TA-lent Connect README

Proposed Level of Achievement

Apollo 11

Motivation

As NUS students, we, many of our friends, and classmates are interested in the idea of being a Teaching Assistant (TA) for our favourite modules. In fact, Jianning is currently a TA for CS1010X. However, each module could have their own specific set of qualifications, application process, or even selection test/interview. These application conditions could also change depending on the semester or module coordinator. This makes consolidating information on applying as a TA a time consuming and difficult process. We feel it must be the same for module coordinators, who would have to hunt for TAs. Through a web based application, we would like to build a platform that contains all the information about becoming a TA for any NUS module (provided by the module coordinators themselves), as well as additional features like past TA testimonials. Potential TAs can also submit their CV or express interest to modules they would like to TA.

Aim

We aim to build a web based application that connects prospective TA's with module co-ordinators. We hope to make a platform that allows module coordinators to place all relevant information in one location. Potential TAs can also submit their CV or express interest in those modules. Additional features like past TA testimonials could also give potential TAs a better understanding of if the TA role or level of commitment suits them.

User Stories

1. [Epic] As a module coordinator, I can input relevant information about becoming a TA for my module so potential TAs are aware of the conditions:
    - Expected hours per week of work
    - Breakdown of work (e.g. teaching tutorial, grading, invigilating)
    - Minimum required grade achieved in the module
    - Number of TA slots available
    - How to submit an application
    - Interview/screening process
    - Deadlines & timeline

2. As a module coordinator, I can read CVs that students submit so that I am aware of their qualifications and the number of interested candidates.

3. As a prospective TA, I can search and view the modules I am hoping to TA for. I can view all the relevant information at once so that I would not need to consolidate information from various sources.

4. As a prospective TA, I can view reviews and testimonials from previous TAs so that I can get a better understanding of the experience and level of commitment.

5. As a prospective TA, I can favourite modules so that I can receive email notifications when there is an update to a module page by the module coordinator

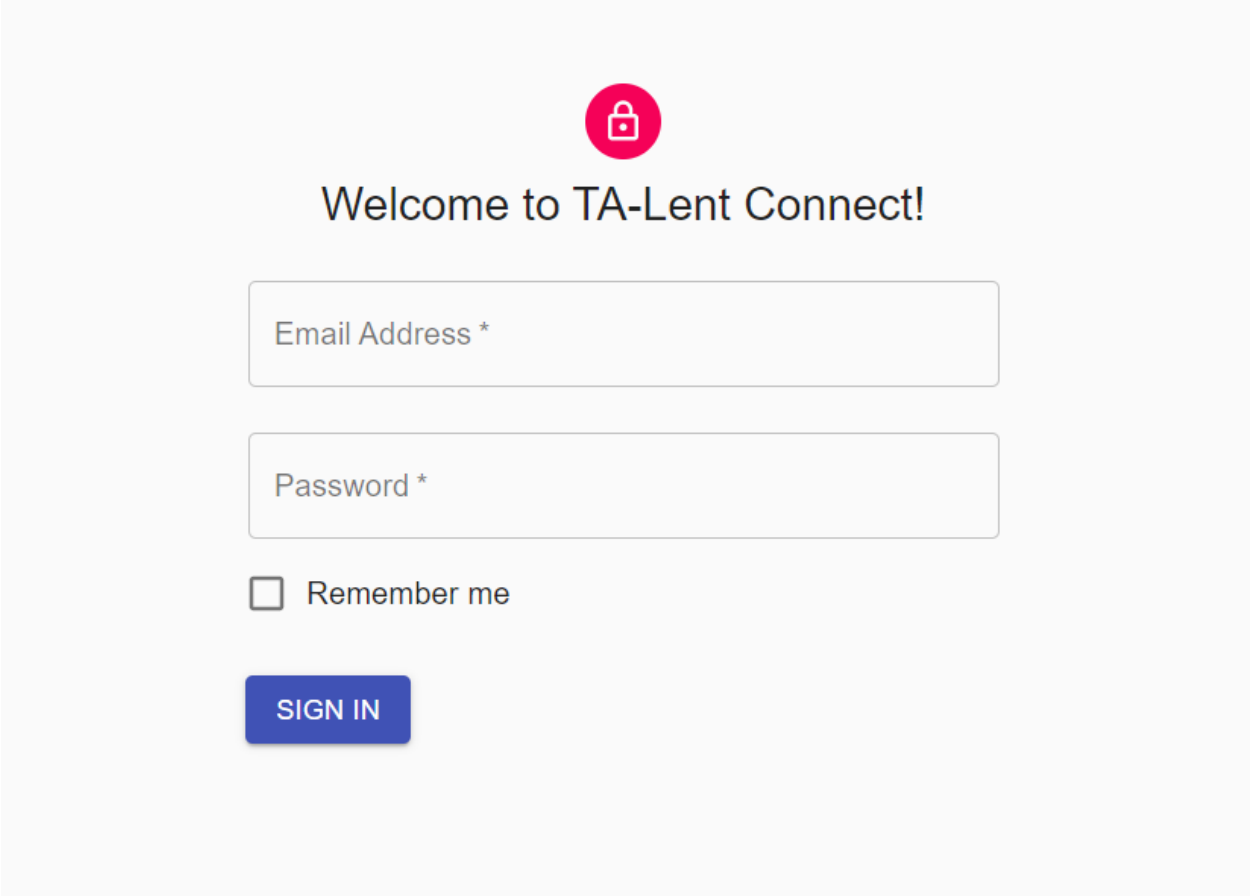
6. As a prospective TA, I can submit my application and CV for the module I am interested to TA so that the module coordinators can include me in the selection process.

7. As a past TA, I can provide a review to the module I TA'ed for (either anonymously or by identifying myself) so that others can read about my experiences.

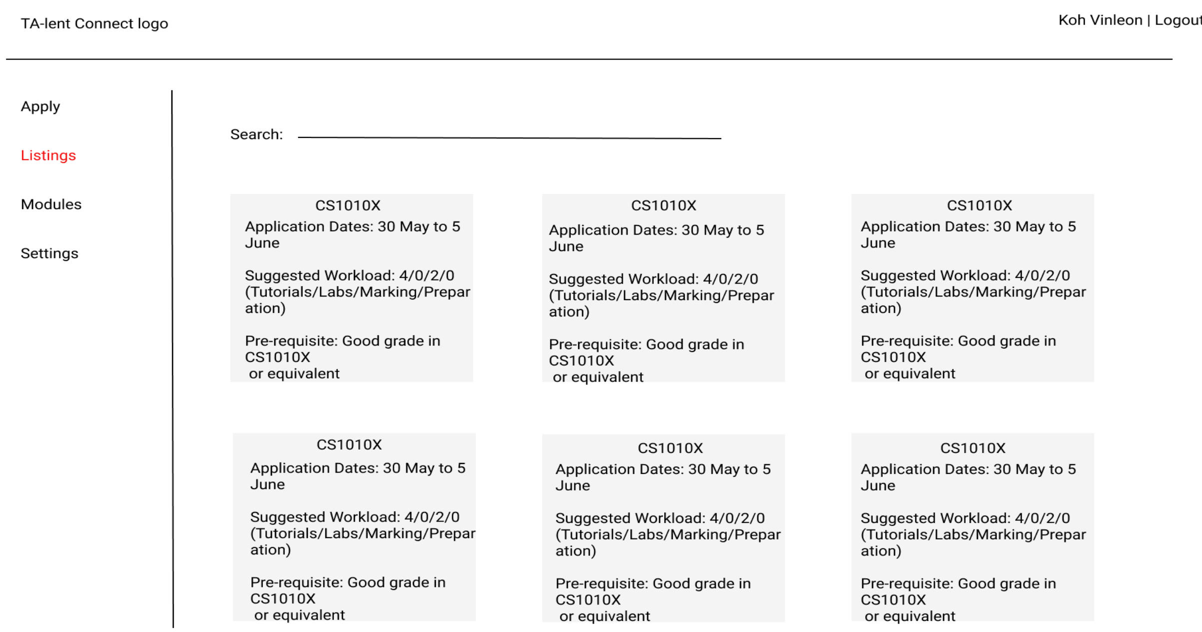
Milestone 1

Design and Features

The first page users will be greeted to when loading up TA-lent Connect's website is the Login Page. Currently we have implemented a temporary login page that allows users to access our website when they input 'admin' as their email and 'password' as their password. This login system will be revamped by making use of NUS's authentication service, in the near future. We will be making use of NUS's authentication service to differentiate between NUS staff and students, as the website will render differently for both.

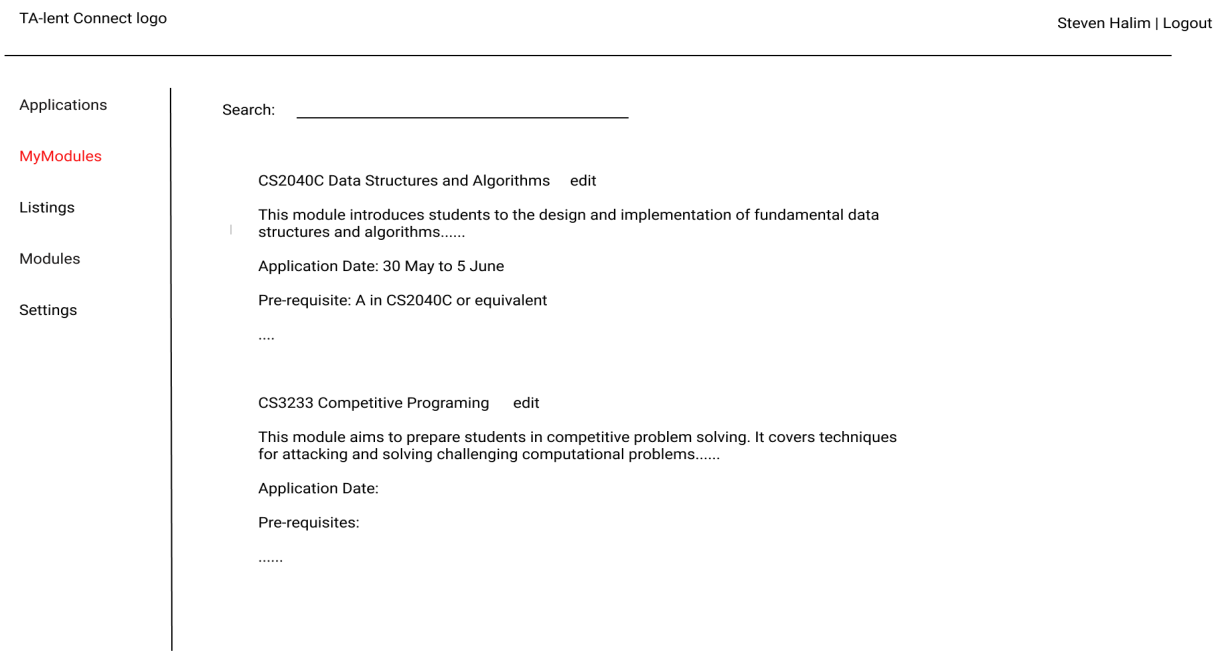


Students, once logged in, will arrive at the landing page showing the current listings for TA openings. They can use the search feature to look for the module they want and click on the card to view more details on the application process and requirements for that module.

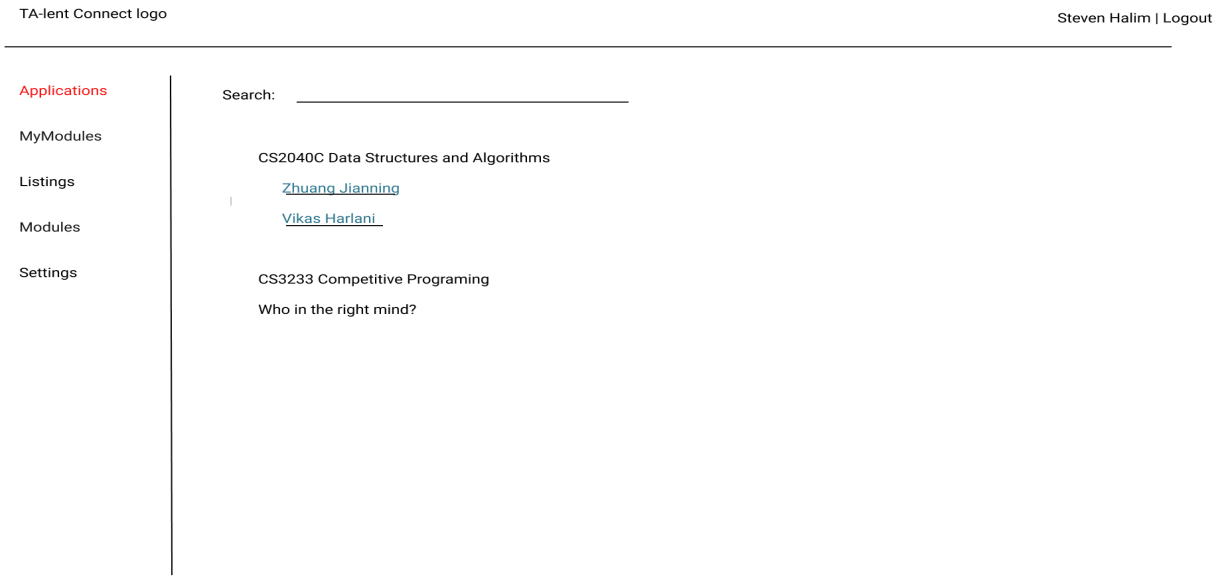


Students who are interested can then click on the apply now button in the module listing to navigate to the applications page where they can download application instructions and submit their applications.

