American University of Sharjah

College of Engineering

Department of Computer Science and Engineering

COE420: Software Engineering

Final Project Report

Huduu

Abstract

"Huduu", derived from the Arabic translation for the word "calm", is a web application developed to help the students of the American University of Sharjah (AUS) who are experiencing difficulties with their mental health and wellbeing. This application is designed to provide these students with a platform to book, edit, and delete appointments with certified AUS counselors, track their mental health progress, as well as receive personalized tips from the counselors. The application also allows the counselors to view the appointments registered with them, as well as add personalized tips for students. This system will be modeled using the spiral model software development process model. The graphical user interface (GUI) will be designed using HTML, CSS, and Bootstrap, whereas the backend will be implemented using Flask, Python, JavaScript for the animation and progress charts, and SQLAlchemy for creating the database that will be used in order to record users' data. Finally, the functionality of the system will be tested using Selenium IDE, and a survey will be conducted to evaluate the effectiveness of the GUI. Maintaining a positive mental health and treating any mental health conditions is essential to stabilizing students' behaviors and emotions, as well as enhancing their wellbeing and quality of life. Huduu aims to achieve this by ensuring quality service to AUS students in need of professional assistance.

Introduction

Throughout their lives, students may encounter a plethora of issues. These issues include but are not limited to: anxiety, depression, relationship concerns, stress management, motivation, self-esteem, loss and life changes, difficulty managing time, family issues, as well as other issues. As more and more students struggle with these issues, they recognize their need for professional mental health guidance. Hence, it has become apparent that a system needs to be created that will benefit both the students and the counselors by providing a simple and efficient booking system that allows students to book, view, edit, and delete appointments with counselors, as well as track their mental health progress, and receive personalized advice from counselors. Similarly, counselors need to be able to view all registered appointments, as well as provide personalized advice to their students.

Problem

As of yet, AUS does not have a web application that provides the aforementioned services. There is currently only booking with the university counseling services through email, which the majority of students do not know or hear about. Moreover, there is little awareness brought to these services. Hence, most students do not end up receiving the professional help and guidance that they need, and suffer negative consequences. To tackle this problem, we will be creating a web application, “Huduu”, for all AUS students that will allow them to have their own accounts, efficiently book appointments with AUS counselors, view, edit, or delete them, as well as track their mental health progress, and receive the necessary recommendations from their counselors. Huduu will also allow counselors to view their registered appointments, in addition to adding personalized recommendations to their students.

Scope

The purpose of Huduu is to provide a platform for AUS students and counselors to use when it comes to appointments, recommendations, and tracking mental health progress. Through this application, awareness regarding the university counseling services will be raised, and more students will reach out for the help they need, as well as benefit from other services offered by Huduu. Counselors will receive more clients and will also be able to utilize other services.

System Description

When Huduu is first launched, the first page displayed is the Home page. It contains several pictures and a brief description of what Huduu is, as well as buttons for joining and learning more about Huduu, with soothing music playing in the background. The About page contains a detailed description of Huduu's services, including the many mental health issues that students may struggle with. It also displays the AUS counselors with their names and photos, as well as an interactive slider that shows students' reviews about the website and their own stories of how Huduu has personally helped them. The Contact page contains contact information about AUS's counseling services such as the phone number, location, and email. It also contains a form to be filled out for those interested in contacting Huduu for any inquiries. In order to benefit from the services provided by Huduu, the user must first register themselves either as a student or as a counselor. There is a Sign Up button on the top right of the screen that directs the user to a registration page. After providing their valid credentials, a personalized account is created for them, and the user can now log in to the application with their username and password. If the information entered is correct, the system will direct the user to their respective homepage depending on whether they are a student or counselor.

If the user is a student, they have the option to book an appointment, view their appointments, input their daily mood and health information, view their progress, and view personalized tips from counselors. If the student wishes to book an appointment, they will be taken to a page with a form that they need to fill with their information for the appointment. Once done, they should press Submit, and if successful, they will be directed to a confirmation page. If the student wishes to view their appointments, they will be taken to a page with a table that has all their upcoming appointments and the information for each appointment. Moreover, they will be allowed to edit or delete a specific appointment by pressing on the little buttons on the side of the appointment. If they press the edit button, they will be directed to a page with a form that has that appointment's details filled. Here they can modify whatever they wish to change, and press Edit, in which they will be taken back to their upcoming appointments. As for deleting an appointment, they will be presented with an alert that asks if they are sure about this action. If yes, the appointment is deleted, otherwise it is left as is. The student also can input their daily mood and other information, such as the number of meals they ate, and the amount of sleep they acquired.

Once done, they can press on Check Progress, which will direct them to another page with charts for each of the information they input. They will be able to see how their progress has changed over time. Furthermore, the student can also view any personalized tips that a counselor has left for them.

If the user is a counselor, they have the option to view appointments, as well as add personalized tips for students. If the counselor wishes to view appointments, they will be taken to a page with a table that has all their upcoming appointments and the information for each appointment registered with them. If the counselor wishes to add a personalized tip, they will be directed to a page with a form that they need to fill with their tip and student details. Once done, they should press Submit, and if successful, they will be directed to a confirmation page, and the tip will be successfully added to the student's page.

Once the user is done with Huduu's services, they may wish to press Sign Out, in which they will be signed out from their personal account and taken back to the main Home page once again.

Project Management

Software Life-Cycle Model

This project will be developed using the Spiral Model. The Spiral Model is a systems development lifecycle method that merges the iterative development process model with parts of the Waterfall model. We found the Spiral Model worked best for the development of Huduu, due to its advantageous qualities. The Spiral Model allows flexibility; this means that changes can be made to the requirements, even after development has started. This was a useful benefit, as it allowed us to adjust and adapt our progress as needed. Moreover, the Spiral Model provides risk handling; this means that in every phase, improvements to the security and reliability of the website were made. Additionally, the Spiral Model facilitates customer feedback. This was the case with developing Huduu, as the opinions of students were taken into account when creating the website, and constant changes were made to enhance it. The Spiral Model consists of five main phases: communication, planning, modeling, construction, and deployment.

Communication: In this phase, the problem was first identified and discussed. Then, the system requirements to solve this problem were identified and gathered. This is to ensure that the exact needs of the users are met. Once all requirements are acquired and complete, the planning phase can commence.

Planning: This phase involves the organization and planning of the project. Activities such as scheduling, allocating, and keeping track of tasks, estimating the layout and timeline of the project, analyzing and predicting certain risks that may arise throughout the project, describing the tasks and what resources are required for them, are carried out.

Modeling: This phase involves the analysis of the system, and a software model for it is designed accordingly. Such a model depends on the requirements acquired in the communication phase and the planning that was carried out in the planning phase.

Construction: In this phase, the actual development and testing of the software takes place. The code is developed based on the model designed in the modeling phase.

Deployment: In this phase, the project is finalized and launched for the public to use. Feedback is taken from the users to ensure that the project is of the required quality.

