.
- The GUI application can only be used for property viewing once the user has selected a desired price range. Once this price range has been selected, the user can then navigate through the rest of the application.

Application Window

- The application window is the main scene of the whole application, the initial stage is created in the App class and the scene will be provided by the application window. Within the application window we have 2 combo boxes for selecting the price range that the user would like and if an invalid price range is provided then an alert is shown to the user. Due to the fact that several panels need to go through 53000 listings there is a slight delay when changing price ranges.
- Two Buttons are at the bottom of the window for switching between panels, they both have a transition creating a somewhat swipe animation in the direction of the button. A sound is also played when clicked on.
- The centre of the pane will be switched out of whenever the buttons are clicked. The panel controller is in charge of returning the pane that is to be displayed, the Panels themselves are inherited from the Panel superclass and this inheritance allows us to easily add new panels and provide them the filtered list of properties swiftly.

Welcome Panel

- The welcome panel is the landing page for the user when the property viewer is first launched after watching the intro video.
- The purpose of the panel is to welcome the user to the application and give them some basic instructions on how to use the application as well as what functionality the program offers.
- The welcome page is purposedly very simple so as not to overwhelm the user with too many options immediately out of the gate.
- It is also visually appealing, with property images shown across the right side of the panel to give the panel a little more life other than just plain text, and to convey the fact that this application is about properties.

Map Panel

- The map panel is the centre point for browsing through properties in the database.
- The functionality of the map panel is to show which London boroughs the user can look for properties in, as well as show how many properties are available in each borough through the use of a colour gradient and a key to explain what the colours mean. The more properties there are in a neighbourhood for a specific price range, the darker the green will be.
- The number of properties for each neighbourhood is re-evaluated and re-coloured to display the correct number of properties for any user selected price range.
- When any of the boroughs are selected, a new window opens which shows properties that are available in that borough as well as only showing properties in the price range the user has previously selected.
- The properties are displayed in a table format. This list can be rearranged in any way that the user selects. The table shows some basic details –
    - The name of the property
    - The listers name
    - The price of the property (per night)
    - The number of reviews of the property
    - The minimum number of nights that you can stay at the property.
- The user cannot open a property viewer if the one is already open that is for the same neighbourhood and price range and hence has the same list. In an attempt to do so they will receive an alert. They can open up multiple property viewers if the exact same one is not already opened.
- To get further details of the property, you can double click on it and see more information such as the room type, the last time the room had been reviewed as well as the property ID an more.
- Similarly to the property viewer, this cannot be opened multiple times if a property window is already opened.
- You can view the property on a new browser tab through Google Maps by selecting 'View property on Map' .

Statistics Panel

- The purpose of the statistics panel is to show the user some basic details that may be of use when selecting the properties.
- Four statistics can be viewed at once, and the user can change the statistic shown by clicking the '<' or '>' next to the stat.
- The following statistics can be seen in the statistics panel -
    - Average number of reviews per property.
    - Total number of available properties.
    - The number of entire home and apartments (as opposed to private rooms).
    - The most expensive borough.
    - Highest crime rate borough
    - Most and least densely populated borough
    - Highest and lowest GDP per capita borough
    - Average availability

<u>A description of your additional statistics.</u>

- **Highest crime rate borough-:**
  - This uses information from a new data set.
  - Each crime rate is obtained for the boroughs from the data set and then a Comparator is used to find the maximum crime rate value.
  - It then returns the corresponding borough.
- **Most and least densely populated borough-:**
  - Population and area of borough is given in the new data set and these values are obtained for the calculation.
  - The calculation is done by dividing the population by the area for each borough.
  - These values are then compared and the borough with the highest and lowest value is obtained and then displayed.
- **Highest and lowest GDP per capita borough-:**
  - This is a measure of the average income earned per person each year.
  - GDP or each borough has been added into the new data set.
  - The computation for this is done by dividing the GDP by the total population for each borough.
  - The maximum and minimum borough is then obtained by comparing each value.
- **Average availability-:**
  - Each property has the number of days that the property is available each year.
  - To find the average availability, firstly the properties are filtered according to the preferred price of the user.
  - Then each availability is added together and stored in a variable called availability.
  - The number of properties in that price range is also filtered and stored in another variable called availableProperties. Finally, the availability is divided by the availableProperties to obtain the average availability out of 365 days.

<u>A description of the functionality provided by your fourth panel.</u>

- **Functionality**
  - The fourth panel allows new or existing hosts to add new properties into the property viewer.
  - Hosts can type in and select the information to describe each new property and this will then be visible in the property viewer panel for the user to view.
- **Requirements**
  - Host name
  - Description of Property
  - Price of Property
  - Minimum number of nights
  - Availability
  - Type of property
  - Restrictions of pets
  - Number of bedrooms and bathrooms
  - Property location
- **Description**
  - Entering this information is added through typing the information, selecting between 2 choices or choosing from a combo box.

- o Each of these must be filled by the host without any exceptions and multiple checks are used to ensure than the information being added isn't invalid. The checks are in order of which the fields are placed in to aid the user when missing details or making mistakes.
- o For example, host name cannot be empty, and it also cannot contain numbers and by doing this and error message will be displayed, and the host will be promoted to enter valid information.
- o Alerts will be displayed by throwing an exception within the HostData class, this exception will be different for each type of error and will have different text within it for the alert to display.
- o Icons that have been imported have been used on this panel to further help the user to know what type of details to type into the text fields.
- o These details will then be used to create a new Airbnb listing which will added into the arraylist natively and not onto the external csv file. The property can then be viewed through the map by selecting the borough that the property was initialised with and by selecting a price range that the property resides in.
- o When a user first opens the program a hostID is created for them in the background, and when the name has been selected and a successful listing has been made then the name field becomes disabled to ensure that there are no clashes between the name and the hostID.
- o HostID will be unique to the user since it is only created once and is compared with all other properties to prevent clashes. PropertyID will be created everytime a successful listing has been made and will also be unique for each property.

A description of your unit tests.

For our unit testing we decided to choose the Property Viewer Panel class since it had great depth and we can test several things. For example, we can test clicking on a property and seeing the details of that property, within the details of the property we can click on the view on map button which will use the longitude and latitude to pinpoint the location of the property. We can also test the reordering of the properties by price, alphabetically and by reviews. These are all done by lambdas in the property viewer panel class. You will be able to compare properties easily by keeping the individual property windows side by side.

Extra Challenge Task
- To make the property viewer look more attractive and to give a better user experience, we have added some visual and audio effects to the GUI.
- As soon as the application is run a short video clip is played before the welcome window is displayed. This short video clip worked perfectly on one of our mac computers but we noticed an issue where sometimes the video did not play and the program crashed on windows. If it does not open please try running the program again.
- Each time the left and right buttons are clicked, a sound is played which also lets the user know that a new window is being displayed.
- Another audio effect that we have added is in the fourth panel where the hosts can add new properties. Two audio effects are used here-:
  - o When the host enters invalid information or doesn't fill a required field, an error message is displayed along with an error sound.
  - o When the host has entered all the information and is all valid, a success message is displayed along with a success sound indicating that the information has been updated to the list.