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COLLEGE OF COMPUTER STUDIES

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers

A Thesis Study
Presented to the Faculty of the
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University of Perpetual Help System - JONELTA

In Partial Fulfillment of the
Requirements for the Degree of
Bachelor of Science in Computer Science (BSCS)

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ABSTRACT

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The primary goal of this study is to develop a system that will help monitor and control access to the desktop computers and user activity in the computer laboratories in UPHSL - Jonelta under College of Computer Studies.

The system utilized Arduino Leonardo as its main microcontroller to be able to perform the following goals of the system. To illustrate and help visualize the system's functions and routines- the researchers used Use Case Diagrams, Activity Diagrams and Class Diagrams. For the software side of the system, the researchers utilized MySQL to handle data, a web hosting service my.web.z, while HTML, CSS, and PHP are the main languages used to create the software. Interviewing and observation was utilized as a

instrument to fact finding in order to determine the requirements of the desired application. Questionnaires and surveys were used for measuring the efficiency of the proposed system and willingness to use the system as evaluated by the end-users.

Results of the evaluation of the proposed system were based on the ISO 25010 standard which showed that the criteria on all of the system's sub-characteristics(Suitability, efficiency, compatibility, usability, reliability, security, maintainability, and portability) have an equal mean of 4.3.

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CHAPTER I

Introduction

TAPTAP is an Arduino-based programmable device that is integrated into the system aiming to control the usage of a PC/Desktop.

The Arduino is a versatile and flexible hardware platform that can be used for various purposes with different modules added to it. One such module is the RFID RC522 Sensor, which allows the Arduino to read and scan RFID tags for identification from a distance. The RC522 module is based on NXP's MFRC522 RFID Chip and is low-cost and easy to use. To build a project using the Arduino Microcontroller and RC522 Sensor, a user taps an RFID tag into the sensor for verification against a database. If approved, the Arduino will turn on the computer and record the user associated with the RFID tag.

In 2019, Balicao, Fernando, Salvador, and Villanueva also conducted a study using Arduino with RFID Technology. The project's purpose is to enable Windows Log-in using RFID, it was made possible by tapping the RFID tag on the sensor, and the Arduino will send a keyboard input of the Login credentials of an authorized user to use the computer in a server room. Another Arduino-based project was made in 2019 by a team composed of Bonto, Bermudo, Caballero, and Versoza creating "Project: Hermes: An Arduino-Based Discourse Helping Device for Deaf and Mute Learners". This project

is a two-way communication tool in aiding the deaf community to communicate with other people.

The problem addressed in the study is the need for a secure and efficient means of logging into a computer, and a two-way communication tool for the deaf community. The solution they proposed is using the Arduino with RFID technology to enable Windows Login and to create a discourse-helping device for deaf and mute learners.

Statement of the Problem

The absence of both a user logging system and RFID security on computers poses a significant risk to the accountability, privacy, and security of sensitive data stored on these devices. Without a logging system, it becomes difficult to identify and track the actions of users, which can lead to unauthorized access, data breaches, and misuse of data (Arya et al., 2018). Similarly, the absence of RFID security can make computers vulnerable to unauthorized access, potentially leading to data breaches, identity theft, financial loss, and damage to reputation (Gupta & Sharma, 2019). The combination of the two can make it even more challenging to track and monitor the usage of computers and ensure the confidentiality and integrity of sensitive data.

1.1. Project Context

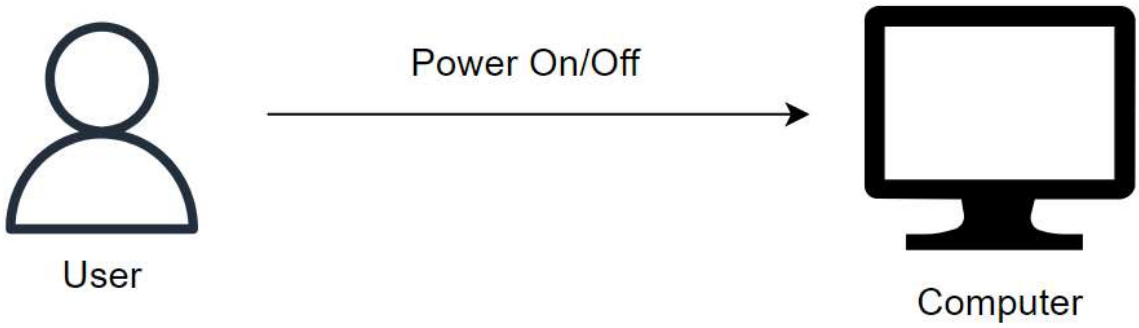

Figure 1.0. Current setup of using computers

Figure 1.0 presents the process of how the current setup of the computers is being accessed. Authorized and unauthorized users are able to use the computers of the university by simply pressing the power button of the system unit, this will initialize the hardware's boot-up and will automatically sign in to the university's profile on the computer without any verification or user logging history.

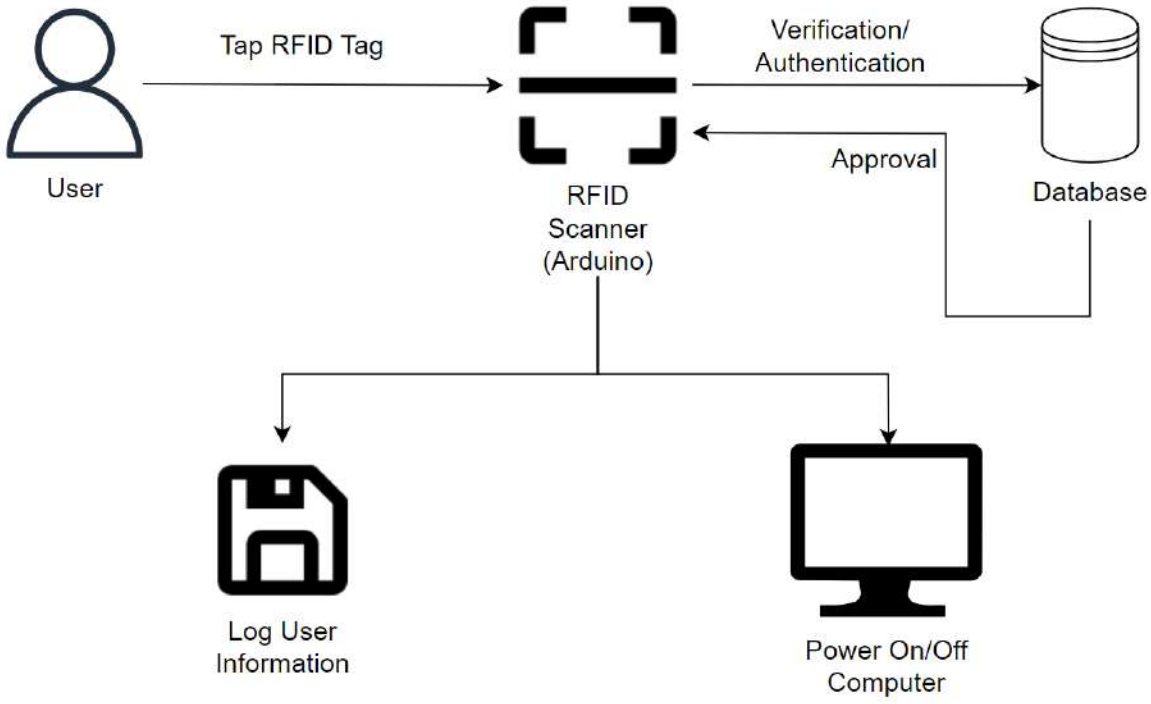

Figure 1.1. Proposed setup for using computers

Figure 1.1 illustrates the proposed setting for using the computers. The user taps their RFID tag to the Arduino RFID Scanner, upon tapping- this will initialize the verification system. If the user matches the credentials on the database containing information of registered users with their respective RFID UIDs, the user will be gained access to the respective hardware and will automatically log their personal information into the system. This solves the issues stated above as the Arduino device will log the user information associated with the RFID tag based on the system database. In addition, this will encourage users to tap their RFID tags again to be able to power off the computer since administrators are able to check who last used the computer if left open.

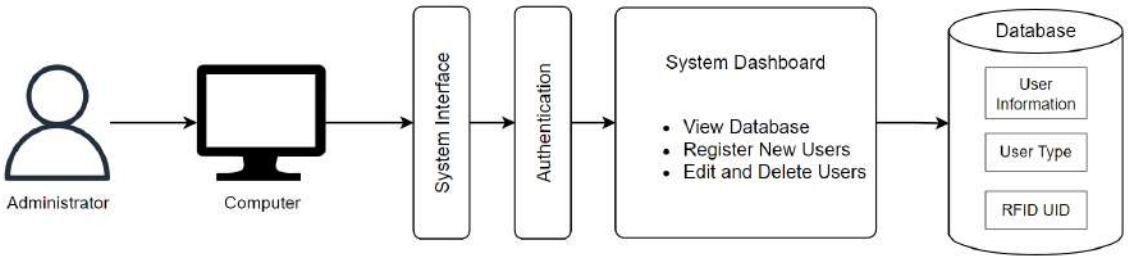

Figure 1.2. Proposed Process of System Software

Figure 1.2 illustrates the process of the systems' software that is critical to managing, accessing, and making changes to the database. In the software, only those with administrative privileges are able to access the dashboard, within the dashboard comes the option to view, edit and delete all of the user's information. Additionally, administrators can also register new users that want and/or need to use the computers within the university.

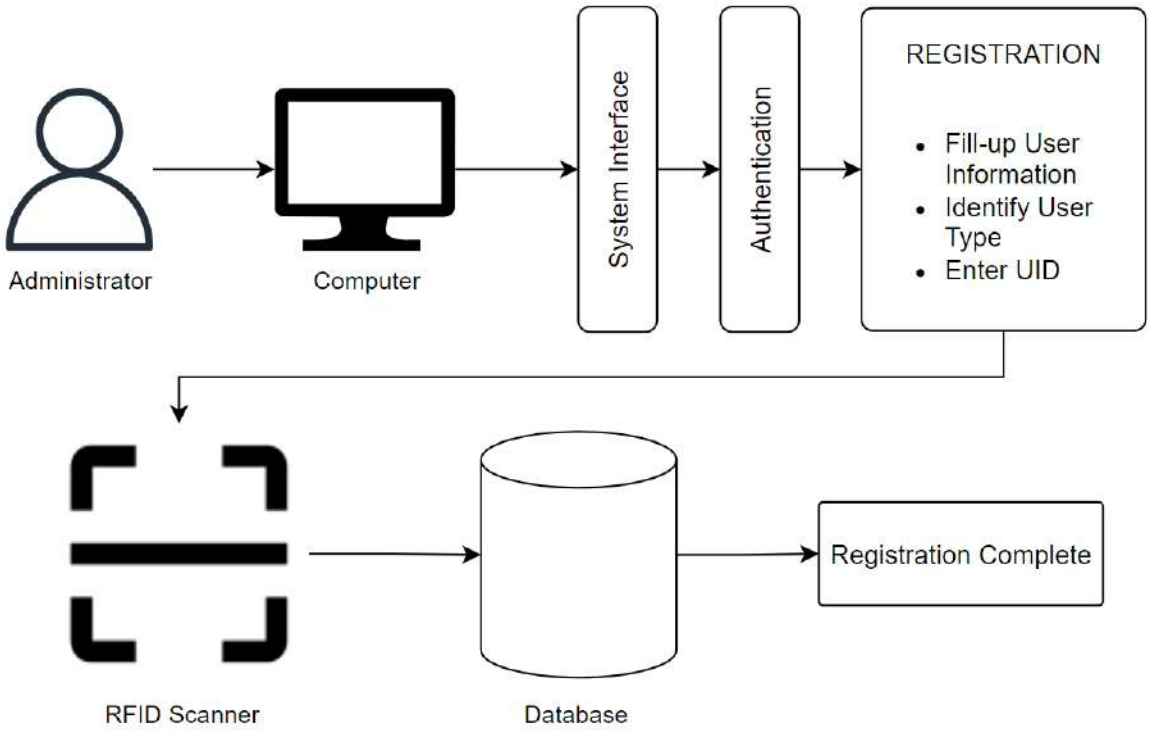

Figure 1.3. Proposed Process of Registration of New User

Figure 1.3 shows the process of registering new users to the system. To start off, the administrator will need to access the database to be able to input the necessary information on the new user such as the name, identification number, user type, and their respective department into the system. Next, a new RFID Tag will be tapped into the Arduino Device and the UID will be recorded by the software and will also be associated with the new user being registered into the system database.

1.2. Purpose and Description

Security plays an important role in institutional places such as universities and companies. (Dhanalakshmi et al., 2021) To combat this, the Arduino RFID Scanner for Controlled Access and User Logging will be created for the computer laboratories of different organizations.

This will help increase the security and efficiency of tracing the user's usage by logging their name, which is automatically detected by logging in to the hardware via tapping their IDs- as shown in Figure 1.1.

In reference to Figure 1.2, administrators of the College of Computer Studies Department will only have permission to edit, delete, and view the logs of the student's information during the time of opened hardware, this will ensure the file's accuracy, integrity, and security when it comes to tampering and editing by unauthorized users.

The logging of users and controlling access to computers is an integral part of maintaining and prolonging the usable life of any hardware. The researchers will use this RFID technology in mind to create a device and integrate it into a desktop computer that aims for the following:

- Track previous and current users
- Automated power on and off the computers
- User verification upon scanning

- Hold accountability to users

This project aims to be implemented in the computer laboratories or offices of any organization or school. The researchers believe that the project will be beneficial for the institution as it will provide the aforementioned goals stated above.

1.3. Objectives of the Study

The general objective of this study is to develop and implement a user logging system using Arduino Leonardo, which specifically aims for the following objectives:

1. To control the computers in the University of Perpetual Help System Laguna - Binan CCS Laboratories in terms of:
    a. Filtering the students, faculty, and staff that are allowed to use the computers
    b. Identification of user access to the desktop computers.
2. Holding accountability in the event of damage to hardware or software, and
3. To evaluate the quality of the system using ISO 25010 Evaluation Tool.

1.4. Scope and Delimitation

The system aims to provide better security for computer resources by automatically logging their information and storing the data in the system for monitoring purposes when the computer is accessed. This can be achieved by requiring the users to

undergo an authentication process in the form of tapping an ID embedded with RFID onto the reader through Arduino to be able to power the computer on or off.

The system will only be conducted and implemented in the CCS Department at UPHSL - Binan.

1.5. Significance of the Study

This project would be a great contribution to the University in relation to security, user tracing, and producing user logging history. Furthermore, the results of this project will benefit the following:

Administrators and Staff. The system will aid the administrators and staff in tracing a student's information whenever peripherals are intentionally missing and/or malfunctions.

Students. The system, will encourage the students to have their IDs at all times and practice the proper handling of computers as they will be held accountable if any issues arise.

Teachers. With the help of the system, faculty will be able to monitor each of the student's application usage during or at the end of class hours via accessing system logs.

Researchers. The researchers have acquired intellectual gains and character empowerment in the course of encountering difficulties and challenges throughout the entirety of the project.

Future researchers. The output of the paper will provide as a reference material and a guide for conducting a similar project to Arduino RFID Scanner for Controlled Access and User Logging.

Overall, this project will aid the entirety of UPHSL - Jonelta in providing physical security and user monitoring system specifically for computer laboratories handled by the CCS Department.

Chapter II

REVIEW OF RELATED LITERATURE

2.1. Related Studies & Literature

In today's technology, text-based passwords are the most widely used technique for establishing human authentication with computer systems. Password-composition restrictions are put in place by system administrators to stop users from choosing passwords that are too easy for an attacker to guess. In order to prevent attackers from figuring out users' text-based passwords and using them to impersonate users, system administrators typically require users to choose passwords in accordance with a password composition policy. Such a policy may mandate, for example, that passwords must be at least a specific length, contain capital letters and symbols, and refrain from using phrases that are often found in dictionaries (Komanduri1, et al., 2011). Unfortunately, Yildring and Mackie (2019) state that, given their vulnerability to attacks, passwords are one of the critical risk factors for the security of information systems. This vulnerability is primarily caused by user actions and habits rather than the password system itself. The fundamental issue with passwords is their memorability, which ultimately leads to other issues with passwords like reuse, sharing, and weak password selection. Guidelines, and suggestions help in creating a more secure password for the users– however, a study conducted by Komanduril shows that they are often unmotivated when shown a strong password suggestion even though they are aware of the importance. Several studies have reported that if the sites and software demand a strict password composition, users find it

too challenging- therefore adopting a coping strategy that will reduce productivity and security. This requires a better solution to help users create a much more secure password in a more creative way. With this in mind- Das, et al., (2014) observed that while password meters and policies do result in users choosing stronger passwords- it causes and increases user fatigue. For a typical internet user who has 25 different online accounts, it is inevitable that they will reuse passwords. Reusing passwords creates a security weakness that if an attacker can access one service, they can access all of the other services that utilize the same password, lowering overall security to that of the least secure site. Traditional composition policies or meters are unable to terminate password reuse since they will only be able to see passwords at a single site. Das et al estimate that 43-51% of users re-use passwords across accounts. In addition to the problems that come with text-based passwords, Tam, et al.,(2010), state that humans are the weakest link when it comes to the security of technology, despite their advances. Their study mainly focuses on whether users understand the construction of a secure password and good password management, the motives behind the password motivation, and the differences between the account types and their password management behavior. The results show that the participants in their study were in fact, able to distinguish an appropriate from an inappropriate password. Despite users being able to distinguish between good and bad passwords, their study shows that those users still resort to weak passwords and even reuse their passwords across the accounts they use. The study concludes that users want a convenient password, which refers to ease of usage- in this case, the passwords the users

usually pick are easy to remember. It is also revealed that some of the users entrust their passwords to others, while it is a bad practice- it helps with convenience issues such as forgetting passwords and ease of password retrieval.

To be able to combat this problem with text-based passwords and their vulnerability Kaur and Mustafa (2019) show and describes authentication as a necessary process to confirm their identity, and its goal is to ultimately raise the level of security for authorized users and to prevent unauthorized access. Unfortunately, several security protocols such as Secure Socket Layer - are still unable to prevent unauthorized access. User authentications help keep everything in order, and we see strict procedures to prevent identity theft. Authentication methods branch out into three(3) categories, these are Knowledge-Based Authentication, Object-Based Authentication, and Characteristics-Based Authentication.

In relation to our study, one of the technologies that will make passwords and authentication easier and increase security is RFID Technology. RFID can also be used as a form of authorization method instead of a password. To support this statement, Figueroa Lorenzo, et al., (2019), states that RFID is one of the best-suited technologies to carry out identification processes, it has gained popularity in applications such as access controls, payment cards, and logistics in recent years. They define RFID as an enabler of the radio waves to immediately identify items without making physical contact. An RFID system consists of two basic types of devices: a reader, which controls communication,

and tags, which have a related electrical code that they use to identify themselves specifically. These tags respond to radio frequency (RF) signals from the reader by providing their identification code (ID). Additionally, the RFID system is one of the fundamental pillars of the Internet of Things. While the Internet of Things mainly focuses on the aid of offering millions of small connected devices that can cooperate with one another for a common purpose. Fortunately, the expanding number of these small devices is making the Internet of Things a reality (Landaluce, et al., 2020). Fingerprints are considered to be the best and fastest method for checking attendance. They are secure to use, unique to every person, and do not change in one's lifetime barring accident. The objective of this paper was to improve the fingerprint identification system for implementation on a large database. The main objective of this paper was to design and construct an attendance system using a fingerprint module. In this system, Arduino Wemos D1 R2 ESP8266 (microcontroller) and Adafruit fingerprint reader are the main components used to insert records into a database. Because of being a low-cost technology that requires little upkeep- it makes it possible to connect to billions of devices- the RFID garnered considerable research efforts due to its creative potential in a variety of application domains. Various RFID sensors with varying architectures, levels of complexity, and system requirements are currently being proposed. These RFID Sensors can be either battery operated or fully passive, tags that are equipped with chips, and chipless tags. Though they possess their advantages and disadvantages- users are able to choose the best type of sensor to achieve the goal of their projects with the abundance

of RFID sensors in the market, consequently the quality of these sensors will also reflect their cost (Costa, et al., 2021). Munoz-Ausecha, et al., (2021), considers RFID to be a necessary component or core technology for the Internet of Things (IoT). When it comes to access control, since it is able to restrict access or provide access, RFID is used in various ways to manage various kinds of systems. Frameworks can be used for this access control to prevent unauthorized users from reading tags, which could lead to unlawful access to information that is stored. Asymmetric keys for mutual authentication, digital signature systems, role-based access for the readers, and employing protocols based on the ownership of the tags have all been examined as ways to limit access to the appropriate stakeholders and systems.

This study will be utilizing Arduino as its main structure and hardware, with the support of the study of Kaswan, et al., (2020). They have stated that Arduino is a tangible programmable board. This allows for the attachment of a broad variety of sensors, and an Arduino sketch can interface with many different third-party libraries. In comparison to other controller architectures, Arduino hardware components are less expensive, and the programming language is simple. When it comes to academic purposes, Arduino is the best-suited hardware to utilize. It comes in a variety of boards that are available in the market today, these boards are the Lilypad Arduino, Red Board, Arduino Leonardo, Arduino Mega, and Arduino Shields. The Arduino board has the potential to offer many beneficial things to the world. One of the main reasons why the researchers will be using Arduino boards is of due to the low cost, and flexibility of design and experimentation

that it allows, the ability to use it with different operating systems (Linux, Macintosh OSX, and Windows), and being open-sourced and extensible both software and hardware, Arduino has had an exponential impact in the educational sector (López-Belmonte, et al., 2020). The following are some of the reasons why the researchers will be using Ardiono- as it is an open-source technology that has proven its contribution as a crucial building block for flexibility and interoperability, because of this, it is anticipated to play a significant role in the future. Due to its benefits for self-development goals and improved cost efficiency, open-source hardware has been employed in numerous industries, which include education, agriculture, environment, and energy. Arduino is an open-source electronics platform. Through the use of "shields," or add-on boards, Arduino has the potential to extend its capabilities and transform input data from a connected sensor into output. Arduino is reasonably priced and sufficiently adaptable to work on known operating systems such as Windows, Macintosh OSX, and Linux. Through C++ libraries, the Arduino software's language can be expanded. Additionally, the Arduino hardware is extensible, allowing users to create their own variants of the module (Kim, et al., (2020).

Along with the benefits and importance of Arduino, it is also important to note that there is a study similar to the current system, to further support the study and its effectiveness- S. S. Shah and N. N. Shah(2016)'s study aimed to develop an Arduino-based RFID scanner for user logging and access control of a computer system. The system also used an RFID reader to scan RFID tags, and an Arduino microcontroller

to read the data and send it to the computer via USB. While there are differences in the materials and methods used in the Shah's study, it is concluded at the end of their research that their system was tested and found to be effective in providing user logging and controlled access to the computer- this in turn provides further proof that the researcher's current study is in fact useful and needed.

2.2. Technical Background

In order to write code into the Arduino microcontroller, an Integrated Development Environment or IDE is needed. The Arduino IDE is the programming software of Arduino, it is based on the C programming language that contains behaviors that need a processor to acquire (San Hlaing, 2019). If the user's tapped RFID tag matches the information on the database, the Arduino will send a signal to the 5V relay that is connected to the power pins of a computer motherboard thus, turning on the computer. If there was no match found, the computer will not turn on.

According to Igoe (2012), there are different types of RFID readers made, an example of this is a 125KHz reader from Parallax that can read EM4001 tags which has a built-in antenna, and its dimensions are 2.5 inches in length and 3.5 inches in width. RFID tags also come in different forms, sticker tags, coin discs, key fobs, credit cards, playing cards, and even capsules designed for injection under the skin. In addition, Denuwara et al (2019) state that RFID tags are similar to barcodes; however, RFID tags

are not limited to the line-of-sight capability that comes with the optical scanning of a barcode tag and items can be scanned with no limitations to direction near an applicable reader. In addition, this technology also allows the scanning of large quantities of RFID-tagged items at once. This feature of the RFID results in efficiency in productivity as it reduces time consumption in scanning tags resulting in a larger yield within the same time frame. As RFID matures over time, the demand for RFID grew to 8% annually and its market value is expected to reach around 28 billion by 2023. Also, further minimizing the footprint of RFID technology resulted in applying it to smaller products (Chanchaichujit et al., 2022).

Automation, according to Nof (2009), is the capability of causing a machine to carry out a specific operation on command from an external source. The nature of these operations may also be part of the external command received. The device involved may likewise have the capability to respond to other external environmental conditions or signals when such responses are incorporated within its capabilities. It is also possible to increase efficiency by using automation compared to a human operator, included in this is completely removing human error in the formula.

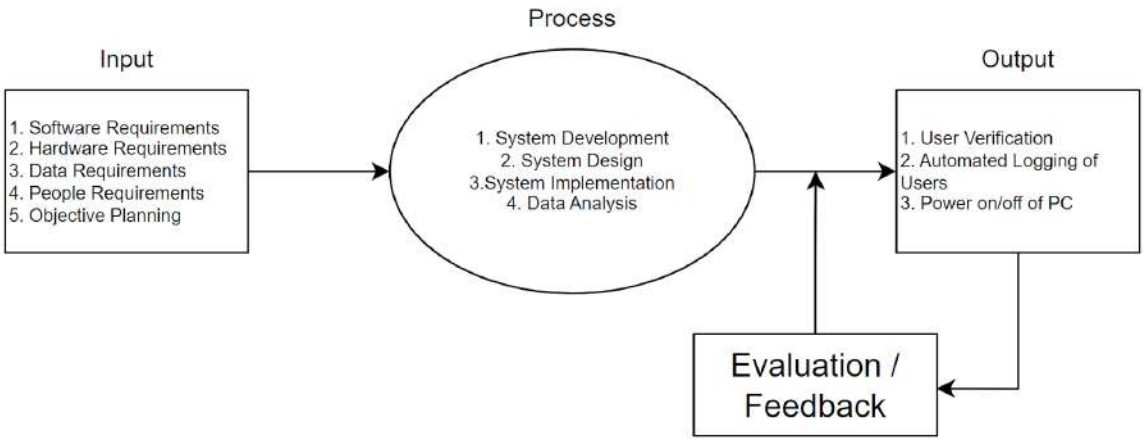

Figure 2.0. Conceptual Model of TAPTAP

The researchers will utilize Arduino to create a system that will implement verification, authentication, and accountability when individuals want to use a computer. The system will be possible with the use of the RFID module. The user needs to tap their RFID card to the reader device and then the computer will turn on. To shut down the computer, the user just needs to tap their RFID card again.

2.3. Definition of terms

Operational

1. Automation - Automation is the development and use of technologies to manufacture and provide goods and services with little to no human involvement. Many tasks that were previously carried out by humans are now more productive, dependable, and/or quick thanks to the use of automation technologies, techniques, and processes.

Technical

1. RFID - A technology known as radio frequency identification (RFID) uses radio waves to passively identify tagged objects. It is employed in a variety of commercial and industrial applications, including inventory management and the tracking of library checkouts.
2. Arduino - An open-source electronics platform or board and the software that is used to program it is referred to as Arduino. With the help of Arduino, anyone who wants to create interactive objects or environments can now more easily access electronics.

3. Arduino IDE - includes a code editor, a message area, a text console, a toolbar with buttons for basic functions, and a series of menus It communicates with and uploads programs to the Arduino hardware.

4. EM4001 - is a CMOS electronic component used in read-only RF transponders for electronic devices. The circuit receives its master clock from the same field via one of the coil terminals and is powered by an external coil positioned in an electromagnetic field.

5. NXP - is a Dutch semiconductor manufacturer and designer with main offices in Eindhoven.

6. RFID RC522 Module - The NXP RC522 is a highly integrated RFID card reader that operates on non-contact 13.56mhz communication. It is designed as a low energy consumption, low cost, and compact size read and write chip, making it the best choice for the implementation of smart meters and portable hand-held devices.

7. RFID Reader - RFID readers are network-connected devices that can be portable or fixed. It transmits signals that activate the tag via radio waves. When activated, the tag sends a wave back to the antenna, which converts it into data. The RFID tag contains the transponder.

