FINAL PROJECT REPORT

SOFTWARE ENGINEERING CS3009

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Introduction:

In an era where technology permeates every aspect of our lives, the healthcare sector stands poised for transformation. Recognizing this opportunity, our team embarked on the development of HealthHub, a comprehensive health management system designed to revolutionize the way individuals engage with their well-being and healthcare providers.HealthHub represents a pivotal step towards empowering users to take proactive control of their health journey. With its array of features, from user-friendly registration and profile management to seamless health data tracking and monitoring and also contact with their doctors, HealthHub aims to bridge the gap between individuals and healthcare services. Through intuitive interfaces, robust security measures, and adherence to industry standards, HealthHub aspires to enhance accessibility, efficiency, and safety in healthcare delivery.

Project Rational:

The inception of the HealthHub project stemmed from a recognition of the pressing need for innovative solutions to address challenges within the healthcare landscape. Despite advancements in medical technology, access to healthcare services, efficient communication between patients and providers, and proactive health management remain areas ripe for improvement.

The rationale behind the development of HealthHub is multifaceted:

1. **Enhanced Access and Communication:** Traditional healthcare delivery models often entail barriers to access, including geographical constraints, long wait times for appointments, and limited channels for communication between patients and providers. HealthHub seeks to break down these barriers by providing a centralized platform accessible via standard desktop and mobile devices. Through features such as appointment scheduling, access to medical records, and interaction with medical specialists, HealthHub aims to facilitate seamless communication and collaboration between users and healthcare professionals.
2. **Empowerment Through Information**: In today's digital age, individuals are increasingly taking charge of their health and well-being. However, navigating the vast sea of health information available online can be overwhelming and confusing. HealthHub endeavors to empower users by providing curated, reliable health information and personalized health insights. By tracking and monitoring health metrics, setting goals, and receiving tailored recommendations, users can make informed decisions about their health and lifestyle choices.

3. **Compliance and Security:** With the ever-growing concern over data privacy and security, compliance with regulatory standards such as HIPAA and GDPR is paramount in healthcare software development. HealthHub prioritizes the implementation of robust security measures, including encryption of sensitive data, secure authentication procedures, and regular security updates. By adhering to industry best practices and regulatory requirements, HealthHub aims to instill confidence in users regarding the privacy and security of their personal health information.
4. **Scalability and Adaptability**: As the healthcare landscape continues to evolve, scalability and adaptability are crucial considerations in software development. HealthHub is designed with scalability in mind, capable of accommodating growing user loads and evolving healthcare needs. By leveraging modular, well-documented code and flexible architecture, HealthHub can easily integrate with emerging technologies and adapt to future changes in healthcare practices and regulations.

In summary, the HealthHub project is driven by a vision of leveraging technology to democratize access to healthcare, empower individuals to take control of their health journey, and foster collaboration between patients and providers. By addressing key challenges in healthcare delivery and embracing principles of accessibility, security, and scalability, HealthHub aims to pave the way towards a healthier, more connected future.

Project Architecture:

The architecture of the HealthHub system is designed to ensure scalability, reliability, and flexibility while meeting the diverse needs of users and stakeholders. The architecture comprises several key components, each serving a specific function within the system's ecosystem.

1. **Client-Side Application**: At the forefront of the HealthHub architecture is the client-side application, which encompasses the user interfaces and interactions that users engage with. Developed using modern web technologies such as Xml and Kotlin , the client-side application offers a responsive and intuitive user experience across a variety of devices and platforms. Through interfaces optimized for mobile devices, users can access the full suite of HealthHub features, including registration, profile management, health data tracking, and interaction with healthcare professionals.
2. **Server-Side Infrastructure**: Supporting the client-side application is the server-side infrastructure, responsible for processing user requests, managing data, and facilitating

communication between clients and external services. The server-side infrastructure is built upon a microservices architecture, comprising modular, independently deployable services that encapsulate specific functionalities. This architecture enables horizontal scaling, fault isolation, and efficient resource utilization, ensuring optimal performance and reliability even under high user loads.

3. **Data Storage and Management**: Central to the HealthHub architecture is the data storage and management layer, which handles the storage, retrieval, and manipulation of user data, medical records, and system configurations. Leveraging the use of SQL relational databases using PHP this ensures that the data storage layer has data integrity, scalability, and flexibility. Data is organized into structured schemas and indexed for efficient querying, enabling fast and reliable access to information across the system.

In summary, the architecture of the HealthHub system is characterized by its scalability, reliability, and security, enabling seamless interaction and collaboration between users, healthcare professionals. By leveraging modern technologies, modular design principles, and robust security measures, HealthHub aims to provide a robust and future-proof platform for comprehensive health management and care delivery.

Product Backlog:

Sprint 1(1-5)
Sprint 2(6-10)
Sprint 3(11-12)

ID	User Story	Estimate	Priority	Acceptance Criteria
1	**As a** user **I want to** create a HealthHub account **so that I can** access personalized health features	8.5 hours	1	● **Given that** *I am on the HealthHub registration page,* ● **when** I provide a valid email address and create a secure password, ● **then** I should receive a verification email for account confirmation. ● The registration page should allow the user to enter their email address and create a password. ● The email address provided should be validated for correct format and non-existence in the system.
2	**As a** user, **I want to** complete a personalized health assessment so **so that I can** understand my current health status.	6 hours	2	**Given that** *I am on the HealthHub health assessment interface,* **when** I provide information on relevant health indicators and lifestyle factors, **then** I should receive personalized insights and recommendations based on my assessment. The health assessment interface should allow the user to input information about their health indicators and lifestyle factors.

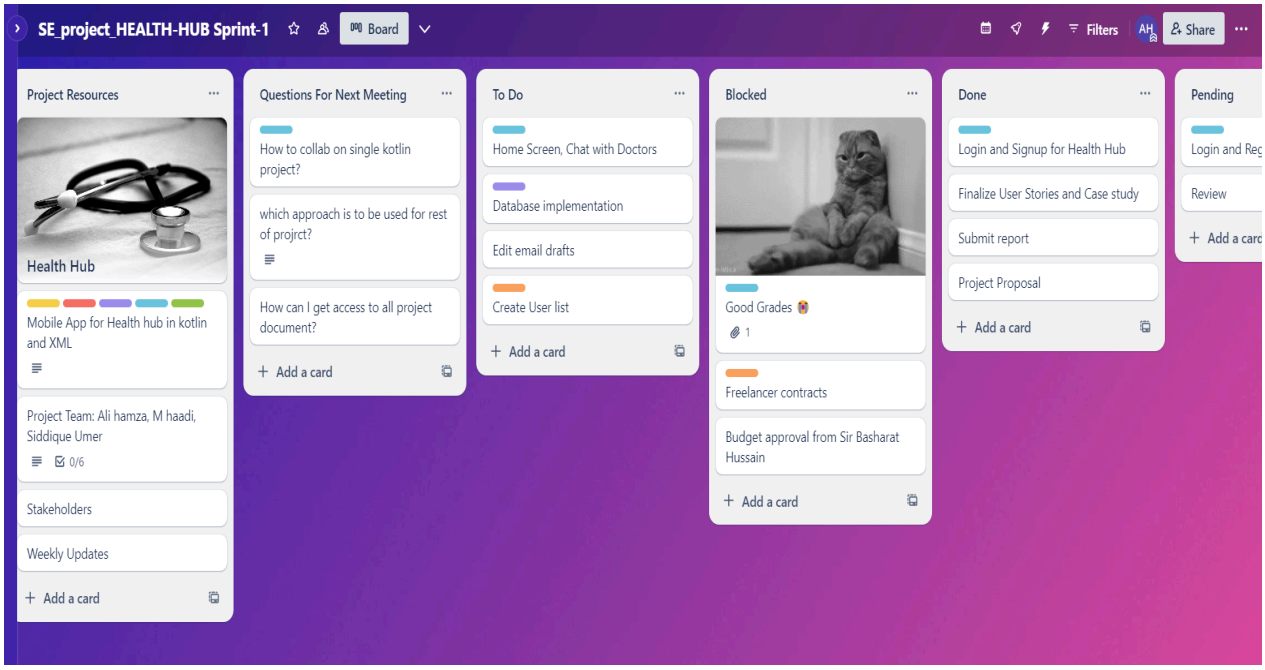
3	**As a** user, **I want** to schedule a telehealth consultation with a doctor. **so that I can** have a virtual medical check-up.	11 hours	3	**Given that** *I am on the HealthHub dashboard,* **when** I select the "Schedule Consultation" option and choose a date and time, **then** I should receive confirmation details. The dashboard should provide a clear and easily accessible "Schedule Consultation" option. After selecting a date and time for the consultation, the user should receive confirmation details.
4	**As a** user, **I want** ,to participate in wellness challenges on HealthHub **so that I can** achieve health goals and earn incentives.	13.5 hours	4	**Given that** *I am on the HealthHub dashboard,* **when** I select the "Wellness Challenges" option, **then** I should be able to view and join various challenges, set health goals, and track my progress.
5	**As a** user, **I want** a user-friendly interface on HealthHub that simplifies the process of managing my health information **so that I can** easily navigate and manage my health data without any complexity.	7 hours	5	**Given that I am** on the HealthHub platform, **When** I use the platform to manage my health information, **then** the interface should be straightforward, with clearly labeled buttons and sections, allowing me to effortlessly find and update my health details.
6	**As a** user, **I want** HealthHub to offer a	4.5 hours	6	**Given that** I am on the HealthHub healthcare provider directory, **When** I search for a specific specialist

