

Portfolio

Kevin Gao - github.com/gaojunxuan



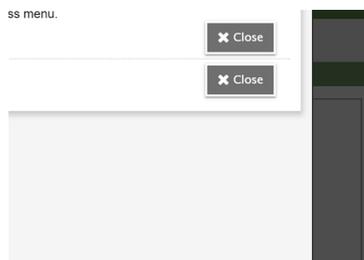
GradeTree by Kevin (Junxuan) Gao

BACKGROUND

After the spring break of 2019, Chicago Public Schools (CPS) rolled out its new online student and parent portal, known as Aspen. However, ever since its first release, there have been complaints from both teachers and students about the new portal, especially its mobile version.

"(Aspen) is slow, especially on mobile. And it's hard to navigate through, like I don't know how to use it. Too many extra buttons." - A.C. (student)

"Well for example, it took me way too long to figure out where to find my attendance and how to interpret it. Same goes for pretty much everything else on the website too. And when you finally figure out how to navigate somewhere, you find out that process to get there is super long and complicated" - N.S. (student)



Which one am I supposed to click?

Absences: 3.0

<input type="checkbox"/>	Date	Code
<input type="checkbox"/>	9/23/2019	A-E
<input type="checkbox"/>	9/20/2019	A-E
<input type="checkbox"/>	9/19/2019	A-E
<input type="checkbox"/>	9/12/2019	SF
<input type="checkbox"/>	9/10/2019	SF

A-E, A, SF, what do they mean?

AS1 AP Calculus BC

Average Summary

Category	Weight	Cumulative Average
Exams	Weight	35.0%
	Avg	95.5 A
Final Exam	Weight	20.0%
	Avg	
Homework	Weight	10.0%
	Avg	100.0 A
Problem Sets	Weight	10.0%
	Avg	97.5 A

Ok, here's my overall grade, but where's my grade for individual assignments?

There are a few major issues with Aspen that lead to the development of GradeTree

Lack of a functioning mobile app

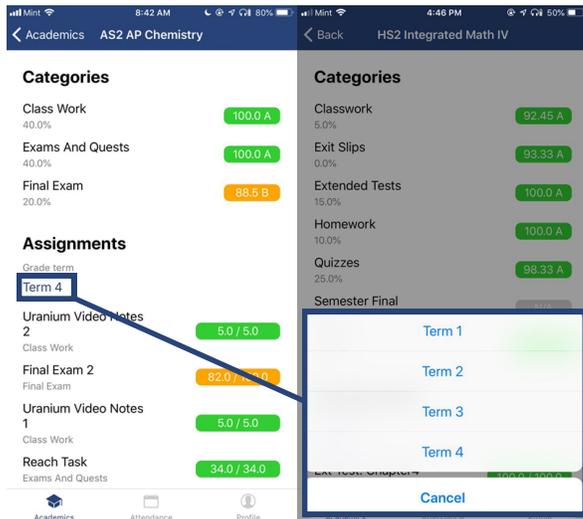
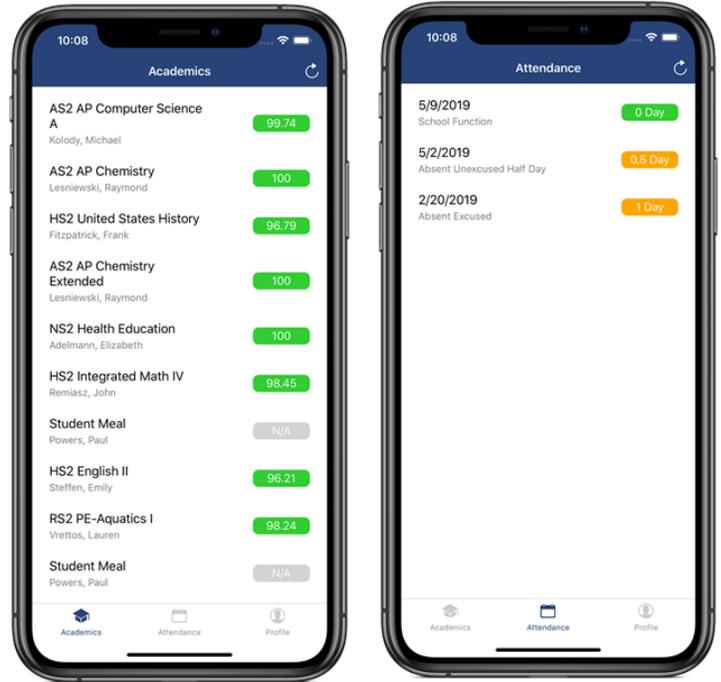
Poorly designed interface that is hard to navigate and use



In attempt to make an app that is easier for students to access their grades and attendance, I created GradeTree.

GradeTree features a more intuitive interface that is easier to navigate. Moreover, students no longer need to go to the website and enter their username and password every time.

As shown by the screenshots, the home page of the app gives students a quick glance of the grades of each class that they take as well as their attendance information. The grades and attendance are color-coded so that the students will be aware of any drop in their grades and unexcused absence.

