



# American International University-Bangladesh (AIUB)

## Department of Computer Science

## Faculty of Science & Technology (FST)

### PROJECT TITLE

### BreathEase

### An AI-Powered Solution for Stress and Anxiety Management

A Software Engineering Project Submitted  
By

Semester: Summer 24-25		Section:	Group Number:	
SL	Student Name	Student ID	Contribution (CO3+CO4)	Individual Marks
1	DIBAJIT ROY	22-48569-3		
2	NABIB AHAMED SUJAN	23-51193-1		
3	MAHBUB HASAN MITHIL	22-48560-3		
4	TONIMA ISLAM	22-48325-3		
5	MST. FAHMIDA ZAMAN	23-50291-1		

The project will be evaluated for the following Course Outcomes

<b>CO3 (PO-g-1)</b> <i>Select appropriate software engineering models, project management roles and their associated skills for the complex software engineering project and evaluate the sustainability of developed software, taking into consideration the societal and environmental aspects</i>	Total Marks	
Selection of Software Engineering Models: Process model selection and presents sufficient evidence to support argument for the model selection	[5 Marks]	
Role identification and Responsibility Allocation: Well-planned project with proper role identification and responsibility allocation in the project management activities	[5Marks]	
Formatting and Submission: Submission, Defense, Completeness, Spelling, grammar, and Organization of the Project report	[5Marks]	
<b>CO4 (PO-k-1)</b> <i>Apply engineering management principles and economic decision making to develop software engineering project management plan.</i>	Total Marks	
Project WBS and Testcases: Relevant WBS (project task list) and testcases for the proposed project are stated properly.	[5Marks]	
Effort Estimation and Scheduling: Project estimation was described using proper effort estimation or schedules based on available project resources	[5Marks]	

Risk Management: Sufficient and appropriate risks are identified, analyzed, and properly categorized or prioritized.	[5Marks]	
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## 1. PROJECT PROPOSAL

### 1.1 Background to the Problem

In the current era, the vast advancement of technology has brought about an unprecedented change in our daily lives. In particular, the ease of access and attractive features of smartphones and social media are occupying a huge part of our time and attention. The younger generation, especially students and young professionals, spend hours after hours on platforms like Facebook, Instagram and YouTube. This excessive digital involvement is not only having a serious impact on physical health, but also on mental health.

While the benefits of technology are undeniable, its misuse has also reached alarming levels today. Studies have shown that staring at screens for a long time causes mental problems such as sleep disturbances, concentration problems, depression and anxiety (Wang et al., 2014). The results of such addiction are often not immediately understood, but gradually have a negative impact on mental imbalance and emotions.

Another important aspect is that there are still a lot of prejudices and a tendency to remain silent in society about mental health. Many people do not seek treatment for symptoms of mental illness due to fear of family or society or lack of appropriate and timely advice. As a result, minor problems can turn into serious mental illnesses over time. In many cases, technology-dependent life creates such boredom that the lack of an effective personal assistant or guide to get rid of it becomes obvious

In this context, a digital and personal assistant that understands the user's behavior, helps in time management, and presents various effective ways to restore mental peace has become the need of the hour.

#### ❖ Root Cause of the Problem

The root cause of the problem is users' lack of self-awareness about their digital habits and the lack of intelligent, immediate support. While screen time measurement apps exist, they generally do not understand the user's context and do not provide mental health support. Users see digital platforms as beneficial for entertainment, but cannot control when and how much they use. As a result, harmful digital behavior continues due to the lack of personalized feedback. In addition, social stigma and psychological fear prevent many from reaching out to therapists or support groups. In addition, current technologies are insufficient to analyze user behavior and provide effective psychological solutions. Therefore, it is imperative to adopt realistic, relevant, and mental health-supportive measures.

#### ❖ Why This Problem Is Important

According to the World Health Organization, depression will become the leading cause of disease worldwide by 2030. This indicates the need for proactive and urgent action on mental health. The COVID-19 pandemic has further increased digital dependency and stress, especially among young people and remote workers. As a result, on the one hand, the risk of mental illness has increased, on the other hand, the accessibility and acceptability of traditional medical treatment methods have been limited. Therefore, an immediate, unobtrusive, artificial intelligence solution for identifying, intervening and supporting mental health at the

individual level has become essential.

## 1.2 Solution to the Problem and Process Model Selection

### ❖ Project Objective

1. The proposed solution is a mobile application called BreathEase, which will act as a personal digital wellness assistant. The app monitors the user's behavior - such as screen time, social media engagement, and sleep routine. It identifies harmful habits and behavioral patterns and provides instant artificial intelligence (AI)- powered mental wellness advice. The app includes various self-help resources, yoga, and calming music, which help reduce stress. Users can also consult with certified mental health experts anonymously if they wish. Moreover, if a user is going through a mental health issue, the app will provide appropriate and relevant solutions or guidance according to their symptoms, so that they can get help quickly and stay mentally healthy.

### Proposed Solutions:

#### ❖ Behavior Monitoring

BreathEase quietly observes your daily digital habits—like how long you're on your phone, which apps you use (e.g., Facebook, YouTube), and when you use them, especially during late hours. This helps the app understand patterns that might be affecting your mental well-being.

##### 1. Smart Alerts and Pattern Detection

When the app notices that you've been using your phone too long or at unhealthy hours, it gently reminds you to take a break. For example:

- “You’ve been scrolling for 2 hours. Take a break?”
  - “It’s midnight—consider winding down for better sleep.”
- These friendly nudges help you stay mindful of your habits without feeling judged.

#### ❖ Mental Wellness Toolkit

This toolkit is like a little wellness corner inside the app. It includes guided yoga and breathing exercises, a mood tracker, a digital journal to express your thoughts, soothing music like rain or piano sounds, and even short lessons on skills like focus and time management—all designed to help you feel more in control and calm.

#### ❖ Anonymous Consultation Services

Not everyone is comfortable opening up about mental health. That’s why BreathEase lets you talk to licensed therapists through secure chat or voice calls—without revealing your identity. It's private, stigma-free, and available when you need it.

#### ❖ AI-Based Personal Assistant

Think of this feature as a supportive friend who checks in on you. It sends helpful reminders, tracks your daily habits and goals, and gives motivational feedback—helping you build routines that support your mental wellness.

## ❖ Emergency Support & Crisis Detection

If you're ever in distress or showing signs of deeper emotional struggle-like a sudden shift in mood or concerning journal entries-the app can detect it. It will then guide you toward urgent support, such as helplines, SOS contacts, or immediate expert help.

## ❖ Personalized Goals & Progress Tracker

You can set small goals like "Reduce screen time by 1 hour" or "Practice breathing daily." The app tracks your progress and shows it in a simple, visual way-cheering you on with encouragement and helping you build healthier habits over time.

## ❖ Mental Wellness Toolkit

BreathEase comes with a gentle set of tools designed to help you unwind and take care of your mind. You'll find:

- Guided yoga sessions and breathing exercises that you can follow anytime to reduce stress, improve focus, and reconnect with your body and mind.
- Mood tracker and digital journaling to help you understand how you're feeling each day and reflect on your thoughts in a private space.
- Soothing music options like rain sounds, forest ambience, or soft piano melodies to calm your nerves and help you relax or sleep better.
- Micro skill-learning modules on things like improving concentration, managing time, or building emotional resilience-short, simple lessons you can practice in just a few minutes.

In short, BreathEase is more than just a mental health app - it is a supportive companion that helps us build healthy habits and a stronger sense of well-being in our busy digital lives.

## ❖ Business Objective

BreathEase's core business objective is to create a smart, AI-powered mobile application that will help users maintain their mental well-being and manage their digital habits in a healthy way. In today's fast-paced, screen-dependent life, students and professionals often suffer from problems such as stress, sleep problems, and mental instability. The main cause of these problems is excessive smartphone and social media use.

BreathEase will serve as an integrated digital companion to solve this modern problem. The app will monitor the user's screen time, app usage patterns, and emotional behavior and provide personalized advice, smart reminders, and various tools for mental calm (such as yoga, breathing exercises, music, and digital journaling). Users can also speak to licensed therapists anonymously if they wish. By providing personal, confidential, and AI-based support, BreathEase will play a significant role in reducing digital addiction, increasing mental stability, and improving quality of life. Its ultimate goal is to use technology as a supportive friend to create a digital and mentally healthy lifestyle, which is very necessary in today's era.

## ❖ Target Users and Benefits

- **Target Group:**

- University students
- Young professionals (especially remote workers)
- High social media users
- Individuals experiencing stress, anxiety, or poor sleep

- **User Benefits:**

- Gain a deeper understanding of your digital usage and behavior, which helps you develop healthy habits.
- Get personalized advice and encouragement on time to help you move forward on your path to change.
- Reduce anxiety and stress, improve focus and performance, and increase your performance in everyday life.
- Get the opportunity to safely and freely consult with mental health experts while maintaining confidentiality, which eliminates social shame.
- Understand and track your own mental and behavioral development, which will ensure long-term well-being.
- Encourage healthy lifestyle habits such as regular sleep, yoga, and mental relaxation, which will improve your overall quality of life.
- Reduce feelings of loneliness or isolation, and increase social connection and self-confidence.
- A personal assistant will always be by your side, who will regularly monitor your well-being and provide advice and reminders when needed.

## ❖ Scientific Contribution

BreathEase plays a key role in the scientific development of digital mental health technology, combining user behavior-aware and personalized wellness tools with cutting-edge artificial intelligence. Its main scientific contributions are:

- **Development of user behavior-aware digital wellness tools:** Providing personalized and adaptive wellness interventions through regular monitoring of user digital habits, which has opened up new directions in mental health support.
- **Innovation in preventive mental health systems:** This app emphasizes early detection and timely intervention rather than reactive problem solving, which has brought a new perspective to mental health care.
- **AI-powered alert system for mental fatigue and emotional risk:** BreathEase uses advanced AI algorithms to detect early signs of stress and emotional fatigue, ensuring fast and effective support.
- **Ethical and safe mobile health technology:** User privacy and data security are protected with utmost importance and comply with applicable policies and laws, setting a standard for future mobile health apps.

Furthermore, the entire system architecture, algorithmic framework, user behavior model, and evaluation

process will be documented in detail. This will play a key role in future research and integration with national health systems, paving the way for the sustainability and expansion of the project.

## ❖ Literature Review

There is currently a lot of research on the relationship between digital use and mental health. Various researchers have shown how the use of mobile and digital devices can help us understand our state of mind.

The **NCBI article (2022)** highlights the growing role of Artificial Intelligence (AI) in mental health care, particularly in diagnosis and treatment support. AI tools improve efficiency and accessibility but raise concerns about data privacy, ethical use, and potential bias. The article emphasizes that AI should complement, not replace, human clinicians to ensure effective and ethical mental health care.

The **UC Berkeley School of Public Health (2023)** critically examines the growing enthusiasm surrounding AI applications in mental health, cautioning that AI is not a standalone solution. Although AI tools such as chatbots and digital screening systems offer scalable support and data processing advantages, they lack the emotional intelligence and nuanced understanding necessary for effective mental health care. The article highlights that AI often fails to capture complex human emotions and social contexts, which are essential for accurate diagnosis and meaningful therapeutic engagement.

In an interview published by the UC Berkeley School of Public Health, **Dr. Jodi Halpern (2024)** argues that AI cannot fully understand human emotional nuance. She points out that while AI can assist with mental health screening and management, it should not be viewed as a replacement for compassionate, human-based care.

