



Database Systems
Assignment 02
Project Name: NeuroFlash
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Miniworld Description

The miniworld for this project is a flashcard-based learning and revision platform where users can create, organize, and review decks of flashcards derived from their own notes. The system supports customized learning experiences through tagging, filtering, and reviewing decks. Users can configure settings, track progress, and share resources with others. It also includes features such as review sessions, leaderboards, and personalized statistics to enhance the user's learning journey.

Business Rules And Requirements

- 📖 A User can create multiple Decks and write multiple Notes.
- 📖 A Note can be used to generate multiple Flashcards and is categorized by a `note_type`.
- 📖 Both Notes and Flashcards can be tagged with multiple Tags (M:N).
- 📖 A Deck consists of multiple Flashcards and has associated `deck_settings`.
- 📖 Users can configure their own Settings that apply to their activity across the system.
- 📖 A user's study session is recorded through `review_sessions` and `review_logs`.
- 📖 Users can filter decks to create `filtered_decks`, which contain specific flashcards (M:N).
- 📖 Users can share decks, resulting in `shared_decks`.
- 📖 All user activity, such as reviewing and stats, are recorded in `user_review` and `user_stat` entities.
- 📖 `Leaderboard_snapshots` capture leaderboard data over time.

Conceptual Design

Entities and Attributes

Entity: users

Attributes:

id|username|email|password_hash|age|gender|country|city|
created_at

Entity: decks

Attributes:

id|user_id|name|description|created_at

Entity: note_types

Attributes:

id|name|fields|templates

Entity: notes

Attributes:

id|user_id|note_type_id|field_values|created_at

Entity: flashcards

Attributes:

id|note_id|deck_id|template_name|card_type|due_date|intervals|
Ease_factor|reps|lapses|last_reviewed|is_suspended|is_buried
|flag_color|created_at

Entity: tags

Attributes:

id|name

Entity: settings

Attributes:

user_id|new_cards_per_day|max_reviews_per_day|learning_steps|ease_bonus

Entity: review_logs

Attributes:

id|flashcard_id|user_id|rating|review_time|intervals_before|intervals_after|ease_factor_before|ease_factor_after

Entity: deck_settings

Attributes:

deck_id|new_cards_per_day|max_reviews_per_day|learning_steps|ease_bonus

Entity: Filtered_decks

Attributes:

id|user_id|name|search_query|is_active|created_at

Entity: Filtered_deck_cards

Attributes:

filtered_deck_id|flashcard_id

Entity: shared_decks

Attributes:

id|deck_id|shared_by|title|description|is_public|shared_at

Entity: user_reviews

Attributes:

id|user_id|rating|feedback|submitted_at

Entity: user_stats

Attributes:

user_id|total_reviews|total_cards_learned|
total_time_spent_seconds|review_streak_days|current_streak_start
|last_reviewed_date| points

Entity: review_sessions

Attributes:

id|user_id|session_start|session_end|cards_reviewed|
cards_learned|time_spent_seconds

Entity: leaderboard_snapshots

Attributes:

id|captured_at|user_id|username|points|rank

Relationships And Cardinalities

Entity A	Relationship	Entity B	Cardinality	Description
User	creates	Deck	1: N	A user can create many decks.
User	owns	Note	1: N	A user can create many notes.
User	reviews	Flashcards	1: N	A user reviews many flashcards.
User	configures	Settings	1: 1	Each user has a single setting configuration.
User	configures	Filtered_decks	1 : N	A user can have multiple filtered decks.
User	shares	Deck	1: N	A user can share decks with others.
User	plays	Review_session	1: N	A user can participate in multiple review sessions.
User	tracked in	User_stat	1: 1	A user's stats are tracked in one place.
User	snapshot	Leaderboard_snapshots	1: N	A user appears in many leaderboard snapshots.

User	logs	Review	1: N	A user can log reviews on multiple decks.
Deck	contains	Flashcards	1: N	Each deck can contain many flashcards.
Deck	configured with	Deck_settings	1 : 1	Each deck has one setting configuration.
Deck	tagged with	Tag	M:N	Decks can have multiple tags and vice versa.
Deck	shared in	Shared_decks	1 : 1	A shared deck is a specific instance of a deck.
Note	generates	Flashcard	1: N	Notes produce flashcards.
Note	defined by	Note_type	N: 1	Notes have a defined type.
Note	tagged with	Tag	M:N	Notes can have multiple tags.
Flashcard	Logged in	Review_log	1:N	Flashcards are reviewed multiple times.
Flashcard	Contained in	Filtered_deck	M:N	Flashcards can belong to multiple filtered decks.
Flashcard	tagged with	Tag	M:N	Flashcards can have multiple tags.

Notations Used

The ERD uses UML notation, where:

- Entities are represented as rectangular classes.
- Relationships are labeled connectors.
- Cardinality is annotated using crowfoot notations beside the connections.
- Attributes are implicit and would be detailed per entity class or expanded in tool view.

[illegible]

Enhanced Entity Relationship Diagram Landscape

