

Data and Applications

Project Phase 1

Arnav Sharma
2023111033

Hardik Chadha
2023111031

Hiten Garg
2023101116

Virat Garg
2023101081

I. INTRODUCTION TO MINI WORLD

Welcome to the world of Pokémon! In this exciting adventure, you, the Pokémon trainer, will explore the Kanto Region, capturing wild Pokémon, and building a powerful team to compete in thrilling battles, all this to achieve your dream of becoming a Pokémon master.

PokeGuide is designed just for you- the Trainer. It will help you to keep track of all the Pokémon you have caught, and the ones in your team. It will store vital information about their stats, strengths and weaknesses. You can also monitor your battle history, badges earned and items collected. With the help of this tool, you'll have everything you need to strategize, level up and continue your Pokémon journey.

II. PURPOSE OF THE DATABASE

This database will be used by the Trainer to track their Pokémon, prepare for upcoming battles, monitor items and badges they own, and during the battles as well, to find the perfect Pokémon or moves to use against the opponent.

III. USERS OF THE DATABASE

The only user of this database will be the Pokémon trainer.

IV. APPLICATIONS OF THE DATABASE

The database would help the trainer in the following use cases-

- Tracking their progress.
- Finding the right moves and items during battles.
- Team Management, i.e. choosing the right Pokémon for your battles.
- Preparing strategies for upcoming battles.
- Analysing battle history.

V. DATABASE REQUIREMENTS

A. Assumptions

- Our database contains only the Pokémon owned by the trainer. Newly caught Pokémon can be added into the database, and Pokémon released into the wild can be removed.
- Only unused PokéBalls are counted in the attribute Count of the PokéBall entity.
- All attributes are simple attributes unless mentioned otherwise.
- A Pokémon gym can have only one gym leader.
- There will be only one Pokémon Gym in a location.

- Each Pokémon has a type.
- Each Pokémon is kept in a PokéBall.
- A Pokémon can perform all moves compatible with its type.
- Every Pokémon has atleast one move, and only moves with a related Pokémon have been included in the database.
- A move can be of only one type.
- A rival trainer will only be added once the trainer has battled against him atleast once.
- Only one Pokémon can be used in a single battle.
- A Pokémon can perform moves of only its Type.
- A trainer can have only one of each Pokémon.

B. Strong Entity Types

1) Owned Pokémon

- Number- Key attribute.
- Name- Key attribute.
- Type
- Height
- Weight
- Category
- XP
- Level →Derived Attribute. It will be defined as [XP/4000].
- Gender
- Base Stats- Composite attribute {HP, Attack, Defense, Special Attack, Special Defence, Speed.}

2) Battles

- Battle Number- Primary key
- Battle Type- Gym Battle or Normal Battle. (This will be the defining predicate.)
- Pokémon Used
- Date
- Outcome

Battles will have two sub-classes- Gym Battles and Normal Battles with rival trainers. Both sub-classes are disjoint, and both are total specialization.

Sub-classes-

a) Gym Battles-

Additional attributes-

- Gym
- Gym Leader

b) **Normal Battles**

Additional attributes-

- Rival Trainer ID
- Location

3) **Bag Items**

The Bag will have the following sub-classes-(Each sub-class represents different pockets in the bag.)

- Item Type- PokéBall, Berry, Normal Item

These sub-classes are disjoint and all three are types of total specialization.

a) **PokéBalls**

Attributes-

- Type- Primary Key (Normal PokéBall, Great PokéBall etc.)
- Count (in bag)
- Catch Rate
- Cost

New Pokémon can only be added if there are more than zero PokéBalls in the bag.

b) **Normal Items**

Attributes-

- Name- Primary Key
- Effect
- Cost
- Count

c) **Berries**

- Name- Primary Key
- Count
- Effect
- Found at

4) **Pokémon Gyms**

- Location- Primary Key
- Gym Leader
- Gym Type
- Gym Badge Name
- Badge Won?- Boolean

5) **Rival Trainers**

- Trainer No.- Primary Key
- Name

C. *Weak Entity Types*

1) **Type**

- a) Name- Primary Key
- b) Strong against.
- c) Weak against.
- d) Immune to.

2) **Moves**

- Move Name- Primary Key
- Type
- Category
- Stats- Composite attribute {Power, Accuracy, PP, Contact?}

Moves are a weak entity as they have no meaning without the Pokémon that perform them.

3) **Ailment Type**

- Name- Primary Key. Example- Paralysis, Asleep, Poisoned etc.
- Severity Level.
- Duration
- Cure- Multi-valued attribute.

This is a weak entity because it has no meaning without the Pokémon themselves. For ex- an ailment such as "poisoning" has no meaning without a Pokémon.

