Data Visualization Design Systems

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Group G1
SS 2025 Information Visualization

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Overview

1. Design Systems
2. Data Visualization Design Systems
3. Examples
4. Prototype TU Graz Data Visualization Design System (Storybook)

1. Design Systems

Design Systems

- Structured frameworks for design.
- Encompasses:
  - Guidelines for look and feel
  - UI components with code
  - Governance rules
- Benefits:
  - Uniformity across organizations
  - Reusable components

Color	Use case
Default	Use a default button (Blue 600) in most cases, especially when brand alignment is warranted. This button is used for form submissions and most primary calls-to-action. Default buttons can be used throughout any experience and have multiple instances.
Destructive	Destructive buttons (Red 600) signal alarm. Use them to indicate that the action the user is about to take will remove content or otherwise result in data loss that cannot be reversed, such as "Delete."
Transactional	Use a transactional button (Green 600) when presenting a choice or decision related to money or purchasing, such as "Add to Cart" or "Checkout." Transactional buttons should be used sparingly and as an action to complete a transactional task flow.
Editorial	Use an editorial button (Gray 900 or White) alongside graphical content and colored or textured backgrounds where contrast could be an issue, such as part of a call-to-action or in banners or cards.

Dell Design System: button colors.

Image: Screenshot taken by Bastian Kandlbauer from https://delldesignsystem.com/components/button/?tab=Design

Design Tokens

- Variables representing single styles:
  - Colors
  - Font-Families
  - Font-Sizes
  - Margins
  - …
- Can be grouped.

```
--default: blue-600;

--destructive: red-600;

--transactional: green-600;

--editorial: gray-900;
```

Dell Design System: button color design tokens.

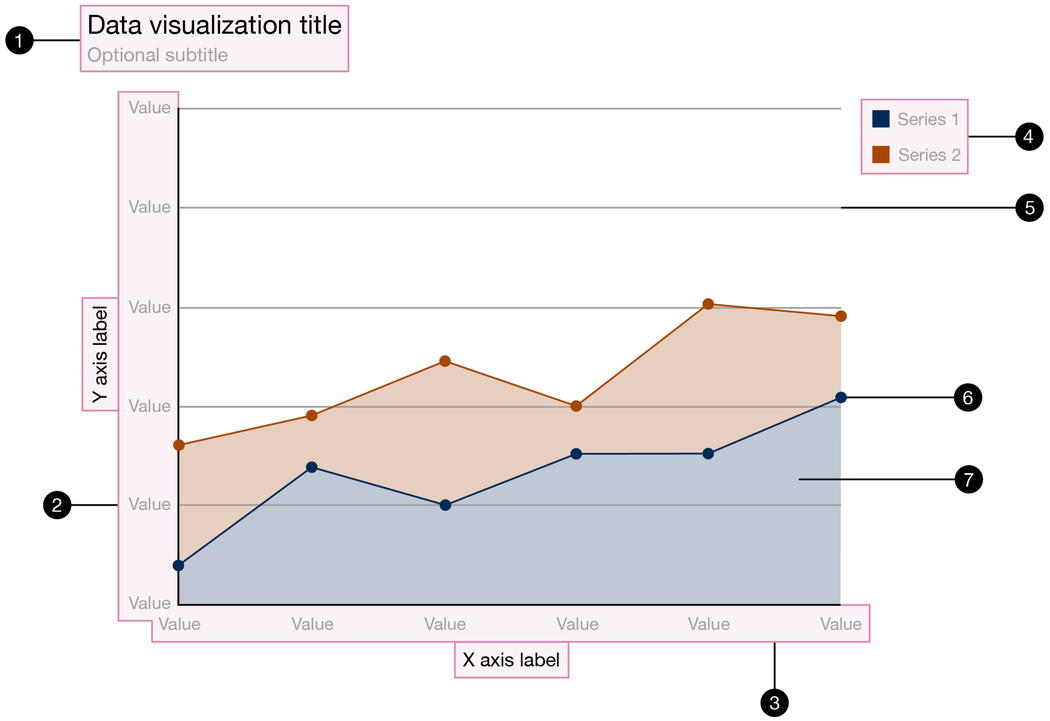
Terminology

- *Style Guide*: focuses on perceptual patterns (e.g. colors, fonts).
- *Pattern Library*: more general, tool to capture, collect and share design patterns and guidelines for their usage (e.g. components, text fields).
- *Design System*: set of interconnected patterns and shared practices, with code snippets and widget library.

