1. What technologies (or code libraries) did you use to build the front-end, back-end, and database in this Mission?  What is **one alternative technology** you could have used instead for each of the front-end, backend and database components?  What are the **benefits, strengths, and limitations** for each of the technologies you used, compared to any alternatives?

As part of group two I was task to build the Student Project Page and the Student Profile Viewer.

Database: We settled on the use of MySQL and MySQL Workbench as the main technology behind of database and RDBMS. MySQL uses Structured Query Language (SQL) to manipulate data in our database. MySQL workbench also has an interactive user interface that allows us to view query data in a table like structure for readability.

While being open source, MySQL can efficiently manage your data. It is powerful, dependable and stable way. It use relational database which has been around for more than 40 years and one of the most commonly used database in web application. It is extremely easy to use, inexpensive and has a large developer community.

An alternative to using a SQL database we could of use a NoSQL database. For example MongoDB. MongoDB is a document database that stores date in a JSON-like format. Data stored in this fashion can be manipulated easily but NoSQL database are non-relational. Although NoSQL are being adopted quickly, the community of support remain relative small compared with MySQL.

To compare these two directly would be unfair as they both serve their own purpose, so we will compare them based on application in Mission X.

* Although relatively easy to learn, SQL database restricts us to working within a predefined tabular schema, where more care must be taken to organise and understand the data. For example. Initiation of primary and foreign keys
* NoSQL on the other hand requires less emphasis on planning, greater freedom when adding new attributes.
* The SQL language itself is mostly uniform across all relational database management system. Fluency in one translate to proficiency in most others.
* As For NoSQL, many of them have a unique data manipulation language constrained.

To conclude, MySQL just seems like the most obvious choice.

Backend:

In terms of technologies for our backend. We can break it up into a few categories.

-First we have the runtime environment/programming language allowing scripting in the backend,

-then we have the framework, built upon the environment

-then we have the library used with in the frameworks

Since we are building everything in JavaScript for the sake of simplicity we will only focus on the library and framework then a bit of the modules use on top of Node.js after a brief description.

NodeJS is open-source, cross-platform JavaScript code that runs on servers. It uses an asynchronous event-driven model and is designed to build scalable network applications. It’s built on Google Chrome’s V8 engine, which makes it fast and efficient to develop apps.

Node.js advantages are numerous and beneficial to all kinds of apps whether you are building a payment system or a video streaming app. Some benefits are identified below. NodeJS:

* Has unmatchable speed due to its non-blocking architecture and event loop feature.
* It is highly scalable despite its single-threadedness.
* It makes debugging easy as it uses Google Chrome’s V8 JavaScript engine to execute code.
* It has a large library of various JavaScript modules that simplifies the development of web applications using NodeJS to a great extent.

Cons of NodeJS

* Uses asynchronous programming model, which can be confusing for beginner developers. However, once mastered, this model helps to improve app performance and responsiveness.
* Lacks support for some databases, like relational ones. In any case, developers can solve this challenge using frameworks such as Express.js.

*Taken from* [*PROCODERS*](https://procoders.tech/blog/express-js-vs-node-js/) *2022*

Node.js Frameworks

We settle on the use of Express.js Framework to build MissionX. Express.js is the best Node.js framework according to[*SIMFORM*](https://www.simform.com/blog/best-nodejs-frameworks/). It has a minimalistic approach and does not require a steeper learning curve. Basic understanding of Node.js environment will be enough.

Some benefits of Express.js includes:

* Rapid server-side programming packages- the framework has many Node.js features as functions and speeds up the process with few code lines.
* High performance- multiple operations are executed independently of each other using asynchronous programming
* Super-high test coverage helps build applications with maximum testability.
* A myriad of HTTP helpers- they make programs more intelligible, reusable.
* Better content negotiation- this helps in better communication between the client and server by providing HTTP headers to URLs, which fetch the exact information for the users/client-side.

Meteor.js is an alternative framework that could have been instead of Express.js. It is an open source platform for seamlessly building deploying Web, Mobile and Desktop application in JavaScript.

