CPSC 304 Project Cover Page

Milestone #: 4

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Group Number: 21

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address, and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

Section 1 -- Project Overview

Github Link: https://github.students.cs.ubc.ca/CPSC304-2022W-T1/project_n7z5j_r0b7x_x7g3b

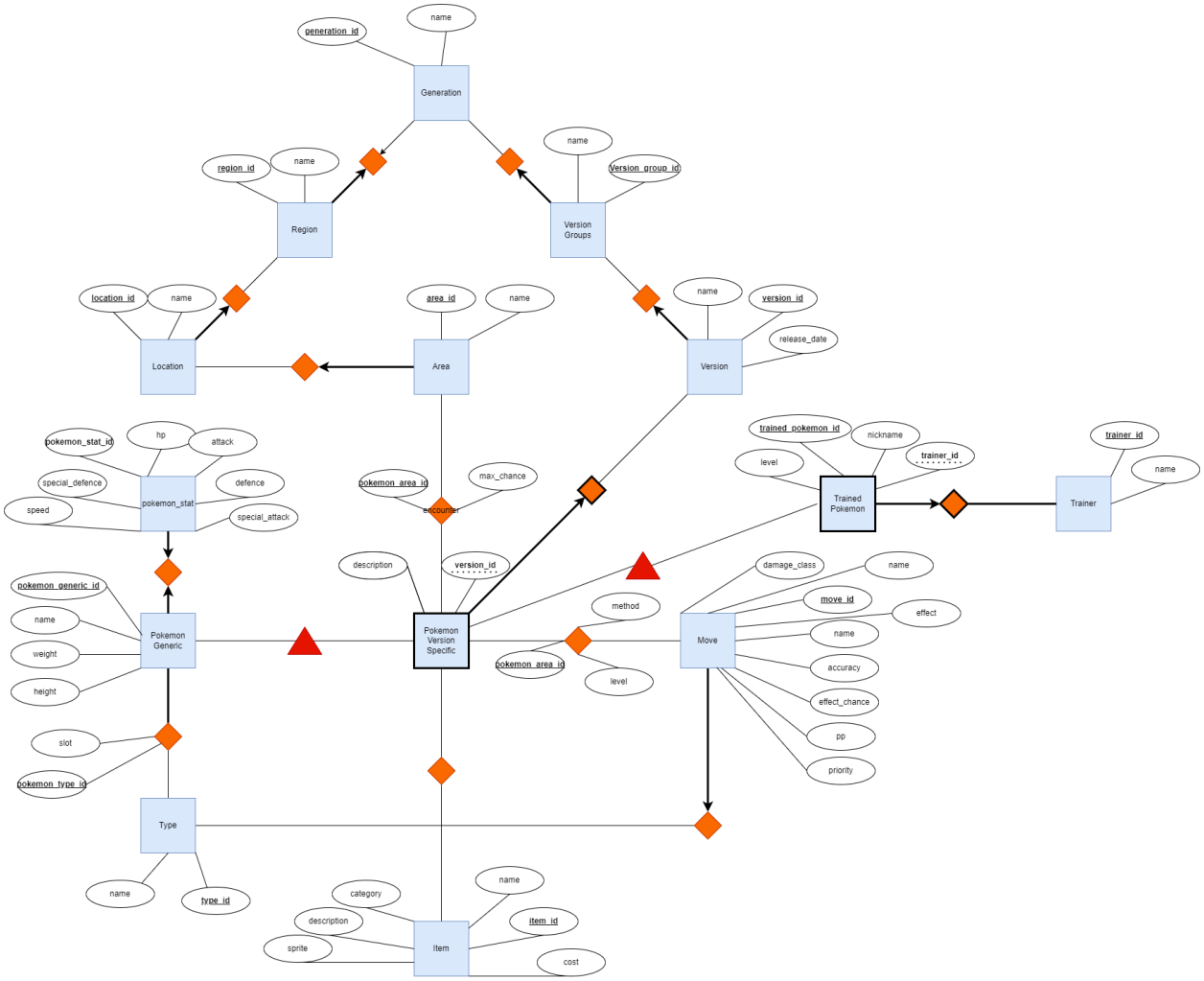
Our group has created a pokemon lookup web application project. Using PostgreSQL, Python, and JavaScript as our technology stack. The data is fetched and compiled using Python from an API called PokeAPI. In the web application, we are able to search for a pokemon using a name. Amidst for a search, the level of when the pokemon can learn a move, stats, sprite, etc is shown. Additionally, users are able to create, update, or delete 'trainers' where trainers have 'trained pokemons. The user is also able to add/delete a trained_pokemon from a specific version.

References for CSS styling and HTML code for Frontend:

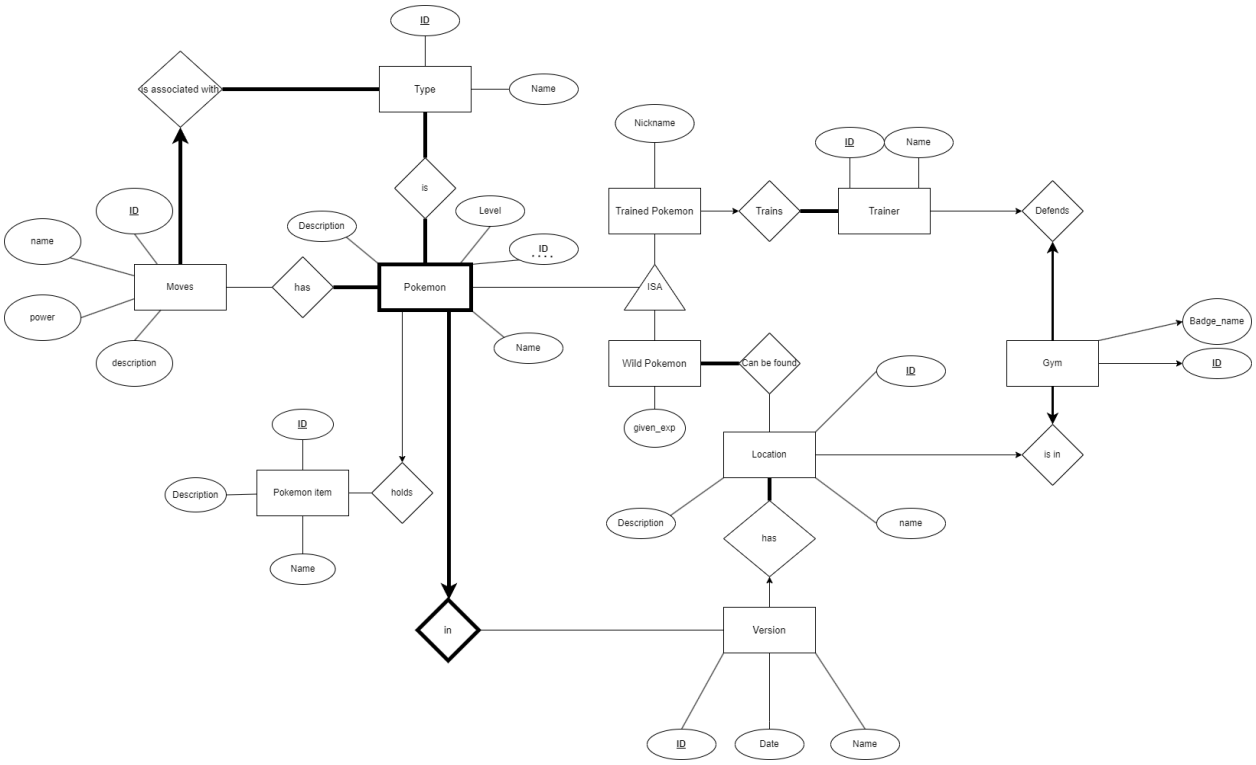
Table Codes: Vant 3 - Lightweight Mobile UI Components built on Vue
Css styling: font-palette demo
Bootstrap: Bootstrap

Section 2 -- Changes from previous Schemas

NEW ER DIAGRAM:



OLD ER DIAGRAM:



Differences between Proposed ER Diagram and New ER Diagram:

As we used an API (https://pokeapi.co/) , many entities were changed/added:

- Broke up the pokemon entity into: pokemon_generic and pokemon_specific where pokemon_generic would be a super class to pokemon_specific and pokemon_specific would have a weak entity to the version.
- Removed Gym entity (entity table was meaningless)
- Added Generation, Region, Version Groups, and Areas.
    - Region, Version Groups, and Areas depend on Generation.
- Added many new attributes to existing tables.
- Changed dependencies on relationships.

Section 3 -- Schema and Screenshots

The single SQL Script will be attached with this pdf file: ExportedDatabase.sql.
It contains a creation of Tables and Triggers as well as the concatenation of dynamic data fetched by the api. The SQL Script was created by using: pg_dump.
(https://www.postgresql.org/docs/current/app-pgdump.html)

List of Schema:

```
              List of relations
 Schema |       Name       | Type  |   Owner
--------+------------------+-------+-----------
 public | area             | table | psqladmin
 public | generation       | table | psqladmin
 public | item             | table | psqladmin
 public | location         | table | psqladmin
 public | move             | table | psqladmin
 public | pokemon_area     | table | psqladmin
 public | pokemon_generic  | table | psqladmin
 public | pokemon_item     | table | psqladmin
 public | pokemon_move     | table | psqladmin
 public | pokemon_specific | table | psqladmin
 public | pokemon_stat     | table | psqladmin
 public | pokemon_type     | table | psqladmin
 public | region           | table | psqladmin
 public | trained_pokemon  | table | psqladmin
 public | trainer          | table | psqladmin
 public | type             | table | psqladmin
 public | version          | table | psqladmin
 public | version_group    | table | psqladmin
(18 rows)
```

Note that some of these tables have over 500 entities which screenshots may not be able to show all entities from the table. In cases of tables that cannot show all the data, I have created another screenshot that shows the size of the table.

i) Area Table:

```
cpsc304=> select * from area;
 area_id |                    name                     | location_id
---------+---------------------------------------------+-------------
       1 | celadon-city-area                           |           1
       2 | celadon-city-celadon-mansion                |           1
       3 | cerulean-city-area                          |           2
       4 | cinnabar-island-area                        |           3
       5 | cinnabar-island-cinnabar-lab                |           3
       6 | digletts-cave-area                          |           4
       7 | fuchsia-city-area                           |           5
       8 | mt-moon-mt-moon-square                      |           6
       9 | mt-moon-1f                                  |           6
      10 | mt-moon-2f                                  |           6
      11 | mt-moon-b1f                                 |           6
      12 | mt-moon-b2f                                 |           6
      13 | pallet-town-area                            |           7
      14 | rock-tunnel-1f                              |           8
      15 | rock-tunnel-b1f                             |           8
      16 | rock-tunnel-b2f                             |           8
      17 | kanto-route-1-area                          |           9
      18 | kanto-route-10-area                         |          10
      19 | kanto-route-11-area                         |          11
      20 | kanto-route-12-area                         |          12
      21 | kanto-route-13-area                         |          13
      22 | kanto-route-14-area                         |          14
      23 | kanto-route-15-area                         |          15
      24 | kanto-route-16-area                         |          16
      25 | kanto-route-17-area                         |          17
      26 | kanto-route-18-area                         |          18
      27 | kanto-sea-route-19-area                     |          19
      28 | kanto-route-2-south-towards-viridian-city   |          20
      29 | kanto-route-2-north-towards-pewter-city     |          20
      30 | kanto-sea-route-20-area                     |          21
      31 | kanto-sea-route-21-area                     |          22
      32 | kanto-route-22-area                         |          23
      33 | kanto-route-24-area                         |          24
```

ii) Generation Table:

```
cpsc304=> select * from generation;
 generation_id |      name
---------------+-----------------
             1 | generation i
             2 | generation ii
             3 | generation iii
             4 | generation iv
             5 | generation v
             6 | generation vi
             7 | generation vii
             8 | generation viii
(8 rows)
```

iii) Item Table:

```
cpsc304=> select * from item;
 item_id |             name               | cost |     category     |                         description                          |                                    sprite
---------+--------------------------------+------+------------------+--------------------------------------------------------------+------------------------------------------------------------------------------
------------
       1 | master-ball                    |    0 | standard-balls   | The best Poké Ball with the ultimate level of               +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/master-ball.png
         |                                |      |                  | performance. With it, you will catch any wild               +|
         |                                |      |                  | Pokémon without fail.                                        |
       2 | ultra-ball                     |  800 | standard-balls   | An ultra-high-performance Poké Ball that provides           +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/ultra-ball.png
         |                                |      |                  | a higher success rate for catching Pokémon than             +|
         |                                |      |                  | a Great Ball.                                                |
       3 | great-ball                     |  600 | standard-balls   | A good, high-performance Poké Ball that provides            +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/great-ball.png
         |                                |      |                  | a higher success rate for catching Pokémon than             +|
         |                                |      |                  | a standard Poké Ball.                                        |
       4 | poke-ball                      |  200 | standard-balls   | A device for catching wild Pokémon. It’s thrown like        +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/poke-ball.png
         |                                |      |                  | a ball at a Pokémon, comfortably encapsulating              +|
         |                                |      |                  | its target.                                                  |
       5 | safari-ball                    |    0 | standard-balls   | A special Poké Ball that was used in the Safari Zone        +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/safari-ball.png
         |                                |      |                  | in the Kanto region and in the Great Marsh in the           +|
         |                                |      |                  | Sinnoh region.                                               |
       6 | net-ball                       | 1000 | special-balls    | A somewhat different Poké Ball that is more                 +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/net-ball.png
         |                                |      |                  | effective when attempting to catch Water- or                +|
         |                                |      |                  | Bug-type Pokémon.                                            |
       7 | dive-ball                      | 1000 | special-balls    | A somewhat different Poké Ball that works                   +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/dive-ball.png
         |                                |      |                  | especially well when catching Pokémon that                  +|
         |                                |      |                  | live underwater.                                             |
       8 | nest-ball                      | 1000 | special-balls    | A somewhat different Poké Ball that becomes more            +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/nest-ball.png
         |                                |      |                  | effective the lower the level of the wild Pokémon.           |
       9 | repeat-ball                    | 1000 | special-balls    | A somewhat different Poké Ball that works                   +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/repeat-ball.png
         |                                |      |                  | especially well on a Pokémon species that has been          +|
         |                                |      |                  | caught before.                                               |
      10 | timer-ball                     | 1000 | special-balls    | A somewhat different Poké Ball that becomes                 +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/timer-ball.png
         |                                |      |                  | progressively more effective at catching Pokémon            +|
         |                                |      |                  | the more turns that are taken in battle.                     |
      11 | luxury-ball                    | 3000 | special-balls    | A particularly comfortable Poké Ball that makes a           +| https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/items/luxury-ball.png
         |                                |      |                  | wild Pokémon quickly grow friendlier after                  +|
```

```
cpsc304=> select count(*) from item;
 count
-------
  1607
(1 row)
```