8. RFID Tag - RFID tags are a type of tracking system that searches, identifies, tracks, and communicates with items and people using radio frequency. RFID tags are essentially smart labels that can store a variety of information ranging from serial numbers to brief descriptions and even pages of data.

9. Radio Frequency - a unit of measurement that represents the rate of oscillation of the electromagnetic radiation spectrum, or electromagnetic radio waves.

10. Identification code - Identification code refers to the unique security key issued on a case-by-case basis to allow access to Market Data only for a select group of Final Users who can be identified through the proper registration process.

11. Internet of things - relates to both the overall network of connected devices as well as the technology that enables communication between connected devices as well as between them and the cloud.

12. Access control - is an important component of data security that governs who has access to and uses organization resources and information. Access control policies ensure that all parties are who they say they are and have suitable access to information through authentication and authorization.

13. Open-source - Software that is intended to be publicly accessible is known as open-source software, anybody can view, alter, and distribute the code as they see appropriate. Peer review and community production are used in the distribution, cooperation, and collaboration of open-source software.

Chapter III

DESIGN AND METHODOLOGY

3.1. Research Methodology and Design

The project will utilize a descriptive research design and experimental method for the initial survey questionnaire and ISO 25010. The researchers will be utilizing the Simple Random Sampling Technique to collect information from the respondents, in this technique- the researchers will be selecting respondents in the pilot area in a random order. In order to learn more about RFID technology as a way for an automated authentication system for the Windows operating system, the researchers will be using the survey method. This approach will be able to assess if the system satisfies all of the 8 requirements of ISO 25010. The initial survey questionnaire and the final survey questionnaire for ISO 25010 were both employed by the researchers as evaluation tools. Ten (10) questions that answer to pre-defined responses make up the initial survey questionnaire.

3.2 System Development Methodology

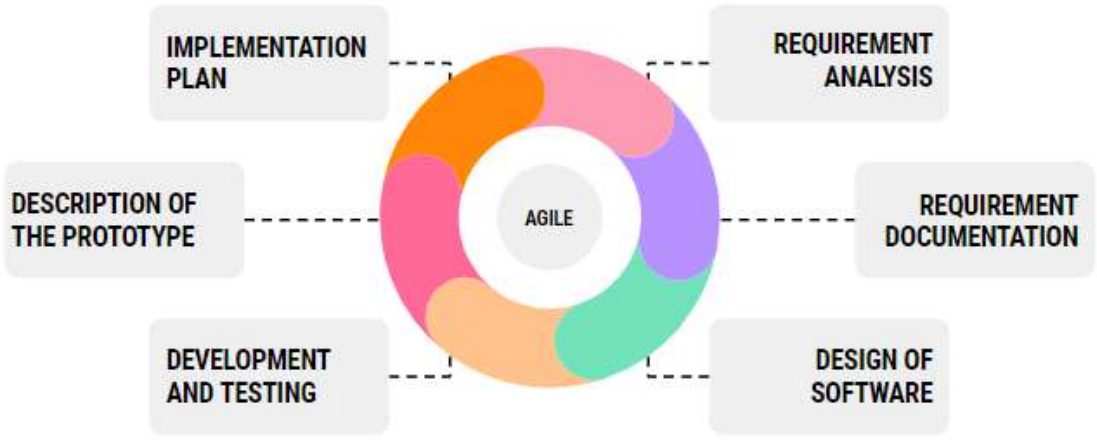

Figure 3.1 System Development Strategies

Figure 3.1 illustrates the Agile Method which will be utilized by the researchers to solve the existing problems of the pilot area. The agile methodology focuses on breaking the cycle into separate phases, it is especially beneficial when it comes to prototyping- since the method requires constant feedback from the stakeholders until it reaches the desired results. The first phase(requirement analysis) tackles the current problem, where the developers research the problem and identify the requirements needed for the project. In the second phase(requirements documentation), developers will be documenting the needed requirements of the stakeholder for the system- the developers will also be planning on the creation of the system in this phase. In the third phase(Design of software), developers will focus on the user's experience and visual design based on the stakeholder's preferences. In the fourth phase(Development and testing) a prototype will be created by the developers and presented to the stakeholders

for testing purposes. This will ensure that all of the requirements have been included in the prototype. Bug fixes, revisions, and additional features to be added will be included in this phase and will require a back to back communication from the developers and stakeholders. The fifth phase(Description of the prototype), is a finalized prototype for the system, stakeholders will review the system once more before moving on to the implementation phase. The final phase(Implementation plan) is the launch and implementation of the system in the pilot area. Feedback will be gained from the users in the pilot area- this will be useful for the system for further bugs and other features that will provide the user ease of access.

3.2.1 Requirements Analysis

In order to fully understand the requirements of the study, the researchers identified the following requirements for the study:

- **Software Requirements** - Software requirements are the various software used in the development of the system
- **Hardware Requirements** - Hardware requirements are the physical equipment and tools required in system development
- **People Requirements** - People requirements are the target end-users of the system
- **Data Requirements** - Data requirements are the data needed for system development

3.2.2 Requirements Documentation

This section describes the required documentation and resources which will be elaborated and discussed. The following are the software requirements, hardware requirements, and data requirements:

3.2.2.1 Software Requirements

Table 3.1 Software Requirements

CATEGORY	SPECIFICATION	COST
IDE	Arduino IDE	N/A
Language	PHP and HTML	
Operating System	Windows 10	₱1,880.00
Database	MySQL	N/A
Web server(Web host, Web domain)	https://my.web.z.com/	₱888.00(1 year)

Table 3.1 shows the essential software for the development of the project. The minimum Operating System for our project is Windows 10. MySQL which the researchers will use as the database. PHP and HTML will be the main language for the registration website. The researchers used my.web.z.com as their web server for web hosting and web domain purposes. The researchers will program the hardware will be done with the use of Arduino IDE.

3.2.2.2 Hardware Requirements

Table 3.2 Hardware Requirements

CATEGORY	SPECIFICATION	COST
Microcontroller Board	Arduino Leonardo	₱424.00/pc
Breadboard	Solderless PCB	₱65.00/pc
RFID Scanner	MFRC522	₱119.00/pc
RFID Card	MIFARE 13.56MHz	₱135.00(10 pcs)
Cable	Jumper Cables 20cm	₱65.00/pc
Cable	USB Type Micro-B	₱100.00/pc
Microcontroller with WiFi	NodeMCU ESP 8266	₱160.00/pc
Enclosure	Sintra Board A4, Custom	₱300.00(10 pcs)
Relay	5-volt Relay	₱45.00/pc
RFID Shield	Carbon fiber or aluminum	₱50.00(10 pcs)

Table 3.2 represents the essential hardware needed for the development of the project. In order for the system to run, the researchers will need a Breadboard, and a Microcontroller Board, the Arduino Leonardo will be the base hardware since this microcontroller provides a keyboard emulation feature. In addition, the researchers will also be needing an RFID Scanner for the data logging function and lock/unlock feature of the desktop computer and an RFID Card. Connecting the hardware to the system unit, the researchers plan to use a 5-Volt relay that will trigger the computers on and off switch. The Wi-Fi Module, NodeMCU ESP 8266, will serve as the main line of data

communication from the desktop computer to the admin/server in order to access the website for the admins' use. In addition, an RFID Shield is added to help block the card's electromagnetic signal- the material consists of Carbon fiber or aluminum.

3.2.2.3 Data

Table 3.3 Primary Data Requirements

PRIMARY DATA	SPECIFICATION
Preliminary Survey	Data collection is done via the Google Forms platform and was given to the Pilot area and respective stakeholders.
Test Data	Data acquired from testing the system hardware and software. Changes will be implemented depending on results from tests
RFID UID	Unique Identifier of RFID Tags that are needed for the verification process of the system.
ISO 25010 Survey	Final survey was conducted via the Google Forms platform after the development of the system is finished.

Table 3.4. Secondary Data Requirements

SECONDARY DATA	SPECIFICATION
Journals	A collection of articles about certain academic topics
Research Studies	An academic paper is an extensive and detailed paper discussing a specific topic
Projects	Documentations of projects related to the research study
Manuals	Documentations on handling the different hardware used in developing the system

Table 3.3 and Table 3.4 represents the data that must be gathered, information collected in the primary and secondary data requirements are critical in the development of the project. Primary data is data that is directly acquired by the researchers and secondary data is data acquired through primary sources and made readily available for researchers to use for their own research.

3.2.2.4 People Requirements

Table 3.5. People Requirements

Position	Specification
Student	People under the department of CCS in UPHSL
Administrator and Faculty	

Table 3.5. shows the criteria of the target end-user for the system. This includes the Students and Administrators and Faculty of the CCS department at UPHSL.

3.2.3 Design of Software

Software Design aids in guiding the research in identifying the correct user interface, features, functionalities, and reliability when it is implemented.

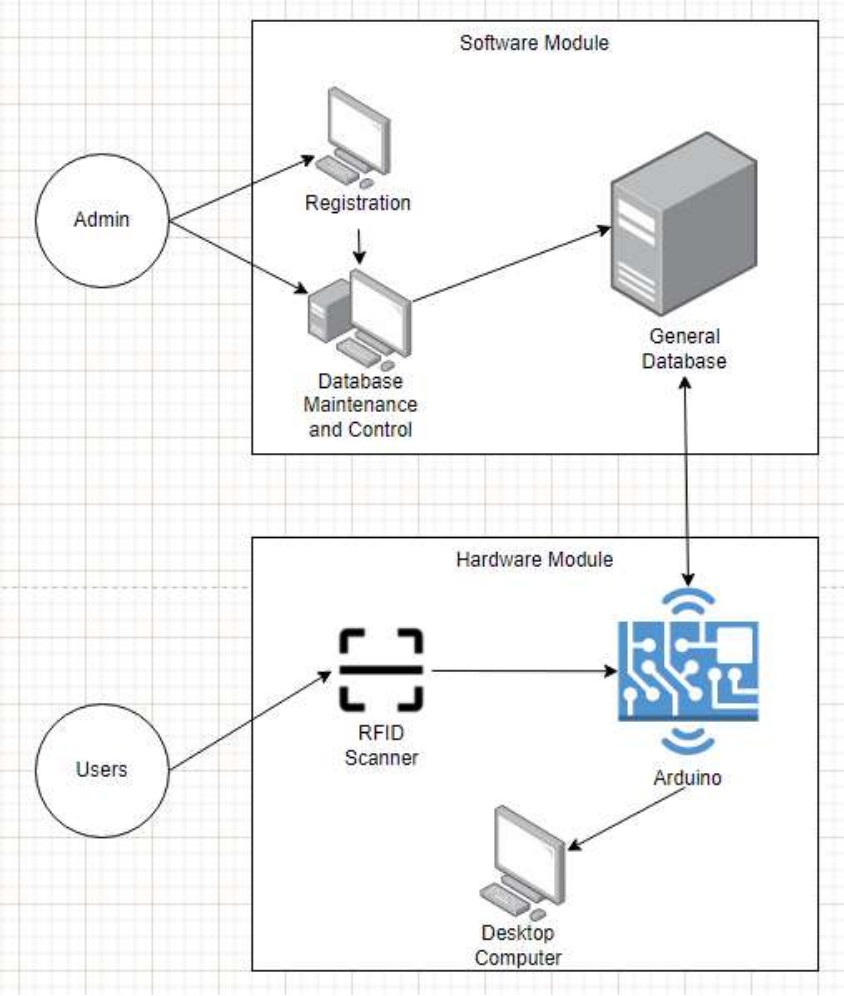

Figure 3.2. System Architecture

Figure 3.2 Shows how the admin can use the system design. The administrator can register any qualified students. The administrator is also in charge of the system maintenance and fully controls the system. The users are registered by the administrators. After registration, they can now use the desktop computers via the system. The system of checking the authentication of the user is checked by the Arduino and the database combined. The desktop computer will not open or give access to the unregistered student.

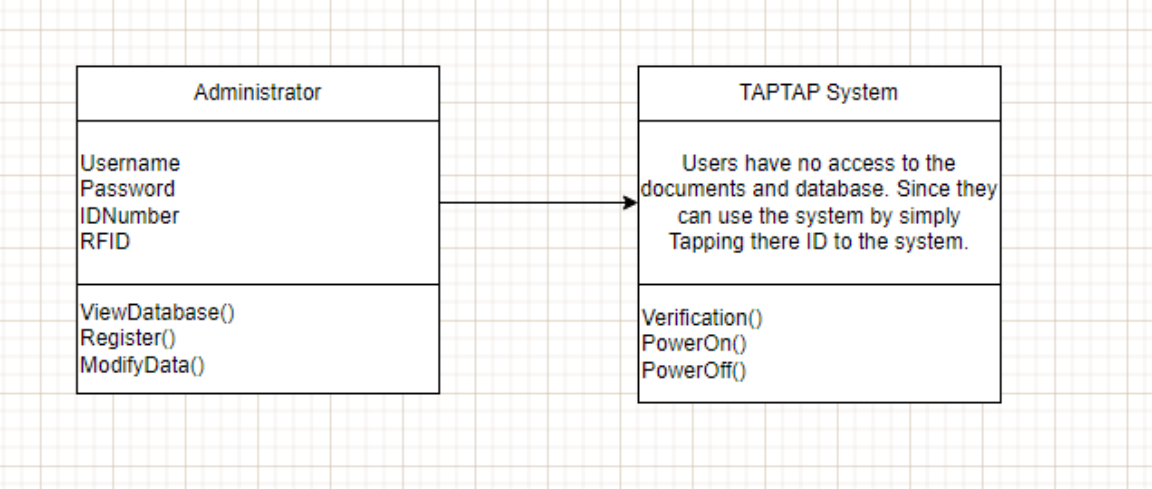

Figure 3.3. Class Diagram

In Figure 3.3, the administrator must have their data in the system to gain access and control the database, registration, and system software. TAPTAP system for the user's end does not need any logins. Since the users only need to tap their id at the scanner. By doing this, the TAPTAP system will verify the ID and power on or off the desktop computer.

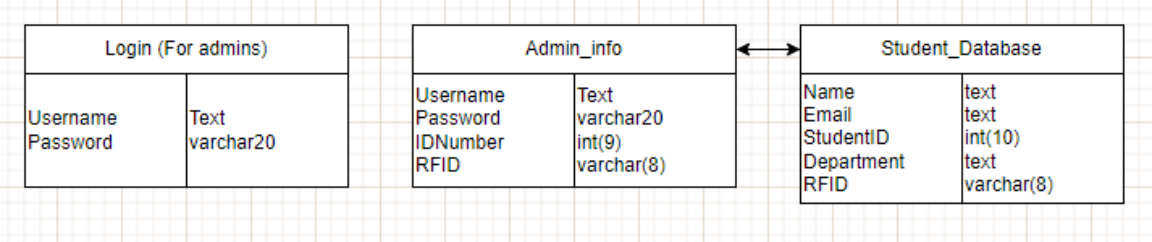

Figure 3.4. Database Schema

Figure 3.4, presents the database schema. The developers of this database made this structure in a way for it to be beginner friendly for future administrators. All of the tables are handled by the administrators only. The diagram also shows the connections between the tables.

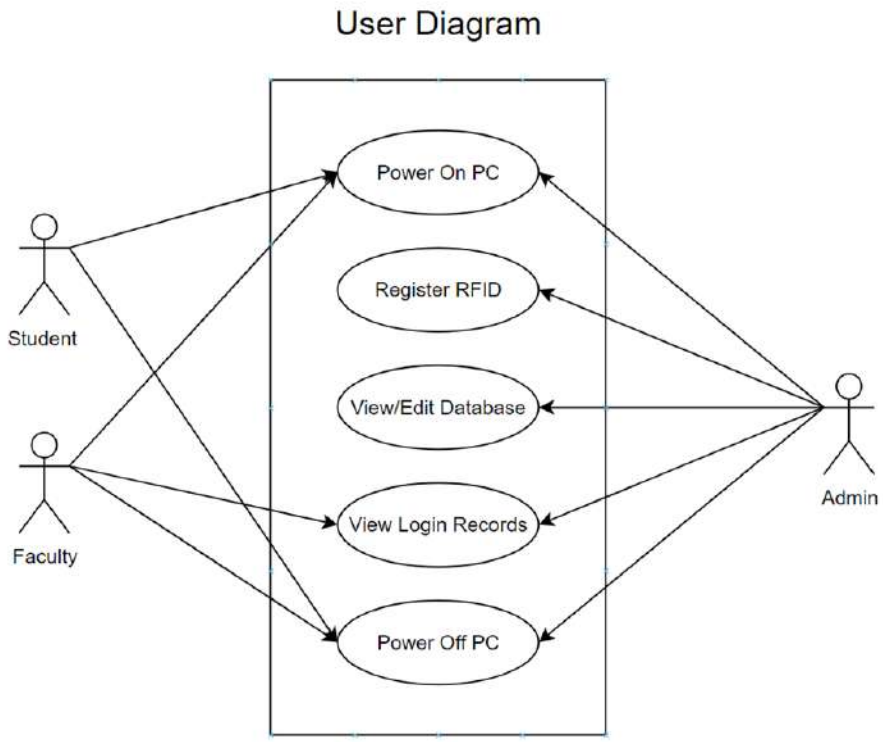

Figure 3.5. Use Case Diagram

Figure 3.5 shows a use-case diagram of the system's function and scope. It also depicts the interactions of the different user types in the system. There are three levels of users in the system; students, which can only use the computers if registered, teachers, who can use the computers and check the log records of the device and lastly the admin, who has all the privileges of the system including registering new users, viewing and editing the database.

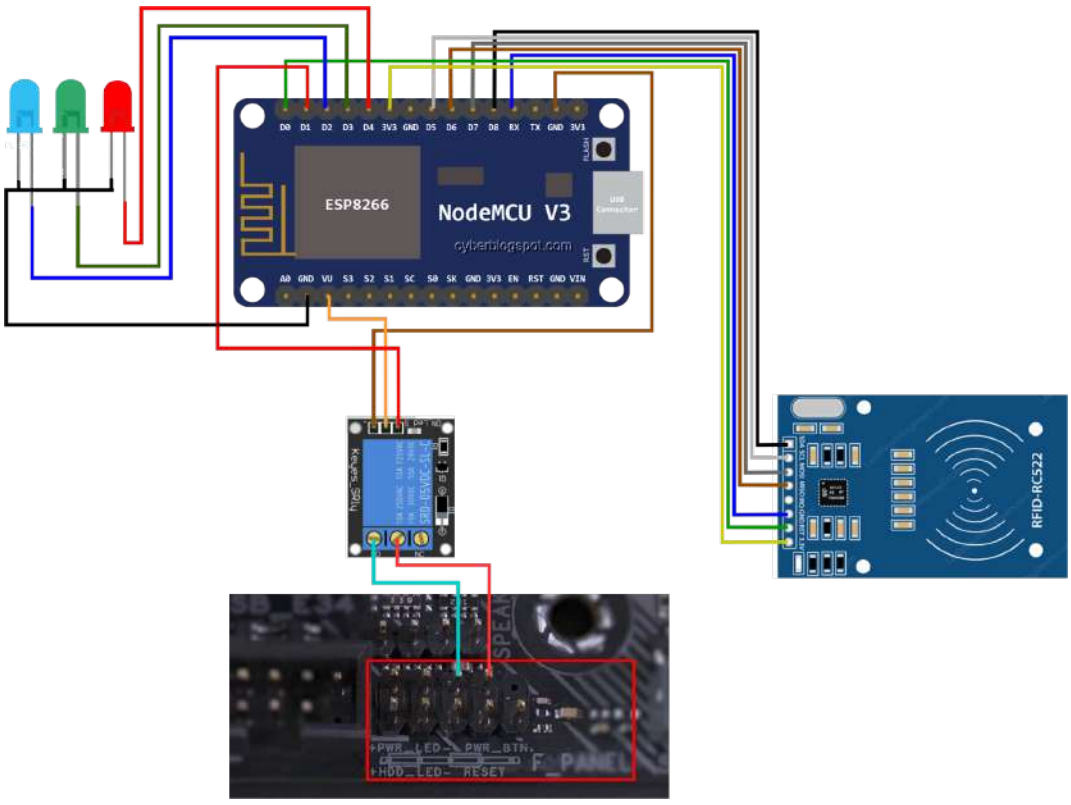

Figure 3.6. Circuit Diagram of TAPTAP

Figure 3.6 shows the circuit diagram of the device. The RFID Scanner receives the input of the user and if an RFID tag is verified, the Arduino Leonardo will send a signal to the relay, which is connected to the motherboard power pins, to close the circuit thus turning on or off the computer. The board is also connected to a set of LED Lights that will help users determine what the system is currently processing. A blinking blue LED signals the user that TAPTAP is connecting to the WiFI, if the blue led stays on then that means the WiFi is connected. When the RFID is accepted and verified- the green LED will activate and proceed the power on/off of the desktop computer. While the red

LED will indicate that the RFID has encountered an error. In addition, the connection of the Arduino device to the database can be seen in Figure 1.1.

3.2.4 Development and Testing

The researchers implemented an Agile model for the System Development Cycle (SDLC) of the research study, wherein the said model contains six (6) phases; analysis phase, requirement phase, design phase, development phase, testing and integration phase, and maintenance phase. In the analysis phase, the researchers gathered the necessary information and analyzed it, and came up with a plan on how to approach the research study, identifying the problem and objective planning are included in this phase. The second phase, which is requirement analysis, means obtaining information regarding the requirements necessary for the system to work. This includes the requirements on how to solve the problem and what important tools and resources are needed to meet the goals and objectives of the study. In the third phase, the design of software, the researchers structured both the hardware and the software designs in this phase. For the hardware part of the study, the researchers used simulation software to create the initial product of the system, this is done to minimize buying unnecessary hardware and to reduce the overall cost of building the system. In the software part, the designers applied a minimal design mind to reduce resource consumption for a faster user experience. In the development, and testing phase, a prototype was built to conduct multiple tests through the preliminary survey and analyze the results for further improvements in the

system. Lastly, in the implementation phase, after meeting the requirements and objectives of the study, along with meeting the standards of the evaluation tools used, the system will be ready for implementation or adaptation by any organization interested.

3.2.5 Description of the Prototype

An Arduino-based RFID Scanner for User Logging and Controlled Access of Computers is a system that aims to automate user logging and control who can use a computer with minimal to no supervision needed. The initial hardware prototype consists of the Arduino microcontroller, the RFID Scanner, and the 5-volt relay, this prototype is designed with a user-friendly interface in mind for easier navigation of the device. The software part of the system contains a dashboard wherein the admin can view, add, update, or delete past users to and from the database. It is also secured enough that non-admins are restricted to access the database or the system as a whole.

3.2.6 Implementation Plan

The system is intended for the use and benefit of the CCS Department and users who require access to the computer laboratories. The system is plug-and-play, which is directly connected to the power switch of the computer's motherboard, and a Wi-Fi module is installed to enable communication with the system's database. Registration of the school IDs will use the institution's computers, the registration process can be achieved during enrollment and creation of the IDs for the students. Once registration and

installation are done, the system will function as intended. The system will be implemented within the pilot area. For the software, it will be installed on the admin's computer.

3.3 Respondents and Population

47 of the respondents under the CCS Department who utilizes the Computer laboratories have answered the Preliminary survey to ensure that the system being developed is in fact needed. They were selected randomly, considering their availability and means of communication. While 102 respondents under the CCS Department answered the ISO 25010 System Evaluation. 32 respondents are from 4th year college students, 25 respondents came from 1st and 3rd year college students, and 18 respondents came from 2nd year college students.

3.4 Evaluation tool

The study will make use of the preliminary survey that consists of a pre-defined response "yes" or "no" to determine the willingness of the respondents to use the System and the Likert scale to identify the Software's Quality.

Survey methods used to collect information are as follows:

a. Preliminary survey and,
b. ISO 25010 System Evaluation.

Table 3.7. ISO 25010 Evaluation Scale

Scale	Range	Interpretation	Level of Agreement
5	4.21 - 5.00	Strongly Agree	Positive
4	3.41 - 4.20	Agree	
3	2.61 - 3.40	Neutral	Neutral
2	1.81 - 2.60	Disagree	Negative
1	1.00 - 1.80	Strongly Disagree	

3.4.1 Statistical tools

In survey research, the Likert scale is the most commonly used method for dealing with scaling responses. Quality estimates can also be done on a three or five-point Likert scale. The research will generate a five-level Likert scale item utilizing the ISO 25010 quality model, such as 5 as highly agree, 4 as agree, 3 as neutral, 2 as disagree, and 1 as severely disagree (Rocha, 2012). When evaluating the quality model characteristics and sub-qualities, the weighted mean will be derived by averaging each sub-quality by multiplying the scale by the number of votes and dividing by the number of respondents.

Formula: ((5 x n) + (4 x n) + (3 x n) + (2 x n) + (1 x n)) / r

To describe the interpretation of the results. A Narrative description is shown in Table 4.2

3.4.2 ISO 25010 System evaluation tools

ISO 25010 provides 8 qualities to know if the system is working properly and free from error. The researchers aim to develop a system that meets all 8 qualities of ISO 25010. The following objective is according to the 8 qualities of ISO 25010:

- Functionality Suitability. To create a system that can log in to the computer with RFID and produce a report generation of Login, Logout, and Activity.
- Performance Efficiency. To create a system that will respond to the end user's command accurately using RFID.
- Compatibility. To create a system that is compatible with any version of Windows OS.
- Usability. To create a system that can be easily understood and used by the end-user regardless of the computer knowledge they have.
- Reliability. To create a system that a user can rely on for a much faster time in logging into the computer.
- Security. To create a system that ensures the security of the end user's data.
- Maintainability. To create a system that can't be broken easily and is easy to modify.

- Portability. To create a system that can be used in different computer units with a minimal amount of specification needed.

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Preliminary evaluation results

After conducting the preliminary survey, it can be concluded that the proposed system project for student monitoring via RFID tapping has received a positive response from the majority of the respondents and demonstrates the need for an automated user logging system, and an automated verification process for the computers of the UPHSL laboratories in order to track users and prevent access from unauthorized users. Answers from the questionnaire are from a predefined response which is the “yes or no".

Table 3.8 Preliminary Survey Questions

Preliminary Survey Questions
Do you think our system helps with increasing physical security when it comes to restricting unauthorized user access?
Do you think that being able to track the history of user access to the computers help increase physical security?
Is the automated method of monitoring computer usage more efficient than using a manual logging sheet?
Is it more secure and convenient if users will just tap their IDs on the hardware- instead of manually typing their logs and entering their password every time they want to use the computer?
Do you think that our system encourages users to practice accountability in terms of handling hardware?
In your opinion, will our system be able to prolong the lifespan of the computers?

Do you think that our system will help users with disabilities?
Do you think that the system will help trace users when peripherals are broken/missing, and there is a presence of malware?
Do you think that our proposed automated user logging system will be beneficial to the College of Computer Studies department?
Will you recommend an automated user logging system for computer laboratories in other departments for easier usage monitoring and access?