A June 2025 study by **Stanford HAI researchers Jared Moore and Nick Haber** revealed critical risks associated with unregulated use of large language models in therapy. Their research found that popular mental health chatbots sometimes gave dangerous or inappropriate responses to users in distress, such as those experiencing suicidal ideation. This highlights the dangers of over-relying on AI without clinical oversight.

**Wikipedia (2024)** provides a general overview of AI applications in mental health, including diagnostic prediction, suicide risk assessment, treatment adherence tracking, and chatbot-based support. However, it also notes the challenges around privacy, ethical deployment, and the lack of transparency in AI decision-making.

Finally, a recent **article on ScienceDirect (2024)** outlines the potential of AI to personalize care, detect early warning signs of mental illness, and support therapeutic intervention. However, it cautions that these benefits come with major concerns about data security, fairness, and the loss of human empathy

## ❖ Existing Solutions and its Limitation:

### 1. Headspace:

Provides powerful meditation and mindfulness guidelines, but doesn't track users' daily digital behavior or provide smart, timely alerts.

### 2. YourHour:

Keeps accurate track of screen time, but doesn't offer tools or relevant advice to improve mental well-

being.

### **3. Wysa:**

Provides AI-powered chat therapy, but doesn't offer pattern recognition or personal monitoring of users' practical behavior.

### **4. Calm:**

Provides calming music and relaxation tools, but doesn't adapt to the user's behavior or emotional state, meaning it's not adaptive.

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### **❖ How BreathEase is Better:**

BreathEase is more effective than other apps because it combines many important features. Many apps only do one or two things - like Headspace only offers meditation, YourHour only tracks screen time, and Wysa only provides AI chat therapy. But BreathEase has user behavior monitoring, real-time smart alerts, yoga and music for mental well-being, mood tracker, anonymous therapy services, and many other essential features all in one. With these versatile features together, users get a complete and integrated solution for their mental and digital health, which is difficult to find in any other single app. As a result, BreathEase not only solves problems, but also provides early warning and ensures long-term well-being.

### **❖ Project Challenges and Solutions**

Artificial intelligence (AI) does not yet fully understand emotions, mental states, and sensitivities like humans. As a result, it may react incorrectly in crisis situations.

- **Possible solution**

To have a system in place where AI connects users with a live therapist in complex or critical situations.

- **Privacy and security of personal data**

Users may be hesitant to share mental health data unless the security and confidentiality of the data is ensured.

- **Possible solution**

Using encrypted databases (such as Firebase), data anonymization, and transparent privacy policies.

- **Lack of clinical supervision**

AI-based advice is at risk of being wrong without the direct involvement of therapists or mental health experts.

- **Possible solution**

Partner with therapists to provide regular content review and consultation opportunities.

- **Social and cultural barriers**

In many societies, talking about mental health is still considered shameful or socially unacceptable.

- **Possible solution**

Creating app content according to local language, culture, and social sensitivities and protecting privacy.

- **Addiction to excessive app use**

Some people may become dependent on technology while using apps to improve their mental health.

- **Possible solution**

Setting daily usage time limits, including offline activities (such as yoga).

- **Maintaining regular user engagement**

Many people may initially lose interest in using apps, but over time.

- **Possible solution**

Adding gamification, reward systems, daily mood streaks or progress trackers.

- **AI bias and misjudgment**

If the data used for training is not diverse, AI can make incorrect analyses or show bias towards one type of user.

- **Possible solution**

AI models are regularly updated and reviewed, and trained with diverse user data.

### ❖ Risk Management Plan for BreathEase Project:

Risk	Category	Probability	Impact	Risk Mitigation/Management Strategy
AI may misinterpret user's emotional state	Technology (TE)	40%	3	Incorporate human therapist review for critical cases and continuous AI model updates.
User data privacy breaches	Customer/User (CU)	30%	3	Use end-to-end encryption, anonymization, and comply with



				GDPR/CCPA.
Low user engagement over time	Business Impact (BU)	50%	2	Add gamification, streak tracking, and regular motivational content.
Excessive reliance on AI instead of human experts	Business/Technology (BU/TE)	40%	2	Integrate hybrid model: AI + live consultation option.
Social stigma prevents app adoption	Customer/User (CU)	60%	2	Enable anonymous consultations and awareness campaigns.
App crashes during peak usage	Product Size (PS)	30%	3	Stress testing, scalable cloud infrastructure, and load balancing.
Delayed emergency support detection	Technology (TE)	20%	3	Implement multi-signal crisis detection and emergency helplines integration.
Lack of training for development tools	Development Environment (DE)	40%	2	Provide training sessions and detailed documentation.
Team inexperience in AI/ML	Staff Experience (ST)	50%	2	Conduct workshops, hire AI consultants, and peer-learning programs.
Changing requirements after Baseline	Product Size (PS)	70%	2	Use (Scrum) with iterative sprints and frequent reviews.

#### ❖ Impact Values and Category Notations

Impact Value / Category	Notation
1 – catastrophic	PS – Product size
2 – critical	BU – Business Impact
3 – marginal	CU – Customer Characteristics
4 – negligible	TE – Technology to be built
	DE – Development environment
	ST – Staff size and Experience

### ❖ Budget Allocation per Risk

Risk	Estimated Cost (\$) Formula: Base × Probability × (5 – Impact)	Notes
AI may misinterpret user's emotional state	\$4,000	P=40%, Impact=3, Weight=2. Model retraining, therapist supervision integration
User data privacy breaches	\$3,000	P=30%, Impact=3, Weight=2. Encryption, secure cloud, compliance audits
Low user engagement over time	\$7,500	P=50%, Impact=2, Weight=3. Gamification, reward systems, retention campaigns
Excessive reliance on AI instead of human experts	\$6,000	P=40%, Impact=2, Weight=3. Hybrid AI + therapist support integration
Social stigma prevents app adoption	\$9,000	P=60%, Impact=2, Weight=3. Awareness campaigns, anonymous consultations
App crashes during peak usage	\$3,000	P=30%, Impact=3, Weight=2. Load testing, auto-scaling, infra upgrades
Delayed emergency support detection	\$2,000	P=20%, Impact=3, Weight=2. Multi-signal crisis detection, SOS integration
Lack of training for development tools	\$6,000	P=40%, Impact=2, Weight=3. Team training, workshops, documentation
Team inexperience in AI/ML	\$7,500	P=50%, Impact=2, Weight=3. Workshops, consultants, skill development
Changing requirements from stakeholders	\$10,500	P=70%, Impact=2, Weight=3. Agile sprint buffers, stakeholder workshops

Total Estimated Risk Management Budget = **\$58,500**

## ❖ SOFTWARE DEVELOPMENT LIFE CYCLE

### ❖ Process Model

We chose the **Scrum** Model for BreathEase app development because it is a step-by-step approach where each feature is developed in a separate Sprint. In Scrum, each Sprint has a predetermined duration (usually 1 to 4 weeks), resulting in a usable feature or part being completed within a specific time frame. This ensures clear deadlines, reduces time wastage, and makes it easier to measure progress. Daily meetings are an important aspect of Scrum, where team members provide work updates and share issues. This results in transparency within the team, faster problem resolution, and improved teamwork. As a mental health app, BreathEase has several sensitive features (such as AI suggestion, emergency alert), which require regular feedback and iteration-Scrum ensures this. Feature-based division, time-bound Sprints, and team-based communication make this model the most suitable for BreathEase.

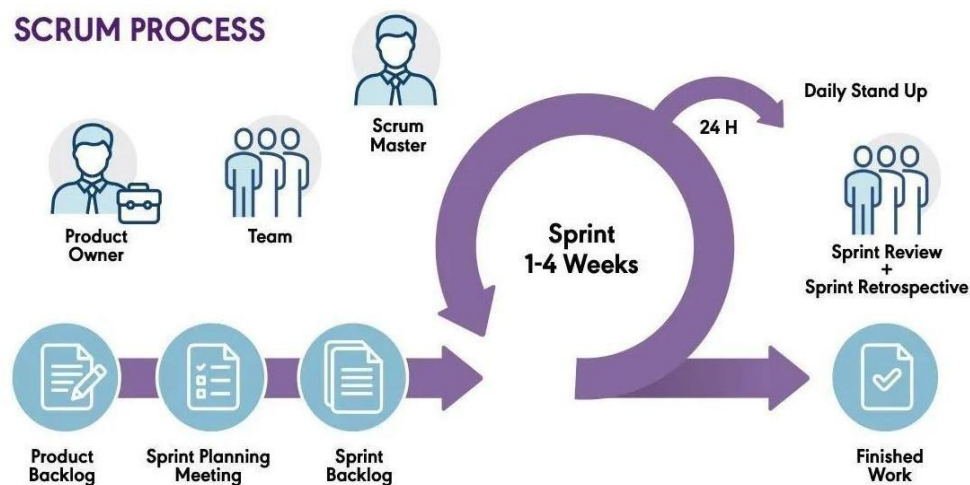


Image Source: <https://www.pm-partners.com.au/insights/the-agile-journey-a-scrum-overview/>

### ❖ Why Not other process Model?

There are different models in software development, but not all of them are equally effective for every project. For example, the Waterfall model is a sequential approach where one step cannot be completed before the next step. It is suitable for fixed and clear requirements, but it is not flexible for projects like BreathEase where requirements can change quickly and user feedback is very important. The V-Model is an advanced version of Waterfall, where each development step has a testing phase associated with it. It ensures the quality of the development, but is not suitable for rapid change and it is difficult to update features quickly according to changing user needs. The Incremental model builds the software in small parts and completes it step by step. Although it has some flexibility, it lacks regular and close communication between the team and it is difficult to incorporate user feedback in a timely manner. The Prototype model quickly creates an initial demo and develops from it with feedback. While this is effective for small projects, it can be a waste of time and resources for large and complex projects. Extreme Programming (XP) is suitable for small teams where the emphasis is on maintaining high coding standards. XP will not be fully effective on feature-rich projects like BreathEase because of the large team size and scope of work. DSDM (Dynamic Systems Development Method) is a rapid application development framework that ensures fast delivery within time and budget. However, it is mostly suitable for large organizations or work within a specific structure and may seem a bit

complex and cumbersome for startups or mid-sized projects like BreathEase .

## 1.3 Project Role Identification and Responsibilities

### 2. Product Owner

The success of the product is primarily the responsibility of the Product Owner.

#### ❖ Responsibilities:

The Product Owner defines and prioritizes the product backlog, which reflects user needs and stakeholder expectations. He clearly communicates the vision for BreathEase to the team and determines which features will be developed first (such as screen time alerts, mental health tools, behavioral alerts, etc.). He acts as the main point of contact for stakeholders and updates the backlog based on feedback and business goals, so that the product is effective in supporting users' mental health.

#### ❖ Scrum Master

The Scrum Master ensures that the team adheres to the Scrum rules and removes any obstacles.

#### ❖ Responsibilities:

The Scrum Master supports the BreathEase team in Scrum practices, conducts sprint planning, reviews, and retrospectives. He ensures that each sprint goal (such as screen time detection or clam music integration) is achieved smoothly. He provides training and support to enhance the team's self-organization skills and build a culture of continuous improvement.

#### ❖ Scrum Team

The development team works together to create product increments to meet the sprint goals.

#### ❖ Responsibilities:

The Scrum Team designs, develops, tests, and delivers new features of BreathEase in each sprint. For example, digital behavior detection, consultation interfaces, yoga or meditation modules. They work self-organized, actively participate in sprint planning and reviews, and ensure that each increment has a positive impact on mental health.

