ADVENTIST UNIVERSITY OF CENTRAL AFRICA

FACULTY: INFORMATION TECHNOLOGY
DEPARTMENT: SOFTWARE ENGINEERING

INTERNSHIP REPORT

Carried out at **Idatech** from 03rd February, 2025 to 04th April, 2025

Prepared by:

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Kigali, April,2025

Declaration

I,, **NIYITANGA Danny,** a student at **ADVENTIST UNIVERSITY OF CETRAL AFRICA** with Student Id of **25588** in the Faculty of **Information Technology**, department of **Software Engineering** hereby declare that the work presented in this internship report carried out at **IDA tech** from **03rd February, 2025** to **04th April, 2025** is my own work.

Signature ………………………………………….

Date …………………………………………….

NIYITANGA Danny
Tel: +250 781897962

APPROVAL

This is to certify that NIYITANGA Danny has undertaken his internship at Ida tech unit from **16th 03rd February, 2025** to **04th April, 2025**. He has successfully completed his internship and we hereby acknowledge receipt of his final internship report ready to submit to ADVENTIST UNIVERSITY OF CETRAL AFRICA(AUCA).

Done at Kigali: April 2025

Supervised by: Emmanuel NZABAREGERIMANA

Date ……... / ……. / …….

Signature: ……………

ACKNOWLEDGEMENT

I express my deepest appreciation to IDA tech for accepting me and creating a wonderful environment for learning both soft and hard skills. I can confidently say I wouldn't have grown and learned as much as I have these past 45 days.

I would also like to thank my parents for giving encouragement, enthusiasm and invaluable assistance to me. Without all of these, I might not be able to accomplish any of my goals.

I also want to thank ADVENTIST UNIVERSITY OF CETRAL AFRICAfor career guidance and opportunity to gain first-hand exposure of working in the real world.

I would like to express my appreciation to those who helped me in the course of the internship and my academic life. My supervisor and other employees for the good heart showed me and advice. Without their support and generosity, I could not have the jubilant time I had.

Finally, I apologize all other unnamed who helped me in various ways to have a good experience and possibility to finish this report.

ABSTRACT

The rapid growth of technology and infrastructure has made our lives easier; all are based on the knowledge we gain in schools. They open our eyes basing on the skills needed to solve real world problem.

This report is the summary of what I have been learning, accomplishing and realizing during Six weeks (45 days) from 16th January, 2024 to 29th February, 2024 of industrial training done at **Ida Technology Ltd**.

All students willing to become future developers and real-world problem solver they must do this internship as it is included in the academic program of the university and it is one of the requirements to accomplish studies at the AUCA.

This internship was an opportunity for me to relate theories and practice gained in class to perform and accomplish tasks that have been assigned to me and gain hands on experience in real work environment and introduce myself to a professional career.

During my internship, my supervisor made sure to give me all the necessary tasks to be accomplished by an internee who goes there including a list of all projects, subjects, and a person to guide me during the days of the internship and find time for the explanation in case I had inquiries about anything related to the tasks given to me.

The internship training is of the key that show if what you learned in university are applicable in real tasks environment, so internship give internee an experience to gain more skills like time management, communication skills and future career design.

This report consists of different parts.

- ✓ First chapter is composed with the general introduction, objectives, significance of internship and the reason for choosing Idatech as my best training Company.
- ✓ Second chapter include field attachment and activities.
- ✓ The third chapter comprises appreciation, conclusion and recommendations.

Dedication

I dedicate this report to:

- ➢ Almighty God,
- ➢ My beloved Parents,
- ➢ My beloved sisters.
- ➢ Staff of ADVENTIST UNIVERSITY OF CETRAL AFRICA.
- ➢ Idatech staff members

God bless you all.

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CHAPTER 1

1.1   GENERAL INTRODUCTION

An internship is a period of work experience offered by an organization for a limited period of time. It is a professional learning experience that offers meaningful, practical work related to a student's field of study or career interest.

An internship gives a student the opportunity for career exploration and development, and to learn new skills. The internship is compulsory for all students of ADVENTIST UNIVERSITY OF CETRAL AFRICA(AUCA) mostly in the final academic year. The internship is a course like others; it contributes to the student's evaluation in order to get a Bachelor's Degree. It gives the student the possibility to participate in the employment activities taking the responsibilities related to a career in which he/she is assigned to work. It is an extensive program through which an intern can learn the practical aspects of what is taught between the four walls of the University lecture halls. The internship helps students to learn, know, look forward and understand what actually happen on the field as compared to what they have studied in the school.

It is aimed at providing the student with the possibility to put into practice what he/she gained in the courses learnt in classroom allowing thus (in the way of result) the comparison between what is being taught and what is being done on the ground so as the student can contribute in improving the way the work is being done and in the way the courses are being taught by giving his/her recommendations based on the courses he/she studied and, on the experience, gained from internship. Internship or industrial training is a way of improving students' skills.

This is a report on the purpose of carrying out the internship, the profile of the chosen organization of the intern, duties performed in the organization, the contributions of the intern to the organization, application of theories to real –life situations, various lessons learnt by the intern, challenges encountered, conclusions drawn and recommendations made by the intern.

Generally, internship perceive student career development to practice skills gained and becoming the best on market of competitive technology that makes life easier to be used in future time.

1.2   OBJECTIVES OF THE INTERNSHIP

1.2.1   GENERAL OBJECTIVES

The general objective of the internship it is not to make money; it is to help the trainee to be familiar with the working environment by putting into practice the theories learned in class and applying them in their respective field thus gaining new knowledge all of those will allow and show students to hands on practice for the theoretical knowledge acquired during their studies and gain practical knowledge in their fields of study to real job environment.

This is to provide students the opportunity to gather work experience relevant to their studies and their professional fields.

1.2.2   SPECIFIC OBJECTIVES

✓ Develop students interpersonal and communication skills that can be used to strengthen their ability to work as a team

✓ Open up student's minds to understanding of work ethics, employment demands, responsibilities and opportunities so that they can get exposed to outside environment.

✓ Develop understanding of the functioning and organization of a business.

✓ Interact with other professional and non-professional groups.

✓ Apply engineering methods such as design and problem solving.

✓ To strengthen work values through an improved understanding of oneself and the working environment and gain interpersonal skills that promotes personal growth and development.

✓ Improving knowledge and qualification as an IT professional.

✓ Gaining interpersonal skills and promote personal growth and development.

✓ Developing employment records/references that will enhance employment opportunities

✓ Providing students, the opportunity to test their aptitudes, interest in particular career before permanent commitments are made.

✓ Helping interns to develop skills in the participation of theory to practical Work situations.

1.3   SIGNIFICANCE OF INTERNSHIP

1.3.1   GAIN NEEDED EXPERIENCE

Through an internship, you increase your knowledge and skills. Doing that gives you greater confidence and a sense of accomplishment that future employers will be excited to see. While you are completing your internship, you can also increase your communication, organizational and teamwork skills, all of which will come in handy in future positions.

