FIT 5147 Assignment 2

HOW AIRBNB IS REALLY USED IN AND AFFECTING NEIGHBOURHOODS IN MELBOURNE?

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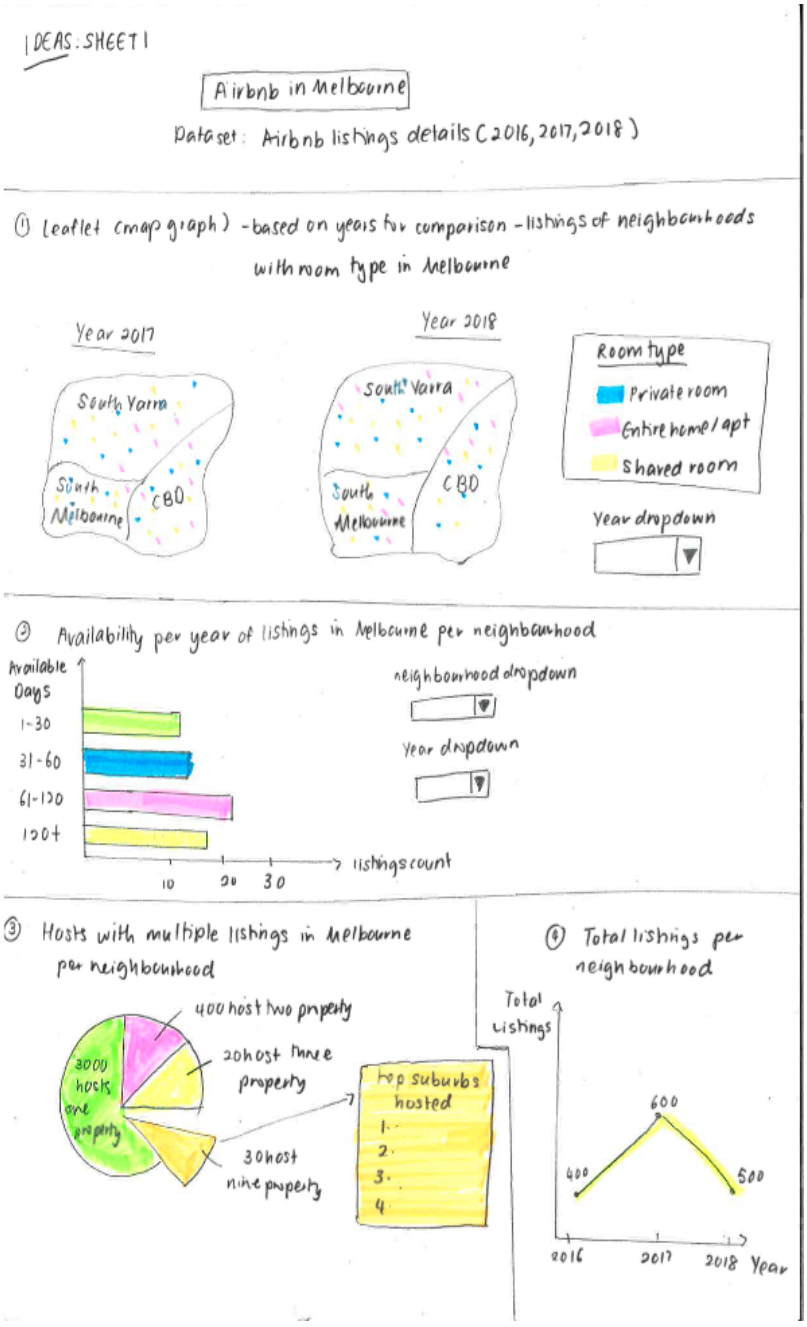
1. INTRODUCTION

It has been debated that the growth of Airbnb listings has affected neighbourhoods. Airbnb claims to be part of the "sharing economy" and disrupting the hotel industry. However, data shows that the majority of Airbnb listings in most cities are entire homes, many of which are rented all year round disrupting housing and communities. Hence, I was curious to find out how Airbnb is really used in and affecting the neighbourhoods in Melbourne. My visualisation project conveys the concentration of Airbnb listings, listings per host in the neighbourhood, type of listings as well as availability throughout the years 2016, 2017 and 2018 of the Airbnb listed in the neighbourhoods of Melbourne. This is for the intended audience who are interested to know the affects of Airbnb on the neighbourhoods in Melbourne.

2. DESIGN



SHEET 1

For sheet 1, I've came up with several designs/graphs that I would like to implement into my visualisation project.

Leaflet Map

Leaflet was considered as an option to show the listings of neighbourhoods with room types along based on a year dropdown filter. This is to enable users to have an overview of the concentration of listings in neighbourhoods.

Barchart

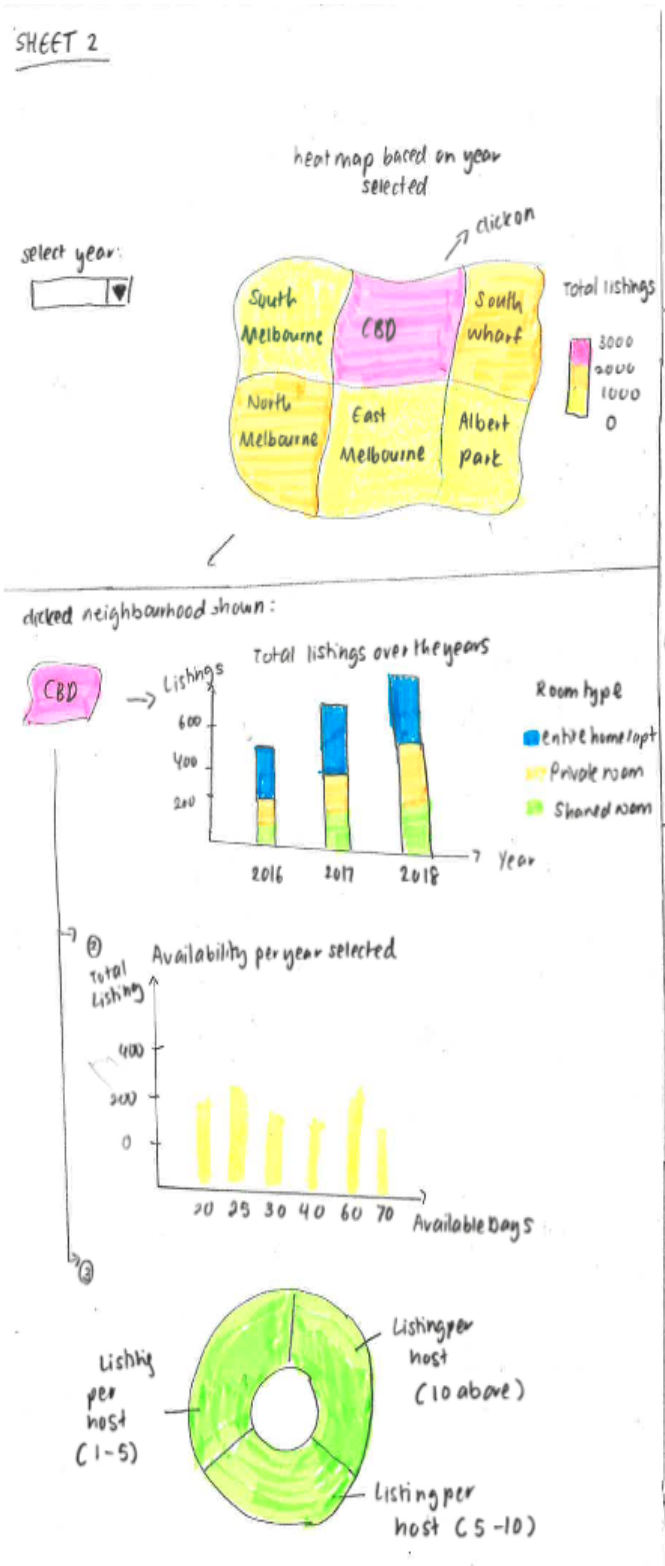
A barchart was considered to display listings as well as compare the total listings for availability of days throughout the year for Airbnb listings filtered by neighbourhood and year dropdown.