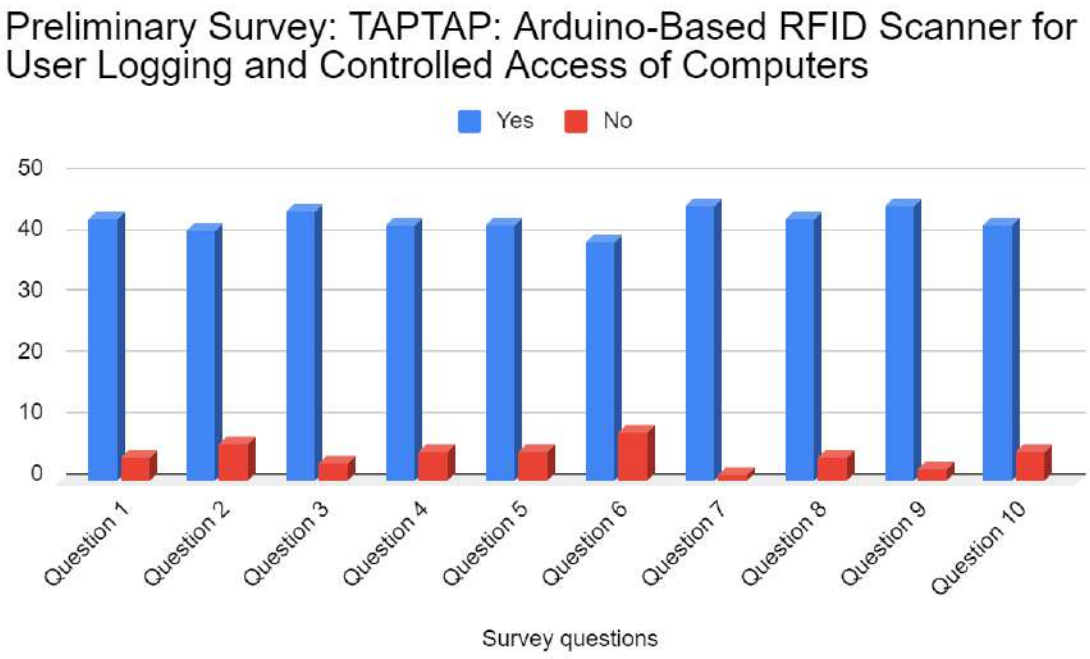

Figure 4.1 Preliminary survey questionnaire results

Figure 4.1 represents the tally of the close-ended questionnaire section of the preliminary survey results. It is observed that the majority of the 47 respondents agree with the effectiveness of the system being conducted. As well as the system's ability to efficiently track and monitor users and their usage activity, increase the physical security

of the hardware, provide a secure and convenient environment when it comes to frequent use of the hardware, encouragement of practicing accountability among users to the hardware, prolonging the lifespan of the computers, and an aid to disabled users. Additionally, respondents also agree with the efficiency of tracing users when hardware or software malfunctions arise.

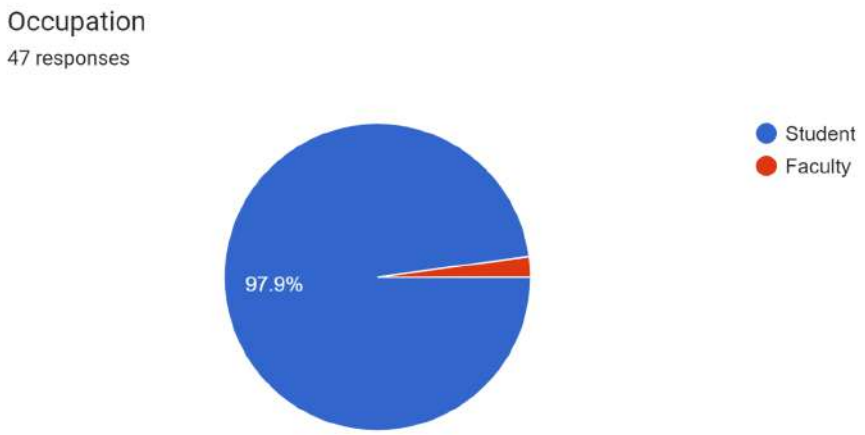

Figure 4.2 Respondent's Demographic Profile - Occupation

Figure 4.2 shows the demographic profile of the respondents in terms of their occupation, it is observed that out of 47 respondents- there are 46 students and 1 faculty under the CCS Department.

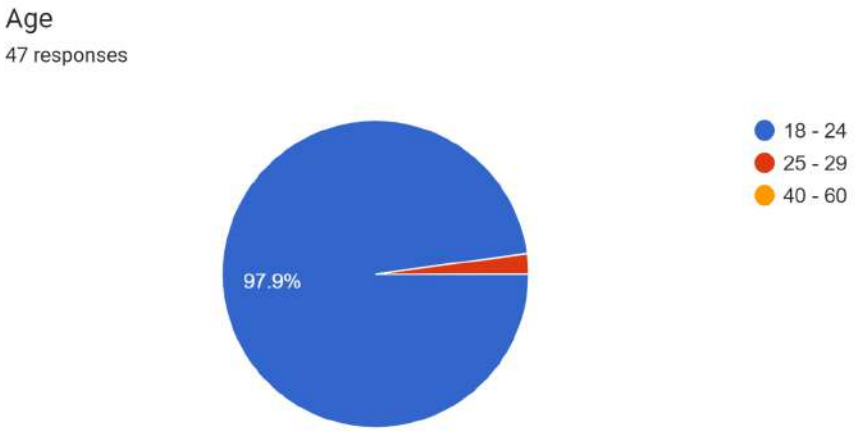

Figure 4.3 Respondent's Demographic Profile - Age

Figure 4.3 represents the age of the 47 respondents that have answered the preliminary survey. The majority of the respondents have an age range of 18 - 24 years old while the latter range from 25 - 29 years old, none of the respondents have answered an age range of 40 - 60 years old.

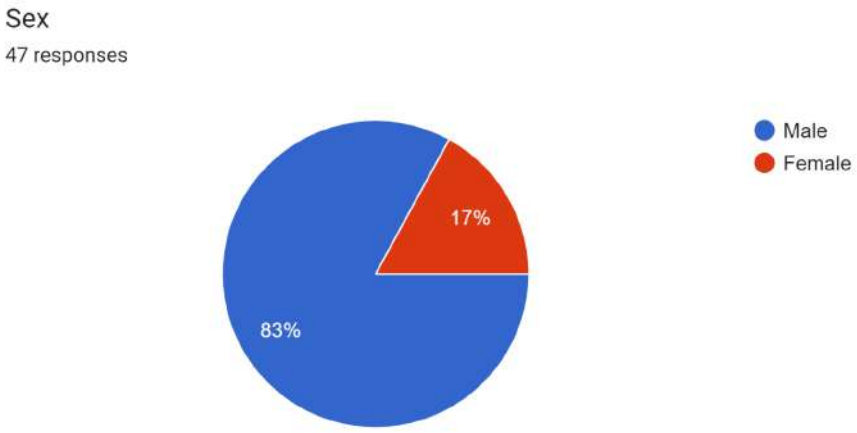

Figure 4.4 Respondent's Demographic Profile - Sex

Figure 4.4 shows the demographic profile of the respondents in terms of sex, out of 47 of the respondents that are from under CCS Department 39 of the respondents are men and 8 of them are women.

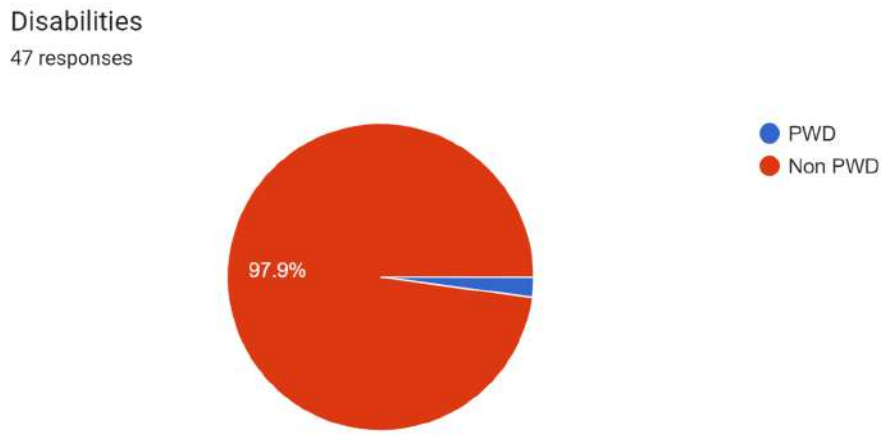

Figure 4.5 Respondent's Demographic Profile - Disabilities

Lastly, Figure 4.5 shows the 47 respondent's demographic profile in terms of disability, it is observed that only one of the respondents is disabled, while the rest of the 46 respondents are non-disabled.

4.2 System evaluation results

The system evaluation results have shown that the research project has utilized various software testing procedures such as unit testing, integration testing, validation testing, and system testing to ensure software quality. In addition, the project has also made use of ISO 25010 to create and implement a high-quality software system. Data was collected through the use of Google Forms and was sent to 102 individuals within the CCS department in UPHSL.

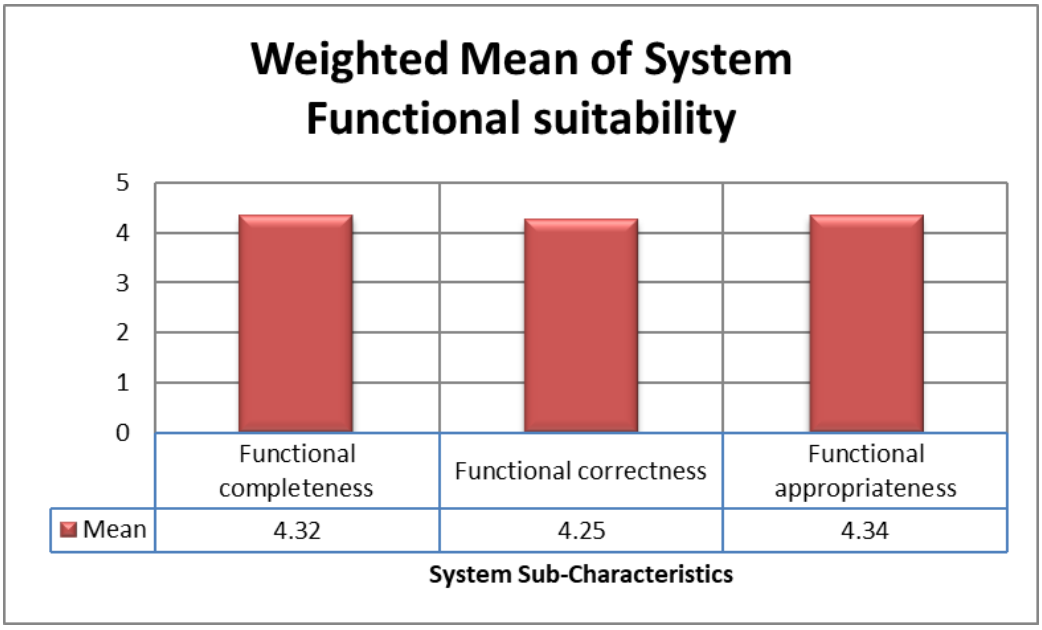

Figure 4.6 Evaluation Result of the Functionality Suitability Features

Figure 4.6, shows the evaluation result of the Functionality Suitability Features of the System. Functional Appropriateness has a mean of 4.34, making this sub-characteristic in the Functional Suitability feature- the highest. While Functional Completeness has a mean of 4.32, and Functional Correctness has a mean of 4.25.

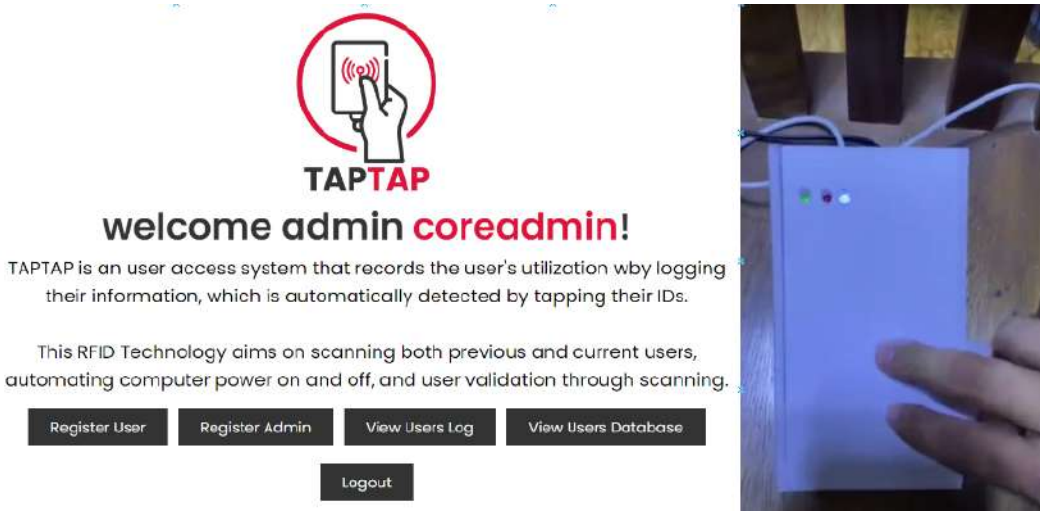

Figure 4.6.1 Functional suitability

In Figure 4.6.1, the functional suitability was found based on **objective #1**(To control the computers in the UPHSL - Binan CCS Laboratories in terms of

Filtering the students, faculty, and staff that are allowed to use the computers) and **objective #2(**To control the computers in the UPHSL - Binan CCS Laboratories in terms of Identification of user access to the desktop computers).

This shows that all of the necessary procedures in the system has been included in the software and hardware. Such as powering the desktop computer on/off, registering users and admins, viewing of user logs, and the database of the students.

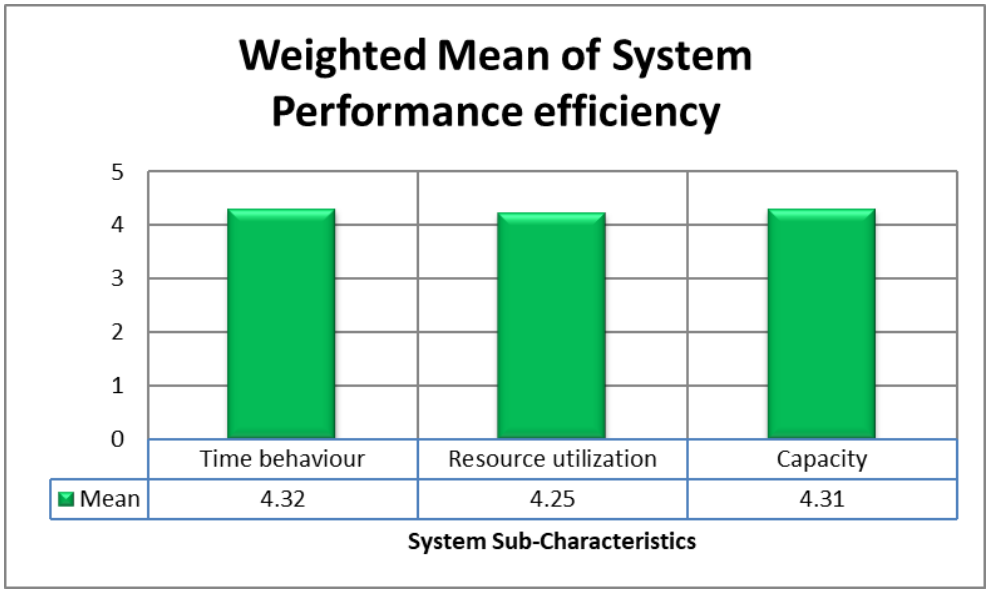

Figure 4.7 Evaluation Result of the Performance Efficiency Features

Figure 4.7, shows the evaluation result of the performance efficiency features of the system. Time behavior has the highest mean out of the three sub-characteristics of Performance Efficiency, having 4.32 as its mean. While Resource utilization has a mean of 4.25 and Capacity has 4.31.

Search Database

Home

Name	Email	Student ID	RFID	department
Eliza	mapanoo@gmail.com	121234123	fl5dca1b	CCS
Test	test@gmail.com	123456789	1234rfid	CCS
Anthony Lester Tirado	c17-1907-812@uphsl.edu.ph	171907812	b311a317	CCS
Monina Viardo	c18-1335-813@uphsl.edu.ph	181335813	a8f9cb33	CCS
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	a1b3229	CCS
Jhzz Mytch S. Malig	c19-2040-785@uphsl.edu.ph	192040785	9223d31d	CCS

Search Database

Home

Name	Email	Student ID	Device Name	RFID	Department	Status	Timestamp
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	off	2023-04-14 20:22:02
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	on	2023-04-14 20:22:02
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	on	2023-04-14 20:22:01
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	off	2023-04-14 20:21:32
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	on	2023-04-14 20:21:29
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	off	2023-04-14 20:09:09
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Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	off	2023-04-14 20:05:39
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	on	2023-04-14 20:04:53
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	off	2023-04-14 20:04:40
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Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 3	a1b3229	CCS	off	2023-04-13 16:10:39
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 3	a1b3229	CCS	on	2023-04-13 16:07:13

Figure 4.7.1 Performance efficiency

In Figure 4.7.1, the Performance efficiency was based on the main hardware of the system. As for Time behaviour, the process rates varies depending on internet connection speed and its signal. For Capacity, the software is able to handle big data as shown in the figure above- this includes the Registered users and User logs. Resource utilization wise, the system is able to use it's hardware and software components (See table 3.1 and table 3.2 for reference) accordingly.

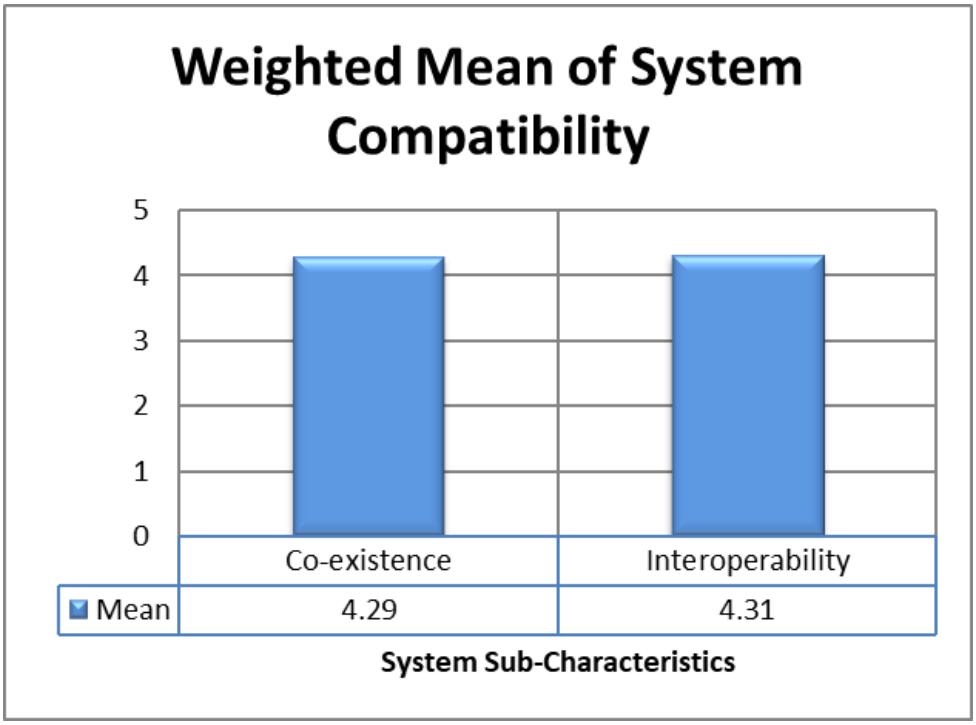

Figure 4.8 Evaluation Result of the Compatibility Features

Figure 4.8, shows the evaluation result of the Compatibility Features of the system. Interoperability ranks the higher mean of 4.31 while Co-existence was evaluated as 4.29 as the weighted mean result.

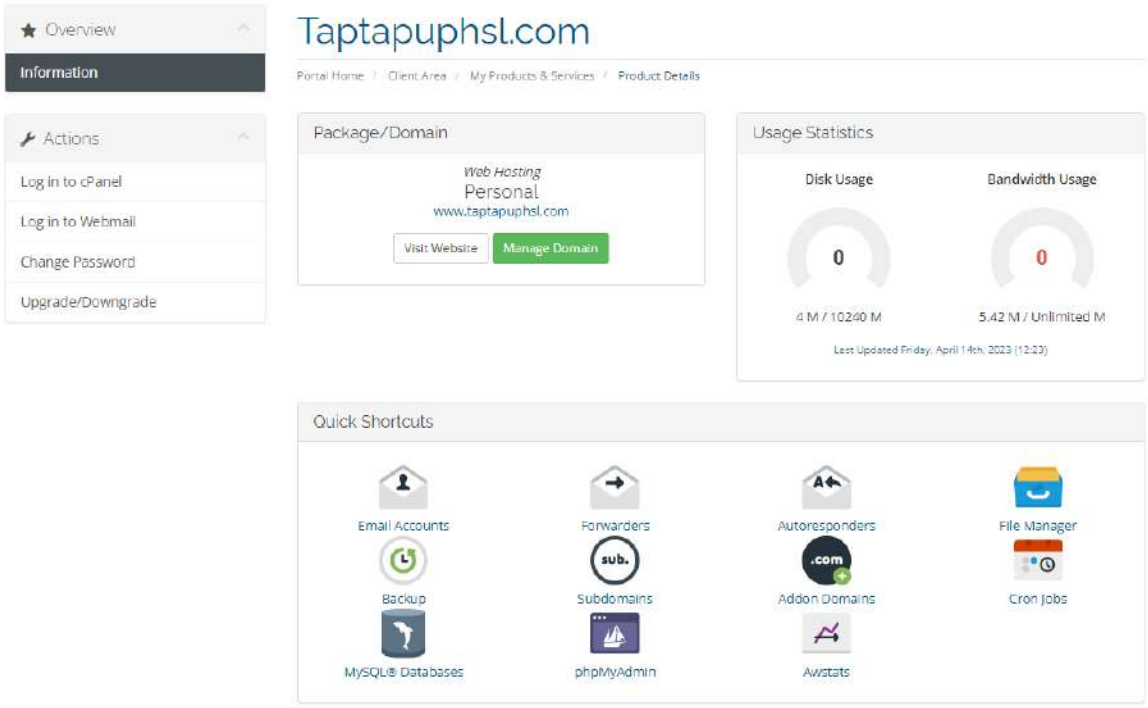

Figure 8.1 Compatibility

Figure 8.1 shows the web hosting server- this plays an important role when it comes to co-existence and interoperability of the system in order to support and handle the data being sent to the software. In reference to Figure 4.7.1, Co-existence and Interoperability of the system is able to handle multiple running hardware without any complications to the software and hardware.

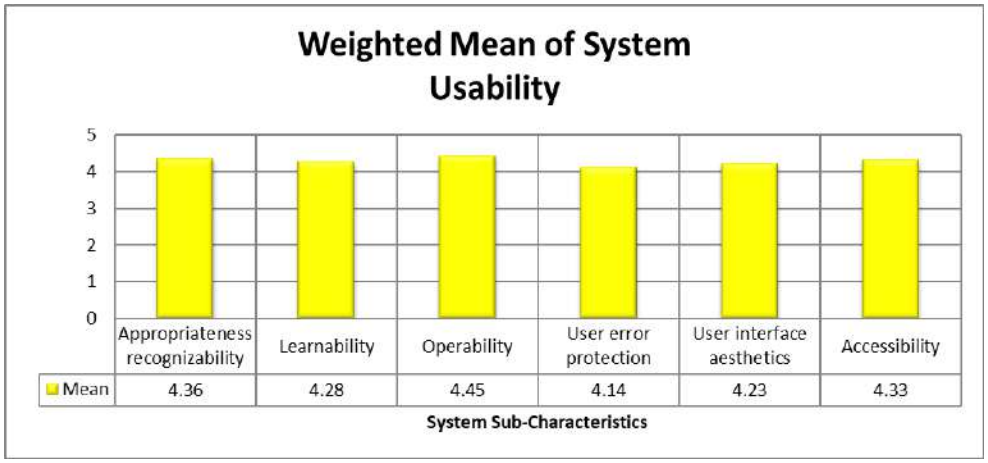

Figure 4.9 Evaluation Result of the Usability Features

Figure 4.9, shows the Evaluation result of the Usability features of the system. Operability ranked as the highest mean of 4.45 next to it is Appropriateness Recognizability which has a 4.36 mean. Accessibility has a mean of 4.33, Learnability has a mean of 4.28, and User interface aesthetics has a mean of 4.23. Ranking the lowest is User Error Protection having a mean of 4.14.

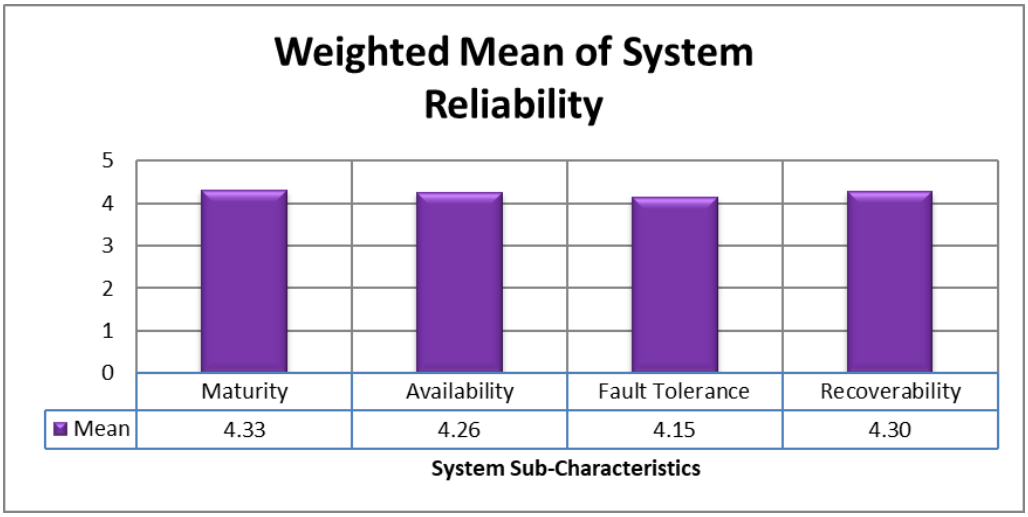

Figure 4.10 Evaluation Result of the Reliability Features

Figure 4.10, shows the Evaluation result of the Reliability features of the system. Maturity is ranked as the highest, having a mean of 4.33. Next to it is Recoverability which has a mean of 4.30, and Availability having a mean of 4.26. The lowest ranked is Fault Tolerance, which has a 4.15 mean.

In reference to Figure 4.6.1 and Figure 4.7.1 the system can be operated, accessed, and edited when needed. If there is a need for further editing of user information, admins will have to access the database in PhpMyAdmin.

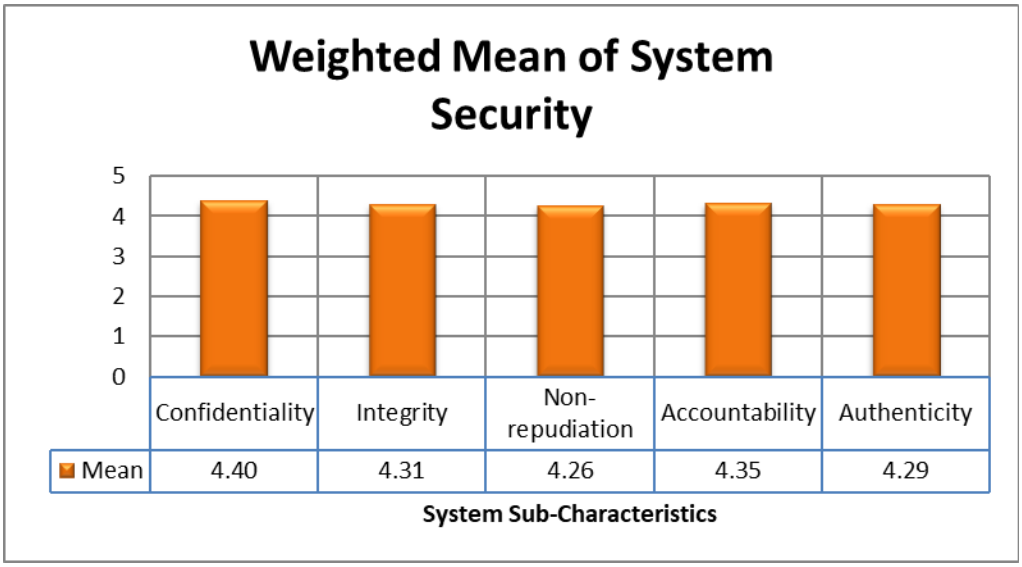

Figure 4.11 Evaluation Result of the Security Features

Figure 4.11, shows the Evaluation result of the Security features of the system. The highest-ranked mean is Confidentiality- which has a mean of 4.40, next to it is Accountability which has a mean of 4.35. Integrity has a mean of 4.31, and Non-repudiation is the lowest ranked out of the system sub-characteristics and has a mean of 4.26.

