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| Technical development  2018 Unit 3,4 Informatics SAT | Abstract  Documentation of the software functions and techniques used in the development of the Crimes MMOS, and evidence of thorough documentation.  Lachie Howe  2018 Unit 3,4 Informatics (ARP MG) |

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# Software functions and techniques

## Breakdown by software

### Microsoft Word

Within Microsoft Word, I used mainly basic functions such as the built-in spellcheck and grammar check, the find-and-replace functions and copying. These were employed for the purpose of writing and editing the content of my MMOS, and ensuring that the content was all correctly-spelled and grammatically correct, as well as exporting it from a Word document into its actual intended file, the index.html file of my MMOS. This enabled me to present data in prose.

### Microsoft Excel

In Excel, I similarly utilised fairly basic functions, such as reformatting data in a table, sorting it by column, and inserting a chart from the data table. These functions were applied to manipulate the data for insertion into the MMOS, as well as creating sample charts to base the appearance of my final charts on.

### Gimp

~~I can’t believe I actually have to include this~~. I used exactly two functions in Gimp: crop and save as. I did this to select which sections of image files I wanted to appear in the MMOS and save those while maintaining a copy of the original file.

### Atom

Atom. Finally, a program with functions that aren’t stupid nonsense like “copy/paste”. Well, actually, not true. I did use paste quite a bit here, in order to import my written content into the page.

But first, I had to actually write code, and to do that I used the convenient auto-complete and auto-indent functions in Atom quite a lot. These also made creating links, navigation and buttons exceedingly quick. I also used the function of the Atom Beautify plugin to ensure my code was correctly formatted. I used the functions of Bootstrap 4 to format my content (including presenting data in tables) and structure my screen layout, and the functions of the Chart.JS JavaScript plugin to present my data in charts.

Once all of my code was written, I used the Atom Minify plugin to shrink my CSS file to the minimal possible size for faster site loading times.

It is worth noting that due to the nature of my images as background decoration only, I decided not to include alt text for these images – their contents are entirely unnecessary for understanding of the MMOS.

### Mozilla Firefox

Mozilla Firefox was used entirely in the testing stage of my development. Side note: Firefox is great, and more people should use it. Second side note: I promise I am not in any way endorsed or paid by Mozilla.

The functions I used for this stage were the developer console (i.e. Inspect Element) for identifying and fixing errors in my JavaScript code as well as experimenting with basic CSS tweaks, and the Responsive Design Mode, in order to test the appearance of my MMOS on phone-sized screens (I chose to test on an iPhone 5 because it’s the smallest phone screen that’s realistically being used today for web browsing).

# File management

## File management plan

### File naming conventions

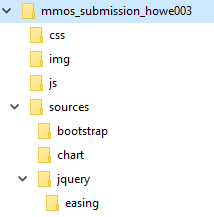
Each file to be used in this MMOS is named semantically to ensure that the purpose and contents of the file is clear, and makes use of snake case in its file name, e.g. bg\_header. This file naming convention utilises underscores to differentiate between words without using spaces.

### File storage and backups

All files are stored in my desktop PC’s C:/ drive, within a project folder in my XAMPP server’s htdocs/ folder. At the end of each day, I saved a dated and iteratively-named version of the entire folder (for example, mmos\_submission\_howe003\_16-08-18 for the 16th of August 2018). This folder was then saved to my Microsoft OneDrive, a password-secured cloud server with 1TB of total storage, thereby ensuring there was no unauthorised access to the files and allowing me to access any of my files on any device with an internet connection. This file management plan also allowed for all previous versions of my files to be accessed easily, meaning that if any errors were made it would be simple to revert back to a previous version.

All the files relating to the MMOS were stored in a hierarchical folder system within my htdocs/ folder. Every file was placed in the relevant folder, which was semantically named. This ensured navigational simplicity. These files were also backed up onto an 8 GB USB drive, the contents of which were then copied onto a desktop solid-state drive.

