# Introduction to QGIS (v3.14).

Schedule and exercises

Kerry Pearn (k.pearn@exeter.ac.uk)

September 15, 2020

## 1 Schedule

Today's session: 13:30 - 16:30

*Format:* I will present some QGIS functionality (for up to 20 mins), and then set you an exercise to essentially replicate what I've just demonstrated (for up to 30 mins). During the exercise please use the handout notes - all the steps for the exercises are in there - and you will have support on Slack from members of the PenCHORD team and your peers. Please use us if you need help by posting any questions you have (referencing the numbered point you are working on).

*Itinerary:*

- *Section 1:* Introduction to session and datasets
  - slides and data (10 mins)
- *Section 2:* The QGIS environment, map navigation & adding your first layer
  - demo (20 mins) & exercise 1 (15 mins)
- *Section 3:* Using simple symbology
  - demo (20 mins) & exercise 2 (15 mins)
- *Section 4:* Point data & using categorized symbology
  - demo (20 mins) & exercise 3 (20 mins)
- *Section 5:* Join own data to Shapefile & using continuous symbology
  - demo (20 mins) & exercise 4 (30 mins)
- *Section 6:* Print layout
  - demo (10 mins) & exercise if time
- *Extra material if needed:* Expressions & dense point data

# 2 Exercise 1.

**Aim**: Become familiar with the relationship between the representation of the layer on the map canvas and in the attribute table.

Follow these steps. *Use notes from chapters 1 - 5 to help you.*

1. Open QGIS
2. Select *new project* (to get a view with a map canvas) 
3. Add these toolbars (using menu: View → Toolbars)
   (a) Map navigation
   (b) Data source manager
   (c) Project
   (d) Manage layers
   (e) Attributes
   (f) Selection
4. Add these panels (using menu: View → Panels)
   (a) Browser Panel
   (b) Layers
   (c) Layer styling
5. Add the world basemap (in coordinate field, in status bar, type "world" and press enter)
6. Practice map navigation using the world layer. Here's a suggested work sequence to follow:
   (a) In map canvas, zoom to New Zealand
   (b) Create a map view (of New Zealand)
   (c) In map canvas, *zoom to layer* for world layer 
   (d) Close map view (of New Zealand)
   (e) In map canvas, zoom to Madagascar
   (f) Bookmark this view 
   (g) In map canvas, *zoom to layer* for world layer 
7. Open attribute table for world layer  & dock attribute table 
8. Order attribute table alphabetically by Country (feature: NAME)
9. Select top row of attribute table & zoom to it on map canvas using *zoom map to selection* icon 
10. *Zoom to layer* for world layer. 
11. Using *select features*  select the polygon representing Russia within the map canvas (turn yellow)
12. Using *move selection to top*  (found in the icons within the attribute table window), bring the details of Russia to the top of the attribute table
13. Use *Identify tool*  and click on the polygon representing Russia to view the same details stored in the attribute table in the *Identify Results* panel.
14. To remove identify function, either select another icon, e.g. the *pan map* icon  , or click the sea.

15. *zoom to layer* for world layer 
16. Save project. Close QGIS. Reopen QGIS & your project.

**Result**: At the end this exercise your QGIS project should show the useful toolboxes and panels, a single layer (world) listed in the layers panel, the world layer in full zoom on the map canvas, and the world layer's attribute table docked to the bottom of the map canvas.

# 3 Exercise 2.

**Aim**: Extract some features from the world layer, and save them as a new shapefile. Become familiar with the *Layers Styling* panel in order to change the appearance of the layer using simple symbology.

Follow these steps. *Use notes from chapter 6 - 8 to help you.*

1. Change the project projection to EPSG: 32630 (see chapter 6).
2. From the world layer, select polygons for UK. These are now your "selected features" (see chapter 7).
3. Export selected features to new shapefile called "UK.shp" (see chapter 7).
4. Play with the order of the two layers in the layers panel (world and UK). Toggle between having both/one/none selected (please end with the UK being the only one selected, and zoom to this layer)
5. Customise the simple symbology for the UK shapefile (follow Chapter 8).