A comparison of both these framework would show that Express.js is superior in the backend but Meteor.js is superior as a full-stack framework. Setting up a new project in Express.js is super easy with a simple npm install. Express is also very easy for Node.js beginners. Express.js also poses robust routing and Http helper which is mandatory for the completion of Mission X. In other words Express provides a routing mechanism for the user requests alongside a middleware to provide necessary responses to the user requests. Express.js is not without its limitation. It has is no single recommended way of doing something which can distraught new users. It is also a framework only for the backend which mean you’ll need to learn another framework to develop the front end. Other benefits includes:

* Does not depend on patterns such as MVP, MVC, etc. So, developers can develop applications as they prefer, without a huge learning curve
* New developers can simply start developing applications even without much programming experience.
* You can create application structures within seconds by using the express application generators via npx or npm.
* You can use all the built-in express middleware or customize them for your usage
* Allows you to render HTML pages by passing arguments to the templates dynamically

*Chameera D. 2022*

Meteor.js on the other hand is pure JavaScript and full-stack framework meaning it can be used in both front-end and the back-end. Meteor.js also provided utilities that takes the place of installing packages like Nodemon. Other benefits includes

* Allows us to use a single language. So, developers can use JavaScript at both server-side and client-side development.
* Real-time updates by default. It automatically performs live updates. For example, if a user is filling a form, it will be pushed to all other browsers in realtime.
* The smart package option is quite beneficial. You can implement functionalities like user registrations in seconds by using Meteor packages. Therefore you can build applications quite fast.
* The community support. As a growing framework over half a million users, support for you is always there.
* The ability to convert web apps into mobile apps. Meteor allows us to implement native functions within our apps without using any 3rd party libraries.

*Chameera D. 2022*

Frontend:

React.js was our go to frontend library. It is a free and open-source front-end JavaScript library for building user interfaces based on UI components. It is maintained by Meta and a community of individual developers and companies.

*Jens. H 2017*

There are a lots of benefit of using React. First of it has a huge community. Choice of technology is community-driven. React has exceptional community support. The number of React developer across the globe is a core advantage. Another great benefit of React is its learning curve. React has an accessible learning curve that anyone with minimal JavaScript skill can master.

An alternative to React would be Angular. Which is a TypeScript-based JavaScript framework. Developed and maintained by Google. Like React, Angular has tons of benefits to the user. For example, Angular is great for cross-platform development.

Comparison of Angular and React

Both of them are component-based. Meaning that reusability are their main focus.

React focuses on the use of JavaScript ES6 while Angular relies on TypeScript. Even though TypeScript offer a more consistency in related exampled and open source project, it is not standard JavaScript. So there is going to be a bit of a learning curve. React uses JSX a pre-processor for HTML-like syntax which will be compiled in JavaScript later. It has some quirks — for example, you need to use className instead of class, because the latter is a protected name in Javascript. JSX is a big advantage for development, because you have everything in one place, and code completion and compile-time checks work better. he Angular templates are enhanced HTML with special Angular language (Things like ngIf or ngFor). While React requires knowledge of JavaScript, Angular forces you to learn Angular-specific syntax.

1. If you could choose an upcoming technology (e.g. Machine Learning, Blockchain, Chatbot, Virtual Reality) to add to your solution in this Mission to enhance its functionality, what technology would you choose? How would applying this technology improve the solution? What are the benefits, strengths and limitations of this technology you chose?

I believe that a Chatbot would be one of the best upcoming technology to enhance the overall functionality not just of the two pages I’ve worked on but the whole website.

“Level Up Work” is design and directed to teachers and student. It holds and monitors all the teaching materials that is used. With that said, there is going to be questions especially on the part of the student. Remember the website is a wealth of information, providing everything that the teacher and students needs. Unless time is taken to go through every aspect of the website there is going to be a bit of frustration. Readily available and accessible information at the user disposal can feel overwhelming. A simple chatbot responding to commands can quickly guide user on navigation and completion of tasks. Students being more technologically inclined will shift towards new technologies and prefer to adopt new technologies in learning than to follow the traditional process. Students spend most of their time on social media and other mobile applications. Adding education chatbots to your learning environment can be beneficial for both teachers and students.

Research from [USMSystems](https://www.linkedin.com/pulse/what-benefits-chatbot-development-children-koteshwar-reddy/) shows that chatbot improve productivity. In fact, one study suggests that companies using e-learning strategies and tools can increase productivity by as much as 50 percent.

