Chapter 1

INTRODUCTION

In this chapter, the background, main and specific objectives, and the scope and limitations of the study are presented along with discussion of the main problem that the researchers aim to address.

Background of the Study

Web portals are vital in Higher Education Institutes (HEI) since they serve as a communication and interface between all of the academic personnel (Pinho et al., 2018). In times of dynamic work arrangements and evolving organizational structures, the traditional methods of daily time record (DTR) management have become increasingly insufficient. The importance of an efficient and integrated system for employee attendance and evaluation is important in times where organizations and companies seek optimal workforce utilization and performance enhancement (Gonzales, 2023).

The primary problem addressed by the study is the lack of a streamlined and systematic approach to employee attendance tracking and evaluation. According to Stern (2021), traditional DTR systems often operate in isolation, leading to inefficiencies, inaccuracies, and a lack of comprehensive data for employee evaluation. In addition, scheduling and attendance management are often not in sync with each other, resulting in suboptimal workforce planning and task allocation. Bowers (2017) noted that universities

using manual procedures for their documents like DTR often lead to problems like limited accessibility and time-consuming.

Ideally, the workplace should have an integrated system that combines dynamic DTR functionalities with intelligent scheduling to provide efficiency to workforce management. The ideal situation intends a workplace where the tracking of employee attendance is not just a matter of compliance but a strategic tool for optimizing productivity and performance (Valjarevic, 2019). This includes a system that facilitates real-time visibility into employee schedules, attendance records, and task assignments, thereby allowing for informed decision-making and efficient resource utilization.

To address the issues mentioned above, the proponents will hereby conduct the study titled "Development of Dynamic DTR Portal for Technological University of the Philippines Visayas " This study aims to provide a comprehensive solution by developing a dynamic DTR portal. The proposed system will not only address the existing challenges in attendance tracking and scheduling but will also contribute to a more systematic and data-driven approach to employee evaluation. Through the implementation of this solution, organizations can anticipate improved accuracy, efficiency, and strategic workforce management, ultimately fostering a more productive and dynamic work environment.

Objectives

The general objective of the study is to develop a Dynamic DTR Portal for Technological University of the Philippines Visayas.

Specifically, the study aims to:

1. Develop an online portal with the following key functions:
    a) Tracking of the time-in, time-out, and absence record of the teaching personnel.
    b) Calculate teaching personnel's duration of minutes late, and under time, and overload in comparison to their personal daily class schedule.
    c) Provide a platform where the HR Administrative Officer can:
        i. Generate printable DTR Summary Report of individual and/or entire teaching personnel.
        ii. View attached documents of approved leave for re-validation.
        iii. Nullify recorded minutes of late time-in, early time-out, and/or absence for special cases such as approved leave and official school-business outside school premises.
    d) Provide a platform where the teaching personnel can:
        i. Submit personal daily class schedule
        ii. View recorded daily time-in and time-out

iii. Attach documents for approved leave, official school-business outside school premises, and problems with QR scanning for specific dates.

iv. Acknowledge and verify that the DTR requires no changes

2. Develop a program for the database that will implement the features of the DTR Portal as designed.

3. Test the system in terms of:

a) Accuracy of generated calculations of total minutes of lateness and undertime, and date of absences.

b) Accuracy of generated calculations of total minutes Overload.

c) Comparing the Time of Completion of the Tardiness, Under-time and Absence reports between the Current System and the Developed System

d) Comparing the Time of Completion of the Overload reports between Current System and the Developed System

4. Evaluate the online portal in terms of:

a) System Usefulness

b) Information Quality

c) Interface Quality

d) Overall Satisfaction

Scope and Limitation

The study will focus on the Development of Dynamic DTR Portal for Streamlined and Systematic Employee Evaluation. It will focus on the daily time record of the teaching staff of Technological University of the Philippines-Visayas. The time frame of the testing and the implementation of the study will be in the 2nd term of Academic Year 2023-2024. The study will only develop the portal/system and will still utilize the existing scanning procedure for time-in and time-out at the faculty entrance.

The study will only be limited to the vicinity of the university and will not include non-teaching staff and personnel. The preliminary testing and implementation of the study will only be limited to the teaching faculty, including part-time teaching personnel, of the Department of Electronics Engineering. The study will not cover the calculations for the monetary deductions of late and absences.

Significance of the Study

The study's primary purpose is to develop a Dynamic DTR Portal System for the Human Resource Department of Technological University of the Philippines Visayas. By developing and implementing an online portal, the study aims to enhance the efficiency and effectiveness of the DTR management system. This study is expected to benefit various sectors, including:

TUP-V Human Resource Department

The implementation of the study offers an efficient tool to automate attendance tracking processes such as the daily time record. With this it can reduce the problems encountered by the HR department in using the traditional process allowing them to allocate more time and resources to other important tasks.

TUP-V Teaching Personnel

The outcome of the study will provide an efficient and user-friendly tool for managing staff attendance and related data. The results will contribute in creating an integrated system with the emphasis on data security and accuracy for the TUP-V's teaching personnel insurance on a reliable system in managing HR related information.

The Researchers

The researchers involved in this study will benefit from the opportunity to apply their knowledge and skills in developing a practical solution to a real-world problem. The outcome of the study could contribute to the development of similar systems especially in other academic institutions.

Future Researchers

The ideas presented may be used as reference data in conducting new research or in testing the functionality of other related studies. The study will serve as a cross-

reference that will give them an overview in developing a dynamic portal system for TUP-V, providing insights into the integration of the HR Department procedure and a technological approach.

Chapter II

CONCEPTUAL FRAMEWORK

This chapter presents the related literature and studies following the researchers' thorough and in-depth search. The studies and literature discussed in this chapter cover a wide range of theories, generalizations, conclusions, and advancements related to the topic. The information in this chapter also helps researchers become familiar with concepts that are pertinent to the concurrent research. Furthermore, this chapter includes the evaluation system, the statistical tool to be used and how the data to be gathered will be analyzed, the conceptual model of the study, and the operational definitions of terms.

Review of Related Works

The related works cited in this part discuss the different ideas, concepts, and understanding related to the study. These served as a guide to the researchers in evaluating past research, identifying key questions, and determining methodologies used in past studies. The summary of works is related and relevant to the research topic and aids in the development of the study.

Traditional Employee Attendance and Payroll Calculations

In a study on problems-based learning and development conducted by Othman et al. (2017), it was discovered that the existing manual attendance recording system, which relies on attendance cards, leads to inefficiencies. The manual calculation of payrolls

based on these attendance cards is time-consuming, posing challenges in managing diverse working hours among various categories of employees, including full-time workers, part-timers, and runners, each operating on distinct work schedules. The findings underscore the limitations of manual systems in addressing the complexities associated with diverse employment structures and the need for a more streamlined and automated solution for attendance tracking and payroll management.

Additionally, Fong (2005) highlighted the prevalent use of manual punch card systems for attendance tracking in many companies in his study titled "Overview of Punch Card & Card Reader Systems". This method involves employees manually inputting their attendance data, followed by a manual verification process conducted by the company manager. The administrator distributes punch cards to employees monthly, and employees are responsible for daily card punching. At the end of each month, the administrator gathers, verifies, and calculates the recorded data, facilitating wage payment based on the attendance report. However, this system has limitations, including the lack of automated attendance input, vulnerability to card loss without data recovery, and the absence of automatic attendance percentage calculation. These drawbacks necessitate additional manual steps for administrators, such as verifying attendance, calculating attendance percentage, determining wages, and executing salary payments.

Re-engineering Traditional Human Resource Management

In the research conducted by Qadir and Agrawal (2017), titled "Human Resource Information System (HRIS): Re-engineering the Traditional Human Resource Management for Leveraging Strategic Human Resource Management," it is asserted that contemporary Human Resource Management (HRM) functions are no longer confined to comfortable offices and sophisticated cabins. The evolving dynamics of the rapidly growing business world have compelled HRM functions to adapt and contribute to business objectives. Presently, HRM has transitioned from managing attendance sheets to influencing the organization's balance sheet in the pursuit of evolving into Strategic Human Resource Management (SHRM). Over the years, numerous HR processes and functions have undergone reengineering, facilitated significantly by one of the pivotal tools in SHRM – the Human Resource Information System (HRIS). HRIS has played a multifaceted role in advancing SHRM practices for HR professionals, facilitating the transformation from traditional HRM to a more progressive form. This paper introduces a conceptual framework, presenting an HRIS model that underscores the potential and opportunities offered by HRIS in the practice of SHRM in the twenty-first century, catering to both academia and industry professionals.

e-Human Resource Management and Human Resource Information System

According to the work of Kettley and Reilly (2003), an Electronic Human Resource Management (E-HRM) system, grounded in computer technology, integrates various HR functions. E-HRM is conceptualized as an organization-wide network

incorporating HR data, information services, and databases driven by HR transactions. It is described as a system utilizing web and voice technologies to manage HR functions and provide HR services.

Gowan (2001) offers another definition of E-HRM as a web-based solution employing the latest web application technology for real-time HRM functions. She highlights the apparent complexity of the E-HRM framework, attributing it to its comprehensive nature. However, she notes that its user-friendly and feature-packed design allows customization to meet specific HR needs. Both E-HRM and HRIS leverage technology as a data distribution center, connecting and facilitating HR service delivery (Stone & Lukaszewski, 2009)

Mayfield, Mayfield, and Lunce (2003), Teotia (2012), and Shaikh (2012) have provided diverse insights into the factors contributing to the successful development of Human Resource Information Systems (HRIS) models. Hendrickson (2003) synthesized their common themes in the development and design of HRIS models. In his research, Hendrickson outlined fundamental factors for creating an HRIS model, suggesting a focus on essential elements such as Hardware, People, Policies, Applications, Procedures, and Data, with the HRIS positioned at the core.

Electronic Employee Attendance

In the article of Koik (2004) The Employee Attendance System (EAS) is a straightforward Windows-based attendance management solution designed specifically for small and medium-sized enterprises. This software is adept at overseeing the recording, control, and monitoring of employee absences. In comparison to traditional manual paper records and file-keeping methods, administrators can effortlessly track and manage attendance records through this application. The database storage of employee records enhances security, providing a more robust and reliable system for safeguarding sensitive information.

Effectiveness of QR Code Technology

QR Code (Quick Response Code) was developed by Denso Corporation in 1994. It is a typical matrix two-dimensional barcode. According to Liu and Liu (2006) QR codes have multiple features such as high capacity encoding of data, high-speed reading, Chinese encoding capability and are readable from any direction from 360 degree. In addition to that, QR Code has been approved as an AIM Standard, a JIS Standard and an ISO standard. So QR Code is being used in a wide variety of applications, such as manufacturing, logistics, and sales applications.

Effectiveness of Web-Based Monitoring

In the study of Othman et al. (2012), the researchers concluded that there is a necessity of an online system for the efficient recording and reporting of student attendance. Embracing a web-based framework allows for the utilization of diverse open-source web technologies like PHP, MySQL, and the Apache web server. Implementing these technologies facilitates the automation of the online system, resulting in more streamlined and effective web services.

Convenience

In his article, Weismann (2012) emphasized that convenience is intricately tied to both time and effort. He explored the role of perception in comprehending service convenience, emphasizing that the benefits derived from time and effort savings are just as crucial as the perception of convenience itself. Designing services perceived as convenient by users involves aligning the design with their specific needs. To achieve genuine convenience, the delivery must encompass aspects of flow, perception, and control. Genuine convenience is linked to the reduction of physical effort in task completion, directly relating to the investment of time and effort. Flow entails understanding the habits, patterns, and primary goals of users. Perception involves strategically managing expectations to enhance users' perception of the product or service they are utilizing. Lastly, control involves empowering users with the freedom to manage their own experience.

Roles of Programming Languages in Modern Technology

Programming languages play a pivotal role in various domains such as artificial intelligence, machine learning, web development, application development, and data analysis and management, including operating systems and system tools. As articulated by Fran (2021), programming is indispensable as services progressively shift towards digital and online technologies. Proficiency in computer programming provides a competitive advantage in today's technology-driven world, fostering innovation and the creation of solutions with a global impact. Additionally, programming contributes to ongoing advancements by automating processes, facilitating data collection, analysis, and knowledge sharing. It serves as a crucial interface for humans to communicate with computers and machines, a vital aspect in the technological landscape where controlling the interaction between people and machines is paramount (Grand Canyon University, 2020).

Bootstrap Framework

As outlined in the book "Bootstrap: Responsive Web Development" authored by Spurlock (2013), Bootstrap stands out as a free and open-source CSS framework designed for responsive, mobile-first front-end web development. This framework encompasses HTML, CSS, and JavaScript-based design templates catering to various elements such as typography, forms, buttons, navigation, and other interface components. Recognized as the most popular CSS framework for creating responsive and mobile-first websites, Bootstrap is employed by 19.2% of all websites and holds the 17th position

among the most starred projects on GitHub, boasting over 164,000 stars. Originally released on August 19, 2011, Bootstrap is coded in HTML, CSS, Less (v3), Sass (v4), and JavaScript. Its development is spearheaded by the Bootstrap Core Team, and it is available under the MIT License (Apache License 2.0 prior to 3.1.0).

Wireframe

In the context of web design, wireframes represent two-dimensional depictions focused on spatial arrangement, content prioritization, and intended functionalities within a webpage's interface. Devoid of styling and graphics, wireframes distinctly emphasize structural aspects, aiding in the establishment of connections between diverse templates in a website's architecture. usability.gov highlights the multifaceted value of wireframes, underscoring their role in connecting information architecture to visual design, elucidating consistent display methods for various information types, defining intended functionalities, and facilitating content prioritization through space allocation decisions. This versatile tool serves as a fundamental guide for web designers in optimizing the user interface (Usability.gov).

Firewall

A firewall is designed to defend a network by securing its points of entry. Firewalls are continually evolving, incorporating advanced features to enhance their protective capabilities. Despite occasional criticisms and evolving developmental trends,

firewalls remain a robust and crucial protective mechanism for networks, emphasizing their paramount role in network security (Abie, 2000).

As per Cheswick and Belloving (1994), the implementation of Firewall technology serves as a protective measure for networks. By strategically placing it at a designated security screen station where the private network or Intranet intersects with the public Internet, enhanced security, traffic auditing, and monitoring capabilities can be ensured, along with the ability to trace potential break-in attempts. Moreover, Firewall technology can be employed to isolate sub-networks within the organization, thereby introducing additional layers of security through a defense-in-depth approach. The protective functions of a firewall primarily involve three fundamental approaches or services: packet filtering, circuit proxy, and application proxy.

My SQL

MySQL is an open-source relational database management system (RDBMS) that enables users to store, manage, and retrieve structured data efficiently. It is widely used for various applications, from small-scale projects to large-scale websites and enterprise-level solutions (MySQL, 2023). MySQL uses structured query language (SQL) to manage data inside a database. SQL is a language that programmers use to create, modify, and extract data from the relational database, as well as control user access to the database. This database is used by many database-driven web applications, including Drupal, Joomla, phpBB, and WordPress (Kofler, 2001).

PHP

As Alcanja (2019) stated, PHP is a general-purpose scripting language geared towards web development. It is a widely-used open-source, server-side programming language that can be embedded into HTML. PHP is commonly used for server-side scripting and is well-suited for web development. It can be used to create websites, applications, and customer relationship management systems. PHP can be used for tasks outside the web context, such as standalone graphical applications and robotic drone control. It is known for its ease of use, extensive feature set, and strong community support (IntelliPaat, 2023).

CodeIgniter

CodeIgniter is an open-source software rapid development web framework, designed for building dynamic web sites using PHP. It is a powerful PHP framework with a small footprint, aimed at providing a simple and elegant toolkit for creating full-featured web applications (CodeIgniter, 2023). CodeIgniter follows the model-view-controller (MVC) development pattern, although models and views are optional. It is known for its speed, flexibility, and the ability to enable rapid website development. The framework offers features such as database connectivity, URL redirection, session management, caching, application profiling, and data encryption (Himawan et al., 2014).

GUI

A Graphical User Interface (GUI) is a digital interface that allows users to interact with electronic devices through graphical icons, buttons, and menus. It displays objects that convey information and represent actions that the user can take, and the objects change color, size, or visibility when the user interacts with them (ComputerHope, 2023). GUIs are used in place of text-based user interfaces and are designed to be more user-friendly and intuitive, allowing users to interact with the computer without needing to know commands (Bishop, 2004).

