FIT3179 Assignment 2

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Word Count: 925

URL: https://blake-haydon.github.io/FIT3179_2021_S2_A2/

GitHub Repo: https://github.com/blake-haydon/FIT3179_2021_S2_A2/

b. Domain

This assignment focuses on Australia's internet and its use over time.

b. Why

The internet is playing an increasing role in day to day life for many Australians, however its history is often forgotten. This assignment aims to educate readers on how the internet has improved over time in order to foster appreciation for the technological tool.

b. Who

This visualisation is targeted towards Australians who are interested in how the internet has changed over time, as well as the current state of technological connection in the country compared to the rest of the world.

c. What

This assignment uses a variety of data from both government and non-government sources. Cell tower data was sourced from The Australian Communications and Media Authority (2021) and combined with suburb data from the data.gov.au (2021). In order to merge the sources, a python script called `*source_merge.py*` was used. This script calculated all of the values needed to produce a choropleth map. In order to find good colour groupings for the map, another python script called `*plot_data_hist*` was used to plot histograms using the derived data.

Internet Live Stats data (2021) was used to map how connected Australia is compared to other countries around the world. Data sourced from the Australian Bureau of Statistics (2021) was used to highlight how connections speeds have changed over time. This data was rendered dynamically using Vega Lite, enabling filtering and sorting.

The Australian Competition and Consumer Commission's (2021) data was used to highlight the difference between advertised and real NBN internet download speeds for a 100 Mbps connection.

Finally, infrastructure.gov.au (2021) was used as a reference to read about the 'Telecommunications Reform Package 2020' that improved internet speeds for all Australians. Only qualitative data was used from this source.

d. Why and How

The first visualisation is a choropleth map that uses a logarithmic scale to identify hotspots where there are multiple cell towers. This idiom was chosen as dotting all of the locations on the map was confusing and overbearing as there are over 10,000 location in Victoria alone. Adding the option to scale the map also removed the need to make the areas larger as a user can zoom into Melbourne city and other locations of interest to resolve data from smaller suburbs.

For the second visualisation, a filterable stacked bar chart was selected as it allowed for the ordinal data, which was years, to be compared to the quantitive number of users. By stacking the charts a viewer can see how the speeds are broken down for that year. The graphic also allows for an opacity change when the legend is click as well as filtering by speed using the dropdown menu. The user also has the option to filter by year using the second smaller bar chart below.

The third visualisation used the heat map and a bar chart idioms to show changes over time in actual NBN speeds compared to the reported speeds. The heat map was important to illustrate the large difference legislation makes (colour difference in Dec-2020), while the bar chart allowed for viewers to see the average speed over multiple months.

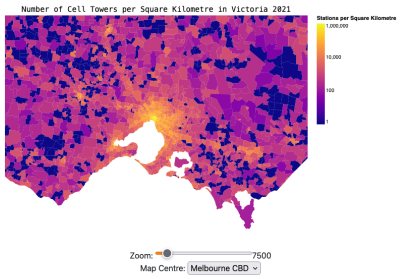
Finally a simple line chart idiom is used as it allowed for many seperate countries to be compared over time rather than just Australia. This adds a global reference point for the other 3 visualisations.

Internet In Australia

🌐 A story of human connection 🌐

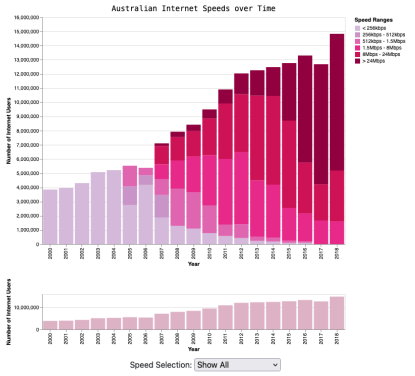
Not All Australians Have Cell Reception

Although most australians are connected to the internet, there are still some suburbs that do not have any cell towers. These places rely on fixed line NBN connections or satellite for their internet connectivity.