iv) location table:

```
cpsc304=> select * From location;
 location_id |               name                | region_id
-------------+-----------------------------------+-----------
           1 | celadon-city                      |         1
           2 | cerulean-city                     |         1
           3 | cinnabar-island                   |         1
           4 | digletts-cave                     |         1
           5 | fuchsia-city                      |         1
           6 | mt-moon                           |         1
           7 | pallet-town                       |         1
           8 | rock-tunnel                       |         1
           9 | kanto-route-1                     |         1
          10 | kanto-route-10                    |         1
          11 | kanto-route-11                    |         1
          12 | kanto-route-12                    |         1
          13 | kanto-route-13                    |         1
          14 | kanto-route-14                    |         1
          15 | kanto-route-15                    |         1
          16 | kanto-route-16                    |         1
          17 | kanto-route-17                    |         1
          18 | kanto-route-18                    |         1
          19 | kanto-sea-route-19                |         1
          20 | kanto-route-2                     |         1
          21 | kanto-sea-route-20                |         1
          22 | kanto-sea-route-21                |         1
          23 | kanto-route-22                    |         1
          24 | kanto-route-24                    |         1
          25 | kanto-route-25                    |         1
          26 | kanto-route-26                    |         1
          27 | kanto-route-27                    |         1
          28 | kanto-route-28                    |         1
          29 | kanto-route-3                     |         1
          30 | kanto-route-4                     |         1
          31 | kanto-route-5                     |         1
          32 | kanto-route-6                     |         1
          33 | kanto-route-7                     |         1
```

```
cpsc304=> select count(*) From location;
 count
-------
   706
(1 row)
```

v) Move Table:

```
cpsc304=> select * from move limit 1;
 move_id | type_id | name  | accuracy | effect_chance | pp | priority | power | damage_class |          effect
---------+---------+-------+----------+---------------+----+----------+-------+--------------+-------------------------
       1 |       1 | pound |      100 |               | 35 |        0 |    40 | physical     | Inflicts regular damage.
(1 row)
```

vi) Pokemon_Area Table

```
cpsc304=> select * from pokemon_area;
 pokemon_area_id | pokemon_specific_id | area_id | max_chance
-----------------+---------------------+---------+------------
               1 |                   3 |       3 |        100
               2 |                   1 |      13 |        100
               3 |                   2 |      13 |        100
               4 |                  10 |      13 |        100
               5 |                  11 |      13 |        100
               6 |                  15 |      13 |        100
               7 |                  16 |      13 |        100
               8 |                  61 |      13 |        100
               9 |                  62 |      13 |        100
              10 |                  70 |      13 |        100
              11 |                  71 |      13 |        100
              12 |                  75 |      13 |        100
              13 |                  76 |      13 |        100
              14 |                  63 |      33 |        100
              15 |                 123 |      55 |        100
              16 |                 121 |      13 |        100
              17 |                 122 |      13 |        100
              18 |                 130 |      13 |        100
              19 |                 131 |      13 |        100
              20 |                 135 |      13 |        100
              21 |                 136 |      13 |        100
              22 |                 194 |     393 |          4
              23 |                 192 |     490 |          8
              24 |                 193 |     490 |          8
              25 |                 194 |     490 |          8
              26 |                 194 |     491 |          8
```

```
cpsc304=> select count(*) from pokemon_area;
 count
-------
 16665
(1 row)
```

vii) Pokemon_Generic Table:

```
cpsc304=> select * from pokemon_generic;
 pokemon_generic_id |         name          | height | weight |                                                  sprite
--------------------+-----------------------+--------+--------+-----------------------------------------------------------------------------------------------------
                  1 | bulbasaur             |      7 |     69 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/1.png
                  2 | ivysaur               |     10 |    130 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/2.png
                  3 | venusaur              |     20 |   1000 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/3.png
                  4 | charmander            |      6 |     85 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/4.png
                  5 | charmeleon            |     11 |    190 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/5.png
                  6 | charizard             |     17 |    905 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/6.png
                  7 | squirtle              |      5 |     90 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/7.png
                  8 | wartortle             |     10 |    225 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/8.png
                  9 | blastoise             |     16 |    855 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/9.png
                 10 | caterpie              |      3 |     29 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/10.png
                 11 | metapod               |      7 |     99 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/11.png
                 12 | butterfree            |     11 |    320 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/12.png
                 13 | weedle                |      3 |     32 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/13.png
                 14 | kakuna                |      6 |    100 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/14.png
                 15 | beedrill              |     10 |    295 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/15.png
                 16 | pidgey                |      3 |     18 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/16.png
                 17 | pidgeotto             |     11 |    300 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/17.png
                 18 | pidgeot               |     15 |    395 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/18.png
                 19 | rattata               |      3 |     35 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/19.png
                 20 | raticate              |      7 |    185 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/20.png
                 21 | spearow               |      3 |     20 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/21.png
                 22 | fearow                |     12 |    380 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/22.png
                 23 | ekans                 |     20 |     69 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/23.png
                 24 | arbok                 |     35 |    650 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/24.png
                 25 | pikachu               |      4 |     60 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/25.png
                 26 | raichu                |      8 |    300 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/26.png
                 27 | sandshrew             |      6 |    120 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/27.png
                 28 | sandslash             |     10 |    295 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/28.png
                 29 | nidoran-f             |      4 |     70 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/29.png
                 30 | nidorina              |      8 |    200 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/30.png
                 31 | nidoqueen             |     13 |    600 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/31.png
                 32 | nidoran-m             |      5 |     90 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/32.png
                 33 | nidorino              |      9 |    195 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/33.png
```

```
cpsc304=> select count(*) from pokemon_generic;
 count
-------
   905
(1 row)
```

viii) Pokemon_Item Table:

pokemon_item_id	pokemon_specific_id	item_id	rarity
1	227	199	5
2	228	199	5
3	229	199	5
4	230	199	5
5	231	199	5
6	232	199	5
7	233	199	5
8	234	199	5
9	235	199	5
10	236	199	5
11	237	199	5
12	238	199	5
13	239	199	5
14	240	199	5
15	287	222	5
16	288	222	5
17	289	222	5
18	290	222	5
19	291	222	5
20	292	222	5
21	293	222	5
22	294	222	5
23	295	222	5
24	296	222	5
25	297	222	5
26	298	222	5
27	299	222	5

```
cpsc304=> select count(*) from pokemon_item;
 count
-------
  3106
(1 row)
```

IX) pokemon_move Table:

```
cpsc304=> select * from pokemon_move LIMIT 10;
 pokemon_move_id | pokemon_specific_id | move_id | method  | level
-----------------+---------------------+---------+---------+-------
               1 |                   4 |       9 | egg     |     0
               2 |                   5 |       9 | egg     |     0
               3 |                   6 |       9 | egg     |     0
               4 |                   1 |      10 | machine |     0
               5 |                   2 |      10 | machine |     0
               6 |                   3 |      10 | machine |     0
               7 |                   9 |      10 | tutor   |     0
               8 |                  10 |      10 | tutor   |     0
               9 |                  11 |      10 | tutor   |     0
              10 |                  12 |      10 | machine |     0
(10 rows)
```

```
cpsc304=> select count(*) from pokemon_move;
 count
--------
 444224
(1 row)
```

X) Pokemon_Specific Table:

```
cpsc304=> select * from pokemon_specific LIMIT 5;
 pokemon_specific_id | pokemon_generic_id | version_id |              description
---------------------+--------------------+------------+-----------------------------------
                   1 |                  1 |          1 | A strange seed was                +
                     |                    |            | planted on its                    +
                     |                    |            | back at birth.\x0CThe plant sprouts  +
                     |                    |            | and grows with                    +
                     |                    |            | this POKéMON.
                   2 |                  1 |          2 | A strange seed was                +
                     |                    |            | planted on its                    +
                     |                    |            | back at birth.\x0CThe plant sprouts  +
                     |                    |            | and grows with                    +
                     |                    |            | this POKéMON.
                   3 |                  1 |          3 | It can go for days                +
                     |                    |            | without eating a                  +
                     |                    |            | single morsel.\x0CIn the bulb on     +
                     |                    |            | its back, it                      +
                     |                    |            | stores energy.
                   4 |                  1 |          4 | The seed on its                   +
                     |                    |            | back is filled                    +
                     |                    |            | with nutrients.\x0CThe seed grows    +
                     |                    |            | steadily larger as                +
                     |                    |            | its body grows.
                   5 |                  1 |          5 | It carries a seed                 +
                     |                    |            | on its back right                 +
                     |                    |            | from birth. As it\x0Cgrows older, the+
                     |                    |            | seed also grows                   +
                     |                    |            | larger.
(5 rows)
```

```
cpsc304=> select count(*) from pokemon_specific;
 count
-------
  8882
(1 row)
```

XI) Pokemon_Stat Table:

```
cpsc304=> select * from pokemon_stat LIMIT 20;
 pokemon_stat_id | pokemon_generic_id | hp | attack | defence | special_attack | special_defence | speed
-----------------+--------------------+----+--------+---------+----------------+-----------------+-------
               1 |                  1 | 45 |     49 |      49 |             65 |              65 |    45
               2 |                  2 | 60 |     62 |      63 |             80 |              80 |    60
               3 |                  3 | 80 |     82 |      83 |            100 |             100 |    80
               4 |                  4 | 39 |     52 |      43 |             60 |              50 |    65
               5 |                  5 | 58 |     64 |      58 |             80 |              65 |    80
               6 |                  6 | 78 |     84 |      78 |            109 |              85 |   100
               7 |                  7 | 44 |     48 |      65 |             50 |              64 |    43
               8 |                  8 | 59 |     63 |      80 |             65 |              80 |    58
               9 |                  9 | 79 |     83 |     100 |             85 |             105 |    78
              10 |                 10 | 45 |     30 |      35 |             20 |              20 |    45
              11 |                 11 | 50 |     20 |      55 |             25 |              25 |    30
              12 |                 12 | 60 |     45 |      50 |             90 |              80 |    70
              13 |                 13 | 40 |     35 |      30 |             20 |              20 |    50
              14 |                 14 | 45 |     25 |      50 |             25 |              25 |    35
              15 |                 15 | 65 |     90 |      40 |             45 |              80 |    75
              16 |                 16 | 40 |     45 |      40 |             35 |              35 |    56
              17 |                 17 | 63 |     60 |      55 |             50 |              50 |    71
              18 |                 18 | 83 |     80 |      75 |             70 |              70 |   101
              19 |                 19 | 30 |     56 |      35 |             25 |              35 |    72
              20 |                 20 | 55 |     81 |      60 |             50 |              70 |    97
(20 rows)
```

```
cpsc304=> select count(*) from pokemon_stat;
 count
-------
   905
(1 row)
```

XII) Region Table:

```
cpsc304=> select * from region;
 region_id |  name  | generation_id
-----------+--------+---------------
         1 | kanto  |             1
         2 | johto  |             2
         3 | hoenn  |             3
         4 | sinnoh |             4
         5 | unova  |             5
         6 | kalos  |             6
         7 | alola  |             7
         8 | galar  |             8
(8 rows)
```

XIII) Trained_Pokemon Table:

```
cpsc304=> select * from trained_pokemon;
 trained_pokemon_id | pokemon_specific_id | trainer_id |    nickname     | level
--------------------+---------------------+------------+-----------------+-------
                  1 |                7130 |          1 |                 |    66
                  2 |                 481 |          2 |                 |   100
                  3 |                 101 |          3 |                 |    36
                  4 |                 169 |          4 |                 |    99
                  5 |                 376 |          5 | Shiny Metagross |    82
(5 rows)
```

XIV) Trainer Table:

```
cpsc304=> select * from trainer;
 trainer_id | gender |  name
------------+--------+---------
          1 | Female | Cynthia
          2 | Male   | Ash
          3 | Male   | Crispin
          4 | Male   | Kevin
          5 | Male   | Simon
(5 rows)
```

XV) Type Table:

```
cpsc304=> select * from type;
 type_id |   name
---------+----------
       1 | normal
       2 | fighting
       3 | flying
       4 | poison
       5 | ground
       6 | rock
       7 | bug
       8 | ghost
       9 | steel
      10 | fire
      11 | water
      12 | grass
      13 | electric
      14 | psychic
      15 | ice
      16 | dragon
      17 | dark
      18 | fairy
      19 | unknown
      20 | shadow
(20 rows)
```

