Introduction to Inkscape

Aims and Objectives

In this practical you will be introduced to the vector graphics program `Inkscape`. We will be using it to edit and combine Python plots and ArcGIS map documents.

By the end of this class you should be able to:

1. Create maps in ArcGIS in a format Inkscape can read
2. Set up Inkscape pages
3. Load `svg` graphics from Python and ArcGIS into Inkscape

4. Annotate and edit imported graphics
5. Save results in vector format for use in reports and presentations

Getting started

Before we can start using Inkscape to create data visualisations, we need to have some data to visualise. For this practical, and the associated assessment, we will be combining spatial and aspatial data in a single overall visualisation.

Creating a map

This first section is mostly revision from what we covered in GEG5223 last year, although the ArcGIS interface is a little different to the version of ArcMap we used last year. Our aim is to make a map in ArcGIS that we can import into Inkscape. The map we are going to make is of catchments, with its hydrology overlain on a hillshade.

Inside the `Map` pane, we can click on `Add data` and navigate to where we saved our data for assessment 1. We are going to load the DEM for one of the catchments. These notes will use catchment `75001`
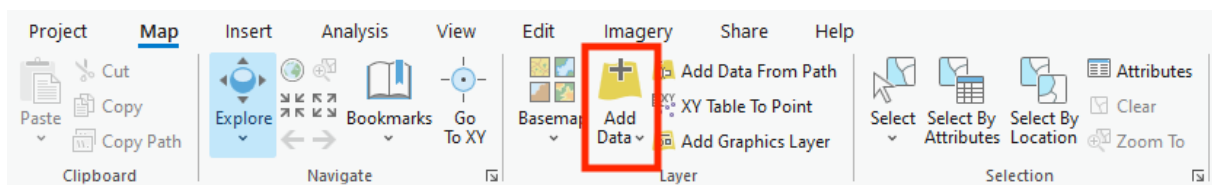

We are now going to do some simple analysis of the DEM. You can follow these prompts or explore other options. The main task here is to create a map that we can use within Inkscape.

In ArcGIS, we can search for tools using the search bar at the top of the screen and run them one by one:

1. Create a hillshade of the catchment DEM (`Hillshade (Spatial Analyst)`)

2. Create a D-Inf flow direction raster for the catchment (`Flow Direction (Spatial Analyst)`)

3. Create a flow accumulation raster for for the catchment (`Flow Accumulation (Spatial Analyst)`)

Now we have the data we want to display, we can start to think about how to visualise it as a map. We want to show where water is likely to accumulate across the landscape.