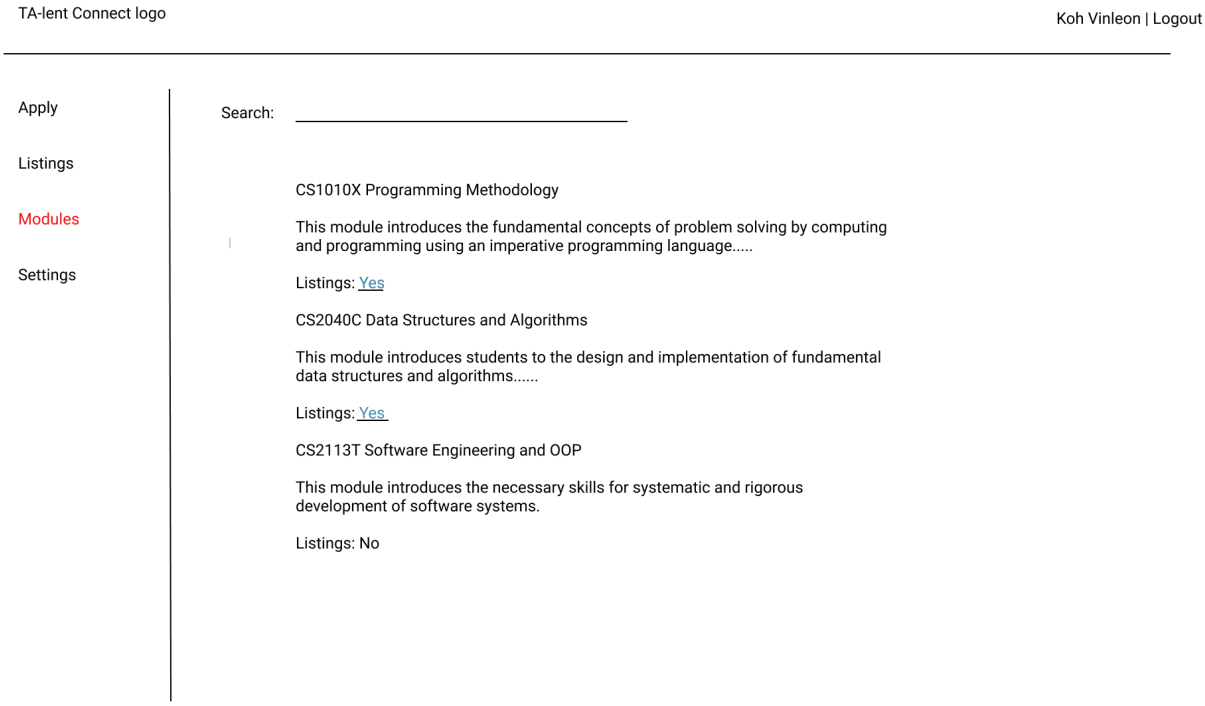
On the module coordinator's side, their landing page would be MyModules which shows them the listings they currently are in charge of. They can add new listings here or click on the edit button to change or add more information about the TA requirements and application. They can also upload documents with detailed instructions



Module coordinators can also navigate to the Applications page to view and download all the current applications from prospective TAs



Both students and professors can navigate to the Modules tab from which they can search for any NUS modules and their general information.



Development Plan

Work Completed (Milestone 1)
The following phases and features have been completed:

1. Project Planning
   We have listed out all our user stories and picked the appropriate ones to be completed for each milestone. We have also set up Issues and Milestones on GitHub and linked them to the corresponding team members.

2. System Functionality
   a. Login Page
   b. API call to NUSMods to retrieve information about all NUS modules
   c. Search and filter feature for modules retrieved from NUSMods
   d. Ability to add and save listings

Work Remaining (Milestone 2)
The following phases and features have yet to be completed:

1. System Functionality
   a. Add the various different pages such as Modules, Listings, Applications
   b. Navigation to different pages

    c. Submitting documents
    d. Connecting to NUS Authentication Service
    e. Implement grouping of users into students and staff, leading to different versions of the app being rendered
    f. Visual aesthetics of application

2. Project Documentation
    a. User guide
    b. Developer guide

Milestone 2

https://talentconnect.herokuapp.com/

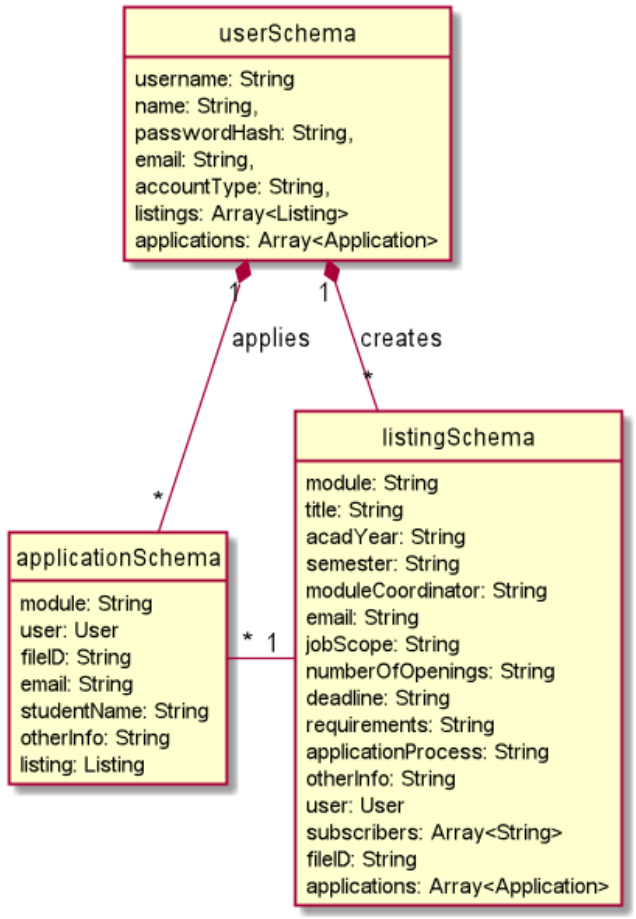
Design

For TA-Lent Connect, we decided to use MERN as our tech stack. We chose it because it is one of leading stacks utilised by web developers today, leading to many resources and guides being available online.

Database - MongoDB

We have implemented a collection in MongoDB for all the data TA-Lent Connect needs to store for/about its users. As TA-Lent Connect aims to be the bridge between module coordinators and students, we are using the database to store module coordinators listings, as well as student applications for those listings. In addition to storing the information about listings and applications, an important feature for our app is the ability to upload files such as job details for module coordinators or student CVs. These files will also be stored on MongoDB using the GridFS specification, which will be implemented for milestone 3.

The diagram below shows the various schemas and their dependencies:



Backend - Express.js

TA-Lent Connect's backend is essential to the functionality of our app. It is responsible for connecting the frontend to the database through API calls.

Frontend - ReactJS

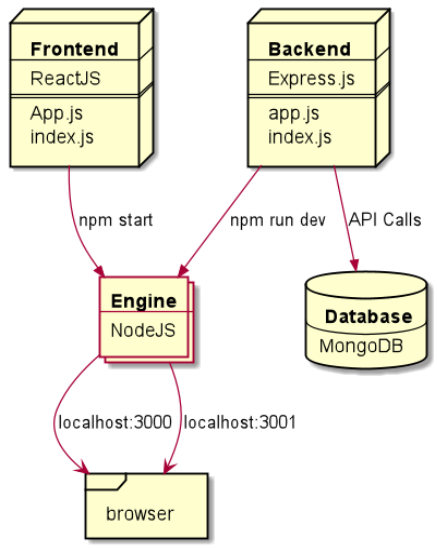
The frontend of our app is coded in ReactJS. To display the various different pages of our app, we make use of React Routes. This means that, as the user navigates TA-Lent Connect, the different page urls will determine what the frontend renders.

Engine - NodeJS

Finally, the engine that both the backend and frontend code is run on is NodeJS.

Overall

The diagram below shows interactions between the four components of our tech stack on a high level. It is the connections between the components that shows the importance of having all four of them in creating a well functioning app.

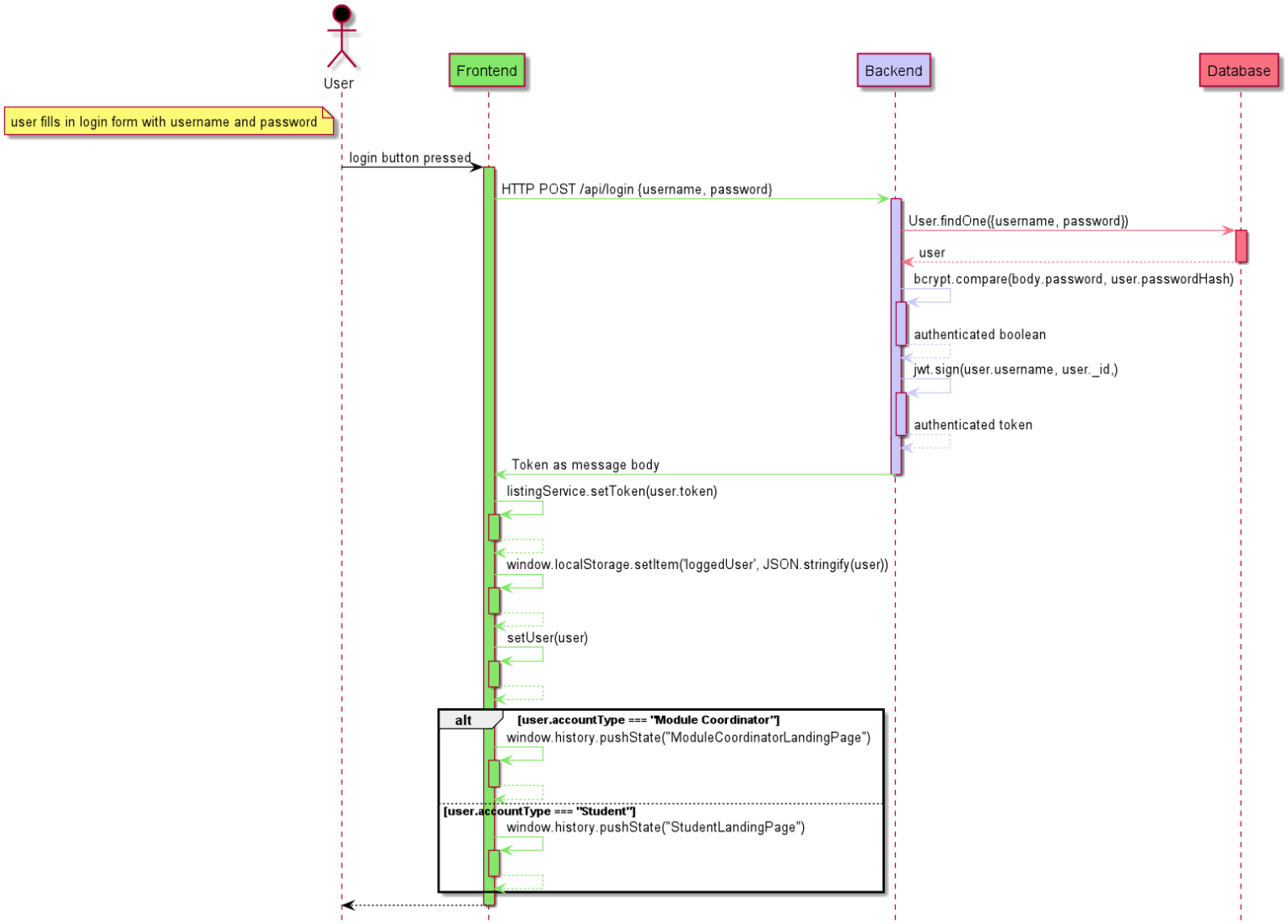


Implementation

Login and Token Authentication System

The Login feature not only allows the system to differentiate between the types of users, it also tags any actions or changes to the user who made them. For example, every listing should be linked to the Module Coordinator who created it. Deleting and editing a listing should also only be allowed for the Module Coordinator who created it.

The following sequence diagram shows the execution flow for user authentication when a user logs in to the app:

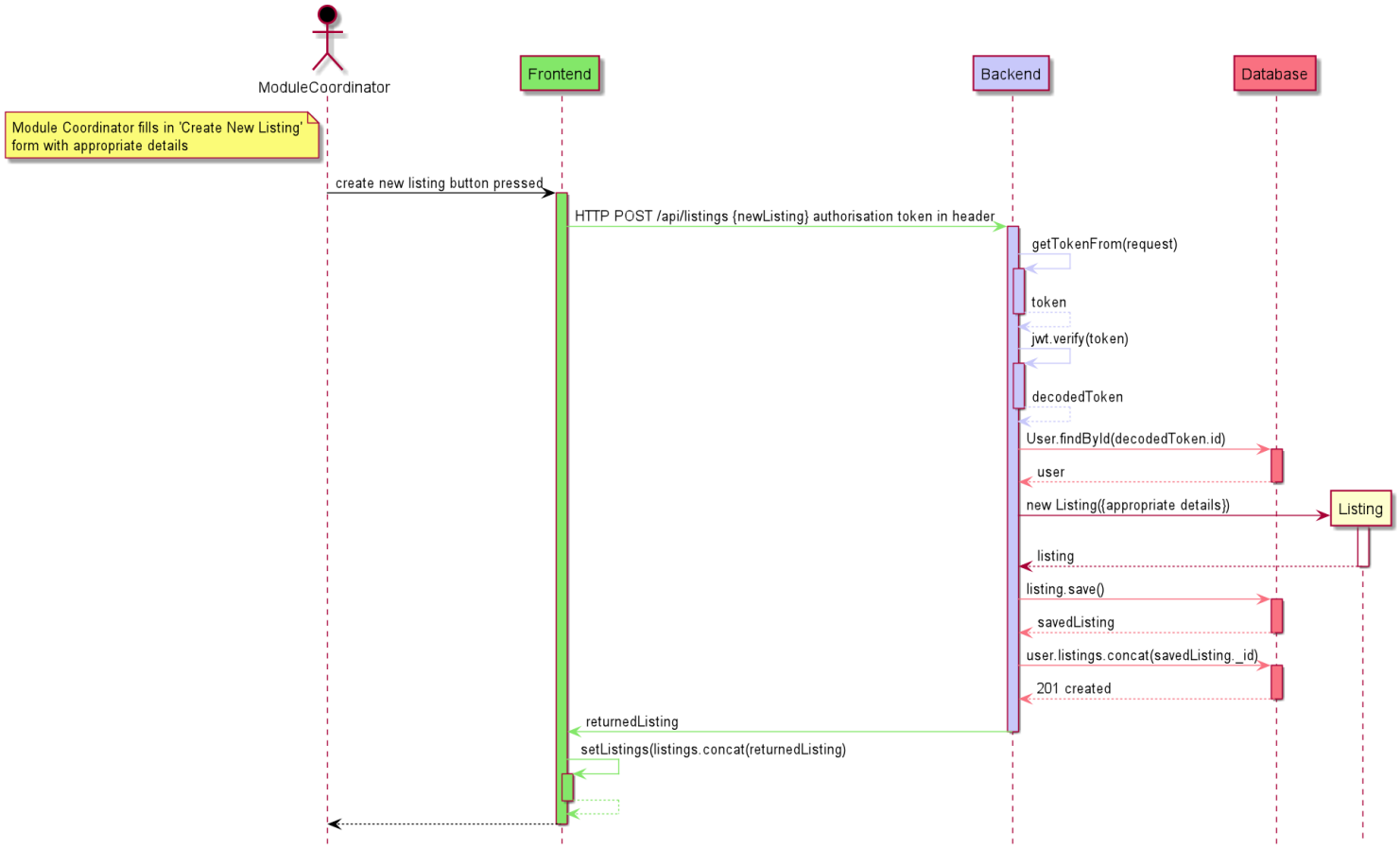


CRUD for Listings

This subsection provides details on the implementation of the Create, Read, Update and Delete operations on a Listing object.

