GIS File formats

Hans van der Kwast / Jan Hoogendoorn

OpenCourseWare
ocw.unesco-ihe.org

GIS File formats

- A GIS file format is a standard of encoding geographical information into a file
- Formats are mainly created by
  - Government mapping agencies
  - GIS software developers
- Vector formats
- Raster formats

GIS File format conversions

UNESCO-IHE Institute for Water Education

Vitens Evides international

Raster:

- Geospatial Data Abstraction Library (GDAL)
  - 142 formats supported

Vector:

- OGR Simple Features Library (OGR)
  - 84 formats supported

GDAL/OGR is open source. Free tools at http://www.gdal.org

GDAL/OGR in GIS software

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- Many GIS and remote sensing applications use the GDAL/OGR libraries, e.g.:
  - QGIS
  - ArcGIS
  - Google Earth
  - GRASS GIS
  - MapServer
  - SAGA GIS
  - gvSIG
  - …

Common vector formats

- ESRI Shapefile
  - Mandatory files:
    - `.shp`: shape format; the feature geometry itself
    - `.shx`: shape index format; a positional index of the feature geometry to allow seeking forwards and backwards quickly
    - `.dbf`: attribute format; columnar attributes for each shape, in dBase IV format
  - Other important files:
    - `.prj`: projection format; the coordinate system and projection information, a plain text file describing the projection using well-known text format

ALWAYS COPY ALL FILES, SHARING ONLY THE .SHP FILE DOES NOT WORK

Common vector formats

- Comma separated values (CSV file)

```
STN,Lon,Lat,Alt(m),Name
210,4.419,52.165,-0.20,Valkenburg
225,4.575,52.463,4.40,IJmuiden
235,4.785,52.924,0.50,De Kooij
```

  - Can be imported/exported from/to
    - Spreadsheet programmes and databases
    - GIS applications, when it has coordinate fields

  - Can be edited in a text editor (e.g. Notepad)

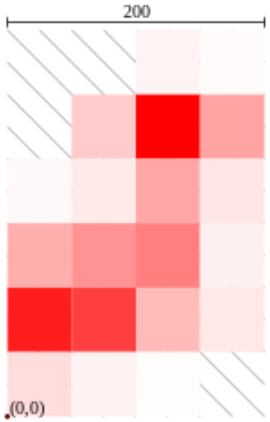
Common raster formats

- TIFF = Tagged Image File Format, a format for storing raster graphics images
- GeoTIFF
  - A public domain metadata standard which allows georeferencing information to be embedded within a TIFF file, such as
    - map projection
    - coordinate systems
    - Ellipsoids
    - Datums
  - An alternative to the "inlined" TIFF geospatial metadata is the `*.tfw` World File sidecar file format which may sit in the same folder as the regular TIFF

Common raster formats

- Arc/Info ASCII GRID

Grid image



Values

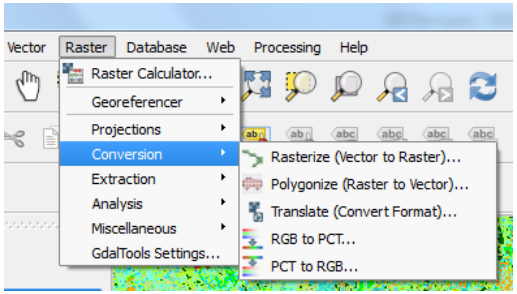
	25	75	125	175
275	NA	NA	5	2
225	NA	20	100	36
175	3	8	35	10
125	32	42	50	6
75	88	75	27	9
25	13	5	1	NA

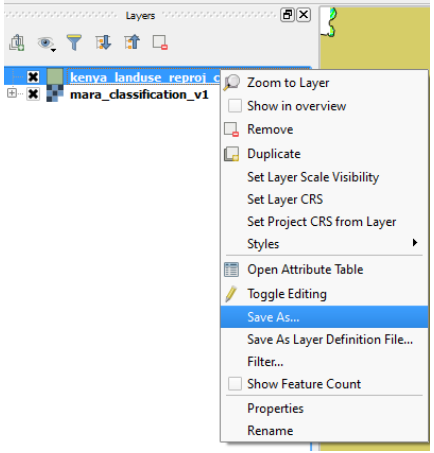
ASCII grid format

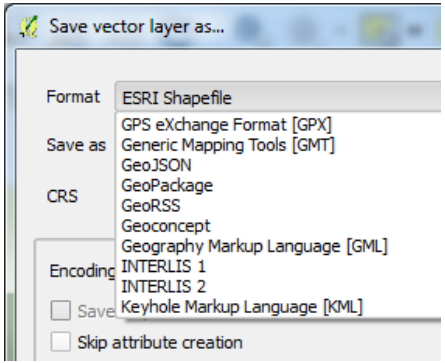
```
ncols         4
nrows         6
xllcorner     0.0
yllcorner     0.0
cellsize      50.0
NODATA_value  -9999
-9999 -9999 5 2
-9999 20 100 36
3 8 35 10
32 42 50 6
88 75 27 9
13 5 1 -9999
```

