

Introduction to the Mini World

The mini-world chosen is the world of **Pokémon**, where trainers go on adventures to catch and train Pokémon, challenge gym leaders, earn badges, and compete in tournaments. It will hold the essence of the Pokémon universe, where trainers try to become the best by mastering battles, exploring various areas, and completing their Pokédex. It will include various aspects of the journey, such as Pokémon training, item management, encounters, various battles and competitive events, which provides a comprehensive detailing of a trainer's adventure.

Purpose Of Our Database

The purpose of this database is to simulate and support the journey of Pokémon trainers as they travel across the regions, challenge gym leaders, earn badges, catch and train Pokémon, and participate in battles and tournaments. The database is aiming to help and manage the various aspects of a trainer's journey, such as tracking Pokémon data, trainer progress, gym challenges, items held, encounters, and official competitions.

Users of the Database

It can be used by **trainers** starting their pokemon journey to store statistics about their journey allowing them to keep track of things happening in their journey and make strategic decisions in tournaments. They can explore popular moves, analyze battle outcomes and track how trainers with certain badges perform, helping them improve their skills and tactics. **Pokémon enthusiasts** can use the database to explore information on various Pokémon species, evolutions, and gym leaders. This includes discovering rare Pokémon, understanding type advantages, and learning about the history of famous tournaments. It will act as a resource for learning, strategizing, and keeping up with the latest updates in the Pokémon world.

Assumptions

- Each gym has exactly one gym leader.
- Battle will always be between only 2 trainers.
- Each battle is added to the database once it is over.
- No tournament has the same name.

Database Requirements

Entity Types

1) Strong Entities

- Pokemon
 - Name : Primary Key, Not Null, Varchar, Simple
 - Pokemon_Type : Not Null, Types, Multivalued
 - Height : Not Null, Float, Simple
 - Weight : Not Null, Float, Simple
 - Weakness : Types, Multivalued

Types : {Fire, Water, Normal, Electric, Grass, Ice, Fighting, Poison, Ground, Flying, Psychic, Bug, Rock, Ghost, Dragon, Dark, Steel, Fairy}

Explanation:

Each pokemon can be any of the 18 types, as defined in the custom Types domain. Each pokemon also has some weaknesses to some types.

- Trainer
 - Name(first,middle,last) : Not Null, Varchar, Composite
 - Gender : Not Null, Varchar, Simple
 - Trainer_ID : Primary Key, Not Null, Integer, Simple
 - Date of Birth : Date, Not Null, Simple
 - Phone Number : Integer , Not Null, Composite (Country Code, Number)
 - Start of Journey Date : Date, Not Null, Simple
 - Derived Attribute- Age (can be calculated by Subtracting Date of Birth from Current Date).
 - Derived Attribute-Years of experience(can be calculated by subtracting Start of Journey Date from Current Date).

Explanation :

The people taking part in the pokemon journey are called trainers.

- Gym
 - Gym Name : Primary Key, Not Null, Varchar, Simple
 - Type : Not Null, Varchar, Simple
 - Location : Unique, Not Null, Address (Region, City, Street), Composite

Explanation :

Gyms are locations, under the control of a trainer called the gym leader. Any trainer has to defeat the gym leader in order to gain the badge of that gym, required for participating in leagues. Each gym has a badge, and a trainer once defeating the gym leader gains it, signifying his victory.

- Items
 - Item Name - Primary Key, Not Null, Varchar, Simple

- Effect - Not Null, Varchar, Simple
- Target - Not Null, Varchar, Simple
- Tournament/League
 - Name : Primary Key, Unique, Not Null, Varchar, Simple
 - Start_date : Date, Not Null, Simple
 - Location : Unique, Not Null, Address (Region, City, Street), Composite
 - End_date : Date, Simple
 - No_of_participants : Not Null, Integer, Simple
 - No_of_Badge_required : Not Null, Integer, Simple
 - Derived Attribute - Status (if end_date is null, then ongoing, else finished)

Explanation :

Leagues are big tournaments between elite pokemon trainers. Only those trainers with the required number of badges can participate in a tournament, and must win each match in order to become the pokemon champion of that league.