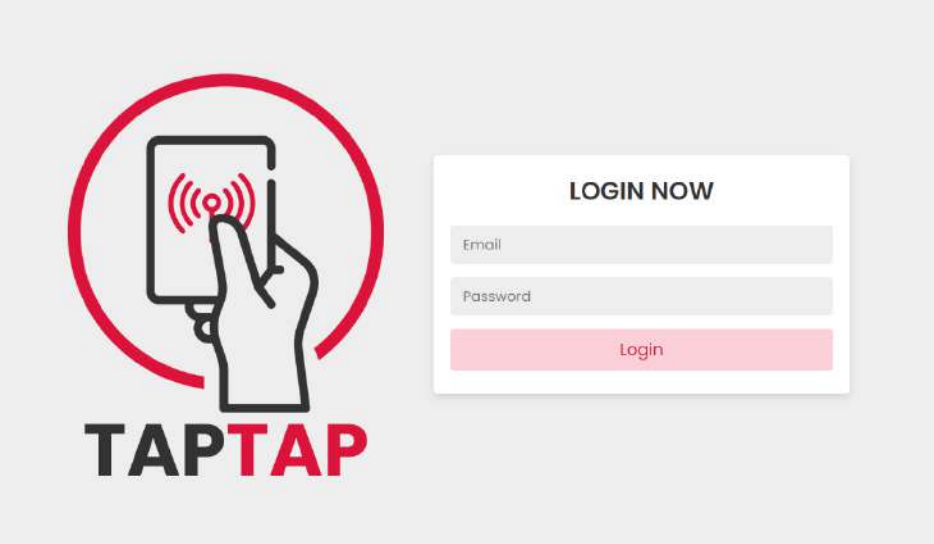

Figure 4.11.1 Security

Figure 4.11.1 shows the login page for the system, admins are required to enter their admin credentials in order to access the site for further monitoring purposes this is applicable to the Confidentiality sub characteristic of the Security Feature. While Integrity, Non-repudiation, and Authenticity can be referenced to Figure 4.7.1 which shows the user information as well as their activity usage.

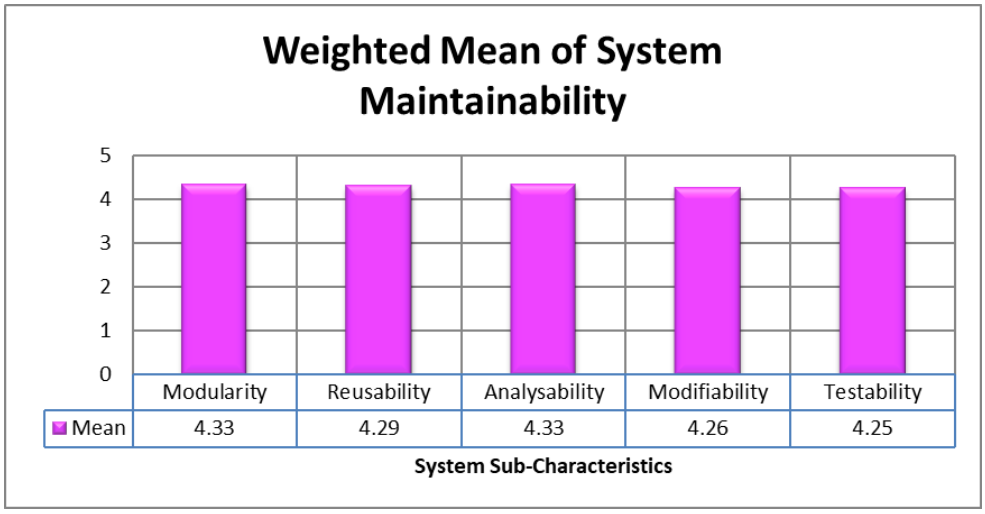

Figure 4.12 Evaluation Result of the Maintainability Features

Figure 4.12, shows the Evaluation result of the Maintainability features of the system. Sub-characteristics with the highest ranks are both Modularity and Analysability, having a mean of 4.33. Next to it is Reusability which has a mean of 4.29, Modifiability has a mean of 4.26, and, Testability is the lowest ranked- having a mean of 4.25.

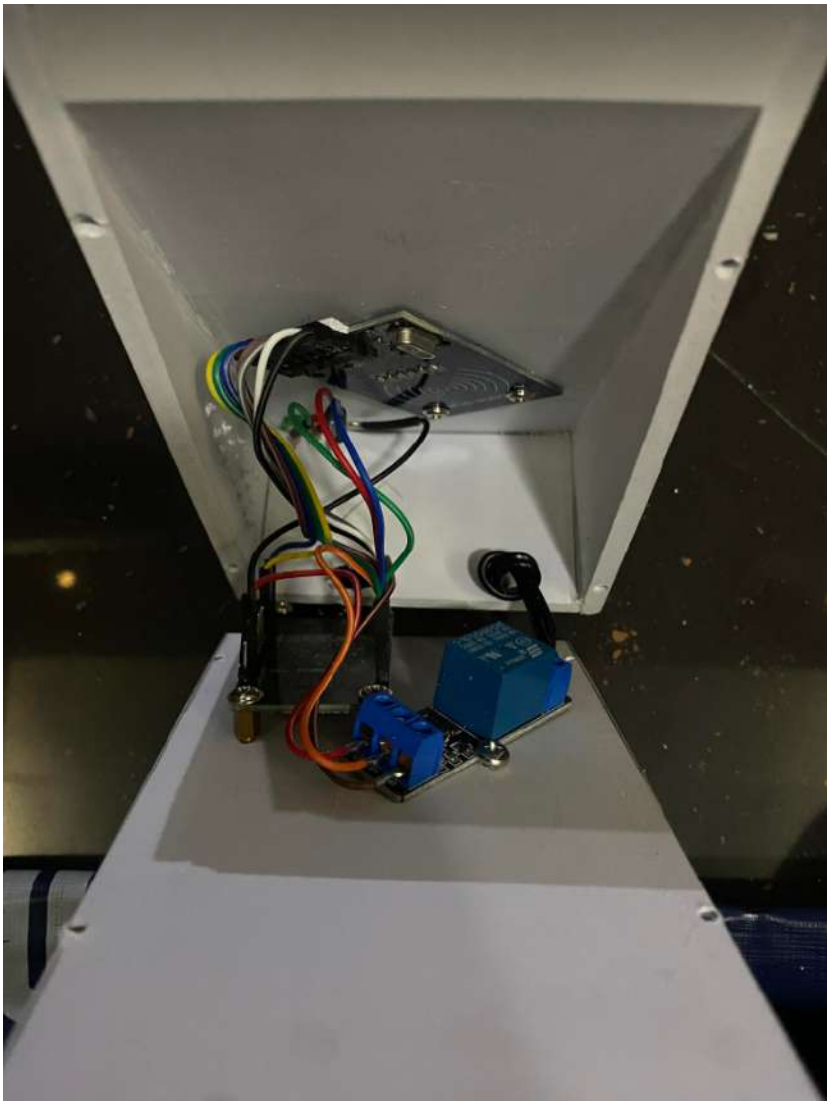

Figure 4.12.1 Maintainability

Figure 4.12.1 shows the enclosure of the system, for Maintanability purposes. The enclosure provides an easy access to the hardware inside- this makes it easy to fix any minor or major issues that is related to the hardware aspect of the system.

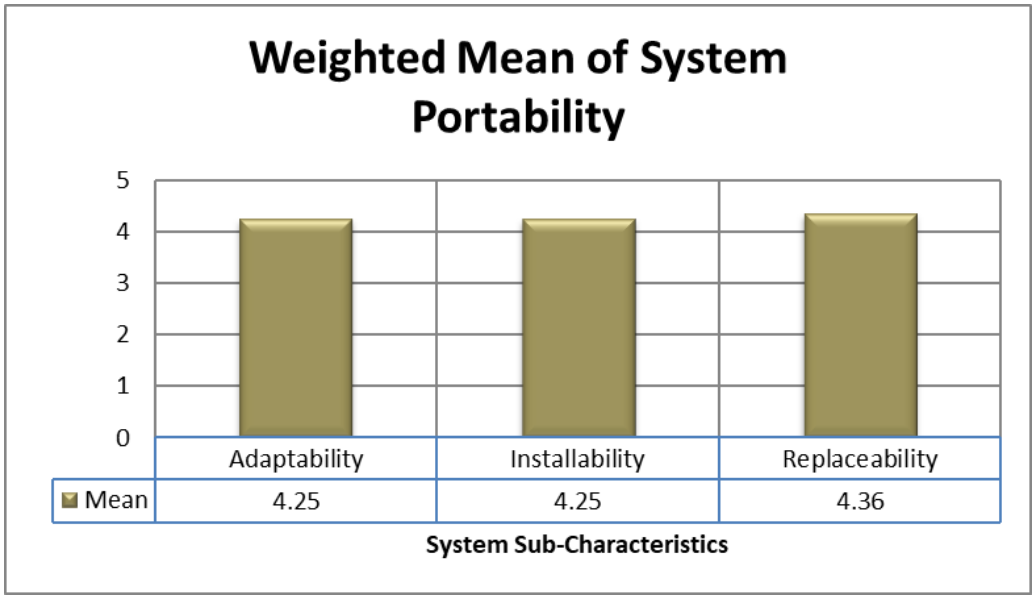

Figure 4.13 Evaluation result of the Portability features

Figure 4.13, shows the Evaluation result of the Portability features of the system. The highest ranked mean is the Replaceability which has a mean of 4.36, while Adaptability and Installability both have a mean of 4.25.

In reference to Figure 4.12.1, hardware changes and upgrades can be easily replaced with the ease of access to the hardware.

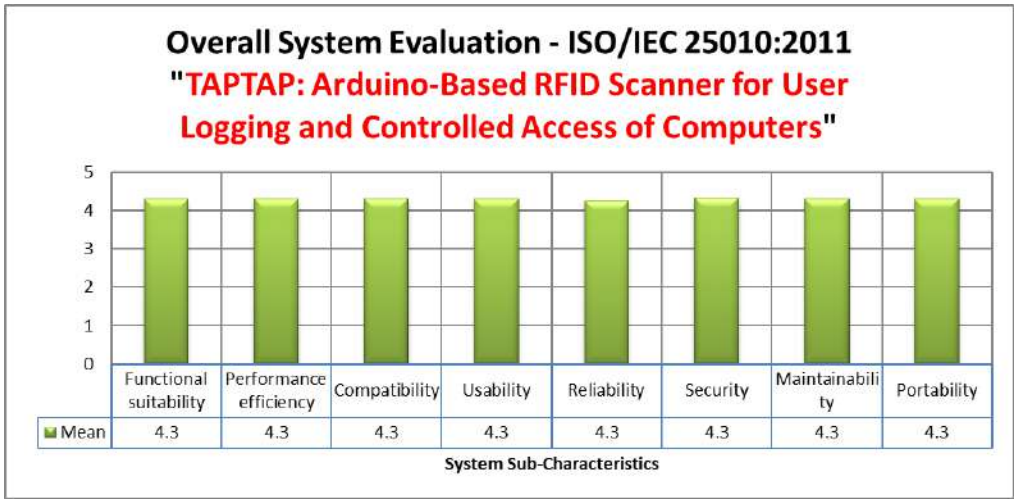

Figure 4.14 Overall System Evaluation

In Figure 4.11, shows the Overall System Evaluation for TATAP. It is observed that All of the System Sub-characteristics have a similar mean of 4.3.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusion

By automating the login and verification procedures and generating a record of the actions of the logged-in user and their status for monitoring reasons, this thesis seeks to provide a hardware and software solution that would decrease password vulnerability and monitoring processes. The created system, known as TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers, falls under the categories of automation and security, both of which are vital to take into account given that businesses and organizations deal with a variety of substantial volumes of private data. The researchers were also able to accomplish the particular objectives that were listed in Chapter 1 since the broad objectives described above had been met. Based on those goals, the researchers created:

1. Hardware that is able to control the computers in the University of Perpetual Help System Laguna - Binan CCS Laboratories in terms of:
    a. Filtering the students, faculty, and staff that are allowed to use the computers
    b. Identification of user access to the desktop computers.
2. A system that enables users to practice accountability in the event of damage to hardware or software, and
3. Evaluated the quality of the system using ISO 25010 Evaluation Tool.

In addition to the accomplished objectives, the researchers were able to get the following insights. According to the results of the Preliminary survey, respondents are in favor of the idea of an automated user logging system.

The researchers have concluded that the planned system and the research paper were successful in achieving the goals originally specified in this document. Where automation of the login process, filtering users, and logging of user information and actions are needed, this system can be set up per workstation.

5.2. Recommendations

The following are the recommendations for the further enhancement of the developed system:

1. Better enclosure that will ensure a strong signal to the WiFi Node.
2. Additional option to delete and edit user information on User Database page.

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APPENDIX A

Relevant Source Code

Arduino Leonardo Code.ini

```
#include <MFRC522.h>
#include <Keyboard.h>
#include <SPI.h>

#define SS_PIN 10
#define RST_PIN 5
/*
Typical pin layout used:
 *
-----------------------------------------------------------------------------
 *             MFRC522      Arduino
Arduino   Arduino    Arduino
Arduino
 *             Reader/PCD   Uno/101
Mega      Nano v3    Leonardo/Micro
Pro Micro
 * Signal      Pin          Pin          Pin
Pin        Pin            Pin
 *
-----------------------------------------------------------------------------
 * RST/Reset   RST          9            5
D9         RESET/ICSP-5     RST
 * SPI SS      SDA(SS)      10           53
D10        10               10
 * SPI MOSI    MOSI         11 / ICSP-4
51         D11        ICSP-4           16
 * SPI MISO    MISO         12 / ICSP-1
50         D12        ICSP-1           14
 * SPI SCK     SCK          13 / ICSP-3
52         D13        ICSP-3           15

*/
MFRC522 mfrc522(SS_PIN,
RST_PIN);

String read_rfid;

void setup() {
        Serial.begin(9600);             //
Initialize serial communications with the
PC
// Do nothing if no serial port is opened
(added for Arduinos based on
ATMEGA32U4)
        SPI.begin();                    //
Init SPI bus
        mfrc522.PCD_Init();             //
Init MFRC522
  Keyboard.begin();
        delay(4);
        // Optional delay. Some board do
need more time after init to be ready, see
Readme

}
void dump_byte_array(byte *buffer, byte
bufferSize) {
   for (byte i = 0; i < bufferSize; i++) {
      read_rfid=read_rfid +
String(buffer[i], HEX);
   }
}

void loop() {

  // Look for new cards
   if ( !
mfrc522.PICC_IsNewCardPresent())
      return;

   // Select one of the cards
   if ( !
mfrc522.PICC_ReadCardSerial())
      return;


dump_byte_array(mfrc522.uid.uidByte,
mfrc522.uid.size);
```

```
  Serial.println(read_rfid);

  Keyboard.print(read_rfid);
  Keyboard.releaseAll();
  Keyboard.end();
  mfrc522.PICC_HaltA();

  read_rfid="";

 }
```

ESP8266 Code.ini

```
#include <Arduino.h>
#include <ESP8266WiFi.h>
#include <ESP8266HTTPClient.h>
#include <SoftwareSerial.h>
#include <WiFiClientSecureBearSSL.h>

#include <SPI.h>
#include <MFRC522.h>
#define SS_PIN D8
#define RST_PIN D0
#define LED D2
#define LED2 D3
#define LED3 D4

MFRC522 rfid(SS_PIN, RST_PIN); //
Instance of the class
MFRC522::MIFARE_Key key;

String cardUID = "";
String cardUID2 = "";
String nodename = "Node X"; //Insert
Device Name or PC Number

//#define HOST
"taptapuphsl.000webhostapp.com"  //
Enter HOST URL without "http:// "  and
"/" at the end of URL
#define WIFI_SSID ""                // WIFI
SSID here
#define WIFI_PASSWORD ""     //
WIFI password here

//#define WIFI_SSID "Taptapuphsl"
// WIFI SSID here
//#define WIFI_PASSWORD
"taptapwifitesting"     // WIFI password
here

const int relay = 5;

String str, postData, postData2;


void setup() {
  pinMode(relay, OUTPUT);
  pinMode(LED,OUTPUT);
  pinMode(LED2,OUTPUT);
  pinMode(LED3,OUTPUT);
  digitalWrite(relay, HIGH);
  digitalWrite(relay, HIGH);
// Open serial communications and wait
for port to open:
Serial.begin(115200);
Serial1.begin(115200);
SPI.begin(); // Init SPI bus
rfid.PCD_Init(); // Init MFRC522
for (byte i = 0; i < 6; i++) {
    key.keyByte[i] = 0xFF;
  }


/*
while (!Serial) {
; // wait for serial port to connect.
Needed for native USB port only
}*/

  //Serial.println("Communication
Started \n\n");
  delay(1000);
```

```
  pinMode(LED_BUILTIN, OUTPUT);
// initialize built in led on the board

  WiFi.mode(WIFI_STA);
  WiFi.begin(WIFI_SSID,
WIFI_PASSWORD); //try to connect
with wifi

  Serial.print("Connecting to ");
  Serial.print(WIFI_SSID);
  while (WiFi.status() !=
WL_CONNECTED) {
    Serial.print(".");
    digitalWrite(LED, HIGH);
    delay(500);
    Serial.print(".");
    digitalWrite(LED,LOW);
    delay(500);
    }

  Serial.println();
  digitalWrite(LED, HIGH);
  Serial.print("Connected to ");
  Serial.println(WIFI_SSID);
  Serial.print("IP Address is : ");
  Serial.println(WiFi.localIP());    //print
local IP address
  Serial.println(nodename);

  delay(30);

}


void loop() { // run over and over


if (!rfid.PICC_IsNewCardPresent()) {
    return;
  }
if (!rfid.PICC_ReadCardSerial()) {
    return;
  }
    // Convert UID bytes to string
cardUID = "";
for (byte i = 0; i < rfid.uid.size; i++) {
  cardUID += String(rfid.uid.uidByte[i],
HEX);
}


Serial.println(cardUID);

// Halt PICC
rfid.PICC_HaltA();
// Stop encryption on PCD
rfid.PCD_StopCrypto1();

//str = Serial.readString();

std::unique_ptr<BearSSL::WiFiClientSe
cure>client(new
BearSSL::WiFiClientSecure);
client->setInsecure();

HTTPClient https;

postData = "str=" + cardUID +
"&name=" + nodename;


https.begin(*client,
"https://www.taptapuphsl.com/system.ph
p");
https.addHeader("Content-Type",
"application/x-www-form-urlencoded");

int httpCode = https.POST(postData);
Serial.println("RFID UID: " + cardUID);

if (httpCode == 200) {
 String uid = https.getString();
```

```
 Serial.println("RFID UID Request
Sent.");
 Serial.println(uid);
 if (uid == "Match!"){
   digitalWrite(LED2, HIGH);
   digitalWrite(relay,LOW); //nagclose
yung circuit parang pinindot yung power
button
   delay(500);
   digitalWrite(relay,HIGH); //binitawan
yung power button or nag open ulit yung
circuit
   digitalWrite(LED2, LOW);

 }

}

else {
  Serial.println("HTTP Code: " +
httpCode);
  Serial.println("Failed to upload values.
\n");
  digitalWrite(LED3, HIGH);
  delay(500);
  digitalWrite(LED3, LOW);
  return;
}

https.end();
Serial.println("putangina");


cardUID2 = "";
while (cardUID != cardUID2)
{
  cardUID2 = "";
  if (rfid.PICC_IsNewCardPresent()){
    Serial.println("may bagong card");

    if (rfid.PICC_ReadCardSerial()){
      Serial.println("binabasa na");
      // Convert UID bytes to string
      for (byte i = 0; i < rfid.uid.size; i++)
{
        cardUID2 +=
String(rfid.uid.uidByte[i], HEX);
       }

      Serial.println("cardUID: " +
cardUID);
      Serial.println("cardUID2: " +
cardUID2);
      if( cardUID != cardUID2) {
        digitalWrite(LED3, HIGH);
        delay(500);
        digitalWrite(LED3, LOW);
      }

   }


}

// Halt PICC
rfid.PICC_HaltA();
// Stop encryption on PCD
rfid.PCD_StopCrypto1();
}

https.begin(*client,
"https://www.taptapuphsl.com/system.ph
p");
https.addHeader("Content-Type",
"application/x-www-form-urlencoded");


Serial.println("RFID UID: " +
cardUID2);

postData2 = "str=" + cardUID2 +
"&name=" + nodename;
```

```
int httpCode2 = https.POST(postData2);
if (httpCode == 200) {
 String uid = https.getString();
 Serial.println("RFID UID Request
Sent.");
 Serial.println(uid);
 if (uid == "Match!"){
   digitalWrite(LED2, HIGH);
   digitalWrite(relay,LOW); //nagclose
yung circuit parang pinindot yung power
button
   delay(500);
   digitalWrite(relay,HIGH); //binitawan
yung power button or nag open ulit yung
circuit
   digitalWrite(LED2, LOW);
 }

}
else {
  digitalWrite(LED3, HIGH);
  Serial.println("HTTP Code: " +
httpCode);
  Serial.println("Failed to upload values.
\n");
  digitalWrite(LED3, LOW);
  return;
}



}
```

admin_page.php

```
<?php

@include 'config.php';

session_start();

if(!isset($_SESSION['admin_name'])){
   header('location:index.php');
}

?>

<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta http-equiv="X-UA-Compatible"
content="IE=edge">
   <meta name="viewport"
content="width=device-width,
initial-scale=1.0">
   <title>admin page</title>

   <!-- custom css file link  -->
   <link rel="stylesheet"
href="css/style.css">
    <script
src="https://cdn.jsdelivr.net/npm/sweetal
ert2@11"></script>
</head>
<body>

<div class="container">

   <div class="content">
   <img src="images/taptap.png"
alt="taptapLogo"
style="width:250px;height:250px;">
      <h1>welcome admin <span><?php
echo $_SESSION['admin_name']
?></span>!</h1>
        <p class="amet_text">TAPTAP is
an user access system that records the
user's utilization wby logging <br>
          their information, which is
automatically detected by tapping their
IDs.
        <br><br>
```

```
        This RFID Technology aims on
scanning both previous and current
users, <br>
        automating computer power on
and off, and user validation through
scanning.
    </p>
    <p></p>
    <a href="register_user.php"
class="btn">Register User</a>
    <a href="register_form.php"
class="btn">Register Admin</a>
    <a href="view_ulogsdb.php"
class="btn">View Users Log</a>
    <a href="view_udb.php"
class="btn">View Users Database</a>
    <br> <br>
    <a href="logout.php"
class="btn">logout</a>
  </div>

</div>
   <?php
     if
(isset($_SESSION['successAddUser']))
{
      echo
"<script>Swal.fire({position:'center',icon
:'success',title:'Successfully Added
User',showConfirmButton:false,timer:10
00});</script>";

unset($_SESSION['successAddUser']);
   }

   ?>
</body>
</html>
```

config.php

```
<?php

$conn =
mysqli_connect('localhost','jbwcnczn_co
readmin','taptapadmin0110','jbwcnczn_u
ser_db');

?>
```

createUser.php

```
<?php
session_start();
require 'config.php';

if (isset($_POST['submit'])) {

  $uname =
mysqli_real_escape_string($conn,
$_POST['uname']);
  $uemail =
mysqli_real_escape_string($conn,
$_POST['uemail']);
  $usid =
mysqli_real_escape_string($conn,
$_POST['usid']);
  $urfid =
mysqli_real_escape_string($conn,
$_POST['urfid']);
  $udepartment =
$_POST['udepartment'];


  $select = " SELECT * FROM
user_database WHERE
urfid='".$urfid."'";

  $result = mysqli_query($conn,
$select);

  if (mysqli_num_rows($result) > 0) {
```

```
    $_SESSION['errorUserExist'] =
"true";
    header('location:/register_user.php');
  } else {

       $insert = "INSERT INTO
user_database(uname, uemail, usid,
urfid, udepartment)
VALUES('$uname','$uemail','$usid','$urf
id','$udepartment')";
       mysqli_query($conn, $insert);
       $_SESSION['successAddUser'] =
"true";

header('location:/admin_page.php');

  }
};
```

dbselectuid.php

```
<?php



$conn =
mysqli_connect('localhost','jbwcnczn_co
readmin','taptapadmin0110','jbwcnczn_u
ser_db');









/* Get date and time variables

date_default_timezone_set('Asia/Kolkat
a');  // for other timezones, refer:-
https://www.php.net/manual/en/timezone
s.asia.php
   $d = date("Y-m-d");
   $t = date("H:i:s");

*/

if(!empty($_POST['str'])) {
                  $uid =
trim($_POST['str']);


// Update your tablename here
            $sql = "SELECT * FROM
user_database WHERE urfid='$uid'";

// Execute the SQL query
      $result = $conn->query($sql);

// Check if there was an error with the
query
   if ($result->num_rows > 0) {
 while($row = $result->fetch_assoc()) {
      echo  "Match!";

      }
   }
   else {
         echo "No Match!";
      }
// Check if there are any results
  /* if (mysqli_num_rows($result) > 0) {

      while($row =
$result->fetch_assoc()) {
      echo  $row["uid"] . "<br>";
      }
   }
      */
}
// Close MySQL connection
$conn->close();
```

```
?>
```

index.php

```
<?php

@include 'config.php';

session_start();

if(isset($_POST['submit'])){

   $name = mysqli_real_escape_string($conn, $_POST['name']);
   $email = mysqli_real_escape_string($conn, $_POST['email']);
   $pass = md5($_POST['password']);
   $cpass = md5($_POST['cpassword']);
   $user_type = $_POST['user_type'];

   $select = "SELECT * FROM user_form WHERE email = '$email' && password = '$pass'";
   $result = mysqli_query($conn, $select);

   if(mysqli_num_rows($result) > 0){

      $row = mysqli_fetch_array($result);

      if($row['user_type'] == 'admin'){

         $_SESSION['admin_name'] = $row['name'];
         header('location:admin_page.php');

      }elseif($row['user_type'] == 'user'){

         $_SESSION['user_name'] = $row['name'];
         header('location:admin_page.php');

      }

   }else{
      $error[] = 'Incorrect Email or Password!';
   }

};
?>

<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta http-equiv="X-UA-Compatible" content="IE=edge">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <title>TAPTAP Login</title>

   <!-- custom css file link  -->
   <link rel="stylesheet" href="css/style.css">
    <script src="https://cdn.jsdelivr.net/npm/sweetalert2@11"></script>
</head>
<body>

<div class="form-container">
   <img src="images/taptap.png" alt="taptapLogo" style="max-width: 100%;width: 500px;">

   <form action="" method="post">
      <h3>login now</h3>
      <?php
```

```
    if(isset($error)){
      foreach($error as $error){
        echo '<span
class="error-msg">'.$error.'</span>';
      };
    };
    ?>
    <input type="email" name="email"
required placeholder="Email">
    <input type="password"
name="password" required
placeholder="Password">
    <input type="submit"
name="submit" value="Login"
class="form-btn">
  </form>

</div>
  <?php
     if
(isset($_SESSION['successAddUser']))
{
      echo
"<script>Swal.fire({position:'center',icon
:'success',title:'Successfully Added
User',showConfirmButton:false,timer:10
00});</script>";

unset($_SESSION['successAddUser']);
   }

   ?>
</body>
</html>
```

logout.php

```
<?php

@include 'config.php';

session_start();
session_unset();
session_destroy();

header('location:index.php');

?>
```

