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CPSC 583 W2020 4th Project Hand-In

https://nadramon.github.io/pages/583Final/index.html

1. INTRODUCTION

Our project is about Homicides in London. The goal of our visualization was to present the data in an informative way. Through the use of visual and interactive elements. Allowing viewers of our data to explore and understand our data set, through interaction. Another goal we had in mind while working on our project was being able to provide viewers, the ability to manipulate our data set to get a better understanding of the information we are trying to represent. By having dynamic and interactive elements we want users to see trends or relationships in our data.

2. DATA DESCRIPTION

2.1. DATA DESCRIPTIONS

Fast Food Restaurant

This is a dataset on fast food restaurants across America from 2015 to 2018. It includes the restaurant's name, location, type, and date added to the dataset. I got this dataset from data.world which got the data from datafiniti. While I could not find much data on the reliability of this source, from their website they promote their usage as a highly developed API for business on business. From featuredcustomers.com they have a near-perfect score with 262 ratings. In regards to the dataset itself, I wanted to know the rate that these places expand and to which location they populate too. While I don't think it would be super useful to anyone's life, I still felt like it would be interesting to know which places had the most growth and their popularity amongst states.

Homicides in London

The data set I submitted is about homicides in London, UK. The columns contain thedates the homicide occur, the location, whether the crime is solved or not, informationabout the victims including age, sex and ethnicity and information about the suspectsincluding age, sex and weapon used. The source for the data is from here:
https://www.kaggle.com/iainagar/london-homicide-data-20082018/data. The data was gathered by the Office of National Statistics which is a UK government run operation,hence they would have access to investigation reports by detectives and the police. Ithink this data is interesting to work with because I like to watch crime dramas and it isfun to see them figure out the mystery of the murder. I think that by analysing past data,it is possible to figure out clues or similarities in future escapades, either to prevent homicide from taking place or to solve the crime and catch the suspect as fast as possible. I also have a lot of friends living in London, so I could warn them about the high appearing areas from homicides by studying this data set.

Unemployment rate and employment rate by educational attainment

The dataset concerns data about Unemployment rate, participation rate and employment rate by educational attainment. This data is a compilation from statistics Canada about employment in different parts of Canada. Listing levels of employment, gender and other attributes. This dataset is meaningful to us as undergraduate students. The data contained in this dataset might show trends about employment and the type of degree obtained from different levels of attainment.

Periodic Table of Elements mapped to stocks

The dataset focusses on data of companies in the stock market to determine a correlation to a company to a specific element in the periodic table. The dataset was constructed by an AI where human curators would feed data such as documents, URLs, news and tweets into the AI. Along with SEC filings, public company data and profiles the AI would score relationships between elements and the stock and was later post curated by a between the company and the element and could examine symbiotic, parasitic and sympathetic relationships between equities.

2.2. PROS AND CONS OF DATA SETS

Fast Food Restaurant

Pros

The exact location is a great interval scale that can help us pinpoint on a map where these locations popped up which enables us to see the density of different states. Having the restaurant's name is a great nominal data so we can see which can allow us to see which fast-food chain expands the most in addition to their state location now. The date that the place was added to the dataset can help us make a timeline to see the rate at which they expand and or the growth in popularity.

Cons

The attribute is a date added to the dataset and not date opened, we can only assume that anything from the start of the creation of this dataset must’ve been opened prior to its creation, and anything beyond must’ve opened after its creation.There is very limited data on anything besides their name, creation and location. There is no insight into how well these locations are doing or their employment size, customer satisfaction, income.

Homicides in London

Pros

Of this data set is that there is a variety of data types. There is nominal data with the gender, ethnicity, weapon, status and area of the homicide. There is qualitative ratio data with age and number of suspects. Finally, there is ordinal data with the date. Another pro is that there is a lot of data to compare with, ranging from 2012 to2018 (after I cut the rows to keep it below 1000), in order to

see specific time periods.Another pro I find is the data for the location combined with some of the others. It ispossible to visualise this data with a map and plotting the locations of the murder,changing the plotting object to represent something, the size of it for another and so on.In between pros and cons, there are some cells that are blank. Some of them are of thesuspect's sex, which makes sense if the crime is unsolved, as they could not find theidentity of the suspect. However, some of them are missing when the crime is solved,which is confusing as there are only 2 sexes possible.

Cons

of this data set is that for the ethnicity column, the data is very restricted and not explicit. For a homicide data, we don't really get the motive of the suspects on why they perform such heinous action, as there could be links between each homicide as well. On the other side, what about the victims, perhaps they had occupations that could give a reason for the suspect to act, which again could show a link between each homicide.

Unemployment rate and employment rate by educational attainment

Pros

The data was collected from a credible source and covers a large population that will provide more accurate information. The information directly concerns all individuals inCanada that are able to work. This also closely relates to Canada's economic and social status. The dataset contains multiple data types. Nominal data types in the form of age,location, employment status, and education level. Ordinal data types in the form of education level, age and employment status. As well as interval data types in the form of age. This allows that data to be visualized more easily and with more methods.

Cons

The data contains an excess amount of data that can be cleaned. The entries in the data are also generalized results rather than the raw data that was obtained through collection methods. The data could also include important information regarding the average salary of each range. As well as the type of the degree attained

Periodic Table of Elements mapped to stocks

Pros

This data is really unique as it is really hard for people to determine the link between company and an element. The data is human curated which means that most of the data is to an extent verified.

Cons

The data is based off of a machine learning model which means that there could be flaws in how it was constructed. Another flaw could be the data which the model was given could be false or flawed.

2.3. DATA SET DECISION

We decided to go with the data set Rahmanta found of the homicides in London. We Went with this one because the data is more interesting and also there are multiple ways of visualising the information compared to the others and you can create a lot more stories with it. The other data sets are interesting to know, however, it isn't very useful and does not have as much of the same potential for visualisation, nor would the visualization be as insightful. The data on periodic tables and stocks could provide information such as what elements are the most valued and also what companies trade with certain elements which is interesting, but knowing which areas to avoid in London Might prove better for survival. The Fast Food data set comes from a source that could not be concluded as reliable, unlike data that was provided by the government for the homicides in London.

3. DESIGN PROCESS

3.1. SKETCH-ABLE DATA SUBSETS

Subset #1: North West London

Focus:

To focus on this subset was to pick a random quadrant of London which was specifically Northwest London. This should lead to a generalization of the data as the quadrant should represent 25% of the total set of data. In addition, it is quite noticeable that most of the records are relatively spread out but then highly concentrated in one area

Trade-Offs:

The location is biased towards a specific geographic area of the map of London which could lead to some anomalies as it represents that quadrant of London.

Subset #2: Random Selection of Population

Focus:

Randomly select a small subset of the population to summarize the data. Randomly selecting rows from our data set gives unbiased choice for the data that will be analyzed. With a simple random sample, every entry in the larger population has an equal chance of being selected.

Trade-Offs:

The randomly selected data does not accurately capture the scope of our data. Since the data is randomly selected and quite small a single entry in the subset may have undue influence over the sample.

Subset #3: Downtown London

Focus:

This subset is supposed to represent the densest part of London which should represent the most of London as data should be centered around the city centre.

Trade-Offs:

The trade-offs of this subset is that maybe the data is too general which would lead to less exploration on interesting visualisations, and maybe the data could be skewed in a way that would only pertain to downtown Londoners.

Subset #4: Murdered by Knives

Focus:

This subset was chosen based on the most popular weapon used for homicides in london. This would represent the most general case of the data that we selected.

Trade-Offs:

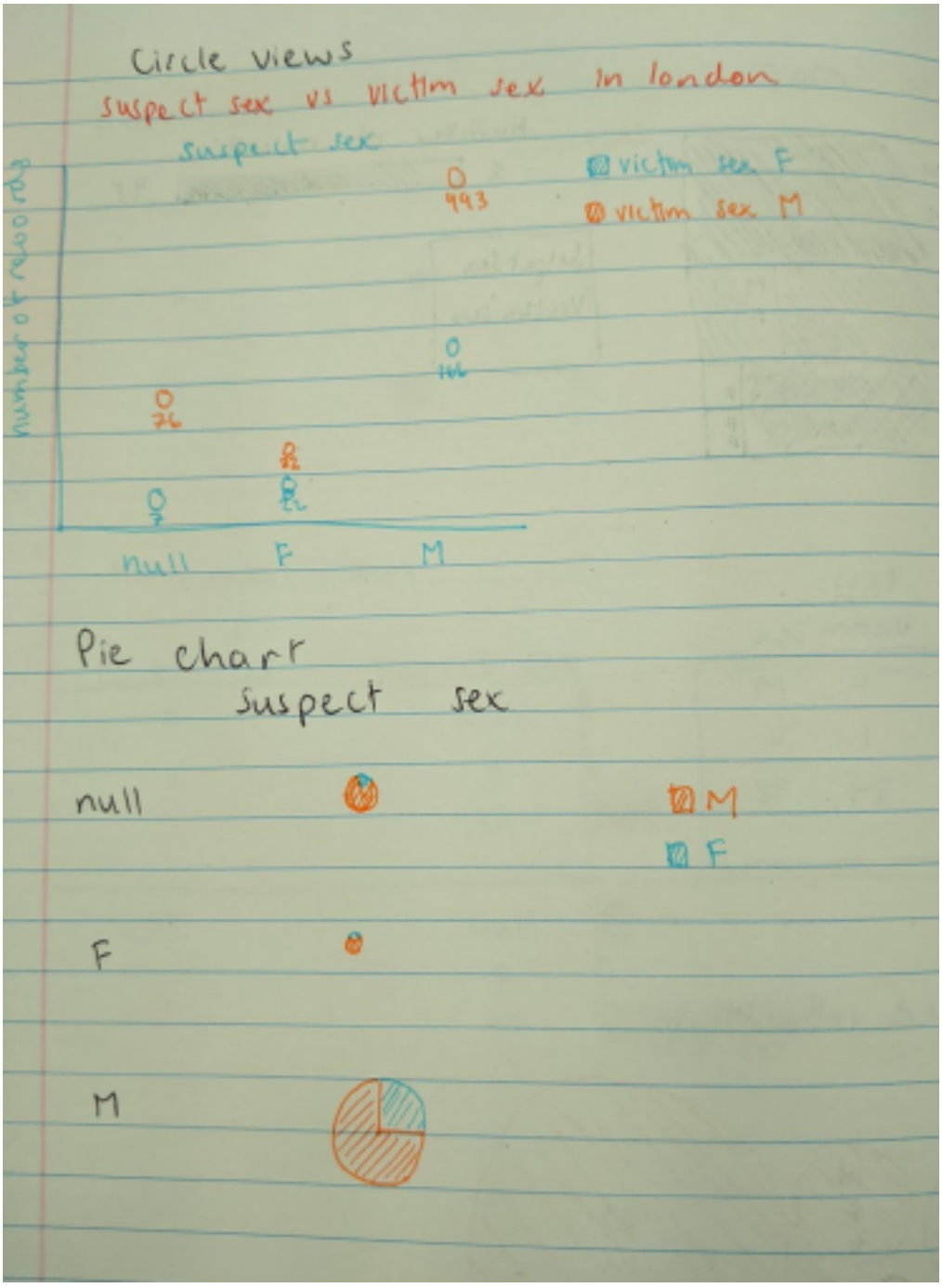
The trade-off is that all special cases are left out of the subset, which would lead to more limited variations on sketches.

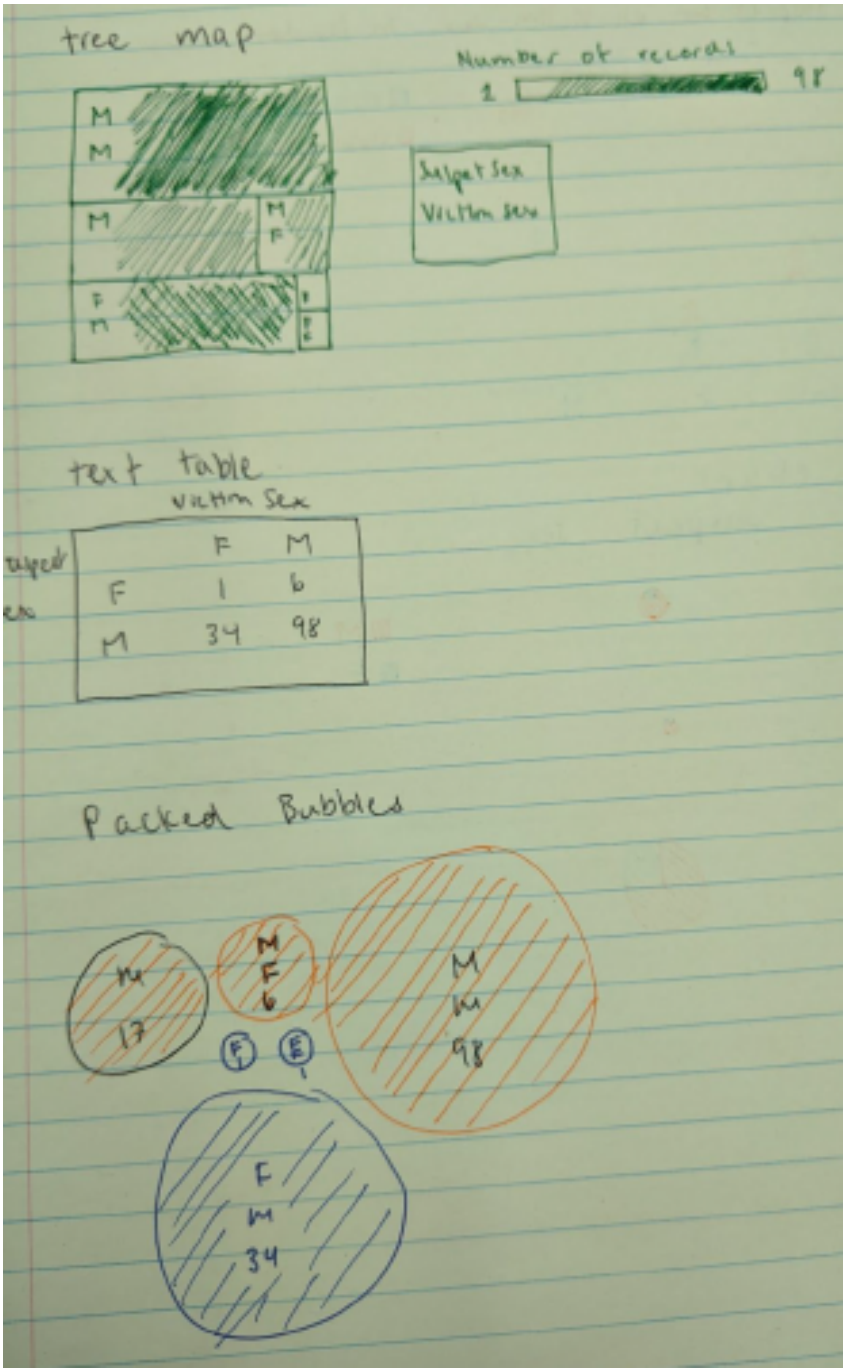
3.2. DESIGN DIRECTION

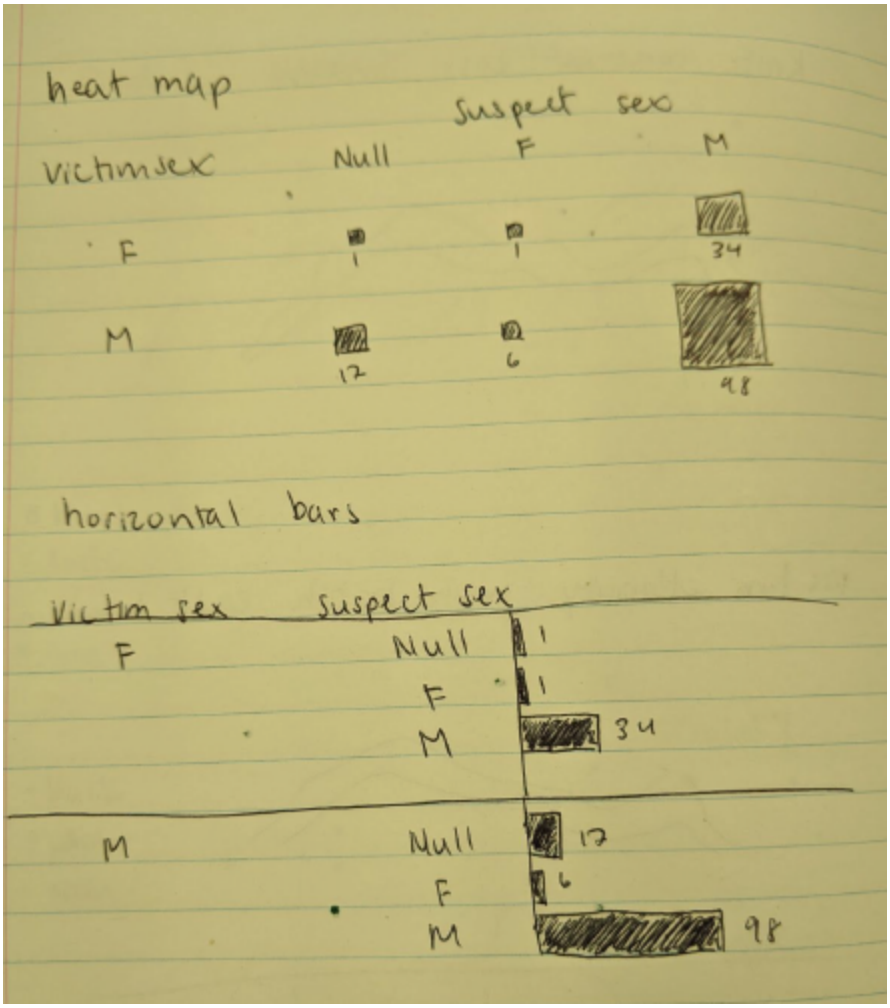
The sketches that we made all had variations of likeness based on the limitations of interpretation of the data provided, for example there's only a handful of ways to represent weapons vs the number of victims they had. What was interesting was the way we all converged on the final sketches we all focused on the data's coordinate values. In D3 we could do animations based on the sketches that revolved around date, implementing a timeline or time lapse feature. This could produce an overall timeline visualization of all the homicides captured in our data set. We could also implement animation in a heat map, as the concentration of homicides increase and the area of concentration would darken in colour. Alternatively, we could animate the number of homicides as a peak, as the area of concentration of homicides increases the peak height of the location would increase topographically. We could also use animations or markers to represent the weapon used.

