

Final Year Project Report

Full Unit – Final Report

A study of Human Computer Interaction

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A report submitted in part fulfilment of the degree of

BSc (Hons) in Computer Science

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Declaration

This report has been prepared on the basis of my own work. Where other published and unpublished source materials have been used, these have been acknowledged.

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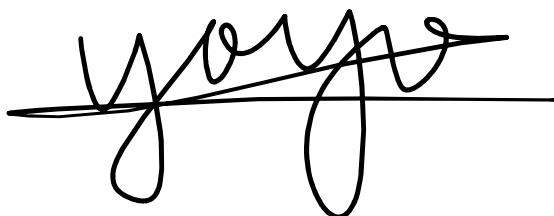
A handwritten signature in black ink, appearing to read "Cheukwing Lim", is written over a horizontal line. The signature is fluid and cursive, with a prominent loop on the left side.

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Abstract

In the later 1970s, the emergence of software and computing such as text editor made everyone a potential computer user. Computers and humans are becoming more tightly integrated. As opposed to the days when they were only able to talk to each other in person, to the present day, most have become bow-headed individuals, constantly interacting with the Internet. They found the usability limitations of computers. Thus, studying the human-machine interface becomes necessary to improve its usability.

Interaction between people and computers is known as human-computer interaction (HCI) and focuses on human-computer interaction as an interface. Human-Computer Interface can observe several types of people to create technologies to help innovative interactions. That enhances the overall usability, productivity and reduces the risk of the system. For example, using the internet is not only for teenagers but also for elderly people. As a group, the elderly tends to have inadequate ability in a variety of functions. Since they rarely handle electronics and are unfamiliar with many operations. Despite this, HCI studied their weaknesses to improve the interface's operation and design for the desired property.

Human-Computer Interface includes three components: human, computer, and the relationship between them. About humans, they will have several types of memory, perception, speech, and voice. The computer has a screen for human visuals, a trumpet for human auditory, and input devices for human tactile. This relationship between them is essential for Human-Computer Interface. Therefore, Norman's model of interaction (HCI execution-evaluation cycle) is for designing an efficient system process. During the model, we can improve the system following three conflicts, gulf of execution, gulf of evaluation, and human error. For HCI, ergonomics also is one of the components to design the best performance for users such as display function and colors catering color blind.

Norman's model of interaction: Establish the goal, Formulate the intention, specify actions, execute action, perceive system state, interpret system state, Evaluate system state.

In this project, I will design and implement three different software interfaces such as websites and databases with one topic small online shopping. During the design, I will follow Norman's model of interaction. For the step of the design process, I will do research of user who will use the software and its requirements analysis. Building some specific guidelines for the design can efficiently meet the requirements of those users. Afterward, I will start designing the idea followed by the analysis of statistics and solve the issues of each different user. Finally, evaluate the whole product that has been built to meet the goal of the website and the requirement of users.

Following HCI design, I will compare different interfaces and so some survey for different type of user on HCI about software and hardware interfaces. Each content will directly record inside the report and the statistic sheet I will build inside my Gitlab.

Project Specification

Name of the project: A study of Human Computer Interaction (HCI)

Aim:

- (1) Learn about Human Computer Interaction by comparing user interfaces and researching.
- (2) To design several software for achieving the theory of Human usability.
- (3) Evaluate by the actual user and improve that software.

Background:

Due to the advance of technology, user interfaces design is necessary to keep making improvement for cater the human usability. Thus, considering the usability of the user, human started to study about the relationship between computer and human call Human Computer Interaction for developing the following software smoothly and perfectly. The aim of this project is to study the theory about HCI through my personal user interface developments and evaluation.

Development in term 1:

- (1) Layout of the first two software
- (2) Some interaction of software 1 and 2
- (3) Do some improvement from design rules

Development in term 2:

- (1) Finish 3-4 software
- (2) Do an improvement from myself
- (3) Make a survey to evaluate the software
- (4) Find some user from different age group to evaluate my software

The report will include:

- (1) Overview and design achievement of those user interfaces
- (2) Process of those user interfaces
- (3) HTA diagram of those user interfaces
- (4) Evaluation of those user interfaces
- (5) User manual of three user interfaces
- (6) Comparison of user interfaces and the theories achievement inside the software

Chapter 1: Introduction

1.1 What is Human Computer Interaction

Human Computer Interaction is a study of designing computer interaction to adapt human's perception, behavior, cognitive. It is a multidisciplinary subject including psychology, cognitive science, ergonomics, sociology, computer science, engineering, business, graphic design, and technical writing. The main reason for the HCI exploration is to improve the usability of technology. Aside from this, it promotes the advancement of the Internet and its practicality. It is studying the relationship and interaction of humans and interaction including memory, visual, movement etc. Therefore, the core concept of HCI is user-centered and usability. HCI researchers found out sets of design processes, principles and methods for guiding the future designer to create advanced software.

1.2 Aims and Goals of the Project

Human Computer Interaction is an essential part of the future software design. This project is a clever way to deeply study the relationship between humans and computers. Plus, I could be an advanced designer to design the best software for users to use. The aim of this project is to learn about the design rules of HCI and build three or above software following the structure of what I learnt and improve the usability of the software continuously until an advanced website. Each software will be evaluated by the actual user through an interview or survey.

1.3 Survey of Related Literature

This section provides an overview and analysis of existing literature and research related to the topic being studied. I identified and summarized three main literature and research for this project and identified any gaps or inconsistencies in the literature the research aims to address.

Alan, D., Janet F., Gregory D. A., and Russell B. (2004) Human-Computer Interaction. 3rd ed. Pearson Education.

"Human-Computer Interaction" provides an overview of the field of human-computer interaction (HCI), covering user interface design, interaction design, usability evaluation, and social and organizational aspects of HCI.

Those sections provide a solid foundation for my project, while its practical advice and examples will help you apply the concepts to real-world situations. In addition, this project is surrounding Human Computer Interaction. This book provides all I need in the project including its history, theories, and principles for the background, task analysis, prototyping, usability testing, and evaluation methods and different application design. It is suitable for my project.

Jakob N., Hoa L. (2006) Prioritizing Web Usability. New Riders.

"Prioritizing Web Usability" focuses on the principles and methods for improving the usability of websites. The book covers the fundamental principles of web usability, user research and testing, and practical guidelines for designing usable websites.

One of the key strengths of this book is its practical focus, providing readers with actionable advice and guidelines for improving website usability which is the key principle of HCI. Moreover, I created two software for analyzing HCI are website either. The authors provide numerous examples and case studies throughout the book to illustrate the concepts they discuss, making it a useful resource for web designers, developers, and usability professionals.

Jeff J. (2010) Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules. Morgan Kaufmann.

"Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules" focuses on the cognitive psychology principles that underlie effective user interface design, providing a framework for understanding how people interact with software and digital devices. Each section provides clear explanations of the relevant cognitive psychology concepts and how they apply to user interface design, as well as practical guidelines and examples.

In my project, I analyze HCI through creating three software. This book helps me to understand how people interact with software and digital devices, and how to design user interfaces that meet the needs of users. The author provides numerous examples and illustrations to explain the concepts discussed in the book. This makes me interested in user interface design, regardless of their level of expertise.

1.4 Milestone Summary

Week 2

I was starting to do the planning of the project 'Human Computer Interaction'. I have searched some details about the HCI on the internet, HCI is about the relationship between Human and Computer. There are several similar elements which connect the interaction of a software. The main reason for studying HCI is improving the usability of software following the advancement of internet and technology.

Week 3

I learnt more about the software process, execution and the evaluation when designer creating a software. There are several principles and design rules we can follow to guarantee the usability of the software. I considered some of the risks of doing this project and prearranged precautions or workarounds.

Week 4

I read the book 'Human Computer Interaction' which can deeply be learnt about the relation between human and computer such as visual channel with the computer screen. I listed the principle of HCI for

the process of creating the software and the evaluation when creating the software which is a checklist for me to evaluate the elements of usability is completely achieved or not such as flexibility or learnability.

Week 5

I planned to design two software be a restaurant ordering, one for teenager, one for elder people. The difference between them is about the font size and the picture size for elder people would be bigger and clearly and the website for the teenager would be simpler which would not spend too much time for the ordering progress since it does not need the step of showing food bigger and clearly.

Week 6

In this week, I learn about the computer and interaction between human and computer from the book and finished the layout of the ordering app either for teenager or elder people. According to the supervisor's advice in the meeting, I started designing the website by HTML file with some HCI theory for drafting the report. I realize the time management is not doing well such as the report are not started yet. I did the high time estimation.

Week 7

I had done the layout of ordering app for teenagers and partially finished the layout for the elder people. I had used some CSS for highly presenting the feature of button and the food display in the webpage for the elder people. I had done some CSS for the vision when user using the website through mobile phone.

Week 8

I learnt about the design process of Human Computer Interaction. I realized it is difficult for me to compare this two software which is same topic with different users (teenager and elder people). However, I changed the topic of the software which is shopping website. I did the plan of ordering app and shopping app according to the design process I learnt. The tools I am using (HTML) are quite old. Therefore, I changed to use react tools to create software which is more advanced and easier. It is a challenge for me since I have not used it much before.

Week 9

I did the layout of an ordering app this week. I created several components in the ordering app which is home 'Home.js', order 'Order.js', cart 'Cart.js' page. React Route can create its own path for each component and add a link path to a button to connect the other component. I use a better way for starting to create the shopping app and created several components which is home 'Home.js', search 'Search.js', type 'Type.js' page.

Week 20

I was starting to add the details of food like adding more food items and adding the image of the food into 'Food.js'. For the picture to be not professional, I edited the picture size to fit the food card. Also, I updated the layout of the food card to fit all the content of food.

Week 21

I have implemented new features into the ordering app, including a map to store selected food items in the customer's cart, named "order". This map updates automatically when customers click the "add" button for a selected food item and includes a feature to count the total price of items added to the cart.

Furthermore, I have developed a patient diary app to cater to different types of patients, such as colorblind or elderly individuals, who require special design considerations for optimal Human-Computer Interaction.

Week 22

I added a calendar feature to the patient diary app, which allows patients to mark down events and appointments. This feature utilizes the "react-big-calendar" package.

In addition, I began working on a to-do list GUI as a separate software project to explore Human-Computer Interaction further. I created a basic GUI layout using Python's Tkinter library, featuring an input frame for entering tasks, an empty frame for displaying tasks with checkboxes, buttons for adding and deleting tasks, and a calendar for selecting task due dates.

To manage the task data, I created a text file called "tasklist.txt" using the format TASK | DATE and wrote functions to load and save task data to an array called "tasklist" upon user input. I also created an array, "my_ref", to update the task list when users switch to a different date by storing all checkbox buttons.

Week 23

To enhance the functionality of the to-do list GUI, I added an "undo" button feature that initially utilized a text file called "undolist.txt" to store previously deleted tasks from the user. However, I realized that this feature could only be used for deleted tasks, so I updated it to use an array list to store all previous user actions.

Furthermore, I added a "move" button to enable users to move incomplete tasks to the next day.

Week 24

I added a login and register function to the system, creating a new GUI interface for users to either log in to their account or create a new account. The login and register interface include fields for usernames and passwords and displays an error message if the user enters incorrect information or fails to meet the required criteria.

To manage user login information, I created a text file called "userlist.txt" that stores user login data. This file is loaded upon system start, and user data is moved to an array for efficient management. Additionally, I updated the to-do list feature to display the username of the current user and use a unique task list file named "USERNAME_tasklist.txt" to prevent conflicts between multiple users.

Week 25

I improved the functionality of the patient diary app by restyling the layout to make it more user-friendly on mobile devices. Additionally, I created a layout for the journal feature and added functions to verify user-entered information during the registration process.

Week 26

Last week, I made changes to the app's navbar by restyling it to only show the icon. However, I realized that this could be confusing for users, so I updated it to show the name when the mouse hovers over the icon. For mobile users, the name and icon are displayed simultaneously for ease of use. To accommodate users with visual channel issues, I added a function that allows them to adjust the font size of text on the symptoms page.

Additionally, I created a page in the Journal feature that displays all the user's previous entries with dates, enabling them to navigate back to the journal entry page. In the Settings page, I added three buttons for turning notifications on/off, customizing app colors, and logging out.

Week 27

I have been working on improving the ordering page by adding new features. I created a function that allows users to remove items from their cart, move confirmed items to the order page, and receive notifications when adding an item to the cart or confirming an order. These notifications are useful for keeping users informed of their actions. ☺

Chapter 2: Introduction and Background of HCI

2.1 Historical Development

Human-computer interaction (HCI) has a history that dates to the 1950s. During its early days, the primary mode of interaction with computers was through punched cards and paper tape, requiring specialists in dedicated computer rooms. However, the concept of a Graphical User Interface (GUI) emerged in the 1970s, revolutionizing the way users interacted with computers. The 1980s and 1990s witnessed a constant need for technological improvements, leading to the development of interfaces designed with the user as the central focus to enhance usability. This era introduced various methods to design different software, such as dynamic evaluation and usability evaluation. With the advent of modern technology, HCI research has encountered new challenges, such as designing interfaces for more compact screens. Throughout its development, HCI has focused on improving user experience and making technology more user-friendly and intuitive.

2.2 Disciplines and Perspectives

Human-Computer Interaction (HCI) is an interdisciplinary field that draws upon several different disciplines and perspectives. One of the primary disciplines that HCI draws upon is computer science, which provides the technical expertise necessary to design and develop computer systems.

Additionally, cognitive psychology is another important discipline, as it is concerned with how people think and process information, which is crucial in designing systems that are easy to use and understand.

Anthropology is also an important discipline, as it provides insights into the social and cultural aspects of human behavior, which is crucial in designing systems that are culturally appropriate and acceptable.

Design is another important perspective, as it emphasizes the need for systems to be aesthetically pleasing, intuitive, and usable. These disciplines and perspectives come together in HCI to address the challenges of designing and developing systems that are technologically sound and meet users' needs and expectations.

2.3 Applications and Domains

Human-Computer Interaction (HCI) involves the design, development, and evaluation of interactive computing systems. As such, HCI has been applied in many areas such as business, education, entertainment, health, and social media. In business, HCI has been used to design interfaces for various applications such as point-of-sale systems and inventory management systems. In education, HCI has been used to design educational software, simulations, and virtual environments. Entertainment applications of HCI include video games, augmented and virtual reality experiences, and interactive television. In healthcare, HCI has been used to design medical equipment, health monitoring devices,

and assistive technologies. In all these domains, the goal of HCI is to create user-friendly, efficient, and effective interactive systems that enhance user experience and productivity.

2.4 Current and Future Trends

Human-Computer Interaction (HCI) has come a long way since its inception and is continually evolving. The current trend in HCI is to move beyond the traditional computer interfaces to include other technologies such as mobile devices, wearables, and the Internet of Things (IoT).

One of the most significant developments in HCI is the increasing importance of user experience (UX) design, which involves designing interfaces that are intuitive, aesthetically pleasing, and easy to use.

Another trend in HCI is the integration of artificial intelligence (AI) and machine learning (ML) techniques, which can improve the performance of interfaces by providing personalized experiences to users.

In the future, it is expected that HCI will become even more pervasive, with interfaces being seamlessly integrated into our everyday lives. Augmented reality (AR) and virtual reality (VR) are also expected to become more prevalent, offering new ways for users to interact with digital content. In summary, the current and future trends in HCI involve the integration of new technologies, a focus on user experience, and the increasing importance of AI and ML in interface design.

Chapter 3: Developments

3.1 Overview

Software 1: Website for restaurant customer ordering (business)

In the restaurant, ordering by waiters is outdated. The mode of restaurant ordering is changing to be ordered online through a QR code. This software would be for customers, whoever is a teenager or elderly people.

The ordering page should be used by mobile phones, Design should match to website and mobile (width). To elder customers, the designer will consider catering to the issue when they use it.

Purpose: analysis how to design a software considering the elderly people and different devices with Human Computer Interaction

Client: the boss of the restaurant

User: customer (doing as the teenager or elder people)

Features:

- Menu: showing the food and add item to the Cart
- Cart: showing what user added and confirm the order
- Order: showing confirmed order with reference number

Software 2: Patient diary app (health care)

A website for patients needs to have a lot of consideration of the design. Such as a patient with colorblind or an elder patient who needs to consider the font size. However, an app for patient diaries is a good creation for analysis about Human Computer Interaction.

The patient diary app should either be used by mobile phone or computer. Design should match the website and mobile (width and effects). According to the aim of webpage, the design would be simple, easy to use and create more functions which can be suitable to different types of patients.

Purpose: analysis how to design a software apply for health with Human Computer Interaction which considers the issue of using laptop by different types of patients.

Client: the owner(s) of hospital.

User: different types of patients.

Features:

- Login and sign up: log in to the system or create a new account.
- Calendar: for patient to add the event in calendar.
- Journal: add diary everyday which convenient for doctor to know what they feel every day.
- Symptoms: a set of questions for the patient to answer.

- Setting: patient can control what color or the notification.

Software 3: To do list GUI (different interface)

GUI is a different software compared with the previous two software, which is a good chance to analyze HCI in different types of software. To do list is quite common software for users to record their daily task.

GUI is a small window including all the functions which are suitable for users to use with multiple screens. In this software, I will do the function which matches the habit of the college usage.

Client: The head of company

Main user: Office Staff

Features:

- Login and register: staff can register their new account and log in the system
- To do list: add, delete, move the task in the frame
- Database (userlist.txt, tasklist.txt): store the login details of each user and the daily task of each user

3.2 Components and Interaction

Software 1: Website for restaurant customer ordering

- a) View menu
 - the default is to display food item type and each individual item including (1) price. (2) quantity. (3) picture. (4) description.
 - show the current quantity selected of each item.
 - add or remove items into the cart.
 - notification and effects show the user added or removed the item.
- b) Ordering items
 - display how many did they chose.
 - display the total price.
 - remove the item that they do not need.
 - edit the quantity of the food item.
 - confirm button for customers to confirm the order.
 - notification of thank you message and confirmed order.
- c) Order tracking
 - Order reference number
 - Status of order
 - show the items they ordered.
- d) Calling waiters (button)

Software 2: Patient Diary app

- a) Log in
 - Log in the system with any email or password
- b) Register
 - Sign up for a new account with (1) First name. (2) Last name. (3) email. (4) password/ confirm password.
 - Show error message if:
 - (1) They didn't fill in the frame.
 - (2) The email is not valid.
 - (3) The password doesn't have 8 or above characters, upper-case or lower-case letter and a special letter.
 - (4) The input of confirm password is not the same as the password input.
- c) Calendar
 - Add events with date and time into the calendar.
 - Show the calendar in month, week, day, or agenda.
- d) Journal
 - Enter title and journal with the selected day.
 - Add journal button.
 - Show the wrote journal with its' date and time.
 - Back to the write journal button.
- e) Symptoms

- Showing a set of questions to know the patient's feeling.
- Five emotion icons in each question for users to select.
- Select the day of symptoms.
- Select the font size of the question.
- f) Settings
- Set the notification to be on or off.
- Set the color of the app.

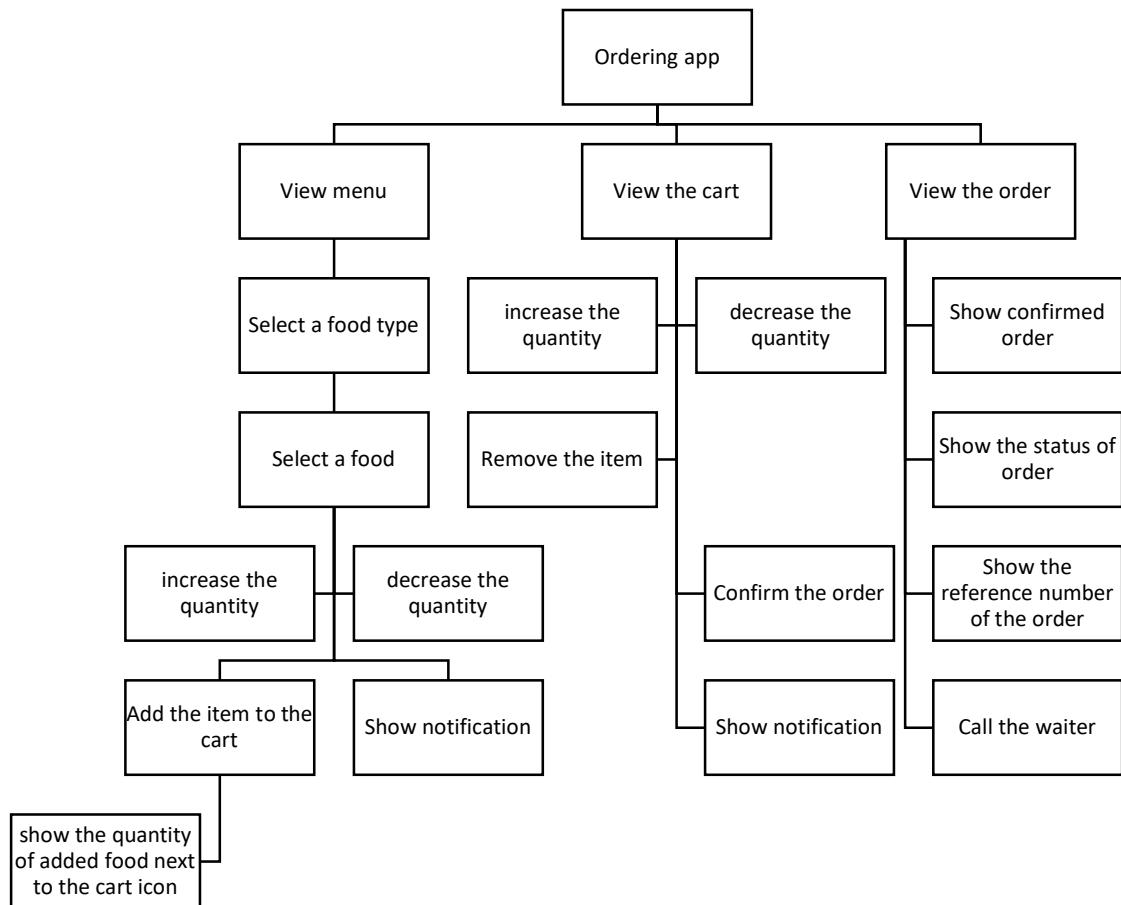
Software 3: To-do-list GUI

- a) Main page
 - For user to choose the option of login and register
 - Function:
 - main_screen_open () -> pop up an interface for user to choose the option of login and register
 - loaduserInfo () -> load the userlist file in the beginning of main program and save it into a list
- b) Register an account
 - Create an account
 - Function:
 - register () -> pop up a register interface for user to register their new account, which include username and password frame
 - check_username () -> check the username is used or no, check the username isn't exist whitespace and confirm the username has been filled in
 - check_password () -> check the password should meet the following rules: include upper-case and lower-case letters and the length of password should 8 or more characters
 - register_user () -> add the registered user into the userlist.txt file which is for login verification and show are they registered successful or not
- c) Login account
 - Login their account which saved their tasks
 - login () -> pop up a login interface for user to login, which include username and password frame
 - login_verify () -> check the user entry is exist into the userlist and check the password is correct or not
- d) To do list Interface
 - User can add the task in the selected date
 - User can click done when they had completed the task
 - User can delete the completed tasks
 - User can move the incomplete task to the next day
 - User can undo their action
 - Variable:
 - task_list: list -> storing the task of each user
 - f_done: font style -> the font style of completed task
 - f_normal: font style -> the font style of incompletely task

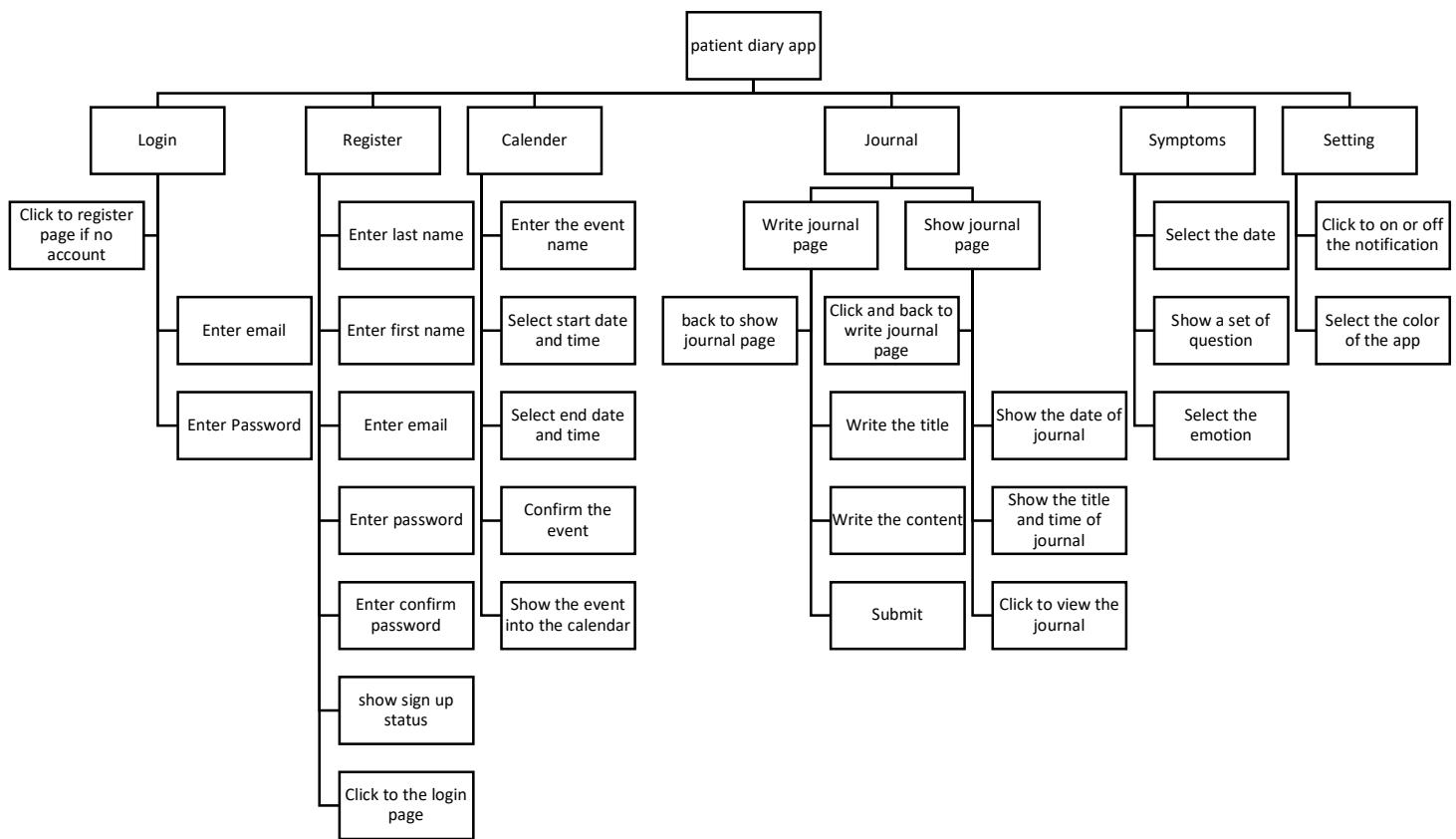
- `my_ref`: hash map -> storing each checkbox, their status and corresponding date
- `finish_register`: bool -> check if the register finished, the register screen will close when user click “Go and login” after registration
- `register_rule`: bool -> check if the user password when doing the registration is meeting all the requirements of password
- `used_name`: bool -> check if the registration username has been used or not
- `login_username`: string -> save the logged in username for creating the tasklist.txt file name and show the name in the interface
- `enter_name`: string -> storing the entered name into the entry box which use for checking the username is existed or not
- Function:
 - `todoList()` -> pop up an interface showing the task of user added before, current date and the function inside the to-do-list
 - `openTaskFile()` -> copy the task from `(username)_tasklist.txt` and store into the `list[]` if the `(username)_tasklist.txt` is existed. Otherwise, it will create a new `(username)_tasklist.txt`
 - `addTask()` -> add the task into the `(username)_tasklist.txt` and `tasklist[]` and show into the frame box
 - `updateTask(event)` -> update the task when user select the other date
 - `checkbtn_triggle(k)` -> change the configure of the task font, color and feature when user click the checkbox
 - `undoTask()` -> undo the user pervious action according to the `undolist[]`
 - `printTask()` -> for code refraction, each function can use this `printTask` function to print the task when update the date or update the task of each action (delete, add, move)
 - `deleteTask()` -> delete the completed task
 - `moveTask()` -> move the incompleted task to the next day and system will directly go to the next day for showing the movement