Front-end and Back-end Development and Framework

In the realm of web development, front-end development focuses on creating the visual and interactive aspects that users directly experience, encompassing design, layout, and features. This process utilizes languages like HTML, CSS, and JavaScript, often incorporating front-end frameworks and libraries like React, Angular, or Vue.js. On the other hand, back-end development pertains to the server-side functionalities, encompassing the structure, system, data, and logic that support the front-end. Key responsibilities of back-end development include database management, user authentication, and server configuration, and it commonly employs languages such as Python, Ruby, Java, or PHP, along with back-end frameworks like Django, Laravel, or Express.js. Both front-end and back-end development benefit from frameworks—tools that offer pre-written code and libraries to streamline and accelerate the development process. Front-end frameworks like React, Angular, and Vue.js focus on constructing the

user interface and interactive elements, while back-end frameworks such as Django, Laravel, and Express.js are employed for building the server-side and back-end components of websites or applications (geeksforgeeks.org, 2023).

PSSUQ

In order to evaluate the device that the researcher created, a Standardized questionnaire will be used. Specifically, Post-Study-System Usability Questionnaire Version 3 (PSSUQ). Originating from IBM (Will, 2016), PSSUQ stands as a standardized questionnaire. According to conducted studies, because of its broad applicability, professionals can use the PSSUQ with assurance when assessing various product types and at different stages throughout the development process (Lewis, 2002). In addition to that, The items within the PSSUQ tool, concerning content validity, cover a broad spectrum of attributes commonly associated with effective usability practices (Fruhling & Lee, 2005). It is also mentioned in the study of Furhling and Lee (2005) that the PSSUQ instrument demonstrated consistent high reliability, as confirmed in both a pilot study and a larger field study conducted in a different system application environment. Pellizzoni et al. (2020), supports the study because according to them PSSUQ measures the user's usability and satisfaction in relation to the system with 96 % reliability.

What is SPSS and Its Importance in Research & Data Analysis?

SPSS, which stands for Statistical Package for the Social Sciences, comprises a suite of software applications primarily designed for the analysis of scientific data related to the field of social science (Noels, 2018). It offers versatile approaches such as market analysis, surveys, data mining, and various other applications for handling this data. Researchers can efficiently assess the results by utilizing the statistical data they have collected. Essentially, SPSS initially organizes and stores the provided data, then processes the data set to generate the desired results. This software is adept at managing and manipulating information with ease. These techniques are utilized to investigate, modify, and establish distinct relationships among different data variables. Additionally, the findings can be visually represented through graphs and charts, making it easier for researchers to comprehend the results.

Statistical Tools

The researcher employed a statistical treatment to systematically analyze and interpret the outcomes derived from the study's evaluation. The chosen statistical tool serves as a critical methodological element for rigorously scrutinizing and drawing meaningful inferences from the collected data. The following methodological approach ensures a comprehensive and accurate examination of the study's findings, contributing to the robustness and reliability of the research outcomes:

Arithmetic Mean

According to Taylor (2020), the mean, denoted as the prevailing value within a set of numbers, serves as the expected value and a key indicator of central tendency in probability distribution. In the context of this thesis, the mean will be systematically applied to compute respondent feedback, specifically evaluating the perceived quality of the assistive aid's performance. This methodological utilization of the mean contributes to the analytical depth and precision of the study's assessment of assistive aid effectiveness.

$$\text{Mean } (x) = \frac{\Sigma x}{n}$$

Where:

$\bar{x}$ = the sample mean

$\sum x$= the sum of the random variables

n = the of variables

Accuracy

As stated by The Office of Research Integrity (2004), accuracy, also known as validity, pertains to the extent to which an instrument or method truly assesses what it is intended to measure. Researchers seek accurate and valid study procedures to ensure that the results of their studies are both valuable and meaningful.

$$\text{Accuracy} = 100\% - \text{Error Rate}$$

$$\text{Error Rate} = (\text{Observed Value} - \text{Actual Value})/\text{Actual Value} \times 100$$

Paired T-Test

A t-test is a statistical method employed to assess the means of two groups. It is commonly utilized in hypothesis testing to ascertain if a given process or treatment has a genuine impact on the target population or if there exists a distinction between two groups. The t-test produces a t-value, which is subsequently compared to a critical value or p-value to establish statistical significance. The paired sample t-test examines whether differences exist within a group between two specific points in time (within-subjects). Also recognized as a dependent or correlated t-test, the paired t-test is a statistical analysis that contrasts the averages/means and standard deviations of two associated groups to identify any noteworthy differences between them (Bevans, 2022).

The formula for paired sample T-test is:

$$t = \frac{\sum d}{\sqrt{\frac{n(\sum d^2) - (\sum d)^2}{n-1}}}.$$

Where:

$\sum d$ *– sum of the difference*

n – sample size

Evaluation System

This part is the documentation of the feedback from respondents. This will validate how the research project made an impact on the end user. In this part, researchers obtained suggestions on how to further enhance the project.

The evaluation of the study involved a thorough examination of diverse system criteria through the application of the Post-Study-System Usability Questionnaire (PSSUQ) that has particular evaluation criteria as shown below. Originating from IBM (Will, 2016), PSSUQ stands as a standardized questionnaire. In this investigation, PSSUQ version 3 was employed, featuring a seven-point Likert scale wherein 1 signifies "Strongly Agree" and 7 denotes "Strongly Disagree." This will validate how the research project made an impact on the end user. In this part, researchers obtained suggestions on how to further enhance the project.

PSSUQ follows a 7-point Likert Scale. The overall result is calculated by averaging the scores from the 7 points of the scale. Unlike SUS, as there are more questions in PSSUQ, it also has 3 sub-scales, namely system usefulness, information quality, and interface quality.

- Overall: the average scores of questions 1 to 16
- System Usefulness (SYSUSE): the average scores of questions 1 to 6
- Information Quality (INFOQUAL): the average scores of questions 7 to 12

- Interface Quality (INTERQUAL): the average scores of questions 13 to 15

The sub-scales provide a more detailed breakdown of different factors affecting the website, software, system or product.

a. System Usefulness - Usefulness is defined as the capacity to fulfill a purpose and provide assistance (Dictionary.com, n.d.). Therefore, the system's usefulness pertains to its effectiveness in aiding the user and serving practical objectives.

b. Information Quality - Information quality denotes the appropriateness and accuracy of the data stored in the systems' databases (IGI Global, n.d.). Consequently, the information quality of the systems reflects the suitability and accuracy of the database information.

c. Interface Quality - The quality of the interface was assessed based on the suitability of graphical elements within the systems' interfaces (Zhou et al., 2020). Hence, interface quality refers to the appropriateness of the graphical elements employed in the system.

d. Overall Satisfaction - The overall assessment of the system captures the user's contentment with the general situation (Collins Dictionary, n.d.). Therefore, overall satisfaction represents the respondents' holistic rating of their experience using the system.

Treatment of Data

Following the comprehensive evaluation, the outcomes will be compiled and interpreted. The qualitative analysis method will be employed to assess the project's acceptability and feasibility.

For this study's evaluation, a meticulous approach is undertaken, utilizing a seven-point Likert scale. As explained by Meleod (2023), this scale, featuring five or seven points, provides respondents with the means to express their degree of agreement or disagreement with specific statements. Seven-point Likert scales appear to be sensitive enough to record a more accurate evaluation of an interface while remaining relatively compact. Seven-point Likert scales appear to be more suited to electronic distribution of usability inventories (Finstad, 2010). The ensuing table illustrates the Seven-point Likert scale, complete with numerical ratings and corresponding interpretations, laying the groundwork for the researchers to meticulously analyze the data garnered from the study participants.

Table 1

Seven-Point Likert Scale

Numerical Data	Qualitative Description	Arithmetic Mean Ranges
1	Strongly Agree	6.01 - 7.00
2	Agree	5.01 - 6.00
3	Somewhat Agree	4.01 - 5.00
4	Neither Agree or Disagree	3.01 - 4.00
5	Somewhat Disagree	2.01 - 3.00
6	Disagree	1.01 - 2.00
7	Strongly Disagree	1.00

Operational Definition of Terms

The following are the important terms related to the study defined accordingly on how it is used.

DTR (Daily Time Record)

It is conceptually a document used to track employee attendance, including arrival, break, and departure times. It traditionally included details like employee name, times, and supervisor's signature. Nowadays, DTRs are often part of automated systems for comprehensive workforce management (EEZI, 2023). Operationally, DTR in this study refers to the automated tracking and recording of time-in and time-out of teaching faculty at the Technological University of the Philippines Visayas. This includes the recording of absences and the integration of this data into the Dynamic DTR Portal System for streamlined employee evaluation and scheduling.

MySQL

Conceptually, it is an Oracle-backed open source relational database management system (RDBMS) that utilizes Structured Query Language (SQL) and is widely used for web applications and online publishing. MySQL is a key component of the LAMP web development stack, consisting of Linux, Apache, MySQL, and PHP (or sometimes Perl or Python). It was originally developed by MySQL AB, later acquired by Sun Microsystems in 2008 and subsequently by Oracle in 2010. While developers can use MySQL under the GNU General Public License (GPL), enterprises typically require a commercial license from Oracle for its use (Moore, 2018). Operationally, MySQL serves as the relational database management system (RDBMS) used to store, manage, and retrieve the structured data, including faculty attendance records, schedules, and leave details, which are fundamental to the functioning of the Dynamic DTR Portal.

PHP

Conceptually, it is an open-source, server-side programming language known as 'PHP: Hypertext Preprocessor,' originally standing for 'Personal Home Page.' PHP is widely used for creating websites, applications, customer relationship management systems, and more. It is renowned for its ability to be embedded into HTML, simplifying HTML code for developers. As of 2022, there have been eight versions of PHP, with version 8.1 being a popular choice for website development (Toal, 2021). Operationally, PHP is the server-side scripting language employed to develop the web-based interface of the Dynamic DTR Portal. It facilitates the processing of attendance data, schedule management, and interaction between the portal and its database (MySQL).

CodeIgniter

Conceptually, it is a PHP MVC (Model-View-Controller) framework designed for the rapid development of web applications. CodeIgniter offers pre-built libraries for tasks such as database connectivity, email sending, file uploading, session management, and more, simplifying the development process (Jackson, 2023). Operationally, CodeIgniter is used as the open-source web framework to build the Dynamic DTR Portal. It provides the structure for creating the portal's features like real-time attendance tracking, schedule management, and data reporting.

Approved Leave

Conceptually, it refers to a sanctioned and authorized period of time during which an employee is granted permission to be absent from work, with or without pay, for various reasons such as vacation, sickness, maternity/paternity, or other personal or statutory reasons (Frey, 2023). The approval is typically granted by the employer in accordance with company policies, labor laws, and specific leave entitlements, ensuring that the employee's absence is managed and accounted for in an organized manner. Operationally, 'approved leave' refers to the officially sanctioned absence of faculty from the university, which is recorded and managed through the Dynamic DTR Portal. This system allows for the tracking and validation of leaves as part of the faculty's attendance record.

Admin

It refers to a local account or security group with full and unrestricted access to create, modify, and delete files, folders, and system settings on a computer. It contrasts with user accounts that have limited permissions. Admins are responsible for system-wide changes, including user account management, password creation, and system configuration. Administrative rights are permissions granted by admins to enable users to modify system elements. Without admin rights, users cannot perform crucial system modifications, such as software installation or network configuration, highlighting the significance of knowing the administrative password for system control (Services, University Information Technology, 2018). Operationally, 'admin' refers to the

administrative personnel or system administrators who use the Dynamic DTR Portal to manage faculty attendance records, approve leaves, and oversee the scheduling and evaluation processes.

HR Office

Conceptually, the HR Office is the specialized division within a business entrusted with the critical tasks of sourcing, recruiting, assessing, and training job candidates. Additionally, it oversees the management of employee benefit programs. The HR Office plays a pivotal role in addressing the challenges posed by a rapidly evolving business landscape and the increasing demand for high-quality personnel in the 21st century (Mansa, 2023). Operationally, the HR Office utilizes the Dynamic DTR Portal for the centralized management of faculty attendance, scheduling, and leave management. It plays a key role in analyzing attendance data and making decisions regarding employee evaluations.

QR Code

Conceptually, it is a scannable barcode that stores data and is commonly used in marketing to redirect users to websites, landing pages, social media profiles, or offer coupons. It allows for the efficient transfer of information by encoding data in a grid of black squares and dots, which can be quickly scanned by QR reader apps on smartphones or other devices (Rodrigue, 2021). Operationally, QR Code is utilized as a means for

faculty to record their time-in and time-out. Each faculty member scans their unique QR code at designated terminals, integrating their attendance data into the DTR system.

Database

Conceptually, it is a structured and electronically accessible collection of data. It serves as a repository for both structured and unstructured data, enabling efficient storage, analysis, and management. Databases come in various types, such as relational, object-oriented, and NoSQL, and find application across diverse sectors, including business, science, and government organizations (Simplilearn, 2023). Operationally, the database in this study refers to the centralized storage system, managed through MySQL, that holds all data related to faculty attendance, schedules, and leaves, which is essential for the functionality of the Dynamic DTR Portal.

Faculty

Conceptually, it refers to a group of educators within an educational institution, including teachers, professors, lecturers, and researchers, responsible for imparting knowledge and education to students. Their role primarily revolves around teaching and academic activities, and their qualifications often align with the institution's standards and criteria (Subrih, 2017). Operationally, 'faculty' refers to the teaching staff of the Technological University of the Philippines Visayas whose attendance, schedules, and leaves are managed and tracked using the Dynamic DTR Portal.

Schedule

Conceptually, it refers to a systematic method used in computing and resource management to allocate valuable resources like processor time, bandwidth, and memory to various processes, threads, applications, or data flows. The goal of scheduling is to balance resource loads, ensure equitable distribution, and establish prioritization based on predefined rules, ultimately enhancing system efficiency and achieving a specific quality of service (Rouse, 2017). Operationally, 'schedule' in this study refers to the timetable of teaching faculty, including class times and room assignments, which is managed and coordinated through the Dynamic DTR Portal.

Full-time Faculty

Conceptually, it refers to educators who are employed by educational institutions on a full-time basis to perform teaching and academic roles. These faculty members typically play a central role in providing educational stability, curriculum planning, and additional availability to students beyond the classroom. Their full-time commitment distinguishes them from part-time faculty and contributes to the overall quality and continuity of education (Pilati, 2016). Operationally, it denotes faculty members with a full workload as per university standards, whose attendance and scheduling are monitored and managed through the Dynamic DTR Portal.

Part-time Faculty

Conceptually, it refers to an individual engaged by a university or educational institution on a term-by-term basis during an academic semester, with no commitment to ongoing employment. The primary responsibility of Part-time Faculty is teaching (Bowles, 2019). Operationally, it refers to faculty members with a reduced workload compared to full-time faculty. Their attendance and schedules are also tracked and managed through the Dynamic DTR Portal.

Overloading

Conceptually, it refers to a state where individuals face excessive demands and tasks in their work, often leading to physical and mental exhaustion due to inadequate time or skills to fulfill those responsibilities (Noori, 2023). Operationally, 'overloading' in this study refers to situations where faculty members undertake teaching responsibilities exceeding their standard workload. The Dynamic DTR Portal tracks and manages such instances as part of the scheduling and employee evaluation process.

Online Portal

Conceptually, an online portal is a web-based platform or webpage that serves as a centralized entry point, providing users with access to a wide range of information, tools, and links related to a specific domain, community, or organization, facilitating various online interactions and engagements (Alveyra, 2021). Operationally, it refers to a web-based interface designed to facilitate the efficient management and tracking of

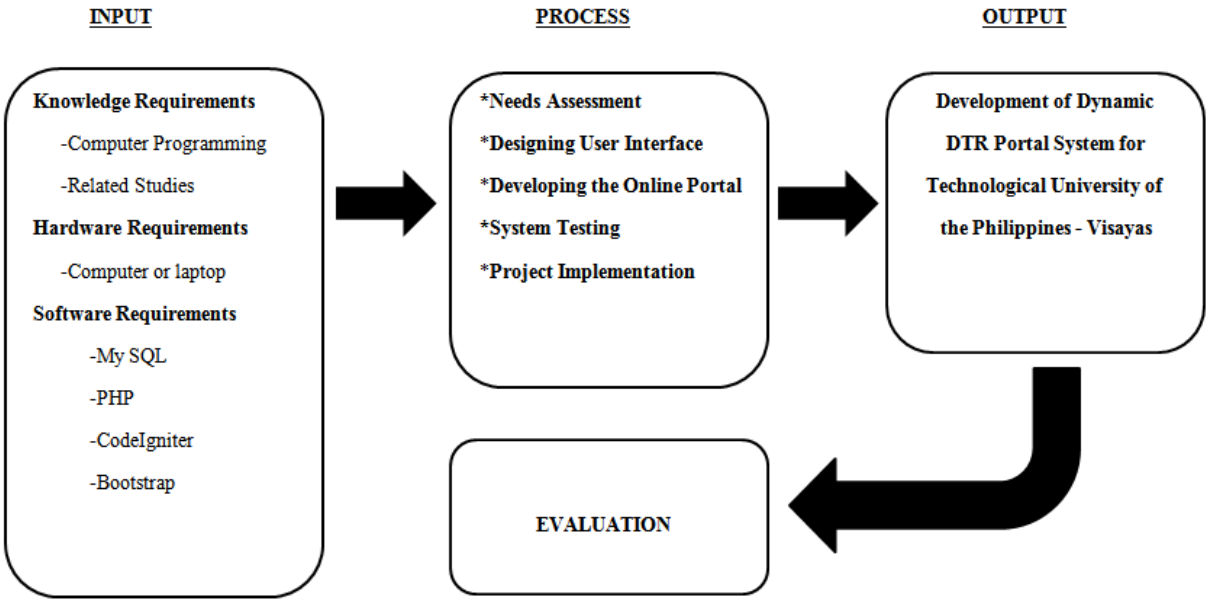
faculty attendance, schedules, and leave records at the Technological University of the Philippines Visayas. This portal allows users (faculty and HR administrators) to access, input, and process attendance-related data, including time-in and time-out records, schedule submissions, and leave applications. It is a centralized platform that integrates various functionalities to enhance the accuracy and efficiency of the daily time record (DTR) system.

