# Make your own GIS service

## Summer School on Digital Humanities

Web site: https://bit.ly/dt4h-gis

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13 giugno 2025

## How to proceed

- The tutorial consists in the step-by-step creation of a simple app that:
  - Displays a map
  - Allow the user to add markers to the map
  - Exports the markers as a GeoJSON string
- The tool we are going to use to practice the *leaflet* library is Stackblitz (`https://stackblitz.com/`), an online IDE for JavaScript
- The code for each step can be viewed, tested and modified as a Stackblitz project
- The link to each project is in the title of each slide, and in the course website page dedicated to this topic.

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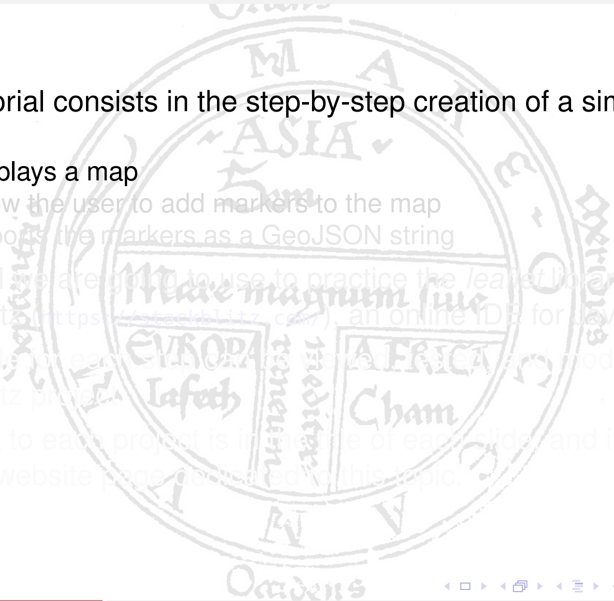

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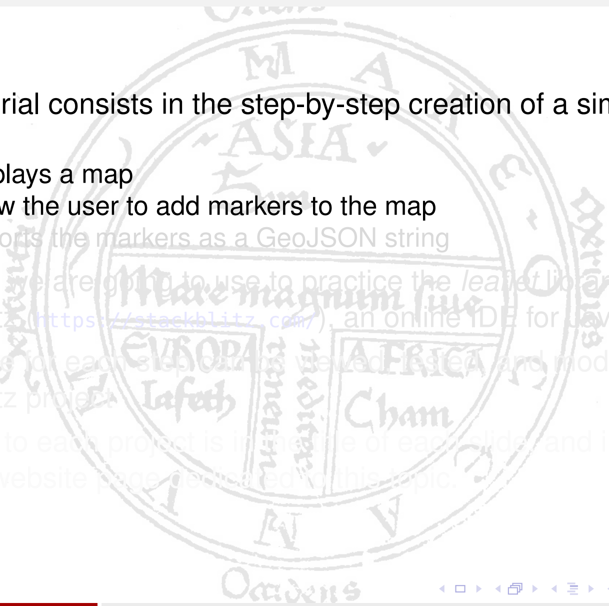

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- The selected file is shown in the center frame

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## Step 1: the background (project)

- The first step in our tutorial consists of using the *Leaflet* library to display an OpenStreetMap raster
- How to:
  - The reference to the library is in the *package-lock* file
  - In the HTML file:
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  - So we create a map with two parameters
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## Step 1: Lab activity

- Browse the web to find the coordinates of a place at your choice as the center of the raster
- Modify/remove the zoom factor

IMPORTANT:

- relax: you **cannot** damage my repo (you'd need my credentials)
- you may *Fork* (button on top-left corner) a branch in a repo of your own (recommended not strictly needed)
- you can undo unsaved updates with Ctrl-z
- after forking and signing up you can save your work

## Step 2: show the coordinates (project)

- When the user clicks on the map an alert appears with the coordinates of the click
- How to:
    - The HTML file is identical, we added management of a click event in the JavaScript
    - We apply the on method to the map to catch click events

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    - the first parameter is the name of the event we want to capture
    - the second parameter is a callback that takes the event description as a parameter
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    - the event description is an object
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## Step 2: Lab activity

- create a named <div> and write within the coordinates. Use

```
document.getElementById("myDiv").textContent = ...
```

