

Classroom Companion

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Case Study





Education in the midst of the COVID-19 pandemic



Impact and strategies

While countries are at different points in their COVID-19 infection and vaccination rates, worldwide there are currently more than [1.2 billion children in 186 countries](#) affected by school closures due to the pandemic.

With this sudden shift away from the classroom in many parts of the globe, some are wondering whether the adoption of online learning will continue to persist post-pandemic, and how such a shift would impact the worldwide education market.

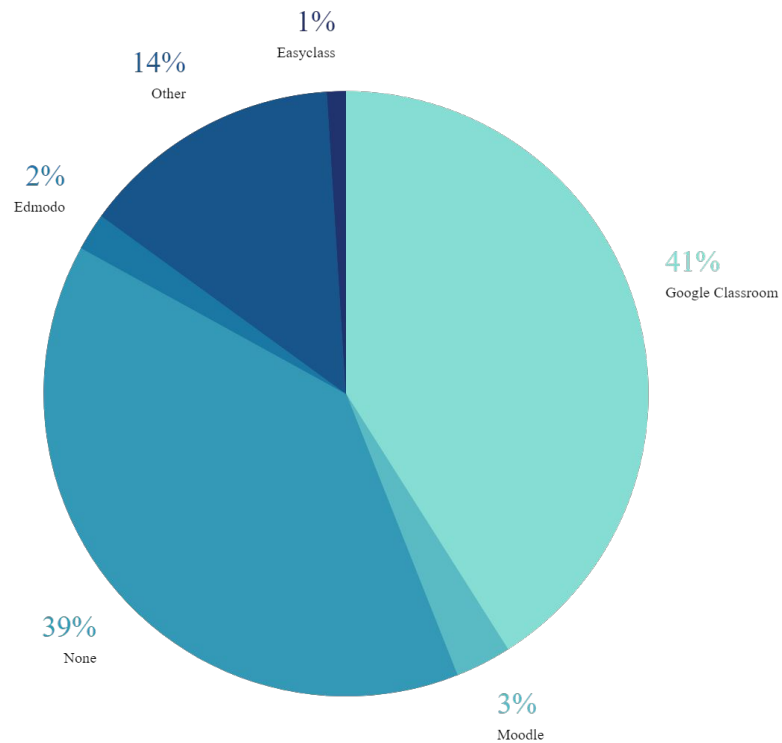
Even before COVID-19, there was already high growth and adoption in education technology, with global edtech investments reaching [US\\$18.66 billion in 2019](#) and the overall market for online education projected to reach [\\$350 Billion by 2025](#). Whether it is language apps, virtual tutoring, video conferencing tools or online learning software, there has been a significant surge in usage since COVID-19.



Statistics



Online Learning Platforms in Romania (2020)



Discord users

Discord monthly active users

Year	Monthly active users
2017	10 million
2018	45 million
2019	56 million
2020	100 million
2021	140 million

Microsoft Teams users

Year	Users
2017	2 million
2018	8 million
2019	20 million
Q2 2020	75 million
Q4 2020	115 million
Q2 2021	145 million

Zoom User Statistics

Zoom peak daily meeting participants*

December 2019	~ 10 million
March 2020	200 million +
April 2020	300 million +

Too many platforms add chaos to online school work



Google Classroom





Problems

The content provided to students should be easy to access and streamlined through as few platforms as necessary.

On a regular school day, a student uses up to eight different platforms for his studies, such as Discord, Slack, Facebook, Google Classroom, Google Drive, Google Meet, Zoom and Webex, to which are added the teachers' own websites.

While the teachers' initiative to provide us with materials is outstanding, the lack of coordination makes it difficult to keep track of assignments and due dates.



Vision

In our vision, we hope to achieve a highly integrated application that combines many solutions for facilitating the learning process, such as classrooms run by professors and joined by students, schedules that can be synchronized with the personal calendar, posted announcements, uploaded resources and so on.

Our motivation for developing Classroom Companion is to alienate the effects of the sudden eruption of the COVID-19 pandemic, which took the world by storm and shifted our paradigm about everything that requires human interaction.



Existing Solutions





Discord



Initially known especially by gamers all around the world, offering quality voice and video streaming capabilities, Discord has gained massive popularity to the masses in the context of the current ongoing pandemic.

According to statistics, the revenue reported for the year 2020 for Discord increased from \$45 million to 130\$ million and its monthly user base almost doubled, counting up to 140 million active users.

This explosive success shows that Discord is a fierce competitor in the field of online communication, even so that legal institutions such as schools or colleges decided to move their online activity to Discord, despite its origin as an application for gamers.

