FIT3179 Data Visualisation

Week 9 Homework: Create a Map with Vega-Lite

Introduction

- This is an assessed homework and is worth 1% of your final mark.
- Submission due date: Sunday 26 October, 10:00 pm.
- The late penalty is 25% of the total mark (1%) per day of late submission.

The goal of this homework is to create a map with Vega-Lite that is useful for your Data Visualisation 2 assignment. You will get feedback about your map in the Week 10 studio, and you can then include an improved version of your map in your submission for the Data Visualisation 2 assignment.

Task

The task is to create a map that is relevant for your Visualisation 2 domain. Search a dataset that you want to visualise. The dataset does not need to include longitude/latitude information; you can link your data with existing geoshape information that you download from naturalearthdata.org or another data source.

Select a map idiom that is well suited for your dataset and makes sense in the context of your Visualisation 2 project. In the unusual case that creating a map does not make sense for your domain and your tutor has given you an exemption from including a map in the Visualisation 2 assignment, you are still required to create a map for this homework. You may choose any topic in this case.

Submission

A report must be submitted in PDF format through the submission link on the Week 9 Moodle page. The page limit of the report content is two pages. Write a report with the following content:

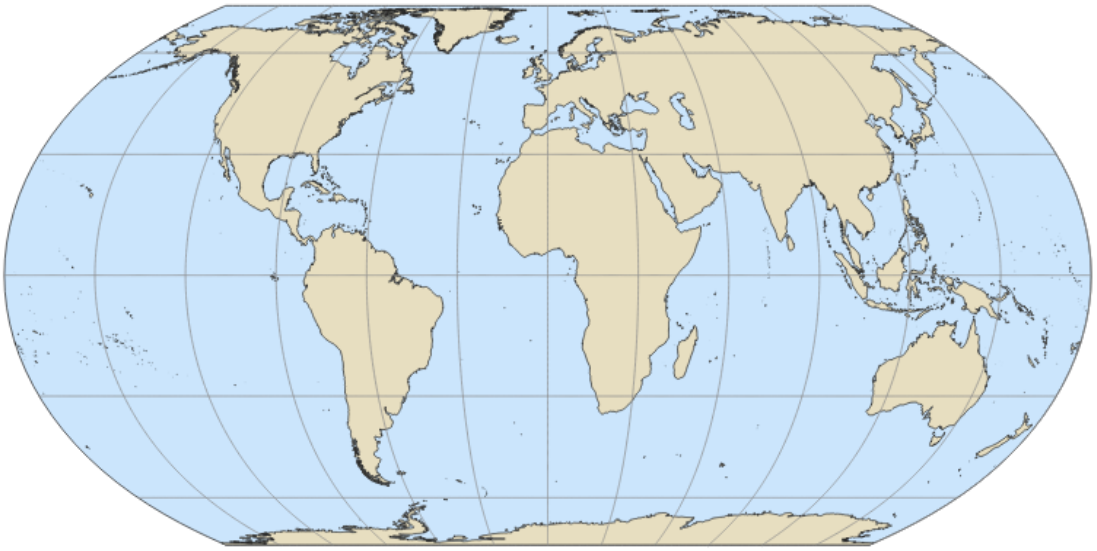
- Your identity (name, Monash student ID, lab, tutor name)
- A URL of your publicly accessible web page on GitHub that embeds the map that you created. Note that a link to the JSON definition of the map is not accepted; a URL of a HTML web page is required instead. Refer to the Week 8 homework for publishing a Vega-Lite visualisation with a GitHub page.
- A screen capture of your map.