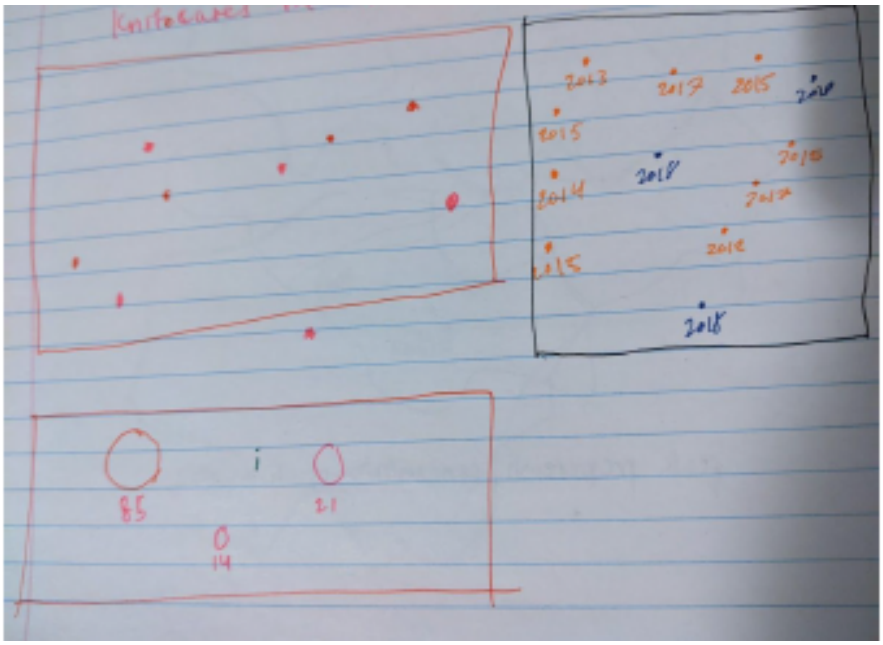
3.2.1. Sketch-able data subsets

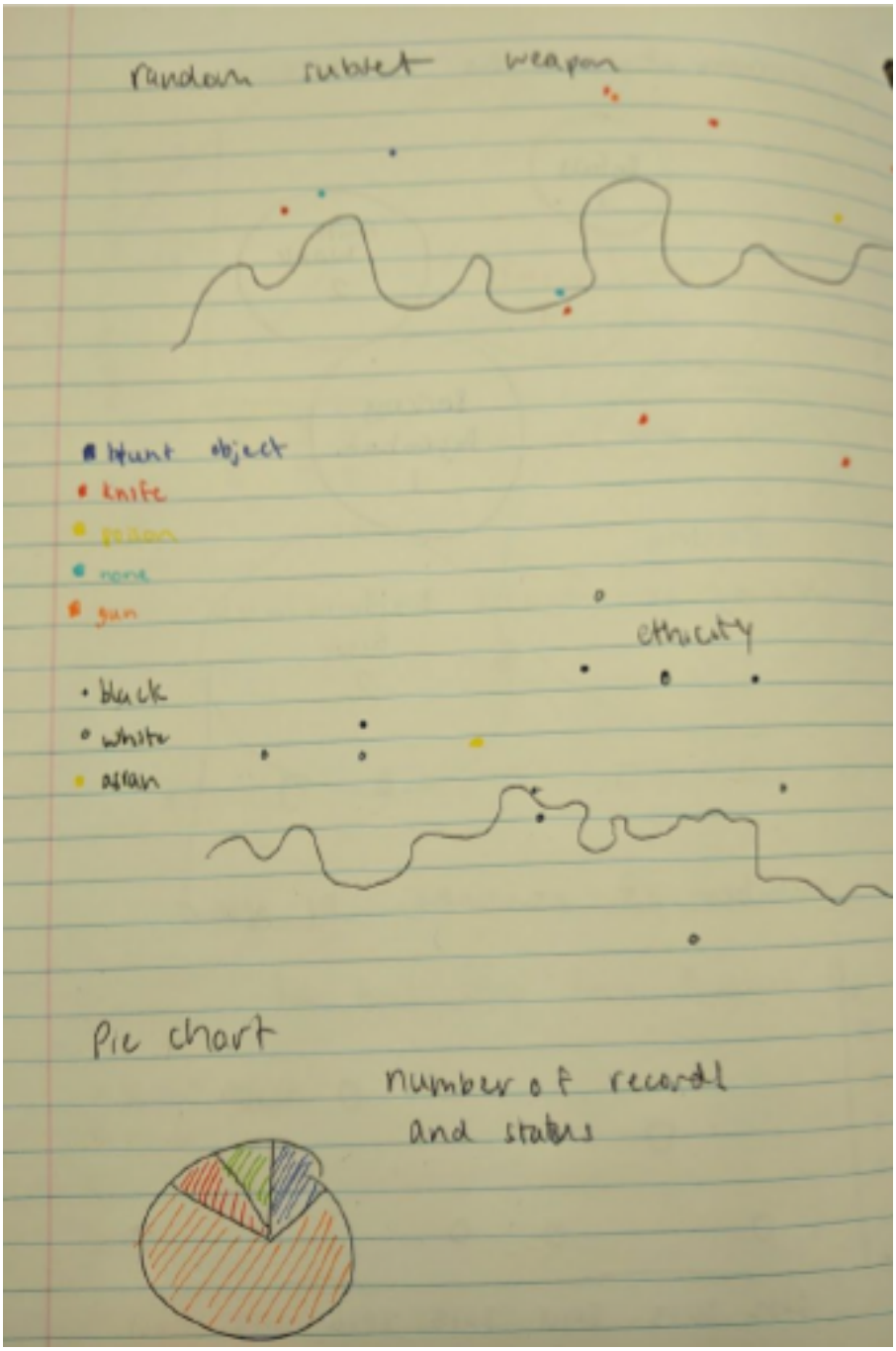
Nielson's Sketches

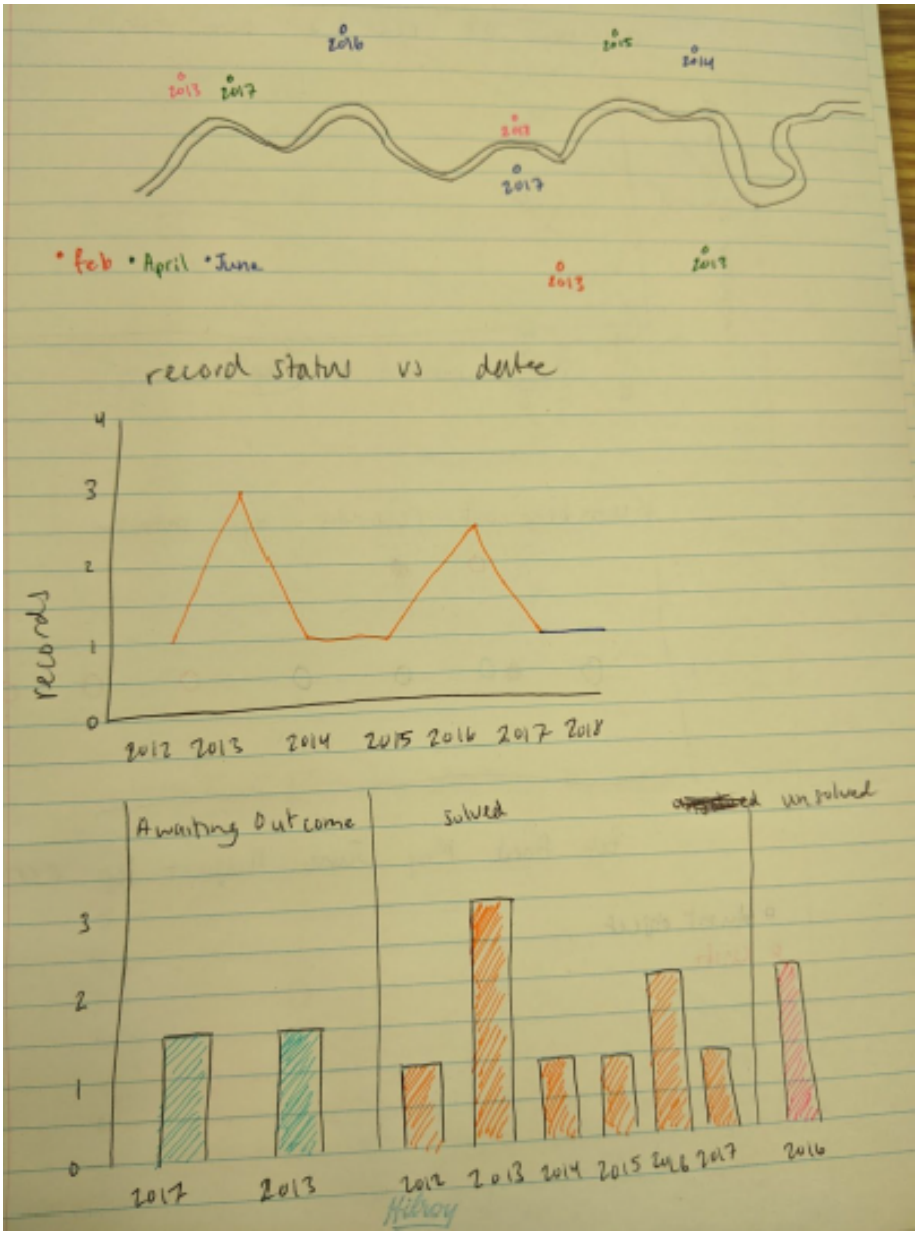

Circle views
suspect sex vs victim sex in london
suspect sex
victim sex F
victim sex M
number of records
993
166
76
null
F
M
Pie chart
suspect sex
null
F
M
M
F


tree map
Number of records
1
98
M
M
M
M
F
F
M
Subject Sex
Victim Sex
text table
Victim Sex
F
M
F
1
6
M
34
98
Packed Bubbles
M
17
M
F
6
F
F
M
98
F
M
34

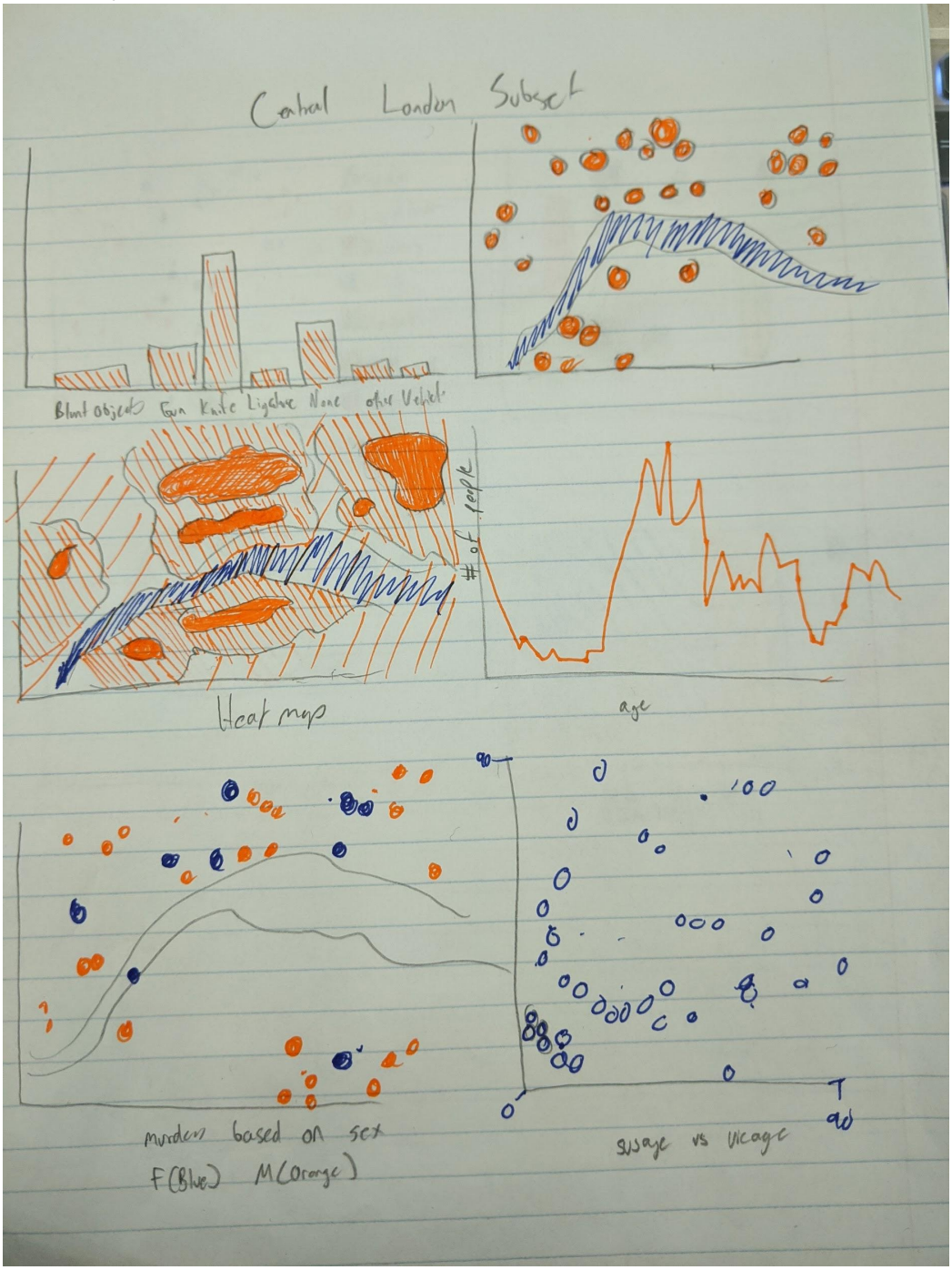

heat map
Suspect sex
Victim sex
Null
F
M
F
1
1
34
M
12
6
98
horizontal bars
Victim sex
Suspect sex
F
Null
1
F
1
M
34
M
Null
17
F
6
M
98


Knifecases
2013
2017
2015
2015
2018
2014
2018
2015
2018
85
21
14

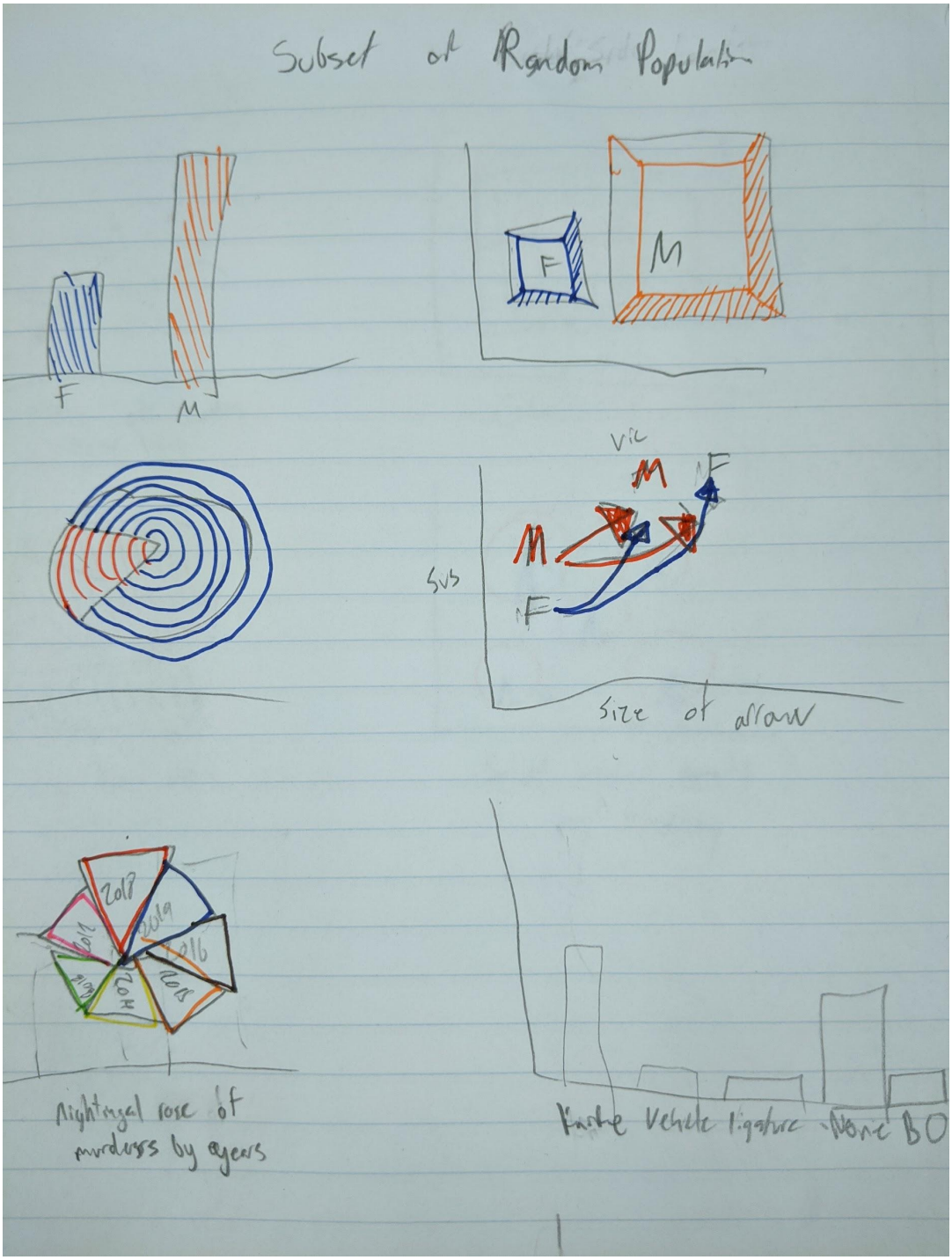

random subset weapon
blunt object
knife
poison
none
gun
ethnicity
black
white
asian
Pie chart
number of record and stabs