Pie Chart

Pie chart was considered to show the percentage represented by the total hosts for the amount of property listed per host. It is broken down based on the total hosts by total properties. Based on the subsection of the pie chart, users can have a breakdown of the top suburbs hosted.

Line Graph

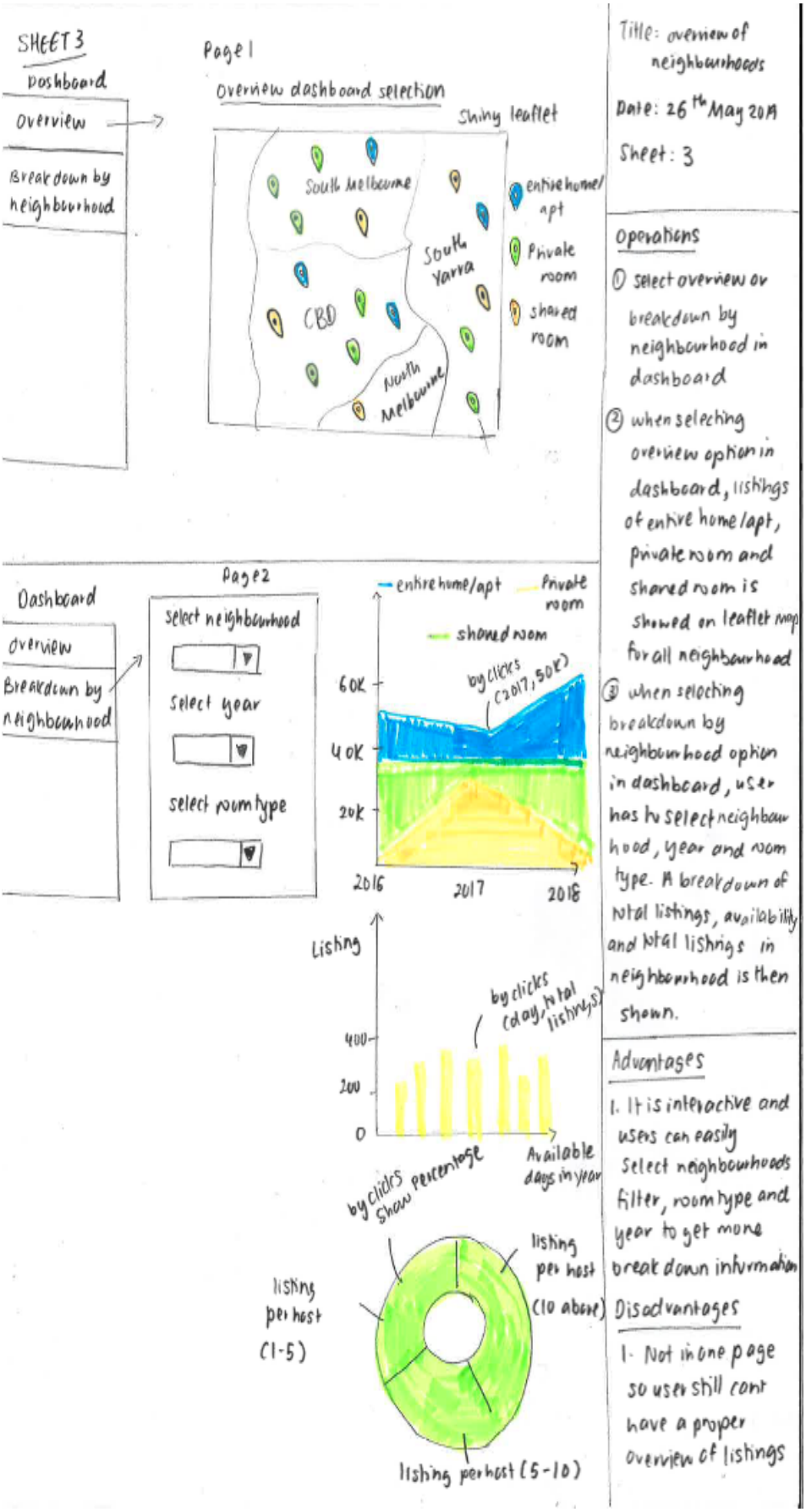
A line graph was considered to show the trend and changes over the years for the total listings based on the neighbourhoods.



SHEET 2

The idea for sheet 2 was to use a heatmap to show the concentration of listings in neighbourhoods in Melbourne. Users have the option to select the year and the heatmap would show the concentration of listings in neighbourhoods based on the filtered year. Then, users can click on the neighbourhoods which will then show a breakdown of the total listings over the years (2016,2017 and 2018) based on room type on a stacked barchart, total availability of total listings with a bar chart for the year selected and lastly a doughnut chart to show the percentage of listings per host in that neighbourhood for the year filtered.

The disadvantages of this design is that there is not much user interaction as the only has to select the year and click on the neighbourhood and a breakdown is given.



SHEET 3

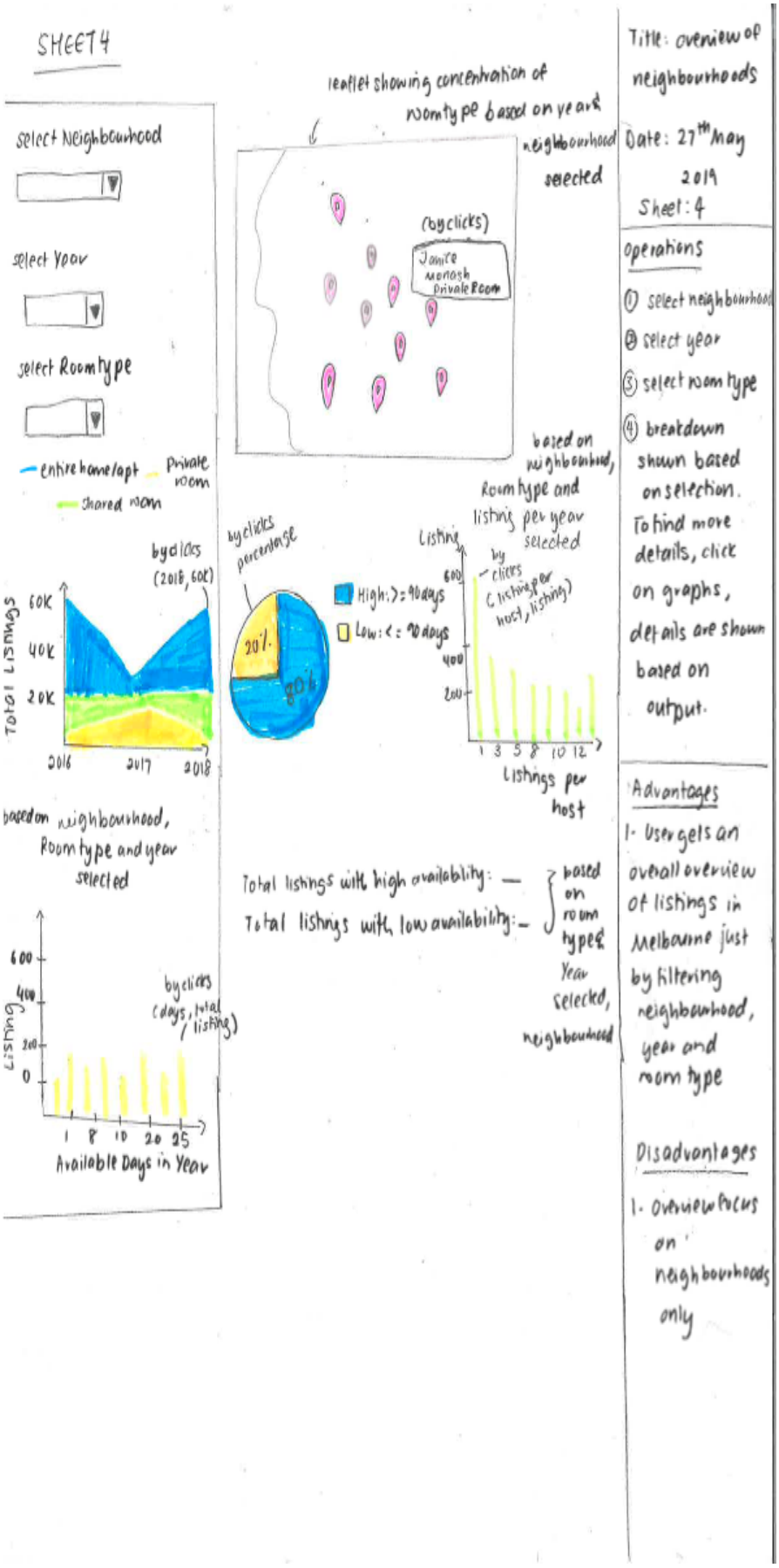
The idea for sheet 3 was to have a dashboard for more user interaction. The dashboard will have two tabs which consist of an overview of the listings and breakdown of listings by neighbourhood.

