Assignment 1: GDAL and OGR

General Information:

- Exercises must be handed in individually.
- Submission deadline is **12.11.2018, 11:55 PM** through **Moodle**.
- **Read all instructions carefully!**

Documents for submission on Moodle:

- **PDF file containing the documentation** of how you solved the exercises and the answers to the questions. Name it according to *"assignment1_yourname_matriclenumber.pdf"* e.g. assignment01_MelanieMüller_1234556.pdf.

Note: Include your name, matriculation number and GitHub name in the beginning of

Read the instructions carefully and document your answers in a PDF document that you submit to Moodle.

Some of these exercises require you to work in the command line. In this case, provide all the commands that you used to solve the task and add a brief comment what it does as explained in the seminar (see slides). If the question requires you to provide the output of a command that is shown in the command line, copy and paste it from the command line into your documentation file along with the command that was used to create it and a brief comment.

Exercise 1: git 5 points

1. Create a GitHub account and register for GitHub Education. Provide your GitHub user name in the documentation.
2. Clone the following GitHub repository to your computer using the command line:

   https://github.com/redfrexx/fossgis19_1.git

3. Navigate inside the top folder of the repository and list all files contained in it. Provide the command and answer the following questions:
   a. How many raster files are shown?
   b. How many vector files are shown?

Exercise 2: GDAL and OGR 20 points

Open the OSGeo4W Shell and navigate to the repository that you cloned before. Answer the following questions.

Useful resources:

- Introduction to GDAL and OGR by Johannes van der Kwast (UNESCO-IHE)
- Official GDAL/OGR Documentation

gdalinfo

1. Execute the following command and answer the questions:

```
gdalinfo relief_san_andres.tif
```

   a. What is the coordinate reference system of the raster file? What is its EPSG code?
   b. What is the pixel size? Don't forget to provide the units.

2. What is the number of rows and columsn of the raster file?

3. What happens if you add the flag "-json" to the command and execute it?

4. Redirect the output of the last command to a new file called *"relief_gdalinfo.json".* List all files of the directory to check if the new file was created. Then display the contents of the file in the command line to check whether it is not empty. Provide all commands and along with brief comments in the documentation.

ogrinfo

1. What is the purpose of the command *ogrinfo*?
2. Execute this command and answer the following questions:

```
ogrinfo -al -so india-disputed-lsib.geojson
```

   a. What is the EPSG code of the file?
   b. What is the geometry type of the file?

gdalwarp

gdalwarp can be used to reproject a raster file into a new coordinate reference system.

1. What is the purpose of the command *gdalwarp*?
2. Reproject the raster file *relief_san_andres.tif* to a UTM coordinate system using gdalwarp.

   Hint: Introduction to GDAL and ORG provides a good explanation for this.

   a. Which UTM zone is this data set located in?
   b. What is the appropriate UTM coordinate reference system? Provide the EPSG code.
   c. Use gdalwarp to reproject the data set.

gdal_translate

Use the GDAL program gdal_translate to convert the file *relief_san_andres.tif* to PNG format with the data type unsigned integer 16 bit (UInt16).

Merging raster files

Find a gdal program that can be used to create a mosaic out of two raster images. Use it to merge the raster files *relief_san_andres.tif and relief_san_andres_west.tif* into one raster file.

Bonus: 5 Points

Write a script (batch, Python, R, whatever you like) which converts all GeoTiff files inside the current directory

- into JPEG files
- with the data type unsigned integer 16 bit (UInt16)
- and reprojects them to the coordinate reference system WGS84 (EPSG:4326)

Hint: Introduction to GDAL and ORG provides a good example for batch file.