	comprehensive directory of healthcare providers, making it easy for me to find specialists and services **so that I can** quickly locate and connect with the healthcare professionals and services I need.			or service, **then** the directory should provide detailed and accurate information, including contact details, specialties, and user ratings for each healthcare provider, facilitating an efficient search and connection process.
7	**As a** user, **I want** HealthHub to provide personalized recommendations for healthy lifestyle changes, including diet and exercise, **so that I** can make informed decisions to enhance my overall well-being.	9 hours	7	**Given that** I complete my health assessment on HealthHub, **When the** platform generates personalized recommendations, **Then I** should receive tailored advice for healthy lifestyle changes, considering my preferences and health assessment results.
8	**As a** user, **I want** HealthHub to provide real-time updates on the availability of healthcare providers, **so that It** helps me to make informed decisions when scheduling appointments.	13 hours	8	**Given that** I am using HealthHub to schedule an appointment, **When** I check the profile of a healthcare provider, **then** I expect to see up-to-date information on their availability, allowing me to choose a convenient time for my appointment.
9	**As a** user, **I want** HealthHub to offer a feature that allows me to book and attend virtual health and wellness	5 hours	9	**Given that** I am on the HealthHub virtual classes section, **When** I browse available classes and workshops, **then** I should be able to easily book and attend virtual sessions, receiving

	classes and workshops **so that** I can access relevant health resources and participate in educational events.			necessary details and reminders.
10	**As a** user, **I want** a secure and user-friendly messaging feature in HealthHub to communicate with my healthcare providers, **so that I can** easily and confidentially communicate about my health concerns.	11.5 hours	10	**Given that** I am on the HealthHub messaging feature,, **When** I initiate a conversation with my healthcare provider, **then** the platform should provide a secure and user-friendly messaging interface, ensuring the confidentiality of our communication.
11	**As a** user, **I want** a straightforward process for updating and managing my personal information within HealthHub, **so that** I can keep my profile information accurate and up-to-date.	5 hours	11	**Given that** I am on the HealthHub platform, **When** I navigate to the personal information section, **then** I should find a clear and intuitive interface that allows me to easily update and manage my personal details.
12	**As a** user, **I want** a personalized dashboard on HealthHub that provides a summary of my overall health and wellness, **so that I can** quickly assess my general well-being.	9 hours	12	**Given that** I am on the HealthHub dashboard, **When** I access the overall health and wellness summary, **then** the dashboard should display key indicators and information, offering a concise overview of my health.

Trello Snapshots:

Sprint-1:



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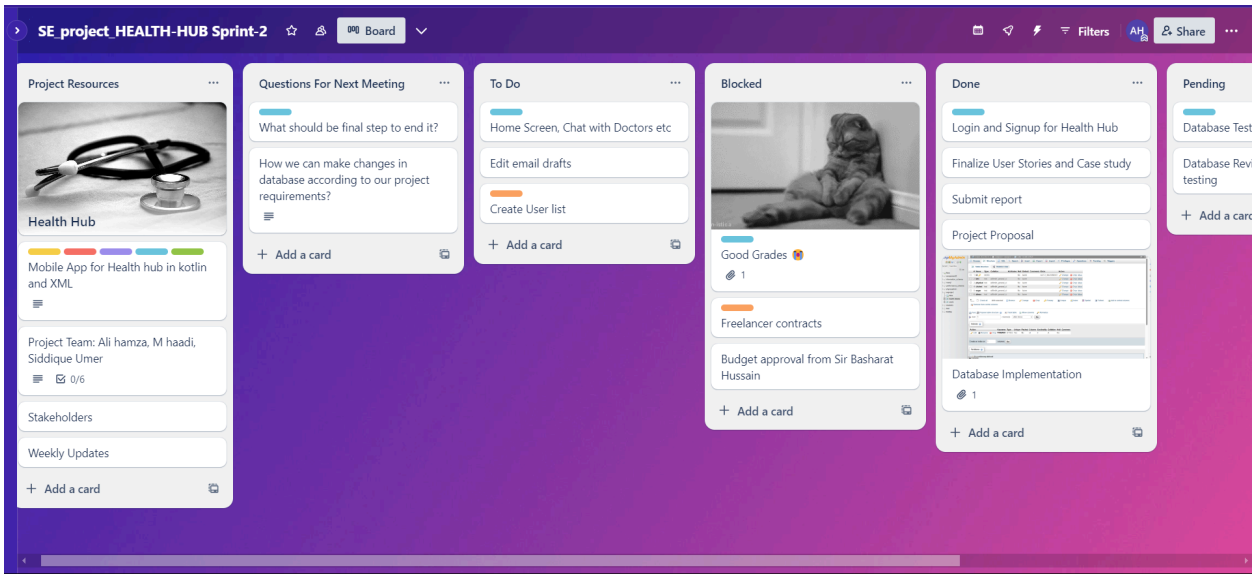