1.3.2   A TRIAL RUN

One of the main objectives of an internship is to expose you to a particular job and a profession or industry. While you might have an idea about what a job is like, you won't know until you actually perform it if it's what you thought it was, if you have the training and skills to do it and if it's something you like.

1.3.3   EXPLORE A CAREER PATH

You can do one or several internships to explore if a career is right for you. The more internships you do, the more experience, skills, confidence and connections you gain. These can all put you ahead of the curve when entering a job market, whether right out of school or when switching careers.

CHAPTER 2

2.1 DESCRIPTION OF INTERNSHIP TRAINING ACTIVITIES

An internship program is composed of a schedule of activities to be carried out, learning objectives, subject areas, methods, trainers or supervisors, methods of assessment, and locations.

During my Internship period, I have acquired many skills and knowledge which are needed on the market.

I was introduced to a new concept Php and Node Js as Backend technology.

I also was introduced to frameworks that exists in java and python and how they reduce the workload.

In this chapter, I am going to describe the activities undertaken, skills learned and the output to demonstrate acquired development skills.

2.1.1 BACKEND

PHP?

AV over IP stands for "Audio-Visual over Internet Protocol". Essentially, it is the transmission of audio-visual data over a network such as a LAN, WAN, or the internet. As opposed to traditional AV environments, AV over IP (also known as AV/IP) refers to the use of standard network equipment to transmit and switch video and audio.

The concept of "Video over IP" has existed a long time. It encompasses everything from internet-based live or on-demand video streaming, to professional video distribution infrastructures in production and broadcast studios. What is being discussed in the professional AV (facilities AV) space over the last few years is the gradual replacement of traditional AV infrastructures with IP-based infrastructures—hence the term AV over IP. For some people, the idea of using IP in the facilities AV space is quite new, while for others, it is familiar territory.

Below is an image of similarities between Traditional AV and AV over IP Setups
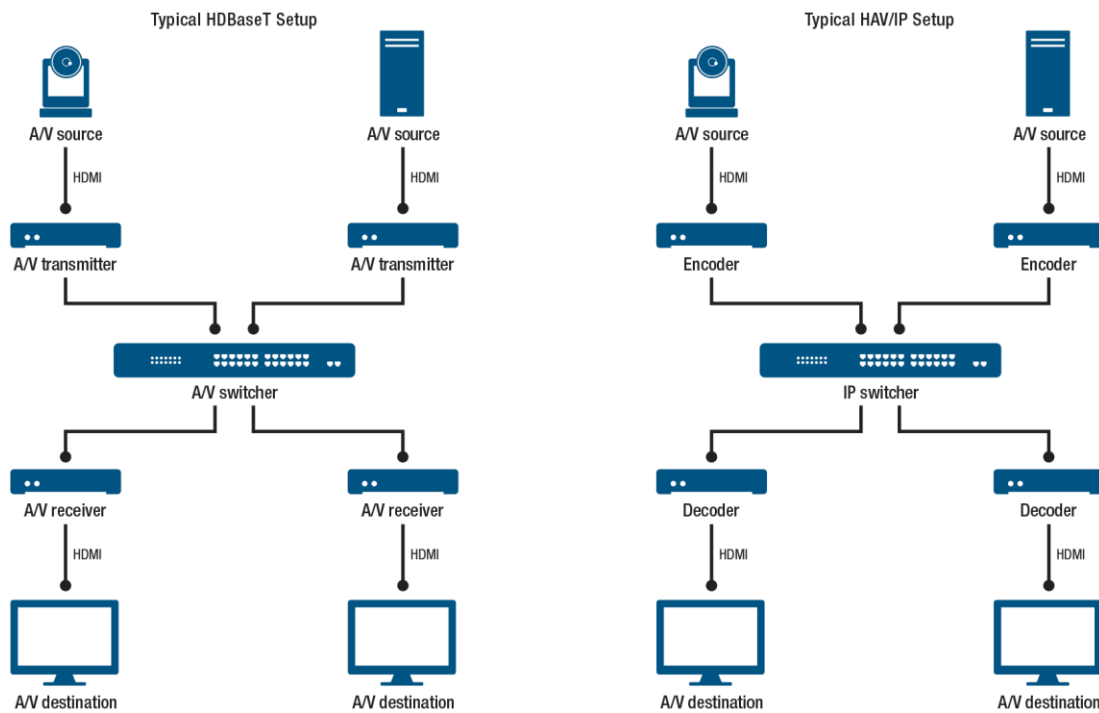
After learning the theory and basics of AV/IP we went on a field trip to Canal Olympia where we saw their server room with AV/IP setup which we got to play around with to understand well how it works.

2.1.2 NETWORK ROUTING AND SWITCHING

DIFFERENCE BETWEEN ROUTING AND SWITCHING

Whereas switching creates a single network made up of individual computers, routing connects entire networks to each other. Routers perform a role similar to that of switches, but on a much larger scale. Thus, a router essentially acts as a dispatcher of data through the most efficient channels between networks.

I did exercise in different routing types and protocols with different topologies, some of them are shown below:

2.1.3 BOOTSTRAP FRAMEWORK

WHAT IS BOOTSTRAP?

Bootstrap is **a free front-end framework for faster and easier web development**. Bootstrap includes HTML and CSS based design templates for typography, forms, buttons, tables, navigation, modals, image carousels and many other, as well as optional JavaScript plugins.

Bootstrap also gives you the ability to easily create responsive designs.

WHAT IS RESPONSIVE WEB DESIGN?

Responsive web design is about creating web sites which automatically adjust themselves to look good on all devices, from small phones to large desktops.

WHY USE BOOTSTRAP?

- o **Easy to use:** Anybody with just basic knowledge of HTML and CSS can start using Bootstrap
- o **Responsive features:** Bootstrap's responsive CSS adjusts to phones, tablets, and desktops
- o **Mobile-first approach:** In Bootstrap 3, mobile-first styles are part of the core framework

o **Browser compatibility:** Bootstrap is compatible with all modern browsers (Chrome, Firefox, Internet Explorer, Edge, Safari, and Opera)

BOOTSTRAP TEMPLATES AND UI COMPONENTS

These include Typography, Tables, Forms, Buttons, Glyphicons, Dropdowns, Buttons and Input Groups, Navigation, Pagination, Labels and Badges, Alerts, Progress Bars, Modals, Tabs, Accordions, Carousels, and many others. Many of these use JavaScript extensions and jQuery plugins.