One noteworthy strength of chatbots is that they mimic human behaviour and interact in a conversational manner. This helps user solve problems simple like “where do I submit my work?” instead of having to disturb the teacher in the middle of the night. Some other benefits of chatbot includes improve student engagement, and 24/7 availability.

A limitation that could arise from the use of chatbot is the fact that they will lack the versatility and capability of improvisation and deduction of the human brain. Which means it going to be very difficult to help someone if you don’t know what they are talking about exactly. For example. A student not being able to articulate the exact problem they have to the chatbot would lead to the assumption that it is useless.

1. What software security practice have you applied or do you think you should apply in this project? How would that benefit the project?

One of the most common security vulnerability is a SQL injection. It allows an attacker to interfere with an application queries to a database. To run a SQL injection attack, you can find a textbox on a website that allows you to type free text. From there we can start typing some SQL code into the text box which will get sent to the database as a query.

Parameterized query is one of the software security practice I think we should implement in Mission X. We will be storing sensitive information of teacher and student. Protection preventing or reducing the probability of unauthorized/inappropriate access to data, or the unlawful use of the information is our first priority.

A parameterized query is a query in which placeholders are used for parameters and the parameter values are supplied at execution time. The most important reason to use parameterized queries is to avoid SQL injection attacks.

Another great security practice is version control. Keeping track of the source code we’ve written is paramount for successful development. It will protect the project from internal and external threats. A local git repositories as a distributed source code management has become a norm for most organisations. We also adopted this method to keep track of our mission X. We’ve also use GitHub as our remote repository. Source control is important for maintaining a single source of truth for development teams. Using it helps facilitate collaboration. Some benefits of source control are: It allows us to work on the same codebase, We can commit and merge code, We can edit shared code without unknowingly overwriting each other’s work.

1. What extra research and learning did you do to assist in completing the Mission? What research findings were applied to the code in this Mission, and how were they applied? (Please be specific, and include references to any research sources that were used.)

Tons of research have been done in completion of Mission. Most of which were revision of what was leant in class.

Material UI- <https://mui.com/material-ui/react-button/>

I incorporated buttons from as I find them to be pretty used an easy to implement.

StackOverflow- <https://stackoverflow.com/questions/47196800/reactjs-and-images-in-public-folder>

During Mission 3, most of my information was coming form an array of object. I was unable to map the image source path from the array without importing the image directly into the component that I was using. To solve this problem I jump onto stack over which taught be that this is possible when the files are in the public folder and not the src folder.

FreeCodeCamp- <https://www.freecodecamp.org/news/search-and-filter-component-in-reactjs/>

Medium.com- <https://medium.com/@mackmcquen/creating-a-filter-form-in-react-e963fc19d5df>

The project library page I was building include a filter form and filter buttons that sort the data that was pulled from the database. The Freecodecamp “How to Search and Filter Components in React” shows me how to use state to keep track of the filter button being click and gave me some insight in the logic used to get all my filter button working. The article from Medium also solidify that information.

1. What is the address of the GitHub link to your work? Paste the link below. How have you (or would you) use your own GitHub as a portfolio to help you with further learning?

Here is the link to our group MissionX - <https://github.com/Mission-Ready/2022-08-Brilliant-MissionX-Group-One>

Here is the link to y personal branch - <https://github.com/Mission-Ready/2022-08-Brilliant-MissionX-Group-One/tree/lennardbranch>

This contains the latest version of my two papes.

A portfolio allows me to showcase samples of my work that I’ve done which serves as a digital resume and proof that I have the skills that I say I have in your resume. As I am employed at the moment, I am not in a rush to change my career. I will be taking 6 months to build the full mission ready project by myself and publish to GitHub to showcase my skills.

1. What specific responsibilities were allocated to you as your contribution to team performance during this Mission? (e.g. develop page A and page B, component XYZ).

I was task with building two pages the Student Project Library and the Student Profile Page. I also build the database and inputted so dummy data.

My student profile page has two components excluding the shared header and footer.

My student project library has six component excluding the shared header and footer.

1. Describe an instance during this Mission where you asked for input from one or more team member(s), or you listened to feedback from them, and then changed your mind as a result.

