



Website: [Anzel Order-n-Track](#)

## LETTER OF SUBMISSION

Group 5,  
Department of Engineering,  
Pan Atlantic University,  
Ibeju-Lekki, Lagos State.  
13<sup>th</sup>, September 2023.

Faculty of Engineering,  
Pan Atlantic University,

Dear Sir,

### **SUBMISSION OF INDUSTRIAL TRAINING REPORT SCHEME I**

We use this medium to notify you that we have successfully completed the 9 weeks Students Industrial Work Experience Scheme for the 2022/2023 session, which commenced on the 17<sup>th</sup> of July, 2022, and ended on the 15<sup>th</sup> of September, 2023 at the Faculty of Engineering, School of Science and Technology, Pan Atlantic University, Lagos state.

We hereby tender this submission letter alongside our weekly report in partial fulfilment of the requirements for the award of Bachelor of Engineering (B. Eng.) Degree, Pan Atlantic University. We greatly appreciate your effort and the effort of the whole Engineering Faculty as a whole in making the SIWES program a success.

Yours faithfully,  
ANZEL.

# **STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME I [S.I.W.E.S] REPORT**

2022/2023 SESSION

BY

**Apampa Muizah, Ogah Daniel, and Ajayi Andrew**

Presented to

**The Faculty of Engineering.**



SCHOOL OF SCIENCE AND TECHNOLOGY,

PAN ATLANTIC UNIVERSITY

SEPTEMBER 2023.

### **CERTIFICATION:**

This is to certify that this project was carried out by **ANZEL** of group 5 for the duration of 9 weeks and has been duly completed as required by the School of Science and Technology (SST), Pan Atlantic University, Ibeju Lekki, Lagos State, Nigeria. Also, this is to certify that this report has been written using the National Office for Technology Acquisition and Promotion (NOTAP) format by the guidelines laid down by Pan Atlantic University.

.....  
Signature

..... 13/09/2023.....  
Date

## **ACKNOWLEDGEMENT**

Our heartfelt appreciation and gratitude go to the management and staff of the Department of Mechanical Engineering and Computer Science, Pan Atlantic University. Sincere appreciation goes to the following individuals, Engineer Onoriode Avbenake, Mr. Soma who took time out to help with the numerous bugs encountered during the course of the project, Dr. Desmond for his guidance while choosing the tools to work with, Engineer Segun Joda, and Dr. George Ihenacho for their amazing support put into this project.

## **DEDICATION**

This report is dedicated foremost to God Almighty for His favour, mercy, and grace upon our lives, especially during the 9-week SIWES program at the School of Science and Technology, Pan Atlantic University.

We would also like to dedicate it to our parents and siblings for their love and support and to everyone else who contributed to making the SIWES experience a fun and successful one.

## **TABLE OF CONTENT**

<b>1.0</b>	<b>TITLE OF THE INVENTION</b>	<b>1</b>
<b>2.0</b>	<b>NAME OF INVENTORS</b>	<b>1</b>
<b>3.0</b>	<b>CONTACT ADDRESS OF INVENTORS</b>	<b>2</b>
<b>4.0</b>	<b>ABSTRACT</b>	<b>2</b>
	<b>4.1</b> <b>Technical Field</b>	<b>3</b>
<b>5.0</b>	<b>BACKGROUND</b>	<b>4</b>
	<b>5.1</b> <b>Literature Review</b>	<b>4</b>
	<b>5.2</b> <b>Research Problem Statement</b>	<b>5</b>
<b>6.0</b>	<b>SUMMARY OF THE INVENTION</b>	<b>6</b>
<b>7.0</b>	<b>INVENTION DESCRIPTION</b>	<b>8</b>
	<b>7.1</b> <b>Aim and Objectives</b>	<b>9</b>
	<b>7.1.1</b> <b>Aim</b>	<b>9</b>
	<b>7.1.2</b> <b>Objectives</b>	<b>9</b>
	<b>7.2</b> <b>Applications of the Anzel Order-n-Track Web App System</b>	<b>10</b>
	<b>7.3</b> <b>Images of the Anzel Order-n-Track Web App System</b>	<b>10</b>
<b>8.0</b>	<b>METHODOLOGY AND MATERIALS</b>	<b>14</b>
	<b>8.1</b> <b>Preliminary Design Considerations</b>	<b>14</b>
	<b>8.2</b> <b>Materials Selection</b>	<b>14</b>
	<b>8.3</b> <b>Materials</b>	<b>14</b>
	<b>8.4</b> <b>Project Management</b>	<b>19</b>
<b>9.0</b>	<b>CLAIMS</b>	
<b>10.0</b>	<b>CONCLUSION AND RECOMMENDATION</b>	