The folder system is pictured below:



*Figure 1: Folder Hierarchy and Naming Conventions*

# Testing

## Testing tables

### Functionality and layout

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item Tested | Testing Method | Expected Result | Actual Result | Changes Made |
| Navbar Links (Research; Findings; Conclusion; References) | Used Chrome, Firefox and Microsoft Edge to click each link | All browsers: clicking Research scrolls smoothly down to the Research section  All browsers: clicking Findings scrolls smoothly down to the Findings section  All browsers: clicking Conclusion scrolls smoothly down to the Conclusion section  All browsers: clicking References scrolls smoothly down to the References section | All browsers: clicking Research scrolls smoothly down to the Research section  All browsers: clicking Findings scrolls smoothly down to the Findings section  All browsers: clicking Conclusion scrolls smoothly down to the Conclusion section  All browsers: clicking References scrolls smoothly down to the References section | N/A |
| Navbar Brand (Crime) | Used Chrome, Firefox and Microsoft Edge to click the navbar-brand while at the bottom of the page | All browsers: clicking the navbar-brand scrolls smoothly up to the top of the page | All browsers: clicking the navbar-brand scrolls smoothly up to the top of the page | N/A |
| Button Link (Discover More) | Used Chrome, Firefox and Microsoft Edge to click the button | All browsers: clicking the button scrolls smoothly down to the Research section | All browsers: clicking the button scrolls smoothly down to the Research section | N/A |
| Reference Links | Used Chrome, Firefox and Microsoft Edge to click each link | All browsers: clicking each link redirects to the relevant website | All browsers: clicking each link redirects to the relevant website | N/A |
| Credit Link (StartBootstrap) | Used Chrome, Firefox and Microsoft Edge to click the link | All browsers: clicking the link redirects to the StartBootstrap page for the template used | All browsers: clicking the link redirects to the StartBootstrap page for the template used | N/A |
| Navbar changing from fixed to collapsible at lower screen widths | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: navbar collapses  All browsers (PC screen): navbar loads as fixed full-width | iPhone 5: navbar collapses  All browsers (PC screen): navbar loads as fixed full-width | N/A |
| Banner Image | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: image takes up 100% of screen width and height  All browsers (PC screen): image takes up 100% of screen width and height | iPhone 5: image takes up 100% of screen width and height  All browsers (PC screen): image takes up 100% of screen width and height | N/A |
| Banner Text | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: banner text aligned centre  All browsers (PC screen): banner text aligned centre | iPhone 5: banner text aligned centre  All browsers (PC screen): banner text aligned centre | N/A |
| Banner Button | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: button aligned centre  All browsers (PC screen): button aligned centre | iPhone 5: button aligned centre  All browsers (PC screen): button aligned centre | N/A |
| Research Section Background Image | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: the image has a fixed position and becomes less faded as the user scrolls down  All browsers (PC screen): the image has a fixed position and becomes less faded as the user scrolls down | iPhone 5: the image has a fixed position and becomes less faded as the user scrolls down  All browsers (PC screen): the image has a fixed position and becomes less faded as the user scrolls down | N/A |
| Hypothesis Text | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: text aligned centre  All browsers (PC screen): text aligned centre | iPhone 5: text aligned centre  All browsers (PC screen): text aligned centre | N/A |
| Key Data Text | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: text aligned left  All browsers (PC screen): text aligned left | iPhone 5: text aligned left  All browsers (PC screen): text aligned left | N/A |
| Table Headings | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: headings aligned right  All browsers (PC screen): headings aligned right | iPhone 5: headings aligned right  All browsers (PC screen): headings aligned right | N/A |
| Table Text (Left Column) | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: table text aligned left  All browsers (PC screen): table text aligned right | iPhone 5: table text aligned left  All browsers (PC screen): table text aligned right | N/A |