After learning bootstrap components, I took on a full hands-on project to make use of what I had learned. I designed a fully Responsive web using bootstrap, below is a screenshot showing overview:
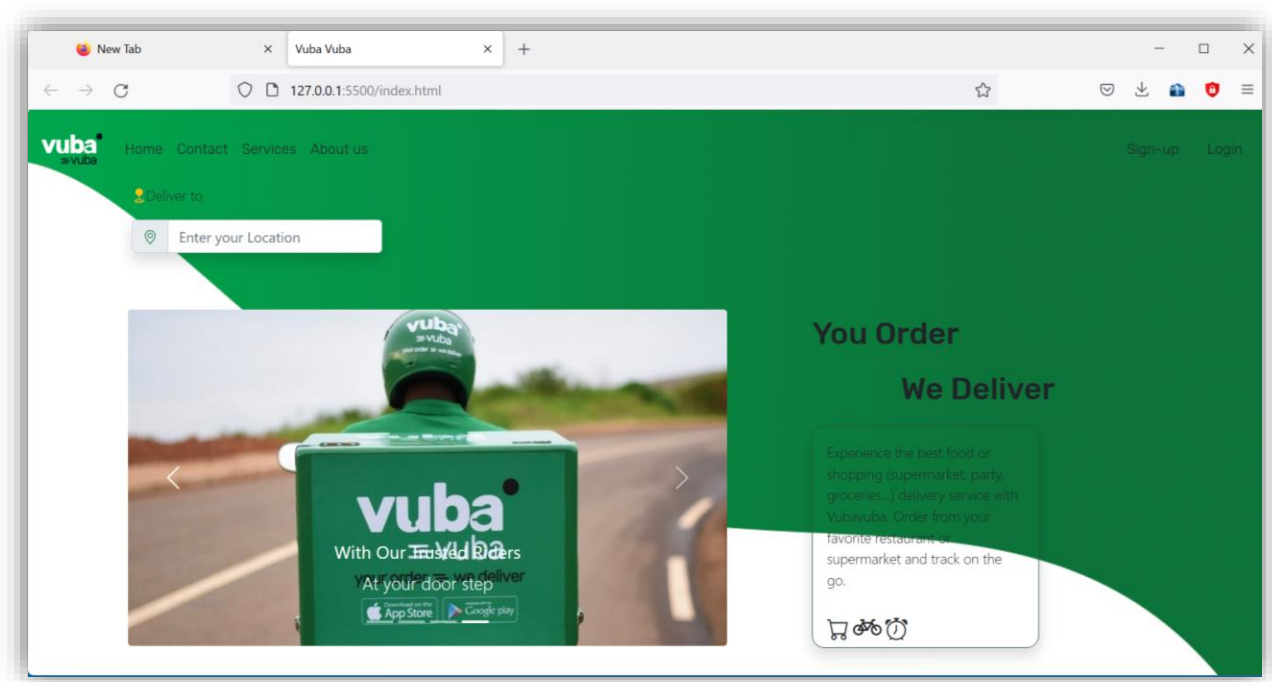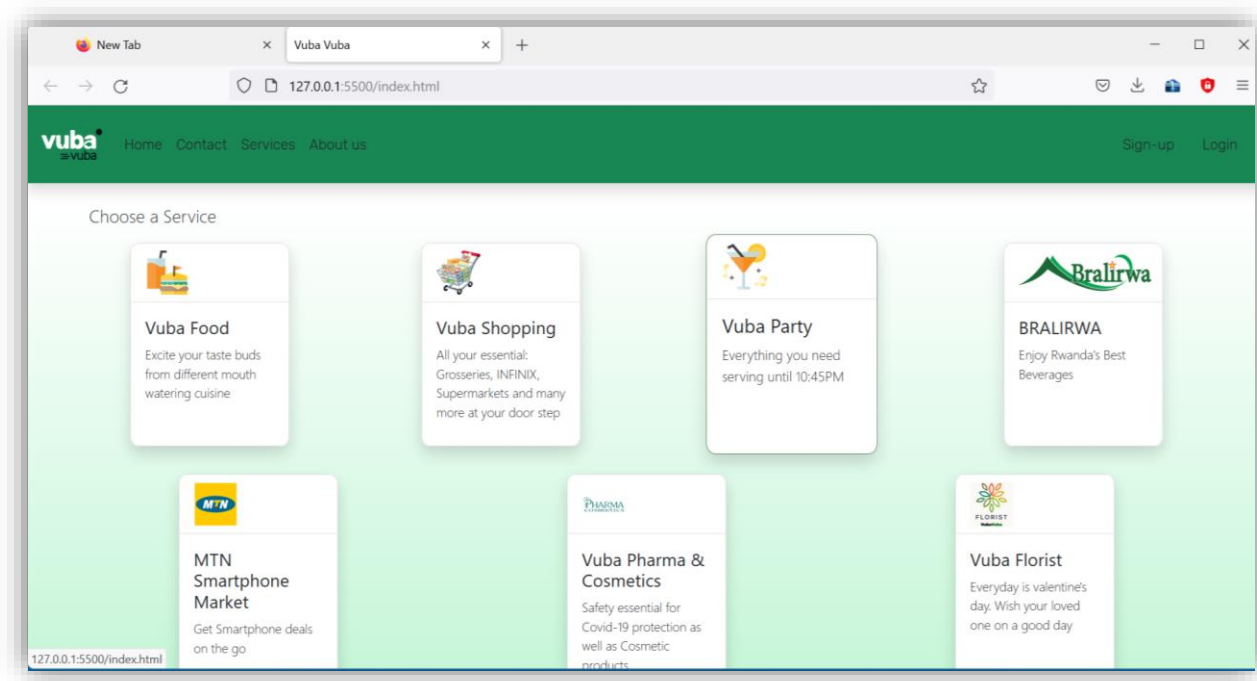
2.1.4 DJANGO FRAMEWORK

Django is the web development framework in python.is a high-level Python web framework that encourages rapid development and clean, pragmatic design. Built by experienced developers, it takes care of much of the hassle of web development, so you can focus on writing your app without needing to reinvent the wheel. It's free and open source.

ADVANTAGES OF DJANGO FRAMEWORK

1. **DJANGO IS HIGHLY SECURE**

When we make web applications in Django, it makes sure that developers   don't commit any mistakes related to security. It will be pretty difficult to find security loopholes in Django, even in the user authentication system.

2. **DJANGO IS POWERED BY PYTHON**

Python is one of the most top-notch programming languages due to its ease of learning, popularity, and power. It is the most popular language at the present time, and for all those Pythonistats, Django is the perfect web development framework.

3. DJANGO PROVIDES A DEFAULT ADMIN PANEL

Django allows you to modify the admin panel with third-party wrappers and add dashboards uniquely for your needs. Additionally, there is a lot of room for customization in the Django admin interface, thanks to third-party applications.

Creating an admin panel by yourself is pointless and takes a lot of time. So, if you're using Django, it is a great advantage to have a default admin panel.

4. DJANGO HAS A GREAT SET OF LIBRARIES

Every programming language or framework comes up with its own set of libraries for solving typical tasks. A software library is a collection of programs and software packages made generally available, often loaded and stored on disk, for immediate use. It includes prewritten code, classes, methods, configuration data, and more.

When it comes to the extensive set of libraries, Python is a rich programming language. Even Django has many libraries to make things easy for you.

5. DJANGO PROVIDES OBJECT RELATIONAL MAPPER (ORM)

Django ORM provides an elegant and powerful way to interact with the database in an Object-Oriented fashion. ORM is a library that automatically transfers data stored in databases into objects commonly used in application code.

