Alternative Pokemon Starter Types
(Excluding Water, Grass, and Fire)

Abstract

Since Pokemon Red's and Pokemon Green's release in 1996 (or Pokemon Red and Pokemon Blue international releases in 1998), starter trios in the Pokemon franchise have consistently been Water, Grass, and Fire types; occasionally, these starters include, or gain upon evolution, a secondary typing. These three primary types have provided a solid foundation for starters due to several key criteria: their offensive relationships with each other, their relationship to themselves, and their relationship to immunities. These relationships are examined and alternatives to them are considered in order to find types for a new starter trio. One of the most qualified trios found is Fighting/Ice, Poison/Rock, & Electric, though several other options are presented.

Key Terms: Pokemon, Python

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Introduction

Coming up with a new trio of typings for starter pokemon has been a classic mental exercise for pokefans over the last 20 years. Although Water, Grass, and Fire are iconic in their elemental representation of the Pokemon series, many can't help but wonder "What if...?" Fans aren't the only ones considering such an idea: even the creators of Pokemon have produced official alternative starters. With the release of Ultra Sun and Ultra Moon in Gen VII, Poipole, the poison pin pokemon was introduced. Poipole has a pokedex entry revealing that it is actually a starter pokemon in the dimension from which it originates: *"This Ultra Beast is well enough liked to be chosen as a first partner in its own world."* (Pokemon Ultra Sun).

It was after a conversation with a friend and fellow pokemon nerd that I decided to look deeper into the possibilities of alternate typings for starter pokemon. We aim to consider the most viable trio of pokemon based on several important criteria: each pokemon's relationship with the other two pokemon in the trio, each pokemon's relationship with itself, and how many immunities the pokemon has along with how many types are immune to that pokemon's types (or how many immunities that pokemon "gives"). Beyond these criteria, there are two restrictions we are self-imposing:

1. *Traditional Type Exclusion:* Water, Fire, and Grass are excluded from the types we consider for our new starters in order to allow other types the opportunity to shine. This leaves us with the 15 other types: Bug, Dark, Dragon, Electric, Fairy, Fighting, Flying, Ghost, Ground, Ice, Normal, Psychic, Poison, Rock, & Steel.

2. *Sharing Is Not Caring:* No two pokemon within a trio may have a type in common, including any secondary typing. Starters within a generation have never shared a type and we will be maintaining that tradition here.

3. *List Limits:* This restriction is a bit meta in nature and more of a preference. I chose to limit the number of lists as much as I could when constructing the code that performed the calculations. Creating a set of lists (immunities given/had) within a set of lists (self-relations) within another set of lists (trio relationships) would have been easier to write, albeit obnoxiously cumbersome, but ultimately much less satisfying to create.
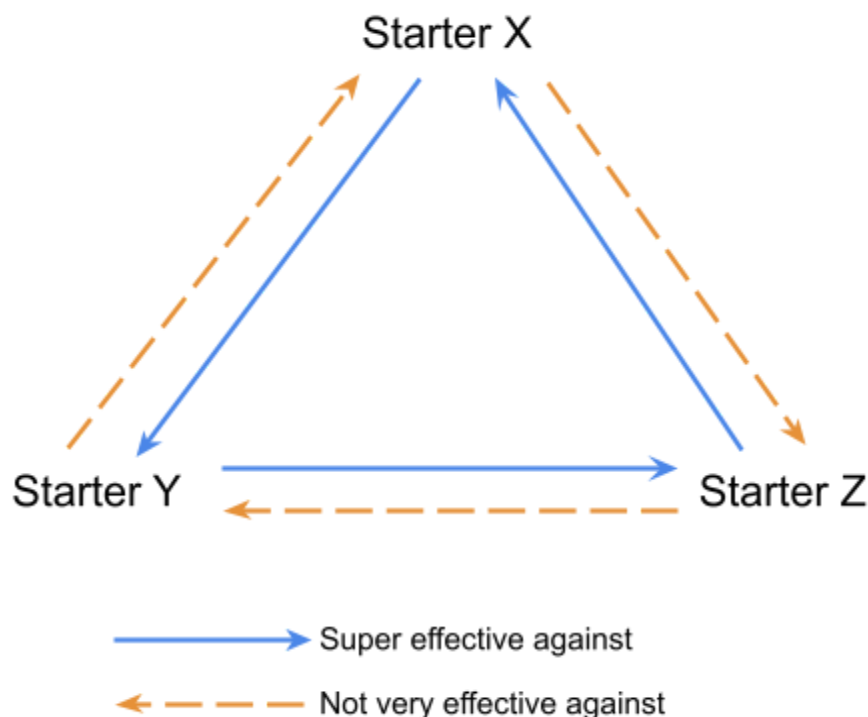
Trio Relationship

Firstly and most importantly is the relationship each pokemon within the trio has with the other two. Because an offensive relationship from one pokemon (Type X is super effective against Type Y) can be seen as a defensive relationship from another pokemon (Type Y is weak to Type X), we will be focusing solely on the offensive relationships between the pokemon.

The traditional starter types of Water, Grass, and Fire maintain two complete yet distinct unilateral relationships.

1. Each is super effective against one opposing starter type. Fire is super effective against Grass which is super effective against Water which is super effective against Fire.

2. Each is not very effective against the other opposing starter type (this other type being different from the one it is super effective against in part 1*). Fire is not very effective against Water which is not very effective against Grass which is not very effective against Fire. *This distinction is important to make as it's possible for a pokemon with two types to be both super effective and not very effective against a single type- e.g. a grass/ground starter against a fire starter. We want to clarify that each starter is super effective against one starter, and not very effective against the other.

Figure 1 displays one potential set of relationships between the 3 different starter types. This image displays a SE relationship one way, and a NVE relationship the other way, the same relationships the Water, Grass, and Fire starter types hold. This is one of the 6 possible relationship sets considered.

Therefore, any viable trio of starter types should simultaneously obey two similar unilateral relationships. The different possible sets are:

1. **Super Effective & Not Very Effective (SE-NVE):** Each pokemon can deal super effective damage to one starter, but deals resisted or no damage to the other pokemon. Most alternative starter trios posted online fall under this category since it follows the same pattern as the traditional starter trio. Two examples are *Fighting, Flying, Rock*, and *Dark, Fighting, Psychic* which are the most commonly-suggested alternative trios. 74 trios obey this relationship.

2. **Super Effective & Neutral (SE-NEU):** Each pokemon can deal super effective damage to one pokemon but only neutral damage to the other. One example is *Bug/Ground, Ice, Rock*. 126 trios obey this relationship.

3. **Super Effective & Super Effective (SE-SE):** Each pokemon can deal super effective damage against both other pokemon. For example, *Dark/Ice, Ground/Rock, Psychic/Steel*. 42 trios obey this relationship.

4. **Neutral & Neutral (NEU-NEU):** Each pokemon can only deal neutral damage to the other pokemon. This is the only case where no pokemon may deal super effective or not very effective damage at all to the other starters. One example is *Electric, Ice, Poison*. 725 trios obey this relationship.

5. **Neutral & Not Very Effective (NEU-NVE):** Each pokemon deals only neutral damage to one pokemon, and only deals resisted or no damage to the other pokemon. One example is *Bug/Dragon, Electric, Steel*. 5 trios obey this relationship. Interestingly, all 5 involve *Dragon, Electric, Steel*.

6. **Not Very Effective & Not Very Effective (NVE-NVE):** Each pokemon deals only not very effective or no damage to both other pokemon. No such trio of pokemon could be found.

It is important to note that no distinction is made between a 2x effective attack and a 4x effective attack: both are considered super effective. Similarly, a ½ effective attack and a ¼ effective attack are both considered not very effective. Notably, 0x effectiveness is also considered not very effective for the purpose of categorization above in order to exclude as few options as possible (instances where this is the case are marked as such and are less ideal).