2. Data Visualization Design Systems

Data Visualization Design Systems

- Usually part of larger design systems.
- Design systems for charts and visualizations.
- Guidelines typically grouped by chart type.
- Consistency of chart styles across an organization.
- Codification of chart best practice, often including code snippets.



1. *Header*: includes the chart's title and optional subtitle.
2. *Y-axis value*: represents the incremental measurements for plotted data.
3. *X-axis value*: the intervals in which measurements occur.
4. *Legend*: uses color to define the property of each category.
5. *Plot area*: shown as a grid within the line chart, where data is displayed.
6. *Data point*: visualizes a point element and represents a single piece of data on a line.
7. *Area fill*: represents volume of data.

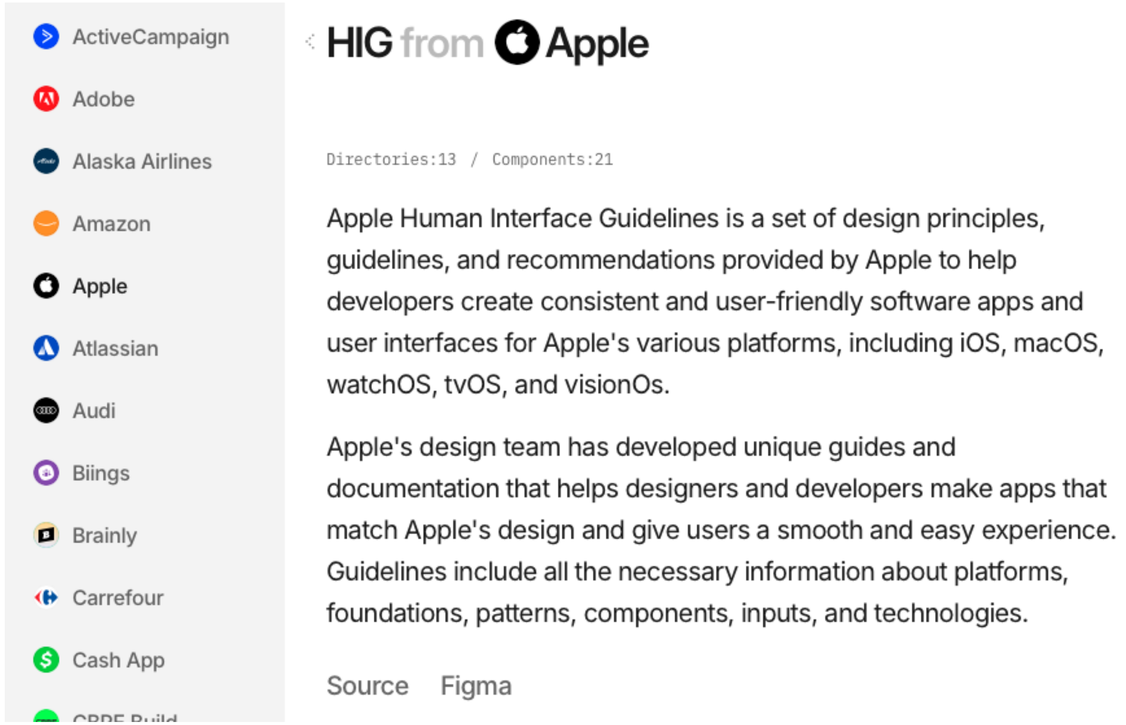
Dell Design System: stacked area chart redrawn by the authors.

3. Examples of Data Visualization Design Systems

Collections of Data Visualization Design Systems

Design Systems Surf

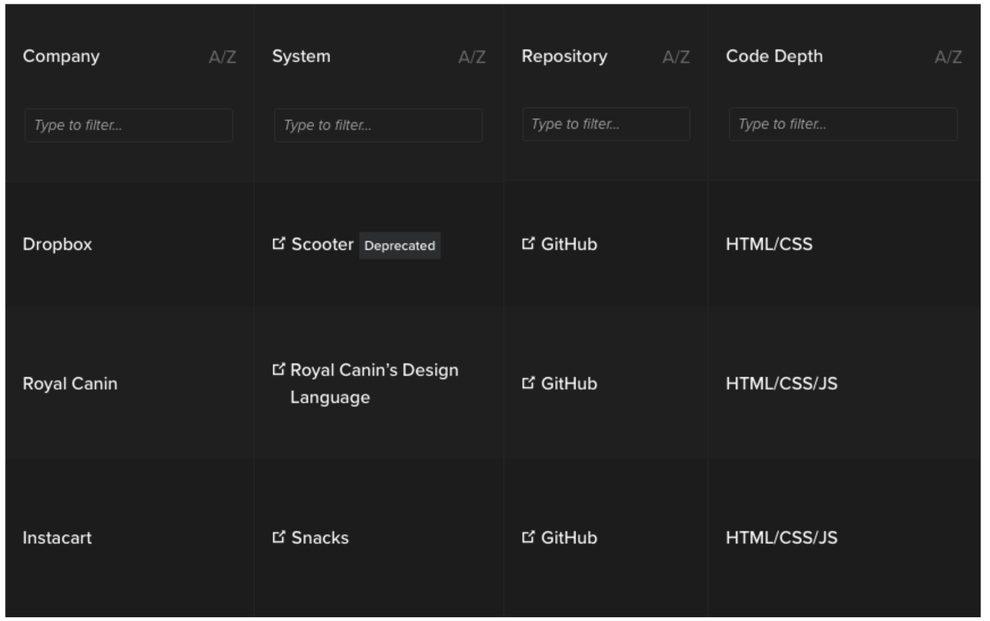
- https://designsystems.surf
- Open- & closed-source systems



