

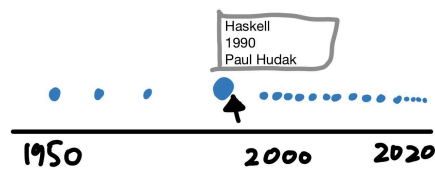
# Milestone 2 - VHXplore

The goal of our project is to explore the world of programming languages through interesting visualizations.

## General Color Theme and Fonts

To match the theme of programming languages, our website adopts the default Visual Studio Code color scheme and font style. We will provide both dark and light modes, allowing users to switch themes based on preference—just like in VS Code. Typography will follow modern coding aesthetics using fonts such as Fira Code or Poppins for clarity and consistency.

## Visualization 1: Timeline of Programming Language Appearance



**Description:** To create an interactive timeline, I will use D3.js to display each programming language as a circle on a horizontal time axis. The x-axis will be generated with `d3.scaleLinear()` or `d3.scaleTime()`, mapping the years of language appearances to the SVG canvas width. Each language will be represented as a circle, with its position based on the appearance year. Tooltips will show additional information on hover, displaying the language

name, year, and inventor, and will follow the cursor's position. This interactive setup will allow users to explore the evolution of programming languages.

## Visualization 2: Mapping programming languages and their countries



**Description:** Using D3, I will create an interactive world map with GeoJSON data, where each country is displayed on an SVG canvas using `d3.geoMercator()` and `d3.geoPath()`. I will process a CSV dataset to map programming languages to their countries of origin. On hover, a tooltip will show the languages invented in that country, with position and visibility controlled by D3's `mouseover` and `mouseout` events. The

hovered country will also change color for visual feedback, providing an engaging way to explore the origins of programming languages.

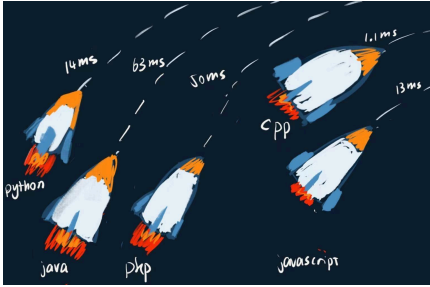
Photo reference <https://stock.adobe.com/fr/search/images?k=world+map+sketch>

## Visualization 3: Name and origin stories of programming languages



**Description:** To illustrate the unique origin stories behind programming languages, we designed a metaphorical “Universe of Languages,” where each language appears as a rotating planet in orbit. Built with HTML, CSS, and JavaScript, each planet acts as an interactive entry point. Clicking reveals a playful modal—some with quizzes (e.g., Python’s name: snake or comedy group?), others with narrative or visual storytelling. This design invites users to discover the cultural and historical background of languages in an intuitive, engaging way.

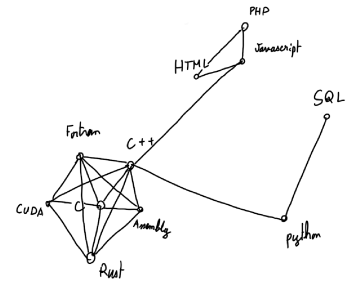
## Visualization 4: Performance comparison of programming languages



**Description:** We compare language performance using a rocket metaphor—each rocket represents a language running the same task. Launch speed visualizes execution time, while flame size and flicker intensity reflect peak memory usage. Faster, smaller-flame rockets are more efficient. D3.js powers the data binding and SVG animations, with runtime and memory data loaded from CSV. A task selector allows users to switch benchmarks and explore how language performance varies by use case.

## Visualization 5: Graph of connections between programming languages

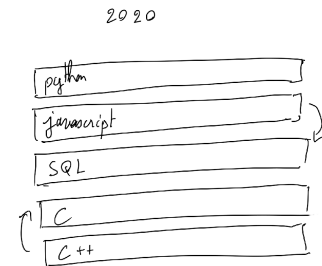
In the [Programming Language Database](#) data set there is the column wikipedia.related which contains programming languages to which each programming language is related. The goal of this visualization would be to do a graph with each vertex being a programming language. And each programming language is connected to their related programming languages. The graph would use a spring like physics so that if an important number of programming languages are related they form a cluster. This would allow allow to discover the link between programming languages.



## Visualization 6: Most popular programming languages over time

We would like to do a ranking over time (every year) of the most popular programming languages. The animation will be dynamic, showing the leaderboard for every year.

On the right is a sketch of the visualization we want to get:



## Tools:

**JavaScript/HTML/CSS:** General structure and styling

**D3.js:** For axis, dots and hovering effects, world map and tooltip, csv loading, filter by language, rollup by metric, visualization, scaleLinear, etc.

**Related lecture for the task:** Basic web development; JavaScript; More JavaScript; More interactive d3.js

## Enhancement:

### Geospatial Time Animation

Animate the spread of programming languages on a world map over time. Dots or flags can appear in specific locations (universities or countries) as languages are “born.” This may be challenging as we need to integrate d3 with many other unfamiliar libraries like TopoJSON and leaflet.js

**Compare Implementation Styles Across Languages:** For each programming language, include a side-by-side code snippet showing how the same basic function—such as printing “Hello World”—is implemented. This highlights syntactic differences and gives viewers an immediate sense of each language’s style and complexity.