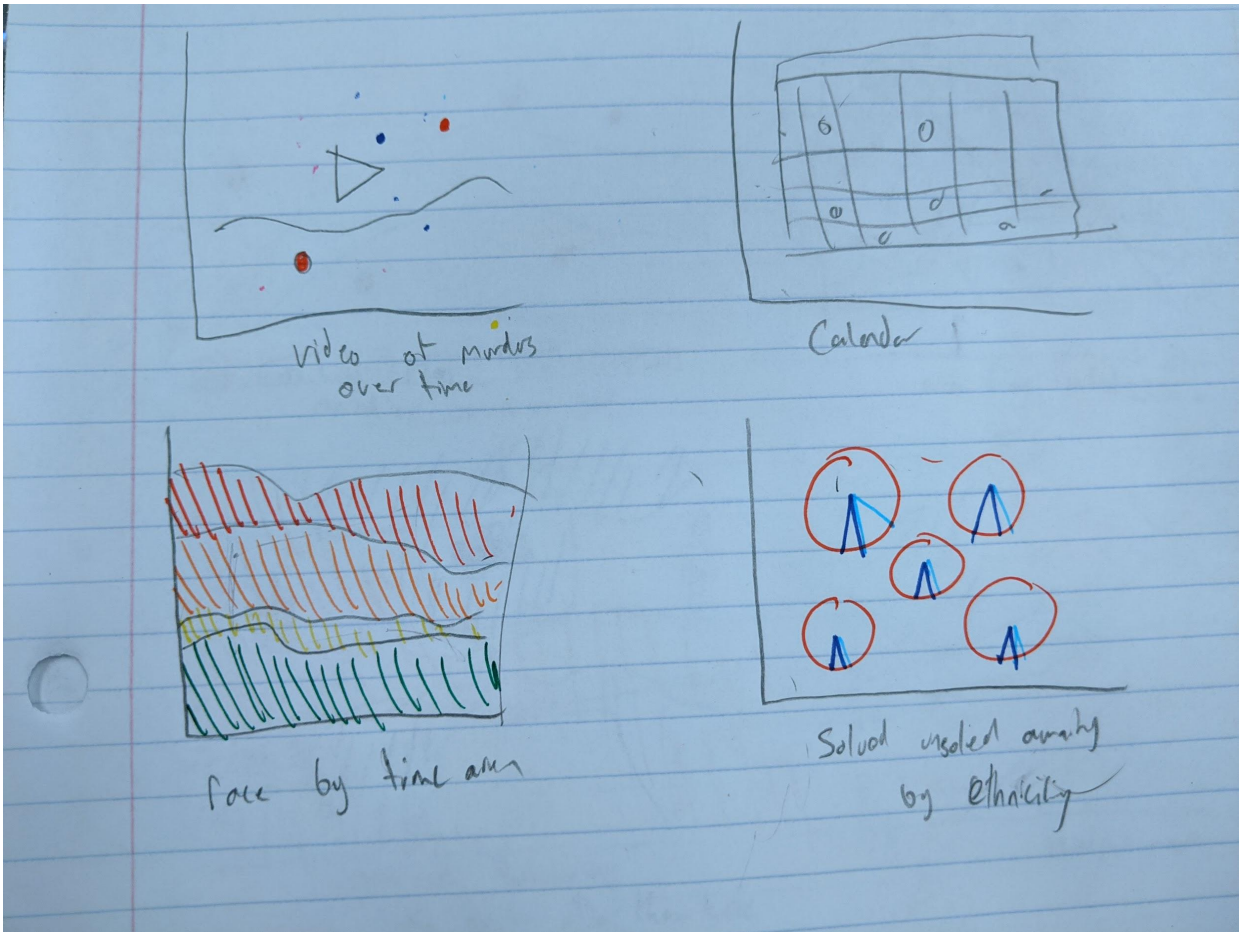

2016
2015
2014
2013
2017
2013
2017
• feb • April • June
2013
2017
record status vs dates
4
3
2
1
0
records
2012 2013 2014 2015 2016 2017 2018
Awaiting Outcome
Solved
Unsolved
3
2
1
0
2017
2013
2012 2013 2014 2015 2016 2017 2016

Ryan's Sketches



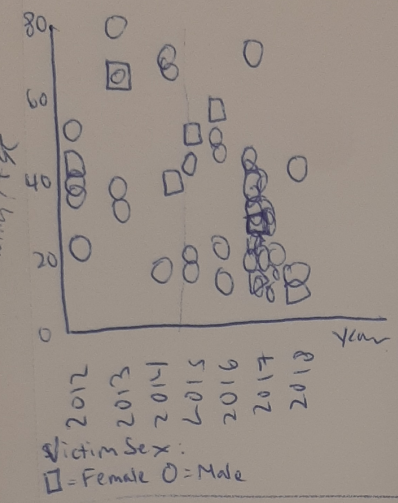

Camden
City of London
Hackney
Islington
Lambeth
Southwark
Westminster
Solved
Unsolved
awaiting
White
Black
Asian
Ethnicity


Subset of Random Population
F
M
F
M
Vic
M
F
M
F
SUS
Size of arrow
2018
2019
2016
2015
2014
Nightingal rose of murders by years
Knife Vehicle ligature None BO

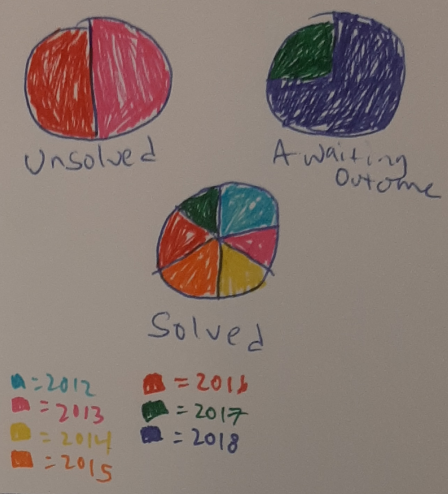


Rahmanta's Sketches

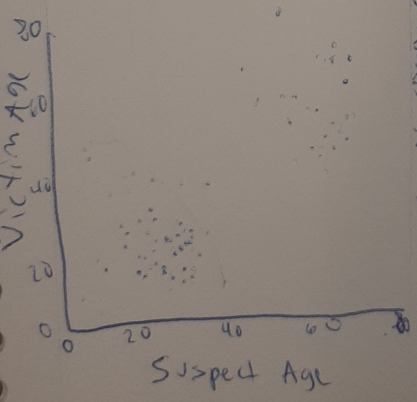
Victims of Central London



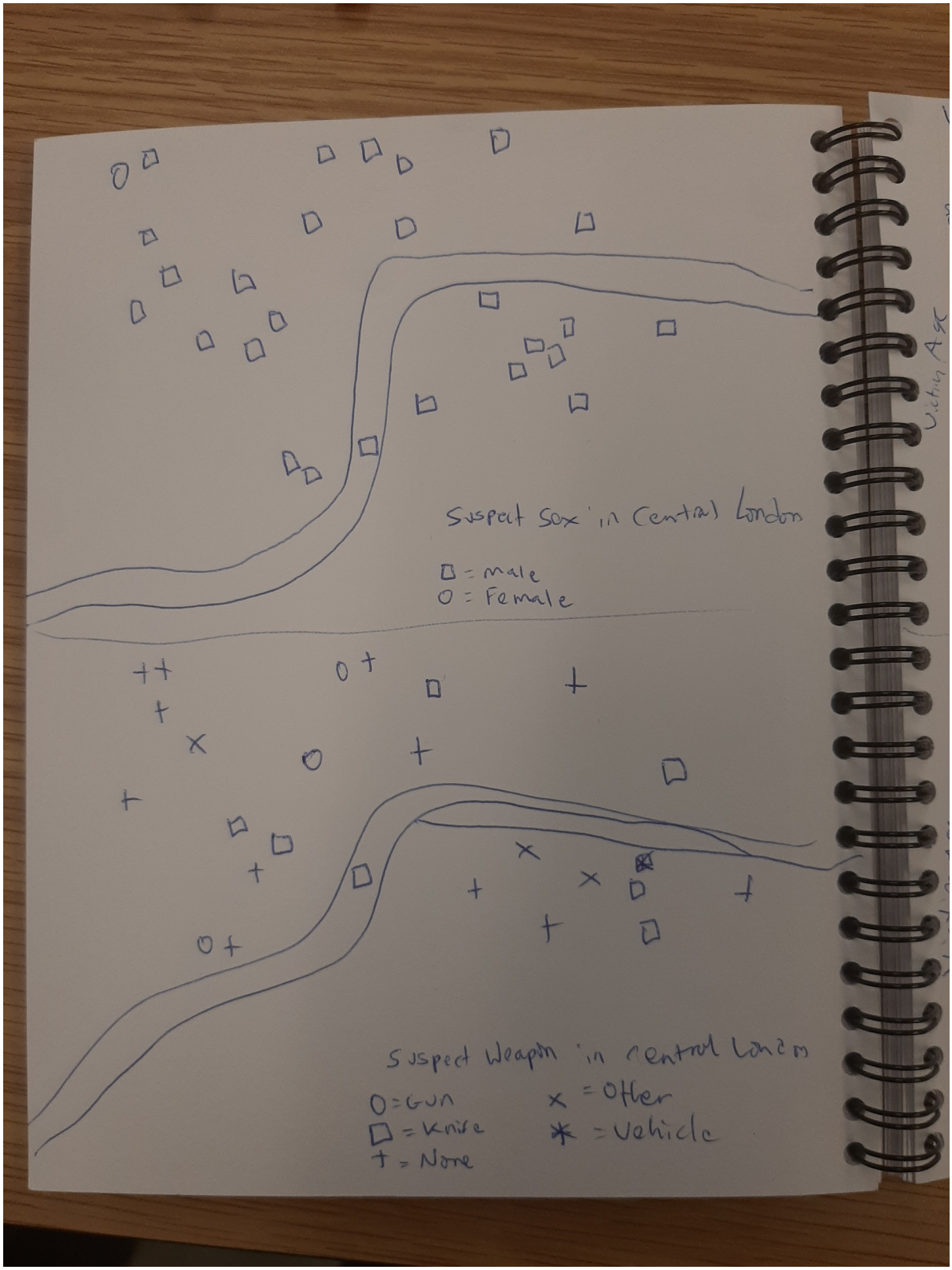
Victims of Central London & their Crime Status



Age Ration in Central London



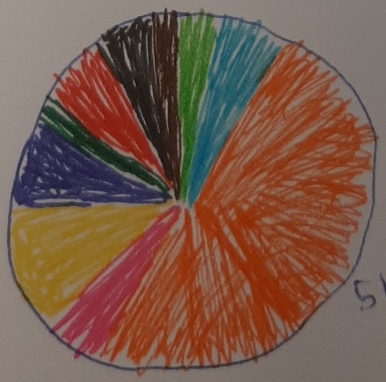
~~Ethnicity~~ Ethnicity victims in central London by Year


Suspect Sex in Central London
□ = male
○ = Female
Suspect Weapon in central London
○ = Gun
□ = Knife
+ = None
x = Other
* = Vehicle

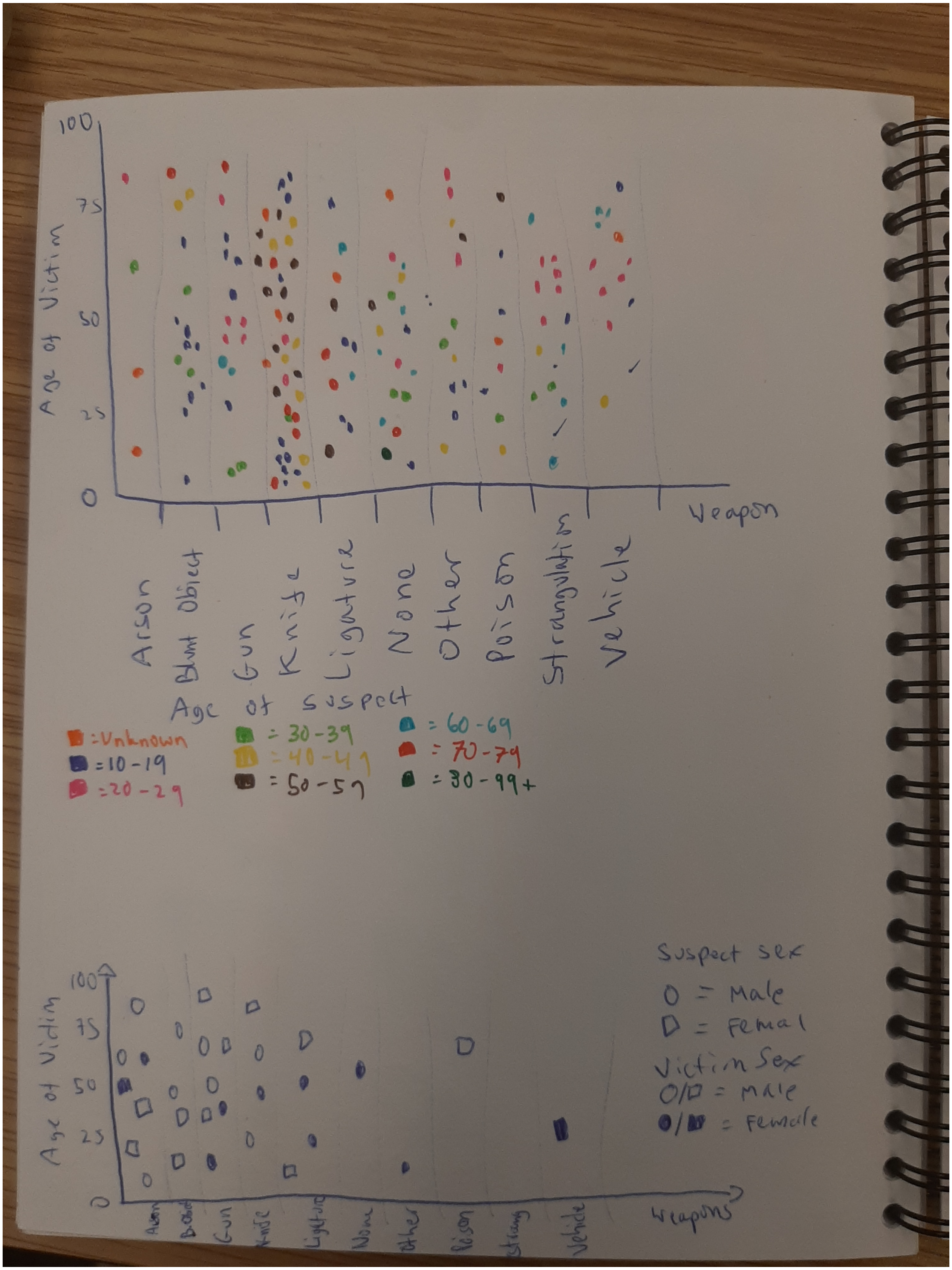
Weapon of Suspect

- = Arson
- = Blunt object
- = Gun
- = Knife
- = Ligature
- = None
- = Other
- = Poison
- = Strangulation
- = Vehicle

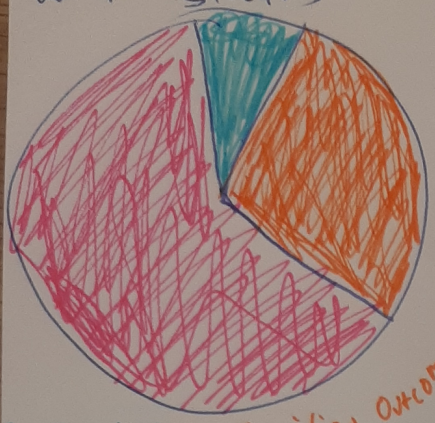
- Types per year
- Total per year
- Popularity of weapons



☑ 2012 ☑ 2013 ☑ 2014 ☑ 2015 ☑ 2016 ☑ 2017 ☑ 2018

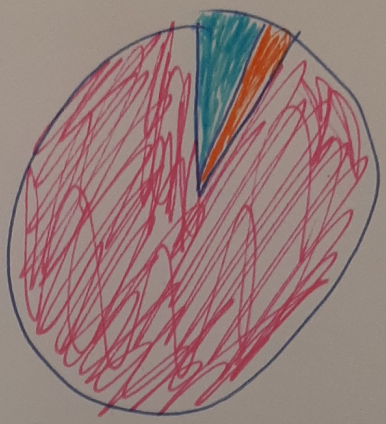

100
75
50
25
0
Age of Victim
Weapon
Arson
Blunt Object
Gun
Knife
Ligature
None
Other
Poison
Strangulation
Vehicle
Age of suspect
=Unknown
=10-19
=20-29
=30-39
=40-49
=50-59
=60-69
=70-79
=80-99+
100
75
50
25
0
Age of Victim
Weapons
Arson
Blunt
Gun
Knife
Ligature
None
Other
Poison
Strang
Vehicle
Suspect sex
O = Male
D = Femal
Victim Sex
O/D = Male
●/■ = Female