#### ❖ Customers

The users of the BreathEase app play a vital role in its development and success.

#### ❖ Responsibilities:

Users participate in feature testing, such as anonymous consultations or pattern breaking alerts, and provide feedback on what is working and what needs improvement. Based on their input, features are prioritized so that the app is effective and relevant to the user's mental needs.

#### ❖ Management

The management team overseeing the development of BreathEase has some important responsibilities.

#### ❖ Responsibilities:

The management team sets the strategic goals of the project, allocates resources, and coordinates with

stakeholders. They provide the team with the necessary tools and support to create a quality digital mental health assistant. They also ensure user data privacy and legal issues. They provide direction to manage risk and maintain quality.

## **2. SOFTWARE REQUIREMENTS SPECIFICATIONS (SRS) / PRODUCT REQUIREMENTS DOCUMENT (PRD)**

### **2.1 Functional Requirements**

#### **1. Software Sign up**

Functional Requirements:

- New users will get a signup page.
- Signup page will have username, email, and password text fields.
- The system will validate email and username.
- If email/username already exists, a popup will ask the user to enter different credentials.
- After successful signup, user details will be securely stored in the database.

Priority Level: Medium

Precondition: Email and username must be unique.

#### **2. Software Log in**

Functional Requirements:

- Registered users can Log in via username/email and password.
- The app will check credentials from the database.
- After successful login, user is redirected to the main dashboard.

Priority Level: High

Precondition: User must have a registered account.

#### **3. Behavior Monitoring Access**

Functional Requirements:

- App will ask permission to monitor digital activities (screen time, app usage).
- A popup prompt will request user consent for tracking.
- Users can allow or deny permission.
- Without permission, monitoring features will remain disabled.

Priority Level: High

Precondition: Device must allow activity tracking.

#### 4. Continue without Sign in/Sign up

##### Functional Requirements:

- Users can enter the app without registration.
- They will have limited access to wellness resources (e.g., breathing exercises, music).

Priority Level: Medium

Precondition: Limited features only; no personalized tracking.

#### 5. Forgot Password

##### Functional Requirements:

- “Forgot Password” option on login page.
- User enters registered email.
- System sends a password reset link.

Priority Level: Medium

Precondition: User must have a registered email.

#### 6. Reset Password

##### Functional Requirements:

- Page to reset password after clicking email link.
- User must enter new password and confirm it.
- System validates and updates database.

Priority Level: Medium

Precondition: User must access reset link from email.

#### 7. Digital Behavior Tracking

##### Functional Requirements:

- Tracks phone usage duration, app usage, and late-night activity.
- Data will be displayed in dashboard.
- Updates periodically in real-time.

Priority Level: High

Precondition: User must grant monitoring permission.

#### 8. Smart Alerts and Notifications

#### Functional Requirements:

- Sends reminders for excessive usage or unhealthy timing.
- Example: “You’ve been scrolling for 2 hours, take a break.”
- Notifications include text and friendly suggestions.

Priority Level: High

Precondition: Notification access required.

### 9. Mental Wellness Toolkit

#### Functional Requirements:

- Provides guided yoga and breathing exercises.
- Includes mood tracker, journaling, and relaxing sounds.
- Available both online and offline.

Priority Level: High

Precondition: None

### 10. Anonymous Consultation Services

#### Functional Requirements:

- Users can chat/call with licensed therapists.
- Communication will be private and anonymous.
- Data security ensured via encryption.

Priority Level: High

Precondition: Internet connection required.

### 11. AI-Based Personal Assistant

#### Functional Requirements:

- App gives personalized advice based on user behavior.
- Tracks daily habits and provides motivational feedback.
- Suggests healthy routines like sleep, yoga, breaks.

Priority Level: High

Precondition: User must grant monitoring access.

### 12. Emergency Support & Crisis Detection

Functional Requirements:

- Detects distress from mood tracker/journal entries.
- Sends alerts with helpline numbers or SOS contacts.
- Provides emergency resources immediately.

Priority Level: High

Precondition: None

### 13. Personalized Goals & Progress Tracker

Functional Requirements:

- Users can set personal goals (reduce screen time, meditation).
- App tracks progress with visual reports.
- Sends motivational reminders.

Priority Level: Medium

Precondition: User Logged in

### 14. Community Feedback & Reports

Functional Requirements:

- Users can share feedback or experience.
- Option to report harmful digital behavior anonymously.
- Data used to improve recommendations.

Priority Level: Medium

Precondition: Internet required.

## 2.2 Non-Functional Requirements

- **Feasibility:**

This app is very easy to create with today's technology. Using the AI capabilities of modern mobile phones, cloud databases such as Firebase or MongoDB, and tools like Flutter or React Native, the app can be developed quickly and effectively. As a result, users will get an accurate and smooth experience.

- **Relevance:**

Today, many of us spend excessive time on digital devices, which increases mental stress—especially among young people and people working from home. BreathEase addresses this problem, which is why it is very necessary for our time.



- **Innovation:**

Many apps can measure screen time, but the specialty of BreathEase is that it understands the user's behavior and extends a helping hand accordingly. In addition, it allows you to talk to therapists anonymously, which is a great help in mental health for many.

- **Impact Potential:**

Using this app will have good mental health, increase work efficiency, sleep better, and improve quality of life. In the long run, it will help improve our quality of life.

- **User Acceptance:**

Users will easily like this app and use it regularly due to its simple and friendly design and privacy protection.

- **Cost-Effectiveness:**

This app can be created using advanced technology at low cost, so many people will be able to easily get mental health support.

### 3. PROJECT ESTIMATION AND SCHEDULING

#### 3.1 Effort and Cost Estimation

##### Why our project is considered Organic:

- Small team (3–5 people)
- Low complexity work
- Clear and stable project scope and requirements
- Simple and familiar technology

Therefore, our calculations (PM, DM, ST) are based on the Organic project type.

**PM (Person-Months):** The amount of work one person can complete in one month; represents total effort required for the project.

**SLOC (Source Lines of Code):** Total number of lines of source code written in the project.

**DM (Development Months / Duration in Months):** Total time required to complete the project, measured in months.

**ST (Staffing / Required People):** Total number of people required to complete the project.

##### Project Estimation

Project Type: Organic

Were,

$P = 1.05$

$T = 0.38$

Coefficient = 2.4

$SLOC = 17,000$

Now,

$$PM = \text{Coefficient} <\text{Effort Factor}> * (SLOC / 1000) ^ P$$

$$= 2.4 * (17,000/1000) ^ 1.05$$

$$= 47.01$$

$$DM = 2.50 * (47.01) ^ 0.38$$

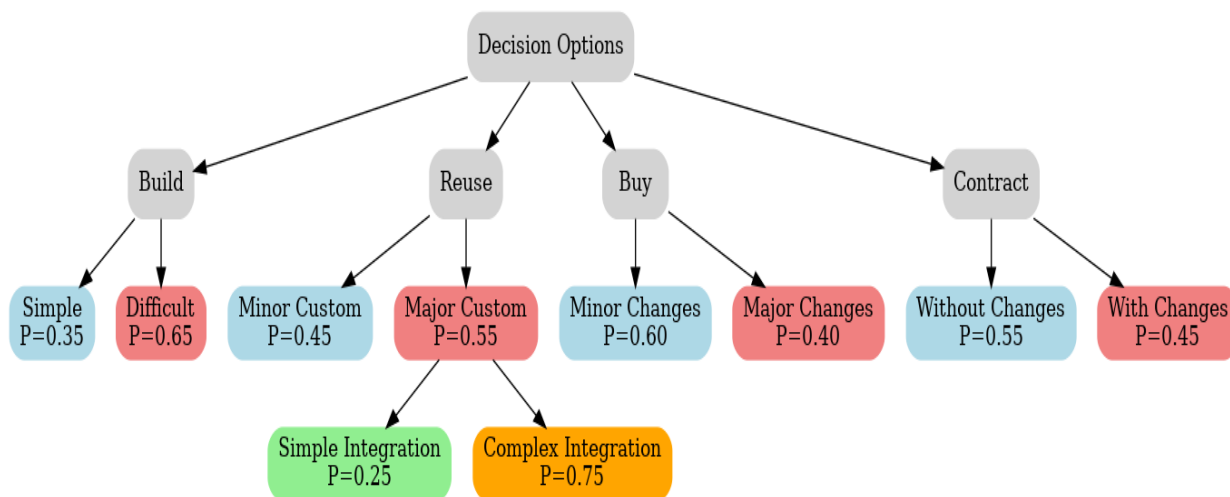
$$= 10.80 \approx 11(\text{week})$$

$$\text{Required number of people} = ST = PM / DM = 47.01 / 11 = 4.27 \approx 4$$

**Note:**

**Although the required number of people is approximately 4, to ensure better efficiency and timely completion, we will assign 5 people to the project.**

**Decision Tree for Budget Estimation of Development Options:**



## **Build**

Simple ( $P = 0.35$ )  $\rightarrow$  \$50,000

Complex ( $P = 0.65$ )  $\rightarrow$  \$120,000

## **Reuse**

Minor Customization ( $P = 0.45$ )  $\rightarrow$  \$30,000

Major Customization ( $P = 0.55$ ):

- Simple Change ( $P = 0.25$ )  $\rightarrow$  \$40,000
- Complex Change ( $P = 0.75$ )  $\rightarrow$  \$90,000

## **Buy**

Minor Change ( $P = 0.60$ )  $\rightarrow$  \$20,000

Major Change ( $P = 0.40$ )  $\rightarrow$  \$60,000

## **Contract**

Without Change ( $P = 0.55$ )  $\rightarrow$  \$15,000

With Change ( $P = 0.45$ )  $\rightarrow$  \$45,000

## **Expected Budget (Per Option)**

### **1. Build**

Expected (Build)  $= 0.35 \times 50,000 + 0.65 \times 120,000$

$= 17,500 + 78,000$

$= \$95,500$

## **Reuse**

First, calculate inside Major Custom:

$$(\text{Major Custom}) = 0.25 \times 40,000 + 0.75 \times 90,000 = 10,000 + 67,500 = 77,500$$

Then full Reuse:

$$\text{Expected (Reuse)} = 0.45 \times 30,000 + 0.55 \times 77,500$$

$$= 13,500 + 42,625$$

$$= \$56,125$$

## **Buy**

$$\text{Expected (Buy)} = 0.60 \times 20,000 + 0.40 \times 60,000$$

$$= 12,000 + 24,000$$

$$= \$36,000$$

## **Contract**

$$\text{Expected (Contract)} = 0.55 \times 15,000 + 0.45 \times 45,000$$

$$= 8,250 + 20,250$$

$$= \$28,500$$

## **Total Expected Budget**

$$\text{Total} = 95,500 + 56,125 + 36,000 + 28,500$$

$$= \$216,125$$

## 3.2 Project Scheduling

### Gantt Chart



The project is planned for a total duration of 11 weeks. All the main tasks and activities will be completed within the first 10 weeks, ensuring that every milestone and deliverable is achieved on time. The remaining 1 week will be kept as a buffer or extra time to handle any unexpected delays, revisions, or final checks. This approach ensures that the project stays on track while also maintaining flexibility for adjustments if needed.

