Introduction to QGIS with Liam McNabb

Basics:

(0) Download QGIS: https://qgis.org/en/site/

(1) Download the data: http://cs.swan.ac.uk/~csmcnabb/CGVC2018/Tutorial-QGIS/

(2) Uncompress the data a folder of your choice

(3) Understand the data of Example 1

-- "OSOpenMapLocal (ESRI Shape File) SS" & "OSOpenMapLocal (ESRI Shape File) ST"

Holds extra shape file information to aid searching (from OSOpenMap ordanance survey free version)

-- "2016-01-south-wales-street.csv"

The data file we will be exploring

-- "lsoaWales.*"

File retaining information needed to display the lower super output areas (LSOA) of Wales.

QGIS Browser:

(4) Open QGIS Browser

QGIS is a lightweight browser for geo-spatial files.

(5) Find “lsoaWales.shp” in the file browser (located on the left)

You can see the metadata held by the file

(6) Click the “Preview” tab

Clicking the preview tab provides an overview of the shape file’s form

(7) Click the “Attributes” tab

Data held for each polygon in the shape file

Example 1 (Exploring Point Data):

(8) Open QGIS Desktop

(9) Go to taskbar -> project -> New

(10) Add LsoaWales to the canvas. Go to taskbar -> Layer -> Add Layer -> Add Vector Layer

Or use the browser panel

(11) Add the data,

-- Go to taskbar -> Layer -> Add Layer -> All Delimited Text Layer

We user the geometry definition “point coordinates”, using the longitude and latitude to plot the points.

-- Add a coordinate reference system WGS 84, EPSG:4326.

The coordinate reference system can be split into two types: Geographic or Projected, we need to use the geographic to match the point data’s coordinates to the underlying map of Wales, which uses a separate coordinate system. We are using the World Geodetic System 1984 for this projection

(12) Make your map beautiful

-- Right click lsoaWales in the layers panel (below the browsers panel) and hover of styles.

The “edit styles” option gives more advanced settings.

-- Go to taskbar -> project properties. Select the general tab, where you can change the background color (if desired).

(13) Go to taskbar. View -> Zoom In. Draw a box around the desired area (Swansea in this example)

(14) Increase understanding of the crime data.

-- Right Click the crime data in the layers panel. Go to properties. Go to Open Attribute Table.

This shows the data stored in the CSV data file.

-- Right Click the crime data in the layers panel. Go to properties. Go to style. Top-left is a drop-down signifying “Single Symbol”. Switch to “Categorized”

We are going to color the points based on an attribute in the data.

-- Use the dropdown to select “Crime Type”. Click the button “Classify”.

This will set a random color to each crime type, and color the points appropriately. If you want, you can also change the color map, and symbol style which are under the Column dropdown.

-- Click on the “+” symbol by the Crime Data in the layers panel to see the legend

You can use the check boxes to filter the points

(15) Increase the understanding of the underlying geography

-- Click the first button wihtin the layers panel to add a group.

-- Open the folder “OSOpenMapLocal (ESRI Shape File) SS”, drag both shp files over the group in the layer panel.

-- Click on the group, and drag above LsoaWales

Although not necessary adding these files allows for easier understanding of the spatial area. These can be recolored in the same vein as lsoaWales (Right click -> Styles)

(16) Review a single point

-- Open the attribute table

-- Make sure the crime data is highlighted in the layers panel (clicked)

-- User the “Select Features button

-- Drag a box around the point you are interested in

-- Select the 9th button in the attribute table to bring the selected item to the top of the database.

Add the second folder of example one to explore Cardiff in the same way. Once you are done. Save and start a new Project.

Example 2 (Creating a choropleth map):

(17) Understand the data of Example 2

(18) Drag us_county shp file to the layers panel

(19) Change the projected view

-- Go to the bottom right corner and look for the globe symbol. Click on it.

-- Enable 'on-the-fly CRS transformation'

-- Change the CRS to NAD83/ Texas Centric Albers Equal Area, EPSG:3083

We used a project view for this. Thanks to the size of the US, representing it on a flat plane isn't ideal, we use a projected view to emulate the projection onto a sphere (like the globe). The system refers to where you are viewing the globe from. In this case we are telling the projection the Texas is in line with our viewpoint.

(20) Add the "IncomeData" to the layers panel

We don't have any point information for this layer, so we just add it as a file-in-use.

(21) Link the two files together

-- Open both Attribute tables and find common fields (in our case, STCOU in the data file, and GEOID in the shp file.

-- Right click the US shape file, go to properties. Select the Joins tab. Click the "+" button.

-- Join Layer = "IncomeData", Join Field = STCOU, Target Field = GEOID. Click OK.

By doing this, we can use fields in the csv file, with the data in the shapefile. We're going to use this to visualize the income data for each county in the US.

(22) Present the Joined Data

-- Go to the Styles Tab. Click the "Graduated" option in the top-left dropdown box

We use this instead of categorized to present number values

-- Click the ε button

-- Use the middle widget to create an expression to convert the field to a number. Conversions -> to_real, Fields and Values -> IncomeData_INC110179D, close the bracket.

-- Click the "Classify" button

You can change the color map using the color ramp. There are also different mode for distributing the values in the drop down menu "Mode"

(23) Export

-- Go to the toolbar -> project -> new print composer

-- Use the "Add new Map" button

The map thats added reflects what is shown in the QGIS Desktop canvas.

-- Modify the extents in the right widget, "Item Properties".

-- Go back to QGIS desktop and zoom in on alaska

-- Use the "Add new Map" button again

-- Use the "Add legend" button

-- Use the toolbar, Composer Export as… (Your choice)

END OF TUTORIAL