For the overview tab (page1), a shiny leaflet will be used to show the concentration of the listings based on room type.

For the breakdown by neighbourhood tab (page2), users have another option to filter the neighbourhoods, year and room type. Based on the filter, an area graph is displayed to show the total listings based on room type over the years (2016,2017 and 2018). A bar chart of the total listings based on available days throughout the year, room type and neighbourhood filtered is shown. And lastly a doughnut chart is used to show the percentage of listings per host in that neighbourhood for the year and room type filtered.

Users can have additional details of the total listings, availability of listings and listings per host by clicking on the area graph, bar chart and doughnut chart.

The disadvantage of this design is that users can't have a proper overview of the listings in neighbourhoods as all the graphs are not in one page.



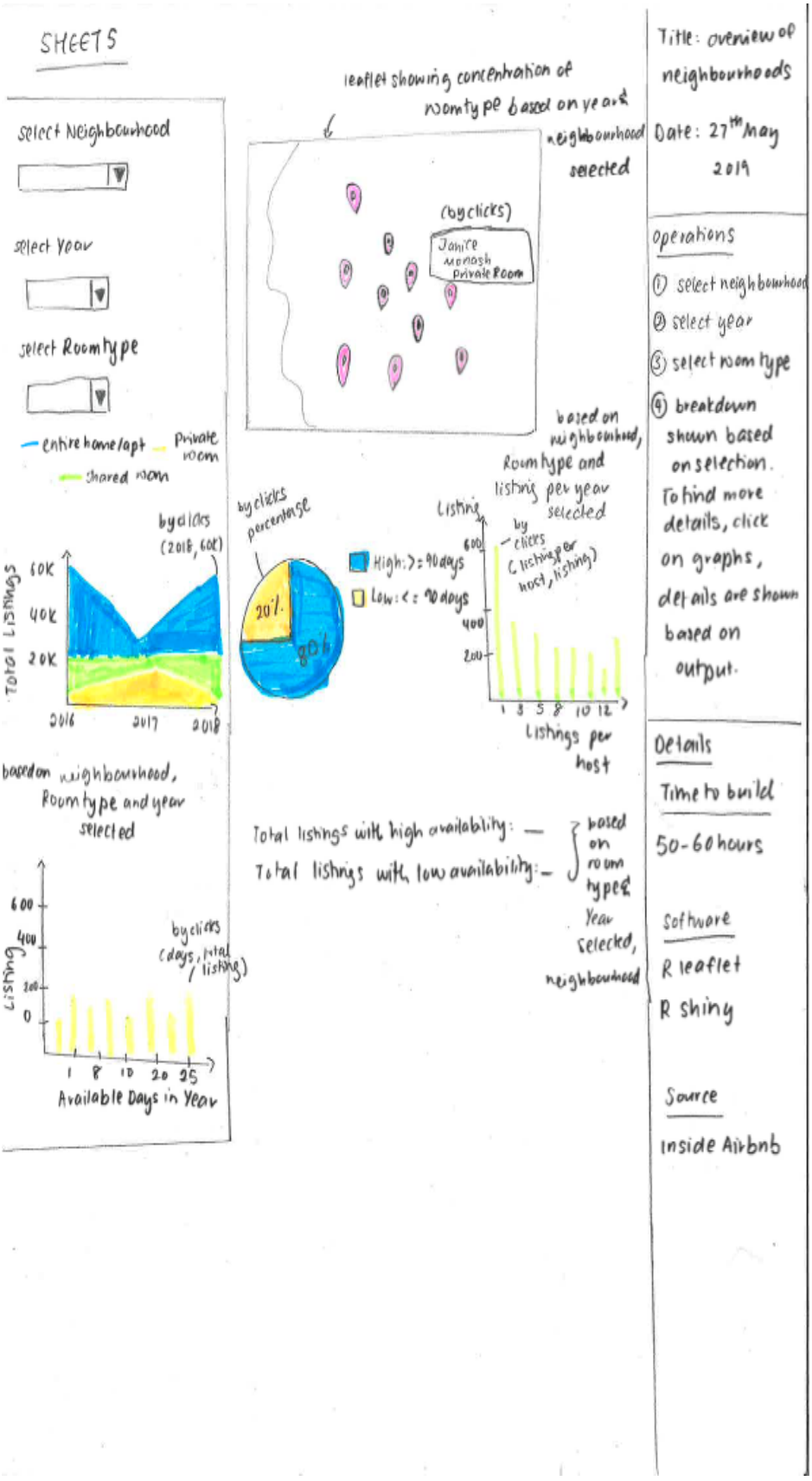
SHEET 4

The idea for sheet 4 was to have all the graphs in one page so that users can have an overview of the listings for the neighbourhoods in Melbourne.

Additional features were added to this design such as a pie chart to show the percentage of listings with high availability (more than 90 days) and low availability (less than 90 days) along with a count of total listings with high and low availability. This is for the user to have an overview of the percentage of listings with high availability in the chosen neighbourhood.

For this design, users have the option to select the neighbourhood, year and room type. Based on the selected filtered options, the leaflet map, pie chart, count of total listings with high and low availability as well as bar charts of available days throughout the year and listings per host will be filtered. The area graph of total listings will show the total listings throughout 2016 to 2018 of the neighbourhood selected. Users can have additional details of the total listings, availability of listings, listings per host and percentage of high availability of listings in the neighbourhoods by clicking on the area graph, bar charts, pie chart. By clicking on the "pin" on the leaflet map, user can see the neighbourhood, name of host and room type.

The disadvantage of this design is that it is only focuses on the neighbourhoods segment only.



SHEET 5: REALIZATION

I've selected the design from sheet 4 for my visualisation project.

This design was selected as it provides an overview of the listings in the neighbourhoods of Melbourne on a single page. This makes the experience more continuous and fluid for the user. In addition, this minimal web design removes any unnecessary noise from the interface, focusing the user's attention on the most important content.

In terms of interaction, the user will be able to filter the neighbourhoods based on the criteria selected. In addition, the user will be able to click on the graphs displayed to get additional information of the individual output of the graphs.

Different pure colours were used for the representation of different room types for the users to be able to differentiate the types of room. The colour for room type in the total listings area graph is used in the leaflet map for the user to be able to identify the room type on the map. The same applies for the pie chart, where a different hue colour is used for the user to be able to identify the concentration of listings and also catered for user who have colour blindness.

3. IMPLEMENTATION

The libraries used for the implementation of my projects are mainly:

a) Plotly

Plotly was used for creating my interactive graphs. It was chosen as it was a good tool to make my graphs interactive and it enabled me to show the breakdown of the output of my graph.