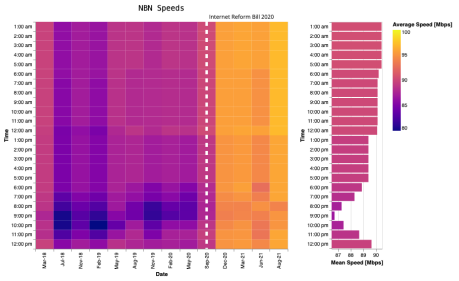
Faster Speeds for More Australians

Internet speeds have been getting faster for the last 20 years. Even with more Australians connected than ever before, the overall speed of internet in Australia has increased year on year since 2000. This improvement has been driven by better technology getting increasingly cheaper. Fiber used to be reserved for high paying governments and business's, however it is now commonplace for homes to be connected via a dedicated fiber line.



Legislation Improves Internet Speeds

Due to the Internet Reform Bill of 2020, Internet Service Providers were forced outline their average real speeds rather than the max speed. This bill drastically improved the experience for many Australian internet users as they essentially got a free speed upgrade. This increase in speed can be seen after December 2020 with the visualization turning from a dark purple to a light yellow, indicating a speed increase.



Australians Are Well Connected

Although many despise the NBN and its slow rollout, in comparison to other nations Australia has kept pace with the percent of the population connected to the internet. Although the world leader for percent of population connected is Sweeden, Australia does not lag too far behind.

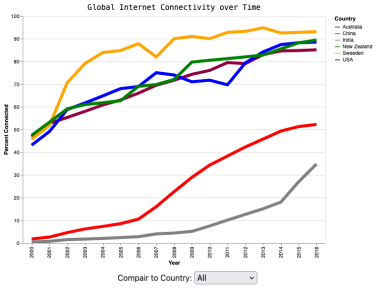


Figure 1: Screenshot of full Assignment 2 visualisation

e. Design

i. Layout

In order to maintain readability, the assignment is composed of 4 main visualisation sections each containing a title, paragraph text and the corresponding visualisation (Figure 2). Due to the linear nature of the layout it appears natural on multiple device sizes and reduces the amount of sight lines leading to less confusion. Because the visualisation is centred for each section, the overall assignment remains balanced.

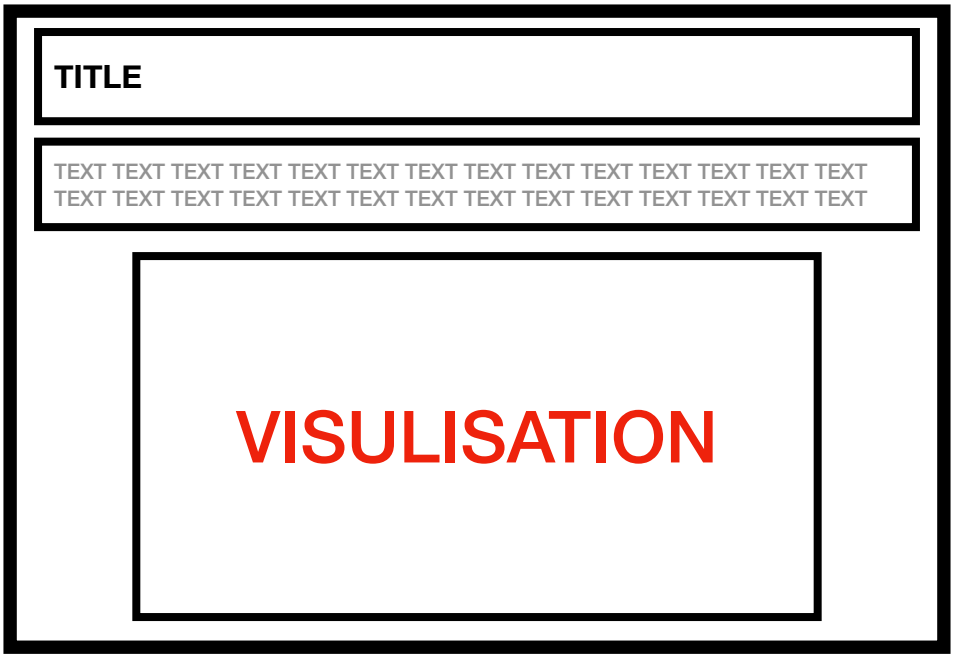


Figure 2: Block diagram of visualisation section

ii. Colour

Colour was kept constant in the assignment by selecting purple as a primary colour and selecting the same ‘plasma’ colour scheme for continuous data as seen in Figure 3. Purple was chosen as it is often associated with future technology. All of the colour choices were checked so that they are colour blind friendly.