**10.1 Conclusion**

**10.2 Recommendation**

**11.0 CONTRIBUTORS**

**12.0 CONTRIBUTIONS**

**12.1 Contributions during the fabrication process**

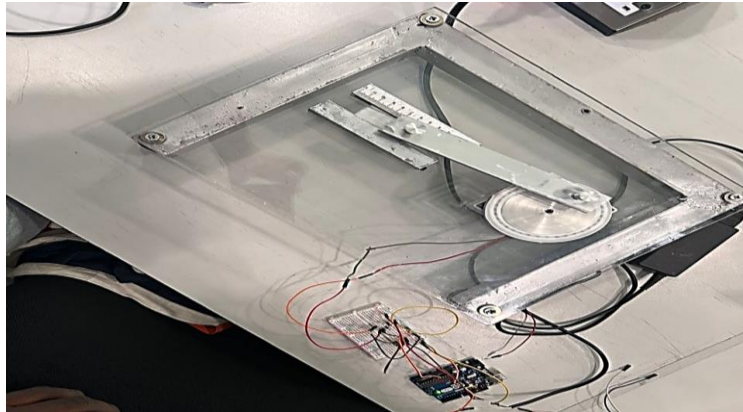
**13.0 APPRECIATION**

**14.0 REFERENCES**

# Anzel

## 1.0 TITLE OF INVENTION

ANZEL Order-n-Track Web App



## 2.0 NAME OF INVENTORS

The following people came together to invent the ANZEL Order-n-Track Web App

- Apampa Muizah
- Ogah Daniel
- Ajayi Andrew



### **3.0 Contact address of the inventors:**

1. [muizah.apampa@pau.edu.ng](mailto:muizah.apampa@pau.edu.ng).
2. [daniel.ogah@pau.edu.ng](mailto:daniel.ogah@pau.edu.ng).
3. [andrew.ajayi@pau.edu.ng](mailto:andrew.ajayi@pau.edu.ng).

### **4.0 ABSTRACT**

In the rapidly evolving world of the food industry, the adoption of digital solutions for enhancing customer experiences has become paramount. Anzel Order-n-Track is a company whose comprehensive digital solution is designed to streamline the food ordering process, offering convenience, efficiency, and transparency to customers and food service establishments. Through a user-friendly interface, customers can explore menus, customize orders, and effortlessly place their requests online. Our web app can be integrated with any restaurant or cafeteria. One of the platform's key features is being able to track the amount of inventory left. This would help the people at the back, who are in charge of making these delicious meals available, to keep track of the inventory. It also helps the users check if what they would like to purchase is available at that moment to avoid wasting their time. This web app is also efficient in that a user can place their order before arriving and all they have to do when they get to the restaurant or cafeteria is to show their proof of payment and have their order served. A self-ordering kiosk serves about the same purpose as our website (which can be



accessed on monitors and mobile phones), and the production cost of the website which was integrated with some other hardware devices amounted to N85,300 and the cost of an imported self-ordering kiosk is anywhere between \$1500 to \$5000 (N1,140,000 to 3,800,000). Therefore, the website made by Anzel Group which can be accessed on monitors and mobile apps, can serve as a substitute for the imported self-ordering kiosk and can be used in restaurants, cafeterias, schools, offices, etc.