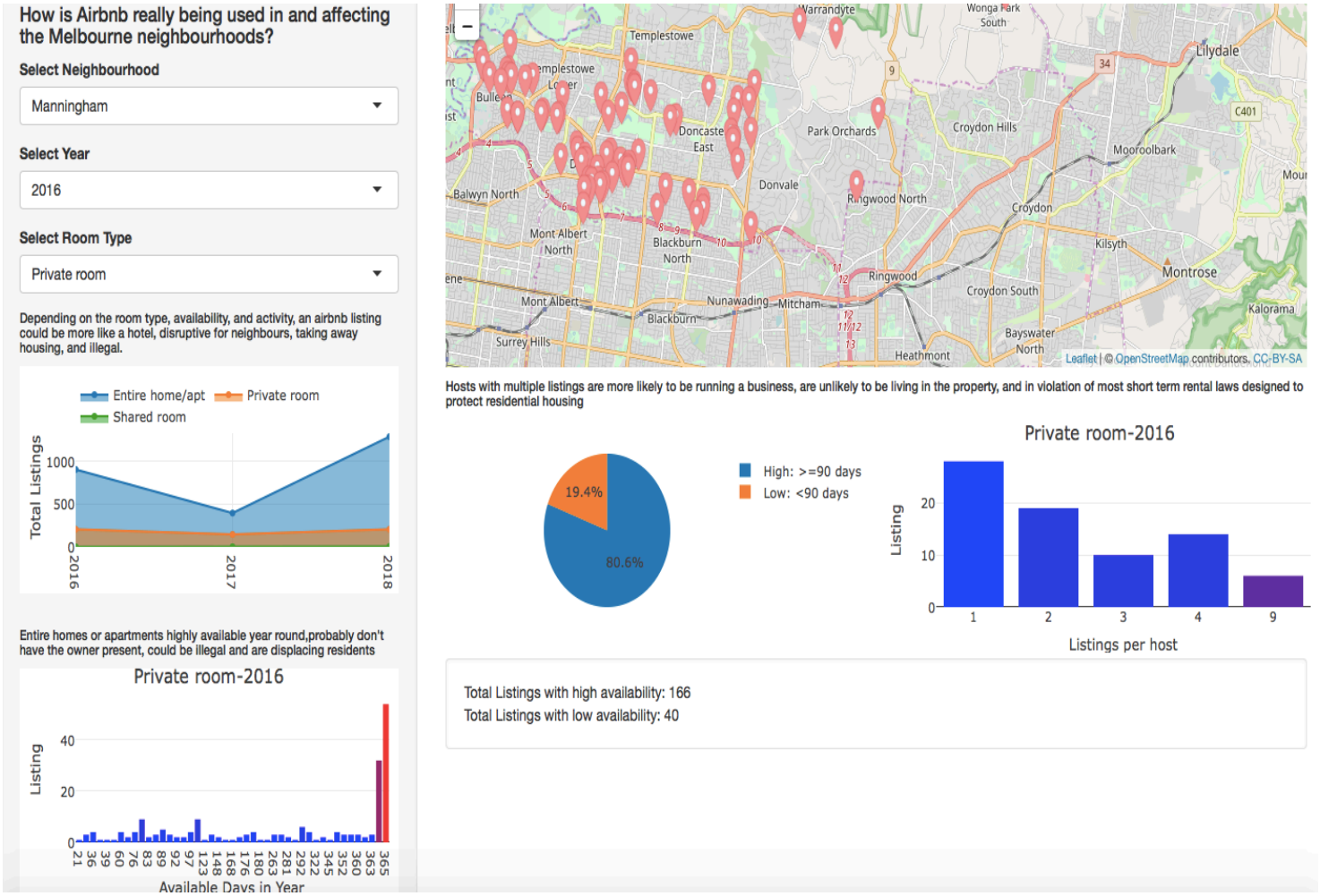
b) Leaflet Shiny

Leaflet Shiny was chosen for creating my interactive map graph. Using leaflet I was able to make my graph interactive by different listings of the room types by clicking on the leaflet map.

This project was difficult to implement as I had made all the graphs into a single webpage as I wanted the users of my visualisation project to have a continuous and more fluid experience when using my Airbnb dashboard. The output of the graphs were all interlinked to the filter option provided.

4. USER GUIDE

4.1. User interface display

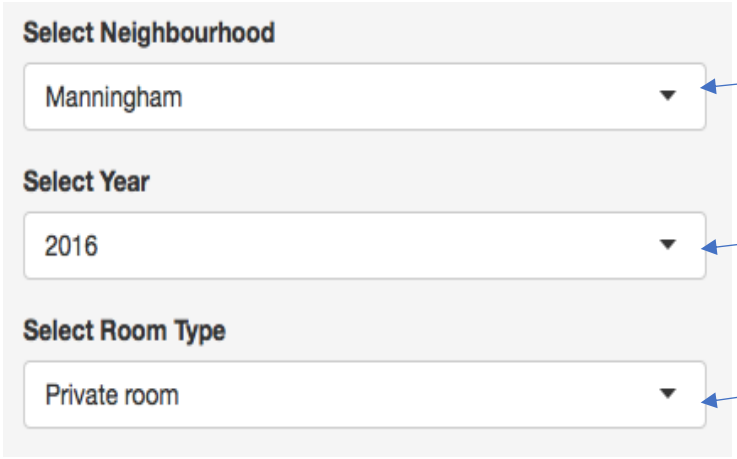


The image above shows the user interface display of the Airbnb visualisation project. It consists of 3 filter options in the dashboard allowing users to select the neighbourhood, year and room type of the Airbnb listings they would like to explore.

The graphs shown are:

a) The leaflet map – showing listing of neighbourhood, year and room type filtered
b) Area graph – showing the total listings based on room type for neighbourhood filtered for the year 2016, 2017 and 2018
c) Bar chart –
    i) Showing available days of listing of room type selected based on year and neighbourhood filtered.
    ii) Showing listings per host for room type selected filtered by the neighbourhood and year selected
d) Pie chart – showing the percentage of listings based on high or low availability for the room type, year and neighbourhood filtered.

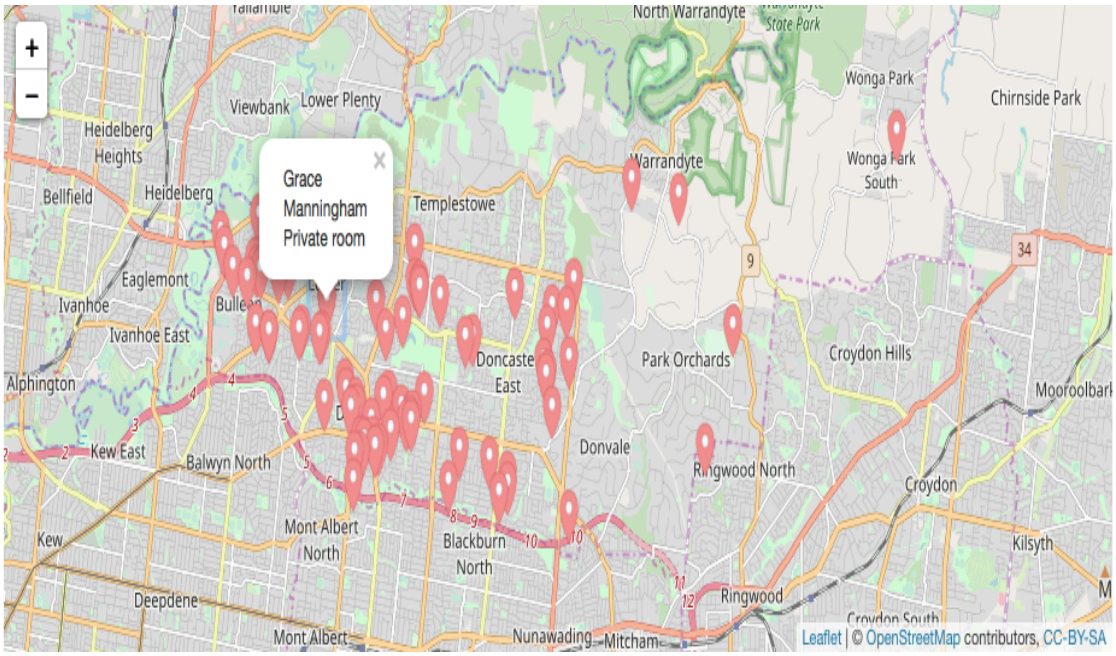
4.2 Steps on using the Airbnb User Interface



