

# Mental Fitness App Database

A Relational Schema for Cognitive Training and Mental Wellness

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Tool used: pgAdmin, DBeaver, PostgreSQL

Description: This project is a relational database created for a cognitive training and mental fitness application. User management, device tracking, training modules, exercises, guided meditation sessions, mood logging, mental health evaluations, AI-based content recommendations, in-app purchases, and clinical study participation are among its essential features.

The database is designed to guarantee data integrity, scalability, and analytics-readiness, which qualifies it for production use in applications that track user progress, promote mental wellness, and train the brain.

## 1. Users

Column Name	Data Type	Constraints	Description
user_id	SERIAL	PRIMARY KEY	Unique user identifier
name	VARCHAR(100)	NOT NULL	Full name of the user
email	VARCHAR(100)	UNIQUE	User's email address
age	INT	CHECK (18-120)	Age of the user
gender	VARCHAR(15)		Gender identity
join_date	DATE	NOT NULL	Date of joining
status	VARCHAR(20)	DEFAULT 'active', CHECK(...)	Account status (active, etc.)

## 2. Devices

Column Name	Data Type	Constraints	Description
device_id	SERIAL	PRIMARY KEY	Unique device ID
user_id	INT	FOREIGN KEY → Users(user_id)	Owner of the device
device_type	VARCHAR(50)	NOT NULL	Mobile, Tablet, etc.
os_version	VARCHAR(50)		OS version (e.g., Android 14)
app_version	VARCHAR(50)		App version installed
last_active	TIMESTAMP	DEFAULT CURRENT_TIMESTAMP	Last activity on the device

## 3. TrainingModules

Column Name	Data Type	Constraints	Description
module_id	SERIAL	PRIMARY KEY	Unique module ID
module_name	VARCHAR(100)	NOT NULL	Name of the training module
category	VARCHAR(50)	NOT NULL	Type like Memory, Focus
difficulty_level	VARCHAR(20)	DEFAULT 'Beginner', CHECK(...)	Difficulty level
is_active	BOOLEAN	DEFAULT TRUE	Whether the module is live

## 4. Exercises

Column Name	Data Type	Constraints	Description
exercise_id	SERIAL	PRIMARY KEY	Unique ID
module_id	INT	FOREIGN KEY → TrainingModules	Parent training module
exercise_name	VARCHAR(100)	NOT NULL	Exercise title
version	INT	DEFAULT 1	Versioning for updates
instructions	TEXT	NOT NULL	Description of the activity
is_active	BOOLEAN	DEFAULT TRUE	Visibility in app

## 5. Sessions

Column Name	Data Type	Constraints	Description
session_id	SERIAL	PRIMARY KEY	Unique session ID
user_id	INT	FOREIGN KEY → Users	User involved in session
module_id	INT	FOREIGN KEY → TrainingModules	Training module in use
session_type	VARCHAR(20)	DEFAULT 'training', CHECK(...)	Type: training, meditation, etc.
start_time	TIMESTAMP	DEFAULT CURRENT_TIMESTAMP	When session began
end_time	TIMESTAMP		When session ended

## 6. MoodLogs

Column Name	Data Type	Constraints	Description
log_id	SERIAL	PRIMARY KEY	Unique mood entry ID
user_id	INT	FOREIGN KEY → Users	Who logged the mood
mood_level	INT	CHECK (1-10)	Mood on a scale of 1-10
note	TEXT		Optional user comment
log_date	DATE	DEFAULT CURRENT_DATE	Date of entry

## 7. Assessments

Column Name	Data Type	Constraints	Description
assessment_id	SERIAL	PRIMARY KEY	Unique test ID
name	VARCHAR(100)	NOT NULL	Name like PHQ-9
description	TEXT		Purpose of the assessment
num_questions	INT	CHECK (> 0)	Total questions in test

## 8. AssessmentResults

Column Name	Data Type	Constraints	Description
result_id	SERIAL	PRIMARY KEY	Unique result ID
user_id	INT	FOREIGN KEY → Users	Person who took it
assessment_id	INT	FOREIGN KEY → Assessments	Which test it was
score	INT	CHECK (>= 0)	Result score
taken_on	DATE	DEFAULT CURRENT_DATE	Date of completion

## 9. AIRecommendations

Column Name	Data Type	Constraints	Description
rec_id	SERIAL	PRIMARY KEY	Unique recommendation ID
user_id	INT	FOREIGN KEY → Users	Who receives recommendation
recommended_module	INT	FOREIGN KEY → TrainingModules	Suggested module
reason	TEXT	NOT NULL	Reason for recommendation
generated_on	DATE	DEFAULT CURRENT_DATE	Date created

## 10. InAppPurchases

Column Name	Data Type	Constraints	Description
purchase_id	SERIAL	PRIMARY KEY	Unique purchase ID
user_id	INT	FOREIGN KEY → Users	Buyer
product_ref	INT	FOREIGN KEY → Products	Product bought
amount	NUMERIC(10,2)	CHECK (>= 0)	Price paid
purchase_date	DATE	DEFAULT CURRENT_DATE	Date of purchase
platform	VARCHAR(20)	CHECK ('iOS', 'Android', 'Web')	Purchase platform