| Table Number Cells | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: table numbers aligned right  All browsers (PC screen): table numbers aligned right | iPhone 5: table numbers aligned right  All browsers (PC screen): table numbers aligned right | N/A |
| Findings Section Heading | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: heading aligned centre with border bars on far edges of screen  All browsers (PC screen): heading aligned centre with border bars in middle of screen | iPhone 5: heading aligned centre with border bars on far edges of screen  All browsers (PC screen): heading aligned centre with border bars in middle of screen | N/A |
| Findings Section Container | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: container takes up full screen-width with black background    All browsers (PC screen): container takes up approximately 80% of screen-width with black background, aligned centre | iPhone 5: container takes up full screen-width with black background    All browsers (PC screen): container takes up approximately 80% of screen-width with black background, aligned centre | N/A |
| Findings Section Chart Positioning | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: Chart 1 appears before text, Chart 2 appears before text  All browsers (PC screen): Chart 1 appears left of text, Chart 2 appears right of text | iPhone 5: Chart 1 appears before text, Chart 2 appears before text  All browsers (PC screen): Chart 1 appears left of text, Chart 2 appears right of text | N/A |
| Findings Section Chart Content | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: both charts appear with 24 data points of 3 different colours  All browsers (PC screen): both charts appear with 24 data points of 3 different colours | iPhone 5: both charts appear with 24 data points of 3 different colours  All browsers (PC screen): only 16 data points of 2 different colours appear | Reloaded page, resulting in the problem resolving itself  Uncertain if this is a recurring problem or not |
| Findings Section Text | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: text aligned centre  All browsers (PC screen): first and third paragraphs aligned left with horizontal rule, second and fourth paragraphs aligned right with horizontal rule | iPhone 5: text aligned centre  All browsers (PC screen): first and third paragraphs aligned left with horizontal rule, second and fourth paragraphs aligned right with horizontal rule | N/A |
| Findings Section Horizontal Rules | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: no horizontal rules  All browsers (PC screen): horizontal rules display below text | iPhone 5: no horizontal rules  All browsers (PC screen): horizontal rules display below text | N/A |
| Conclusion Section Background Image | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: the image has a fixed position and becomes more faded as the user scrolls down  All browsers (PC screen): the image has a fixed position and becomes more faded as the user scrolls down | iPhone 5: the image has a fixed position and becomes more faded as the user scrolls down  All browsers (PC screen): the image has a fixed position and becomes more faded as the user scrolls down | N/A |
| Conclusion Section Text | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: text aligned centre  All browsers (PC screen): text aligned centre | iPhone 5: text aligned centre  All browsers (PC screen): text aligned centre | N/A |
| References Section Heading | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: heading aligned centre  All browsers (PC screen): heading aligned centre | iPhone 5: heading aligned centre  All browsers (PC screen): heading aligned centre | N/A |
| References Section Cards | Used Firefox and Chrome’s responsive design modes to view the page as if being opened on an iPhone 5  Viewed the page on Chrome, Firefox and Microsoft Edge as normal | iPhone 5: cards displayed in 8 rows of 1  All browsers (PC screen): cards displayed in 2 rows of 3 and 1 row of 2 | iPhone 5: cards displayed in 8 rows of 1  All browsers (PC screen): cards displayed in 2 rows of 3 and 1 row of 2 | N/A |
| References Section Card Content | Viewed the page on Chrome, Firefox and Microsoft Edge as normal | All browsers: text is all-caps, links have no text-decoration and are blue-green | All browsers: text is all-caps, links have no text-decoration and are blue-green | N/A |