In conclusion, the programming and fabrication of the Anzel Order-n-Track web app were successful.

Keywords:

Programming, Tracking, Cost, Food ordering, Integration.

#### **4.1 Technical Field**

Inventory management:

The Anzel food scheduling system aims to help in the real-time tracking of food items. It is very useful to both the customer and the staff. This is prompted by the need for constant updates on the availability of food items to customers and also the need for staff to continuously update the menu by increasing the quantities of food items. Knowledge of Computer-aided engineering (CAE) formed the basis for the project as it involved using programming and computer systems to solve engineering problems.

Mechanical Engineering:

As stated above knowledge from CAE was crucial to the work done regarding the programming aspects of this project and many more. The crash course on web design also played a huge role. Along with CAE, workshop practice (GET205) was also important as knowledge and skills from the course were needed in the process of cutting and joining the plastic needed to case the Raspberry Pi.

Electrical Engineering:

This field was also important even though the input was very little in the final product as it played a crucial part in the materials considered for the product design.

## **5.0 BACKGROUND**

### **5.1 Literature Review**

The emergence of technology has transformed a number of businesses, and the food service industry is no exception. Innovative approaches to simplifying the ordering process at cafeterias, restaurants, and similar facilities have been made possible by the integration of web-based apps, hardware components, and real-time inventory management systems. This literature review seeks to give a thorough understanding of the essential ideas that underlie the project.

The idea for this project originated from the working principle of self-ordering kiosks. The concept of self-service ordering in the hospitality industry dates back several decades. Early iterations included basic touch-screen systems for ordering fast food, which aimed to streamline the ordering process and reduce wait times (Smith et al., 2017). Over the

years, technological developments and the widespread use of touch-screen devices have paved the way for more advanced self-ordering kiosk systems that provide a variety of features beyond simple order-taking.

Self-ordering kiosks are interactive digital terminals or machines placed in restaurants, cafes, and other food service establishments. Research has shown that the adoption of self-ordering kiosks provides numerous benefits to both customers and food service establishments. Firstly, self-ordering kiosks empower customers with control over their ordering process, allowing them to customize their orders and review menu options at their own pace (Yoo & Kim, 2019). Research has shown that self-ordering kiosks can lead to increased sales, improved order accuracy, and enhanced customer satisfaction (Smith et al., 2017).

While self-ordering kiosks offer a range of benefits, there are also challenges and considerations that need to be addressed. One significant consideration is the initial investment cost, which includes the purchase of kiosk hardware and software, as well as installation and integration into existing systems (Hartman Group, 2019). Additionally, staff training is crucial to ensure smooth operation and to assist customers who may need guidance when using the kiosks. Another challenge is the potential resistance from certain customer demographics, such as older individuals who may be less familiar with technology.

## **5.2 Research Problem Statement**

In today's fast-paced academic environments, students often face lengthy queues at cafeterias, and workers in restaurants, resulting in valuable time being spent on meal procurement. To address this issue, our project endeavours to develop a web application utilizing HTML, CSS, JS, Firebase, and Bootstrap in conjunction with Raspberry Pi hardware

components. This innovative solution aims to provide a more expeditious and efficient ordering system, inspired by the principle of self-ordering kiosks. However, resource constraints necessitated the selection of this web app approach over a traditional self-ordering kiosk, ensuring feasibility within budgetary and time limitations.

Additionally, our system boasts key features designed to revolutionize the ordering experience. Back-end staff will have the capability to dynamically modify menu information visible to front-end users, ensuring real-time updates and flexibility in menu offerings. Furthermore, the system will automatically adjust item quantities as orders are placed, preventing discrepancies between displayed and actual availability. For instance, if the inventory initially contains 50 pieces of chicken and a customer purchases 10, the system will promptly reflect the updated quantity of 40.

This research problem addresses the urgent need for a streamlined and efficient ordering process within educational institutions, ultimately enhancing the academic experience for students and staff alike.

