**Pokémon 3: The Return of the Kingler**

**Research Question:** **Which Pokémon team is the best suited for beating the Elite Four, and can we determine it via simulation?**

Pokémon, as a franchise, is a **combat adventure simulator**. In Computational Methods 2, we created a model from multiple **Kaggle datasets augmented with data pulled from Bulbapedia and Serebii**. Those datasets are only about 200KB. That model could simulate an automated battle between two Pokémon at level 1, considering the individual traits, attacks, and abilities of each Pokémon. That model took each action and tracked the battle through those actions.

In Simulation Modeling, we expanded that code to successfully model Pokémon at level 50. With that expansion we simulated 6-on-6 battles more akin to the setup in the games. We leveraged that upgrade to pit a handful of teams against the Elite Four (4 end bosses with teams of 5 Pokémon each) in sequence, declaring a winner from those limited hand-picked teams. (see below for illustrations from that project) We were constrained by time and computing resources, as we simulated 6-on-20 battles, modeling each and every attack, and then stochastically repeated those battle 1000 times each. Those entire simulation runs **took hours on local machines** and our analyzed output from that project was 121KB just from 11 teams.

Now we want to take that model to its logical end and try as many teams as achievable with the **HPC resources** available to us now, without the biases of the investigators limiting the initial team choices. Simulations with **6 million teams** should give us a dataset of roughly **3 GB** if our current simulation outputs are a good indication. That output dataset will be stored on the HPC as well, and then we will run analysis on it from there with Python IDEs. Furthermore, we would like to incorporate as much new information from the course as possible such as API calls to PokeAPI database, Streamlit Dashboard showcasing the results with interactivity, and maybe even the use of SQL databases. This is ultimately the question we have been asking from the beginning. How can we “be the very best, like no one ever was” as we have been challenged to be by this franchise’s theme song?

A screenshot of a video game

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