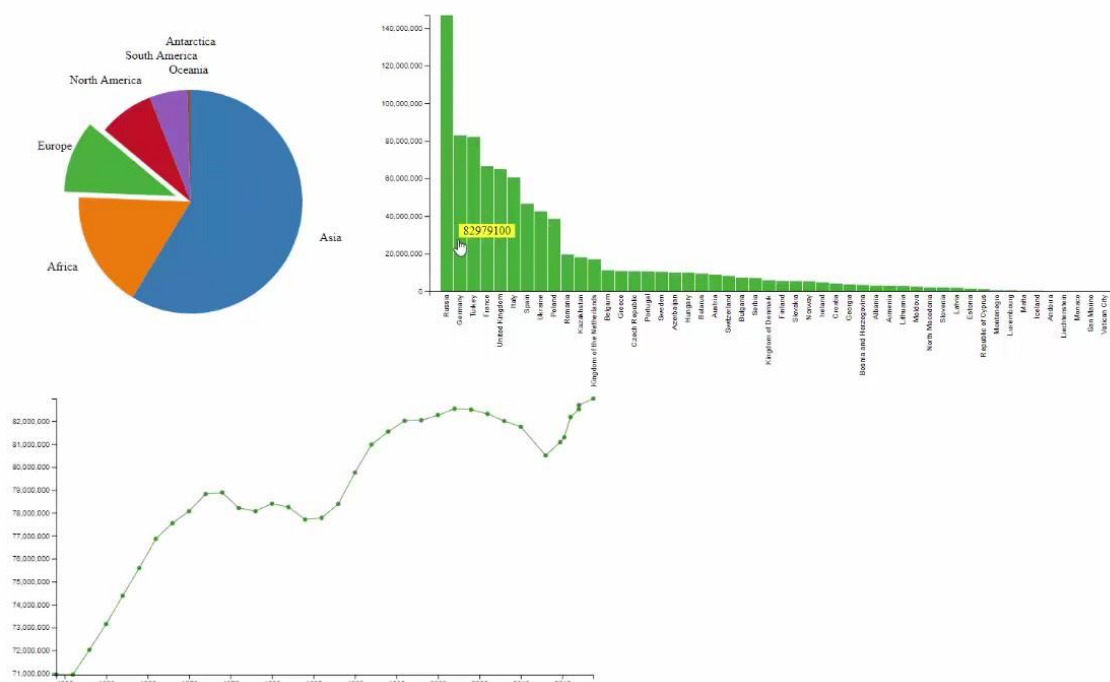


## Introduction to D3.js - Exercise

### Overview

This exercise applies the core concepts of D3.js (see “introduction\_to\_d3.pdf”) to create animated interactive diagrams: a pie chart, a bar chart, and a line chart. In the initial state, some important parts are missing. To solve the exercise, you need to add or modify JavaScript snippets in the source code.

#### Population



### Installation

- Download “introduction\_to\_d3\_code.zip” and extract it to an arbitrary location
- Navigate with the console (command line, shell, terminal) of your operating system into the extracted folder where “package.json” is located
- Execute the command “npm install” (without quotation marks) to download the required JavaScript dependencies
- If the previous command returns an error, check if ...
  - o Node.js is installed, you can download it from <https://nodejs.org/> (it includes npm), after the installation execute the command again in a new console window
  - o npm is added to your system’s search path in your environment variables
  - o you are in the correct folder
- Execute the command “npm run serve” to start the development server at <http://localhost:8080>
- You can now start to edit the code, the page should be dynamically reloaded every time the code has been saved
- Optionally you can set break points in the files by following the path “webpack > src” in the developer tools of your web browser
- An IDE like Visual Studio Code is recommended but not required

## Tasks

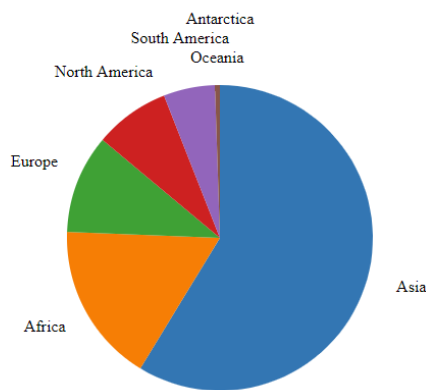
All tasks are indicated by their name inside the code in comments (e.g. /\* TASK: Hello World \*/). Note that only certain datasets are available, indicated in the console of the developer tools.