You don't need to write specific SQL queries to create tables and insert data. When a class is defined, ORM generates a table for the class automatically. This table contains fields for all the variables inside the class. Also, the table adds rows automatically when we create objects.
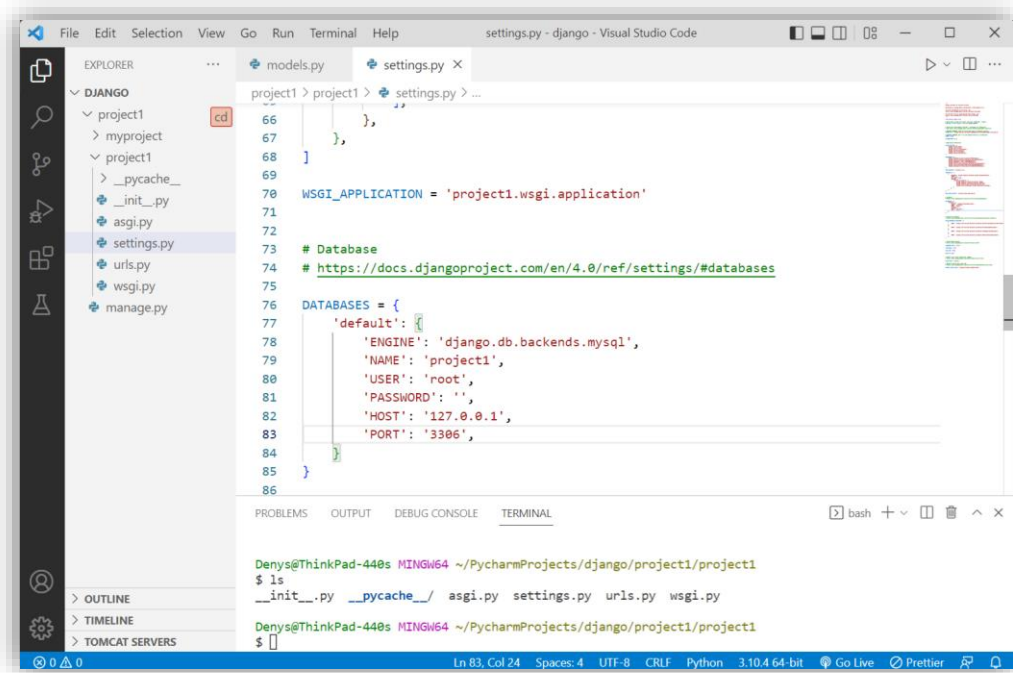
6. DJANGO IS HIGHLY SCALABLE

Django can handle any hardware additions. Also, it is capable of meeting massive traffic demands. It is the main reason why websites like Instagram, Pinterest, Disqus, etc., use the Django framework.

Django can handle traffic and mobile app API usage of more than 400 million users, helping maximize scalability and minimize web hosting costs. Many third-party applications come with Django. These applications can be integrated, depending on project requirements.