XVI) Version Table:

```
cpsc304=> select * from version limit 10;
 version_id |   name   | release_date | version_group_id
------------+----------+--------------+------------------
          1 | red      | 1996-02-27   |                1
          2 | blue     | 1996-10-15   |                1
          3 | yellow   | 1998-10-12   |                2
          4 | gold     | 1999-11-21   |                3
          5 | silver   | 1999-11-21   |                3
          6 | crystal  | 2000-12-14   |                4
          7 | ruby     | 2002-11-21   |                5
          8 | sapphire | 2002-11-21   |                5
          9 | emerald  | 2004-09-16   |                6
         10 | firered  | 2004-01-29   |                7
(10 rows)
```

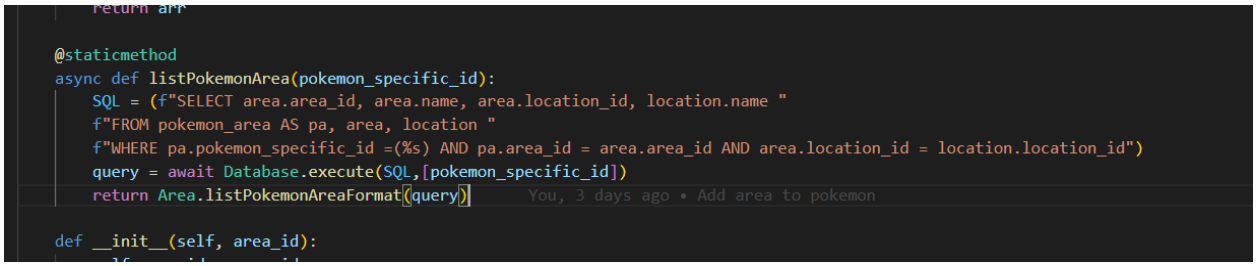
XVII) Version_Group Table:

```
cpsc304=> select * from version_group;
 version_group_id |                name                | generation_id
------------------+------------------------------------+---------------
                1 | red-blue                           |             1
                2 | yellow                             |             1
                3 | gold-silver                        |             2
                4 | crystal                            |             2
                5 | ruby-sapphire                      |             3
                6 | emerald                            |             3
                7 | firered-leafgreen                  |             3
                8 | colosseum                          |             3
                9 | xd                                 |             3
               10 | diamond-pearl                      |             4
               11 | platinum                           |             4
               12 | heartgold-soulsilver               |             4
               13 | black-white                        |             5
               14 | black-2-white-2                    |             5
               15 | x-y                                |             6
               16 | omega-ruby-alpha-sapphire          |             6
               17 | sun-moon                           |             7
               18 | ultra-sun-ultra-moon               |             7
               19 | lets-go-pikachu-lets-go-eevee      |             7
               20 | sword-shield                       |             8
               21 | the-isle-of-armor                  |             8
               22 | the-crown-tundra                   |             8
               23 | brilliant-diamond-and-shining-pearl |             8
               24 | legends-arceus                     |             8
(24 rows)
```

Section 4 -- SQL Queries

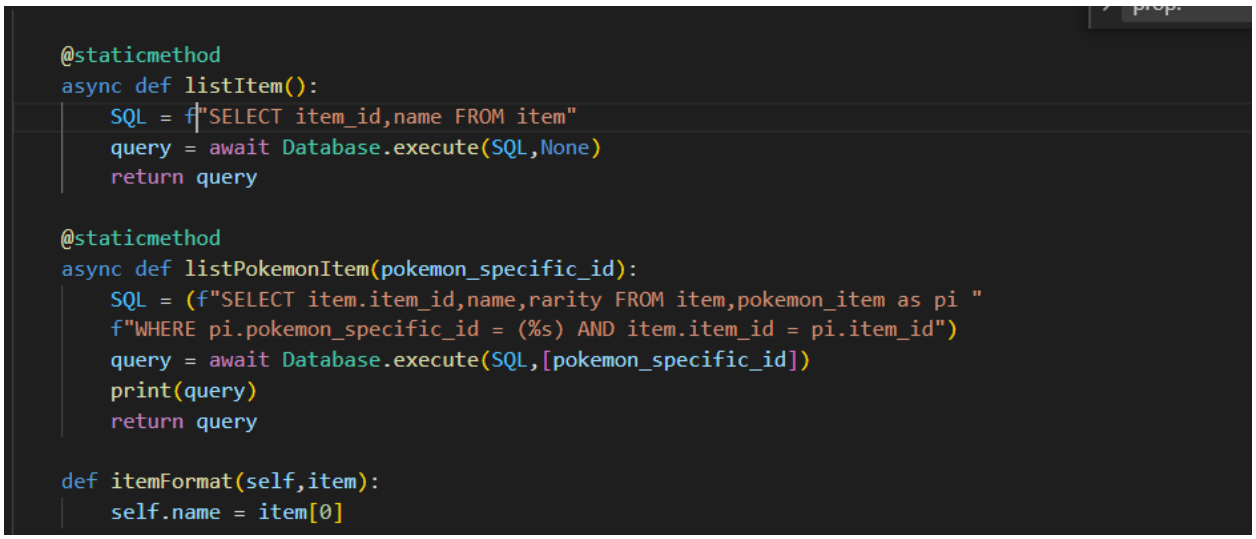
This section will be a compilation of all SQL Queries used in the project. We have sorted each SQL Queries by classes/tables. SQL Queries can be found with the variable "SQL =" on the screenshots **NOTE: (%S) and {<variable_name>} are ways we inject variables.**

Area SQL Queries:

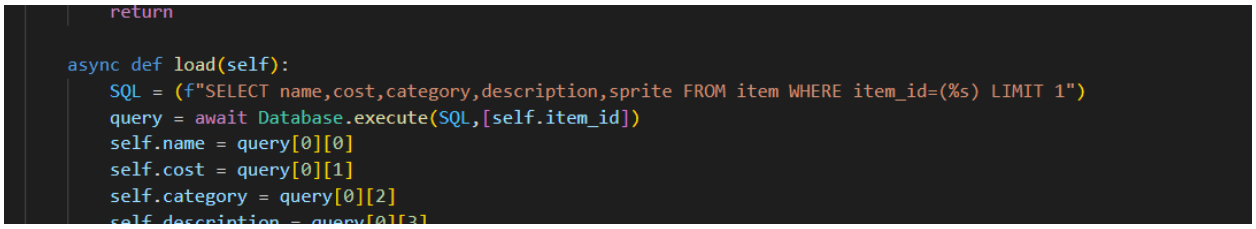


```
    return arr

@staticmethod
async def listPokemonArea(pokemon_specific_id):
    SQL = (f"SELECT area.area_id, area.name, area.location_id, location.name "
    f"FROM pokemon_area AS pa, area, location "
    f"WHERE pa.pokemon_specific_id =(%s) AND pa.area_id = area.area_id AND area.location_id = location.location_id")
    query = await Database.execute(SQL,[pokemon_specific_id])
    return Area.listPokemonAreaFormat(query)      You, 3 days ago • Add area to pokemon

def __init__(self, area_id):
```

Item SQL Queries:



```
@staticmethod
async def listItem():
    SQL = f"SELECT item_id,name FROM item"
    query = await Database.execute(SQL,None)
    return query

@staticmethod
async def listPokemonItem(pokemon_specific_id):
    SQL = (f"SELECT item.item_id,name,rarity FROM item,pokemon_item as pi "
    f"WHERE pi.pokemon_specific_id = (%s) AND item.item_id = pi.item_id")
    query = await Database.execute(SQL,[pokemon_specific_id])
    print(query)
    return query

def itemFormat(self,item):
    self.name = item[0]
```



```
    return

async def load(self):
    SQL = (f"SELECT name,cost,category,description,sprite FROM item WHERE item_id=(%s) LIMIT 1")
    query = await Database.execute(SQL,[self.item_id])
    self.name = query[0][0]
    self.cost = query[0][1]
    self.category = query[0][2]
    self.description = query[0][3]
```

Location SQL Queries:

```python
# Add location to database return id and all information on location
@staticmethod
async def addLocation(name,version_id):
    SQL = f"INSERT INTO location (name,region_id) VALUES (%s, %s) RETURNING location_id"
    query = await Database.execute(SQL,(name,version_id))
    return query[0][0]

def __init__(self, location_id):
    self.location_id = location_id
    self.name = None
    self.location = None

async def load(self):
    SQL = f"SELECT * FROM location WHERE location_id=({self.location_id})"
    query = await Database.execute(SQL,None)
    self.name = query[0][1]
```

Move SQL Queries:

```python
    @staticmethod
    async def listPokemonMoves(pokemon_specific_id):
        SQL = (f"SELECT move.move_id, name "
        f"FROM pokemon_move AS pm, move "
        f"WHERE pm.pokemon_specific_id =(%s) AND pm.move_id = move.move_id")
        query = await Database.execute(SQL,[pokemon_specific_id])
        return query

    @staticmethod
    async def listMoves():
        SQL = f"SELECT move_id,name FROM move"
        query = await Database.execute(SQL,None)
        return query
```

```python
async def load(self):
    SQL = (f"SELECT * "
    f"FROM move,type "
    f"WHERE move.move_id=(%s) AND type.type_id = move.type_id LIMIT 1")
    move = await Database.execute(SQL,[self.moveId])
    print(move)
    self.name = move[0][2]
    self.accuracy = move[0][3]
    self.effectChance = move[0][4]
    self.pp = move[0][5]
    self.priority = move[0][6]
    self.power = move[0][7]
    self.damageClass = move[0][8]
    self.typeId = move[0][9]
```

Pokemon SQL Queries:

```python
class Pokemon:

    @staticmethod
    async def listPokemon():
        SQL = f"SELECT pokemon_generic_id,name FROM pokemon_generic"
        query = await Database.execute(SQL,None)
        return query

    @staticmethod
    async def getPokemonVersions(generic_id):
        SQL = (f"SELECT version.version_id,name FROM pokemon_specific,version "
         f"WHERE pokemon_generic_id=(%s) AND version.version_id = pokemon_specific.version_id")
        query = await Database.execute(SQL,[generic_id])
        print(query)
        return query

    @staticmethod
    async def getPokemonAreaCountPerRegion(generic_id):
```

```python
    @staticmethod
    async def getPokemonAreaCountPerRegion(generic_id):
        innerSQL = (f"SELECT ps.pokemon_specific_id, ps.version_id, COUNT(*) AS areaCount "
        f"FROM pokemon_specific as ps "
        f"INNER JOIN pokemon_area as pa ON ps.pokemon_specific_id = pa.pokemon_specific_id "
        f"INNER JOIN pokemon_generic as pg ON pg.pokemon_generic_id = ps.pokemon_generic_id "
        f"WHERE pg.pokemon_generic_id=(%s) GROUP BY ps.pokemon_specific_id, ps.version_id")

        SQL = (f"SELECT r.region_id, r.name, SUM(ps.areaCount) "
        f"FROM ({innerSQL}) AS ps, version AS v, version_group AS vg, region AS r "
        f"WHERE vg.version_group_id = v.version_group_id AND ps.version_id = v.version_id AND r.generation_id = vg.generation_id "
        f"GROUP BY r.region_id")
        query = await Database.execute(SQL,[generic_id])
        print(query)
        return query

    def initPokemon(self):
        self.versionIdList = []
```

```
MS  OUTPUT  DEBUG CONSOLE  TERMINAL  GITLENS  JUPYTER
```

```python
    async def load(self):
        # Get general data
        SQL = (f"SELECT name,height,weight,sprite,pokemon_specific_id,description "
        f"FROM pokemon_generic AS pg INNER JOIN pokemon_specific AS ps ON ps.pokemon_generic_id = pg.pokemon_generic_id  "
        f"WHERE pg.pokemon_generic_id =(%s) AND ps.version_id =(%s)")
        query = await Database.execute(SQL,[self.pokemon_generic_id,self.version_id])
        self.name = query[0][0]
        self.height = query[0][1]
        self.weight = query[0][2]
        self.sprite = query[0][3]
        self.pokemon_specific_id = query[0][4]
```

```
prop.  Aa  ab  .*  No results
```

```python
async def findPokemonThatAllTrainer(gender):
    if gender is not None:
        SQL = f"SELECT DISTINCT pg.pokemon_generic_id, pg.name FROM pokemon_specific ps "\
              f"INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id "\
              f"WHERE NOT EXISTS((SELECT t.trainer_id FROM trainer t WHERE t.gender = {gender}) EXCEPT "\
              f"(SELECT t.trainer_id FROM trained_pokemon tp INNER JOIN trainer t ON t.trainer_id = tp.trainer_id WHERE ps.pokemon_specific_id = tp.pokemon_specific_id)) "
    else:
        SQL = f"SELECT DISTINCT pg.pokemon_generic_id, pg.name FROM pokemon_specific ps " \
              f"INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id " \
              f"WHERE NOT EXISTS((SELECT t.trainer_id FROM trainer t) EXCEPT " \
              f"(SELECT t.trainer_id FROM trained_pokemon tp INNER JOIN trainer t ON t.trainer_id = tp.trainer_id WHERE ps.pokemon_specific_id = tp.pokemon_specific_id)) "
    query = await Database.execute(SQL, [])
    return query
```