The prejudices seem not to be enough to keep non-gamer users away from this application, mostly due to its exceptional services, such as ludicrous crisp voice chat functionality and efficient video streaming (top of the notch screen sharing functionalities).

Despite that, Discord was never tailored to be used in academic settings, which is apparent by its lack of features like a system to manage announcements or a system for reliable file transfer to a trusted source.



Discord: Pros & Cons



Pros:

- is easy to use
- has attractive UI/UX
- is highly available to everyone
- has excellent voice and video streaming

Cons:

- cannot be easily adapted for purposes other than entertainment
- lacks features to be considered an all around tool to encourage development of non-gaming related communities



Google Classroom



Google Classroom is the leading technology offered by Google to encourage the digitalization of the traditional educational environment. Highly tailored for this purpose, Google Classroom seems to be the closest version to the application we wish to implement.

During the pandemic, Google sought the opportunity coming and invested heavily on this platform to be ready to support the ever growing number of users. But even considering this, Google Classroom lacks a lot of features that would make it a fully grown e-learning platform, features we deem essentials, such as the possibility to add schedules and synchronize them with the personal calendar or the possibility for students to chat privately with their professors.



Google Classroom: Pros & Cons



Pros:

- is highly available to everyone
- integrates other Google Services, such as Google Meet

Cons:

- lacks integration with Google Calendar
- does not encourage interaction between students and professor



Strategy





Strategy and marketing approach

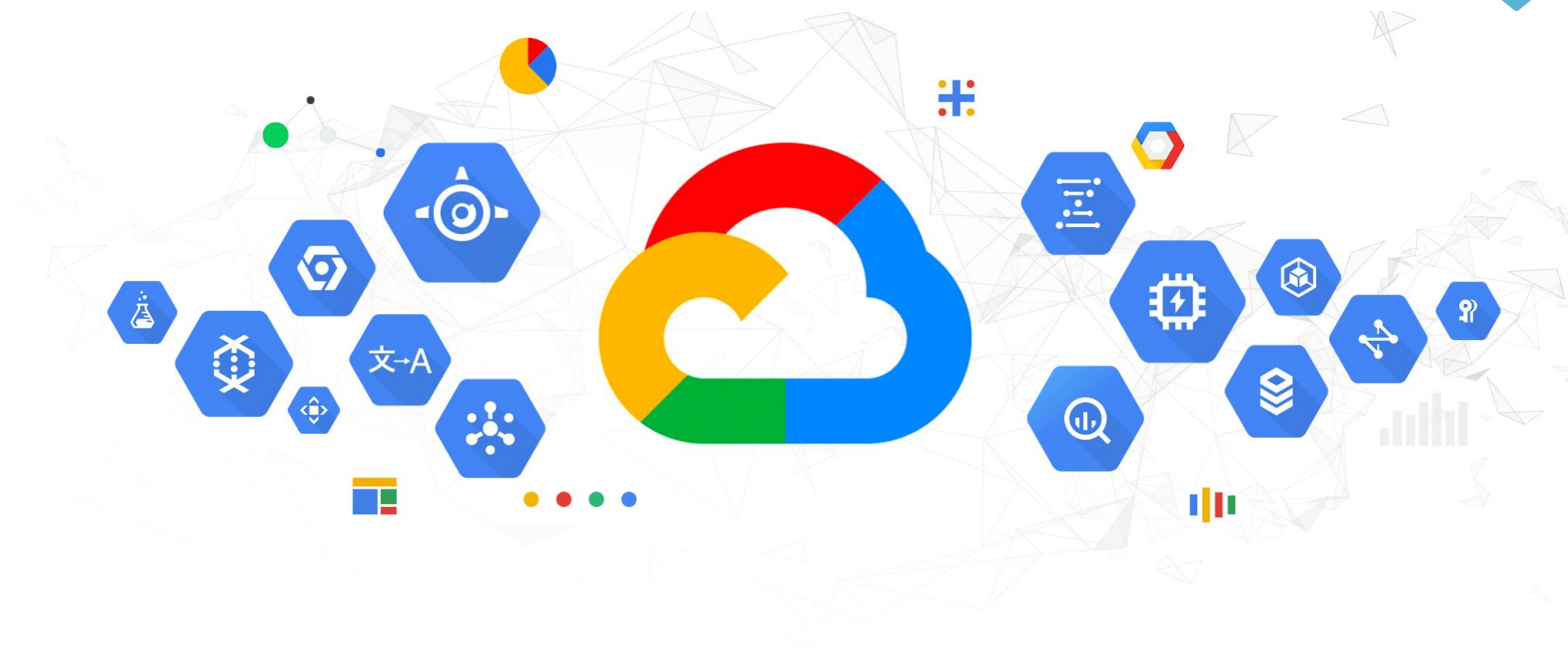
Our current strategy is to capitalize on the lack of features presented above in our competitors. As mentioned in the previous slides, there is a need for a well-thought integrated e-learning platform which we think we are able to provide through our application.