3.3 Task Analysis

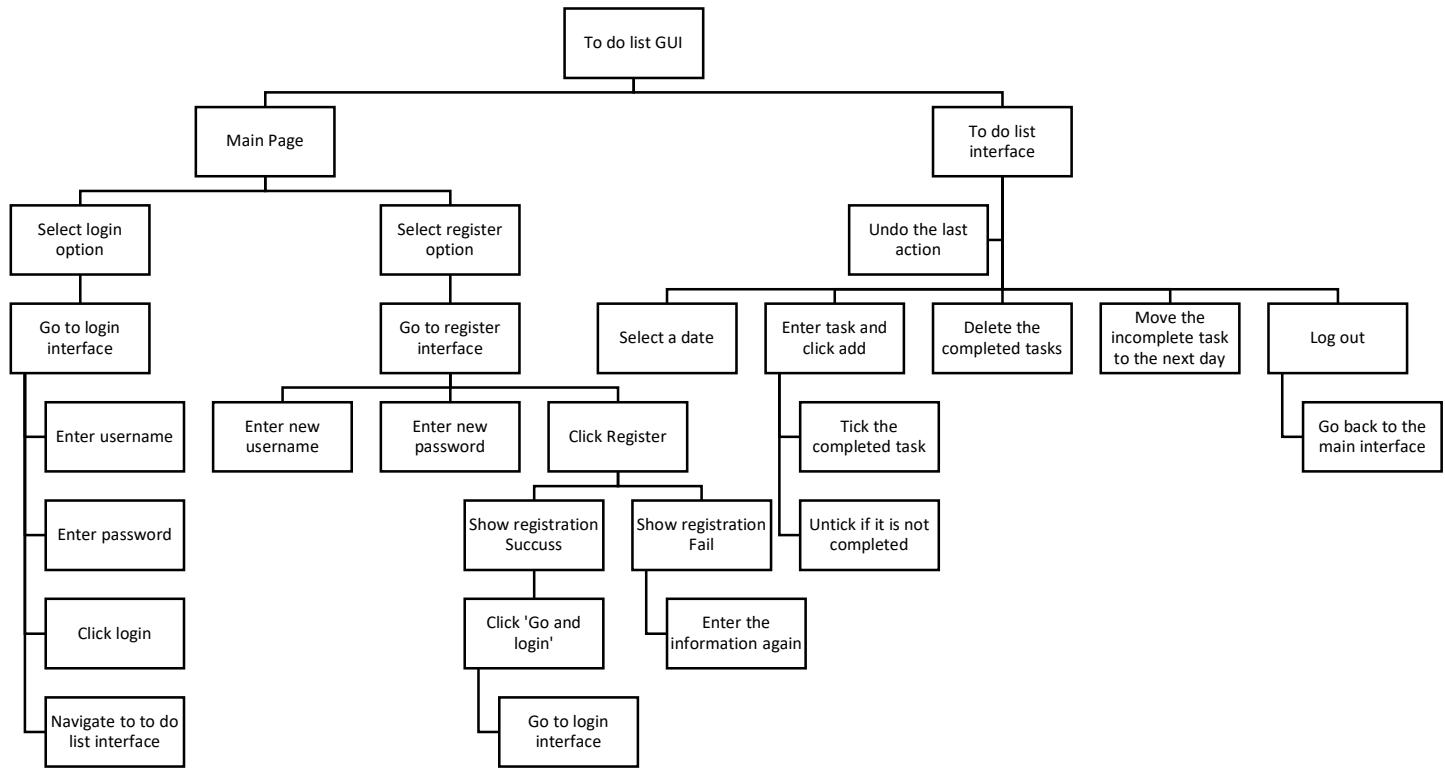
Software 1: Website for restaurant customer ordering



Software 2: Patient Diary app



Software 3: To-do-list GUI

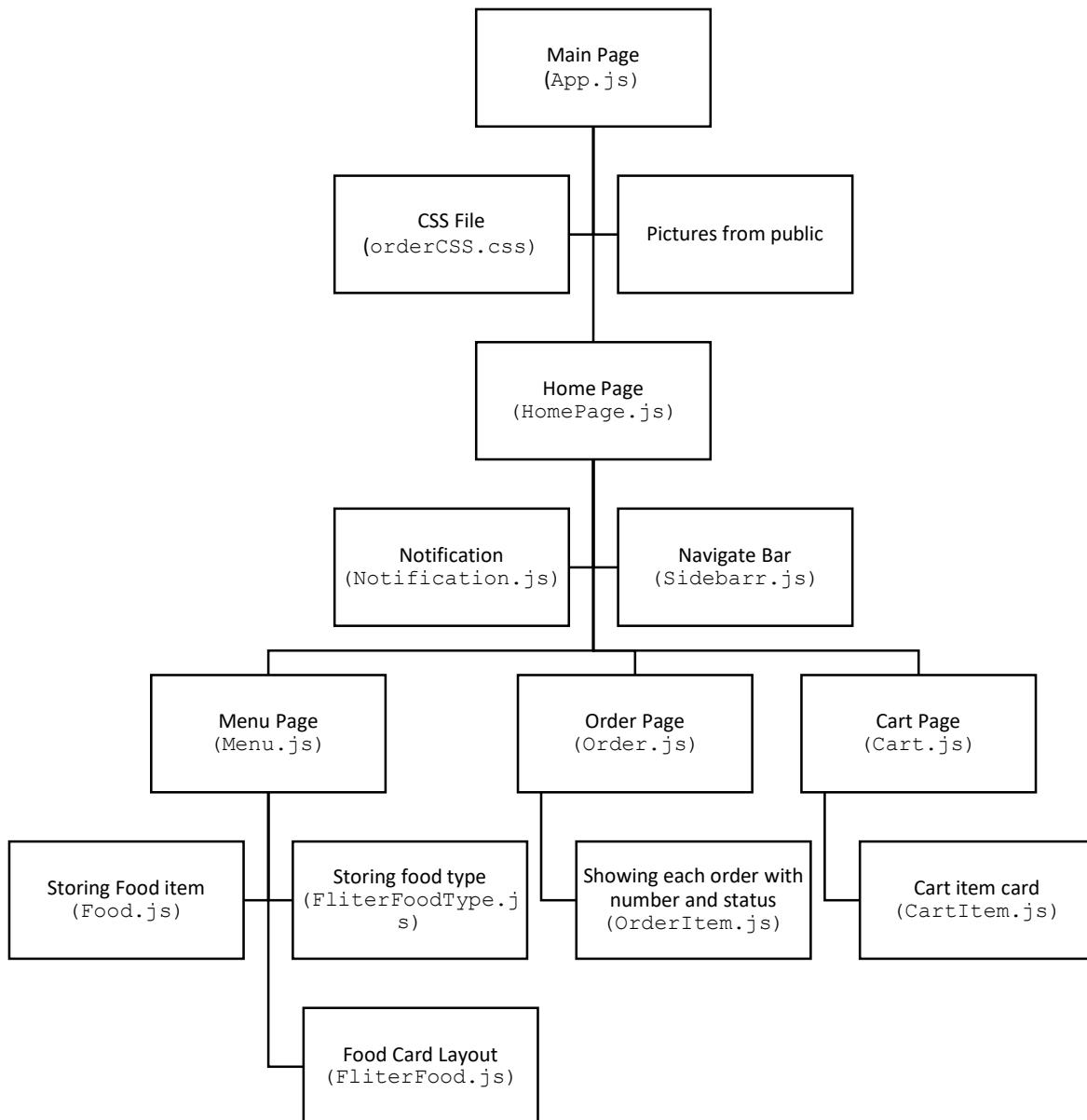


3.4 Documentation

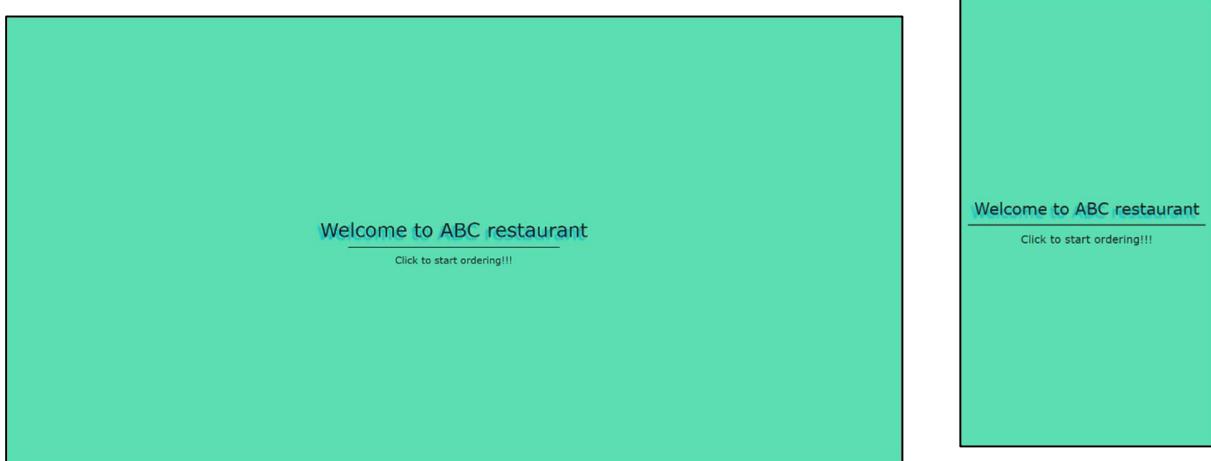
Software 1: Website for restaurant customer ordering

Link of software description: <https://youtu.be/EIpDeiJ6yOI>

Website design:



Home Page: <http://localhost:3000/>



Menu Page with nav bar:

Path: <http://localhost:3000/menu>

Item	Description	Price	Quantity
Chicken Dumpling	5 deep fried chicken dumpling	£ 5.2	- 0 +
Yakitori	4 battered balls filled with octopus served in tonkatsu and mayonnaise sauce	£ 4.9	- 0 +
Spicy Prawn Tempura	Deep fried prawns. Served with spicy chilli mayonnaise sauce	£ 8.7	- 0 +

Cart Page with nav bar:

Path: <http://localhost:3000/cart>

Item	Description	Price	Quantity
Yakitori	4 battered balls filled with octopus served in tonkatsu and mayonnaise sauce.	£ 4.9	- 2 +
Bulgogi Udon	Large bowl of udon noodles soup with varied toppings	£ 8.7	- 2 +
Salmon Sashimi	3 slices of fresh raw fish	£ 3.5	- 2 +

Sub-total: £ 34.2
Services fee: £ 3
Total: £ 37.2

Confirm

Sub-total: £ 36.4
Services fee: £ 4

Order Page with nav bar: 

Path: <http://localhost:3000/order>

ABC Restaurant

Ref. #812894

	Status: Preparing...
Yakitori	2
Bulgogi Udon	2
Salmon Sashimi	2

Ref. #729983

	Status: Preparing...
Spicy Prawn Tempura	1
Spicy Tuna Handroll	1
Prawn Tempura Udon	1

[Call waiter](#)

ABC Restaurant

Menu Your Order 

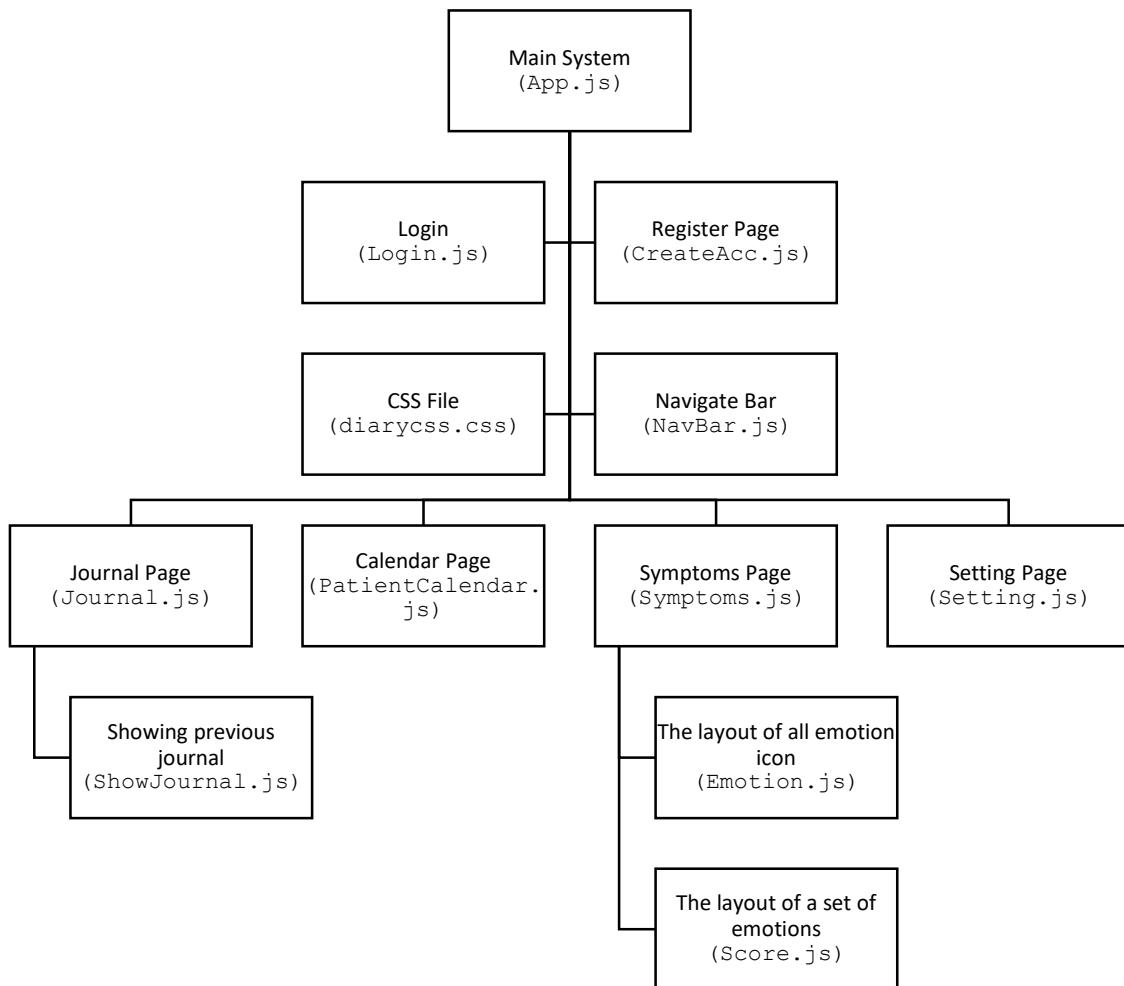
Ref. #486803 Status: Preparing...

Chicken Dumpling	3
Salmon and Cheese Handroll	2

[Call waiter](#)

Software 2: Patient Diary App

Link of software description: <https://youtu.be/wJCfra6EiK8>



Login Page:

The image displays two side-by-side wireframe mockups of a 'Log In' page. Both versions feature a light gray background with a white rectangular form in the center. The form has a header 'Log In' at the top. Below it are two input fields: 'Email:' and 'Password:', each with a small placeholder text ('Email:' or 'Password:'). Underneath these fields is a teal-colored rectangular button labeled 'Log In'. At the very bottom of the form, there is a small, dark blue link that reads 'No account? Sign Up'.

Register Page:

The image shows two wireframe mockups of a 'Create Account' page. Both versions have a light gray background with a white central form. The form starts with a header 'Create Account'. It contains four input fields: 'First Name', 'Last Name', 'Email', and 'Password'. Below the 'Password' field is a small red text box containing five rules for password strength: '1. 8 or above characters', '2. Include upper case', '3. Include lower case', '4. Include special character', and '5. Include one number'. Underneath the password field is another input field for 'Confirm Password'. At the bottom of the form is a teal button labeled 'Sign In'. A small dark blue link 'Already have an account? Log in' is located at the very bottom.

Journal Page with navbar:

The image presents two wireframe mockups of a 'Journal Page with navbar'. On the left is a vertical teal sidebar containing icons for a calendar, a mood meter, settings, and a search bar. The main content area has a teal header bar with the text 'ABC Hospital Patient Diary'. Below the header is a message 'Hello ABC patient, how is your feeling today?'. A purple rectangular box displays the date '29 / 03 / 2023'. The main workspace includes a title input field and a large text area for 'Journal'. At the bottom of the page are two buttons: 'Submit' and 'Back to journal review'.

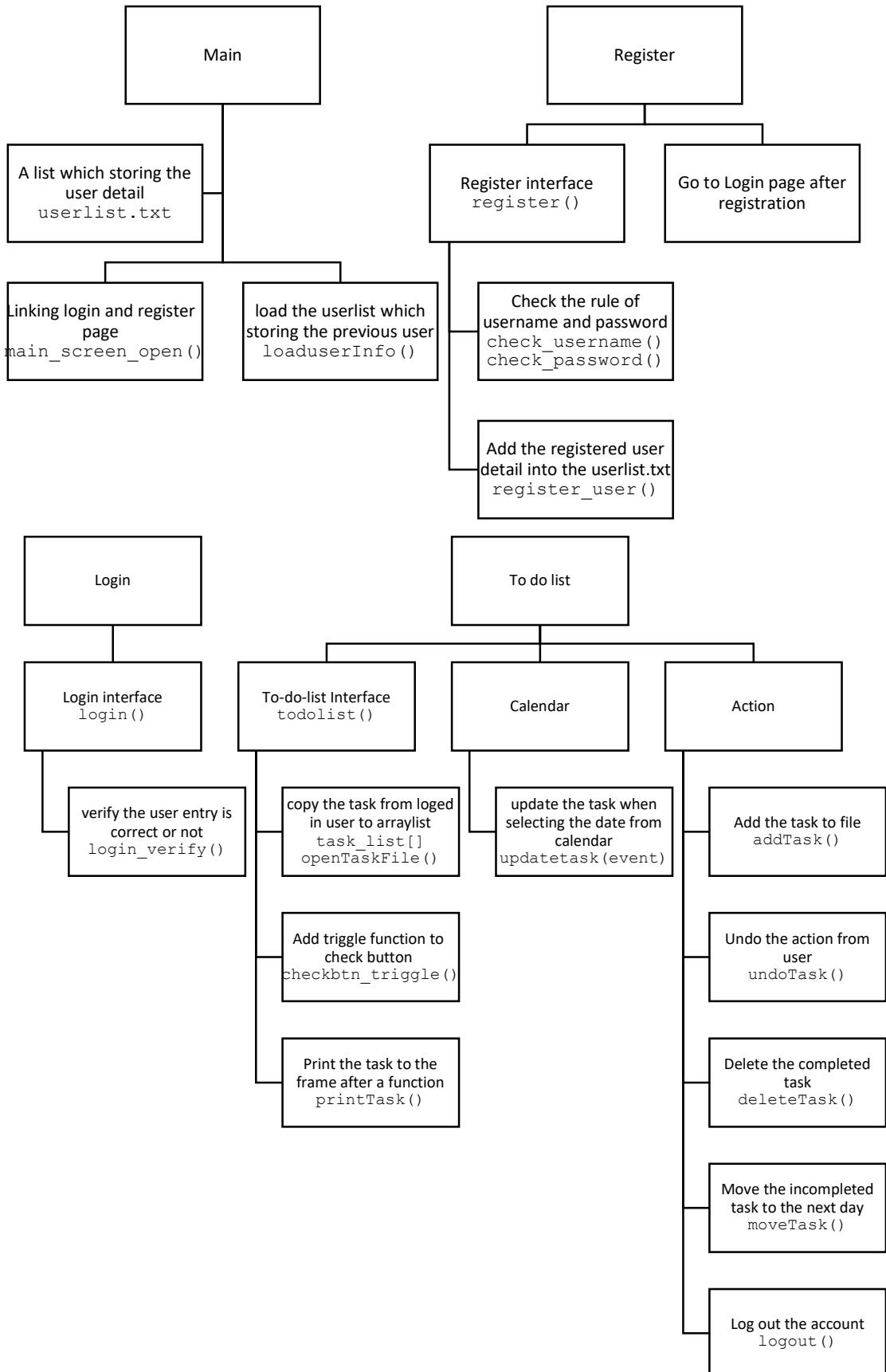
Calendar Page with navbar:

Symptoms Page with navbar:

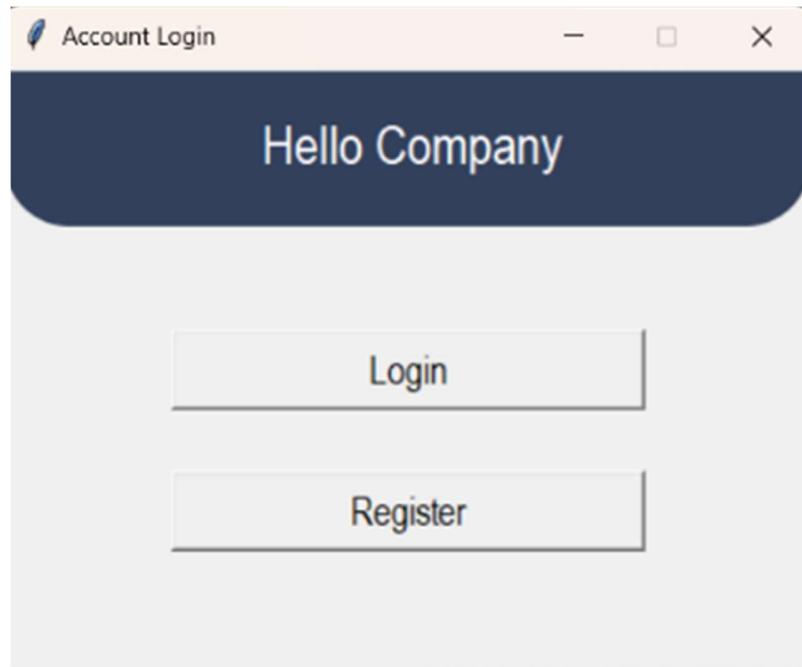
Setting Page with navbar:

Software 3: Todolist GUI

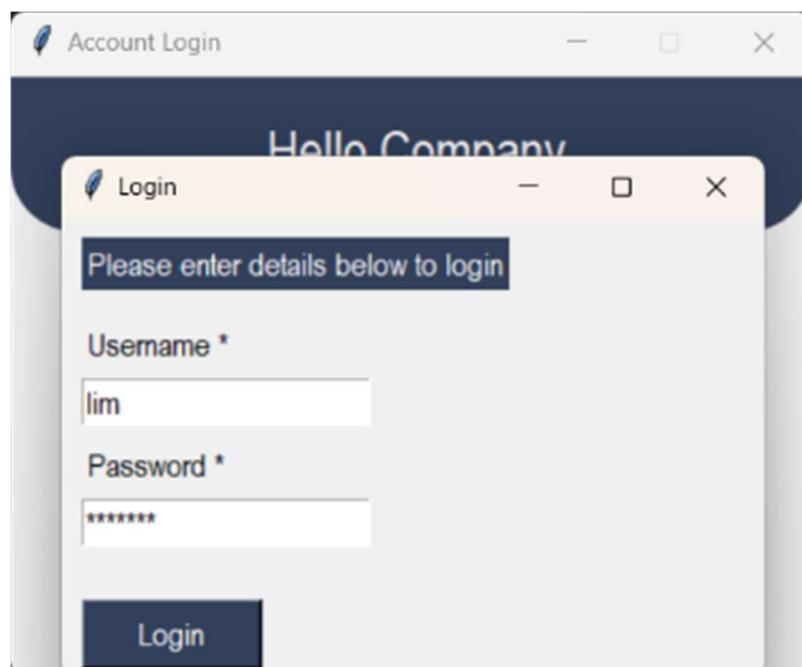
Link of software description: <https://youtu.be/kSKuVLjqXZ4>



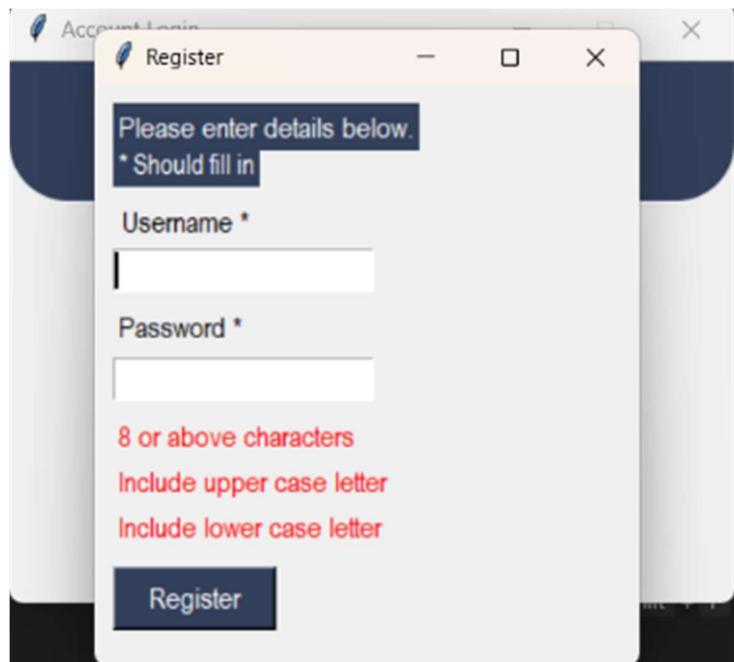
Main Interface:



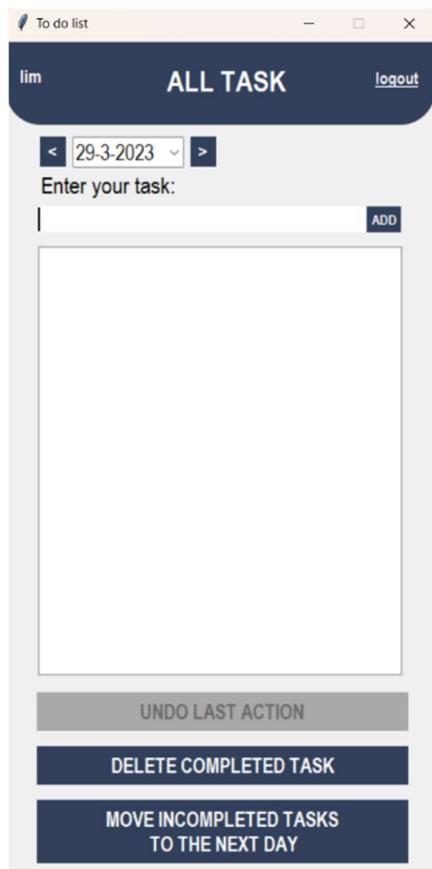
Login Interface:



Register Interface:



To do list Interface:



Chapter 4: Proof-of-concept Development

4.1 Software 1: Website for ordering

4.1.1 Proof-of-concept Development and Justification

Home Page (HomePage.js)

The first proof-of-concept development, which represents the first page of the user using, Home Page. The home page in the ordering app which I designed is a welcome page. The page at the beginning of the software is the first impression of the user.

- A welcome message not only can improve the satisfaction of user experience, but also can make customers know they are going into the right website.
- Customers can follow the guide on the page that click to start ordering.
- Using the background color of green and font color for black is catering to people with color blindness. Even if they are red, green, blue, or colorblind. They can see the cover of grey and the word with black color.
- It will first show the navigation bar including all the components of the software after clicking start.

Menu Page (Menu.js)

The second proof-of-concept development, which represents the page after clicking start, Menu page. The menu page shows all the food by filtered food type and displays all the food by display card which includes the name and the description of food, the quantity of the customer selected and the button for adding the item into the cart.

- Adding a feature in the right corner of food cards about the quantity of customer selected. Users can check the selected item clearly even if it is full of food cards over the whole page.
- User can see the quantity of the food when user click '+' in the right corner of the food card. This feature can make the user see how many they clicked clearly.
- After adding the food item, the notification, "item is added into the cart", will show up to inform the customer that they added the food, and the food quantity will show up next to the cart icon. It can make everything clearer for the user even if the user is elderly.

Cart Page (Cart.js)

The third proof-of-concept development, which represents the order items selected by customers. Each order item shows the picture, name and the description. Customer can edit the quantity of the item or remove the whole item from the cart. In addition, there is a summary of price and service fee and a button of confirm.