Conceptual Model of the Study

The Input-Process- Output (IPO) model encompasses all elements constituting a process, including materials, information, requirements, and product descriptions (Canonizado, 2021). It outlines the configuration of an information processing program or various other procedures. **Figure 1** shows the IPO model used in this study. It shows the block-by-block organization of input and output processes involved in the conceptualization of the project.

Figure 1

Conceptual Model of the Study



Input

This segment of the research's theoretical framework focused on formulating, computing, and assembling the prototype's knowledge base, as well as determining the hardware and software prerequisites. This phase was instrumental in identifying the necessary components for translating the overarching concept into a web-based portal. It encompassed deep understanding of programming, web developing and applying statistical analysis to interpret data. The researchers of the study primarily need knowledge of programming that will be utilized in developing a Dynamic DTR Portal System for the Human Resource Department of Technological University of the Philippines-Visayas. The related studies served as basis and guide for the researchers as they progressed in their study.

Process

This segment of the thesis conceptual framework will involve the utilization of input, knowledge, and hardware and software requirements to create the online portal system. It will delve into testing and refinement procedures aimed at ensuring complete functionality. Throughout the testing and refinement phase, a series of trials and tests will be conducted, accompanied by the identification and rectification of any encountered errors in the project. The process of the study involved assessment from the Human Resources Department, designing the graphical user interface, developing the program database, testing the accuracy of the program developed and efficiency of the time it takes to generate the DTR report, the time it takes to complete the overload reports, and the project implementation.

Output

The output of the study is a Dynamic DTR Portal System for the Human Resource Department of Technological University of the Philippines-Visayas where the HR department can automatically calculate the total minutes of lateness and under-time of the teaching personnel and generate a summary of report.

Evaluation

The evaluation of the study involved the participation of the respondents that will evaluate the different aspects of the Dynamic DTR Portal System for the Human Resource Department of Technological University of the Philippines-Visayas.

Chapter III

METHODOLOGY

This chapter includes the methods implemented to achieve the objectives mentioned in this study. The development of methods is also presented in this section to show that the procedures of the study were conducted systematically.

Research Design

This study will be utilizing a developmental research design. According to De Vaus (2001), A research design encompasses the comprehensive strategy and analytical approach selected to systematically integrate the various components of the study. This approach ensures a coherent and logical exploration of the research problem. It serves as the blueprint guiding the collection, measurement, and interpretation of information and data. One can observe how the chosen research design forms the structural framework for a thorough investigation of the research problem.

Developmental research encompasses a systematic exploration of the creation, refinement, and assessment of methods, and materials that are required to adhere to criteria related to internal coherence and efficiency. The study will focus on a specific type of developmental research design involving the analysis of the entire device development process and the evaluation of the end efficiency of the device as a medical aid for diagnosis (Richey, 1994). In addition to that, Developmental research is particularly important in the field of instructional technology. The most common types of

developmental research involve situations in which the product-development process is analyzed and described, and the final product is evaluated (Richey and Klein, 2005).

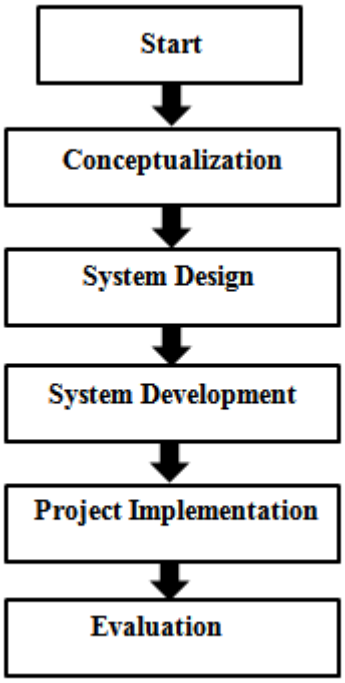
Project Development

Project Development is the discussion of the procedures needed to develop a research concept from its initialization to its implementation. It gives a summary of the procedures followed in order to convert an idea from a research topic into a workable research proposal.

Experience and research have shown that some of the most crucial elements in creating a workable study would effectively answer the research question, according to Eston and Rowlands (2000). These are taken into consideration to avoid inconveniences when the study is published. The research study's project development process is depicted below.

Figure 2

Project Development Flow Diagram



Conceptualization

The research was conceptualized due to the need of the Human Resource Department of Technological University of the Philippines - Visayas for a more efficient Attendance Management System. The researchers recognized the problem after having interviewed several offices in the university and have visualized a web-based DTR portal for the efficient calculation of the number of minutes short from the specific schedule of teaching personnel.

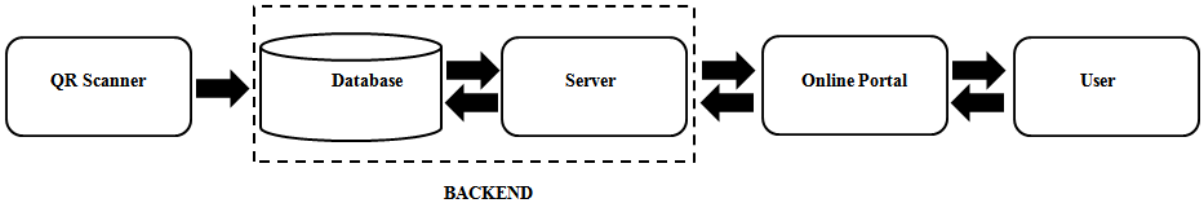
The researchers conducted a needs assessment in the Human Resource Office, through Mrs. Rutchel E. Pabalinas, Administrative Officer IV. A needs assessment is a systematic process for determining and addressing needs or gaps between current conditions and desired conditions or wants. It is a set of procedures used to determine needs, examine their nature and causes, and set priorities for future action (Kaufman, 1979). The researchers were able to identify the specific problems with regards to the current attendance management and have received an acknowledgement letter from the HR office. The researchers were also able to visualize the desired scenario according to Mrs. Pabalinas, and the steps to undertake to meet the needs of the HR office in attendance management. The research will focus on the development of a web portal to address the biggest need of the HR office, which is a more efficient way to calculate the tardiness or minutes late of each teaching personnel in the university based on their individual class schedules.

System Design

The Dynamic DTR Portal System incorporates the subsequent system design. Figure 5 illustrates the system design that will be executed by the researchers during the development of the Portal.

Figure 3

System Design Block Diagram



Scanner

The QR scanner is an existing hardware implemented in Technological University of the Philippines - Visayas for the attendance checking of faculty and staff. The researchers will utilize the input from the QR Scanner as important information for the database to ensure the smooth flow of the system's functionalities.

Backend

The backend constitutes the segment of the system responsible for server-side operations and the administration of the DTR portal database. It serves as the fundamental framework of the software, facilitating the operations necessary for attendance management functionalities. The database will contain the input from the attendance of the faculty from the QR Scanner and the output of the server

which is the official DTR, complete with minutes late, absences, overload, and leave.

Online Portal

The frontend of the system would be the online web-based portal that would be utilized by the users. The user and the admin will have different interfaces and features available in their front-end. The user side, which is for the faculty, can view and update their schedule, view their DTR and upload attachments for supporting documents. The admin side, which is the Human Resource Department, can view the DTR of every faculty member real-time, calculate the number of minutes late, and overload.

User

The users of the Dynamic DTR Portal System would be the faculty members of the Technological University of the Philippines- Visayas for the user side, and the Human Resource Department staff, specifically Mrs. Rutchel Pabalinas, for the admin side.

System Development

The researchers utilized Bootstrap and PHP for the development of the portal system. Bootstrap was used for the frontend specifically for the structure, content and

interface quality of the website. PHP was used for the backend, specifically for the server-side logic, with CodeIgniter as the PHP framework for the web application development. The database and system logic for the calculations was developed following the objectives of the study. The users and the admin interact with the DTR portal through the operation of the frontend of the system.

Software Development

This section refers to the procedure that will be implemented by the researchers in the development of the software for the Dynamic DTR portal system. This includes flowchart, Graphic User Interface (GUI), and wiring frame of the portal.