## **6.0 SUMMARY OF THE INVENTION**

The Anzel Order-n-Track web app is a website app where front-end users can order items on the menu without having to be in the restaurant or cafeteria. Our web app also offers a real-time tracker for the back-end as well as the front-end users to track the quantity left of each item. And a feature for the back-end users to manually make changes to the menu. Our web app was

programmed using HTML, CSS, JS, Firebase, and Bootstrap. A Raspberry Pi was introduced to host the web app on the monitor.

- Firebase

Firebase, a cloud-based platform developed by Google, plays a pivotal role in enabling real-time data synchronization between the front-end and back-end components of the web application. Its NoSQL database capabilities provide a scalable and secure foundation for managing dynamic content, such as menu items, pricing, and availability.

- Bootstrap

Responsive web design is imperative in ensuring that the web application is accessible and user-friendly across various devices and screen sizes. Bootstrap, a popular front-end framework, empowers developers to create responsive and visually appealing interfaces. The development process is sped up by its grid architecture and pre-designed components, resulting in a refined and uniform user experience.

- Raspberry Pi

The Raspberry Pi single-board computer serves as the hardware foundation of the project, facilitating the connection between the web application and the display monitor. Additionally, the use of an HDMI cable enables seamless

communication between the Raspberry Pi and the monitor, ensuring crisp and clear display output.

- HTML

This served as the framework of the web app. HTML is useful for writing the layout of pages. It allows sectioning paragraphs together, putting items in different divisions i.e. divs.

- CSS

CSS was used for the design aspect of our web app, it made the interface more user-friendly. And it was also used to make some of the pages responsive for all screen sizes.

- Plastic casing

This plastic casing was fabricated in the workshop at Pan-Atlantic University, School of Science and Technology, to serve as a protection for the Raspberry Pi which is sensitive and should be protected from external interference.

## **7.0 INVENTION DESCRIPTION**

The Anzel food scheduling is a real-time inventory tracking system used for ordering and real-time tracking of food. It consists of a computer which displays the website and has 2 interfaces; one for customers and one for staff. The staff interface is used by the staff in updating the available meals, their prices, and quantities. The user interface is used by customers to order and see meals that are available for sale and the quantities left.

The programming languages used for the building of this web app system are HTML, CSS, and JavaScript. The database used for authentication of users -both front-end and back-end- is Firebase. Firebase allowed the menu items to be written, saved, displayed to the users, updated, and save updated data back to Firebase. The Firebase products that were used are:

- Firestore: This is where the menu items are saved, retrieved, and updated if need be.
- Storage: This is where the images of the menu items were stored and later retrieved by Firestore for display.
- Authentication: This is where the signup and login information provided by the user and staff would be saved.
- Real-time database: This is where the information provided by the staff and user would be saved in real-time. So every time someone logs in or signs up, their information would be saved here.

## **7.1 AIM AND OBJECTIVES**

### **7.1.1 AIM**

- To fabricate a web app system that eases the process of ordering from cafeterias and restaurants using materials available in the country.

### **7.1.2 OBJECTIVES**

- Mathematical modelling of the layout of the web app system and Raspberry Pi.
- 3D Modelling design of the web app system using Fusion 360.