- A pop-up message 'Thanks for ordering. The item(s) is confirmed, please check the order page.' which can make customers feel satisfied using this website.

- Using 'CartItem.js' to layout the food items which make the website organized and make user feel comfortable.

Order Page (Order.js)

The fourth proof-of-concept development, which represents the page after clicking confirm order in the Cart Page, Order page. The order page shows the order which the customer ordered. Each order card will sequence the name and the quantity of order in each single order with a reference number and status. Customer can click 'Call the waiter' for each order.

- Record a unique reference number for each order which is convenient for the customer to track their order.
- A message 'Waiter is coming, please wait' below the call waiter button can make user knowing their progress of action clearly and a kindly interaction with users.
- Status of tracking order which is the main purpose of the website.
- Using 'OrderItem.js' to layout the food items which make the website organized and make user feel comfortable.

Notification (Notification.js)

The fifth proof-of-concept development, which is a notification pop up message on the right top corner of the page. It will show up after the user adds items to the cart, 'items added to the cart', and confirms the order from the cart, 'Thanks for ordering. The item(s) is confirmed, please check the order page'.

- Notification is an important part of an app or website for showing the instruction for user and make them clear what they did or what they need to do.

4.1.2 Work Log

9th November

I change the tools I use from HTML file to React file, and create a branch call 'ordering-app-menu' for doing the base of ordering app.

10th November

I create the navbar 'SideBar.js' and the food type bar 'Menu.js' using a loop by the other JS file which saving the name and the path of the menu 'FliterFoodType.js'. That is more useful than HTML file which can easier create a page.

11th November

I created the layout of food display card which includes the name, description, add and minus button for editing the quantity and the button of add to cart. This display food card also uses a loop from the other JS file which saves the different type of food 'Food.js'.

13th November

I add a picture in the public and try to put the path in the JS file which saves the food items 'Food.js' for testing the code is working or not.

14th November

I create the home page `Home.js` which is for user can see after they scanned the QR code of ordering and download a package of `react-router-dom` for using the `Link` and `Route` element for creating the path of each page. I edited the main JS file `App.js` to create the path of Home.

15th November

I deeply learn about how to use the `Route` in the `App.js`, so I fix the path of Home and Menu page in the main. In the Addition, I create a feature for user to see how many quantities they add for each food item. It is an interaction of the user and software.

16th November

I added a button hover which can let users know which food type they are looking for.

17th November

I created the card `Cart.js` for users to confirm their selected order and create an order page `Order.js` for user can track the status of their order. I had almost done the layout and the interaction of the restaurant ordering app.

5th February

I have updated the database of the food list by adding edited pictures that fit the layout of the display food area.

9th February

I implemented an array list called order to store the selected food items from the food card after the user clicks the add button. This array list was then shared with Cart.js to display the selected items using the map function. Additionally, I implemented a function to calculate the total price of the items in the cart.

10th February

I added a feature to allow users to increase or decrease the quantity of food items in their cart. This feature enables users to modify their order easily, even after adding items to their cart.

18th March

I implemented several features to improve the functionality of the ordering page. Firstly, I created an arraylist called "confirmedOrders" to store the orders that have been confirmed by the user after clicking the confirm button in the cart. Additionally, the cart now displays the price of each item added by the user, and I created a counting function to automatically calculate the total price of the order as items are added to the cart. To uniquely identify each order, I generated a random reference number.

22nd March

I developed a notification system called Notification.js that alerts users when they add an item to the cart or confirm their order. This feature enhances user experience by keeping them informed of their actions. Additionally, I designed a logo for the ordering app.

4.2 Software 2: Patient diary App

4.2.1 Proof-of-concept Development and Justification

Login Page (Login.js):

The first proof-of-concept development, which represents the log in page at the beginning of the software. The login page includes input frames of email and password and a link 'No account? Sign up' which is connecting to the register page. The input frame will check if the user enters the frames or not.

- Set the background color which is light grey is a mild color even if the user has color blind, they won't have any issue reading it.
- A link for the user can be easier to access to the register page for creating new accounts.

Register Page (CreateAcc.js):

The second proof-of-concept development, which represents a platform for the new patient to create their new account. The register page includes input frames of last name, first name, email, password and confirm password. Each frame has their corresponding verification. When you click the sign up, it will pop up a message, 'Sign up successfully!'. However, there is some warning under the frame if your input doesn't match the requirements.

- Each error message clear display under the corresponding input frame. User will easier know what they should do.
- A pop-up message representing the status of your registration which is user-friendly design for the patient.

Journal Page (Journal.js):

The third proof-of-concept development, which represents a platform for patients to write daily journals and make the doctor observe their situation every day. Patient should enter the title and journal contents with the selected submission date. After submitting the journal, it will navigate to a page showing all the journal with the time and date wrote before, it is convenient for their doctor can check if they have any abnormal emotion.

- Show all the information in the show journal page which including the date, time and title of journal and you can click the title for checking the content which make users feel simple and easy to use, even if the content of the diary is very long, it will not hinder the user experience.

Calendar Page (Calendar.js):

The fourth proof-of-concept development, which represents a platform for users to add events into the calendar. I consider if patients who need follow-up visits for a long time, they would have many appointments to see a doctor, or somebody check. Therefore, I created this page.

- Calendar can switch the display method, like seeing the event by month, week, day or agenda. It allows user can control which mode they will be more suitable for.

Symptoms Page (Symptoms.js):

The fifth proof-of-concept development, which represents a page for users to record how their feeling of the day is. This page includes a set of questions for users to rate their feelings. The main purpose is for doctors to observe their emotions and behavior. It has five emotion icons for users to rate their feelings. Moreover, I set a section for user can edit the size of the questions' word.

- Using icon representing emotion is easier for patients to understand how to rate their feelings.
- A section of change the font size of the question is suitable for all patients, even a visually impaired patient.

Setting Page (Setting.js):

The sixth proof-of-concept development, which represents a page for user to control the notification and the color of the website. This page includes an on or off button of notification, an option for user to change the color of the page and a button of log out.

- Notification is an important part of an app or website. However, a control for user to choose the notification is on or off which can give user more freedom.
- The color section is used for the case if the patient has colorblind.

4.2.2 Work Log

12th February

I developed a patient diary app using React, which aims to cater to the unique requirements of different types of patients by adhering to the principles of Human Computer Interaction. Subsequently, I completed the layout of the login, register page, and the navigation bar on the main page.

13th February

I developed the calendar page of the patient diary app using react-big-calendar. This feature allows users to add events such as appointments to the calendar.

1st-4th March

I reviewed the layout of the patient diary app and noticed that the navigation bar was not optimized for mobile use. Therefore, I restyled the navigation bar to display page icons. Additionally, I made mobile devices the navigation bar would be displayed at the bottom of the screen with both the icon and the page name visible to users.

6th-10th March

I began designing the layout of the journal for the patient diary app, which consists of frames for the title and content, and a calendar for selecting the date of the journal entry. Additionally, I incorporated a button on the symptoms page that uses icons to represent the severity of symptoms and enables the user to record their symptoms daily.

12th March

I implemented a function that validates user input information during the registration process. This ensures that all required fields are filled out and that the input meets the specified criteria.

16th March

I implemented a font size adjustment feature in the symptoms page to accommodate patients with visual impairments or elderly patients. This feature allows users to change the size of the questions. Additionally, I created a `ShowJournal.js` page using React, which displays all previously written journals with their respective dates. The page also includes a button that takes users back to the journal entry page.

17th March

I added a color control feature in the setting page to cater to color blind patients who may find it difficult to use the app. This feature allows the user to choose the color of the app. Additionally, I added an on/off button for notification in the setting page to give users more control over the app.

4.3 To Do List Main Page

4.3.1 Proof-of-concept Development

The first proof-of-concept development, which represents the first page of the user using, main screen. I used a function, `main_screen_open()`, to create an interface for user to choose options of logging in to register an account of to do List software with the title of “Account Login”. In addition, it will run a function, `loadUserInfo()`, when the interface is created. This function will load the file of `userlist.txt` which stored the registered user login detail and save the information to an arraylist[] `user_list`.

- Load the old user's login details to the arraylist for the following process.

4.3.2 Justification

In designing the GUI for the to-do list software, a key objective was to ensure that users could use the app conveniently in multiple windows. To achieve this, the size of the GUI was set to 400-pixel width by 300-pixel height, which provides users with sufficient workspace to manage their tasks while working on other windows simultaneously. This design decision aimed to enhance the software's usability and productivity, as users could easily and efficiently switch between tasks and windows without having to constantly resize or rearrange the GUI.

By saving user login information in an array list, we can easily and quickly verify login details when a user attempts to log in, as the system can quickly search the array list to find a match. This approach reduces the time and effort required for login verification, resulting in a smoother and more efficient login process. Also, it improves the app's overall performance and usability

4.3.3 Work Log

27-28th February

I created the main interface for choosing the option of login or register. To store user login details, I created a `userlist.txt` file that the system loads and saves in an array list `user_list` for verification during login. Additionally, if a user has their own account, they should have their own database, so I created a separate `USERNAME_tasklist.txt` file for each user.

4.4 To Do List Login and Register Page

4.4.1 Proof-of-concept Development

a. Login Interface: Login Page(`login_screen`)

I used a function, `login()`, to create an interface for users to login their account with the title of “Login”. In the language of Tkinter, I made the interface to the top level of the main screen. Also, I used the variable of `username_verify` and `password_verify` to save the user entry for login verification.

- Guideline for user knowing what they should do
- Hided message of unfound user, wrong password

b. Login verification – username:

I used a function, `login_verify()`, to verify the logging in user entry is correct or not. It will get the value of `username_verify` and use for loop looping `user_list` to match the items. I used the Boolean variable, `found`, to verify if the username has registered before or not. The initial value of `found` would be false which means it does not find the username in `user_list[]`. If the username which the user enters is inside the `user_list[]`, `found` will change to True. However, the message of unfound user will show up next to the input frame after user clicking to log in.

- ✓ Check the username is in the `user_list` or not
- ✓ For loop looping the `user_list` for login verify (including checking username and password)
- ✓ Variable found to recognize the username is found or not
- ✓ Show the message, “*User not found*”, saying the username is not found if the entry value is not in the `user_list`

c. Login verification – password:

It will get the value of `password_verify` using the same for loop looping `user_list` to match the items. It will check the password if the username exists in the database. If the password matches the detail in the database, it will close the main screen including the login screen, link to the To Do List interface and break the loop. However, if the password is not correct, it will show up the message of wrong password.

- ✓ Check the password of the corresponding user is correct or not
- ✓ Show the message, “*Wrong password*”, saying the password of the corresponding users is not correct according to the database
- ✓ Link to the To Do List Interface if the password is correct

Register Page(register_screen)

a. Register Interface

I used a function, `register()`, to create an interface for users to create their individual account with the title of "Register". In the language of Tkinter, I made the interface to the top level of the main screen. In the top of the screen, it has a message for user to know what they should do in this step. Also, I used the variable of `username_entry` and `password_entry` to save the user entry for checking if their information meets the requirements or not. The requirement of the username and password is below. If the entry doesn't meet the requirement, it will show up with the error message next to the corresponding input frame. Each input frame will update the error message when the key is released. In addition, a message of registration successful or not will show after the user clicks the register button. If the user registers successfully, the button of register will change for user to click and link to login interface.

- ✓ Guidelines for users knowing what they should do.
- ✓ Register username input frame.
- ✓ Register password input frame.
- ✓ Hided warning message of username and password.
- ✓ Hided success or failed registration message.
- ✓ Checking according to the requirements when key release from the input frames.
- ✓ Register button for check the username and password met all the requirement(`register_user()`) and link to login interface if it met all the requirements

Username:

- Cannot be empty.
- Cannot repeat from the database.
- Cannot include space.

Password:

- Cannot be empty.
- It should have 8 characters.
- Should either include upper case or lower-case letters.

b. Register verification – username:

I used a function, `check_username()`, to verify the registration in username entry is met the requirements or not. It will get the value of `username_entry()` and use for loop looping `user_list` to check its input username exists or not. If it had already existed, it would show up a warning message. I used the Boolean variable, `used_name`, to save the result of the username has taken before or not. The initial value of `used_name` would be False which means it hasn't been taken before. If the username which the user entry is inside the `user_list[]`, `used_name` will change to True. However, the message of username taken will show up next to the input frame when user key release from the username input frame. If the username which the user entry is not inside the `user_list[]`, `used_name` will change to False and hide the message. In addition, the loop will also check if the frame is empty or check if there are spaces or not and show up the corresponding message.

- ✓ Check the username is repeated in the `user_list[]` or not

- ✓ For loop looping the `user_list` for register username verification
 - ✓ Variable `used_name` to recognize the username is taken or not
 - ✓ Show the message, “*USERNAME has been used*”, saying the username is taken
 - ✓ Show the message, “*Should fill in*”, saying the username is empty and inform the user should fill in the form
 - ✓ Show the message, “*shouldn't include space*”, saying the username have space
- c. Register verification – password:
- I used a function, `check_password()`, to verify the registration in password entry matches the corresponding user. It will get the value of `password_entry()` and check if the password meets the requirement or not. It will check if the password has 8 characters or not then would check if it includes upper case and lower-case letter. If it does not match either one requirement, it will show up with the corresponding message. I used the Boolean variable, `register_rule`, to ensure the result of the password meets all the requirements. The initial value of `register_rule` would be False which means it hasn't met all the requirements. Thus, if the password can pass all the if conditions, the value of `register_rule` will change to True.
- ✓ Check the password is met all the conditions or not using if condition.
 - ✓ Variable `register_rule` for recognizes the result.
 - ✓ Show the messages, “*password should 8 CHARS*”, “*should include UPPER case letter*” and “*should include LOWER case letter*” when face to each error situations.
- d. Register result and save information to database
- I used a function, `register_user()`, to check the information are met all the conditions and save the user information to the database. It will check if the variable of `register_rule` is True (password meet all the conditions) and `used_name` is False (username hasn't taken), it will save the username and the password to the datafile `userlist.txt`, append the information to the arraylist `user_list[]` and show up the message for user know the registration success or not.
- ✓ Check the username and password past the conditions.
 - ✓ Store the user information in the data file `userlist.txt`.
 - ✓ Append to the arraylist of `user_list` for the following process.
 - ✓ Show the messages, “*Registration Succes*” and “*Registration Fail*”, for user know that are they register successfully.

4.4.2 Justification

The feature of the message prompt located at the top of the screen provides clear and concise instructions to the user regarding the task at hand. This prompt is designed to ensure that users are fully aware of what they need to do at each step, thereby reducing confusion and errors.

Also, we implemented error messages displayed next to the corresponding input frame when an error occurs. These messages provide users with immediate feedback on what went wrong and how to rectify the issue, thereby reducing frustration and streamlining the task completion process.

4.4.3 Work Log

27-28th February

I created a login and registration interface to allow users to log in or create a new account, as I realized that having separate accounts for each user in a company is more effective. I also implemented some functions to ensure that registration information meets certain requirements, such as passwords being more than 8 characters.

4.5 To Do List GUI

4.5.1 Proof-of-concept Development and Justification

To Do List Page (root)

a. To Do List Interface

I used a function, `todolist()`, to create a to do list software with the title of “To do list” which is for user to store their daily task and check it had done or not. Users can select a day and enter the task in the input frame for adding to the task box. The checkbox of each box represents the status of each task is “completed” or “unfinished”. In addition, it will run a function, `openTaskFile()`, when the interface is created. This function will load the file of `USERNAME_tasklist.txt` which stored the tasks of each day with their status which the user added before. Then save the information to an `arraylist[] task_list`. It is more convenient for running the following process such as printing the task which the system does not need to open the file again. Also, this function will print the tasks of that day into the task box.

- ✓ Top bar showing the logged in username and the title of “TO DO LIST”.
- ✓ Input frame for entering the task.
- ✓ Calendar with previous day and next day button for selecting the date they want.
- ✓ A task box for showing the tasks with checkbox of selected day.
- ✓ Undo button for undo the previous actions.
- ✓ Add button for adding the entered task from the input frame to the task box.
- ✓ Delete button for deleting the completed task.
- ✓ Move button for user to move the unfinished task to the next day.

b. Add task

I used a function, `addtask()`, for user to add the task to the task frames after clicking the add button. The function first gets the input from the task frame and the selected date from the calendar for displaying the task in the task frames with check button. It then formats the task and date into a string, `task | date | status*`, and appends it to a text file containing the user's task list. The function also adds the task to a task list in memory and appends the task to an undo list.

*Status identifies whether the check button of the task is ticked or not. “True” means unticked and “False” means ticked.

c. Load the task

I used function, `openTaskFile()`, for opening a task file in read mode, reads all the lines from the file and splits them into task, date, and status using the separator "||". It then creates a dictionary and appends the task dictionary to the `task_list`. The function also prints the tasks from the database to the task box.

We add the task in memories in the beginning of software which makes the system quickly loop the array list for printing the task. This approach reduces the time and effort required for opening the text file, resulting in a smoother and more efficient printing process. Also, it improves the software's overall performance and usability.

I added a "try-except" block which is used to handle the case when the file is not found. If the file is not found, it creates a new file with the name "USERNAME_tasklist.txt". It handles the case where the file 'USERNAME_tasklist.txt' might not exist. The block handles this situation by creating an empty file if it doesn't exist, thus avoiding a program crash.

d. Triggle function of check button

I used a function, `checkbtn_triggle()`, which is called when a user checks or unchecks a task item in the to-do list. The function takes an integer argument `k` that represents the index of the task item in the to-do list to be checked or unchecked.

The function achieves this by accessing the global variable `my_ref`, which is a dictionary that contains the `Checkbutton` objects, the status, and date of each task item in the to-do list. The function first checks the status of the task item at index `k` by accessing the `status` field of the `my_ref` dictionary using `my_ref[k][1]`. If the status is "True", it sets the font color to green. If the status is "False", it sets the font color to black.

Finally, the function uses the `open` function to read and write the to-do list file.

e. Undo the task

I used a function, `undoTask()`, used to undo the most recent action performed by the user. The `undo_list` is a list which contains the list of tasks that were performed in reverse order of execution. It will retrieve the most recent task performed by the user from the `undo_list` by taking the last element using `undo_list[-1]` and checks the type of action performed on the undone task, i.e., "add", "delete", or "move".

By providing an undo button, the user can quickly and easily undo their previous action, without having to manually restore the data or redo their work. This can help improve user productivity, reduce frustration, and increase user confidence in the system.

f. Delete the task

I used a function, `deleteTask()`, for deleting completed tasks from the task list based on the selected date. It removes references to tasks associated with the selected date from the `my_ref` dictionary and updates the task, which is a dictionary that holds references to the `Checkbutton` widgets that represent tasks with a status of "True" which means completed.

It allows users to easily remove completed tasks from their task list, making it easier for them to focus on incomplete tasks. When users have many tasks in a day, it can be difficult to keep track of which tasks have been completed and which ones still need to be done. By deleting completed tasks with the `deleteTask()` function, the task frame becomes clearer and more organized, allowing users to quickly and easily check their list of incomplete tasks.

g. Move the task to the next day

I used a function, `moveTask()`, for moving incomplete tasks to the next day, with confirmation from the user. If the user confirms, it will link to the next day. The function then iterates through the task list, and for tasks associated with the current date, it checks if they are incomplete. If all tasks associated with the current date are marked as complete, the function informs the user that they have completed all their tasks.

This function offers an efficient way for the user to manage their incomplete tasks by allowing them to move all their pending tasks to the next day with just one click, instead of manually updating each task. This is particularly helpful when the user has many incomplete tasks, as it saves them time and effort.

4.5.2 Work Log

13th February

I began work on a new software project, a to-do list GUI, using the Python Tkinter library. This project will allow me to gain experience in creating software that aligns with Human Computer Interaction principles. I have established the basic GUI framework and will continue to build upon it as the project progresses.

16th February

I created the main page layout of the to-do list GUI using Python's Tkinter library. The layout includes an input frame for the user to enter tasks, a list box to display the added tasks with checkboxes, and buttons for adding, deleting, and saving tasks. To store the added tasks, I used a text file called `tasklist.txt` with the format `TASK` and loaded the tasks to an arraylist `task_list` to avoid having to load the file each time.

17-18th February

I integrated a date picker using the `tkcalendar` library in the to-do list GUI. This allows users to add tasks to different dates for better organization. Upon selecting a date, the task list is updated accordingly. Additionally, I modified the format of the `tasklist.txt` file to include the date in the form of `TASK | DATE` to ensure the task is associated with the correct date.

19th February

I created an ArrayList called `my_ref` to store the check buttons and update the list whenever the user selects a new date. This list helps to update the tasks in the list box. Additionally, I updated the `tasklist.txt` format to include the status of each checkbox as `TASK | DATE | STATUS`, where the status indicates if the task has been completed or not. A status of false means the checkbox is ticked.

22nd February

Last week, I implemented the functionality to track the status of each checkbox in the to-do list. This enables the creation of a delete button for removing completed tasks. Additionally, I created an undo function that uses `undolist.txt` to store information about deleted tasks, allowing for their restoration if necessary.

24th February

I implemented a feature that allows users to move incomplete tasks to the next day using a move button. This functionality considers the status of the task; if it is marked as incomplete (`status=True`), it will be moved to the next day. Additionally, I created buttons on the left and right sides of the date picker that allow the user to navigate to the previous or next day, respectively.

25th February

I improved the move button functionality by adding a feature that shows the tasks the next day when it is clicked. I also fixed the undo function by implementing an `undo_list` to store user actions, which is not available once the user exits the system. This avoids the need to load the text file every time. To prevent misunderstandings, I disabled the undo button at the start of the system.

Chapter 5: [OBJ]Software Design and Implementation

5.1 Principles

The principle of Human Computer Interaction is based on the understanding of human behavior, cognition, perception, and ergonomics, as well as the characteristics of the computer system and its interface. The key principles of HCI include simplicity, consistency, feedback, affordance, visibility, learnability, and error tolerance. There are some rules explored in the study of Human Computer Interaction such as Shneiderman's 8 Golden Rules.

Behavioral sciences

Understanding how people interact with computer interfaces can help us understand human behavior in general. Human Computer interaction and interaction design studies creating an interface to have a conversation between a technology product and user. However, the focus of HCI is not the interaction of computer. It would be the reaction and behavior of humans when using the computer. Behavioral science includes

Psychology: Provides a scientific perspective on how to design effective systems based on human abilities and limitations

Economics: Represents applications, interfaces, and devices in an intuitive and natural way

Perception

Individual preferences or needs rarely dictate the exact details of an interface. Creating something suitable for a broad audience requires the input and opinions of many people, rather than just the designer, when creating an interface. UIs are designed in a way to go with the majority whilst keeping it as simple as possible. Although opinions will differ on UIs, the majority are designed with a more general approach and go with the majority, keeping it as simple as possible. To ensure that arena goers can use the device effectively, perceptions of the UI are critical.

Cognition

Cognition encompasses the process by which individuals perceive, interpret, and comprehend information while utilizing software. Multiple factors influence cognition, including users' goals, prior knowledge, memory, attention, perception, and decision-making abilities. Thus, when designing or developing software, it is imperative to consider the cognitive abilities and limitations of the users to ensure efficient and effective interaction. In this regard, HCI researchers need to investigate mental models, attention, perception, and memory to improve user experience and performance, as well as understand how the cognitive demands of tasks impact performance, providing valuable insights for designing interfaces that reduce cognitive load.

Shneiderman's 8 Golden Rules

These design rules were published by an American scientist, Ben Shneiderman, who has designed countless works and derived the principles of Human Computer Interaction design. Shneiderman developed these set of principles derived from his experience, which are applicable to interactive systems once they are further refined, developed, and explained. Designers can improve the usability of their design by these collections of principles.

Strive for consistency

Layout is the feature of software that should always affect the perception of the user. Including the color, the tone, the style of the webpage, it is essential to make it consistent between all pages throughout the site. The layout is the first impression of each user when browsing the site which I am designing.

Enable Frequent Users to Use Shortcuts

Shortcuts make the software easier to use for all users. The structure of each page better to have good hierarchy to click on in the other pages. It is important to keep the website flexible, each page is related to each other. However, we should consider universal usability such as elderly people or color blindness. Advanced design should require catering to the disability.

Offer Informative Feedback

Notification of each action is not only useful for the user to clarify what had they done recently, but also make effective interaction between user and the software. It is better to pop up informative feedback or notification showing their current process.

Design Dialog to Yield Closure

Satisfaction of the user experience is always satisfied by the detail of software. Interaction between each stage of action can improve the user's experience using the software. Design should require organizing a message with the user such as thank you message which makes user feel satisfied and accomplish. The path of user action should be included in the page that makes the user using it clearly and flexible.

Offer Simple Error Handling

Human error is one of the considerations during the interaction design. The best design should avoid error tile users have no path to cause the error such as pop up a warning when facing human error. It is the better way for users to understand the problem and solve it easily.

Permit Easy Reversal of Actions

Facing an error in the webpage should make user feel a sense of anxiety. However, if there is a guideline that can easily solve the problem immediately such as undo action 'Ctrl + Z,' it should reduce the stress of using it. It can deal with UI design in every single operation.

Support Internal Locus of Control

Being “user friendly” as a design requirement, control is the power to determine outcomes by directly influencing actions, people, and events. Keeping the user in control makes them satisfied and means they are more likely to continue using the software in question, even recommend it to others. Design should consider giving the user a flexible setting of the software. It can make the user feel they are controlling all the operation and function in the webpage.

Reduce Short-Term Memory Load

Humans should be using short term memory when using software. They would not remember the path or specific action from the software. Designers should require staying straightforward design to the website. Clear navigation is an effective way to guide the user to connect to another site or a path shortcut for user to remember each process and click to the site they want to go flexibly.

5.2 Methodologies

Behavioral sciences, Perception, Cognition

1. User Research: User research involves studying users' behavior, attitudes, and motivations to better understand their needs and preferences. This information is then used to inform the design of user interfaces that are tailored to users' needs.

(See Section 6)

2. Usability Testing: Usability testing involves observing users as they interact with a product or prototype and evaluating the effectiveness and efficiency of the product. This helps identify areas for improvement and ensures that the product is user-friendly. I selected several participants for evaluating the interface with specific tasks and made improvements.

(See Section 6)

3. Cognitive Walkthrough: A cognitive walkthrough involves simulating the thought process of a user as they interact with a product or prototype. This helps identify areas where users may become confused or encounter difficulties in using the product. I set a set of questions for evaluating the interface.

(See Section 6)

4. Task Analysis: Task analysis involves breaking down complex tasks into smaller, more manageable components. This helps designers create user interfaces that are easy to navigate and use.

(See Section 3.3)

Strive for consistency

In web design, a CSS stylesheet controls the layout and look of a page. It not only can simplify the code of styling the same element, but also can make all sites follow the same style. It is advantageous to be able to control several areas with one instruction.

```
1 body {  
2     background-color: #rgb(232, 232, 232);  
3 }  
4  
5 button {  
6     background-color: #black;  
7     color: #white;  
8     width: 80px;  
9     padding: 5px 20px;  
10 }  
11  
12 button:hover {  
13     background-color: #rgb(143, 143, 143);  
14 }  
15  
16 a {  
17     text-decoration: none;  
18     color: inherit;  
19 }
```

To ensure consistency and user familiarity across the entire website, all the ordering app pages have been designed to display a consistent style, as shown in Picture 1 - 3. The use of light grey and yellow colors throughout the app pages helps users easily recognize that they are still on the same website, thereby reducing confusion and increasing ease of use.

The image displays three screenshots of a mobile application interface for a restaurant named "ABC Restaurant".

