HKUST
VISLAB

COMP 4462
Data Visualization Tutorial

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https://bit.ly/vis-t08

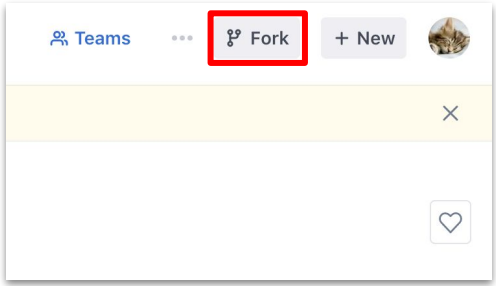
Visualization with D3.js

- SVG (Scalable Vector Graphics)
  - An extension of HTML for representing scalar graphics in XML syntax
  - Available in all the web browsers
- D3.js
  - The most widely used visualization library
  - The library behind Vega, Vega-Lite and Altair
  - Binding data with SVG DOM, marking data points visually onto screen
  - Imperative syntax, compared to the declarative syntax of Vega-Lite and Altair
- Why D3.js
  - ❌Exploring a dataset, use Altair with Python or Tableau instead
  - ❌Embed visualization in web applications, use Vega-Lite instead
  - ✔️Make customized plots, customized interactions or transitions
- Cost
  - Much more coding, much easier to make mistakes
  - Check Vega-Lite Gallery and Vega Gallery before committing to D3.js