register_form.php

```
<?php

@include 'config.php';

if(isset($_POST['submit'])){

  $name =
mysqli_real_escape_string($conn,
$_POST['name']);
  $email =
mysqli_real_escape_string($conn,
$_POST['email']);
  $pass = md5($_POST['password']);
  $cpass = md5($_POST['cpassword']);
  $user_type = $_POST['user_type'];

  $select = " SELECT * FROM
user_form WHERE email = '$email' &&
password = '$pass' ";

  $result = mysqli_query($conn,
$select);

  if(mysqli_num_rows($result) > 0){

    $error[] = 'user already exist!';

  }else{

    if($pass != $cpass){
      $error[] = 'password not matched!';
    }else{
```

```
        $insert = "INSERT INTO
user_form(name, email, password,
user_type)
VALUES('$name','$email','$pass','$user_
type')";
        mysqli_query($conn, $insert);
        header('location:admin_page.php');
     }
  }

};


?>

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible"
content="IE=edge">
  <meta name="viewport"
content="width=device-width,
initial-scale=1.0">
  <title>register form</title>

  <!-- custom css file link  -->
  <link rel="stylesheet"
href="css/style.css">

</head>
<body>

<div class="form-container">

  <form action="" method="post">
    <h3>admin registration</h3>
    <?php
    if(isset($error)){
      foreach($error as $error){
        echo '<span
class="error-msg">'.$error.'</span>';
      };
    };
    ?>
    <input type="text" name="name"
required placeholder="enter your
name">
    <input type="email" name="email"
required placeholder="enter your
email">
    <input type="password"
name="password" required
placeholder="enter your password">
    <input type="password"
name="cpassword" required
placeholder="confirm your password">
    <select name="user_type">
      <option
value="admin">admin</option>
      <option
value="admin">teacher</option>
    </select>
    <input type="submit"
name="submit" value="register now"
class="form-btn">
    <p><a
href="admin_page.php">Main
page</a></p>
  </form>

</div>

</body>
</html>
```

register_user.php

```
<?php
session_start();
?>
<!DOCTYPE html>
<html lang="en">
```

```
<head>
    <meta charset="UTF-8">
    <meta
http-equiv="X-UA-Compatible"
content="IE=edge">
    <meta name="viewport"
content="width=device-width,
initial-scale=1.0">
    <title>register form</title>

    <!-- custom css file link  -->
    <link rel="stylesheet"
href="css/style.css">
    <script
src="https://cdn.jsdelivr.net/npm/sweetal
ert2@11"></script>
</head>

<body>

    <div class="form-container">

        <form action="/createUser.php"
method="post">
            <h3>User Registration</h3>
            <?php
            if (isset($error)) {
                foreach ($error as $error) {
                    echo '<span
class="error-msg">' . $error . '</span>';
                };
            };
            ?>
            <input type="text"
name="uname" required
placeholder="enter your name">
            <input type="email"
name="uemail" required
placeholder="enter your email">
            <input type="int" name="usid"
required placeholder="enter your student
id">
            <input type="varchar"
name="urfid" required
placeholder="confirm your rfid">
            <select name="udepartment">
                <option value="CCS">College
of Computer Studies</option>
                <option
value="CAS">College of Arts and
Sciences</option>
                <option
value="EDUC">College of Education
and Criminology</option>
                <option
value="CRIM">College of
Criminology</option>
                <option
value="CEAA">College of Enginnering
Architecure and Avitation</option>
                <option
value="CBA">College of Business and
Accountancy</option>
                <option
value="CIHM">College of International
Hospitality Manegment</option>
                <option
value="CME">College of Maritime
Education</option>
                <option value="BE">Basic
Education</option>
            </select>
            <input type="submit"
name="submit" value="register now"
class="form-btn">
            <p><a
href="admin_page.php">Main
page</a></p>
        </form>

    </div>
    <?php
```

```
    if
(isset($_SESSION['errorUserExist'])) {
        echo
"<script>Swal.fire({position:'center',icon
:'warning',title:'User Already Exist,
Please Try New
User',showConfirmButton:false,timer:10
00});</script>";

unset($_SESSION['errorUserExist']);
    }
    ?>
</body>

</html>
```

system.php

```
<?php
$mysqli = new
mysqli('localhost','jbwcnczn_coreadmin',
'taptapadmin0110','jbwcnczn_user_db');
if
($_SERVER['REQUEST_METHOD']=
="POST") {

    if (!empty($_POST['str']) &&
!empty($_POST['name'])) {
        $uid = trim($_POST['str']);
        $nem = $_POST['name'];
        $sql = "SELECT * FROM
user_database WHERE urfid=?";
        $stmt = $mysqli->prepare($sql);
        $stmt->bind_param("s", $uid);
        $stmt->execute();
        $result = $stmt->get_result();
        $user = array();
        while ($row =
$result->fetch_assoc()) {
            array_push($user, $row);
        }
        if (!empty($user)) {
            $sql = "Call
spUserLogs(?,?,?,?,?)";
            $stmt = $mysqli->prepare($sql);
            $stmt->bind_param("sisss",
$user[0]['uname'], $user[0]['usid'],
$user[0]['urfid'],$nem,
$user[0]['udepartment']);
            $result = $stmt->execute();
            if ($result) {
                header('Content-Type:
application/json; charset=utf-8');
                echo  "Match!";
            } else {
                header("HTTP/1.1 500
Internal Server Error");
                echo 'Failed to create logs';
            }
        } else {

            header('Content-Type:
application/json; charset=utf-8');
            echo "No Match!";
        }
    } else {
        header("HTTP/1.1 500 Internal
Server Error");
        echo 'Required Paramaters Must
Not Be Empty';
    }
} else {
    header("HTTP/1.1 403 Forbidden");
    echo 'Method not allowed';
}
```

user_page.php

```
<?php

@include 'config.php';

session_start();
```

```
if(!isset($_SESSION['user_name'])){
  header('location:login_form.php');
}

?>

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible"
content="IE=edge">
  <meta name="viewport"
content="width=device-width,
initial-scale=1.0">
  <title>user page</title>

  <!-- custom css file link  -->
  <link rel="stylesheet"
href="css/style.css">

</head>
<body>

<div class="container">

  <div class="content">
    <h3>hi, <span>user</span></h3>
    <h1>welcome <span><?php echo
$_SESSION['user_name']
?></span></h1>
    <p>this is an user page</p>
    <a href="login_form.php"
class="btn">login</a>
    <a href="register_form.php"
class="btn">register</a>
    <a href="logout.php"
class="btn">logout</a>
  </div>

</div>

</body>
</html>
```

view_udb.php

```
<!DOCTYPE html>
<html>
<head>
  <meta charset="UTF-8">
  <meta http-equiv="X-UA-Compatible"
content="IE=edge">
  <meta name="viewport"
content="width=device-width,
initial-scale=1.0">
  <title>Table with database</title>

  <!-- custom css file link  -->
  <link rel="stylesheet"
href="css/style.css">

</head>
<body>
        <div style="position: absolute;
top: 25px; right: 25px;">
                <a
href="admin_page.php"
style="background-color: #333333;
color: white; padding: 10px 15px;
text-decoration: none;">Home</a>
        </div>

        <h1 style="color:
#333333;">Search Database</h1>
        <form action=""
method="POST">
                <label for="search"
style="color: #dc143c;">Search:</label>
                <input type="text"
id="search" name="search"
value="<?php echo
```

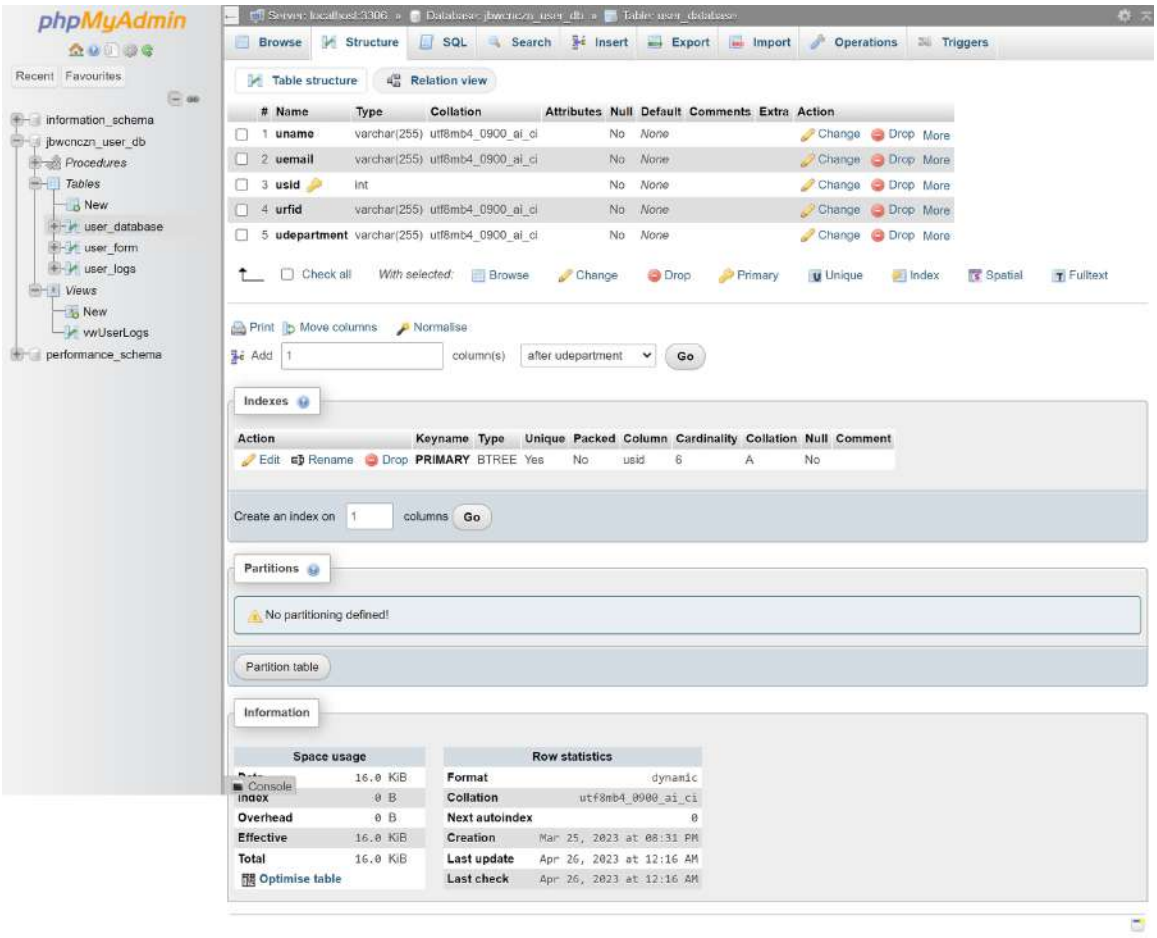
```
isset($_POST['search']) ?
$_POST['search'] : ''; ?>">
                <button type="submit"
style="color:
#dc143c;">Submit</button>
        </form>

        <table>
                <tr>
                        <th>Name</th>
                        <th>Email</th>
                        <th>Student
ID</th>
                        <th>RFID</th>

<th>department</th>
                </tr>
                <?php
                        include
'config.php';

                        $search = "";

if(isset($_POST["search"])){
                                $search =
$_POST["search"];
                                $sql =
"SELECT uname, uemail, usid, urfid,
udepartment FROM user_database
WHERE uname LIKE '%{$search}%'
OR uemail LIKE '%{$search}%' OR
usid LIKE '%{$search}%' OR urfid
LIKE '%{$search}%' OR udepartment
LIKE '%{$search}%' LIMIT 50";
                        }else{
                                $sql =
"SELECT uname, uemail, usid, urfid,
udepartment FROM user_database
LIMIT 50";
                        }
                                $result =
$conn->query($sql);

                                if
($result->num_rows > 0) {
                                        // output
data of each row

while($row = $result->fetch_assoc()) {

echo "<tr><td>" . $row["uname"].
"</td><td>" . $row["uemail"] .
"</td><td>"
                                                .
$row["usid"].  "</td><td>" .
$row["urfid"] . "</td><td>" .
$row["udepartment"] .  "</tr></td>";
                                        }
                                } else {
                                        echo
"<tr><td colspan='5'>0
results</td></tr>";
                                }

                                $conn->close();
                        ?>
                </table>
</body>
</html>
```

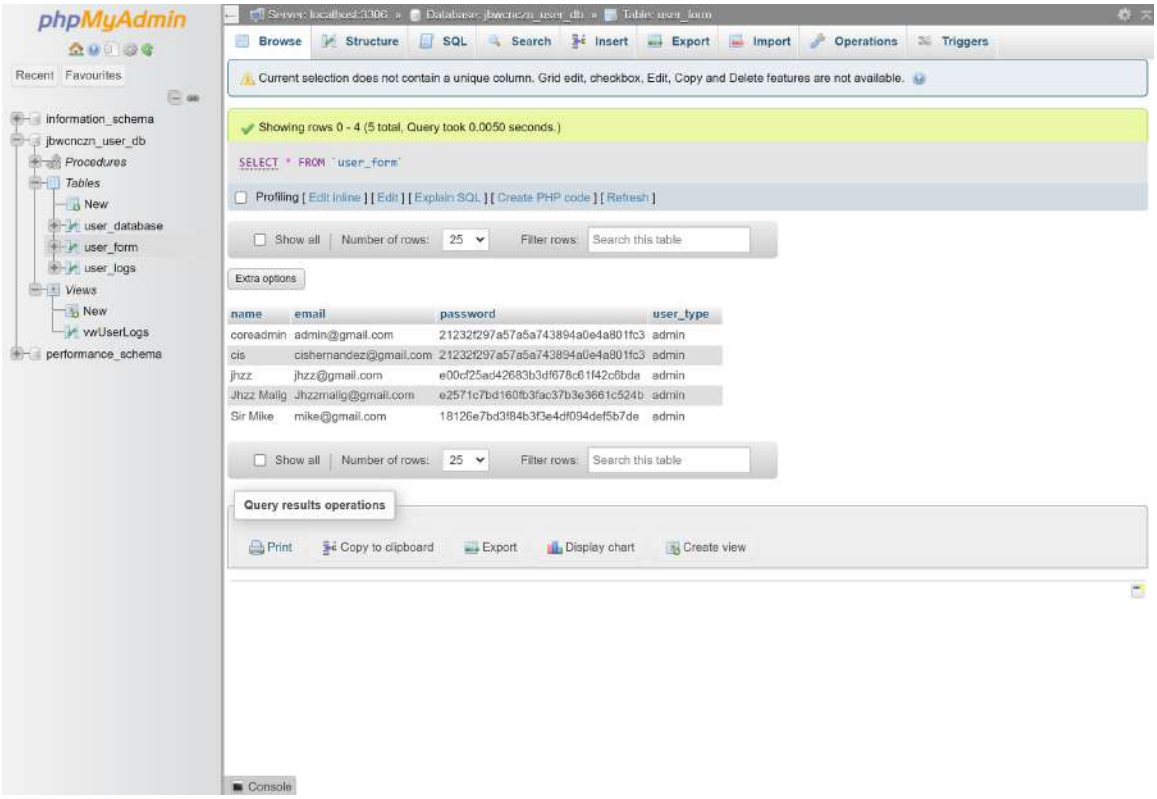
view_ulogsdb.php

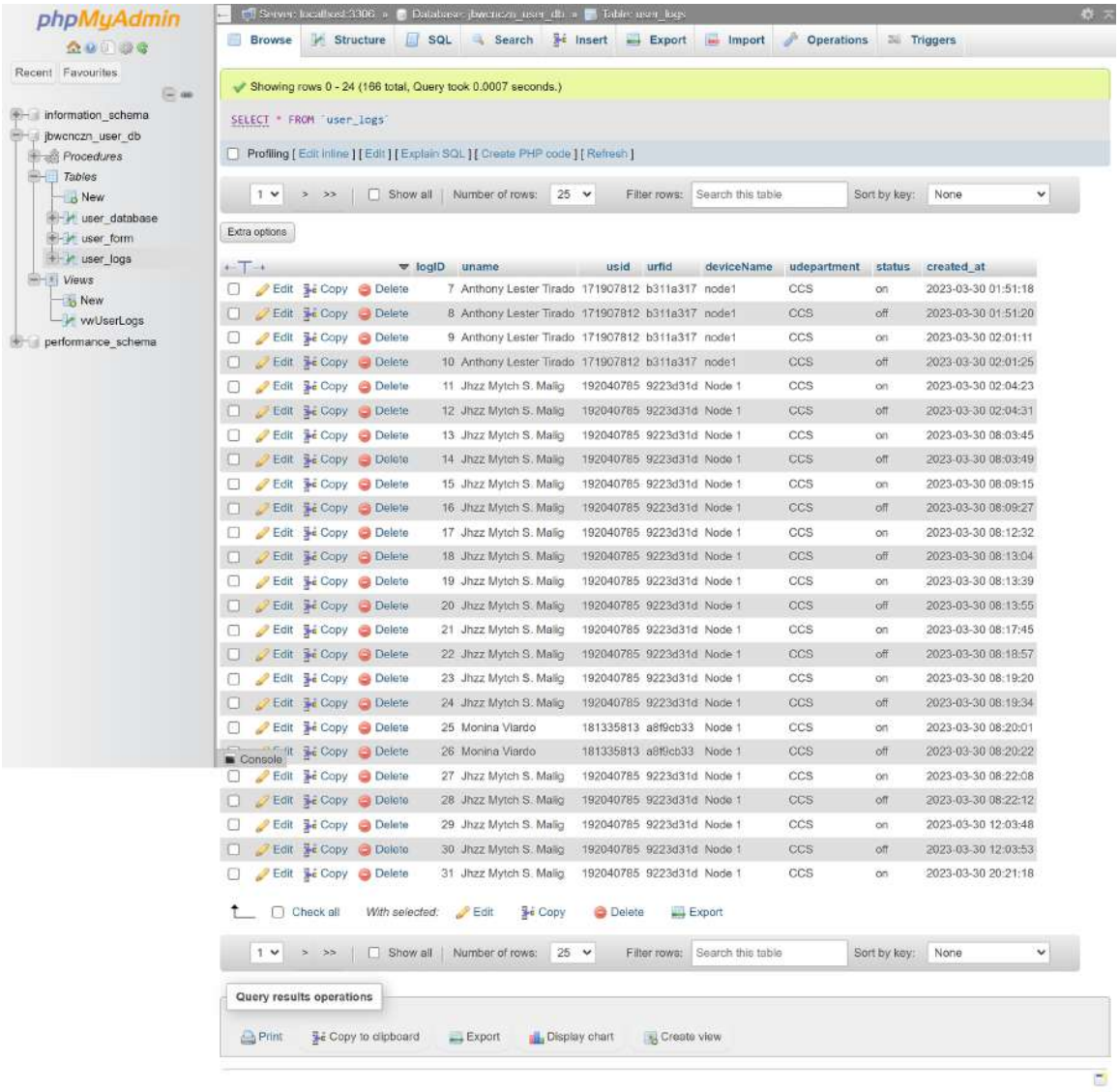
```
<?php
$mysqli = new
mysqli('localhost','jbwcnczn_coreadmin',
'taptapadmin0110','jbwcnczn_user_db');
$search = "";
if(isset($_POST["search"])){
   $search = $_POST["search"];
   $sql = "SELECT uname, uemail, usid,
urfid,deviceName,
udepartment,created_at,status FROM
```

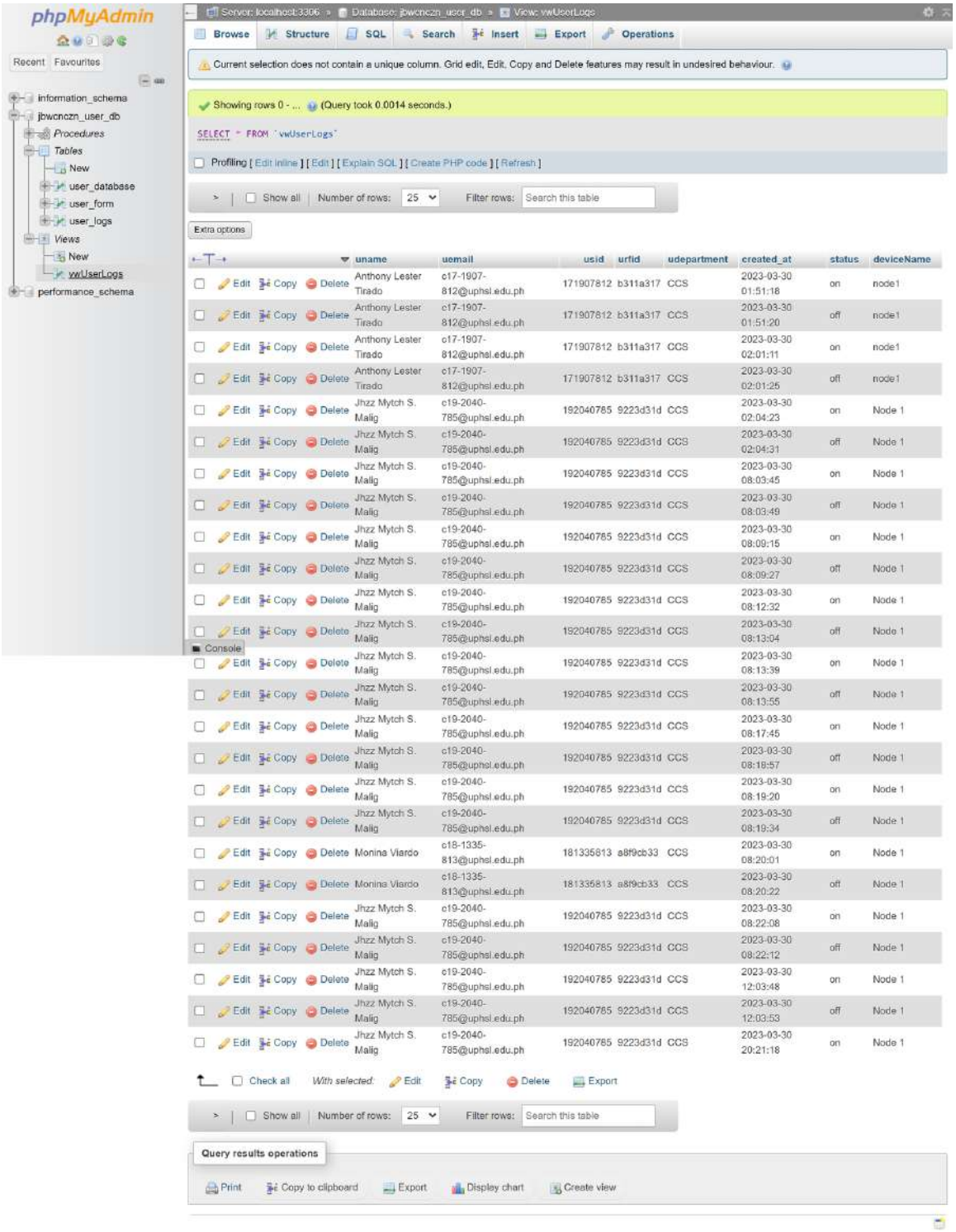
```
vwUserLogs WHERE uname LIKE
'%{$search}%' OR uemail LIKE
'%{$search}%' OR usid LIKE
'%{$search}%' OR urfid LIKE
'%{$search}%' OR deviceName LIKE
'%{$search}%' OR udepartment LIKE
'%{$search}%' ORDER BY created_at
DESC LIMIT 50";
}else{
   $sql = "SELECT uname, uemail, usid,
urfid,deviceName,
udepartment,created_at,status FROM
vwUserLogs ORDER BY created_at
DESC LIMIT 50";
}
$stmt = $mysqli->prepare($sql);
$stmt->execute();
$result = $stmt->get_result();
$user = array();
while ($row = $result->fetch_assoc()) {
   array_push($user, $row);
}
?>

<!DOCTYPE html>
<html>

<head>
   <title>Table with database</title>

   <head>
      <meta charset="UTF-8">
      <meta
http-equiv="X-UA-Compatible"
content="IE=edge">
      <meta name="viewport"
content="width=device-width,
initial-scale=1.0">
      <title>register form</title>

      <!-- custom css file link  -->
      <link rel="stylesheet"
href="css/style2.css">
   </head>
   <style>
   input[type=text] {
      color: #333333;
   }
</style>
</head>

<body>
         <h1 style="color:
#333333;">Search Database</h1>
         <form action=""
method="POST">
               <label for="search"
style="color: #dc143c;">Search:</label>
               <input type="text"
id="search" name="search"
value=""<?php echo $search; ?>">
               <button type="submit"
style="color:
#dc143c;">Submit</button>
         </form>

         <div style="position: absolute;
top: 25px; right: 25px;">
               <a
href="admin_page.php"
style="background-color: #333333;
color: white; padding: 10px 15px;
text-decoration: none;">Home</a>
         </div>

   <table style="padding: 5%
!important;">
      <tr>
         <th>Name</th>
         <th>Email</th>
         <th>Student ID</th>
         <th>Device Name</th>
         <th>RFID</th>
```

```
            <th>Department</th>
            <th>Status</th>
            <th>Timestamp</th>
        </tr>
        <?php

        if (!empty($user)) {
            foreach ($user as $u) {
                echo "<tr><td>" . $u["uname"]
. "</td><td>" . $u["uemail"] .
"</td><td>". $u["usid"] .  "</td><td>" .
$u["deviceName"] . "</td><td>" .
$u["urfid"] . "</td><td>" .
$u["udepartment"] . "</td><td>" .
$u["status"] . "</td><td>" .
$u["created_at"] . "</td></tr>";
            }
            echo "</table>";
        } else {
            echo "0 results";
        }
        ?>
    </table>
</body>

</html>
```


phpMyAdmin
Recent
Favourites
information_schema
jbwcnczn_user_db
Procedures
Tables
New
user_database
user_form
user_logs
Views
New
vwUserLogs
performance_schema
Browse
Structure
SQL
Search
Insert
Export
Import
Operations
Triggers
Table structure
Relation view
Name Type Collation Attributes Null Default Comments Extra Action
1 uname varchar(255) utf8mb4_0900_ai_ci No None Change Drop More
2 uemail varchar(255) utf8mb4_0900_ai_ci No None Change Drop More
3 usid int No None Change Drop More
4 urfid varchar(255) utf8mb4_0900_ai_ci No None Change Drop More
5 udepartment varchar(255) utf8mb4_0900_ai_ci No None Change Drop More
Check all
With selected:
Browse
Change
Drop
Primary
Unique
Index
Spatial
Fulltext
Print
Move columns
Normalise
Add
column(s)
after udepartment
Go
Indexes
Action Keyname Type Unique Packed Column Cardinality Collation Null Comment
Edit Rename Drop PRIMARY BTREE Yes No usid 6 A No
Create an index on
columns
Go
Partitions
No partitioning defined!
Partition table
Information
Space usage
Data 16.0 KiB
Index 0 B
Overhead 0 B
Effective 16.0 KiB
Total 16.0 KiB
Optimise table
Row statistics
Format dynamic
Collation utf8mb4_0900_ai_ci
Next autoindex 0
Creation Mar 25, 2023 at 08:31 PM
Last update Apr 26, 2023 at 12:16 AM
Last check Apr 26, 2023 at 12:16 AM
Console


phpMyAdmin
Recent
Favourites
information_schema
jbwcnczn_user_db
Procedures
Tables
New
user_database
user_form
user_logs
Views
New
vwUserLogs
performance_schema
Browse
Structure
SQL
Search
Insert
Export
Import
Operations
Triggers
Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.
Showing rows 0 - 4 (5 total, Query took 0.0050 seconds.)
SELECT * FROM `user_form`
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
Show all
Number of rows: 25
Filter rows: Search this table
Extra options
name email password user_type
coreadmin admin@gmail.com 21232f297a57a5a743894a0e4a801fc3 admin
cis cishernandez@gmail.com 21232f297a57a5a743894a0e4a801fc3 admin
jhzz jhzz@gmail.com e00cf25ad42683b3df678c61f42c6bda admin
Jhzz Malig Jhzzmalig@gmail.com e2571c7bd160fb3fac37b3e3661c524b admin
Sir Mike mike@gmail.com 18126e7bd3f84b3f3e4df094def5b7de admin
Show all
Number of rows: 25
Filter rows: Search this table
Query results operations
Print
Copy to clipboard
Export
Display chart
Create view
Console