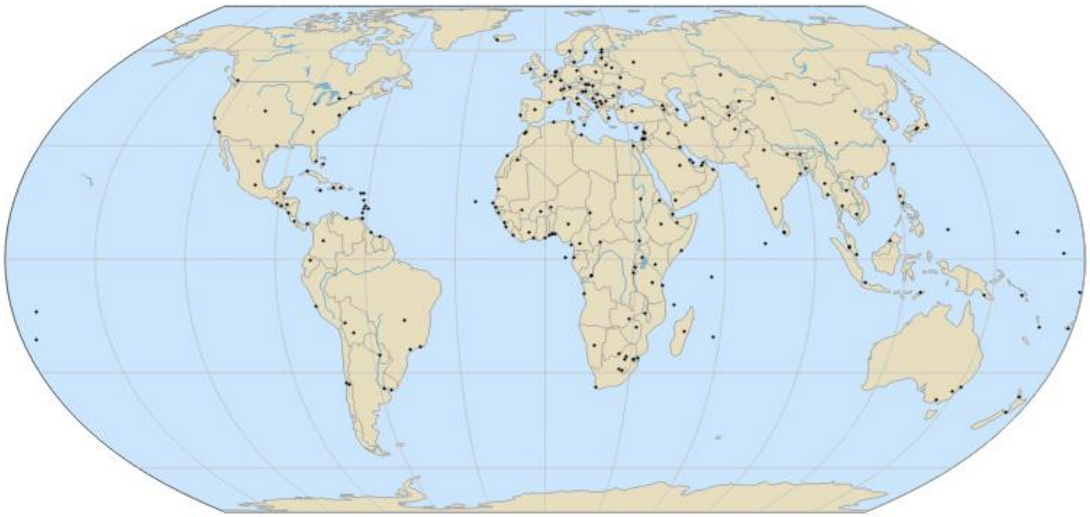
- One short bullet point for each of the following items:
    - The domain of your visualisation
    - The visualised dataset (attribute types, source and author, etc.)
    - Data transformation that you applied (if any), such as normalisation by area or population.
    - Data classification that you applied (if any) and the reason for choosing class limits.
    - A justification for the type of map idiom used (that is, why are you creating a choropleth map, a proportional symbol map, a dot map, etc.)?

Hints for creating an outstanding map

- Your dataset should not be too large. While it is technically possible to load datasets of multiple megabytes, large datasets should be avoided if possible, because your final visualisation will load slowly. To reduce the size of your dataset, you may remove attributes that are not needed. You may also remove geometry that is not shown on your map. For example, if you create a map of Australia, loading geometry for the entire world would be wasteful. Mapshaper.org has an easy-to-use command line interface for specifying a clipping area to remove geometry outside of a bounding box (https://github.com/mbloch/mapshaper/wiki/Command-Reference#-clip).
- Your map could include a graticule, that is, lines of constant longitude and latitude. The naturalearthdata.com site provides shapefiles with graticules at different resolutions. The maps below include a graticule with a 30-degree resolution.
- Consider including additional map layers if useful and relevant for your map. For example, you may want to include lakes and rivers, major roads, major cities, etc. Naturalearthdata.com is the best resource for map layers that show the entire world or large sections of Earth.
- Including a shaded relief image for showing terrain or including satellite images or other raster imagery would be great but is not trivial with Vega-Lite.
- It is tempting to include very detailed geometry in maps. However, it is often better to use simpler geometry (also known as “generalised” geometry), as details are distracting and add a lot of noise and visual clutter. The first map below uses data for a scale of 1:10 million. This is too detailed for the map shown at the scale here. The second map uses data for a scale of 1:110 million. The outlines of continents are much less noisy and visually pleasing

to look at. If your geometry data is too detailed, use mapshaper to simplify it.





- Use figure-ground: select bright and desaturated colours for larger areas and elements that are the ground of your map. For example, in the second map above, the continents and the oceans are shown with bright colours, and all lines (including outlines of continents) are bright grey. In the second map, only the small dots indicating major cities use pure black.
- http://colorbrewer.org is an essential tool for selecting colours for maps.
- Select map projections judicially. Start with the “equirectangular” projection, then use https://projectionwizard.org for selecting an optimum projection. Modify your projection in Vega-Lite: https://vega.github.io/vega-lite/docs/projection.html#projection-types Note that TopoJSON can only contain longitude/latitude coordinates. Mapshaper.org can convert from various Cartesian coordinate systems to longitude and latitude coordinates in case your geometry is not in longitude/latitude coordinates.