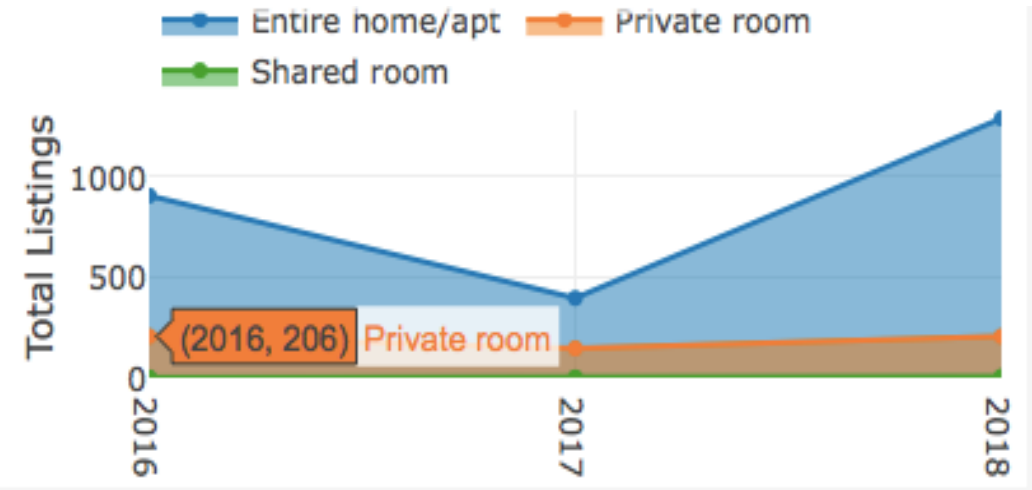
1. User will have to firstly select the neighbourhood they would like to visualise

2. Secondly, user will have to select the year

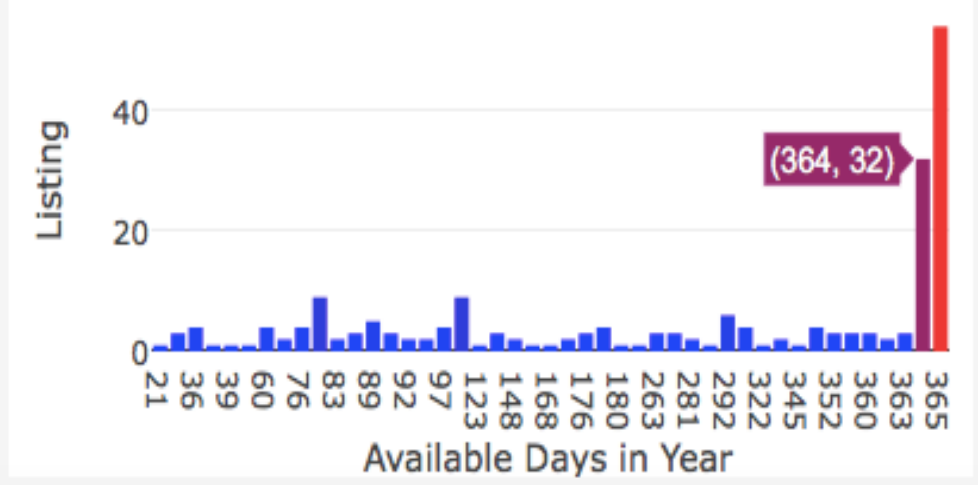
3. Then the users will have to select the room type



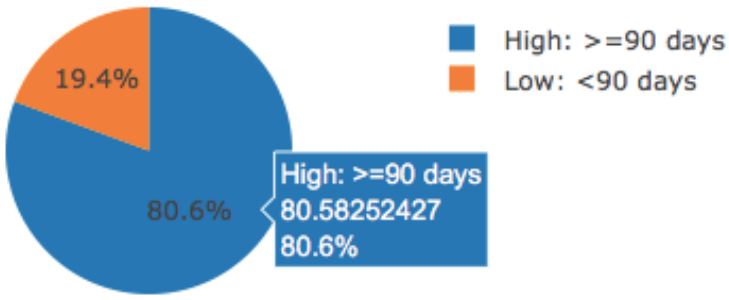
4. User can click on the leaflet map for additional details of listing. For this case, we can see that Grace has a listing in Manningham for a private room.



5. Users can click on the area graph segment to get the total listings for that particular year interested. For example, as shown in the image we can see that for the year 2016, private room had 206 total listings.

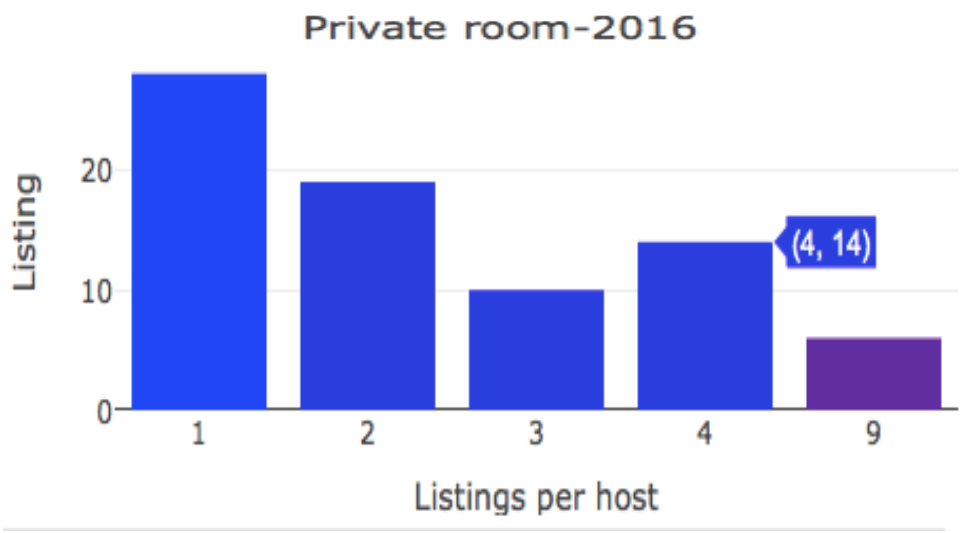


6. Users can click on the individual bar graph output to get the total listings based on the available days interested for the year, neighbourhood and room type filtered. For this case, we can see that there are 32 listings for listings which have 362 days available in the year 2016 for Manningham private room



Total Listings with high availability: 166
Total Listings with low availability: 40

7. User can click on the pie chart to show the breakdown of the pie chart. For this case, we can see that the percentage of high availability (above 90 days of listings per year) is 80.6% with a total of 166. This is for the year, suburb and neighbourhood filtered (Manningham).



8. User can click on the bar chart to show the detailed information on the count of the listings per host based on the room type, year and neighbourhood filtered (Manningham). For this case, we can see that there are 14 listings which had hosts who have more than 4 listings in total.

5. CONCLUSION

Overall , I've managed to create an interactive narrative visualisation for customers to explore how Airbnb is used in and affecting the neighbourhoods in Melbourne.

The intention for my Airbnb project is for users to be able to identify:

a) the neighbourhoods which are highly concentrated with Airbnb listings
b) the total count of room type of the Airbnb listings per neighbourhood
c) availability (high or low) for room types and neighbourhood selected
d) the listings per host for the room type in the neighbourhood selected

Depending on the room type, availability, and activity, an Airbnb listing could be more like a hotel, disruptive for neighbours, taking away housing, and illegal.