## Step 3: collect coordinates (project)

- Each click on the map adds a marker, and their coordinates are shown on the page
- How to:
  - We add a *div* for the coordinates in the html
  - In the JavaScript we add to the event callback the creation of the new marker
    - its position is computed using the [illegible]
  - The coordinates are appended to the [illegible] element of the DOM

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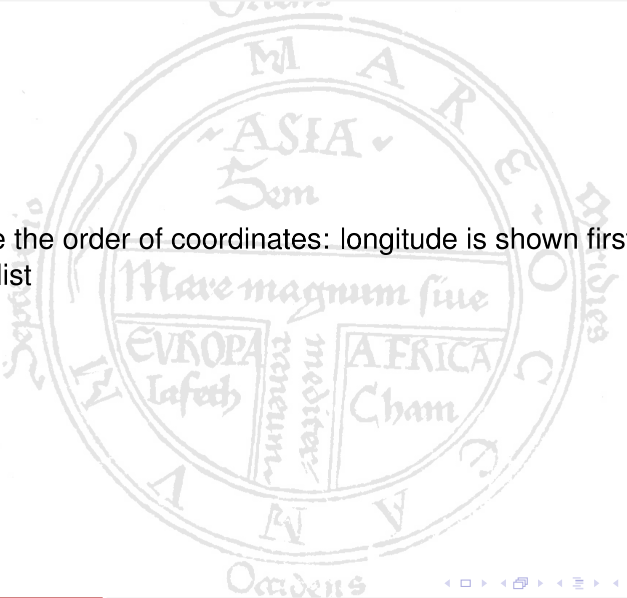

- Reverse the order of coordinates: longitude is shown first in the bottom list

## Step 4: enumerated markers (project)

- A progressive index is assigned to each new point
- The index is shown in the list and added as a *title* field in the marker definition
  - the title field is automatically displayed when the mouse hovers on the marker
- How to:

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  - The [illegible]
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  - The marker constructor [illegible] the marker [illegible]

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## Step 4: enumerated markers (project)

- A progressive index is assigned to each new point
- The index is shown in the list and added as a *title* field in the marker definition
    - the title field is automatically displayed when the mouse hovers on the marker
- How to:
    - HTML is the same
    - We add a new global variable n in the JavaScript
    - The event callback increments the variable each time it is run
    - The value of n is displayed on each line in the list
    - The marker constructor now takes a second parameter containing the marker options

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## Step 4: Lab activity

- Configure the marker as draggable (ignore that the displayed coordinates become inconsistent)
  - hint: in the `marker` variable definition add a `draggable: true` property after the title, separated by a ","

## Step 5: all markers in an array (project)

- Record the markers in an array to have them accessible
  - in the previous steps the marker was a local variable in the callback
- How to:
  - [illegible]
  - [illegible]
  - [illegible]
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## Step 5: all markers in an array (project)

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  - Push markers in the array
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    - [illegible]

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## Step 5: Lab activity

- Create a button that fades-out the markers
- Hint
  - loop through all items in the array with a for loop

```
for (let m in markers) {...}
```

  - use the `setOpacity(0.5)` on each marker

## Step 6: all markers in a layer (project)

- Having all markers in a layer is more practical than in an array
- How to:
  - HTML is always the same
  - Replace the array with a *layerGroup* object added to the map (markers)
  - [illegible] layerGroup
  - Add [illegible]
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    [illegible]
  - See the [illegible]

## Step 6: all markers in a layer (project)

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- How to:
    - HTML is always the same
    - Replace the array with a *layerGroup* object added to the map (`markers`)
    - Replace the *push* operation with an *addLayer* applied to the layerGroup
    - Add a layer control to the map to toggle layer visibility
    - The control creation takes two object arguments
    - See the effect on the layers button top right in the map

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## Step 6: Lab activity

- move the `markers` *layerGroup* in the base layers. Any change?

## Step 7: GeoJSON serialization (project)

- It is handy to have a standard string representation of a piece of data (serialization)
  - e.g. to store the data in a file
- The GeoJSON representation can be easely transformed into a JSON string, and viceversa
- We want to print in the console the JSON string for our markers
- The `toGeoJSON` method converts the markers layer into a JavaScript object with the GeoJSON format

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## Step 7: Lab activity

- Copy the generated GeoJSON and feed it to an online viewer, like `https://www.geometrymapper.com/`
- Is there any way to record the *title* field in the JSON string?
- Study the GeoJSON format in the console and find a solution