phpMyAdmin
Recent
Favourites
information_schema
jbwcnczn_user_db
Procedures
Tables
New
user_database
user_form
user_logs
Views
New
vwUserLogs
performance_schema
Browse
Structure
SQL
Search
Insert
Export
Import
Operations
Triggers
Showing rows 0 - 24 (166 total, Query took 0.0007 seconds.)
SELECT * FROM `user_logs`
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
Show all
Number of rows: 25
Filter rows: Search this table
Sort by key: None
Extra options
logID uname usid urfid deviceName udepartment status created_at
Edit Copy Delete 7 Anthony Lester Tirado 171907812 b311a317 node1 CCS on 2023-03-30 01:51:18
Edit Copy Delete 8 Anthony Lester Tirado 171907812 b311a317 node1 CCS off 2023-03-30 01:51:20
Edit Copy Delete 9 Anthony Lester Tirado 171907812 b311a317 node1 CCS on 2023-03-30 02:01:11
Edit Copy Delete 10 Anthony Lester Tirado 171907812 b311a317 node1 CCS off 2023-03-30 02:01:25
Edit Copy Delete 11 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 02:04:23
Edit Copy Delete 12 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS off 2023-03-30 02:04:31
Edit Copy Delete 13 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 08:03:45
Edit Copy Delete 14 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS off 2023-03-30 08:03:49
Edit Copy Delete 15 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 08:09:15
Edit Copy Delete 16 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS off 2023-03-30 08:09:27
Edit Copy Delete 17 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 08:12:32
Edit Copy Delete 18 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS off 2023-03-30 08:13:04
Edit Copy Delete 19 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 08:13:39
Edit Copy Delete 20 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS off 2023-03-30 08:13:55
Edit Copy Delete 21 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 08:17:45
Edit Copy Delete 22 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS off 2023-03-30 08:18:57
Edit Copy Delete 23 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 08:19:20
Edit Copy Delete 24 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS off 2023-03-30 08:19:34
Edit Copy Delete 25 Monina Viardo 181335813 a8f9cb33 Node 1 CCS on 2023-03-30 08:20:01
Edit Copy Delete 26 Monina Viardo 181335813 a8f9cb33 Node 1 CCS off 2023-03-30 08:20:22
Edit Copy Delete 27 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 08:22:08
Edit Copy Delete 28 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS off 2023-03-30 08:22:12
Edit Copy Delete 29 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 12:03:48
Edit Copy Delete 30 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS off 2023-03-30 12:03:53
Edit Copy Delete 31 Jhzz Mytch S. Malig 192040785 9223d31d Node 1 CCS on 2023-03-30 20:21:18
Check all
With selected:
Edit
Copy
Delete
Export
Console
Query results operations
Print
Copy to clipboard
Export
Display chart
Create view


phpMyAdmin
Recent Favourites
information_schema
jbwcnczn_user_db
Procedures
Tables
New
user_database
user_form
user_logs
Views
New
vwUserLogs
performance_schema
Server: localhost:3306 » Database: jbwcnczn_user_db » View: vwUserLogs
Browse Structure SQL Search Insert Export Operations
Current selection does not contain a unique column. Grid edit, Edit, Copy and Delete features may result in undesired behaviour.
Showing rows 0 - ... (Query took 0.0014 seconds.)
SELECT * FROM `vwUserLogs`
Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]
Show all Number of rows: 25 Filter rows: Search this table
Extra options
uname uemail usid urfid udepartment created_at status deviceName
Anthony Lester Tirado c17-1907-812@uphsl.edu.ph 171907812 b311a317 CCS 2023-03-30 01:51:18 on node1
Anthony Lester Tirado c17-1907-812@uphsl.edu.ph 171907812 b311a317 CCS 2023-03-30 01:51:20 off node1
Anthony Lester Tirado c17-1907-812@uphsl.edu.ph 171907812 b311a317 CCS 2023-03-30 02:01:11 on node1
Anthony Lester Tirado c17-1907-812@uphsl.edu.ph 171907812 b311a317 CCS 2023-03-30 02:01:25 off node1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 02:04:23 on Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 02:04:31 off Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:03:45 on Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:03:49 off Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:09:15 on Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:09:27 off Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:12:32 on Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:13:04 off Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:13:39 on Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:13:55 off Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:17:45 on Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:18:57 off Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:19:20 on Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:19:34 off Node 1
Monina Viardo c18-1335-813@uphsl.edu.ph 181335813 a8f9cb33 CCS 2023-03-30 08:20:01 on Node 1
Monina Viardo c18-1335-813@uphsl.edu.ph 181335813 a8f9cb33 CCS 2023-03-30 08:20:22 off Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:22:08 on Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 08:22:12 off Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 12:03:48 on Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 12:03:53 off Node 1
Jhzz Mytch S. Malig c19-2040-785@uphsl.edu.ph 192040785 9223d31d CCS 2023-03-30 20:21:18 on Node 1
Check all With selected: Edit Copy Delete Export
Show all Number of rows: 25 Filter rows: Search this table
Query results operations
Print Copy to clipboard Export Display chart Create view
Console

APPENDIX B

Evaluation Tool

ISO 25010 Software Evaluation Tool

Functional Suitability

This characteristic represents the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions.

1. Functional completeness *

Degree to which the set of functions covers all the specified tasks and user objectives

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2. Functional correctness *

Degree to which a product or system provides the correct results with the needed degree of precision.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

3. Functional appropriateness *

Degree to which the functions facilitate the accomplishment of specified tasks and objectives.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Performance efficiency

This characteristic represents the performance relative to the amount of resources used under stated conditions.

1. Time behaviour *

Degree to which the response and processing times and throughput rates of a product or system, when performing its functions, meet requirements.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2. Resource utilization *

Degree to which the amounts and types of resources used by a product or system, when performing its functions, meet requirements.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

3. Capacity *

Degree to which the maximum limits of a product or system parameter meet requirements

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Compatibility

Degree to which a product, system or component can exchange information with other products, systems or components, and/or perform its required functions while sharing the same hardware or software environment

1. Co-existence *

Degree to which a product can perform its required functions efficiently while sharing a common environment and resources with other products, without detrimental impact on any other product.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2. Interoperability *

Degree to which two or more systems, products or components can exchange information and use the information that has been exchanged.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Usability

Degree to which a product or system can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.

1. Appropriateness recognizability *

Degree to which users can recognize whether a product or system is appropriate for their needs.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2. Learnability *

Degree to which a product or system can be used by specified users to achieve specified goals of learning to use the product or system with effectiveness, efficiency, freedom from risk and satisfaction in a specified context of use.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

3. Operability *

Degree to which a product or system has attributes that make it easy to operate and control.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly gree

4. User error protection. *

Degree to which a system protects users against making errors.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

5. User interface aesthetics *

Degree to which a user interface enables pleasing and satisfying interaction for the user.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

6. Accessibility *

Degree to which a product or system can be used by people with the widest range of characteristics and capabilities to achieve a specified goal in a specified context of use.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Reliability

Degree to which a system, product or component performs specified functions under specified conditions for a specified period of time.

1. Maturity *

Degree to which a system, product or component meets needs for reliability under normal operation.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2. Availability *

Degree to which a system, product or component is operational and accessible when required for use.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

3. Fault tolerance *

Degree to which a system, product or component operates as intended despite the presence of hardware or software faults.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

4. Recoverability *

Degree to which, in the event of an interruption or a failure, a product or system can recover the data directly affected and re-establish the desired state of the system.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Security

Degree to which a product or system protects information and data so that persons or other products or systems have the degree of data access appropriate to their types and levels of authorization.

1. Confidentiality *

Degree to which a product or system ensures that data are accessible only to those authorized to have access.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2. Integrity *

Degree to which a system, product or component prevents unauthorized access to, or modification of, computer programs or data.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

3. Non-repudiation *

Degree to which actions or events can be proven to have taken place so that the events or actions cannot be repudiated later.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

4. Accountability *

Degree to which the actions of an entity can be traced uniquely to the entity.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

5. Authenticity *

Degree to which the identity of a subject or resource can be proved to be the one claimed.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Maintainability

This characteristic represents the degree of effectiveness and efficiency with which a product or system can be modified to improve it, correct it or adapt it to changes in environment, and in requirements.

1. Modularity *

Degree to which a system or computer program is composed of discrete components such that a change to one component has minimal impact on other components.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2. Reusability *

Degree to which an asset can be used in more than one system, or in building other assets.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

3. Analysability *

Degree of effectiveness and efficiency with which it is possible to assess the impact on a product or system of an intended change to one or more of its parts, or to diagnose a product for deficiencies or causes of failures, or to identify parts to be modified.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

4. Modifiability *

Degree to which a product or system can be effectively and efficiently modified without introducing defects or degrading existing product quality.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

5. Testability *

Degree of effectiveness and efficiency with which test criteria can be established for a system, product or component and tests can be performed to determine whether those criteria have been met.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

Portability

Degree of effectiveness and efficiency with which a system, product or component can be transferred from one hardware, software or other operational or usage environment to another.

1. Adaptability *

Degree to which a product or system can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

2. Installability *

Degree of effectiveness and efficiency with which a product or system can be successfully installed and/or uninstalled in a specified environment.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

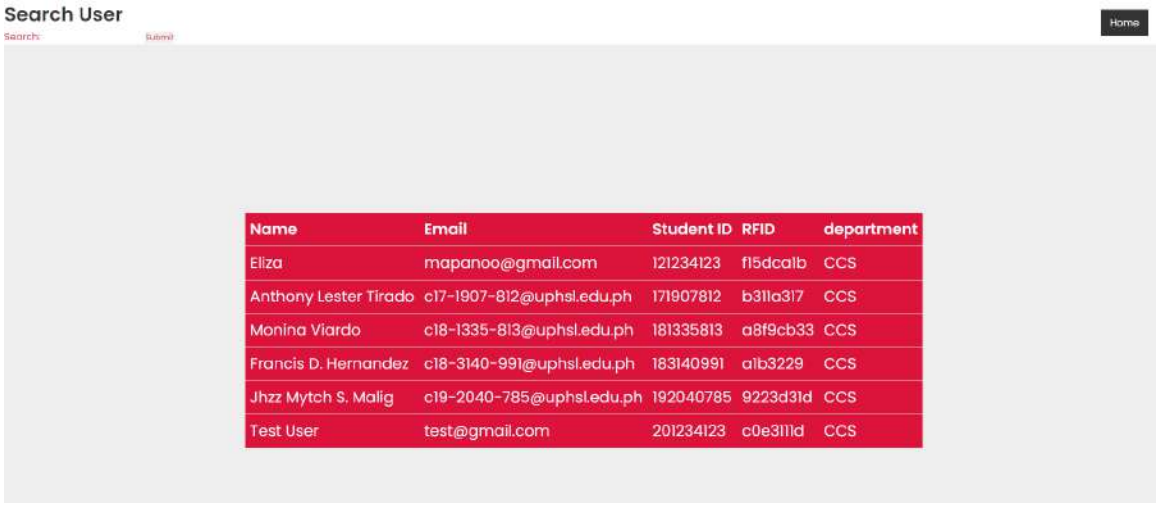
3. Replaceability *

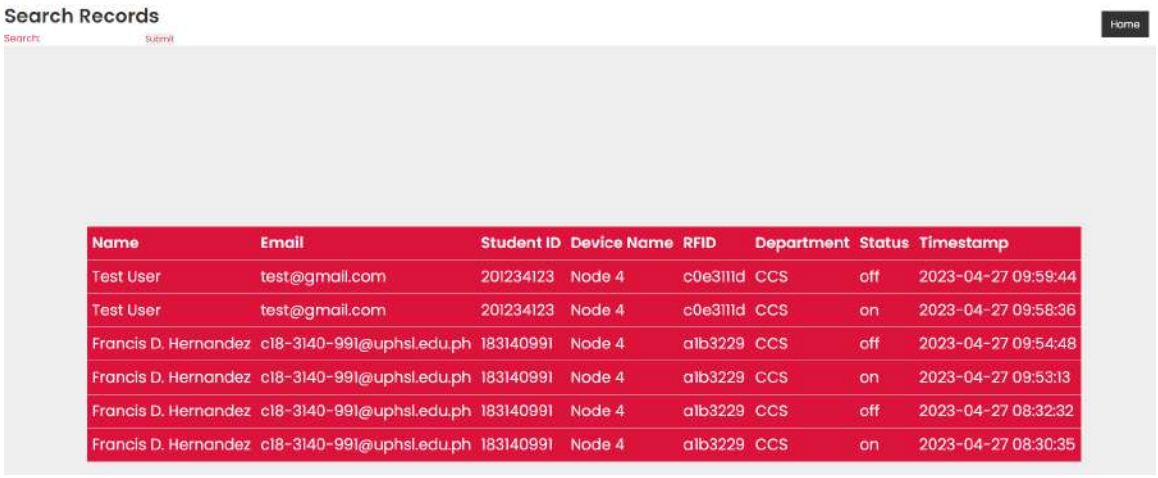
Degree to which a product can replace another specified software product for the same purpose in the same environment.

	1	2	3	4	5	
Strongly Disagree	○	○	○	○	○	Strongly Agree

APPENDIX C

Sample input/Output/Reports




Search Records
Search:
Submit
Home
Name Email Student ID Device Name RFID Department Status Timestamp
Test User test@gmail.com 201234123 Node 4 c0e3111d CCS off 2023-04-27 09:59:44
Test User test@gmail.com 201234123 Node 4 c0e3111d CCS on 2023-04-27 09:58:36
Francis D. Hernandez c18-3140-991@uphsl.edu.ph 183140991 Node 4 a1b3229 CCS off 2023-04-27 09:54:48
Francis D. Hernandez c18-3140-991@uphsl.edu.ph 183140991 Node 4 a1b3229 CCS on 2023-04-27 09:53:13
Francis D. Hernandez c18-3140-991@uphsl.edu.ph 183140991 Node 4 a1b3229 CCS off 2023-04-27 08:32:32
Francis D. Hernandez c18-3140-991@uphsl.edu.ph 183140991 Node 4 a1b3229 CCS on 2023-04-27 08:30:35

TAPTAP

TAPTAP

APPENDIX D

Users Guide

SOFTWARE MANUAL

TAPTAP

Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers

1.0 GENERAL INFORMATION

This section provides the explanation of the TAPTAP in general terms and its purpose.

1.1 SYSTEM OVERVIEW

TAPTAP is a system that enables an organization to control who can or can't use their computers through the use of RFID technology. TAPTAP verifies RFID tags through its database and turns on/off a computer if there is a match. Also, TAPTAP records the information of the user along with time of use.

1.2 ORGANIZATION OF THE MANUAL

This manual is divided into four (4) sections: General Information, System Summary, Getting Started and Using The System.

General Information - provides the brief explanation of TAPTAP in general terms and purpose.

System Summary - provides the overview of the system.

Getting Started - provides explanation on how to run TAPTAP and its functions.

Using The System - lastly, this provides detailed description of TAPTAP different functions and features.

2.0 SYSTEM SUMMARY

This section provides the overview of TAPTAP.

2.1 SYSTEM CONFIGURATION

The software of TAPTAP is a Web-based System that can be accessed through any desktop PC or Laptop that has access to the internet and also have a web browser. TAPTAP's hardware installation will be documented in another manual.

2.2 USER ACCESS LEVELS

Only one user level is integrated to TAPTAP which is the admin account. The admin account is the only one allowed to access the user database and user logs of TAPTAP.

2.3 CONTINGENCIES

In case of errors in the system, please contact the System Developers.

3.0 GETTING STARTED

This section provides the explanation of the TAPTAP in general terms and its purpose.

3.1 INSTALLATION AND LOGGING IN

There is no need install TAPTAP's software on a computer. Just log on to https://www.taptapuphsl.com and log-in with the necessary credentials and it will automatically redirect the admin to the home page.

3.2 SYSTEM MENU

TAPTAP's software has four (4) features: User Registration, Admin Registration, View User Logs, and View User Database. The functions of these are as follows:

- **User Registration** - Registers new Users with a corresponding RFID Card.
- **Admin Registration** - Registers an additional admin account for TAPTAP.
- **View User Logs** - Allows viewing of User Logs of computers with TAPTAP units installed.
- **View User Database** - Allows viewing of all registered users along with school information and RFID tags.

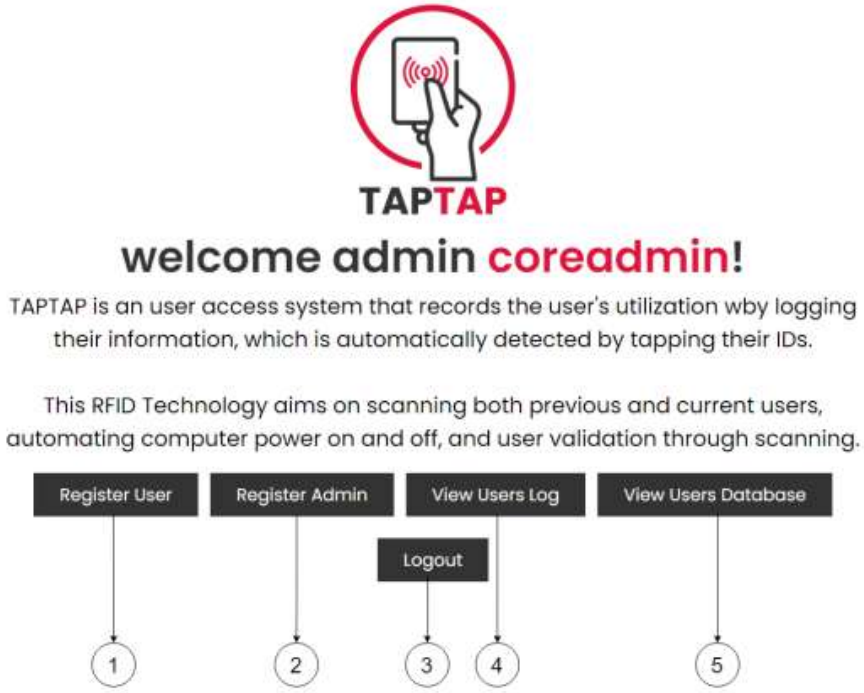
4.0 USING THE SYSTEM

This section will show how to use and maneuver around TAPTAP's software.

4.1 LOGIN PAGE

After entering TAPTAP's URL, the admin must enter their credentials and click "Login" in order to access the software. If login is successful, the admin will be redirected to the home page TAPTAP. (1) is the text box for input of email address and (2) is the text box for the password.

4.2 HOME PAGE



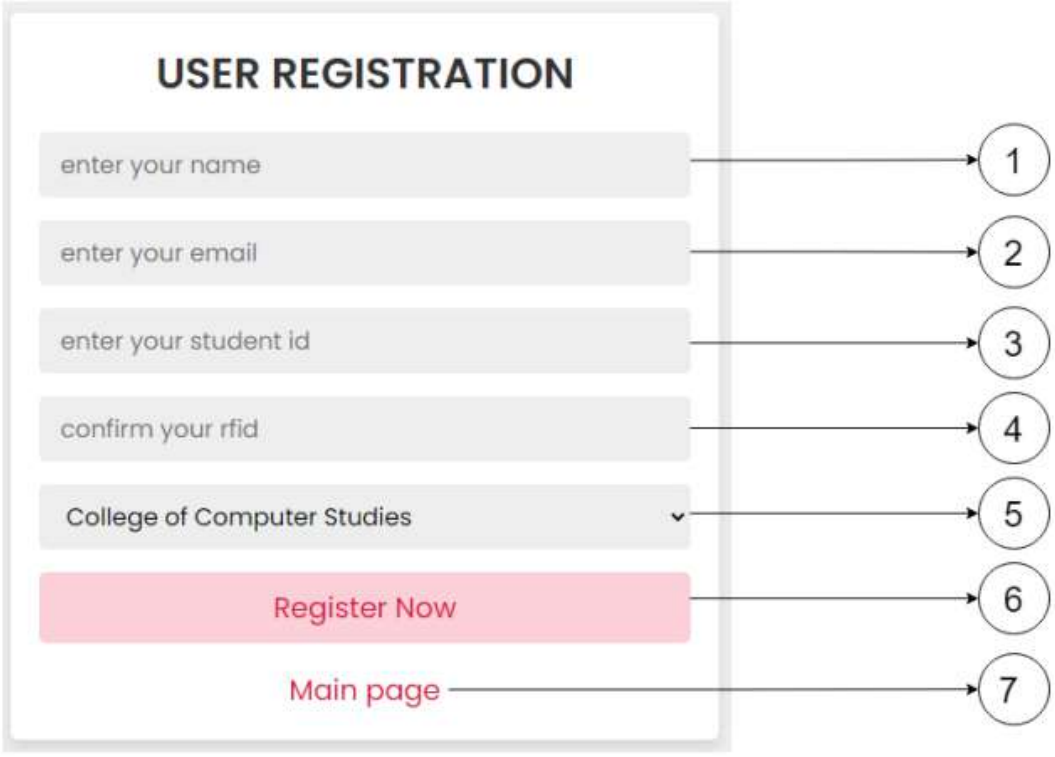
This is the home page of TAPTAP, the admin will be displayed with different buttons that correspond with different functions namely:

1. **Register User** - Redirects to a page where user registration is done.
2. **Register Admin** - Redirects to a page where admin registration is done.
3. **Logout** - Logout button when admin is done using TAPTAP. Redirects to Login page.
4. **View Users Log** - Redirects to a page where admin can view the User Logs of computers with installed TAPTAP units.
5. **View Users Database** - Redirects to a page where admin can view all of registered users.

4.3 REGISTRATION

There will be two types of registration, User Registration and Admin Registration. They differ in their purposes, User Registration is for adding new users (student, faculty, or staff) to the TAPTAP database with a corresponding RFID Card or Tag. Admin Registration is for adding new Admin accounts, number of admin accounts is dependent on the preference of the organization.

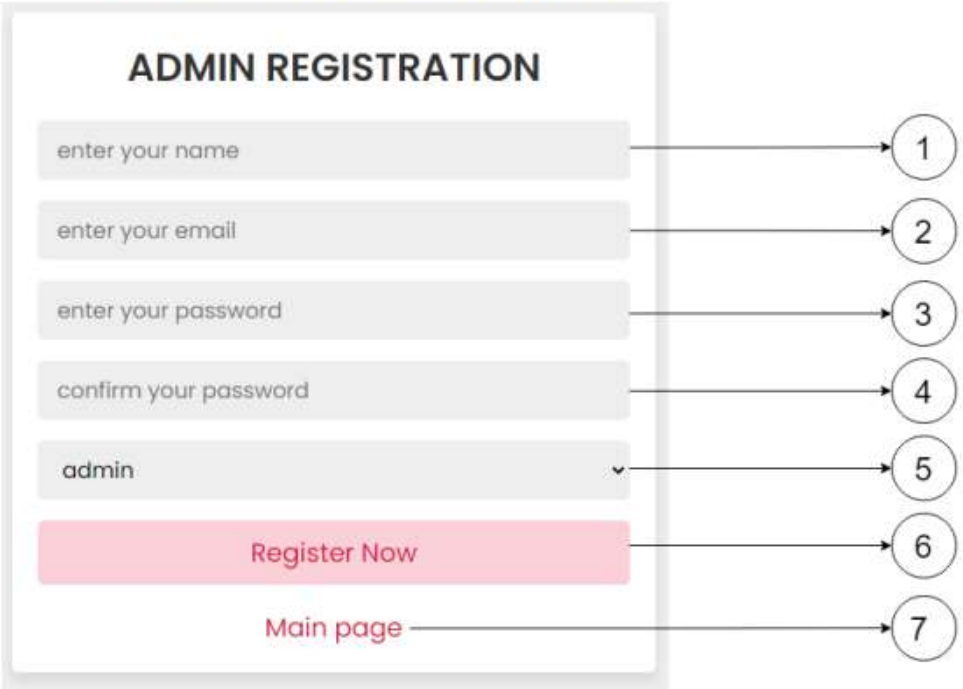
4.3.1 USER REGISTRATION



User registration is composed of 5 input boxes and 2 buttons. Description are as follows:

1. **Name** - Input name of new user.
2. **Email** - Input email of new user.
3. **ID** - Input School ID
4. **RFID** - Input the RFID UID using the Leo unit.
5. **Department** - Select from the list which department the user belongs to.
6. **Register** - After filling up the form, clicking this button will add the user to the database.
7. **Main Page** - Button to go back to Home page.

4.3.2 ADMIN REGISTRATION

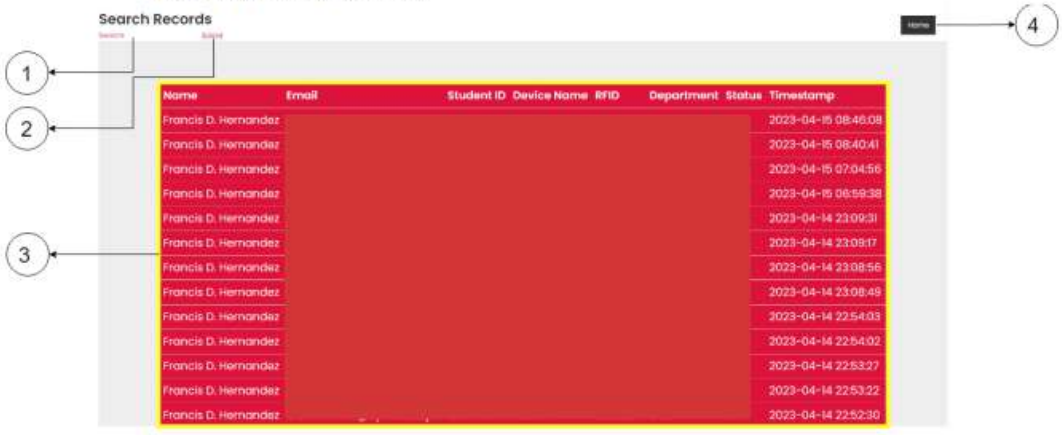


Admin registration is composed of 5 input boxes and 2 buttons. Description are as follows:

1. **Name** - Input name of new user.
2. **Email** - Input email of new user.
3. **ID** - Input School ID.
4. **RFID** - Input the RFID UID using the Leo unit.
5. **Account** - Select from the list which account type to use.
6. **Register** - After filling up the form, clicking this button will add the user to the database.
7. **Main Page** - Button to go back to Home page.

4.4 USER LOGS

In this page, the admin can view registered users who used computers with installed TAPTAP units. Included in the table are important information for monitoring behavior of users.

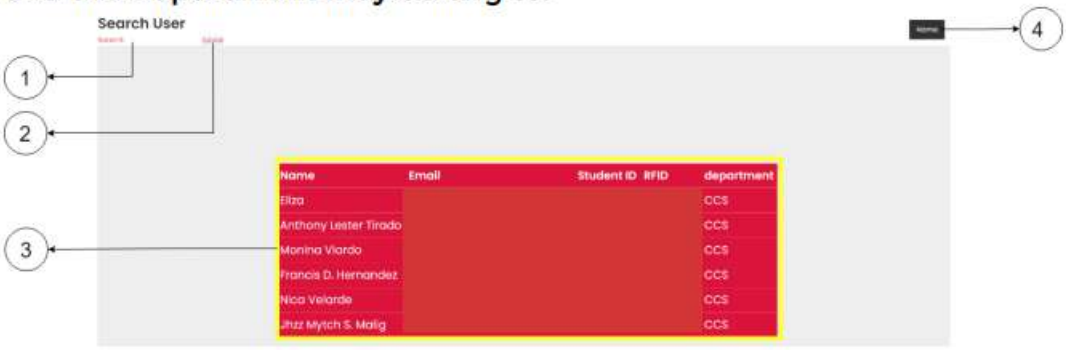


There are 4 parts in this page, description of each are as follows:

1. **Search** – Search bar used for looking for certain categories in the user logs database.
2. **Submit** – Button for submitting the search query.
3. **User Logs Table** – This table shows the complete information of registered users who used the computers, including device name, computer status (on/off), and time stamp to when it was turned on and off.
4. **Home** – Button for when the admin wants to go back to the home page.

4.5 USER DATABASE

In this page, the admin can view the list of registered users with important information including Name, Email, School ID, RFID UID, and the Department they belong to.