System Flowchart

Figure 4

User Log-In Flowchart

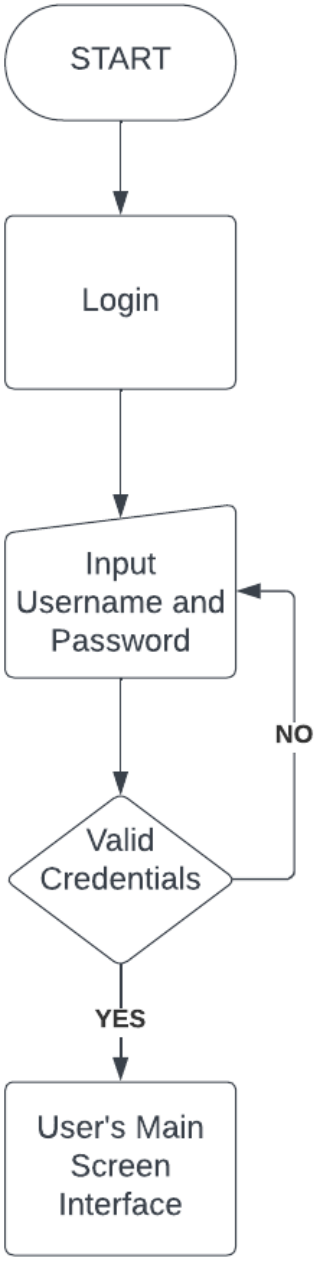


Figure 5

User Main Screen Interface Flowchart

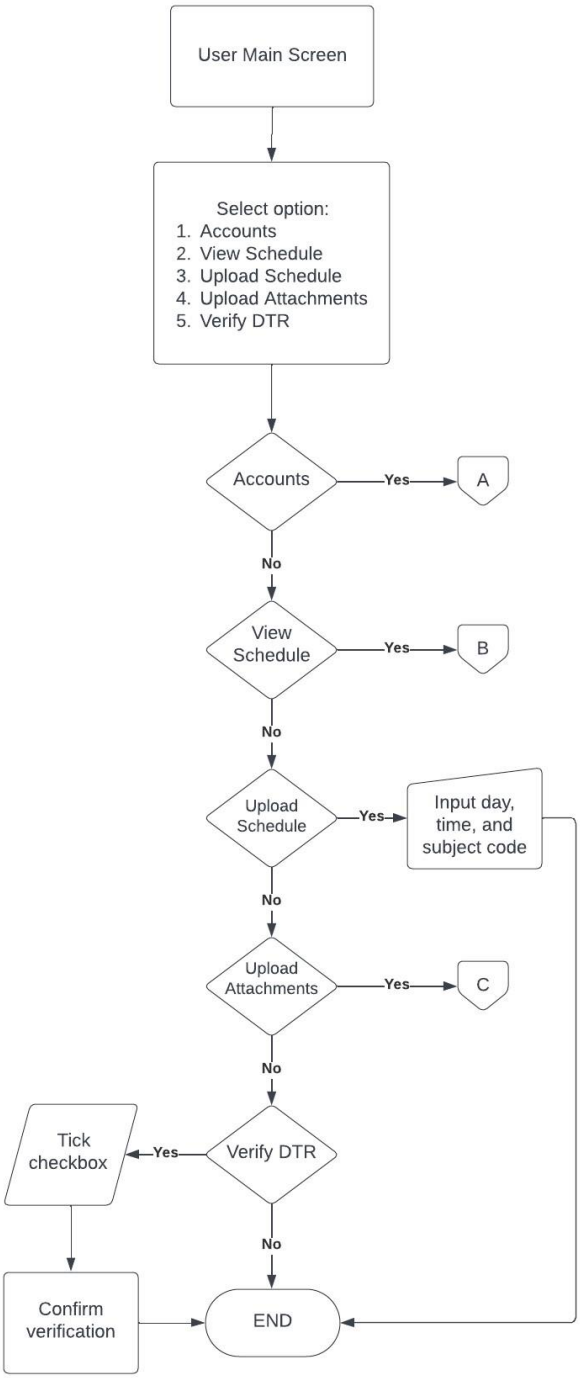


Figure 6

Accounts Flowchart

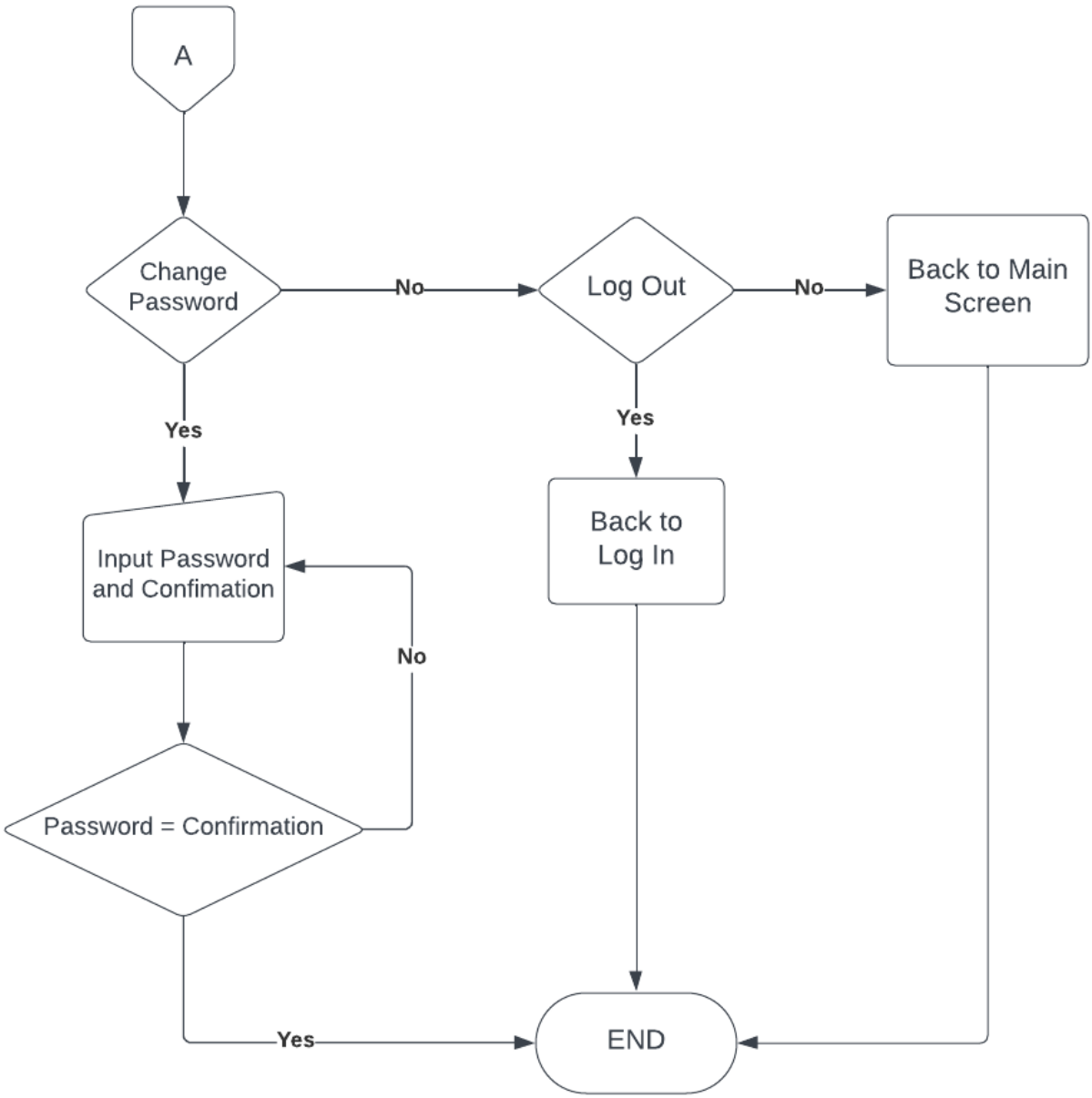


Figure 7

Schedule Viewing Flowchart

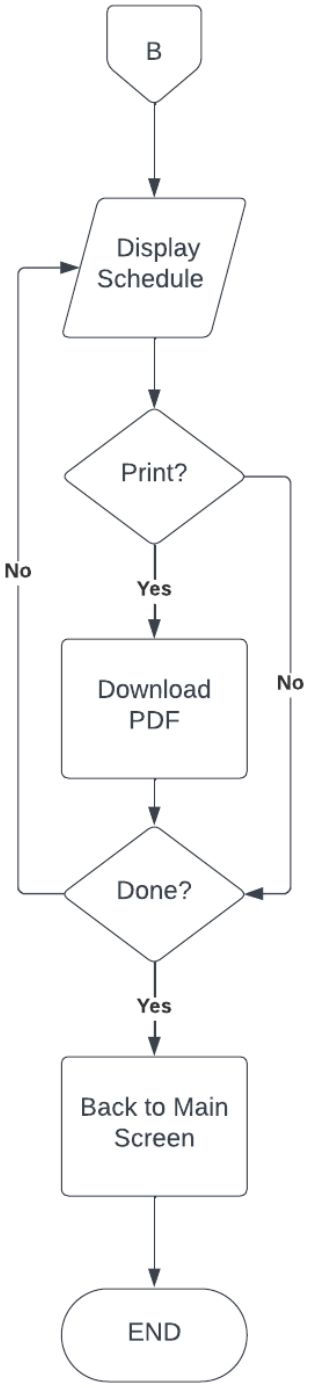


Figure 8

Upload Attachments Flowchart

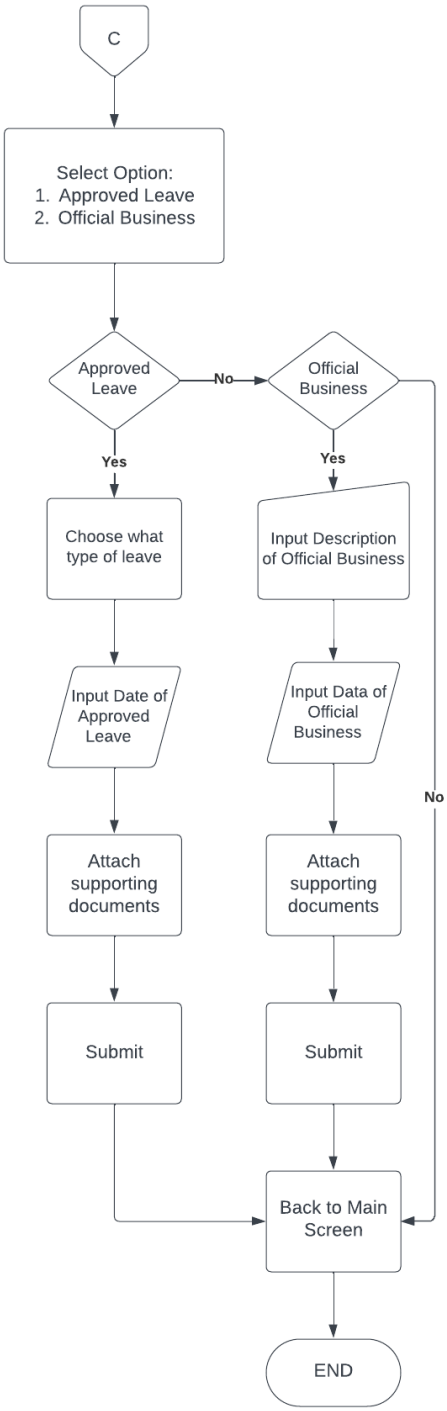


Figure 9

Admin Interface Flowchart

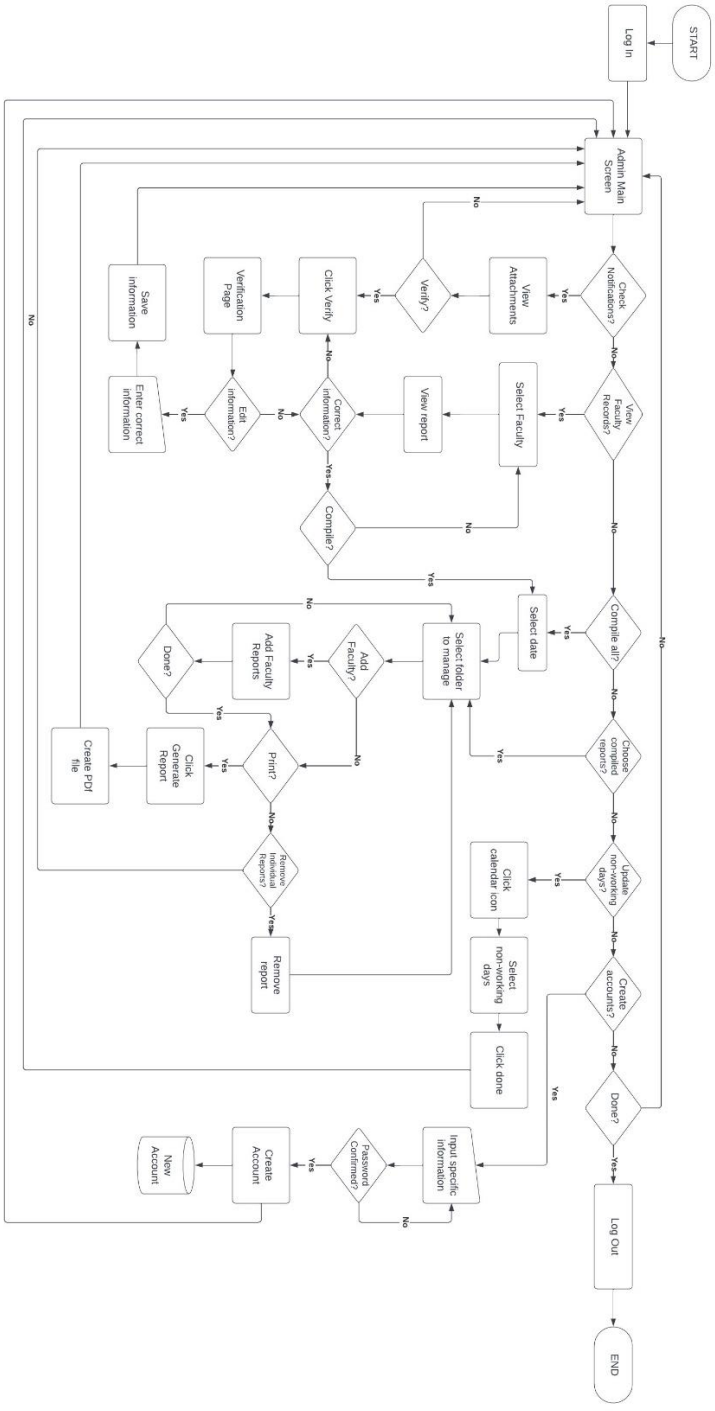


Figure 10

Logic Operations of Absences Record Flowchart

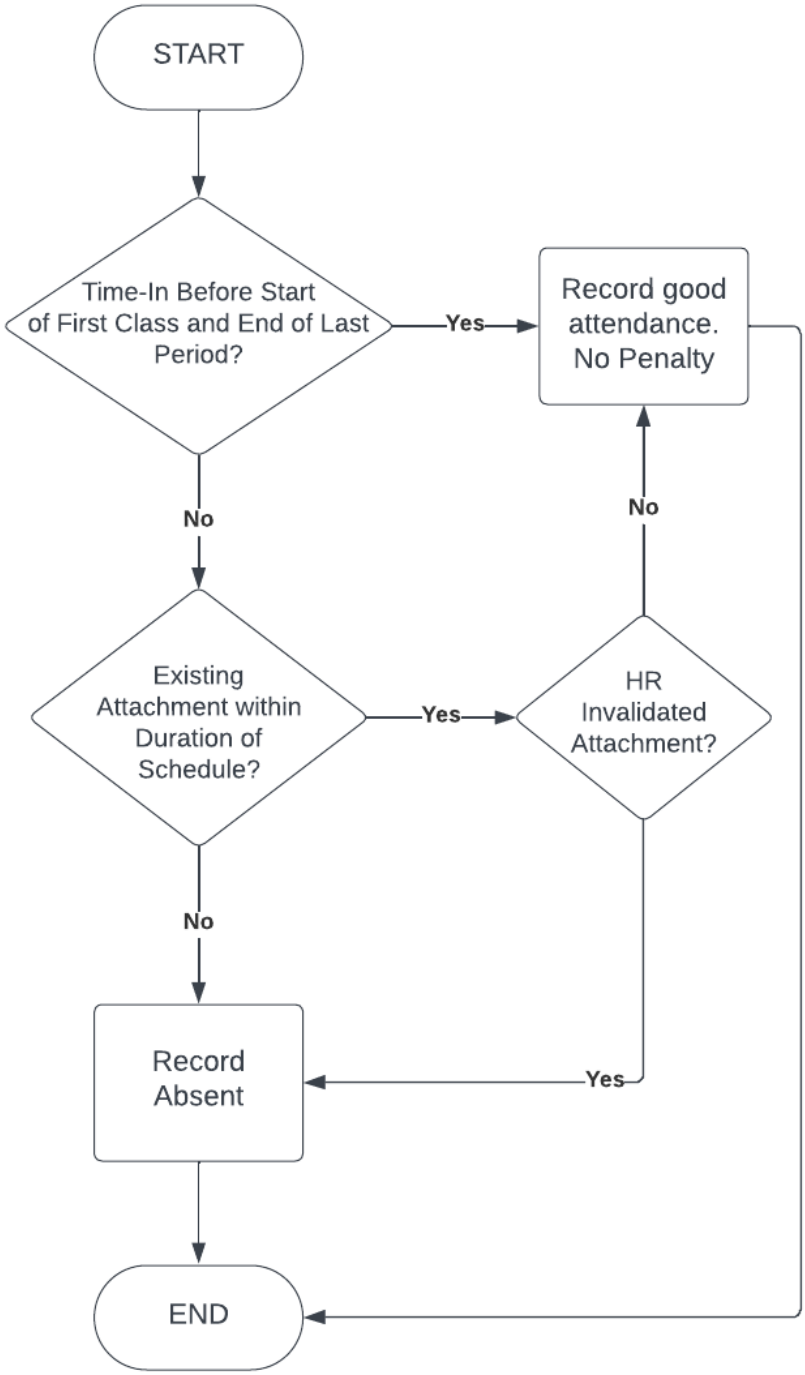


Figure 11

Logic Operations for Time-In Flowchart

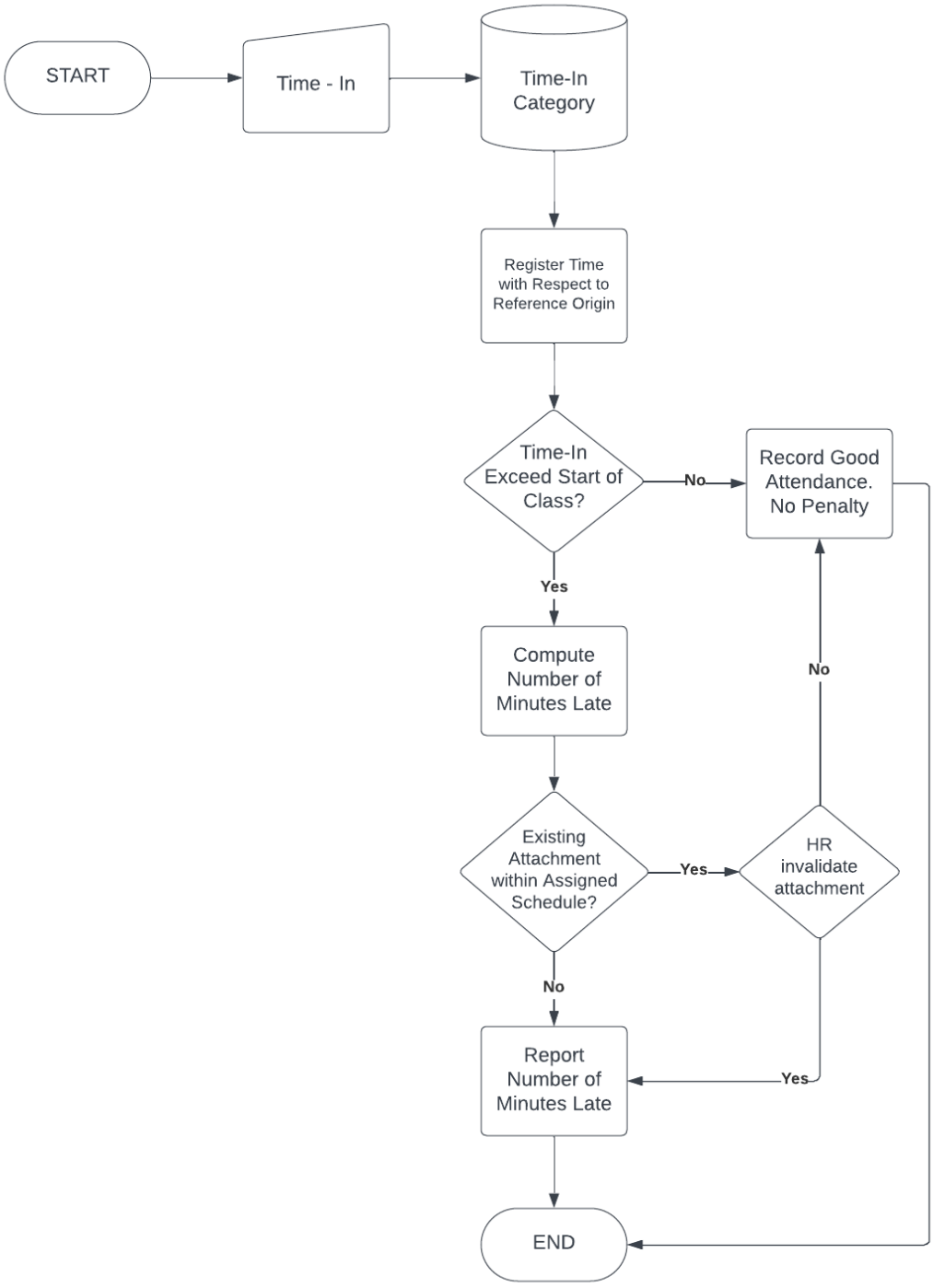
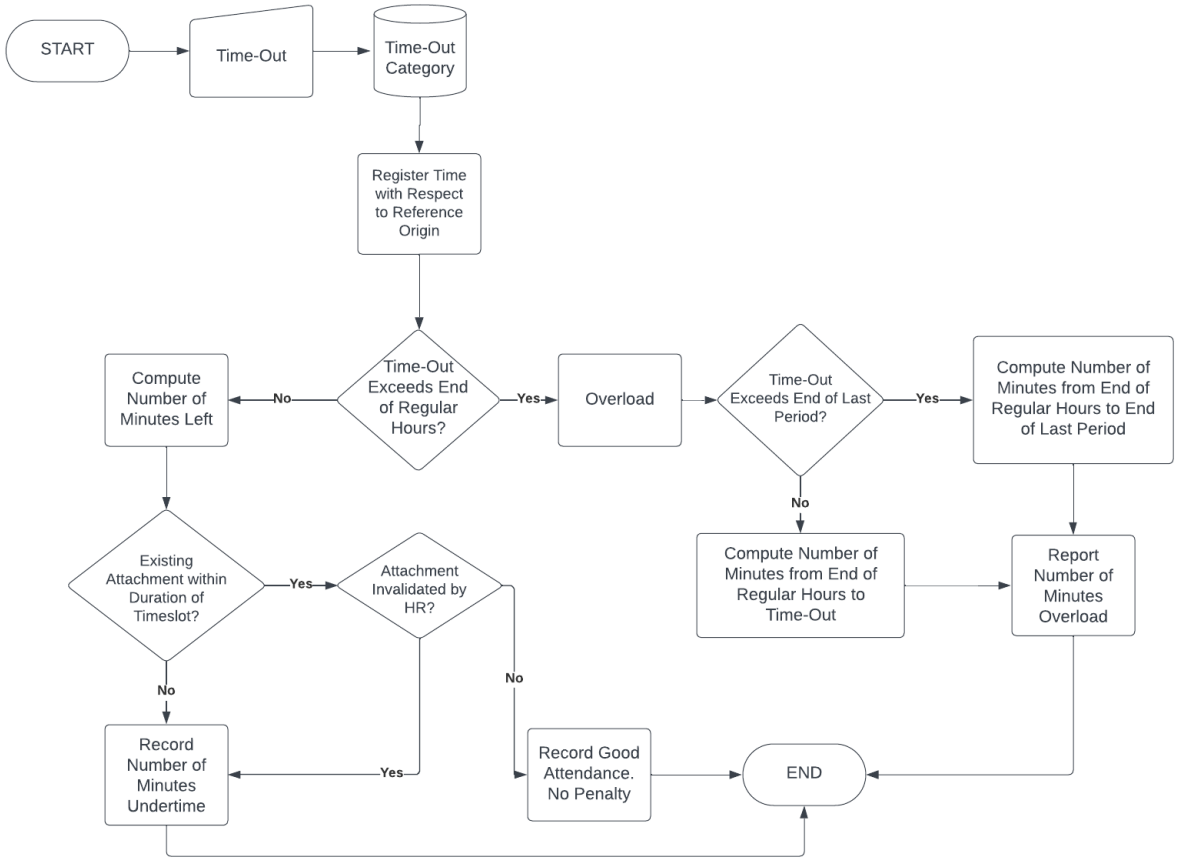


Figure 12

Logic Operations for Time-Out Flowchart



Flowchart Summary

A. User

1. Log In - The login of the system is where the user inputs the username and password provided by the admin

2. Dashboard - The dashboard will show the different options that the user can do in the system
    a) DTR Viewing - This page will show the real-time daily time record of the user
    b) Schedule Viewing - This page will show the schedule of the user uploaded on the portal. The user is also given an option to print the schedule.
    c) Schedule Uploading/Updating -This page allows the user to input the subject code, the day and time of the classes to be uploaded in the portal
    d) File Attachments - This page allows the user to upload attachments as proofs or supporting documents for approved leaves and official business outside the campus
3. Account - The account is the option where the user can change the given password or logout and stop navigating the portal

B. Admin

1. Log-In - the system verifies if the account entered exists in the database. The admin inputs the assigned username and password to be directed to the admin main screen.