# 11. Products

Column Name	Data Type	Constraints	Description
product_id	SERIAL	PRIMARY KEY	Unique product ID
product_name	VARCHAR(100)	NOT NULL	Name of the product
product_type	VARCHAR(30)	CHECK (IN list), NOT NULL	Type: Subscription, One-time
price	NUMERIC(10,2)	CHECK (>= 0), NOT NULL	Product price
currency	VARCHAR(10)	DEFAULT 'USD'	Currency
platform	VARCHAR(20)	DEFAULT 'Cross-platform'	Supported platform
duration_days	INT		Validity period (subscriptions)
status	VARCHAR(20)	DEFAULT 'active', CHECK (IN list)	Product availability
created_on	DATE	DEFAULT CURRENT_DATE	Product creation date

# 12. ExerciseResults

Column Name	Data Type	Constraints	Description
result_id	SERIAL	PRIMARY KEY	Unique result ID
session_id	INT	FOREIGN KEY → Sessions	Related session
exercise_id	INT	FOREIGN KEY → Exercises	Related exercise
score	INT	CHECK (>= 0)	Score achieved
accuracy_percent	NUMERIC(5,2)	CHECK (0–100)	Accuracy in percentage
reaction_time_ms	INT	CHECK (>= 0)	Reaction time in milliseconds

# 13. MeditationSessions

Column Name	Data Type	Constraints	Description
meditation_id	SERIAL	PRIMARY KEY	Unique meditation ID
user_id	INT	FOREIGN KEY → Users	Person who meditated
duration_minutes	INT	CHECK (> 0)	Duration of session
mood_before	VARCHAR(20)		Mood before meditation
mood_after	VARCHAR(20)		Mood after meditation
session_date	DATE	DEFAULT CURRENT_DATE	Date of the meditation

# 14. ExerciseVersions

Column Name	Data Type	Constraints	Description
version_id	SERIAL	PRIMARY KEY	Unique version ID
exercise_id	INT	FOREIGN KEY → Exercises	Related exercise
version_num	INT	NOT NULL	Version number
change_summary	TEXT		Description of changes
updated_on	DATE	DEFAULT CURRENT_DATE	Date of update

# 15. MeditationVersions

Column Name	Data Type	Constraints	Description
version_id	SERIAL	PRIMARY KEY	Unique version ID
meditation_id	INT	FOREIGN KEY → MeditationSessions	Related meditation session
version_num	INT	NOT NULL	Version number
change_summary	TEXT		What was changed
updated_on	DATE	DEFAULT CURRENT_DATE	Update date

## 16. ClinicalStudies

Column Name	Data Type	Constraints	Description
study_id	SERIAL	PRIMARY KEY	Unique study ID
title	VARCHAR(100)	NOT NULL	Study title
description	TEXT		Description of the study
start_date	DATE	NOT NULL	Start date of study
end_date	DATE		Optional end date

## 17. StudyParticipants

Column Name	Data Type	Constraints	Description
study_id	INT	FOREIGN KEY → ClinicalStudies	Study ID
user_id	INT	FOREIGN KEY → Users	Participating user
consented_on	DATE	DEFAULT CURRENT_DATE	Date of consent
PRIMARY KEY	(study_id, user_id)	Composite primary key	Unique per study-user pair

Entity Relationships:

Child Table	Foreign Key Column	Parent Table	Primary Key Referenced	Relationship Description
Devices	user_id	Users	user_id	Each device is assigned to a user
Exercises	module_id	TrainingModules	module_id	Exercises belong to a training module
Sessions	user_id	Users	user_id	A session is linked to a user
Sessions	module_id	TrainingModules	module_id	Each session involves a training module
ExerciseResults	session_id	Sessions	session_id	Results are linked to a specific session
ExerciseResults	exercise_id	Exercises	exercise_id	Results are for a specific exercise
MeditationSessions	user_id	Users	user_id	Meditation logs are user-specific
MoodLogs	user_id	Users	user_id	Mood logs are recorded by users
AssessmentResults	user_id	Users	user_id	Assessment results belong to users
AssessmentResults	assessment_id	Assessments	assessment_id	Results refer to a particular assessment
AIRecommendations	user_id	Users	user_id	Recommendations are made for users
AIRecommendations	recommended_module	TrainingModules	module_id	AI recommends modules
InAppPurchases	user_id	Users	user_id	Each purchase is made by a user
InAppPurchases	product_ref	Products	product_id	Refers to a purchased product
ExerciseVersions	exercise_id	Exercises	exercise_id	Versioning data for exercises
MeditationVersions	meditation_id	MeditationSessions	meditation_id	Versioning data for meditations
StudyParticipants	user_id	Users	user_id	Users who have opted into studies
StudyParticipants	study_id	ClinicalStudies	study_id	Links user participation to a study

- Users → Devices, Sessions, MoodLogs, MeditationSessions, InAppPurchases, AssessmentResults, AIRecommendations, StudyParticipants
- TrainingModules → Exercises, Sessions, AIRecommendations
- Sessions → ExerciseResults
- Exercises → ExerciseResults, ExerciseVersions
- MeditationSessions → MeditationVersions
- Products → InAppPurchases
- Assessments → AssessmentResults
- ClinicalStudies → StudyParticipants