### Hello World

Add the heading (h1) "Population" to the HTML document's body.

Expected result:

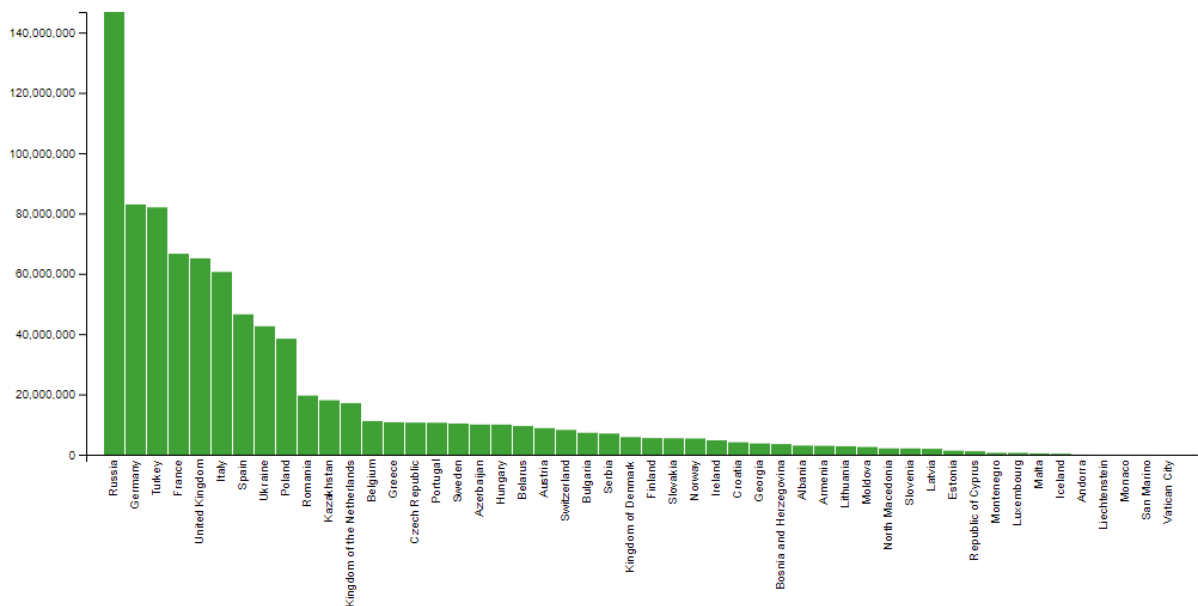
### Population



### Selections

Hide (display: none) the ticks of the x-axis of the bar chart.

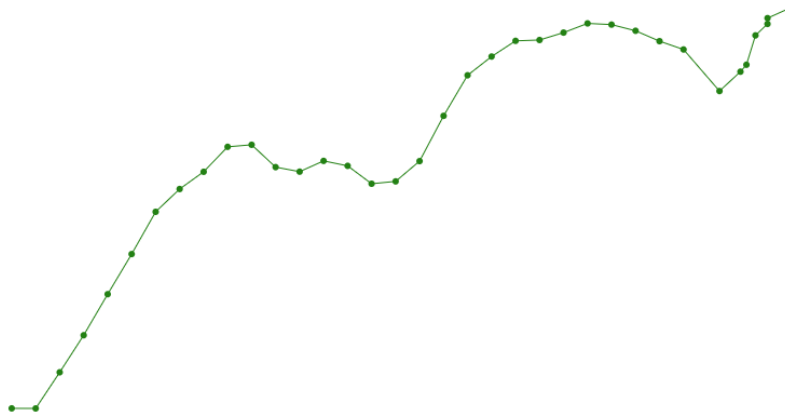
Expected result (for Europe):



## Method chaining

Make the line appear by setting the stroke color of the path. Use a function to retrieve the color from the country.