- Officials
 - Official_Name(first,middle,last) : Not Null, String, Composite
 - Official_ID : Primary Key, Not Null, Integer, Simple
 - Role: Not Null, Varchar, Simple
 - Location : Unique, Not Null, Address (Region, City), Composite
 - Start of Service : Not Null, Date, Simple
 - Derived Attribute-Years of experience(can be calculated by Subtracting Start of Service from Current Date).

Explanation:

There are many officials present in a pokemon journey which help trainers or are responsible for overseeing them, such as nurses for healing pokemon, police officers, etc.

2) Weak Entities

- Moves
 - Move_Name : Partial Key, Unique, Not Null, String, Simple
 - Move_Type : Not Null, Types, Multivalued
 - Description : Not Null, Text, Simple
 - Power : Not Null, Integer, Simple
 - Accuracy : Not Null, Float between 0 and 1, Simple
 - PP(Power Points) : Not Null, Integer, Simple
 - Effect_on_opponent : Not Null, Text, Simple

Explanation:

Each pokemon has a list of moves with which it can attack its opponent. PP is the energy requirement of each move. Power is the power of each move, and accuracy is the likeliness of the move to connect.

- Event
 - Description : Not Null, Text, Simple
 - Event ID: Partial Key, Not Null, Integer, Simple
 - Location : Unique, Not Null, Address (Region, City, Street), Composite
 - Time of Occurrence : Not Null, Time, Simple
 - Result : Text, Simple

Subclasses-

- Encounter
- Battle

Explanation:

Event is any notable occurrence which takes place. It is divided into two subclasses, encounter - which is between a trainer and any wild pokemons, and battle - which is between two trainers.

3) Relationships

- HasBadge
 - Between Trainer and Gym
 - Cardinality Ratio 1:N
 - Tells us about which gyms a trainer has defeated, and earned its badge.
- HasMoves (Identifying Relationship for Moves)
 - Between Pokemon and Moves
 - Cardinality Ratio 1:N
 - Identifies what moves a pokemon has.
- IsGymLeader
 - Between Gym and Trainer
 - Cardinality Ratio 1:1
 - Identifies the gym leader of a gym.
- HasEncounter (Identifying Relationship for Encounter)
 - Between Trainer, Pokemon, Encounter, Items
 - Cardinality Ratio 1:N:1:M
- UsedPokemon
 - Between Trainer, Event, Pokemon
 - Cardinality Ratio : 1:1:N
 - Tells us which pokemon a trainer used in an event.
- HasBattle (Identifying Relationship for Battle)
 - Between Trainer, Battle, Items
 - Cardinality Ratio 2:1:N
- EvolvesTo
 - Recursive relation between Pokemon
 - Cardinality Ratio - 1:N
 - Details which pokemon the current one will evolve to next.

- HasPokemon
 - Between Trainer and Pokemon
 - Cardinality Ratio 1:N
 - Attributes:
 - Level
 - Experience
 - Date of Capture

Functional Requirements

1) Retrieval

- Query
 1. Selection
Ex- Select all Pokemon which are of type electric
 2. Projection
Ex- Select Gym Name from Gym which is located in Pewter City.
 3. Aggregate
Ex- Calculate total number of participants across all Tournaments.
 4. Search
Ex - Select Pokemon where name like "%chu".
This will select the pokemon name which will have the "chu" as an ending of that string. This particular string will list all the evolutions of Pikachu.
- Analysis
 1. Find percentage of battles won by trainers with at least 5 Badges. This report calculates the win percentage of trainers who have earned at least 5 badges, helping to assess if having more badges correlates with better battle outcomes.
 2. Determine top 5 popular moves among electric type pokemons. In order to accomplish this we have to count functionality for moves and join operator across Move and Pokemon and set Limit = 5;

2) Modification

- Insertion
Ex-Insert <"healing potion","restores pokemon's hp","pokemon">
- Updation
Ex- Update the End_date of the Tournament having the name "Sinnoh League".
- Deletion
Ex- Delete an official from Officials with Official_ID 355646.

