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**FW 891 Homework**

**March 23rd, 2022**

**Git/GitHub links:**

Here are some [Git desktop apps](https://git-scm.com/downloads/guis) like RStudio's Git app

The [Git Pro Book](https://git-scm.com/book/en/v2) – definitely designed for engineers but may someday be useful

\*Watched 3.17 class recording first (missed due to doctor’s appt.)

**Group 1:**

~~Add a file to your repository through the file explorer (i.e., not in RStudio)~~

* ~~Try to~~ ***~~Commit/Push~~*** ~~the change to your repository~~ 
  + ~~you should see an error on~~ ***~~Push~~*** ~~(section 12 in~~ [~~Git/GitHub Quick Setup~~](https://d2l.msu.edu/d2l/le/content/1459992/viewContent/12243559/View)~~) – this is because I added a chapter to your book (an image of where I will be backpacking in May)~~
* ***~~Pull~~*** ~~my Commit first, then~~ ***~~Push~~*** ~~your Commit~~

~~Add a user in your breakout group to your repository (section 10 in~~ [~~Git/GitHub Quick Setup~~](https://d2l.msu.edu/d2l/le/content/1459992/viewContent/12243559/View)~~)~~

~~Send a message to that user using~~ ***~~Issues~~*** ~~(section 9 in~~ [~~Git/GitHub Quick Setup~~](https://d2l.msu.edu/d2l/le/content/1459992/viewContent/12243559/View)~~)~~

**RMapping:**

Spherical vs Projected Coordinates

* [helpful webpage](https://www.esri.com/arcgis-blog/products/arcgis-pro/mapping/gcs_vs_pcs/)
* [funny video](https://www.youtube.com/watch?v=jtBV3GgQLg8) (might not be useful but I enjoyed the video!)

The wiki page about [UTM Zones](https://en.wikipedia.org/wiki/Universal_Transverse_Mercator_coordinate_system) – the [simplified view of the contiguous US](https://en.wikipedia.org/wiki/File:Utm-zones-USA.svg) is a helpful image.

**Answers in Red:**

**RMapping Terms:**

Coordinate reference systems (crs): A CRS is a coordinate-based system used to directly locate specific geographic entities.

EPSG registry: public registry including spatial reference systems, coordinate transformations and other geographical measurement systems.

* 4326: the WGS 84 coordinate reference system
* 29616: the NAD83 / UTM zone 16N coordinate reference system

Geographic coordinate system: a system that utilizes a three-dimensional spherical base/surface to locate specific places on Earth.

* Longitude/Latitude: Longitude: a geographic coordinate that gives the east-west position of a location on Earth. Latitude: a geographic coordinate that gives the north-south position of a location on Earth.

Projected coordinate system: a two-dimensional representation of Earth.

* Northing/Easting: these terms refer to cartesian geographic coordinates for a specific point. With UTM, northing is distance to equator, and easting is the difference to the “false easting”.
* Universal Transverse Mercator (UTM): a map projection system that uses coordinates to pinpoint locations on Earth. It divides the whole of the planet into 60 distinct zones.
  + Lansing is in UTM 16N or (more specifically) 16T: we are located in UTM 16N, one of the distinct aforementioned ’60 zones’.

Datum: generally, a piece of information (part of a larger set of data), but with regards to GIS, a ‘datum’ is a reference from which spatial measurements can be made.

**Group 2:**

* ~~Fill out the definitions for the RMapping terms above.~~
* ~~Answer the following in the same file as the definitions:~~
  + Why do we need to use different datums?
  + From my understanding, datums can have varying bases of measurement that determine larger, projected measurements that are made based on their reference. So, if you have datums with different measurements (radii, center points, etc.), you would see different coordinates associated with distinct datums. Datums differ from one another, and are not restricted to one universal set of measurements.
  + What is a false northing/easting? Why is this used?
  + False northing/easting is when you apply linear values to the origin of x(easting) and y(northing) coordinates. This is done so that all the working values are positive.
* ~~Put definitions/answers in your repository and Push/Commit.~~ 
  + ~~In the Commit message, give the file name that has the answers.~~

**Homework:**

* ~~Update Zoom to newest version (5.9.7 as of 3/17/22)~~
* ~~Finish Group 1 and Group 2 work~~
* ~~Install all the packages in the two lesson09 script files from the FW891 repository (this is so you do not spend 30 minutes in class next week installing the packages)~~
* ~~From~~ [~~Git/GitHub Quick Setup~~](https://d2l.msu.edu/d2l/le/content/1459992/viewContent/12243559/View) ~~lesson (D2L)~~
  + ~~Add email notifications on Push for you and~~ [~~belinsky@msu.edu~~](mailto:belinsky@msu.edu) ~~(section 8)~~
  + ~~Send a message to~~ ***~~belinskyc~~*** ~~using~~ ***~~Issues~~*** ~~(section 9)~~
* ~~Add any shapefile to your repository -- a CSV file with lat/long coordinates or a KMZ/KML file counts as a shapefile~~
* ~~Commit/Push all the changes above~~ 
  + ~~make sure your Commit Message is descriptive~~
  + ~~In Commit message, talk about what the shapefile represents~~