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IAT438 Individual Project

# Appendix A: List of Referenced Materials

This appendix lists major issues I encountered when building the project, as well as external resources that I looked for to counter those issue.

## **Issue: Embedding an interactive map in webpage**

Need to figure out a way to put a map on my website, as it is the base for everything else.

### **Solutions:**

Use Leaflet: a Javascript map plugin

<https://leafletjs.com>

## **Issue: Figure out a way to divide map into sections, and show that on the map**

According to my plan the map will be divided into several sections to reflect different risk levels for bike owners in different parts of the town. I have no idea how to implement this.

### **Solutions:**

Use GeoJSON to define sections on the map. GeoJSON is basically a series of coordinates that forms up a shape.

*Tutorials on Leaflet on how to use GeoJSON file to create data map with Leaflet*

<https://leafletjs.com/examples/geojson/>

Use postal code to define those sections. It appears to be a good idea since it matches the current database of 529 garage where they are already tracking location of reports with postal code and postal code boundary is already defined, so no need to reinvent the wheel.

*Case study: displaying postal code areas of Montreal on the map using GeoJSON*

<https://www.linkedin.com/pulse/mapping-geojson-polygons-montr%C3%A9-al-postal-codes-js-alexandre-sabatier/>

The case study listed above is based on Rapid API, an API that helps users to grab GeoJSON data for postal code boundaries from an online database.

<https://rapidapi.com/VanitySoft/api/ca-boundaries-io>

<https://rapidapi.com/hub>

The API has code templates for users to grab data from the database, but it only provides me a base to work on. I took their provided code, modified it, and ran it to get the postal code boundaries I need.

## **Issue: Work with the data I got with database**

The API only allow 50 accesses per day for free user, so I have to store the result in a database for future use. IAT352 taught me about database design and generating database with MySQL, but the data I got from the API are in JSON format, and IAT352 doesn't provide much help on how to deal with JSON format in database. I need to figure out a way to store, as well as to retrieve and use those JSON formatted data.

### **Solution:**

*Instruction on store JSON file to database with MySQL as well as how to retrieve them*

<https://dzone.com/articles/using-json-in-mariadb>

Other Sources that I looked for, but didn't use at end:

*MariaDB (the database engine that I am using) Documentation on GeoJSON*

<https://mariadb.com/kb/en/geojson/>

[https://mariadb.com/kb/en/geojson-st\\_asgeojson/](https://mariadb.com/kb/en/geojson-st_asgeojson/)

[https://mariadb.com/kb/en/st\\_geomfromgeojson/](https://mariadb.com/kb/en/st_geomfromgeojson/)

*Help request found in many programmer communities*

[https://techcommunity.microsoft.com/t5/sql-server-blog/loading-geojson-data-into-sql-server/ba-p/384601?advanced=false&collapse\\_discussion=true&search\\_type=thread](https://techcommunity.microsoft.com/t5/sql-server-blog/loading-geojson-data-into-sql-server/ba-p/384601?advanced=false&collapse_discussion=true&search_type=thread)

<https://learn.microsoft.com/en-us/sql/relational-databases/json/store-json-documents-in-sql-tables?view=sql-server-ver16>

<https://stackoverflow.com/questions/52930395/correct-structure-for-a-json-object-with-multiple-values>

## Issue: Insert the data I got into database

There are lots of postal codes that need to be inserted, and it is too tedious to insert them manually. To tackle the issue, I decided to figure out a way to auto-generate insert command with python.

### Solution:

Store the data I got from the API in a .json file, read the .json file with python, take the parts that I need from the data, format into corresponding commands for database insertion, store the result in another file, copy them and run in my database.

*Tutorial on reading JSON file, pulling a specific element from a JSON object, with python*

<https://yourblogcoach.com/how-to-extract-data-from-json-file-in-python/>

*JSON formatter by the same author (not used for this project by far but might be useful)*

<https://yourblogcoach.com/tools/json-formatter/>

*Write into files with python*

[https://www.w3schools.com/python/python\\_file\\_write.asp](https://www.w3schools.com/python/python_file_write.asp)

## Issue: Add parking lot icons to the map

According to my plan, the map will also reflect locations of bike parking lots.

### Solution:

*Leaflet tutorial on how to add custom icons*

<https://leafletjs.com/examples/custom-icons/>

*Documentation on how to embed vector graphic elements in HTML*

[https://www.w3schools.com/graphics/svg\\_path.asp](https://www.w3schools.com/graphics/svg_path.asp)

[https://www.w3schools.com/html/html5\\_svg.asp](https://www.w3schools.com/html/html5_svg.asp)

*Tutorial on how to use vector graphic as leaflet icons*

<https://onestepcode.com/leaflet-markers-svg-icons/>

After adding parking lots to the map, I find that they look quite bad when the map zoomed out. I need to figure out a way to let those icons adjust to zooms, or just let them disappear when the map is zoomed out to certain levels.

*Tutorial on how to adjust icon size based on zoom level*

<https://stackoverflow.com/questions/39696033/leaflet-changing-icon-based-on-zoom-level>

<https://stackoverflow.com/questions/18609091/leaflet-js-detecting-when-map-finishes-zooming>

## **Issue: Submit mechanism: how to let users submit reports with images.**

After finishing the map and parking lots, I think it is natural to also implement the mechanism that allow users to submit theft reports. Submitting a form is covered in IAT352, however I need to figure out how to submit an image myself.

Sources that I looked for when implementing the feature of letting users embed an image when submitting a report:

<https://web.dev/media-capturing-images/>

[https://www.simplilearn.com/tutorials/php-tutorial/image-upload-in-php#final\\_code\\_combining\\_the\\_php\\_css\\_and\\_html](https://www.simplilearn.com/tutorials/php-tutorial/image-upload-in-php#final_code_combining_the_php_css_and_html)

<https://www.php.net/manual/en/features.file-upload.php>

<https://www.php.net/manual/en/function.move-uploaded-file.php>

<https://www.php.net/manual/en/reserved.variables.files.php>

<https://stackoverflow.com/questions/15735450/images-as-links-in-mysql-database>

[https://www.w3schools.com/php/func\\_filesystem\\_move\\_uploaded\\_file.asp](https://www.w3schools.com/php/func_filesystem_move_uploaded_file.asp)

<https://www.codexworld.com/store-retrieve-image-from-database-mysql-php/>

<https://stackoverflow.com/questions/18576762/php-stdclass-to-array>

Sources that I looked for when dealing with the rest of the submit mechanism:

<https://www.formget.com/submit-form-using-ajax-php-and-jquery/>

<https://stackoverflow.com/questions/16104078/append-array-to-formdata-and-send-via-ajax>

<https://laracasts.com/discuss/channels/javascript/formdata-append-javascript-array-jsonstringify-how-to-cast-as-php-array>

## **Issue: Host the website online**

When considering how to submit the final product, I considered hosting the website online. I had some experience with hosting websites before where I hosted my portfolio on google cloud, but I don't have much experience on how to host a website that has database.

Up until this moment I am not able to figure out a way to do this. Here are some resources that I looked for during the process.

<https://stackoverflow.com/questions/50340559/how-do-i-connect-and-retrieve-data-from-google-cloud-sql-using-php>

<https://pages.github.com/>

<https://www.youtube.com/watch?v=yK0iHciH-FI>

<https://www.youtube.com/watch?v=VgixM-4ckJA>