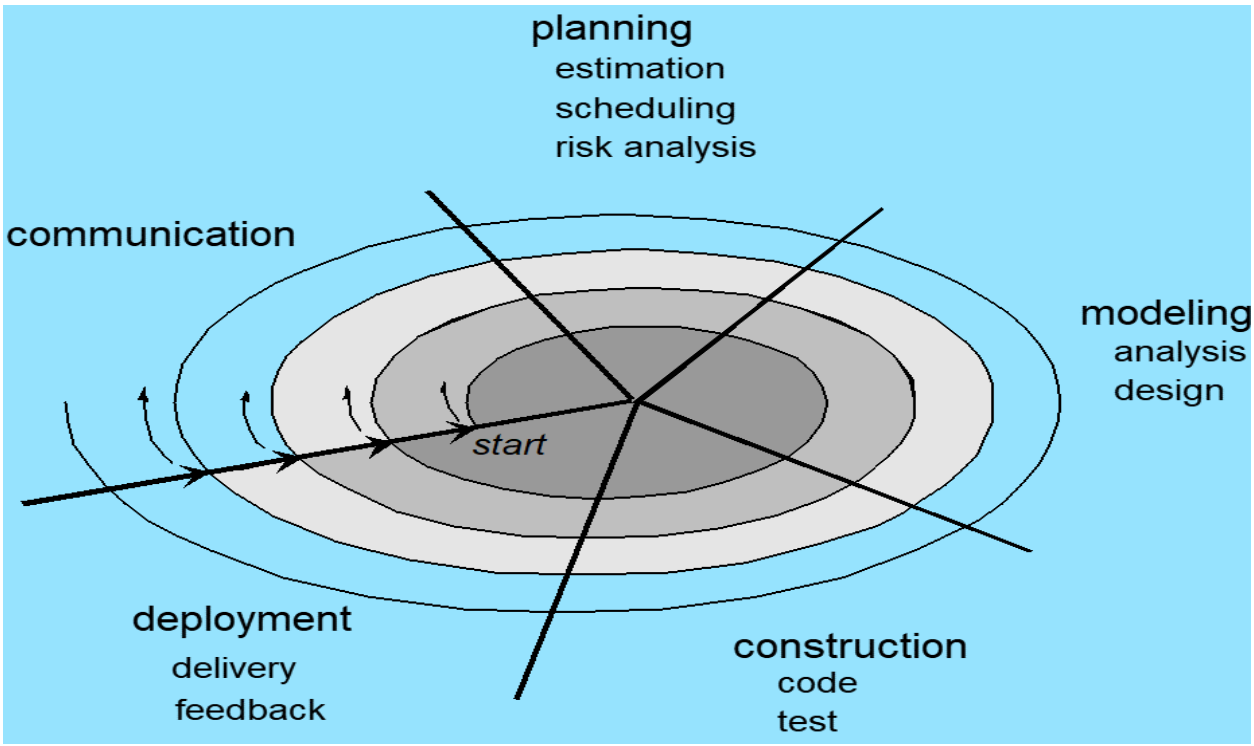


Fig. 1 Spiral Model

Gantt Chart

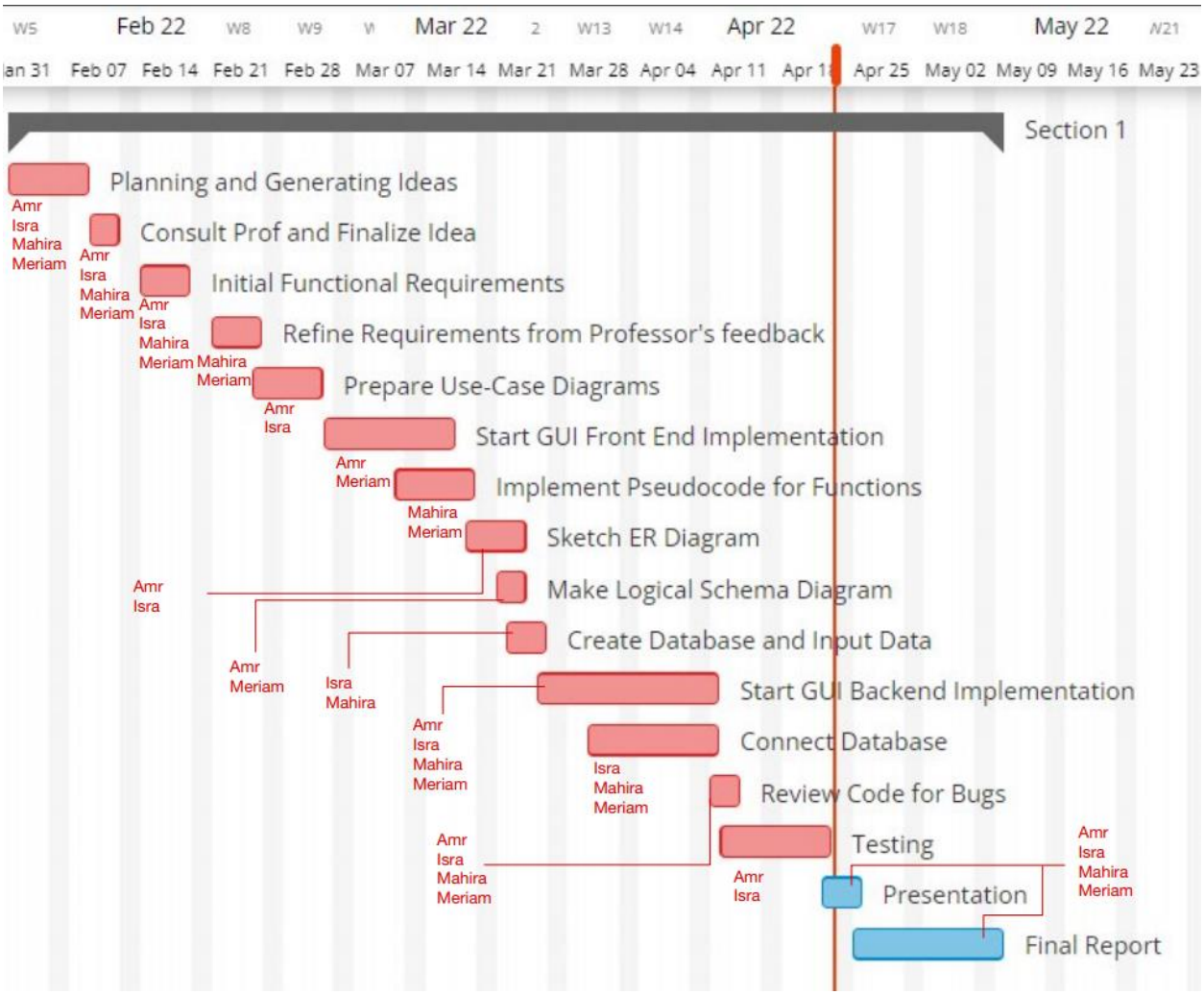


Fig. 2 Gantt Chart

Functional requirements

- F.R.1 - Login: Allows users to log in account depending on their role, whether they are a student or counselor
- F.R.2 – Register: Allows users to create account depending on their role, whether they are a student or counselor
- F.R.3 - Book Appointment: Allows students to schedule an appointment with a counselor of their choice, during a time of their choice

- F.R.4 - View Appointments: Allows Students to view existing appointments that they have previously made
- F.R.5 - Modify Appointment: Allows Students to modify existing appointments that they have previously made
- F.R.6 - Delete Appointment: Allows Students to delete existing appointments that they have previously made
- F.R.7 - Answer Welfare Questions: Allows Students to reflect on their welfare by answering a few questions. The data collected from this will be used for analysis later on
- F.R.8 - Check Welfare Progress: Allows Students to view welfare statistics that have been stored in the database
- F.R.9 - View Tips: Allows Students to view tips provided to them by counselors in order to help with their mental state and provide motivation
- F.R.10 - Add Tips: Allows Counselors to add tips to be viewed by students to help them with their mental health and wellbeing
- F.R.11 - Sign Out: Allows users to sign out of their account regardless of whether they are a student or counselor

Actors

- User: In this system we have two main users. Students who are using this system to seek mental health advice and help, and Counselors, who are there to provide this help to the students.
- Counselor: The counselors have multiple characteristics in the system. Each counselor has an availability in terms of time, where the students can pick from to schedule help sessions. In addition to this, the counselors can provide their students with mental health tips in order to enhance the aid the students get and to provide a constant line of support.
- Student: The students are the center focus of this system, as it is designed to aid and support them. First, a student can schedule sessions with multiple counselors of their choice. They also have the freedom of modifying or deleting these appointments after booking. Additionally, they can also answer some welfare questions designed so that,

over time, a general realization can be graphed to give results of improvement of the student's mental health.

- Database: All data stored, such as the tips, the welfare records, and usernames and passwords are stored in this database

Use Case Diagram:

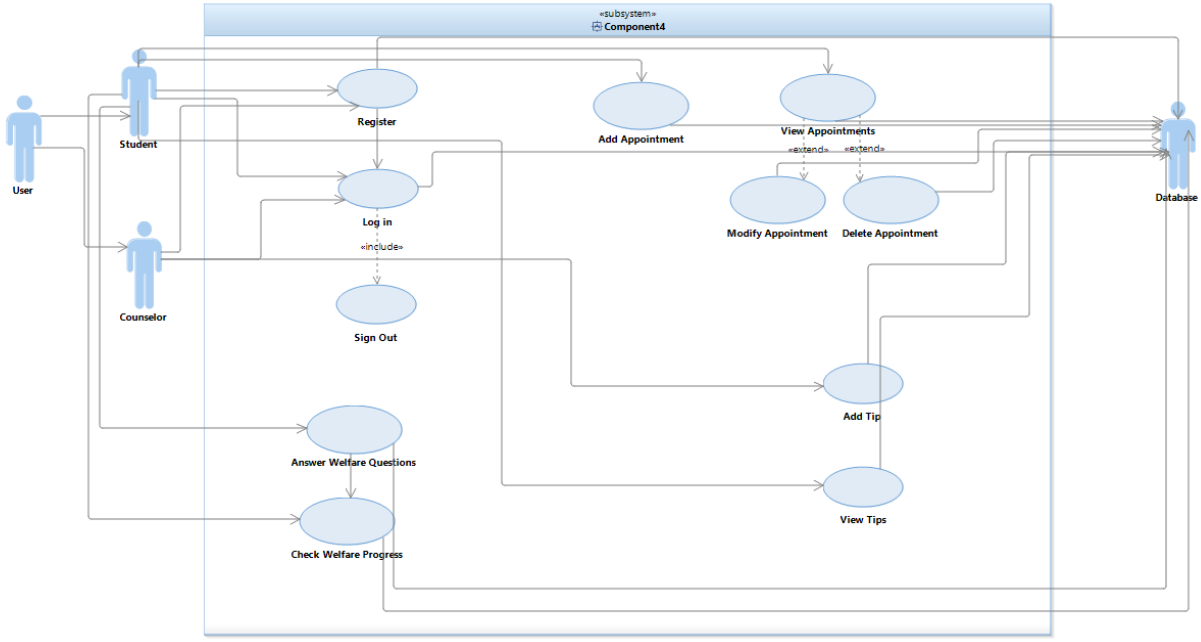


Fig. 3 Use Case Diagram

Use Case Tables:

Use Case ID:	UC1		
Use Case Name:	Register		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Counselor, Student
Description:	Allows users to create account depending on their role, whether they are a student or counselor
Preconditions:	None
Postconditions:	None
Normal Course:	1. Enter required fields (Student or Counselor, Username, Password, Name, AUS ID, Email, and Phone Number) 2. The program checks the username is unique to be able to register the new user 3. The data is added to the database 4. The user is redirected to the log in page
Alternative Courses:	Normal Flow, step 1 through step 2 3. The username already exists and therefore the user is redirected to the registration page to attempt again
Exceptions:	None
Includes:	None
Assumptions (if any):	None

Use Case ID:	UC2		
Use Case Name:	Log In		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Counselor, Student
Description:	Allows users to log in account depending on their role, whether they are a student or counselor
Preconditions:	Account already exists
Postconditions:	None
Normal Course:	1. Enter required fields (Username and password) 2. The data is compared to the database data 3. The user is redirected to the home page once the user is logs in
Alternative Courses:	Normal Flow, step 1 through step 2 3. The username or password is not correct, which will give an error message
Exceptions:	None
Includes:	Sign Out
Assumptions (if any):	None

Use Case ID:	UC11		
Use Case Name:	Sign Out		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Counselor, Student
Description:	Allows users to sign out of their account regardless of whether they are a student or counselor
Preconditions:	Account already exists User logged in
Postconditions:	None
Normal Course:	1. Click Sign out 2. User is redirected to logged out home page
Alternative Courses:	None
Exceptions:	None
Includes:	None
Assumptions (if any):	None

Use Case ID:	UC3		
Use Case Name:	Book Appointment		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	Student
Description:	Allows students to schedule an appointment with a counselor of their choice, during a time of their choice
Preconditions:	Account already exists Student logged in
Postconditions:	None
Normal Course:	1. User is shown a list of available counselors 2. User chooses a specific counselor 3. If there is available time, user books at available time 4. Counselor receives message that a user has booked in a time slot through their account
Alternative Courses:	None
Exceptions:	Normal Flow, Step 1 through Step 2 3. If no available time, the user will not be able to book with selected counselor 4. User can choose a different counselor
Includes:	None
Assumptions (if any):	Counselor is free at the time chosen

Use Case ID:	UC6		
Use Case Name:	Delete Appointment		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Student
Description:	Allows Students to delete existing appointments that they have previously made
Preconditions:	Account already exists User logged in Appointment Booked
Postconditions:	None
Normal Course:	1. Click the delete button 2. The appointment gets deleted 3. The counselor becomes free during the time slot the appointment was booked in as the database record is deleted 4. A message will appear on the student's screen that the appointment was deleted
Alternative Courses:	None
Exceptions:	None
Includes:	None
Assumptions (if any):	Appointment date didn't elapse