**Result**: At the end this exercise your QGIS project should show the UK as land and coast

# 4 Exercise 3

**Aim**: Add point data from a delimited text file (.csv) and style the points using categorised symbology

**Exercise 3A**: Add your Police HQ point data and style each point to represent whether the site is also a Fire and Rescue HQ. Follow these steps, and *use notes from chapter 11 to help you.*

1. Add delimited file  to project: *headquarters.csv*

   Within the *Data Source Manager / Delimited text* window, choose these settings:
   **File name:** Navigate to the csv file: *headquarters.csv*
   **Layer name** (what appears in the *Layers Panel*, so choose something meaningful): street_crime
   **File Format**: CSV (comma separated values)
   **Geometry definition** → Point coordinates → **x field** = Longitude & **y field** = Latitude
   **Coordinate system**: EPSG4326 – WGS 84 (leave as default)
   **Add**.

2. Use the field "Fire_Rescue_HQ_site" (a boolean to represent whether the feature is also a Fire and Rescue HQ) to format the points to show this information.

   In the *Layers Styling* panel:
   Select *headquarters*
   Select *Categorized*
   **Column**: Fire_Rescue_HQ_site.
   **Classify**

3. Choose the style for each symbol
4. Set legend text to *"Police HQ"* and *"Police & Fire Rescue HQ"*.

**Exercise 3B**: Add a label to each point to state the site's location (using field "Head quarters"). Follow these steps, and *use notes from chapter 12 to help you.*

1. In the *Layer Styling* panel select the layer *headquarters*.
2. Click the *Labels* icon on the LHS of the *Layer styling* panel.
3. Select "Single labels"
4. Value: Head quarters
5. Experiment with changing the settings under the various style tabs to create your label visualisation.
6. If time, follow the instructions in the notes for section 12.3 to *Put a number in a point*

**Result**: At the end this exercise your QGIS project should show the UK basemap, with 5 points for the locations of the Police headquarters, points styled based on site type, and a label showing the site name.

# 5 Exercise 4

**Aim**: Become familiar with joining your own data (.csv file) to a corresponding shapefile in order to visualise your data. Use continuous symbology to style the layer.

**Exercise 4A**: Add delimited text file, add shapefile and create a table join *Use notes from chapter 13 & 14 to help you.*

1. Add vector layer to your QGIS project: $LSOA\_2011\_sw5forces\_BGC\_V2.shp$
2. Open the attribute table & dock. If have time, you can practice what you've learnt on this shapefile, such as:
   (a) Move between selecting features on the map canvas (select feature tool ), and identifying them in the attribute table (move selected rows to top of table ).
   (b) Move between selecting features in the attribute table, and identifying them in the map canvas (zoom to selected features ).
   (c) Save selected feature as new feature layer (try creating a shapefile for just the Exeter features)
   (d) Use Identify feature tool .
   (e) Zoom to UK layer and deselect features .
3. Add this delimited text layer : $sw\_5forces\_street\_by\_lsoa.csv$.
4. Open the attribute table for this layer. Identify the common column within each of the two layers about to join.
5. Table join: Join data from csv file to shapefile (follow section 14.3 in the notes).

**Exercise 4B**: Use graduated symbology to style your layer *Use notes from chapter 15 to help you.*

1. Using the information covered in chapter 15, choose two columns from the street crime dataset, and style them using graduated symbology. Whilst doing this please also:
   (a) Edit the text to be used in the legend (usually involves removing the unnecessary decimals)
   (b) Have a separate layer displaying the visualisation for each column (duplicate the layer)
   (c) Rename each layer
   (d) Within the *Layers* panel, put these two layers in a group with the property *Mutually Exclusive* (see chapter 10).

**Result**: At the end this exercise your QGIS project should show LSOA crime data for the SW, styled to represent a data field, together with a UK basemap & the 5 locations of the Police headquarters.