Development Document

Introduction:

The application was developed to intake 3 raster files, in CSV format, and merge them with varying weights as chosen by the user. The application does this, showing the output to the user and giving the option to save the output as a CSV file (.txt format). The development of the application was not without problems or issues, as is the case with all program development. This document will outline some of the issues that arose, what was done to overcome them and what future versions of this code will try to improve upon as well as discuss the design process.

Design Process:

When designing the application some thought was given to handling the input data. Being in a CSV format an array structure was the first design idea that was considered and was developed as the development progressed. Issues surrounding it are discussed in the issues section.

The GUI was developed concurrently with the rest of the app. This aided with the design as functions were defined and integration with the GUI considered concurrently. The addition of the “top 10%” check box and related functions were developed further on in the process but with limited issues. The design was modified as required without much hinderance to the progress.

Issues:

One of the first issues that arose, but was not fully understood, at the beginning of development, was the structure in which the data was to be stored and manipulated. Due to the nature of this project, working with arrays was inevitable and at first it was decided to create an array using a 2D list. When multiplying arrays by a multiplier or adding them together a function was created, however; it was an inefficient process. Later, Pandas (pd) data frames were used to read in and store the files as they have built in methods for such processes. This was far more efficient and made the code much more legible. When creating the function for isolating the top 10% of the output raster, it was discovered that it would be much easier with NumPy (np) as opposed to pd. This is due to np containing a percentile function. Finally, the code was altered again so that the rasters were read in and stored in np arrays.

At one point there was a function called “remover()” which would change all of an array’s zero values to another value so that an outline of the UK could be shown. This was later commented out as it was discovered that there are some values within the UK landmass of zero on some of the input rasters. Therefore, an outline of the raster cannot be added, with the data provided as there is no boundary value between land and sea.

The first function in the application script was relatively simple to test, as evidenced in the testing file “SiteLocatorFunc\_Test.py”. However, the remaining ones were not. Because the “smpl()” and “adv()” functions take values from the GUI using the “get()” method, the functions have been changed slightly in the testing file. The changes don’t affect the behaviour of the function apart from the methods in which values are input and returned. While this is not standard practice and is not recommended, it was done in this case due to limited understanding of how to undergo testing. In the future testing will not be carried out in this manner as there is now a greater understanding of the test-driven development process, and the modular structure in which code should be developed.

Another area that was challenging, and consumed a large amount of time, was the development of the Graphical User Interface (GUI). The use of tabs was implemented to distinguish between certain features. The use of “sliders” or “scale bars” was also implemented to give a more refined look and functionality as per the project brief. Issues arose in trying to display the output in the same window as the GUI as opposed to in a separate figure window. A great amount of time and research was used trying to make a Tkinter (tk) canvas display the output. While this was unsuccessful, a lot was learnt which will be of use in further projects.

Future Ideas:

In the future, the application will undergo another cycle of development and testing, beyond the scope of this assignment. The aim is to give greater functionality to the GUI by allowing other rasters to be input and the output raster to be displayed in the same window. A better script structure with modules and classes separating functions where required and more rigorous testing would also be included.

Reference List:

McKinney, W. 2013. *Python for Data Analysis.* California, USA: O’Reilly Media Inc.