Use Case ID:	UC5		
Use Case Name:	Modify Appointment		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Student
Description:	Allows Students to modify existing appointments that they have previously made
Preconditions:	Account already exists User logged in Appointment Booked
Postconditions:	None
Normal Course:	1. Click the modify button 2. The student is redirected to the to a page to modify the appointment details 3. The student can change the details of the appointment 4. After successfully modifying the appointment, the user will get redirected to the appointments,
Alternative Courses:	None
Exceptions:	None
Includes:	None
Assumptions (if any):	Appointment date didn't elapse

Use Case ID:	UC4		
Use Case Name:	View Appointments		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Student
Description:	Allows Students to view existing appointments that they have previously made
Preconditions:	Account already exists User logged in Appointment(s) Booked
Postconditions:	None
Normal Course:	1. All booked appointments will be fetched from the database 2. The fetched data is then displayed in the form of a table for the student to see 3. The options to delete or modify an appointment is displayed to the student 4. Extends Modify Appointment 5. Extends Delete Appointment
Alternative Courses:	None
Exceptions:	1. No booked appointments, which means the displayed table will be empty
Includes:	None
Assumptions (if any):	Appointment dates didn't elapse

Use Case ID:	UC7		
Use Case Name:	Answer Welfare Questions		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Student
Description:	Allows Students to reflect on their welfare by answering a few questions. The data collected from this will be used for analysis later on
Preconditions:	Account already exists User logged in
Postconditions:	None
Normal Course:	1. Few questions will be displayed to the student 2. Student will answer these questions by selecting the appropriate buttons 3. Data collected will be added to database 4. After the student answers all the questions they will be redirected to the 'Check Welfare Progress' page
Alternative Courses:	None
Exceptions:	None
Includes:	None
Assumptions (if any):	None

Use Case ID:	UC8		
Use Case Name:	Check Welfare Progress		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Student
Description:	Allows Students to view welfare statistics that have been stored in the database
Preconditions:	Account already exists User logged in Previous data exists
Postconditions:	None
Normal Course:	1. Previous data fetched from database 2. Data represented in terms of graphs and charts 3. Visual representations of data displayed to the Student which summarizes their previous mental attitude
Alternative Courses:	None
Exceptions:	1. Previous data doesn't exist. Data representation will contain one data sample if the student does the welfare questions.
Includes:	None
Assumptions (if any):	None

Use Case ID:	UC9		
Use Case Name:	View Tips		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Student
Description:	Allows Students to view tips provided to them by counselors in order to help with their mental state and provide motivation
Preconditions:	Account already exists User logged in Counselor uploaded tips
Postconditions:	None
Normal Course:	1. Tips for a specific student is stored in a database where it is linked to that specific student 2. The student's tips are fetched from the database 3. The student's tips are displayed in a table on the student's screen
Alternative Courses:	None
Exceptions:	2. If no tips are uploaded, then there will be no data to fetch from the database and therefore the table displayed to the student will be empty
Includes:	None
Assumptions (if any):	None

Use Case ID:	UC10		
Use Case Name:	Add Tips		
Created By:	Amr Hamza	**Last Updated By:**	Amr Hamza
Date Created:	05/07/2022	**Date Last Updated:**	05/07/2022

Actors:	User: Counselor
Description:	Allows Counselors to add tips to be viewed by students to help them with their mental health and wellbeing
Preconditions:	Account already exists Counselor logged in
Postconditions:	None
Normal Course:	1. Counselor clicks on add tips 2. Counselor types a tip they see fitting for a specific student 3. Counselor uploads the tip 4. The tip is added to the database so that it is linked to a particular student so that they will be able to view it through their account
Alternative Courses:	None
Exceptions:	None
Includes:	None
Assumptions (if any):	Counselor knows about the student's mental state and is adding professional tips based on that

Sequence Diagram:

Booking Appointment:

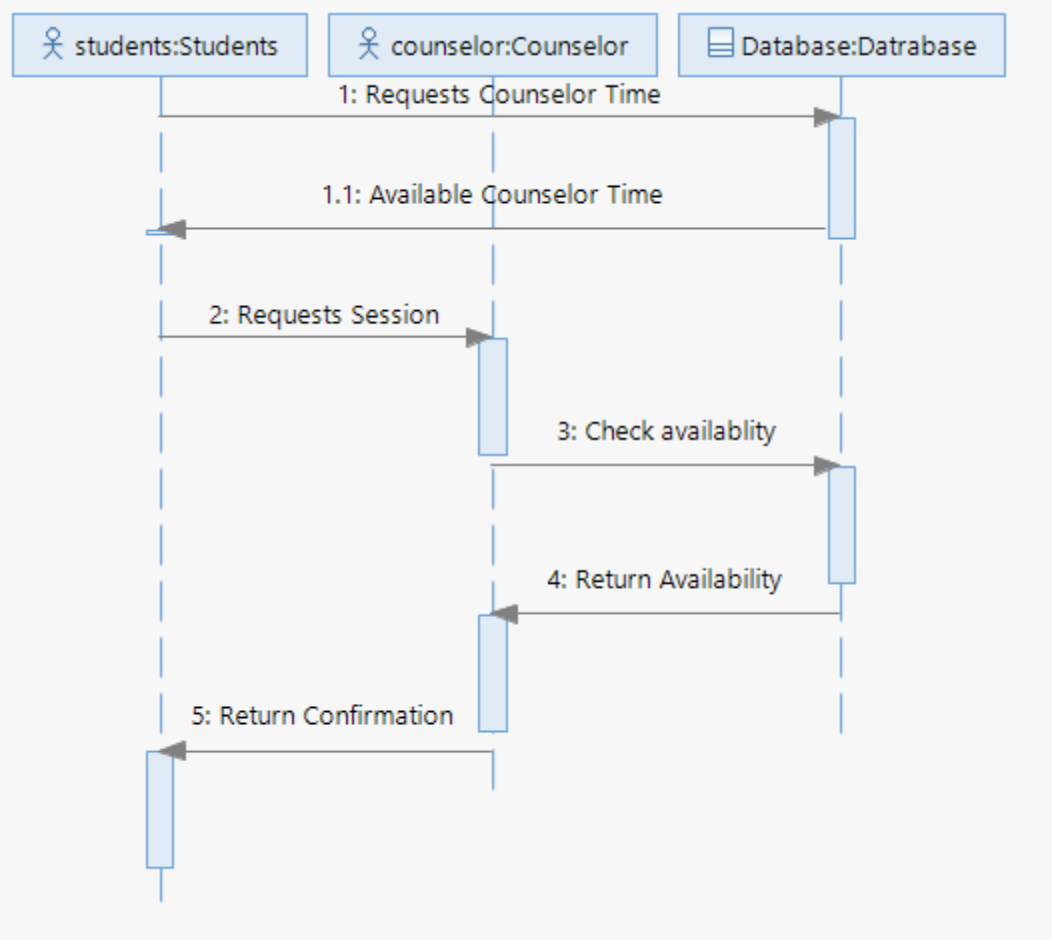


Fig. 4 Sequence Diagram

Non-functional Requirements:

- N.F.R.1 - Look and Feel: It is important in our system that it is user friendly to support the idea of positive mental health. It is also important that the system is well designed yet simple, as if it were complicated it would cause confusion and irritation to those already seeking mental help. Therefore, the look and feel of the system must be perfected so that the experience of using it is light and promising.

- N.F.R.2 - Usability: The system has to be easy to use so that booking appointments and receiving tips is natural for the student. This is important because students usually have mental health problems revolving around university stress, and therefore this system should not be adding onto the stress.

- N.F.R.3 - Operational: It is crucial that the system works the way it is intended to. This is important for many reasons. For example, the mental health of a student and the appointments regarding that is very important to both the counselor and the student, and hence, cannot be faulty.

- N.F.R.4 - Security: The welfare data of each student must be kept confidential. This means that the login functionality is of utmost importance, providing separate portals for each student to view their own data only.

Technical Environment

The Huduu counseling system was designed to be operational on any device with access to the internet. The application is not limited to any specific web browser or operating system. The web application was developed and compiled using the following software tools:

1. **Eclipse IDE for Enterprise Java and Web Developers (HTML, CSS, Bootstrap, JavaScript):** Used to test the initial front-end look and feel of the application to ensure ease of accessibility for the user and consistency of the application. The web application was designed using HTML, CSS, Bootstrap. Animations were incorporated using JavaScript.
2. **Visual Studio Code (Flask, SQLAlchemy):** Once the web application front-end was developed, it was launched using Visual Studio code. The back-end for the application was developed and integrated with the front-end using Flask.
3. **SQLAlchemy:** Used to create a web user database to store and update users' data.
4. **Google Chrome/Safari:** To display and test the final system.

5. **IBM Rational Software:** Used to model and visualize various diagrams representing different aspects of the system such as use case diagrams, sequence diagrams, class diagrams, etc.
6. **Selenium IDE:** To test the functionality of the web pages created, determine if they satisfy the functional requirements and ensure consistency of use.

System Architecture

This project incorporated a three-layer architecture that enhances security and allows for distributed management of different parts of the project.

- **User Interface:** The web application GUI serves as the user interface that enables the user to access the various functionalities of the system and input their data..
- **Application:** The application tier consists of the user management system present in the software.
- **Database:** The database tier will be responsible for saving all the students' and counselors' information including name, username, email, phone number, appointments, mental health tips, etc.