SETTING UP DJANGO

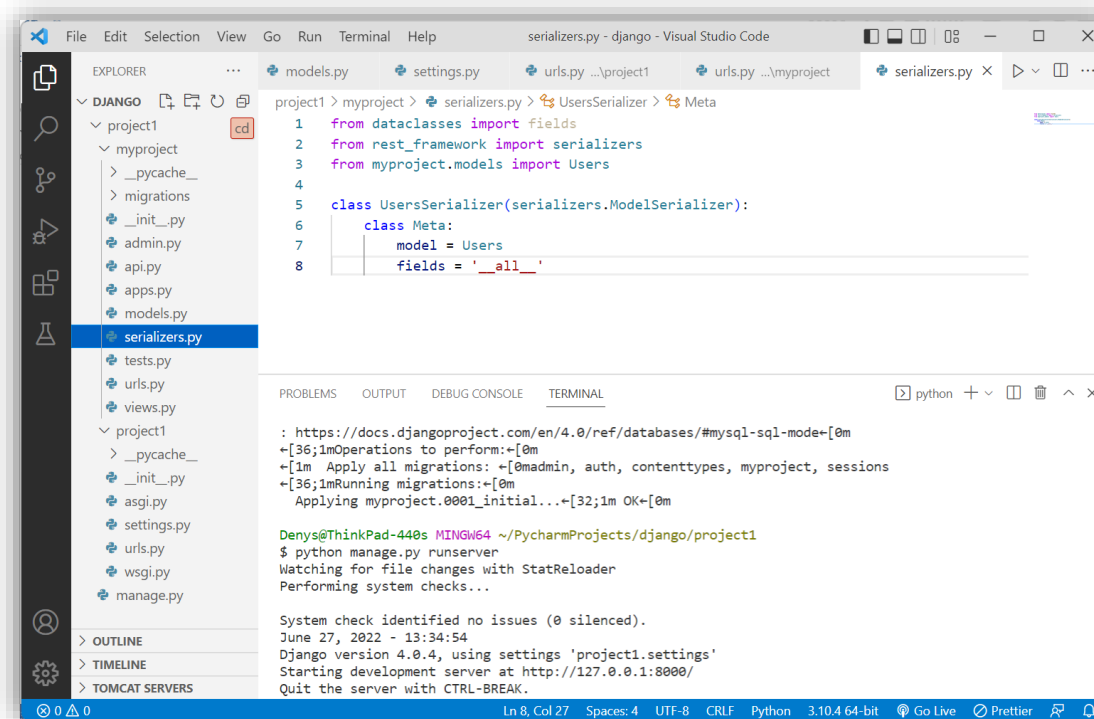## Setting up database engine

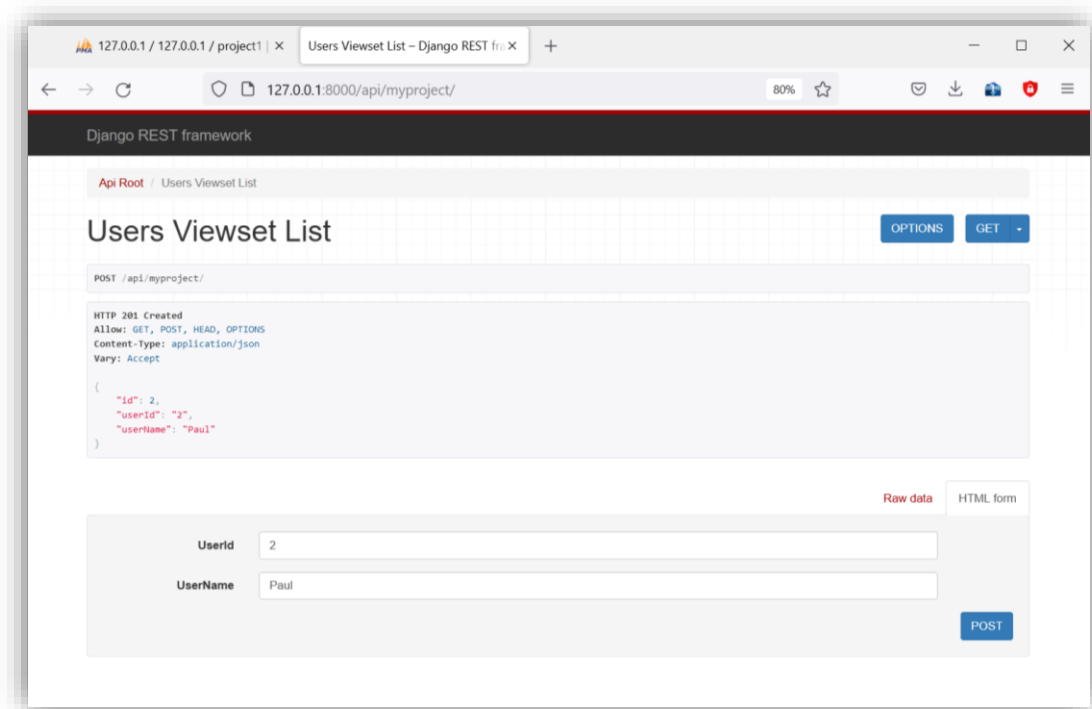## Testing Django setup

Setting up model class
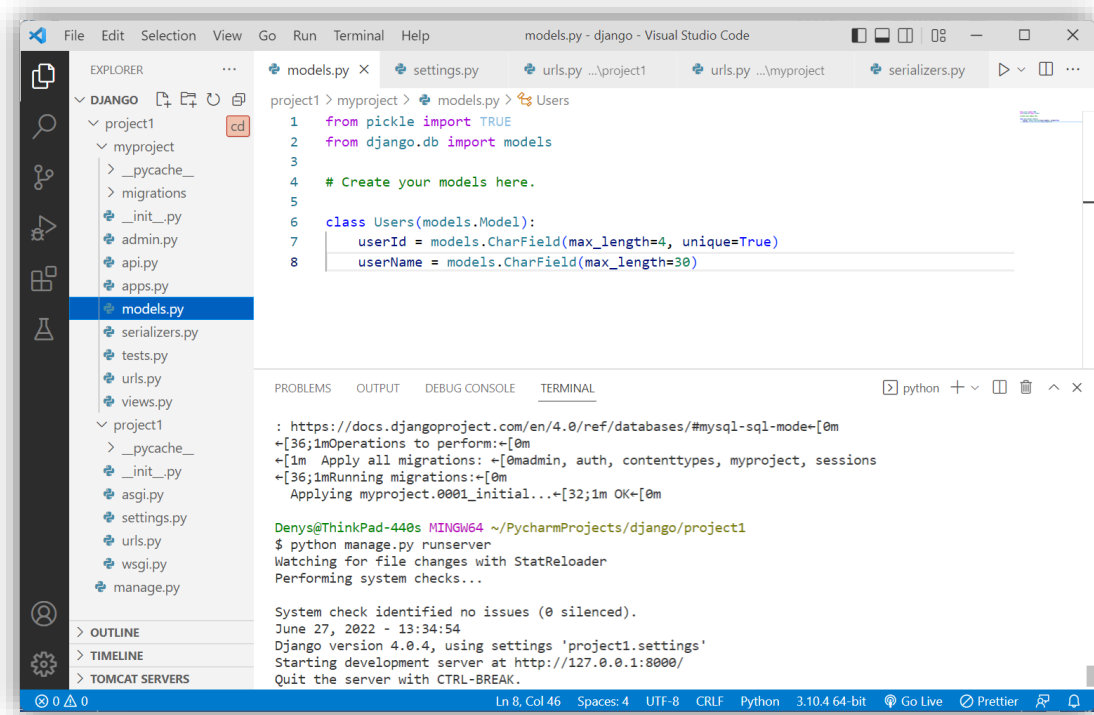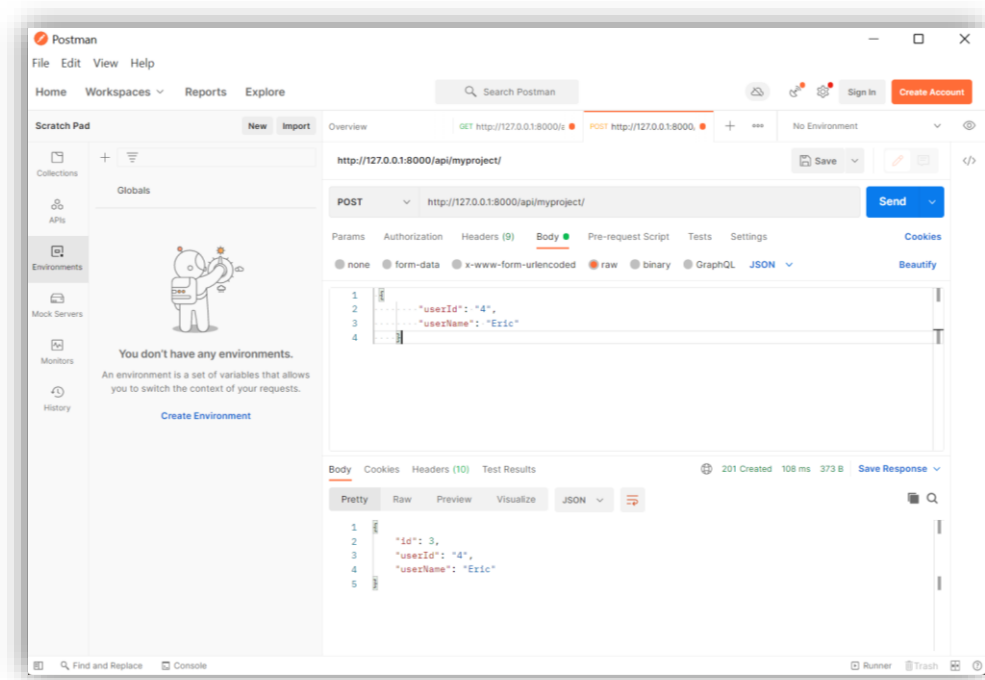

Setting up serializers

Sending POST request from REST FRAMEWORK
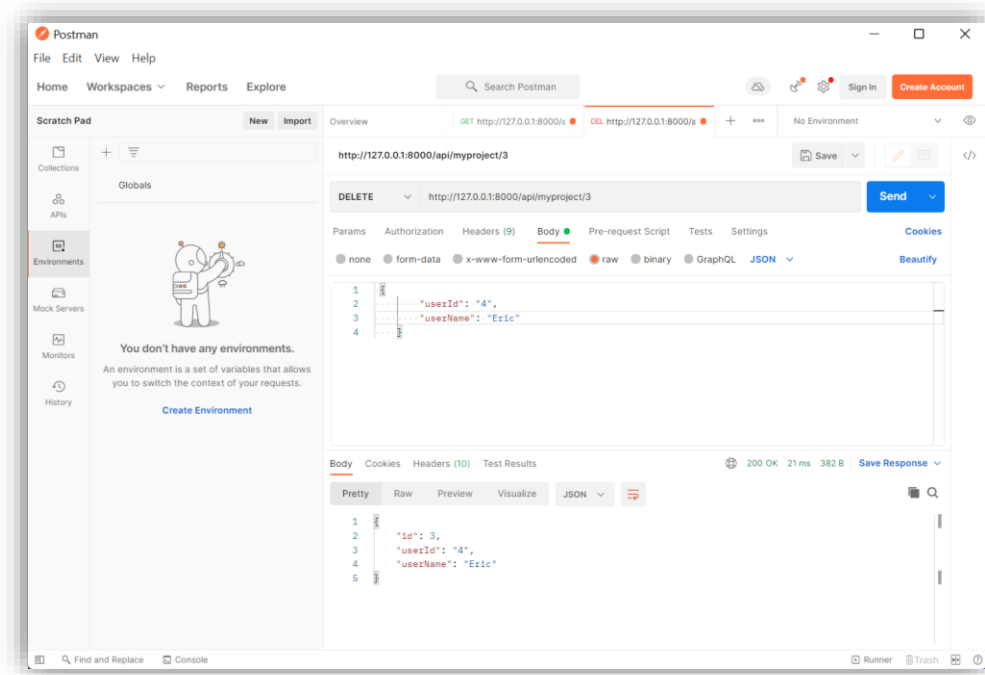