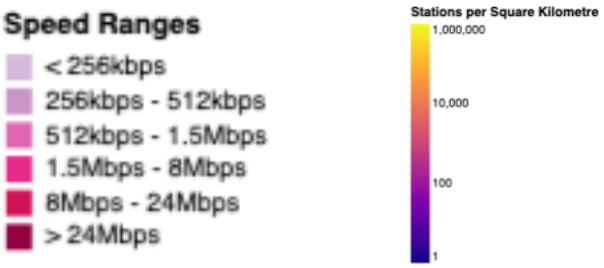


Figure 3: Sequential scales

iii. Figure-ground

A visual hierarchy was formed by bolding titles in black and using a normal weight for the grey paragraphs, as well as making the titles larger. These alterations naturally draw the reader's eye towards the more important headings first rather than the text.

In order to create a hierarchy within the visualisations, bright / saturated colours were chosen to denote larger values. Because of the stronger colour values a viewer is initially drawn to these items.

As shown in Figure 4, a dashed line was rendered on the visualisation to symbolise an event that occurred. By colouring this line in white it is brought to the front of the visualisation, thus being more impactful.

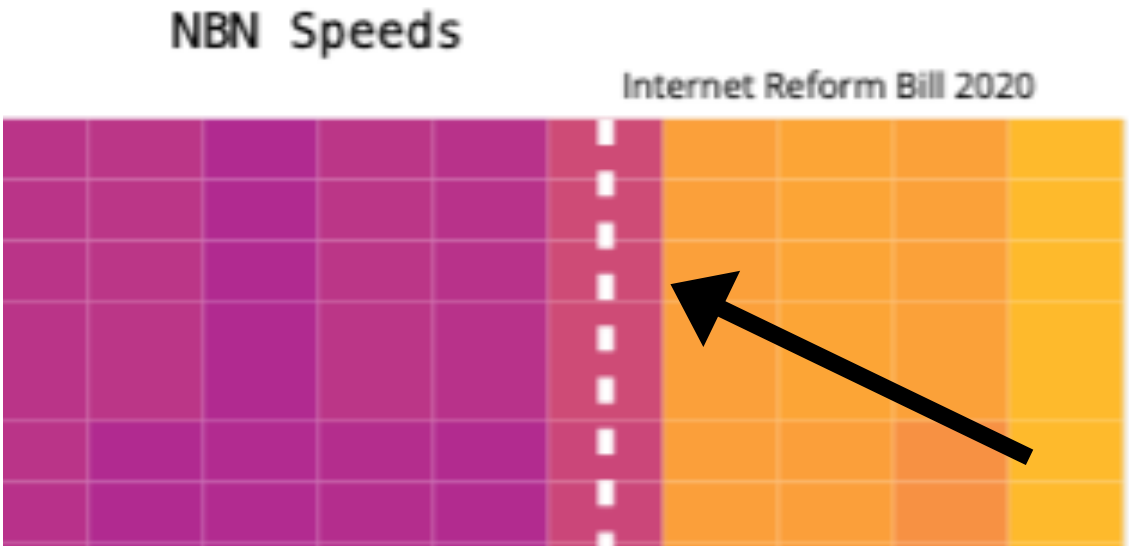


Figure 4: White dashed line drawn to the front

iv. Typography

There were two fonts used in this assignment, ‘Open Sans’ for paragraphs (Figure 6) and ‘IBM Plex Mono’ for headings (Figure 5). ‘IBM Plex Mono’ was chosen as it is monotype and is a common font to use while coding. This design decision was meant to infuse the assignment with an ‘early internet’ feel. ‘Open Sans’ was chosen because of its legibility due to it being a sans serif typeface.