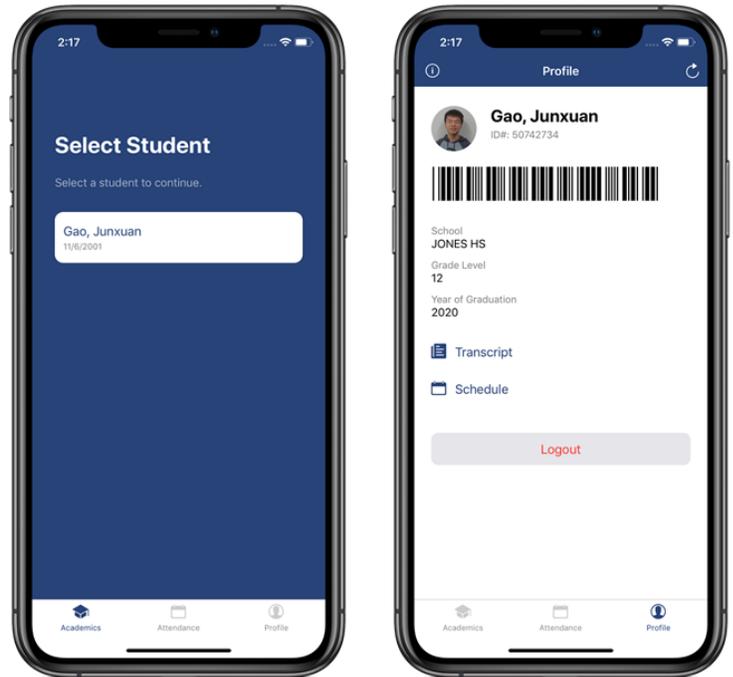


One of the features that many students have complained about Aspen is the feature that allows students to see the grades from other terms or semesters. Although there is a feature like that on the original Aspen website, it is very hard to find, and most users don't even know the existence of that feature.

I added the switching term feature to my app after hearing feedbacks from students. Students can switch terms simply by clicking the button located at the class information page.

I also made a parent version for GradeTree. The difference between parent portal and student portal is that you can switch between students and you can check your bill on the parent version.

The screenshot on the right shows some of my future plans for GradeTree. Some schools like mine have a barcode on their student IDs, and students need to scan this barcode to get lunch or if they want to borrow a book from the library. The barcode is generated from the student ID number. By including this barcode in the app, students can just get their phone scanned instead of an actual ID.



TECHNOLOGIES BEHIND GRADETREE

The app caches the webpage containing grade information and parses the HTML elements in the webpage. I then extract the desired information from the DOM tree based on the class and id of HTML elements.

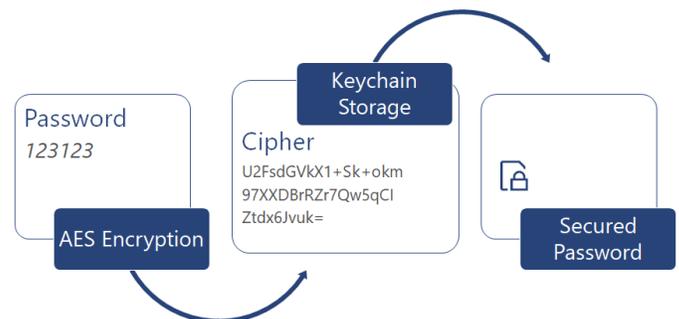
The cookie obtained during authentication is stored securely and locally on the user's device

SECURITY

The credentials and all the information are sent through protected HTTPS requests.

For convenience purpose, the app stores user's login information locally.

User credentials are stored using a double-layer encryption. The user password is first encrypted using AES algorithm. The key used to encrypt the password is unique to the device. Then the encrypted cipher is stored in a system-level storage system.



PUBLIC RECOGNITION

Within the first week of releasing, the app received over a thousand downloads. It was reported by several student-owned magazines and school newspaper. I was met by the CTO from Chicago Public Schools and staff from the Information Technology Service department of CPS during the summer. During the meeting, we discuss the future of GradeTree and possibility of adopting GradeTree as an official mobile app for Aspen.

The "mad hacker" - the student behind GradeTree and his next steps, by Jones Blueprint

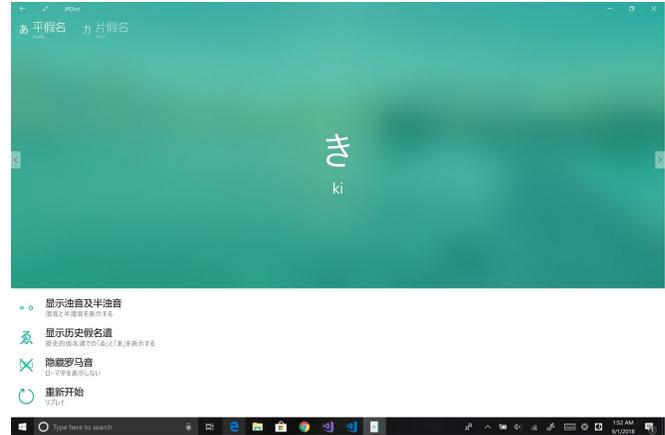
<http://jonesblueprint.com/2019/10/17/the-mad-hacker/>

Kid genius outsmarts CPS - The truth about GradeTree, by Teen Insider

<http://www.teeninsidermag.com/blog/kid-genius-outsmarts-cps-the-truth-about-gradetree/>

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I created JPDict when I was still in middle school. It is a Chinese-Japanese dictionary app with many useful features specially designed for Japanese learners. It has become one of the most popular Japanese learning apps on the Chinese market of Microsoft Store.



Many language learners find Japanese hard to learn because of its complicated conjugation system. Using natural language processing, I was able to make a “conjugation helper” tool within the app. The app also has a feature that can break sentence into chunks of words and phrases with their parts of speech labeled so that users can understand the conjugation and sentence structure of the language. The desktop is built using C# on the Universal Windows Platform. iOS and Android versions are built using React Native.

The backend of JPDict provides daily news, listening exercises, and translation services. The backend runs on Microsoft Azure and is built using Azure Functions. With Azure Functions, I was able to simplify the development workflow and deployment.

<https://github.com/gaojunxuan/JPDictBackend>