Self Relationship

Beyond their relationship with each other, pokemon and trios are classified according to their relationship to themselves. In the traditional trio of Water, Grass, and Fire, each type resists itself. However, because pokemon have multiple types, it's possible to have multiple self-relationships. Such pokemon are considered in both categories. For example, Rowlet, a grass/flying starter, doubly resists grass, but flying deals super effective damage, putting it in both "self super effective" and "self not very effective." The 4 categories are:

- **Self Super Effective:** can deal super effective damage against itself. For example: *Ground/Rock, Dragon, Ghost.* 44 typings fall into this category.
- **Self Not Very Effective:** resists at least one of its own types: For example: *Bug/Dark, Electric, Ice.* 80 typings fall into this category.
- **Self Neutral:** deals only neutral damage against itself. For example: *Fairy/Rock, Ground/Ice, Fighting.* 18 typings fall into this category.
- **Self Immune:** immune to one of its own types. For example: *Fairy/Dragon, Ghost/Normal, Poison/Steel.* 7 typings fall into this category. These 7 typings are the 6 types with immunities paired with types they are immune to; Ghost gets two, one for Normal and one for Fighting.
- **No Self-Relation.** Though less ideal, trios with no shared self-relation are also considered in our data. For example, *Dark, Fighting, Psychic* [self-resist, self-neutral, self-resist respectively]. All trios that don't fall into one of the previous categories fall into this one.
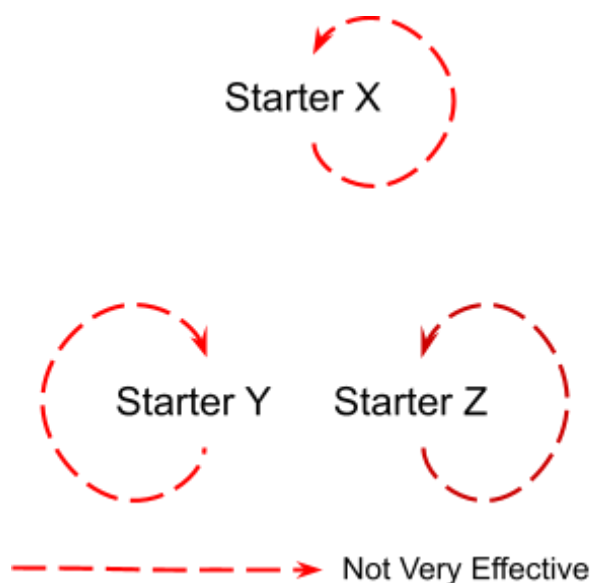

Figure 2 to the right displays a self not very effective relationship, the same kind displayed by the traditional starter types. In this figure, each starter only possesses one type though, so it's important to keep in mind that multiple self-relationships can exist within a single pokemon.

Immunities

Beyond the simple-to-understand nature of the original starter types' relationships, one thing that made them ideal starter candidates was their lack of immunities both offensively and defensively. Water, Grass, and Fire are 3 of only 6 types that neither possess any immunities nor have any type immune to them (the other 3 types being Bug, Ice, and Rock). We can also see that they each have just as many immunities as they give (that is, how many types are immune to them) so we include trios with pokemon who each have an identical number of immunities given and taken. One example would be a trio of *Ground, Normal, Ice;* all three give just as many immunities as they have (1,1,0). Taken one step further, we can also include trios where the algebraic difference between immunities possessed and immunities given -- that is, one subtracted from the other -- is the same for each pokemon, such as if each pokemon gives one more immunity than it has. Therefore, all three pokemon within a trio should share the same value, *The Immunity Difference,* for the following calculation:

Immunity Difference Value = # of immunities had - # of immunities given

Immunity classes are:

- **Immunities Possessed:**
  - **No Immunities.** E.g. *Psychic, Poison/Rock, Ice.* 36 typings are in this class.
  - **One Immunity each.** E.g. *Fairy, Flying, Normal.* 54 pokemon are in this class.
  - **Multiple (2+) Immunities.** E.g. *Ghost/Ground, Flying/Steel, Fairy/Dark.* 30 pokemon are in this class
  - **Mixed Immunity:** Trios with different numbers of immunities E.g. *Ground/Rock, Dragon, Ghost* (1,0,2 immunities, respectively).
- **Immunities Given:** pokemon in trios aren't classified based on how many immunities they give up- that is, how many type pairings are immune to one of their types- but rather if they share the same immunity difference value. E.g. *Fairy, Steel/Normal, Ghost* all have an immunity difference value of 1: they each have 1 more immunity than they give.
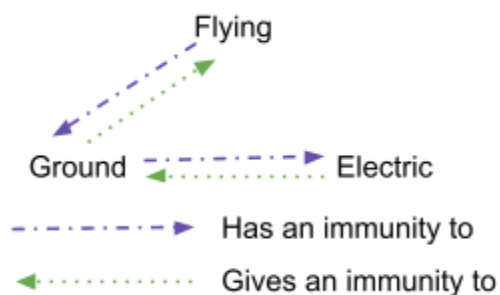

Figure 3 displays the concept of immunities had or given. Flying has one immunity to Ground but gives no immunities to any other type. Ground has one immunity to Electric, and gives one immunity to Flying. Electric gives one immunity to Ground but possesses no immunities itself.

Analysis

From the nearly 1000 trios available, only one trio exists which completely obeys the trio relationship requirements, has the exact same number of immunities possessed and given for each pokemon, and obeys a self relation: *Electric, Fighting/Ice, Poison/Rock.* Each pokemon in the trio can only deal neutral damage to the others, each has 0 immunities but gives one immunity (giving them all an *immunity difference value* of -1), and they are each capable of resisting one of their own types (*Fighting/Ice* can also deal super effective damage against itself and *Poison/Rock* can deal neutral damage against itself, but this doesn't exclude them from the self-resist category). Other viable trios and important aspects about them are presented in the table below.

Multitype Trio Table

Trio	Trio Relation	Self Relation	Immunities Possessed	Immunities Given	Notes
Electric, Fighting/Ice, Poison/Rock	Neu-Neu	Not Very Effective	0	1	The only trio to obey all requirements and all have the same number of immunities.
Dragon/Fairy, Ghost/Psychic, Ground/Rock	Neu-Neu	Super Effective & Not Very Effective	Mixed (1,2,1)	Matched (1,2,1)	Each pokemon has two self-relationships: they can all deal super effective and resist/are immune to one of their own types.
Ice(/Rock), Electric/Fairy, Ghost/Psychic	Neu-Neu	Not Very Effective	Mixed (0,1,2)	Matched (0,1,2)	Ice and Ice/Rock work equally well. Rock could be gained upon evolution.
Ice, Bug/Ground, Normal/Rock	SE-Neu	Not Very Effective	Mixed (0,1,1)	Matched (0,1,1)	Similar to the next trio, but perhaps more balanced.
Ice, Bug/Ground, Dragon/Steel	SE-Neu	Not Very Effective	Mixed (0,1,1)	Matched (0,1,1)	Similar to previous trio. Dragon/Steel may be too good of a defensive typing

Trio	Trio Relation	Self Relation	Immunities Possessed	Immunities Given	Notes
Electric, Fighting/Ice, Normal/Poison	Neu-Neu	Not Very Effective	Mixed (0,0,1)	One More (1,1,2)	Each pokemon gives one more immunity than it has, offering a different type of balance.

Honorable Mentions
These trios do not obey the "Immunities Possessed - Immunities Given" rule

Trio	Trio Relation	Self Relation	Immunities Possessed	Immunities Given	Notes
Dark/Ground, Electric/Ghost, Fighting/Flying	SE-NVE	Not very effective	Mixed (2,2,1)	Mixed (1,2,1)	One of only two trios available with an Immunity Triangle. Each pokemon is immune to one and gives an immunity to another.
Dragon/Fairy, Flying/Ground, Ghost/Normal	Neu-Neu	Immune	Mixed (1,2,3)	Mixed (1,1,2)	The only available trio where each pokemon is immune to one of its own types. G/N is also the only possible typing that is fully immune to itself.

Monotype Trio Table

Trio	Trio Relation	Self Relation	Immunities Possessed	Immunities Given	Notes
Electric, Ice, Psychic	Neu-Neu	Not Very Effective	0	Mixed (1,0,1)	These 4 trios were the only monotype trios that obeyed the trio relationship, shared a self-relation, and shared the same number of immunities. Unfortunately, none also shared the same number of given immunities and no monotype trio shared immunity difference values.
Electric, Ice, Poison	Neu-Neu	Not Very Effective	0	Mixed (1,0,1)	
Fairy, Flying, Normal	Neu-Neu	Neutral	1	Mixed (0,0,1)	
Fairy, Ground, Normal	Neu-Neu	Neutral	1	Mixed (0,1,1)	

Data

The data was provided through original code. Using Python3, I wrote a program that categorized trios of pokemon based on which trio requirement they satisfied, and classified individual pokemon based on their number of immunities and their self relationship. Each trio was then checked against the requirements and displayed accordingly.

Note: our ideal trio will be in green and bold; the next ideal will be yellow and bold. Highlighted trios are rare but present an unique scenario where each pokemon is immune to another one within the trio.