Example: Description of design system HIG from Apple with forwarding links
Screenshot taken by Laura Pessl from https://designsystems.surf/design-systems/apple

Adele

- https://adele.uxpin.com/
- Open-source systems
- Add a system to the collection:
  https://github.com/UXPin/adele/blob/master/READM



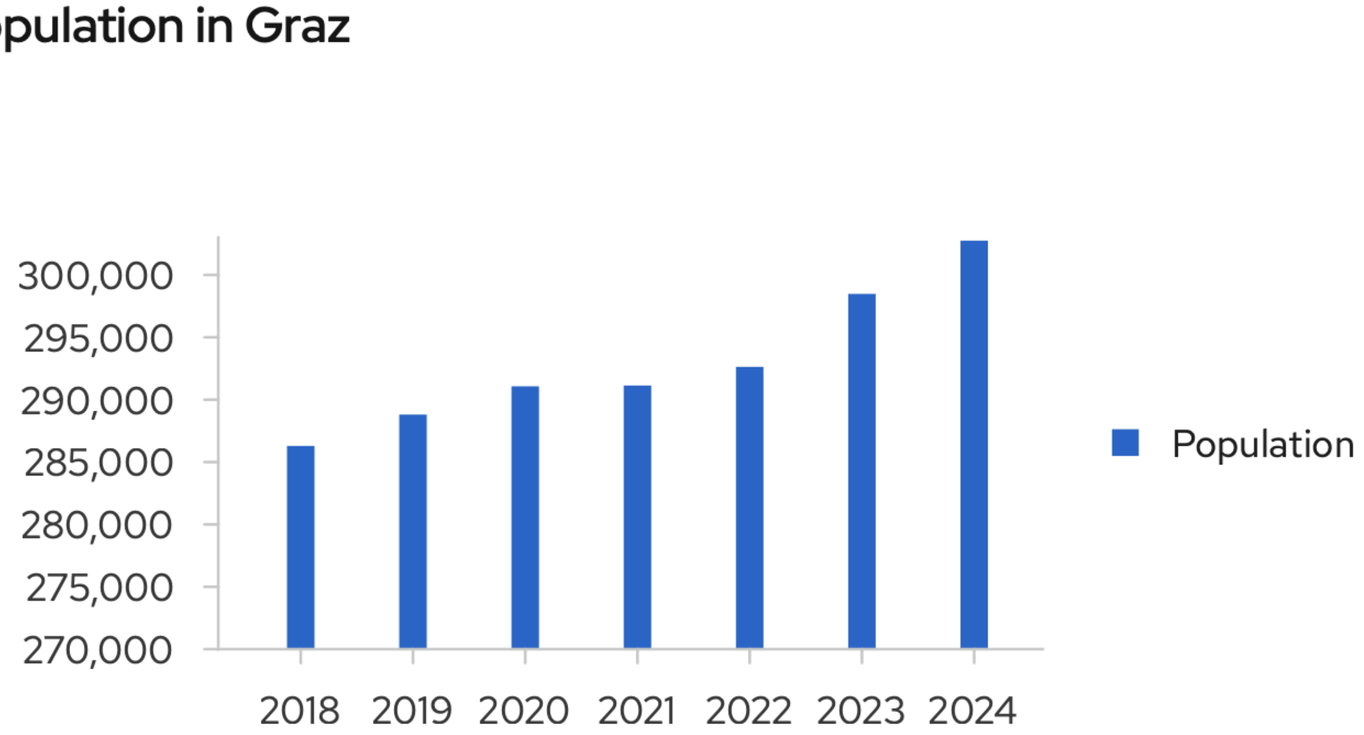
Adele – Collection of (Data Visualization) Design Systems
Screenshot taken by Laura Pessl from https://adele.uxpin.com/