### Clarity and readability

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item Tested | Testing Method | Desired Result | Actual Result | Changes Made |
| Accessibility via Screen Reader | Used Microsoft Edge’s built-in screen reader to read the page aloud | All text was read correctly by screen reader | All text was read correctly by screen reader | N/A |
| Readability User Acceptance | Gave the final MMOS to three users and had them read the entire site, rating its readability out of 8 (based on 8 criteria out of 1) | Score of 8/8 from each user for a total score of 24/24 | Total score of 22/24  One user commented on the difficulty of reading the heading on the banner image  One user commented that it was difficult to read the figure captions | Decreased the opacity of the heading’s gradient start-point from 40% to 20%  Increased the size of the blockquote-footer text elements from 0.6rem to 0.8rem |
| Readability User Acceptance Revisited | Gave the final MMOS to three users and had them read the entire site, rating its readability out of 8 (based on 8 criteria out of 1) | Total score of 24/24 | Total score of 24/24 | N/A |

### Readability criteria:

* Is the text large enough?
* Does the font colour contrast with the background enough?
* Are lines or paragraphs of a reasonable length?
* Is text alignment attractive and readable?
* Is spelling, grammar and punctuation accurate?
* Is vocabulary appropriate?
* Is expression clear and unambiguous?
* Do headings logically divide content?

# Appendix: all MMOS content

## Crime in Victoria

Does affluence affect criminal activity?

### My hypothesis

Suburbs with higher-than-average income will experience **more crimes against property** than suburbs with lower-than-average income, but **less crimes overall**.

### Background information

Crimes against property are non-violent crimes which directly affect a person's property. They include:

* Arson,
* Property damage,
* Extortion,
* Burglary,
* Theft,
* Fraud, and
* Bribery.

Crimes against property are referred to by the Crime Statistics Agency Victoria as Category B "Property and Deception" offences.

### Key facts and statistics

Crimes against property made up 59.23% of all crimes reported in 2017, an increase of 4.5% from 2016.   
Factors such as unemployment and poverty are often associated with higher-than-average rates of crime.   
Wealthier people are more likely to fall victims to scams and extortion.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Low-income areas | High-income areas | State average |
| Overall Crimes (Per 100,000 People) | 8,202 | 8,008 | 8,597 |
| Property Crimes (Per 100,000 People) | 3,864 | 4,826 | 5,100 |
| Property Crimes (% of Overall Crime) | 47.17% | 60.73% | 59.23% |

The above numeric data was collected from the Australian Bureau of Statistics and the Crime Statistics Agency Victoria before being analysed.

## My findings

*Figure 1: Income vs Crime Against Property*

The data shown in Figure 1 indicates that, as income increases, the proportion of reported crimes that are crimes against property also increases. This indicates that there is a correlation between the wealth of a suburb and the types of crimes committed there.

*Figure 2: Income vs Overall Crime*

However, the data shown in figure 2 suggests that the relationship between income and overall crime rates is less clear. Both lower- and higher-income suburbs experience similar rates of crime overall, while middle-income suburbs experience higher rates of crime, which is seemingly random rather than adhering to any sort of pattern.

### What does this suggest?

The above findings indicate that income is not a major factor in crime rates. However, it is possible that income inequality in middle-income suburbs could lead to their increased rates of crime.

In addition, these findings suggest that income does have a moderate impact on the types of crimes committed in different areas, with more crimes against property such as theft being committed in more affluent suburbs. This makes a great deal of sense, because simple logic dictates that it is better to steal from someone rich than someone poor.

### Interview with a detective

In the course of my research, I conducted a brief in-person interview with a detective in the Victoria Police Fraud and Extortion Squad. This detective wished to remain anonymous, but was able to give some insights into the types of cases they have dealt with and their workload.

This detective informed me that Fraud and Extortion Squad was being allocated increased resources to assist them in stopping crime, with their own workload increasing as a result. They were also able to inform me that most of their investigations took place in wealthier inner-city suburbs.

## Conclusion

The data collected indicates that increased income does appear to lead to increased incidence of crimes against property.   
However, there is not a significant enough correlation between the wealth of a suburb and the overall crime rate of that suburb to say that there is any relation between these two factors.   
As such, it can be concluded that **the primary hypothesis was supported**, while **the secondary hypothesis was not**.

## References

Barns, G. (2014). Slashing welfare is a recipe for crime

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Pinsker, J. (2014). Does Inequality Cause Crime?

Plumer, B. (2010). Crime Conundrum

Census Data Search by geography - Australian Bureau of Statistics

Sitwell, F., & Primrose, D. (2009). The distribution of wealth in Australia