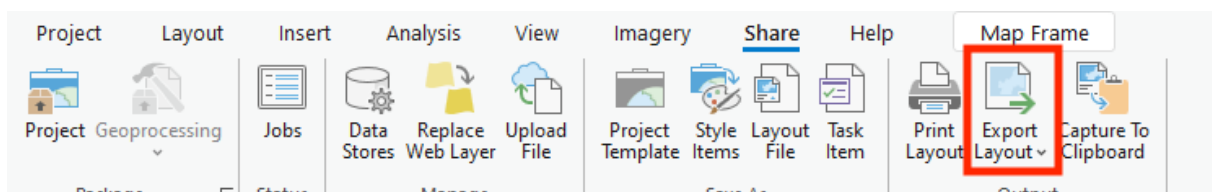To add our map data to the layout, click on `Insert` and then select `New Layout`:
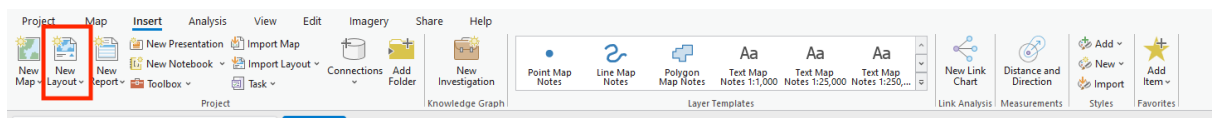
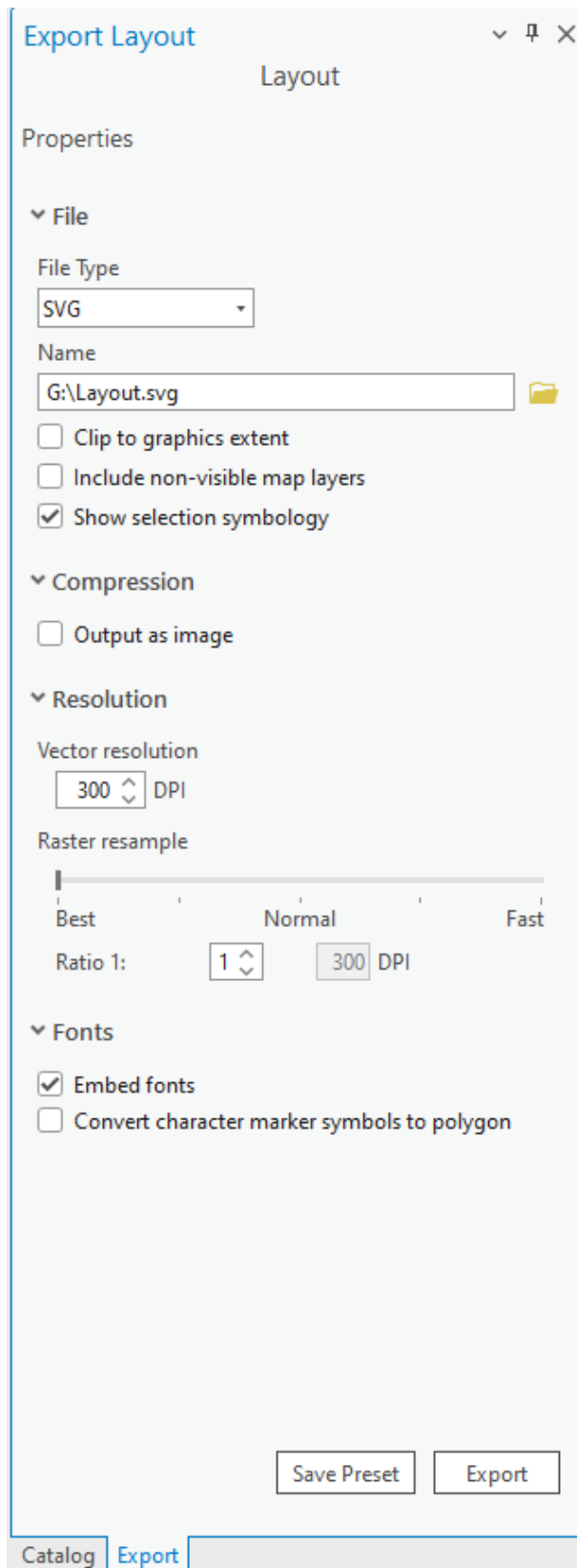We can then add a map frame to show our data inside our layout:
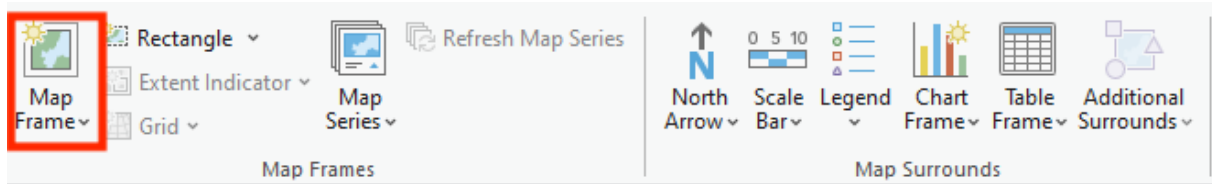
Once you have added your map data, explore the other options within the Layout View to add relevant things to your map (scale bar, north arrow, legend, etc).

