Targeted skills

By the end of this module, you will know how to:

- convert Excel file to csv (comma separated value) files
- import/convert csv file with lat, lon attributes into GIS layer
- overlay layer created over GoogleMap or OpenStreeMap layers

Data

Data to be used in this module can be found in the following folders:

```
aiv-20180101-20190410.xlsx
aiv-20180101-20190410.csv
```

These files contain Avian Influenze Virus (AIV) data from 2018/01/01 to 2019/04/10 worldwide provided by the "EMPRES: Global Animal Disease Information System" platform

Exercise outline & memos

1. Converting Excel files to csv format

CSV stands for Comma-Separated Value

Before being able to import your data into QGIS as a plain GIS layer, you need to pre-process it via Microsoft Excel or OpenOffice for instance.

To do so for instance with Microsoft Excel:

```
Open: aiv-20180101-20190410.xlsx

[In Excel top menu]
File   Save As..
[In Save window/dialog]
Change "Format" dropdown to "Windows Comma Separated (.csv)
```

IMPORTANT NOTE: You can follow a similar process using an Open Source equivalent to Microsoft Excel named OpenOffice Download
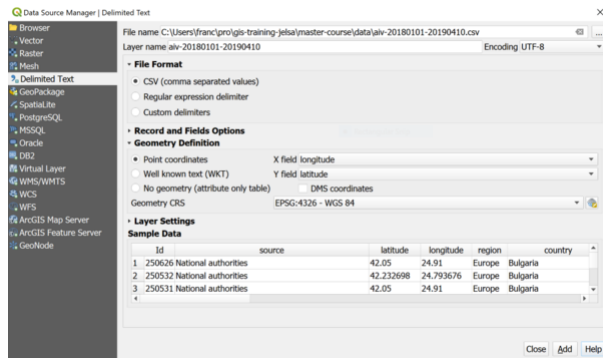
2. Importing/converting csv file with lat, lon attributes into GIS layer

```
[In QGIS top menu]
Layer   Add Layer   Add Delimited Text Layer...
```

then reproduce settings shown below including:

- `File name`
- `File format`
- `Geometry CRS`
- …

```
Click "OK"
```

At this stage, your geo-referenced file is visible in the QGIS map panel but you still need
to save it as a shapefile (or GeoPackage).

To do so:

```
[In QGIS layers panel]
Click right on your layer    Export    Save Features As

Choose "ESRI shapefile" format, a proper folder and save it with a meaningful name,
for instance: "aiv-20180101-20190410" (the file extension will be created automatically) - see screenshot below
```
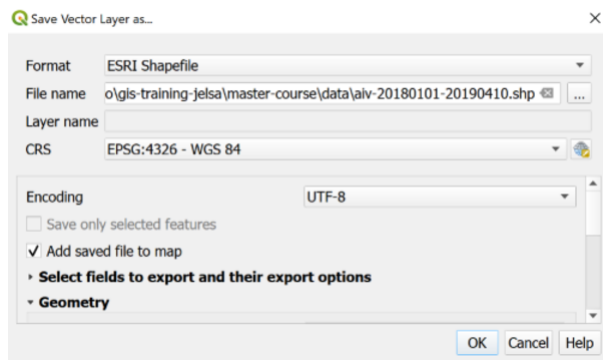

Congrats, you have created your first GIS layer / shapefile from scratch!

Remove this layer from the Layers Panel for now!

3. Overlaying layer created over XYZ tiles (GoogleMap, OpenStreeMap layers, ...)

In previous QGIS versions 2.x, a dedicated plugin named "OpenLayers Plugin" allowed to load background image layers
such as Google Map and the like. This plugin has not yet been adapted to the new QGIS version. However, there is a
pretty straightforward to achieve the same result in the newest version.

There are basically two ways to add these useful background layers (including satellite imagery): one by one or many of
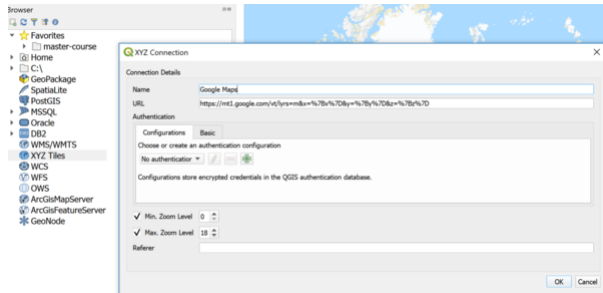them in one go.

- **Manual version**

```
[In QGIS Browser Panel]
Click Right on XYZ Tiles   New Connection...

and reproduce the settings below:
Name: Google Maps
URL: https://mt1.google.com/vt/lyrs=m&x=%7Bx%7D&y=%7By%7D&z=%7Bz%7D
```

We could do the same for each individual layers, instead we will load most important ones in one go:

- **Automatic version**

```
[In QGIS Top toolbox]
Click on "Python Console"
```

Copy the content (Ctrl-C) the following Python script:

```
sources = []
sources.append(["connections-xyz","Google Maps","","","","https://mt1.google.com/vt/lyrs=m&x=%7Bx%7D&y=%7By%7D
sources.append(["connections-xyz","Google Satellite", "", "", "", "https://mt1.google.com/vt/lyrs=s&x=%7Bx%7D&y
sources.append(["connections-xyz","Google Terrain", "", "", "", "https://mt1.google.com/vt/lyrs=t&x=%7Bx%7D&y=%
sources.append(["connections-xyz","Google Terrain Hybrid", "", "", "", "https://mt1.google.com/vt/lyrs=p&x=%7Bx
sources.append(["connections-xyz","Google Satellite Hybrid", "", "", "", "https://mt1.google.com/vt/lyrs=y&x=%7
sources.append(["connections-xyz","Stamen Terrain", "", "", "Map tiles by Stamen Design, under CC BY 3.0. Data by
sources.append(["connections-xyz","Stamen Toner", "", "", "Map tiles by Stamen Design, under CC BY 3.0. Data by Op
sources.append(["connections-xyz","Stamen Toner Light", "", "", "Map tiles by Stamen Design, under CC BY 3.0. Data
sources.append(["connections-xyz","Stamen Watercolor", "", "", "Map tiles by Stamen Design, under CC BY 3.0. Data
sources.append(["connections-xyz","Wikimedia Map", "", "", "OpenStreetMap contributors, under ODbL", "https://ma
sources.append(["connections-xyz","Wikimedia Hike Bike Map", "", "", "OpenStreetMap contributors, under ODbL", "
sources.append(["connections-xyz","Esri Boundaries Places", "", "", "", "https://server.arcgisonline.com/ArcGIS
sources.append(["connections-xyz","Esri Gray (dark)", "", "", "", "http://services.arcgisonline.com/ArcGIS/rest
sources.append(["connections-xyz","Esri Gray (light)", "", "", "", "http://services.arcgisonline.com/ArcGIS/res
sources.append(["connections-xyz","Esri National Geographic", "", "", "", "http://services.arcgisonline.com/Arc
sources.append(["connections-xyz","Esri Ocean", "", "", "", "https://services.arcgisonline.com/ArcGIS/rest/serv
sources.append(["connections-xyz","Esri Satellite", "", "", "", "https://server.arcgisonline.com/ArcGIS/rest/se
sources.append(["connections-xyz","Esri Standard", "", "", "", "https://server.arcgisonline.com/ArcGIS/rest/ser
sources.append(["connections-xyz","Esri Terrain", "", "", "", "https://server.arcgisonline.com/ArcGIS/rest/serv
sources.append(["connections-xyz","Esri Transportation", "", "", "", "https://server.arcgisonline.com/ArcGIS/re
sources.append(["connections-xyz","Esri Topo World", "", "", "", "http://services.arcgisonline.com/ArcGIS/rest/
sources.append(["connections-xyz","OpenStreetMap Standard", "", "", "OpenStreetMap contributors, CC-BY-SA", "ht
sources.append(["connections-xyz","OpenStreetMap H.O.T.", "", "", "OpenStreetMap contributors, CC-BY-SA", "http
sources.append(["connections-xyz","OpenStreetMap Monochrome", "", "", "OpenStreetMap contributors, CC-BY-SA", "
sources.append(["connections-xyz","OpenTopoMap", "", "", "Kartendaten: © OpenStreetMap-Mitwirkende, SRTM | Karte
sources.append(["connections-xyz","Strava All", "", "", "OpenStreetMap contributors, CC-BY-SA", "https://heatmap
sources.append(["connections-xyz","Strava Run", "", "", "OpenStreetMap contributors, CC-BY-SA", "https://heatmap
sources.append(["connections-xyz","Open Weather Map Temperature", "", "", "Map tiles by OpenWeatherMap, under CC
sources.append(["connections-xyz","Open Weather Map Clouds", "", "", "Map tiles by OpenWeatherMap, under CC BY-SA
sources.append(["connections-xyz","Open Weather Map Wind Speed", "", "", "Map tiles by OpenWeatherMap, under CC B
sources.append(["connections-xyz","CartoDb Dark Matter", "", "", "Map tiles by CartoDB, under CC BY 3.0. Data by O
sources.append(["connections-xyz","CartoDb Positron", "", "", "Map tiles by CartoDB, under CC BY 3.0. Data by Open
sources.append(["connections-xyz","Bing VirtualEarth", "", "", "", "http://ecn.t3.tiles.virtualearth.net/tiles/


# Add sources to browser
for source in sources:
    connectionType = source[0]
    connectionName = source[1]
```

```
QSettings().setValue("qgis/%s/%s/authcfg" % (connectionType, connectionName), source[2])
QSettings().setValue("qgis/%s/%s/password" % (connectionType, connectionName), source[3])
QSettings().setValue("qgis/%s/%s/referer" % (connectionType, connectionName), source[4])
QSettings().setValue("qgis/%s/%s/url" % (connectionType, connectionName), source[5])
QSettings().setValue("qgis/%s/%s/username" % (connectionType, connectionName), source[6])
QSettings().setValue("qgis/%s/%s/zmax" % (connectionType, connectionName), source[7])
QSettings().setValue("qgis/%s/%s/zmin" % (connectionType, connectionName), source[8])

# Update GUI
iface.reloadConnections()
```

and paste (Ctrl-V) into the Python console and press Enter.

You should now have a dozen of interesting XYZ Tiles loaded

Open as well the shapefile created in previous chapter, load various Tiles layers and explore.