Key:
Dark Blue: Identify type of Trio relationship (SE = Super Effective, NVE = Not Very Effective, NEU = Neutral)
Magenta: Identify number of immunities possessed
Red/Underlined: Identify type of self relationship
Green Trios: Trios that obey the trio relationship, immunities possessed, and self relationship requirements
Teal Trios: Trios that have mixed immunity and/or no uniform self relation
Yellow/Bold Trios: Trios that have mixed immunity with uniform self relation and uniform immunity difference values
Bold Trios: Immunity difference value is equal for each pokemon
Light Trios: Trio has a type immunity imbalance: one type is immune to another type within the trio
Highlight: Each pokemon in the trio has and gives an immunity to another pokemon within the trio

Data Printout:

Super Effective - Super Effective
  One Immunity
   Self Not Very Effective:
1: Dark/Ice, Ground/Rock, Psychic/Steel
   No Self Relation
1: Dark/Ice, Fighting/Ground, Psychic/Steel
2: Electric/Steel, Fighting/Flying, Ground/Ice
  Mixed Immunities
   Self Not Very Effective:
1: Bug/Fairy, Dark/Flying, Psychic/Rock
2: Bug/Flying, Dark/Ice, Psychic/Rock
3: Bug/Ghost, Dark/Ice, Psychic/Rock
4: Bug/Ice, Dark/Flying, Psychic/Rock
5: Bug/Psychic, Dark/Electric, Fighting/Flying
6: Bug/Psychic, Dark/Ground, Fighting/Rock
7: Bug/Psychic, Dark/Ice, Fighting/Flying
8: Bug/Poison, Dark/Rock, Ground/Psychic
9: Dark/Fairy, Ghost/Poison, Psychic/Steel
10: Dark/Flying, Ghost/Ice, Psychic/Rock
11: Dark/Ground, Fighting/Rock, Ice/Psychic
12: Dark/Ground, Fighting/Rock, Ice/Steel
13: Dark/Ice, Ghost/Steel, Ground/Rock
14: Dark/Rock, Ghost/Steel, Ground/Psychic

15: Dark/Steel, Fighting/Ice, Ground/Psychic
16: Ghost/Ice, Ground/Rock, Psychic/Steel
   No Self Relation
1: Steel, Fairy/Ground, Fighting/Ice
2: Steel, Fighting/Rock, Ground/Ice
3: Bug/Dark, Flying/Ghost, Psychic/Rock
4: Bug/Dragon, Dark/Ice, Psychic/Rock
5: Bug/Ice, Dark/Rock, Fairy/Flying
6: Bug/Ice, Dragon/Rock, Fairy/Flying
7: Bug/Ice, Flying/Ghost, Psychic/Rock
8: Bug/Poison, Dark/Rock, Fairy/Flying
9: Dark/Ice, Dragon/Rock, Fairy/Flying
10: Dark/Ice, Fairy/Ground, Ghost/Steel
11: Dark/Ice, Fairy/Ground, Psychic/Steel
12: Dark/Ice, Fighting/Ground, Psychic/Rock
13: Dark/Ice, Ghost/Rock, Psychic/Steel
14: Dark/Steel, Fairy/Ground, Fighting/Ice
15: Dark/Steel, Fighting/Rock, Ground/Ice
16: Dragon/Steel, Fairy/Ground, Fighting/Ice
17: Dragon/Steel, Fighting/Rock, Ground/Ice
18: Electric/Steel, Fairy/Ground, Fighting/Ice
19: Electric/Steel, Fighting/Rock, Ground/Ice
20: Fairy/Ground, Fighting/Ice, Normal/Steel

21: Fairy/Ground, Fighting/Ice, Rock/Steel
22: Fighting/Rock, Ground/Ice, Normal/Steel
23: Fighting/Rock, Ground/Normal, Ice/Steel

Neutral - Neutral

No Immunities

Self Not Very Effective:

1: Electric, Ice, Psychic
2: Electric, Ice, Poison
3: Electric, Ice, Bug/Psychic
4: Electric, Ice, Bug/Poison
5: Electric, Ice, Psychic/Poison
6: Electric, Psychic, Ice/Rock
7: Electric, Bug/Ice, Fighting/Psychic
8: Electric, Bug/Ice, Psychic/Poison
9: Electric, Fighting/Ice, Poison/Rock
10: Ice, Bug/Electric, Psychic/Poison

No Self Relation

1: Bug, Dragon, Psychic/Poison
2: Bug, Electric, Ice
3: Bug, Electric, Psychic/Poison
4: Bug, Ice, Psychic/Poison
5: Bug, Dragon/Electric, Psychic/Poison
6: Bug, Dragon/Ice, Psychic/Poison
7: Bug, Electric/Ice, Psychic/Poison
8: Dragon, Psychic, Rock
9: Electric, Fighting, Ice/Poison
10: Electric, Psychic, Rock
11: Psychic, Rock, Dragon/Electric

One Immunity

Self Not Very Effective:

1: Dark, Electric/Flying, Normal/Poison

Self Neutral:

1: Fairy, Flying, Normal
2: Fairy, Ground, Normal
3: Fairy, Normal, Flying/Ice
4: Fairy, Normal, Ground/Ice

No Self Relation

1: Dark, Flying, Normal
2: Dark, Flying, Dragon/Normal
3: Dark, Flying, Normal/Poison
4: Dark, Ground, Normal
5: Dark, Ground, Dragon/Normal
6: Dark, Normal, Dragon/Flying
7: Dark, Normal, Dragon/Ground
8: Dark, Normal, Electric/Flying
9: Dark, Normal, Electric/Ground
10: Dark, Normal, Flying/Ice
11: Dark, Normal, Flying/Poison
12: Dark, Normal, Ground/Ice
13: Dark, Normal, Ground/Poison
14: Dark, Dragon/Flying, Normal/Poison
15: Dark, Dragon/Normal, Flying/Poison
16: Dark, Dragon/Normal, Ground/Poison
17: Dark, Flying/Ice, Normal/Poison
18: Fairy, Flying, Normal/Psychic
19: Fairy, Ground, Normal/Psychic
20: Fairy, Normal, Electric/Flying
21: Fairy, Normal, Electric/Ground
22: Fairy, Normal, Flying/Psychic
23: Fairy, Normal, Ground/Psychic
24: Fairy, Electric/Flying, Normal/Psychic
25: Fairy, Electric/Ground, Normal/Psychic
26: Fairy, Flying/Ice, Normal/Psychic
27: Fairy, Ground/Ice, Normal/Psychic
28: Flying, Normal, Dark/Dragon
29: Flying, Normal, Dark/Psychic
30: Flying, Normal, Dark/Poison
31: Flying, Normal, Dragon/Fairy
32: Flying, Normal, Fairy/Psychic
33: Flying, Normal, Fairy/Poison
34: Flying, Dark/Dragon, Normal/Poison
35: Flying, Dark/Psychic, Dragon/Normal
36: Flying, Dark/Poison, Dragon/Normal
37: Flying, Dragon/Fairy, Normal/Psychic
38: Ground, Normal, Dark/Dragon
39: Ground, Normal, Dark/Psychic
40: Ground, Normal, Dragon/Fairy
41: Ground, Normal, Fairy/Psychic
42: Ground, Bug/Steel, Dark/Fighting
43: Ground, Dark/Psychic, Dragon/Normal
44: Ground, Dragon/Fairy, Normal/Psychic
45: Normal, Bug/Flying, Dark/Poison
46: Normal, Bug/Flying, Fairy/Psychic
47: Normal, Bug/Ground, Fairy/Psychic
48: Normal, Dark/Dragon, Flying/Poison
49: Normal, Dark/Dragon, Ground/Poison
50: Normal, Dark/Psychic, Dragon/Flying
51: Normal, Dark/Psychic, Dragon/Ground
52: Normal, Dark/Psychic, Electric/Flying
53: Normal, Dark/Psychic, Electric/Ground
54: Normal, Dark/Psychic, Flying/Ice
55: Normal, Dark/Psychic, Ground/Ice
56: Normal, Dark/Poison, Dragon/Flying
57: Normal, Dark/Poison, Electric/Flying
58: Normal, Dark/Poison, Flying/Ice
59: Normal, Dragon/Fairy, Flying/Psychic
60: Normal, Dragon/Fairy, Ground/Psychic
61: Normal, Electric/Flying, Fairy/Psychic

62: Normal, Electric/Flying, Fairy/Poison
63: Normal, Electric/Ground, Fairy/Psychic
64: Normal, Fairy/Psychic, Flying/Ice
65: Normal, Fairy/Psychic, Ground/Ice
66: Normal, Fairy/Poison, Flying/Ice
67: Bug/Flying, Dark/Poison, Dragon/Normal
  Mixed Immunities
    Self Super Effective:
1: Dragon, Ghost, Flying/Rock
2: Dragon, Ghost, Ground/Rock
3: Dragon, Bug/Flying, Ghost/Psychic
4: Dragon, Bug/Rock, Ghost/Psychic
5: Dragon, Flying/Rock, Ghost/Psychic
6: Dragon, Ghost/Psychic, Ground/Rock
7: Ghost, Dragon/Fairy, Flying/Rock
8: Ghost, Dragon/Fairy, Ground/Rock
9: Bug/Rock, Dragon/Electric, Ghost/Psychic
10: Dragon/Fairy, Flying/Rock, Ghost/Psychic
11: Dragon/Fairy, Ghost/Psychic, Ground/Rock
    Self Not Very Effective:
1: Dark, Electric, Ice
2: Dark, Electric, Poison
3: Dark, Electric, Ice/Normal
4: Dark, Electric, Ice/Poison
5: Dark, Electric, Ice/Rock
6: Dark, Electric, Normal/Poison
7: Dark, Electric, Normal/Rock
8: Dark, Electric, Poison/Rock
9: Dark, Ice, Poison
10: Dark, Ice, Electric/Normal
11: Dark, Ice, Electric/Poison
12: Dark, Ice, Normal/Poison
13: Dark, Poison, Dragon/Electric
14: Dark, Poison, Electric/Flying
15: Dark, Poison, Electric/Ice
16: Dark, Poison, Electric/Normal
17: Dark, Poison, Ice/Normal
18: Dark, Dragon/Electric, Normal/Poison
19: Dark, Dragon/Electric, Normal/Rock
20: Dark, Dragon/Electric, Poison/Rock
21: Dark, Electric/Ice, Normal/Poison
22: Dark, Electric/Normal, Ice/Poison
23: Dark, Electric/Poison, Ice/Normal
24: Dark, Electric/Rock, Ice/Steel
25: Electric, Ice, Bug/Dark
26: Electric, Ice, Bug/Fairy
27: Electric, Ice, Bug/Ghost
28: Electric, Ice, Dark/Fairy
29: Electric, Ice, Dark/Normal