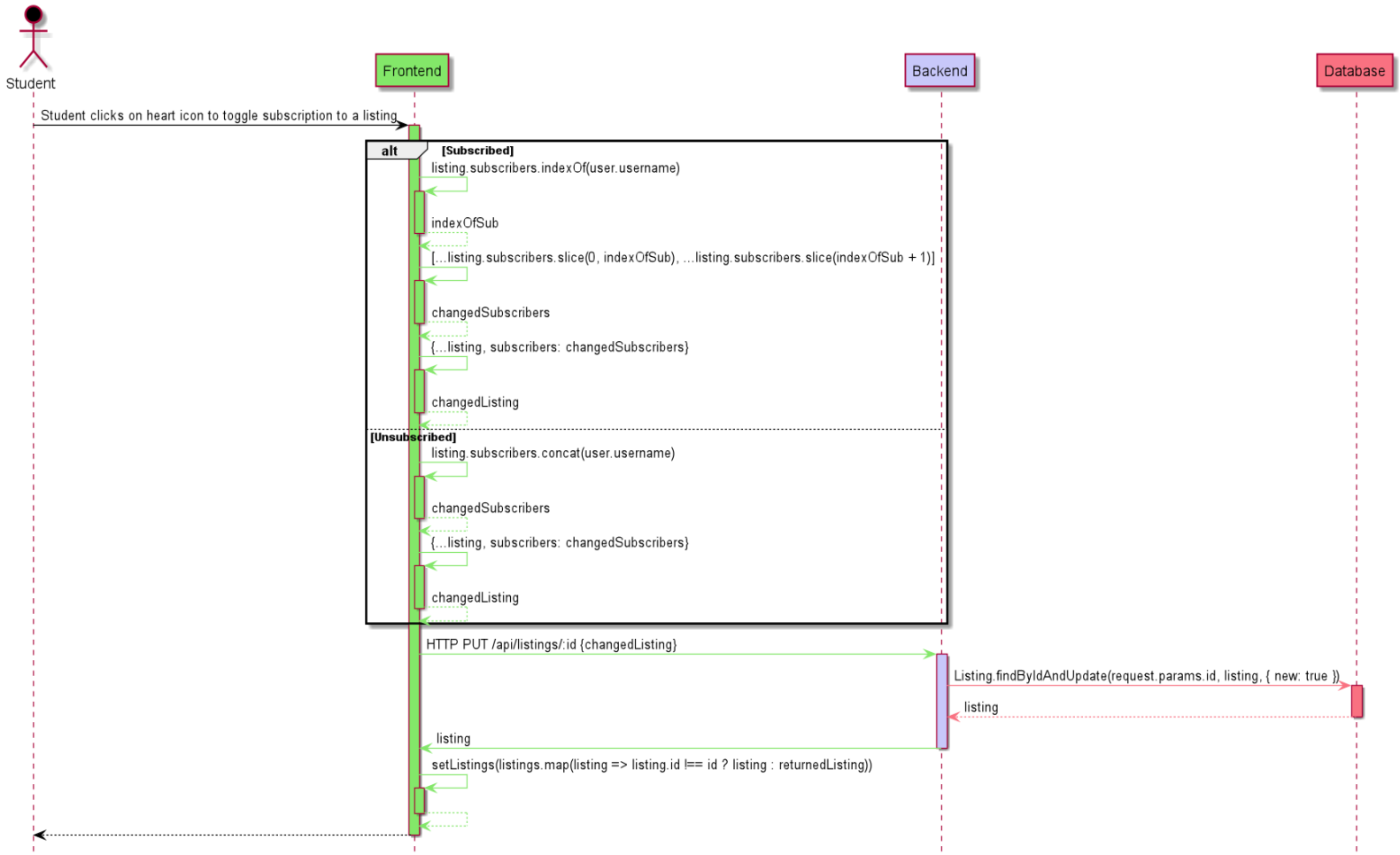
Every listing should be linked to the Module Coordinator who created it. Deleting and editing a listing should also only be allowed for the Module Coordinator who created it. When a Module Coordinator creates a new Listing, the Frontend sends the token saved to the state of the React application to the server with the POST request. The server then uses the token to identify the user and tags the listing to the user.

Given below if the sequence diagram for creating a new Listing:



Subscribe to listing

The subscription feature is implemented for students to be able to subscribe to particular listings they are interested in. These listings would then appear in their MyModules page. Any updates to the listing would also create a notification for the student.



Sort Listings by Newest Update or Alphabet

Students and Module Coordinators are able to toggle between sort by newest or sort by alphabet when viewing listings. Any listing that is edited by the Module Coordinator will automatically be pushed to the top.

Given below is the sequence diagram for toggling between the two sortings:

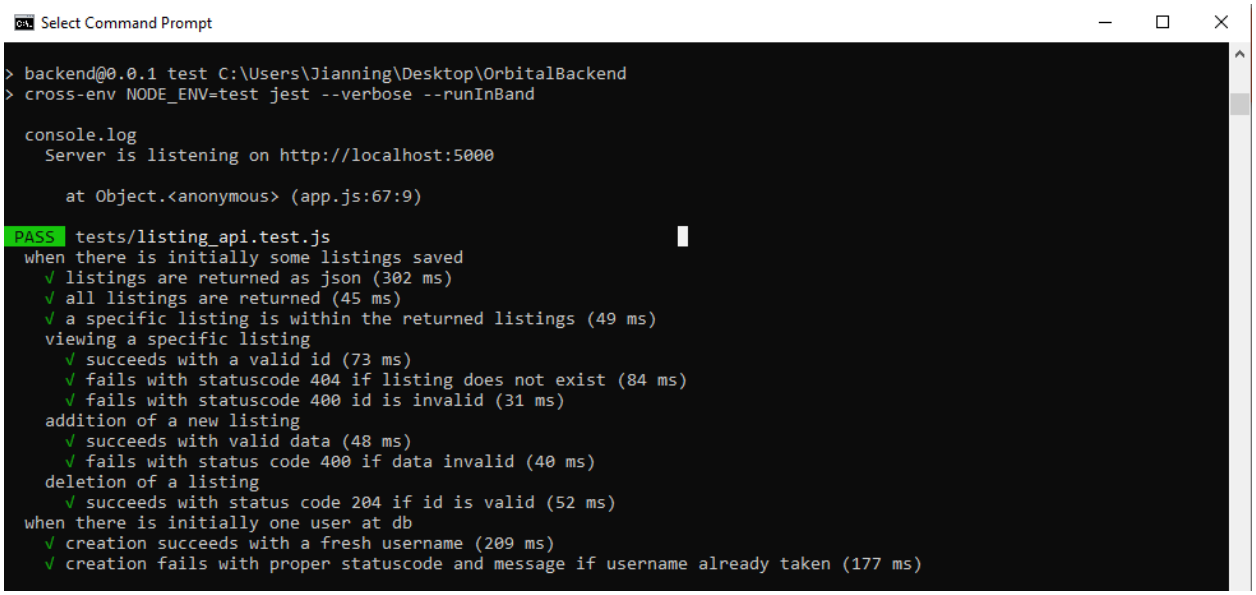
<include Milestone 3>

Testing

Backend (Jest)

For our backend, we used the Jest testing library as a test runner for JavaScript.

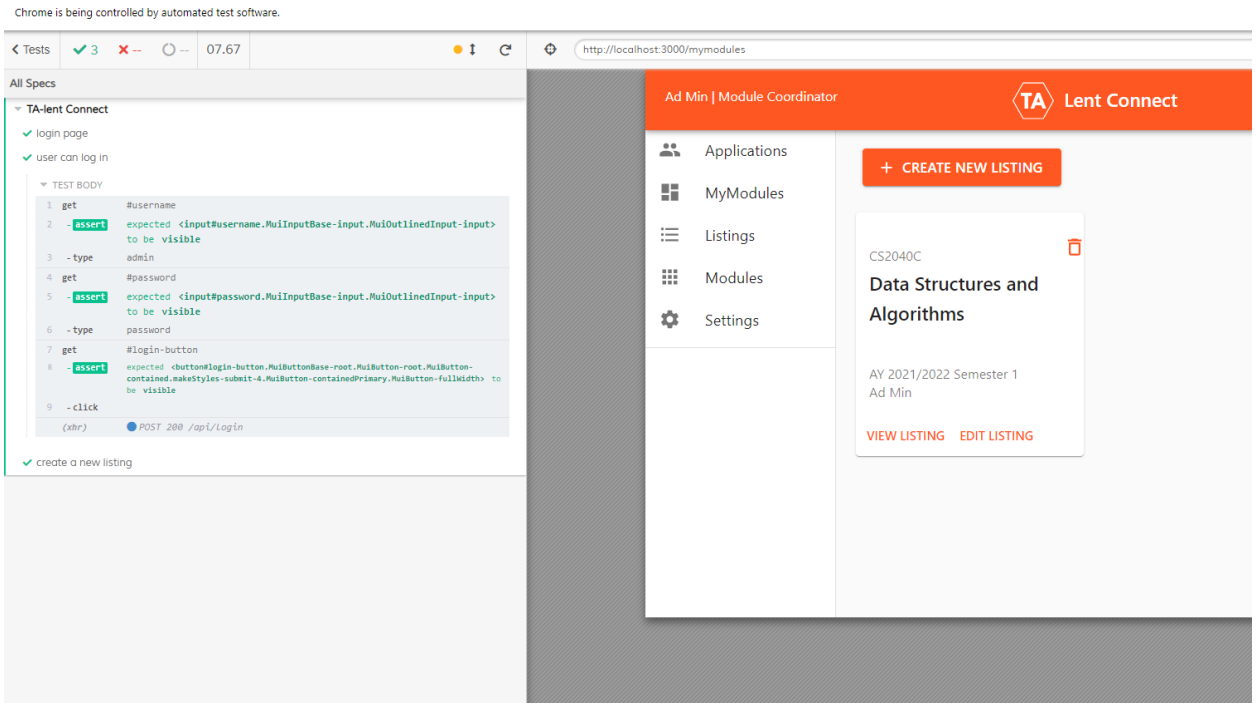
We are able to test the entire application through its REST API along with Unit Testing.



Frontend (Cypress)

Jest is also used in our frontend testing.

However, we mainly use End to End testing of our web application using a browser and the Cypress testing library



Development Plan

Work Completed (Milestone 2)
The following phases and features have been completed:

3. System Functionality
    a. Add the various different pages such as Modules, Listings, Applications
    b. Navigation to different pages
    c. Implement grouping of users into students and staff, leading to different versions of the app being rendered
    d. Add the ability for module coordinators to create, edit and delete TA listings for a module
    e. Visual aesthetics of application

4. Testing
    a. Add frontend tests using Cypress
    b. Add backend tests using JEST
    c. User acceptance testing from distributing our deployment to potential users and obtaining testers feedback

Work Remaining (Milestone 3)
The following phases and features have yet to be completed:

3. System Functionality
    a. Ability to upload and then subsequently download files to be stored on MongoDB as part of a listing (module coordinator side) or as part of an application (student side).
    b. Connecting to NUS Authentication Service
    c. Add Forum/Review of modules feature