Component Diagram

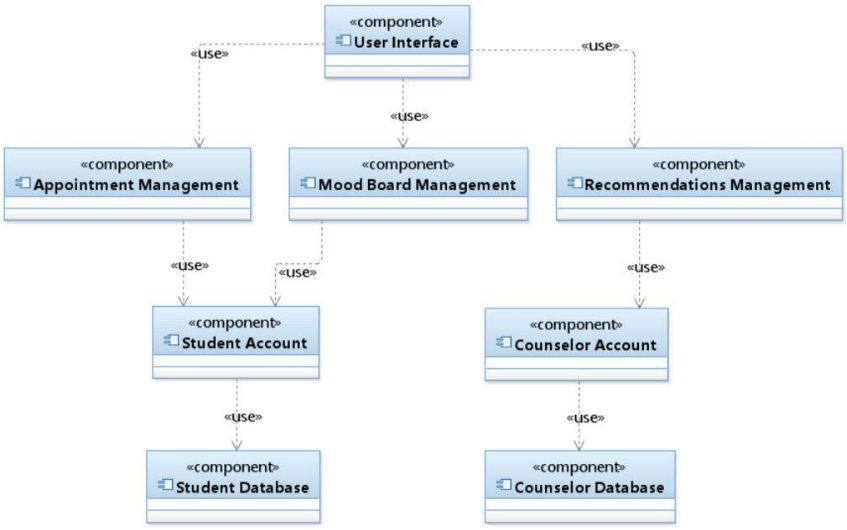


Fig. 5 Component Diagram

Node (Deployment) Diagram

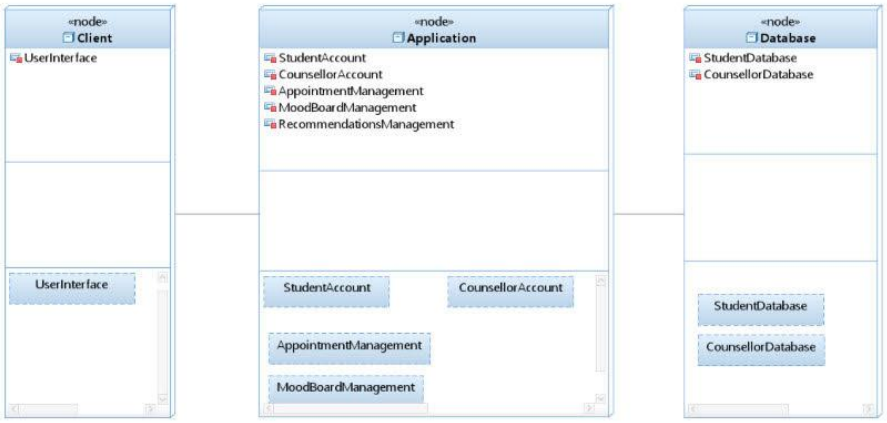


Fig. 6 Node (Deployment) Diagram

System State Machine Diagram

Class Diagram

Graphical User Interface:

User Interface

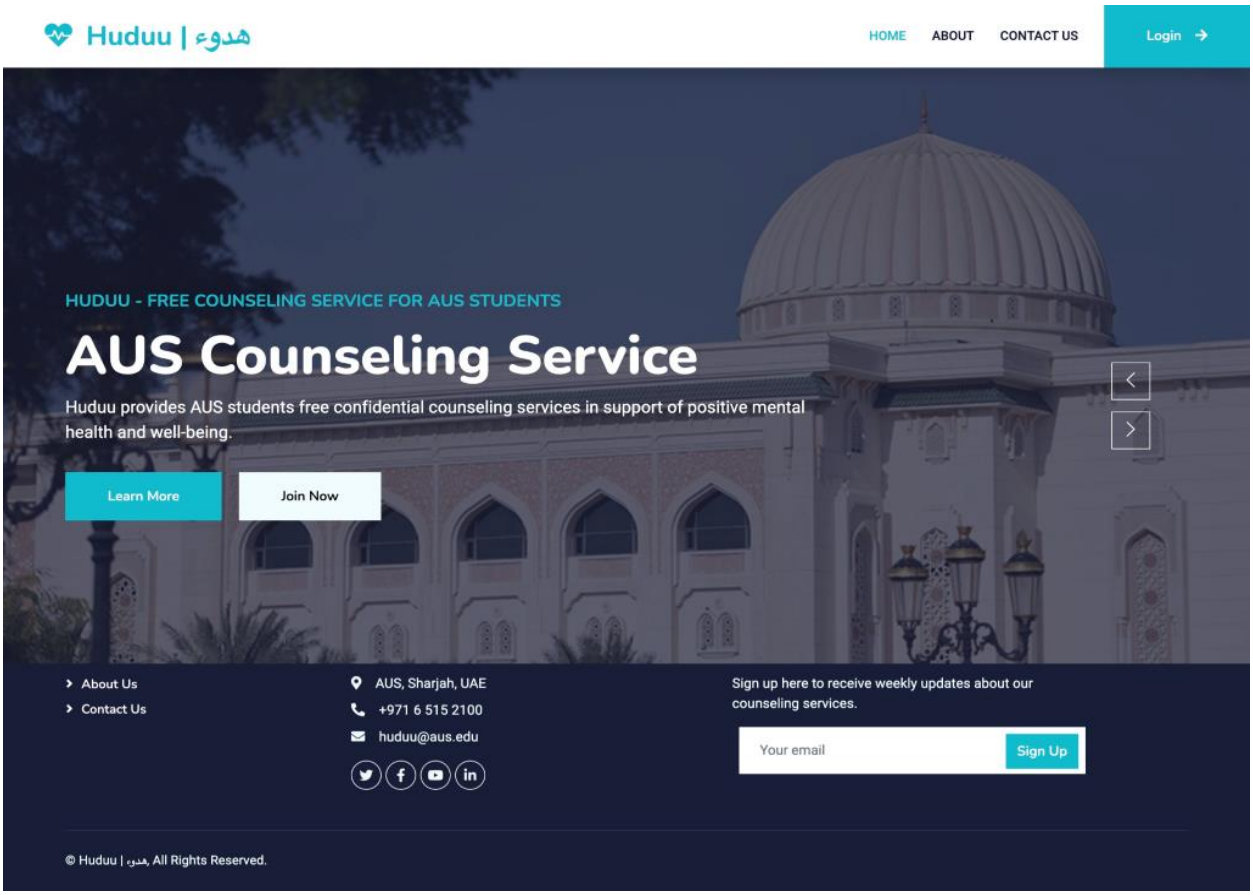


Fig. 7 Main Page

Fig. 6 About Us

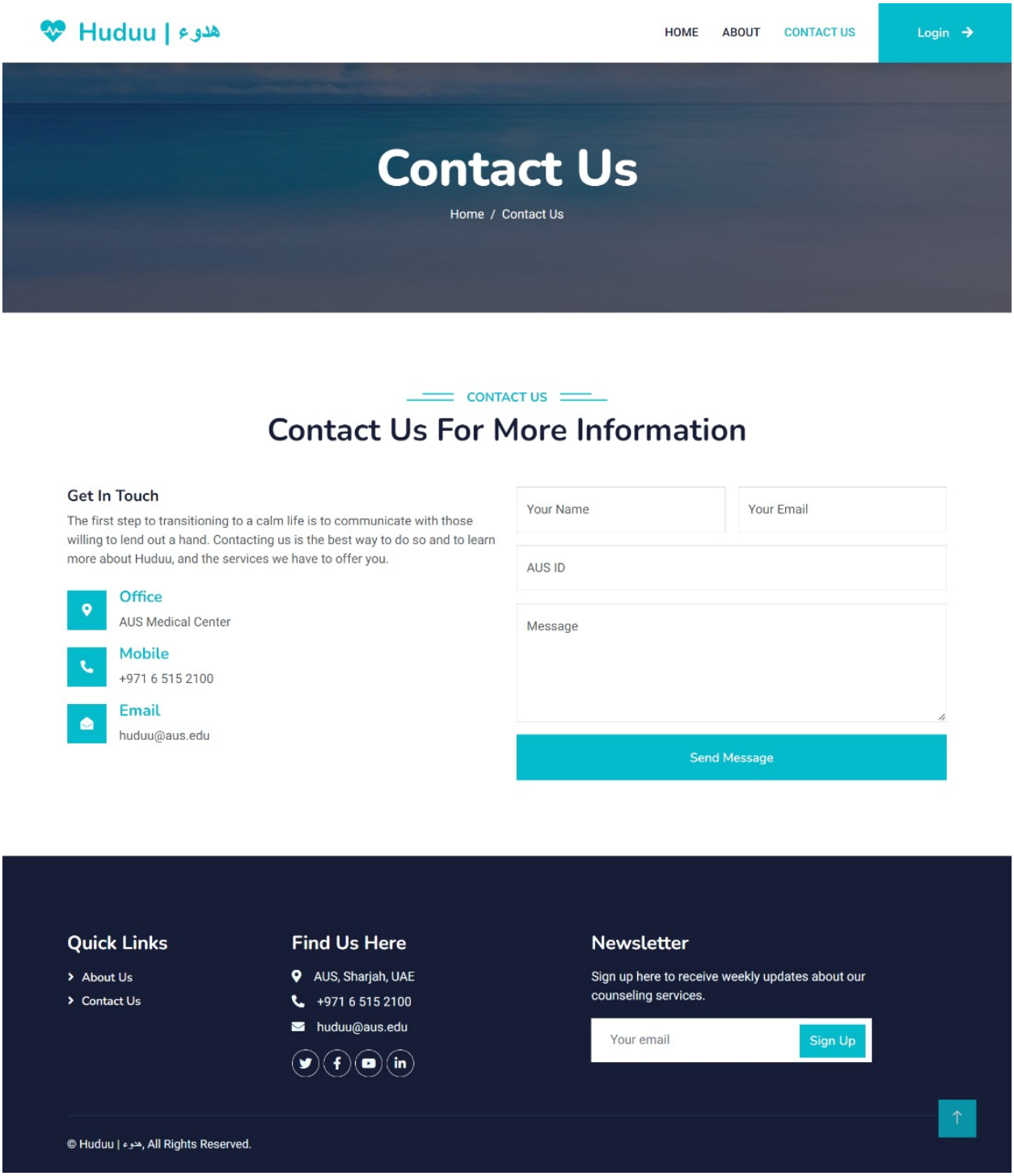


Fig. 7 Contact Us

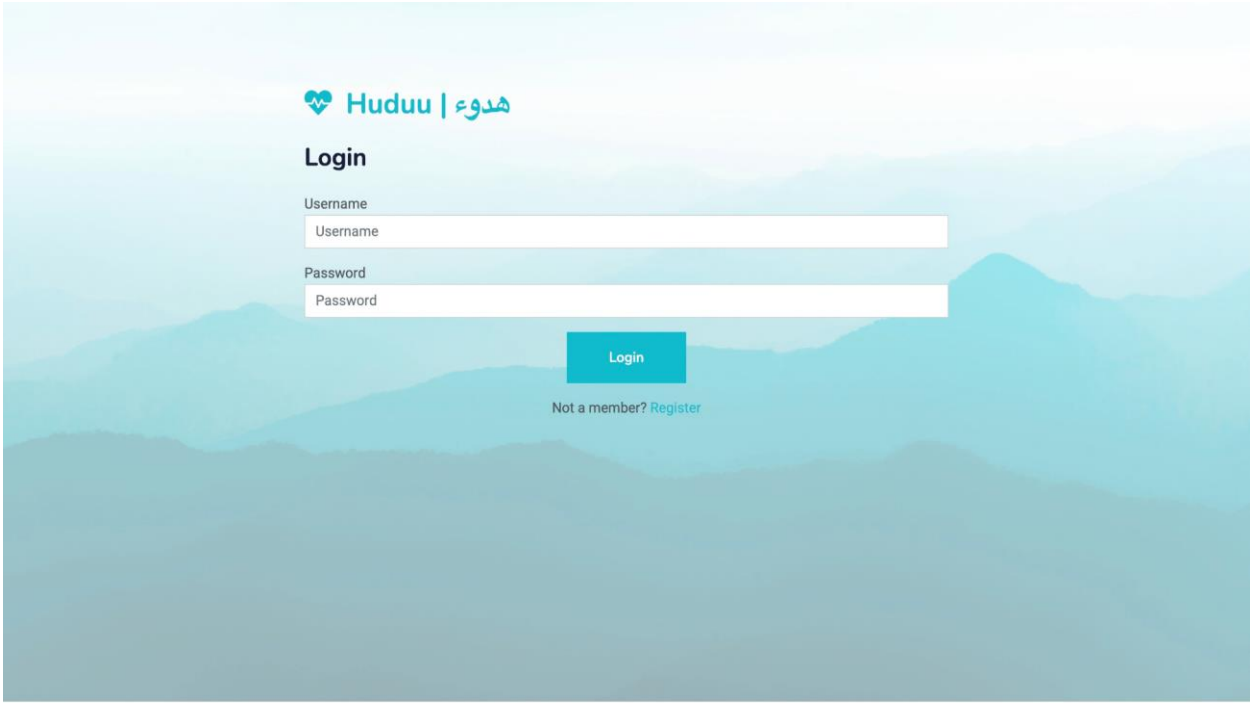


Fig. 810 Login

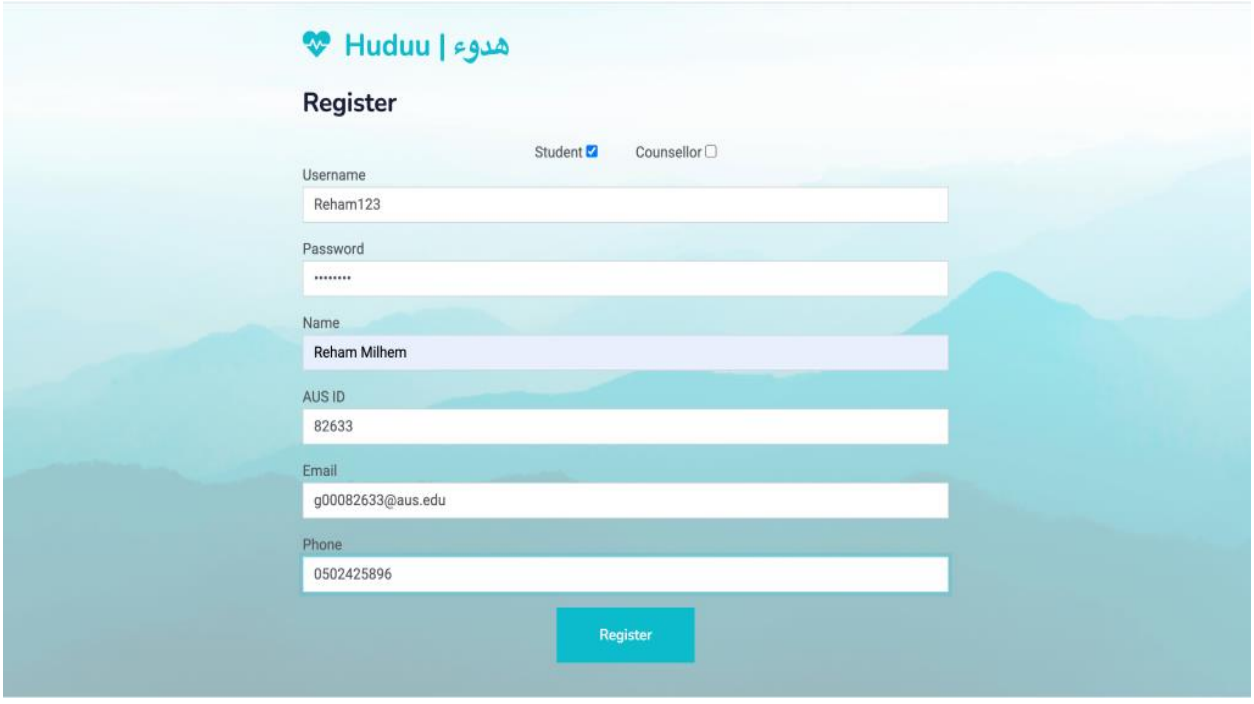


Fig. 9 Register

Student View

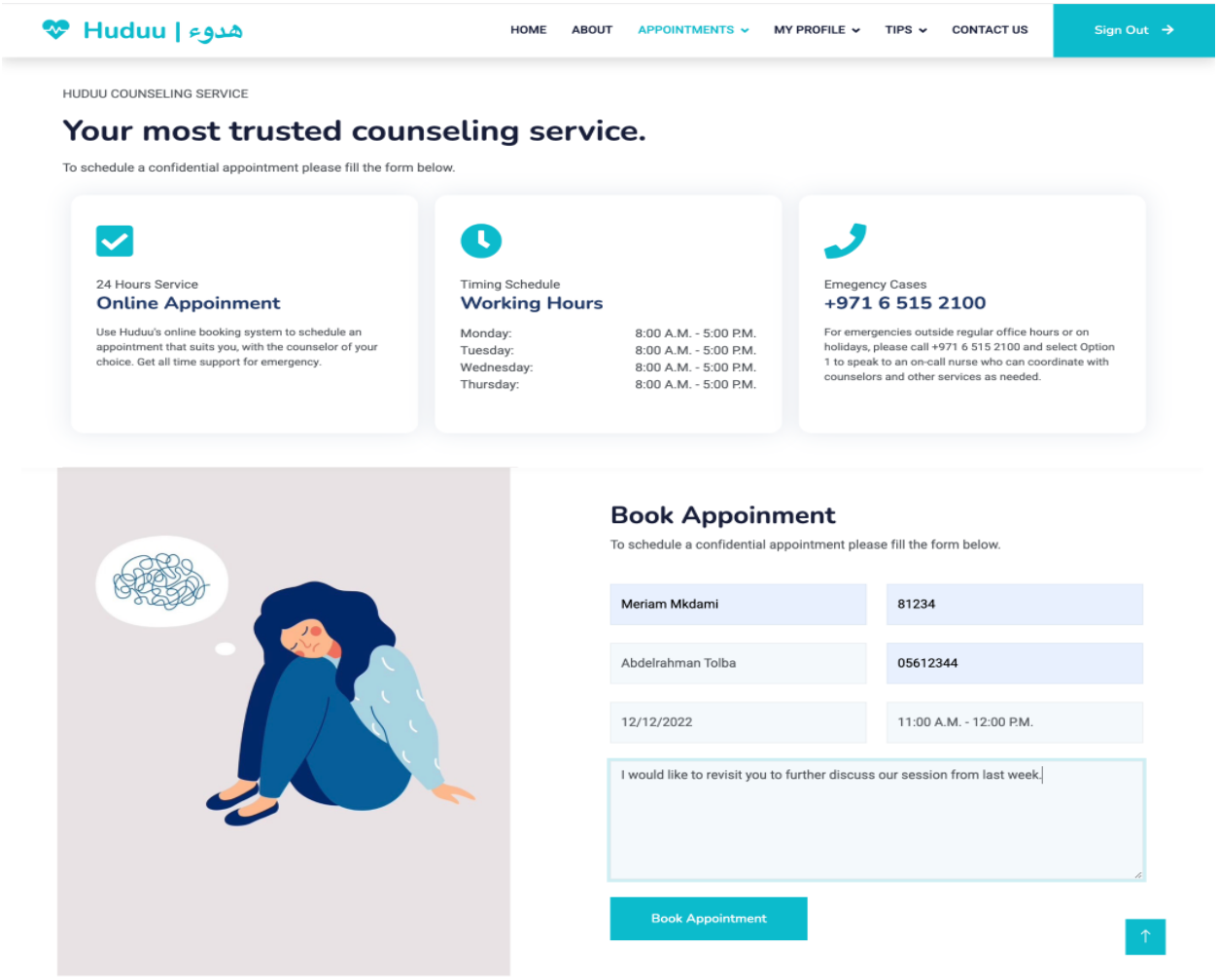


Fig. 10 Booking Appointment

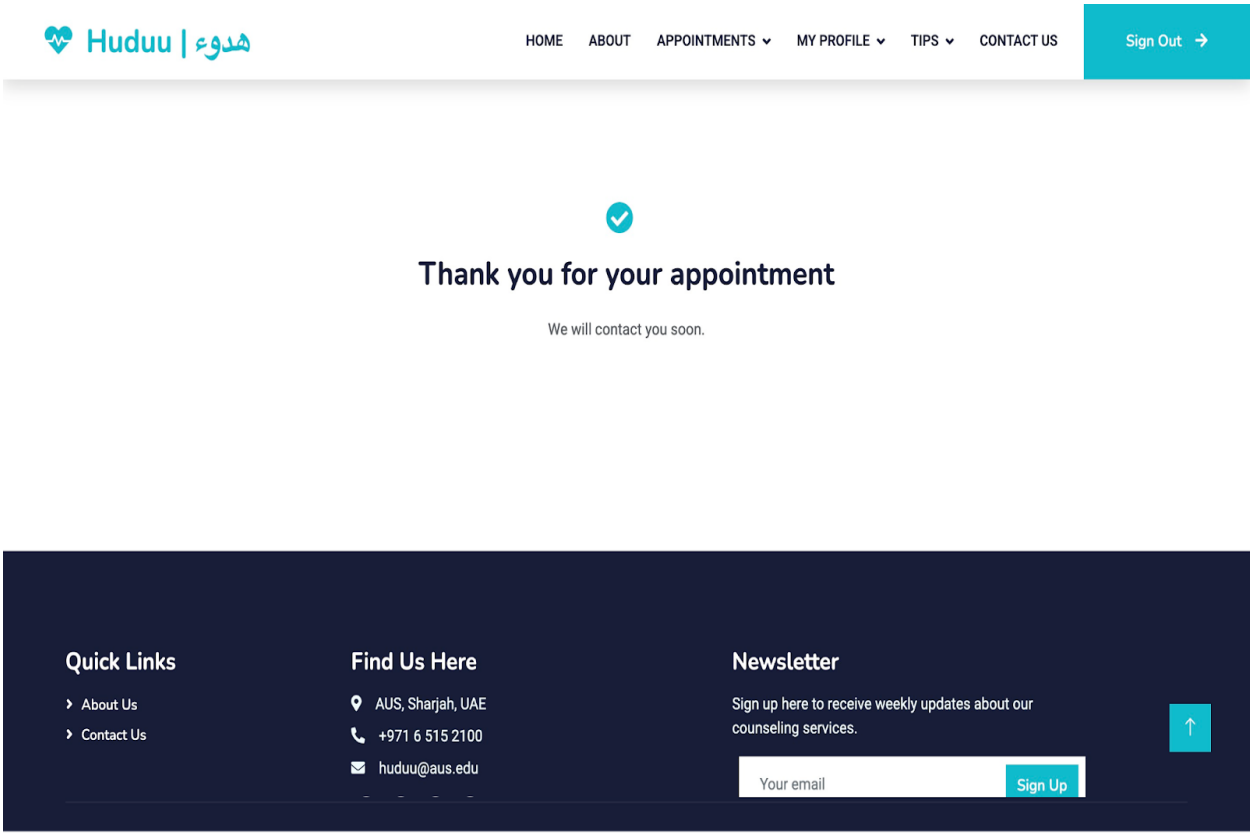


Fig. 11 Confirmation

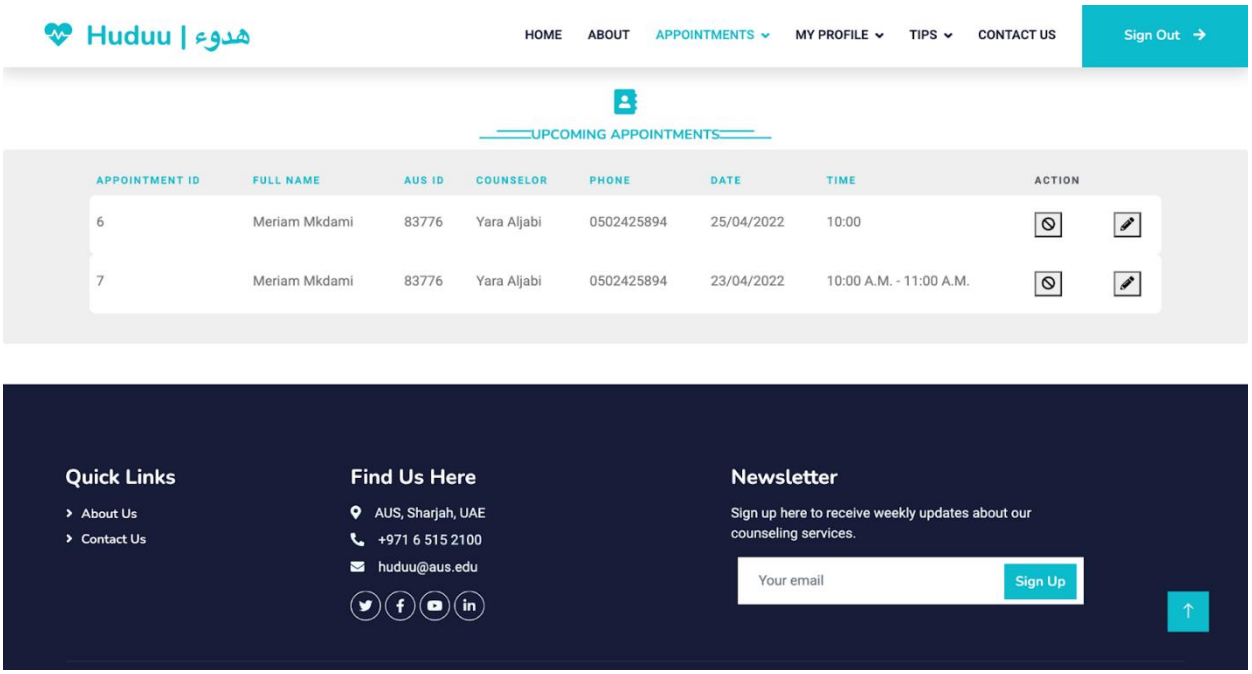


Fig. 12 View Appointments

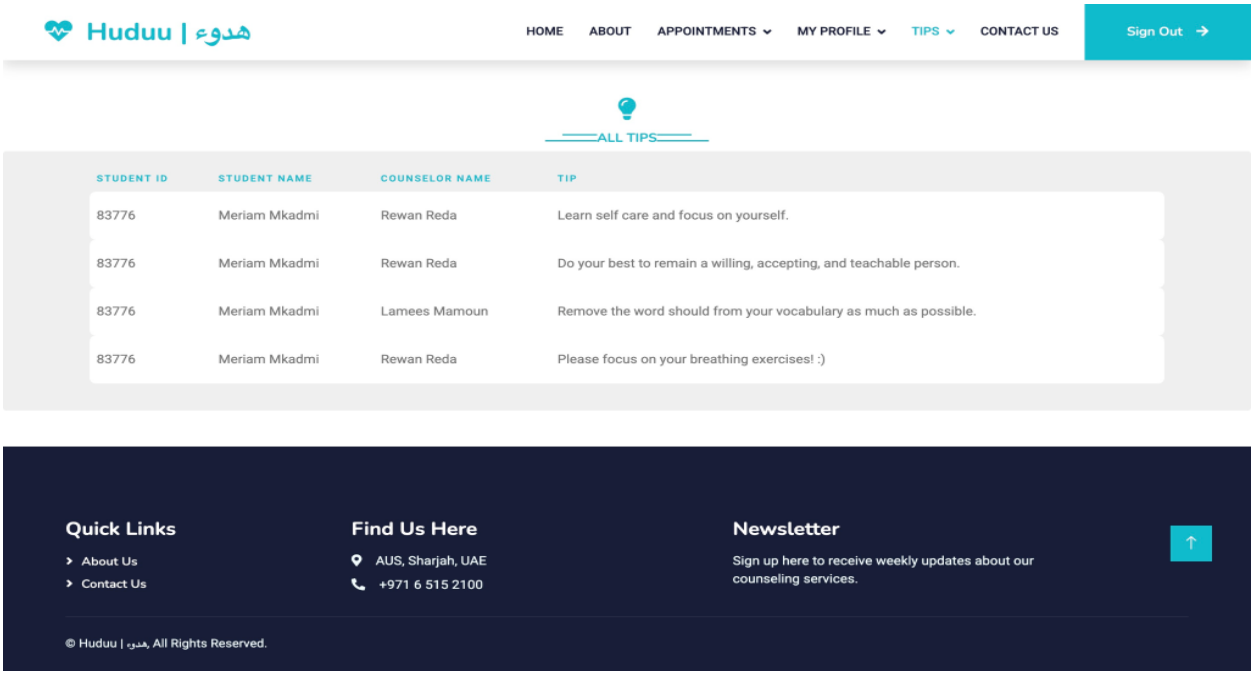


Fig. 13 View Tips

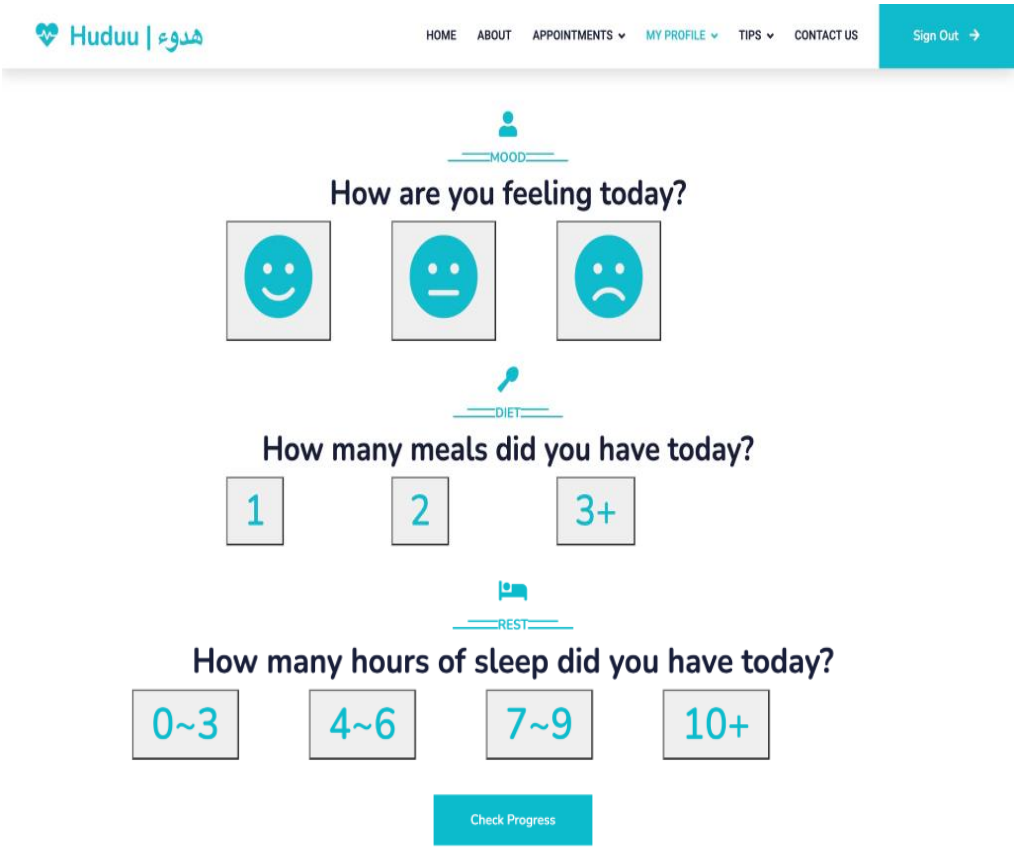


Fig. 14 Today's Mood

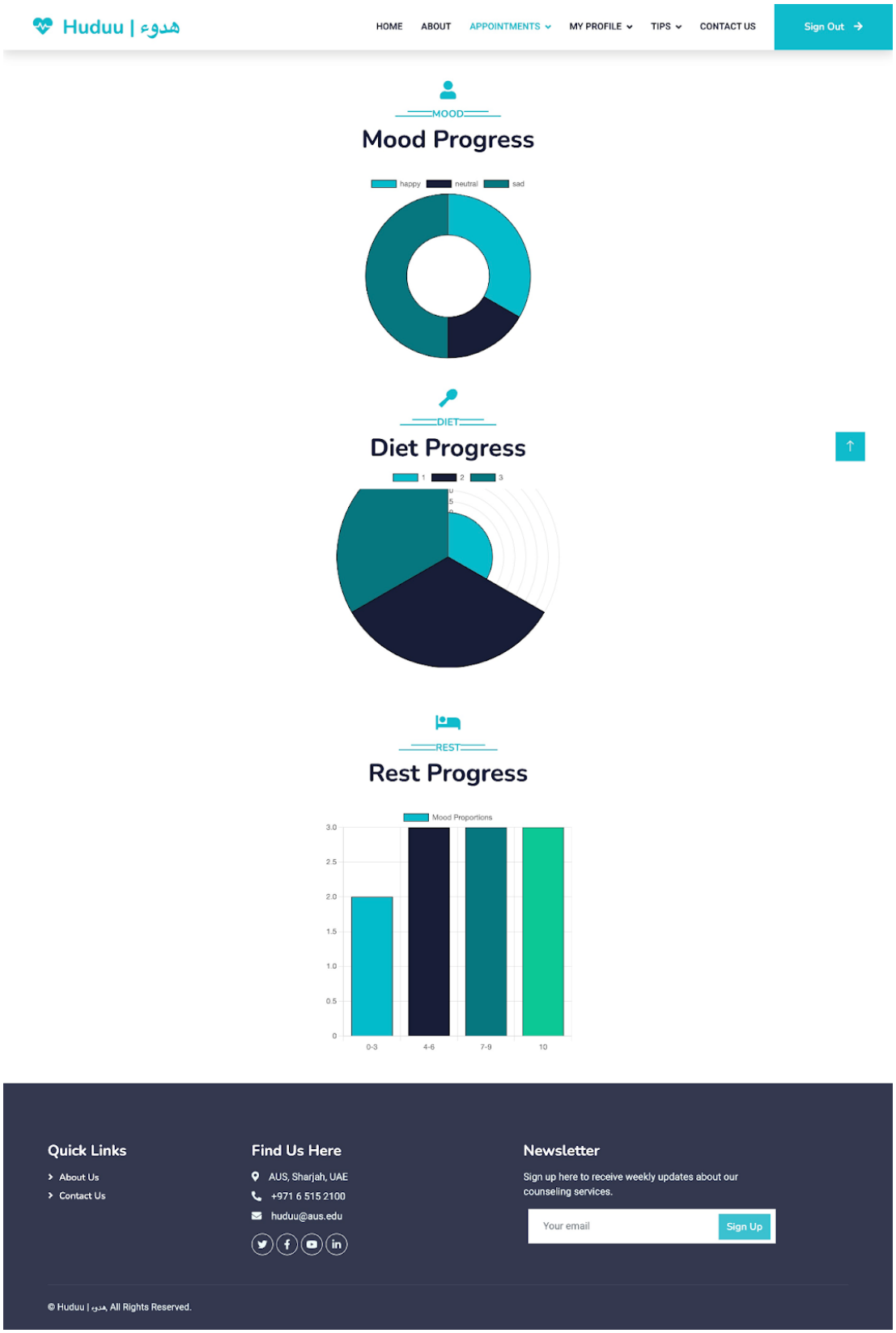


Fig. 15 My Progress

Counselor View:

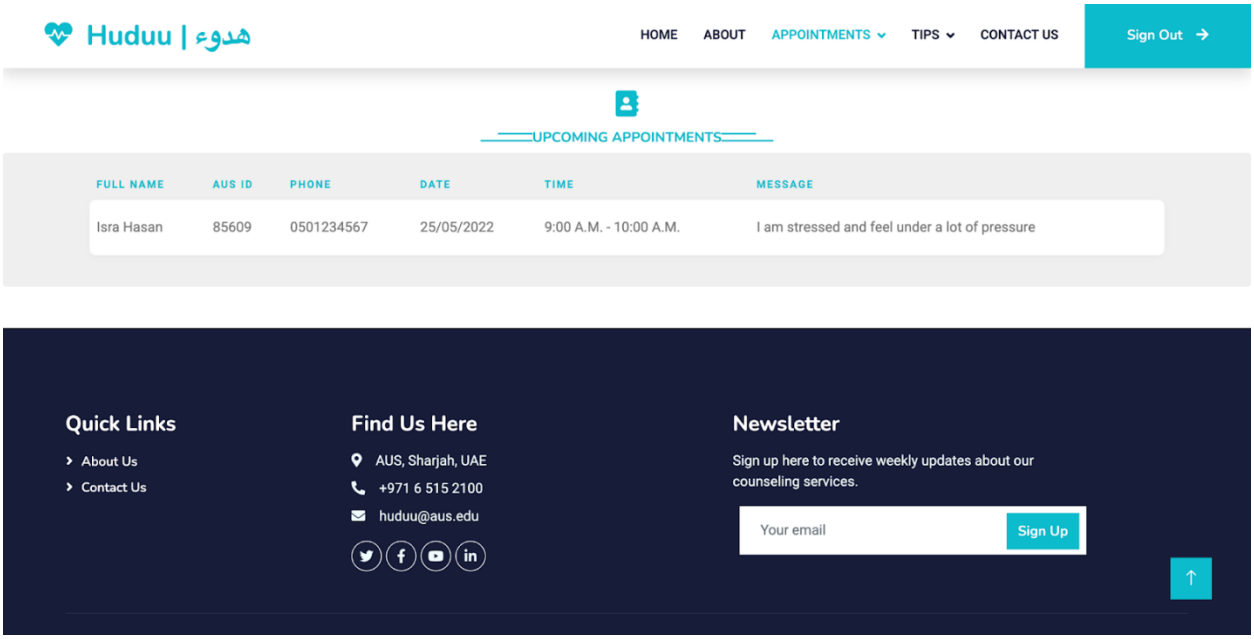


Fig. 16 View Students Appointments