## Workloads Distribution:

Category	Task/Project Name	Start Date	End Date	Assigned To
Project Initiation and Planning	Problem and Solution Identification	July 1, 2025	July 2, 2025	Full Team
Project Initiation and Planning	Selection of Development Methodology	July 3, 2025	July 3, 2025	Full Team
Project Initiation and Planning	Role Finalization	July 4, 2025	July 4, 2025	DibaJit Roy
Project Initiation and Planning	Initial Product Backlog Creation	July 5, 2025	July 6, 2025	Fahmida
Project Initiation and Planning	Tool and Environment Setup	July 7, 2025	July 7, 2025	Mithil
Requirement Analysis	Collect Functional and Non Functional Requirement	July 9, 2025	July 10, 2025	Nabib
Requirement Analysis	Draft User Stories	July 11, 2025	July 12, 2025	Nabib
Requirement Analysis	Backlog Prioritization	July 13, 2025	July 14, 2025	DibaJit Roy
System Design and Prototyping	Diagram(class,activity,sequence)	July 15, 2025	July 18, 2025	Fahmida Mithil
System Design and Prototyping	Prototype Design	July 19, 2025	July 21, 2025	Nabib DibaJit Roy
Project Estimation	Effort Estimation	July 22, 2025	July 23, 2025	Mithil
Project Estimation	Cost Estimation(Using COCOMO method)	July 24, 2025	July 26, 2025	Mithil
Development	Coding/Development	July 29, 2025	August 12, 2025	Full Team
Development	Testing	August 13, 2025	August 16, 2025	DibaJit Roy Fahmida
Quality Ensure	Unit and Integration Testing	August 19, 2025	August 22, 2025	Nabib
Quality Ensure	System Testing	August 23, 2025	August 25, 2025	Nabib DibaJit Roy
Quality Ensure	User Acceptance Testing	August 26, 2025	August 29, 2025	Fahmida Mithil
Maintenance and Documentation	Maintenance and Support	August 1, 2025	September 5, 2026	Full Team
Maintenance and Documentation	Documentation	July 1, 2025	August 31, 2025	Full Team

**Note:** In case of workload pressure, unexpected issues, or if specialized input is required, **Tonima** will act as an expert backup for tasks related to requirement analysis, system design, estimation, and testing.

**EVA Table (Planned vs Actual)**

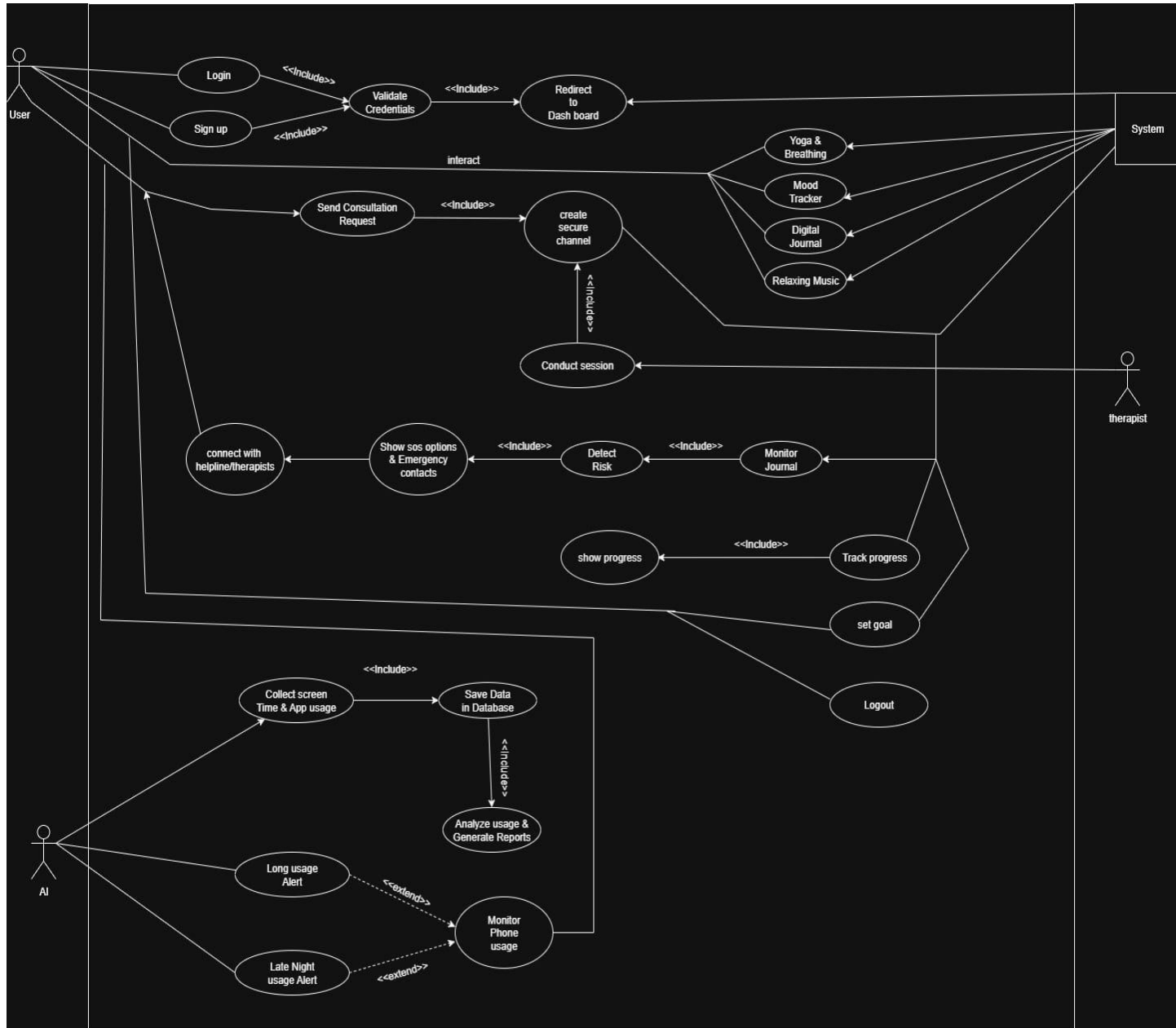
Total tasks = 21; completed = 19; tasks 20-21 incomplete.

Task	Planned Effort (person-days)	Actual Effort (person-days)
1	12.00	12.50
2	3.50	3.00
3	14.20	13.80
4	2.00	2.20
5	9.80	10.10
6	16.50	17.00
7	7.30	7.00
8	4.10	4.50
9	11.60	12.00
10	8.25	8.00
11	5.50	5.80
12	13.90	14.20
13	15.00	15.50
14	6.20	6.00
15	3.90	4.10
16	4.80	5.00
17	10.00	9.50
18	14.70	15.00
19	18.20	17.00
20	20.00	-
21	9.40	-
Total	210.85	182.20

## 4. SOFTWARE DESIGN

### 4.1 System Design

#### ❖ Use Case Diagram:

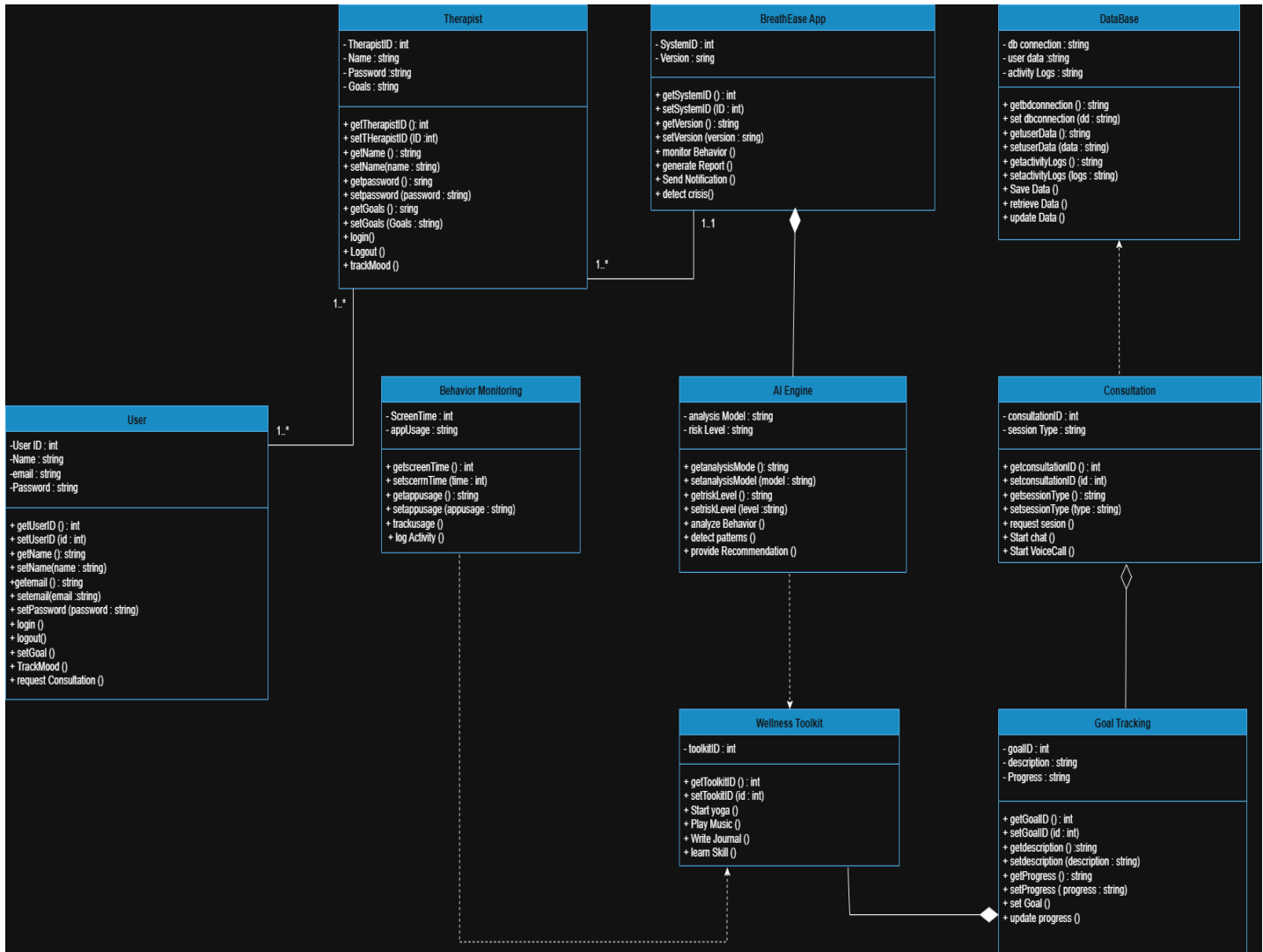


#### Description:

The diagram outlines the user interactions and system functions for a "BreathEase App". The main actors are the User and the Therapist. A User can register, manage their profile, track their mood, and book consultations. The app's core functionality, powered by an AI Engine, allows the system to monitor behavior, determine risk, and provide personalized recommendations to the user, who can also access a Wellness Toolkit. The Therapist can manage their own profile and view the user's data to provide support.