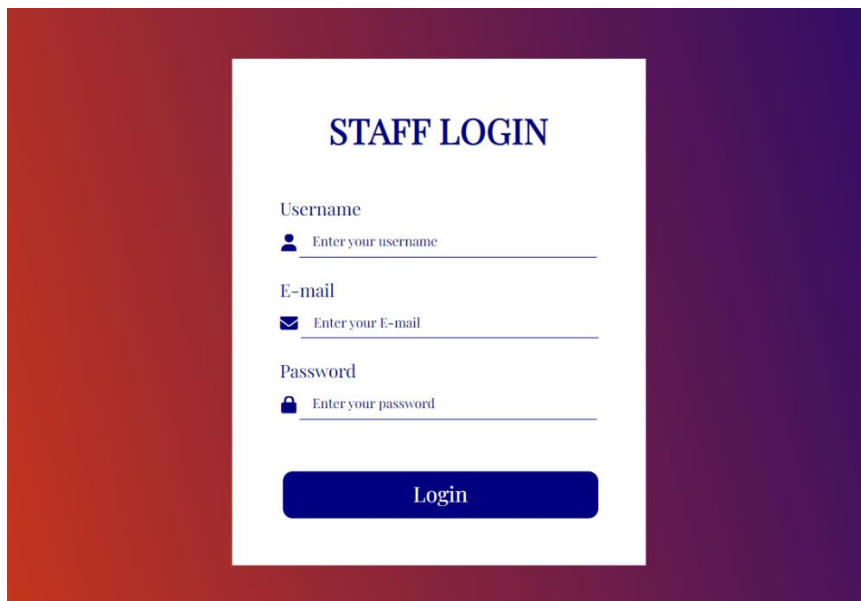
- Fabrication and construction of parts to fit.
- Programming of the web app to enable users and staff to interact effectively.

## **7.2 APPLICATIONS OF THE ANZEL ORDER-N-TRACK WEB APP SYSTEM**

The order-n-track web app system finds extensive use in restaurants, cafeterias, and industries that sell edible goods. The order-n-track web app system is versatile in that it can be adapted and integrated with the specific needs of whichever industry or company it is required to be used.

The order-n-track web app system can be used in small-scale businesses as well as large-scale businesses. The technicalities can be updated or reduced to fit in with what each and every business needs.

## **7.3 IMAGES OF THE ANZEL ORDER-N-TRACK WEB APP SYSTEM:**



The image shows a 'STAFF LOGIN' form centered on a white background, which is itself set against a dark purple and red gradient background. The form contains the following elements:

- STAFF LOGIN**: The title of the login page in a bold, dark blue font.
- Username**: A label above the first input field.
- Enter your username**: The placeholder text for the username input field, preceded by a small blue user icon.
- E-mail**: A label above the second input field.
- Enter your E-mail**: The placeholder text for the email input field, preceded by a small blue envelope icon.
- Password**: A label above the third input field.
- Enter your password**: The placeholder text for the password input field, preceded by a small blue lock icon.
- Login**: A blue button with white text located at the bottom of the form.



USER SIGN UP

Username

Enter your Username

E-mail

Enter your E-mail

Password

Create your password

Confirm password


Confirm your password

Sign Up Now

Already have an account? Login

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MENU




Fried Rice

₦300

35

Edit




Fried Fish

₦350

49

Edit




Beef

₦200

50

Edit




Chicken

₦150

50

Edit



Doughnut

₦150

50

Edit

Update Item

Name:

Beef

Price:

₦200

Quantity:

50


Image:

Choose File

No file chosen

Update

Cancel




Fried Plantain

₦150

45

Edit




Rice

₦100

35

Edit




Bottle of Water

₦50

20

Edit




Meat Pie

₦120

40

Edit



Akara

₦100

30

Edit

11

## PASSWORD RECOVERY

E-mail



Enter your E-mail

Submit

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## MENU



Fried Rice

32

₱300

Add to cart



Fried Fish

48

₱350

Add to cart



### My Cart



Fried Rice

₱300.00



Fried Rice

₱300.00



Total ₱ 600 .00

Proceed to  
Checkout >

MENU

Fried Rice  
34  
₦300

Add to cart

Fried Fish  
48  
₦350

Add to cart

Akara  
₦100.00

Add to cart

Bottled Water  
₦150.00

Add to cart

My Cart

Fried Rice
₦300.00

Fried Fish
₦350.00

Bottled Water
₦150.00

Akara
₦100.00

Total

₦ 900 .00

Proceed to Checkout >

Anzel

Order-n-Track

Are you a?