Expected result (for Germany):



## Data binding

The bars are not updated correctly because attributes, styles, and events are only set for newly created bars. To solve this dilemma, you just need to add one line of code with an appropriate D3 method.

## Data requesting and parsing

Load and parse the CSV file with population data for North America.

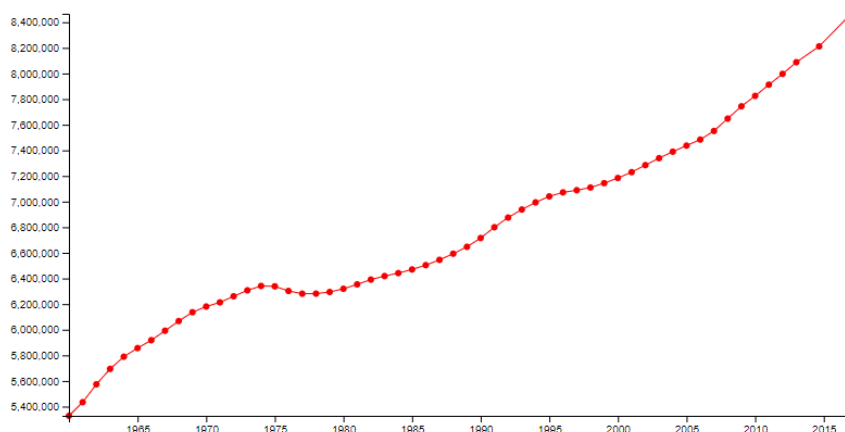
## Scales

Replace the color function with an appropriate D3 scale which returns the same results.

## Axes

Add a horizontal date (= x) axis and a vertical population (= y) axis to the line chart.

Expected result (for Switzerland):



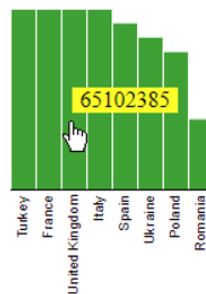
## Animation

Let the bars grow from the x-axis to their actual height in 1000 milliseconds. To do so, set initially the height of the bars to 0 and the y-value of the bars to the y-value of the x-axis. Afterwards let these two attributes transition to their original values.

## Interactivity

Add a custom tooltip (i.e. not using the title attribute) to the bars showing the population count of each country when hovering a bar. A div element called "tooltipDiv" has been already prepared for this purpose. Make the tooltip visible and set the text to the population count when the mouse cursor enters a bar. Hide the tooltip when the mouse cursor leaves the bar. Update the position (i.e. top, left) of the tooltip by retrieving the mouse coordinates with `d3.event.pageX + d3.event.pageY`. Add a little offset so that the tooltip appears at the above and right of the mouse cursor.

Expected result (for United Kingdom):



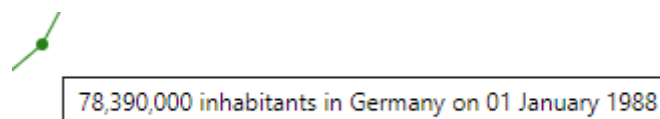
## Generator functions

Replace the dummy line maker by the proper D3 line generator. Apply scales to transform the data within the line generator.

## Helper functions

Replace the dummy function by a D3 formatter, so that the date in the tooltip looks like "day number, month text, year number".

Expected result (for January 1<sup>st</sup> 1988):



## Building

- Execute the command “npm run build” when you want to generate a bundled version of the code
- The bundled file will be generated in a folder called “dist” of the package
- You can serve the bundled file for testing also via the development server but you have to change “main.js” to “dist/main.js” in the file “index.html”

*Raimund Schnürer, 8 April 2020*