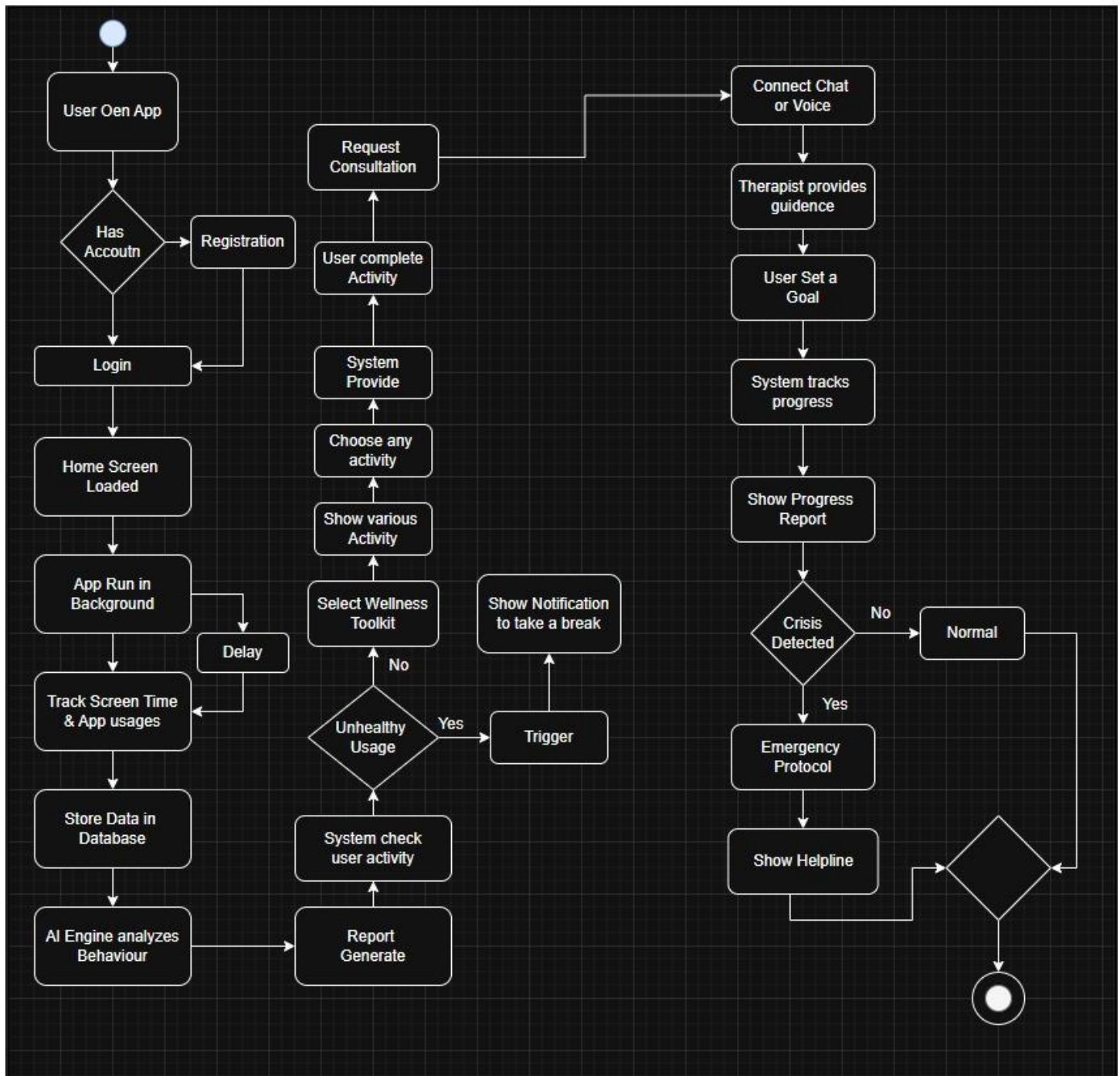
## ❖ Class Diagram:



## Description:

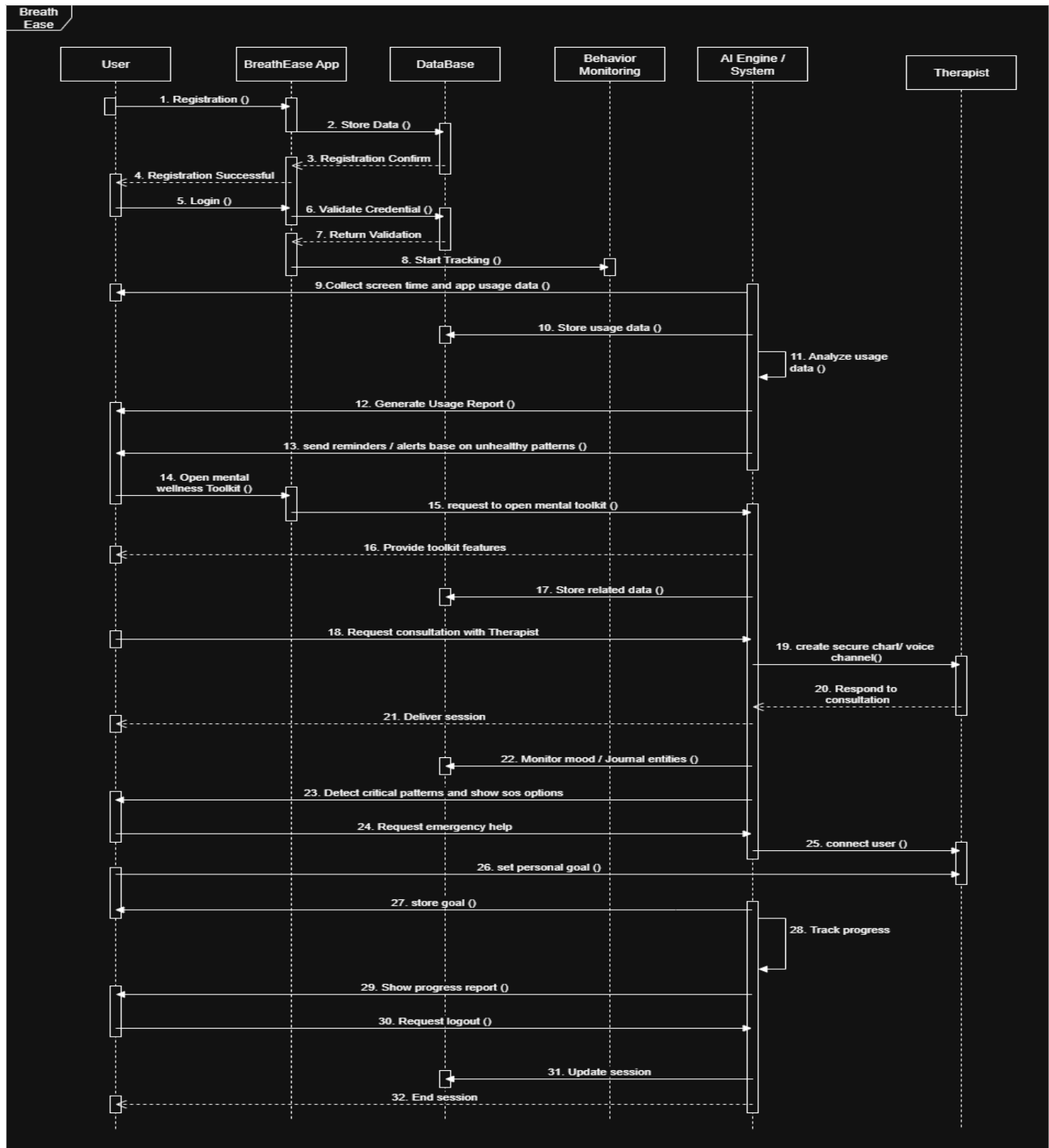
The diagram shows relationships like association (e.g., User to Behavior Monitoring, User to Wellness Toolkit), aggregation (e.g., Therapist to User), and dependency (e.g., AI Engine to Behavior Monitoring). The numbers (e.g., "1..\*", "1.1") indicate multiplicity, showing how many instances of one class can be related to instances of another. For instance, one User can be associated with multiple Behavior Monitoring records.

## ❖ Activity Diagram:



**Description:** The activity diagram shows how the BreathEase App supports users through AI monitoring and therapist consultation. After registration or login, the system tracks screen time, stores data, and analyzes behavior. If unhealthy usage is detected, notifications and wellness activities are provided. Users can request consultation, set goals with therapist guidance, and track progress. In case of crisis, the system triggers emergency protocols and displays the helpline; otherwise, users continue normally.

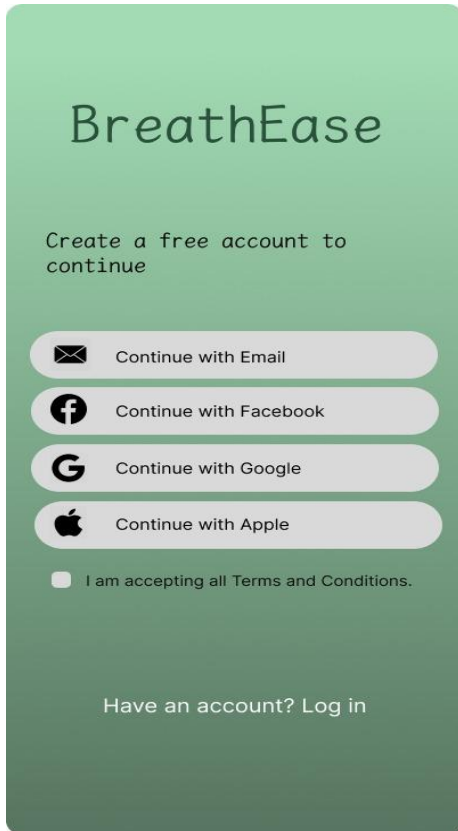
## ❖ Sequence Diagram:



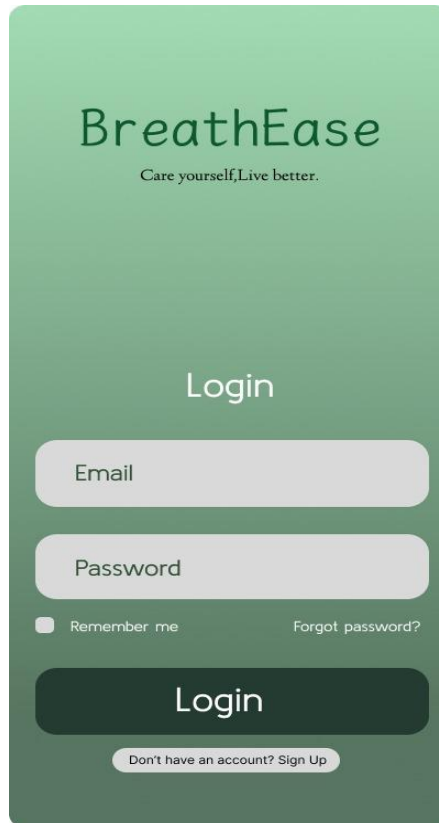
**Description:** The provided sequence diagram illustrates the chronological interactions between different components of the "BreathEase App" system. It details the flow of messages for key processes such as user registration, login, data tracking, and consultation initiation. For instance, a user's registration involves the app storing data in the database and receiving confirmation, followed by login validation. The AI Engine analyzes usage data to generate reports and send reminders, while users can access the wellness toolkit and request consultations, leading to sessions with therapists. The diagram visually represents how these elements work together over time to deliver the app's functionality.