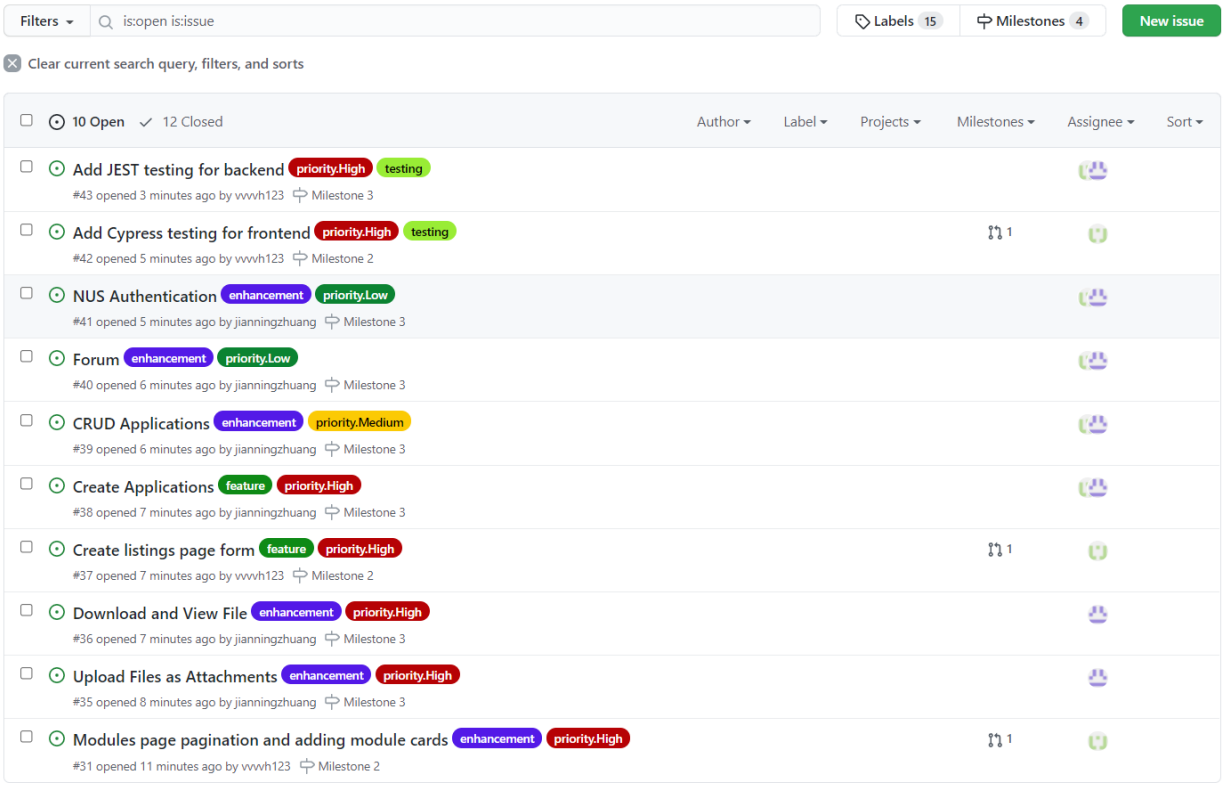
4. Project Documentation
    a. User guide
    b. Developer guide

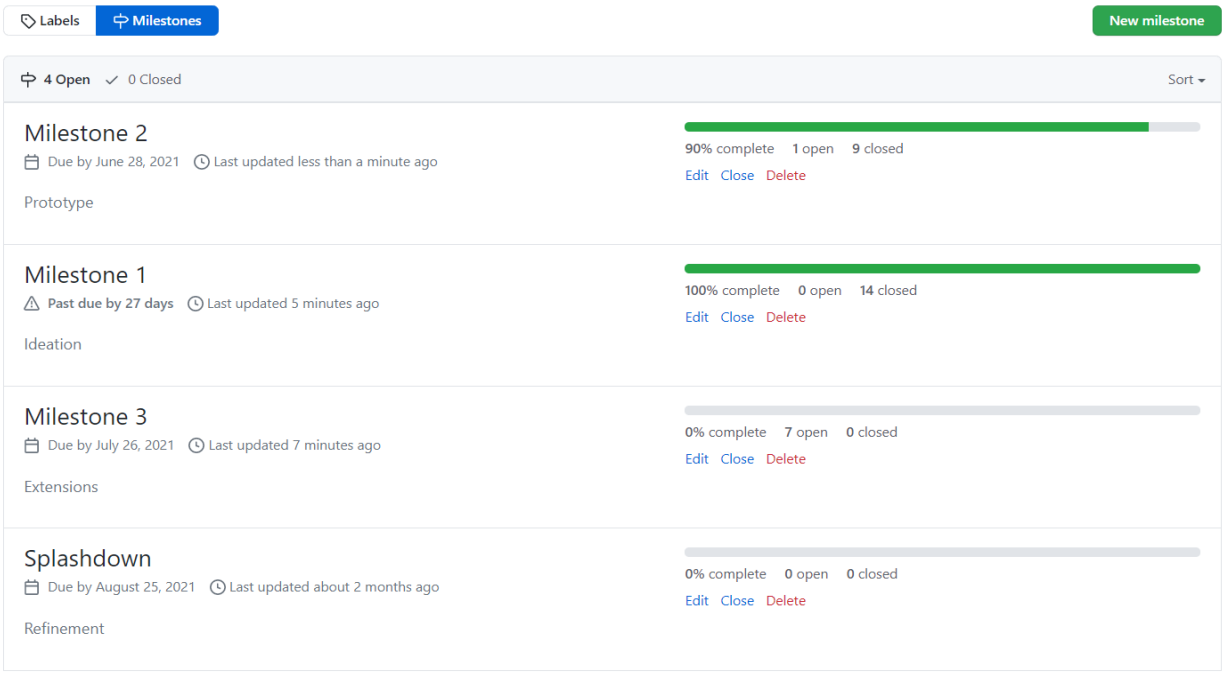
Software Engineering Practices

To track our progress throughout the project and collaborate effectively, we made use of some software engineering practices.

1) Github Issues

As shown in the screen captures below, we make use of Github Issues to track tasks that need to be done. This includes design and implementation features, bugs, documentation and testing. With the help of Github issues, we are able to easily track our progress and assign tasks.

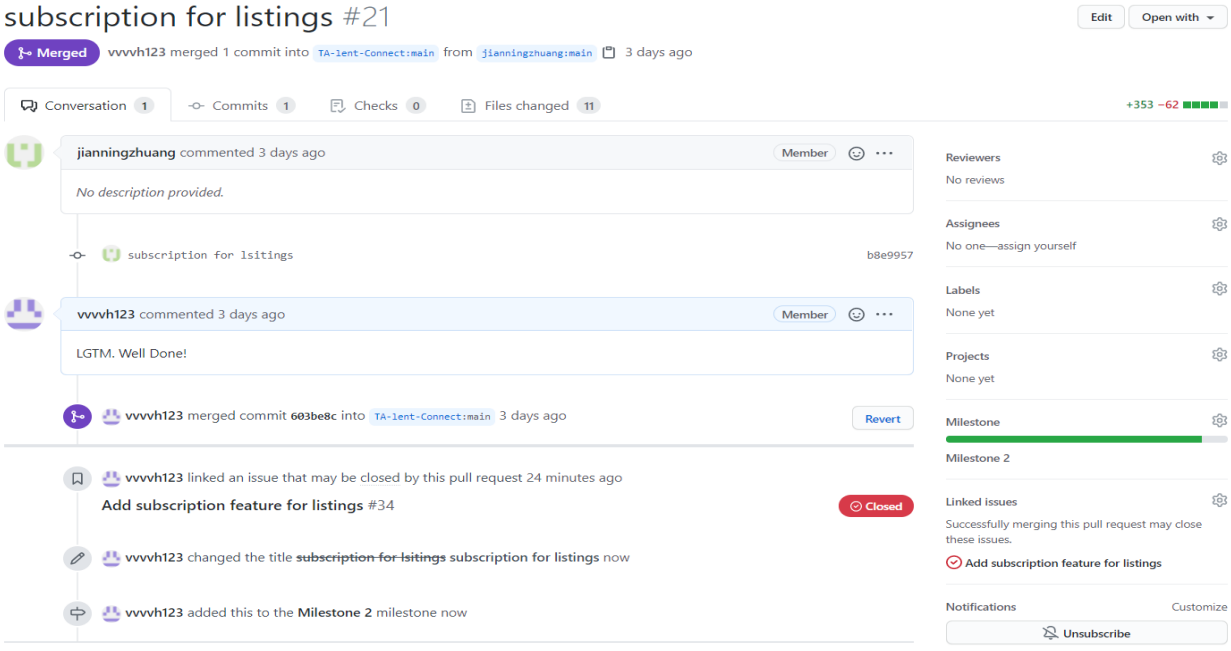




2) Forking Workflow

In the forking workflow, the 'official' version of the software is kept in a remote repo designated as the 'main repo'. All team members fork the main repo and create pull requests from their fork to the main repo. These pull requests are then reviewed by the other team member before merging to the main repo.

The screen capture below shows a pull request from Milestone 2.



3) Continuous Integration and Regression Testing

Milestone 3

Deployment: https://talentconnect.herokuapp.com/

Features

This section will cover the final list of features implemented for TA-lent Connect.

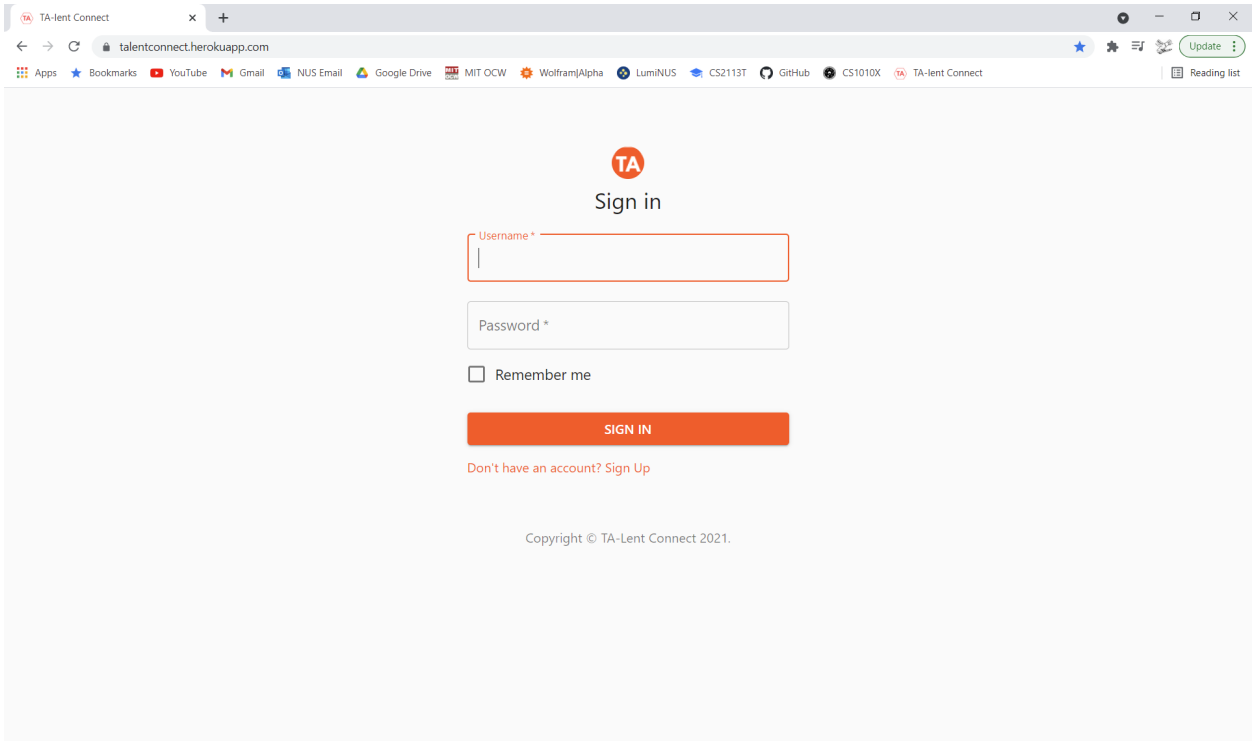
Summary Table for you to copy paste for peer evaluation :-)

Feature	User Role	Desired Outcome
Login and Authentication	All Users	Allow users to register and sign in to their TA-lent Connect Account. Separates users into Students and Module Coordinators
View all modules available at NUS	All Users	Calls NUSMods API to list all modules currently offered by NUS. Listings can be viewed from the module card if it exists.
Create, update and delete listings for any module	Module Coordinators	Module coordinators can create listings by filling up a form. Validations in place to ensure valid listing based on modules offered by NUS. Module coordinators can update and delete listings that they created
View listings	All Users	Listings are listed as cards which can be clicked on to reveal more details and application instructions to download
Favorite a listing	Students	From the 'Listings' page, students can favorite the listings they are interested in. Only these listings will show up in the MyModules page, allowing students to view just the listings they are interested in.
Sort and Search Listings	All Users	Listings can be sorted by alphabetical order or by newest update. Search Bar helps to search for listing based on module code or module title/description
Create and delete applications	Students	Students can create applications for a particular listing by filling up a form. Students can delete applications that they created.
View applications	Module Coordinators	Module Coordinators can view all student applications for each of their listings. Details such as Name, Email, Major, and Year of Study are included, so they can make contact if interested.
Forum	All Users	Discuss, read, and share your thoughts/experience as a TA/Prof on

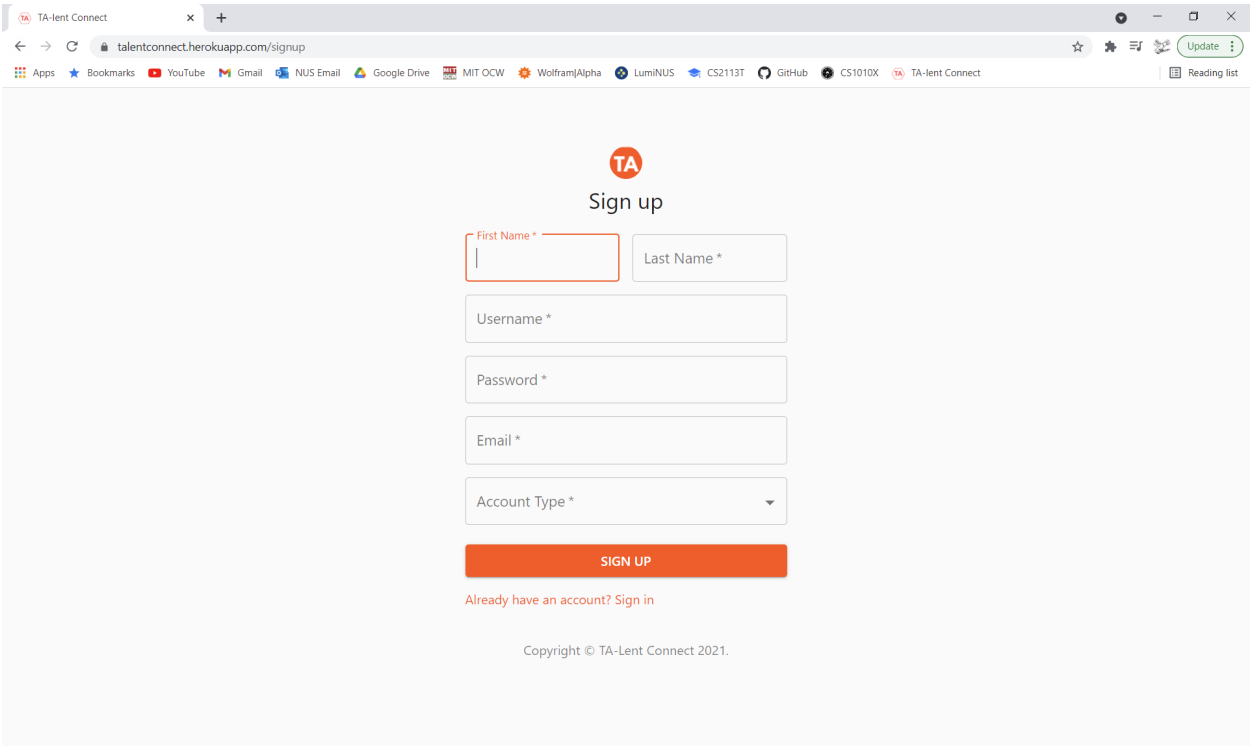
		each listing’s forum. Forum is located underneath the listing, with a unique one for each module.