30: Electric, Ice, Dark/Poison
31: Electric, Ice, Fairy/Psychic
32: Electric, Ice, Fairy/Poison
33: Electric, Ice, Ghost/Psychic
34: Electric, Ice, Ghost/Poison
35: Electric, Ice, Normal/Psychic
36: Electric, Ice, Normal/Poison
37: Electric, Psychic, Fairy/Ice
38: Electric, Psychic, Ice/Normal
39: Electric, Psychic, Normal/Rock
40: Electric, Poison, Dark/Ice
41: Electric, Poison, Dark/Normal
42: Electric, Poison, Ice/Normal
43: Electric, Bug/Dark, Ice/Normal
44: Electric, Bug/Fairy, Ghost/Psychic
45: Electric, Bug/Fairy, Ice/Normal
46: Electric, Bug/Ice, Dark/Fairy
47: Electric, Bug/Ice, Dark/Fighting
48: Electric, Bug/Ice, Dark/Poison
49: Electric, Bug/Ice, Fairy/Psychic
50: Electric, Bug/Ice, Ghost/Psychic
51: Electric, Bug/Psychic, Ice/Normal
52: Electric, Bug/Poison, Ice/Normal
53: Electric, Dark/Fairy, Ice/Normal
54: Electric, Dark/Fairy, Ice/Rock
55: Electric, Dark/Fairy, Normal/Rock
56: Electric, Dark/Fighting, Ice/Poison
57: Electric, Dark/Fighting, Normal/Poison
58: Electric, Dark/Ice, Normal/Poison
59: Electric, Dark/Normal, Ice/Poison
60: Electric, Dark/Poison, Ice/Normal
61: Electric, Fairy/Ice, Ghost/Psychic
62: Electric, Fairy/Ice, Normal/Psychic
63: Electric, Fairy/Psychic, Ice/Normal
64: Electric, Fairy/Psychic, Ice/Rock
65: Electric, Fairy/Psychic, Normal/Rock
66: Electric, Fairy/Poison, Ice/Normal
67: Electric, Fighting/Ice, Normal/Poison
68: Electric, Ghost/Psychic, Ice/Rock
69: Electric, Ice/Normal, Psychic/Poison
70: Ice, Psychic, Electric/Fairy
71: Ice, Psychic, Electric/Normal
72: Ice, Poison, Dark/Electric
73: Ice, Poison, Dark/Normal
74: Ice, Poison, Electric/Normal
75: Ice, Bug/Dark, Electric/Normal
76: Ice, Bug/Electric, Dark/Fairy
77: Ice, Bug/Electric, Dark/Poison
78: Ice, Bug/Electric, Fairy/Psychic

79: Ice, Bug/Electric, Ghost/Psychic
80: Ice, Bug/Fairy, Electric/Normal
81: Ice, Bug/Fairy, Ghost/Psychic
82: Ice, Bug/Psychic, Electric/Normal
83: Ice, Bug/Poison, Electric/Normal
84: Ice, Dark/Electric, Normal/Poison
85: Ice, Dark/Fairy, Electric/Normal
86: Ice, Dark/Normal, Electric/Poison
87: Ice, Dark/Poison, Electric/Normal
88: Ice, Electric/Fairy, Ghost/Psychic
89: Ice, Electric/Fairy, Normal/Psychic
90: Ice, Electric/Normal, Fairy/Psychic
91: Ice, Electric/Normal, Fairy/Poison
92: Ice, Electric/Normal, Psychic/Poison
93: Psychic, Dragon/Electric, Normal/Rock
94: Psychic, Electric/Fairy, Ice/Normal
95: Psychic, Electric/Fairy, Ice/Rock
96: Psychic, Electric/Fairy, Normal/Rock
97: Psychic, Electric/Normal, Fairy/Ice
98: Poison, Dark/Electric, Ice/Normal
99: Poison, Dark/Ice, Electric/Normal
100: Poison, Dark/Normal, Dragon/Electric
101: Poison, Dark/Normal, Electric/Flying
102: Poison, Dark/Normal, Electric/Ice
103: Bug/Electric, Dark/Fairy, Ice/Normal
104: Bug/Electric, Dark/Poison, Ice/Normal
105: Bug/Electric, Fairy/Psychic, Ice/Normal
106: Bug/Electric, Ice/Normal, Psychic/Poison
107: Bug/Fairy, Electric/Ice, Ghost/Psychic
108: Bug/Ice, Dark/Fairy, Electric/Normal
109: Bug/Ice, Dark/Poison, Electric/Normal
110: Bug/Ice, Electric/Normal, Fairy/Psychic
111: Bug/Ice, Electric/Normal, Psychic/Poison
112: Dark/Fighting, Dragon/Electric, Normal/Poison
113: Electric/Fairy, Ghost/Psychic, Ice/Rock
  Self Immune:
1: Dragon/Fairy, Flying/Ground, Ghost/Normal
  No Self Relation
1: Bug, Dragon, Normal
2: Bug, Dragon, Dark/Ghost
3: Bug, Dragon, Dark/Poison
4: Bug, Dragon, Ghost/Psychic
5: Bug, Electric, Normal
6: Bug, Electric, Dark/Fairy
7: Bug, Electric, Dark/Ghost
8: Bug, Electric, Dark/Poison
9: Bug, Electric, Fairy/Psychic
10: Bug, Electric, Ghost/Psychic
11: Bug, Electric, Ice/Normal

12: Bug, Ice, Normal
13: Bug, Ice, Dark/Fairy
14: Bug, Ice, Dark/Ghost
15: Bug, Ice, Dark/Poison
16: Bug, Ice, Electric/Normal
17: Bug, Ice, Fairy/Psychic
18: Bug, Ice, Ghost/Psychic
19: Bug, Normal, Dark/Fairy
20: Bug, Normal, Dark/Poison
21: Bug, Normal, Dragon/Electric
22: Bug, Normal, Dragon/Ice
23: Bug, Normal, Electric/Ice
24: Bug, Normal, Fairy/Psychic
25: Bug, Normal, Psychic/Poison
26: Bug, Dark/Fairy, Electric/Ice
27: Bug, Dark/Fairy, Electric/Normal
28: Bug, Dark/Fairy, Ice/Normal
29: Bug, Dark/Ghost, Dragon/Electric
30: Bug, Dark/Ghost, Dragon/Ice
31: Bug, Dark/Ghost, Electric/Ice
32: Bug, Dark/Poison, Dragon/Electric
33: Bug, Dark/Poison, Dragon/Ice
34: Bug, Dark/Poison, Dragon/Normal
35: Bug, Dark/Poison, Electric/Ice
36: Bug, Dark/Poison, Electric/Normal
37: Bug, Dark/Poison, Ice/Normal
38: Bug, Dragon/Electric, Ghost/Psychic
39: Bug, Dragon/Ice, Ghost/Psychic
40: Bug, Dragon/Normal, Psychic/Poison
41: Bug, Electric/Ice, Fairy/Psychic
42: Bug, Electric/Ice, Ghost/Psychic
43: Bug, Electric/Normal, Fairy/Psychic
44: Bug, Electric/Normal, Psychic/Poison
45: Bug, Fairy/Psychic, Ice/Normal
46: Bug, Ice/Normal, Psychic/Poison
47: Dark, Dragon, Flying
48: Dark, Dragon, Ground
49: Dark, Dragon, Normal
50: Dark, Dragon, Poison
51: Dark, Dragon, Rock
52: Dark, Dragon, Flying/Ground
53: Dark, Dragon, Flying/Normal
54: Dark, Dragon, Flying/Poison
55: Dark, Dragon, Flying/Rock
56: Dark, Dragon, Ground/Normal
57: Dark, Dragon, Ground/Poison
58: Dark, Dragon, Ground/Rock
59: Dark, Dragon, Normal/Poison
60: Dark, Dragon, Normal/Rock