2. Admin Dashboard Interface - The dashboard shows the different options that the admin can do in the system.

a) Notifications - This section displays messages with designated dates or time for approved leaves and official business outside the campus.

b) Faculty Records - This page allows the admin to review records of individual faculties and manage the results of the automated reports.

c) Compile Reports - This section assists the admin to compile reports within a file for collective printing.

3. Create Account - This page will enable the admin to add another account in the database with username and password, to be given later to the assigned personnel. It will also give the admin the chance to formulate the faculty's assigned schedule.

C. Logic Operation of Recording the Attendance of a Faculty

1. Absences - this flowchart shows how absences will be recorded. If a faculty was not able to time-in for the whole duration of the assigned schedule of the day, the individual will be recorded as absent for that day. Unless, it will be disregarded if an attachment was sent to the admin and would further wait for invalidation if it does not meet the conditions of leave.

2. Time-In - this flowchart involves comparing the registered time-in to the assigned time of the day’s first class. If time-in exceeds the start of class, the number of minutes that have passed will be recorded as late unless there is already an available attachment to disregard the recorded tardiness.

3. Time-Out - this flowchart involves comparing the registered time-out to the time where the number of hours required starting from first class is completed. If time-out exceeds the required number of hours, recording of overload minutes will commence until the end of the designated last period. However, if time-out did not exceed the required number of hours, the number of minutes left will be recorded for undertime.

System Graphic User Interface and Wireframe

The DTR Portal System for the Human Resource Department of the Technological University of the Philippines-Visayas implemented the following Graphical User Interface (GUI) and wireframe that shows how to navigate the web portal. Figures 13 to 22 details the GUI of the web portal and Figure 23 and 24 shows the wireframe from the user and admin view.