- Screenshot 1 (Left):** Shows the "Menu" screen. At the top, there are tabs for "Sides", "Salad", "Sushi Roll", "Hand Roll", "Sashimi", and "Nod". Below these are three items:
 - Chicken Dumpling:** A photograph of dumplings in a bowl with dipping sauce. Description: "5 deep fried chicken dumpling". Price: £ 5.2. Quantity: - 0 + [Add].
 - Yakitori:** A photograph of skewered chicken. Description: "4 battered balls filled with ocyopus served in tonkatsu and mayonnaise sauce.". Price: £ 4.9. Quantity: - 0 + [Add].
 - Spicy Prawn Tempura:** A photograph of prawns. Description: "Deep fried prawns.". Price: £ 4.9. Quantity: - 0 + [Add].
- Screenshot 2 (Middle):** Shows the "Your Order" screen. It lists the items selected from the menu:
 - Chicken Dumpling:** 5 deep fried chicken dumpling, £ 5.2, quantity - 2 +.
 - Salmon and Cheese Handroll:** 1 large seaweed wrapped cone shaped roll with fresh salmon, cucumber and Philadephia cheese, £ 4, quantity - 2 +.
 - Prawn Tempura Udon:** Large bowl of udon noodles soup with varied toppings, £ 9, quantity - 2 +.
 The total sub-total is £ 36.4 and the service fee is £ 4.
- Screenshot 3 (Right):** Shows the "Your Order" screen with a different layout. It includes a reference number (Ref: #486803) and a status message ("Status: Preparing..."). It lists the items again:
 - Chicken Dumpling:** 3
 - Salmon and Cheese Handroll:** 2
 A blue button labeled "Call waiter" is visible at the bottom right.

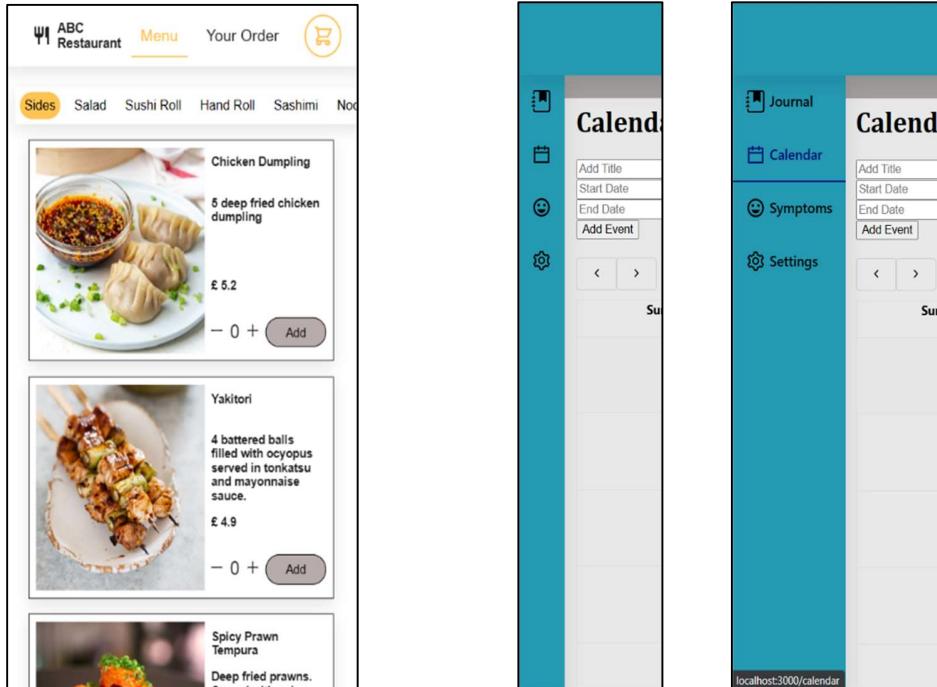
Example 2 (To do list GUI):

The image displays three screenshots of a web-based application for managing tasks.

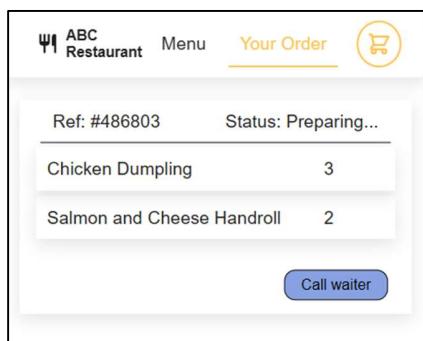
- Screenshot 1 (Top Left):** Shows the "Account Login" screen with a dark header bar and a white content area containing the text "Hello Company". Below this are two buttons: "Login" and "Register".
- Screenshot 2 (Bottom Left):** Shows the "Register" screen. It has a header "Register" and a sub-header "Please enter details below." with a note "* Should fill in". It contains fields for "Username" (with a validation message "lim has been used") and "Password" (with validation messages "8 or above characters", "Include upper case letter", and "Include lower case letter"). At the bottom are "Register" and "Registration Fail" buttons.
- Screenshot 3 (Top Right):** Shows the "To do list" screen with a dark header bar and a white content area. It displays a date selector (29-3-2023), a search bar, and a text input field "Enter your task:". Below these are three buttons: "ADD", "UNDOLAST ACTION", "DELETE COMPLETED TASK", and "MOVE INCOMPLETED TASKS TO THE NEXT DAY".

Enable Frequent Users to Use Shortcuts

In each component, there is a navbar for user to have a shortcut connecting to any sites.

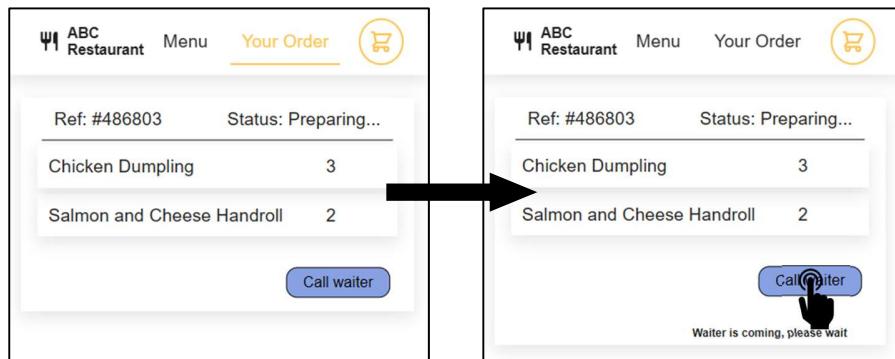


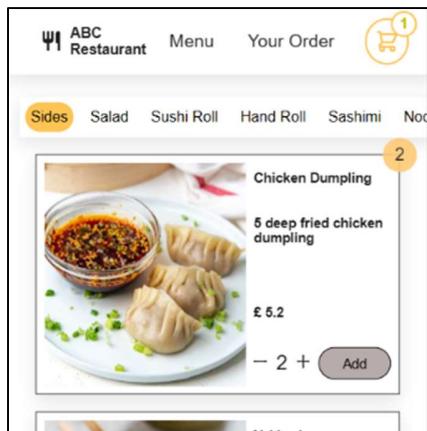
Offer Informative Feedback



In the ordering app, I will show the status of order after customer ordered the food in the page of order. It lets the customer know the progress of their order.

Second, I put a message when customer clicked the button of calling waiter, it makes user knowing they had clicked the button and waiter is heading.





Third, I added a feature about the quantity of customers selected which is the right corner of food cards. Customer can see how many they added to the cover of the food item. In addition, I added the feature of the basket item quantity next to the cart icon.

As the fourth enhancement to the ordering app, a notification feature has been added. This feature provides feedback to the user when they perform an action such as adding an item to the cart or attempting to place an order without specifying a quantity. It is alerting the user to any mistakes they may have made and prompting them to take the necessary corrective action.

Notification:
2 Chicken Dumpling added to the cart

Notification:
You should click + to increase the quantity of food!

Notification:
Thanks for ordering! The item(s) is confirmed, please check your order
Total: £ 0
Confirm

In the patient diary website, I have implemented a pop-up message system that appears after the user registers a new account. This message informs the user whether the registration was successful or not, allowing them to quickly understand the status of their registration.

localhost:3000 says

Sign In Successfully!!!

OK Cancel

First Name :
Cheuk Wing

Last Name :
Lim

Email :
yoyolim1205@gmail.com

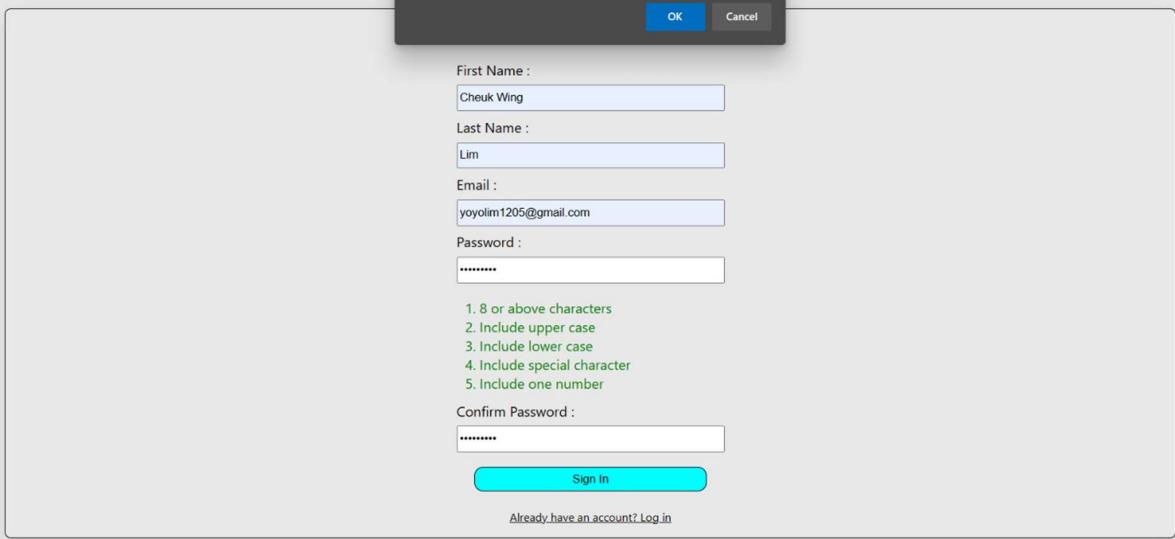
Password :
.....

1. 8 or above characters
2. Include upper case
3. Include lower case
4. Include special character
5. Include one number

Confirm Password :
.....

Sign In

Already have an account? Log in

A screenshot of a web browser showing a sign-in form. A dark gray pop-up window is centered over the form, displaying the message "Sign In Successfully!!!". Below the message are two buttons: "OK" (blue) and "Cancel" (gray). The sign-in form itself is visible underneath, containing fields for First Name, Last Name, Email, and Password, along with a password strength checker and a "Sign In" button. At the bottom of the page, there is a link "Already have an account? Log in".

localhost:3000 says

You didn't complete the form.

OK Cancel

First Name :
Cheuk Wing

Last Name :
Lim

Email :
yoyolim1205@gmail.com

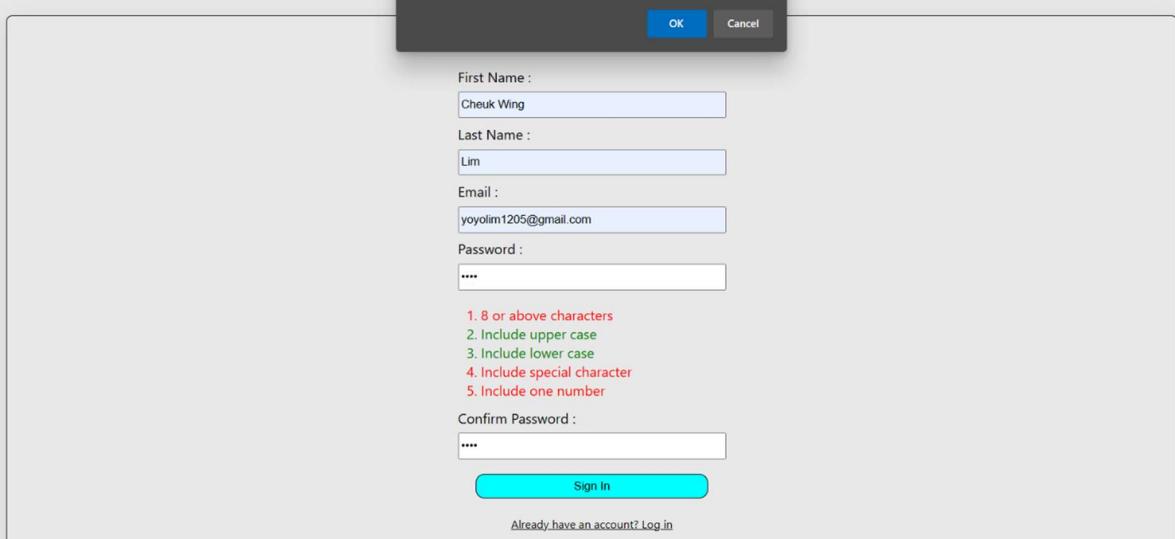
Password :
....

1. 8 or above characters
2. Include upper case
3. Include lower case
4. Include special character
5. Include one number

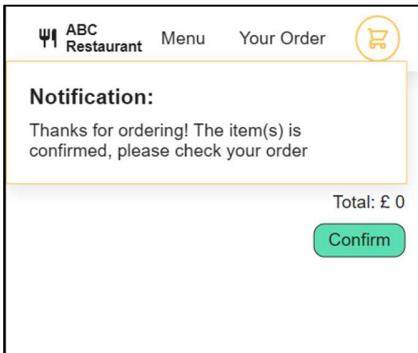
Confirm Password :
....

Sign In

Already have an account? Log in

A screenshot of a web browser showing the same sign-in form as the previous image. However, this time a dark gray pop-up window is displayed with the message "You didn't complete the form.". It includes the same "OK" and "Cancel" buttons. The sign-in form is partially visible, showing the first name and email fields filled in, while the last name and password fields are empty. The password strength checker and other form elements are also present. The bottom of the page has the same "Log in" link as the previous screenshot.

Design Dialog to Yield Closure

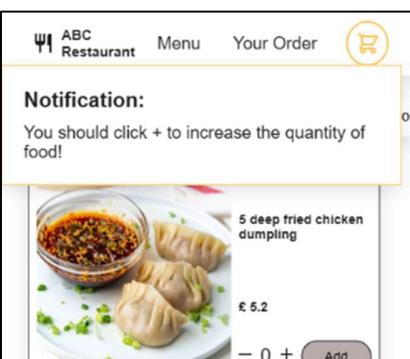


In the ordering app, I have implemented a "Thank you" message feature for customers who confirm their food order. This feature enhances user satisfaction with the app.

In the patient diary website, I have implemented a warm welcome message that says, "Hello ABC patient, how is your feeling today?" beneath the header. This personalized message has been included to make the user feel more comfortable and satisfied, especially the patients who might be in a vulnerable state.



Offer Simple Error Handling



In ordering apps, considering elderly people, there are more possible human errors such as adding items with 0 quantity. I implemented a notification that will show up on the top to guide the following step. This feature improves the user experience by reducing the likelihood of human errors and providing clear guidance to the user throughout the ordering process.

Furthermore, I have implemented a feature in both the patient app and to-do list GUI where all password requirements are clearly stated beneath the password input fields. If the user enters a password that does not meet these requirements, an error message is displayed. This serves to enhance the likelihood of successful registration.

A screenshot of a registration form. It includes fields for "Password" (containing "Qwer1234") and "Confirm Password". Below the password field is a list of validation rules: "1. 8 or above characters", "2. Include upper case", "3. Include lower case", "4. Include special character", and "5. Include one number". At the bottom, there is a "Sign In" button.A screenshot of a registration form titled "Register". It shows an error message: "Please enter details below. * Should fill in". Below this are fields for "Username" and "Password". To the right of the password field, there are red validation messages: "8 or above characters", "Include upper case letter", and "Include lower case letter". At the bottom is a "Register" button.

Permit Easy Reversal of Actions

The screenshot shows a mobile application interface for an ordering service. At the top, there's a navigation bar with icons for ABC Restaurant, Menu, Your Order, and a shopping cart containing 3 items. Below the navigation, the user's cart contains three items:

- Chicken Dumpling**: 5 deep fried chicken dumpling, £ 5.2. Includes a minus button, a plus button, and a circular touch icon.
- Salmon and Cheese Handroll**: 1 large seaweed wrapped cone shaped roll with fresh salmon, cucumber and Philadelphia cheese, £ 4. Includes a minus button, a plus button, and a circular touch icon.
- Prawn Tempura Udon**: Large bowl of udon noodles soup with varied toppings, £ 9. Includes a minus button, a plus button, and a circular touch icon.

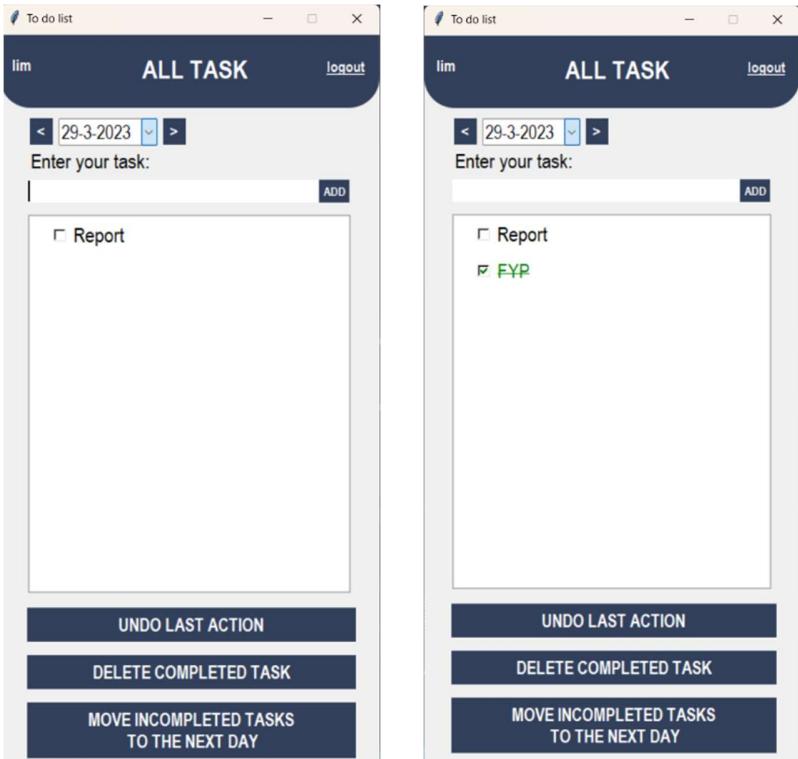
At the bottom of the screen, it displays "Sub-total: £ 36.4" and "Services fee: £ 4".

In the ordering app, I have included a feature that allows users to edit all the food items they have added to their cart. This feature enables users to remove items from their cart or adjust the quantity of food they have selected. With this feature, users have greater control over their order, making the app more user-friendly and convenient to use.

In patient diary website, I implement a back button in the journal page and showing journal page. It allows patients to easily navigate back to the show journal page and review their previous entries. These enhancements will improve the usability of the app and provide patients with a more seamless and effective experience.

The screenshot shows a web-based patient diary system. The top header reads "ABC Hospital Patient Diary" and includes a greeting "Hello ABC patient, how is your feeling today?". The main content area is titled "Your Journal Entries:" and shows a single entry: "29/03/2023 Today :)" with a timestamp "07:47 PM". There are icons for a calendar, a smiley face, and a gear. A "Back to Write Journal" button is visible. Below this, a large empty text area is labeled "Submit" and "Back to journal review".

This screenshot shows the "Back to journal review" page from the previous diary system. It features a large, empty text area for journal entries. At the bottom left, there are two buttons: "Submit" and "Back to journal review".



In the to do list GUI, I implemented an undo button for undoing all the previous actions. This can save the user time and effort, as they can quickly correct mistakes or make changes to their work.

Support Internal Locus of Control

In the patient diary website, I have implemented a settings page that provides users with greater control. This feature enables users to turn notifications on or off, and choose the color scheme that suits their preferences.

The image shows a screenshot of the 'ABC Hospital Patient Diary' settings page. The top navigation bar is teal with the title 'ABC Hospital Patient Diary' and a greeting 'Hello ABC patient, how is your feeling today?'. On the left is a vertical sidebar with icons for Settings, Calendar, Mood, and Help. The main content area is titled 'Settings'. It contains two main sections: 'Notifications' (with a switch set to 'OFF') and 'Page Color' (with a color picker set to blue). At the bottom is a 'Sign out' button.

5.3 Tools of use

The software applications were developed using different programming tools and languages to suit the project requirements. Two of the applications were built using React, a popular front-end JavaScript library for building user interfaces. The third application was developed using Python's Tkinter library to create a graphical user interface (GUI).

For the React applications, we used the following tools and technologies:

React: a JavaScript library for building user interfaces

Node.js: a JavaScript runtime environment

NPM: a package manager for the Node.js ecosystem

CSS: a stylesheet to style the layout of software

Visual Studio Code: a source code editor developed by Microsoft

For the Python Tkinter application, we used the following tools:

Python: a high-level programming language

Tkinter: A Python library for creating GUIs

PyCharm: an integrated development environment (IDE) for Python

By using these tools, we were able to create functional and user-friendly software applications that met the project requirements.

5.4 Challenging during the implementation

5.4.1 Technical Challenges:

One of the main challenges you may face when creating software programs for exploring HCI is the technical complexity involved. Designing software that effectively demonstrates complex HCI concepts will require a high level of programming expertise and knowledge of user interface design. You may also encounter issues with compatibility between different software platforms and operating systems. Additionally, testing and debugging the software programs to ensure they are reliable and functional will require a significant amount of time and resources.

5.4.2 User-Centered Design Challenges:

Another key challenge you may encounter when creating software programs to explore HCI is ensuring that the user interface is intuitive and user-friendly. Developing software that effectively demonstrates the chosen HCI concepts will require a deep understanding of user-centered design principles and user feedback. You may need to iterate on the design and gather feedback from users throughout the development process to ensure that the software is accessible and usable for a wide range of users.

5.4.3 Time Management Challenges:

Creating three software programs in seven months can be a daunting task that requires careful planning and time management. You will need to prioritize the development tasks and allocate resources effectively to ensure that each program is developed within the given timeline. You may also encounter unexpected delays or setbacks that require adjustments to the development plan. To manage these challenges effectively, you will need to be flexible and adaptable and willing to make changes as needed to ensure the project stays on track.

Chapter 6: ~~OBJ~~ User Testing and Evaluation

The main concept of Human Computer Interaction in software is improving usability. There are four fundamentals of usability: Suitability for the task, Appropriate for trained users, Learnability, Error tolerance.

6.1 User testing 1: Restaurant ordering

I did user testing for evaluating the software of restaurant ordering app in March. This test is a good chance for me to do some improvement of my product.

6.1.1 Usability goals

For analyzing Human Computer Interaction, the purpose of creating this software is to explore the design consideration of elderly people using a software. The theme of this software is an ordering page used by phone or website. Since the advance of technology, many restaurants are using the method of ordering through scanning a QR code. Therefore, it is inevitable that the elderly will need to use the software. During the design of the software, I should consider different types of users such as the elderly and teenagers. The aim of the app is for customers to order food inside the restaurant, know the status of the order and call the waiter in the app if they have any problems.

6.1.2 Selecting participants

I selected two participants for testing this software which is an elderly and teenager. Here is the background of them.

Background of user 1:

Name: Leo (Male)

Age: 68 years old

Occupation: Retirees

Technique skills: ★★★

He only started using a smartphone a year ago, and he has a proper understanding of the functions, but there are some technical questions that he needs to ask his children. He has never tried QR code ordering, but he often eats out.

Background of user 2:

Name: Aileen

Age: 21 years old

Occupation: Student

Technique skills: ★★★★

She didn't particularly study the knowledge about smart phones, but she has used smart phones for 8 years, and she is familiar with many functions, and has many functional tools, such as apple watch, ipad. And I have experience with mobile ordering in restaurants.

6.1.3 Designing the test scenarios

Scenario: You have decided to order dinner from your favorite restaurant using the app in the restaurant. Your order consists of an udon meal, your favorite sushi roll, and a coke. You want to view the price of the order and check the status of the food. *(For elderly) However, you have never used this app before, and you are not very tech-savvy. You will use my laptop mobile version for this purpose.*

Task: Using the app, place your order for an udon meal, your favorite sushi roll, and a coke. You will view the price of the order and check the status of the food when waiting for the food afterward.

Follow-up questions:

Did you feel well when using the app? (About the layout)

Was it clear how to navigate to the order page?

Did you understand how to select each item for your order?

Was it easy to understand the process of confirming order?

Did you encounter any difficulties or confusion while placing your order?

Were you able to complete the task in a reasonable amount of time?

How confident do you feel in your ability to use the app again in the future?

6.1.4 Analyzing the results

From the layout:

User 1 (Elderly): ★★★★

The layout of the app looks so clear, all the information can be seen on the whole screen and the size of words is big enough for me to see it. However, the color theme is yellow which is a light color series will make people feel dazzled. It is better to use a dark color for an app theme for elderly people.

User 2 (Teenager): ★★★★

The layout of the app seems so clear, but the width of content seems not to match the width of mobile device.

From functional:

User 1 (Elderly): ★★★★

During the testing, there was a problem with the add button in the food card. I clicked the add button from the food card when the quantity is 0 accidentally. However, there are not any changes in the app and even don't know what happened to it. It is better to add some notification on this situation.

User 2 (Teenager): ★★★★★

I understand all the parts of the app when I achieve the task. All the functions are clear enough to order the food and check the food order.

Usability:

User 1 (Elderly): ★★★★

After adding the food to the cart, I don't know how many items are in the cart. I need to click into the cart and check the quantity of the food I clicked. It is better to add a number next to the cart to represent the quantity which is clearer. In addition, add item button (+) would be on the right of the quantity number and decrease item button (-) would be on the left of the quantity in general.

User 2 (Teenager): ★★★★★

I am used to pressing the symbol to increase the quantity to the right of the quantity, so I made a mistake at first because of my habit, but in general, it is convenient to use.

From clarity:

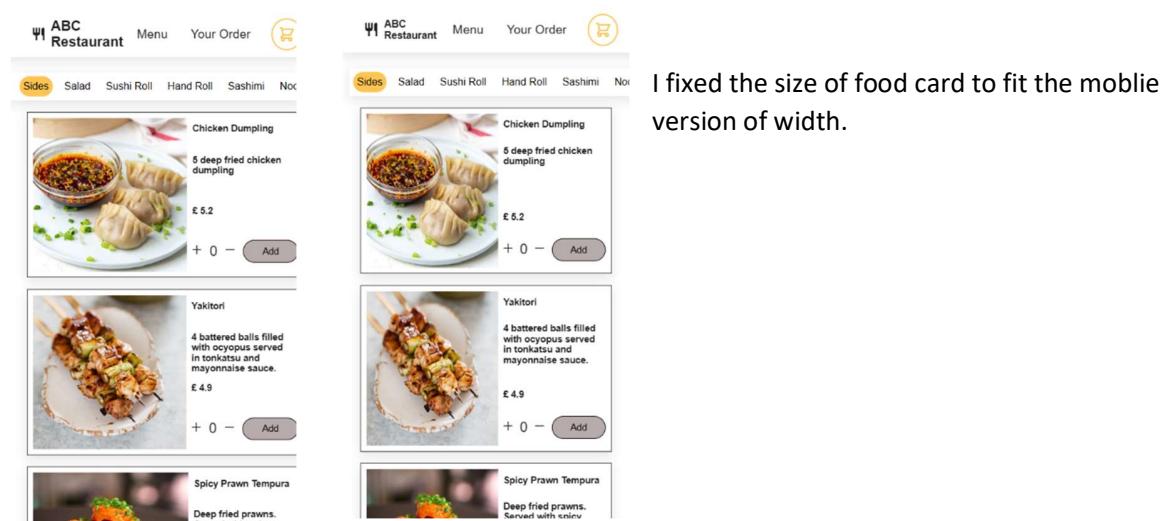
User 1 (Elderly): ★★★★

Everything is clear for ordering food in the restaurant. However, the notification of confirming order is so fast like showing 2 second only. I didn't realize why the cart was cleaned when I clicked the confirm button. My children remind me there is a notification, but I can't see it.

User 2 (Teenager): ★★★★★

6.2 Interface Improvement of User Testing 1

Improvement 1 (Layout):

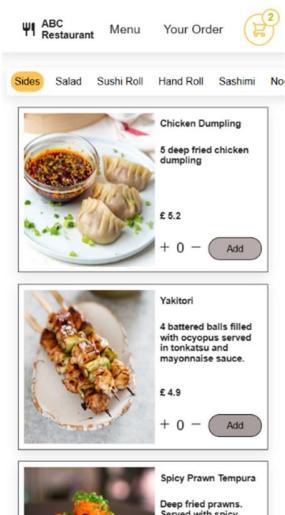


Improvement 2 (Function):

I added a notification for a human error of adding item with no quantity. If the customer clicks on an add item when the quantity of food is zero, it will show up a notification about an instruction, ‘You should click + to increase the quantity of food!’, for 5 seconds.



