



**HKUST**  
VISLAB

# **COMP 4462**

## **Data Visualization Tutorial**

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<https://bit.ly/vis-t09>

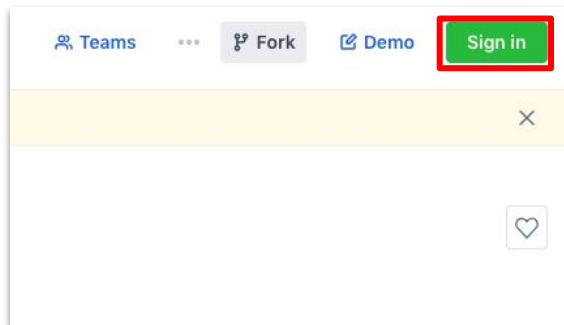
# Visualization and Interaction with D3.js

- Interaction with visualization
  - Visualization has well established before the invention of computer
    - But interaction with visualization only available through the use of computers
  - Huge space of possibilities
    - But all successful interaction designs follow **“Overview first, details on demand”**
  - Visualization interactions mostly through mouse
    - Seldomly with keyboard
    - Interaction through touch devices is a grand challenge in data visualization
- Animation
  - Makes interaction smoother, more responsive
  - Keep conceptual consistency, objects enter the scene instead of appear suddenly
  - Motion is a very attention attractive channel
    - It is built-in in our mind to track moving objects (because of primal instincts?)
    - But too much moving objects will overwhelm viewers