Figure 5: Example ‘IBM Plex Mono’ heading

Figure 6: Example ‘Open Sans’ text

v. Storytelling

The assignment was designed so that each visualisation is in rough chronological order allowing for a user to scroll through time by scrolling down the page. In order to aid with explanations, there are short paragraphs for each visualisation as well as annotations when necessary (Figure 7). For each visualisation in the assignment a tooltip has been added for more context as seen in Figure 8.

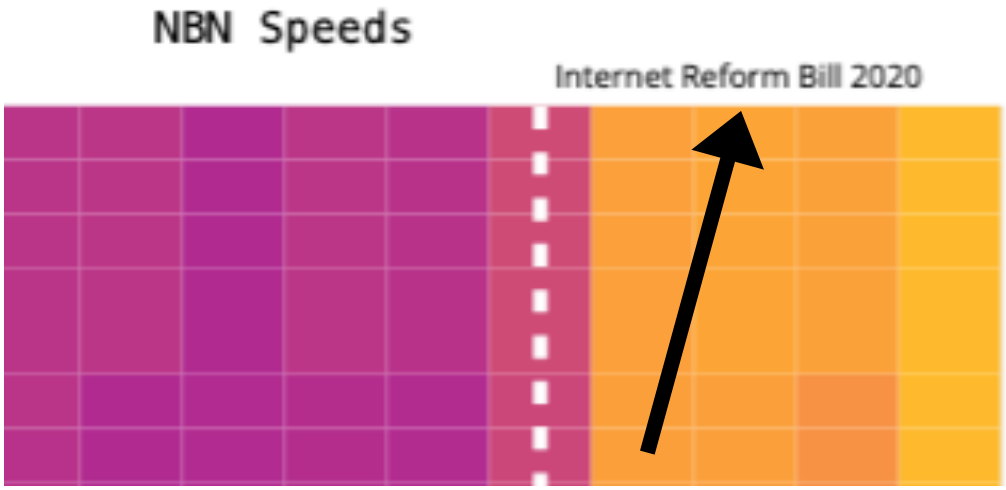


Figure 7: Useful annotations

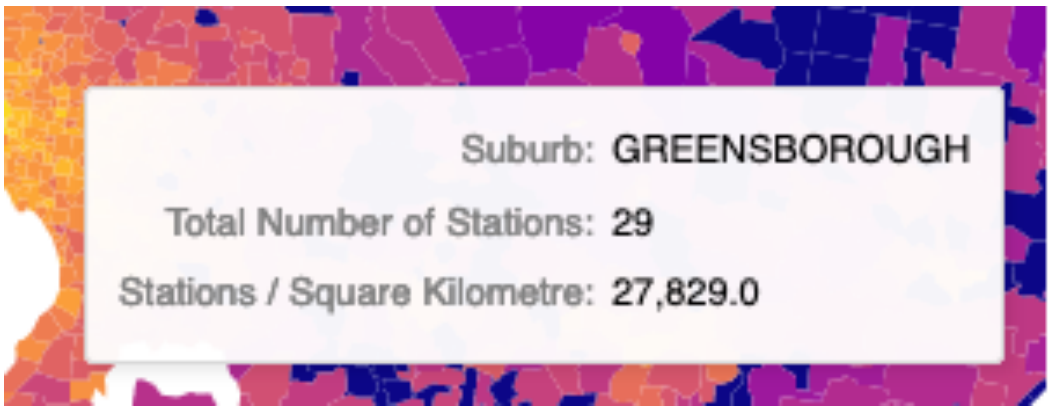


Figure 8: Example tooltip

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infrastructure.gov.au. (2021). Telecommunications Reform Package. Retrieved 10 October 2021, from https://www.infrastructure.gov.au/media-technology-communications/internet/telecommunications-reform-package