Region SQL Queries:

```python
@staticmethod
async def listRegions():
    SQL = (f"SELECT r.region_id, r.name, COUNT(DISTINCT ps.pokemon_generic_id) "
    f"FROM pokemon_specific AS ps, version AS v, version_group AS vg, region AS r "
    f"WHERE vg.version_group_id = v.version_group_id AND v.version_id = ps.version_id AND r.generation_id = vg.generation_id "
    f"GROUP BY r.region_id")
    query = await Database.execute(SQL,None)
    return query

def __init__(self, region_id):
    self.region_id = region_id
```

```python
# Load all region statistic and everything
async def load(self):
    SQL = (f"SELECT r.region_id, r.name, COUNT(DISTINCT ps.pokemon_generic_id) "
    f"FROM pokemon_specific AS ps, version AS v, version_group AS vg, region AS r "
    f"WHERE vg.version_group_id = v.version_group_id AND v.version_id = ps.version_id AND r.generation_id = vg.generation_id AND region"
    f"GROUP BY r.region_id")
    # query = await Database.execute(SQL,None)
    # self.name = query[0]
    return None
```

Stat SQL Queries:

```python
async def load(self):
    SQL = (f"SELECT *"
    f"FROM pokemon_stat "
    f"WHERE pokemon_stat.pokemon_generic_id= (%s) LIMIT 1")
    stats = await Database.execute(SQL,[self.pokemon_generic_id])
    self.formatStats(stats[0])
    return

def getStats(self):
    return {
        "hp": self.hp,
```

Trained Pokemon Queries:

```python
@staticmethod
async def listTrainedPokemon(trainer_id):
    SQL = f"SELECT tp.trainer_id, tp.trained_pokemon_id, ps.pokemon_specific_id,pg.name, tp.nickname, tp.level, pg.sprite, v.name " \
          f"FROM trained_pokemon tp INNER JOIN pokemon_specific ps ON ps.pokemon_specific_id = tp.pokemon_specific_id " \
          f"INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id " \
          f"INNER JOIN version v ON v.version_id = ps.version_id "\
          f"WHERE tp.trainer_id = (%s) "
    query = await Database.execute(SQL,[trainer_id])
    return TrainedPokemon.listTrainedPokemonFormat(query)

@staticmethod
async def create(trainer_id,data):
    pokemon_specific_id,nickname,level = itemgetter('pokemon_specific_id','nickname','level')(data)
    SQL = (f"INSERT INTO trained_pokemon (pokemon_specific_id,trainer_id,nickname,level) "
    f"VALUES (%s,%s,%s,%s) RETURNING trained_pokemon_id")
    query = await Database.execute(SQL,[pokemon_specific_id,trainer_id,nickname,level])
    return query[0][0]


def __init__(self, trained_pokemon_id):
    self.trained_pokemon_id = trained_pokemon_id
```

```python
async def load(self):
    SQL = f"SELECT pokemon_specific_id,trainer_id,nickname,level FROM trained_pokemon WHERE trained_pokemon_id=(%s)"
    query = await Database.execute(SQL,[self.trained_pokemon_id])
    self.pokemon_specific_id = query[0][0]
    self.trainer_id = query[0][1]
    self.nickname = query[0][2]
    self.level = query[0][3]
    print("Finish loading trained pokemon data")
    return

async def update(self):
    SQL = f"UPDATE trained_pokemon SET nickname=(%s), level=(%s) WHERE trained_pokemon_id=(%s) RETURNING true"
    await Database.execute(SQL,[self.nickname,self.level,self.trained_pokemon_id])

async def delete(self):
    SQL = f"DELETE FROM trained_pokemon WHERE trained_pokemon_id=(%s) RETURNING true"
    await Database.execute(SQL,[self.trained_pokemon_id])


async def getLeaderboard(range, operator):
    SQL = f"SELECT tr.trainer_id, tr.name, COUNT(*) FROM trained_pokemon tp INNER JOIN trainer AS tr ON tp.trainer_id = tr.trainer_id "\
          f"INNER JOIN pokemon_specific AS ps ON ps.pokemon_specific_id = tp.pokemon_specific_id "\
          f"INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id "\
          f"INNER JOIN pokemon_stat pst ON pst.pokemon_generic_id = pg.pokemon_generic_id "\
          f"GROUP BY tr.trainer_id, tr.name HAVING COUNT(*) {operator} {range} ORDER BY COUNT(*) DESC, tr.name"

    query = await Database.execute(SQL, [])
    return query
```

Trainer SQL Queries:

```python
    @staticmethod
    async def listTrainers():
        SQL = f"SELECT trainer_id,name,gender FROM trainer"
        query = await Database.execute(SQL,None)
        return query

    # Add location to database return id and all information on location
    @staticmethod
    async def create(data):
        name,gender = itemgetter('name','gender')(data)
        SQL = f"INSERT INTO trainer (name,gender) VALUES (%s,%s) RETURNING trainer_id"
        query = await Database.execute(SQL,[name,gender])
        return query[0][0]

    def __init__(self, trainer_id):
```

```python
    async def load(self):
        SQL = f"SELECT name,gender FROM trainer WHERE trainer_id=(%s)"
        query = await Database.execute(SQL,[self.trainer_id])
        self.name = query[0][0]
        self.gender = query[0][1]
        print("Finish loading trainer data")
        self.pokemon = await TrainedPokemon.listTrainedPokemon(self.trainer_id)
        print("Finish loading trained pokemons")



    async def update(self,data):
        self.name = data.get('name') or self.name
        self.gender = data.get('gender') or self.gender
        SQL = f"UPDATE trainer SET name=(%s), gender=(%s) WHERE trainer_id=(%s) RETURNING true"
        await Database.execute(SQL,[self.name,self.gender,self.trainer_id])
```

```python
async def delete(self):
    SQL = f"DELETE FROM trainer WHERE trainer_id=(%s) RETURNING true"
    await Database.execute(SQL,[self.trainer_id])

async def getPokemonOwnedCount(self):
    SQL = (f"SELECT tp.pokemon_specific_id, pg.name, COUNT(tp.pokemon_specific_id) FROM trained_pokemon tp "
    f"INNER JOIN trainer AS tr ON tp.trainer_id = tr.trainer_id "
    f"INNER JOIN pokemon_specific AS ps ON tp.pokemon_specific_id = ps.pokemon_specific_id "
    f"INNER JOIN pokemon_generic AS pg ON pg.pokemon_generic_id = ps.pokemon_generic_id "
    f"WHERE tr.trainer_id = (%s) GROUP BY tp.pokemon_specific_id, pg.name")
    query = await Database.execute(SQL, [self.trainer_id])
    return query
```

Type SQL Queries:

```
            self.types.append(vals)
        return

    async def load(self):
        SQL = (f"SELECT name,slot "
        f"FROM type, pokemon_type "
        f"WHERE pokemon_type.pokemon_generic_id = (%s) AND pokemon_type.type_id = type.type_id")
        types = await Database.execute(SQL,[self.pokemon_generic_id])
        self.formatTypes(types)
        return

    def getTypes(self):
        return self.types
```

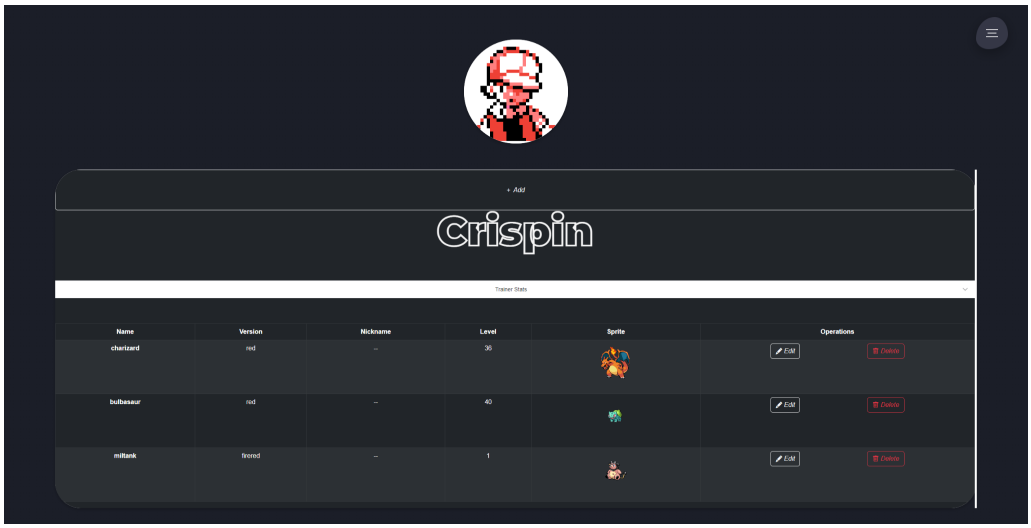
Section 5 -- Screenshots of Required Queries

i) INSERT
ii) DELETE
ii.2) DELETE CASCADE
iii) UPDATE
iv) SELECTION
v) Projection
vi) Join
vii) Aggregation GROUP BY
viii) Aggregation HAVING
ix) Nest Aggregation with GROUP BY
x) Division

i) INSERT

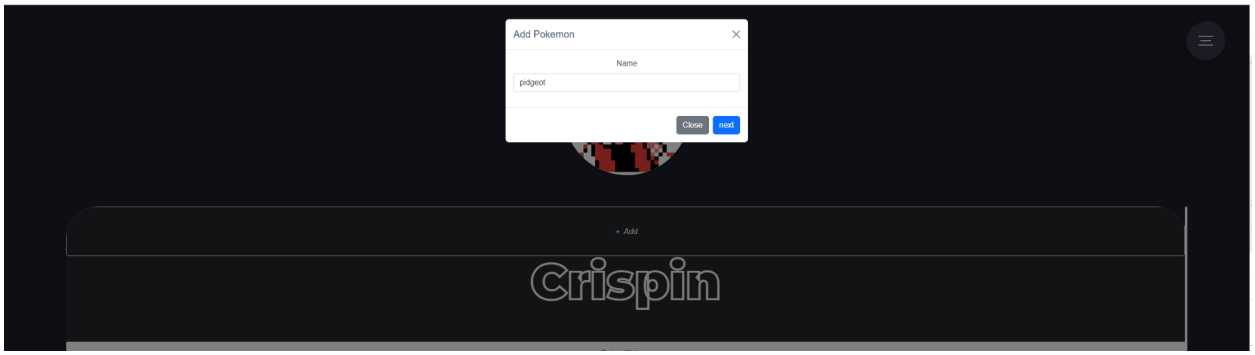
```python
@staticmethod
async def create(trainer_id,data):
    pokemon_specific_id,nickname,level = itemgetter('pokemon_specific_id','nickname','level')(data)
    SQL = (f"INSERT INTO trained_pokemon (pokemon_specific_id,trainer_id,nickname,level) "
    f"VALUES (%s,%s,%s,%s) RETURNING trained_pokemon_id")
    query = await Database.execute(SQL,[pokemon_specific_id,trainer_id,nickname,level])
    return query[0][0]
```

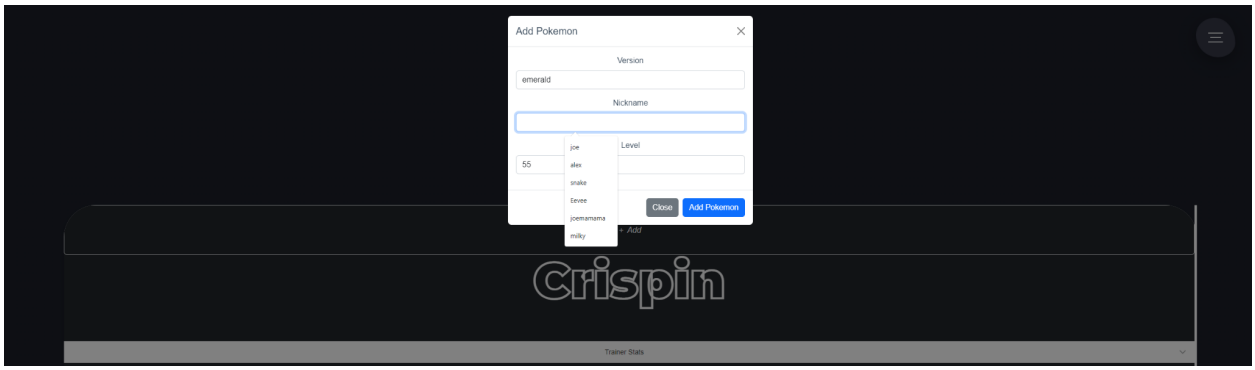
Before INSERT:

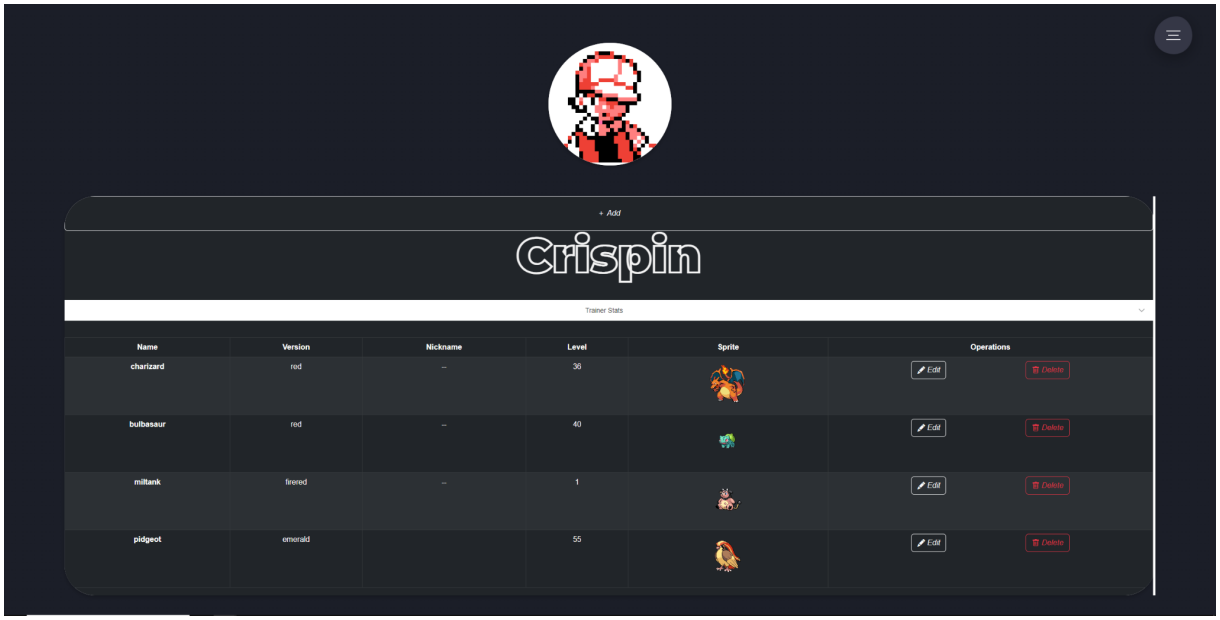


```
cpsc304=> select * From trained_pokemon WHERE trainer_id=3;
 trained_pokemon_id | pokemon_specific_id | trainer_id | nickname | level
--------------------+---------------------+------------+----------+-------
                  3 |                 101 |          3 |          |    36
                 18 |                   1 |          3 |          |    40
                 25 |                4540 |          3 |          |     1
(3 rows)
```

During/After (clicking Add Pokemon button):





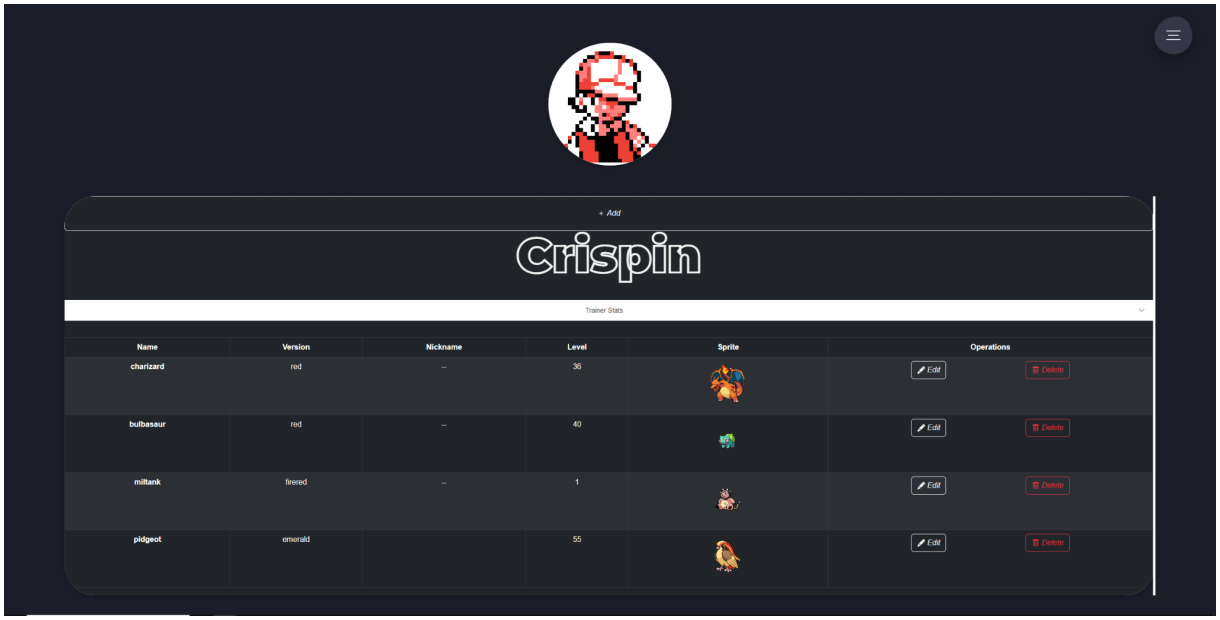



```
cpsc304=> select * From trained_pokemon WHERE trainer_id=3;
 trained_pokemon_id | pokemon_specific_id | trainer_id | nickname | level
--------------------+---------------------+------------+----------+-------
                  3 |                 101 |          3 |          |    36
                 18 |                   1 |          3 |          |    40
                 25 |                4540 |          3 |          |     1
                116 |                 349 |          3 |          |    55
(4 rows)
```

ii) DELETE

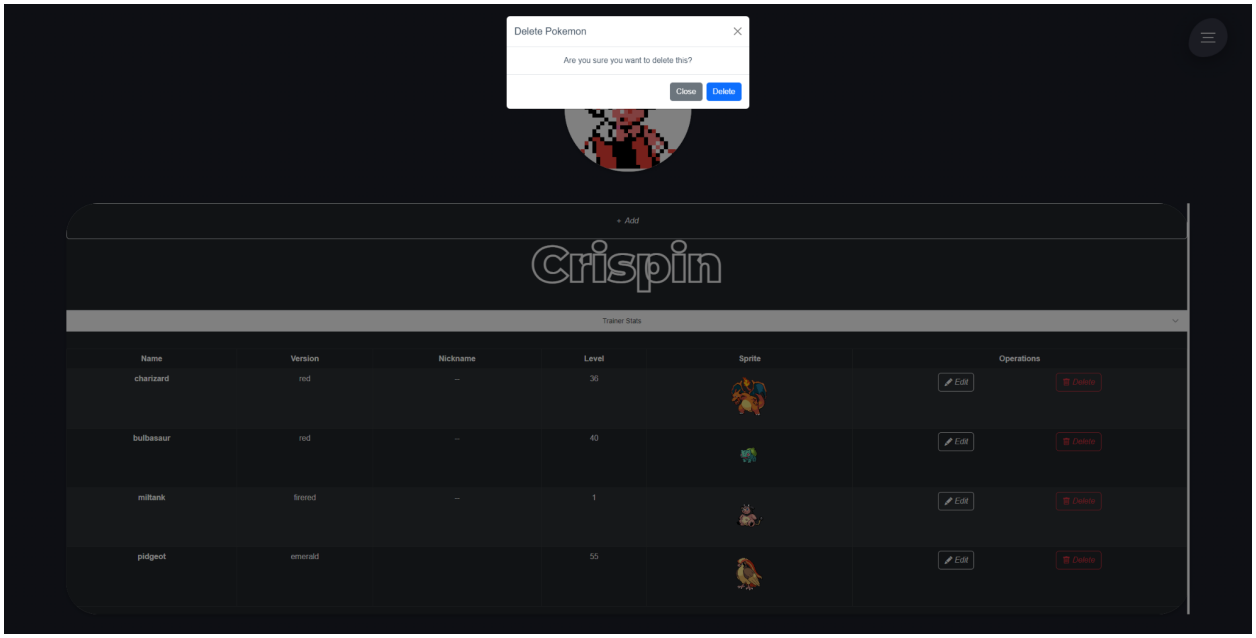
```
async def delete(self):
    SQL = f"DELETE FROM trained_pokemon WHERE trained_pokemon_id=(%s) RETURNING true"
    await Database.execute(SQL,[self.trained_pokemon_id])
```

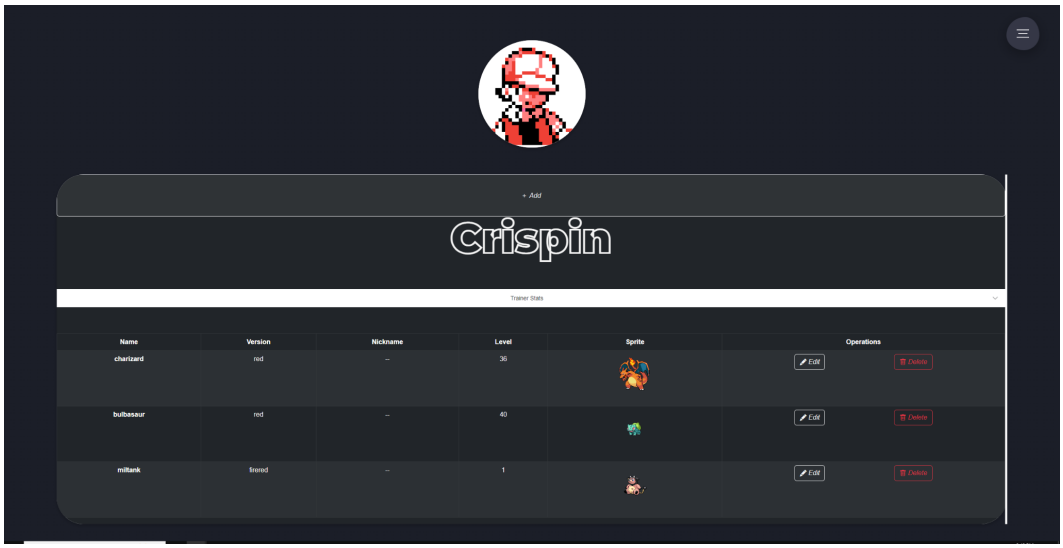
Before DELETE:




```
cpsc304=> select * From trained_pokemon WHERE trainer_id=3;
 trained_pokemon_id | pokemon_specific_id | trainer_id | nickname | level
--------------------+---------------------+------------+----------+-------
                  3 |                 101 |          3 |          |    36
                 18 |                   1 |          3 |          |    40
                 25 |                4540 |          3 |          |     1
                116 |                 349 |          3 |          |    55
(4 rows)
```

After DELETE (clicking Delete button):

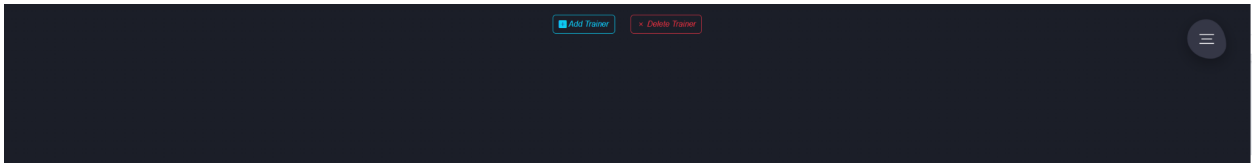


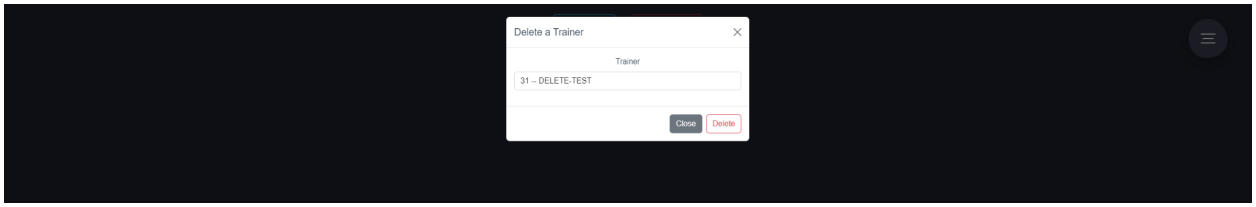



```
cpsc304=> select * From trained_pokemon WHERE trainer_id=3;
 trained_pokemon_id | pokemon_specific_id | trainer_id | nickname | level
--------------------+---------------------+------------+----------+-------
                  3 |                 101 |          3 |          |    36
                 18 |                   1 |          3 |          |    40
                 25 |                4540 |          3 |          |     1
(3 rows)
```

ii.2) DELETE CASCADE

Before DELETE:






```
cpsc304=> select * from trained_pokemon where trainer_id=31;
 trained_pokemon_id | pokemon_specific_id | trainer_id | nickname | level
--------------------+---------------------+------------+----------+-------
                122 |                 132 |         31 |          |    12
                123 |                4355 |         31 |          |    45
(2 rows)
```

```
cpsc304=> select * from trainer where trainer_id=31;
 trainer_id | gender |    name
------------+--------+-------------
         31 | Male   | DELETE-TEST
(1 row)
```

After DELETE:

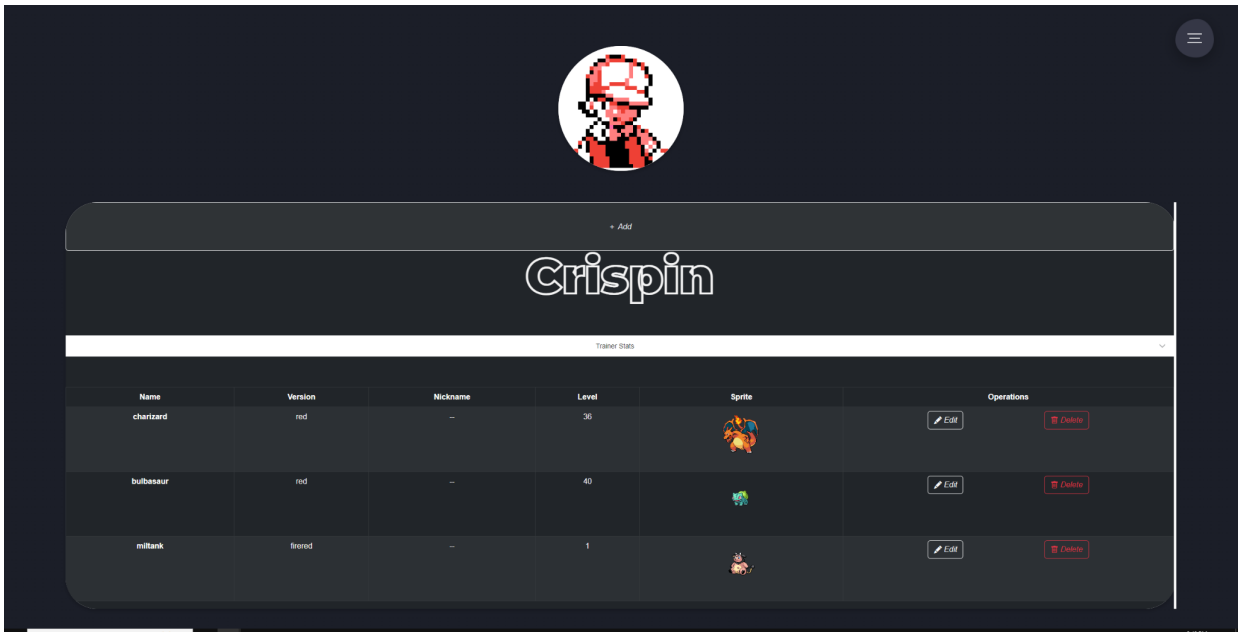
```
cpsc304=> select * from trainer where trainer_id=31;
 trainer_id | gender | name
------------+--------+------
(0 rows)
```

```
cpsc304=> select * from trained_pokemon where trainer_id=31;
 trained_pokemon_id | pokemon_specific_id | trainer_id | nickname | level
--------------------+---------------------+------------+----------+-------
(0 rows)
```

iii) UPDATE

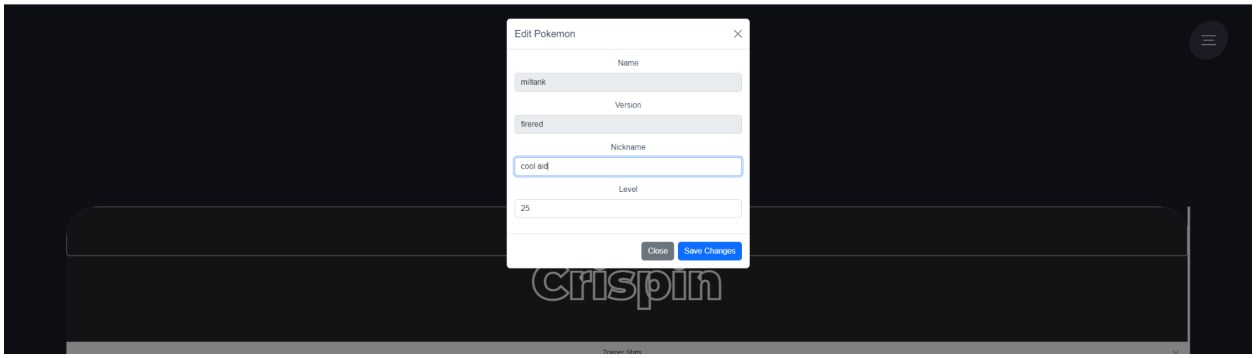
```
async def update(self):
    SQL = f"UPDATE trained_pokemon SET nickname=(%s), level=(%s) WHERE trained_pokemon_id=(%s) RETURNING true"
    await Database.execute(SQL,[self.nickname,self.level,self.trained_pokemon_id])
```

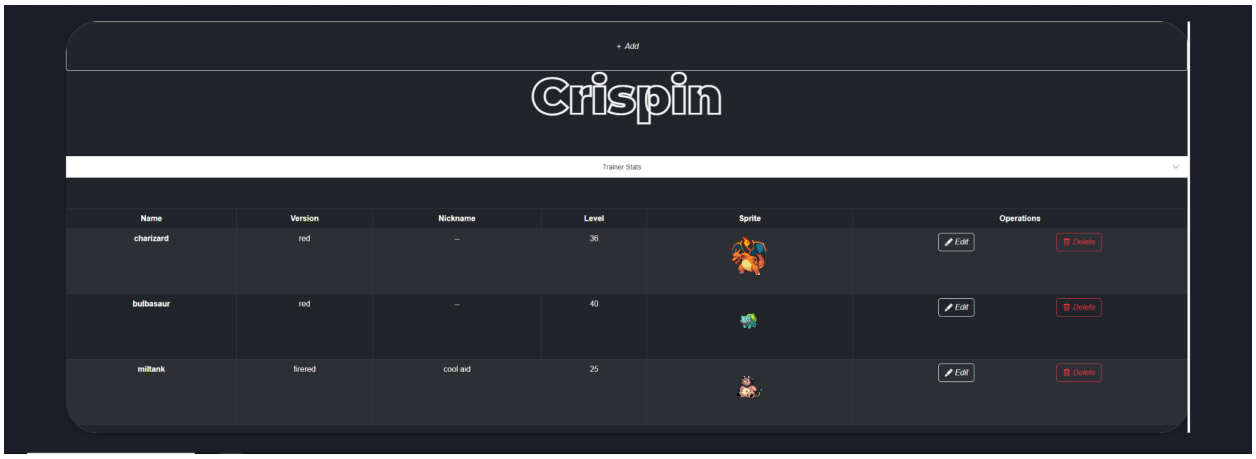
Before UPDATE:




```
cpsc304=> select * From trained_pokemon WHERE trainer_id=3;
 trained_pokemon_id | pokemon_specific_id | trainer_id | nickname | level
--------------------+---------------------+------------+----------+-------
                  3 |                 101 |          3 |          |    36
                 18 |                   1 |          3 |          |    40
                 25 |                4540 |          3 |          |     1
(3 rows)
```

After UPDATE:



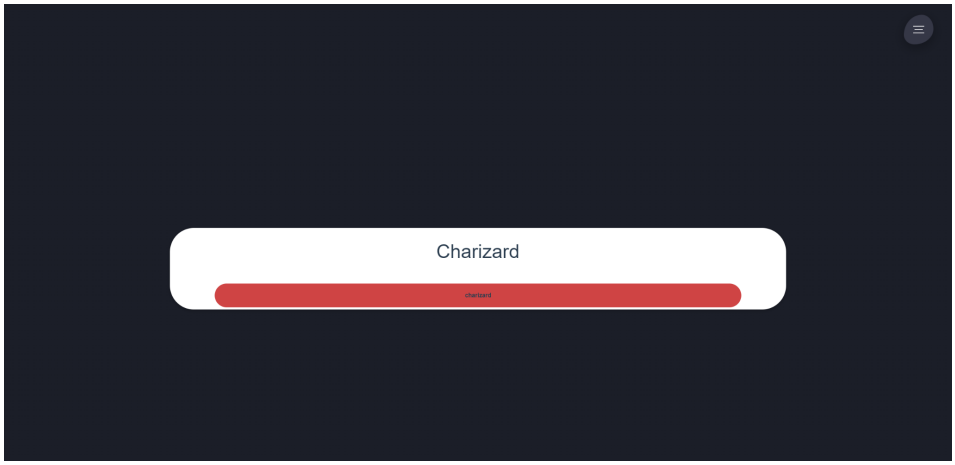



```
cpsc304=> select * From trained_pokemon WHERE trainer_id=3;
 trained_pokemon_id | pokemon_specific_id | trainer_id | nickname | level
--------------------+---------------------+------------+----------+-------
                  3 |                 101 |          3 |          |    36
                 18 |                   1 |          3 |          |    40
                 25 |                4540 |          3 | cool aid |    25
(3 rows)
```

iv) SELECTION

```
async def load(self):
    SQL = (f"SELECT *"
    f"FROM pokemon_stat "
    f"WHERE pokemon_stat.pokemon_generic_id= (%s) LIMIT 1")
    stats = await Database.execute(SQL,[self.pokemon_generic_id])
    self.formatStats(stats[0])
```

Before Selection Query :



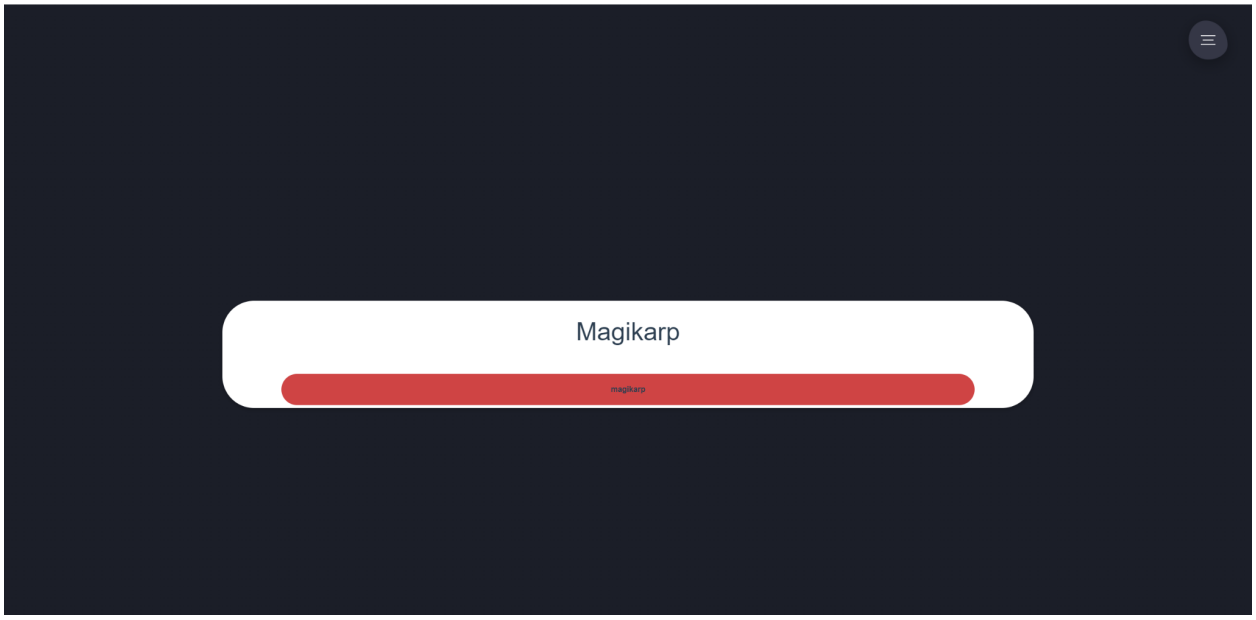
After Selection Query:

- Note: The search bar queries multiple data of pokemon_generic

v) PROJECTION

```
@staticmethod
async def listPokemonArea(pokemon_specific_id):
    SQL = (f"SELECT area.area_id, area.name, area.location_id, location.name "
    f"FROM pokemon_area AS pa, area, location "
    f"WHERE pa.pokemon_specific_id =(%s) AND pa.area_id = area.area_id AND area.location_id = location.location_id")
    query = await Database.execute(SQL,[pokemon_specific_id])
    return Area.listPokemonAreaFormat(query)       You, 3 days ago • Add area to pokemon …

def __init__(self, area_id):
    self.area_id = area_id
```

Before Projection Query:



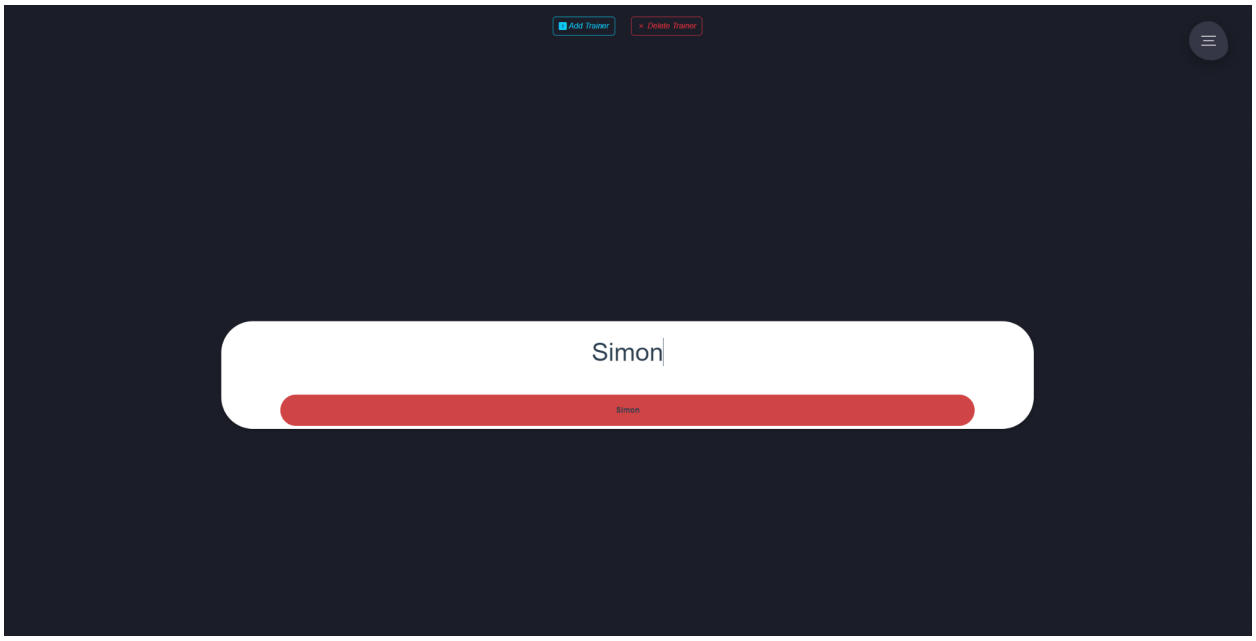
After Projection Query:

vi) JOIN

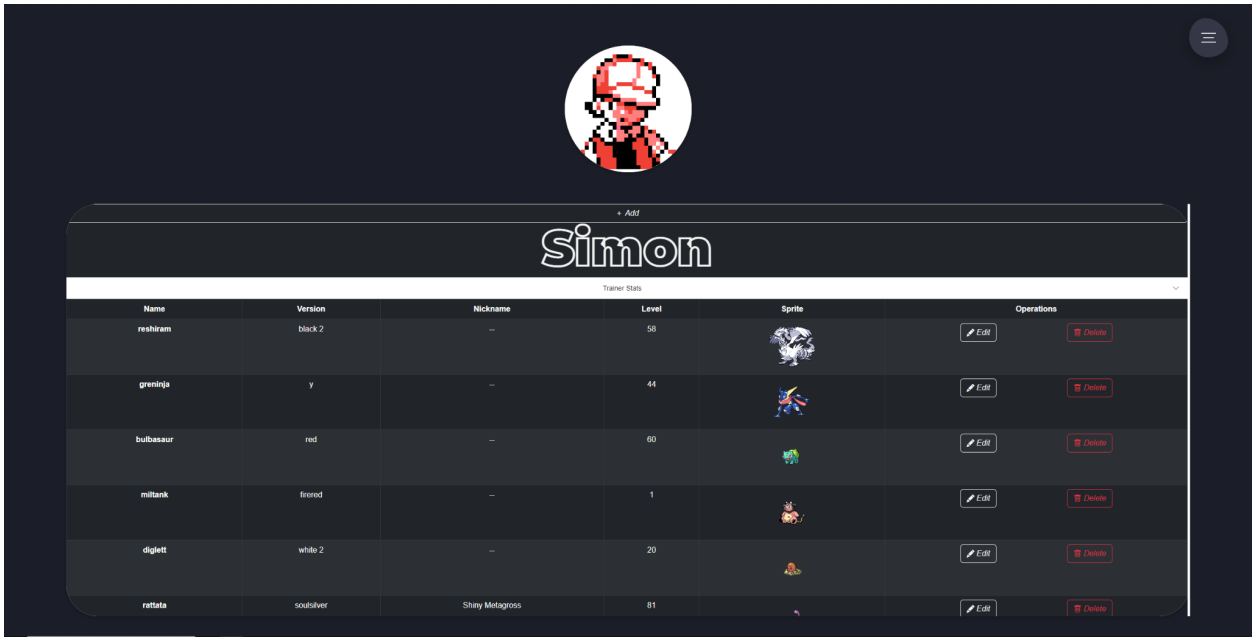
```python
@staticmethod
async def listTrainedPokemon(trainer_id):
    SQL = f"SELECT tp.trainer_id, tp.trained_pokemon_id, ps.pokemon_specific_id,pg.name, tp.nickname, tp.level, pg.sprite, v.name " \
          f"FROM trained_pokemon tp INNER JOIN pokemon_specific ps ON ps.pokemon_specific_id = tp.pokemon_specific_id " \
          f"INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id " \
          f"INNER JOIN version v ON v.version_id = ps.version_id "\
          f"WHERE tp.trainer_id = (%s) "
    query = await Database.execute(SQL,[trainer_id])
    return TrainedPokemon.listTrainedPokemonFormat(query)

@staticmethod
async def create(trainer_id,data):
    pokemon_specific_id,nickname,level = itemgetter('pokemon_specific_id','nickname','level')(data)
    SQL = (f"INSERT INTO trained_pokemon (pokemon_specific_id,trainer_id,nickname,level) "
```

szhou13, 22 hours ago • WIP trainer

Before Join Query:



After Join Query:

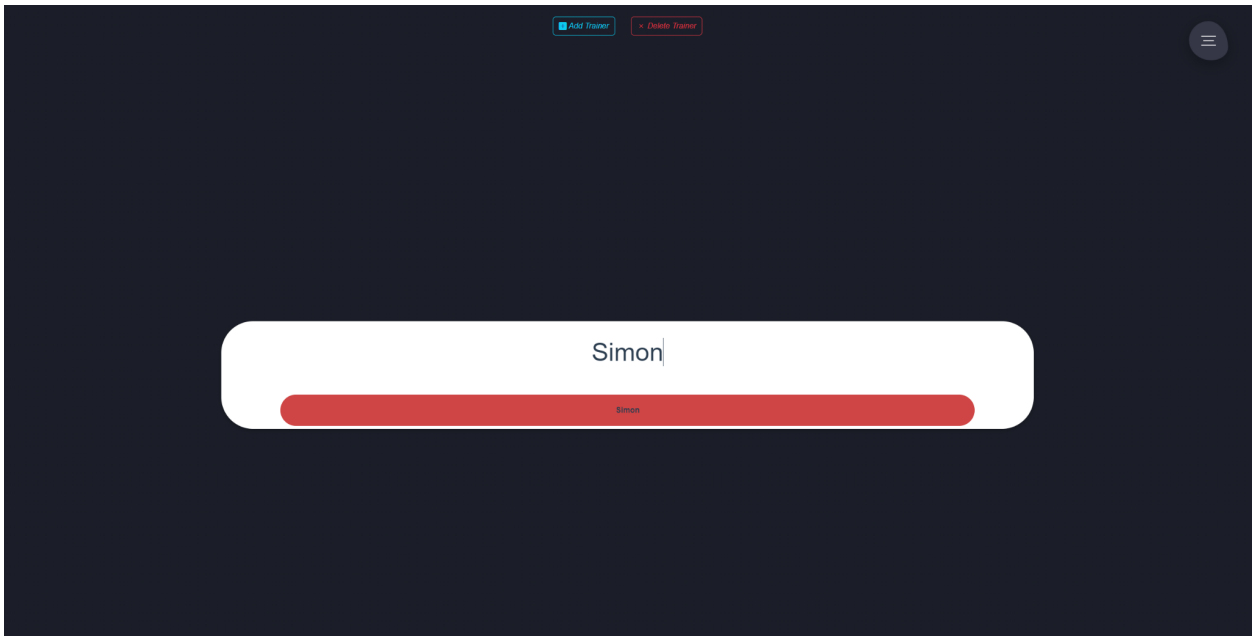



```
cpsc304=> SELECT tp.trainer_id, tp.trained_pokemon_id, ps.pokemon_specific_id,pg.name, tp.nickname, tp.level, pg.sprite, v.name
FROM trained_pokemon tp INNER JOIN pokemon_specific ps ON ps.pokemon_specific_id = tp.pokemon_specific_id
INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id
INNER JOIN version v ON v.version_id = ps.version_id
WHERE tp.trainer_id = 5;
 trainer_id | trained_pokemon_id | pokemon_specific_id |    name    |    nickname     | level |                                    sprite                                    |    name
------------+--------------------+---------------------+------------+-----------------+-------+------------------------------------------------------------------------------+-----------
          5 |                 12 |                8169 | reshiram   |                 |    58 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/643.png | black 2
          5 |                 13 |                8212 | greninja   |                 |    44 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/658.png | y
          5 |                 20 |                   1 | bulbasaur  |                 |    60 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/1.png   | red
          5 |                 27 |                4540 | miltank    |                 |     1 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/241.png | firered
          5 |                 89 |                1000 | diglett    |                 |    20 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/50.png  | white 2
          5 |                  5 |                 376 | rattata    | Shiny Metagross |    81 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/19.png  | soulsilver
          5 |                 90 |                2652 | eevee      | Garcho0         |    77 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/133.png | diamond
          5 |                 88 |                2652 | eevee      | joe4            |   554 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/133.png | diamond
          5 |                 91 |                5000 | lombre     | joe             |    50 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/271.png | white 2
          5 |                 93 |                8860 | regieleki  | aack            |    52 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/894.png | shield
          5 |                 94 |                5484 | aggron     |                 |    44 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/306.png | platinum
          5 |                 95 |                3003 | mew        |                 |    87 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/151.png | yellow
          5 |                 97 |                4812 | mudkip     |                 |    45 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/258.png | platinum
          5 |                 98 |                1612 | magnemite  |                 |    45 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/81.png  | diamond
          5 |                 99 |                  86 | charmeleon |                 |    12 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/5.png   | crystal
          5 |                105 |                4352 | kingdra    | joemamama       |    77 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/230.png | emerald
          5 |                101 |                4580 | raikou     |                 |    60 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/243.png | soulsilver
          5 |                106 |                1454 | tentacruel | joe             |  1212 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/73.png  | platinum
          5 |                107 |                6762 | luxio      |                 |    90 | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/404.png | pearl
(19 rows)
```

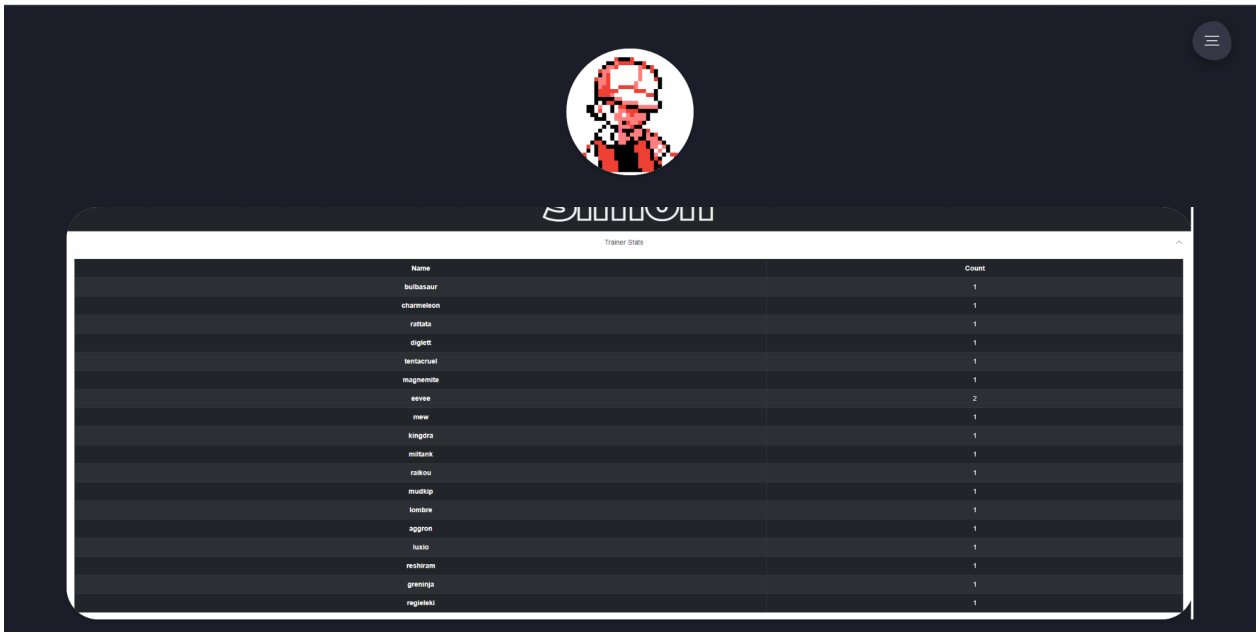
vii) AGGREGATION WITH GROUP BY

```
ync def getPokemonOwnedCount(self):
  SQL = (f"SELECT tp.pokemon_specific_id, pg.name, COUNT(tp.pokemon_specific_id) FROM trained_pokemon tp "
  f"INNER JOIN trainer AS tr ON tp.trainer_id = tr.trainer_id "
  f"INNER JOIN pokemon_specific AS ps ON tp.pokemon_specific_id = ps.pokemon_specific_id "
  f"INNER JOIN pokemon_generic AS pg ON pg.pokemon_generic_id = ps.pokemon_generic_id "
  f"WHERE tr.trainer_id = (%s) GROUP BY tp.pokemon_specific_id, pg.name")       You, 9 hours ago • Add traine
  query = await Database.execute(SQL, [self.trainer_id])
  return query
```

Before Aggregation Query:



After Aggregation Query:



Trainer Stats

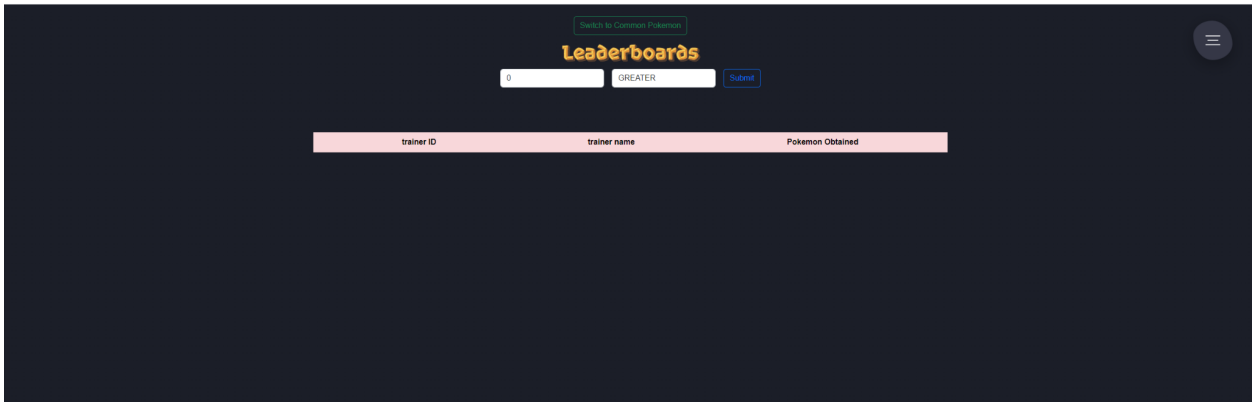
Name	Count
bulbasaur	1
charmeleon	1
rattata	1
diglett	1
tentacruel	1
magnemite	1
eevee	2
mew	1
kingdra	1
miltank	1
raikou	1
mudkip	1
lombre	1
aggron	1
luxio	1
reshiram	1
greninja	1
regieleki	1

```
cpsc304=> SELECT tp.pokemon_specific_id, pg.name, COUNT(tp.pokemon_specific_id) FROM trained_pokemon tp
INNER JOIN trainer AS tr ON tp.trainer_id = tr.trainer_id
INNER JOIN pokemon_specific AS ps ON tp.pokemon_specific_id = ps.pokemon_specific_id
INNER JOIN pokemon_generic AS pg ON pg.pokemon_generic_id = ps.pokemon_generic_id
WHERE tr.trainer_id = 5 GROUP BY tp.pokemon_specific_id, pg.name;
 pokemon_specific_id |    name    | count
---------------------+------------+-------
                   1 | bulbasaur  |     1
                  86 | charmeleon |     1
                 376 | rattata    |     1
                1000 | diglett    |     1
                1454 | tentacruel |     1
                1612 | magnemite  |     1
                2652 | eevee      |     2
                3003 | mew        |     1
                4352 | kingdra    |     1
                4540 | miltank    |     1
                4580 | raikou     |     1
                4812 | mudkip     |     1
                5000 | lombre     |     1
                5484 | aggron     |     1
                6762 | luxio      |     1
                8169 | reshiram   |     1
                8212 | greninja   |     1
                8860 | regieleki  |     1
(18 rows)
```

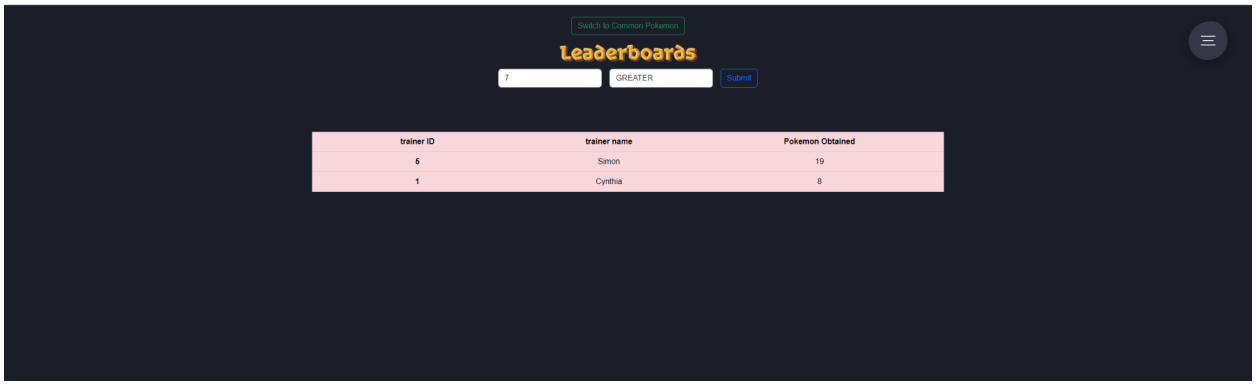
viii) AGGREGATION WITH HAVING

```
 Database.execute(SQL,[self.trained_pokemon_id])


 getLeaderboard(range, operator):
 f"SELECT tr.trainer_id, tr.name, COUNT(*) FROM trained_pokemon tp INNER JOIN trainer AS tr ON tp.trainer_id = tr.trainer_id "\
  f"INNER JOIN pokemon_specific AS ps ON ps.pokemon_specific_id = tp.pokemon_specific_id "\
  f"INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id "\
  f"INNER JOIN pokemon_stat pst ON pst.pokemon_generic_id = pg.pokemon_generic_id "\
  f"GROUP BY tr.trainer_id, tr.name HAVING COUNT(*) {operator} {range} ORDER BY COUNT(*) DESC, tr.name"

 = await Database.execute(SQL, [])
n query
```

Before AGGREGATION WITH HAVING:



After AGGREGATION WITH HAVING:

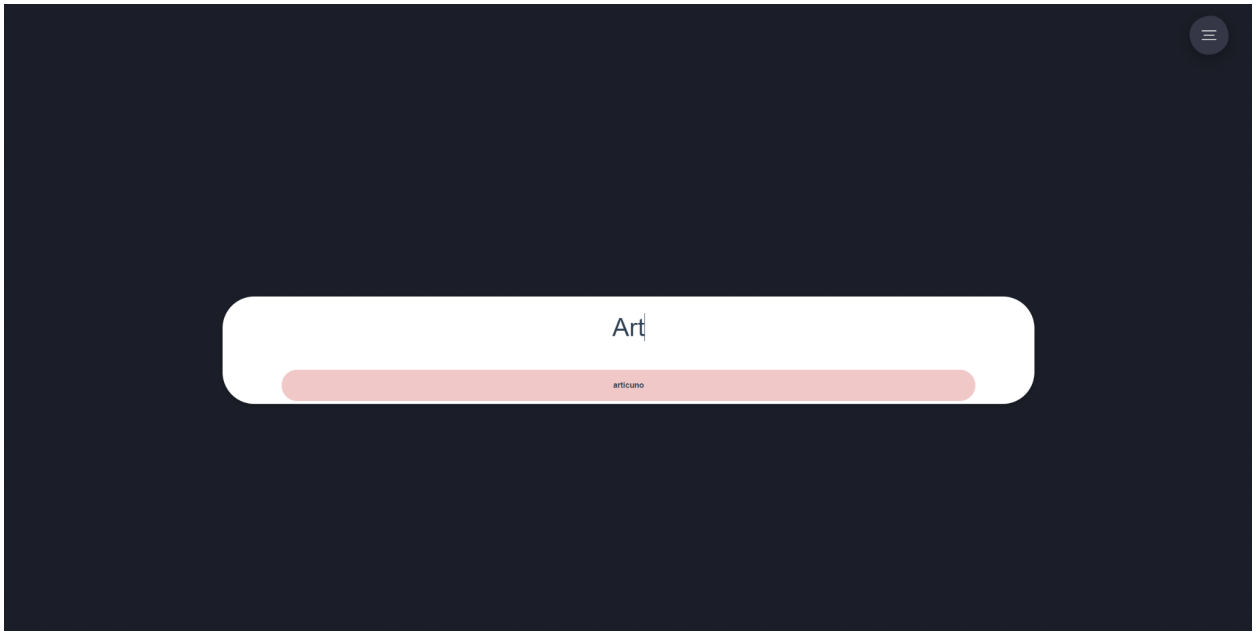



```
cpsc304=> SELECT tr.trainer_id, tr.name, COUNT(*) FROM trained_pokemon tp INNER JOIN trainer AS tr ON tp.trainer_id = tr.trainer_id
INNER JOIN pokemon_specific AS ps ON ps.pokemon_specific_id = tp.pokemon_specific_id
INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id
INNER JOIN pokemon_stat pst ON pst.pokemon_generic_id = pg.pokemon_generic_id
GROUP BY tr.trainer_id, tr.name HAVING COUNT(*) > 7 ORDER BY COUNT(*) DESC, tr.name;
 trainer_id |  name   | count
------------+---------+-------
          5 | Simon   |    19
          1 | Cynthia |     8
(2 rows)
```

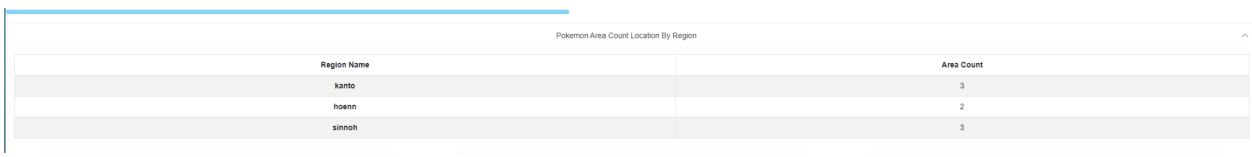
ix) NESTED AGGREGATION GROUP BY

```
@staticmethod
async def getPokemonAreaCountPerRegion(generic_id):
    innerSQL = (f"SELECT ps.pokemon_specific_id, ps.version_id, COUNT(*) AS areaCount "
    f"FROM pokemon_specific as ps "
    f"INNER JOIN pokemon_area as pa ON ps.pokemon_specific_id = pa.pokemon_specific_id "
    f"INNER JOIN pokemon_generic as pg ON pg.pokemon_generic_id = ps.pokemon_generic_id "
    f"WHERE pg.pokemon_generic_id=(%s) GROUP BY ps.pokemon_specific_id, ps.version_id")

    SQL = (f"SELECT r.region_id, r.name, SUM(ps.areaCount) "
    f"FROM ({innerSQL}) AS ps, version AS v, version_group AS vg, region AS r "
    f"WHERE vg.version_group_id = v.version_group_id AND ps.version_id = v.version_id AND r.generation_id = vg.generation_id "
    f"GROUP BY r.region_id")       You, 6 hours ago • Add nested group endpoint
    query = await Database.execute(SQL,[generic_id])
    print(query)
    return query

def initPokemon(self):
    self.versionIdList = []
```

BEFORE NESTED AGGREGATION GROUP BY:



AFTER NESTED AGGREGATION GROUP BY:



Pokemon Area Count Location By Region

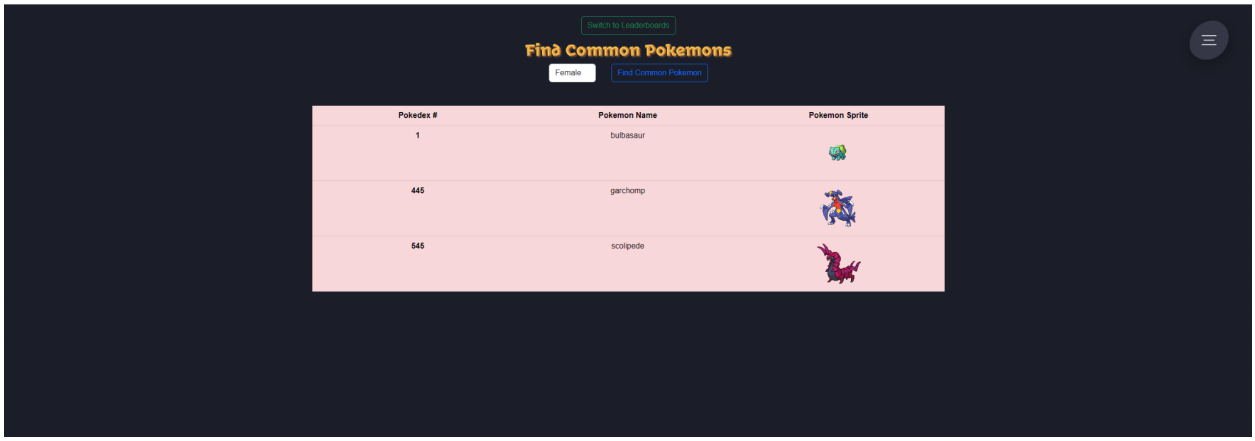
Region Name	Area Count
kanto	3
hoenn	2
sinnoh	3

x) DIVISION

```
def findPokemonThatAllTrainer(gender):
 gender is not None:
  SQL = f"SELECT DISTINCT pg.pokemon_generic_id, pg.name FROM pokemon_specific ps "\
        f"INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id "\
        f"WHERE NOT EXISTS((SELECT t.trainer_id FROM trainer t WHERE t.gender = {gender}) EXCEPT "\
        f"(SELECT t.trainer_id FROM trained_pokemon tp INNER JOIN trainer t ON t.trainer_id = tp.trainer_id WHERE ps.pokemon_specific_id = tp.pokemon_specific_id)) "
se:
  SQL = f"SELECT DISTINCT pg.pokemon_generic_id, pg.name FROM pokemon_specific ps " \
        f"INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id " \
        f"WHERE NOT EXISTS((SELECT t.trainer_id FROM trainer t) EXCEPT " \
        f"(SELECT t.trainer_id FROM trained_pokemon tp INNER JOIN trainer t ON t.trainer_id = tp.trainer_id WHERE ps.pokemon_specific_id = tp.pokemon_specific_id)) "
ery = await Database.execute(SQL, [])
turn query
```

BEFORE DIVISION QUERY:

AFTER DIVISION QUERY:



```
cpsc304=> SELECT DISTINCT pg.pokemon_generic_id, pg.name, pg.sprite FROM pokemon_specific ps
INNER JOIN pokemon_generic pg ON pg.pokemon_generic_id = ps.pokemon_generic_id
WHERE NOT EXISTS((SELECT t.trainer_id FROM trainer t WHERE t.gender = 'Female') EXCEPT
(SELECT t.trainer_id FROM trained_pokemon tp INNER JOIN trainer t ON t.trainer_id = tp.trainer_id WHERE ps.pokemon_specific_id = tp.pokemon_specific_id)) ORDER BY pg.pokemon_generic_id ASC;
 pokemon_generic_id |   name    |                                  sprite
--------------------+-----------+-------------------------------------------------------------------------
                  1 | bulbasaur | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/1.png
                445 | garchomp  | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/445.png
                545 | scolipede | https://raw.githubusercontent.com/PokeAPI/sprites/master/sprites/pokemon/545.png
(3 rows)
```