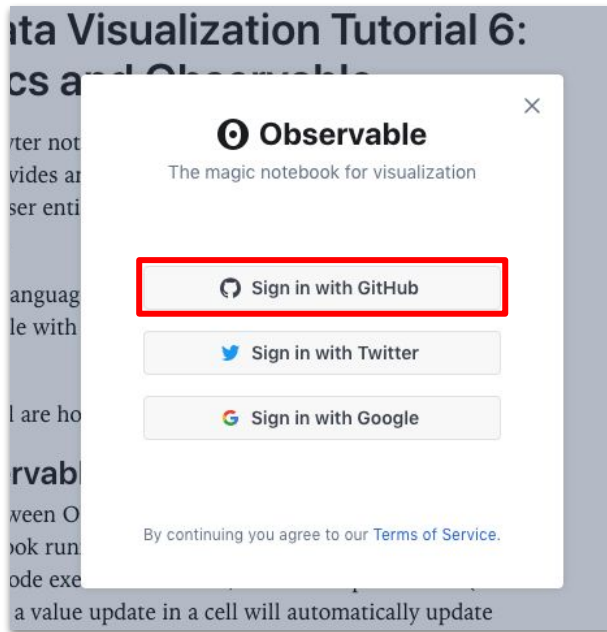
# Sign in Observable

1. Go to the [notebook of this tutorial](#)

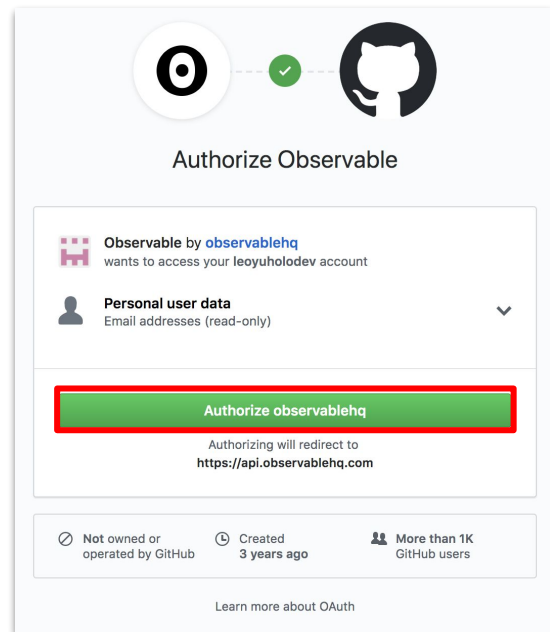
2. Click Sign in



3. Sign in with GitHub (recommended)



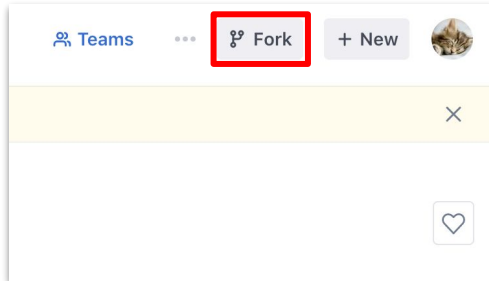
4. Authorize observablehq



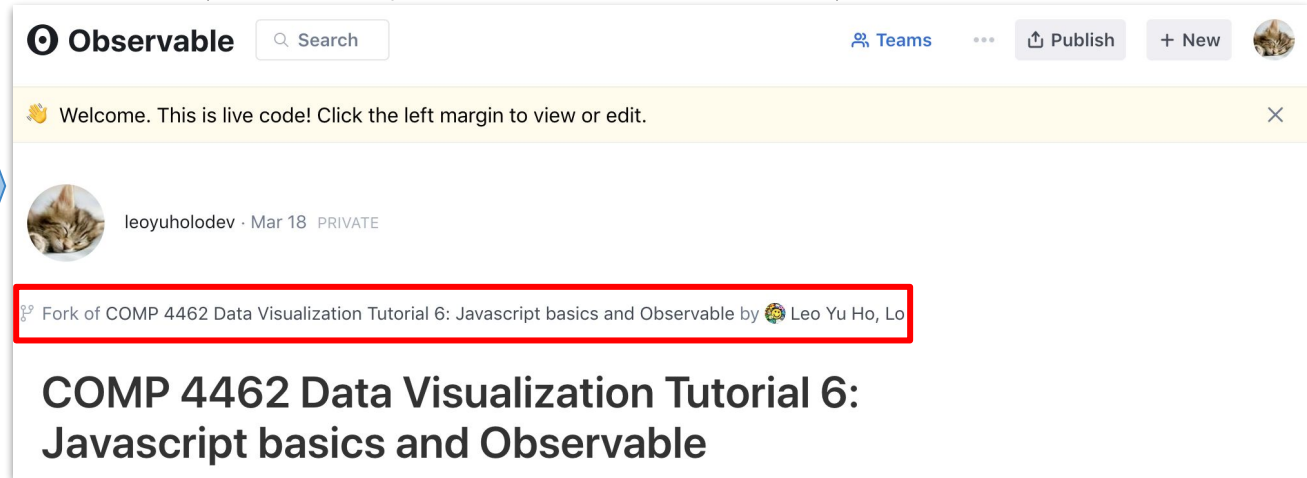
# Fork Observable notebook

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)



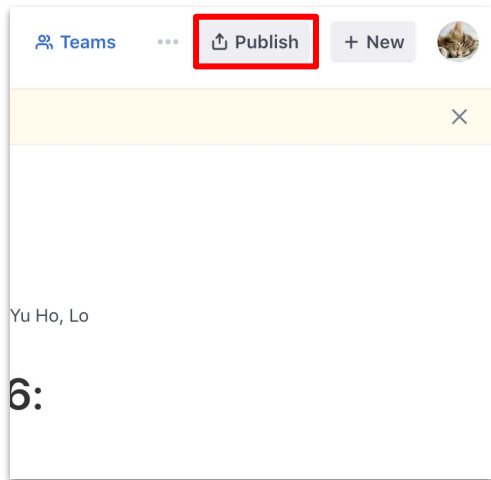
# Visualization and Interaction with D3.js

- See the [Observable notebook of this tutorial](#)
- Choropleth (maps with color encoding)
- Interaction
  - Overview first, details on demand!
  - Tooltip with <title> element, d3-tip
  - Mouse events: mouseover, mouseout, click
  - Observable inputs: dropdown menu, slider
  - Linked views
- Animation
  - Eyes beat memory!
  - Animation with redraw, D3.js transition
  - Motion encoding, pop-out effect
- Data analysis techniques
  - Daily average over month total
  - How to handle missing data?

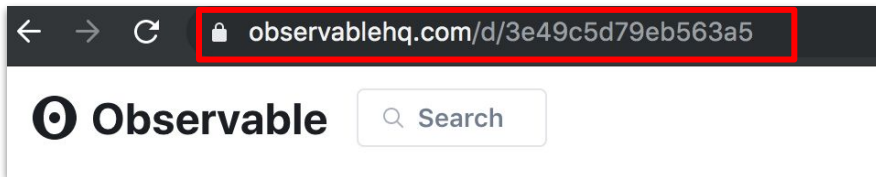
# Publish your Observable notebook

1. In your working copy of the notebook

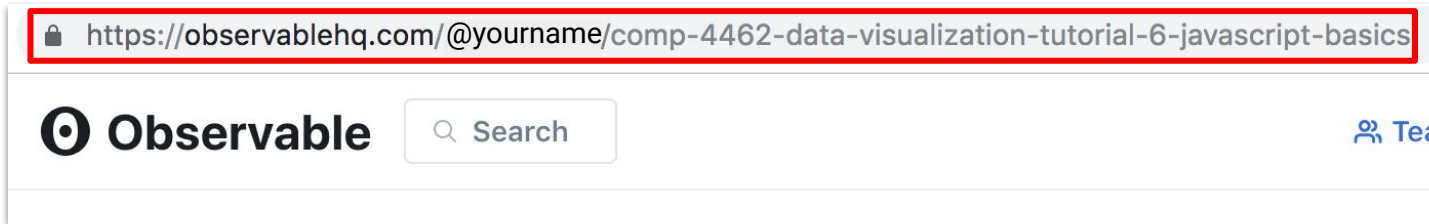
2. Click Publish



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
- Try to use tooltips with SVG <title> element and d3-tip library
- Use Observable inputs (dropdown, slider) to explore the spotify dataset
- Learn how to plot choropleth (map with color encoding)
- Learn about using transition with D3.js, and different kind of easing
- 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-9-visualization-and>
- Help us improve this tutorial by answering [the questionnaire](#)

- Optional

- Like [our Observable notebook](#) ❤️❤️❤️ and star [our GitHub repository](#) ★★★★★ Thank you!
- Learn about how to make wordle/graph, and using D3.js/Vega outside Observable notebooks

# More on interactions and D3.js

- More on interactions
  - D3.js: [d3-drag](#), [d3-zoom](#), [d3-brush](#)
    - Demos: [d3-drag](#), [d3-zoom](#), [d3-brush](#)
  - Vega-Lite:
    - [Interactive Plots with Selection in Vega-Lite](#)
  - Altair:
    - [Making Charts Interactive in Altair](#)
- Visualizations not covered in tutorials
  - Wordle (a.k.a. Word Cloud)
    - [Javascript implementation of wordle by Jason Davies](#)
    - [Vega Word Cloud Example](#)
  - Graph visualization
    - [D3 in Depth: Layouts](#) and [D3 in Depth: Force layout](#)
    - [Vega Force Directed Layout Example](#)
    - Besides D3, [Gephi](#) is a professional graph visualization tool



# This is our last tutorial

Have fun making  
beautiful  
visualizations!

- We have learnt to make visualizations with:
  - [MS Excel](#)
  - [Tableau](#)
  - [Python, Pandas and Altair](#)
  - [Javascript, Observable, Vega-Lite](#) and [D3.js](#)
- We have gone through a long way!