Final Year Project Report

**Full Unit – Final Report**

Utilising HTML5 and Vector Maps to create an offline map application

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A report submitted in part fulfilment of the degree of

**BSc (Hons) in Computer Science**

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**Declaration**

This report has been prepared on the basis of my own work. Where other published and unpublished source materials have been used, these have been acknowledged.

Word Count:

Student Name: Adil Mushtaq

Date of Submission:

Signature:

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Abstract

Online map applications have been an essential utility for a large majority of the population with users varying from cyclists to long distance HGV drivers. However, both users sometimes may travel through areas with limited or no internet connectivity or in the case of the latter travel through regions where they may need to pay for roaming charges to use the service. Existing solutions to this problem include google maps’ ability to download and store maps/directions as image tiles. It does this using raster maps which generates an image based of the location of each pixel. The alternative to this is vector maps which uses information about connected vertices to generate the same image. Although raster maps are effective at storing map data and displaying it even when there is no internet connection, the large file size combined with the loss of directions and searching capabilities make it less than ideal in the circumstances mentioned above. This means that the smaller file size of vector maps as well as the ability to store Points of interests (POIs) as items within the map file means that they can be used without the same limitations as a raster map. However, the disadvantage of this technology is that it requires a higher level of client level hardware to process and display information. Despite this, modern mobile devices are much more powerful than ever and so the impact of this problem may be negligible. OsmAnd is a notable example of how this concept can be applied and my project will attempt to replicate its successes in a web application context. In this project, I will use HTML5, JS, CSS and OpenStreetMap (OSM)to develop a browser-based, vector maps application with offline capabilities. To do this, I will use the advanced features of HTML5 combined with JS and CSS to develop a usable interface for the application. I will initially have to revisit standard HTML and CSS to relearn the basics needed to create a simple web page before moving onto the features ofHTML5which will allow me to create canvas objects. This will allow me to process the vector data received and display roads, paths, buildings. Recent updates in HTML5 also allow for further support for mobile browsers so that users can also use the app on the move in a lightweight package. The utility of HTML5 canvases would allow me to directly process and display the vector data required to generate the image seen by the user. Alongside this, I will need to revisit JavaScript to develop the client-side scripts to allow users to interact with the map and, as an extension, search for POIs both online and offline. The data I will use for this will be gathered using the OSM database which will then be stored locally using an XML format. Another key aspect of the project is the ability to work offline which would rely on application caching. However, after further research and a conversation with my supervisor, it was made apparent that this was a deprecated method of doing such and so I should focus on using service workers which check for availability of resources in local storage and retrieves them when available. This would be in collaboration with an indexedDB which will store the data from OSM. Finally, as an extension to the project I will attempt to develop a method for the user to dynamically download data from OSM when there is an internet connection available. This will be a toggleable feature which will automatically download data for tiles within a user specified radius of their current location when they are connected to the internet. This will provide a level of reliability for the user as they will always have local map information but also ensures that it doesn’t overwhelm local storage.

Project Specification

Your project specification goes here.

# Introduction

The project report is a very important part of your project, and its preparation and presentation should be of extremely high quality. Remember that a significant portion of the marks for your project are awarded for this report. **The electronic submission of your report must be in PDF format. You can use the menu option *File->Save As* to generate it.**

This document is a style guide for final year project reports in the Department of Computer Science. As such, it constitutes a collection of predefined Microsoft Word formatting styles for the production of your final report.

While this may sound like a rather prescriptive approach to report writing, it is introduced for the following reasons.

1. The style guide allows students to focus on the critical task of producing clear and concise content, instead of being distracted by font settings and paragraph spacing.
2. By providing a comprehensive style guide the Department benefits from a consistent and professional look to its internal project reports.

The remainder of this document briefly outlines the main components and their usage.

A **final project report** is approximately 15,000 words and must include a word count. It is acceptable to have other material in appendixes. Your **interim report** for the December Review meeting, even if it is a collection of reports, should have a total word count of about 5,000 words. This should summarise the work you have done so far, with sections on the theory you have learnt and the code that you have written.

Bibliography

1. Dave Cohen and Carlos Matos. *Third Year Projects – Rules and Guidelines*. Royal Holloway, University of London, 2013.