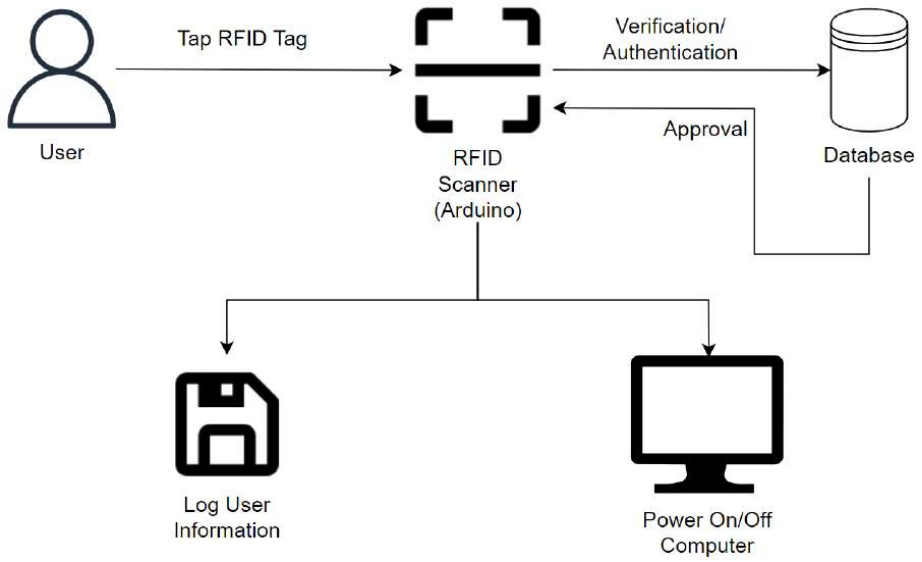


There are 4 parts in this page, description of each are as follows:

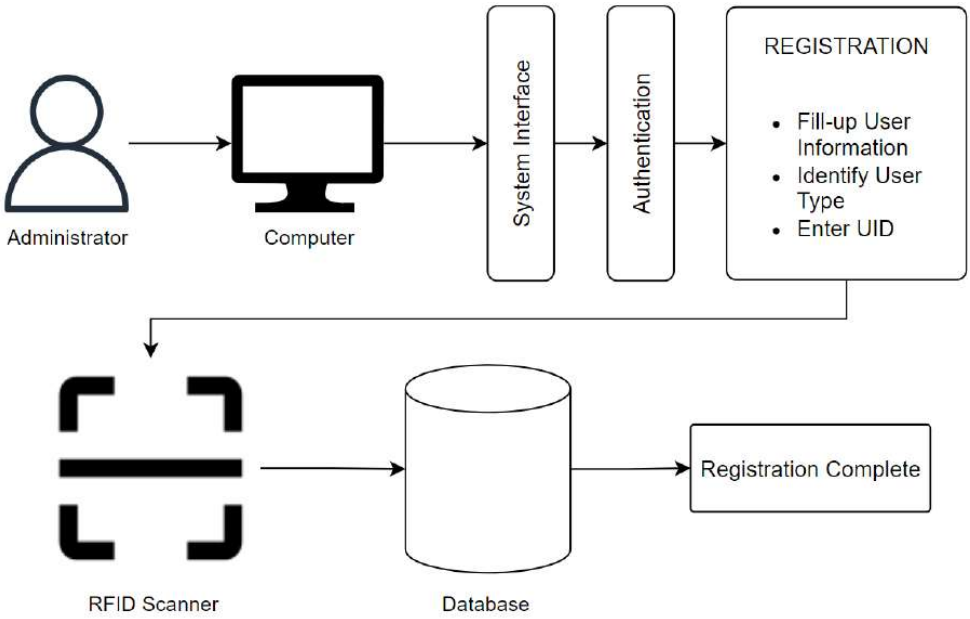
1. **Search** – Search bar used for looking for certain categories in the user logs database.
2. **Submit** – Button for submitting the search query.
3. **User Database Table** – This table shows the complete information of registered users.
4. **Home** – Button for when the admin wants to go back to the home page.

APPENDIX E

Process/Data/Information Flow



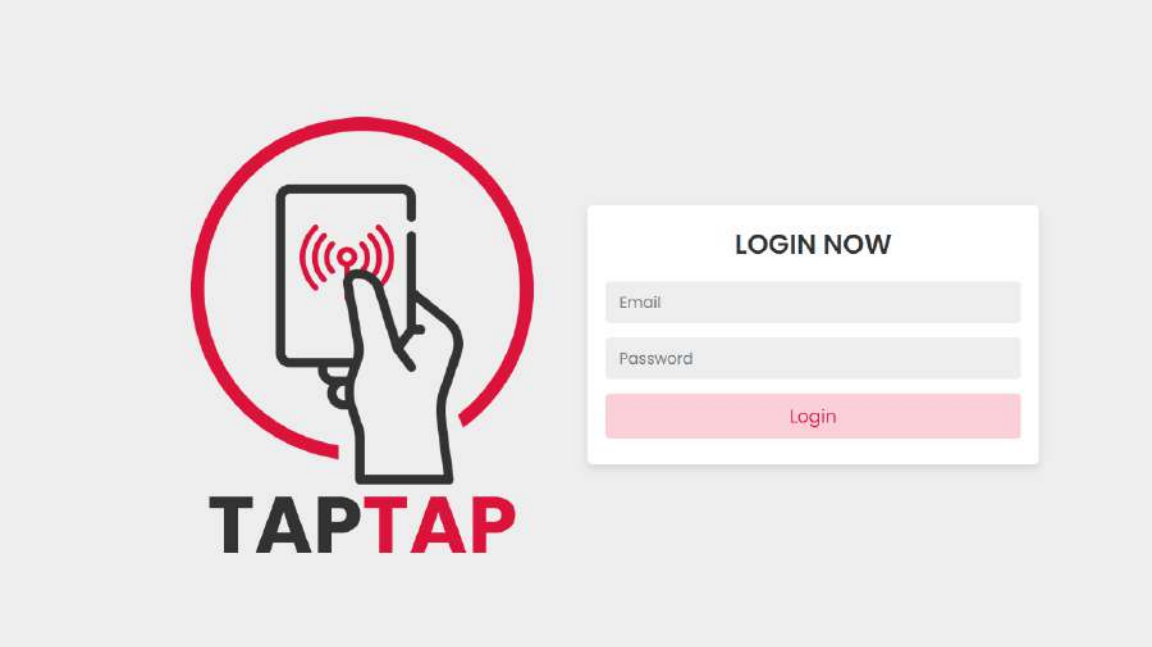
The illustration above depicts a representation of how data flows in the system. The user taps their RFID tag to the Arduino RFID Scanner, upon tapping- this will initialize the verification system. If the user matches the credentials on the database containing information of registered users with their respective RFID UIDs, the user will be gained access to the respective hardware and will automatically log their personal information into the system. This solves the issues stated above as the Arduino device will log the user information associated with the RFID tag based on the system database. In addition, this will encourage users to tap their RFID tags again to be able to power off the computer since administrators are able to check who last used the computer if left open.

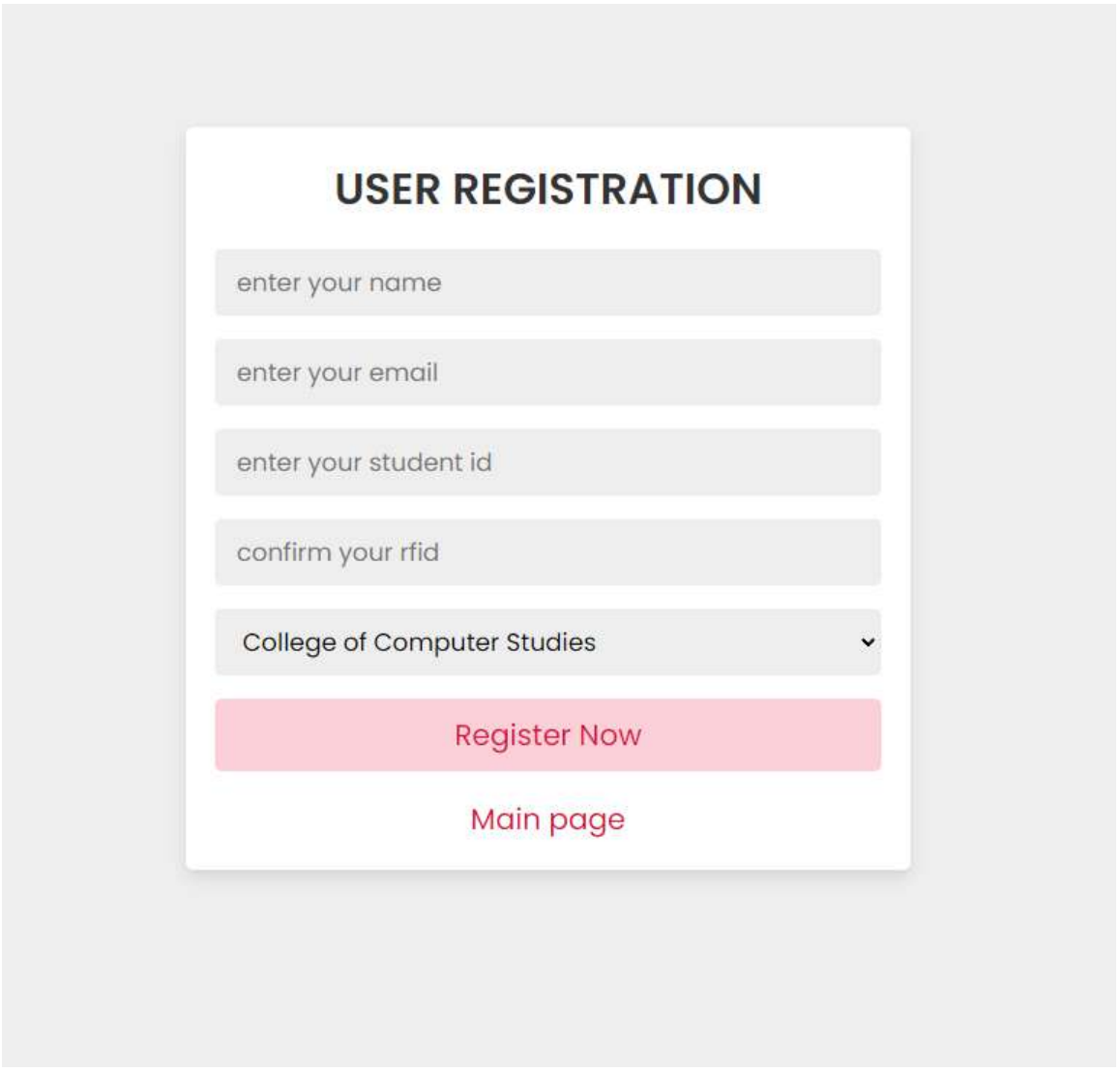


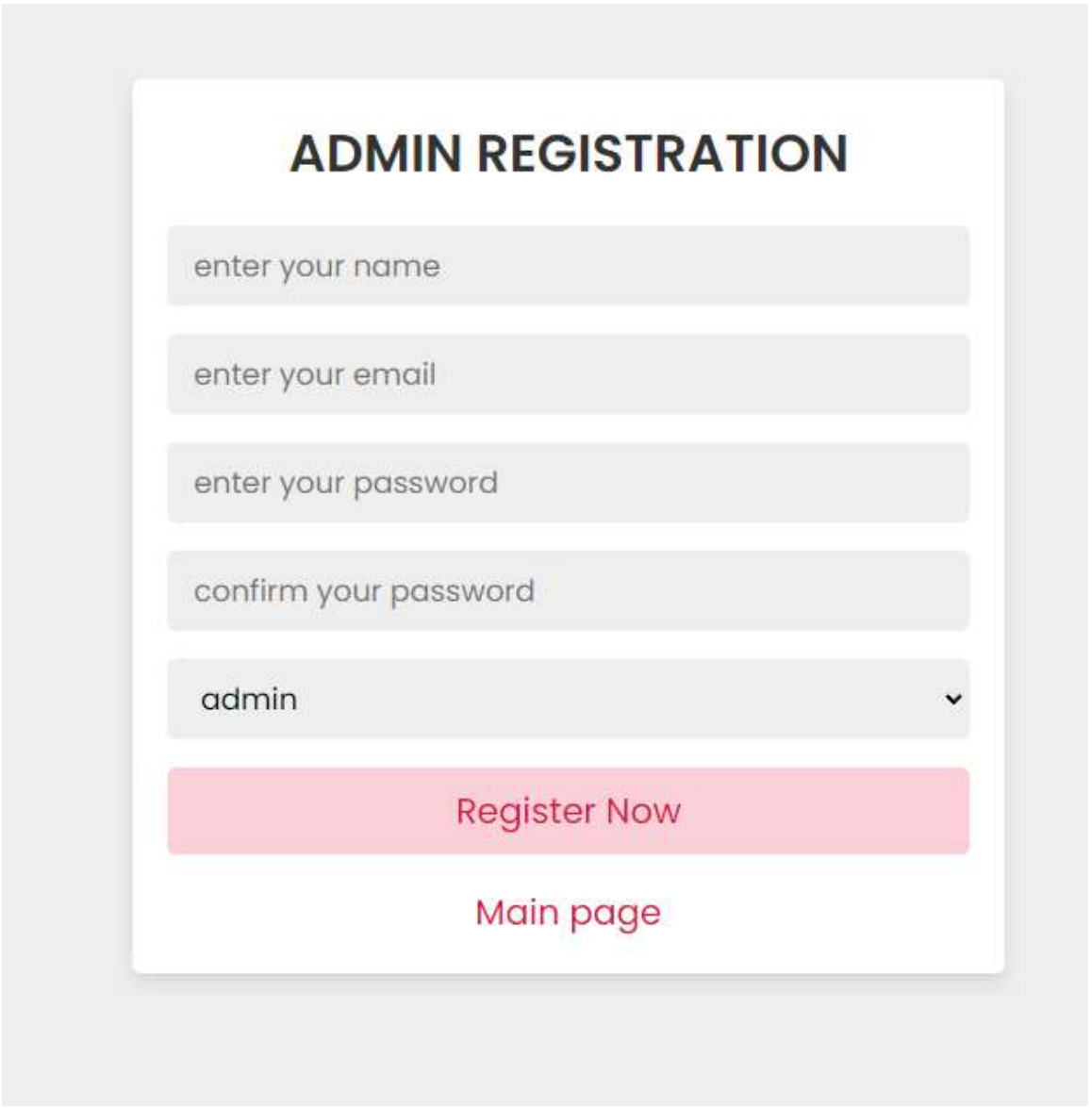
The figure above illustrates the process of the systems' software that is critical to managing, accessing, and making changes to the database. In the software, only those with administrative privileges are able to access the dashboard, within the dashboard comes the option to view, edit and delete all of the user's information. Additionally, administrators can also register new users that want and/or need to use the computers within the university.

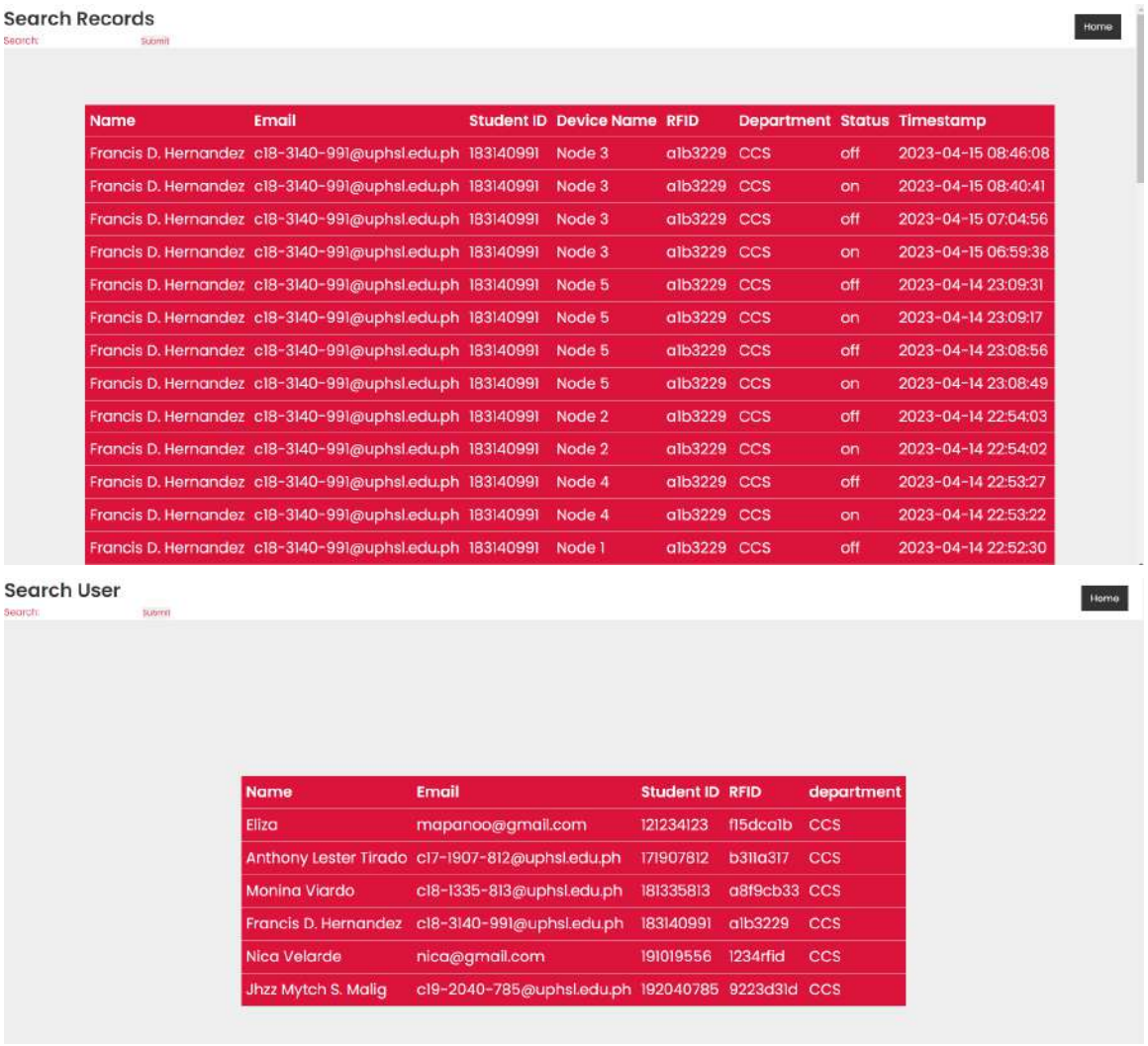
APPENDIX F

Screen Layout


TAPTAP
LOGIN NOW
Email
Password
Login


USER REGISTRATION
enter your name
enter your email
enter your student id
confirm your rfid
College of Computer Studies
Register Now
Main page


ADMIN REGISTRATION
enter your name
enter your email
enter your password
confirm your password
admin
Register Now
Main page



Search Records

Search: Submit Home

Name	Email	Student ID	Device Name	RFID	Department	Status	Timestamp
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 3	a1b3229	CCS	off	2023-04-15 08:46:08
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 3	a1b3229	CCS	on	2023-04-15 08:40:41
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 3	a1b3229	CCS	off	2023-04-15 07:04:56
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 3	a1b3229	CCS	on	2023-04-15 06:59:38
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 5	a1b3229	CCS	off	2023-04-14 23:09:31
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 5	a1b3229	CCS	on	2023-04-14 23:09:17
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 5	a1b3229	CCS	off	2023-04-14 23:08:56
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 5	a1b3229	CCS	on	2023-04-14 23:08:49
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 2	a1b3229	CCS	off	2023-04-14 22:54:03
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 2	a1b3229	CCS	on	2023-04-14 22:54:02
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	off	2023-04-14 22:53:27
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 4	a1b3229	CCS	on	2023-04-14 22:53:22
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	Node 1	a1b3229	CCS	off	2023-04-14 22:52:30

Search User

Search: Submit Home

Name	Email	Student ID	RFID	department
Eliza	mapanoo@gmail.com	121234123	f15dca1b	CCS
Anthony Lester Tirado	c17-1907-812@uphsl.edu.ph	171907812	b311a317	CCS
Monina Viardo	c18-1335-813@uphsl.edu.ph	181335813	a8f9cb33	CCS
Francis D. Hernandez	c18-3140-991@uphsl.edu.ph	183140991	a1b3229	CCS
Nica Velarde	nica@gmail.com	191019556	1234rfid	CCS
Jhzz Mytch S. Malig	c19-2040-785@uphsl.edu.ph	192040785	9223d31d	CCS

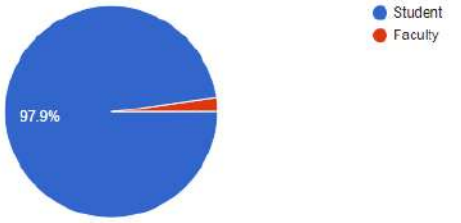
APPENDIX G

Test Result

Occupation

47 responses

Copy



Age

47 responses

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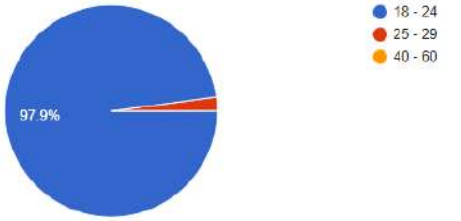

Sex

47 responses

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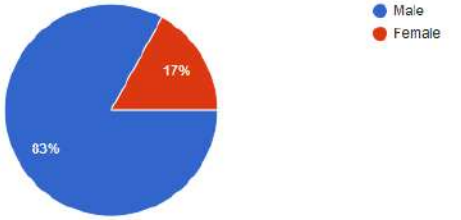

Disabilities

47 responses

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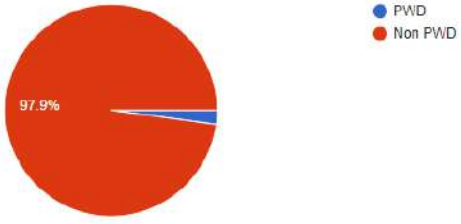
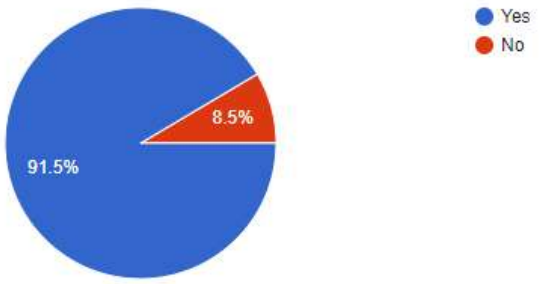


1. Do you think our system helps with increasing physical security when it comes to restricting unauthorized user access?

Copy

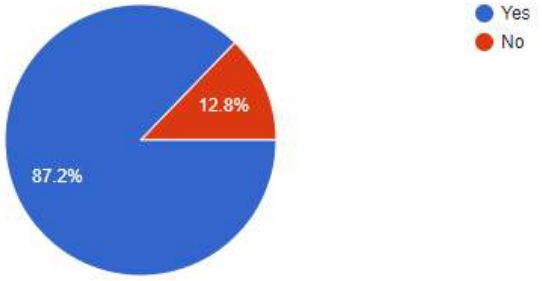
47 responses



2. Do you think that being able to track the history of user access to the computers help increase physical security?

Copy

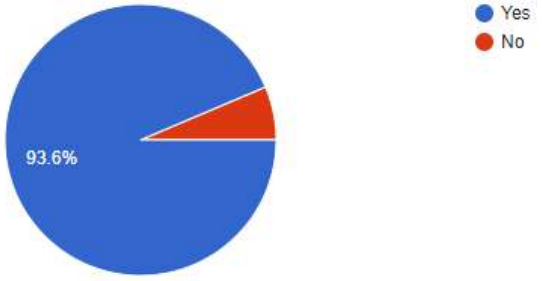
47 responses



3. Is the automated method of monitoring computer usage more efficient than using a manual logging sheet?

Copy

47 responses



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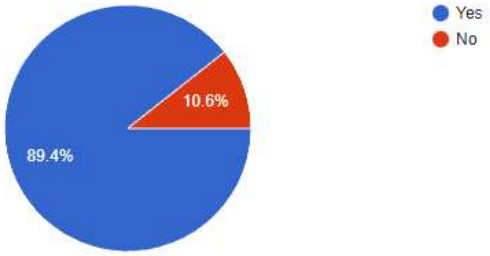
4. Is it more secure and convenient if users will just tap their IDs on the hardware-instead of manually typing their logs and entering their password every time they want to use the computer?

47 responses



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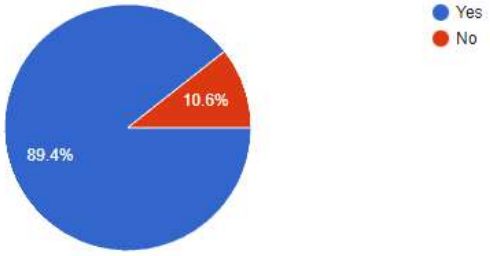
5. Do you think that our system encourages users to practice accountability in terms of handling hardware?

47 responses



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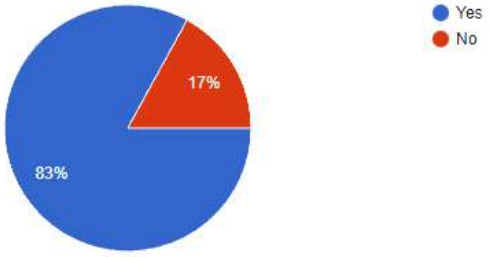
6. In your opinion, will our system be able to prolong the lifespan of the computers?

47 responses



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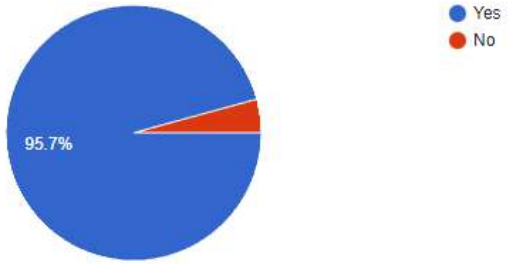
7. Do you think that our system will help users with disabilities?

47 responses



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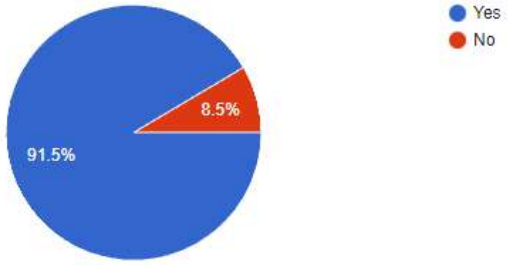
8. Do you think that the system will help trace users when peripherals are broken/missing, and there is a presence of malware?

47 responses



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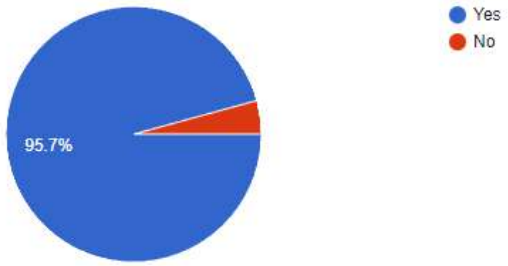
9. Do you think that our proposed automated user logging system will be beneficial to the College of Computer Studies department?

47 responses



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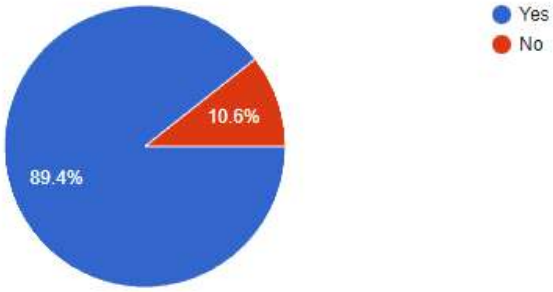
10. Will you recommend an automated user logging system for computer laboratories in other departments for easier usage monitoring and access?