When it comes to deployment in the real world, we thought that the best way to approach the situation is not to charge anything for the application, but to add some minors advertisement panels, using the Google AdSense platform.



Technologies







Motivations



Why Google Cloud Services?

- are the ideal choice for cost, ease of use, popularity and familiarity
- have reliable documentation

App Engine and Cloud Build

- are easier to use than the counterparts

Cloud SQL

- is suitable for our resource management, compared to the NoSQL solutions
- can be easily connected with App Engine
- is faster and cheaper than the counterparts

Secret Manager

- is a secure and convenient storage system for API keys and passwords
- provides a central place and single source of truth to manage, access and audit secrets across Google Cloud



Motivations



Google Calendar

- most popular time-management and scheduling calendar

Why Azure Active Directory B2C?

- high availability to scale to hundreds of millions of customers
- customization for every aspect of the registration and sign-in experience
- strong authentication using the preferred identity provider
- easy integration with applications and databases

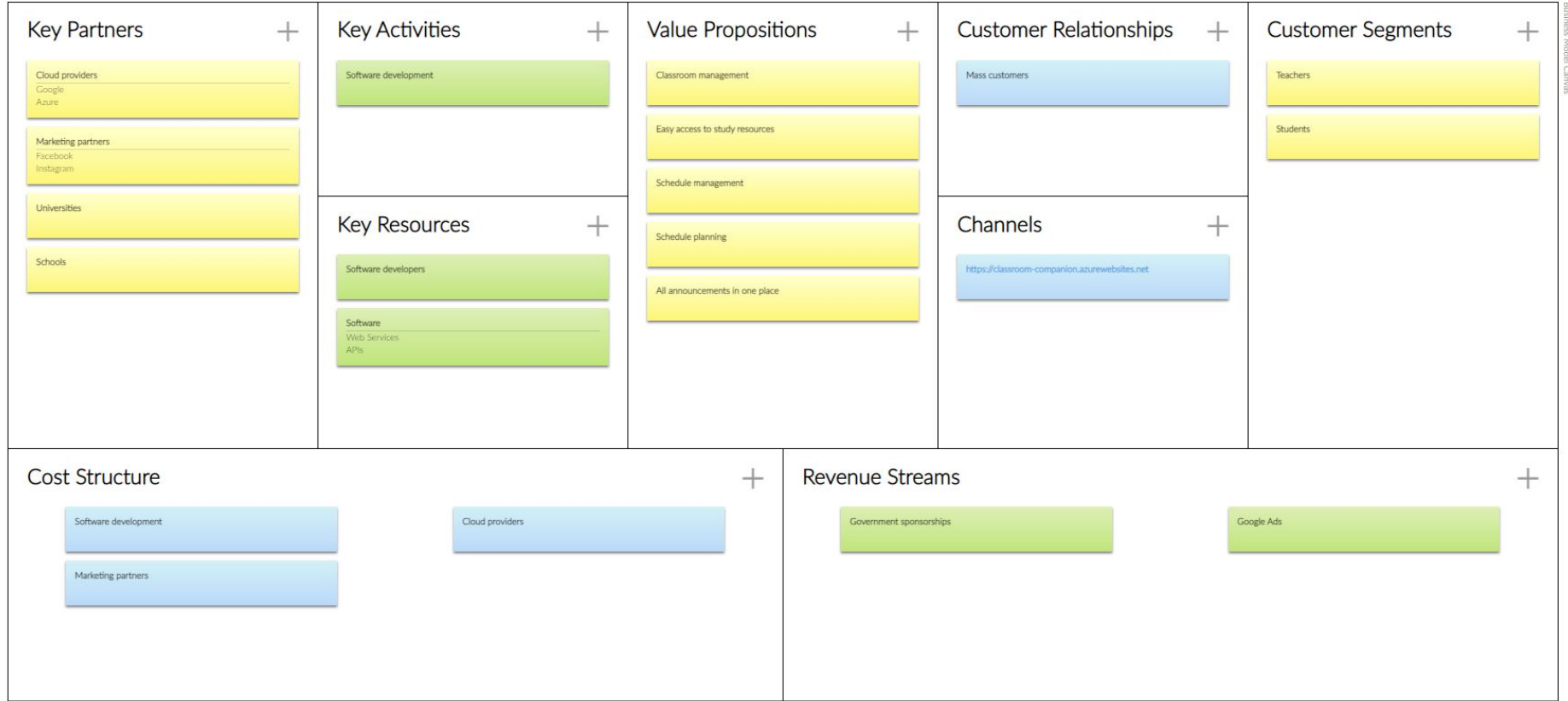
Why Node.js?

