**Mapping the average age in Switzerland in 2015 using R and QGIS**

**Introduction**

The assessment critically analyses two maps that have been created using a Graphical User Interface and a code-based software. QGIS is a GUI tool that has been used and a code-based software called R Studio.

**Data**

The data acquired for this project used three different data sources:

1. The Swiss Federal Statistical Office (FSO) – It provides the average age of the municipalities in Switzerland.
2. The Swiss Federal Office of Topography (SFOT) – It provides the raster file in a GEOTIFF format.
3. Swiss Geometry – This a shapefile obtained from FSO. Since it was not freely available, I have obtained this from an author (Beautiful Thematic Maps using ggplot2) of a website who republished the shapefile for educational purpose.

The data sources used in this tutorial are available in the input folder which is used by R. The ‘swiz-joined’ folder contains data with formats such as prj, shp, dbf.

**Data Visualisation**

QGIS works well for making maps, with easily customizable symbology, and a good set of tools to develop a layout for print and publication. One of the most useful and powerful features of QGIS is the ‘spatial join’ property. We can use the spatial relationships among objects in our project to join tables with different information. In the assessment, we spatially joined a spatial file component called ‘gde-1-1-5.shp’ with a non-spatial file component called ‘avg\_age\_15.csv’. This works by selecting a target feature ‘bfs\_id’ and joins it with spatial component of the shapefile. The target features will inhertit all the properties from the other features if they share the same spatial reference.

However in R, the ggplot2 module, which is based on the implementation of the ‘Grammar of Graphics’ by Leland Wilkinson. According to Leland Wilkinson the following are the building blocks of ggplot2 library:

1. **Data** represented as values in the visualisation.

2. **Aesthetic mappings**are directions for how data are mapped in a plot in a way that we can perceive. Aesthetic mappings include linking variables to the x-position, y-position, colour, shape, and size.

3. **Scales allows the data to be transformed into aesthetic values.**

4.  Though not as commonly used, **statistical transformations** transform the data, typically through summary statistics and functions, before aesthetic mapping.

**Conclusion**

R was used to provide more detailed and finer view of the map compared to QGIS.

Finally, a comparison between code-based software and GUI software describes the average age population in Switzerland in 2015. QGIS as well as R is constantly being further developed by the addition of new tools, processes and data management protocols.