Login and Authentication

Users are greeted with the Login Page when they visit TA-lent Connect at https://talentconnect.herokuapp.com/



The Login Page will allow users to login to TA-lent Connect using their username and password. For new users who do not have an existing account, the sign up button redirects users to the Sign Up Page where they can create their account by providing the appropriate details and choosing their account type between Student or Module Coordinator.

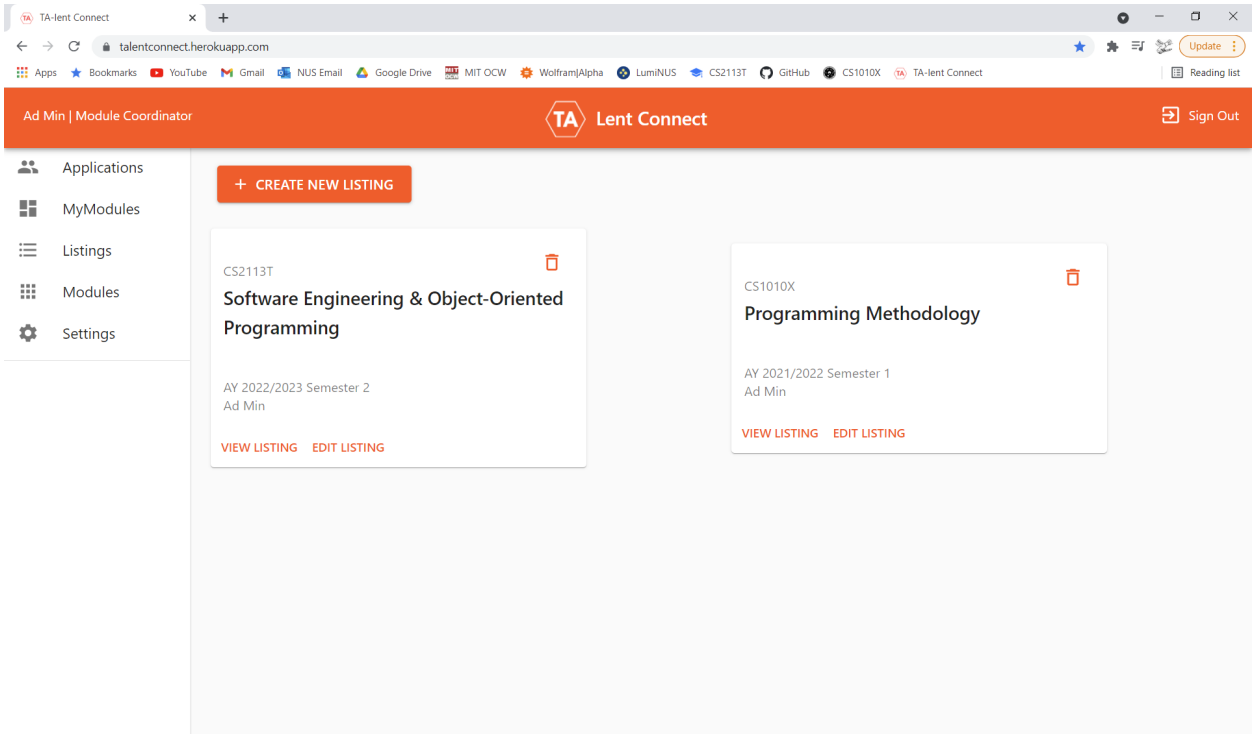


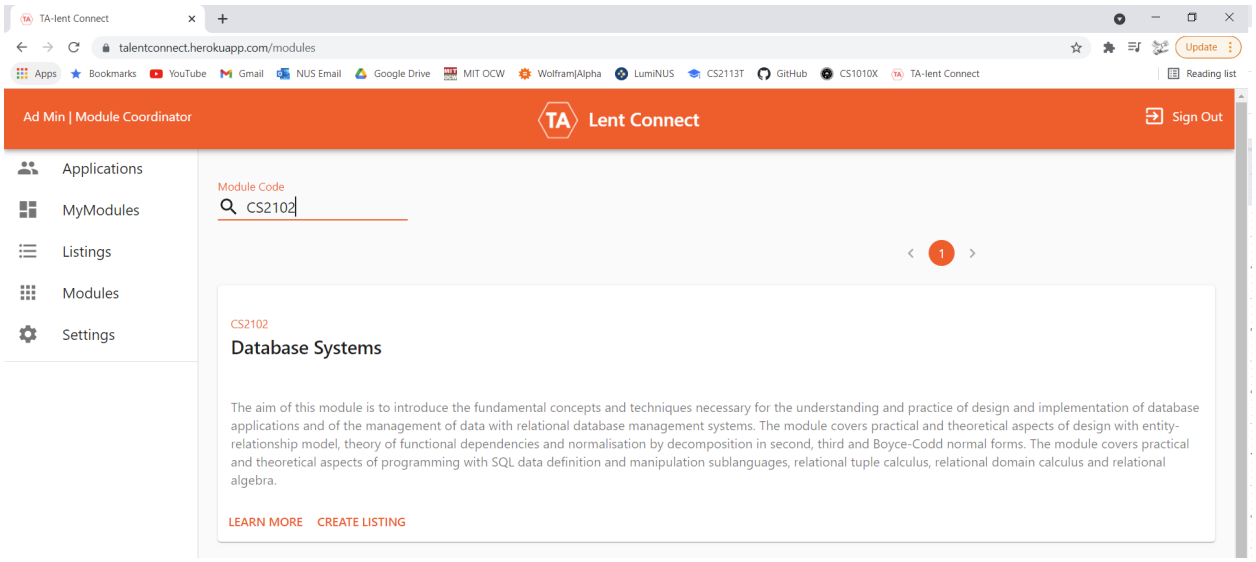
Validators are in place to ensure user input for username and password follow our authentication specifications. Duplicate usernames are also not allowed when registering a new username.

Upon successful login, Module Coordinators are brought to their MyModules Page while Students are brought to their Listings Page.

<u>Listings(CRUD)</u>

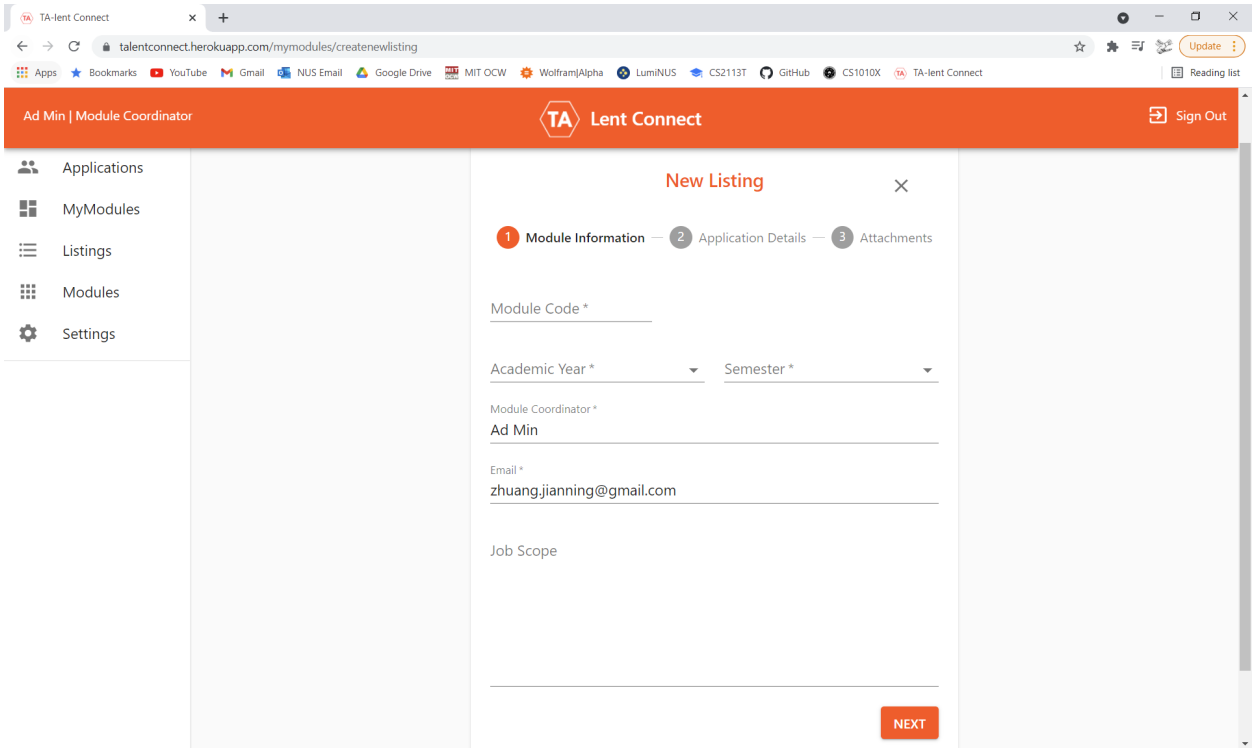
Create:
Only Module Coordinators are allowed to create listings. Listings can be created either from the MyModules Page or through module cards in the Modules Page.





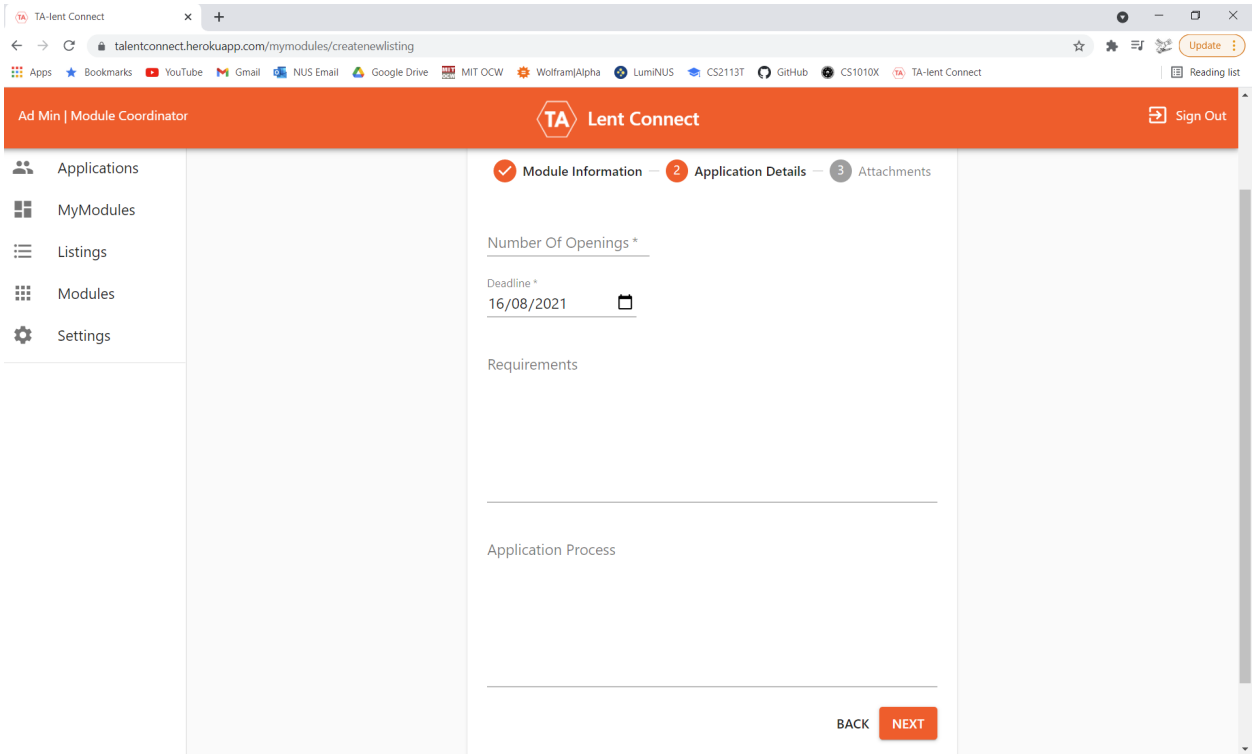
The difference between the 2 being that the module code will be autofilled if the listing is created through CREATE LISTING in the module card.

The create new listing form is split up into 3 sections to partition the type of information required from the Module Coordinator. It also makes the form more intuitive and user friendly. For example, the Module Information section only deals with details like the module code, academic year, semester, module coordinator, etc.