## 4.2 UI / Wireframe Design

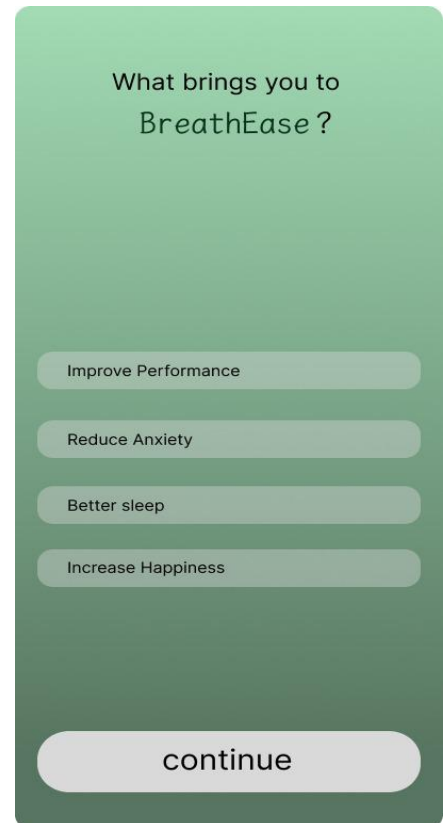
### UI Design (Figma):



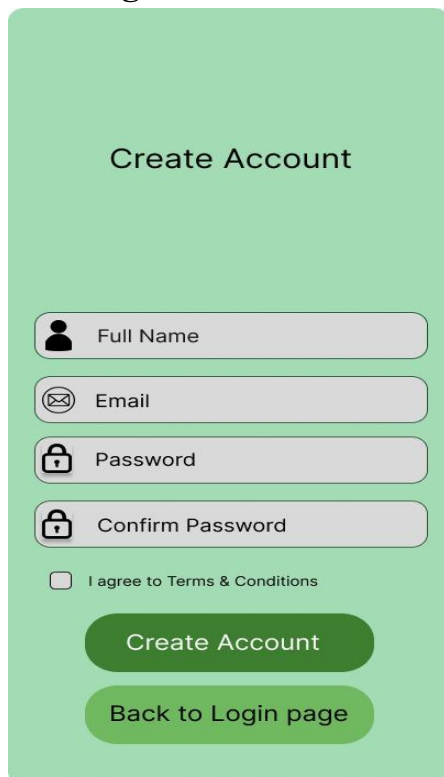
Page NO.1



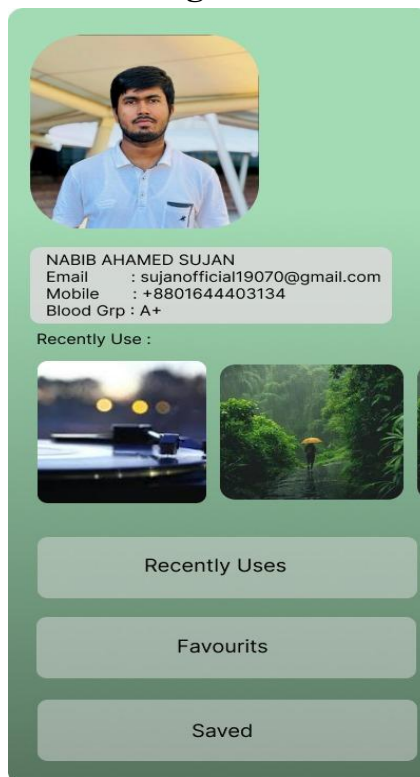
Page NO.2



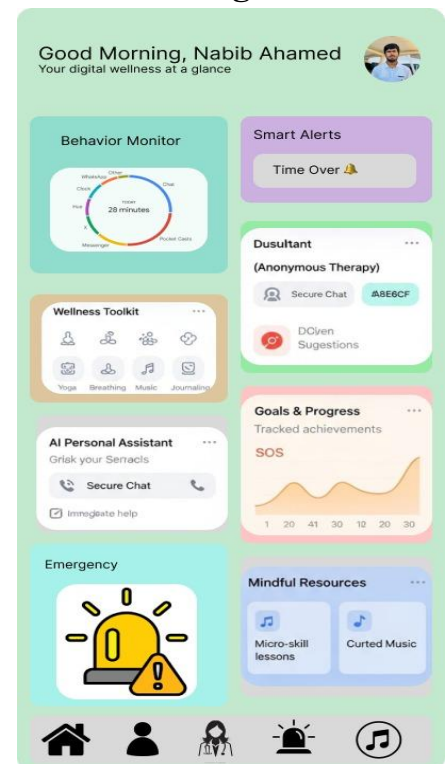
Page NO.3



Page No.4



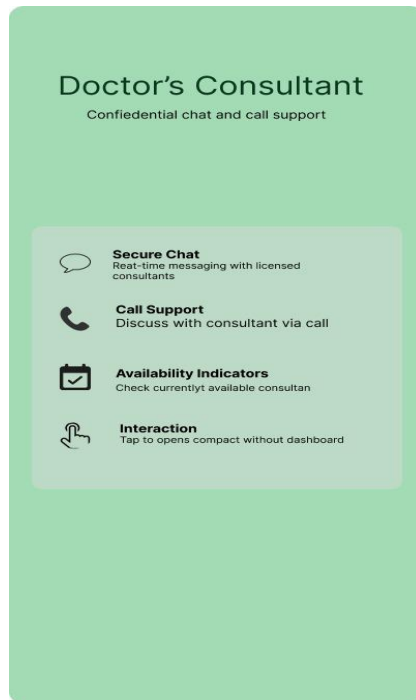
Page No.5



Page No.6



**Page NO.7**



**Page NO.8**

**BreathEase App – Page Flow Documentation:**

Page No.	Page Name	Description
1	Welcome / Sign Up Options	User can sign up using Email, Facebook, Google, or Apple.
2	Login	User enters Email and Password to access account.
3	User Goals	User selects goals like Improve Performance, Reduce Anxiety, Better Sleep, Increase Happiness.
4	Create Account	Form to create a new account with Full Name, Email, Password, and Confirm Password.
5	Profile	Displays user info, Recently Used, Favorites, and Saved items.
6	Dashboard	Main screen with Behavior Monitor, Smart Alerts, Wellness Tracker, AI Assistant, and Resources.
7	Behavior Monitor	Shows Daily Screen Time, App Usage Breakdown, Usage Trends, and Risk Warnings.

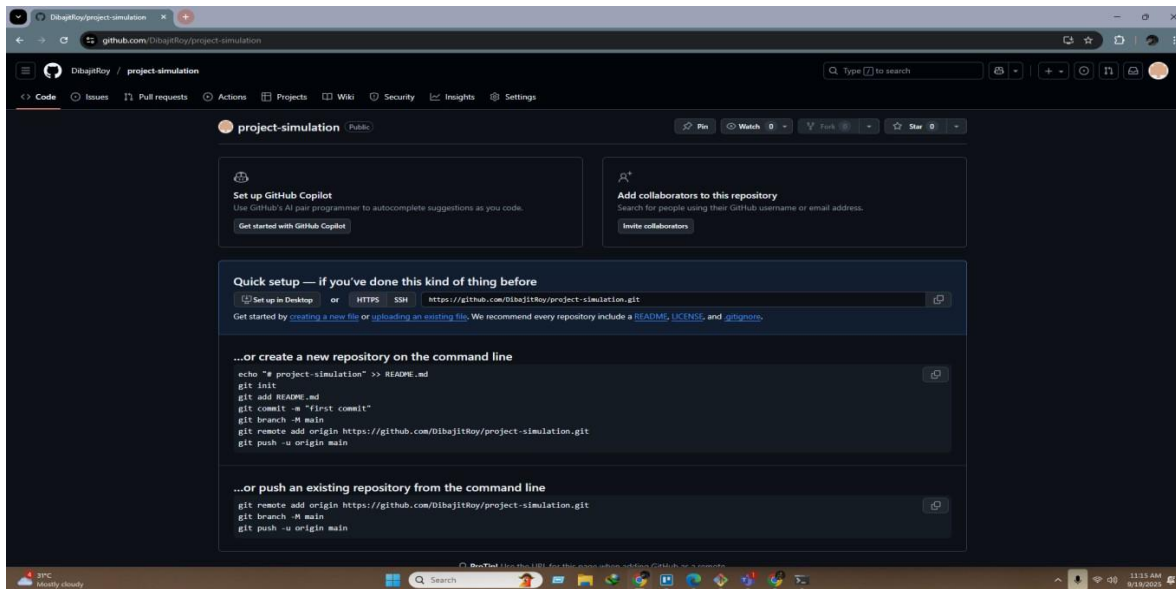
8

Doctor's Consultant

Provides Secure Chat, Call Support, Availability Indicators, and Intervention options.

## 5. GIT WORKFLOW

### Step 1: Create the Repository on GitHub/GitLab:



### Step 2: Initialize the Repository Locally and Create the Structure:

```
Windows PowerShell
d----- 12/31/2024 11:05 PM .dotnet
d----- 7/29/2023 8:42 PM .ms-nd
d----- 12/31/2024 11:10 PM .templateengine
d----- 7/14/2025 10:07 PM .VirtualBox
d----- 8/24/2021 8:31 PM 3D Objects
d----- 4/13/2023 8:15 PM analog
d----- 7/14/2025 8:37 PM Cisco Packet Tracer 8.2.2
d----- 2/1/2025 7:19 PM Contacts
d----- 9/8/2025 9:21 PM Documents
d----- 9/19/2025 1:36 AM Downloads
d----- 2/1/2025 7:19 PM Favorites
d----- 2/1/2025 7:19 PM Links
d----- 2/1/2025 7:19 PM Music
d----- 8/24/2021 8:38 PM OneDrive
d----- 9/19/2025 11:02 AM project-simulator
d----- 2/1/2025 7:19 PM Saved Games
d----- 3/28/2025 10:09 PM Searches
d----- 10/24/2024 11:29 PM source
d----- 9/19/2025 9:40 AM Videos
d----- 7/14/2025 9:15 PM VirtualBox VMs
-a----- 9/18/2025 11:45 PM 1816 bash_history
-a----- 9/8/2025 6:50 PM 18 gitconfig
-a----- 7/14/2025 8:35 PM 174 .packetracer

PS C:\Users\User> cd project-simulator
PS C:\Users\User\project-simulator> ls
PS C:\Users\User\project-simulator> git init
Initialized empty Git repository in C:\Users\User\project-simulator\.git\
PS C:\Users\User\project-simulator> echo "# Project Simulator" > README.md
PS C:\Users\User\project-simulator> echo "# ChangeLog" > CHANGELOG.md
PS C:\Users\User\project-simulator> echo "# Implemented Features" > PROJECT_FEATURES.md
PS C:\Users\User\project-simulator> git commit -m "chore: initial project setup and documentation"
On branch master
Initial commit
Untracked files:
  (use "git add <file>..." to include in what will be committed)
        CHANGELOG.md
        PROJECT_FEATURES.md
        README.md

nothing added to commit but untracked files present (use "git add" to track)
PS C:\Users\User\project-simulator> git add
PS C:\Users\User\project-simulator> git commit -m "chore: initial project setup and documentation"
[master (root-commit) e6d8998] chore: initial project setup and documentation
 3 files changed, 8 insertions(+), 0 deletions(-)
 create mode 100644 CHANGELOG.md
 create mode 100644 PROJECT_FEATURES.md
 create mode 100644 README.md
```