Once we have finished making our map, we need to export it in the `svg` format, by going to `Share > Export Layout`:

And then making sure to select `svg` when exporting your map:

Export Layout

Layout

Properties

∨ File

File Type

SVG ▾

Name

G:\Layout.svg 📁

☐ Clip to graphics extent

☐ Include non-visible map layers

☑ Show selection symbology

∨ Compression

☐ Output as image

∨ Resolution

Vector resolution

300 ⌃⌄ DPI

Raster resample

Best   Normal   Fast

Ratio 1:   1 ⌃⌄   300 DPI

∨ Fonts

☑ Embed fonts

☐ Convert character marker symbols to polygon

Save Preset   Export

Catalog Export

Creating a graph

We have already created several graphs during today's live coding session. Follow your notes from this part of the class to save one of these graphs as an `svg` file. For this practical any `matplotlib` plot in `svg` format will be fine.

Launch Inkscape

Inkscape is installed on all of the student PCs on campus, including the ones in the Geography Computer Room and the library. To launch it, search for `Inkscape` in the Start Menu, or navigate to the Inkscape icon under `I` in the Start Menu.

It may take a little while to load, the first time you access it on a new machine, but once it loads it will prompt you for some settings, which you can leave as the defaults:
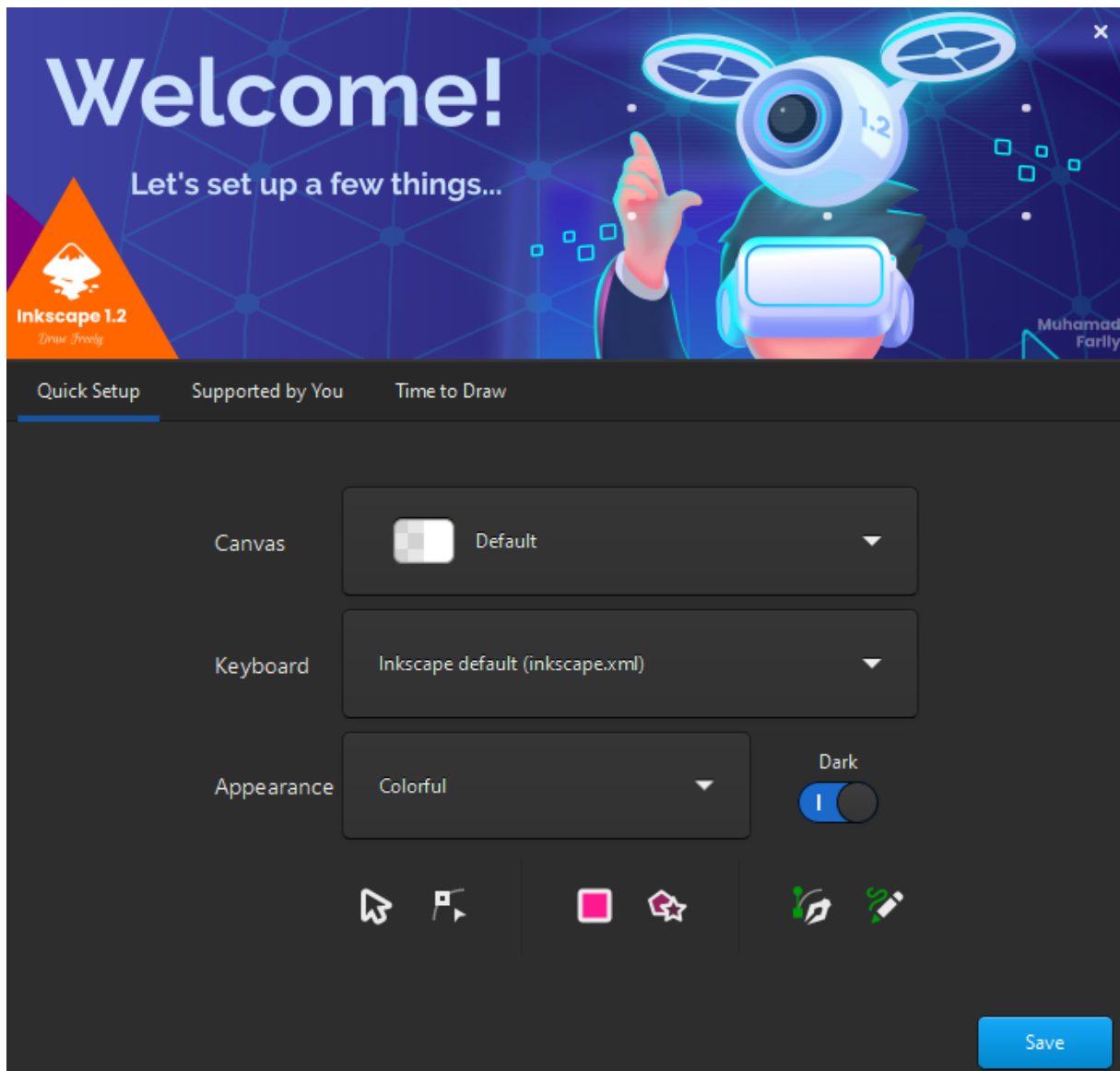
Before clicking through to `Time to Draw` and then selecting `New Document`. The resulting window will look something like this:
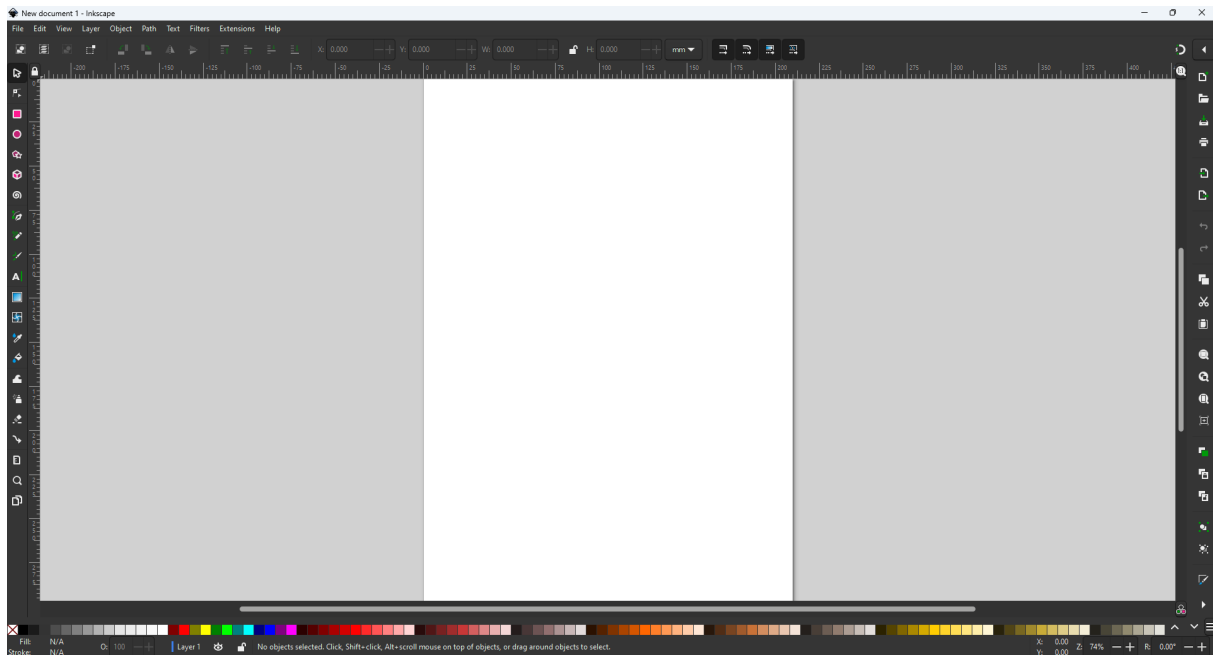
Inkscape page setup

When you load Inkscape, you will see a rectangle in the centre of the screen, this is the page outline. By default this is set up to be a portrait orientated A4 page. This means that any graphics you create inside this boundary will be able to be placed on a page of that size.