- better efficiency and overall developer productivity
- speed and performance
- a huge number of free tools



Business Canvas

Classroom Companion

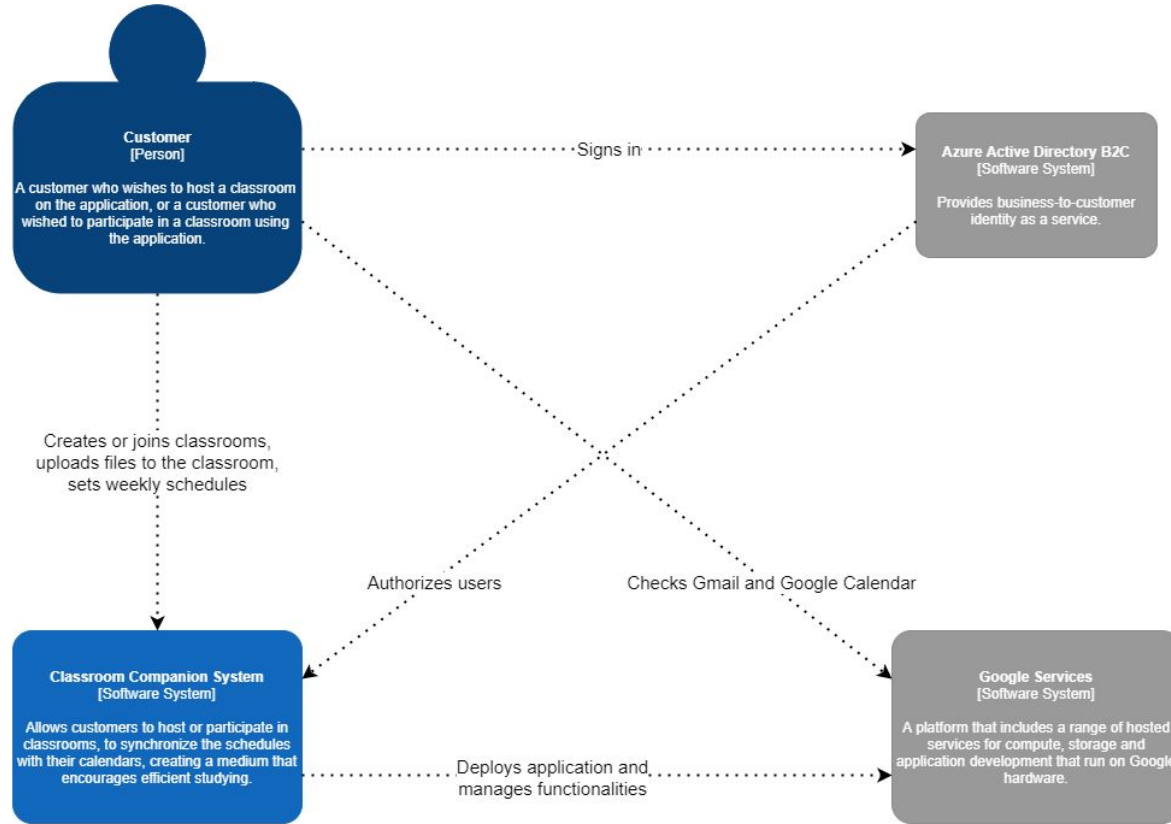