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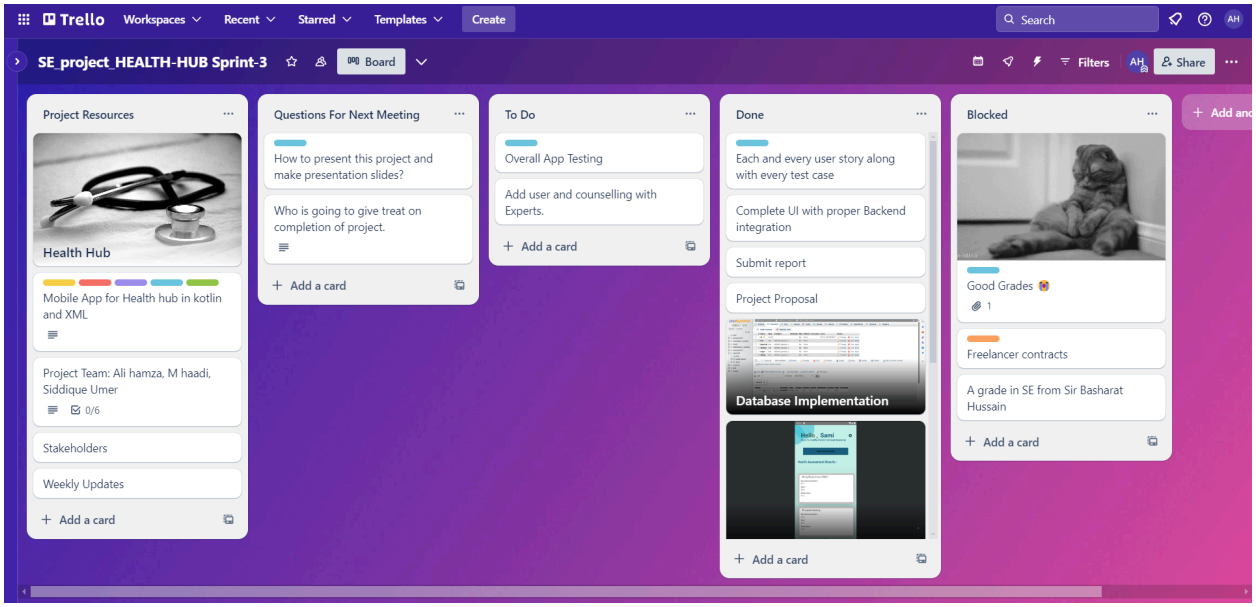
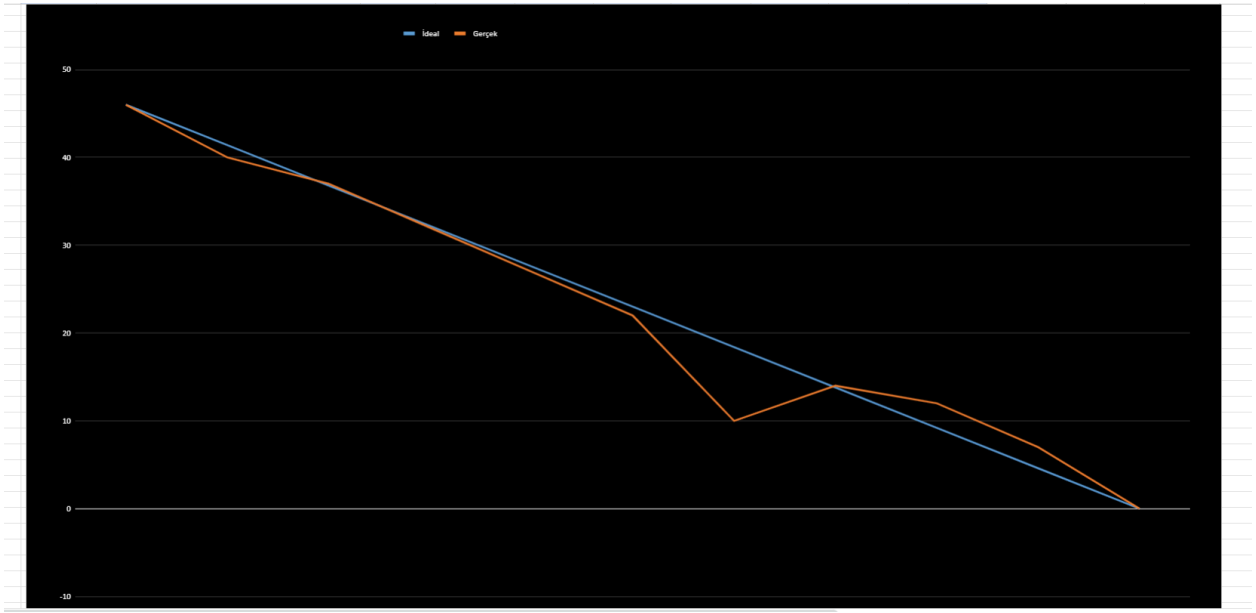


Burndown Chart

Sprint 1:



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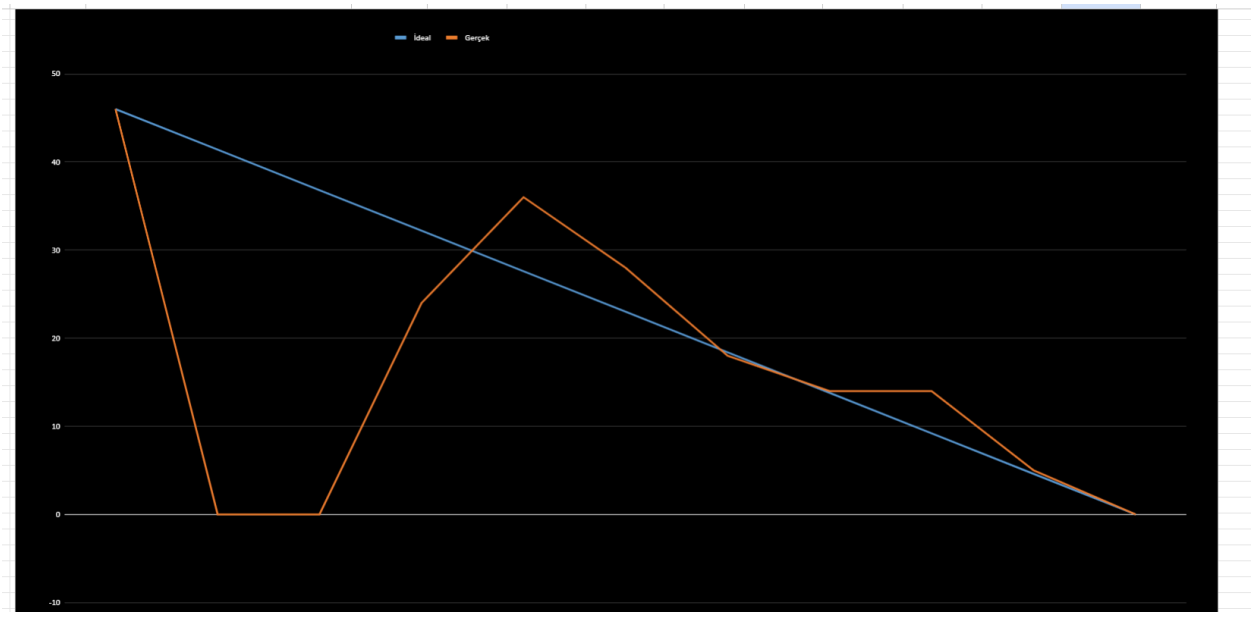