File conversions

- Raster to raster (*Translate*)
- Vector to vector (*Save as…*)
- Rasterize (*Vector to Raster*)
- Polygonize (*Raster to Vector*)
- GIS file to geodatabase
- Geodatabase to GIS file







Save a project in QGIS

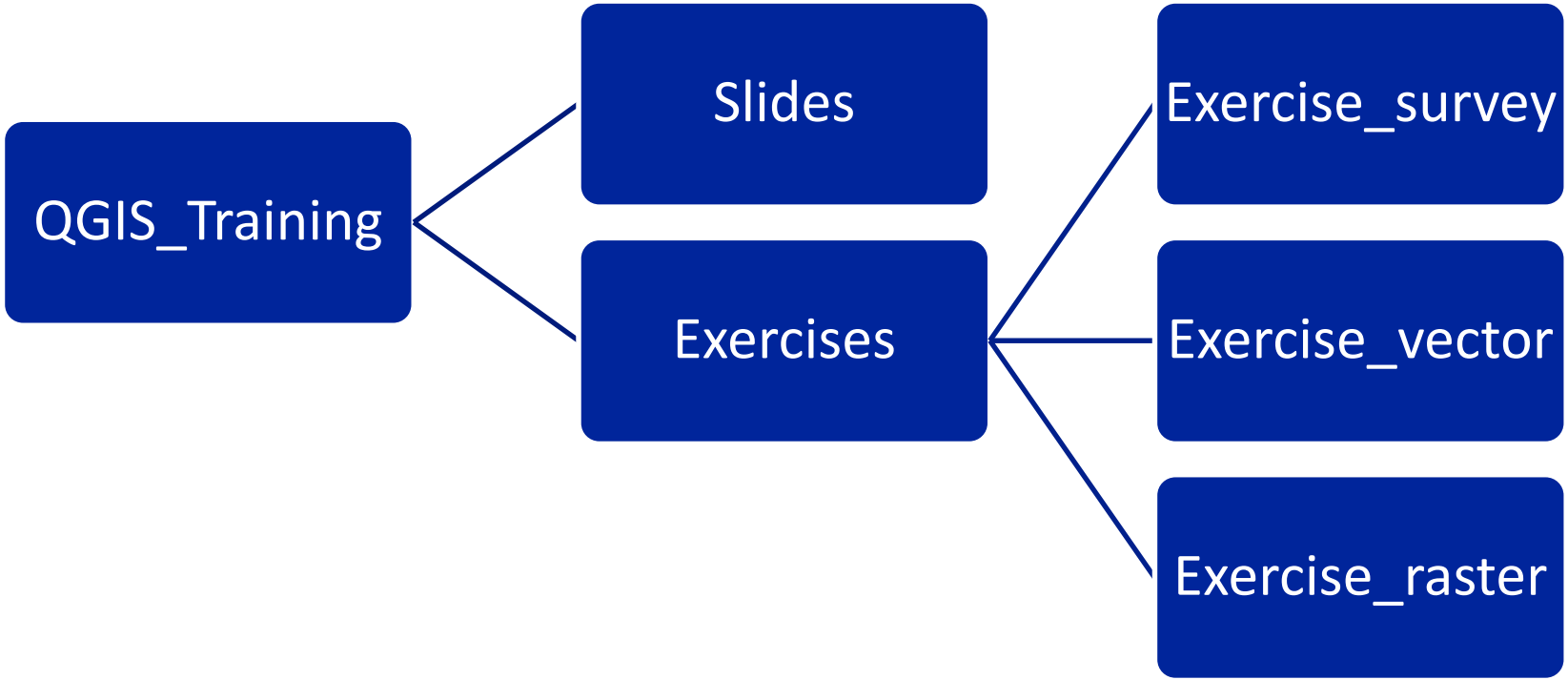
- You can save the state of your QGIS project in a .qgs file
  - Includes links to layers
  - Styling of layers
  - Zoom level
  - On the fly projection

Be careful: the .qgs file does not contain the files, but only paths to the files. IF YOU MOVE OR DELETE FILES, QGIS WILL GIVE AN ERROR WHEN OPENING A PROJECT FILE

Organizing your GIS data

- Never save data on the desktop or in My Documents
- Better to have a separate partition for data and system
- Don’t use spaces in folder and file names
- Keep file names intuitive. So not `test1.shp`, `test2.shp`
- Learn where your browser saves downloaded files
- Learn how to use zip files

Organizing your GIS data



Show extensions

- Go to file explorer (Windows Explorer)
- Press <ALT> button
- In the menu go to *Tools→Options*
- Choose *View* tab
- Uncheck *Hide extensions for known file types*

Learning objectives exercise

- After the exercise you are able to:
  - Use MS DOS commands for file management
  - Use GDAL for conversion of raster data
  - Use OGR for conversion of vector data
  - Make a simple script for batch conversion