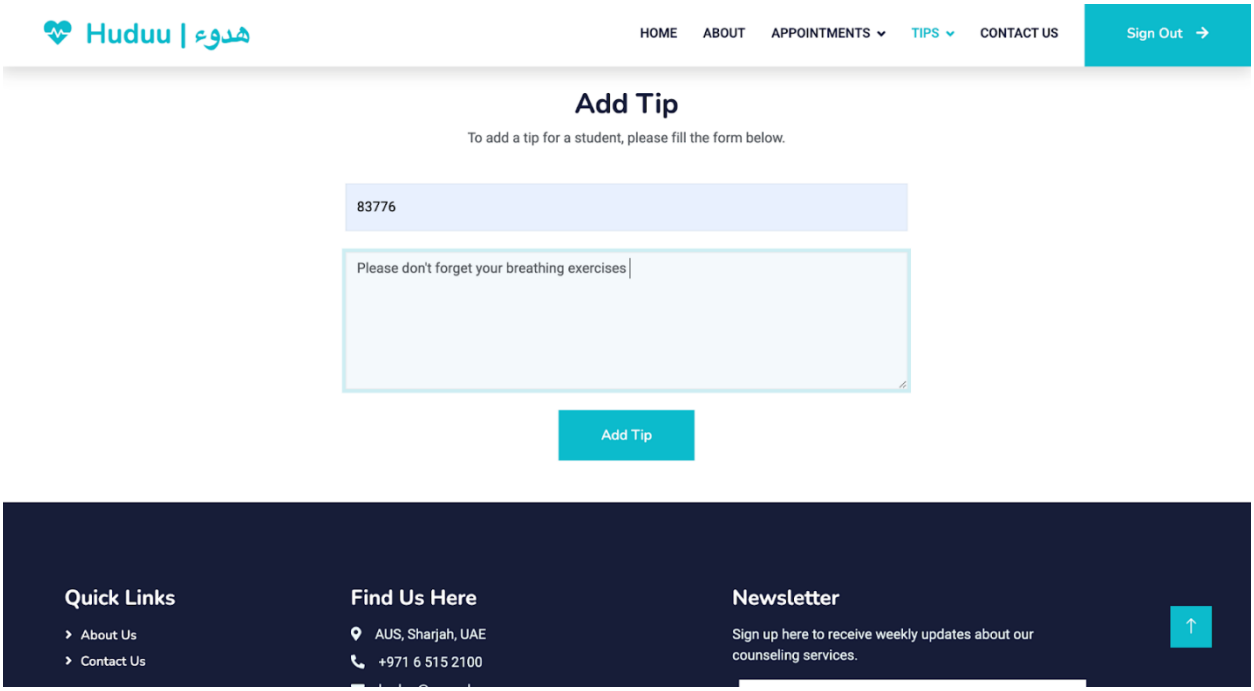


Fig. 11 Add Tips

Testing

Login:

tests ⟲⌘R l:5000

	Command	Target	Value
1	✓ *open*	/login	
2	✓ *set window size*	1061x824	
3	✓ *click*	name=username	
4	✓ *type*	name=username	Meriam123
5	✓ *click*	name=username	
6	✓ *click*	name=username	
7	✓ *double click*	name=username	
8	✓ *click*	name=password	
9	✓ *type*	name=password	Meriam123
10	✓ *click*	css=.btn	

Register:

2	✓ *set window size*	1061x824	
3	✓ *click*	name=Student	
4	✓ *click*	name=username	
5	✓ *type*	name=username	Mohammad123
6	✓ *click*	name=password	
7	✓ *type*	name=password	Mohammd123
8	✓ *click*	name=name	
9	✓ *type*	name=name	Mohammad Hasan
10	✓ *click*	name=aus_id	
11	✓ *type*	name=aus_id	98765
12	✓ *click*	name=email	
13	✓ *type*	name=email	mohammad123@gmail.com
14	✓ *click*	name=phone	
15	✓ *type*	name=phone	0562425895
16	✓ *click*	css=.btn	

Book appointment:

http://127.0.0.1:5000/bookAppointmentStudent

	Command	Target	Value
1	✓ *open*	http://127.0.0.1:5000/bookAppointmentStudent	
2	✓ *set window size*	1440x900	
3	✓ *click*	id=name	
4	✓ *type*	id=name	Isra Hasan
5	✓ *click*	id=aus_id	
6	✓ *type*	id=aus_id	85609
7	✓ *click*	id=select_counselor	
8	✓ *select*	id=select_counselor	label=Rewan Reda
9	✓ *click*	css=.col-lg-6:nth-child(4)	
10	✓ *click*	id=phone	
11	✓ *type*	id=phone	0502425894
12	✓ *click*	id=date	
13	✓ *type*	id=date	08/05/2022
14	✓ *click*	id=select_time	
15	✓ *select*	id=select_time	label=1:00 P.M. - 2:00 P.M.
16	✓ *click*	id=message	
17	✓ *type*	id=message	I require assistance with my stress and anxiety levels
18	✓ *click*	css=.py-md-3	

Add Tip Counselor:

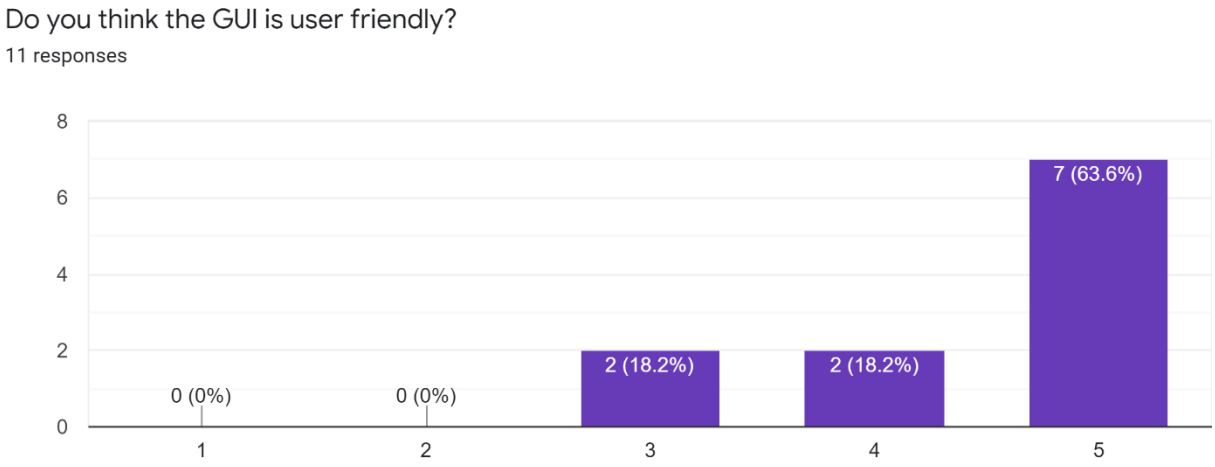
	Command	Target	Value
1	✓ *open*	http://127.0.0.1:5000/addTipCounselor	
2	✓ *set window size*	1061x824	
3	✓ *click*	id=studentId	
4	✓ *type*	id=studentId	83776
5	✓ *click*	id=message	
6	✓ *type*	id=message	Please work on trying to exercise weekly
7	✓ *click*	css=.py-md-3	

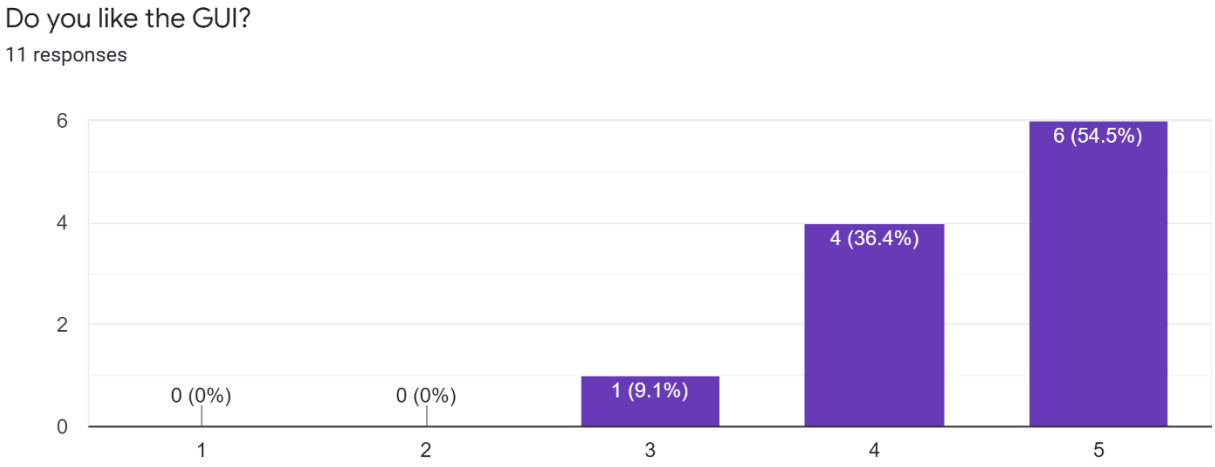
Conclusion

The focus of our project was to create a platform in which University students felt they could find and seek help for any issues they may face in regards to stress, anxiety, depression, academic pressure, etc. This report demonstrates the problem that inspired us to create Huduu, the scope of the project, and an in-depth system description. Moreover, the methodology and choice of the software life cycle model for the project management is explained. Additionally, all functional and non-functional requirements were listed and described, as well as the use-case diagrams that illustrated the relationship between the functional requirements and the actors used in each. Furthermore, documentation on the project schedule and task allocations for each member was provided, as well as a Gantt Chart that displayed the timeline of the project. As for design and implementation, the software tools used for the development of Huduu were listed and explained. Diagrams such as the component and node diagrams were also provided. For system architecture, the three-layer architecture was chosen, which includes user interface, application and database layer. Additionally, screenshots of the GUI interface, including every page of the Huduu website, were included. Testing using Selenium IDE was also documented, and screenshots were provided for each function testing. Finally, the feedback from users of Huduu was taken, and the results were displayed in a survey.

Appendix

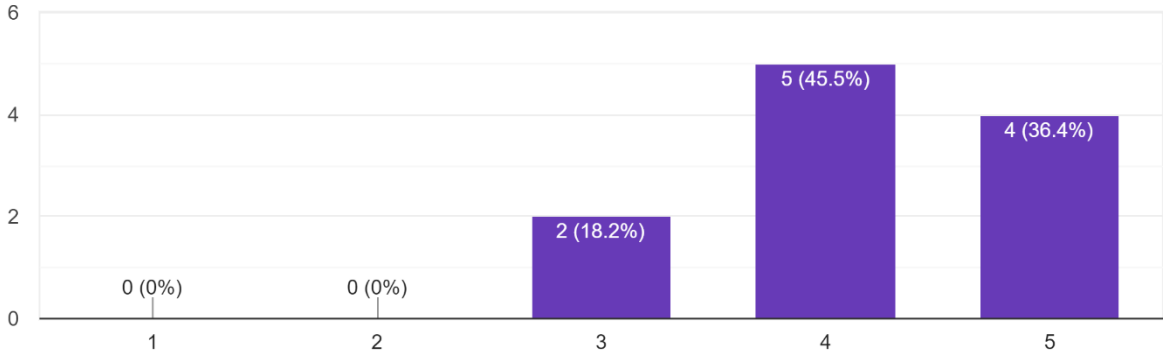
Survey Results





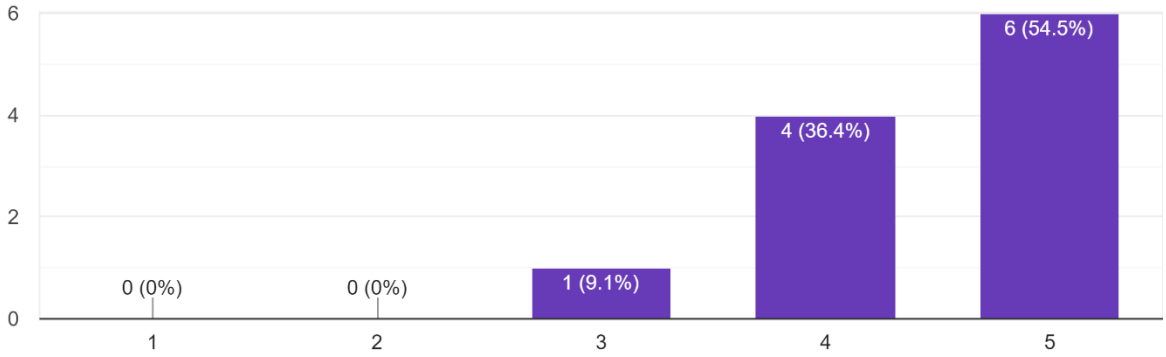
Do you like the color palette and text style used?

11 responses



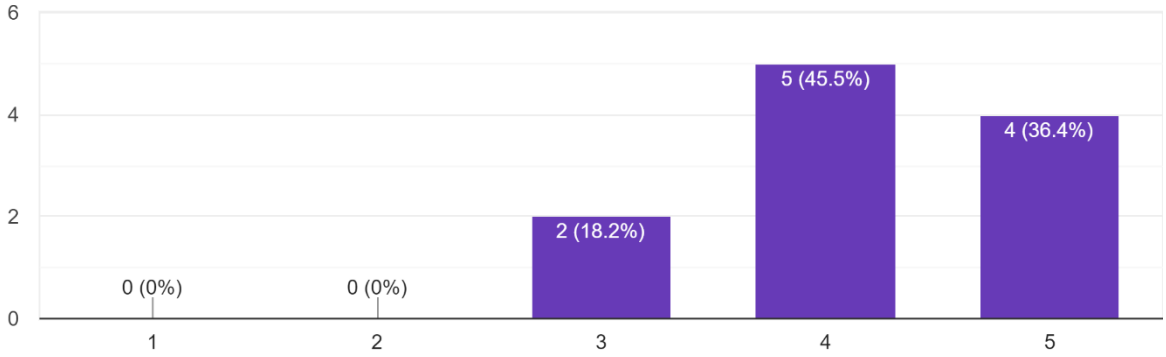
Is the content on the web pages clear?

11 responses



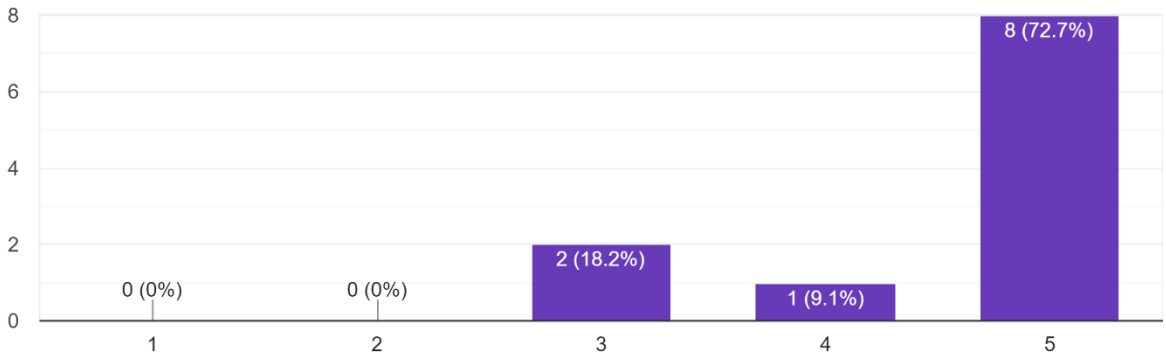
Do you like the web pages' animations?

11 responses



Were the images and interactive elements (buttons/menus/etc.) useful?

11 responses



Project Link:

https://github.com/Mahira-commits/Huduu_Project