47 responses

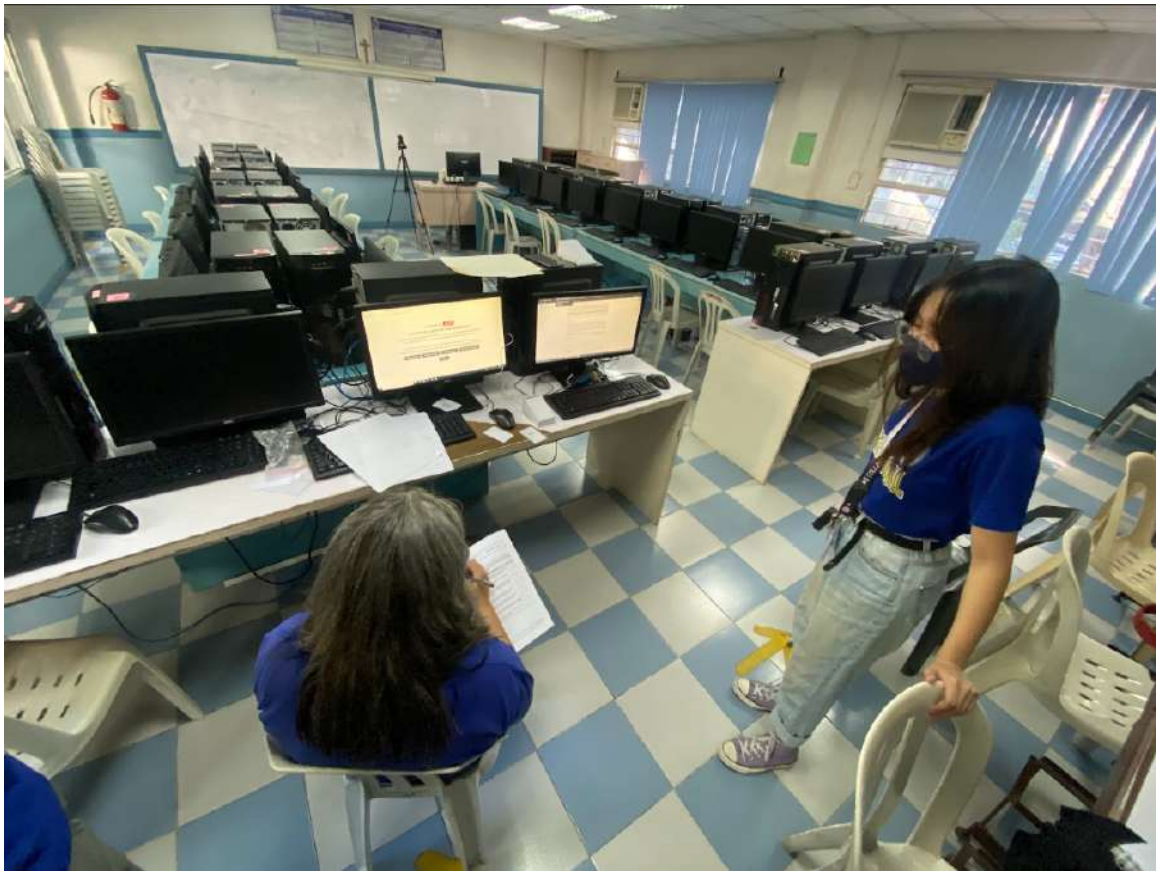


		SA	A	N	D	SD	Weighted Mean	Total
Functional suitability		5	4	3	2	1		102
1	Functional completeness	51	35	14	2		4.32	102
2	Functional correctness	47	38	13	3	1	4.25	102
3	Functional appropriateness	52	37	10	2	1	4.34	102
Performance efficiency		SA	A	N	D	SD	Weighted Mean	
		5	4	3	2	1		
4	Time behaviour	49	39	12	2		4.32	102
5	Resource utilization	44	41	15	2		4.25	102
6	Capacity	48	40	13		1	4.31	102
Compatibility		SA	A	N	D	SD	Weighted Mean	
		5	4	3	2	1		
7	Co-existence	48	39	12	3		4.29	102
8	Interoperability	52	32	16	2		4.31	102
Usability		SA	A	N	D	SD	Weighted Mean	
		5	4	3	2	1		
9	Appropriateness recognizability	53	34	14	1		4.36	102
10	Learnability	50	34	15	3		4.28	102
11	Operability	54	40	8			4.45	102
12	User error protection	42	36	20	4		4.14	102
13	User interface aesthetics	46	35	19	2		4.23	102
14	Accessibility	51	35	15	1		4.33	102
Reliability		SA	A	N	D	SD	Weighted Mean	
		5	4	3	2	1		
15	Maturity	49	39	13	1		4.33	102
16	Availability	44	43	13	2		4.26	102
17	Fault Tolerance	40	42	15	5		4.15	102
18	Recoverability	49	37	15		1	4.30	102
Security		SA	A	N	D	SD	Weighted Mean	
		5	4	3	2	1		
19	Confidentiality	58	30	11	3		4.40	102
20	Integrity	48	40	12	2		4.31	102
21	Non-repudiation	52	27	21	2		4.26	102
22	Accountability	53	35	11	3		4.35	102
23	Authenticity	47	38	17			4.29	102
Maintainability		SA	A	N	D	SD	Weighted Mean	
		5	4	3	2	1		
24	Modularity	54	29	18	1		4.33	102
25	Reusability	47	38	17			4.29	102
26	Analysability	54	29	18	1		4.33	102
27	Modifiability	47	36	18	1		4.26	102
28	Testability	46	38	16	1	1	4.25	102
Portability		SA	A	N	D	SD	Weighted Mean	
		5	4	3	2	1		
29	Adaptability	49	33	17	3		4.25	102
30	Installability	48	34	18	2		4.25	102
31	Relaceability	55	30	16	1		4.36	102

APPENDIX H

Pictures showcasing the data gathering

COLLEGE OF MARITIME



CORE Elite
700 WATTS
CAUTION!

Preliminary Survey

Demographic Profile

Name *

Your answer

Occupation *

- ○ Student
- ○ Faculty

Age *

- ○ 18 - 24
- ○ 25 - 29
- ○ 40 - 60

Sex *

- ○ Male
- ○ Female

Disabilities *

- ○ PWD
- ○ Non PWD

1. Do you think our system helps with increasing physical security when it comes to restricting unauthorized user access? *

- ◯ Yes
- ◯ No

2. Do you think that being able to track the history of user access to the computers help increase physical security? *

- ◯ Yes
- ◯ No

3. Is the automated method of monitoring computer usage more efficient than using a manual logging sheet? *

- ◯ Yes
- ◯ No

4. Is it more secure and convenient if users will just tap their IDs on the hardware- instead of manually typing their logs and entering their password every time they want to use the computer? *

- ◯ Yes
- ◯ No

5. Do you think that our system encourages users to practice accountability in terms of handling hardware? *

- ◯ Yes
- ◯ No

6. In your opinion, will our system be able to prolong the lifespan of the computers? *

- ◯ Yes
- ◯ No

7. Do you think that our system will help users with disabilities? *

- ◯ Yes
- ◯ No

8. Do you think that the system will help trace users when peripherals are broken/missing, and there is a presence of malware? *

- ◯ Yes
- ◯ No

9. Do you think that our proposed automated user logging system will be beneficial to the College of Computer Studies department? *

- ◯ Yes
- ◯ No

10. Will you recommend an automated user logging system for computer laboratories in other departments for easier usage monitoring and access? *

- ◯ Yes
- ◯ No

APPENDIX I

One-Page Curriculum Vitae

Francis D. Hernandez
Blk 39 Lot 29 Phase 1A Golden City Subdivision
Brgy. Dila, City of Santa Rosa, Laguna 4026
c18-3140-991@uphsl.edu.ph • cishernandez10@gmail.com
09294006515

Personal Data

Age:	26 years old	**Weight:**	75kg
Date of Birth:	January 10, 1997	**Religion:**	Iglesia Ni Cristo
Birthplace:	Santa Rosa, Laguna	**Nationality:**	Filipino
Civil Status:	Single	**Citizenship:**	Filipino
Height:	165 cm	**Language Spoken:**	Filipino/English

Educational Attainment

Tertiary

University of Perpetual Help System Laguna - JONELTA 2018-2023
BS Information Technology

University of The Philippines – Los Baños 2013-2017
BS Food Technology

High School

Santa Rosa Science and Technology High School 2009-2013

Elementary

Regina Coeli School 2003-2009

Skills

- Knowledgeable in C++, Java, SQL, HTML, PHP
- Knowledgeable in Arduino Hardware
- Knowledgeable in Adobe Software
- Knowledgeable in Microsoft Office
- Computer assembly and troubleshooting

Work Experience

On-the-job Training

Department of Science and Technology – Regional Office CALABARZON
Jamboree Rd, Los Baños, Laguna

Jhzz Mytch S. Malig
B11 L39 Abraham cor. Moses st. Juana 6,
Brgy. San Francisco (halang), Binan Laguna
c19-2040-785@uphsl.edu.ph • JhzzSMalig@gmail.com
0961-202-6293

Personal Data

Age:	22 years old	**Weight:**	73 kg.
Date of Birth:	November 7, 2000	**Religion:**	RomanCatholic
Birthplace:	San Pedro, Laguna	**Nationality:**	Filipino
Civil Status:	Single	**Citizenship:**	Filipino
Height:	176 cm	**Language Spoken:**	Filipino/English

Educational Attainment

Tertiary
University of Perpetual Help System Laguna - JONELTA 2019-2023
BS Information Technology

Senior High School
AMA Colleges Binan Laguna 2017-2019
TVL - ICT

Junior High School
Saint Louis Anne Colleges Annex 2013-2017

Elementary
Saint Louis Anne Colleges Annex 2007-2013

Skills

- Knowledgeable in C++, PHP, MySQL, HTML
- Knowledgeable in Adobe Software
- Knowledgeable in Microsoft Office
- Knowledgeable in Visual Studios
- Computer assembly and troubleshooting

Work Experience

On-the-job Training:
RACEM Construction Cor.
Rosario Complex, San Pedro Laguna.

On-the-job Training:
1Export Trade and Services Inc.
104 V.A. Rufino St, Legazpi Village,
Makati, 1229 Metro Manila

Anthony Lester L. Tirado
Blk 8 Lot 18 Phase 1 Fukuyama Street, Kinnari Village,
Carmona Estates, Brgy. Lantic, City of Carmona, Cavite 4116
c17-1907-812@uphsl.edu.ph ● anthonytirado36@gmail.com
09066801201

Personal Data

Age:	23 years old	**Weight:**	63 kg.
Date of Birth:	October 20, 1999	**Religion:**	Roman Catholic
Birthplace:	Parañaque City	**Nationality:**	Filipino
Civil Status:	Single	**Citizenship:**	Filipino
Height:	173 cm	**Language Spoken:**	Filipino/English

Educational Attainment

Tertiary
University of Perpetual Help System Laguna - JONELTA 2019-2023
BS Computer Science

Senior High School
University of Perpetual Help System Laguna - JONELTA 2017-2019
STEM

Junior High School
Zion Academy of Carmona 2016-2017
Carmona National High School 2012-2016

Elementary
Carmona Elementary School 2006-2012

Skills

- Knowledgeable in C++, Java, SQL, HTML
- Knowledgeable in Adobe Software
- Knowledgeable in Microsoft Office
- Computer assembly and troubleshooting

Work Experience

On-the-job Training **Work Immersion**
Trainee in Electronic and Data Processing (200 hours) CREOTEC Philippines, Inc.
San Antonio Ave, San Antonio, Parañaque, 1700 Metro Manila

Monina Vera Anne P. Viardo
195 National Highway Brgy Sala, Cabuyao, Laguna 4025
c18-1335-813@uphsl.edu.ph • viardo.monina@gmail.com
09067439630

Personal Data

Age:	22 years old	**Weight:**	40 kg.
Date of Birth:	November 23, 2000	**Religion:**	Roman Catholic
Birthplace:	Quezon City	**Nationality:**	Filipino
Civil Status:	Single	**Citizenship:**	Filipino
Height:	150 cm	**Language Spoken:**	Filipino/English

Educational Attainment

Tertiary

University of Perpetual Help System Laguna - JONELTA 2019-2023
BS Computer Science

Senior High School

University of Perpetual Help System Laguna - JONELTA 2018-2019
STEM

Malayan Colleges Laguna 2017-2018
STEM

Skills

- Knowledgeable in C++, Java, SQL, HTML
- Knowledgeable in Adobe Software
- Knowledgeable in Microsoft Office
- Knowledgeable in Digital Art

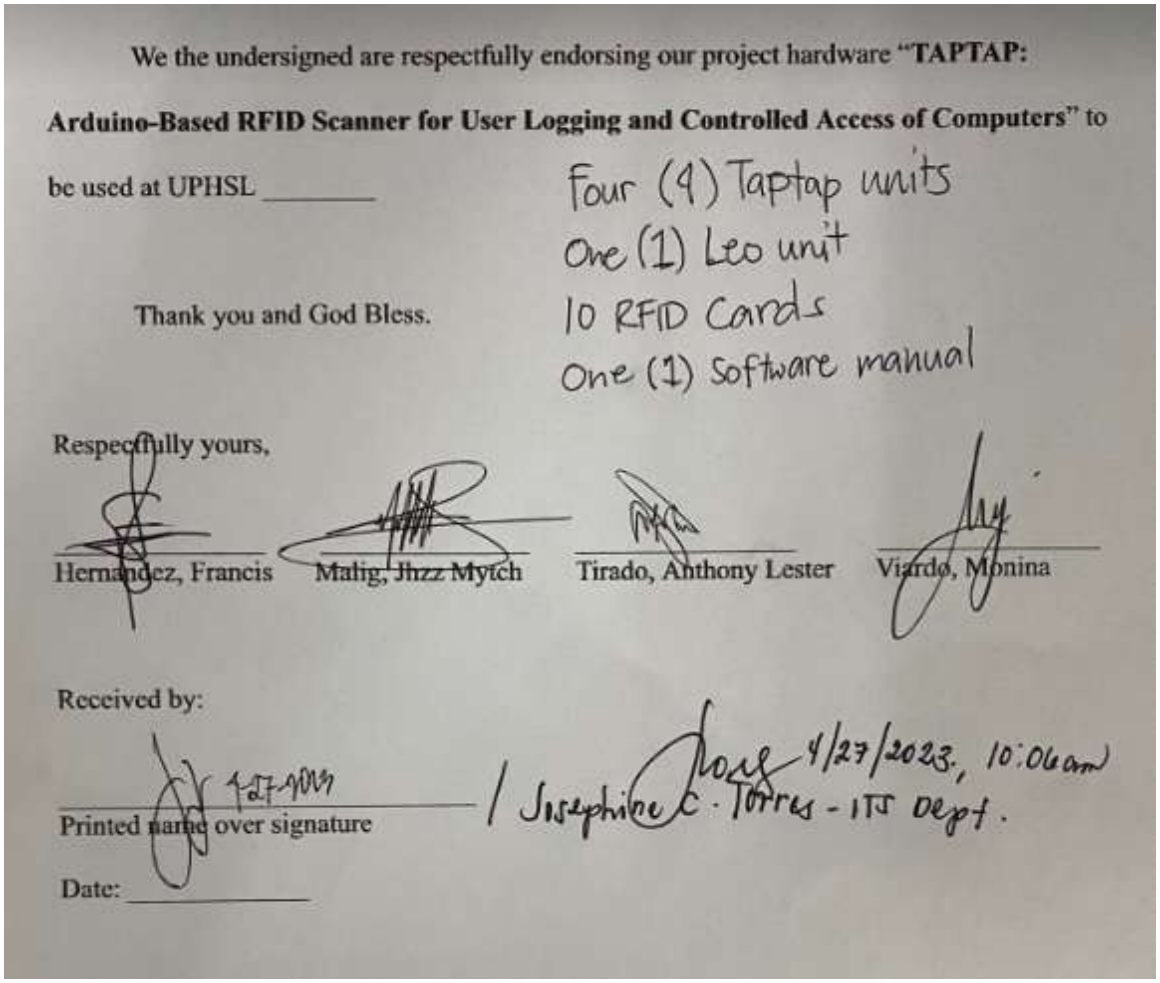
Work Experience

On-the-job Training
Link Offshoring Solutions
29th Floor Rufino Tower, 6784 Ayala Avenue,
cor V.A. Rufino St, Legazpi Village, Makati,
1229 Metro Manila

Work Immersion
CREOTEC Philippines, Inc.

APPENDIX J

Letters/Turnitin Certification



We the undersigned are respectfully endorsing our project hardware "**TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers**" to be used at UPHSL _____

Four (4) Taptap units
One (1) Leo unit
10 RFID Cards
One (1) Software manual

Thank you and God Bless.

Respectfully yours,

Hernandez, Francis | Malig, Jhzz Mytch | Tirado, Anthony Lester | Viardo, Monina

Received by:

4/27/2023

Printed name over signature / Josephine C. Torres - ITS Dept. 4/27/2023, 10:06am

Date: _____

APPENDIX K

User Acceptance Testing

ACCEPTANCE TEST PLAN

TAPTAP: ARDUINO-BASED RFID SCANNER FOR USER LOGGING AND CONTROLLED ACCESS OF COMPUTERS

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers

College of Computer Studies Department

Authors:

FRANCIS D. HERNANDEZ

JHZZ MYTCH S. MALIG

ANTHONY LESTER L. TIRADO

MONINA VERA ANNE P. VIARDO

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers		Acceptance Test Plan

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Final sign-off 14
User acceptance testing 14

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers		Acceptance Test Plan

REVISIONS

Version	Primary Author(s)	Description of Version	Date Completed
1	Francis Hernandez Jhzz Mytch Malig Anthony Lester Tirado Monina Vera Anne Viardo	Initial Version	3.30.2023

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers		Acceptance Test Plan

INTRODUCTION

This document outlines the methods and testing procedures for all acceptance testing for TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers. For acceptance testing to be completed successfully, they must perform all tests to successful completion in the presence of a UPHSL-Computer Studies Department representative. Each test has two possible outcomes: Accepted or Not Accepted. Any failed test is the reason for the entire test sequence to be failed. The tests may be passed with deficiencies if the Computer Studies Department approves. Written copies of all deficiencies must be provided to the Computer Studies Department before the signoff. All deficiencies from the tests must be rectified.

PROJECT DESCRIPTION

The Computer Studies Department's current process for managing user access and monitoring user activity is manual and less secure. The method is causing them inefficiency in tracking user activity and controlling user access.

TAPTAP was created to solve the existing problems within the company and reduce inefficiency in their tasks. It is intended to innovate their monitoring of user activity and access control.

TEST TEAM PERSONNEL

The test team consists of one tester and one primary customer witness who can sign off tests. Optionally, a small, agreed number of additional customer observers can observe the tests and input their observations with the primary witnesses.

Name	Role	Company
Emmanuel Vargas	System Admin	Information Technology Services
		Information Technology Services
Francis Hernandez	Developer	UPHSL

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers		Acceptance Test Plan

Stakeholders

PILOT AREA

Name	Department	Role
Dean Oliver M. Junio	Information Technology Services	ITS Head
Emmanuel D. Vargas	Information Technology Services	System Administrator

DEVELOPERS

Name	Department	Role
Francis Hernandez	CCS	Developer
Jhzz Mytch Malig	CCS	Developer
Anthony Lester Tirado	CCS	Developer
Monina Vera Anne Viardo	CCS	Developer

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers		Acceptance Test Plan

SIGN-OFF

By signing this document, each party agrees to the terms and protocols in the Acceptance Test Plan.

	DEVELOPERS	PILOT AREA
Signature		
Name	Francis Hernandez Jhzz Mytch Malig Anthony Lester Tirado Monina Viardo	Emmanuel D. Vargas
Title	Developers	System Admin
Date	March 31, 2023	March 31, 2023

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers		Acceptance Test Plan

DELIVERABLES

HARDWARE

The following hardware items must be delivered to the PILOT AREA fully inspected and functional.

Quantity	Deliverable	Accepted/ Not accepted	Model/Part #
5	PRODUCT	✓	Hardware

SOFTWARE

The following software items must be delivered to the College of Computer Studies Department fully inspected and functional.

Quantity	Deliverable	Accepted/ Not accepted	Product/Part #
1	PRODUCT	✓	Website

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers		Acceptance Test Plan

System Acceptance Test Plan

Testing

All tests taking place during acceptance testing will be outlined in this section.

#	Test Description	Expected Result	Acceptable	Not Acceptable
1	UNIT TESTING	Hardware unit meets the required specification and support software for the application	✓	
2	SYSTEM TESTING	All basic system components are working accurately	✓	
3	FUNCTIONAL TESTING	All the intended protocols for the workflows have functioned properly without missing functionality	✓	
4	SOFTWARE TESTING	All the system components perform the expected function without any bug	✓	
5	DATABASE TESTING	Database stores all the inputted data, and update changes on data accordingly	✓	
6	DATA HANDLING TESTING	Each data handling components provides an accurate data based on what is in the database	✓	
7	SAFETY TESTING	Assures the confidentiality, integrity, and availability of data	✓	

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Unit Testing

Each mechanical piece of hardware, as designed by the SYSTEM DEVELOPERS. If any sub-system fails unit testing which prevents further testing from proceeding, then PILOT AREA must rectify the solution before testing can continue. If a sub-system function fails and it has no direct impact on testing, then it can be noted as a deficiency and rectified prior.

#	Test Description	Expected Result	Accep table	Not Accep table	Remarks
1	RFID SCANNING	Scans the IDs embedded with UID	✓		
2	ENCLOSURE	Easy to dismantle and provides user interface	✓		
3	WI-FI MODULE	Able to connect to the network	✓		

System Testing

Each software system must be tested to show basic system performance as designed by the developers. If any part of the system fails in testing and prevents further testing from proceeding, then developers must rectify the solution before testing can continue. If a system function fails and it has no direct impact on testing, then it can be noted as a deficiency and rectified prior.

#	Test Description	Expected Result	Accep table	Not accep table	Remarks
1	SOFTWARE	Admins can access website	✓		
2	HARDWARE ON/OFF	Powers the Desktop Computers ON/OFF	✓		

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Functional Testing

Describes how to test everyday use. Each workflow step for every protocol will be tested. The following tables are workflows broken up by protocol, and their contents are the test descriptions for each respective protocol.

WORKFLOW #1: Unit 1

#	Test Description	Expected Result	Acceptable	Not acceptable	Remarks
1	RFID SCANNING	Scans the registered UID embedded ID	✓		
2	HARWARE ON/OFF	Powers the Desktop Computer ON/OFF	✓		
3	USER LOGGING	Logs user information to the system's database	✓		
4	CONNECT	Able to connect to the network and communicate with the system	✓		
5	ACCESS	Limited access to only one Desktop Computer, disables power on/off function to other opened computers via RFID tapping	✓		

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Software Testing

Each software component provided by the developers must be tested and performed to the expected standards outlined in the table below. It is expected that several bugs or unexpected behaviors may occur during testing. Any bug, unexpected behavior, or missing functionality will be documented as a deficiency. Each software deficiency must be resolved and tested unless agreed upon in writing by both parties. If the number of deficiencies is greater than 10 then the College of Computer Science Department will retain the right to postpone or fail the entire testing sequence if they desire.

#	Test Description	Expected Result	Acceptable	Not acceptablee	Remarks
1	REGISTER USER	Registers user to the system	√		
2	REGISTER ADMIN	Registers admins to the system	√		
3	VIEW USERS LOG	Shows user logs and status	√		
4	VIEW USERS DATABASE	Shows registered users' information	√		
5	LOGOUT	Properly linked into intended page	√		

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Database Testing

Each database component provided by the developers must be tested and performed to the expected standard outlined in the table below. Any bug, unexpected behavior, or missing functionality will be documented as a deficiency. Each database deficiency must be resolved and tested unless agreed upon in writing by both parties.

#	Test Description	Expected Result	Acceptable	Not Acceptable	Remarks
1	RECORD IN THE DATABASE FIELD ARE ACCURATE	All correct	√		
2	FIELDS ARE LABELED CORRECTLY	Correct field description	√		

Data handling Testing

Each data handling component provided by the developers must be tested and performed to the expected standard outlined in the table below. Any bug, unexpected behavior, or missing functionality will be documented as a deficiency. Each data handling deficiency must be resolved and tested unless agreed upon in writing by both parties.

#	Test Description	Expected Result	Acceptable	Not Acceptable	Remarks
1	SHOW REGISTERED USERS	Displayed number is accurate based on the data available	√		

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Safety Testing

The College of Computer Studies Department expects that all data will conform to Security standards outlined within the User Requirements Specification. This section will ensure that the system conforms to these standards. All safety tests must be passed without exception. No deficiencies will be accepted for this section.

#	Test Description	Expected Result	Acceptable	Not Acceptable	Remarks
1	AUTHENTICATION	The system requires the user to log in via RFID Tapping before accessing the computer.	✓		
2	CONFIDENTIALITY	Only users with admin rights can access the website	✓		

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Deficiencies

Issues

#	Test # / Sequence	Description	Comments
1			

Action Plan

Deficiency	Action Plan
1	To be resolved by Francis Hernandez, Jhzz Malig, Anthony Lester Tirado, and Monina Viardo before sign-off.

TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers		Acceptance Test Plan

FINAL SIGN-OFF

USER ACCEPTANCE TESTING

The User Acceptance Testing for College of Computer Studies Department system TAPTAP: Arduino-Based RFID Scanner for User Logging and Controlled Access of Computers was,

ACCEPTED.

Tested by:	Date:	Witnessed by:	Date:
Hernandez, Francis	3/31/2023	N/A	3/31/2023
DEVELOPER		PILOT AREA	

4-28-2023

APPENDIX L

Memorandum of Understanding

UNDERGRADUTE THESIS/ CAPSTONE PROJECT

MEMORANDUM OF UNDERSTANDING

Date:

To: UPHSL - College of Computer Studies Department

From: Francis Hernandez, Jhzz Malig, Anthony Tirado, Monina Viardo

Re: Memorandum of Understanding for BSIT and BSCS students – UPHSL College of Computer Studies

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Head/ in-charge/ coordinator in the Pilot Area:

Students/ System Developers: Francis Hernandez, Jhzz Malig, Anthony Tirado, Monina Viardo

Pilot Area/ Company Name: UPHSL - College of Computer Studies Department

Pilot Area/ Company's Address: Sto. Niño, City of Biñan, Laguna

Main Information:

- The Thesis/ Capstone Project - software/ system is one of the major requirement of 4th year students of Bachelor of Science in Computer Science and Bachelor of Science in Information Technology in their Thesis/ Capstone Project subject.
- After the Final Defense of the students/ developers, the fully functioning system/ software should turn over to the respective pilot area as selected by the students/ developers of the system/ software.
- The system/ software that will be given to the pilot area is for FREE including the hardware needed (if any) unless the hardware is sponsored by the pilot area based on the previous verbal agreement.

- The two main objectives of the Thesis/ Capstone Project is for the students to evaluate their skills in creating a system/ software and to provide technology modernization/ innovation for the pilot area.
- Final evaluation, surveys, and implementation of the system/ software will be applied to the pilot area for future use.
- Expected date of implementation should be after the final editing of the system/ software.
- Once the system/ software is fully implemented by the company/ pilot area, added revisions or reconstruction of the system software (month after the implementation) will be based on another agreement by the pilot area and the developers of the system/ software.

Agreements:

The student/ developers agrees to implement the system/ software to the pilot area as their major requirement in Thesis/ Capstone Project; provides hardbound manuscript and the system/software user's manual; and provides training plan for the administrator and users of the system/ software.

The site head/ in-charge/ coordinator agrees to support, assists and provide enough time for observing/ managing the implemented output or system/ software.

The adviser/ thesis and capstone project coordinator agrees to support, checks for implementation/ system software turn over, and communicate with the pilot area for the implementation of the system/ software.

Student/s/ Developers:

Hernandez, Francis D.

Malig, Jhzz Mytch S.

Tirado, Anthony Lester L.

Viardo, Monina Vera Anne P.

Technical Adviser:

Dr. Ma. Eliza D. Mapanoo

site head/ in-charge/ coordinator:

Emmanuel D. Vargas

Dean Oliver M. Junio

Thesis/ Capstone Project Coordinator:

Dr. Michael M. Orozco