For our assignment, we need a landscape A3 sized drawing area. We can change this in `File >` `Document Properties`, which looks like:
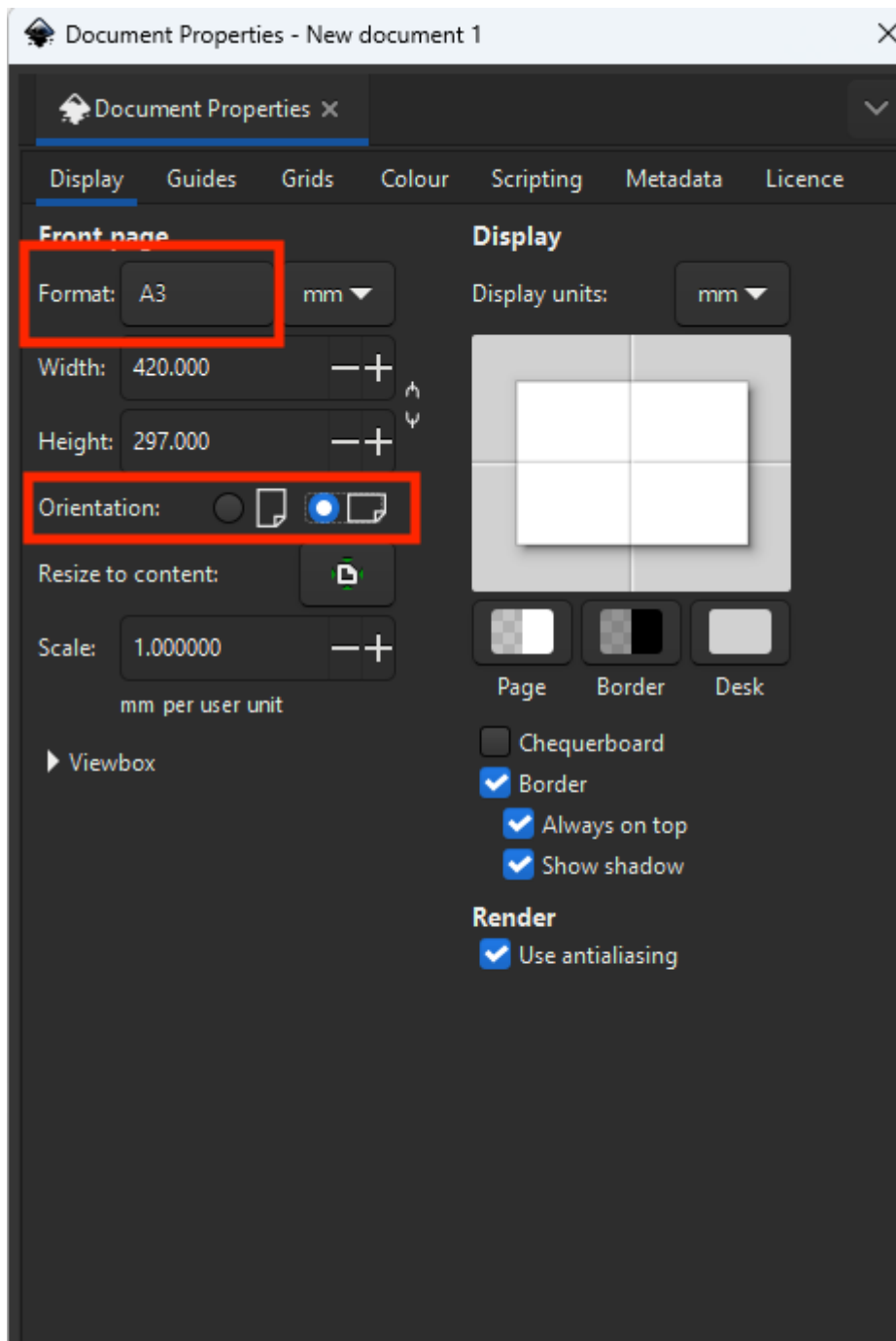
The areas highlighted in the above image show where to change our document to landscape, and to select the A3 paper size. Close the menu once you have done this.