Internet Live Stats. (2021). Internet Users by Country. Retrieved 10 October 2021, from https://www.internetlivestats.com/internet-users-by-country/

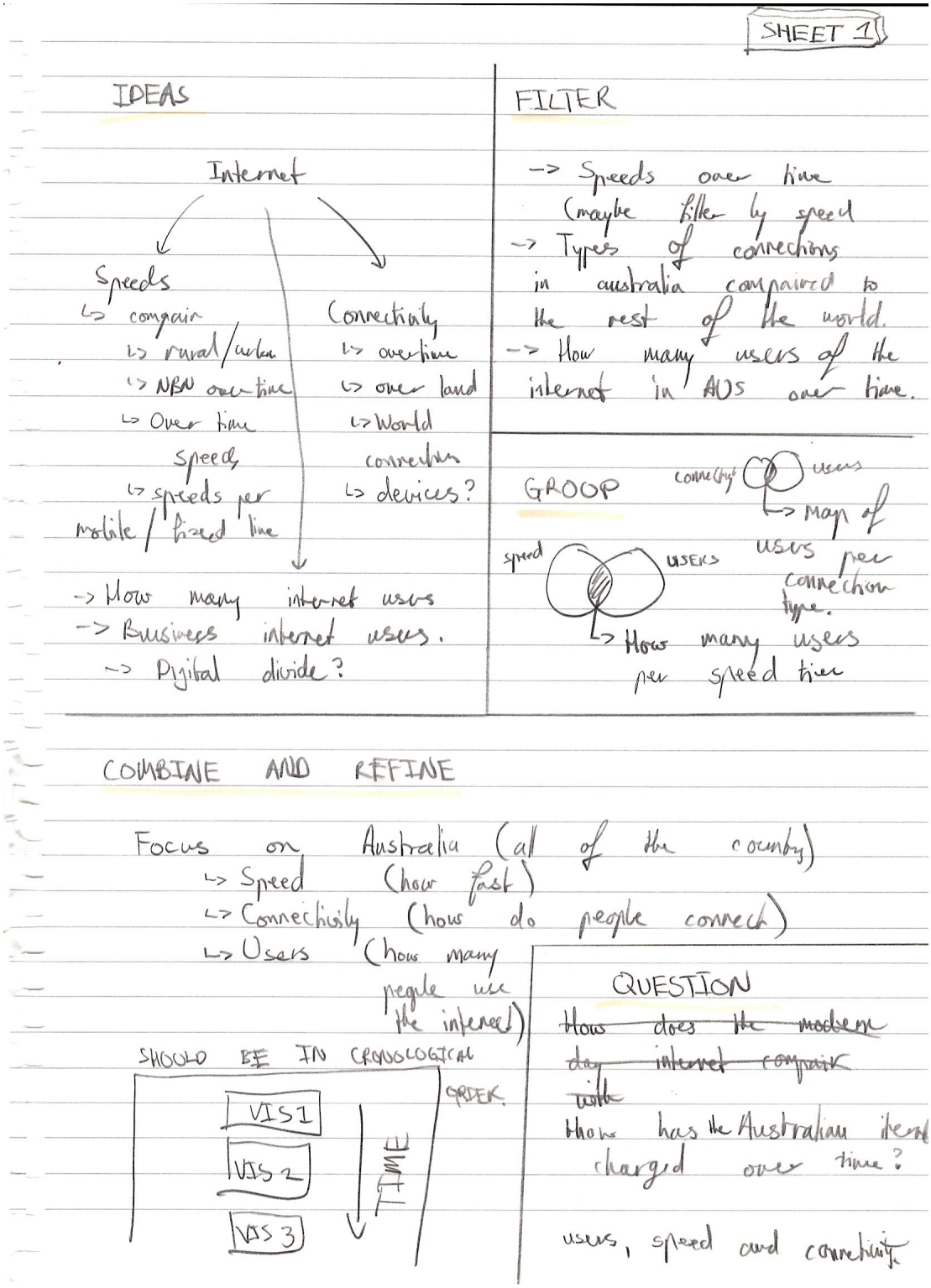
g. Appendix

Sheet 1

Author: Blake Haydon

Date: October 7

Task: Assignment 2



Sheet 2

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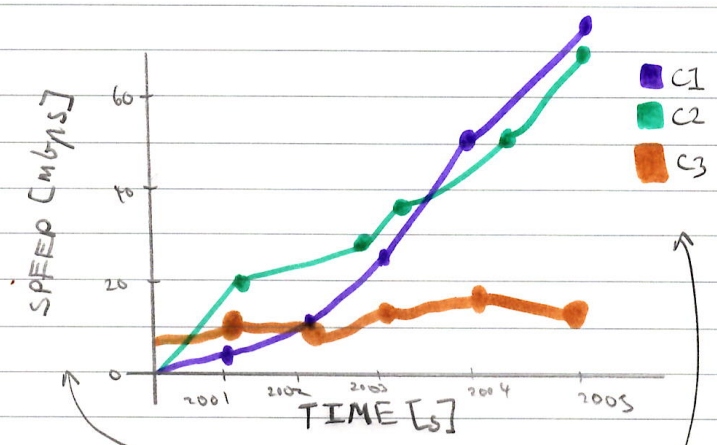
Date: October 7

Task: Assignment 2

SHEET 2

LAYOUT



OPERATIONS

HOVER: When hovering it should show the tooltip with current year and speed information.

LEGEND: The legend should act as a filter to filter out countries by seting them to grey / desaturating all but the single selected line.

FOCUS

-> When hovering over a point a tooltip showing year and value should show

-> Different colours should correspond to the county given (flag colours)

-> Maybe use non-linear connection between nods.
↳ Quadratic?

DISCUSSION