STAFF

USER

## 8.0 METHODOLOGY AND MATERIALS

### 8.1 PRELIMINARY DESIGN CONSIDERATIONS

Most of the materials and methods of operation used were carefully chosen with the following considerations in mind: cost of production, availability of materials, time factor, ease of operation, and level of technical knowledge level.

### 8.2 MATERIALS SELECTION

Most of the materials to be used were sourced within the locality, Pan-Atlantic University and Lagos, to be precise to ensure the reduction of the overall cost of production, thereby achieving one of the cardinal objectives of this project.

### 8.3 MATERIALS



1. **Monitor:** This is used for displaying the webpage. The group would have liked the monitor to be touch screen due to its easier operation and aesthetically pleasing nature but due to cost the monitor was chosen was not.



2. **Keyboard:** This is used for inputting commands on the website. For the staff, it will be used to input prices and quantities of food available for sale.



3. **Mouse:** This is also used to input commands, especially in the case of the customer when he or she wants to select food items.



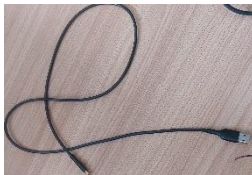
**4. Raspberry Pi:** This works like a CPU which will help to run the website on the monitor.



**5. Plastic (casing):** This was important to shield the Raspberry Pi from adverse weather conditions and protect it.



**6. HDMI to type B adapter**



**7. Type-C charger**



**8. VGA cable**



**9. VGA to HDMI adapter**

**10. Programming languages (JavaScript, CSS, HTML, Bootstrap and firebase):** This formed the backbone of the project constituting majority of the work which included the coding behind the website. JavaScript and HTML were used for the front end development. Bootstrap was used for the responsiveness of the website. Firebase was used as the database management system.





```
File Edit Selection View Go Run Terminal Help Anzel Order-n-Track
# passwordreset.css
border: none;
border-bottom: 1px solid #navy;
outline: none;
border-top: none;
margin-left: 0.25em;
margin-right: 0.25em;

::placeholder {
  color: #navy;
  font-family: "Playfair Display", serif;
  padding-left: 0.8em;
}

input:hour {
  font-size: large;
}

.password_recovery #password_reset {
  font-family: "Playfair Display", serif;
  width: 100%;
  border-radius: 10px;
  border: 1px solid #navy;
  background-color: #white;
  color: #navy;
  font-size: large;
  outline: none;
  border: none;
  overflow: hidden;
  padding: 0.5em 0 2.5em 0;
}

.password_recovery #password_reset:active {
  background-image: linear-gradient(75deg, #navy, #red);
  font-size: x-large;
}

footer {
  color: #white;
  position: fixed;
  bottom: 0;
  width: 100%;
  display: flex;
  justify-content: center;
}

#passwordreset.js
1 // Import the functions you need from the SDKs you want
2 // Import the FirebaseApp module from 'firebase/app'
3 // Import the initializeApp function from 'firebase/app'
4 // Import the getAuth, createUserWithEmailAndPassword, signInWithEmailAndPassword, and onAuthStateChanged functions from 'firebase/auth'
5 // Import the getDatabase, set, ref, update functions from 'firebase/database'
6 // Import the getStorage, ref, uploadBytes, and getDownloadURL functions from 'firebase/storage'
7 // Your web app's Firebase configuration
8 const firebaseConfig = {
9   apiKey: "AIzaSyDyZqfuxfjG2n5ePjhHTP509Hcp42",
10   authDomain: "anzel-main.firebaseio.com",
11   databaseURL: "https://anzel-main.firebaseio.com",
12   projectId: "anzel-main",
13   storageBucket: "anzel-main.appspot.com",
14   messagingSenderId: "1016468813112",
15   appId: "1:1016468813112:web:1f0b6f619f3e1568917dc"
16 };
17 // Initialize Firebase
18 const app = initializeApp(firebaseConfig);
19 const database = getDatabase(app);
20 const auth = getAuth();
21 const resetPassword = document.querySelector("#password_reset");
22 resetPassword.addEventListener("click", (e) => {
23   const email = document.querySelector("#email").value;
24   sendPasswordResetEmail(auth, email)
25     .then(() => {
26       // Password reset email sent!
27       alert("Check your email for the password reset link.");
28       // ...
29     })
30     .catch((error) => {
31       const errorCode = error.code;
32       const errorMessage = error.message;
33       alert(errorMessage);
34     });
35 });
36 // Footer
37 <div id="password_reset">
38   <input type="text" value="Email" id="email" />
39   <input type="submit" value="Reset" id="password_reset" />
40 </div>
41 </body>
42 </html>
```

