ECM1421 Systems Development 1
Group Programming Exercise CA2

Hand-out date: Monday 24th February 2020
Hand-in date: Monday 30th March 2020
Feedback: Friday 24th April 2020

This assignment is worth 30% of the marks for ECM1421. This is a group assessment. Your attention is drawn to the university's regulations on plagiarism.

Aim: To test your ability design, construct, and test Python programs, as covered in the ECM1421 module.

Submission method: Team submission via TurnItIn.com (see ELE for link).

Submission format: A ZIP file containing the Python programs and PDF report with brief instructions for the use of the program, and screenshots of the working program.

Requirements

Appendix A. presents the scenario, or use case, for this assignment.

Each team is required to build a program with multiple Python modules of your own design. These modules, and functions within the modules, should be tested independently.

Your program must use a command-line interface to prompt the user for input parameters, display results, and provide user instructions, i.e. help. For commands that produce many lines of output your program should prompt the user for a file name, and save the output to that file.
When your program prompts for user input it must always accept the options of Quit and Restart.

In use, you program will:

1. Retrieve the centre coordinate (latitude or longitude) of a postcode, only for EX postcodes.
2. Retrieve all reported *street level crimes* within a radius of 1 km, 2 or 5 km of the centre coordinate.
3. Optionally sort data by –
    a. Distance from the postcode centre
    b. By date, most recent first
    c. Crime category
4. Produce a tabular report of *street level crimes* in *CSV format*, suitable for use with spreadsheet programs such as Microsoft Excel.
5. Save the report with a user specified file name.

Your program should only use libraries (modules) from the standard Python 3.8 (or 3.7/3.6/3.5) distribution.

Suitable data, postcode coordinates and crime reports, are available for download from the module ELE page.

Marking guide

Item	Criterion	Mark	Guidance
Summary of requirements and work break down	A single page report summarising the requirements and broken down into work packages for the team.	15%	Use tables to show functional and non-functional requirements. You may use this marking guide as an estimate of effort required for each part.
User interface	Python code as one or more modules.	20%	Fully implemented and independently tested command-line user interface.
Data sorting and filtering	Python code as one or more modules.	20%	Fully implemented and independently tested functions.
File reading	Python code as one or more modules.	20%	Fully implemented and independently tested functions.
File writing	Python code as one or more modules.	15%	Fully implemented and independently tested functions.
Test report	Screenshots and reports.	10%	Evidence of suitably designed and performed tests.
	Total	100%	

Appendix A.

Dear Sir/Madam,

I hope this letter finds you well. Please excuse my direct approach. Tom Gainer, whom we both know, speaks very highly of your team of software developers.
We are a small consultancy that helps our clients to relocate in to the Exeter area. As part of our portfolio we provide clients with a street level crime report for postcodes of their choice.

At present we laboriously extract recent crime statistics, and we should like your team to help us automate this aspect of our work.

Our current procedure is as follows:

- Use Google Maps to find the latitude and longitude coordinate for a specific street.
- Use Microsoft Excel to extract nearby recent crime from the current 'street-level crime' data provided by Devon and Cornwall Police.
- Format the output to include it into the portfolio for the client.

Our desired improved approach would be an interactive program that prompts for a postcode and produces reports. The crime report should make use of the freely available crime data from data.police.uk.

Kind regards,
Michael and Frank

END