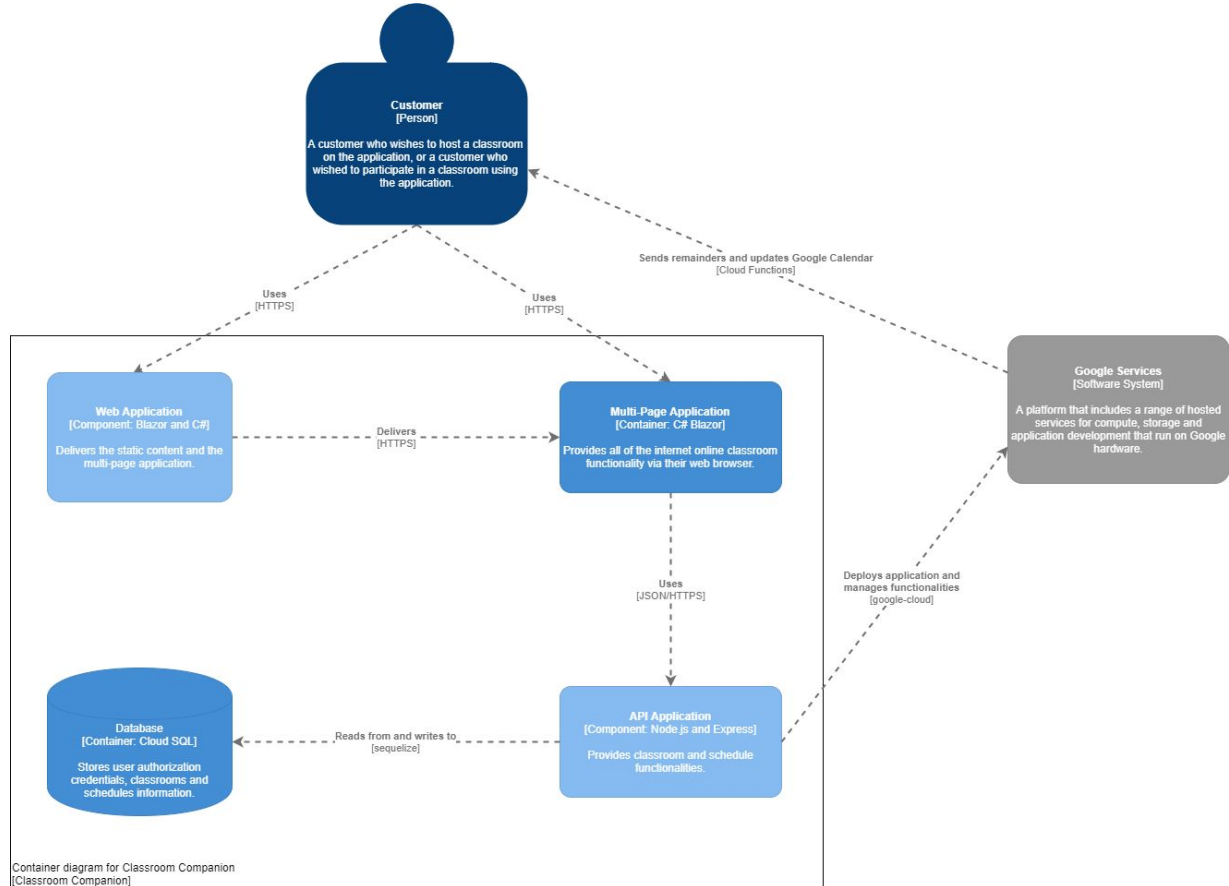
Architectural Diagrams



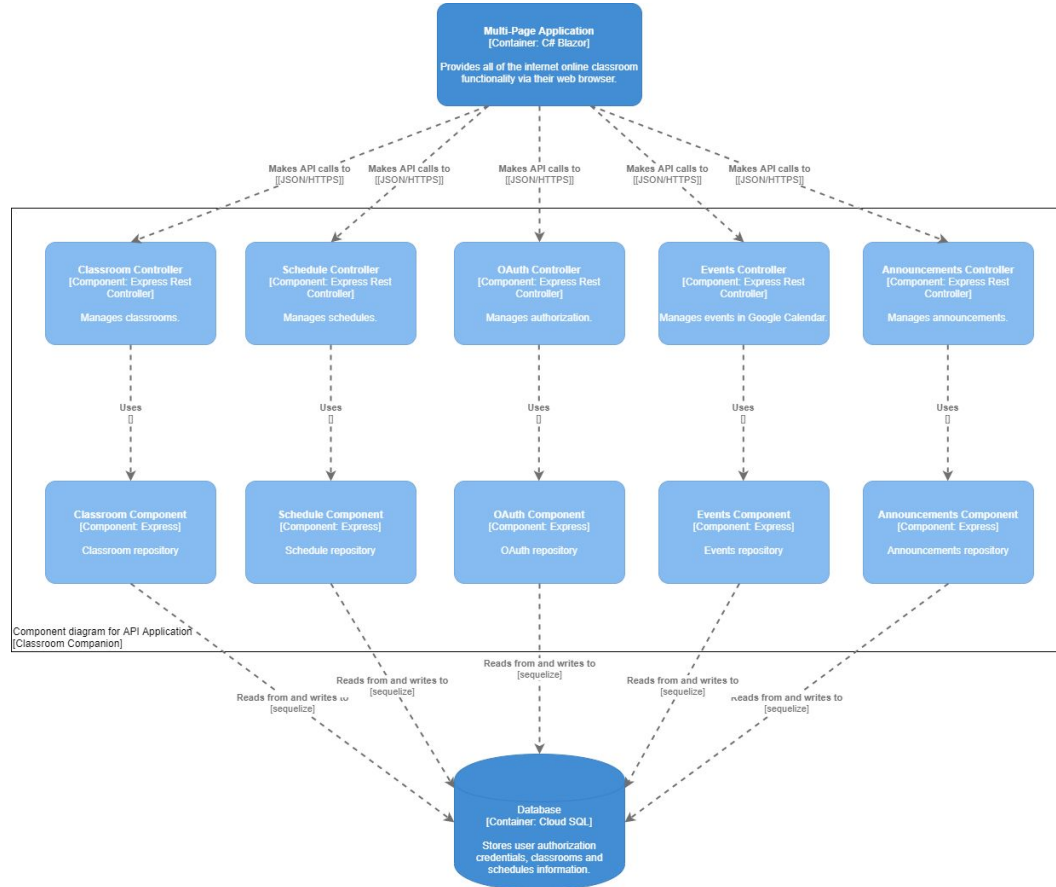
C4 Level 1



C4 Level 2



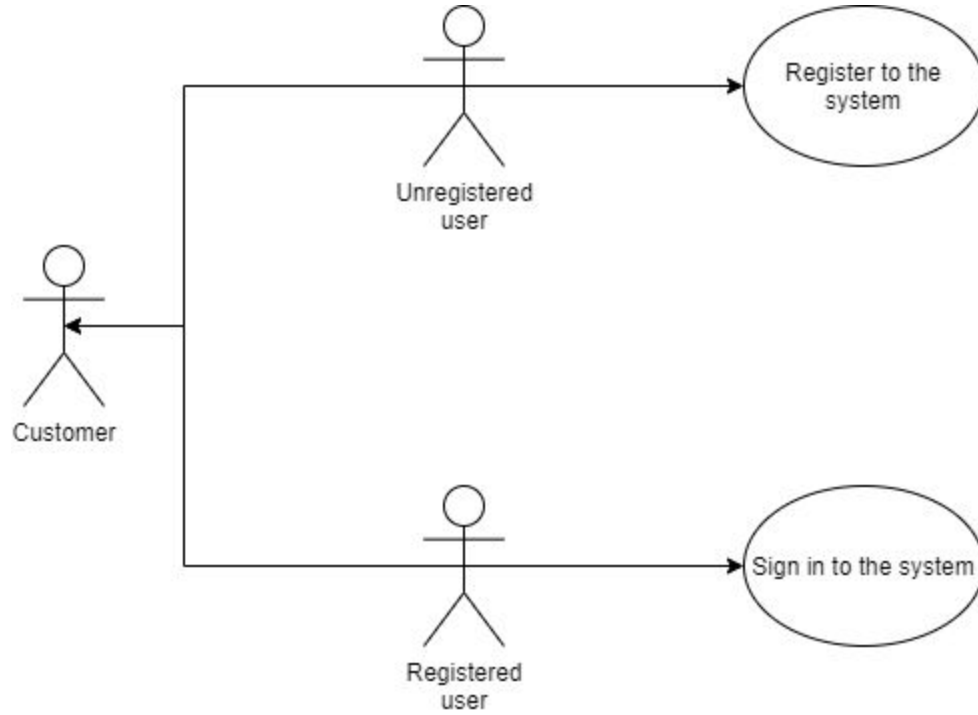
C4 Level 3



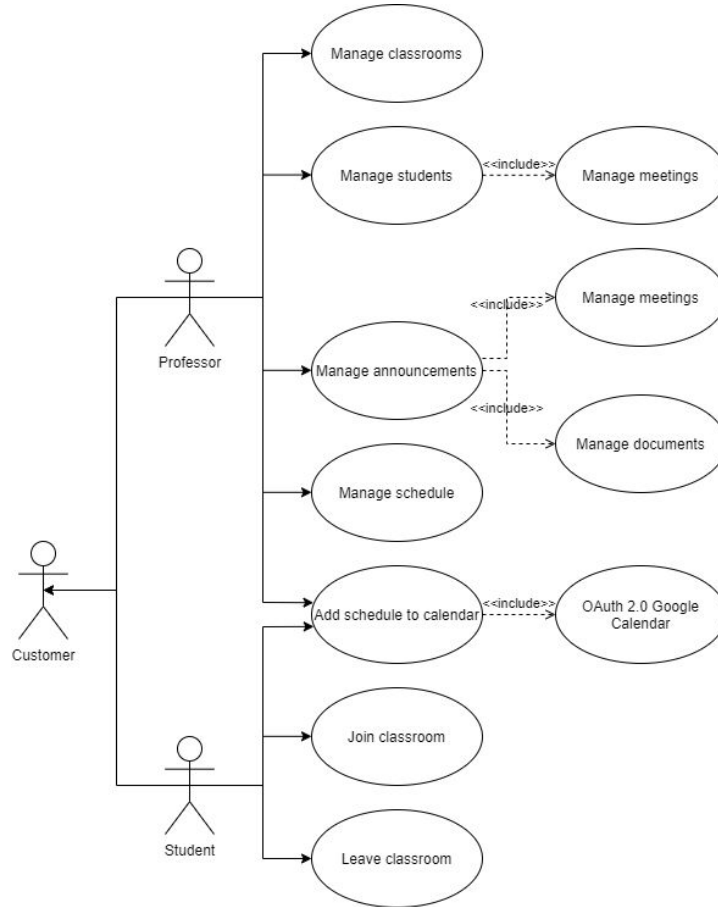