61: Dark, Dragon, Poison/Rock
62: Dark, Electric, Normal
63: Dark, Electric, Rock
64: Dark, Flying, Poison
65: Dark, Flying, Dragon/Poison
66: Dark, Ice, Normal
67: Dark, Normal, Poison
68: Dark, Normal, Dragon/Electric
69: Dark, Normal, Dragon/Ice
70: Dark, Normal, Dragon/Poison
71: Dark, Normal, Electric/Ice
72: Dark, Normal, Electric/Poison
73: Dark, Normal, Flying/Ground
74: Dark, Normal, Ice/Poison
75: Dark, Poison, Dragon/Flying
76: Dark, Poison, Dragon/Ice
77: Dark, Poison, Dragon/Normal
78: Dark, Poison, Flying/Ice
79: Dark, Poison, Flying/Normal
80: Dark, Rock, Dragon/Electric
81: Dark, Dragon/Ice, Normal/Poison
82: Dark, Dragon/Normal, Flying/Ground
83: Dark, Dragon/Poison, Flying/Normal
84: Dragon, Fighting, Ground
85: Dragon, Fighting, Normal/Poison
86: Dragon, Flying, Ghost
87: Dragon, Flying, Normal
88: Dragon, Flying, Psychic
89: Dragon, Flying, Poison
90: Dragon, Flying, Dark/Ghost
91: Dragon, Flying, Dark/Normal
92: Dragon, Flying, Dark/Psychic
93: Dragon, Flying, Dark/Poison
94: Dragon, Flying, Ghost/Normal
95: Dragon, Flying, Ghost/Psychic
96: Dragon, Flying, Ghost/Poison
97: Dragon, Flying, Normal/Psychic
98: Dragon, Flying, Normal/Poison
99: Dragon, Flying, Psychic/Poison
100: Dragon, Ghost, Ground
101: Dragon, Ghost, Rock
102: Dragon, Ghost, Flying/Ground
103: Dragon, Ground, Normal
104: Dragon, Ground, Psychic
105: Dragon, Ground, Dark/Fighting
106: Dragon, Ground, Dark/Ghost
107: Dragon, Ground, Dark/Normal
108: Dragon, Ground, Dark/Psychic
109: Dragon, Ground, Fighting/Ghost
110: Dragon, Ground, Fighting/Normal
111: Dragon, Ground, Fighting/Psychic
112: Dragon, Ground, Ghost/Normal
113: Dragon, Ground, Ghost/Psychic
114: Dragon, Ground, Normal/Psychic
115: Dragon, Normal, Psychic
116: Dragon, Normal, Poison
117: Dragon, Normal, Bug/Dark
118: Dragon, Normal, Bug/Flying
119: Dragon, Normal, Bug/Ground
120: Dragon, Normal, Bug/Psychic
121: Dragon, Normal, Bug/Poison
122: Dragon, Normal, Dark/Flying
123: Dragon, Normal, Dark/Ground
124: Dragon, Normal, Dark/Psychic
125: Dragon, Normal, Dark/Poison
126: Dragon, Normal, Flying/Ground
127: Dragon, Normal, Flying/Psychic
128: Dragon, Normal, Flying/Poison
129: Dragon, Normal, Ground/Psychic
130: Dragon, Normal, Ground/Poison
131: Dragon, Normal, Psychic/Poison
132: Dragon, Psychic, Flying/Ground
133: Dragon, Psychic, Flying/Normal
134: Dragon, Psychic, Flying/Rock
135: Dragon, Psychic, Ground/Normal
136: Dragon, Psychic, Ground/Rock
137: Dragon, Psychic, Normal/Rock
138: Dragon, Poison, Dark/Flying
139: Dragon, Poison, Dark/Normal
140: Dragon, Poison, Flying/Normal
141: Dragon, Rock, Dark/Ghost
142: Dragon, Rock, Dark/Psychic
143: Dragon, Rock, Ghost/Psychic
144: Dragon, Bug/Flying, Dark/Ghost
145: Dragon, Bug/Flying, Dark/Poison
146: Dragon, Bug/Flying, Psychic/Poison
147: Dragon, Bug/Ground, Dark/Ghost
148: Dragon, Bug/Ground, Ghost/Psychic
149: Dragon, Bug/Normal, Dark/Fighting
150: Dragon, Bug/Normal, Dark/Poison
151: Dragon, Bug/Normal, Fighting/Psychic
152: Dragon, Bug/Normal, Psychic/Poison
153: Dragon, Bug/Rock, Dark/Ghost
154: Dragon, Dark/Fighting, Normal/Poison
155: Dragon, Dark/Flying, Normal/Poison
156: Dragon, Dark/Ghost, Flying/Ground
157: Dragon, Dark/Ghost, Flying/Rock
158: Dragon, Dark/Ghost, Ground/Rock

159: Dragon, Dark/Normal, Flying/Ground
160: Dragon, Dark/Normal, Flying/Poison
161: Dragon, Dark/Normal, Ground/Poison
162: Dragon, Dark/Psychic, Flying/Ground
163: Dragon, Dark/Psychic, Flying/Normal
164: Dragon, Dark/Psychic, Flying/Rock
165: Dragon, Dark/Psychic, Ground/Normal
166: Dragon, Dark/Psychic, Ground/Rock
167: Dragon, Dark/Psychic, Normal/Rock
168: Dragon, Dark/Poison, Flying/Normal
169: Dragon, Fighting/Flying, Normal/Poison
170: Dragon, Flying/Ground, Ghost/Normal
171: Dragon, Flying/Ground, Ghost/Psychic
172: Dragon, Flying/Ground, Normal/Psychic
173: Dragon, Flying/Normal, Psychic/Poison
174: Electric, Fairy, Ghost
175: Electric, Fairy, Ice
176: Electric, Fairy, Normal
177: Electric, Fairy, Psychic
178: Electric, Fairy, Rock
179: Electric, Fairy, Ghost/Ice
180: Electric, Fairy, Ghost/Normal
181: Electric, Fairy, Ghost/Psychic
182: Electric, Fairy, Ghost/Rock
183: Electric, Fairy, Ice/Normal
184: Electric, Fairy, Ice/Psychic
185: Electric, Fairy, Ice/Rock
186: Electric, Fairy, Normal/Psychic
187: Electric, Fairy, Normal/Rock
188: Electric, Fairy, Psychic/Rock
189: Electric, Fighting, Normal/Poison
190: Electric, Ghost, Ice
191: Electric, Ghost, Rock
192: Electric, Ghost, Fairy/Ice
193: Electric, Ghost, Fairy/Rock
194: Electric, Ghost, Ice/Rock
195: Electric, Ice, Normal
196: Electric, Ice, Bug/Normal
197: Electric, Ice, Dark/Ghost
198: Electric, Ice, Dark/Psychic
199: Electric, Ice, Fairy/Ghost
200: Electric, Ice, Fairy/Normal
201: Electric, Ice, Ghost/Normal
202: Electric, Normal, Psychic
203: Electric, Normal, Poison
204: Electric, Normal, Bug/Dark
205: Electric, Normal, Bug/Fairy
206: Electric, Normal, Bug/Ice
207: Electric, Normal, Bug/Psychic

208: Electric, Normal, Bug/Poison
209: Electric, Normal, Dark/Fairy
210: Electric, Normal, Dark/Ice
211: Electric, Normal, Dark/Psychic
212: Electric, Normal, Dark/Poison
213: Electric, Normal, Fairy/Ice
214: Electric, Normal, Fairy/Psychic
215: Electric, Normal, Fairy/Poison
216: Electric, Normal, Ice/Psychic
217: Electric, Normal, Ice/Poison
218: Electric, Normal, Psychic/Poison
219: Electric, Psychic, Fairy/Normal
220: Electric, Psychic, Fairy/Rock
221: Electric, Rock, Dark/Fairy
222: Electric, Rock, Dark/Ghost
223: Electric, Rock, Dark/Psychic
224: Electric, Rock, Fairy/Ghost
225: Electric, Rock, Fairy/Psychic
226: Electric, Rock, Ghost/Psychic
227: Electric, Bug/Ice, Dark/Ghost
228: Electric, Bug/Normal, Dark/Fairy
229: Electric, Bug/Normal, Dark/Fighting
230: Electric, Bug/Normal, Dark/Poison
231: Electric, Bug/Normal, Fairy/Psychic
232: Electric, Bug/Normal, Fighting/Psychic
233: Electric, Bug/Normal, Psychic/Poison
234: Electric, Bug/Rock, Dark/Fairy
235: Electric, Bug/Rock, Dark/Ghost
236: Electric, Bug/Rock, Fairy/Psychic
237: Electric, Bug/Rock, Ghost/Psychic
238: Electric, Dark/Ghost, Ice/Rock
239: Electric, Dark/Psychic, Ice/Normal
240: Electric, Dark/Psychic, Ice/Rock
241: Electric, Dark/Psychic, Normal/Rock
242: Electric, Fairy/Ghost, Ice/Rock
243: Electric, Fairy/Ice, Ghost/Normal
244: Electric, Fairy/Normal, Ice/Psychic
245: Electric, Fairy/Rock, Ghost/Psychic
246: Electric, Fighting/Normal, Ice/Poison
247: Fairy, Flying, Ghost
248: Fairy, Flying, Psychic
249: Fairy, Flying, Ghost/Normal
250: Fairy, Flying, Ghost/Psychic
251: Fairy, Ghost, Ground
252: Fairy, Ghost, Ice
253: Fairy, Ghost, Rock
254: Fairy, Ghost, Electric/Flying
255: Fairy, Ghost, Electric/Ground
256: Fairy, Ghost, Electric/Ice