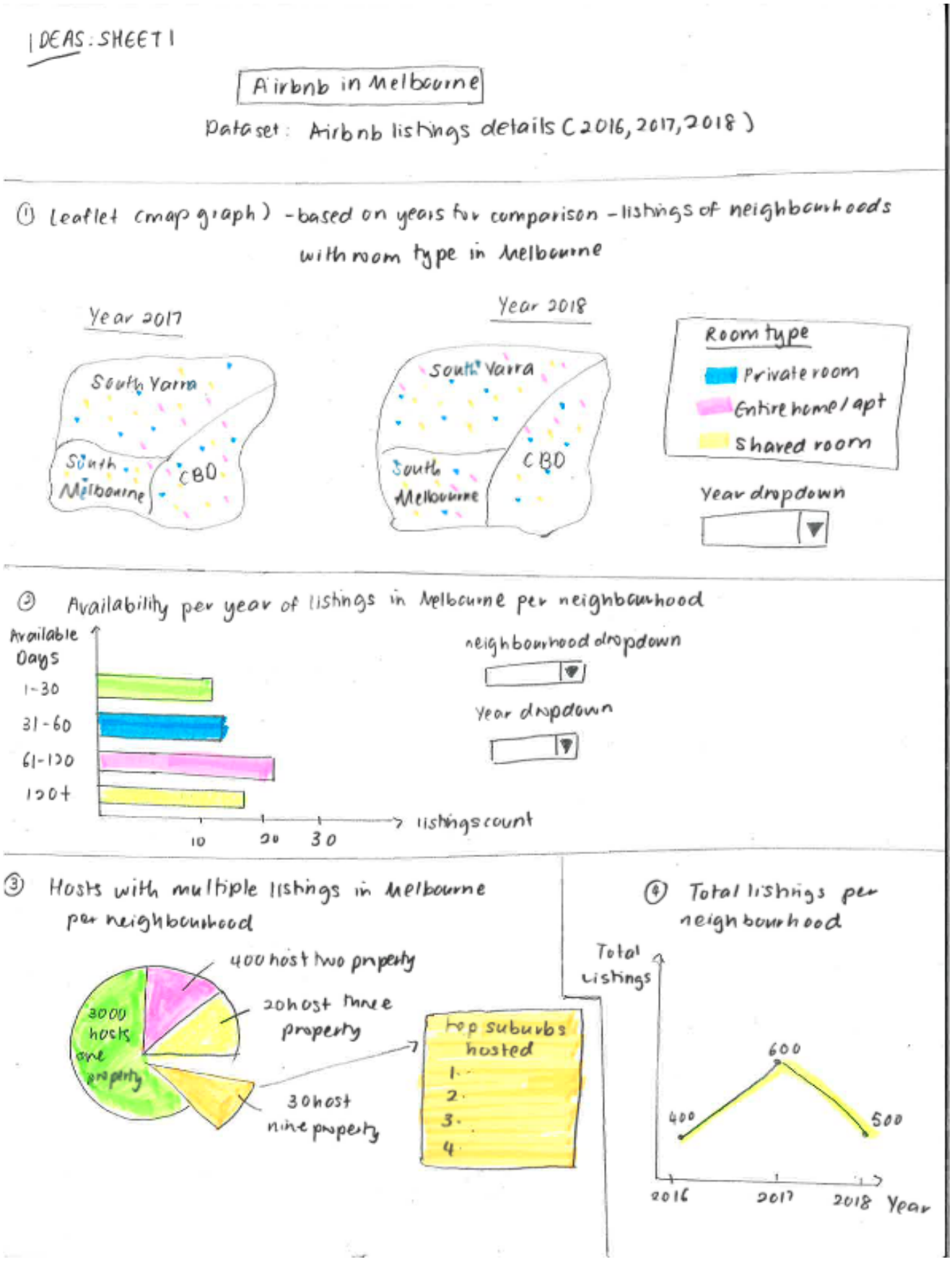
From this project, I have learnt the usage of important and useful libraries such as leaflet and plotly which have helped me create the visualisation that I intend to demonstrate to my users for my application. These libraries will definitely be used again for my future project.

To improve the result, I could have provided more details of the suburbs breakdown in Melbourne. However, I wanted to show the neighbourhood of Melbourne for users to get an overview of the listings in Melbourne as a whole.

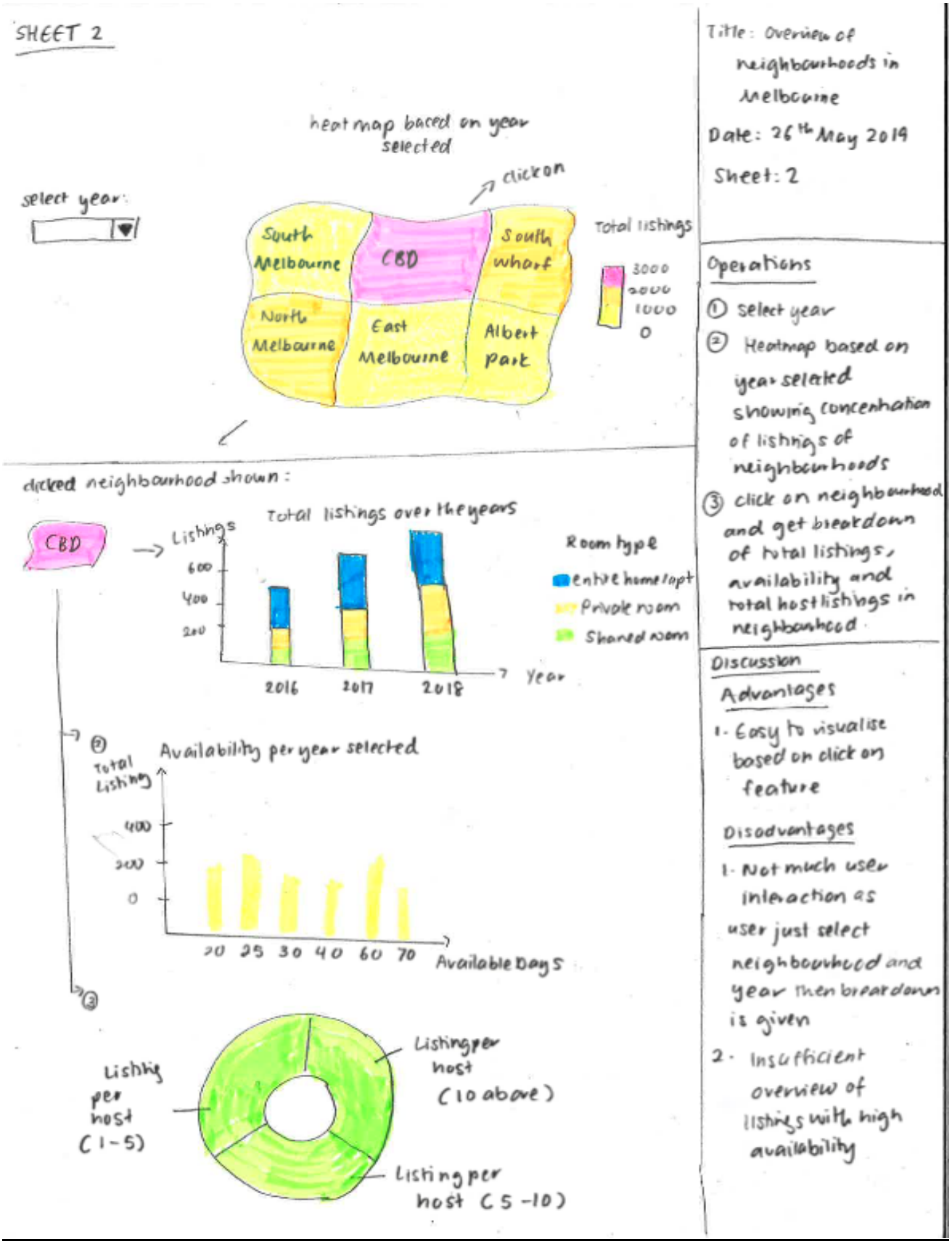
REFERENCES

Inside Airbnb. Adding data to the debate. (2019). Retrieved from http://insideairbnb.com/