Overview

	PatternFly	Pajamas	Carbon	Dell	Druids	Motion
Originator	Red Hat	GitLab	IBM	Dell	DataDog	Michelin
Licence	MIT	MIT	Apache 2.0	Proprietary	Proprietary	Proprietary
Types of Charts	Area, Bar, Box Plot, Bullet, Donut, Line, Pie, Scatter Plot	Area, Bar, Gauge, Line, Scatter Plot, Sparkline	Alluvial, Area, Bar, Box Plot, Bubble, Donut, Floating Bar, Gauge, GeoMap, Heatmap, Histogram, Line, Lollipop, Network, Pie, Parallel Coordinates, Radar, Scatter Plot, Stream, Treemap, Wordcloud	Area, Bar, Bubble, Donut, Gauge, Line, Metrics Card, Pie	Pie, Funnel, GeoMap, Heatmap, Histogram, Query Value, Scatter Plot, Timeseries, Topology Map, Treelist	Bar, Bubble, Donut, Line, Pie, Polar, Radar, Scatter Plot, Treemap, Waterfal
Documentation	https://patternfly.org/, CodeSandbox	https://design.gitlab.com/data-visualization/overview https://gitlab-org.gitlab.io/gitlab-ui/?path=%2Fstory%2Fcharts-column-chart--default	https://carbondesignsystem.com/data-visualization/getting-started/	https://www.delldesignsystem.com/data-visualization/ddv-overview/ https://vanilla-dv.delldesignsystem.com/2.14.0/index.html?path=/docs/components-area-chart--basic	https://druids.datadoghq.com/patterns/dataviz#treemap	https://designsystem.michelin.com/data-visualization/introduction
Distribution	https://github.com/patternfly/patternfly-org/tree/main	https://figma.com/file/17NxNEMa7i28Is8sMetO2H/Data-Visualization?node-id=3%3A0&t=eUwyBziODXxctWco-1, https://gitlab.com/gitlab-org/gitlab-services/design.gitlab.com	https://github.com/carbon-design-system/carbon	https://www.figma.com/design/a1X9m1vTZdG3N6xV5G9bz4/Data-Visualization?node-id=9252-7656&t=1JUaLcGovuBr4i6p-0	Figma Kit (internal use only)	Private Github
JS Library/Framework	React	Vue	Angular, React, Svelte	Angular, React, Vue, Svelte	React	Angular, Blazor, Svelte

PatternFly

Originator	Red Hat
Licence	MIT
Types of Charts	Area, Bar, Box Plot, Bullet, Donut, Line, Pie, Scatter Plot
Documentation	https://patternfly.org/, CodeSandbox
Distribution	https://github.com/patternfly/patternfly-org/tree/main
JS Library/Framework	React

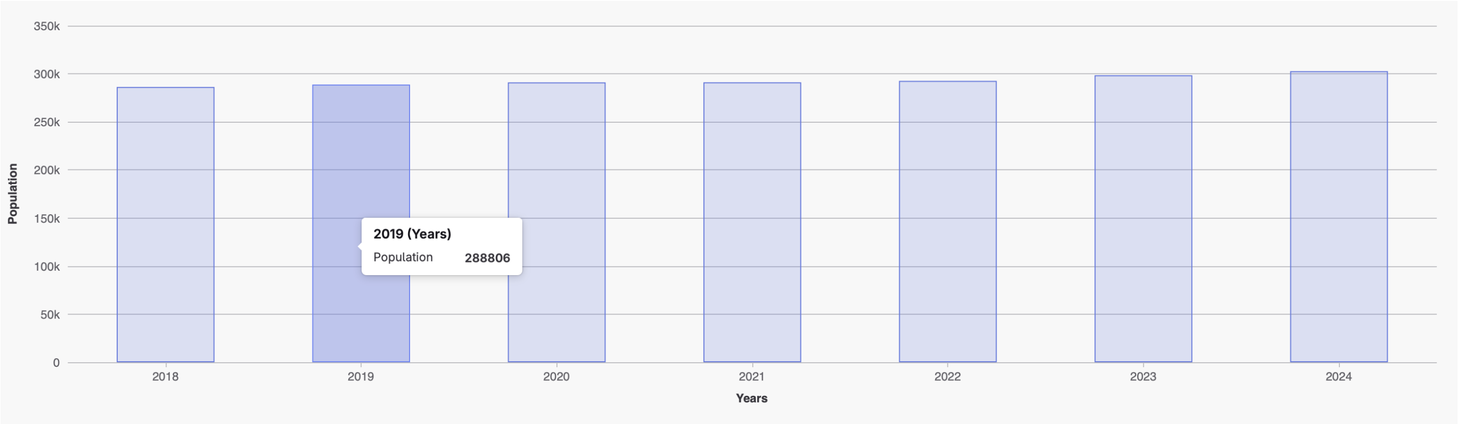


Bar chart created by authors with own data using PatternFly
https://patternfly.org/charts/bar-chart