257: Fairy, Ghost, Electric/Rock
258: Fairy, Ghost, Flying/Ground
259: Fairy, Ghost, Flying/Ice
260: Fairy, Ghost, Flying/Rock
261: Fairy, Ghost, Ground/Ice
262: Fairy, Ghost, Ground/Rock
263: Fairy, Ghost, Ice/Rock
264: Fairy, Ground, Psychic
265: Fairy, Ground, Ghost/Normal
266: Fairy, Ground, Ghost/Psychic
267: Fairy, Ice, Normal
268: Fairy, Ice, Psychic
269: Fairy, Ice, Electric/Ghost
270: Fairy, Ice, Electric/Normal
271: Fairy, Ice, Electric/Psychic
272: Fairy, Ice, Ghost/Normal
273: Fairy, Ice, Ghost/Psychic
274: Fairy, Ice, Normal/Psychic
275: Fairy, Normal, Psychic
276: Fairy, Normal, Electric/Ice
277: Fairy, Normal, Electric/Psychic
278: Fairy, Normal, Flying/Ground
279: Fairy, Normal, Ice/Psychic
280: Fairy, Psychic, Rock
281: Fairy, Psychic, Electric/Flying
282: Fairy, Psychic, Electric/Ground
283: Fairy, Psychic, Electric/Ice
284: Fairy, Psychic, Electric/Normal
285: Fairy, Psychic, Electric/Rock
286: Fairy, Psychic, Flying/Ground
287: Fairy, Psychic, Flying/Ice
288: Fairy, Psychic, Flying/Normal
289: Fairy, Psychic, Flying/Rock
290: Fairy, Psychic, Ground/Ice
291: Fairy, Psychic, Ground/Normal
292: Fairy, Psychic, Ground/Rock
293: Fairy, Psychic, Ice/Normal
294: Fairy, Psychic, Ice/Rock
295: Fairy, Psychic, Normal/Rock
296: Fairy, Rock, Electric/Ghost
297: Fairy, Rock, Electric/Psychic
298: Fairy, Rock, Ghost/Psychic
299: Fairy, Electric/Flying, Ghost/Normal
300: Fairy, Electric/Flying, Ghost/Psychic
301: Fairy, Electric/Ghost, Ice/Rock
302: Fairy, Electric/Ground, Ghost/Normal
303: Fairy, Electric/Ground, Ghost/Psychic
304: Fairy, Electric/Ice, Ghost/Normal
305: Fairy, Electric/Ice, Ghost/Psychic

306: Fairy, Electric/Ice, Normal/Psychic
307: Fairy, Electric/Normal, Ice/Psychic
308: Fairy, Electric/Psychic, Ice/Normal
309: Fairy, Electric/Psychic, Ice/Rock
310: Fairy, Electric/Psychic, Normal/Rock
311: Fairy, Electric/Rock, Ghost/Psychic
312: Fairy, Flying/Ground, Ghost/Normal
313: Fairy, Flying/Ground, Ghost/Psychic
314: Fairy, Flying/Ground, Normal/Psychic
315: Fairy, Flying/Ice, Ghost/Normal
316: Fairy, Flying/Ice, Ghost/Psychic
317: Fairy, Flying/Rock, Ghost/Psychic
318: Fairy, Ghost/Normal, Ground/Ice
319: Fairy, Ghost/Psychic, Ground/Ice
320: Fairy, Ghost/Psychic, Ground/Rock
321: Fairy, Ghost/Psychic, Ice/Rock
322: Fighting, Dragon/Electric, Normal/Poison
323: Flying, Ghost, Dragon/Fairy
324: Flying, Normal, Psychic
325: Flying, Normal, Poison
326: Flying, Normal, Dark/Fairy
327: Flying, Normal, Dragon/Psychic
328: Flying, Normal, Dragon/Poison
329: Flying, Normal, Psychic/Poison
330: Flying, Psychic, Dragon/Fairy
331: Flying, Psychic, Dragon/Normal
332: Flying, Psychic, Fairy/Normal
333: Flying, Poison, Dark/Dragon
334: Flying, Poison, Dark/Normal
335: Flying, Poison, Dragon/Normal
336: Flying, Dark/Normal, Dragon/Poison
337: Flying, Dragon/Fairy, Ghost/Normal
338: Flying, Dragon/Fairy, Ghost/Psychic
339: Flying, Dragon/Normal, Psychic/Poison
340: Ghost, Ground, Dragon/Fairy
341: Ghost, Ice, Electric/Fairy
342: Ghost, Rock, Dragon/Electric
343: Ghost, Rock, Dragon/Fairy
344: Ghost, Rock, Electric/Fairy
345: Ghost, Dragon/Fairy, Flying/Ground
346: Ghost, Electric/Fairy, Ice/Rock
347: Ghost, Electric/Rock, Ice/Steel
348: Ground, Normal, Psychic
349: Ground, Normal, Dark/Fairy
350: Ground, Normal, Dragon/Psychic
351: Ground, Psychic, Dragon/Fairy
352: Ground, Psychic, Dragon/Normal
353: Ground, Psychic, Fairy/Normal
354: Ground, Bug/Steel, Dark/Ghost

355: Ground, Dragon/Fairy, Ghost/Normal
356: Ground, Dragon/Fairy, Ghost/Psychic
357: Ice, Normal, Psychic
358: Ice, Normal, Poison
359: Ice, Normal, Bug/Dark
360: Ice, Normal, Bug/Electric
361: Ice, Normal, Bug/Fairy
362: Ice, Normal, Bug/Psychic
363: Ice, Normal, Bug/Poison
364: Ice, Normal, Dark/Electric
365: Ice, Normal, Dark/Fairy
366: Ice, Normal, Dark/Psychic
367: Ice, Normal, Dark/Poison
368: Ice, Normal, Electric/Fairy
369: Ice, Normal, Electric/Psychic
370: Ice, Normal, Electric/Poison
371: Ice, Normal, Fairy/Psychic
372: Ice, Normal, Fairy/Poison
373: Ice, Normal, Psychic/Poison
374: Ice, Psychic, Fairy/Normal
375: Ice, Bug/Electric, Dark/Ghost
376: Ice, Bug/Normal, Dark/Fairy
377: Ice, Bug/Normal, Dark/Poison
378: Ice, Bug/Normal, Fairy/Psychic
379: Ice, Bug/Normal, Psychic/Poison
380: Ice, Dark/Psychic, Electric/Normal
381: Ice, Electric/Fairy, Ghost/Normal
382: Ice, Electric/Psychic, Fairy/Normal
383: Normal, Psychic, Dragon/Electric
384: Normal, Psychic, Dragon/Fairy
385: Normal, Psychic, Dragon/Flying
386: Normal, Psychic, Dragon/Ground
387: Normal, Psychic, Dragon/Ice
388: Normal, Psychic, Electric/Fairy
389: Normal, Psychic, Electric/Flying
390: Normal, Psychic, Electric/Ground
391: Normal, Psychic, Electric/Ice
392: Normal, Psychic, Fairy/Flying
393: Normal, Psychic, Fairy/Ground
394: Normal, Psychic, Fairy/Ice
395: Normal, Psychic, Flying/Ground
396: Normal, Psychic, Flying/Ice
397: Normal, Psychic, Ground/Ice
398: Normal, Poison, Dark/Dragon
399: Normal, Poison, Dark/Electric
400: Normal, Poison, Dark/Flying
401: Normal, Poison, Dark/Ice
402: Normal, Poison, Dragon/Electric
403: Normal, Poison, Dragon/Flying