Knife ~~Weapons~~ & Crime Status



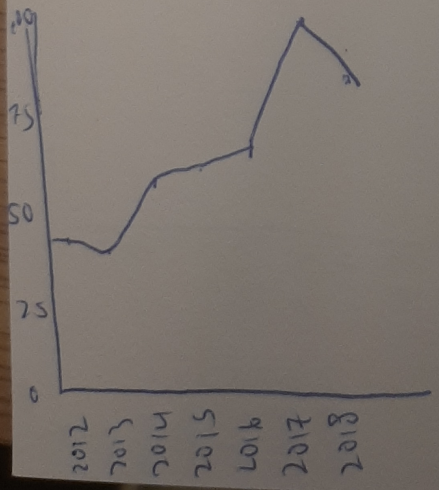
■ = Unsolved ■ = Awaiting Outcome
■ = Solved

Knife & Suspect Sex

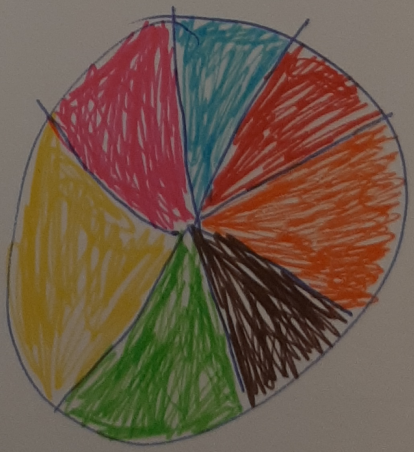


■ = Unknown ■ = Female ■ = Male

Knife & victims by year

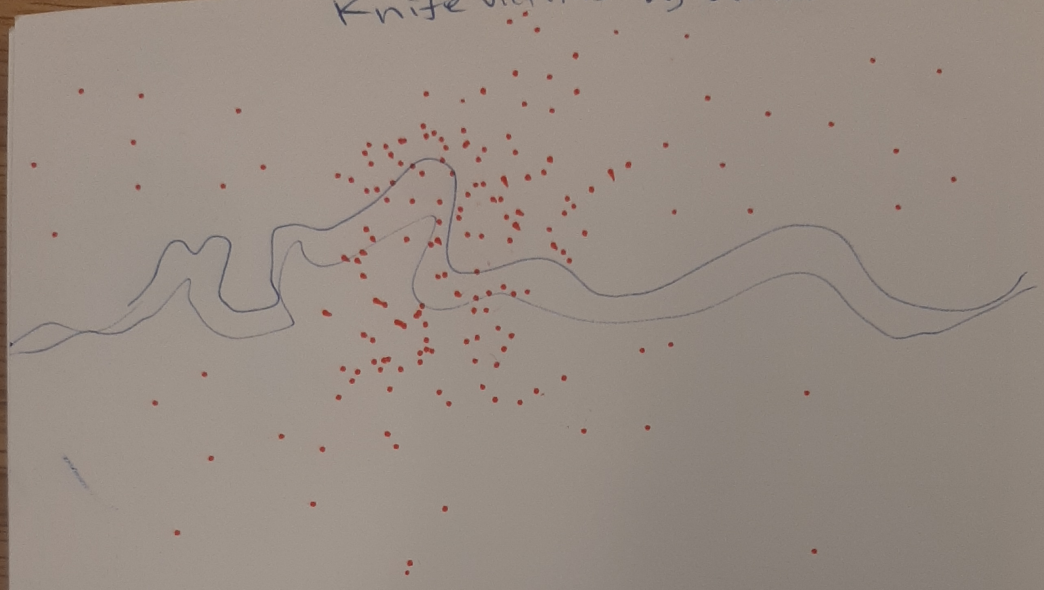


Knife & victims by year

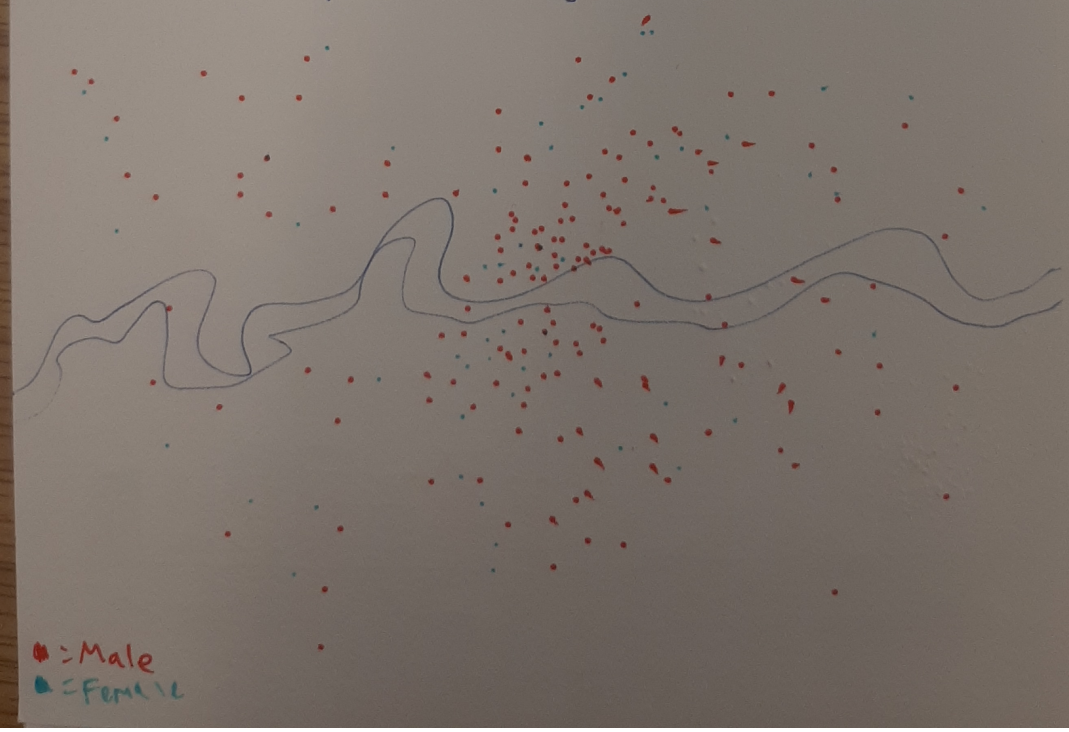


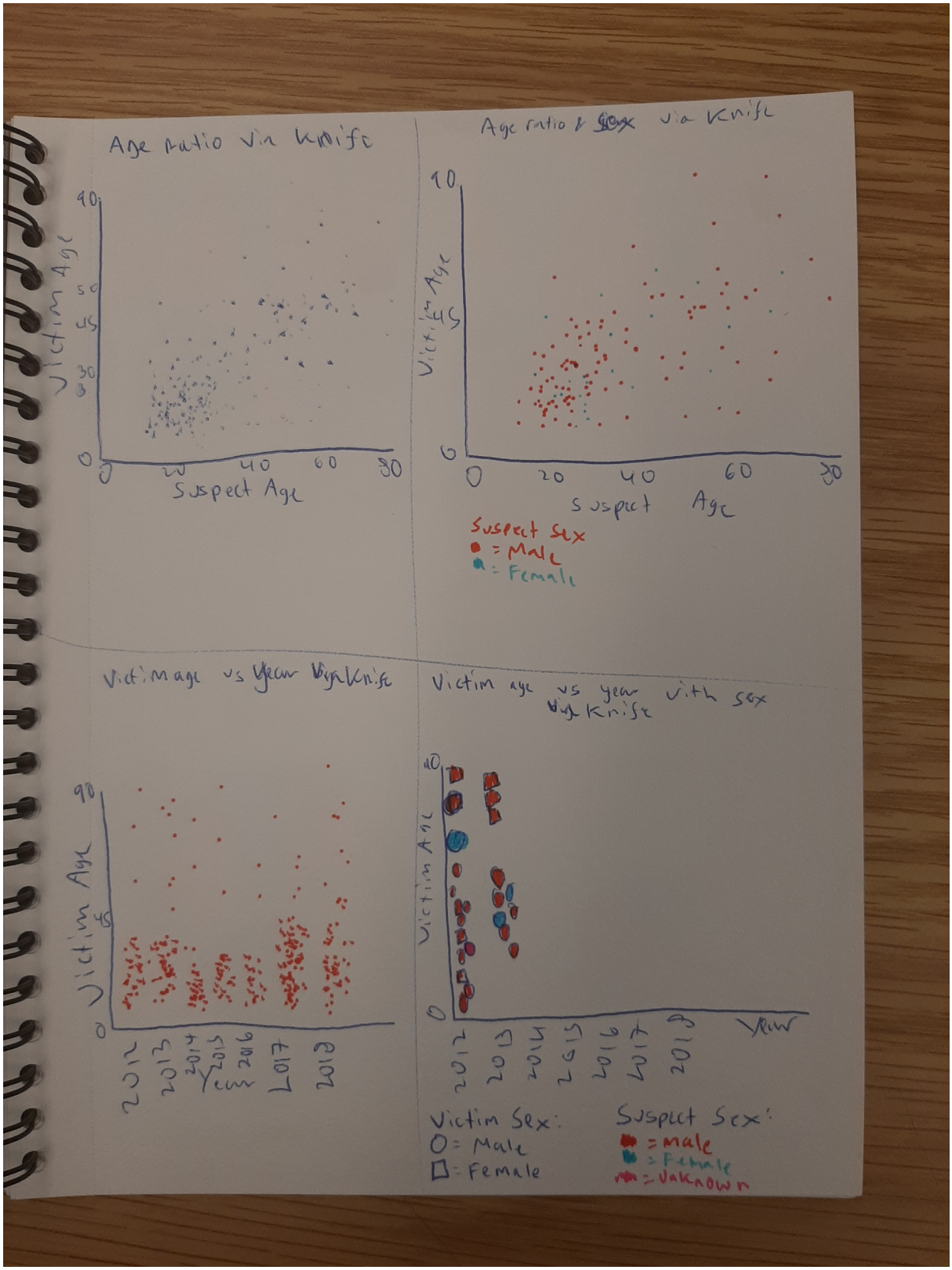
■ = 2012
■ = 2013
■ = 2014
■ = 2015
■ = 2016
■ = 2017
■ = 2018

Knife victims by Location



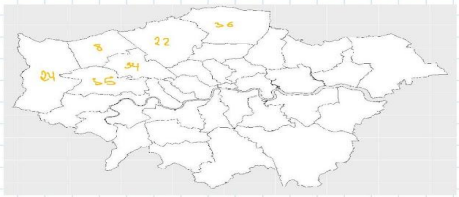
Knife victims by location with victim sex



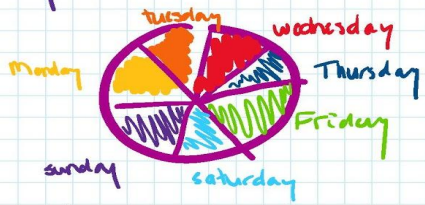

Age ratio via knife
Victim Age
Suspect Age
0
20
40
60
80
Age ratio & Sex via knife
Victim Age
Suspect Age
Suspect Sex
= Male
= Female
Victim age vs year via knife
Victim Age
Year
2012
2013
2014
2015
2016
2017
2018
Victim age vs year with sex via knife
Victim Age
Year
Victim Sex:
= Male
= Female
Suspect Sex:
= Male
= Female
= Unknown

Additional Sketches

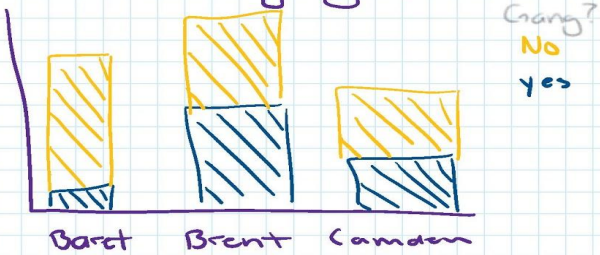
1)



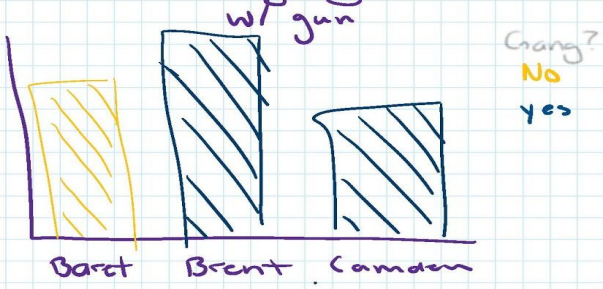
2) day of week and ratio Of records



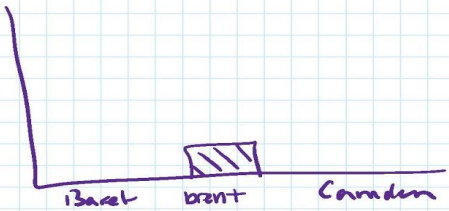
3) records w/ gang presents



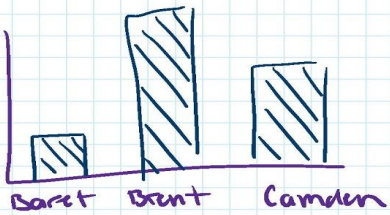
3) records w/ gang presents



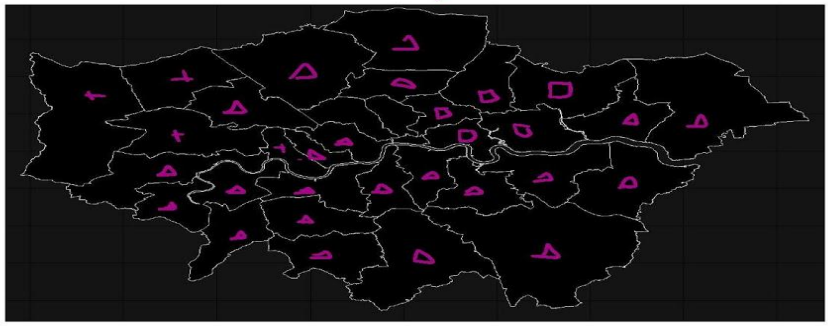
4) records of gang presence against women



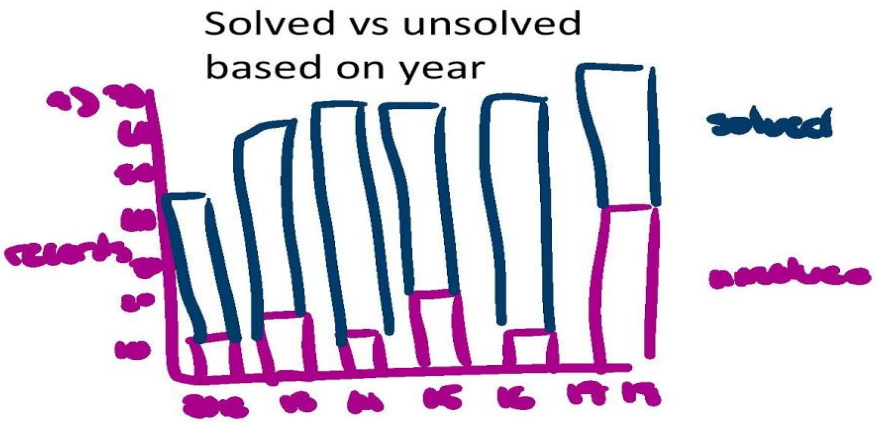
5) records of gang victim's being 25-30 years old