Use-Case Diagrams

Authentication



Manager





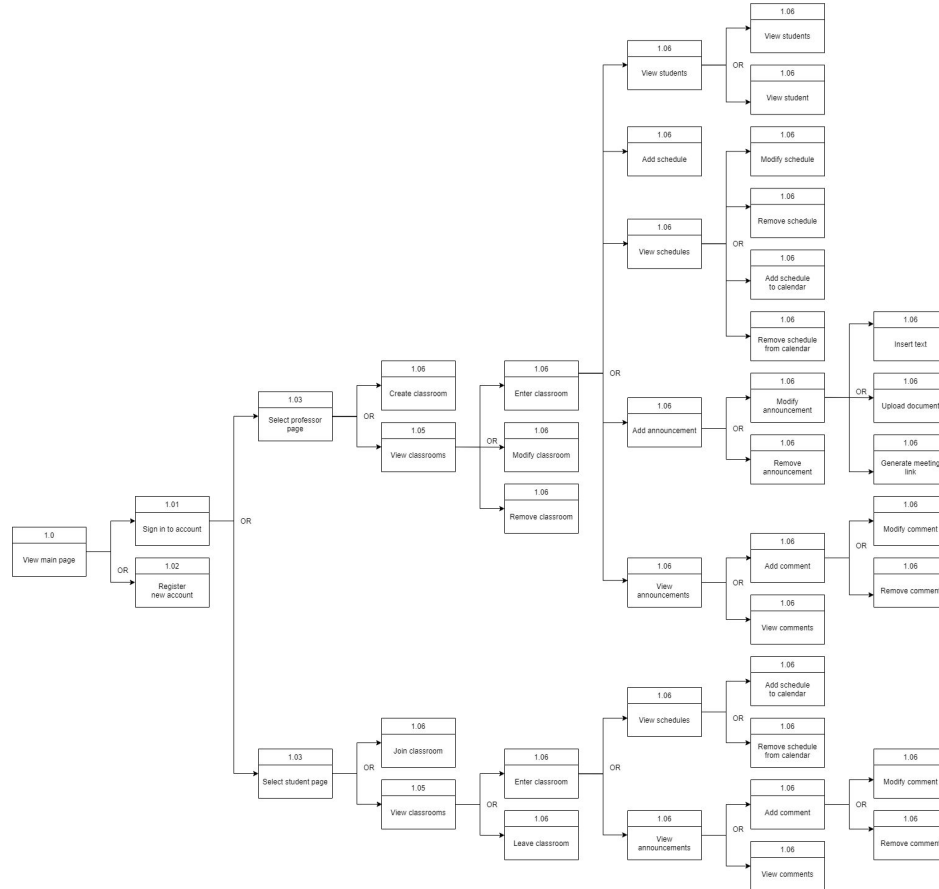
OpenAPI Specification



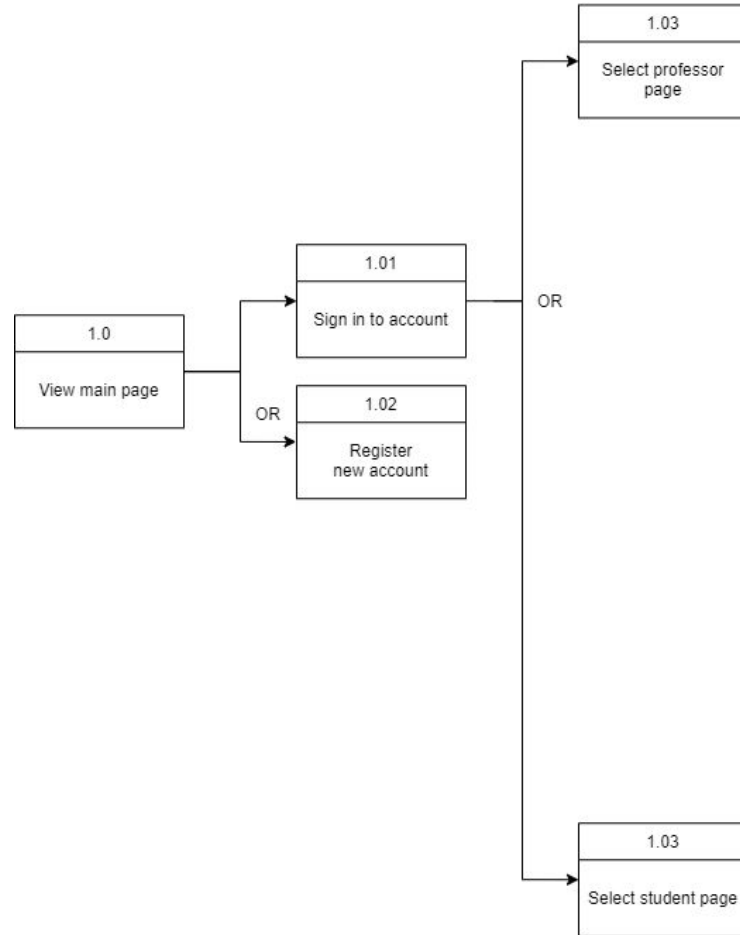
Functionality Flow Diagrams



Overview