Figure 13

User Log-in GUI

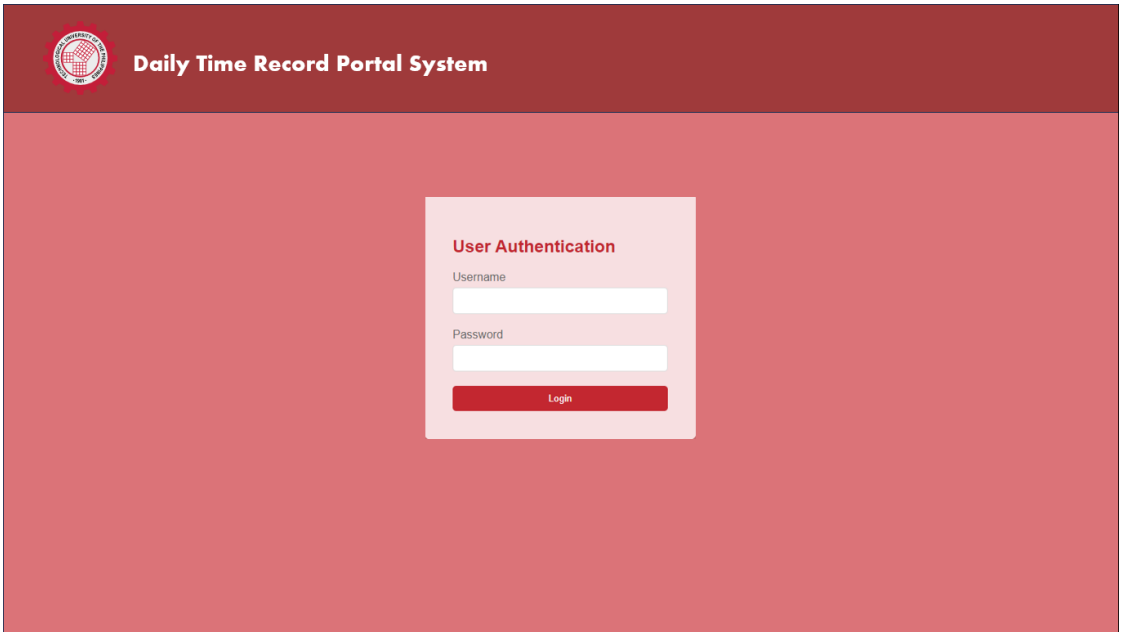


Figure 14

User Dashboard GUI

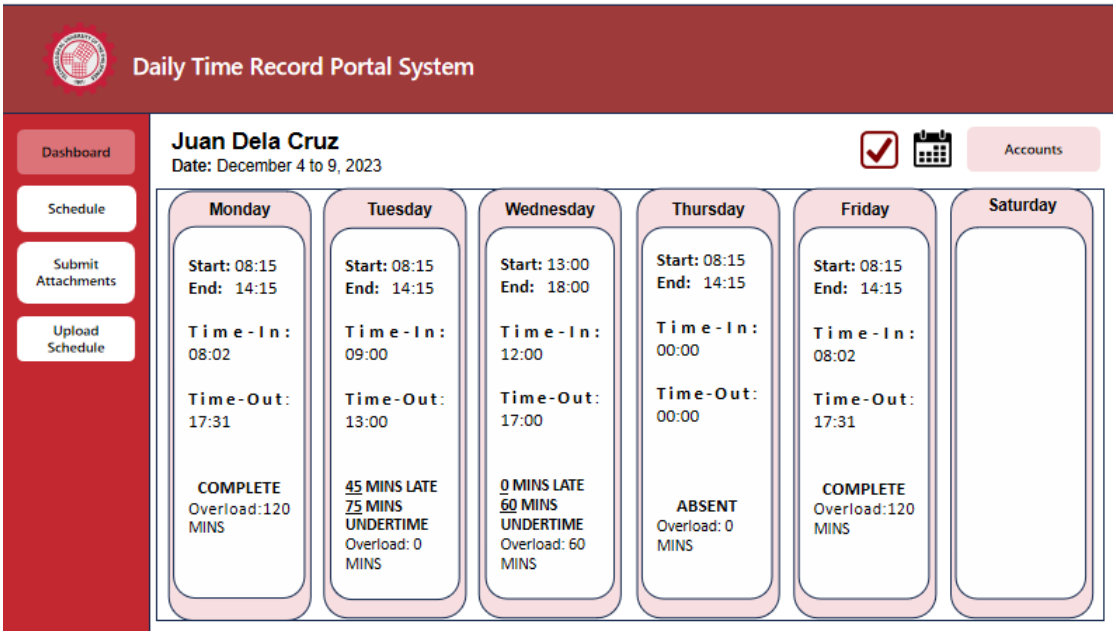


Figure 15

Check Calendar GUI

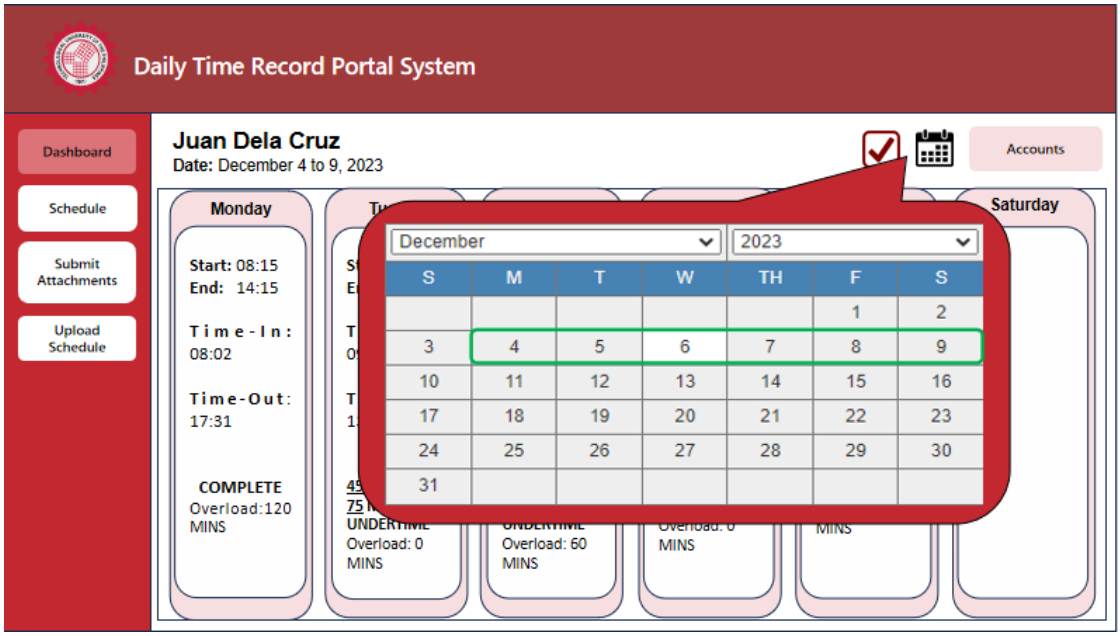


Figure 16

Acknowledge DTR GUI

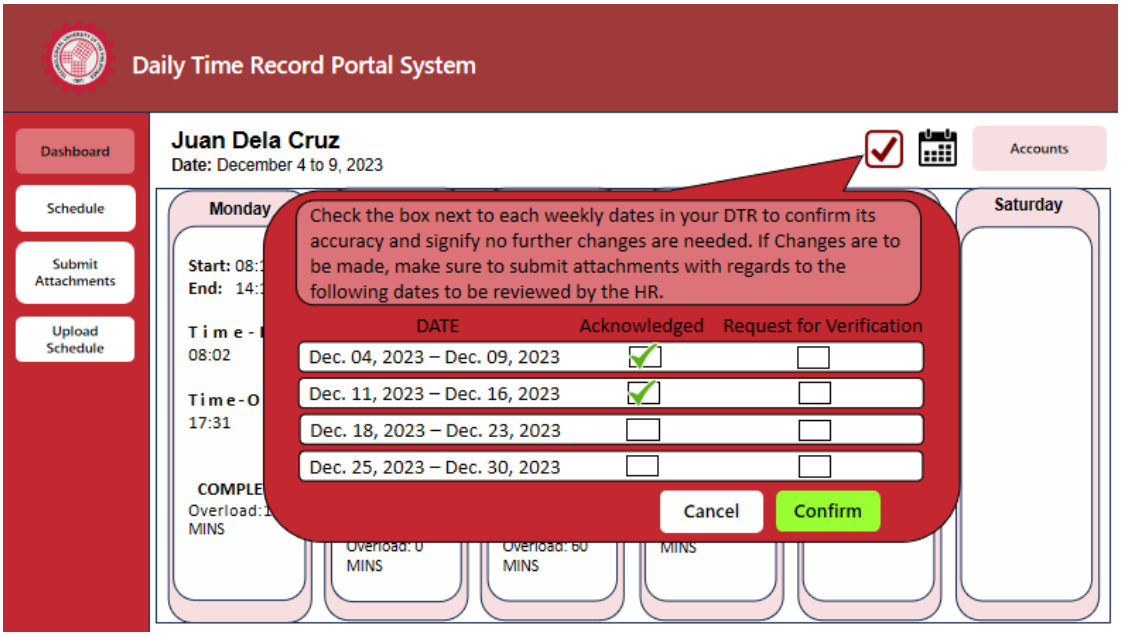


Figure 17

Check Schedule GUI

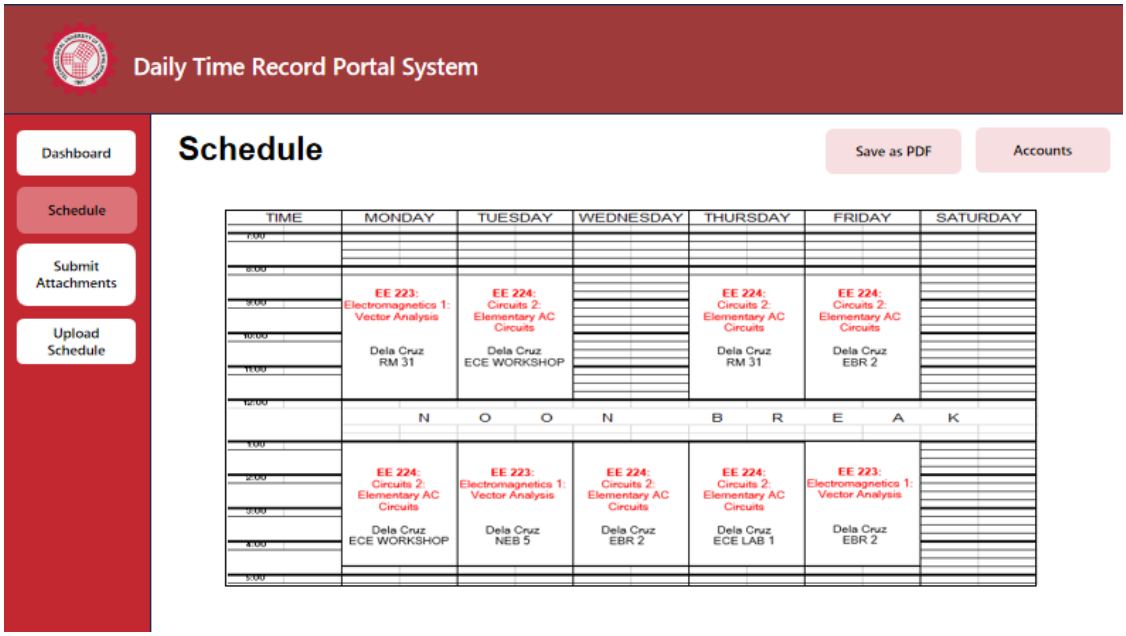


Figure 18

Upload Attachments GUI

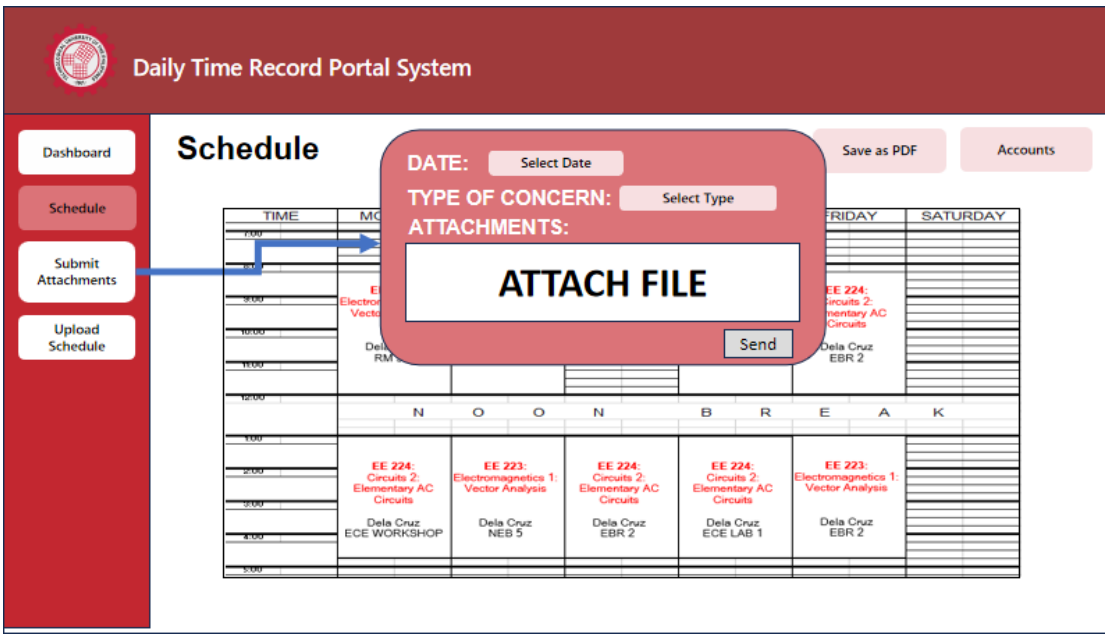


Figure 19

Upload Schedule GUI

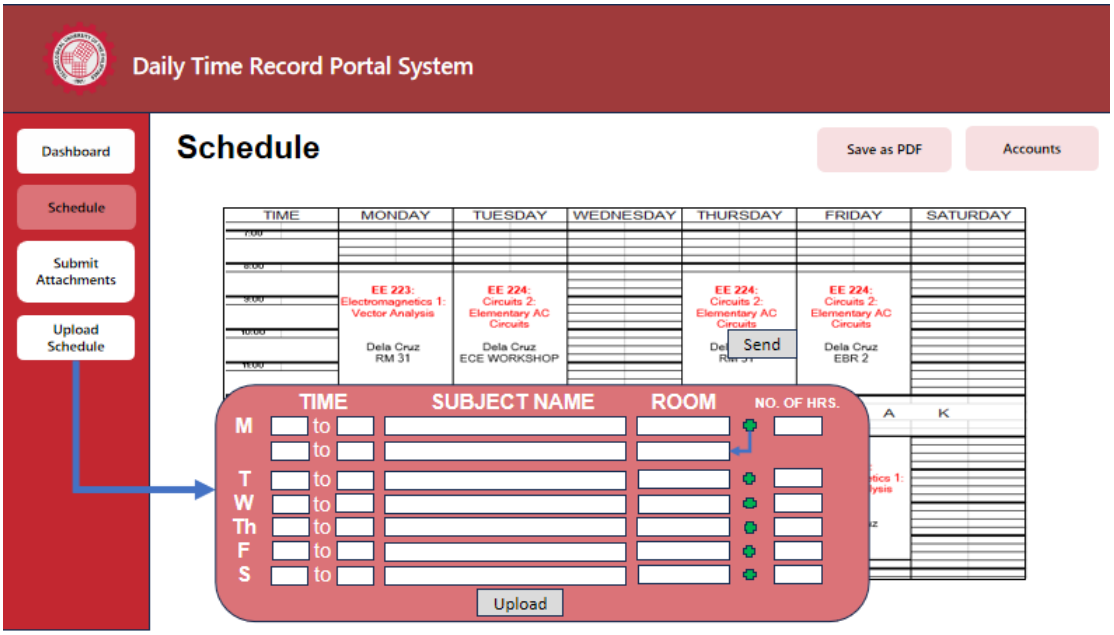


Figure 20

Accounts GUI

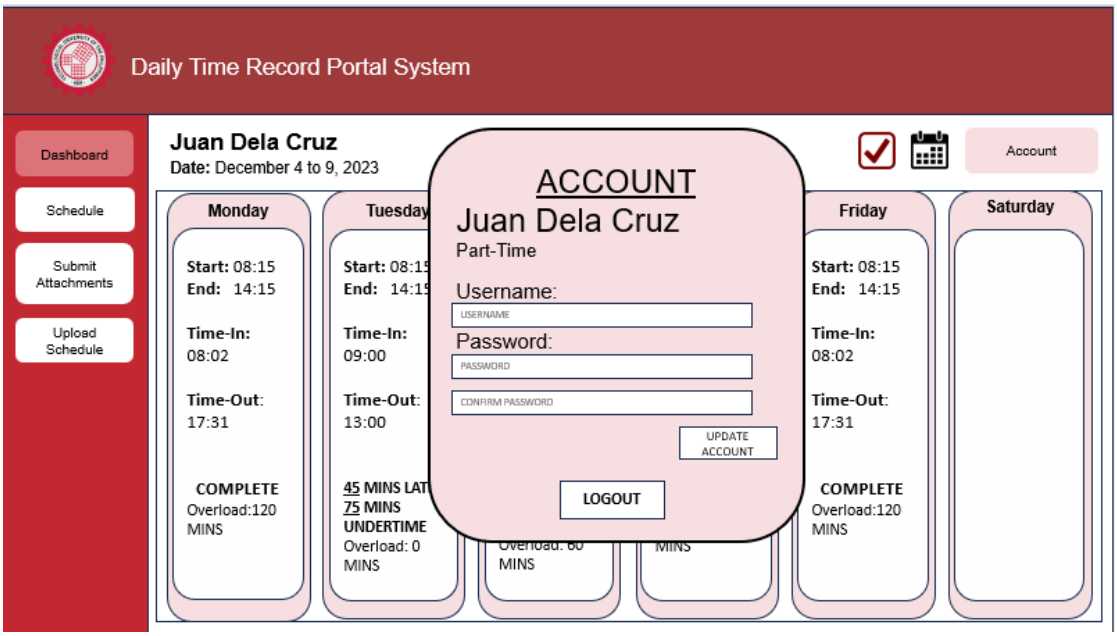


Figure 21

Admin Dashboard GUI

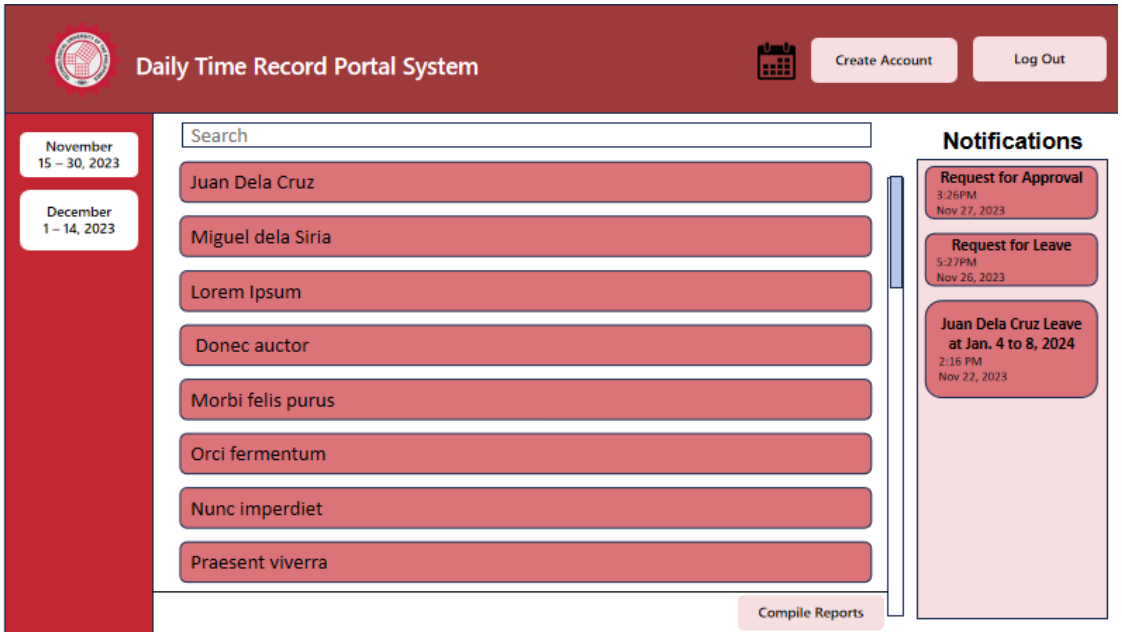


Figure 22

Check Calendar GUI

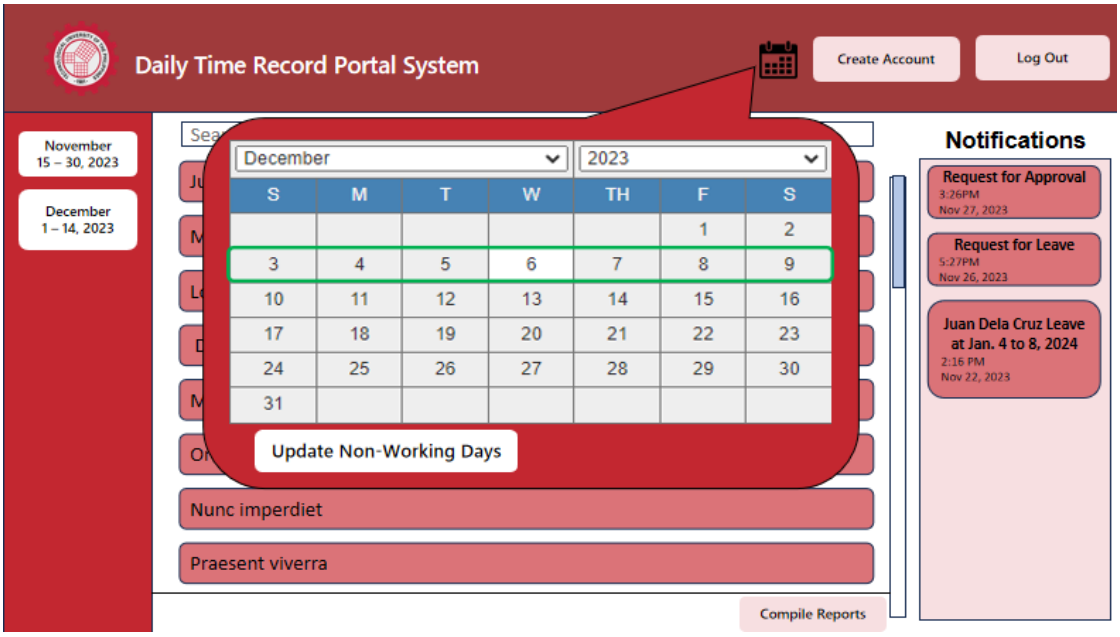


Figure 23

Update Non-Working Days GUI

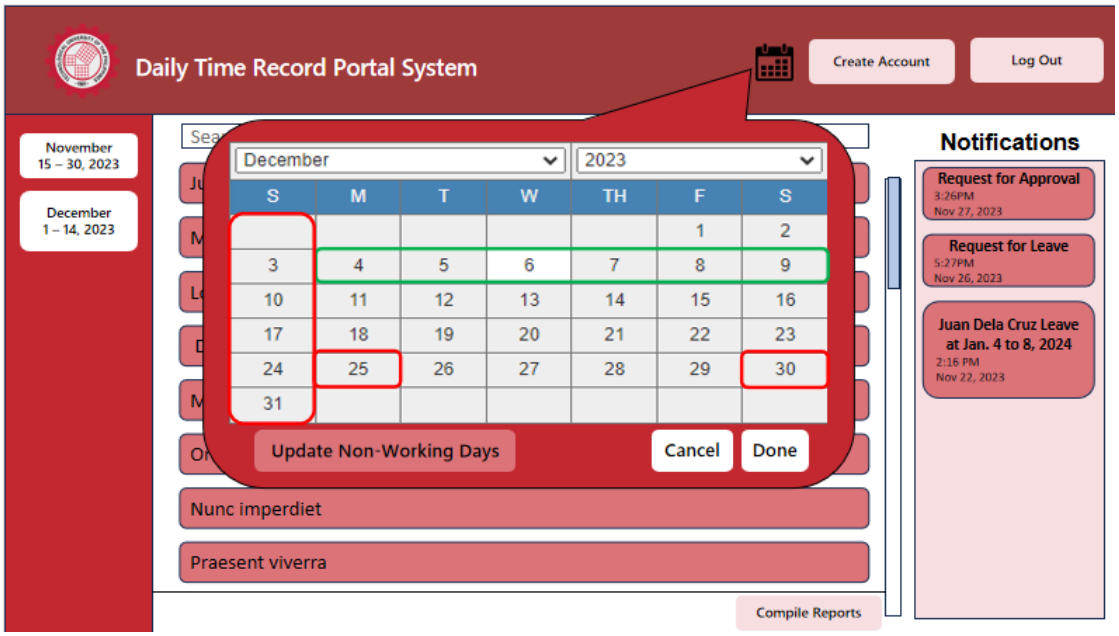


Figure 24

Compilations Folder GUI

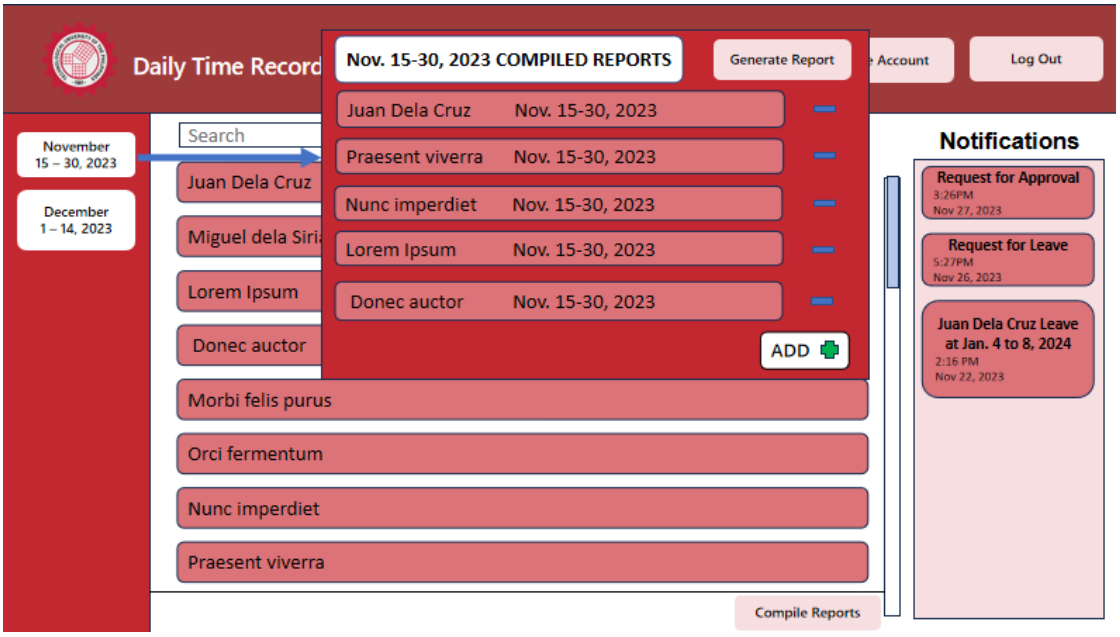


Figure 25

Manage Folder (Included Dates) GUI

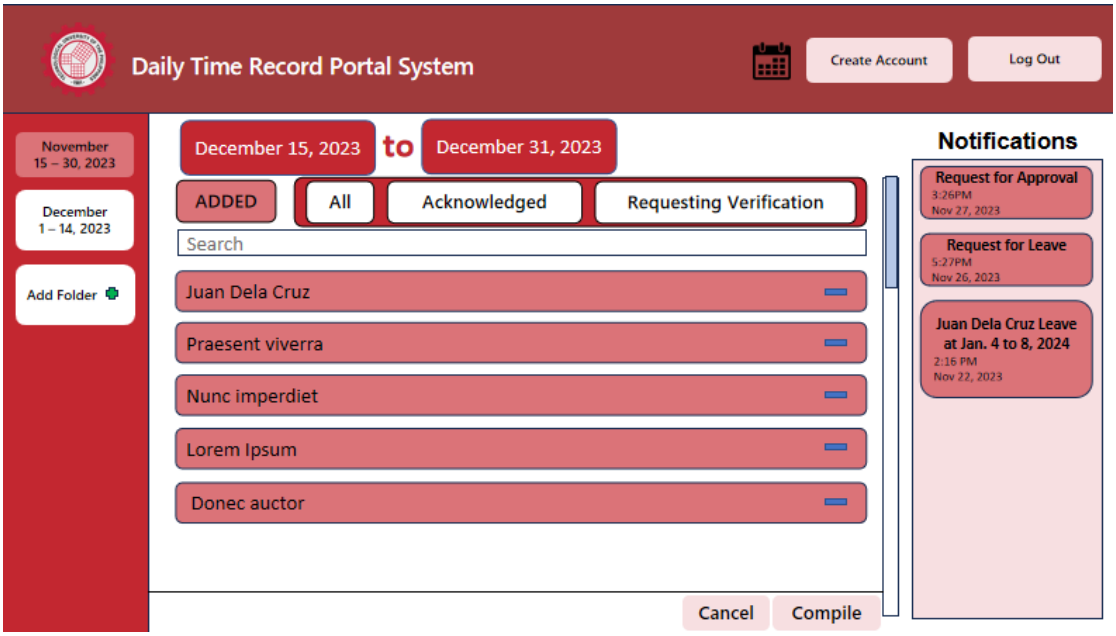


Figure 26

Manage Folder (Faculties Under Requesting Verification) GUI

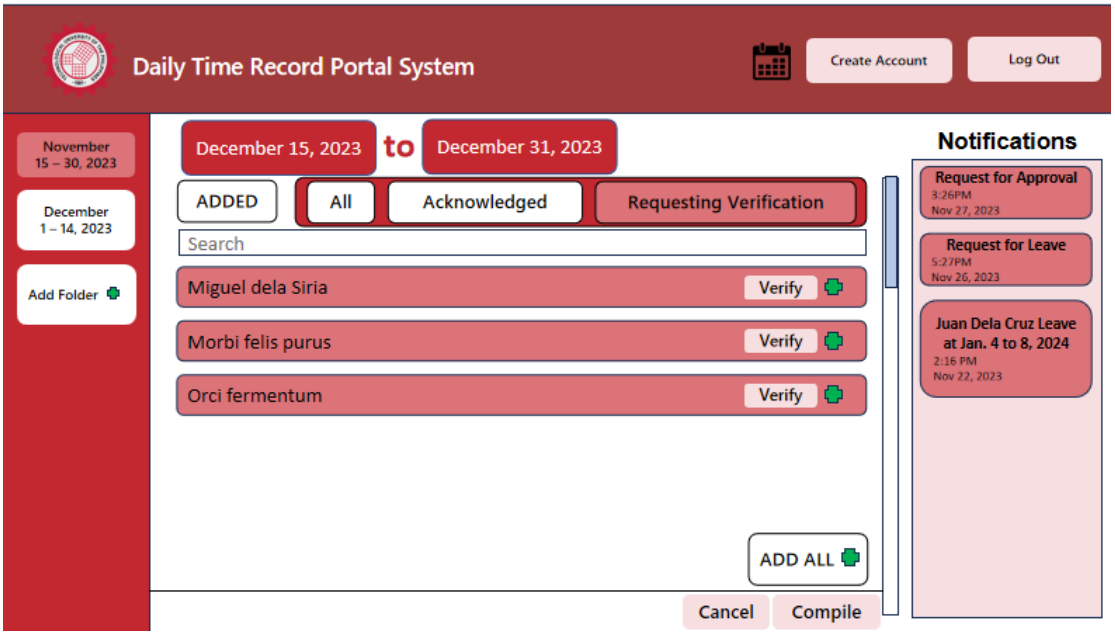


Figure 27

View Notification GUI

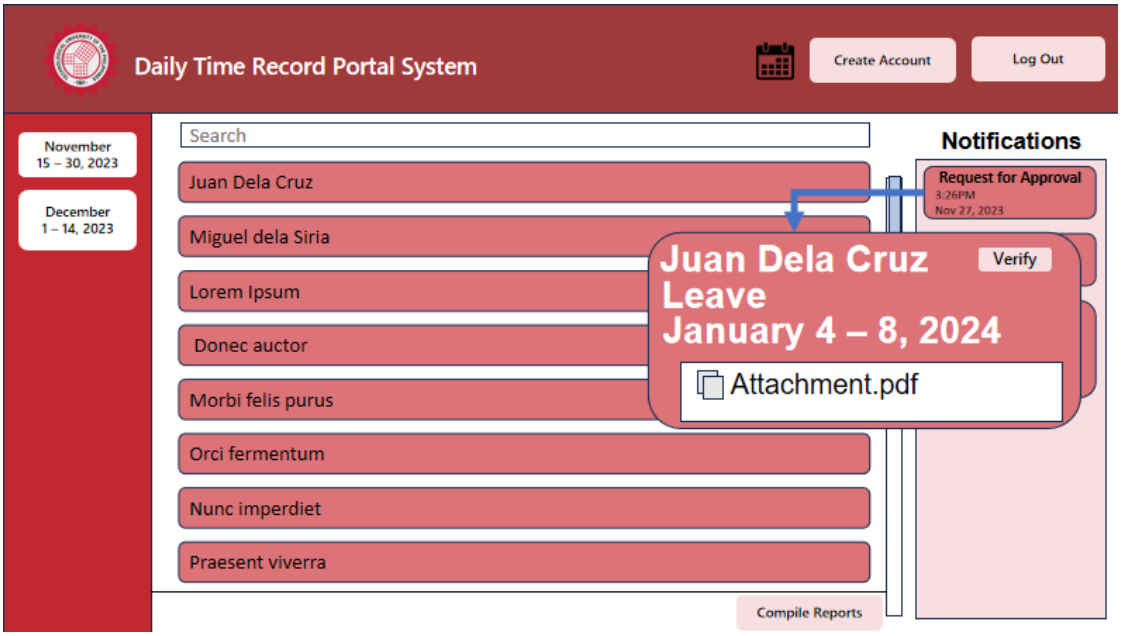


Figure 28

Create Accounts and Upload Schedule GUI

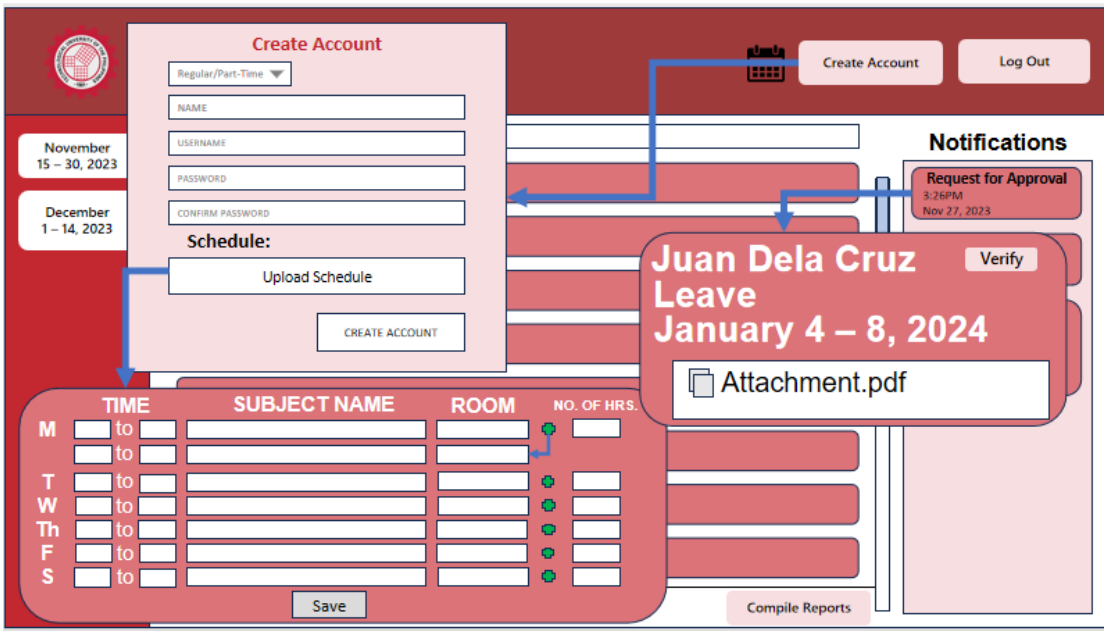


Figure 29

Individual DTR Report GUI

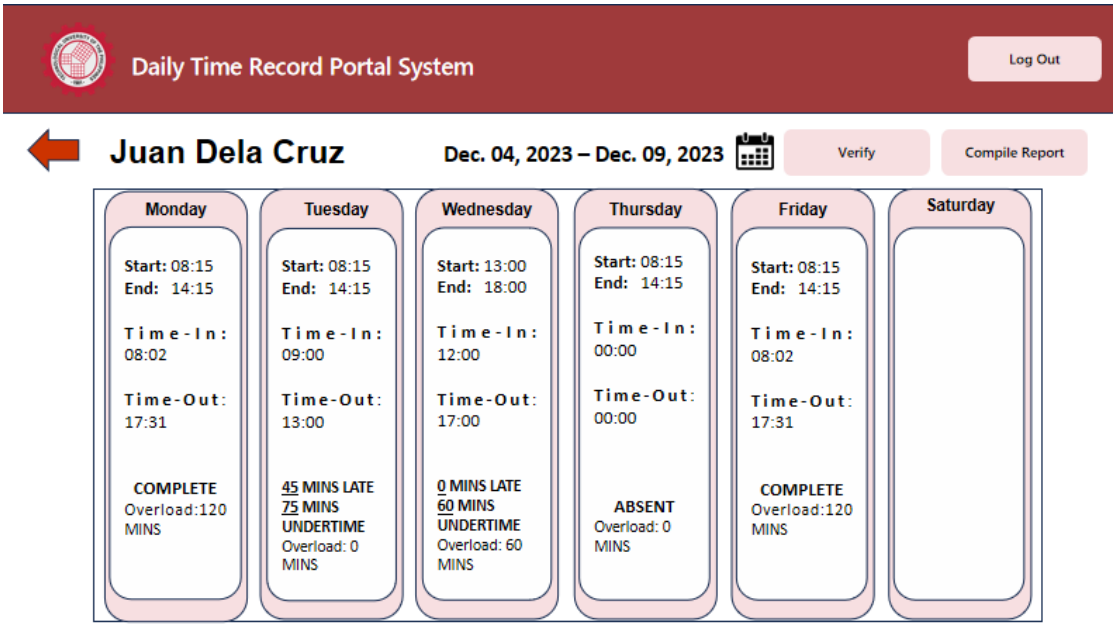


Figure 30

Navigate to Other Dates through Calendar GUI

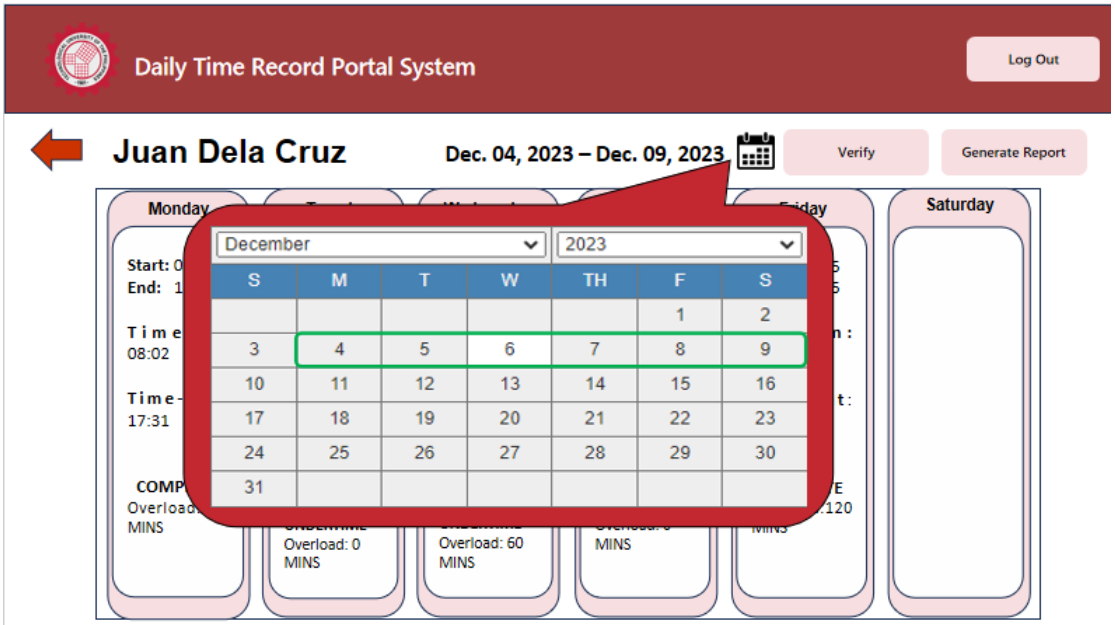


Figure 31

Verification Page GUI

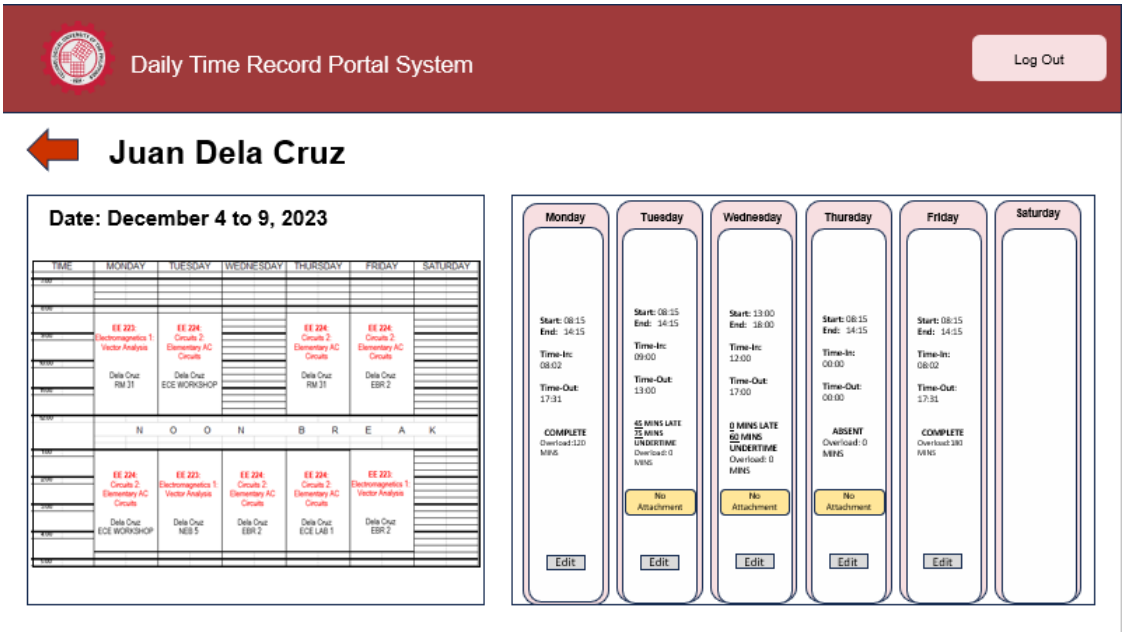


Figure 32

Edit DTR Report GUI

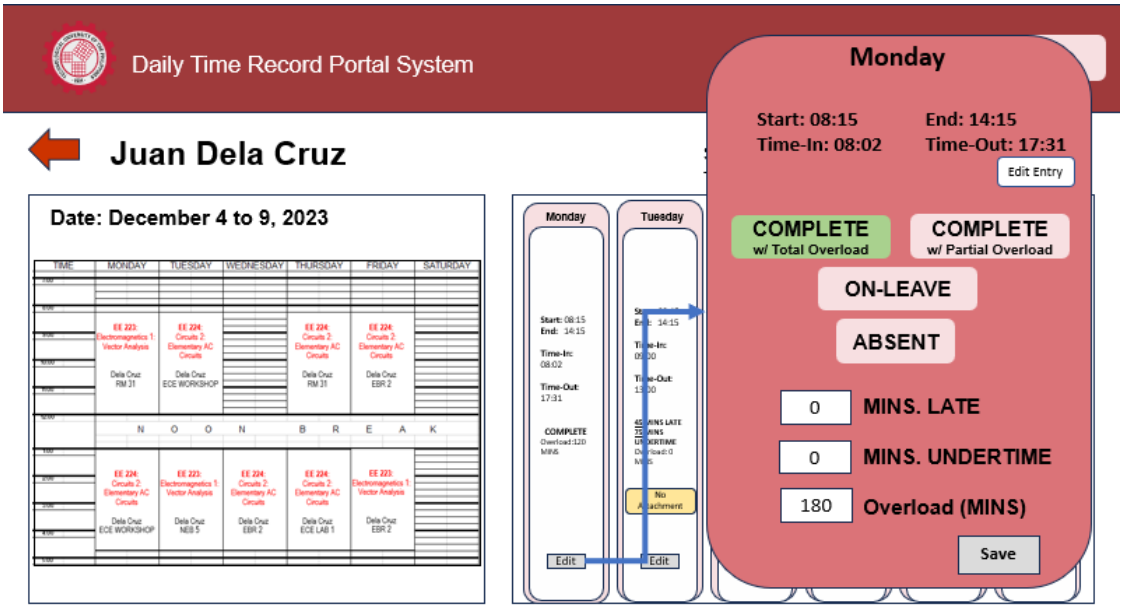


Figure 33

User End Wireframe

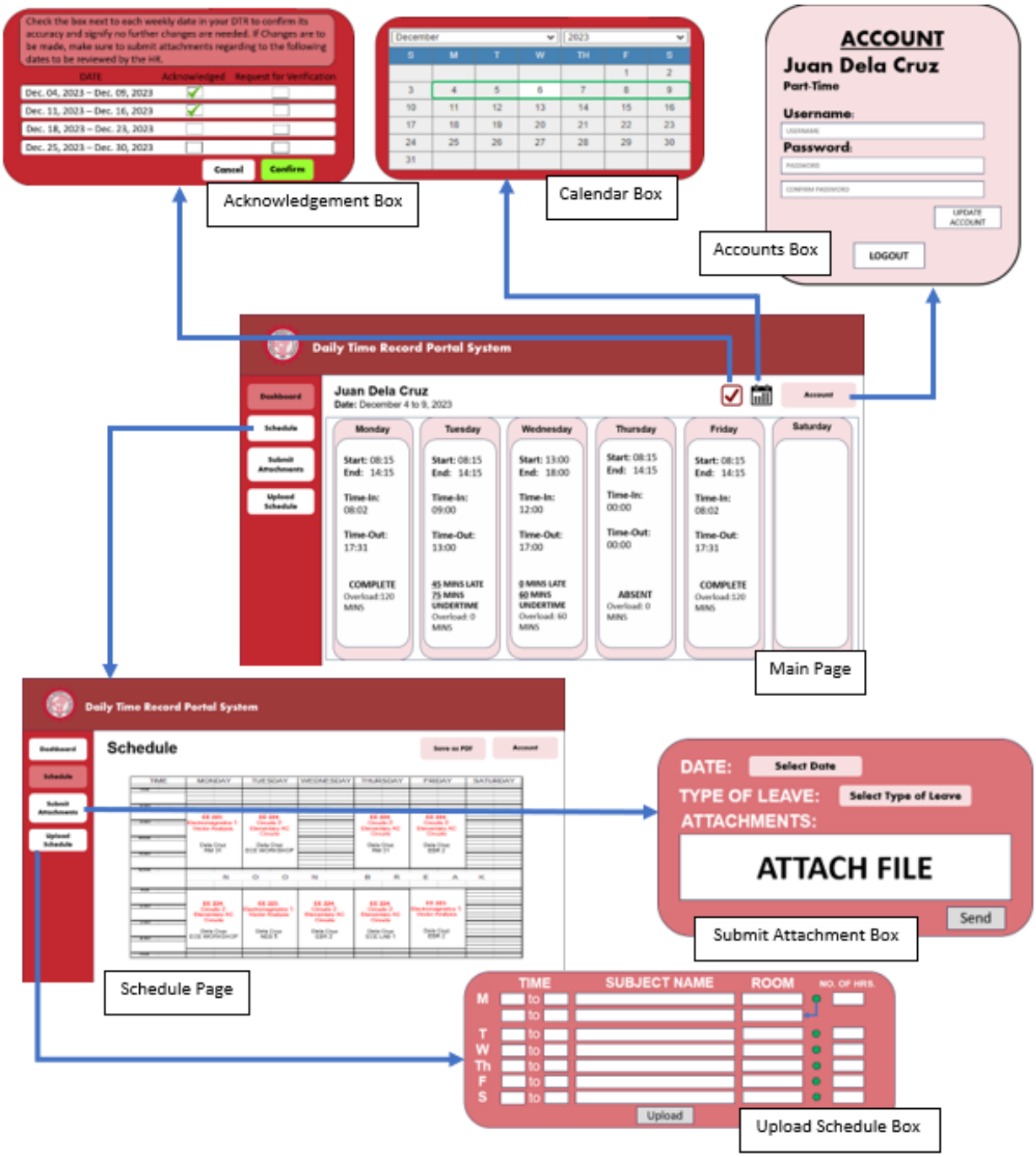
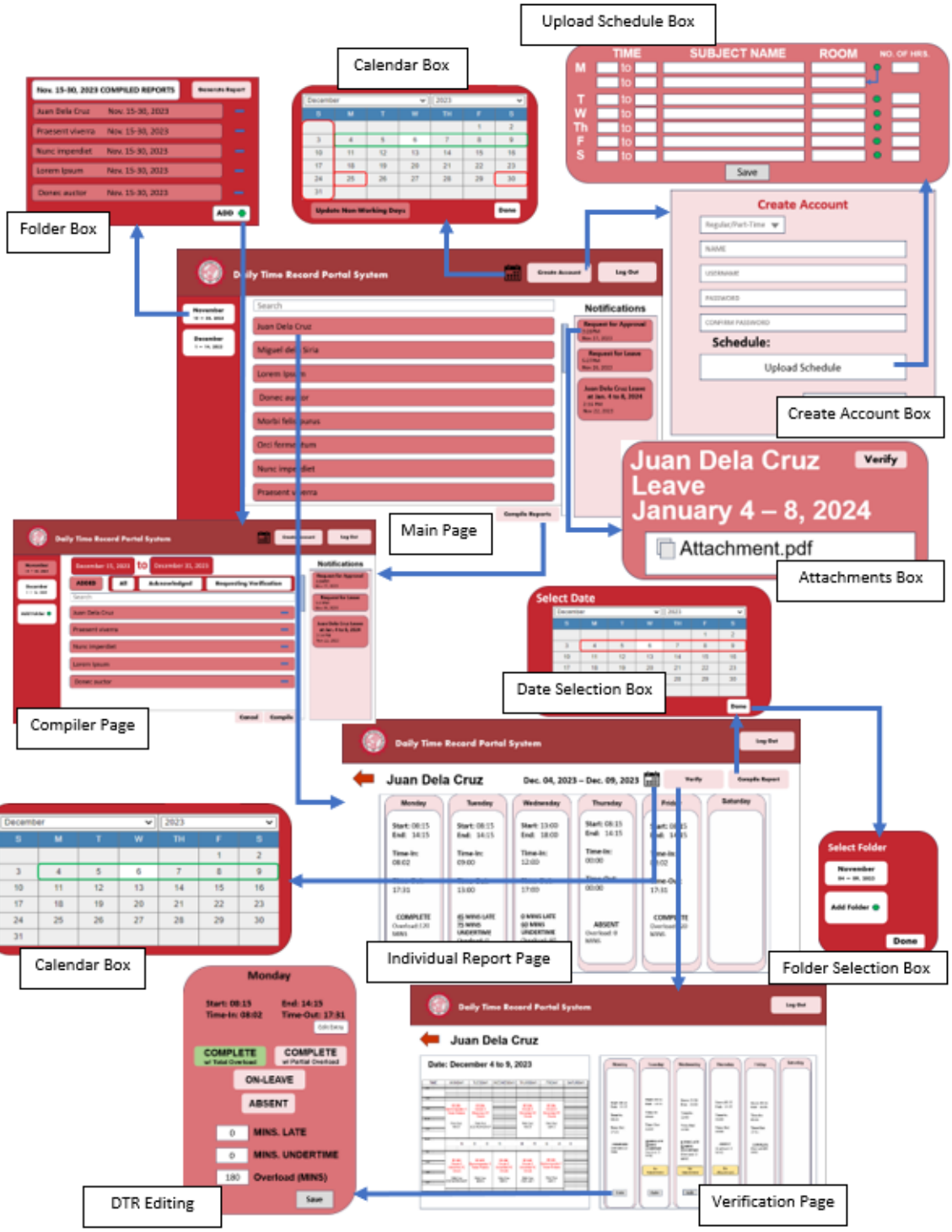


Figure 34

Admin End Wireframe



Testing Procedure

This section of the paper outlines the testing procedures for DTR portal. The DTR portal system will undergo preliminary testing for the accuracy of its functionalities, specifically on the calculations (minutes late, time in, time out and overload calculations) prior to implementation in the Human Resource Office. The input will be previous time-in and time-out records from the database so as not to interfere with the operations of the real time DTR of the university. Furthermore, the entirety of the system will be tested for efficiency of the time it takes to generate the DTR report, and the time it takes to complete the overload reports.

Procedure:

A. ***Testing Procedure for the calculation of total minutes and time it takes to generate a tardiness, undertime and absence report using the current system***

1. Randomly select a DTR of a teaching faculty
2. Start the timer
3. Calculate for the minutes of tardiness and undertime and absences daily
4. Calculate for the total minutes of tardiness and undertime for the whole month
5. Recheck the calculations as needed
6. Stop the timer
7. Record the calculations of total minutes in the 2nd column of Table 2 under Total Minutes for Current System

8. Record the time durations of calculations accordingly in the 2nd column of Table 3 under Time for Current System
9. Repeat steps 1 to 8 for the succeeding trials

B. ***Testing Procedure for the calculation of total minutes and time it takes to generate a tardiness, undertime and absence report using the developed system***

1. Start the timer
2. Input Log-in credentials on the admin log-in page
3. Choose and click on the name of the same teaching faculty as in Testing Procedure A, Step 1
4. Click generate report for tardiness, undertime and absences
5. Click Print as soon as the report is flashed on the website
6. Stop the timer as soon as the hard copy of the DTR is printed
7. Record the calculations of total minutes in the 3rd column of Table 2 under Total Minutes for Developed System
8. Record the time it took to generate the report on the 3rd column of Table 3 under Time for developed System
9. Repeat steps 2 to 8 for the succeeding trials

Table 2

Calculations for Total Minutes of Tardiness, Undertime, and Absences report

Trials	Actual Calculations	Calculations for Current System	Calculations for Developed System
1			
2			
3			
…			
20			
Average			

Table 3

Time it takes to generate a Tardiness, Undertime, and Absences report

Trials	Time for Current System	Time for Developed System
1		
2		
3		
…		
20		
Average		

C. ***Testing Procedure for the calculation of total minutes and time it takes to generate an Overload report using the current system***

1. Randomly select a DTR of a teaching faculty

2. Start timer