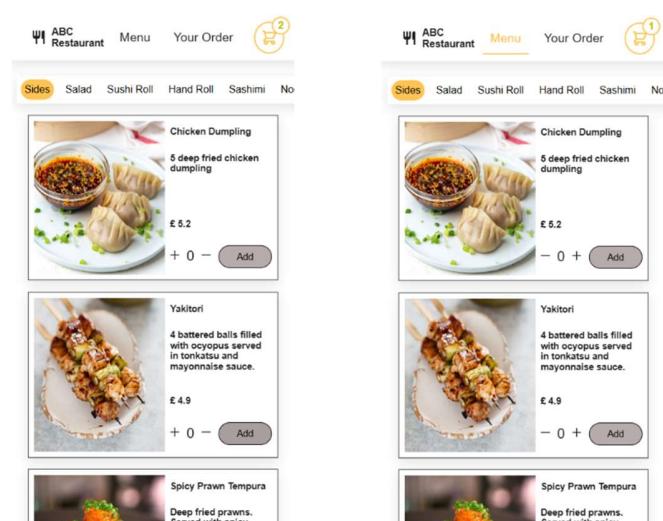
Improvement 3 (Usability):



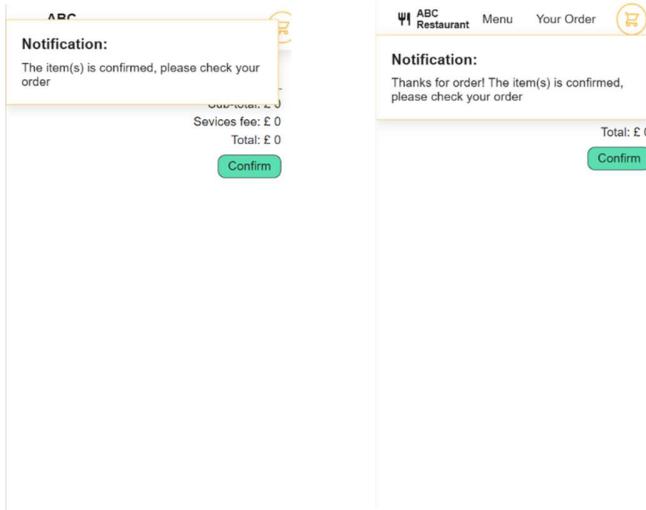
I added a number next to the cart icon representing the quantity of food customer added to the cart. It will more clear to know how many item they added and show they added item to the cart.

Improvement 4 (Usability):

I made change the position of the plus and minus button which match the general position in the uk.



Improvement 5 (Clarity):



I made a kindly notification after customer confirmed the order and made it show up for 4 second which is enough to read the whole message. In addition, I made the notification won't cover the cart icon. Customer can click the cart or other page when the notification even show up

6.3 User Testing 2: Patient Diary app

I did a second user testing for evaluating the software of patient diary app in March.

6.3.1 Usability goals

The primary purpose of this software is to provide patients with a platform to record their daily moods and general diaries, which can be observed by their doctors. It is designed to be accessible through a website and mobile phone to cater to the varying preferences of patients.

To ensure that the patient diary app is usable and accessible to different types of patients, several design considerations must be considered during the software development process. These considerations include accommodating colorblind and visually impaired patients and ensuring that the app's design is intuitive and easy to navigate.

The usability goals for testing this patient diary app can include evaluating the ease of use and navigation, as well as the functionality of the app. Testing the app's usability can involve tasks such as recording a mood entry or adding a new diary entry.

6.3.2 Selecting participants

I selected a participant for testing this software which is a visually impaired patient. Here is the background of them.

Background of user 1:

Name: Sinha (Male)

Age: 35 years old

Occupation: Construction worker

Technique skills: ★★★★

He has had vision problems since he was a child, and has been seeking medical treatment continuously, requiring regular follow-up visits. After his eyesight improved, he started to use a smart phone, and he didn't use a computer very rarely, because he didn't need it for work, and a lot of it only needed labor, so he rarely used a computer to use the web.

6.3.3 Designing the test scenarios

Scenario: You are a visually impaired patient who wants to use the patient diary app on a laptop to track your health and emotions.

Tasks:

1. Create an account on the patient diary app.
2. Log in to the patient diary app using your account.
3. Add an event to the calendar for tomorrow's doctor's appointment.
4. Write a journal entry about your symptoms and how you're feeling today.
5. Answer the questions about your emotions for today.
6. Adjust the website settings to a high contrast color scheme.

Follow-up questions:

1. Were you able to create an account on the app easily? If not, what difficulties did you encounter?
2. Was the login process accessible and easy to navigate? If not, what challenges did you face?
3. Were you able to add an event to the calendar without difficulty? If not, what issues did you experience?
4. Was it easy to write a journal entry about your symptoms and how you're feeling today? If not, what challenges did you encounter?
5. Did you find it easy to answer the questions about your emotions for today? If not, what difficulties did you face?
6. Was the process of adjusting the website settings to a high contrast color scheme accessible and easy to follow? If not, what issues did you experience?

6.3.4 Analyzing the results

From the layout: ★★★★

The layout of the website is so simple and good for me. In the part of navigate bar is doing well, representing each page by an icon and you can see the name when click it which is a nice design.

However, when I registered my account, there were not instructions about the password requirement. I need to enter something into the password input frame to see the requirement which is a long message. In addition, on the page of showing journal, the content will show up when I click the title, but the content will show under all the journal titles. It will become a problem if there are many journal articles which you need to scroll down to check the content of the earlier journal.

From functional: ★★★★

The function of overall the website is complete. All the functions can fully conform to a patient diary for doctor observed a patient.

However, there is missing some function which is important. In the page of calendar, it is missing the time selection of the event. I can just choose the day but not the time of the events added to the calendar. Since patients always have some appointments with the doctor which have a specific time.

Second, the journal page is missing the time either. If the patient has some abnormal mood writing in the journal, the doctor should know what time that emotion is happening and can be processed in time. In addition, there should be a back button on the writing journal page to show journal page. Patients will want to go back and see what they wrote before.

From Usability: ★★★★☆

Overall, the whole software is easy to use, and each part is clear, and nothing unclear. It can be seen in the setting that the situation of different patients is considered, for example, the font can be enlarged in the symptoms page and the frequency color can also be selected in the setting.

From clarity: ★★★★☆

Everything is clear.

6.4 Interface Improvement of User Testing 2

Improvement 1 (layout):

Original register page:

The screenshot shows a registration form titled "Create Account". The form consists of five input fields: "First Name", "Last Name", "Email", "Password", and "Confirm Password". Below the "Password" field, there is a note in red text: "Password must be at least 8 characters and include lowercase and uppercase letters, a number, and a special character". The "Password" field contains a password and includes a character count indicator (14) and a visibility toggle icon. A "Sign In" button is located below the "Confirm Password" field. At the bottom of the form, there is a link: "Already have an account? Log in".

After improvement of register page:

The screenshot shows a registration form titled "Create Account". It includes fields for First Name, Last Name, Email, and Password. The Password field contains "Qwer123" and has a red border, indicating it does not yet meet the requirements. Below the Password field is a list of five requirements: 1. 8 or above characters, 2. Include upper case, 3. Include lower case, 4. Include special character, and 5. Include one number. A "Sign In" button is at the bottom, and a link "Already have an account? Log in" is at the very bottom.

This screenshot shows the same registration form after the user has entered "Qwer1234!" into the Password field. The red border around the Password field has turned green, indicating the requirement has been met. The rest of the form remains the same, with the "Sign In" button and the "Log in" link visible.

In the register page, when user didn't enter anything, it won't show any requirement of the password or others. It make user feeling confusion. Therefore, I created an area showing all the requirement of the password with red in the beginning. Red color is meaning not completed in general. If the user input match the requirement, the condition will change to green color. Green color is meaning completed in general.

Improvement 2 (From layout):

Original show journal page:

The screenshot shows a mobile application interface for a patient diary. At the top, a teal header bar displays the title "ABC Hospital Patient Diary" with a small icon. Below it, a grey bar contains the text "Hello ABC patient, how is your feeling today?". The main content area has a light grey background. On the left, there is a vertical sidebar with icons for a pen, calendar, smiley face, and gear. The main content area starts with a section titled "Your Journal Entries:" which lists two entries: "28/03/2023 Today :)" and "28/03/2023 TMR". Each entry has a small "x" icon to its left. Below these entries is a large rectangular input field with a thin black border. Inside this field, the text "Title: Today :)" is displayed above the placeholder "Content: ABC". At the bottom of the input field is a small "Back to Write Journal" button.

This screenshot shows the same mobile application interface as the previous one, but with different content. The "Your Journal Entries:" section now lists "28/03/2023 Today :)" and "28/03/2023 TMR". The input field at the bottom contains the text "Title: TMR" above the placeholder "Content: hELLO THIS IS EXAMPLE 2". The rest of the interface is identical to the first screenshot, including the teal header, grey bars, and sidebar icons.

After Improvement of showing journal page:

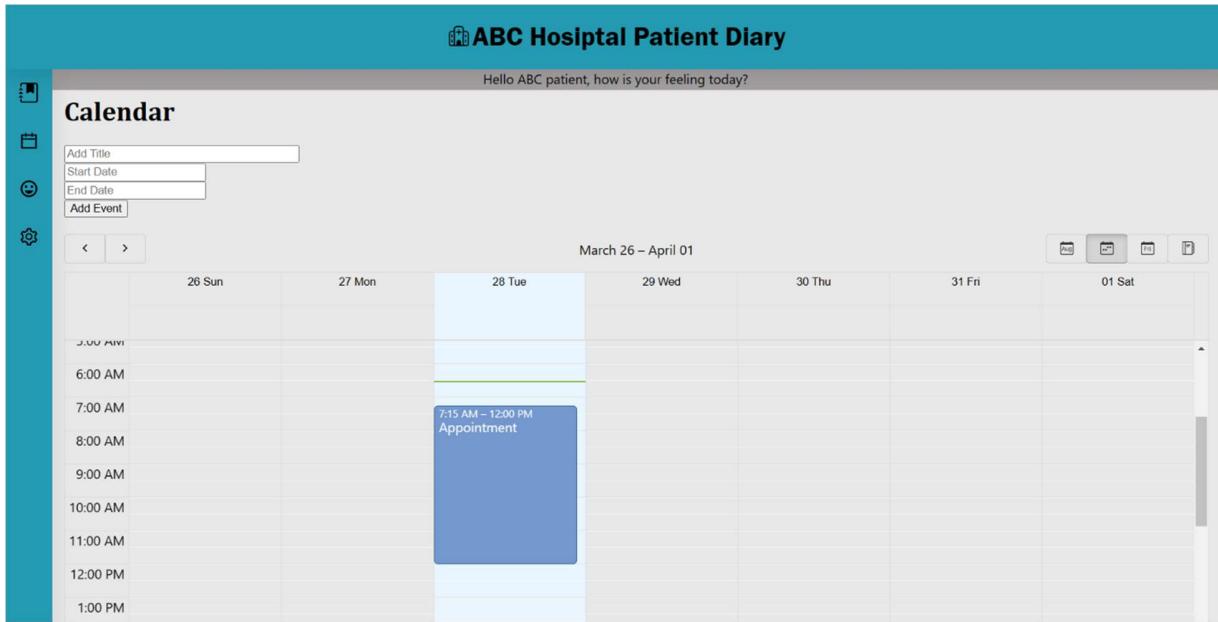
The screenshot shows the 'ABC Hospital Patient Diary' application interface. At the top, there is a blue header bar with the title 'ABC Hospital Patient Diary' and a small icon. Below the header, a message says 'Hello ABC patient, how is your feeling today?'. On the left side, there is a vertical sidebar with icons for a pen, calendar, smiley face, and gear. The main content area is titled 'Your Journal Entries:' and lists two entries. The first entry is dated '28/03/2023' and has a title 'Today :)' with content 'Content: ABC'. The second entry is also dated '28/03/2023' and has a title 'TMR' with content 'Content: TMR'. A 'Back to Write Journal' button is located at the bottom of the list.

This screenshot shows the same application interface as the previous one, but it illustrates a previous state where all journal titles were listed together. The main content area lists two entries: 'Today :)' with content 'Content: ABC' and 'TMR' with content 'Content: TMR'. Both titles are visible simultaneously, which was the initial problem mentioned in the text.

In the show journal page, the content of the journal will show up under all the journal titles. However, it will become a problem if there are many journal articles which you need to scroll down to check the content of the earlier journal. Therefore, I improved the content will show under the corresponding title and it will only show up one content in the page which mean if the click the title to check the content, it would close the other content if you clicked the other title before.

Improvement 3 (Functional):

After Improvement of calendar page:



The calendar page of the patient diary app is missing the option to select the time of an event.

Currently, users can only choose the day when adding an event to the calendar, which is insufficient for patients who have appointments at specific times, such as doctor's appointments. Therefore, I added a time selection feature to the calendar page to improve the app's usability and meet the needs of patients with scheduled events. 

Improvement 4 (Functional):

Original Journal page:

The original journal page interface features a teal header with the title 'ABC Hospital Patient Diary' and a small icon. Below the header is a grey bar with the text 'Hello ABC patient, how is your feeling today?'. On the left side, there is a vertical sidebar with icons for calendar, smiley face, and settings. The main area contains a date input field ('28 / 03 / 2023'), a 'Title:' input field, a 'Journal:' input field, and a large empty text area for writing. At the bottom, there is a 'Submit' button.

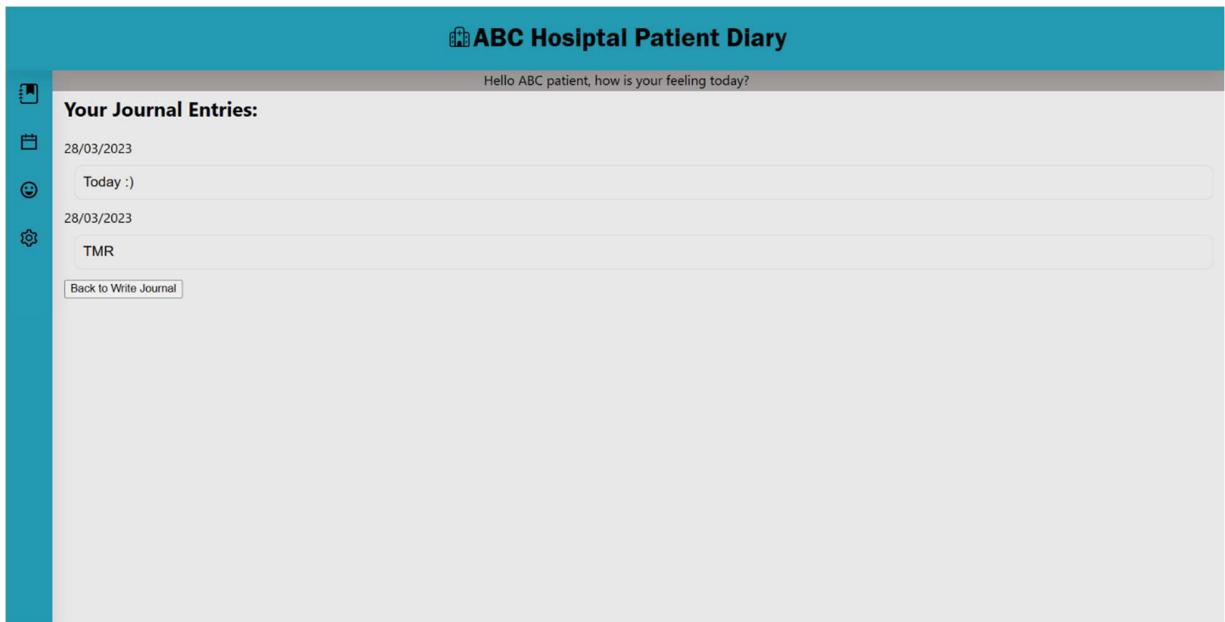
After improvement of journal page:

The improved journal page interface has a similar layout to the original. It includes a teal header with the title 'ABC Hospital Patient Diary' and a grey bar with the greeting 'Hello ABC patient, how is your feeling today?'. The vertical sidebar on the left remains the same. The main area now has a 'Journal:' input field, a large empty text area for writing, and at the bottom, it includes a 'Submit' button and a 'Back to journal review' link.

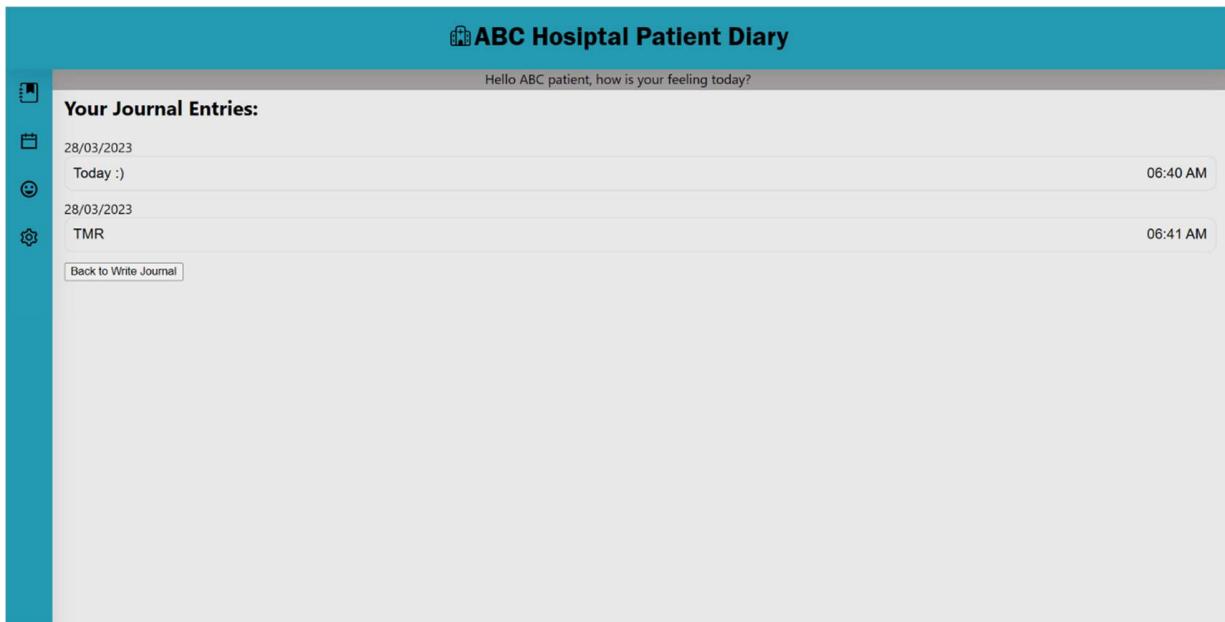
The journal page is missing the button of back to show journal page. It is better to add a back button on the writing journal page to allow patients to easily navigate back to the show journal page and review their previous entries. These enhancements will improve the usability of the app and provide patients with a more seamless and effective experience. Therefore, I added the button of 'Back to journal review'.

Improvement 5 (Functional):

Original Journal page:



After improvement of journal page:



The journal page of the patient diary app is missing a time stamp feature, which is crucial for patients to record the time of an abnormal mood or symptom. This feature is essential to ensure timely and accurate processing of patient information by doctors. Therefore, I added the time of journal next to the title.

6.5 User testing 3: To do list GUI

6.5.1 Usability goals

The purpose of this software is to provide a user-friendly interface for office staff to manage their daily tasks in a convenient and efficient manner. As the primary interface is on a laptop, the design must prioritize usability and accessibility for users working on a desktop computer. The software has been designed with a Graphical User Interface (GUI), which provides a simple and intuitive way to navigate the different features.

To match the principles of Human Computer Interaction, the design considers the user's needs and preferences, and prioritizes accessibility and usability. This software is developed with a goal to make the user's task management experience efficient and convenient.

6.5.2 Selecting participants

I selected a participant for testing this software which is an office staff. Here is the background of them.

Background of user 1:

Name: Olivia (Female)

Age: 37 years old

Occupation: Clerk

Technique skills: ★★★★☆

He is very computer savvy, as he uses it a lot at work and needs to communicate with his smartphone, so he is very familiar with electronics. However, because the company I work for has not used any to do list software.

6.5.3 Designing the test scenarios

Scenario: You are an office staff member who wants to use the to-do list GUI on a laptop to manage your daily tasks.

Tasks:

1. Create an individual account and login.
2. Add tasks to the to-do list with a deadline for tomorrow.
3. Mark the task as complete.
4. Delete the completed task
5. Move the completed task to the next day's to-do list.
6. Undo the completion of the task.
7. Add another task to the to-do list with a deadline for next week.
8. Log out account and log in for checking the task

Follow-up questions:

1. Was it easy to add a task to the to-do list with a deadline for tomorrow? If not, what difficulties did you encounter?

2. Were you able to mark the task as complete without difficulty? If not, what challenges did you face?
3. Was it easy to move the completed task to the next day's to-do list? If not, what issues did you experience?
4. Were you able to undo the completion of the task easily? If not, what difficulties did you encounter?
5. Was it easy to add another task to the to-do list with a deadline for next week? If not, what challenges did you face?

6.5.4 Analyzing the results

From layout: ★★★★

The layout of the GUI is nice and clear. However, there is a problem when I am selecting the calendar. If I move the window to the right size, the calendar will be half blocked. I thought the purpose of this software is that the staff can have multiple windows when doing work and we can see the task and other windows at the same time. If the calendar is half block, we need to move the window to the left to select the date.

From functional: ★★★★

All functions look good and complete. I have almost done all the tasks provided. Thus, it is missing the last task which is log out. I don't know how to logout my account. There is no button to do this task.

From usability: ★★★★★

Overall, the whole software is very easy to use, and each part is very clear, there is nothing unclear.

From clarity: ★★★

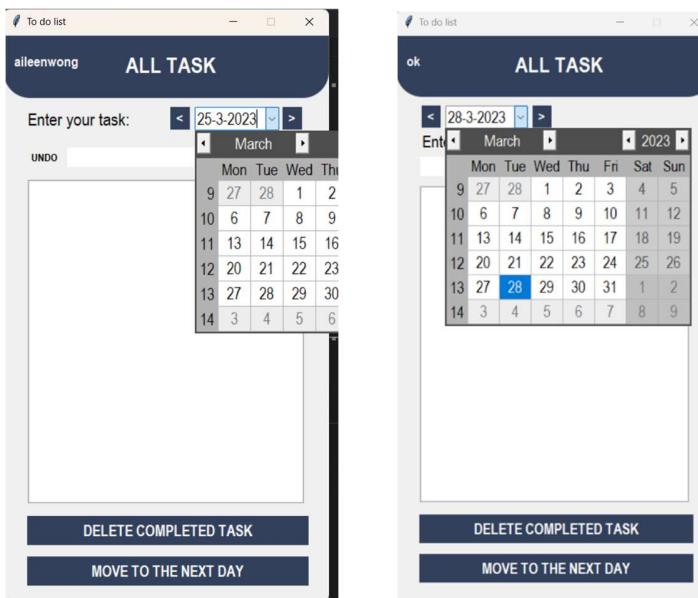
When I register my account, there is not any instruction about the requirement of the password. I need to enter something into the password input frame to see the requirement. Even the warning of the password is next to the input frame which is half block. I can't see what's wrong with my password I entered.

In addition, it is not clear the function of clicking move button. I need to look at the task to know what the function is of 'move to the next day'.

The last one would be the undo button. The undo button is next to the input frame of adding task. I thought this button was undoing the word I entered in the input frame. In fact, it is undoing the previous action.

6.6 Interface Improvement of User Testing 3

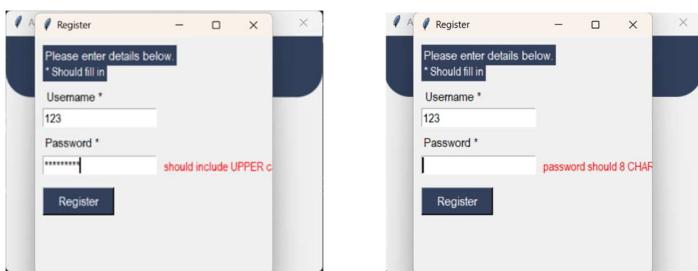
Improvement 1 (Layout):



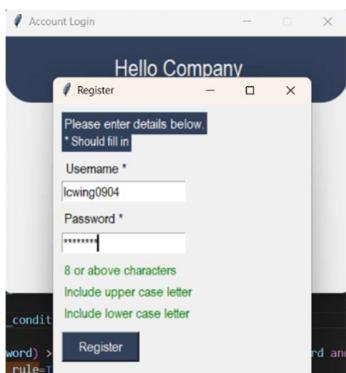
There is an issue with the calendar selection feature in the patient diary app. When the user moves the app window to the right side of the screen, the calendar view is partially blocked, making it difficult to select a date. This problem is particularly problematic for staff members who need to multitask and view multiple windows simultaneously. To address this issue, I made an improvement which is move the calendar to the middle of app. It can improve the app's usability and ensure that staff members can efficiently manage their tasks without any hindrances or delays.

Improvement (Clarity):

Original register interface:

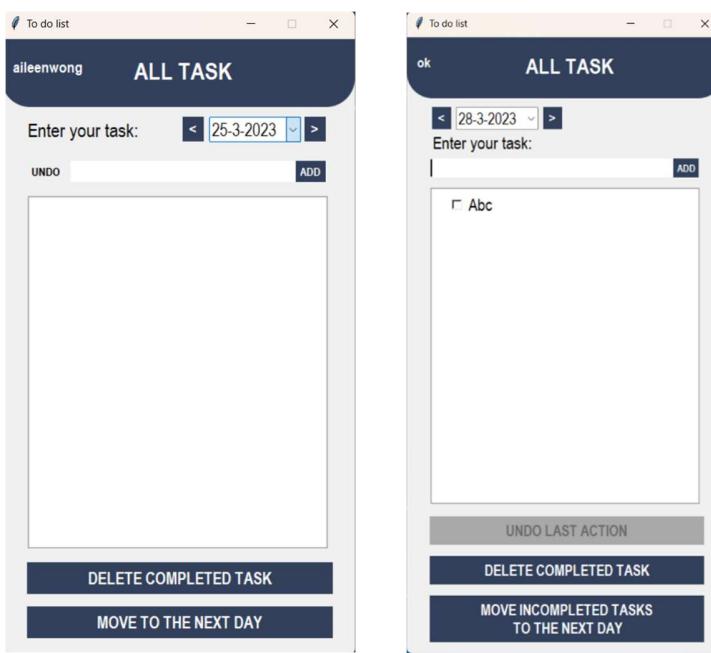


After improvement of register interface



During the account registration process in the patient diary app, there is no clear instruction provided about the password requirements. As a result, users must enter a password into the input field to view the requirements, which is inconvenient and time-consuming. Furthermore, the password warning message appears next to the input field, which is partially blocked and may not be fully visible to the user. This issue can make it challenging for users to identify and correct any password errors effectively. Therefore, I updated the registration process to include clear instructions regarding the password requirements and displaying the password warning message in a more visible location.

Improvement (Clarity):



There are two usability issues with the to-do list GUI that require attention. Firstly, it is not immediately apparent what the "Move to the next day" button does, as there is no clear indication or explanation provided. Therefore, I made the name of button clearer for user to know the function of the button, ' Move incomplete task to the next day'.

Secondly, the position and purpose of the "Undo" button require attention. The button is located next to the input field for adding tasks, which can lead to confusion as to whether it undoes the last typed word or the previous action. Therefore, I moved the undo button under the task list and named 'undo Last Action'

Improvement (Functional):



An important usability issue has been identified in the patient diary app related to the lack of a logout button. Users are unable to log out of their accounts because there is no clear indication or option available. Therefore, I added a logout on the top right corner with an underline which shows it is a button for user to click for logging out account. The logout function button closes the to do list window and reloads the whole app backing the window of choosing to register or log in.

Chapter 7: Professional issues for this project

7.1 Usability – accessibility

Usability and accessibility are two critical components of human-computer interaction design, particularly in professional contexts. Poor usability can lead to frustration, decreased productivity, and ultimately a loss of trust in the digital product or service. Poor accessibility, on the other hand, can result in the exclusion of users with disabilities from fully participating in digital experiences, which can have legal, ethical, and reputational implications for organizations. Therefore, it is essential for designers and developers to consider both usability and accessibility from the outset and to design with the needs of all users in mind.