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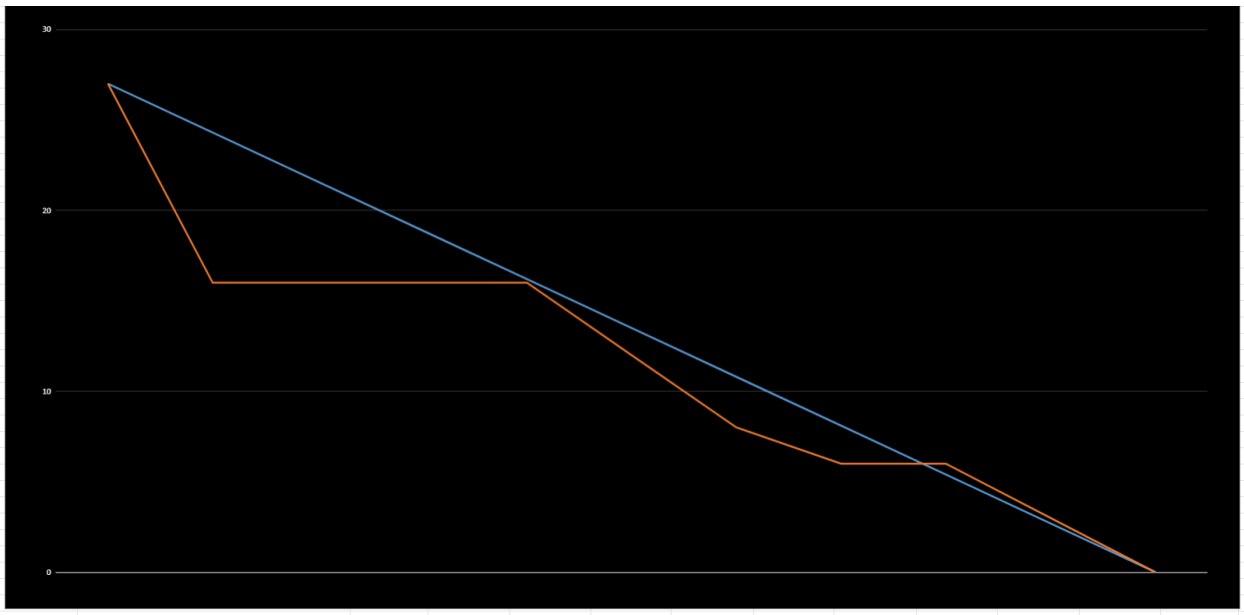
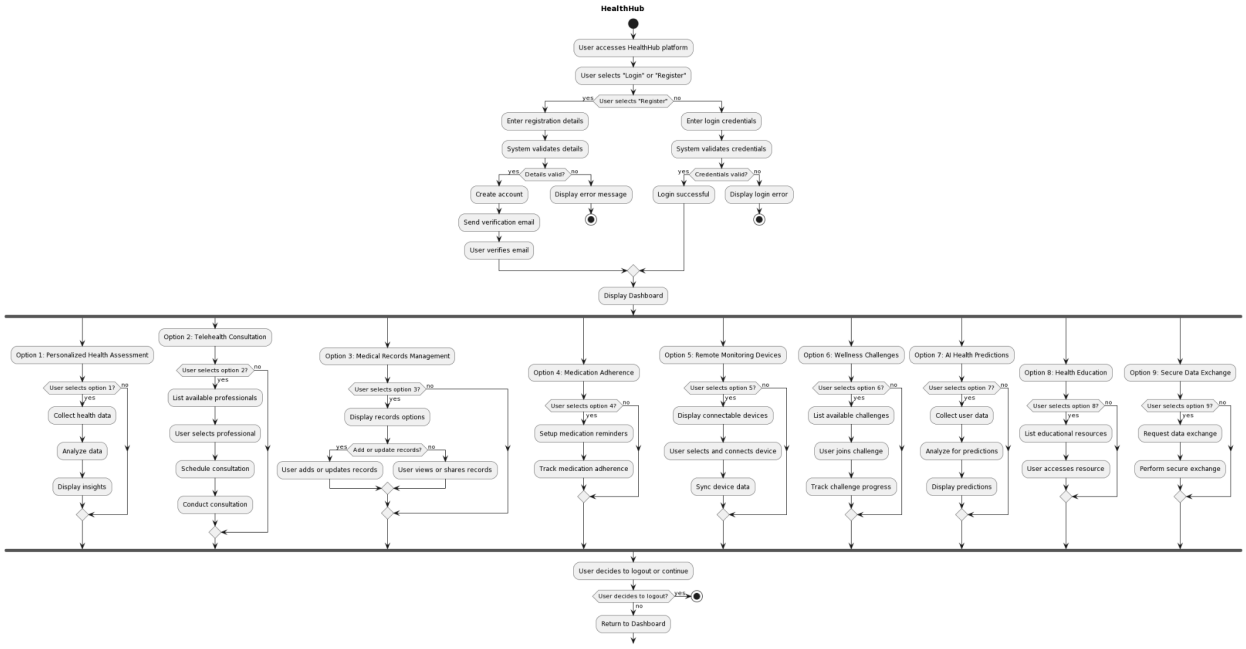
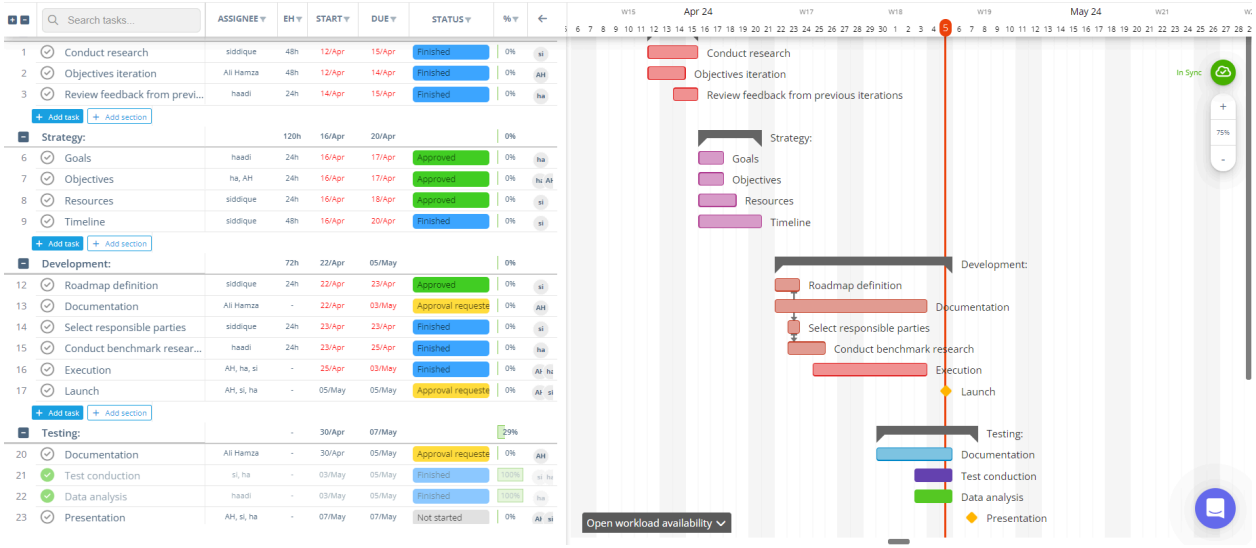


Project Planner:

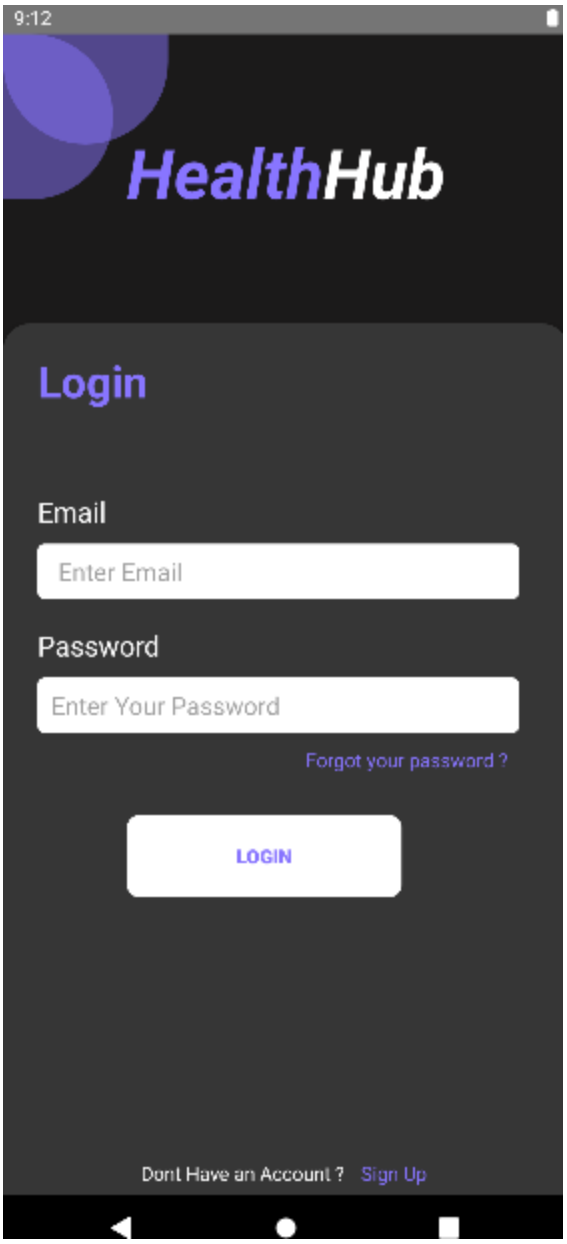


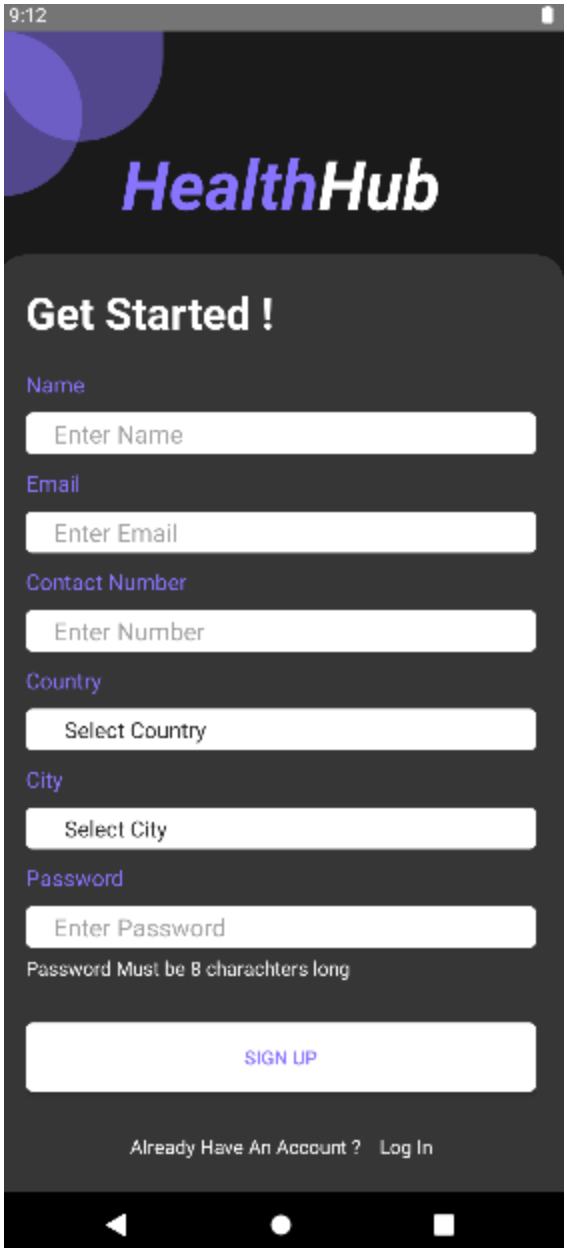
Gantt Chart:

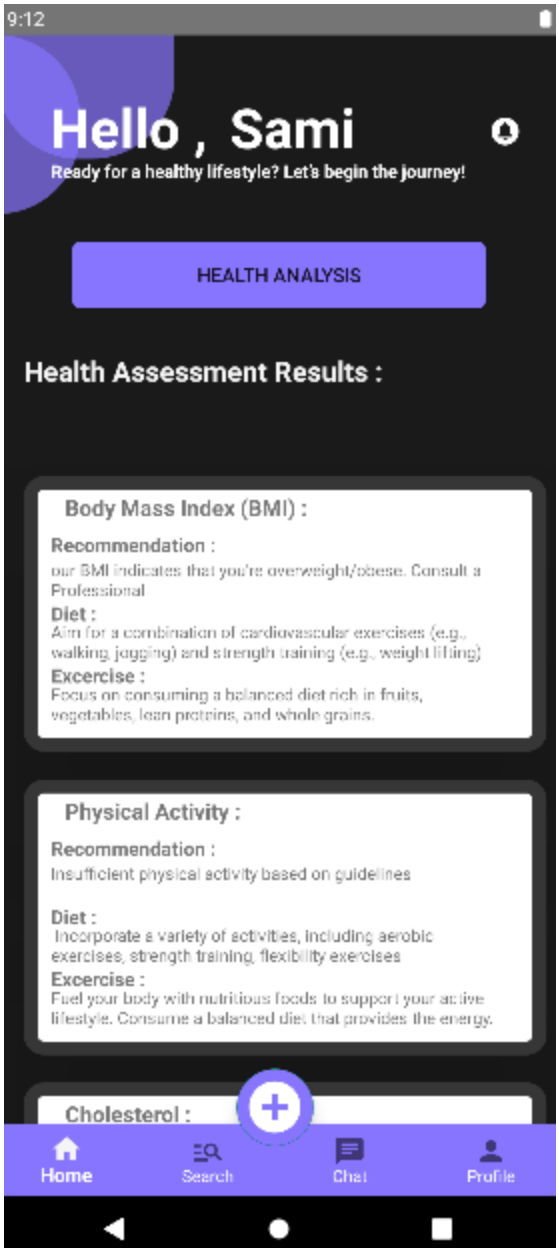


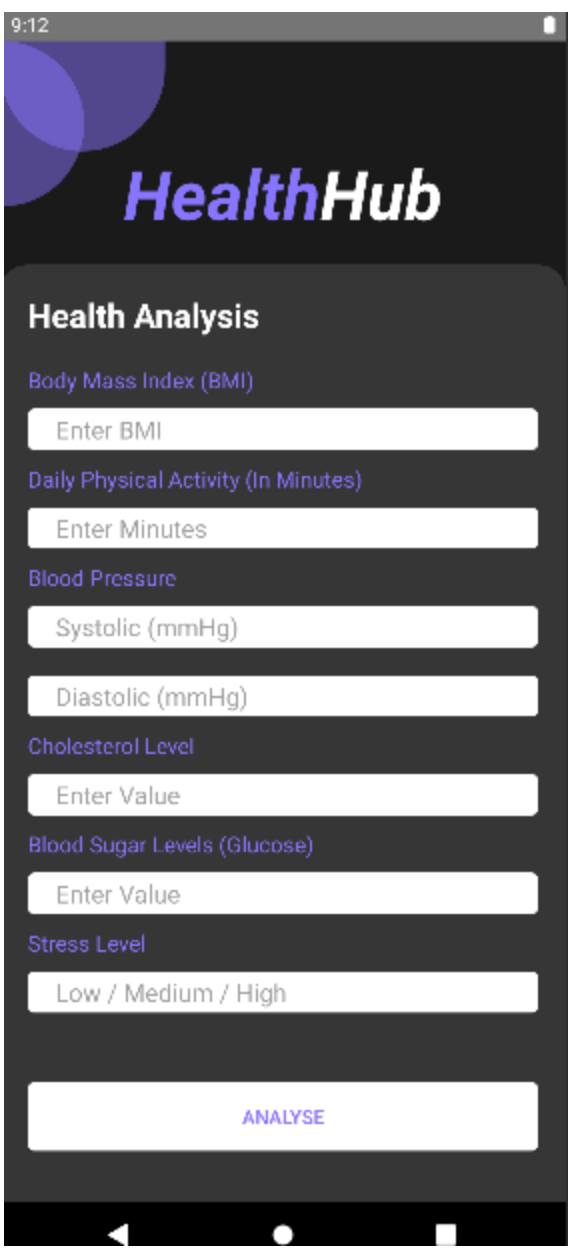
<u>UI DESIGN:</u>

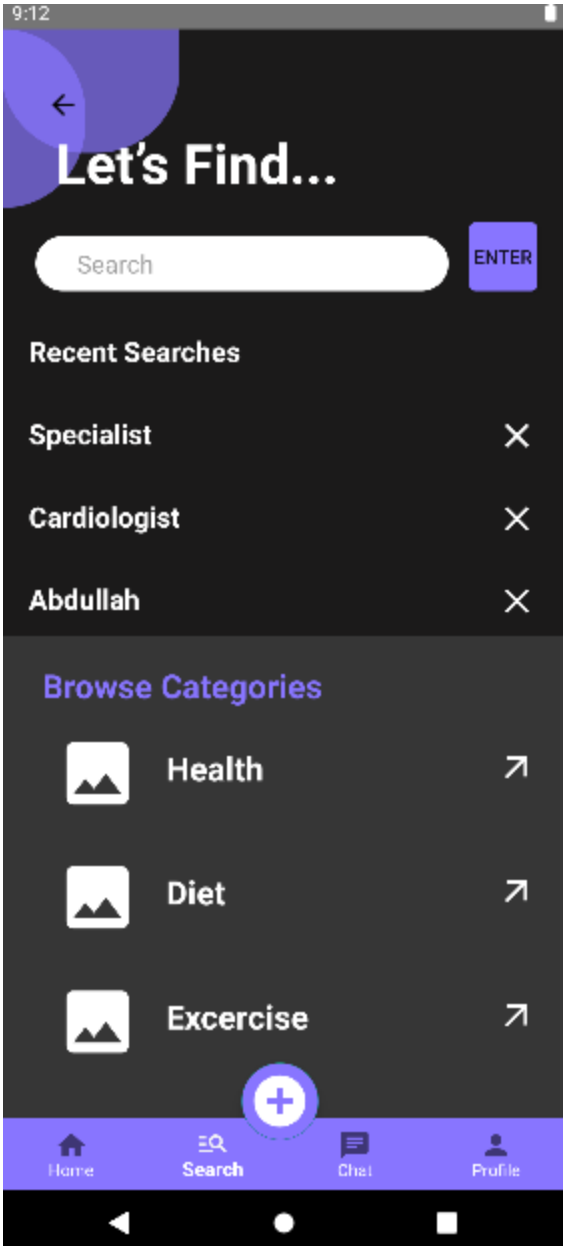

9:12
HealthHub
Wellness. Guidance. Empowerment.

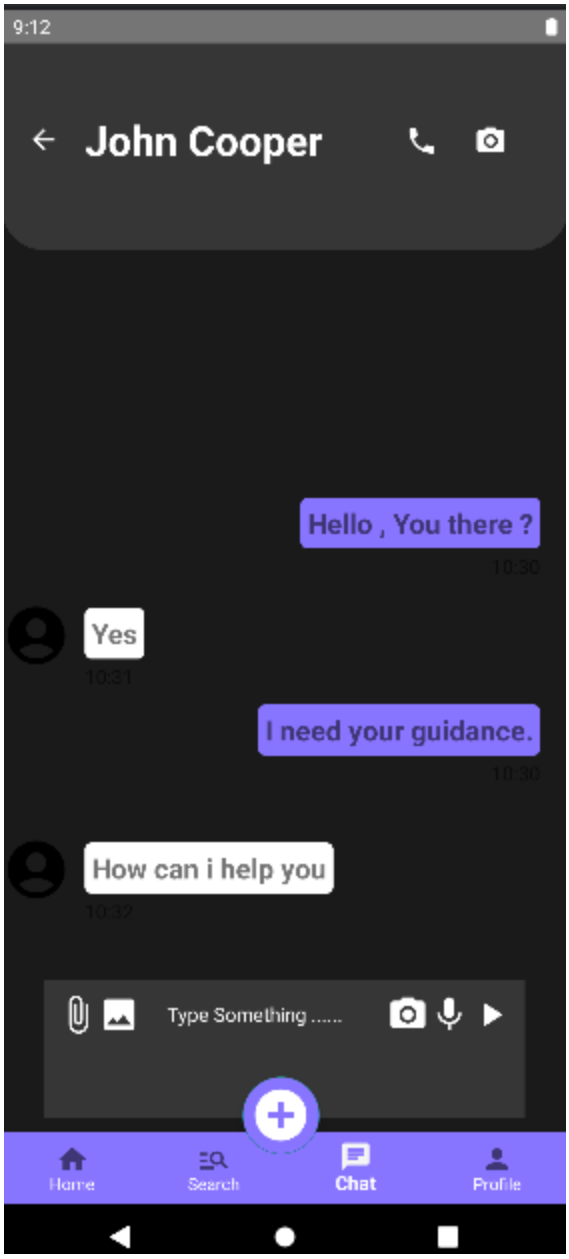

9:12
HealthHub
Login
Email
Enter Email
Password
Enter Your Password
Forgot your password ?
LOGIN
Dont Have an Account ?
Sign Up

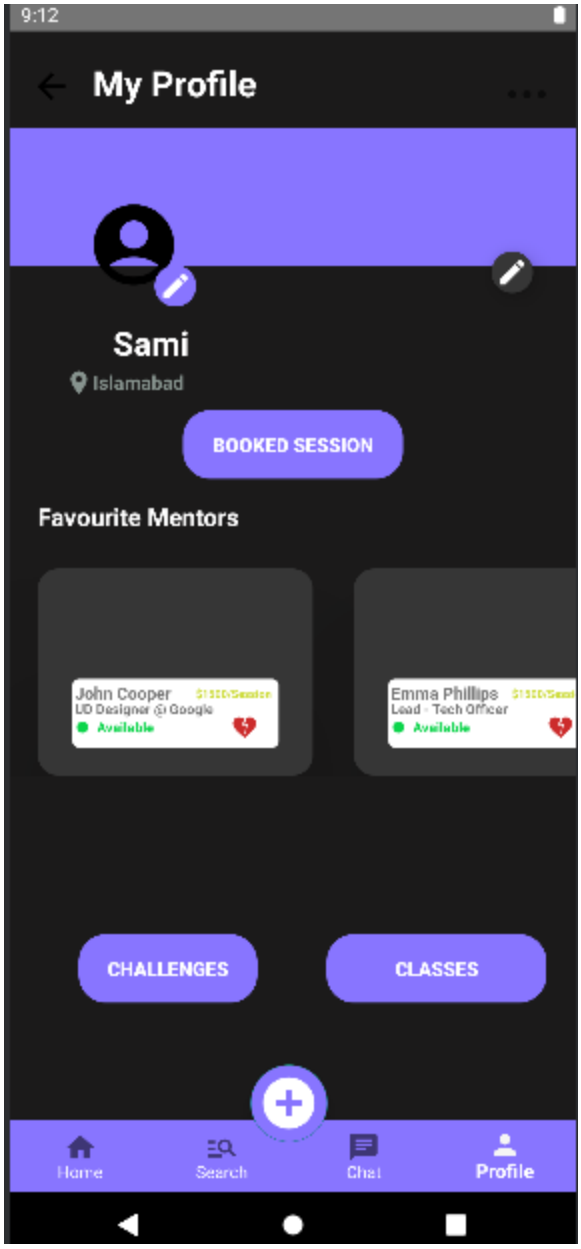

9:12
HealthHub
Get Started !
Name
Enter Name
Email
Enter Email
Contact Number
Enter Number
Country
Select Country
City
Select City
Password
Enter Password
Password Must be 8 charachters long
SIGN UP
Already Have An Account ? Log In


9:12
Hello , Sami
Ready for a healthy lifestyle? Let's begin the journey!
HEALTH ANALYSIS
Health Assessment Results :
Body Mass Index (BMI) :
Recommendation :
our BMI indicates that you're overweight/obese. Consult a Professional
Diet :
Aim for a combination of cardiovascular exercises (e.g., walking, jogging) and strength training (e.g., weight lifting)
Excercise :
Focus on consuming a balanced diet rich in fruits, vegetables, lean proteins, and whole grains.
Physical Activity :
Recommendation :
Insufficient physical activity based on guidelines
Diet :
Incorporate a variety of activities, including aerobic exercises, strength training, flexibility exercises
Excercise :
Fuel your body with nutritious foods to support your active lifestyle. Consume a balanced diet that provides the energy.
Cholesterol :
Home
Search
Chat
Profile