Importing `svg` files

Now we need to load our map and graph into Inkscape. To do this we again use the File menu (`File > Import...`) and navigate to where we saved our `svg` map and graph from earlier. Select one of these, and click open. Repeat this process to load the second image.

Inkscape layers

Like many other graphics programs, Inkscape is able to represent our graphics as a series of layers. Open the layers tab from `Layer > Layers and Objects`. It will open a small pane on the right of the window:
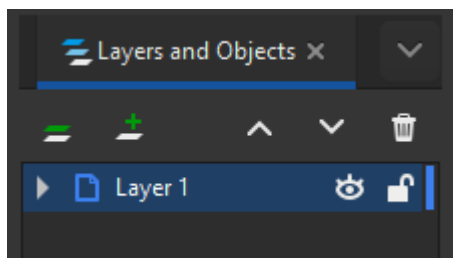
If we press the small eye symbol beside the layer name (`Layer 1` by default), we can toggle the visibility of a layer. If we click the little padlock, we can lock a layer from editing. This allows us to build up complex visualisations as a series of independent layers. Layers are shown on the screen in order, from top to bottom, the same way that a GIS displays layers.

Lets split our graph and our map into different layers. Currently they are both in `Layer 1`. Lets create a new layer, that we will call `graph`, click on the plus symbol and input the new name for the layer and click `Add`. Next, rename `Layer 1` to `map`, by double clicking on its name and typing the new name in.

Now we have 2 layers, but both of our objects are in the same layer. Lets move the graph into the new `graph` layer by right clicking on it and selecting `Move to Layer`, and then choosing the appropriate layer for the object. Note that when we are creating new objects, they are automatically created in the layer that is currently highlighted in the Layers Pane.
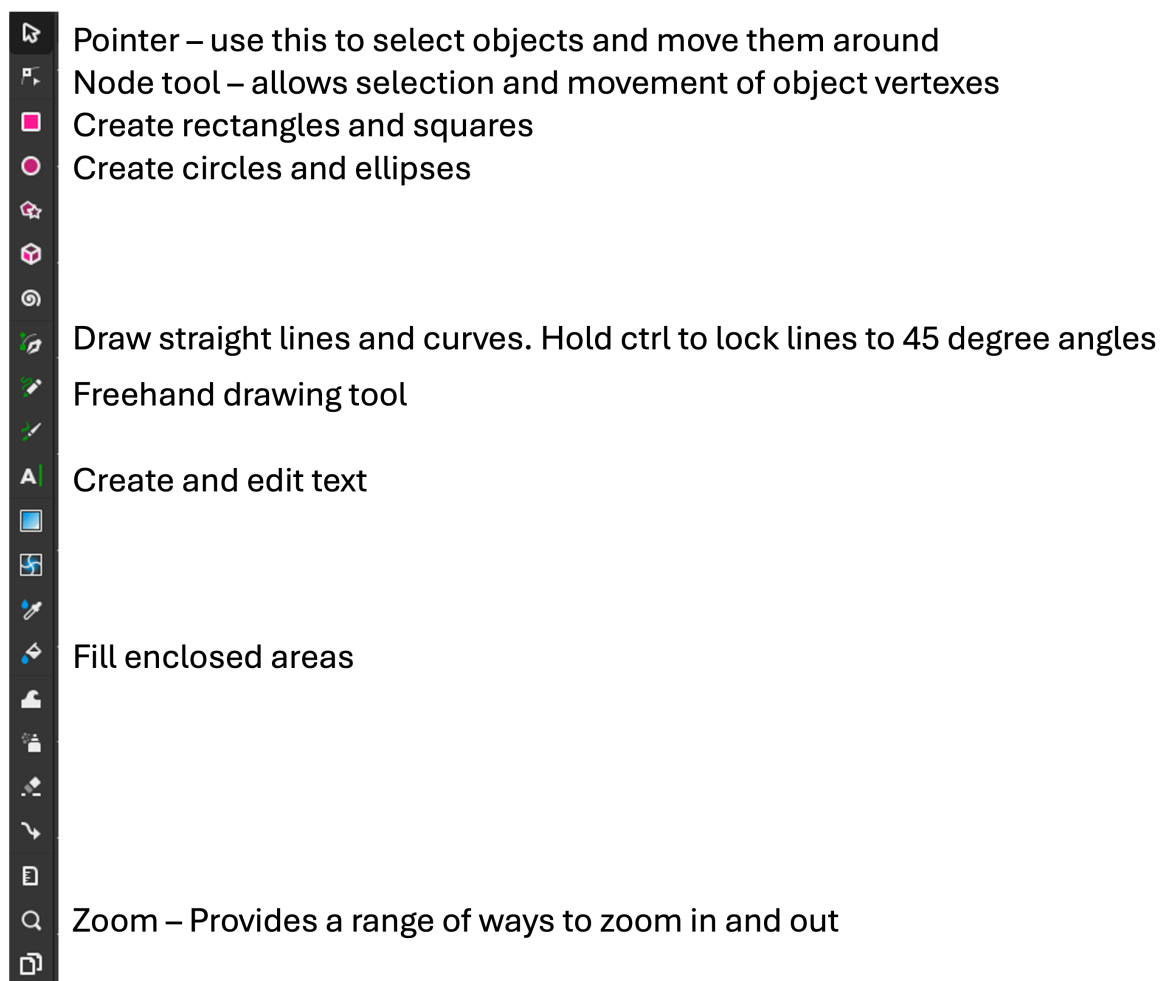
Ungrouping