D. *Relationships*

The relationship types in our database, along with their degrees, participating entities and constraints have been listed below-

(Abbreviations of entities have been given along with them.)

1) **Is of Type**

- Degree: 2
- Participating entities:-Owned Pokémon(OwP), Type(T).
- Min-Max Constraint- $OwP \rightarrow (1,N)$, $T \rightarrow (1,M)$.

2) **Can Perform**

- Degree: 2
- Participating entities:-Owned Pokémon(OwP), Moves(Mo).
- Min-Max Constraint- $OwP \rightarrow (1,N)$, $Mo \rightarrow (1,M)$.

3) **Are of Type**

- Degree: 2
- Participating entities:-Type(T), Moves(Mo).
- Min-Max Constraint- $T \rightarrow (1,N)$, $Mo \rightarrow (1,1)$.

4) **Ailments and Cure**

- Degree: 3
- Participating entities:-Ailments(A), Berries(B), Items(I)
- Min-Max Constraint- $A \rightarrow (1,N)$, $B \rightarrow (0,M)$, $I \rightarrow (0,P)$.

5) **Battling Gym Leader**

- Degree: 3
- Participating entities:-Owned Pokémon(OwP), Pokémon Gyms(G), Gym Battle(GB) This is a sub-class of the Battles entity.
- Min-Max Constraint- $OwP \rightarrow (0,1)$, $G \rightarrow (0,1)$, $GB \rightarrow (1,1)$

Every gym battle tuple will have only one instance of this relationship type. For every Pokémon tuple, it is optional to appear in this battle. A Gym might not have any battles take place in it yet. But a Gym Battle will always be a part of this relationship.

6) **Battling Rival Trainer**

- Degree: 3
- Participating entities:-Owned Pokémon(OwP), Rival Trainer(RT), Normal Battle(NB).
- Min-Max Constraint- $OwP \rightarrow (0,1)$, $RT \rightarrow (1,1)$, $NB \rightarrow (1,1)$

E. Sub-classes

- Battles- Gym Battles, Normal Battles
- Bag- PokéBalls, Berries, Items.

VI. FUNCTIONAL REQUIREMENTS

1) Retrievals

- Example for Selection-**
"Retrieve complete data tuples of all Owned Pokémon."
Query- "SELECT * FROM Owned_Pokémon;"
- Example for Projection**
Searching by a particular attribute.
"Select Names of all Pokémon with level more than 30"
Query-"SELECT Name FROM Owned_Pokémon WHERE Level>30"
- Example of Aggregate Function**
"Find the maximum level of a Pokémon in the Pokémon owner by the trainer."
Query-"SELECT MAX(Level) FROM Owned_Pokémon"
- Example for Search-**
Partial text search-
"Select details of Pokémon whose name starts with 'Char'. "
Query-"SELECT * FROM Owned_Pokémon WHERE Name LIKE 'Char%';"
- Analysis Reports-**
 - "Select names and possible moves for all Pokémon."
Query-
"SELECT P.Name AS Pokémon_Name,
M.Move_Name as Possible_Moves
FROM Owned_Pokémon P
JOIN
Moves M ON P.Type = M.Type
ORDER BY
P.Name;"
 - "List all the Fire Type Pokémon and their Win rate against Grass Type Gym Leaders".
Query-
"SELECT
P.Name AS Pokémon_Name,
(SUM(CASE WHEN B.Outcome = 'Win'
THEN 1 ELSE 0 END) * 100 / COUNT(*))
AS Win_Rate
FROM
Owned_Pokémon P
JOIN
Battles B ON P.Number = B.Pokémon_Used
JOIN
Gym_Battles GB ON B.Battle_Number =
GB.Battle_Number
JOIN

```
Gyms G ON GB.Gym = G.Location
WHERE
P.Type = 'Fire'
AND G.Gym_Type = 'Grass'
GROUP BY
P.Name;"
```

2) Modifications

- Insertion of data**
Example- Adding a new rival trainer.
Query-"INSERT INTO Rival_Trainer ('1', 'Gary Oak';"
- Updation of data**
Example- Update the XP of Pokémon, increasing it by 250.
Query-"UPDATE Owned_Pokémon SET XP=XP+250;"
- Deletion of data**
Example-Delete the tuple of a Pokémon, let's say Zubat, considering that the trainer released it into the wild.
Query="DELETE FROM Owned_Pokémon where Name='Zubat';"

VII. SUMMARY

Through the design of this database, we have made a resource/tool which will help Pokémon trainers to reach their true potential, and reach the highest level in the world of Pokémon. It provides all the information they need along their journey in an organized and accessible manner.

PokéGuide acts as a personal assistant for any aspiring Pokémon Master, helping them pave the path to success.