- Separate color section for charts.
- Tooltips, Legends
- Showcase Video: https://youtu.be/B1neQtb4FQM

Pajamas

Originator	GitLab
Licence	MIT
Types of Charts	Area, Bar, Gauge, Line, Scatter Plot, Sparkline
Documentation	https://design.gitlab.com/data-visualization/overview https://gitlab-org.gitlab.io/gitlab-ui/?path=%2Fstory%2Fcharts-column-chart--default
Distribution	https://figma.com/file/17NxNEMa7i28Is8sMetO2H/Data-Visualization?node-id=3%3A0&t=eUwyBziODXxctWco-1, https://gitlab.com/gitlab-org/gitlab-services/design.gitlab.com
JS Library/Framework	Vue

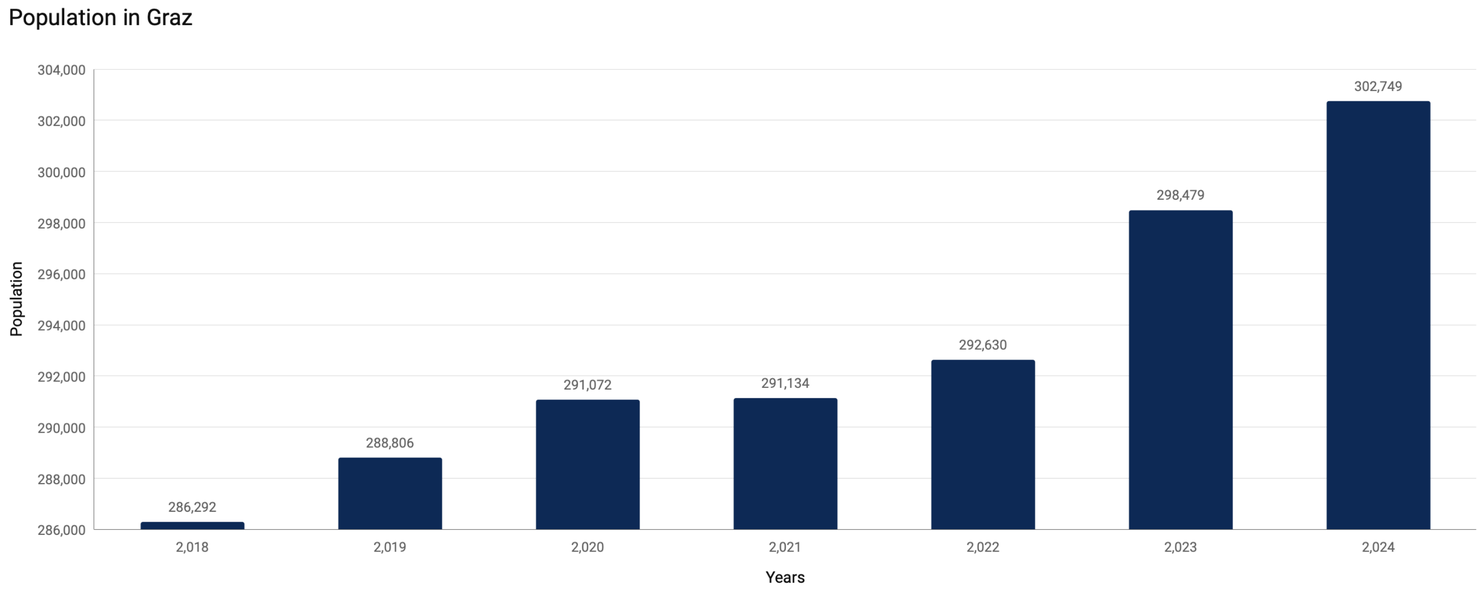


Bar chart created by authors with own data using Pajamas
https://gitlab-org.gitlab.io/gitlab-ui/?path=%2Fstory%2Fcharts-column-chart--default