404: Normal, Poison, Dragon/Ice
405: Normal, Poison, Electric/Flying
406: Normal, Poison, Electric/Ice
407: Normal, Poison, Flying/Ice
408: Normal, Bug/Dark, Dragon/Electric
409: Normal, Bug/Dark, Dragon/Ice
410: Normal, Bug/Dark, Electric/Ice
411: Normal, Bug/Dragon, Dark/Poison
412: Normal, Bug/Dragon, Psychic/Poison
413: Normal, Bug/Electric, Dark/Fairy
414: Normal, Bug/Electric, Dark/Poison
415: Normal, Bug/Electric, Fairy/Psychic
416: Normal, Bug/Electric, Psychic/Poison
417: Normal, Bug/Fairy, Electric/Ice
418: Normal, Bug/Flying, Dark/Fairy
419: Normal, Bug/Flying, Psychic/Poison
420: Normal, Bug/Ground, Dark/Fairy
421: Normal, Bug/Ice, Dark/Fairy
422: Normal, Bug/Ice, Dark/Poison
423: Normal, Bug/Ice, Fairy/Psychic
424: Normal, Bug/Ice, Psychic/Poison
425: Normal, Bug/Psychic, Dragon/Electric
426: Normal, Bug/Psychic, Dragon/Ice
427: Normal, Bug/Psychic, Electric/Ice
428: Normal, Bug/Poison, Dragon/Electric
429: Normal, Bug/Poison, Dragon/Ice
430: Normal, Bug/Poison, Electric/Ice
431: Normal, Dark/Dragon, Flying/Ground
432: Normal, Dark/Electric, Ice/Poison
433: Normal, Dark/Fairy, Electric/Flying
434: Normal, Dark/Fairy, Electric/Ground
435: Normal, Dark/Fairy, Electric/Ice
436: Normal, Dark/Fairy, Flying/Ground
437: Normal, Dark/Fairy, Flying/Ice
438: Normal, Dark/Fairy, Ground/Ice
439: Normal, Dark/Flying, Dragon/Poison
440: Normal, Dark/Ice, Electric/Poison
441: Normal, Dark/Psychic, Dragon/Electric
442: Normal, Dark/Psychic, Dragon/Ice
443: Normal, Dark/Psychic, Electric/Ice
444: Normal, Dark/Psychic, Flying/Ground
445: Normal, Dark/Poison, Dragon/Electric
446: Normal, Dark/Poison, Dragon/Ice
447: Normal, Dark/Poison, Electric/Ice
448: Normal, Dragon/Electric, Psychic/Poison
449: Normal, Dragon/Fairy, Flying/Ground
450: Normal, Dragon/Flying, Psychic/Poison
451: Normal, Dragon/Ice, Psychic/Poison
452: Normal, Dragon/Psychic, Flying/Ground

453: Normal, Electric/Fairy, Ice/Psychic
454: Normal, Electric/Flying, Psychic/Poison
455: Normal, Electric/Ice, Fairy/Psychic
456: Normal, Electric/Ice, Fairy/Poison
457: Normal, Electric/Ice, Psychic/Poison
458: Normal, Electric/Psychic, Fairy/Ice
459: Normal, Fairy/Psychic, Flying/Ground
460: Normal, Flying/Ice, Psychic/Poison
461: Psychic, Rock, Dragon/Fairy
462: Psychic, Rock, Electric/Fairy
463: Psychic, Dragon/Fairy, Flying/Ground
464: Psychic, Dragon/Fairy, Flying/Normal
465: Psychic, Dragon/Fairy, Flying/Rock
466: Psychic, Dragon/Fairy, Ground/Normal
467: Psychic, Dragon/Fairy, Ground/Rock
468: Psychic, Dragon/Fairy, Normal/Rock
469: Psychic, Dragon/Normal, Flying/Ground
470: Psychic, Electric/Flying, Fairy/Normal
471: Psychic, Electric/Ground, Fairy/Normal
472: Psychic, Electric/Ice, Fairy/Normal
473: Psychic, Fairy/Normal, Flying/Ground
474: Psychic, Fairy/Normal, Flying/Ice
475: Psychic, Fairy/Normal, Ground/Ice
476: Poison, Dark/Dragon, Flying/Normal
477: Poison, Dark/Flying, Dragon/Normal
478: Poison, Dark/Normal, Dragon/Flying
479: Poison, Dark/Normal, Dragon/Ice
480: Poison, Dark/Normal, Flying/Ice
481: Rock, Dark/Ghost, Dragon/Electric
482: Rock, Dark/Psychic, Dragon/Electric
483: Rock, Dragon/Electric, Ghost/Psychic
484: Rock, Dragon/Fairy, Ghost/Psychic
485: Rock, Electric/Fairy, Ghost/Psychic
486: Bug/Flying, Dragon/Normal, Psychic/Poison
487: Bug/Normal, Dark/Fairy, Electric/Ice
488: Bug/Normal, Dark/Fighting, Dragon/Electric
489: Bug/Normal, Dark/Poison, Dragon/Electric
490: Bug/Normal, Dark/Poison, Dragon/Ice
491: Bug/Normal, Dark/Poison, Electric/Ice
492: Bug/Normal, Dragon/Electric, Fighting/Psychic
493: Bug/Normal, Dragon/Electric, Psychic/Poison
494: Bug/Normal, Dragon/Ice, Psychic/Poison
495: Bug/Normal, Electric/Ice, Fairy/Psychic
496: Bug/Normal, Electric/Ice, Psychic/Poison
497: Bug/Rock, Dark/Fairy, Ground/Ice
498: Bug/Rock, Dark/Ghost, Dragon/Electric
499: Bug/Rock, Dark/Ghost, Ground/Ice
500: Bug/Rock, Fairy/Psychic, Ground/Ice
501: Bug/Rock, Ghost/Psychic, Ground/Ice

502: Bug/Steel, Dark/Ghost, Electric/Rock
503: Dark/Ghost, Electric/Rock, Ice/Steel
504: Dark/Psychic, Dragon/Electric, Normal/Rock
505: Dark/Psychic, Dragon/Normal, Flying/Ground
506: Dragon/Fairy, Flying/Ground, Ghost/Psychic
507: Dragon/Fairy, Flying/Ground, Normal/Psychic

Super Effective - Not Very Effective
  One Immunity
   Self Not Very Effective:
1: Dark/Rock, Fairy/Fighting, Flying/Poison
   No Self Relation
1: Flying, Dark/Electric, Fighting/Ground
2: Flying, Dark/Rock, Fighting/Ground
3: Dark/Electric, Dragon/Fairy, Psychic/Steel
4: Dark/Electric, Fighting/Ground, Flying/Psychic
5: Dark/Rock, Fighting/Ground, Flying/Psychic
6: Dark/Rock, Fighting/Ground, Flying/Poison
  Mixed Immunities
   Self Super Effective:
1: Bug/Dark, Fighting/Rock, Ghost/Ground
   Self Not Very Effective:
1: Dark, Fighting/Poison, Ghost/Psychic
2: Electric, Bug/Ground, Flying/Steel
3: Poison, Bug/Fairy, Dark/Ground
4: Bug/Dark, Fighting/Rock, Ground/Psychic
5: Bug/Fairy, Dark/Ground, Electric/Poison
6: Bug/Fairy, Dark/Ground, Ghost/Poison
7: Bug/Fairy, Dark/Ground, Poison/Rock
8: Bug/Ground, Electric/Poison, Fighting/Flying
9: Bug/Ground, Electric/Poison, Flying/Steel
10: Dark/Ground, Electric/Ghost, Fighting/Flying
11: Dark/Ground, Electric/Psychic, Fighting/Flying
12: Dark/Ground, Electric/Poison, Fighting/Flying
13: Dark/Rock, Fairy/Fighting, Ghost/Poison
14: Dark/Rock, Fairy/Fighting, Psychic/Poison
15: Dark/Rock, Fighting/Poison, Ghost/Psychic
16: Dark/Steel, Dragon/Psychic, Electric/Fighting
   Self Neutral:
1: Fighting, Flying, Rock
2: Flying, Rock, Fighting/Ground
   No Self Relation
1: Dark, Fighting, Psychic
2: Dark, Fighting, Ghost/Psychic
3: Dark, Fighting/Normal, Ghost/Psychic
4: Electric, Flying, Bug/Ground
5: Electric, Flying, Fighting/Ground
6: Electric, Fairy/Ground, Flying/Steel
7: Fighting, Flying, Dark/Rock
8: Fighting, Psychic, Dark/Rock