3. Calculate for the minutes of overload daily
4. Calculate for the total minutes of overload for the whole month
5. Recheck the calculations as needed
6. Stop timer
7. Record the calculations of total minutes in the 2nd column of Table 4 under Total Minutes for Current System
8. Record the data accordingly in the 2nd column of Table 5 under Time for Current System
9. Repeat steps 1 to 8 for the succeeding trials

D. ***Testing Procedure for the calculation of total minutes and time it takes to generate an Overload report using the developed system***

1. Start the timer
2. Input Log-in credentials on the admin log-in page
3. Select the name of the same teaching faculty as in Testing Procedure C, Step 1
4. Click generate overload report
5. Press Print as soon as the report is flashed on the website
6. Stop timer as soon as the last overload report of the faculty is printed
7. Record the calculations of total minutes in the 3rd column of Table 4 under Total Minutes for Developed System

8. Record the time it took to generate the hard copy of the DTR report on the 3rd column of Table 5 under Time for developed system
9. Repeat steps 1 to 8 for the succeeding trials

Table 4

Calculations for Total Minutes of Overload

Trials	Actual Calculations	Calculations for Current System	Calculations for Developed System
1			
2			
3			
…			
20			
Average			

Table 5

Time it takes to generate an Overload report

Trials	Time for Current System	Time for Developed System
1		
2		
3		
…		
20		
Average		

Project Implementation

After preliminary testing of the back-end part of the system, the researchers will implement the project in coordination with Engr. Christopher S. Faciolan, PECE, head of University Information Technology Center and Mr. Jonathan Mandia of the Computer Engineering Technology Department.

The researchers will facilitate the integration between the frontend and backend components and coordinate with Engr. Faciolan with the deployment of the web portal in Technological University of the Philippines-Visayas together with the implementation of security measures. The web portal will be added to the existing in-line firewall of the university. After which, the researchers will coordinate with Mr. Mandia along with Mrs. Rutchel Pabalinas of the Human Resource Department and the teaching faculty for the User acceptance testing. The researchers will provide a demonstration through actual and video on how to use and be familiarized with the online portal. The users will be asked to perform different tasks in line with the objectives of the study for verification and testing. The portal will run for at least a month for both the user and the admin side prior to the evaluation.

Evaluation Procedure

The evaluation assessment of this device will be guided by the following criteria: System Usefulness, Information Quality, Interface Quality, and Overall Satisfaction. The intended participants for this evaluation procedure will include individuals possessing

significant expertise in the relevant subject matter, capable of astutely assessing whether the developed device aligns with the predetermined evaluation criteria. The determination of the portal's System Usefulness, Information Quality, Interface Quality, and Overall Satisfaction will be based on the collective assessment derived from the average results of the respondents.

The researchers employed the Post Study System Usability Questionnaire (PSSUQ) Version 3.0, a standardized survey instrument developed by IBM, to assess various facets of the system. Respondents used a 7-Likert Scale, ranging from "Strongly Agree" (1 point) to "Strongly Disagree" (7 points), based on their experience with the assessment generator. The evaluation focused on System Usefulness, Information Quality, Interface Quality, and Overall Satisfaction. The specific survey items for System Usefulness encompassed questions 1 through 6. The assessment of Information Quality involved survey items 7 through 12, while Interface Quality was gauged through items 13 to 15. Overall Satisfaction was assessed comprehensively through all 16 items. After respondents completing the evaluation form, the PSSUQ survey instruments were collected, and the gathered results were consolidated for subsequent analysis in the study.

Figure 35

Post Study Usability Questionnaire Version 3

	The Post-Study Usability Questionnaire Version 3		Strongly agree						Strongly disagree		NA
			1	2	3	4	5	6	7		
1	Overall, I am satisfied with how easy it is to use this system.		O	O	O	O	O	O	O		O
2	It was simple to use this system.		O	O	O	O	O	O	O		O
