BAIS:3200
Homework 4: SQL Queries
Total Points: 50

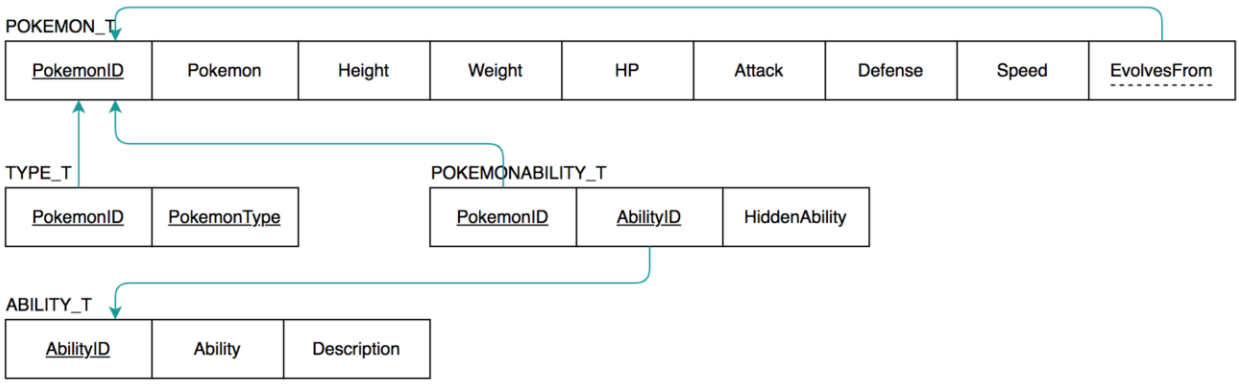
Specifications
For this homework, you need to submit two files:

- APEX-encoded SQL script with your SQL queries to answer each question
  - APEX-encoded scripts are created using the "Export" option (not "Download")
  - Add comments with your name and question number into the script
- Word or PDF file with screenshots of code and results
  - You may need to adjust the "Rows" dropdown menu and/or zoom out to ensure that all results are in the screenshot
- Your file names should contain your last name and the assignment name (e.g., "lastname_homework4.sql", "lastname_homework4.docx")
- All files should be attached in 1 submission
  - If you are using a cloud service (e.g., Google Drive, OneDrive) to save your files, you may need to download the file(s) to your computer, and submit the local copies to ICON
  - If you need to re-submit the assignment, make sure to include all files
- Q6 is an optional extra credit question worth up to **3 points**. No assistance will be given on the extra credit item.

Download "POKEMON.sql" from ICON, then Import into APEX and run. This script contains 152 SQL statements to create and populate a database tracking information about Pokemon appearing in the original Pokemon Red and Blue games. This data is sourced from Bulbapedia (https://bulbapedia.bulbagarden.net/wiki/Main_Page) and Pokemon DB (https://pokemondb.net/). The normalized database contains 4 tables:

- POKEMON_T (26 rows) records the unique ID, name, height (in centimeters), weight (in kilograms), and basic statistics (HP, Attack, Defense, Speed ratings) for each Pokemon. Additionally, this table tracks the evolution chain of each Pokemon, specifically, which Pokemon it evolves from. Some Pokemon do not evolve from another Pokemon.
- TYPE_T (39 rows) stores the type(s) for each Pokemon. Each Pokemon belongs to 1 or 2 types.
- ABILITY_T (22 rows) stores the unique ID, name, and description for a variety of innate/passive effects that Pokemon may possess. All abilities in the database are possessed by at least 1 Pokemon.
- POKEMONABILITY_T (57 rows) tracks which abilities are possessed by each Pokemon, and whether that ability is "hidden" or not. All Pokemon possess at least 1 ability.

You should review each table in the Object Browser and/or examine the SQL script to make sure that you understand the field definitions, constraints, primary key(s), foreign key(s), and relationships. A logical relational schema for the data is displayed below:



Then write SQL queries to answer the following questions. Submit all code as a SQL script (.sql). Add a comment at the top of the script with your name and comments to denote each question:

1. (6.5 points) Pokemon represent a diverse set of types. Write a **simple query** that returns the type and total number of Pokemon belonging to each type. Only include types that have at least 5 Pokemon in the results. Make sure to rename any new, calculated fields.

2. (8.5 points) All members of the Bulbasaur family have names ending in “saur”. Write a **simple query** that returns summary statistics for the HP of Pokemon in this family, specifically the maximum and average HP. Round the average to a whole number (0 decimal places). Make sure to rename any new, calculated fields.

3. (11 points) Assume that calculating BMI (body mass index) works the same in the Pokemon universe as in our own, using the following formula:

$$BMI = \frac{Weight\ (kg)}{Height\ (m)^2}$$

   Write a **join query** that returns the top 10 Pokemon with the highest BMI. For each, return their ID, name, BMI (rounded to one decimal place), and the name of their evolution (i.e., the Pokemon they evolve into). Make sure to rename any new, calculated fields.

4. (11 points) Some Pokemon belong to multiple types, but is this more common in base evolution Pokemon or evolved Pokemon? Write a **compound query** that returns the name and speed rating for each evolved Pokemon that belongs to both the poison type and any other secondary type.

5. (13 points) Pokemon may possess a “hidden” ability. Write a **subquery** that returns the name of each Pokemon with a hidden ability, plus the name and description of the ability. Only include Pokemon whose defense rating is greater than the median over all Pokemon.

6. (Extra Credit) Does evolution yield stronger Pokemon? Write a **join query** that returns the name and attack rating for each evolved Pokemon, plus the name of their direct ancestor (i.e., the Pokemon they evolved from). In addition, return the difference in

attack strength between them (attack rating of Pokemon – attack rating of ancestor). Sort the results so that the Pokemon with the highest attack ratings are listed at the top. Make sure to rename any new, calculated fields.