In professional contexts, designers and developers should be aware of relevant laws and regulations related to accessibility, such as the Americans with Disabilities Act (ADA) in the United States. Compliance with such regulations may require specific design considerations, such as providing alternative text for images or ensuring that web content can be accessed with a keyboard.

In addition, designers and developers must consider the diverse needs of users when designing interfaces. This includes considering users with different abilities, language backgrounds, and cultural backgrounds. For example, providing text alternatives for non-text content can help users who use screen readers or who have slower internet connections. It is essential to ensure that digital experiences are inclusive and effective for all users, regardless of their backgrounds or abilities.

During the project, I understood usability and accessibility testing should be an integral part of the design process, particularly in professional contexts. User testing can identify issues that may be missed during the design phase and help designers and developers make necessary adjustments. Moreover, ongoing maintenance and updates to digital interfaces should prioritize usability and accessibility, as technologies evolve and user needs change.

Overall, considering usability and accessibility in professional human-computer interaction design can help ensure that digital experiences are inclusive and effective for all users.

7.2 Privacy – web privacy

Web privacy is a critical issue in human-computer interaction design, particularly in professional contexts. Digital technologies often collect personal data to tailor content and advertising to individual users, which can result in a breach of privacy and trust. This is why designers and developers must ensure that user data is collected and used in a transparent and ethical manner.

To achieve this, designers and developers must first understand the types of personal data that are collected through websites and web applications. This includes information such as browsing history, search queries, location data, and demographic information. By understanding the types of data that are collected, professionals can design interfaces that are transparent about data collection and usage.

Secondly, designers and developers must ensure that web interfaces provide users with clear and concise information about how their data is collected and used. This information should be easily accessible and understandable to all users, regardless of their technical background. This includes providing a privacy policy that clearly outlines what data is collected, how it is used, and who has access to it.

Finally, designers and developers must respect the user's right to control their personal data. This includes providing users with the ability to opt-out of data collection or delete their data if they choose to do so. User consent should also be obtained before collecting or using any personal data.

7.3 Monopoly – proprietary formats

The issue of monopolies created by proprietary formats in professional human-computer interaction is a major concern. Proprietary formats, owned by dominant technology companies, can create a monopolistic hold on the digital marketplace by limiting user choice and stifling innovation.

Proprietary formats can lead to vendor lock-in, where users are locked into using specific software or services, limiting competition and innovation. The widespread use of proprietary formats can also limit interoperability between different technologies, making it challenging for users to transfer data between different platforms or use software from different vendors. This can create barriers to entry for new competitors and stifle innovation.

To address this issue, it is crucial to promote open standards and interoperability in the digital marketplace. Open standards allow for greater collaboration and competition by ensuring that technologies can work together, regardless of who owns them. By promoting open standards, vendors can avoid monopolistic control of the market and create a level playing field for users and developers.

7.4 Management – consultation with stakeholders

Stakeholders can include a variety of individuals, including clients, designers, developers, and end-users. Effectively consulting with these stakeholders can ensure that the project is completed within the established timeline and budget while also satisfying the needs and expectations of all involved parties.

During the project, I am stakeholder which should involve identifying the stakeholders and determining their individual needs and preferences. This can be achieved through various research methods, such as conducting surveys, analyzing user data, and gathering feedback through focus groups. Once stakeholders have been identified, clear communication channels must be established, and expectations must be set for how feedback and input will be incorporated into the project.

Then, I should be involved in the design and development process. This can be accomplished through user testing, prototyping, and feedback sessions. Early stakeholder involvement ensures that the final product will meet user needs and preferences, resulting in a more successful project outcome.

I understand prioritizing stakeholder feedback is crucial and should be evaluated based on feasibility and potential impact on the project timeline and budget. A clear process must be in place for decision-making to incorporate feedback in a way that benefits the project.

Chapter 8: Conclusion

Human-Computer Interaction (HCI) is an interdisciplinary field focusing on the design, development, and evaluation of usable and effective interactive computer systems. In recent years, HCI has become increasingly important as more and more people rely on technology to accomplish tasks and access information. Throughout the project on "A study of Human-Computer Interaction" I was able to gain a comprehensive understanding of the importance of designing user interfaces that are user-friendly, intuitive, and meet the needs of diverse users during the software implementation and the user testing of software. It provided me with hands-on experience in creating and analyzing software from the perspective of human-computer interaction.

The project encompassed three software applications, which allowed me to explore different aspects of HCI, including mobile web design, medical applications, and various types of software.

From the first software implementation, I created a restaurant ordering app. The main analysis theme is elderly people and mobile web design. I considered the elderly people have the chance to order food on the phone by scanning the QR code. It is an excellent choice understanding the needs and issues of using a mobile app. In addition, I can deeply understand how to design a good mobile website which shows all the information on a small screen compared to the computer.

In the second software implementation, I created a patient diary app. The main analysis theme is medical application in HCI. HCI is included in different domains and applications. Medical is an essential part of technology. Technology is involved in many areas of medicine such as Healthcare Information Systems and Practice Management Software. It is an excellent choice understanding the design for medical area.

In the third software implementation, I also created a to-do list GUI and analyzed it through the lens of human-computer interaction. Through this software implementation, I learned about the importance of designing software that is easy to use and intuitive for users. I gained valuable experience in designing software for user experience and learned how to apply the principles of human-computer interaction to create interfaces that meet the needs of users from different types of software.

One of the most valuable aspects of the project was the opportunity to conduct usability testing for each of the software implementations. Through this process, I learned how to evaluate the software from the perspective of the end user, identifying areas where the user experience could be improved. This experience helped me to understand the importance of designing software with the user in mind, and how usability testing can be used to iteratively improve the design of a product. By implementing changes based on user feedback, I was able to create software that was more intuitive and user-friendly, ultimately leading to a better overall user experience. This experience has given me a greater appreciation for the iterative nature of user-centered design and the importance of continuously gathering feedback from users to improve the design of software applications.

Overall, the project has provided me with a solid foundation in the principles of human-computer interaction and interaction design. It has equipped me with valuable experience in conducting user testing and implementing user-centered design principles. I look forward to applying the knowledge and

skills I gained from this project to future software design projects that prioritize user experience and meet the needs of a diverse user base.

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34. Yvonne R., Helen S., Jenny P. (2011) Interaction Design: beyond human-computer interaction. 3rd ed. Wiley.

Appendix A: User Manual - Restaurant ordering

Welcome to our food ordering app! This app is designed to make ordering food at our restaurant quick and easy. Instead of waiting in line or flagging down a server, you can use your phone to scan a QR code at your table, which will bring up the restaurant's menu on your screen. From there, you can browse through the available items, customize your order, and submit it directly to the kitchen. With our app, you'll be able to enjoy your meal without any unnecessary delays or hassle.

Part one: (Installation manual)

```
Path of the react app: ../PROJECT/SoftwareDesign/ordering-app  
cd SoftwareDesign  
cd ordering-app  
npm cache clean --force  
npm install  
npm start
```

Part two: (The main page)



Click the screen to get started.

Part three: (Selecting food)

The screenshot shows a mobile application interface for a restaurant named 'ABC Restaurant'. The top navigation bar includes icons for ABC Restaurant, Menu, and Your Order, along with a shopping cart icon containing a single item. Below the navigation, a tab bar allows switching between Sides, Salad, Sushi Roll, Hand Roll, Sashimi, and Nod. The main content area displays a list of food items under the 'Sides' tab. Each item is presented with a small image, the name, a detailed description, the price in £, a quantity selector (minus, zero, plus), and an 'Add' button.

Item	Description	Price (£)	Quantity	Action
Chicken Dumpling	5 deep fried chicken dumpling	£ 5.2	0	Add
Yakitori	4 battered balls filled with octopus served in tonkatsu and mayonnaise sauce.	£ 4.9	0	Add
Spicy Prawn Tempura	Deep fried prawns.			

After click the screen, it will navigate to the menu page

If you want to select a food, you can click the ‘+’ button to add the quantity before click the add button. Add button is for user to add the item to the cart.

This screenshot shows the same mobile application interface after interacting with the first item. The quantity for 'Chicken Dumpling' has been increased to 2, indicated by the number '2' next to the minus and plus buttons. A hand cursor is shown clicking the 'Add' button for the first item. The shopping cart icon in the top right corner now shows a total of 2 items.

Item	Description	Price (£)	Quantity	Action
Chicken Dumpling	5 deep fried chicken dumpling	£ 5.2	2	Add
Yakitori	4 battered balls filled with octopus served in tonkatsu and mayonnaise sauce.	£ 4.9	0	Add
Spicy Prawn Tempura	Deep fried prawns.			

The image consists of two side-by-side screenshots of a mobile application interface for 'ABC Restaurant'. Both screenshots show a menu list with three items visible: 'Chicken Dumpling', 'Yakitori', and 'Spicy Prawn Tempura'. Each item has a small image, a name, a description, a price (£ 5.2 or £ 4.9), and a quantity selector with minus and plus buttons.

Screenshot 1 (Left): A hand is shown clicking the plus button for the 'Chicken Dumpling' item. A small circular icon with the number '2' is visible in the top right corner of the screen, indicating the current number of items in the cart.

Screenshot 2 (Right): The same screen after adding the item. A notification box appears at the top left, stating 'Notification: 2 Chicken Dumpling added to the cart'. The cart icon in the top right now shows a value of '1'.

After clicking the add button, it will show up a notification to mention you added the item to the cart already. In addition, you can check how many items you added to the cart next to the cart icon.

This screenshot shows the same mobile application interface as the previous one, but with a different notification message. The notification box at the top left says 'Notification: You should click + to increase the quantity of food!'. The rest of the screen displays the same menu items and layout as the first screenshot.

However, if you add the item with 0 quantity. There is a notification to show the instructions.

The screenshot shows a mobile application interface for 'ABC Restaurant'. At the top, there is a logo, the restaurant name 'ABC Restaurant', a 'Menu' button, a 'Your Order' button, and a shopping cart icon with a notification badge showing '1'. Below the header, there is a navigation bar with tabs: 'Sides', 'Salad', 'Sushi Roll', 'Hand Roll' (which is highlighted with a yellow background), 'Sashimi', and 'N...'. The main content area displays three food items in a grid:

- Salmon and Cheese Handroll**: A photograph of a salmon handroll on a white plate. Description: '1 large seaweed wrapped cone shaped roll with fresh salmon, cucumber and Philadelphia cheese £ 4'. Quantity: '- 0 +' with an 'Add' button.
- Spicy Tuna Handroll**: A photograph of a spicy tuna handroll. Description: '1 large seaweed wrapped cone shaped roll with fresh tuna, cucumber and Philadelphia cheese £ 4'. Quantity: '- 0 +' with an 'Add' button.
- California Handroll**: A photograph of a California handroll. Description: '1 large seaweed'. Quantity: '- 0 +' with an 'Add' button.

You can switch the food type when you are selecting the food.

Part four: (Cart page)

After finishing selecting all the food, you can click the cart icon to view your added items.

The screenshot shows the 'Your Order' page from the ABC Restaurant app. At the top, there is a logo, the restaurant name 'ABC Restaurant', a 'Menu' button, a 'Your Order' button, and a shopping cart icon with a notification badge showing '3'. The cart contains the following items:

- Chicken Dumpling**: Description: '5 deep fried chicken dumpling'. Price: '£ 5.2'. Quantity: '- 2 +'.
- Salmon and Cheese Handroll**: Description: '1 large seaweed wrapped cone shaped roll with fresh salmon, cucumber and Philadelphia cheese'. Price: '£ 4'. Quantity: '- 2 +'.
- Prawn Tempura Udon**: Description: 'Large bowl of udon noodles soup with varied toppings'. Price: '£ 9'. Quantity: '- 2 +'.

At the bottom of the screen, there are two lines of text: 'Sub-total: £ 36.4' and 'Services fee: £ 4'.

The screenshots show the ABC Restaurant app's cart screen. Both screens have a header with the restaurant logo, 'ABC Restaurant', 'Menu', 'Your Order', and a shopping cart icon with a '3' badge.

Left Screen (Initial State):

- Item 1:** Chicken Dumpling, 5 deep fried chicken dumpling, £5.2, quantity -2 (with a hand cursor icon).
- Item 2:** Salmon and Cheese Handroll, 1 large seaweed wrapped cone shaped roll with fresh salmon, cucumber and Philadelphia cheese, £4, quantity -2 +.
- Item 3:** Prawn Tempura Udon, Large bowl of udon noodles soup with varied toppings, £9, quantity -2 +.

Bottom: Sub-total: £36.4, Services fee: £4

Right Screen (After Edit):

- Item 1:** Chicken Dumpling, 5 deep fried chicken dumpling, £5.2, quantity -3 +.
- Item 2:** Salmon and Cheese Handroll, 1 large seaweed wrapped cone shaped roll with fresh salmon, cucumber and Philadelphia cheese, £4, quantity -2 +.
- Item 3:** Prawn Tempura Udon, Large bowl of udon noodles soup with varied toppings, £9, quantity -2 +.

Bottom: Sub-total: £41.6, Services fee: £4

You can edit the quantity of food into the cart.

You can also remove the item from the cart. The price and the cart quantity number will change automatically.

The screenshots show the ABC Restaurant app's cart screen. Both screens have a header with the restaurant logo, 'ABC Restaurant', 'Menu', 'Your Order', and a shopping cart icon with a '2' badge.

Left Screen (Initial State):

- Item 1:** Chicken Dumpling, 5 deep fried chicken dumpling, £5.2, quantity -3 +.
- Item 2:** Salmon and Cheese Handroll, 1 large seaweed wrapped cone shaped roll with fresh salmon, cucumber and Philadelphia cheese, £4, quantity -2 +.
- Item 3:** Prawn Tempura Udon, Large bowl of udon noodles soup with varied toppings, £9, quantity -2 +.

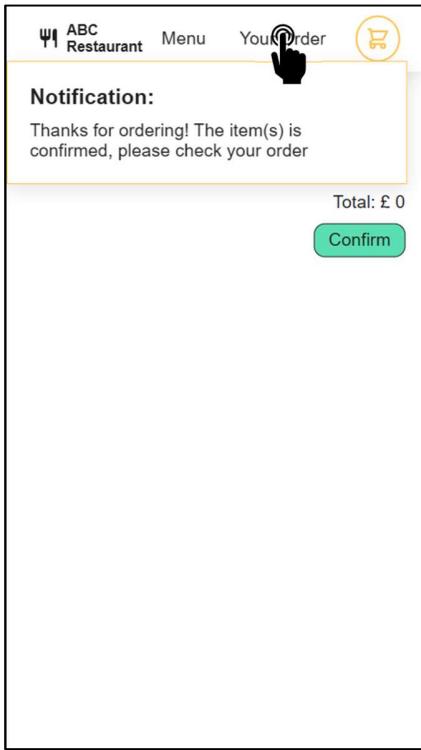
Bottom: Sub-total: £41.6, Services fee: £4

Right Screen (After Removal):

- Item 1:** Chicken Dumpling, 5 deep fried chicken dumpling, £5.2, quantity -3 +.
- Item 2:** Salmon and Cheese Handroll, 1 large seaweed wrapped cone shaped roll with fresh salmon, cucumber and Philadelphia cheese, £4, quantity -2 +.

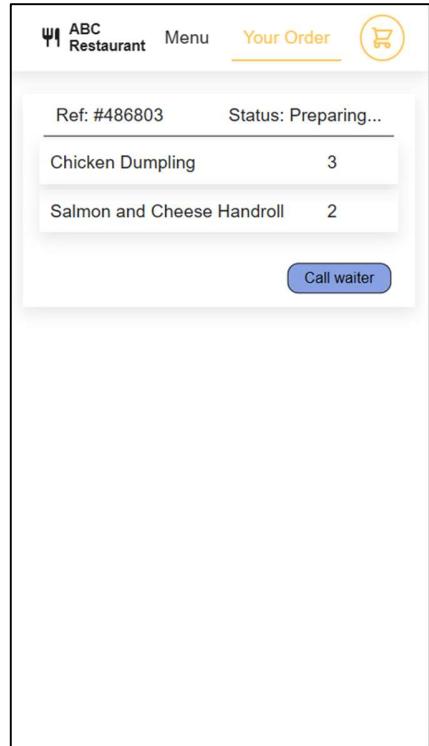
Bottom: Sub-total: £23.6, Services fee: £2, Total: £25.6

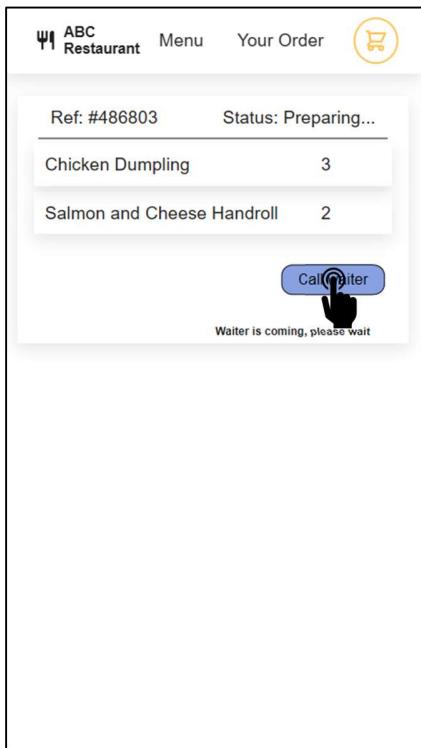
A green 'Confirm' button is visible at the bottom right.



After finishing editing your items fromt the cart, you can click 'Confirm' button to confirm your order. If your order confirm successfully, it will show up a thank you message and tell you the instructions of next step which is clicking to the order page to check your order.

Part five: (Order page)



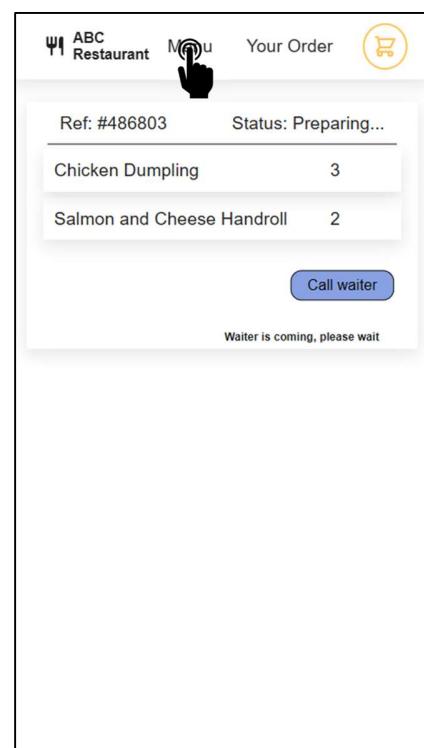


If you have any issue about the order, you can click the button of 'Call waiter' to call the waiter. They will come to help you.

Part six: (Back to menu page)

If you want to order more food, you can click the menu in the navigate bar and go back to the menu for ordering again.

It will show up two orders on the order page with different reference numbers and status separately when you confirm the second order.

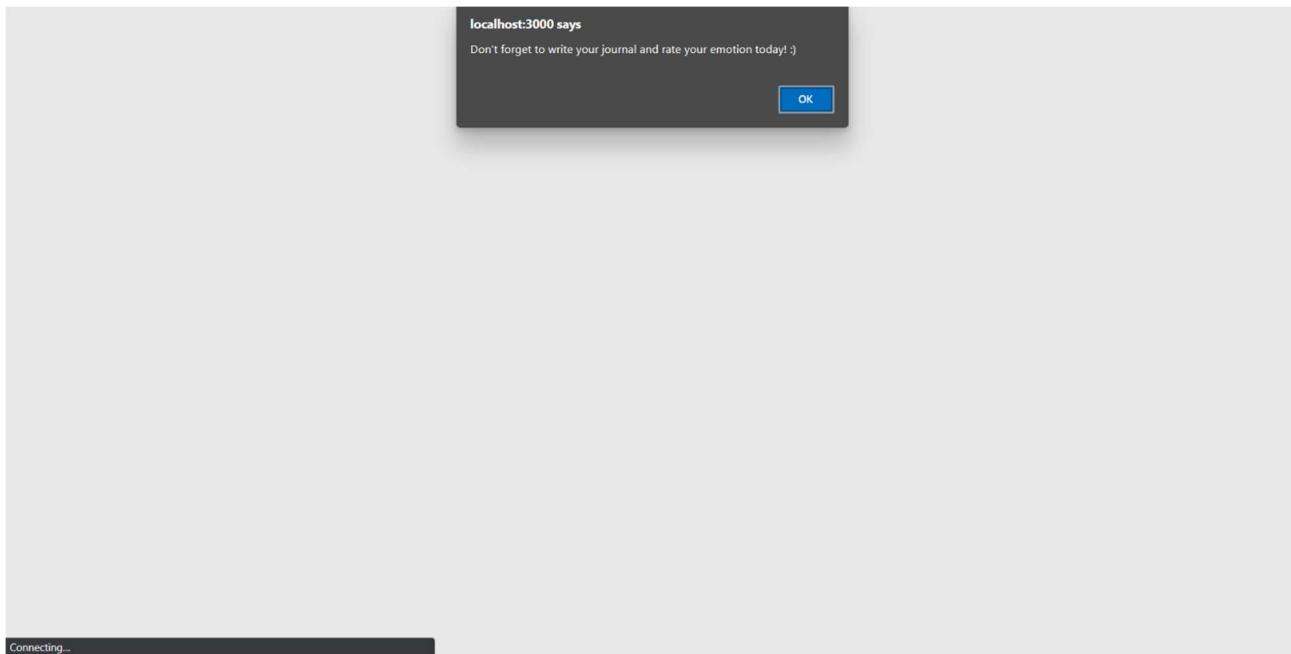


Appendix B: User Manual – Patient diary app

Welcome to our patient journaling website! Our website is designed to help different types of patients easily record their thoughts, emotions, and symptoms in a journal format. By using this website, you can keep track of your daily experiences and share them with your doctor. This will enable your doctor to better understand your situation and provide you with personalized care. Whether you are dealing with a chronic illness or simply want to monitor your mental health, our app provides an intuitive platform to help you stay on top of your health and wellbeing.

Part one: (Installation manual)

```
Path of the react app: .../PROJECT/SoftwareDesign/patient-diary  
cd SoftwareDesign  
cd patient-diary  
npm cache clean --force  
npm install  
npm start
```



This website will start with a reminding message to remind you to write your journal today.

Part two: (Create an account)

After clicking ok of the message, it will start with a login page. If you are a new patient which has no account. You should click 'No account? Sign Up'. It will connect to the register page.

The screenshot shows a 'Log In' form with fields for 'Email' and 'Password', and a 'Log In' button. Below the buttons is a link 'No account? Sign Up' with a black arrow pointing to it.

After clicking the Sign up link, it will show up a set of input frame. You should fill in all the frame for creating an new account. There are some requirements of the password which display under the frame of password. You should meet all the requirements to sign up.

The screenshot shows a 'Create Account' form with fields for 'First Name' (Cheuk Wing), 'Last Name' (Lim), 'Email' (wjis187@live.rhul.ac.uk), and 'Password' (Qwer1234). Below the password field, a list of requirements is displayed: 1. 8 or above characters, 2. Include upper case, 3. Include lower case, 4. Include special character, 5. Include one number. A 'Confirm Password' field is present below, with a note 'You must confirm your password' and a 'Sign In' button. At the bottom, there is a link 'Already have an account? Log in'.

This is an example of the password which met all the requirements.

Create Account

First Name :

Last Name :

Email :

Password :
 

1. 8 or above characters
2. Include upper case
3. Include lower case
4. Include special character
5. Include one number

Confirm Password :

You must confirm your password

Sign In

Already have an account? [Log in](#)

If your password is not match with the conditions, the condition that you didn't achieve yet will be stay to be red color.

Red color: the password didn't reach that requirement

Green color: the password reach that requirement

Create Account

First Name :

Last Name :

Email :

Password :

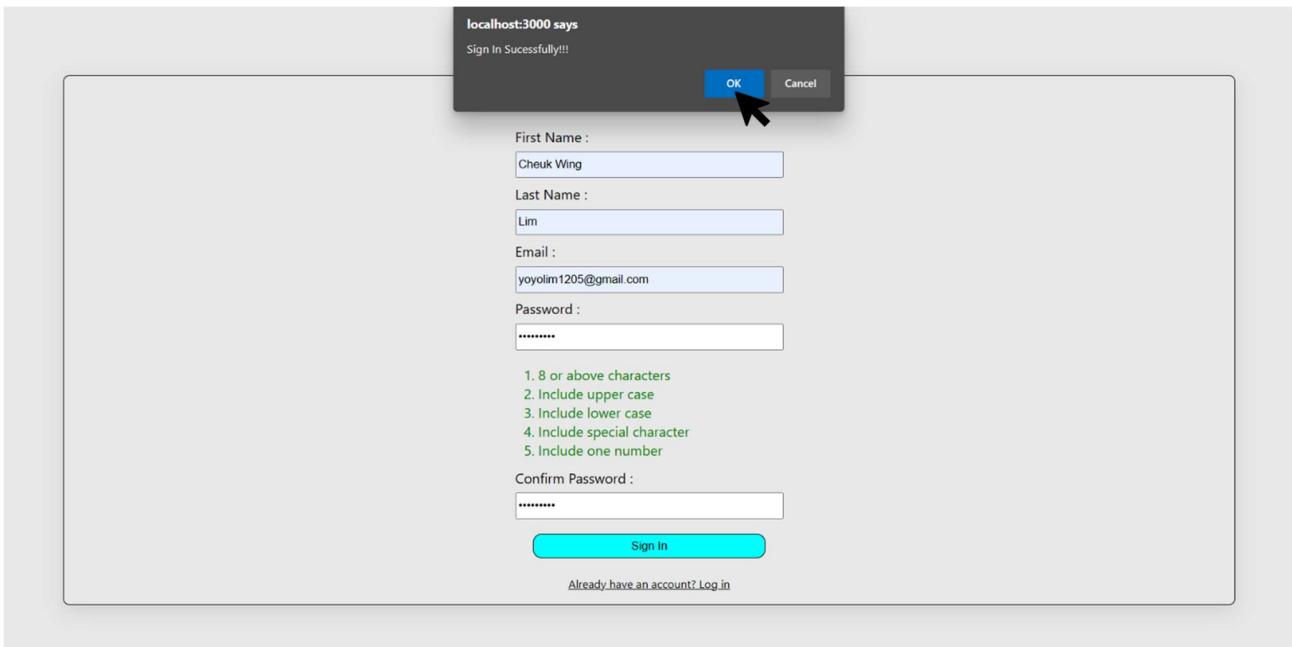
1. 8 or above characters
2. Include upper case
3. Include lower case
4. Include special character
5. Include one number

Confirm Password :

Sign In

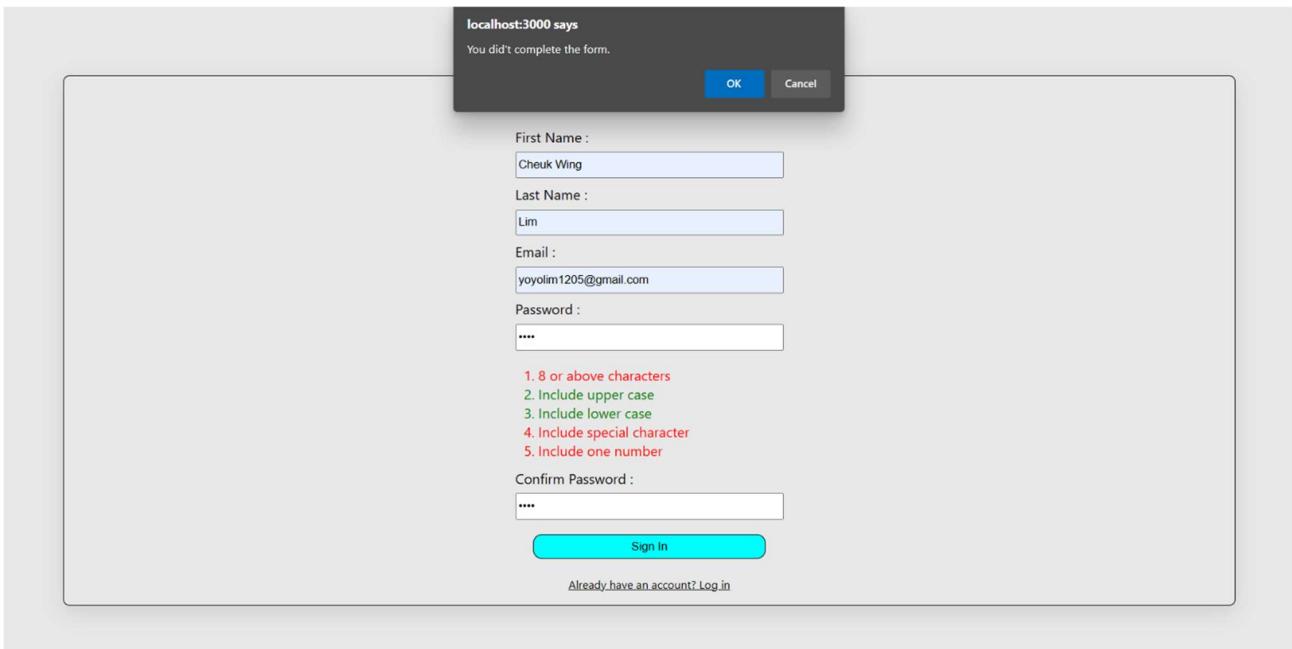
Already have an account? [Log in](#)

If you meet all the requirements and fill in all the frames, you will see there is not any message with red color. Then, you can click 'Sign In' button.