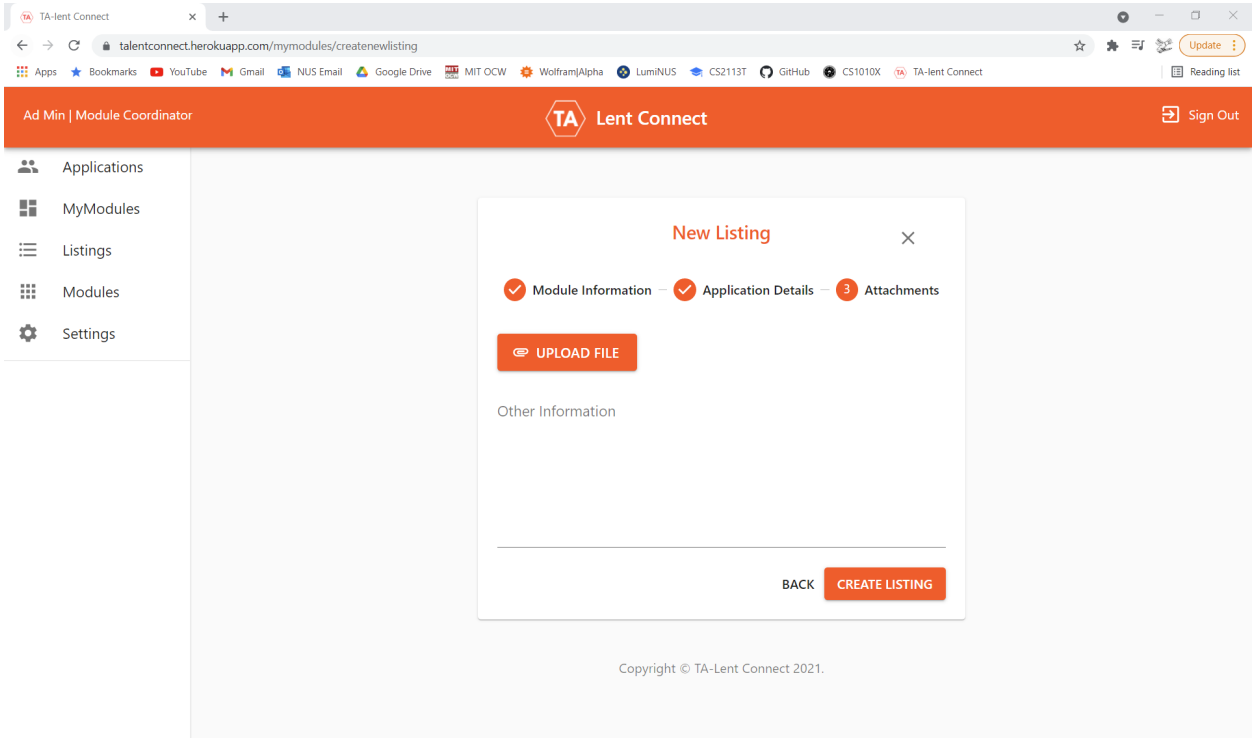
Validators are also in place to ensure that the module code is valid from the list of modules found in NUSMods. There is also a check for duplicates for listings with the same module code, academic year and semester. Fields like Module Coordinator and Email are autofilled with the user information used to sign up for TA-lent Connect but are allowed to be edited.

The Application Details section focuses on information like Number of Openings, Deadline for application, Requirements and even the application process.



Module Coordinators are only able to press NEXT when they have filled up all the requirements in the current section.

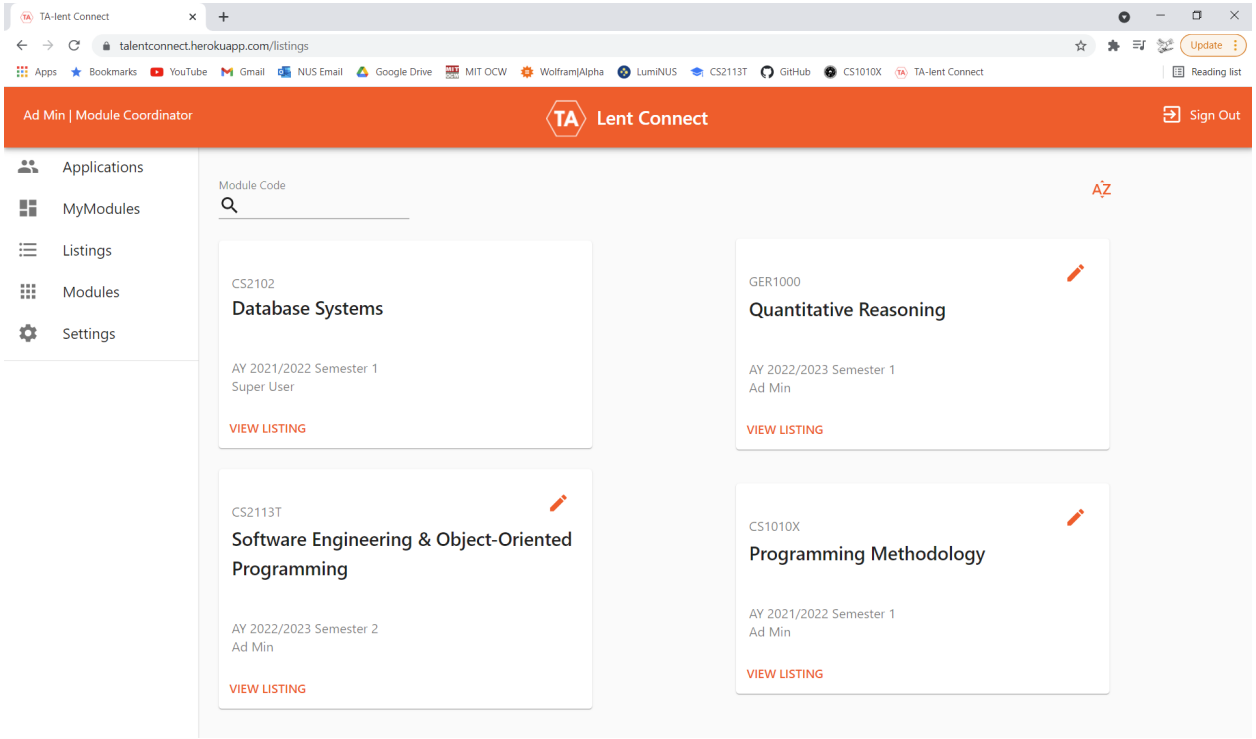
Lastly, the Attachments section allows the Module Coordinator to Upload instructions in the form of files such as pdf or docx. There is also a section for any other extra information which allows for flexibility.



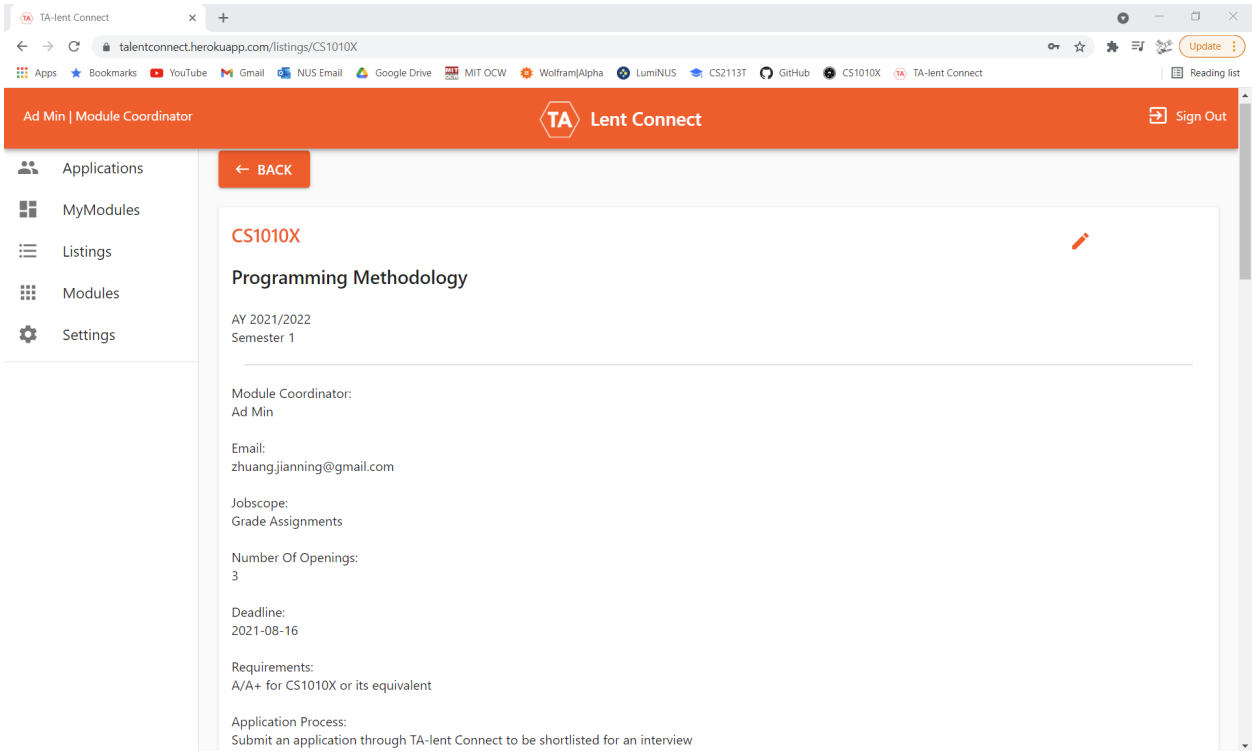
Once the listing is successfully created, the module coordinator will be brought back to their MyModules Page where they can view the cards for all their current listings.

Read/View:

Both Module Coordinators and Students can view all the current listings through the Listings Page.

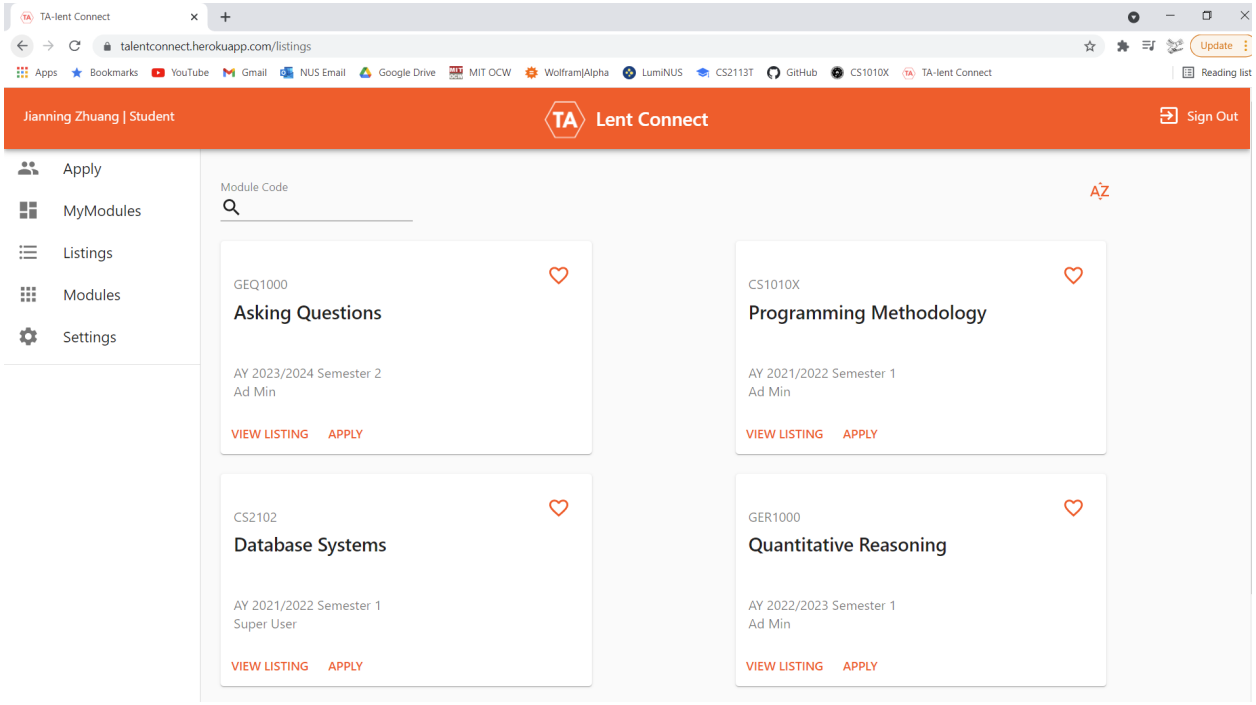


Listings are displayed as cards and can be viewed by clicking on the card or the VIEW LISTING button.



More detailed information can be viewed. Any attachments such as application instructions can also be downloaded. If a listing is owned by the user, they are able to click on the edit icon to update their listing.

On the Student side, the cards instead have heart icons which students can use to favourite the particular listing and save it to their MyModules Page.