3	I was able to complete the tasks and scenarios quickly using this system.		O	O	O	O	O	O	O		O
4	I felt comfortable using this system.		O	O	O	O	O	O	O		O
5	It was easy to learn to use this system.		O	O	O	O	O	O	O		O
6	I believe I could become productive quickly using this system.		O	O	O	O	O	O	O		O
7	The system gave error messages that clearly told me how to fix problems.		O	O	O	O	O	O	O		O
8	Whenever I made a mistake using the system, I could recover easily and quickly.		O	O	O	O	O	O	O		O
9	The information (such as online help, on-screen messages and other documentation) provided with this system was clear.		O	O	O	O	O	O	O		O
10	It was easy to find the information I needed.		O	O	O	O	O	O	O		O
11	The information was effective in helping me complete the tasks and scenarios.		O	O	O	O	O	O	O		O
12	The organization of information on the system screens was clear.		O	O	O	O	O	O	O		O
13	The interface* of this system was pleasant.		O	O	O	O	O	O	O		O
14	I liked using the interface of this system.		O	O	O	O	O	O	O		O
15	This system has all the functions and capabilities I expect it to have.		O	O	O	O	O	O	O		O
16	Overall, I am satisfied with this system.		O	O	O	O	O	O	O		O

**The "interface" includes those items that you use to interact with the system. For example, some components of the interface are the keyboard, the mouse, the microphone, and the screens (including their graphics and language).*

Statistical Treatment

A. Testing

The results obtained from the testing procedure conducted by the researchers will be subjected to statistical treatment and interpretation using accuracy test and paired

t-test. The accuracy test is used to assess the conformity of the calculation of minutes late, undertime and overload to the correct calculation. The statistical tool is used to assess if there exist a significant difference between the current system and the developed system. The researchers will be using Statistical Package for Social Sciences (SPSS) software for the statistical analysis of the research.

Table 6

Accuracy of Calculations of Total Minutes Tardy and Undertime

Trials	Current System	Developed System
1		
2		
3		
…		
20		
Average		

Table 7

Accuracy of Calculations of Total Minutes Overload

Trials	Current System	Developed System
1		
2		
3		
…		
20		
Average		

Table 8

Descriptive Statistics of Completion time of Tardiness, Undertime, and Absences reports

	Mean	Standard Deviation	Standard Error Mean
Current System			
Developed System			

Table 9

Paired Differences of Completion time of Tardiness, Undertime, and Absences reports

	Mean	Standard Deviation	Standard Error Mean	95% Confidence Interval of the Differences
Current and Developed System				

Table 10

Paired T-test of Completion time of Tardiness, Undertime, and Absences reports

Paired T-test	
T Value	
Degree of Freedom	
P – Value	

Table 11

Descriptive Statistics of Completion time of Overload reports

	Mean	Standard Deviation	Standard Error Mean
Current System			
Developed System			

Table 12

Paired Differences of of Completion time of Overload reports

	Mean	Standard Deviation	Standard Error Mean	95% Confidence Interval of the Differences
Current and Developed System				

Table 13

Paired T-test of Completion time of Overload reports

Paired T-test	
T Value	
Degree of Freedom	
P - Value	

B. Evaluation

The PSSUQ Version 3.0 evaluation form is a standardized tool created to gauge the respondents' satisfaction, and quality of functionality of the Assistive Tool. The statistical analysis of the data involved calculating the average scores relating to the different aspects of the system, which are System Usefulness, Interface Quality, and Overall Satisfaction.

Table 14

Average of System Usefulness per Participant

Participants	Items						Average
	1	2	3	4	5	6	
1							
2							
3							

4							
…							
10							

Table 15

Average of Information Quality per Participant

Participants	Items						Average
	7	8	9	10	11	12	
1							
2							
3							
4							
…							
10							

Table 16

Average of Interface Quality per Participant

Participants	Items			Average
	13	14	15	
1				
2				
3				

4				
…				
10				

Table 17

Average of Overall Satisfaction per Participant

	System Usefulness	Information Quality	Interface Quality	Item 16	Average
1					
2					
3					
4					
…					
10					

Table 18

Summary Table of PSSUQ Evaluation

Participants	System Usefulness	Information Quality	Interface Quality	Overall Satisfaction
1				
2				
3				
…				
10				
Average				

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