**Geodetic Exercise 01**

**input:**

* A table in a Word document that contains 5 geographic coordinates and their expected projected coordinates.
* Projection parameters (FE= 1000000, FN=2000), projection formulas, and GRS80 datum parameters (a= 6378137, b=6356752.314140).

**Requirements:**

* Read a text file of the given geographic coordinates.
* Project the given geographic coordinates and save them into a text file.
* Compute and display the differences between the calculated and the expected coordinates.

**Steps:**

* Create 2 separate text files. One, for the given geographic coordinates and the second for their corresponding projected ones.
* Load both files.
* Use the given formulas to project the geographic coordinates and save the output into a text file.
* Load the projected coordinates and compare them to the expected ones. Then, display the differences and save them into a text file.
* All the differences are zero or near zero. **Only point (5)** has a **600m difference in X** as shown in figure 1.
* Figure 2 shows a screenshot of the program while running.
* A screenshot of a computer

  Description automatically generated

Fig.1: The differences between the projected and the expected coordinates for 5 points.

A screenshot of a computer

Description automatically generated

Fig.2: A screenshot of Ex01 program.

**Program architecture:**

* In the Geodetic.Exercise.Shared, there are 2 classes (Geographic and Cartesian). The Geographic class contains some operations on the geographic data such as loading from files (which is being used in Ex01 and Ex02), converting DMS into degrees and into Cartesian CS, etc.
* In Geodetic.Exercise.1, there is a Projected class which contains the definition of the projected coordinates and methods of loading the projected coordinates text files, projecting them, and saving the output into a text file.
* CoordinatesDifferences class is used to calculate the differences and save the output into a text file.