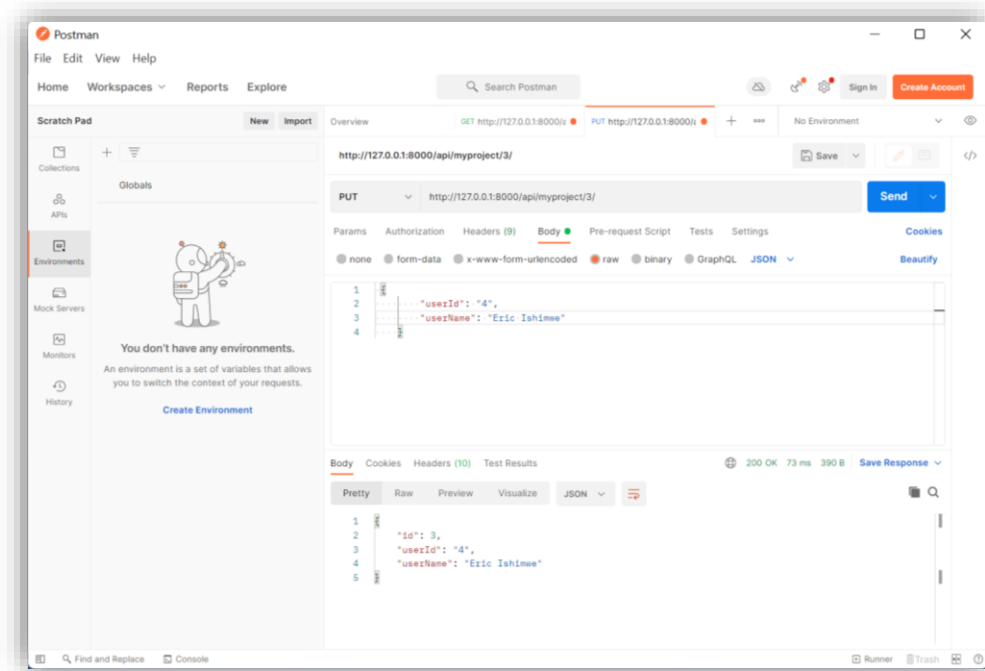## 2.1.4.1 PERFORMING CRUD USING POSTMAN
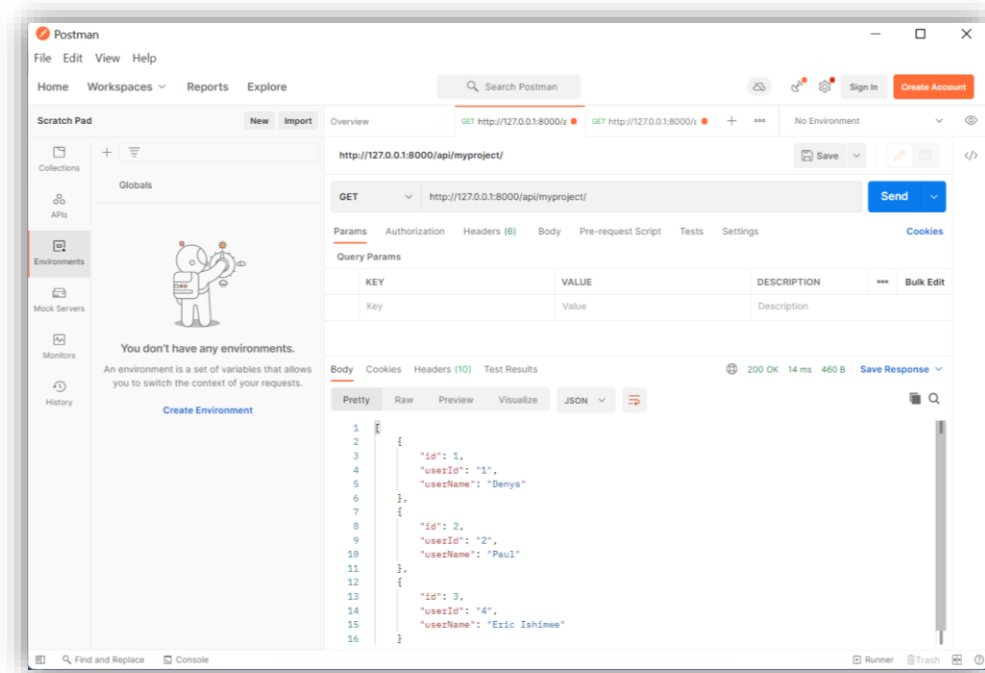
Sending POST request from Postman

Deleting from Postman

Updating from Postman

Read/Get using Postman

2.1.5   REACTJS FRAMEWORK

React is an open-source a declarative, efficient, and flexible JavaScript library for building user interfaces. It lets you compose complex UIs from small and isolated pieces of code called "components, component-based front-end library responsible only for the view layer of the application. It is maintained by Facebook.

ADVANTAGES OF REACT JS

IT HELPS TO BUILD RICH USER INTERFACES

Today, the quality of the user interface in an application plays an important role. If the user interface is poorly designed, then it lowers the chances of an application to succeed.

The good news is, react allows building such high quality, rich user interfaces through its declarative components.

IT ALLOWS WRITING CUSTOM COMPONENTS

React comes with JSX, an optional syntax extension, which makes it possible to write your own components.

These components basically accept HTML quoting and also makes all subcomponent rendering a delightful experience for developers.

IT UPLIFTS DEVELOPERS' PRODUCTIVITY

Frequent updates often turn into headaches when an app has a complex logic and when a single modification in one component can dramatically affect other components.

But, to combat this problem, Facebook has amplified React with the component reusability feature.

Component reusability in React basically allows developers to redeploy the same digital objects.

IT OFFERS FAST RENDERING

When you're building a complex, high-load app, it becomes mandatory to define the structure of the app in the beginning since it can impact the performance of your app.

In simple words, the DOM model is tree-structured. So, a minor modification at a higher-level layer can awfully impact the user interface of an application. To solve this, Facebook has introduced a virtual DOM feature.

IT COMES WITH USEFUL DEVELOPER TOOLSET

Learning emerging technologies and using them in real-life projects can be both fun and beneficial, but only if they are used correctly.