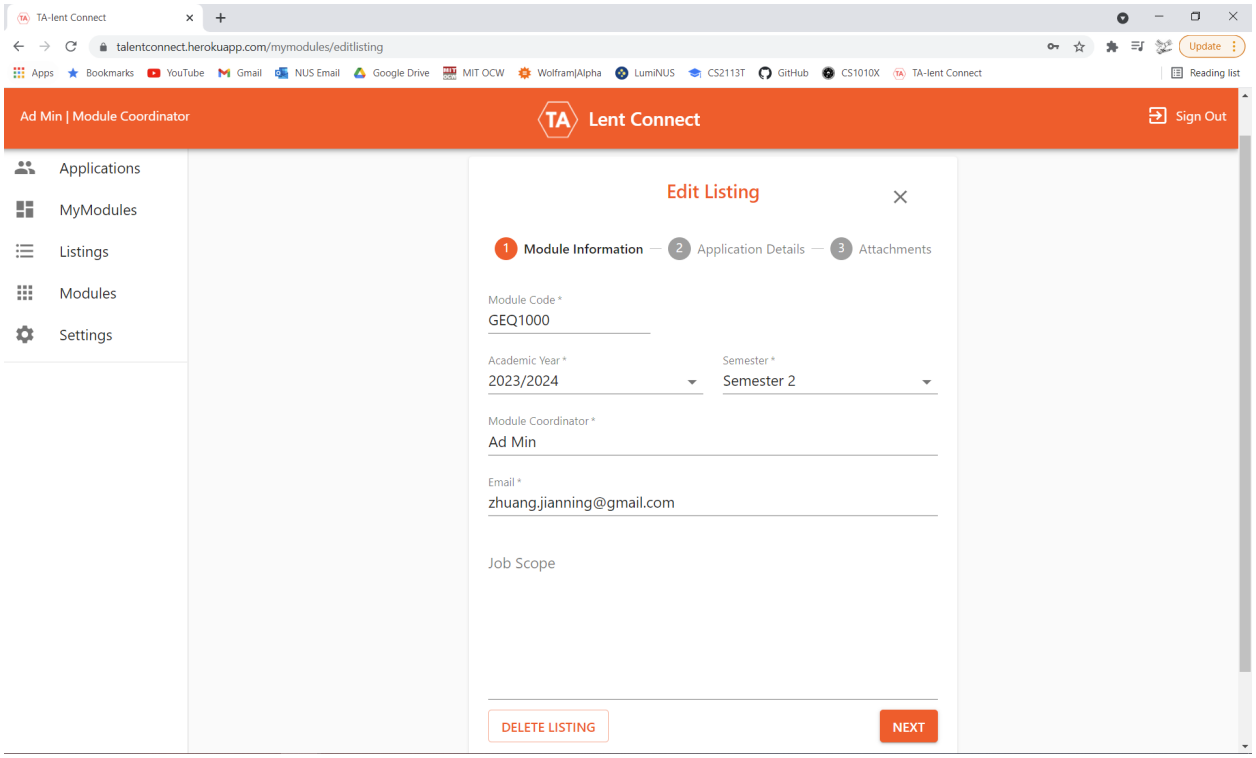


There is also a search bar at the top of the Listings Page where users can filter the listings by module code or a description of the module title. Users can also toggle between newest listings or sort the listings by alphabetical order.

Edit/Delete:

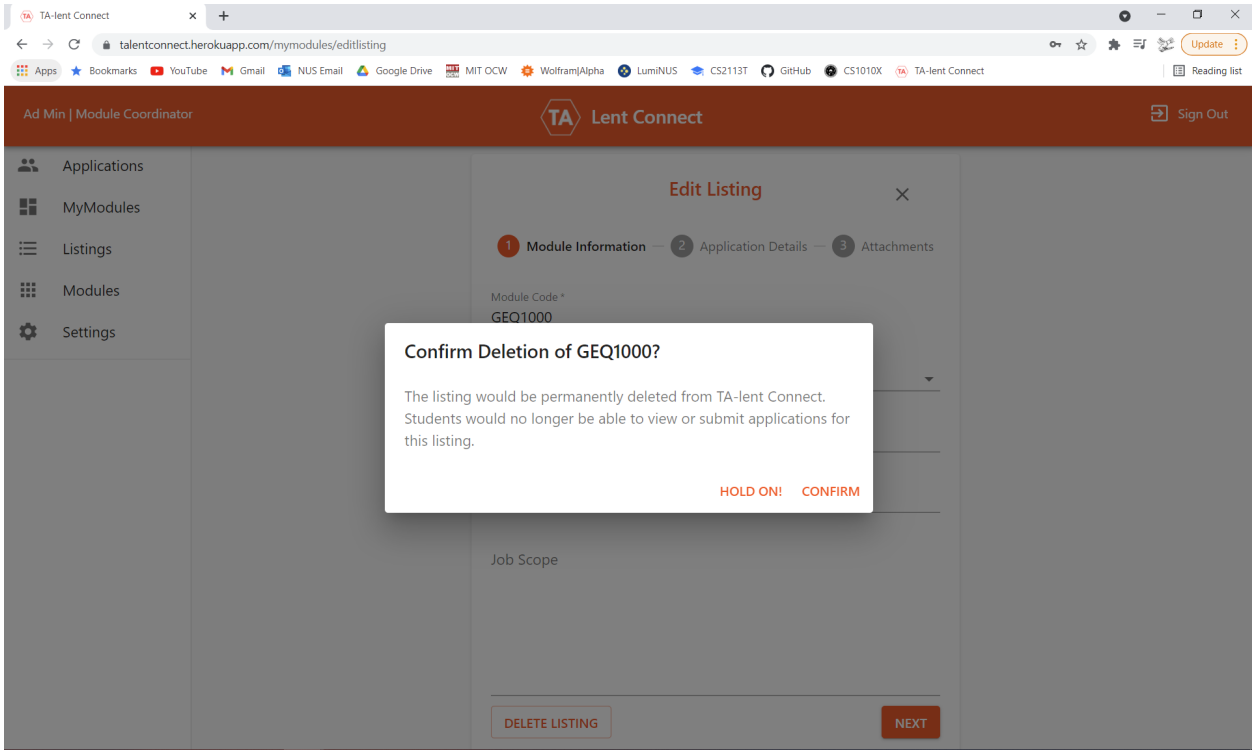
Only Module Coordinators are allowed to delete their own listings. This can be done through the MyModules Page or through the Listings Page for their own listings.

Editing the listing brings back the create listing form but with all the current information filled.



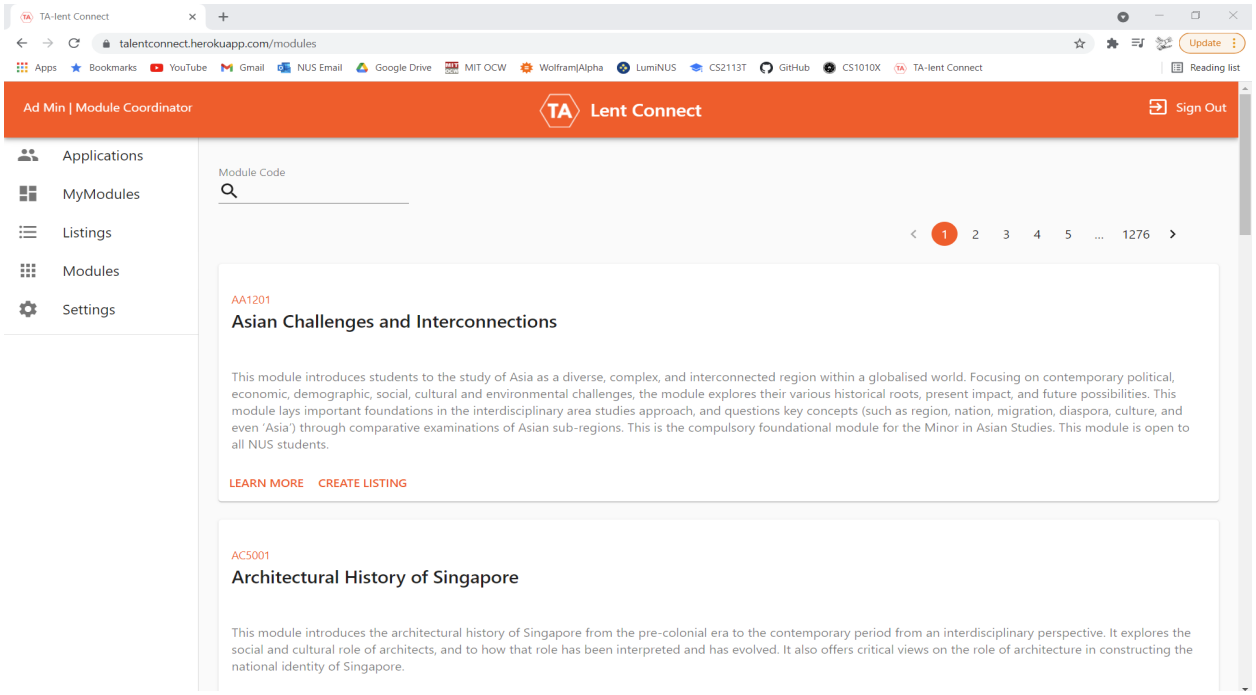
All checks on valid module code and listings still apply.

Listings can also be deleted by clicking on the DELETE LISTING button or icon on the listing cards. A confirmation alert will pop out as deletion is a permanent action.

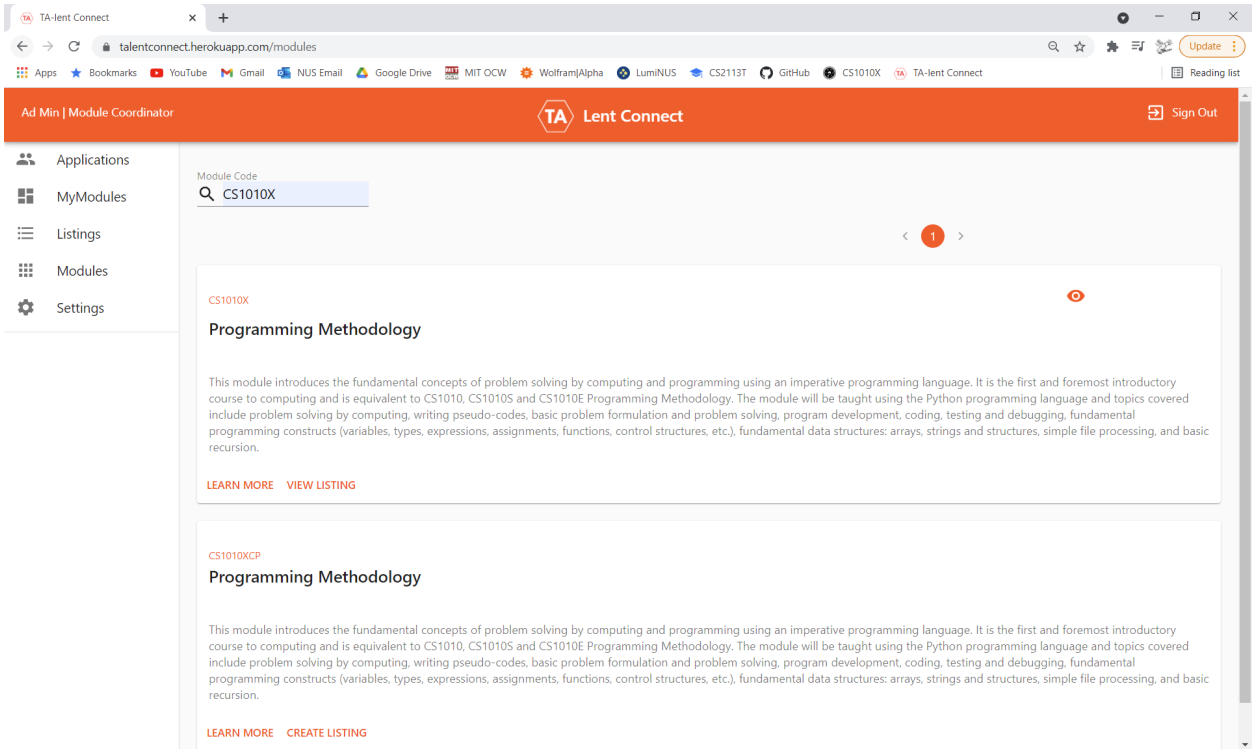


Modules

The Modules Page lists all current modules offered by NUS. A search bar and pagination allows users to search for modules easily.



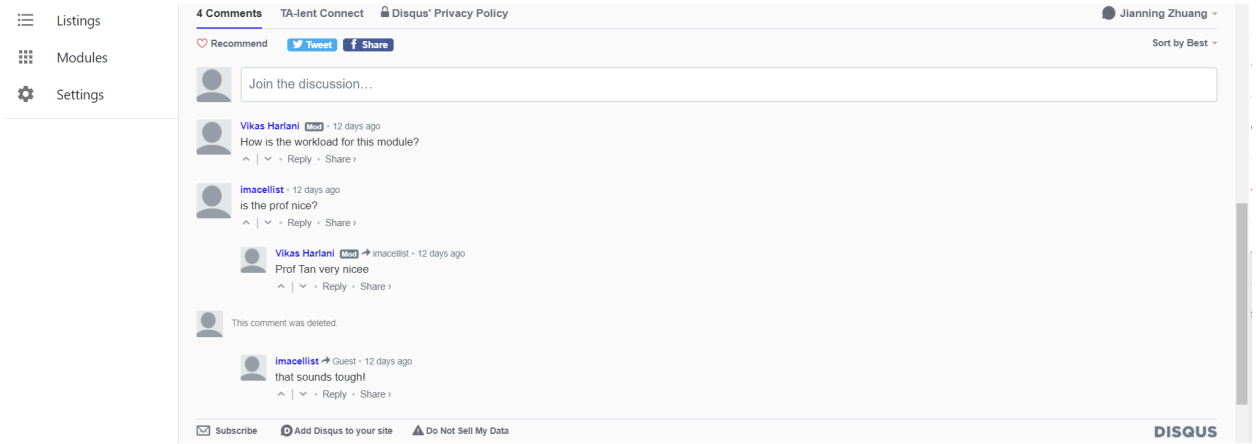
If a listing exists for a particular module, there would be an icon to show a listing exists and a button to VIEW LISTING. If not, the CREATE LISTING button is shown instead which allows module coordinators to create a new listing from the Modules Page. The listing form will be autofilled with the module code of the module card which was selected.



Clicking on the LEARN MORE button will redirect the user to the corresponding page on NUSMods for more information on the module.

Forum

Each listing has a forum that goes along with the listing information. Users can sign in with their Disqus account and start a discussion for the listing.



