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# Business Task

In this study, I will evaluate the effectiveness of Fairy-type Pokémon as a counter to Dragon-type Pokémon. With the introduction of Fairy-type Pokémon, Dragon-type Pokémon now have a type that they are vulnerable to. This study aims to determine the usefulness of Fairy-type Pokémon in battles against Dragon-type Pokémon. I will assess whether Fairy-types are stronger on their own, or if they are still dependent on other Pokémon types.

To measure the effectiveness of Fairy-types, I will use the following metrics:

* Type 1: Each Pokémon has a specific type that determines its weaknesses and resistances to different attacks.
* Type 2: Some Pokémon have dual types.
* Total: A summary of the Pokémon's overall strength, calculated as the sum of all its stats.
* HP: A measurement of how much damage a Pokémon can endure before fainting.
* Attack: The base modifier for normal attacks.
* Defense: The base resistance to normal attacks.
* SP Atk: The base modifier for special attacks.
* SP Def: The base resistance to special attacks.
* Speed: The determining factor for which Pokémon attacks first each round.

The results of this study will assist Pokémon players in making informed decisions about whether to use a Fairy-type or Dragon-type Pokémon in battles against teams with a heavy presence of Dragon-types.

# Data Description

The dataset thar I will be using is located here: <https://www.kaggle.com/datasets/abcsds/pokemon>

This dataset contains information about Pokémon and their types, including 9 different features, and was gathered from multiple sources such as the official Pokémon website and the Bulbapedia, a Pokémon-focused Wikipedia-style website. The information was cross-checked to ensure accuracy and credibility.

The dataset provides a comprehensive comparison between Dragon-type and Fairy-type Pokémon, including a summary of overall strength, which may be useful in determining the necessity of Fairy-types.

The dataset is licensed under a Creative Commons Public Domain license, allowing for unrestricted use.

# Summary of analysis

To start the analysis, I imported the data into a Datalore notebook and followed a structured data wrangling process. This process consisted of the following steps:

1. Removing irrelevant data: I removed the "Legendary" and "Generation" columns as they were not relevant to answering the research questions. I also filtered the dataset to only include dragon and fairy type Pokémon for focused comparison during the exploration phase.
2. Deduplicating the data: I checked for duplicates in the data using the duplicated method and found no duplicates to fix.
3. Fixing structural errors: I filtered out the Mega Pokémon as they would be outliers in the data if included.
4. Dealing with missing data: I checked for missing data using the isna and sum methods and found twenty-six missing values in the "Type 2" column. These values were replaced with "None" as they corresponded to Pokémon with only one type. The "Number" category was also filtered out as it was not needed for further exploration.
5. Filtering out outliers: I used the "Total" column to identify outliers by plotting a histogram and a boxplot. The descriptive statistics, including the median, quartiles, and interquartile range, were calculated to search for outliers, but none were found.
6. Validating the data: Finally, I validated the data by using regex to remove any incorrect symbols, correcting misspelled words using the replace method, and separating two forms of Kyurem and Giratina into separate entries.

This process ensures that the data is clean and ready for analysis, providing accurate and reliable results.

# Insights

## Introduction

In the world of Pokémon, each type of Pokémon has a corresponding type that it is particularly vulnerable to. For example, fire-type Pokémon are vulnerable to water-type Pokémon, and ice-type Pokémon are weak against fire-types. Historically, dragon-type Pokémon were only vulnerable to themselves. With the introduction of fairy-type Pokémon, dragon-type Pokémon now have a new type that they are weak against.

In this study, I aimed to understand the strengths and weaknesses of fairy-type Pokémon in comparison to their natural rivals in the Pokémon universe using a Pokémon database. The study aimed to determine if the introduction of this new type was useful, assess its overall strength, and determine if it was truly necessary. The dragon-type Pokémon was previously only weak against itself, but with the inclusion of fairy-type Pokémon, dragon-types now have a rival type they are especially weak against.

## Analysis

### How useful has the inclusion of fairy type Pokémon been?

The base attributes of dragon-type and fairy-type Pokémon were compared in this study, excluding their special attack and special defense. It was expected that fairy-type Pokémon would excel in these areas based on their natural strengths, but the results showed otherwise. The chart below displays the comparison of these base attributes for both dragon and fairy types.

Chart, bar chart

Description automatically generated

While fairy-type Pokémon may have an advantage against dragon-type attacks, their base attributes indicate otherwise. Compared to dragon-type Pokémon, fairy-types are weaker in nearly all categories, with the exception of special defense. This disparity in strength calls into question the effectiveness of fairy-types as a counter to dragon-types, particularly when considering base stats alone.

### Are they stronger than dragon type Pokémon on their own?

The base attributes of fairy-type Pokémon are generally lower than those of dragon-type Pokémon. However, when looking specifically at fairy-type Pokémon with a Type 1 attribute of "fairy" and a Type 2 attribute of "none", they are shown to have a high special defense, as depicted in the chart below. This information could be useful for a player to consider when battling against a dragon-type Pokémon that prioritizes moves that use the special attack attribute.

Chart

Description automatically generated

The base attributes of fairy-type Pokémon are inferior to those of dragon-type Pokémon. However, when examining fairy-types with a "Fairy" Type 1 attribute and "None" Type 2 attribute, it becomes evident that their special defense is notably strong. This can be useful information for a player when facing a dragon-type opponent known for relying on moves with a high special attack attribute.

Chart, box and whisker chart

Description automatically generated

### Based on the features provided by the data, are they needed?

According to the Pokémon universe, fairy-type Pokémon are immune to dragon-type moves, which can make them a useful addition to a well-rounded Pokémon team. However, when comparing their base stats to those of dragon-type Pokémon, it becomes clear that fairy-types are weaker in overall defense and attack.

In the chart below, the attributes of Rayquaza and Xerneas are compared. Xerneas is the most powerful fairy-type Pokémon currently available to players, but shares the same overall score as Rayquaza as calculated from the Total column. Xerneas is a well-rounded Pokémon, while Rayquaza is designed to withstand powerful attacks. However, this strength in defense means that Xerneas would struggle to overcome Rayquaza, as it lacks a particular attribute in which it excels. While it may be able to damage Rayquaza with fairy-type attacks, it is unlikely that it would be able to outlast the durable dragon-type Pokémon.

Chart

Description automatically generated

It can be tempting to conclude that fairy-type Pokémon are not necessary based on the comparatively weaker base attributes of the strongest fairy-type Pokémon, Xerneas, when compared to a dragon-type Pokémon like Rayquaza. However, it is possible that other Pokémon types may have higher special attack stats and, when combined with a fairy-type move, could outperform Rayquaza. Without a similar comparison of other Pokémon types against dragon-types, it is difficult to definitively say whether fairy-types are truly necessary.

# Conclusion

In conclusion, the strength of Fairy-type Pokémon in battles is not solely determined by their base type. When compared to Dragon-type Pokémon, Fairy-types tend to have weaker base stats in all aspects, including special defense and attack. This means that trainers should be cautious when selecting a Fairy-type Pokémon to face a Dragon-type in battle, as they are more likely to face defeat. However, the effectiveness of Fairy-types can be improved by incorporating Fairy-type moves into their moveset. In this case, a Normal-type Pokémon with Fairy-type moves can prove to be a better choice for battling Dragon-type Pokémon. Overall, the key to successfully using Fairy-types in battle lies in a combination of the right Pokémon and the right moveset.