This code deals with resetting the password of an account when the user forgets the original password.

The HTML deals with the framework, the CSS deals with the designing of the page, and the JavaScript deals with the page functionality.

```
File Edit Selection View Go Run Terminal Help Anzel Order-n-Track
# staffMenu.css
height: 80px;
width: 90%;
background-image: linear-gradient(75deg, #navy, #red);
margin: 10px 0px;
display: flex;
align-items: center;
justify-content: space-between;
padding: 10px;
}

#staffMenu.js
1 // Import the initializeApp function from the Firebase SDK
2 // Import the initializeApp function from 'firebase/app'
3 // Import the getAuth, createUserWithEmailAndPassword, signInWithEmailAndPassword, and onAuthStateChanged functions from 'firebase/auth'
4 // Import the getDatabase, set, ref, update functions from 'firebase/database'
5 // Import the getStorage, ref, uploadBytes, and getDownloadURL functions from 'firebase/storage'
6 // Your web app's Firebase configuration
7 const firebaseConfig = {
8   apiKey: "AIzaSyDyZqfuxfjG2n5ePjhHTP509Hcp42",
9   authDomain: "anzel-main.firebaseio.com",
10   databaseURL: "https://anzel-main.firebaseio.com",
11   projectId: "anzel-main",
12   storageBucket: "anzel-main.appspot.com",
13   messagingSenderId: "1016468813112",
14   appId: "1:1016468813112:web:1f0b6f619f3e1568917dc"
15 };
16 // Initialize Firebase with the provided configuration
17 const app = initializeApp(firebaseConfig);
18 // Get a reference to the Firebase Realtime Database
19 const database = getDatabase(app);
20 // Get a reference to Firebase Authentication
21 const auth = getAuth();
22 // Add an event listener to the staffMenu button
23 staffMenu.addEventListener("click", function (event) {
24   // Check if the entered values match the expected staff
25   if (username.value === "Staff" && email.value === "staff@anzel.com") {
26     // ...
27   }
28 });
29 // Footer
30 <div id="staffMenu">
31   <input type="text" value="Username" id="username" />
32   <input type="text" value="Email" id="email" />
33   <input type="button" value="Login" id="login" />
34 </div>
35 </body>
36 </html>
```

This code deals with the staff menu page, where the data of menu items can be edited. The HTML deals with the framework, the CSS deals with the designing of the page, and the JavaScript deals with the page functionality.





## **8.4 PROJECT MANAGEMENT**

## **9.0 CLAIMS**

The Anzel Order-n-Track is the first and only automated food-ordering and tracking web app in Pan-Atlantic University that encompasses:

1. A Raspberry Pi to host the web app.
2. A web app where the front-end users can order items on the menu without having to be in the cafeteria.
3. A real-time tracker to show the quantity of items left.

## **10.0 CONCLUSION AND RECOMMENDATION**

### **10.1 CONCLUSION**

The fabrication and programming of the Anzel Order-n-Track web app was successful, with the main features working as expected. The front-end users can with the help of our user-friendly interface, order items available on the menu. As well as check if what they want is still available at every point in time. The back-end users i.e. the staff, are also able to edit the necessary data in the menu and this automatically reflects in the menu seen by the front-end users.