- Separate color section for charts.
- Tooltips
- Showcase Video: https://youtu.be/OFhINvk1kkA

Carbon

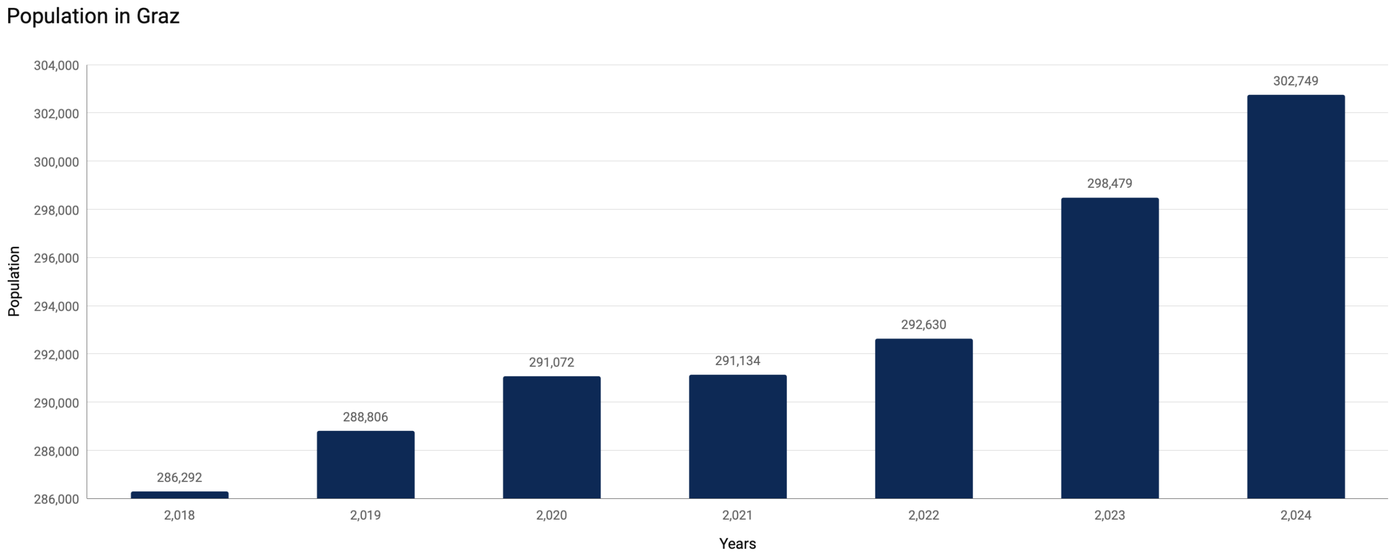
Originator	IBM
Licence	Apache 2.0
Types of Charts	Alluvial, Area, Bar, Box Plot, Bubble, Donut, Floating Bar, Gauge, GeoMap, Heatmap, Histogram, Line, Lollipop, Network, Pie, Parallel Coordinates, Radar, Scatter Plot, Stream, Treemap, Wordcloud
Documentation	https://carbondesignsystem.com/data-visualization/getting-started/
Distribution	https://github.com/carbon-design-system/carbon
JS Library/Framework	Angular, React, Svelte



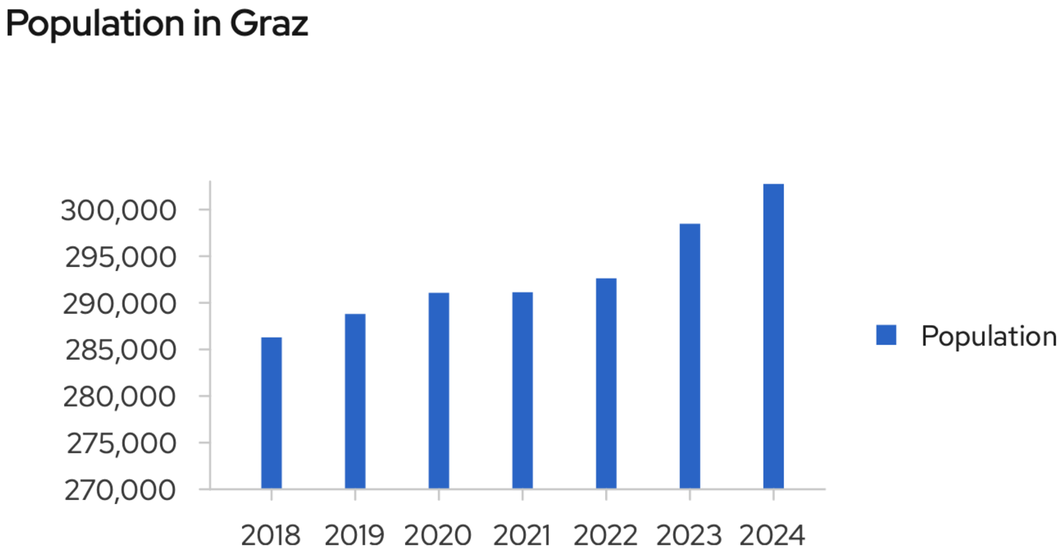
Bar chart created by authors with own data using Carbon
https://charts.carbondesignsystem.com/bar#vertical

