

Phase III – Logical Model Design

Project Title: Daily Habit and Goal Alarm System

1. Entities and Attributes

This phase presents a fully normalized **Logical Data Model** designed to support all core functionalities identified in Phases I and II. The model defines entities, their relationships, constraints, and normalization principles.

1.1. User

| Attribute | Type | Description |
|------------|--------------|-------------------------------|
| user_id | INT (PK) | Unique ID for each user |
| username | VARCHAR(50) | User's login name |
| email | VARCHAR(100) | User's email (must be unique) |
| password | VARCHAR(100) | User's password (encrypted) |
| created_at | DATE | Account creation date |

1.2. Habit

| Attribute | Type | Description |
|-------------|--------------|---------------------------|
| habit_id | INT (PK) | Unique ID for each habit |
| user_id | INT (FK) | Linked to User(user_id) |
| title | VARCHAR(100) | Name of the habit |
| description | TEXT | Habit details |
| frequency | VARCHAR(20) | Daily, weekly, etc. |
| start_date | DATE | When habit begins |
| status | VARCHAR(20) | Active, paused, completed |

1.3. Goal

| Attribute | Type | Description |
|-------------|--------------|-------------------------------|
| goal_id | INT (PK) | Unique ID for each goal |
| user_id | INT (FK) | Linked to User(user_id) |
| title | VARCHAR(100) | Goal name |
| description | TEXT | Goal description |
| target_date | DATE | Deadline for goal |
| status | VARCHAR(20) | In-progress, achieved, failed |

1.4. Alarm

| Attribute | Type | Description |
|------------|-------------|--------------------------------|
| alarm_id | INT (PK) | Unique alarm ID |
| habit_id | INT (FK) | Linked to Habit(habit_id) |
| alarm_time | TIME | Time to notify user |
| recurrence | VARCHAR(20) | Recurring schedule (e.g., MWF) |
| is_active | BOOLEAN | Alarm status |

1.5. Habit_Log

| Attribute | Type | Description |
|-----------|-------------|----------------------------|
| log_id | INT (PK) | Unique ID for log entry |
| habit_id | INT (FK) | Linked to Habit(habit_id) |
| log_date | DATE | Date of tracking |
| status | VARCHAR(20) | Completed, missed, skipped |
| note | TEXT | Optional user notes |

1.6. Goal_Status

| Attribute | Type | Description |
|-----------------------|-------------|---------------------------------|
| status_id | INT (PK) | Unique progress log ID |
| goal_id | INT (FK) | Linked to Goal(goal_id) |
| update_date | DATE | Date of update |
| progress_note | TEXT | Description of current progress |
| completion_percentage | NUMBER(5,2) | e.g., 85.50% complete |

2. Relationships

| Relationship | Type |
|--|------|
| One User can have many Habits | 1:N |
| One User can have many Goals | 1:N |
| One Habit has one Alarm | 1:1 |
| One Habit can have many Habit_Logs | 1:N |
| One Goal can have many Goal_Status entries | 1:N |

3. Constraints

- PRIMARY KEY and FOREIGN KEY constraints on all relational fields
- NOT NULL on essential attributes (e.g., title, email, log_date)
- UNIQUE constraint on email
- CHECK constraints for:
 - i) status IN ('active', 'paused', 'completed')
 - ii) completion_percentage BETWEEN 0 AND 100
- Use of DEFAULT values where needed (e.g., is_active = TRUE)

4. Normalization

The logical model satisfies the **Third Normal Form (3NF)**:

- All tables are in 1NF: Each field has atomic values.
- 2NF achieved: No partial dependencies (every non-key attribute fully dependent on PK).
- 3NF achieved: No transitive dependencies.

5. ERD Diagram