Facebook understands this and it's for this reason they have added much needed React dev tools and Chrome dev tools in their React JS framework.

IT OFFERS BETTER CODE STABILITY

React follows downward data flow to ensure that the parent structure don't get affected by any modifications in its child structure.

So, whenever a developer makes changes in an object, he or she only needs to modify its states and make proper amendments. This way only a specific component will be updated.

2.1.6 DJANGO&REACTJS PROJECT

This particular project help me put together Django and reactjs knowledge in a single web application, it also taught me to join other web based api's to your project while also learning session management using Django, Reactjs and MaterialUI.

In this project I join with Spotify music service, so that one user on this app can create a room or a group session, and other user who has the code given by the room creator, can join in and listen together, and have some type of controls over the playback given by the room creator.

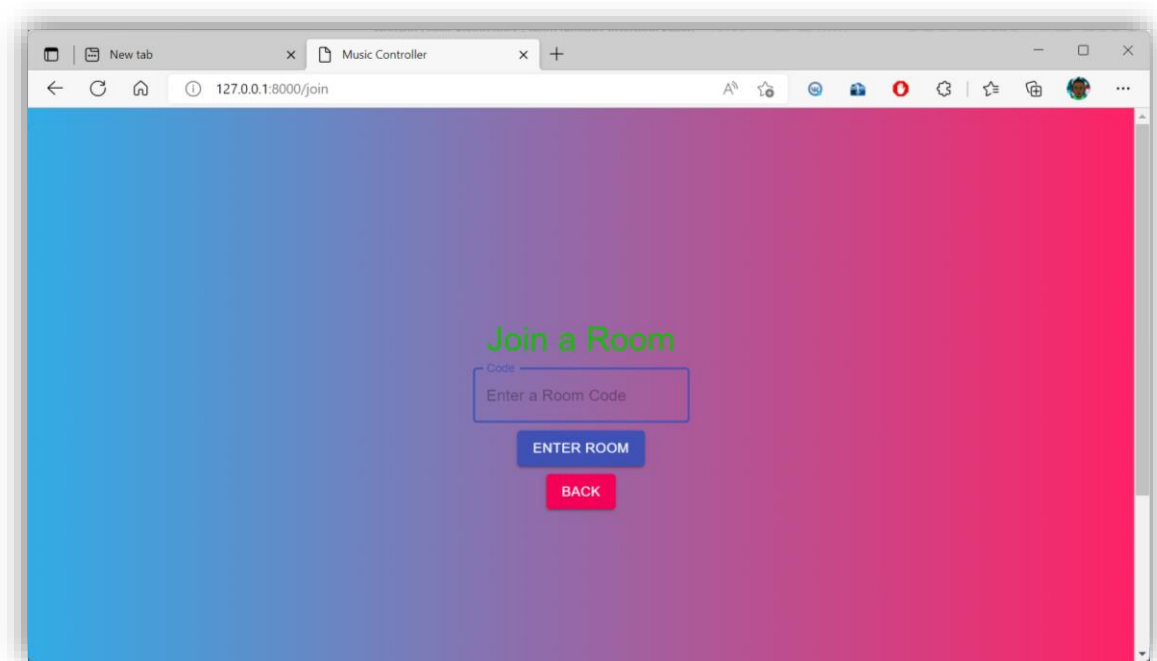The following are screenshots to show how it works

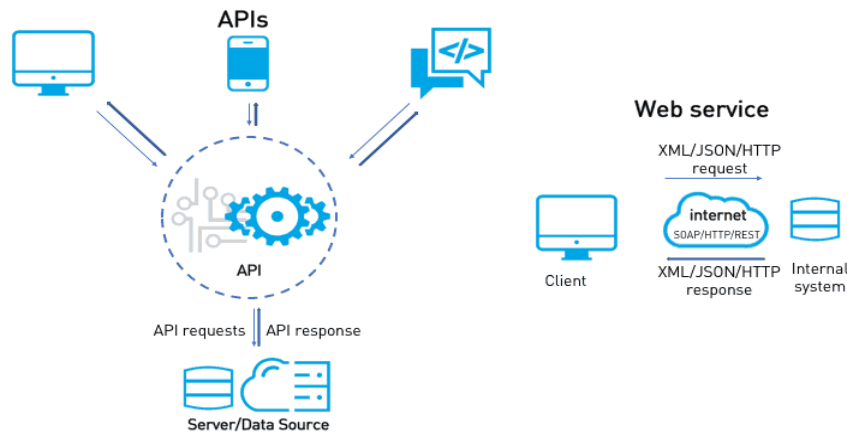**This is the homepage**
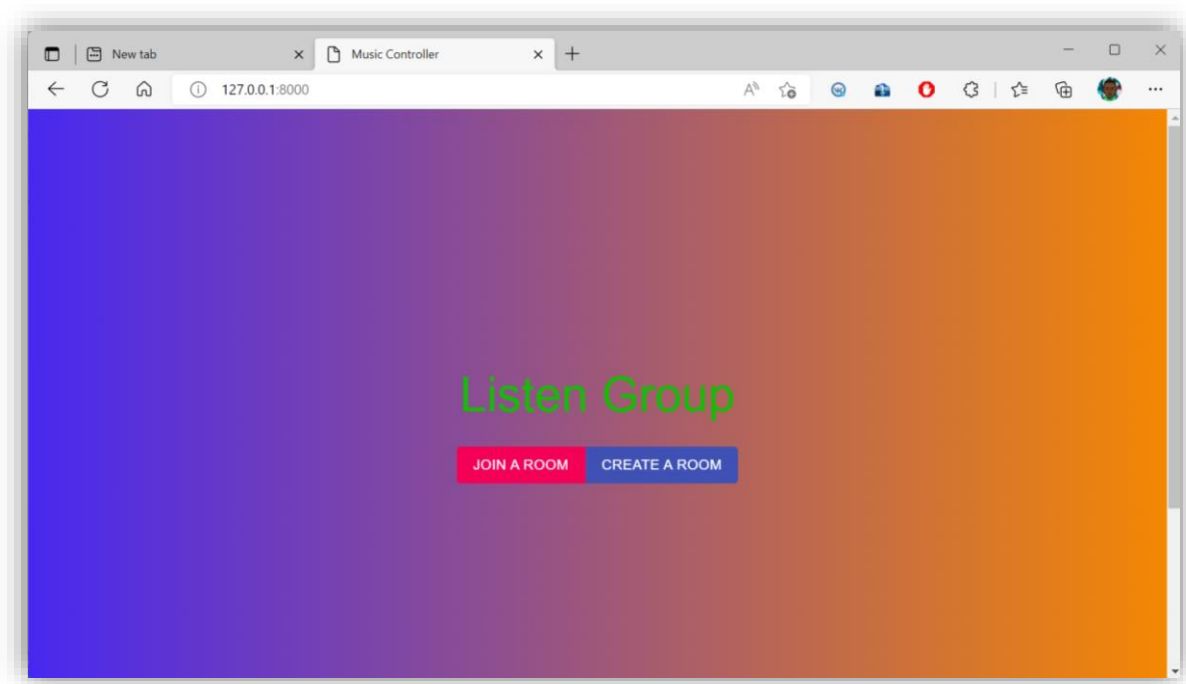
The Create room page
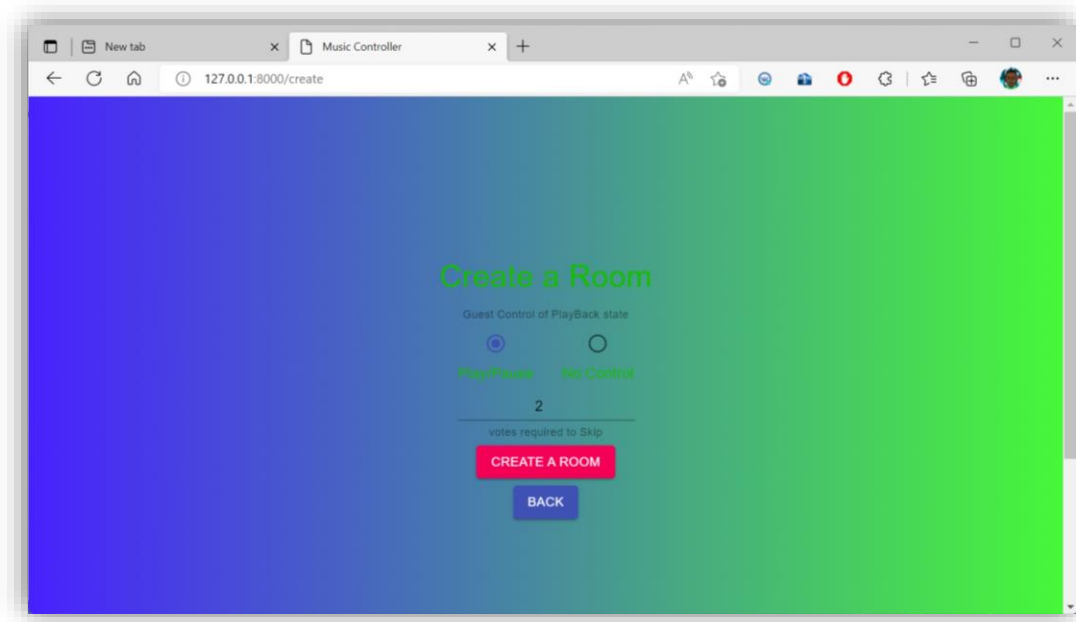
The Join Room Page