- Separate color section for charts.
- Tooltips, Labels
- Showcase Video: https://youtu.be/CSXDZgKc7dw

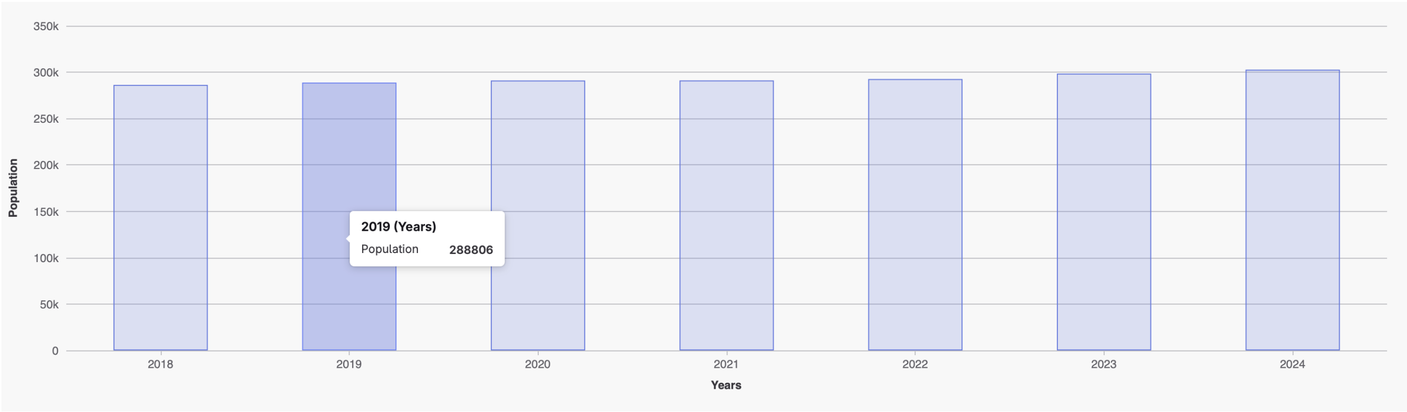
Carbon



PatternFly



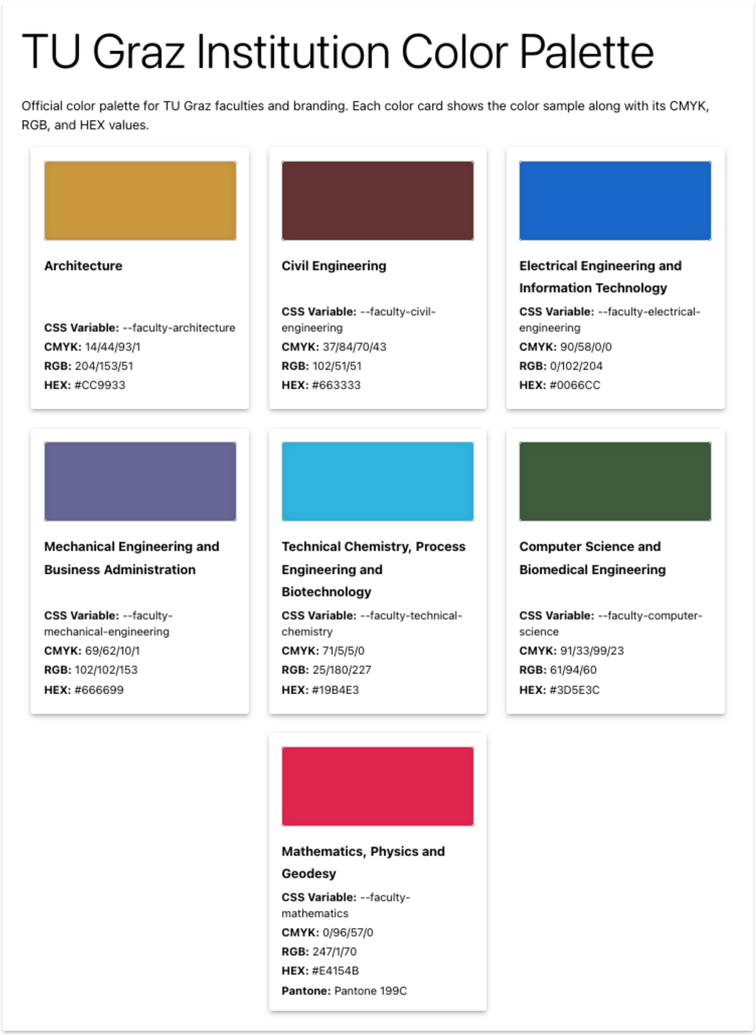
Pajamas



4. Prototype TU Graz Data Visualization Design System (Storybook)

TU Graz Corporate Design

- Typography guidelines
- Official color palette for faculties.



Headings

Heading 1 - Arial, 20pt

Heading 2 - Arial Bold, 14pt

Heading 3 - Arial Bold, 12pt

Heading 4 - Arial Bold, 10pt

Body Text

This is the standard body text style using Arial font at 10pt with 15pt line height. It is suitable for general content and provides good readability for most documents.

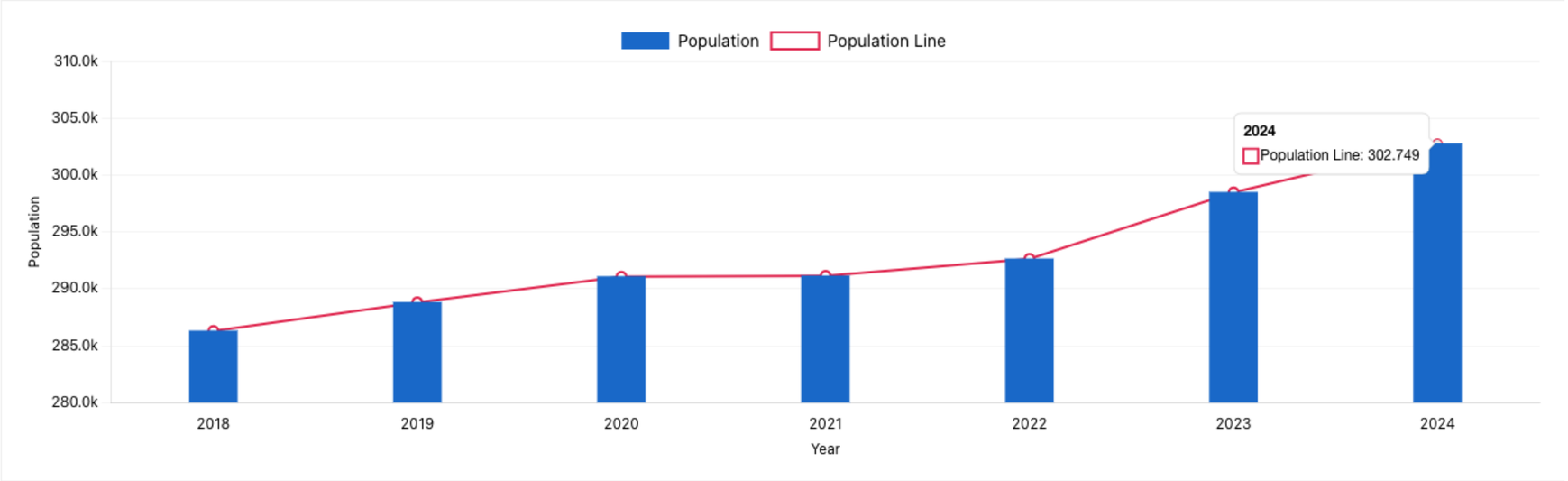
This is the alternative serif font style using Cambria at 11pt with 15pt line height. It is recommended for scientific works and provides a more formal appearance.

TU Graz Corporate Design: https://tu4u.tugraz.at/bedienstete/organisation-und-administration/vorlagen-und-corporate-design
Screenshot taken by Laura Thaci from https://lpandath.github.io/information-visualisation-project/?path=/docs/visualization-designsystemdocumentation--docs

TU Graz Data Visualization Design System

- Data presentations align with branding.

- Tech stack:
  - React
  - TypeScript
  - Material-UI
  - Storybook
  - Recharts



Population bar chart including the population line

- Showcase Video: https://youtu.be/p2cfN-wUbs8

Live Project: https://lpandath.github.io/information-visualisation-project/?path=/story/visualization-populationcolumnchart--with-population-line
Repository: https://lpandath.github.io/information-visualisation-project/