When we started to write code for Mission X our knowledge and experience wasn’t as vast as it is now. I remember one weekend while working on the Student project page I asked the group for some feedback on my pages. I separated the project page into three components header, main and footer. The main section at that point in time was almost over 400 line long. While I was showing my teammate, trying to explain what I have done to them they immediate stop me to address the length of the code. They were having trouble keeping up with my explanation because of the length. The feedback I was given that day made me change my mind. I was advise to break up the Project page into as many component as I possibly can. Because some of the component are non-functional, separating them allows me to work on the functional one without having the non-functional one distract me. This was one of the best advice I’ve gotten during mission x.

1. Describe an instance during this Mission where you provided feedback to one or more team member(s), or negotiated with them, and then they changed their mind or you reached a consensus with them as a result.

I remember vividly one of my teammate was having trouble with his pages. He was working on the home page and the login/signup form. And for some reason he couldn’t get the rendering of the signup button to reflect the correct input forms. We try many solution that we found online. Most of which didn’t work. I advise him to recreate the problem. To try to build the modal with the sign in form over step by step until he meets the problem again. That way by the process of elimination can find if the problem is created from bad code or is he missing something. I believe he tried out this solution along with getting help from an AT to get the correct from. He commended me for the feedback. By recreating the problem he was able to ask more direct informed questions to the AT.

1. Reflecting on how you worked on the Mission, how important was it for you to be able to work effectively in collaboration with your team-mates; how effectively did you think you were able to do so; how effectively were your team-mates able to do so?

I remember watching an interview with Gregg Popovich. He is the president and head coach of the San Antonio Spurs of the National basketball associate. In this interview he mention some point on what make a winning team

*“It’s about discipline, it’s about building block. It’s about* ***relationship with your players***

*Uh****, how do you get something out of somebody who’s selfish***

***Or doesn’t really compete the way you’d like****, and so on and so forth*

*Uh, all those things I think have more to do with winning and losing the drawing certain kind of plays”*

*Gregg Popovich*

Collaborating as a team is important in today’s highly digital world. As you can tell from Popovich statement strong relationship can do more for a team that the skills.

It was extremely important to me to be able to collaborate well with everyone on my team. I strongly believe in Popovich statement that great teamwork can lead to a winning team more than all the resources in the world. We were able to help each other solve problems. We had so much meeting where we just use the time to brainstorm how to solve each other problems. We found out that the more eyes given to a problem the easier it gets. We’ve also build great relationships during our time together. This regular interaction forces us to build personal relationship. We broke down some walls and became not just teammates but friends.

1. Based on the work that you did during the Mission, what areas in your knowledge and of yourself would you like to improve on? Please include at least one technical area and one non-technical area.

Mission X was a welcomed challenge. As a team we were eager to get started while at the same time overwhelmed by the thought of getting started. I have gained so much knowledge and skills throughout the completion of Mission X. But… with every ounce of knowledge there is a pound of doubt and fear that follows. One non-technical skills I believe that I need to work on is my communication. It is no exaggeration to say that interpersonal skills are the foundation for success in life. People with strong interpersonal skills tend to be able to work well with other people, including teams seamlessly.

Communication is the simplest act of transferring information from one place to the next. It sounds simple enough but being a teacher pre-COVID, I spent most of my time communicating non-verbally. So getting into an environment where the only reaction we had was through a webcam made things difficult. This could also be my personal apprehension with online dating. Moving forward I vow to put some effort on improving my interpersonal skills. I would also love for this improve communication to branch out into my coding. Sometimes I find it extremely difficult coming up with meaningful names within my code. I’ve did some research reading through *Clean Code by Robert C. Martin.* I’ve tried some of his technique during Mission X to use some intention revealing names but as the project got large. The naming convention got a bit distorted.

In terms of technical skill, I believe one of my biggest downfall is my implementation of CSS. I believe I have a solid grasp of CSS. While doing Mission X I came to the realization that I am not fully aware of internal CSS relationship. I found out that a lot of solution for writing CSS are about understanding CSS relationships instead of trying to isolate its effects to individual element. For example I learned that it’s easier to set the height on the child instead of the parent to avoid over flow issues. Some other element relations that I need to improve on is the collapsing margin and flex sibling relations. Because I lack some of the foundation in these relationship I found myself in a battle if trial an error to fix simple problems.