The key trick with `svg` files, is that they are built up of a series of individual shapes and objects. In order to edit either our map or our graph, we can right click on an object and select `Ungroup` to break it into its component parts. you may need to do this several times to get to the individual object you

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wish to interact with. One of the most common reasons for doing this is to try to increase our data-ink ratio, by removing superfluous lines from graphics created in other programs.

Useful Inkscape tools

The majority of the tools you will need to edit, annotate and add to your data visualisations can be found on the left of the screen. When you select one of these tools, the bar on the top of the screen changes to show the various settings available for the currently chosen tool. Of the many tools on offer, the most useful ones for our purposes are:

Pointer – use this to select objects and move them around
Node tool – allows selection and movement of object vertexes
Create rectangles and squares
Create circles and ellipses

Draw straight lines and curves. Hold ctrl to lock lines to 45 degree angles
Freehand drawing tool

Create and edit text

Fill enclosed areas

Zoom – Provides a range of ways to zoom in and out

Duplicate

If you wish to create a copy of an object, and be able to edit it, you need to `Duplicate` it rather than simply copy and paste it. To do this you can right click on an object and select `Duplicate` from the

menu, or you can use the keyboard shortcut `Ctrl`+D to duplicate the currently selected objects.

Fill and stroke

When creating or editing objects, we can change the properties of lines (thickness, colour, transparency, etc) through the fill and stroke menu, which can be opened by right clicking on an object and selecting `Fill and Stroke`.... This will open a pane on the right of the window, which provides options to edit lines as well as changing the fill colour or pattern of solid objects.