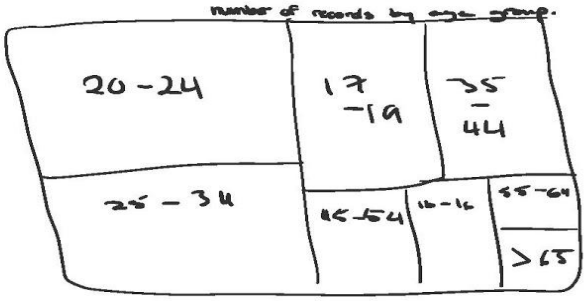


6) most victim ethnicity per location

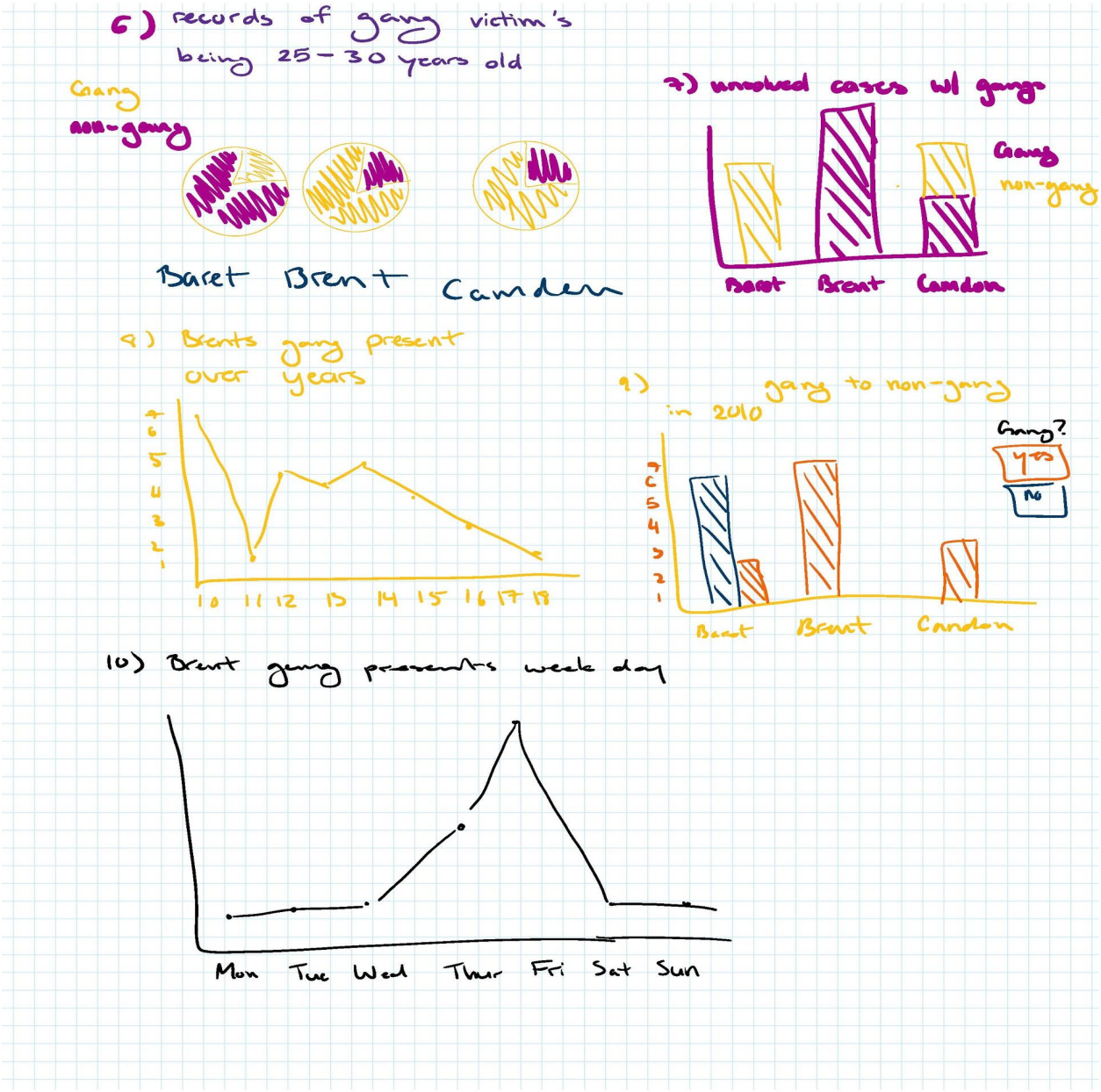


△ White
+ Black
□ Asian
○ other



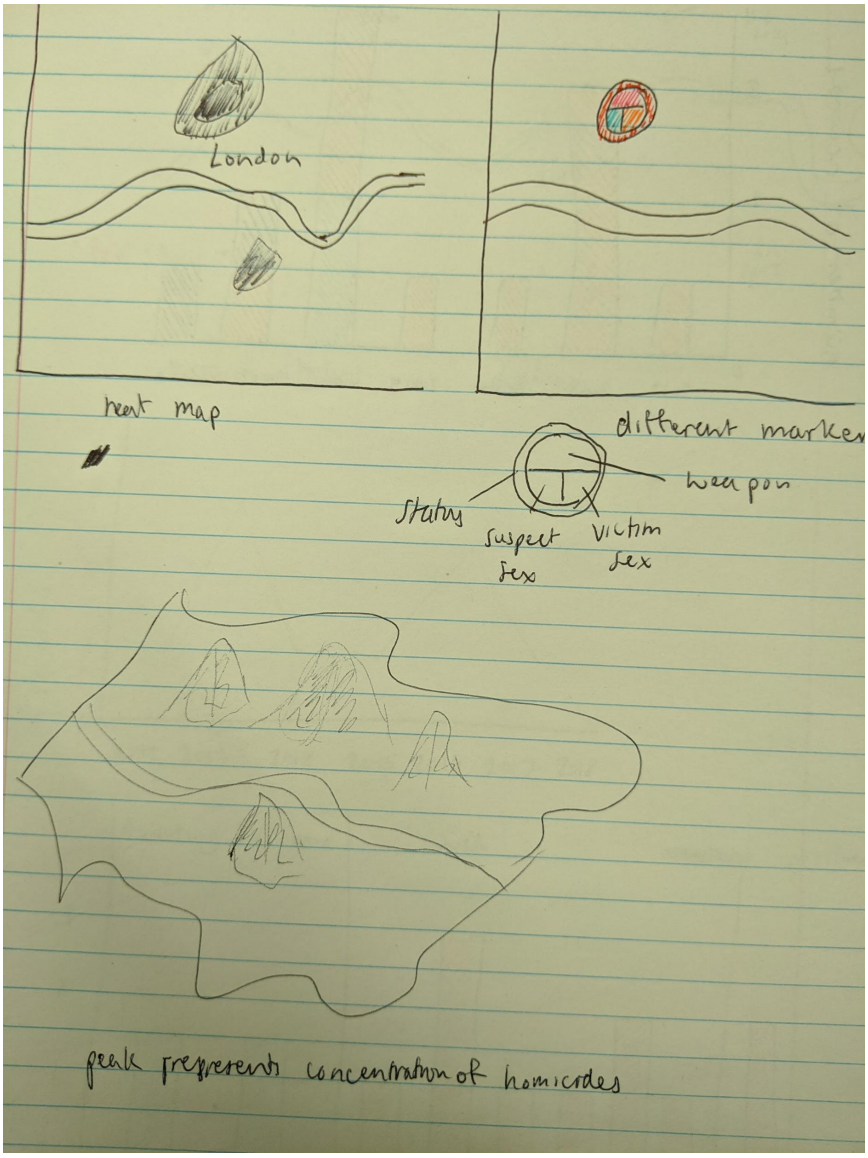


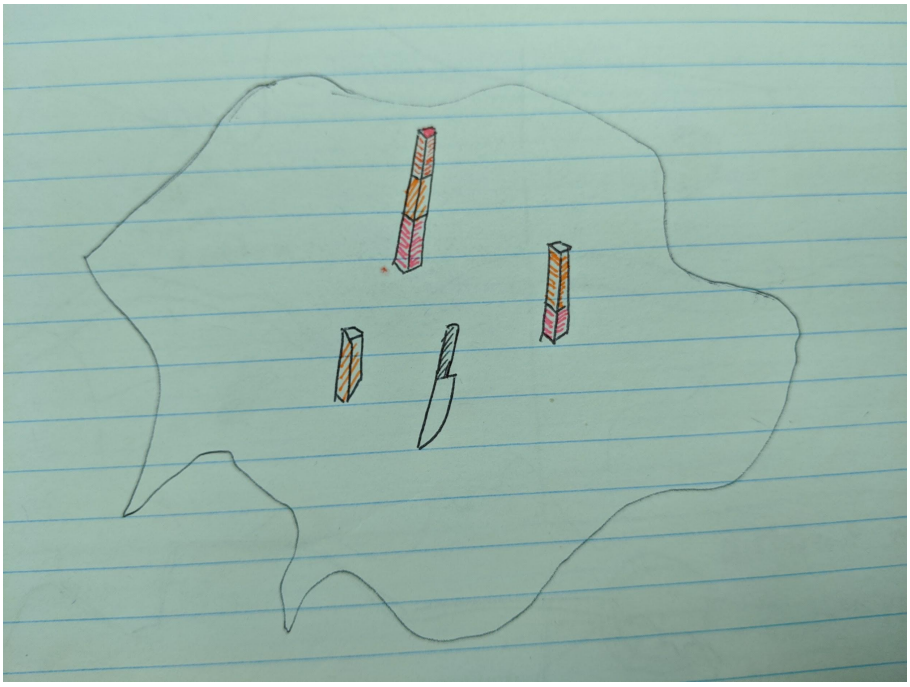
1.

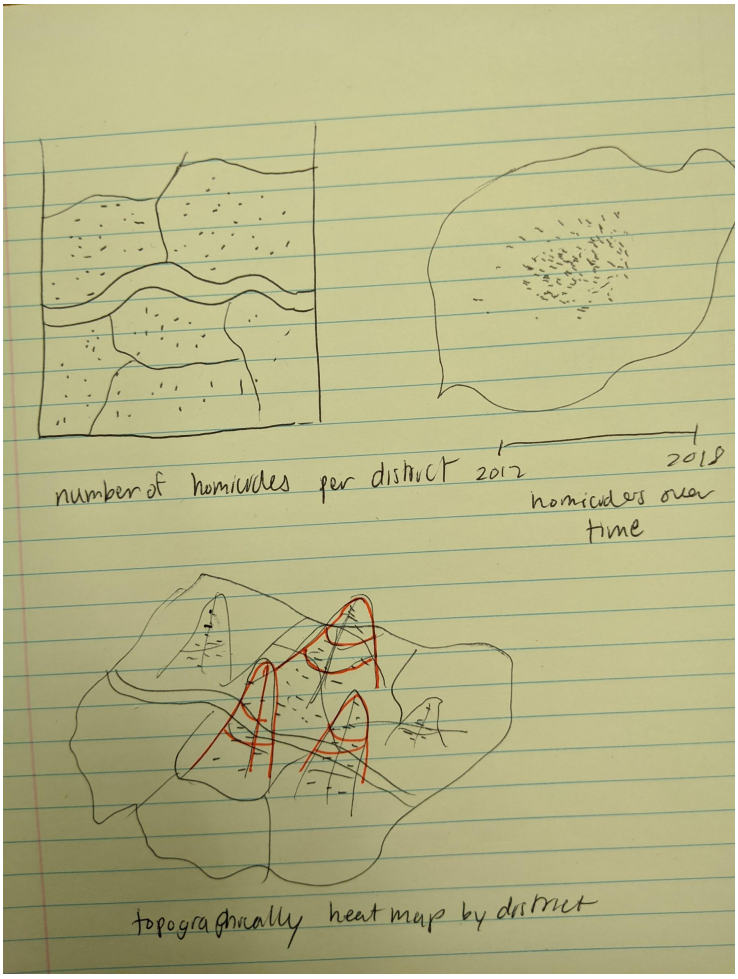


3.2.2 Variations

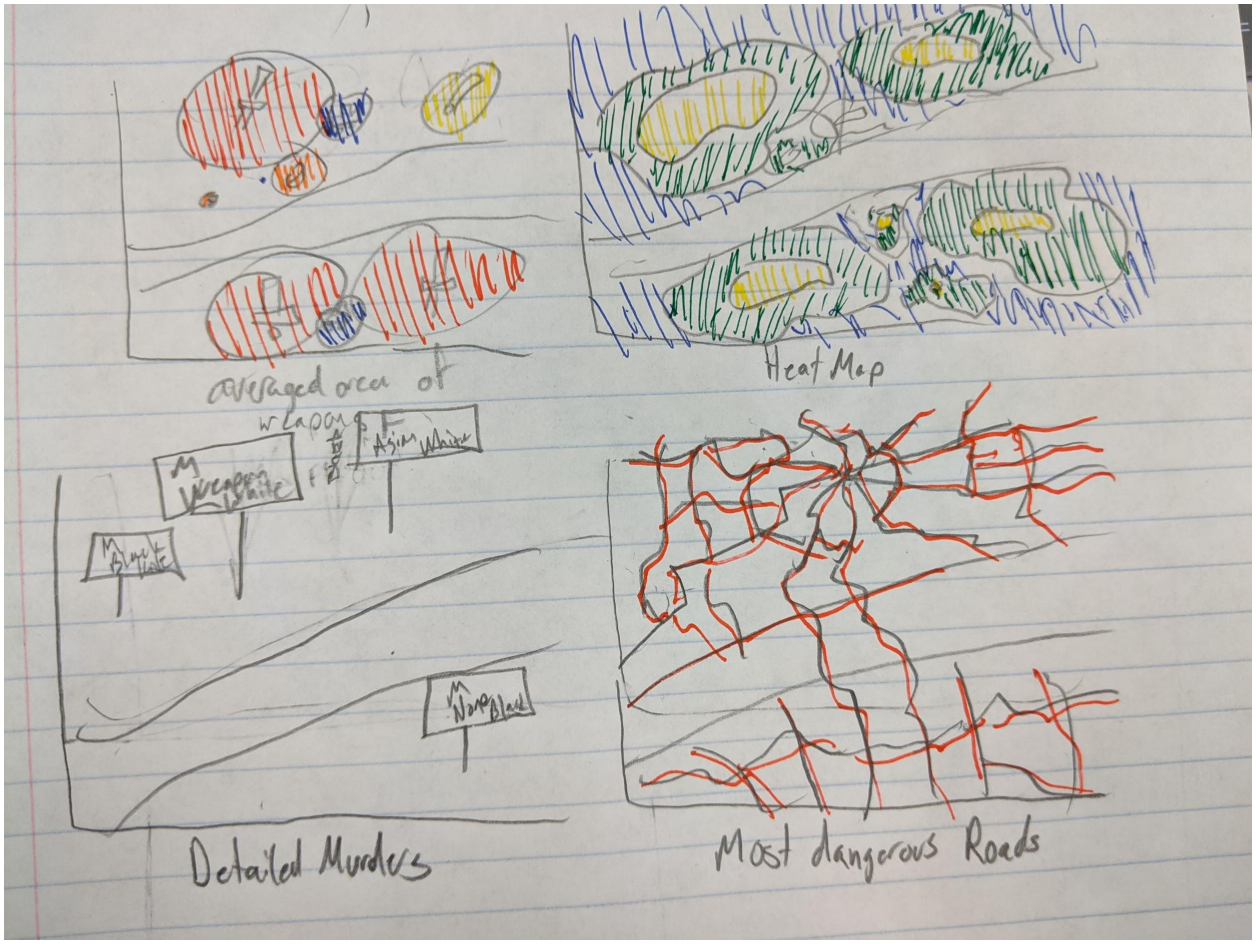
Nielson's Variations


London
heat map
different markers
weapon
status
suspect sex
victim sex
peak represents concentration of homicides