2.1.7 WEB SERVICES

Here I got a chance of practicing what I learned in web technology after completing window forms application by trying to work on the web applications. It guides me to learn more.

APIs

- ➢ APIs are a set of protocols that allow you to build communication interfaces between applications.
- ➢ APIs were built solely to facilitate communication and transfer of data between unrelated applications.

To get a proper meaning of how APIs and web services work here there are some terms used.

JSON [JavaScript Object Notation]: JSON is a standardized data storage and transfer format that uses an object-based methodology for storing data.

XML [extended Markup Language]: XML is also a data storage and transfer format, similar to JSON, but it uses descriptive tags to store data instead.

SOAP [Simple Object Access Protocol]: SOAP is a messaging protocol used to share data in structure format (XML data) across networks. SOAP was the first protocol designed to enable applications built on different platforms and using different programming languages, to communicate via structured data.

REST [Representational State Transfer]: REST is a software architectural style commonly used to develop interactive web services. The REST protocol uses a stateless format and standard

operations to allow systems to communicate and collaborate while enabling individual components of the system to be

reused and updated without affecting the performance of the system. REST provides standardized operations like GET, POST, PUT and DELETE using HTTP methods. Any web resource that follows REST protocols is referred to as RESTful.

SOA [Service Oriented Architecture]: SOA is an architectural pattern used for designing software applications where the functions are split up and presented as services in a network.

WEB SERVICE

we can define web services as a resource that allows machine-to-machine communication over a network using a few set protocols and standardized commands.

SMALL KEY DIFFERENCE BETWEEN WEB APIS AND WEB SERVICES

1. Web services have to communicate across a network while APIs can be accessed locally within a device or software system.

2. Web services only use HTTP protocols while APIs use both HTTP and HTTPS

3. Web services are mostly designed using SOAP, REST or XML-RPC styles while APIs can be designed using any style or architectural procedure.

4. Web services communicate using data in XML format while APIs responses are formatted in XML, JSON or any other type of requested format.

5. All web services are APIs but not all APIs are web services.

APIs provides product or service to communicate with other products and services without having to know how they're implemented. As mentioned above in the introduction at Idatech, they treat server side and client side separately, which is where RESTful API comes in handy.

I chose to use API to make the two applications (backend and frontend) communicate. And as we know APIs allow users in same network to communicate where backend can be to another laptop and front end to another laptop and also database to other machine, will communication through APIs link using IP Address.

WEB API FEATURES

- Time effective
- Data ownership
- Easy integration with graphical user interface
- Resource sharing.

ADVANTAGES OF WEB API

- It supports non-soap-based services like xml or json string. (MediaType Formatter)

- Supports full features of HTTP (like Get, Put, Post, Delete for CRUD operations).

- Widely supported clients like browsers and mobiles.

- Can be hosted in IIS or outside of IIS (self-hosted).

- Supports routing.

- Supports OData.

- Supports model binding and validations.

DISADVANTAGES OF WEB API

- Creating API is a very time-consuming process.
- A Creating API is a very time-consuming process.
- Imprecise boundary delineation.
- To create API, programming knowledge is necessary.
- Maintenance cost is very high.
- Developing APIs is a lengthy procedure that requires a set size. Programming skills are required to construct APIs. It can crash when testing the API. The expense of maintenance is significant.

API STRUCTURE

Interfaces of the application (Inventory Management System)

CHAPTER 3

3.1 CONCLUSIION AND RECOMMENDATION

The time I spent at **Idatech** during the industrial training course in has been beneficial to me because;

I have been able to exhaust the theoretical learned into practice. By the industrial training course, I have discovered that without it, a student most especially an IT is not full of sufficient luggage to interact with the outside working enterprises. In one sense, theories are merely nothing without practice. Anywhere the notion harvested during the training will help me very well to carry my profession. I have been familiarized to manage the time management, communication keys, new coding methodology using framework. Etc.…

Another challenge I met faced was to work from home due to the rules of working 30%. Though there are some days I used to work physically at the organization, another day I worked remotely which was somehow challenging because it requires me to make research as much as possible and also internet connection it was not stable all the time, sometimes I took break of buying bundles.

3.2 RECOMMENDATION

Internship usually is the first work experience most students should focus to become future success. For me it was a lifetime experience and I would advise to my fellow students to value and appreciate it as it gives much more insight to practice what they have been learning so far to my university (AUCA).

It would be much better to allocate more time for the internship period so students can have more time in such experience and make sure students really are present accordingly. And finally, to my supervisors, it was a huge and thrilling period for me, but it would be more fun and thrilling for internee to have more on hand-labs practices and on field assignment so that they can be more comfortable once they join after finishing their studies.