Exporting the finished product

Once you have completed all of the editing you wish to do on your maps and graphs, you can export them in a range of formats outlined in the `Save As` menu. **Note that you should always save a copy of your work as an `Inkscape SVG` file to ensure you can come back and make more edits in the future.**

You can also export a high resolution `png` version of your visualisation, using the `Export PNG Image` option in the file menu:
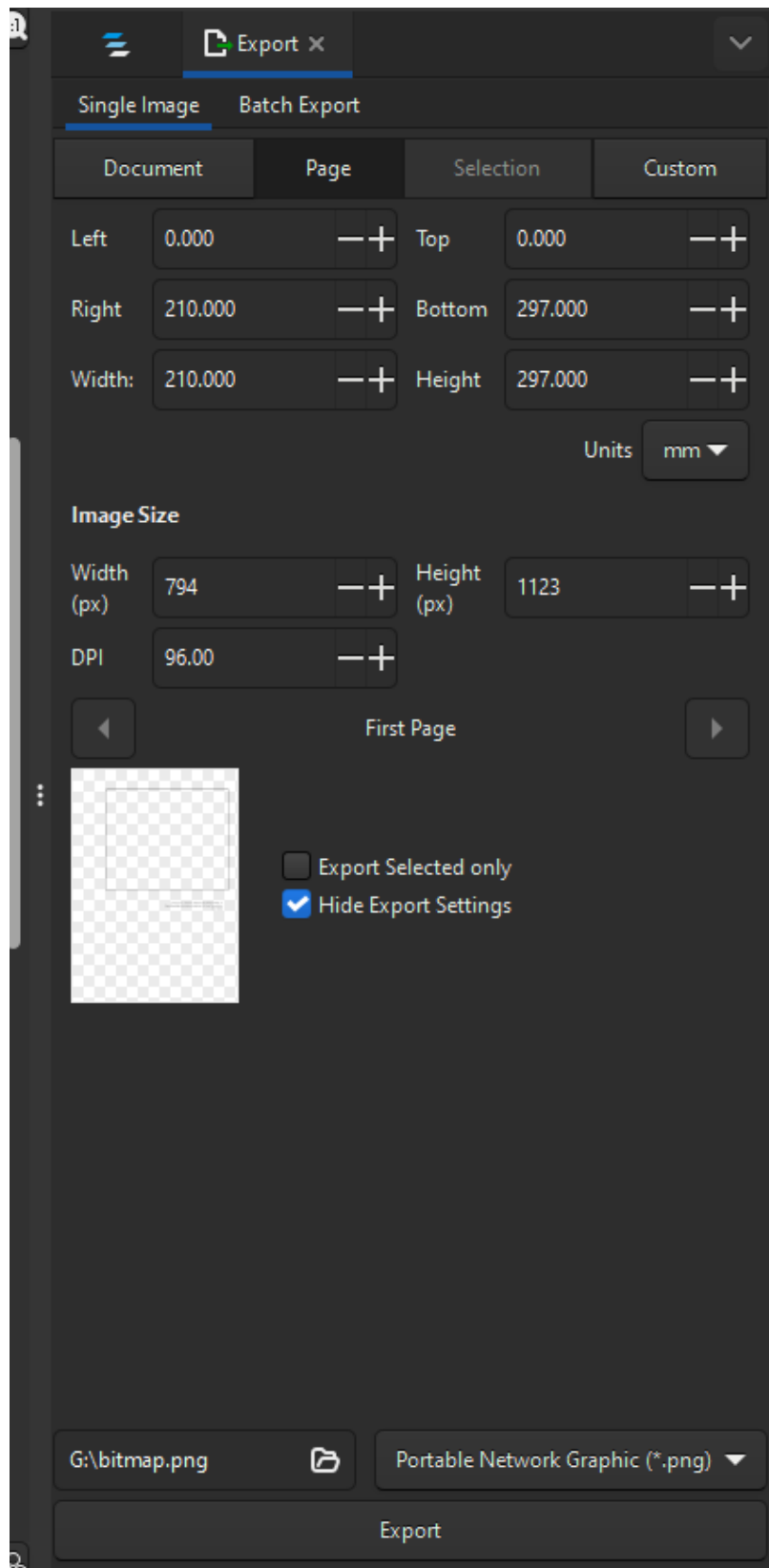
This allows you to export the whole page, or a currently selected object. You can increase the `dpi` (dots per inch) to export higher resolution images. Remember to click the `Export` button after choosing your output location, to actually start the export process.