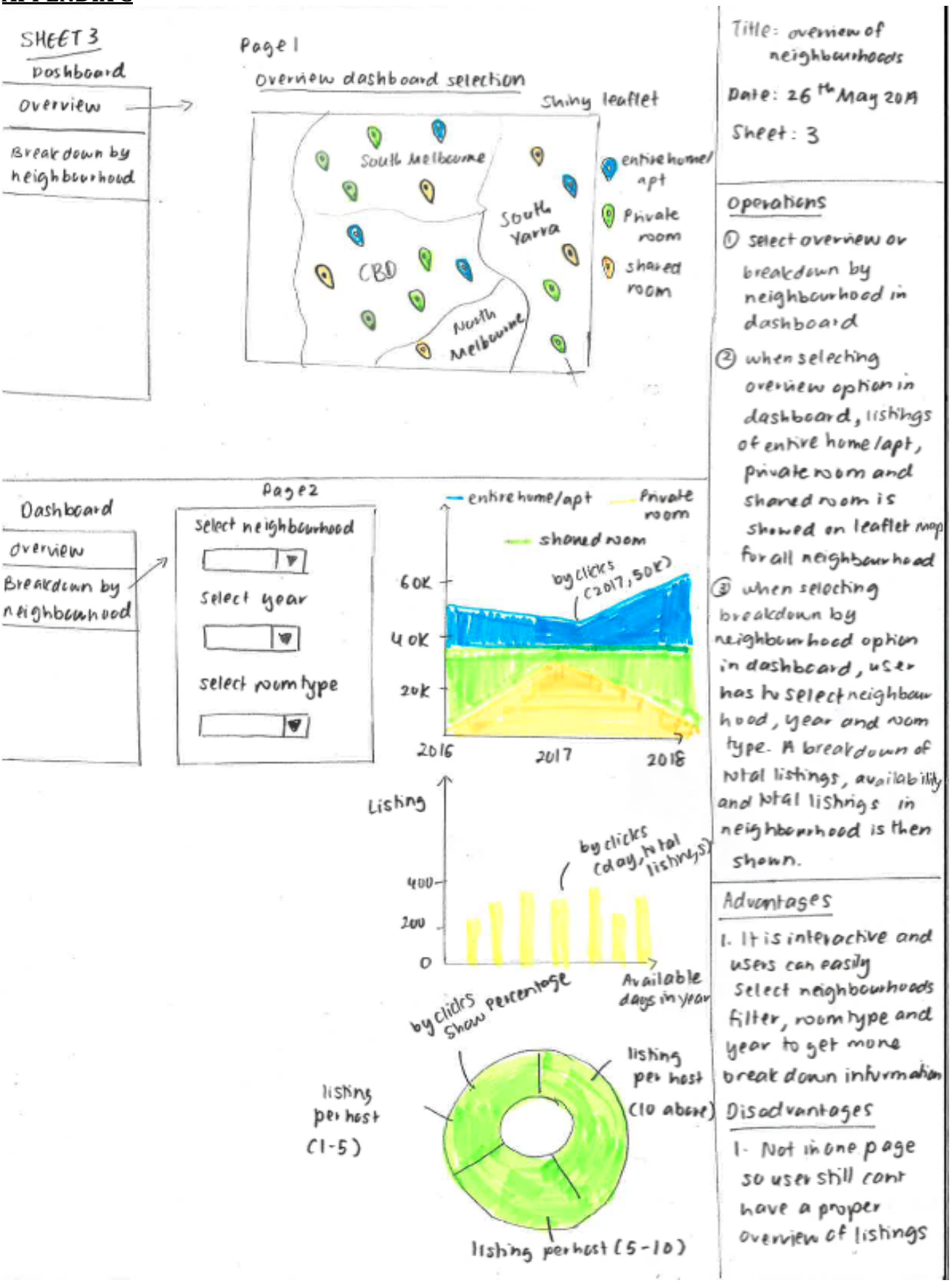
APPENDIX A


IDEAS: SHEET 1
Airbnb in Melbourne
Dataset: Airbnb listings details (2016, 2017, 2018)
① Leaflet (map graph) - based on years for comparison - listings of neighbourhoods with room type in Melbourne
Year 2017
South Yarra
South Melbourne
CBD
Year 2018
South Yarra
South Melbourne
CBD
Room type
Private room
Entire home/apt
Shared room
Year dropdown
② Availability per year of listings in Melbourne per neighbourhood
Available Days
1-30
31-60
61-120
120+
10
20
30
listings count
neighbourhood dropdown
Year dropdown
③ Hosts with multiple listings in Melbourne per neighbourhood
400 host two property
200 host three property
30 host nine property
3000 hosts one property
Top suburbs hosted
1.
2.
3.
4.
④ Total listings per neighbourhood
Total listings
600
400
500
2016
2017
2018
Year

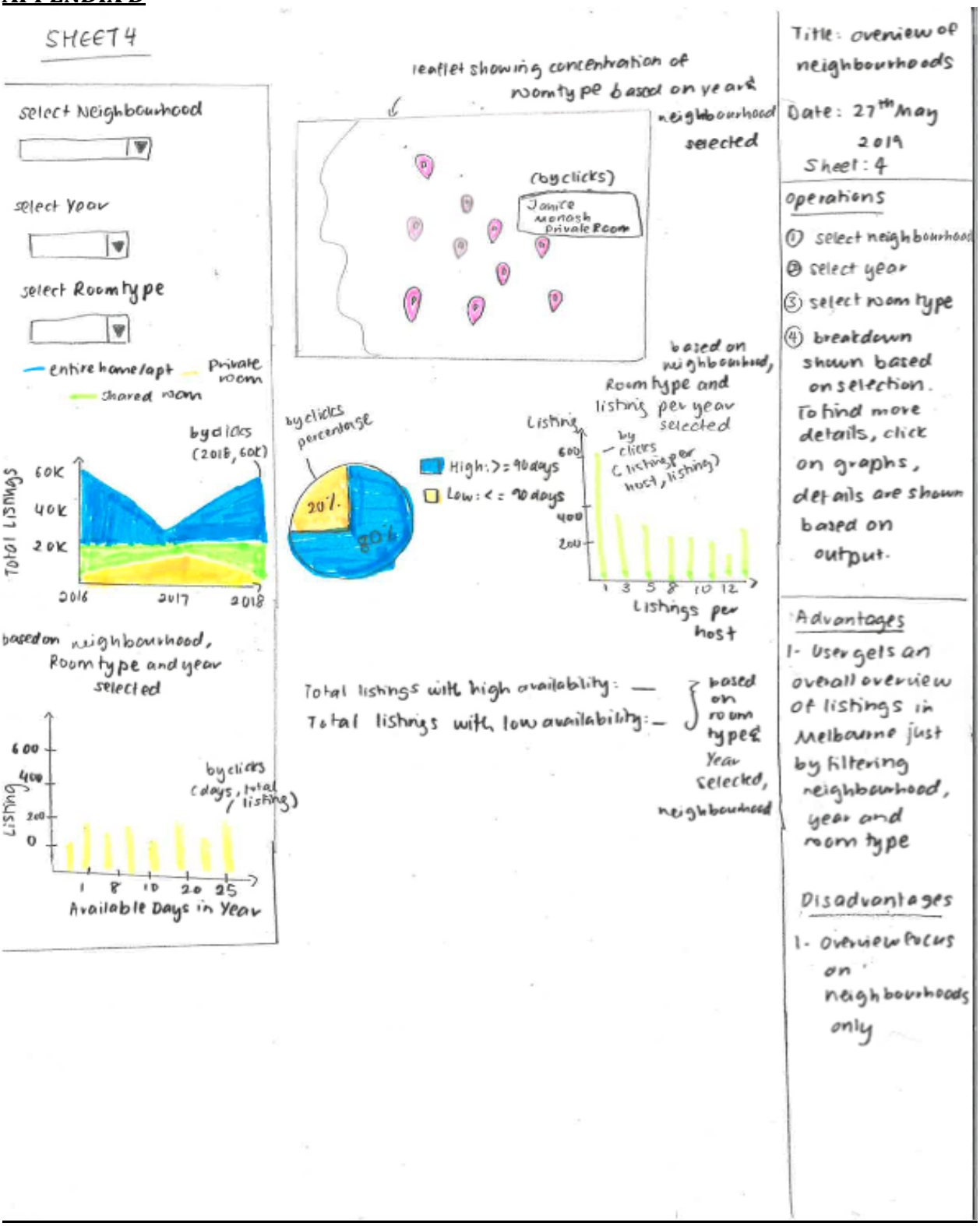
APPENDIX B


SHEET 2
heat map based on year selected
select year:
click on
South Melbourne
CBD
South wharf
North Melbourne
East Melbourne
Albert park
Total listings
3000
2000
1000
0
clicked neighbourhood shown:
CBD
Total listings over the years
Listings
600
400
200
2016
2017
2018
Year
Room type
entire home/apt
Private room
Shared room
Availability per year selected
Total Listing
400
200
0
20 25 30 40 60 70
Available Days
Listing per host (1-5)
Listing per host (10 above)
Listing per host (5-10)
Title: Overview of neighbourhoods in Melbourne
Date: 26th May 2019
Sheet: 2
Operations
1 Select year
2 Heatmap based on year selected showing concentration of listings of neighbourhoods
3 click on neighbourhood and get breakdown of total listings, availability and total host listings in neighbourhood
Discussion
Advantages
1. Easy to visualise based on click on feature
Disadvantages
1. Not much user interaction as user just select neighbourhood and year then breakdown is given
2. Insufficient overview of listings with high availability

