Welcome to

instats

The Session Will Begin Shortly

START

Spatial Data Analysis and Visualization in R

Session 11: Visualization of Vector Data with tmap
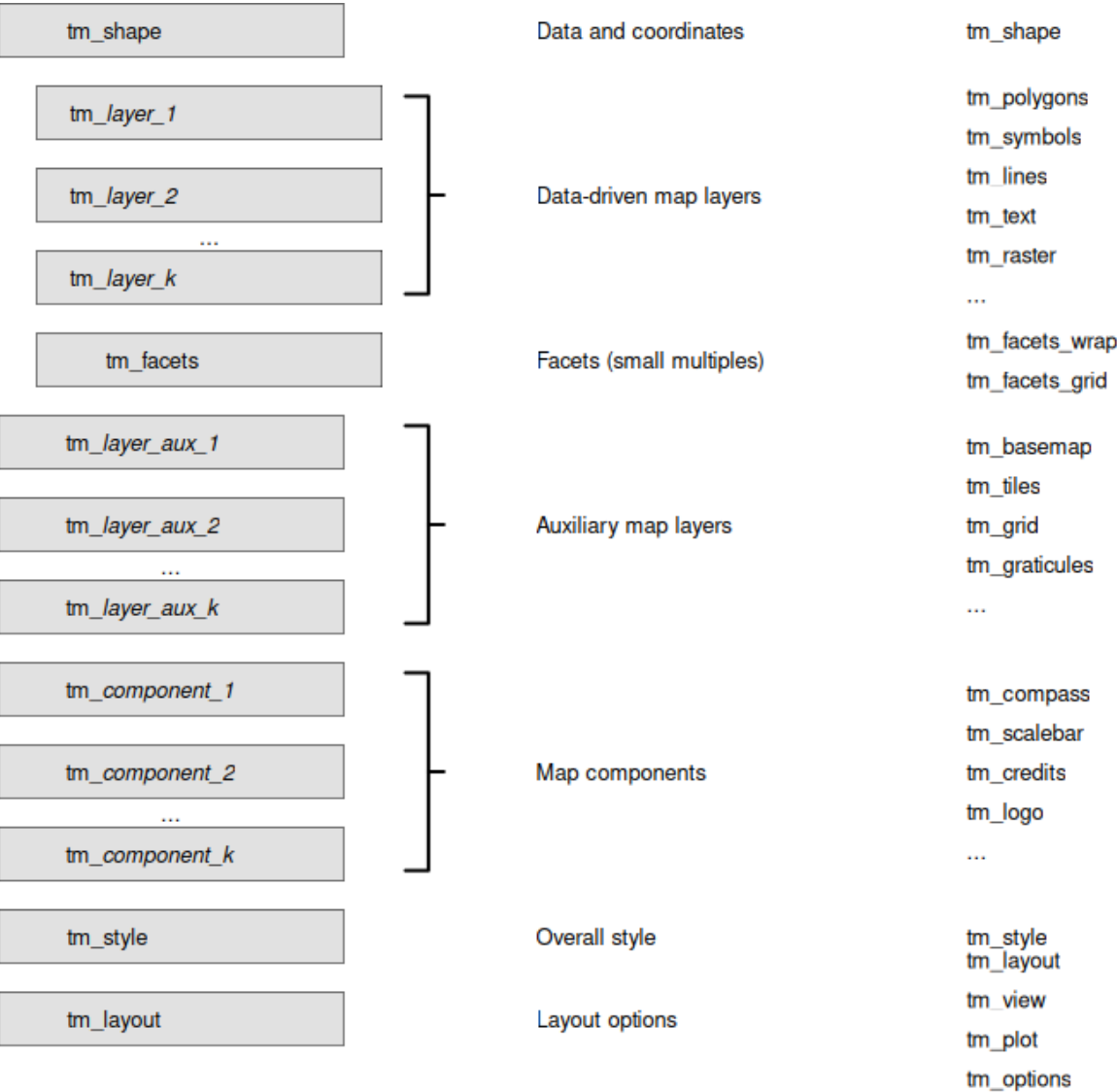
instats

Grammar of graphics

- A framework for building statistical graphics

- Implemented in **ggplot2**

- Also implemented in **tmap** but differently

Grammar of graphics building blocks

- Data: The dataset being visualized.

- Aesthetic Mappings: How data maps to visual properties (e.g., position, color, size).

- Geometric Objects: Shapes representing the data (e.g., points, lines, bars).

- Scales: Rules linking data values to aesthetic values.

- Transformations: Adjustments to data or coordinates (e.g., log scales).

- Statistical Summaries: Computed data representations (e.g., means, trends).

- Facets: Layouts for splitting data into subsets for comparison.

Implementation in **tmap**

| tm_shape | Data and coordinates | tm_shape |

tm_layer_1		tm_polygons
tm_layer_2	Data-driven map layers	tm_symbols
...		tm_lines
tm_layer_k		tm_text
		tm_raster
		...

| tm_facets | Facets (small multiples) | tm_facets_wrap |
| | | tm_facets_grid |

tm_layer_aux_1		tm_basemap
tm_layer_aux_2	Auxiliary map layers	tm_tiles
...		tm_grid
tm_layer_aux_k		tm_graticules
		...

tm_component_1		tm_compass
tm_component_2	Map components	tm_scalebar
...		tm_credits
tm_component_k		tm_logo
		...

tm_style	Overall style	tm_style
		tm_layout
tm_layout	Layout options	tm_view
		tm_plot
		tm_options

Specify the 'shape' with `tm_shape()`

- In tmap, a spatial data object is called a "shape"

- It can be an object of any supported class (including `sf`, `terra`, and `stars` objects)

- What you can also specify here:

  → `bbox` - bounding box

  → `crs` - projection (CRS)

Add data-driven map layers

- A data-driven map layer is a layer of a specific geometry type, e.g. polygons

- It is data-driven because a data variable can be mapped to a *map variable*, e.g. fill color

- Most fundamental ones:

  → `tm_polygons()` generates a layer of polygons

  → `tm_lines()` generates a layer of polylines

  → `tm_symbols()` generates a layer of symbols

Add auxiliary map layers

- Auxiliary map layers are layers without data-mapping possibility.
- Common ones:
  - → `tm_basemap()` adds a basemap. More on this in Session 12
  - → `tm_grid()`/`tm_graticules()` add grid/graticule lines

Add map components

- Map components are objects that can be placed anywhere on the map

- Common ones:

  → `tm_scalebar()` scale bar

  → `tm_compass()` map compass

  → `tm_title()` title

- Also legends are map components

Recap

- **tmap** uses the Grammar of Graphics but slightly differently than **ggplot2**

- Use `tm_shape` to specify the spatial object

- Use the data-driven map layer functions, like `tm_polygons()` to create thematic maps

- Use the component functions, like `tm_compass` to enhance the map

STOP