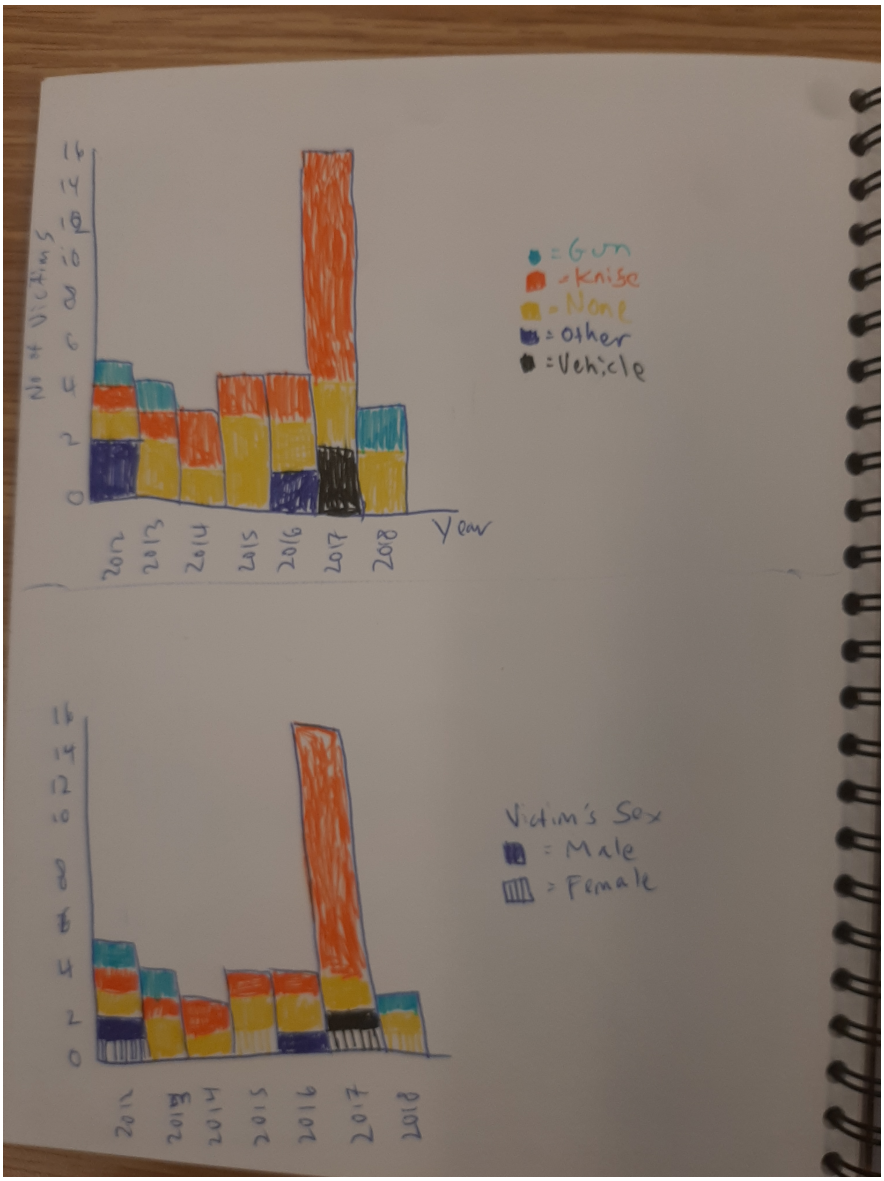


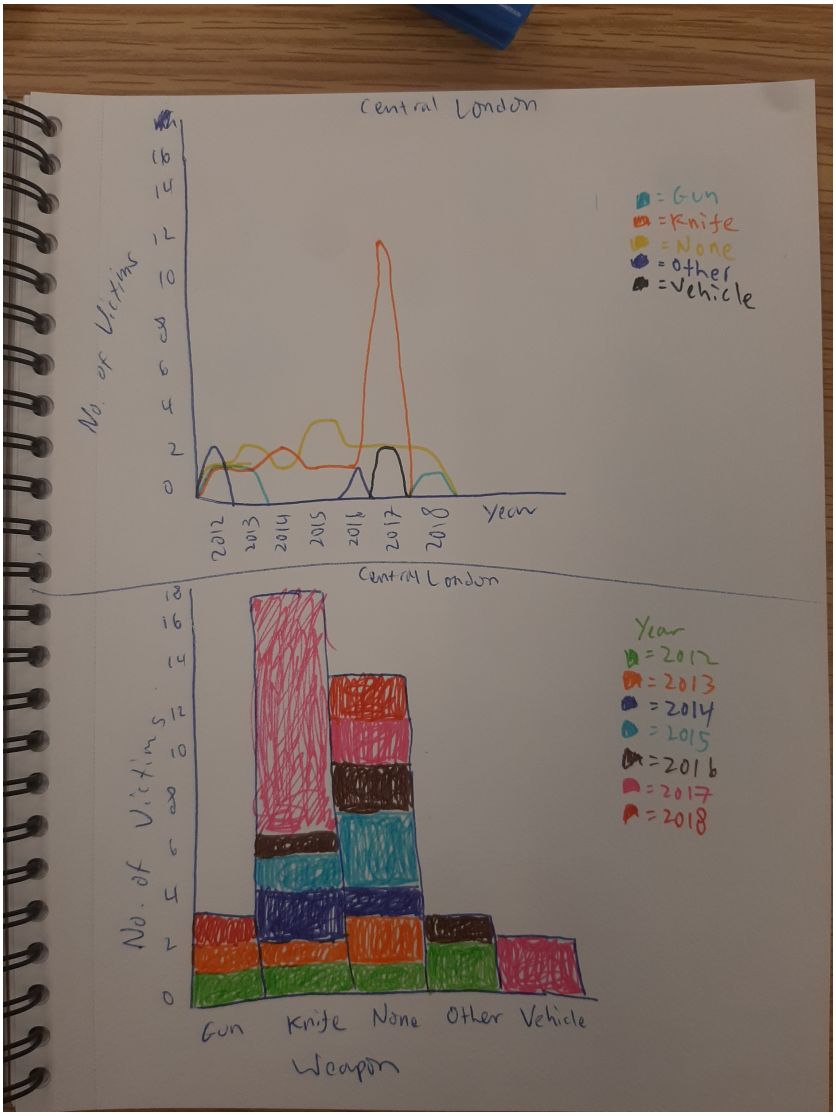


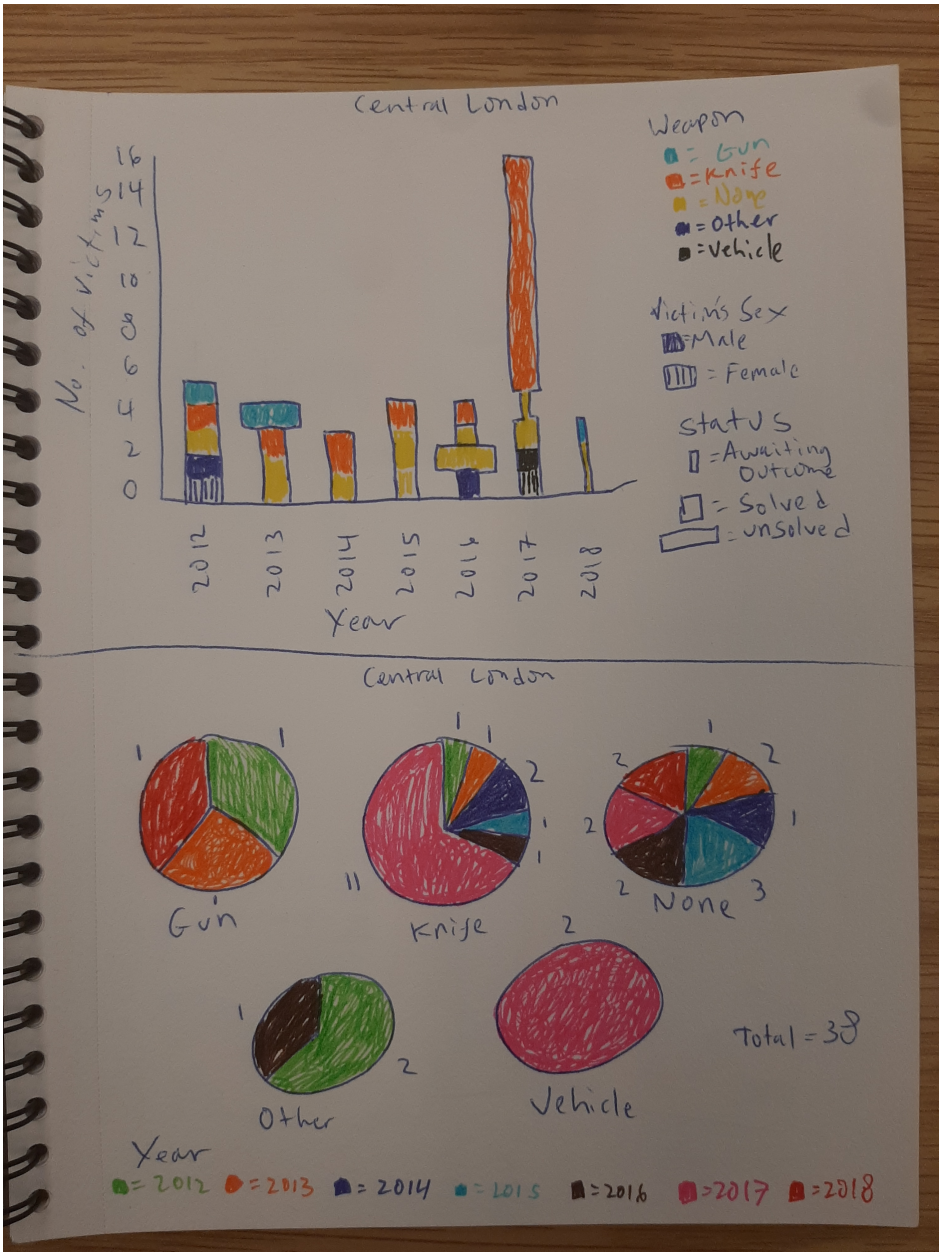
Ryan's Variations

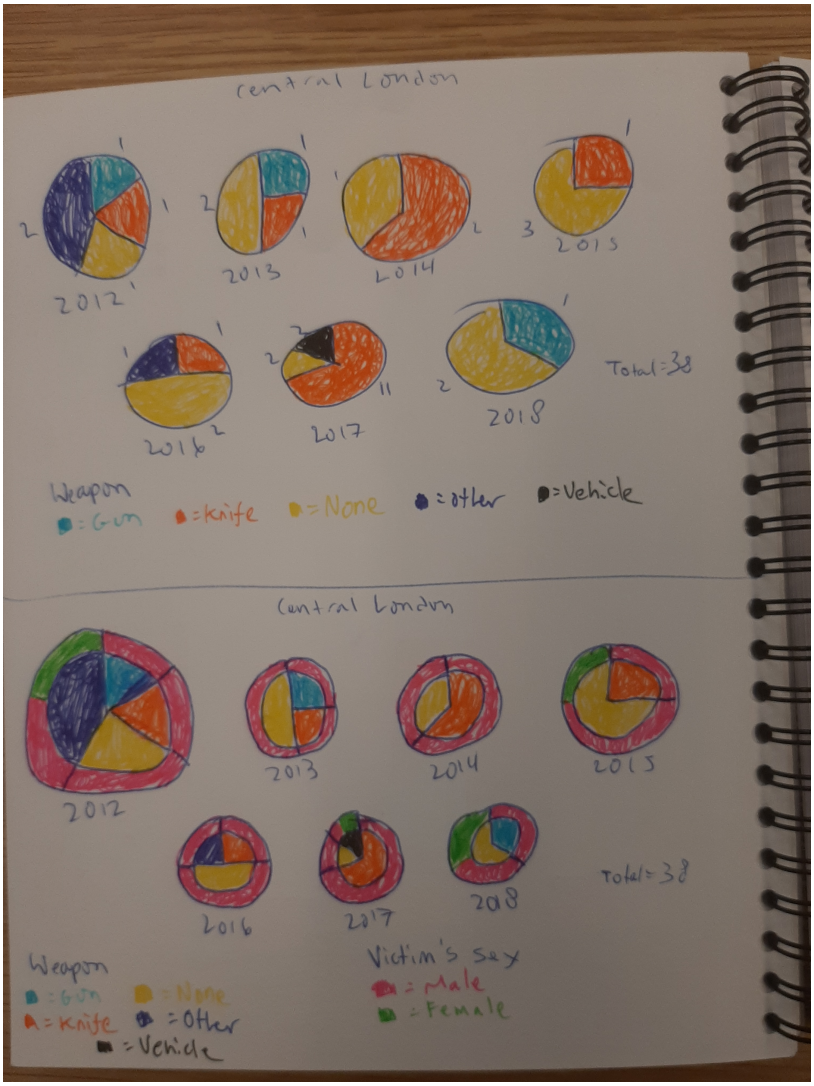

Heat Map
Detailed Murders
Most dangerous Roads

Rahmanta's Variations




Central London
No. of Victims
0
2
4
6
8
10
12
14
16
2012
2013
2014
2015
2016
2017
2018
Year
= Gun
= Knife
= None
= Other
= Vehicle
Central London
No. of Victims
Year
= 2012
= 2013
= 2014
= 2015
= 2016
= 2017
= 2018
Gun
Knife
None
Other
Vehicle
Weapon


Central London
No. of Victims
0
2
4
6
8
10
12
14
16
2012
2013
2014
2015
2016
2017
2018
Year
Weapon
= Gun
= Knife
= None
= Other
= Vehicle
Victim's Sex
= Male
= Female
Status
= Awaiting Outcome
= Solved
= unsolved
Central London
Gun
Knife
None
Other
Vehicle
Total = 38
Year
= 2012
= 2013
= 2014
= 2015
= 2016
= 2017
= 2018

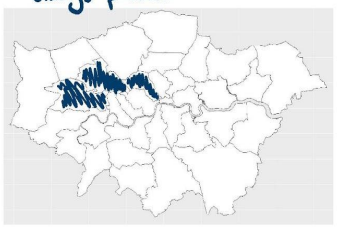


Additional Variations

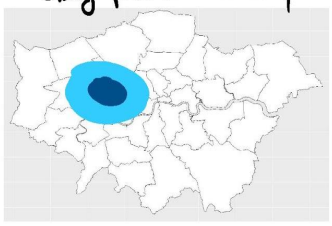
Records on Location

Sunday, February 23, 2020 5:36 PM

1.1) Gangs present

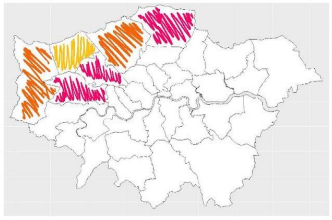


1.2) Gang present density

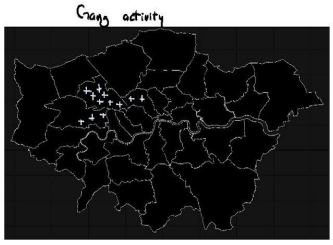


1.3) Number of records

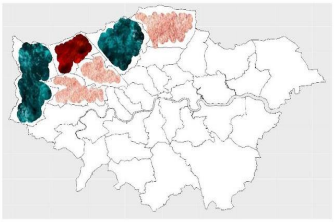
0-9
20-29
30-39



1.4) Gang activity

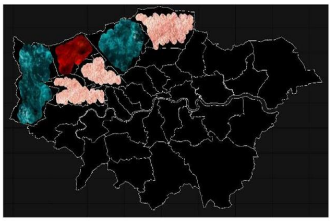


1.5)



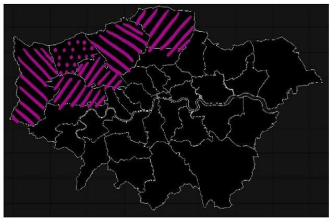
0-9
20-29
30-39

1.6)



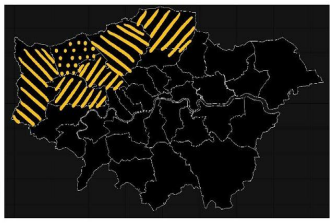
0-9
20-29
30-39

1.7)



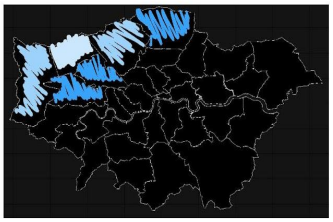
0-9
20-29
30-39

1.7)



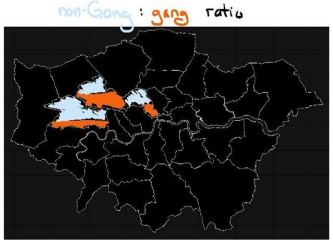
0-9
20-29
30-39

1.8)



30-39
20-29
0-9

non-Gang : gang ratio



3.3. PROCESS

The overall process of designing our sketches revolved around picking a data subset from the existing data to try to gain insight on how different variations of the same data set would affect how the data set would affect how each individual would visualize the data. With each data subset we each had our own design process on sketching the subset. This involved choosing appropriate visualisations for each data subset.

3.4. GENERAL DESIGN DIRECTION

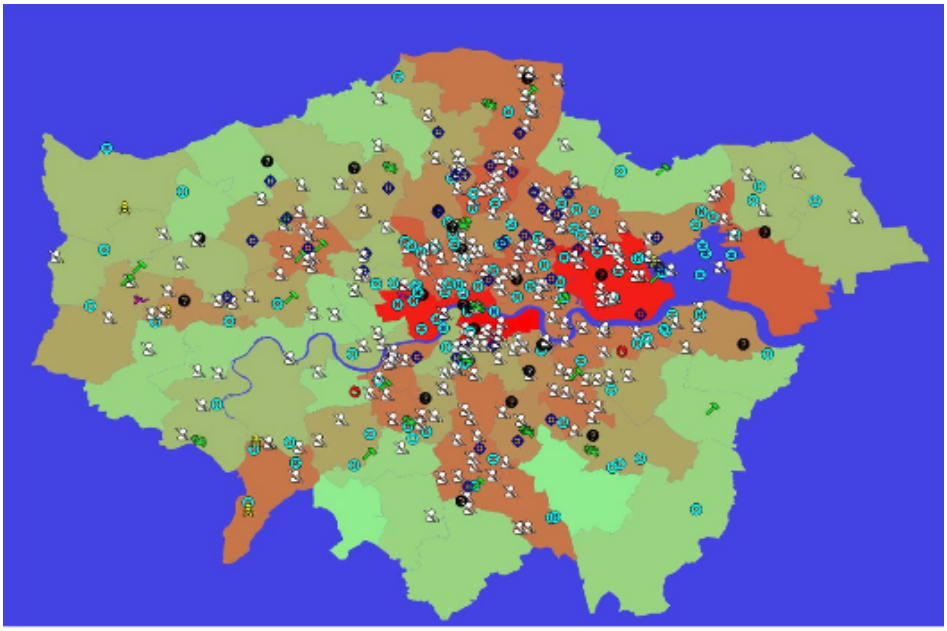
From the previous hand-in we explored different visualizations by sketching them out on paper and we decided to visualize the map-based visualisations. The reason we did this is that we thought that the map allowed us to represent the data to the fullest and allowed for the most derivations that seemed the most interesting. This sketch is the main design inspiration for our dataset. We really liked the use of icons to portray the weapon choice of each homicide, and we also liked the idea of plotting them on a map to see visually the frequencies of homicides in each borough. Once we had the datacentered around location and weapon, we had to further think on how to portray the rest of thedata, for example date and sex of the victim. We can do a lot of things with the icon, such as changing the size or the colour. The map itself can also have different colours. For further interaction, we can do hovers and clicks on the map and icons which can display further information as text that might not be possible to display visually. We can even connect the heatmap with another chart for more interactivity and display of information.This meant that there are a lot of ways we can portray the data, which is why we chose this design. Obviously,we do not want to overload the visualisation with too much information otherwise it will become legible and turn people away from viewing it. Hence, coming up with variations will help us decide which dataset we should actually portray. Visualizing the dataset as a map would also allow us to develop interactive visualizations for the future project iteration. Adding things like a time series animation, interactive zoom, rotate or a translate features, would only be possible with a map visualization. Although the map is a great method of visualizing data it is hard to summarize what our data is saying. To supplement the information that our data set is representing we would also like to include other graphs and visualizations. Things like a simple bar chart or pie chart could help summarize nominal data that it is hard to recognize by looking at a heat map. This would also allow us to make data visualization more interactive. By having multiple elements of visualization communicating information between one another we can make cool dynamic interactions. In some of our variations we have made simple interactions like basic zoom and hover events. In the next iteration we could possibly add more interactive events.