-> The colours selected for the countries should be reinsable for those who are color blind and thick enough so that people with impaired vision can still see

-> Maybe use Log scale to show exponential growth as linear growth

Sheet 3

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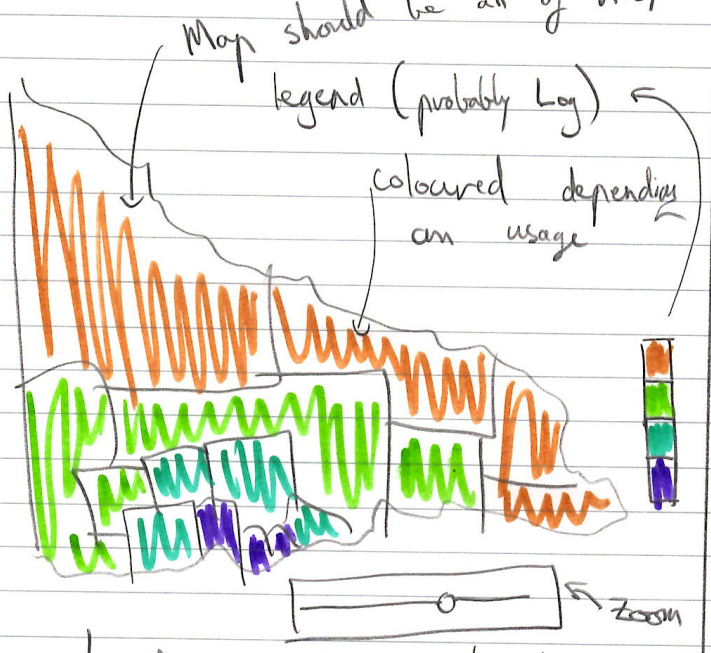
Date: October 7

Task: Assignment 2

SHEET 3

LAYOUT



↳ Map containing internet usage for each town

OPERATIONS

ZOOM: using a slider users should be able to zoom into the map.

FILTER: Should be able to filter depending on how much band width in that point of area.

FOCUS

-> Being able to zoom means that a user can explore small geographic regions that would blur together like city centres.

-> A tooltip should be presentable for each suburb / state showing non-scaled values.

DISCUSSION

-> The colours used have to be colour-blind sensitive

-> The data values must be scaled depending on area / number of people.

-> If log doesn't work use discrete groups of values.