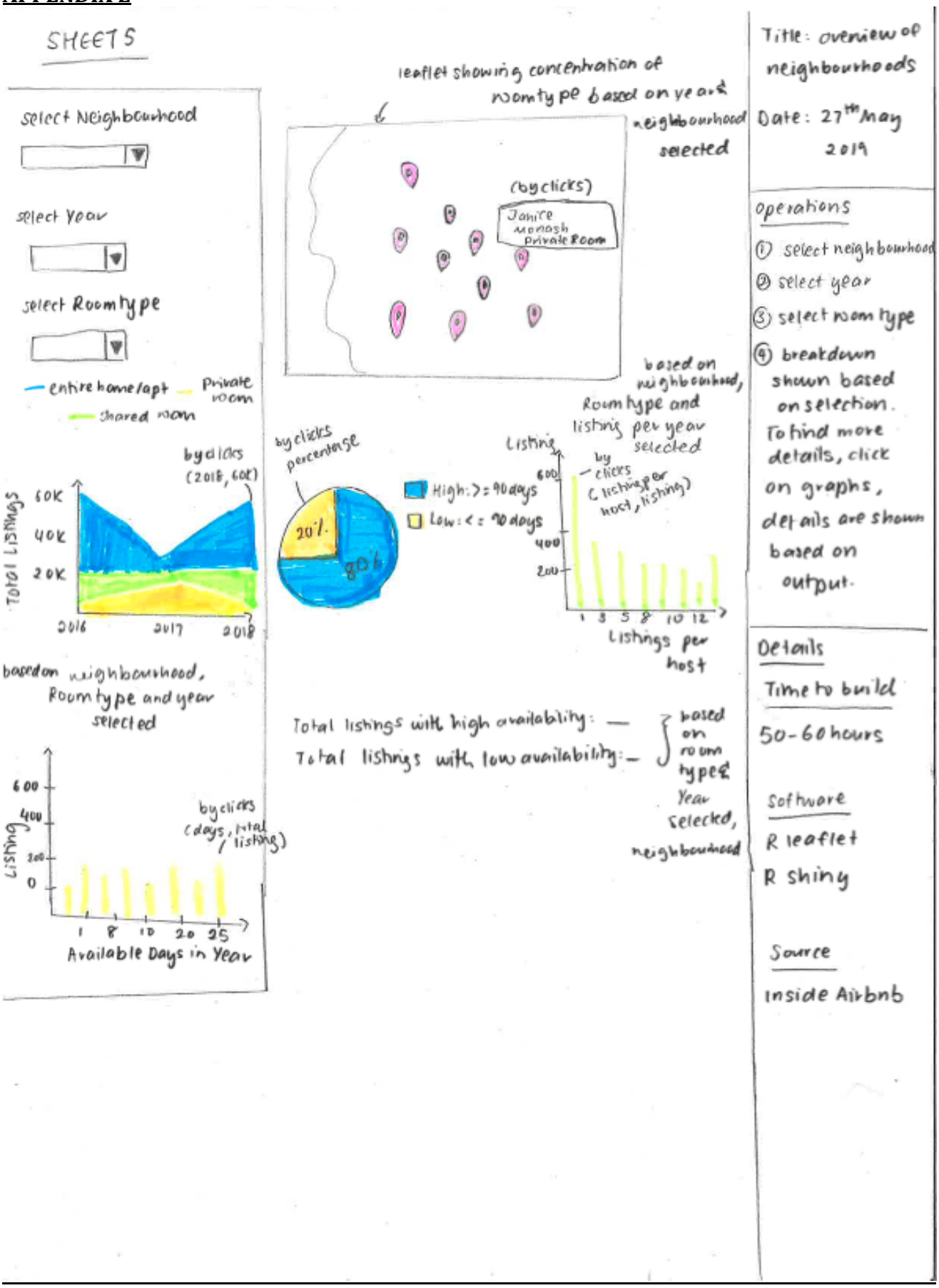
APPENDIX C


SHEET 3
Dashboard
Overview
Breakdown by neighbourhood
Page 1
Overview dashboard selection
Shiny leaflet
South Melbourne
South Yarra
CBD
North Melbourne
entire home/apt
Private room
shared room
Dashboard
Overview
Breakdown by neighbourhood
Page 2
Select neighbourhood
Select year
Select room type
entire home/apt
Private room
shared room
60K
40K
20K
by clicks (2017, 50K)
2016
2017
2018
Listing
400
200
0
by clicks (day, total listings)
Available days in year
by clicks show percentage
listing per host (1-5)
listing per host (10 above)
listing per host (5-10)
Title: overview of neighbourhoods
Date: 26th May 2019
Sheet: 3
Operations
① select overview or breakdown by neighbourhood in dashboard
② when selecting overview option in dashboard, listings of entire home/apt, private room and shared room is showed on leaflet map for all neighbourhood
③ when selecting breakdown by neighbourhood option in dashboard, user has to select neighbourhood, year and room type. A breakdown of total listings, availability and total listings in neighbourhood is then shown.
Advantages
1. It is interactive and users can easily select neighbourhoods filter, room type and year to get more break down information
Disadvantages
1. Not in one page so user still cant have a proper overview of listings

APPENDIX D


SHEET 4
select Neighbourhood
select year
select Room type
entire home/apt
Private room
Shared room
Total Listings
60K
40K
20K
2016
2017
2018
by clicks (2018, 60k)
based on neighbourhood, Room type and year selected
Listing
600
400
200
0
1
8
10
20
25
Available Days in Year
by clicks (days, total listing)
leaflet showing concentration of room type based on year & neighbourhood selected
(by clicks)
Jamie Monash Private Room
by clicks percentage
20%
80%
High: >= 90 days
Low: < = 90 days
based on neighbourhood, Room type and listing per year selected
Listing
600
400
200
1
3
5
8
10
12
Listings per host
by clicks (Listings per host, listing)
Total listings with high availability: —
Total listings with low availability: —
based on room type & year selected, neighbourhood
Title: overview of neighbourhoods
Date: 27th May 2019
Sheet: 4
Operations
1. select neighbourhood
2. select year
3. select room type
4. breakdown shown based on selection. To find more details, click on graphs, details are shown based on output.
Advantages
1- User gets an overall overview of listings in Melbourne just by filtering neighbourhood, year and room type
Disadvantages
1- Overview focus on neighbourhoods only

APPENDIX E


SHEETS
Select Neighbourhood
Select Year
Select Room type
entire home/apt
Private room
shared room
by clicks (2018, 60k)
Total Listings
60K
40K
20K
2016
2017
2018
based on neighbourhood, Room type and year selected
Listing
600
400
200
0
by clicks (days, total listing)
1 8 10 20 25
Available Days in Year
leaflet showing concentration of room type based on year & neighbourhood selected
(by clicks)
Jahre Monash Private Room
based on neighbourhood, Room type and listing per year selected
by clicks percentage
20%
80%
High: >= 90 days
Low: < = 90 days
Listing
by clicks (listing per host, listing)
600
400
200
1 3 5 8 10 12
Listings per host
Total listings with high availability: —
Total listings with low availability: —
based on room type & Year selected, neighbourhood
Title: overview of neighbourhoods
Date: 27th May 2019
operations
① select neighbourhood
② select year
③ select room type
④ breakdown shown based on selection. To find more details, click on graphs, details are shown based on output.
Details
Time to build
50-60 hours
Software
R leaflet
R shiny
Source
Inside Airbnb