3.5. PROTOTYPING VARIATIONS

https://nadramon.github.io/pages/583/

For our variations we wanted to explore different ways of showing our data. Eachmember independently designed and implemented their own variations without input from other team members. An important aspect to our variations was changing the colours of the map and icons. Since one of our members is colour blind we wanted to help visualize our data that can be both aesthetic to people with and without colour blindness. For our variations we chose to explore things like variation in color, interactivity, and information displayed in the map that we initially designed. For the variation in color we tried different color variations in the icon colors and borough colors as it could potentially have an impact on how the viewer can interpret the visualisation and the data. For the variations in interactivity, we thought it was necessary as the initial map design did not have a solid way of displaying data, or trends in the data to the user.for variations of information displayed we wanted to get an idea on how the user could interact with the map for the next assignment, this lead to the exploration of user driven events that would display more information that the user could comprehend. For all of our variations, we chose to do small iterations of the initial map to gauge how meaningful these changes are,under the logic that if a small change could lead to an impactful and positive interpretation to the data, it would be necessary to be included in the final implementation.

3.5.1. VARIATION A

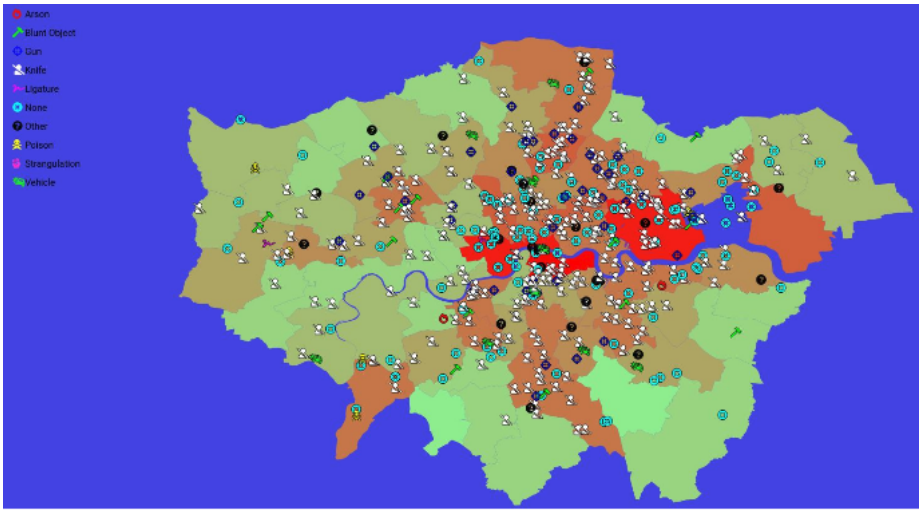


This was the base visualisation we built off of. It contains a heatmap of the number of homicidesand icons scattered on it to portray the murder weapon. Each borough is hoverable which presents a bit more information

3.5.2. VARIATION B

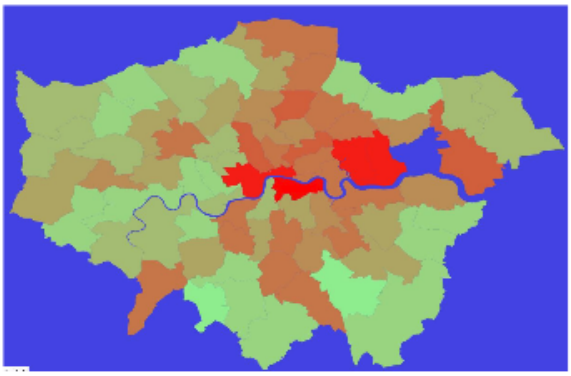
For variation B, a zoom feature was implemented so that you can look closer into the map.

3.5.3. VARIATION C



A legend of the weapons were added to notify users what the icons represent

3.5.4. VARIATION D

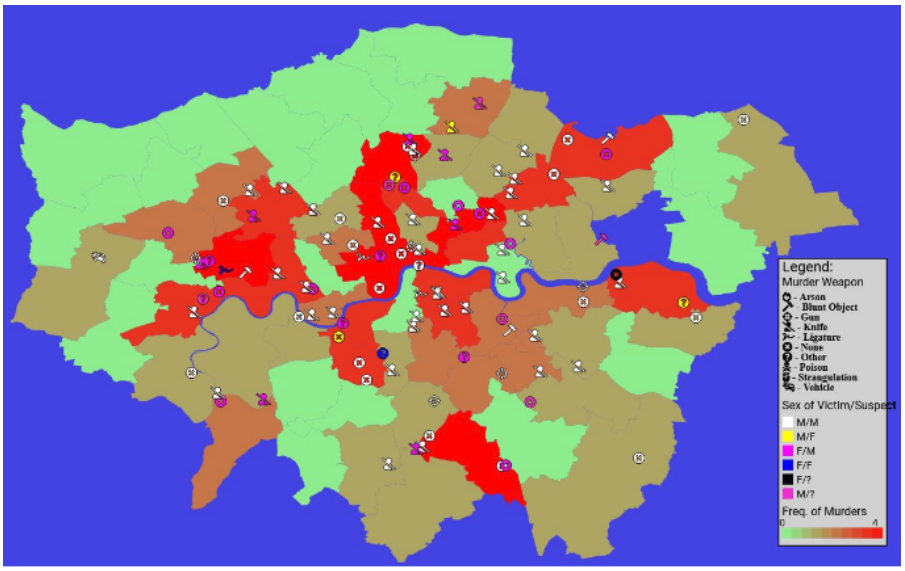


Bourough: Hayes and Harlington

Deaths: 6

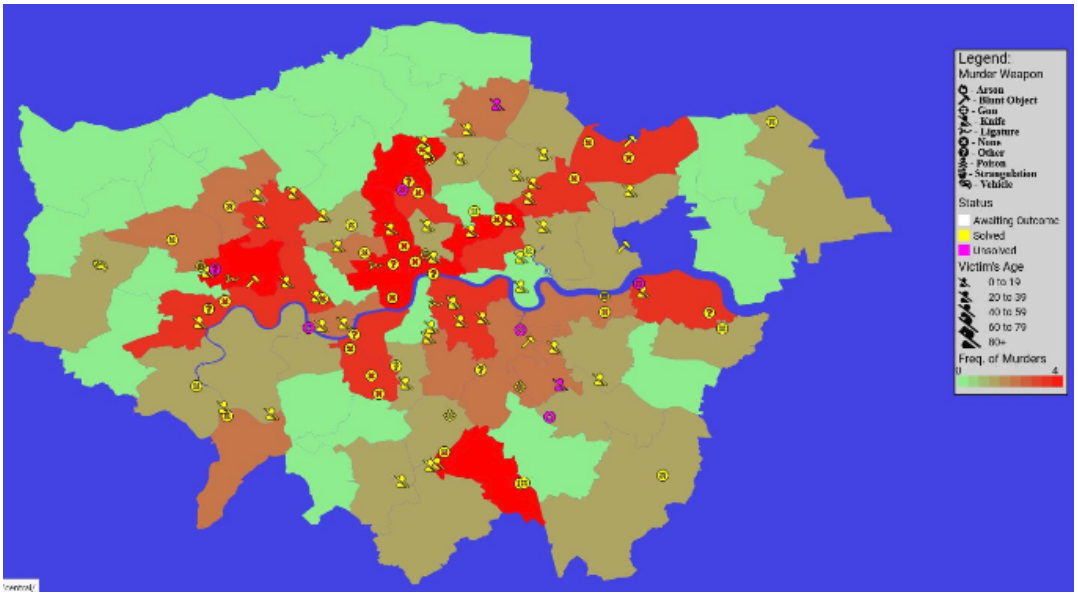
Each borough is now clickable instead of hoverable, and when clicked it will show more information.

3.5.5. VARIATION E



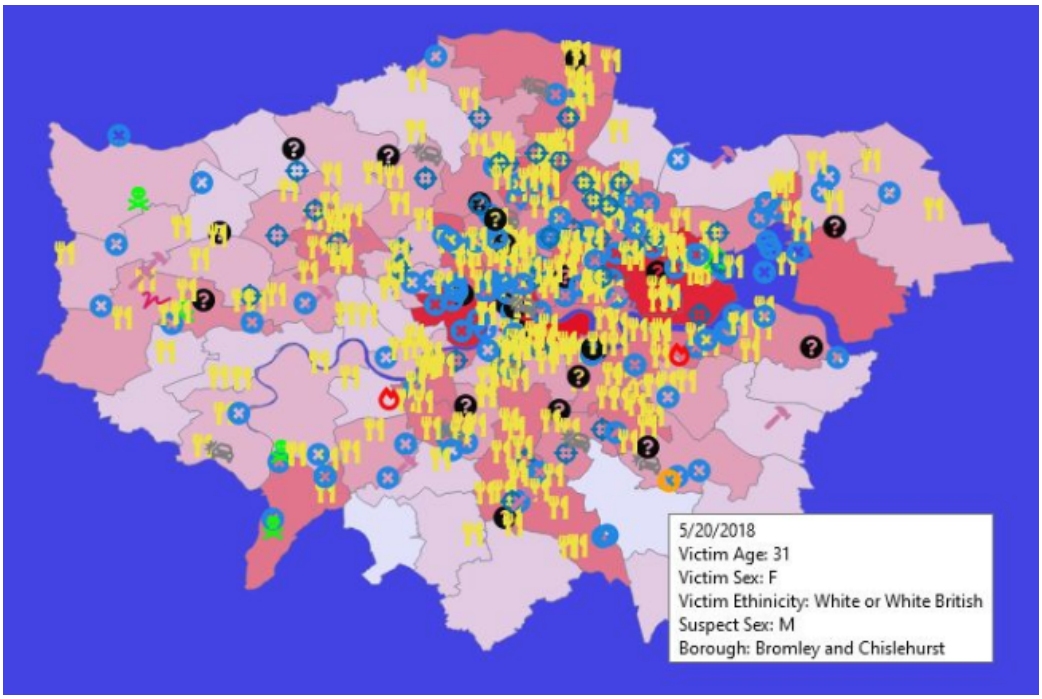
More data is added with the icons. The colour determines the sex of the victim and suspect. For this one, I have limited the dataset only to that in 2012 to not scuff the visualisation.

3.5.6. VARIATION F



Again further implementation to the icons. This time the color represents the status of the homicide. The size of the icon also represents the age of the victim.

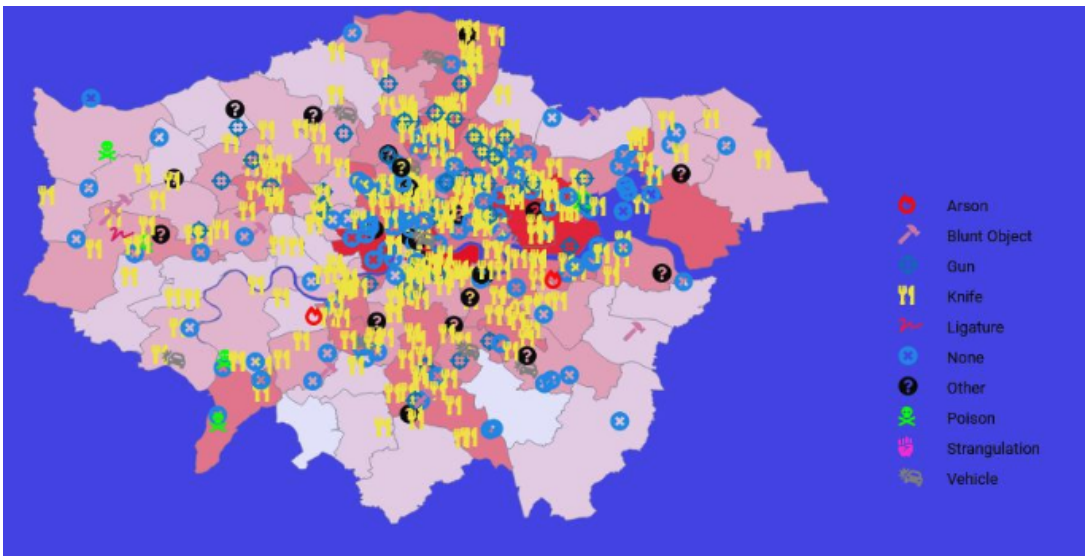
3.5.7. VARIATION G



I thought it would be helpful to let a user see additional information by making an interactive hover event. This helps represent additional information for any data point without affecting the view of the map. I also changed the colour scheme of the heat map. The initial map colour we

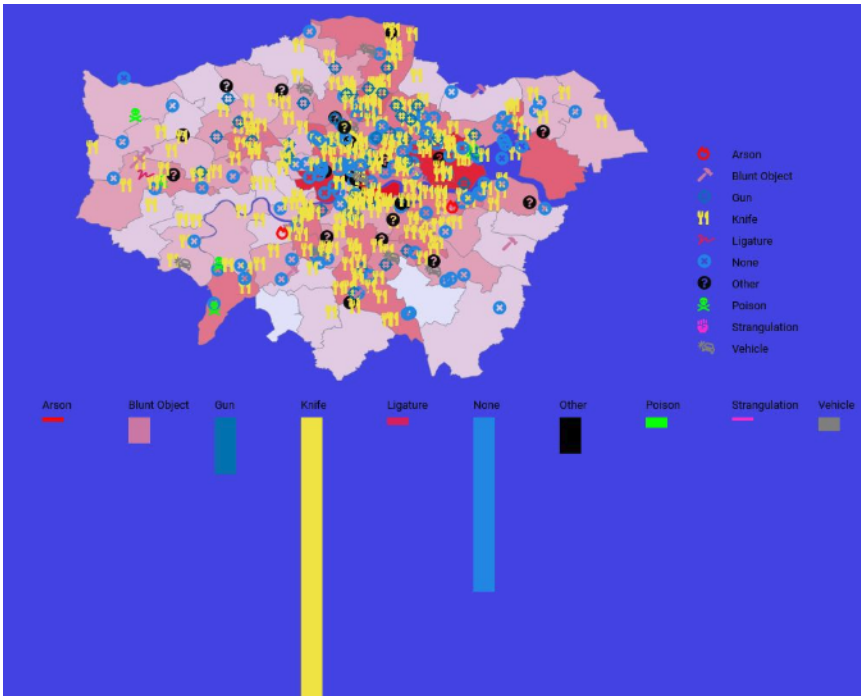
used from variation 1 used a green and red scale. After careful consideration, I Thought it would be better to use a single colour scale. To denote the concentration of points peterborough. I came to this conclusion since one of our group members has deuteranomaly orred-green color blindness. Having a single color scheme would make the map visualization easier to see and understand.

3.5.8. VARIATION H



I added a legend for viewers to understand the map better. In other variations like 7, viewers have no indication of what icon represents what data. To solve this issue, Idecided adding a legend would be best.

3.5.9. VARIATION I



I wanted to add another visualization for our data set. With our map, the maindata attribute we are emphasizing is the icon. To improve upon our initial visualization, I thought a bar graph would be a simple but effective means to summarize the data shown on the map.

3.6. IMPLEMENTATION PROCESS

For our variations we wanted to explore different ways of showing our data. Eachmember independently designed and implemented their own variations without input from other team members. An important aspect to our variations was changing the colours of the map and icons. Since one of our members is colour blind we wanted to help visualize our data that can be both aesthetic to people with and without colour blindness. For our variations we chose to explore things like variation in color, interactivity, and information displayed in the map that we initially designed. For the variation in color we tried different color variations in the icon colors and borough colors as it could potentially have an impact on how the viewer can interpret the visualisation and the data. For the variations in interactivity, we thought it was necessary as the initial map design did not have a solid way of displaying data, or trends in the data to the user.for variations of information displayed we wanted to get an idea on how the user could interact with the map for the next assignment, this lead to the exploration of user driven events that would display more information that the user could comprehend. For all of our variations, we chose to do small iterations of the initial map to gauge how meaningful these changes are,under the logic that if a small change could lead to an impactful and positive interpretation to the data, it would be necessary to be included in the final implementation. The coding process also allowed us to explore d3 more in depth than compared to tutorials. In some of the iterations we were able to explore and experiment in new ways. This was mostly

through implementing interactive events such as mouse on and mouse out hover events. By implementing these simple interactions we gained some insight on how we will do future interactions between svg elements and our data set. Through our coding process we were able to apply our knowledge ofd3 in a meaningful way. This was a very interesting experience. Since d3 is an imperative language making function calls while setting attributes was confusing and will probably be challenging when we implement dynamic interactions in the next iteration.

3.7. FINAL STATIC DESIGN

Based on our previous project hand ins, we think that interactive elements through the map would be the best way to visualize our data. We decided that this would be used for the final implemented visualization. Since the dataset can be best represented by a map visualization.