The economic feasibility of the fabrication and programming of the Anzel Order-n-Track web app website with cost-effective materials and principles is more reasonable as most start-up or even already established companies that would like to incorporate this technology in their

companies might not have enough money to go for self-ordering kiosks. So, this would be a more reasonable substitute, as well as a faster one.

## **10.2 RECOMMENDATION**

The team initially contemplated going for a more complex idea and at some point, adding additional features to the project but due to resource constraints such as budgetary and time limitations, these other ideas were not feasible. Some of the ideas that could have been incorporated are:

- Touch Screen Monitor with a stand:

This would have been more similar to the self-ordering kiosks and would have improved user experience.

- A Braille reader

Incorporation of braille readers with the monitor to assist individuals with visual impairments to use the web app seamlessly.

## **11.0 CONTRIBUTORS**



Apampa Muizah (Head of Web Development & Project Head):

Muizah is an aspiring mechanical engineer going into her third year. She hopes to one day delve into the design aspect of mechanical engineering.

She possesses skills such as the ability to work in a team, programming skills, and communication skills.



Ogah Daniel (Head of Finance & Head of Fabrication):

Daniel is an aspiring electrical engineer who hopes to make an impact in the field with his ideas and skills. For now, he is only concerned about accumulating knowledge as he strives for excellence in his endeavors.



Ajayi Andrew (Design Head):

Andrew is a student of mechanical engineering. He possesses skills in AutoCAD and fusion.



Engr. Paul Onoriode Avbenake (Mentor)

Engr. Paul Onoriode Avbenake is a faculty member at The School of Science and Technology, Pan-Atlantic University. Prior to his appointment, he was a Faculty member at the Chemical and Petroleum Engineering Department, Bayero University Kano. He obtained his B.Sc. in Chemical Engineering from The University of Lagos, M.Sc. in the same field specializing in process from Ahmadu Bello University (ABU), Zaria. He has published several journal articles and contributed various book chapters with international publishers as well as presented his research in several international conferences. He is equally a registered COREN, NSChE and a member of the African Membrane Society (AMS).

## **12.0 CONTRIBUTION**

Muizah designed the company's official website which was shown in the first presentation and she also worked on the first PowerPoint presentation, and the user manual. Daniel sketched a diagram of the project. Andrew designed the logo and also got the monitor used for the project. Andrew worked on the Fusion 360 document of the project and also the second PowerPoint presentation. Muizah and Daniel worked on the budget and procurement of the materials needed. They both ensured to take pictures of the fabrication and programming processes. They also worked on the report that was printed and submitted.

### **12.1 CONTRIBUTIONS DURING THE FABRICATION PROCESS**

After the materials needed to start the project were obtained, the programming as well as fabrication processes began. Muizah programmed and designed the web app under the supervision of Mr. Soma. The staff and user front-end was worked on, and the authorization process as well. After that, the staff and user menu pages were programmed before moving on to the cart and checkout page for the front-end users.

Daniel fabricated the plastic casing for the Raspberry Pi board with the supervision of Engineer Segun and he had some help from Andrew. The measurements of the Raspberry Pi were taken and the plastic material was measured with respect to the measurements of the Raspberry Pi and the cutting of the plastic commenced. After cutting, the pieces were assembled.

Signature.....  
Apampa Muizah

Signature.....  
Ogah Daniel

Signature.....  
Andrew Ajayi

### 13.0 APPRECIATION:

We are delighted to appreciate Engineer Onoriode Avbenake for his guidance and mentorship during the project work and his continuous direction through the daily routine plan sent to our emails. This project would have not been completed without the continuous support and help from Mr. Soma. To Dr. Desmond, we are grateful for your guidance in choosing the right languages to use for the programming aspect. We are also deeply grateful to Mr. Fortune who provided us with the monitor used for the project, and Dr. Ihenacho for his guidance while drafting the budget. We are also grateful to every member of the department who gave us access to instruments and materials needed for the actualization of our project. And we also want to take this opportunity to thank our Honourable Dean Dr. Darlington Agholor for approving the necessary funds required to make this project successful.

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