Sheet 4

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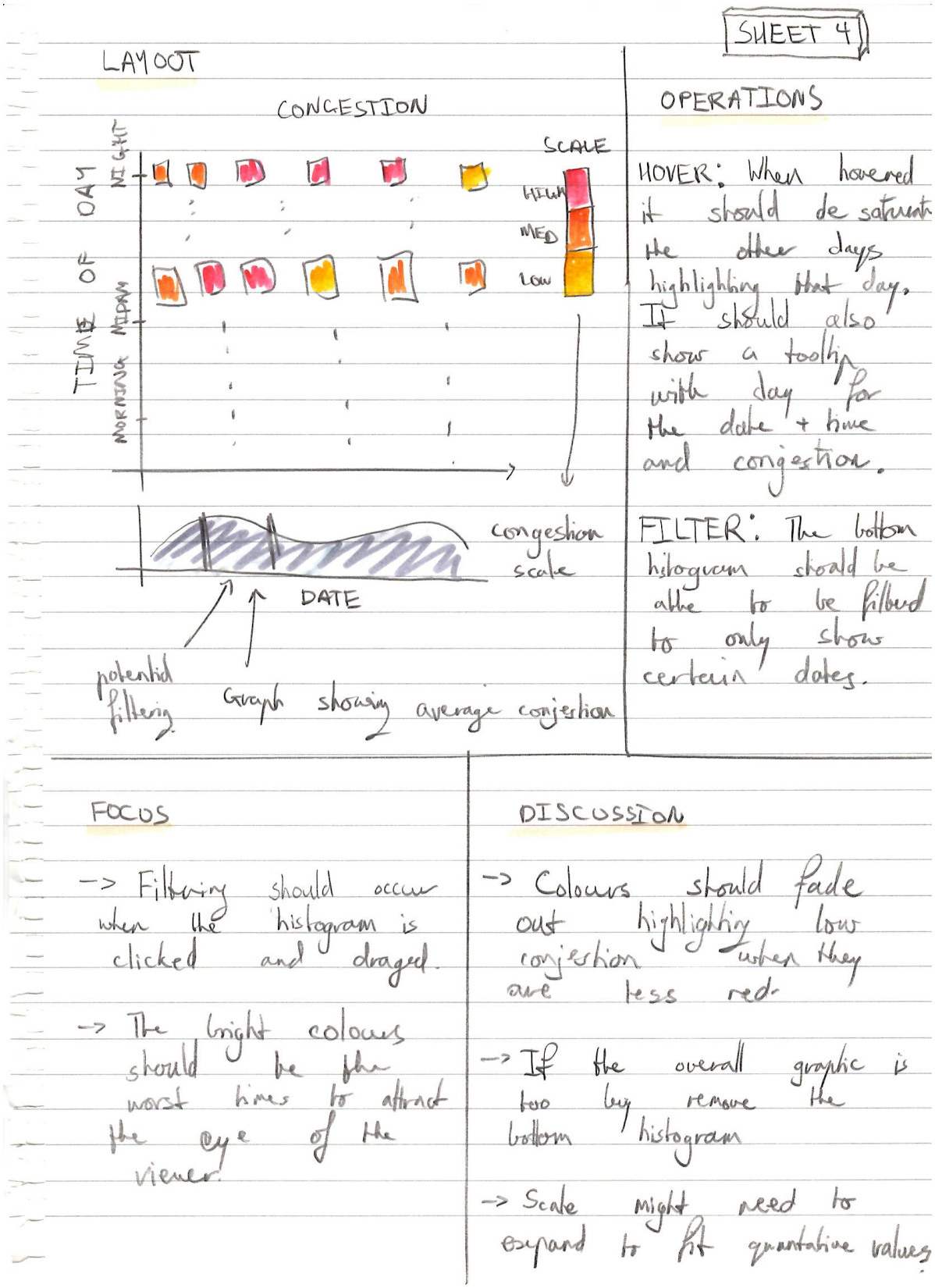
Task: Assignment 2



Sheet 5

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