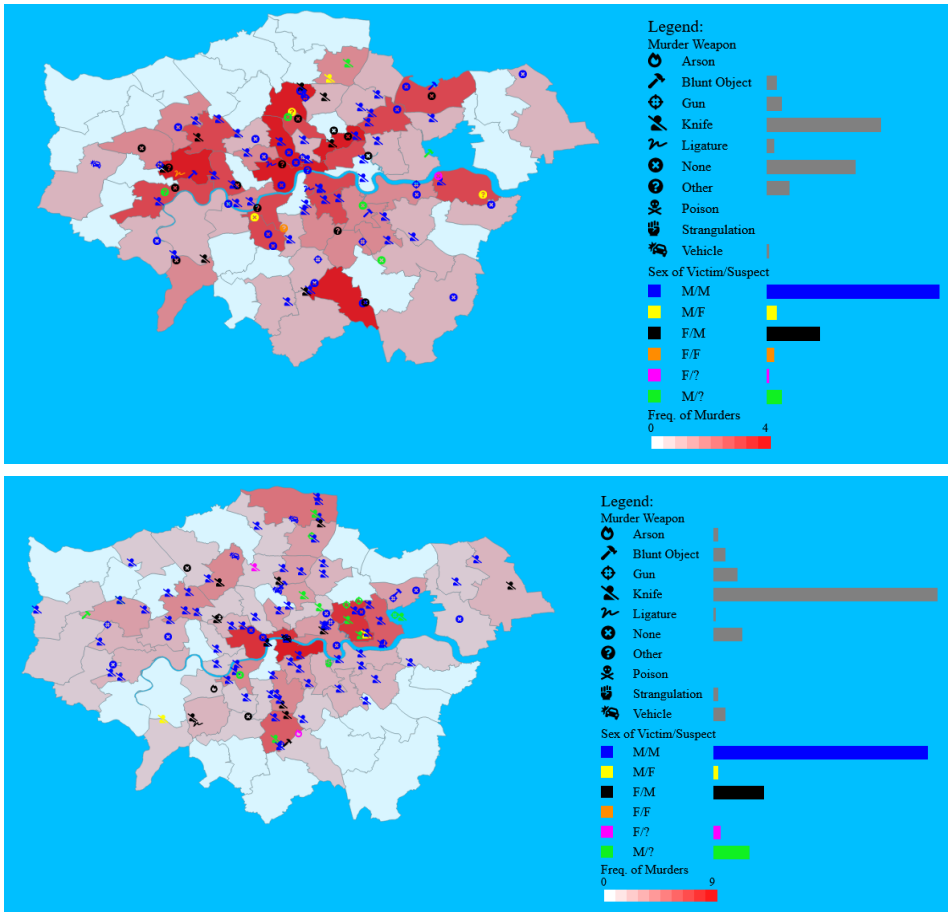
The primary information we wanted to portray were the locations and weapons used by the homicide, which came to the map and icons usage respectively. There is a lot more you can do with points on a map as it is quite flexible when it comes to visual language, hence we decided to give colour to portray a different set of data. The secondary information we thought was important was providing the legend. Users would not be able tell what the icons and its colours represent if we don't let them know. The legend consists of the weapon types and the sexes of the victim and suspect, as well as the colour spread of the map. We considered the interactions as well for this which includes connecting a bar chart to the map, which I will explain in more detail in sections 3.8 and 4.1. We thought that adding axes to the bar charts is unnecessary as the visualisation is primarily for comparisons rather than reading a single data, hence it would just make the page more cluttered. Having a clean and simple rectangle to present volume was what we went with.

3.8. PROTOTYPING INTERACTION(S)

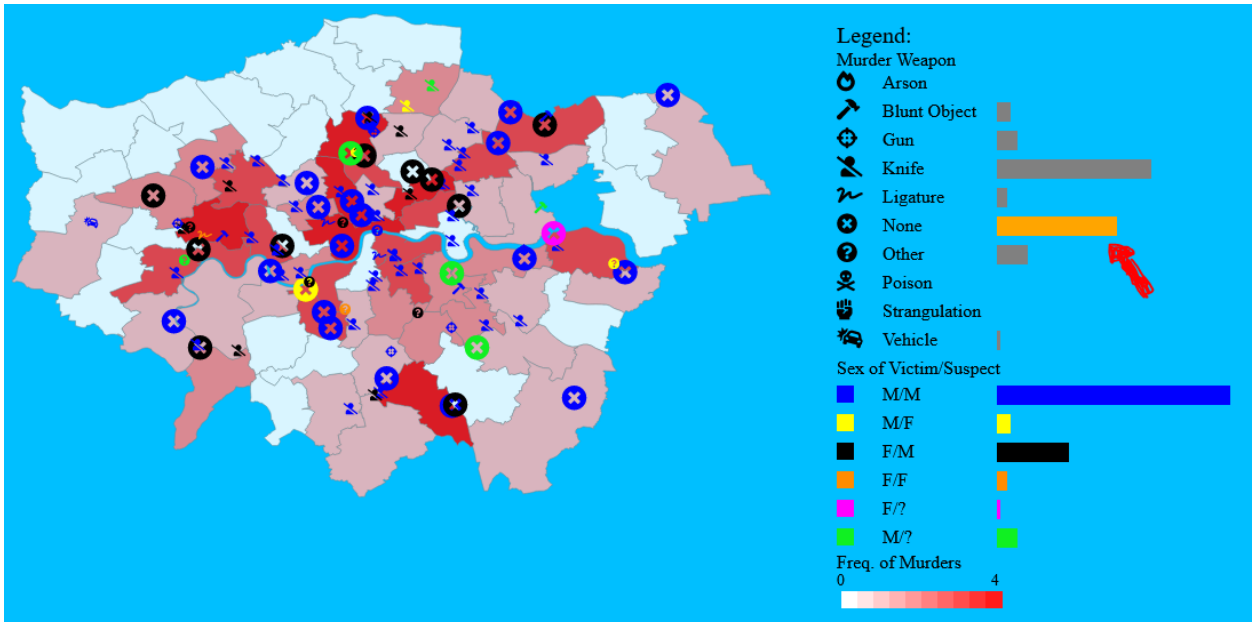
From programming assignment 3 and the previous project hand-in, we learned basic dynamic interaction between visual elements. The first interaction we implemented were basic hover events and tooltips. This interaction provided secondary information to the user. Revealing important information about the visualization without overbearing the visualization with excess detail. The next interaction we added was a bar graph that would dynamically change according to the data points on the map. We thought this interaction was necessary to help display information that was poorly reflected in the map. Since the map is finite, there are many areas of concentration. This makes seeing all data points difficult, to compensate for this we added a bar graph which summarizes the total deaths by weapon. The bar graph helps the visualization by giving it a secondary means of displaying this data. Nextly we added another interactive element of the bar graph. Similar to programming assignment 3, we added a selection interaction. Where the user can click a bar from the bar graph to filter the data points on the map. This allows the user to play with elements of the map and bar graph. To further establish connections and relationships between the two visual elements.

After this implementation we decided to add another tool to help filter the data points on the map. Since our data includes ordinal data, we wanted to filter the data in a time series manner. To accomplish this interaction, we added a slider where the data can be filtered to a particular year in our data set. With the addition of this interaction we made changes to the bar graph and map to incorporate all three elements. After prototyping ideas we wanted to improve upon our interactions, making them more visually appealing. To enhance our visualization we experimented with different colours and the orientation of the visual elements.

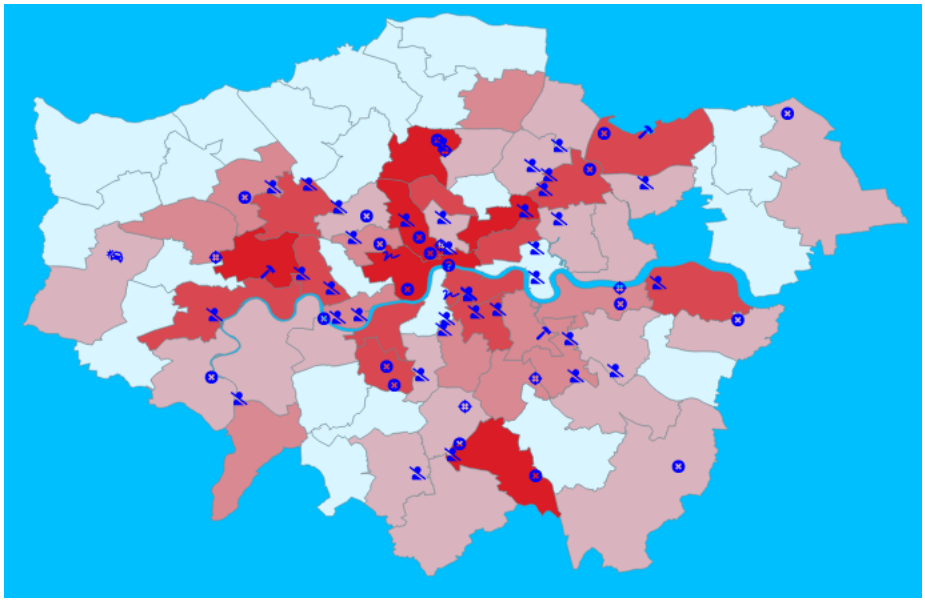
Using the slider to change from 2012 to 2017:



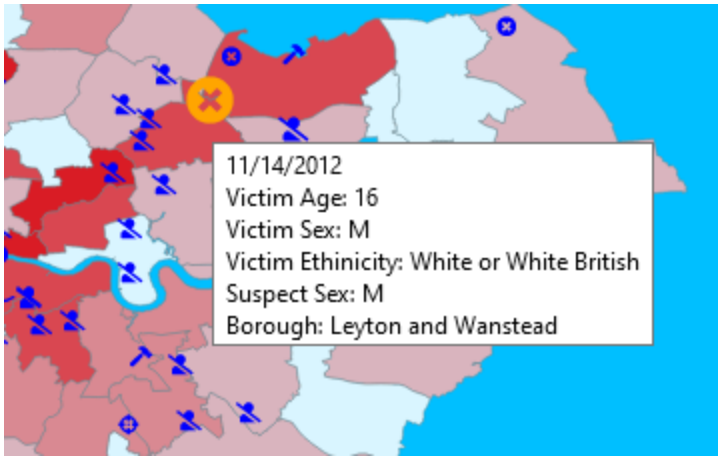
Hovering the bar chart:



Clicking on the M/M bar chart:



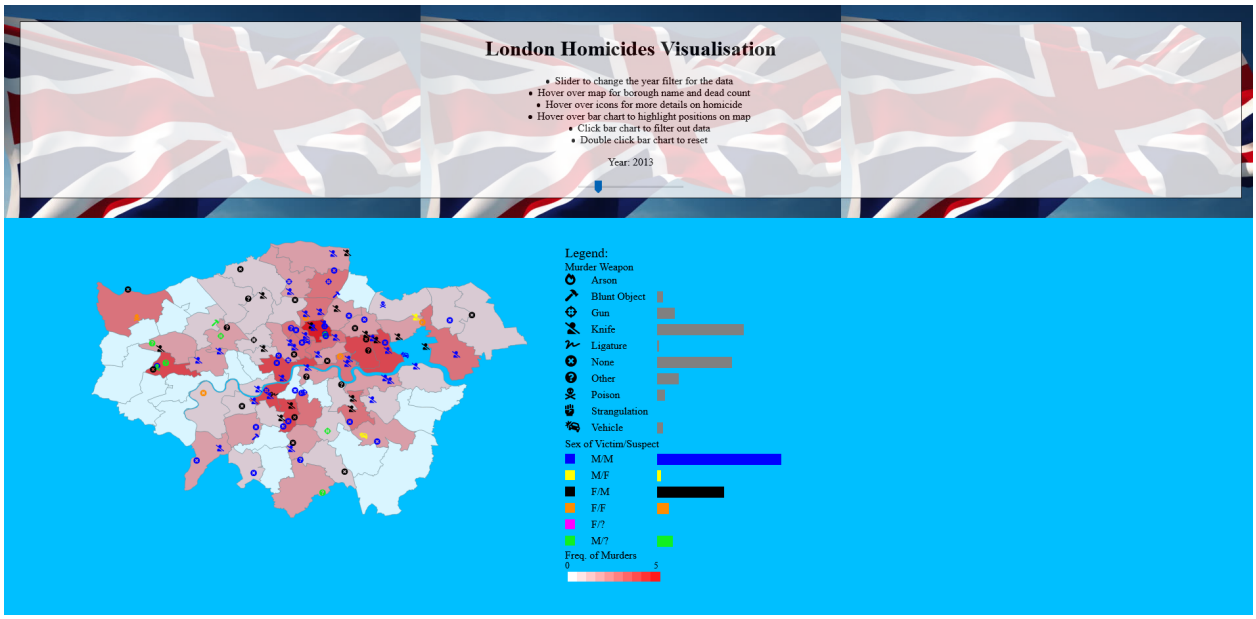
Hovering over an icon:

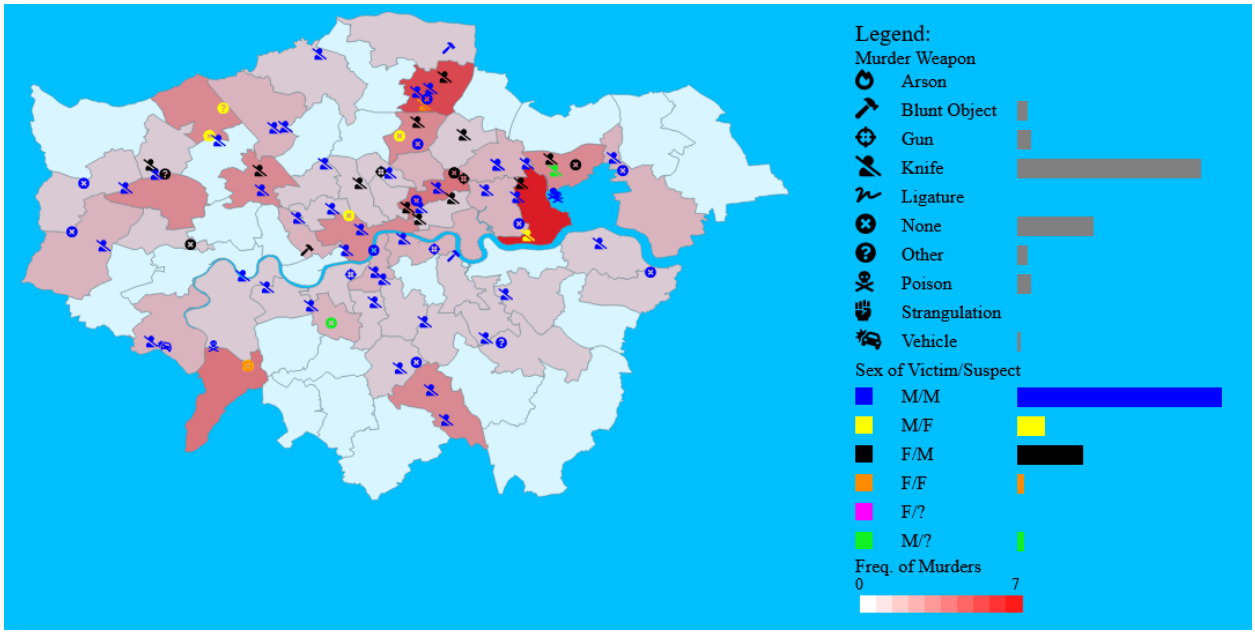


4. FINAL IMPLEMENTED VISUALIZATION

Our visualization offers viewers an insightful look at the crime rate in London, by visualizing data in a meaningful and organized manner. This data could be used to help police enforcement monitor trouble areas within the city. The same visualization could be used for other cities to better understand areas where crime is prevalent. This information would also be helpful for the public to educate them about dangerous regions within the city. Police spending could also be better utilized by monitoring high concentration areas. Ensuring resources are better allocated to areas of trouble. By visualizing this information we are also able to give insight to patterns or relationships within the data.

https://nadramon.github.io/pages/583Final/index.html





4.1. PROCESS REFLECTIONS

Our implementation process began with visualizing and sketching ideas that could provide meaningful intera ctions. After sketching and prototyping ideas we made attempts at implementing our visualization ideas. After achieving basic working interactions. We wanted to link the map with the bar chart to portray more information somehow. In the end, the bar chart simply counted the frequency of the weapons, which when you think about it is redundant as you can see the frequency from the scattered icons on the map. We had to revise this plan and we decided to incorporate the bar chart into the legend as a filter. Although it shows frequency again, you would be able to click and hover on it to filter out the data presented on the map. It came to us that perhaps the chart being redundant is alright as the map primarily shows the locations of the murders, while the bar chart can be used to quickly grasp the numbers and comparison for each item in the legend. One comment our group member made was that the map was cluttered and the icons with less frequency are buried underneath at times, which made us come up with increasing the size of the icon when you hover the bar chart in order to highlight where they are on the map.

Another form of interaction we did in our project hand in 3 was that the icons also differed in size to present the age of the victims. Although this showed an extra layer of information, it was difficult to tell the different sizes from one another, and having it too big would cover up a lot of the other data and potentially cross over to a different borough that it does not belong to. Hence, we decided to keep it out for the final hand in, and simply present it by hovering over the icons on the map.

Perhaps we could have used another chart such as a pie chart that is connected to the map and bar charts as well to portray more data such as the age ranges of the victims, since there is still a lot of space available to be used on the page.

5. DISCUSSION

After completing the project we gained new insight with using visualization and implementing interactions. Throughout the development of our project we were able to develop basic understanding on fundamentals of visualization, organizing data in a meaningful way. As well as the technical skills to implement these visualizations. To supplement our visualization animations using CSS or other javascript libraries would have been interesting to implement. Through the combination of interaction and animation these visual elements could be coordinated to bring the data to life. Giving a more impressive representation of the data to viewers. If we had more time on the project and resources, implementing animations to incorporate into our visualization would have been the most interesting. After using d3 in limited ways in the programming assignments and previous project iterations. We learned that working with d3 was challenging at first getting used to the imperative paradigm. Organizing data the way we wanted was another challenging process, that was very time consuming. Things that we could improve upon are the colour scheme and other visual elements like design. The data visualization has a dated feeling. This is perhaps a result of the colour choice and the format of the visual elements.

6. CONCLUSION

At the end of this semester we were able to create an information visualization. Although the overall visualization is limited we were able to produce a visualization that reflects our knowledge about information visualization. Through combining and organizing interactive and visual elements. We successfully created a meaningful data visualization. Our other achievements were learning how to use d3 and important guidelines for visualization. We are also now comfortable with brainstorming, sketching, and prototype novel visualization designs. Through daily submissions from the visual journal we were also able to describe the effectiveness, expressiveness, and distinguishing properties of a range of different visual encodings. Class activities allowed us to explore and explain differences and challenges of how the different data types nominal, ordinal and quantitative data can be communicated. The visual journal and class activities developed our abilities to interpret, critique, and deconstruct visualizations created by others.