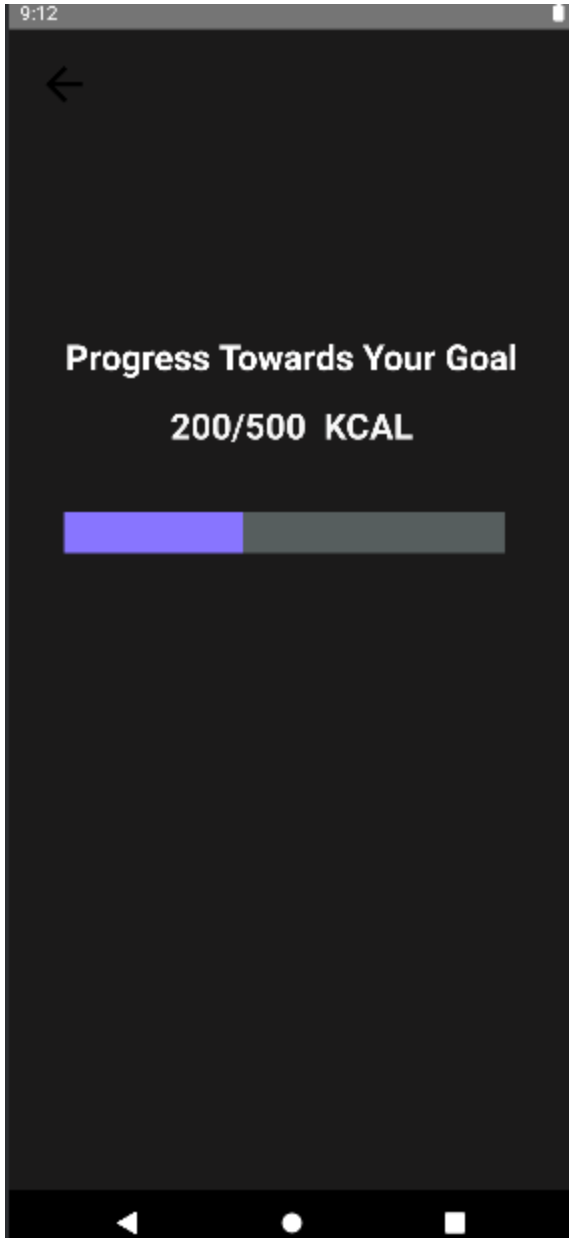

9:12
HealthHub
Health Analysis
Body Mass Index (BMI)
Enter BMI
Daily Physical Activity (In Minutes)
Enter Minutes
Blood Pressure
Systolic (mmHg)
Diastolic (mmHg)
Cholesterol Level
Enter Value
Blood Sugar Levels (Glucose)
Enter Value
Stress Level
Low / Medium / High
ANALYSE

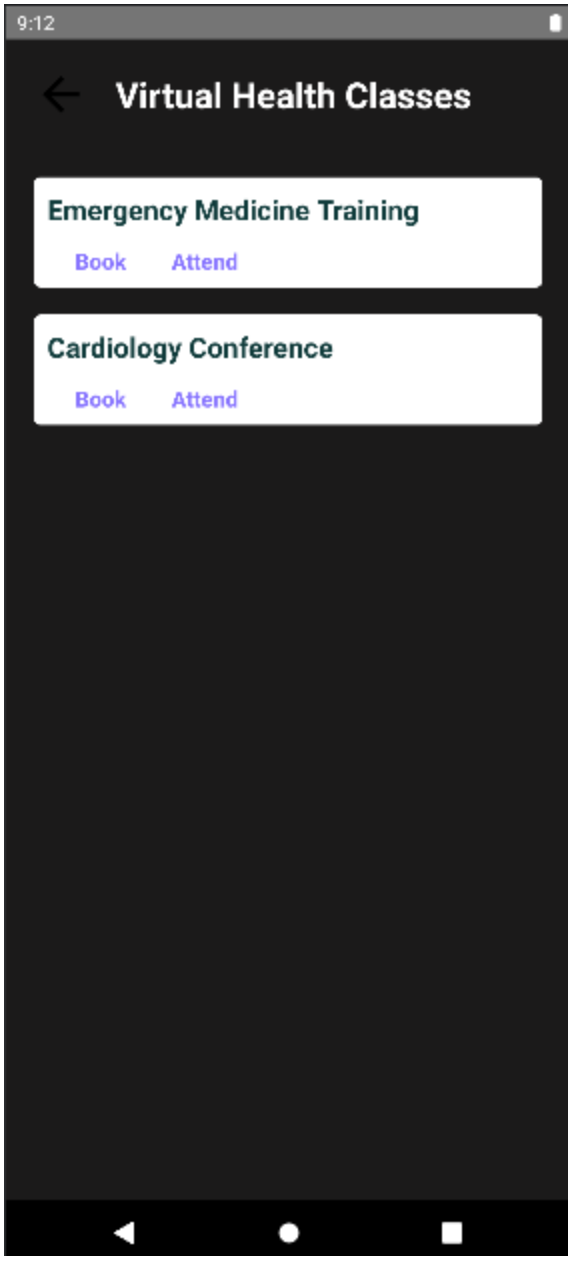

9:12
Let's Find...
Search
ENTER
Recent Searches
Specialist
Cardiologist
Abdullah
Browse Categories
Health
Diet
Excercise
Home
Search
Chat
Profile

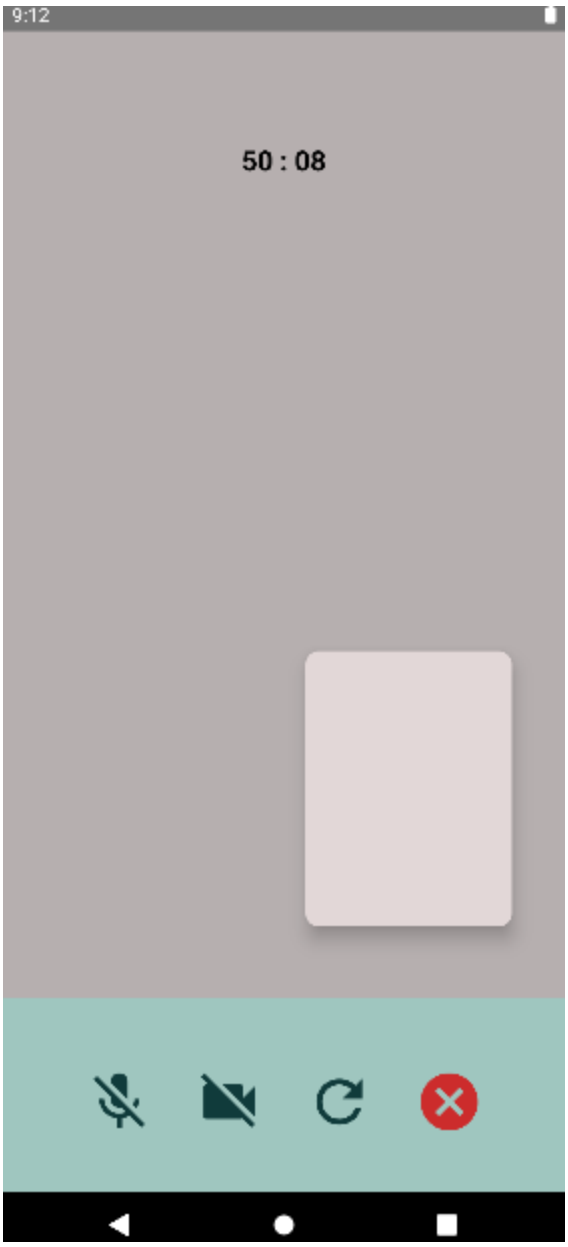

9:12
John Cooper
Hello , You there ?
Yes
I need your guidance.
How can i help you
Type Something .....
Home
Search
Chat
Profile

