Concept Presentation

Project Scope:

My goal is to program a one-pager website on which chemical students can calculate required amounts of different solutions for them to mix their target solution together. As my brother is currently studying chemical biology and mentioned how that would be something nice to have, I thought this is a great project for my first web application.

Target Group:

The target group of my project is not only my brother but everyone that needs to calculate solutions and concentrations daily. This calculator should help speed up the process, especially when planning these things out in advance.

Software development methodology:

I plan on employing the big bang model I learned in my computer science class, as it is a simple and fast model and requires little planning or resources. As this is a one-person project with limited time and scope the risks regarding complexity and expensive failure cost are outweighed by the benefit of fast code delivery, learning along the way and massive flexibility. This means that I will write the code as fast as possible and solve issues I run into whenever I do. So, while I will lay out a clear idea in my composite presentation, this project has the potential to change along the way.

Composite Presentation/Project Profile

The webpage should have a small introduction and explanation on how to use it, then I will have several text fields structured like a table. Implementing several rows will allow users to calculate target solutions including several components. On the left column users can enter the molarity of their current solution into the input field and select the unit of concentration from a dropdown menu. The second columns functions identically but is used to enter the desired molarity within the target solution. It also includes a dropdown menu. The right column is used for the output and includes read only fields of text that will be filled once the calculation is done. I also need to include an option for users to input the amount of their target solution they want to create as that is essential for calculating the concentration of the individual solutions. Lastly, I need a way to initiate the calculation which I plan on doing via a button.

Functional requirements:

- The website needs a way for user input regarding their available solutions.
- The website needs a way for user input regarding the desired concentration of their target solution.
- The website needs to calculate the volume of the specified available solutions to mix the target solution.
- The website needs a way to display the calculated volumes.
- The website needs a way to initiate the calculation once user input is finished.

Nonfunctional requirements:

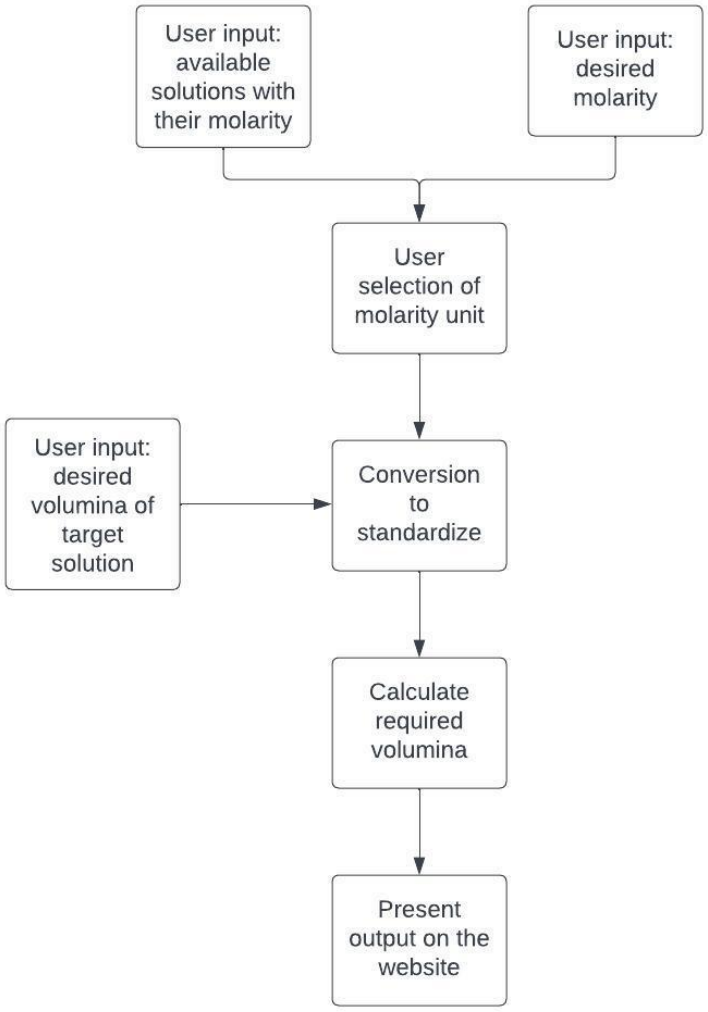
- The website needs to have a “guide” on how to use it.
- The web application needs to be provided as docker-compose configuration.
- The web application needs to be provided as cloud-hosted application (preferably with unrestricted access).
- I need to write an installation guide on how to run the web application.
- I need to write tests to ensure functionality.
- I need to implement version control.

Glossary:

- Molarity (also molar concentration): a measure of concentration, in specific: the amount of substance per unit volume of a solution
- M, mM, µM: units for molarity. M (molar), mM (millimolar), µM (micromolar)
- Solution: a liquid mixture in which the solute (the minor component) is uniformly distributed within the solvent (the major component)

System Design:

As I've employed the big bang model, I've already started coding the website. So far, I've run with the design outlined in my project profile. I am working on this kind of functionality:



I will split my code into 3 files (1 HTML, 1 CSS, 1 JavaScript).

At the moment I am still considering potential additions to user functionality. First, a way to alert users to potential "wrong" input, in case they are entering letters or invalid characters instead of valid molarity. And additionally, a way for the user to select the number of different solutions their target solution should include (in contrast to just a set number of 5, which according to my research is covering most of the field already). This would work in form of a dropdown menu that selects a number out of a list which in turn would make that number of rows appear. As I am completely new to HTML, CSS and JavaScript I will evaluate along the way for how much additional functionality I can include, and which steps should take priority.