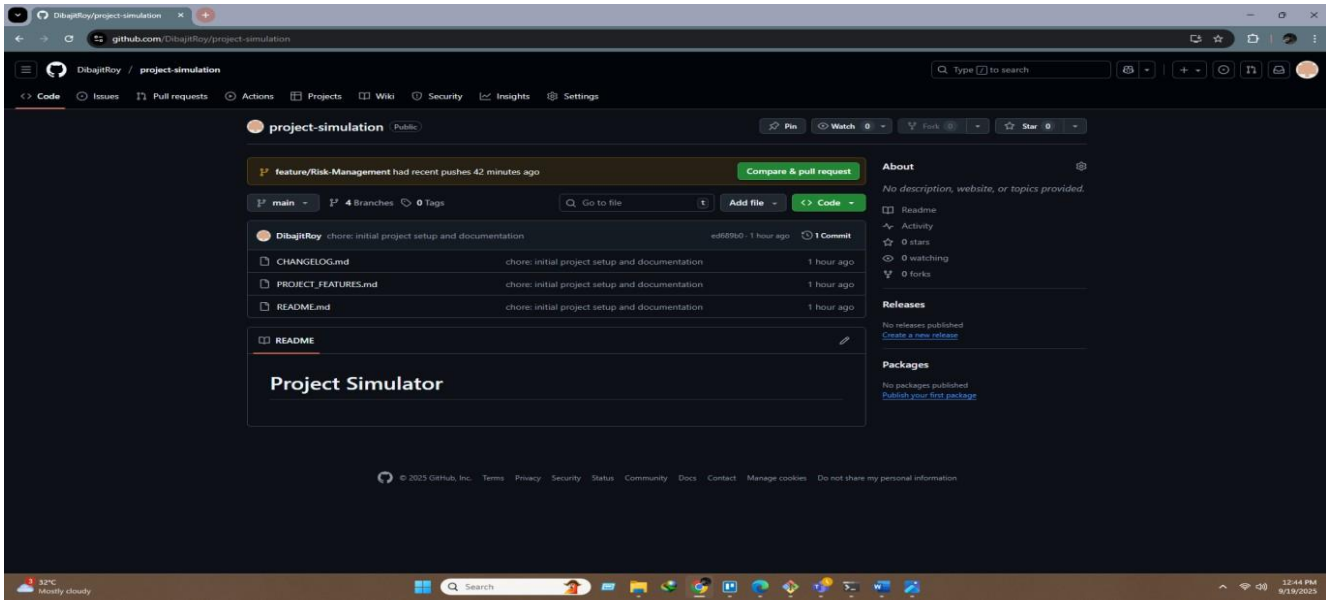
### Step 3: Rename the Default Branch and Create the Workflow Branches:

```
nothing added to commit but untracked files present (use "git add" to track)
PS C:\Users\User\project-simulator> git add .
PS C:\Users\User\project-simulator> git commit -m "chore: initial project setup and documentation"
[master (root-commit) add99a0] chore: initial project setup and documentation
3 files changed, 0 insertions(+), 0 deletions(-)
create mode 100644 CHANGELOG.md
create mode 100644 PROJECT_FEATURES.md
create mode 100644 README.md
PS C:\Users\User\project-simulator> git branch -m main
PS C:\Users\User\project-simulator> git branch dev
PS C:\Users\User\project-simulator> git branch stage
PS C:\Users\User\project-simulator> git branch
* main
  stage
PS C:\Users\User\project-simulator> git remote add origin https://github.com/DibajitRoy/project-simulation.git
PS C:\Users\User\project-simulator> git push -u origin main
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (5/5), 444 bytes | 444.00 KiB/s, done.
Total 5 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/DibajitRoy/project-simulation.git
* [new branch] main -> main
branch 'main' set up to track 'origin/main'.
PS C:\Users\User\project-simulator> git push -u origin dev
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'dev' on GitHub by visiting:
remote:   https://github.com/DibajitRoy/project-simulation/pull/new/dev
remote:
To https://github.com/DibajitRoy/project-simulation.git
* [new branch] dev -> dev
branch 'dev' set up to track 'origin/dev'.
PS C:\Users\User\project-simulator> git push -u origin stage
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'stage' on GitHub by visiting:
remote:   https://github.com/DibajitRoy/project-simulation/pull/new/stage
remote:
To https://github.com/DibajitRoy/project-simulation.git
* [new branch] stage -> stage
branch 'stage' set up to track 'origin/stage'.
PS C:\Users\User\project-simulator> git checkout main
Already on 'main'
Your branch is up to date with 'origin/main'.
PS C:\Users\User\project-simulator> git checkout dev
Switched to branch 'dev'
Your branch is up to date with 'origin/dev'.
```

### Step 4: Connect the Local Repository to the Remote and Push All Branches:

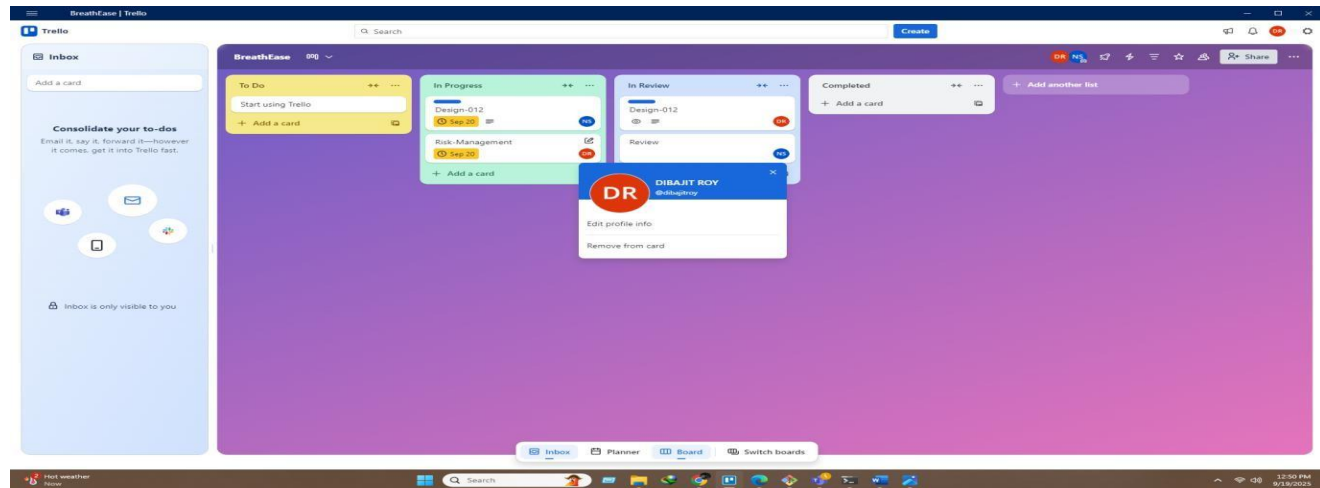
```
PS C:\Users\User\project-simulator> git remote add origin https://github.com/DibajitRoy/project-simulation.git
PS C:\Users\User\project-simulator> git push -u origin main
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (5/5), 444 bytes | 444.00 KiB/s, done.
Total 5 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
To https://github.com/DibajitRoy/project-simulation.git
* [new branch] main -> main
branch 'main' set up to track 'origin/main'.
PS C:\Users\User\project-simulator> git push -u origin dev
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'dev' on GitHub by visiting:
remote:   https://github.com/DibajitRoy/project-simulation/pull/new/dev
remote:
To https://github.com/DibajitRoy/project-simulation.git
* [new branch] dev -> dev
branch 'dev' set up to track 'origin/dev'.
PS C:\Users\User\project-simulator> git push -u origin stage
Total 0 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'stage' on GitHub by visiting:
remote:   https://github.com/DibajitRoy/project-simulation/pull/new/stage
remote:
To https://github.com/DibajitRoy/project-simulation.git
* [new branch] stage -> stage
branch 'stage' set up to track 'origin/stage'.
PS C:\Users\User\project-simulator> git checkout main
Already on 'main'
Your branch is up to date with 'origin/main'.
PS C:\Users\User\project-simulator> git checkout dev
Switched to branch 'dev'
Your branch is up to date with 'origin/dev'.
```

## Step 5: Verify Success:



## Step 6: Feature Development Simulation Workflow On GitHub:

6.1



6.2

```
Your branch is up to date with 'origin/main'.
PS C:\Users\User\project-simulator> git checkout dev
Switched to branch 'dev'
Your branch is up to date with 'origin/dev'.
PS C:\Users\User\project-simulator> git pull origin dev
From https://github.com/DibajitRoy/project-simulation
 * branch      dev       -> FETCH_HEAD
Already up to date.
PS C:\Users\User\project-simulator> git checkout -b feature/Risk-Management
Switched to a new branch 'feature/Risk-Management'
PS C:\Users\User\project-simulator>
PS C:\Users\User\project-simulator>
PS C:\Users\User\project-simulator> echo "## Risk-Management: add risk management section" >> PROJECT_FEATURES.md
PS C:\Users\User\project-simulator> echo "This task involves documenting the project risk and mitigation strategies" >> PROJECT_FEATURES.md
PS C:\Users\User\project-simulator> echo "##Status: Implemented##" >> PROJECT_FEATURES.md
PS C:\Users\User\project-simulator> echo "" >> PROJECT_FEATURES.md
PS C:\Users\User\project-simulator>
PS C:\Users\User\project-simulator> git add PROJECT_FEATURES.md
PS C:\Users\User\project-simulator> git commit -m "Feat: add risk management section (Risk-Management)"
[feature/Risk-Management 7ba7b2d] feat: add risk management section (Risk-Management)
1 file changed, 0 insertions(+), 0 deletions(-)
PS C:\Users\User\project-simulator> git push -u origin feature/Risk-Management
Enumerating objects: 0, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 527 bytes | 527.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature/Risk-Management' on GitHub by visiting:
remote:   https://github.com/DibajitRoy/project-simulation/pull/new/feature/Risk-Management
remote:
To https://github.com/DibajitRoy/project-simulation.git
 * [new branch]      feature/Risk-Management -> feature/Risk-Management
branch 'feature/Risk-Management' set up to track 'origin/feature/Risk-Management'.
PS C:\Users\User\project-simulator>
```



6.3

```
PS C:\Users\User\project-simulator>
PS C:\Users\User\project-simulator> echo "## Risk-Management: add risk management section" >> PROJECT_FEATURES.md
PS C:\Users\User\project-simulator> echo "This task involves documenting the project risk and mitigation strategies" >> PROJECT_FEATURES.md
PS C:\Users\User\project-simulator> echo "**Status: Implemented**" >> PROJECT_FEATURES.md
PS C:\Users\User\project-simulator> echo "" >> PROJECT_FEATURES.md
PS C:\Users\User\project-simulator>
PS C:\Users\User\project-simulator> git add PROJECT_FEATURES.md
PS C:\Users\User\project-simulator> git commit -m "feat: add risk management section (Risk-Management)"
[feature/Risk-Management 7ba7b2d] feat: add risk management section (Risk-Management)
1 file changed, 0 insertions(+), 0 deletions(-)
PS C:\Users\User\project-simulator> git push -u origin feature/Risk-Management
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 12 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 527 bytes | 527.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'feature/Risk-Management' on GitHub by visiting:
remote:   https://github.com/DibajitRoy/project-simulation/pull/new/feature/Risk-Management
remote:
To https://github.com/DibajitRoy/project-simulation.git
 * [new branch]      feature/Risk-Management -> feature/Risk-Management
branch 'feature/Risk-Management' set up to track 'origin/feature/Risk-Management'.
PS C:\Users\User\project-simulator> |
```