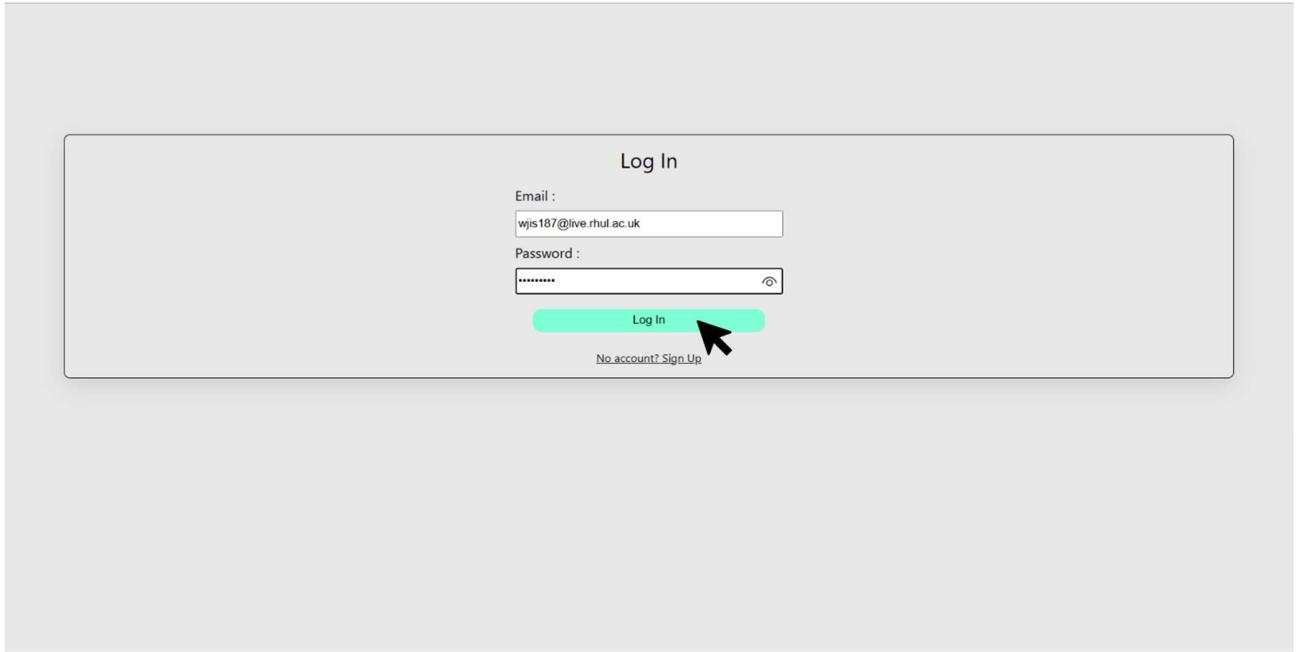
It will show up the message of registration successfully, 'Sign in Successfully'. Then, you can click 'OK' to link to login page.

In contrast, if you didn't match all the requirements which mean there are some error messages with red. It will show up the message of registration fail, 'You didn't complete the form'.



Part three: (Log in page)

In the log in page, it includes the input frames of email and password. You need to log in with the email that you registered with the corresponding password. If you confirm your email and password is correct, you can click 'Log In' to get in to the website.



Part four: (Calendar page)

After log in the account, it will navigate to the calendar page, this page is for user to add events to the calendar which would be a reminder for user to know what is their up coming appointment.

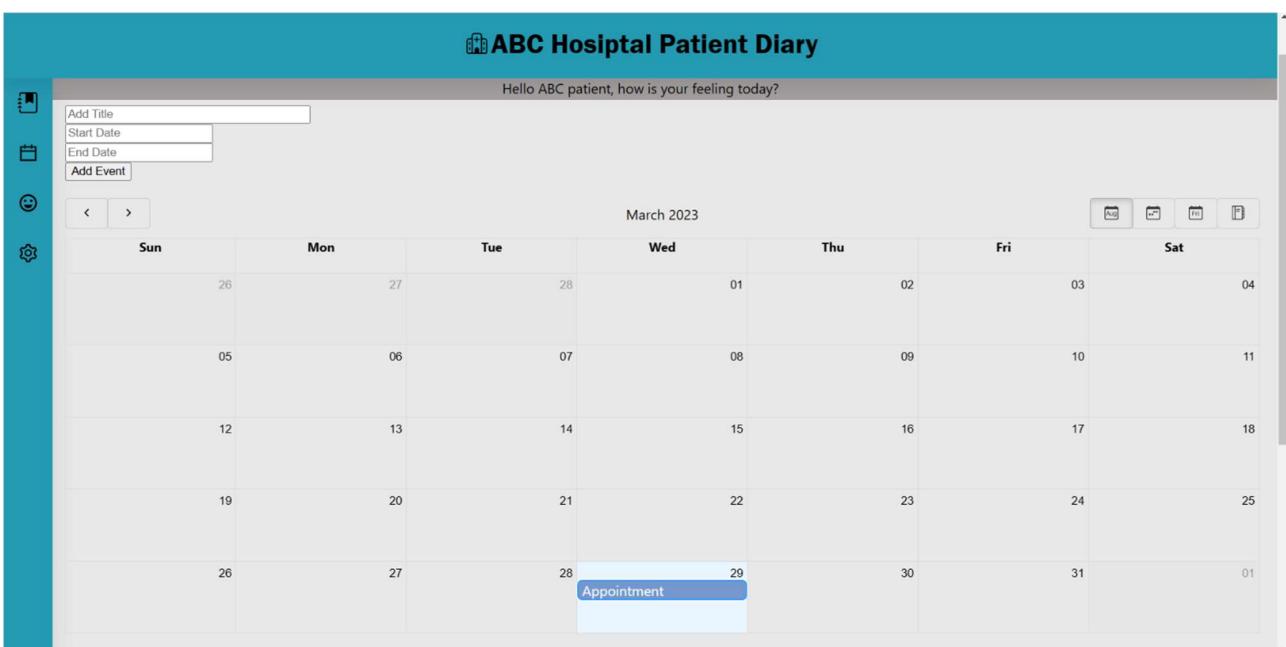
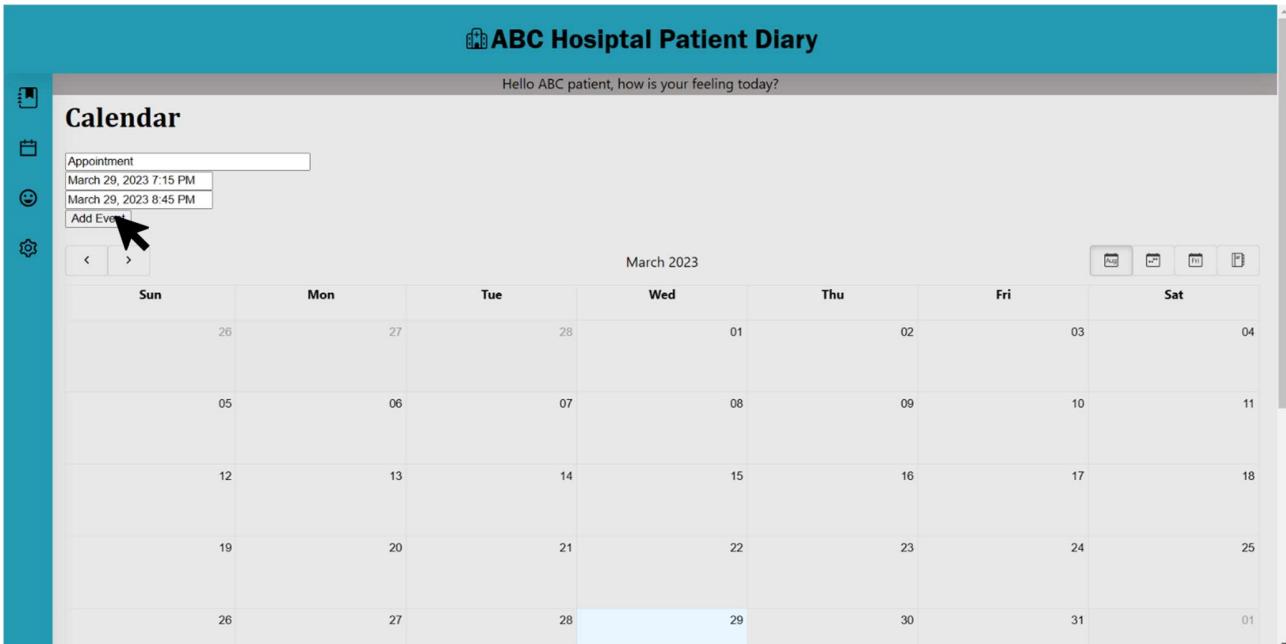
A screenshot of the "ABC Hospital Patient Diary" application. The top navigation bar is teal with the title "ABC Hospital Patient Diary" and a patient greeting "Hello ABC patient, how is your feeling today?". On the left is a vertical sidebar with icons for Home, Calendar, Mood, and Settings. The main area is titled "Calendar". A form for adding an event is visible, with fields for "Add Title", "Start Date" (set to March 1st), "End Date" (set to March 2nd), and a "Add Event" button. Below the form is a navigation bar with arrows and month/year controls. The main calendar grid shows March 2023 with days from Sunday to Saturday. Each day cell contains a date: 26, 27, 28, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 01. To the right of the calendar are five small square buttons labeled "Aug", "Sep", "Oct", "Nov", and "Dec".

For adding the events to the calendar, you should first enter the title of the events. For example, enter 'Appointment'. Then you can click the Start date and End date to choose the date and time of the event.

The screenshot shows the 'ABC Hospital Patient Diary' application interface. At the top, there is a teal header bar with the title 'ABC Hospital Patient Diary' and a small icon. Below it is a grey navigation bar with icons for file operations (New, Open, Save, Print) and a message 'Hello ABC patient, how is your feeling today?'. The main area is titled 'Calendar'. On the left, there is a vertical sidebar with icons for file operations, a calendar, a smiley face, and settings. The main calendar view shows March 2023. The days of the week are labeled from Sunday to Saturday. The dates are displayed in a grid format. A red box highlights the 'Add Event' button at the bottom right of the input field. A black arrow points to the 'Start Date' input field. The input fields for 'Add Title', 'Start Date', and 'End Date' are visible. The month header 'March 2023' is centered above the grid. The days of the month are numbered sequentially. The last day of the month, March 31, is highlighted in light blue. The right side of the calendar grid has four small icons for file operations.

This screenshot shows the same 'ABC Hospital Patient Diary' application interface as the previous one, but with a significant visual change: the entire screen is darkened to a black background. This indicates a night mode or a specific theme setting. The calendar grid remains the same, showing March 2023. The days of the week and dates are clearly legible against the dark background. The 'Add Event' button, 'Start Date' input field, and other UI elements are also visible despite the dark theme. The overall layout and functionality appear identical to the first screenshot, except for the aesthetic difference in the background color.

After confirming the information of the event, user can click 'Add event' button for adding the event to the calendar



You can view the events by month in original. However, you can also view it by week, day or agenda which can clearer to know the time or overview all the events added before from the agenda.

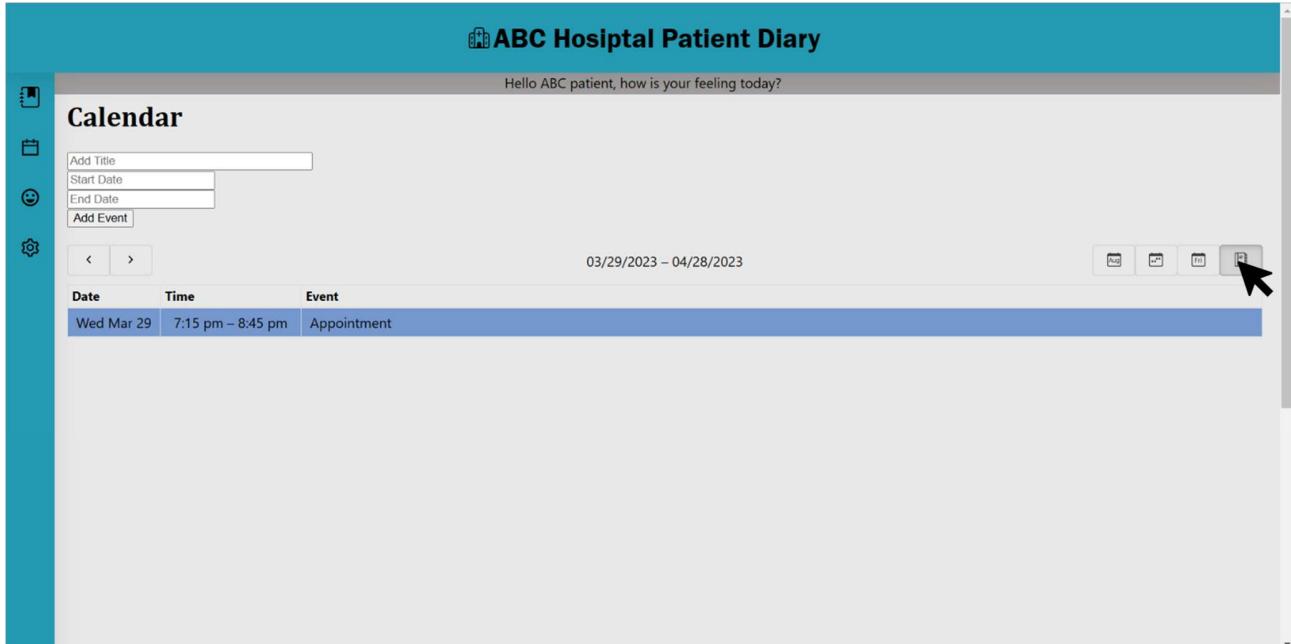
Week:

The screenshot shows a weekly calendar interface for the period from March 26 to April 1. The days of the week are listed horizontally at the top: 26 Sun, 27 Mon, 28 Tue, 29 Wed, 30 Thu, 31 Fri, and 01 Sat. The time axis is on the left, ranging from 3:00 PM to 11:00 PM. A specific appointment is highlighted on Wednesday, March 29, from 7:15 PM to 8:45 PM. The interface includes a toolbar with various icons and a search bar at the top.

Day:

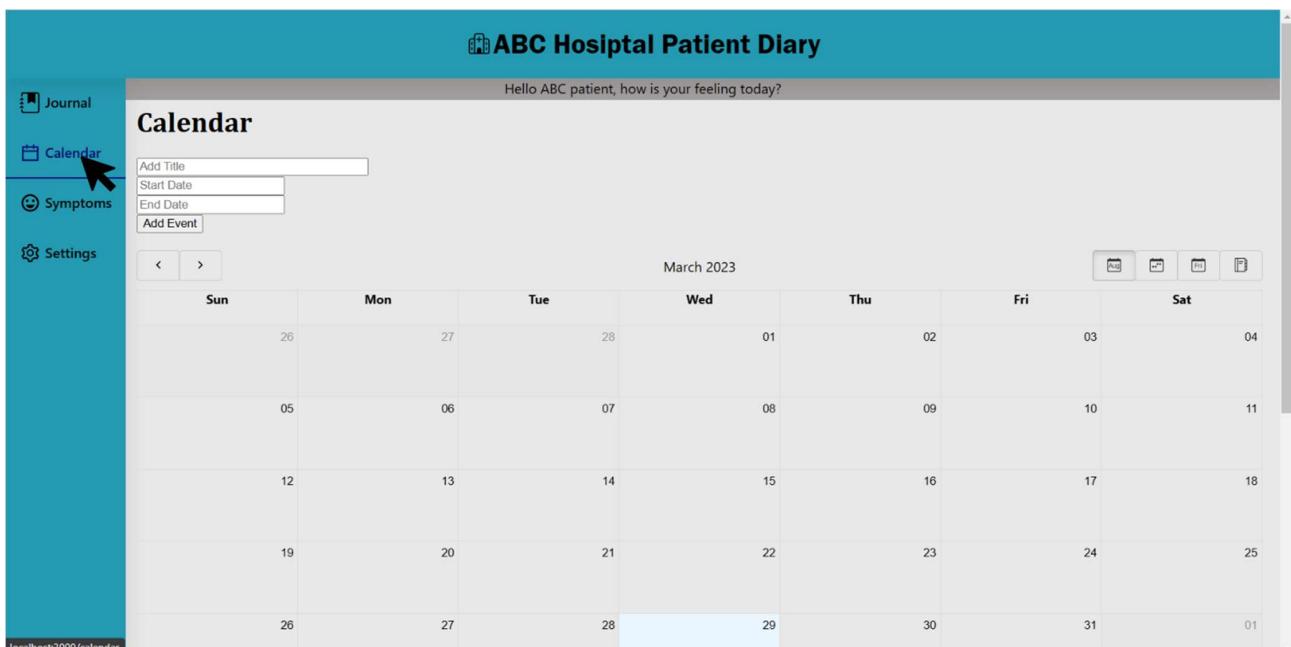
The screenshot shows a daily calendar interface for Wednesday, March 29. The time axis on the left shows hours from 2:00 PM to 11:00 PM. A blue box highlights an appointment from 7:15 PM to 8:45 PM. The interface includes a toolbar with various icons and a search bar at the top.

Agenda:



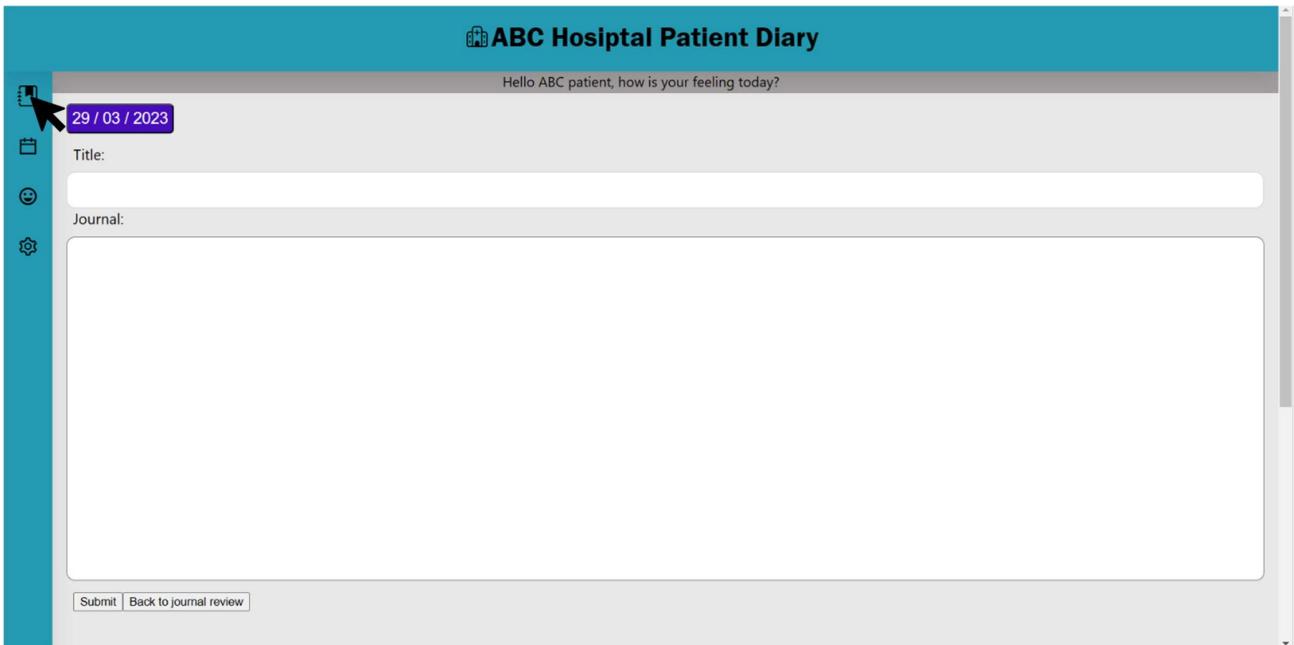
Part five: (About the navigate bar)

When your mouse on the navigate bar. It will show the name of the icon.

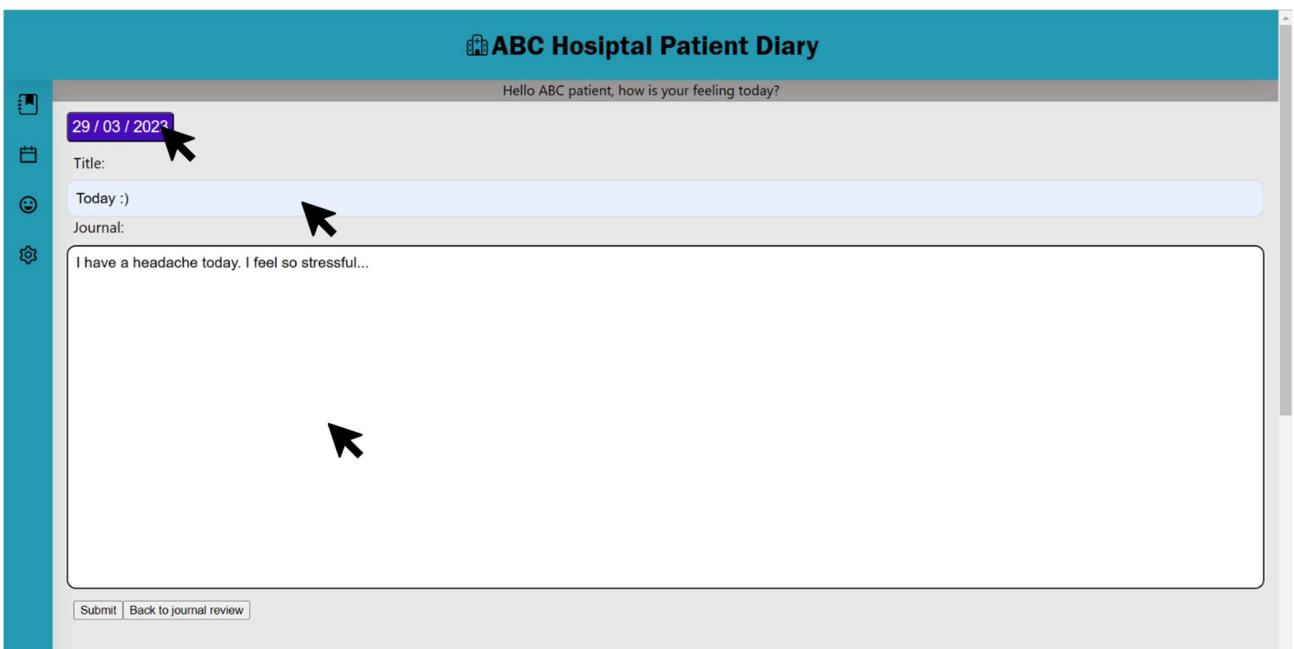


Part six: (Journal page)

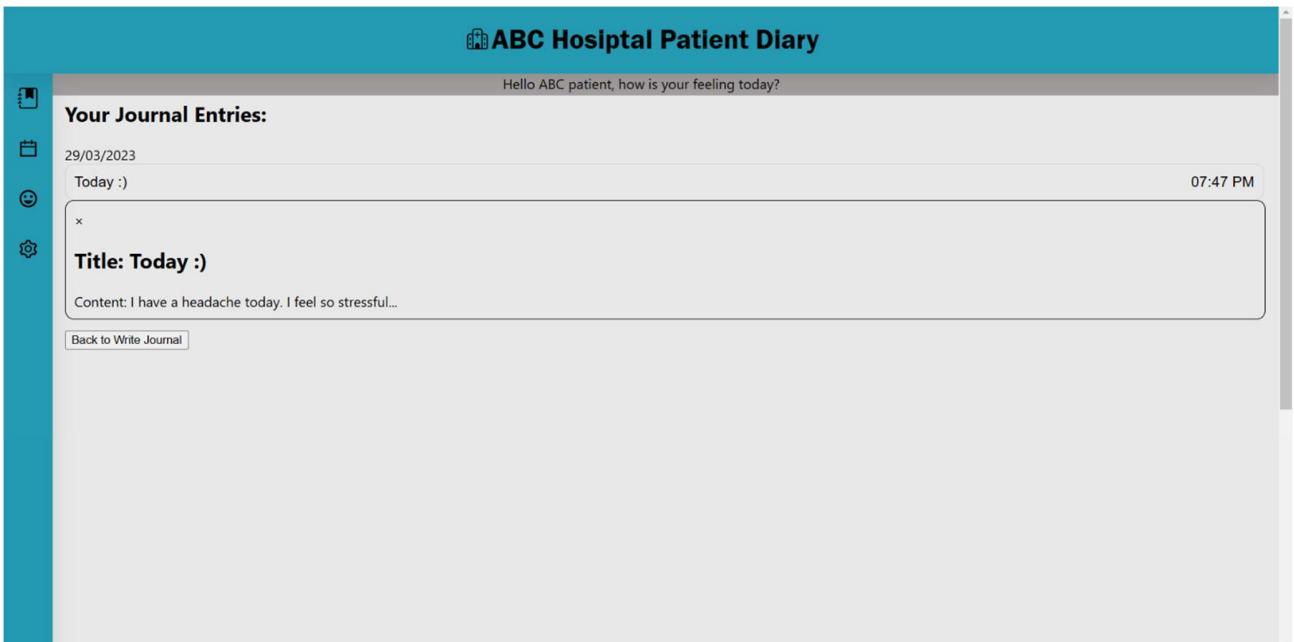
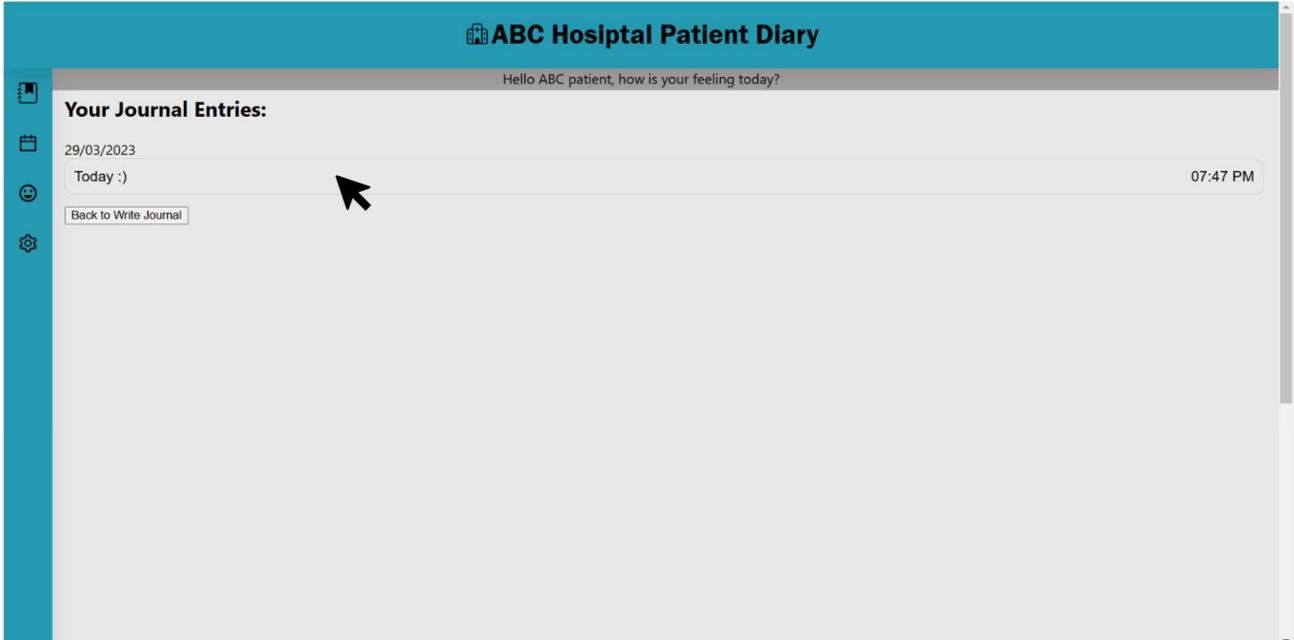
You can click the first icon of the navigate bar to go to the journal page. Journal page is for user to write the journal and view the journal they wrote before.