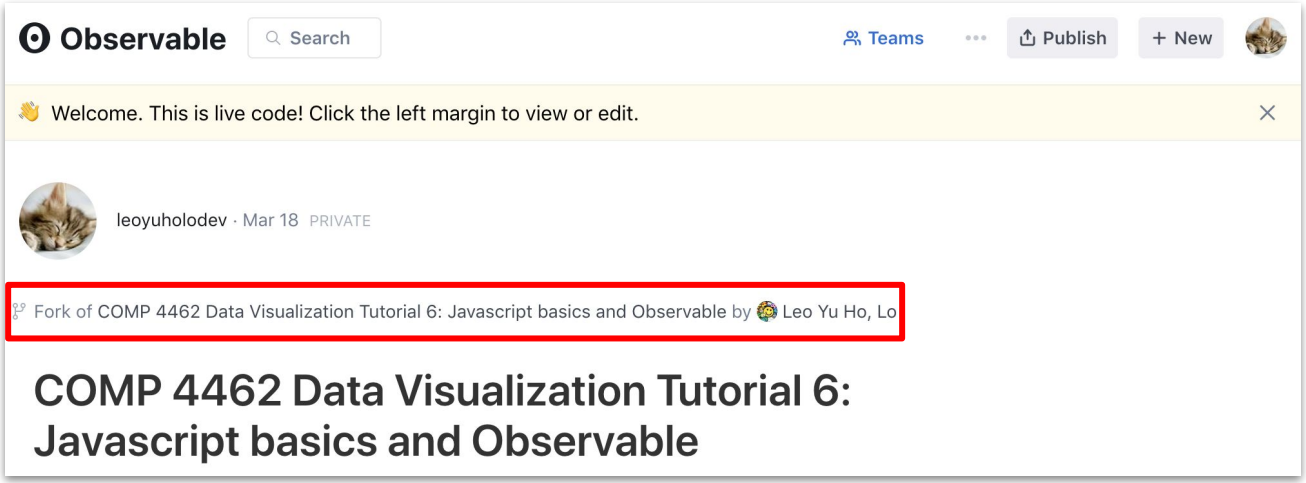
Fork Observable notebook

1. Go to the notebook of this tutorial

2. Click Fork



3. Check if you're working on your copy of the notebook (otherwise, your work will not be saved)



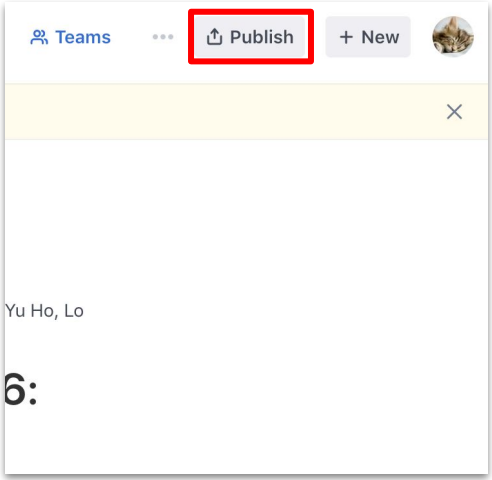
Visualization with D3.js

- See the Observable notebook of this tutorial
- SVG
- Scales
  - Linear scale (numeric, color)
  - Time scale
  - Point scale (categorical)
- Coordinate System
  - Axes
  - Cartesian coordinate (X and Y)
  - Polar coordinate (angular and distance)
- Marks and channel
  - Point: scatter plot
  - Line: (multi-)line chart, parallel coordinate, radar chart
- Selection

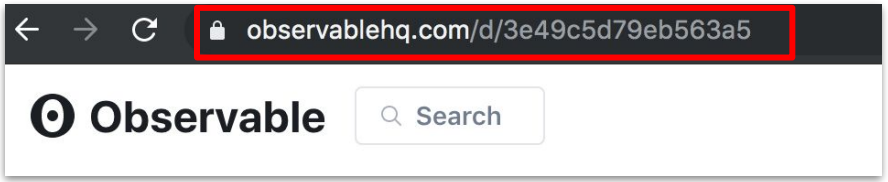
Publish your Observable notebook

1. In your working copy of the notebook

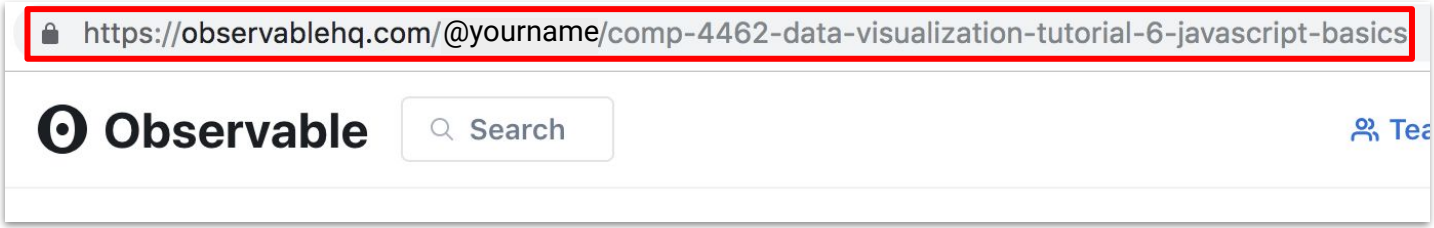
2. Click Publish



3. The URL changes from a hash...



4. To a meaningful URL, this URL is publicly accessible



Lab exercise

- Tasks
  - Sign in Observable
  - Open this Observable notebook and fork it (otherwise, your work will not be saved)
  - Read through the notebook and fill in the “TODO” cells
  - If you are going to use D3.js in your project, make sure you understand these concepts:
    - What is SVG? What is “selection” in D3.js?
  - You will make 4 visualizations:
    - Scatter plot, multi-line chart, parallel coordinates, and radar chart
  - Publish your notebook when finished
  - Copy the URL of your Observable notebook and submit to Canvas
    - The URL should be something like:
      - https://observablehq.com/@yourname/comp-4462-data-visualization-tutorial-8-visualization-wit
  - Help us improve this tutorial by answering the questionnaire
- Optional
  - Like our Observable notebook ❤️❤️❤️ and star our GitHub repository ⭐⭐⭐Thank you! ❤️
  - Learn about how selection works and check out the notebooks created by D3

More on D3.js

- More on SVG
  - A list of all the SVG elements and a list of all the SVG attributes
- More on D3.js
  - A long list of d3.js examples
  - Even more examples on Block Builder
  - Observable notebooks by D3
  - Color schemes available in D3.js
  - The reference book of these tutorials:
    - Interactive Data Visualization for the Web by Scott Murray
    - Code examples are available on this GitHub repository
- Interactions, transition and maps
  - Next tutorial: Visualization and Interaction with D3.js

Next tutorial

Visualization and Interaction with D3.js

- We will use Observable and D3.js again
- And learn about adding interactions to our visualizations!