Verify

```
PS C:\Users\User> git config user.name
DibajitRoy
PS C:\Users\User> git config user.email
dibajit.2003@gmail.com
PS C:\Users\User> git config --list
diff.astextplain.textconv=astextplain
filter.lfs.clean=git-lfs clean -- %f
filter.lfs.smudge=git-lfs smudge -- %f
filter.lfs.process=git-lfs filter-process
filter.lfs.required=true
http.sslbackend=schannel
core.autocrlf=true
core.fsmonitor=true
core.symlinks=false
pull.rebase=false
credential.helper=manager
init.defaultbranch=master
user.email=dibajit.2003@gmail.com
user.name=DibajitRoy
core.repositoryformatversion=0
core.filemode=false
core.bare=false
core.logallrefupdates=true
core.symlinks=false
core.ignorecase=true
remote.origin.url=https://github.com/DibajitRoy/BreathEase-project.git
remote.origin.fetch=refs/heads/*:refs/remotes/origin/*
branch.main.remote=origin
branch.main.merge=refs/heads/main
PS C:\Users\User> |
```

6. TESTING

Project Name: BreathEase			Test Designed by: Dibajit Roy	
Test Case ID: TC_01			Test Designed date: 29/07/2025	
Test Priority (Low, Medium, High): Medium			Test Executed by: MST. Fahmida Zaman	
Module Name: Welcome / Sign Up Options			Test Execution date: 23/08/2025	
Test Title: Verify sign-up using Email, Facebook, Google, or Apple				
Description: Ensure users can sign up through different available options.				
Precondition: App installed, internet available.				
Dependencies: OAuth services (Google, Facebook, Apple).				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)

1. Open BreathEase app. 2. Click “Sign Up with Email” 3. Click “Sign Up with Google”. 4. Click “Sign Up with Facebook”. 5. Click “Sign Up with Apple”	1. Email: <a href="mailto:test@gmail.com">test@gmail.com</a> Password: 12345 2.Valid Google account 3. Valid Facebook account 4.Valid Apple ID	1.Welcome page loads 2.Redirects to Create Account 3.Logs in successfully 4. Logs in successfully 5. Logs in successfully	As expected	Pass
---	--	---	-------------	------

Project Name: BreathEase		Test Designed by: Nabib		
Test Case ID: TC_02		Test Designed date: 1/08/2025		
Test Priority (Low, Medium, High): High		Test Executed by: MST. Fahmida Zaman		
Module Name: Login		Test Execution date: 24/08/2025		
Test Title: Verify login with valid and invalid credentials.				
Description: Verify login functionality				
Precondition: User has a registered account				
Dependencies: Database availability.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Enter valid email & password.  2. Enter wrong password  3. Leave fields blank	1 .Email: <a href="mailto:test@mail.com">test@mail.com</a> Password: 12345 2. Email: test@mail.com, Pass: wrong	1.Logs in successfully  2. Error message  3. Validation error shown	As expected	Pass

<b>Project Name:</b> BreathEase		<b>Test Designed by:</b> Dibajit Roy	
<b>Test Case ID:</b> TC_03		Test Designed date: 03/08/2025	
<b>Test Priority (Low, Medium, High):</b> Medium		Test Executed by: MST. Fahmida Zaman	

<b>Module Name:</b> User Goals			Test Execution date: 25/08/2025	
<b>Test Title:</b> Verify user goal selection				
<b>Description:</b> Ensure users can select and save personal goals.				
<b>Precondition:</b> User logged in.				
<b>Dependencies:</b> Database must be available.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Navigate to Goals page  2. Select “Improve Performance”  3. Save selection	1. Option chosen  2. Save button clicked	1. Goals page loads  2. Goal selected  3. Goal saved and reflected in dashboard	As expected	Pass

<b>Project Name:</b> BreathEase			<b>Test Designed by:</b> Dibajit Roy, Nabib	
<b>Test Case ID:</b> TC_04			Test Designed date: 5/08/2025	
<b>Test Priority (Low, Medium, High):</b> High			Test Executed by: MST. Fahmida Zaman	
<b>Module Name:</b> Create Account			Test Execution date: 26/08/2025	
<b>Test Title:</b> Verify account creation				
<b>Description:</b> Verify account creation with valid details.				
<b>Precondition:</b> User not yet registered.				
<b>Dependencies:</b> Email must be unique.				
<b>Test Steps</b>	<b>Test Data</b>	<b>Expected Results</b>	<b>Actual Results</b>	<b>Status (Pass/Fail)</b>

1. Enter Full Name, Email, Password, Confirm Password 2. Click Submit 3. Enter existing email	1. Name: Alex, Email: alex@test.com, Pass: 12345 2. Valid data 3. Email already used	1. Data accepted 2. Account created and stored in DB 3. Error message displayed	As expected	Pass
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Project Name: BreathEase		Test Designed by: Nabib		
Test Case ID: TC_05		Test Designed date: 07/08/2025		
Test Priority (Low, Medium, High): Medium		Test Executed by: Dibajit Roy		
Module Name: Profile		Test Execution : 27/08/2025		
Test Title: Verify profile view and update				
Description: Ensure users can view and update their profile.				
Precondition: User logged in.				
Dependencies: Database must store changes				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Open Profile page 2. Edit information 3. Save changes	1. Update Name, Favorites 2. Save button	1. Profile details shown  2. Info editable  3. Profile updated successfully	As expected	Pass

<b>Project Name:</b> BreathEase		<b>Test Designed by:</b> Dibajit Roy		
<b>Test Case ID:</b> TC_06		Test Designed date: 10/08/2025		
<b>Test Priority (Low, Medium, High):</b> High		Test Executed by: MST. Fahmida Zaman		
<b>Module Name:</b> Dashboard		Test Execution date: 29/08/2025		
<b>Test Title:</b> Verify dashboard loading and features				

<b>Description:</b> Ensure dashboard loads and shows all modules.				
<b>Precondition:</b> User logged in.				
<b>Dependencies:</b> All modules integrated				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1.Login and navigate to Dashboard 2.Check Behavior Monitor section 3.Check Smart Alerts 4.Check Wellness Toolkit		1. Dashboard loads 2. Shows screen time & app usage 3. Alerts displayed 4. Tools accessible	As expected	Pass

<b>Project Name:</b> BreathEase		<b>Test Designed by:</b> Nabib		
<b>Test Case ID:</b> TC_07		Test Designed date: 11/08/2025		
<b>Test Priority (Low, Medium, High):</b> High		Test Executed by: Tonima		
<b>Module Name:</b> Behavior Monitor		Test Execution date: 29/08/2025		
<b>Test Title:</b> Verify behavior monitoring				
<b>Description:</b> Ensure screen time and app usage are tracked correctly				
<b>Precondition:</b> User granted permission				
<b>Dependencies:</b> Device activity tracking enabled				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Grant tracking permission 2. Use apps for 2 hours 3. Check dashboard	1.Yes 2. Facebook, YouTube	1. Permission accepted 2. Screen time recorded 3. Usage breakdown shown	As expected	Pass

<b>Project Name:</b> BreathEase		<b>Test Designed by:</b> Dibajit Roy	
<b>Test Case ID:</b> TC_08		Test Designed date: 12/07/2025	

<b>Test Priority (Low, Medium, High): High</b>		Test Executed by: MST.Fahmida Zaman,Tonima		
<b>Module Name:</b> Doctor’s Consultant		Test Execution date: 30/08/2025		
<b>Test Title:</b> Verify secure consultation				
<b>Description:</b> Ensure users can securely chat/call with therapist				
<b>Precondition:</b> Internet connection required				
<b>Dependencies:</b> Therapist available online.				
Test Steps	Test Data	Expected Results	Actual Results	Status (Pass/Fail)
1. Navigate to Consultant page 2. Start chat with therapist 3. Call therapist	1. Message: “Hello” 2. Voice call	1. Page loads 2. Chat established 3. Call connected securely	As expected	Pass

## 7. SOFTWARE PRODUCT METRICS

### 1. Function-based Metrics (Function Points)

The functionality delivered by BreathEase is evaluated using the Function Point (FP) approach. The following countable measures were identified from the project features:

Element	Count
External Inputs (EIs)	4
External Outputs (EOs)	4
Internal Logical Files (ILFs)	3
External Interface Files (EIFs)	2
External Inquiries (EQs)	2

Total FP counts (raw) = 15. This indicates a moderately sized system delivering diverse functionalities such as input logging, alert generation, file storage, external API integration, and information queries.

## 2. Object-Oriented and Class Metrics

BreathEase follows an object-oriented design, where classes are defined for modules like Tracker, AlertSystem, MusicModule, YogaModule, Consultation, etc. The design quality is evaluated using OO metrics:

- **Weighted Methods per Class (WMC):** Each major class contains 5–8 methods on average. Assuming 8 classes, total methods 52. WMC 6.5 per class moderate complexity.
- **Depth of Inheritance Tree (DIT):** Inheritance depth is shallow (max depth = 2). This indicates limited complexity and easier maintainability.
- **Number of Children (NOC):** Two base classes (e.g., UIComponent, ServiceModule) have 2–3 subclasses each.  $NOC \approx 2-3$ , showing manageable class hierarchies.
- **Coupling Between Classes (CBC):** Average coupling per class 3, as most modules interact with Tracker or UserProfile. Coupling is moderate.
- **Lack of Cohesion in Methods (LCOM):** Most classes group related methods (e.g., YogaModule contains yoga sessions only). LCOM is low, indicating high cohesion.

## 3. Operation-oriented Metrics

Operations (methods) were evaluated to estimate size, complexity, and parameters:

- **Average Operation Size:** Each operation has 15–25 lines of code. Average 20 LOC per operation.
- **Operation Complexity:** Complexity measured via control structures is moderate. Typical methods have decision depth of 2–3, indicating low-to-medium complexity.
- **Average Number of Parameters per Operation:** Most methods take 1–2 parameters. Average 1.5 parameters per operation.

## 4. Maintenance Metrics (Software Maturity Index)

The Software Maturity Index (SMI) measures stability across updates. For the current release of BreathEase:

Assume:  $MT = 10$  modules,  $Fa = 1$  (new meditation module),  $Fc = 2$  (changed social media monitor, consultation),  $Fd = 1$  (skill dev removed).

Formula:  $SMI = [MT - (Fa + Fc + Fd)] / MT$

$$= [10 - (1+2+1)] / 10 = 6 / 10 = 0.6$$

SMI = 0.6, which is near 1.0, indicating stability with ongoing changes.

## 8. CONCLUSION

The BreathEase project shows how technology can be used positively to improve mental health and digital habits. By tracking user behavior, giving smart alerts, and offering tools like yoga, breathing exercises, mood tracking, and anonymous consultation, the app works as a complete digital wellness assistant. We used the Scrum model to build the system step by step, tested all main features, and made sure they work as expected. The results prove that BreathEase is useful, user-friendly, and effective in reducing stress, anxiety, and digital addiction.

## 9. FUTURE WORK

1. Although the project is complete, there are many areas to improve in the future:
2. Add more advanced AI features to better understand user emotions.
3. Connect with wearable devices (smartwatches, fitness bands) for health tracking.
4. Use gamification (rewards, challenges) to keep users engaged.
5. Provide support in multiple languages and cultures.
6. Work with mental health professionals for more accurate advice.
7. Improve scalability and cloud security to support more users.
8. Use anonymized data for research and future development.
9. With these improvements, BreathEase can become a more powerful, reliable, and widely used solution for stress and anxiety management.

Used Apps:

For PRD & documentation: <https://www.notion.com/>

For Wireframe & clickable prototype: <https://www.figma.com/>

For version control: <https://github.com/>

For Task Management: <https://trello.com/>

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