So, you can first select the date of journal and enter the content of the journal with the title. Then you can click submit to view the journal.



After clicking the submit button, it will navigate to the page of showing all the journal. You can see the date and time of the journal title. If you want to see the content of the journal, you can click the title to check the content.



Part seven: (Symptoms page)

This page has a set of questions representing your emotion every day. It will rate your emotion by five emotion icons. You can first click to select the date of symptoms.

ABC Hospital Patient Diary

Hello ABC patient, how is your feeling today?

29 / 03 / 2023

A A A A

How anxious you feel today?	How is your sleep quality last night?	How tired you feel today?
Excellent Good Average Bad Awful	Excellent Good Average Bad Awful	Excellent Good Average Bad Awful

How well do you feel today?	Can you keep focusing on ur work?	Do you have any joint pain today?
Excellent Good Average Bad Awful	Excellent Good Average Bad Awful	Excellent Good Average Bad Awful

How depressed you feel today?
Excellent Good Average Bad Awful

ABC Hospital Patient Diary

Hello ABC patient, how is your feeling today?

29 / 03 / 2023

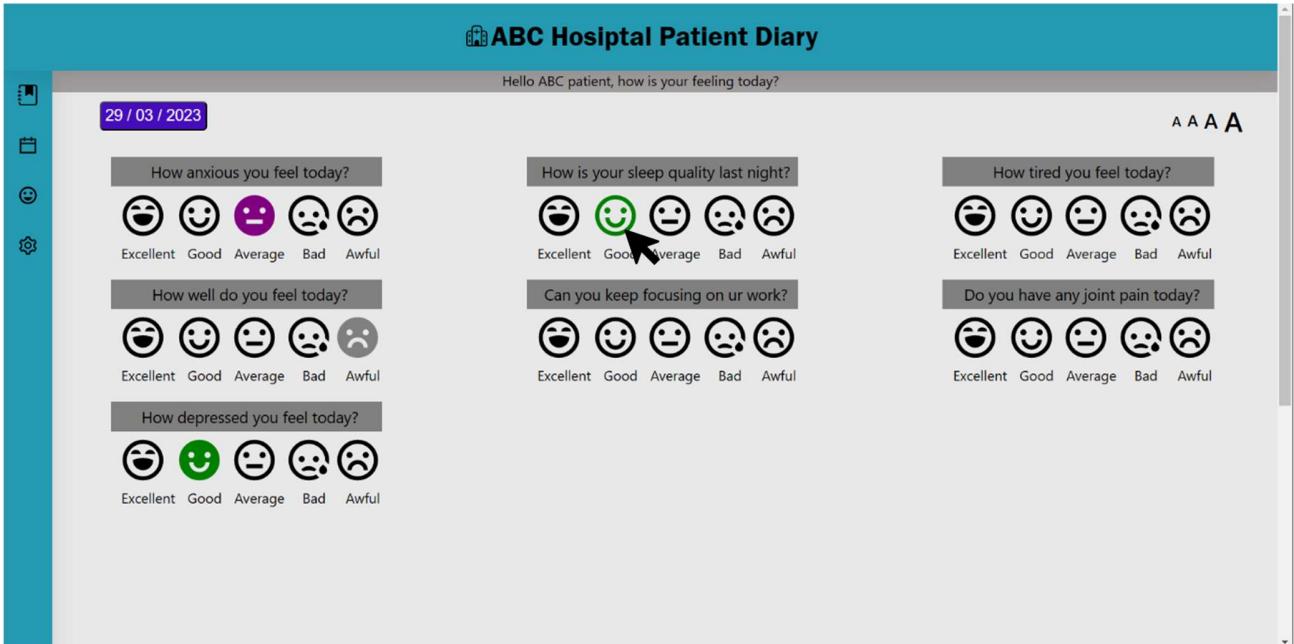
A A A A

today?	How is your sleep quality last night?	How tired you feel today?
Bad Awful	Excellent Good Average Bad Awful	Excellent Good Average Bad Awful

today?	Can you keep focusing on ur work?	Do you have any joint pain today?
Excellent Good Average Bad Awful	Excellent Good Average Bad Awful	Excellent Good Average Bad Awful

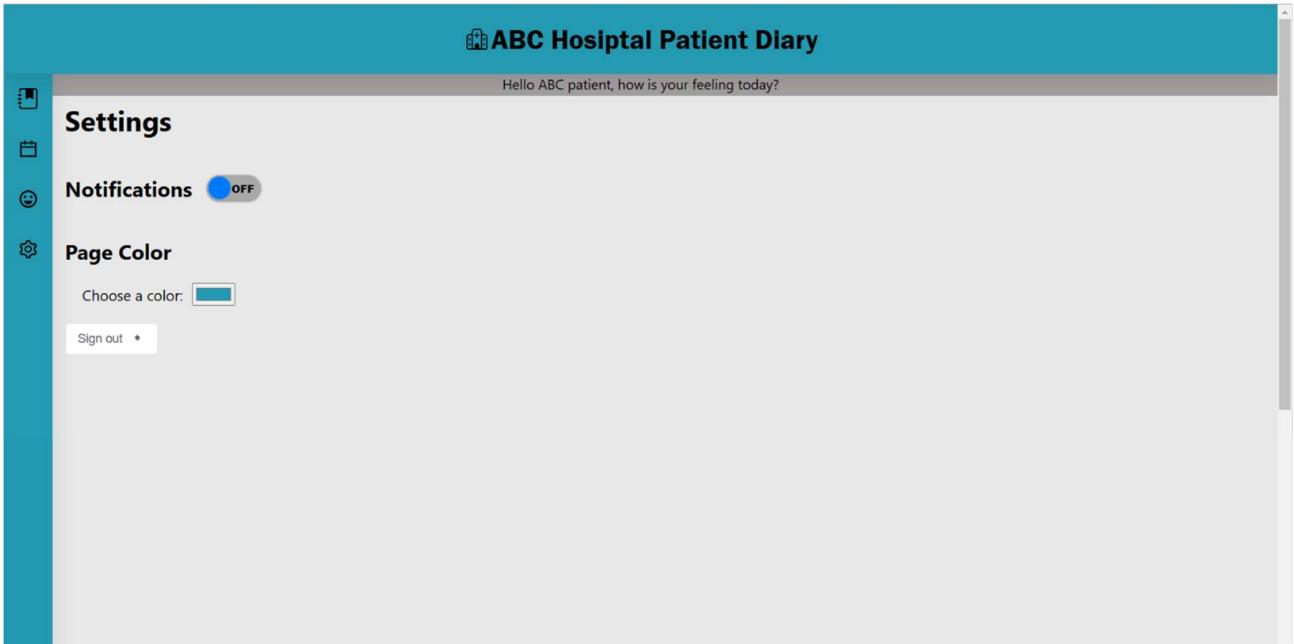
How depressed you feel today?
Excellent Good Average Bad Awful

Then, you can start to rate your symptoms today which need to click the emotion icon. Also, if you want the font size bigger, you can select the right top corner. There are four level of font size you can choose.

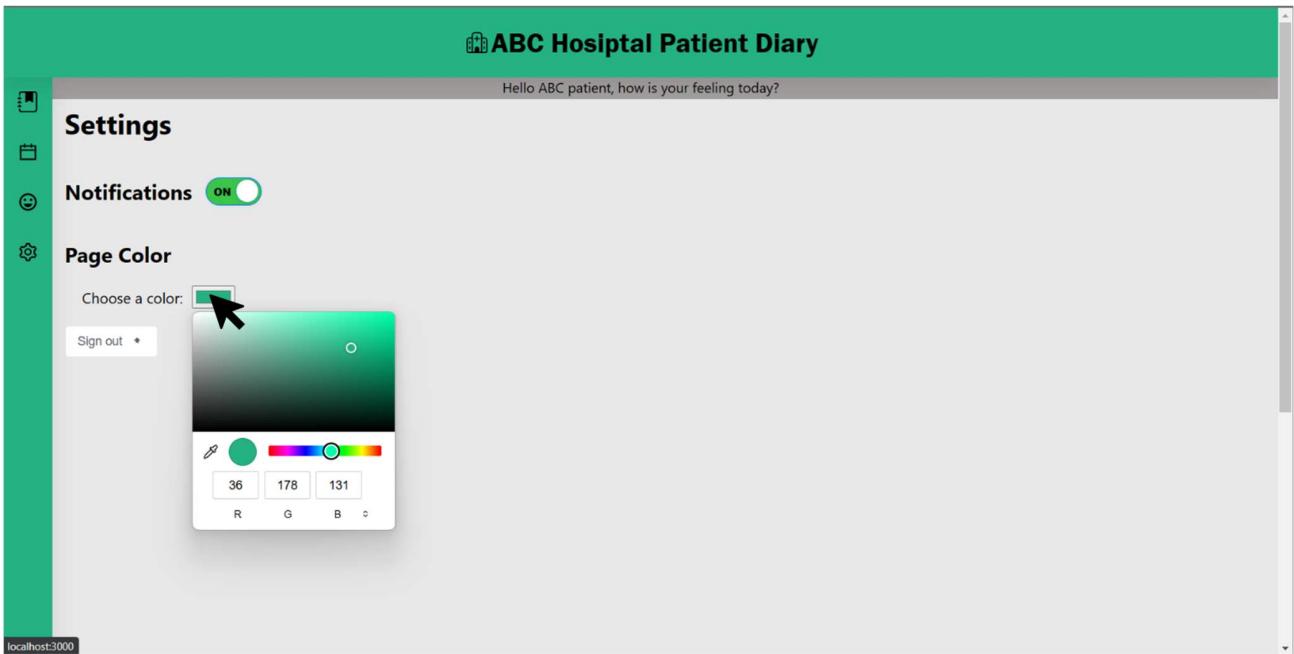


Part eight: (Setting page)

This page is for user can control about the feature of the website. It includes a on or off button of notification and a option to choose the color of the website



This is an example of changing the color of the website.



Part nine: (Sign out)

You can click 'Sign out' in the setting page if you want to log out the account for the priacy. After you clicking the 'Sign Out' button. It will back to log in page.

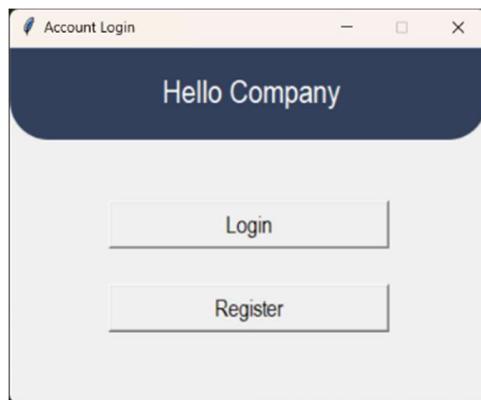
Appendix C: User Manual – To Do List GUI

This application has been designed to help office staff to effectively manage their daily tasks with ease. Our to-do list GUI provides you with a dedicated workspace to keep track of your tasks while working on other windows simultaneously. This manual will guide you through the software's features and show you how to use it to enhance your productivity.

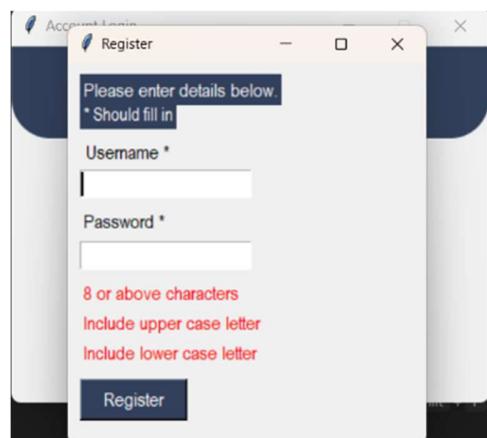
Part one: (Installation manual)

```
Path of the react app: ../PROJECT/SoftwareDesign/todolist-gui  
cd SoftwareDesign  
cd todolist-gui  
python todolist.py
```

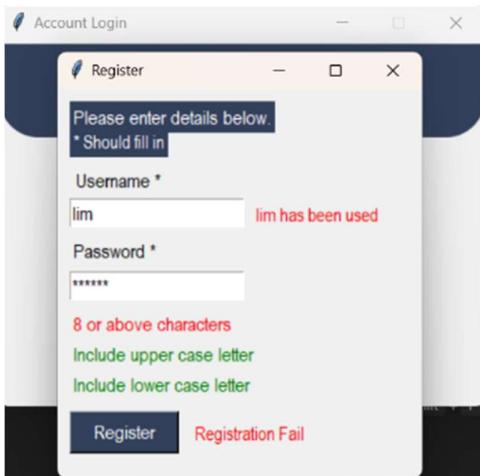
This software will start will a main window of choosing the option of log in or register.



Part two: (Register page)



After clicking 'register', it will link to register interface. The register interface includes the input frames of username of password. You should fill in all the frames.



About the username, if the username you entered had been registered. It will show up a warning message.

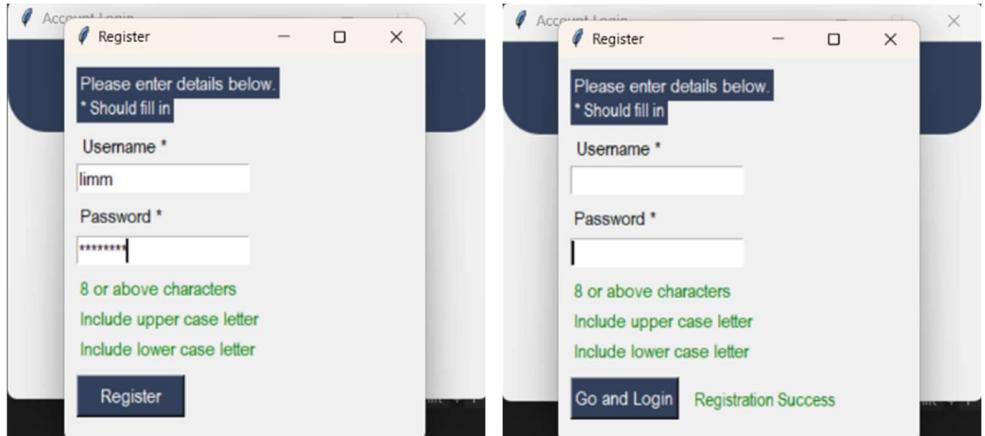
About the password, you should meet the requirements below:

- 8 or above characters
- Include upper case letters
- Include lower case letters

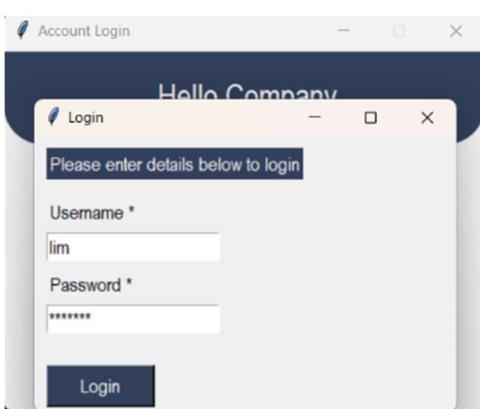
If you didn't meet the conditions, the color of the word would be red.

Please make sure you enter all the thing without warning. Otherwise, it will show 'Registration Fail'.

If you enter all the thing without warning, it will show 'Registration Success'. Then you can click 'Go and Login' button to the log in page.



Part three: (Login interface)



After going to the login interface, you need to enter the username and password you registered and click 'Login'. The information you entered will verify after you click the 'Login' button. If the username is not found or the password is not match, it will show up warning message.

Part four: (To do list interface)

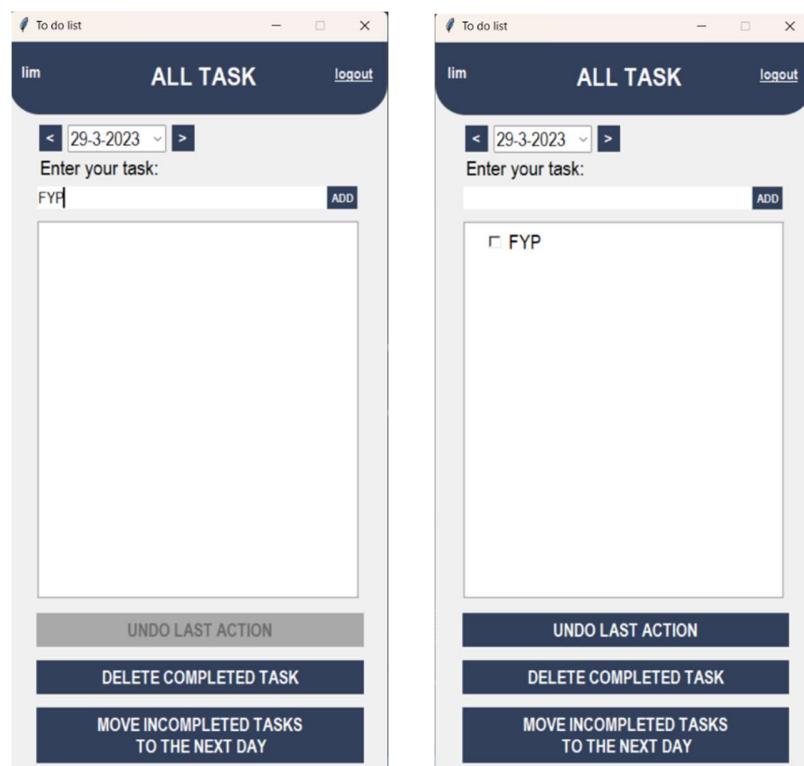


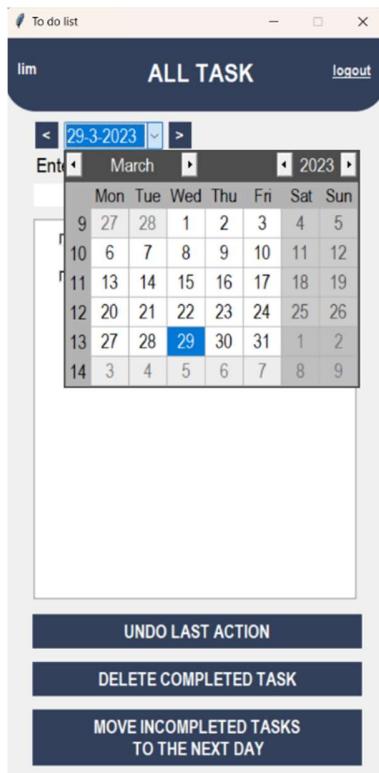
This is the beginning of the software which includes

- log out button
- username
- the date: select the date of task
- a input frame: entering the task
- add button: adding the task to the task box
- undo button: undo the last action
- delete button: delete the completed task
- move button: move the incomplete task to the next day

Add task :

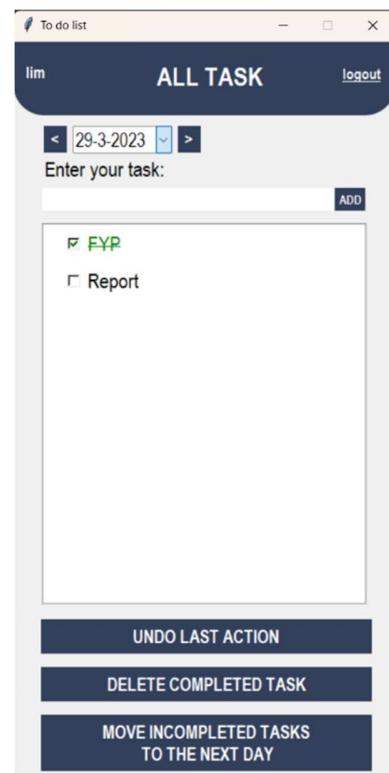
Enter the task name to the input frame and click 'ADD'. Then, the task will show up into the task box

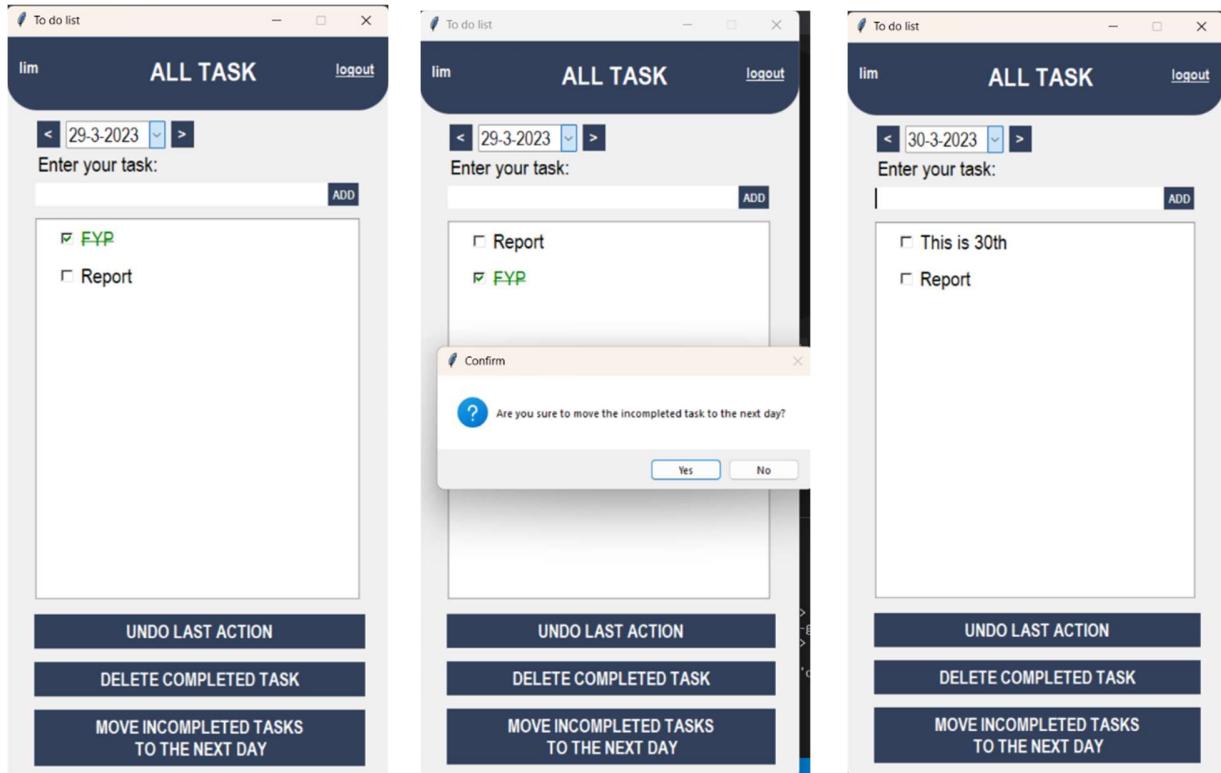




Select date:

you can select the date for adding a new task or checking the previous task.



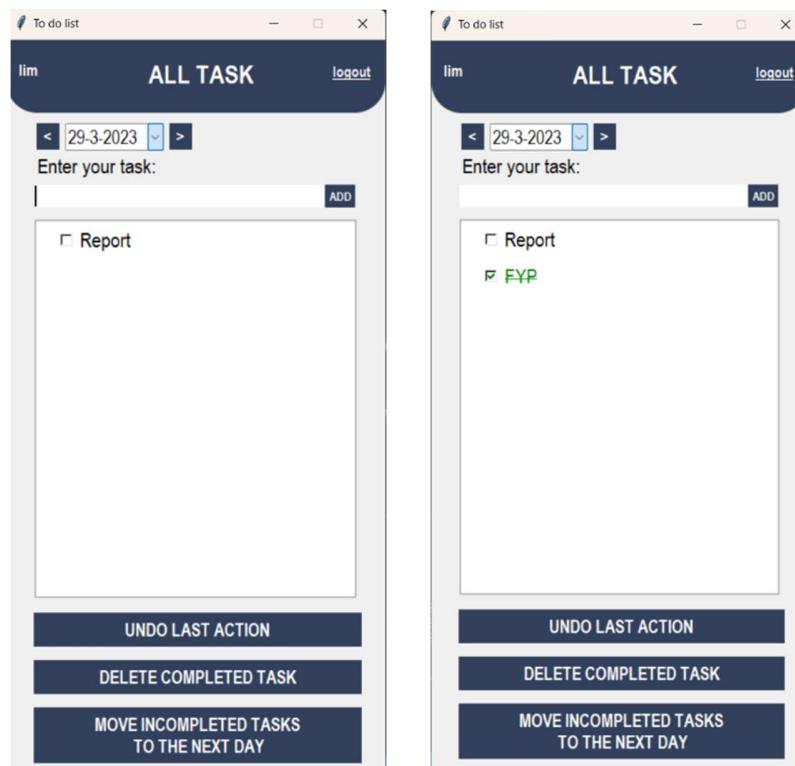
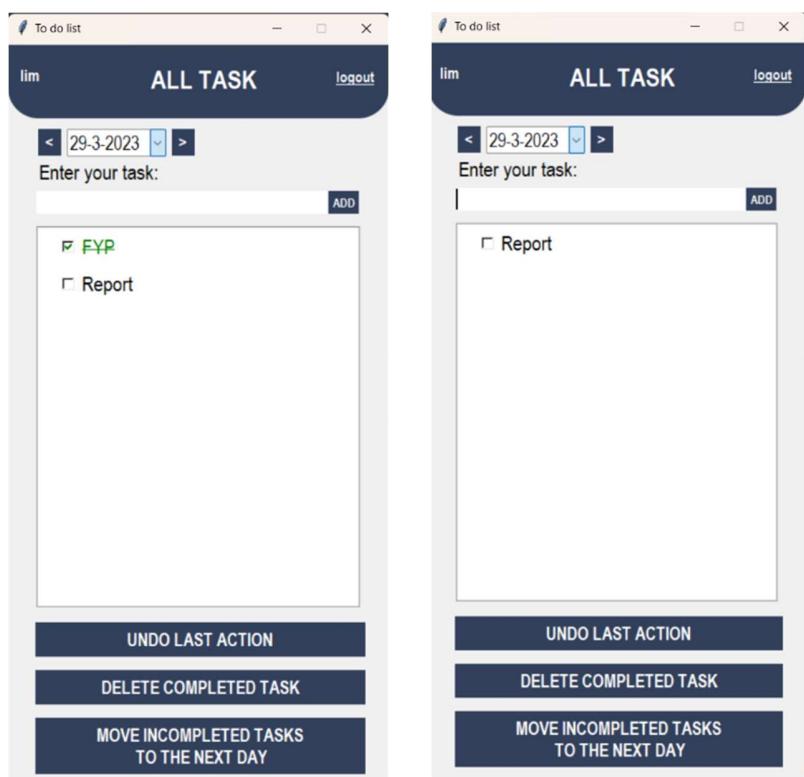


Move task:

The purpose of move button is for moving the incomplete task to the next day which is the task didn't ticked yet. So, if you click 'MOVE INCOMPLETED TASKS TO THE NEXT DAY', it will have a pop up window asking you to confirm. After click 'confirm', the task of 'Report' will move to 30th March. And the task in 29th March will disappear.

Delete task:

The purpose of delete button is for deleting the completed task. When I click 'DELETE COMPLETED TASK', the task 'FYP' which is ticked will disappear.



Undo action:

After deleting the task, if you undo the action, you can click 'UNDO LAST ACTION'. Then, the task of 'FYP' will come back to the task box.