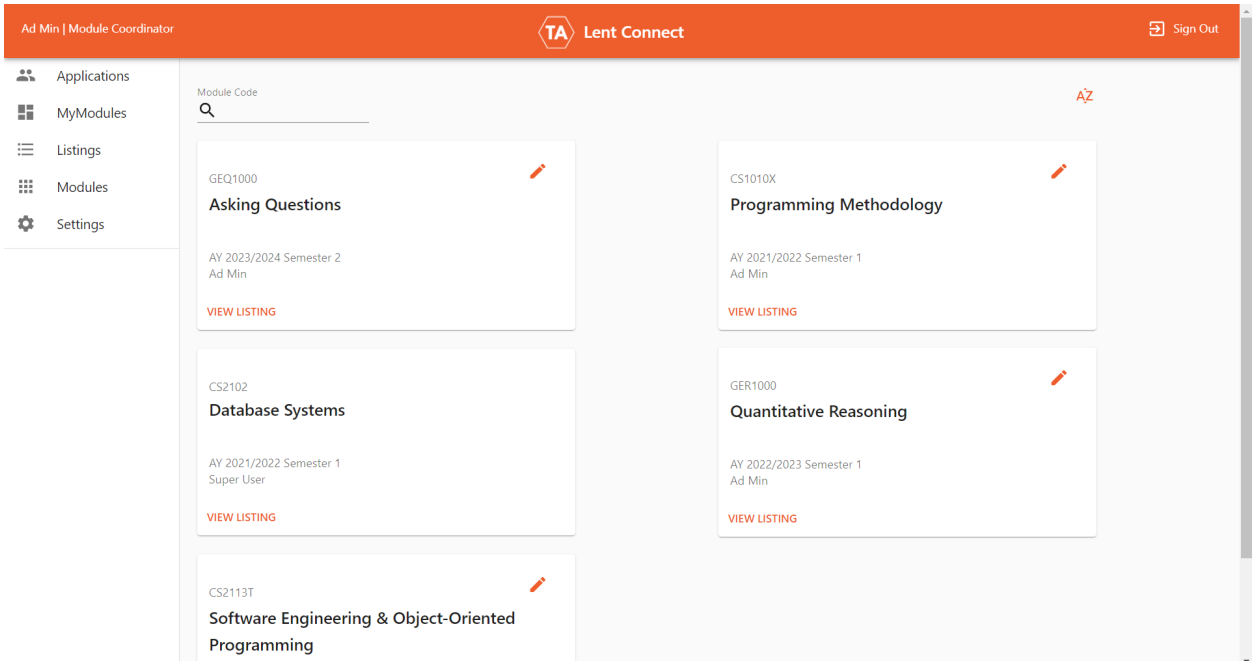
Past TAs can provide a review to the module they TAed for (either anonymously or by identifying myself) so that others can read about their experiences.

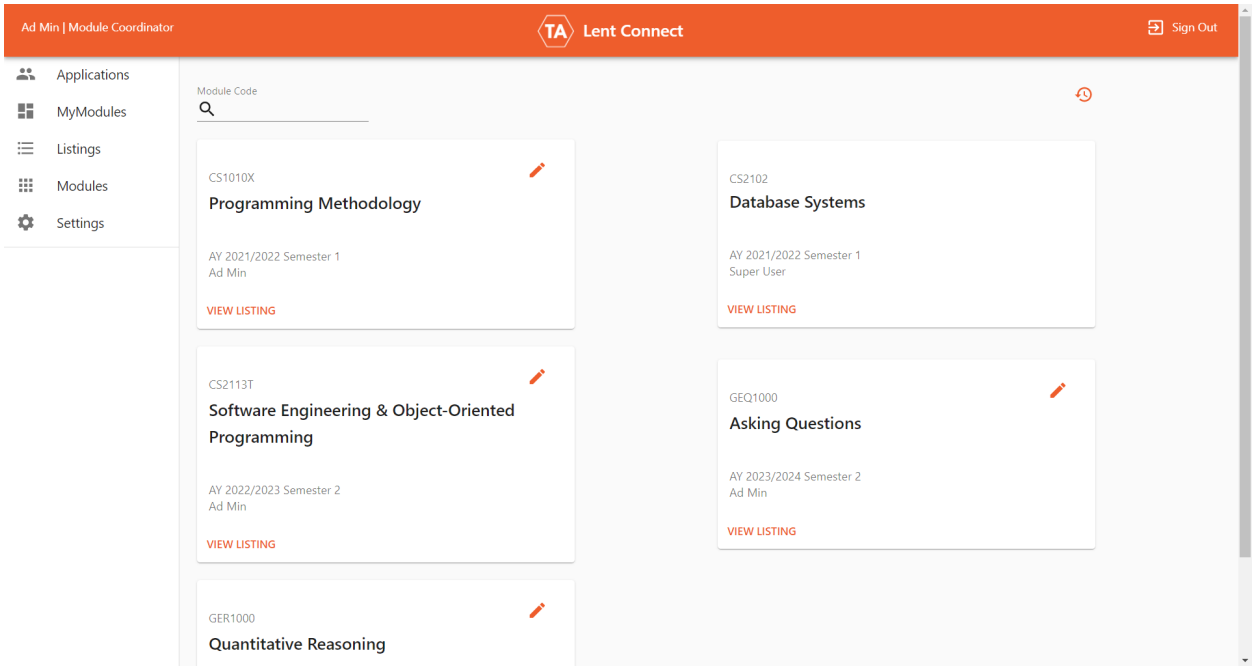
Prospective TAs can view reviews and testimonials from previous TAs so that they can get a better understanding of the experience and level of commitment.

Module Coordinators will be given admin level access to moderate the discussion in their listing.

<u>Sorting</u>

Listings can be sorted either by alphabetical order or by when they were last updated/created.



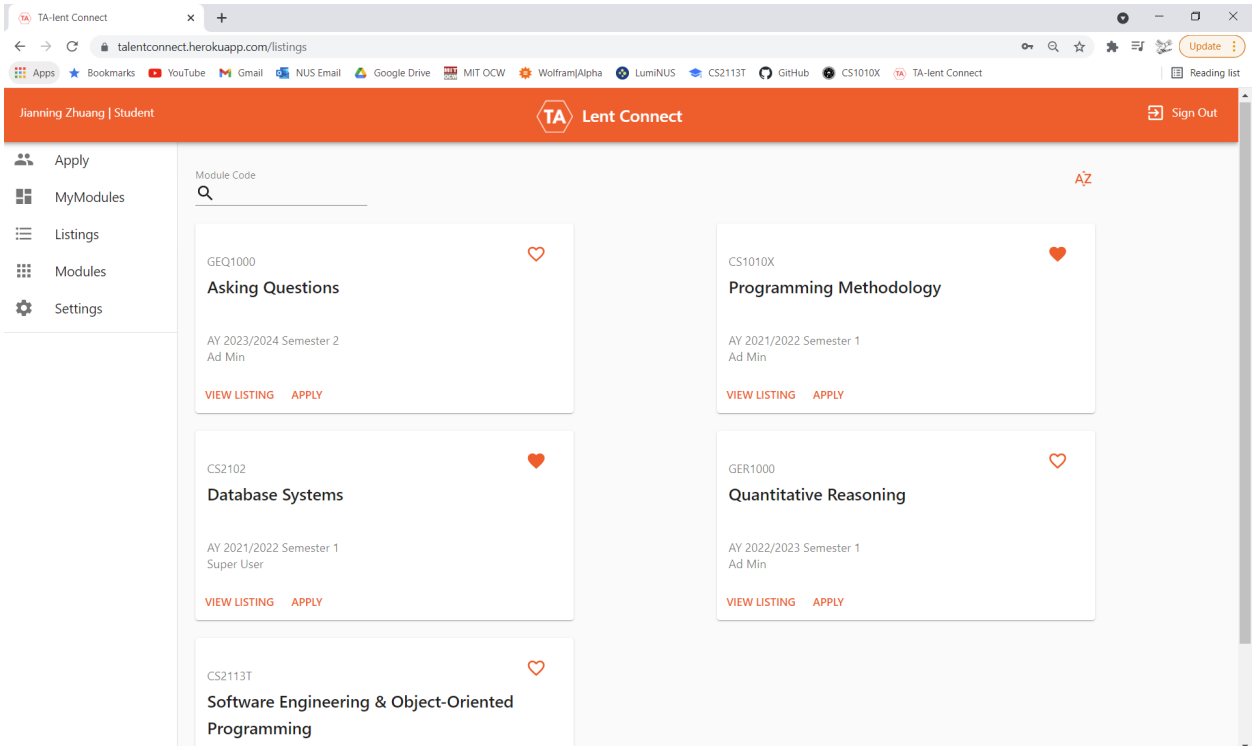


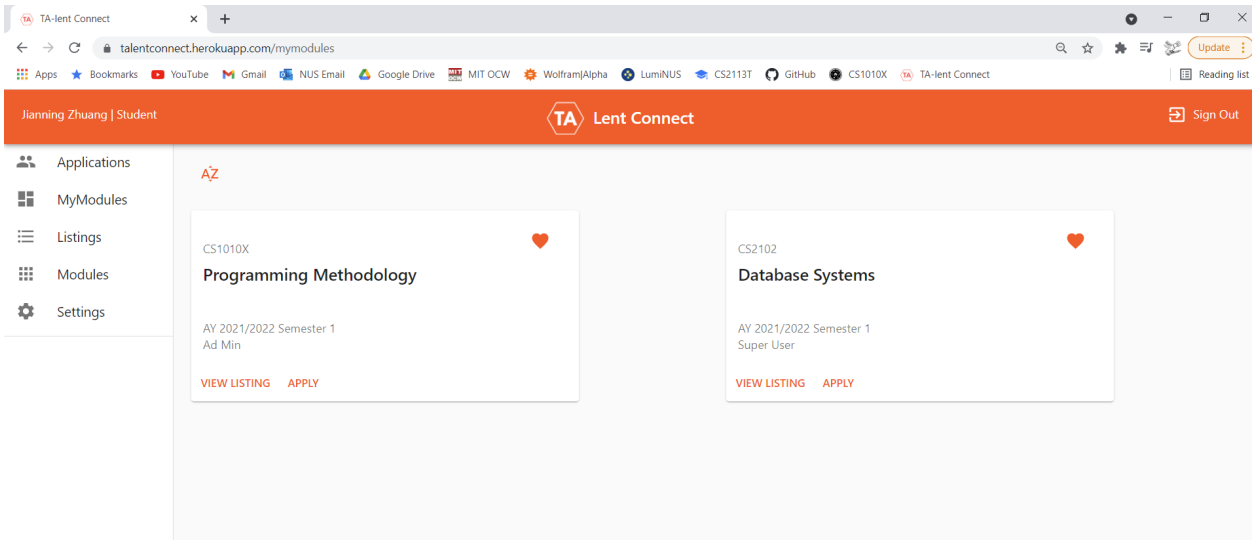
The icon and hover over text will change to show how clicking the button will sort the listings. For example, clicking the icon when it is AZ will sort the listings by alphabetical order while clicking the icon when it is a clock icon will sort by newest listings.

Sorting listings by newest allows users to keep up to date with the newest listings.

<u>Favourite</u>

Students can favourite particular listings and save them to their MyModules Page. This allows them to easily view the listings they are interested in and receive notifications when a listing is updated





Applications

User Testing

Survey CS1010X Teaching team
Peer evaluations
Friends and batchmates from CEG

Sorting

One of the most requested feature was the ability to toggle between newest/most updated listings and alphabetical order

Forum

Another feedback was to include the forum within the listing card instead of in the module card. Also tag the forum by module code so can be shared by multiple listings with the same module code cos when the module is over testimonial

Accessibility

Create listings from 2 places, a completely new listing from mymodules or a partially filled listing from modules

Edit listings from Listings and Modules Page if listing belongs to you

Naming of Pages

More intuitive naming of different pages

Development Plan

Work Completed (Milestone 3)
The following phases and features have been completed:

Future Extensions

The following phases and features have yet to be completed:

Code Base:

https://github.com/TA-lent-Connect

Deployment:

https://talentconnect.herokuapp.com/

Poster

https://drive.google.com/file/d/1YLEc595oOh_CHfv7zBZt1q15to3Qefk1/view?usp=sharing

Video Demo

https://drive.google.com/file/d/1p3gK8A13uJseC_csq8wP1uDAlNQB7bsb/view?usp=sharing

Project Log

S/N	Task	Date	Orbitee 1	Orbitee 2	Remarks
Liftoff					
1	Liftoff	12 May	2	2	Programme Overview and Project Consultation
2	Poster + Video for Liftoff	13 May	3	3	
Milestone 1					
3	Weekly Team Meeting	14 May	2	2	Initial Planning and Wireframes
4	HTML/CSS/JS workshop	15 May	2	2	Mission Control #1
5	Web app development: ReactJS Workshop Part 1	15 May	2	2	Mission Control #1
6	Weekly Team Meeting	21 May	2	2	Discussion of implementation and features for Milestone 1
7	Web app development: ReactJS Workshop Part 2	22 May	2	2	Mission Control #2
8	UI/UX Workshop	29 May	2	2	Mission Control #3
9	Learning Tech Stack	10 May to 30 May	20	20	Fullstackopen course (includes React, Redux, Node.js, MongoDB, GraphQL and TypeScript)
10	Weekly Team Meeting	29 May	2	2	Integration of Frontend and Backend

11	Programming at home	20 May to 30 May	10	10	Implement System Functionalities as listed in Development Plan -> Work Completed(Milestone 1)
Milestone 2					
12	Qualitative Evaluation Workshop	5 June	2	2	Mission Control #4
13	Software Testing Workshop	5 June	2	2	Mission Control #4
14	Weekly Team Meeting	6 June	4	4	Discussion of implementation and features for Milestone 2
15	Programming at home	6 June to 26 June	30	30	Implement functionalities as listed in Development Plan -> Work Completed(Milestone 2)
16	Weekly Team Meeting	13 June	3	3	Integration of current features
17	Learning Software Testing	14-18 June	5	5	JEST and Cypress
18	Weekly Team Meeting	20 June	3	3	Documentation and Diagrams
19	Weekly Team Meeting	27 June	5	5	Wrap up Milestone 2 (create a video, deploy latest version, and documentation)
Milestone 3					
20	User Testing	1 July	3	3	Prepared and sent out surveys for User Testing
21	Weekly Team Meeting	1 July	2	2	Discussion of implementation and features for Milestone 3
22	Programming at home	2 July to 18 July	20	20	Implement functionalities as listed in Development Plan ->

					Work Completed(Milestone 3)
22	Weekly Team Meeting	14 July	5	5	Discuss results of User Testing
23	Programming at home	19 July to 26 July	15	15	Implement and tweak features based on User Testing
24	Weekly Team Meeting	26 July	5	5	Wrap up Milestone 3 (create a video, deploy latest version, and documentation)

Total Hours: 306
Orbitee 1: 153
Orbitee 2: 153