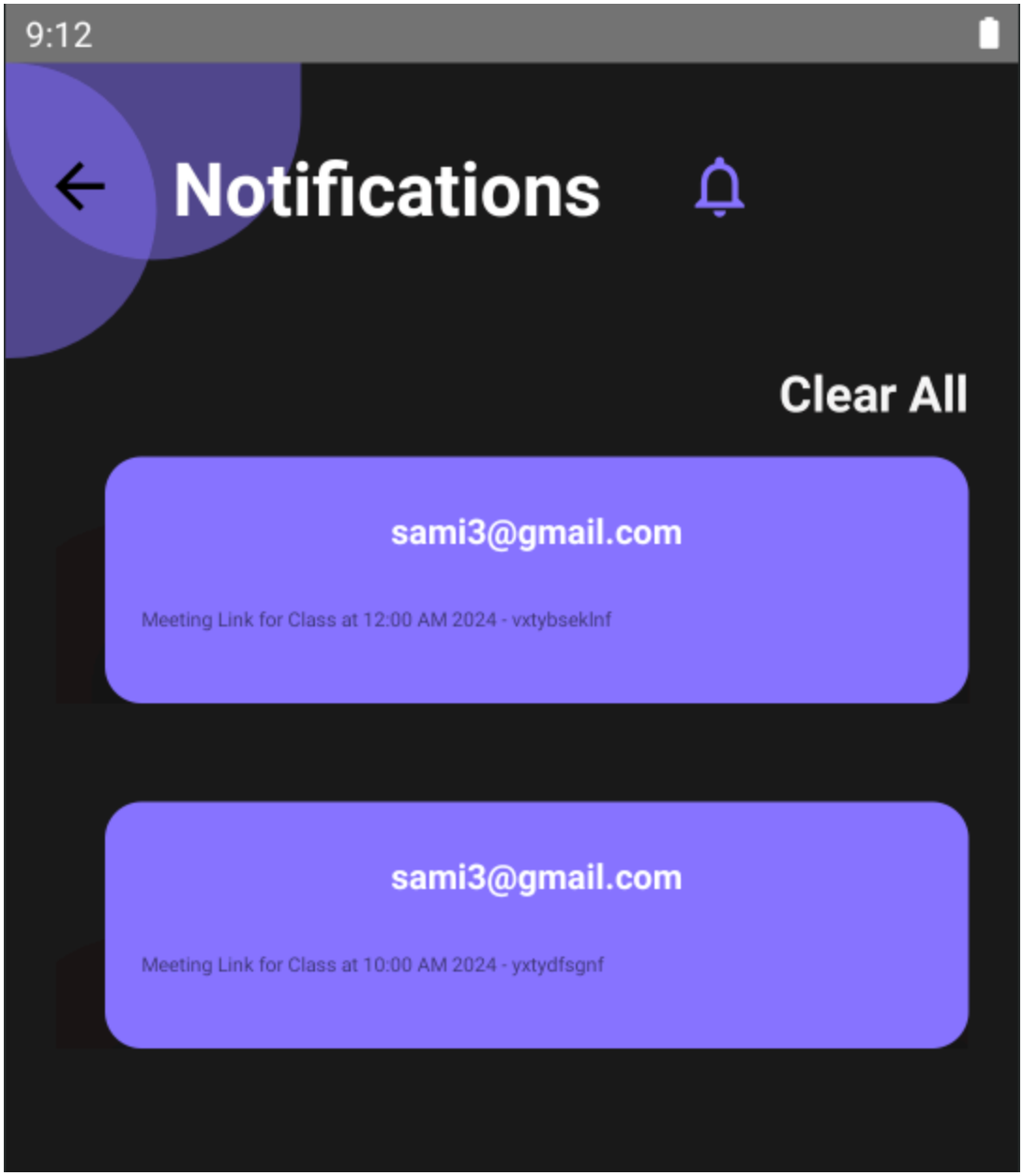

9:12
My Profile
Sami
Islamabad
BOOKED SESSION
Favourite Mentors
John Cooper
UD Designer @ Google
Available
Emma Phillips
Lead - Tech Officer
Available
CHALLENGES
CLASSES
Home
Search
Chat
Profile


9:12
Wellness Challenges
Day Fitness Challenge
Join
Cycling Challenge
Join


9:12
Progress Towards Your Goal
200/500 KCAL


9:12
Virtual Health Classes
Emergency Medicine Training
Book
Attend
Cardiology Conference
Book
Attend


9:12
50 : 08


9:12
Notifications
Clear All
sami3@gmail.com
Meeting Link for Class at 12:00 AM 2024 - vxtybseklnf
sami3@gmail.com
Meeting Link for Class at 10:00 AM 2024 - yxtydfsgnf

Equivalent Class Partitioning and Boundary Values:

User Story 1: Account Creation

Equivalent Class Partitions:

Input or Output Event	Valid Equivalence Classes	Invalid Equivalence Classes
Name field—The Admin has to enter the employee's name	Any non-empty string containing alphabetic characters, spaces, and special characters.	Empty string, numeric values, or special characters not allowed.
Email field—The Admin has to enter the employee's email.	Properly formatted email addresses (e.g., example@email.com).	Empty string, incorrect format (e.g., missing "@" symbol), or invalid domain.
Username field—The Admin has to create a username which will be used for login credentials of employees.	Unique alphanumeric username without spaces.	Empty string, username with spaces, or username containing special characters.
Phone Number—The Admin has to provide the employee's phone number.	Properly formatted phone numbers (e.g., +1234567890).	Empty string, incorrect format (e.g., letters), or invalid length
Password—The Admin has to provide a password for the account so employees can securely access their account.	Strong password meeting security requirements (e.g., minimum length, combination of uppercase, lowercase, numbers, and special characters).	Empty string, weak password, or password containing spaces.
Address—The Admin has to provide the complete address of the employee.	Complete address including street, city, state, and postal code.	Empty string or incomplete address (missing required components).

Boundary Value Analysis:

Input	Boundary Value

Name	Minimum length (0 characters), maximum length (255 characters), and typical length (e.g., 50 characters).
Username	Minimum length (1 character), maximum length (20 characters), and typical length (e.g., 8 characters).
Phone Number	Minimum length (10 characters for a standard phone number), maximum length (15 characters), and typical length (e.g., 12 characters).
Password	Minimum length (8 characters), maximum length (20 characters), and typical length (e.g., 12 characters).
Address	Minimum length (1 character), maximum length (255 characters), and typical length (e.g., 50 characters).

User Story 3: Health recommendations based on BMI, cholestrol input

Valid Equivalence Classes:

1. User inputs cholesterol, nutritions, BMI etc.
2. Users receive personalized recommendations or adjustments to nutritional goals based on individual factors (e.g., age, weight, activity level, dietary preferences).
3. Users monitor nutritional goals over time and adjust as needed to maintain or improve health outcomes.

Invalid Equivalence Classes:

1. User inputs cholesterol, BMI outside recommended range based on nutritional goals.
2. Users fail to set or track nutritional goals consistently.
3. Users track daily nutritional intake inaccurately or incompletely.
4. Users receive inaccurate or irrelevant recommendations or adjustments to nutritional goals.
5. Users neglect to monitor nutritional goals over time and make necessary adjustments.

Boundary Value Analysis:

●Boundary values: Minimum and maximum Values for a normal person for BMI, Blood Pressure , Exercise Minutes , Sugar level , Cholesterol , Stress

●Test cases: Testing value for each of the fields mentioned above with the maximum and the minimum possible value.

ThankYou!!!!