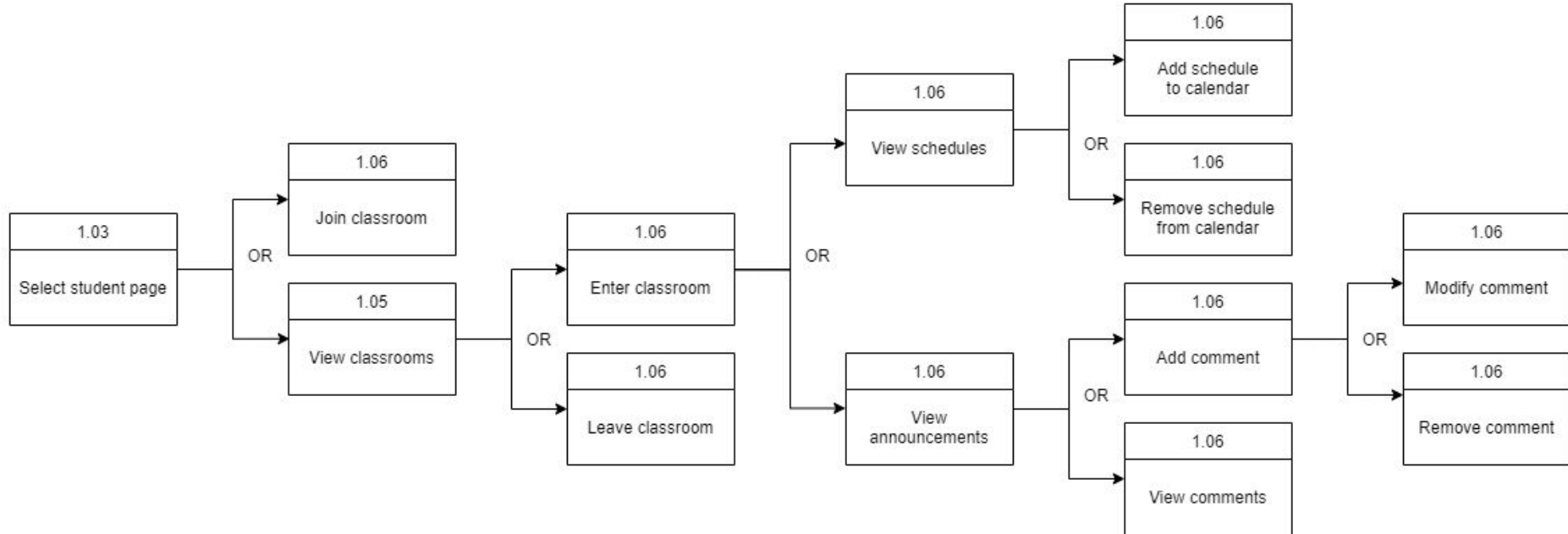
Role



Professor



Student





Bibliography

- [The rise of online learning during the COVID-19 pandemic](#)
- [Statista - The Statistics Portal for Market Data, Market Research and Market Studies](#)
- [Discord Revenue and Usage Statistics \(2021\)](#)
- [Microsoft Teams Revenue and Usage Statistics \(2021\)](#)
- [Zoom Revenue and Usage Statistics \(2020\)](#)

