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CS146 – Saroj Sabherwal

Kathematics Documentation

Team and Job Roles
Adish Betawar: Android Front-end and theory implementer, and supposed chem expert, back-end
Kevin Trinh: iOS Front-end designer, and Server side programmer
Hammad Ilyas: Group clown, Back-end
Tuan Nguyen: Android Front and Back-end

Goal of Project
To ease the learning of students with the use of an application that allows for them to look up information necessary to their chemistry courses. An application that is similar to Wolfram Alpha but more focused on Chemistry.

Files included
Files/Android/* contains source code for Android application
Files/iOS/* contains source code for iOS application
Files/Server/*KathematicsAPI contains source code for server side API

How the algorithm works
The algorithm of chemical balancing works by parsing the string input and tokenizing the terms. From the terms, we found the values of each chemical for that specific term only and stored them into a multi-dimensional array. After the parsing has completed, we stored them into a Matrix and applied the Row Reduced Echelon form, which gave us the coefficients to plug back into the returning string.

The front end for Android has the chemical balancing algorithm built into it because it is natively can support Java.

The front end for iOS contacts a server, which is written in Java, and receives the string by sending an HTTP query to the server.

The server is written in Java and utilizes Apache Tomcat as well as Jersey to handle REST protocol requests.

Data structures used

- HashMap
- Binary Search Tree
- Priority Queue
- Matrix and Fraction

Future of the project

We are currently in review for submission to the App store for both Android and iOS. We would like to continue to work on this project more over the summer and perfect and fine-tune it for chemistry students! We think it will be really helpful to them.

Conclusion

We learned a lot about how to incorporate data structures into the nature of our very projects. How time efficiency is really important for back-end development as well as in the front-end. We couldn't have started this project without our CS146 course at San Jose State University. We definitely experienced and overcame the challenges that come with real world development.

Thank you Professor Sabherwal for a great semester and a unique classroom environment that allowed for us to take on this project!

Screenshots of Android

Screenshots of iOS