9: Fighting, Rock, Flying/Poison
10: Fighting, Dark/Rock, Flying/Ghost
11: Fighting, Dark/Rock, Flying/Psychic
12: Fighting, Dark/Rock, Flying/Poison
13: Fighting, Dark/Rock, Ghost/Psychic
14: Fighting, Dark/Rock, Psychic/Poison
15: Flying, Bug/Ground, Electric/Poison
16: Flying, Electric/Poison, Fighting/Ground
17: Flying, Electric/Rock, Fighting/Ground
18: Flying, Fighting/Ground, Poison/Rock
19: Poison, Bug/Fairy, Dragon/Ground
20: Poison, Bug/Fairy, Fighting/Ground
21: Rock, Fairy/Fighting, Flying/Poison
22: Rock, Fighting/Ground, Flying/Poison
23: Steel, Dragon/Fairy, Electric/Fighting
24: Bug/Fairy, Dragon/Ground, Electric/Poison
25: Bug/Fairy, Dragon/Ground, Poison/Rock
26: Bug/Fairy, Electric/Poison, Fighting/Ground
27: Bug/Fairy, Fighting/Ground, Poison/Rock
28: Bug/Flying, Electric/Poison, Fighting/Ground
29: Bug/Flying, Fighting/Ground, Poison/Rock
30: Bug/Ground, Electric/Poison, Fairy/Flying
31: Dark/Electric, Dragon/Fairy, Flying/Steel
32: Dark/Electric, Dragon/Fairy, Ghost/Steel
33: Dark/Electric, Fairy/Ground, Flying/Steel
34: Dark/Electric, Fighting/Ground, Flying/Ghost
35: Dark/Ground, Electric/Poison, Fairy/Flying
36: Dark/Ground, Fairy/Flying, Poison/Rock
37: Dark/Rock, Fighting/Ground, Flying/Ghost
38: Dark/Rock, Fighting/Normal, Flying/Ghost
39: Dark/Rock, Fighting/Normal, Ghost/Psychic
40: Dark/Rock, Fighting/Poison, Flying/Ghost
41: Dragon/Electric, Fairy/Ground, Flying/Steel
42: Dragon/Fairy, Electric/Fighting, Rock/Steel
43: Dragon/Ground, Electric/Poison, Fairy/Flying
44: Dragon/Ground, Fairy/Flying, Poison/Rock
45: Dragon/Rock, Fairy/Fighting, Flying/Poison
46: Electric/Poison, Fairy/Flying, Fighting/Ground
47: Electric/Rock, Fighting/Ground, Flying/Poison
48: Fairy/Flying, Fighting/Ground, Poison/Rock

Super Effective - Neutral
  No Immunities
    Self Not Very Effective:
1: Ice, Dragon/Psychic, Poison/Rock
2: Dragon/Psychic, Electric/Ice, Poison/Rock
  One Immunity
    Self Not Very Effective:
1: Dark/Ice, Dragon/Steel, Ground/Poison
2: Dragon/Steel, Fairy/Ice, Fighting/Flying

3: Dragon/Steel, Fairy/Ice, Ground/Psychic
4: Fairy/Ice, Fighting/Flying, Normal/Rock
    No Self Relation
1: Ground, Dark/Ice, Dragon/Steel
2: Ground, Dragon/Steel, Fairy/Ice
3: Dark/Fighting, Flying/Rock, Ground/Ice
4: Dragon/Steel, Fairy/Ice, Fighting/Ground
5: Dragon/Steel, Fairy/Ice, Fighting/Normal
6: Fairy/Fighting, Flying/Rock, Ground/Ice
  Mixed Immunities
    Self Super Effective:
1: Dark/Fairy, Dragon/Poison, Fighting/Ice
    Self Not Very Effective:
1: Ice, Bug/Fighting, Dark/Flying
2: Ice, Bug/Ground, Dark/Rock
3: Ice, Bug/Ground, Dragon/Steel
4: Ice, Bug/Ground, Normal/Rock
5: Ice, Bug/Ground, Psychic/Rock
6: Ice, Dark/Flying, Fighting/Poison
7: Ice, Dark/Ground, Dragon/Steel
8: Ice, Dragon/Steel, Ground/Psychic
9: Ice, Dragon/Steel, Ground/Poison
10: Psychic, Ghost/Ice, Poison/Rock
11: Bug/Fighting, Dark/Fairy, Dragon/Steel
12: Bug/Fighting, Dark/Flying, Ice/Normal
13: Dark/Fairy, Dragon/Poison, Fighting/Ice
14: Dark/Fairy, Dragon/Steel, Fighting/Flying
15: Dark/Flying, Fighting/Poison, Ice/Normal
16: Dragon/Psychic, Ghost/Ice, Poison/Rock
17: Dragon/Steel, Fairy/Ice, Fighting/Psychic
18: Dragon/Steel, Ghost/Ice, Ground/Psychic
19: Electric/Psychic, Ghost/Ice, Poison/Rock
20: Fighting/Flying, Ice/Psychic, Normal/Rock
    Self Neutral:
1: Fighting, Fairy/Rock, Ground/Ice
2: Fighting, Flying/Normal, Ground/Ice
    No Self Relation
1: Fighting, Ice, Dark/Flying
2: Fighting, Ice, Flying/Normal
3: Fighting, Dark/Fairy, Dragon/Steel
4: Fighting, Dark/Flying, Dragon/Ice
5: Fighting, Dark/Flying, Ground/Ice
6: Fighting, Dark/Flying, Ice/Normal
7: Fighting, Dragon/Ice, Flying/Normal
8: Fighting, Dragon/Steel, Fairy/Ice
9: Fighting, Fairy/Steel, Ground/Normal
10: Fighting, Flying/Rock, Ground/Ice
11: Fighting, Ground/Ice, Psychic/Rock
12: Fighting, Ground/Normal, Psychic/Steel

13: Ground, Ice, Dragon/Steel
14: Ground, Dragon/Steel, Ghost/Ice
15: Ice, Rock, Bug/Ground
16: Ice, Rock, Flying/Ground
17: Ice, Bug/Ground, Fairy/Rock
18: Ice, Bug/Ground, Ghost/Rock
19: Ice, Dark/Fighting, Flying/Normal
20: Ice, Dark/Flying, Fighting/Normal
21: Ice, Dark/Rock, Flying/Ground
22: Ice, Dragon/Ghost, Psychic/Rock
23: Ice, Dragon/Steel, Flying/Ground
24: Ice, Dragon/Steel, Ghost/Ground
25: Ice, Dragon/Steel, Ground/Normal
26: Ice, Fairy/Fighting, Flying/Normal
27: Ice, Fairy/Rock, Flying/Ground
28: Ice, Fighting/Psychic, Flying/Normal
29: Ice, Fighting/Poison, Flying/Normal
30: Ice, Flying/Ground, Ghost/Rock
31: Ice, Flying/Ground, Normal/Rock
32: Ice, Flying/Ground, Psychic/Rock
33: Psychic, Dragon/Ghost, Ice/Poison
34: Psychic, Flying/Ghost, Ice/Poison
35: Rock, Bug/Ground, Dragon/Ice
36: Rock, Dark/Ice, Flying/Ground
37: Rock, Dragon/Ice, Flying/Ground
38: Rock, Fairy/Ice, Fighting/Flying
39: Rock, Fairy/Ice, Flying/Ground
40: Rock, Fighting/Flying, Ice/Psychic
41: Rock, Flying/Ground, Ghost/Ice
42: Rock, Flying/Ground, Ice/Psychic
43: Bug/Fighting, Dark/Flying, Dragon/Ice
44: Bug/Ground, Dark/Rock, Dragon/Ice
45: Bug/Ground, Dragon/Ice, Ghost/Rock
46: Bug/Ground, Dragon/Ice, Normal/Rock
47: Bug/Ground, Dragon/Ice, Psychic/Rock
48: Dark/Fairy, Dragon/Steel, Fighting/Ground
49: Dark/Fairy, Dragon/Steel, Fighting/Normal
50: Dark/Fighting, Dragon/Ice, Flying/Normal
51: Dark/Fighting, Flying/Normal, Ground/Ice
52: Dark/Flying, Dragon/Ice, Fighting/Normal
53: Dark/Flying, Dragon/Ice, Fighting/Poison
54: Dark/Flying, Fighting/Normal, Ground/Ice
55: Dark/Ground, Dragon/Steel, Fairy/Ghost
56: Dark/Ice, Dragon/Steel, Flying/Ground
57: Dark/Ice, Dragon/Steel, Ground/Normal

58: Dark/Ice, Fighting/Psychic, Flying/Normal
59: Dark/Ice, Flying/Ground, Normal/Rock
60: Dark/Rock, Dragon/Ice, Flying/Ground
61: Dragon/Ghost, Electric/Ice, Psychic/Rock
62: Dragon/Ghost, Fighting/Ice, Psychic/Rock
63: Dragon/Ice, Fighting/Psychic, Flying/Normal
64: Dragon/Ice, Fighting/Poison, Flying/Normal
65: Dragon/Ice, Flying/Ground, Ghost/Rock
66: Dragon/Ice, Flying/Ground, Normal/Rock
67: Dragon/Ice, Flying/Ground, Psychic/Rock
68: Dragon/Poison, Fairy/Normal, Fighting/Ice
69: Dragon/Poison, Fairy/Normal, Fighting/Psychic
70: Dragon/Steel, Fairy/Ghost, Ground/Psychic
71: Dragon/Steel, Fairy/Ice, Fighting/Ghost
72: Dragon/Steel, Fairy/Ice, Flying/Ground
73: Dragon/Steel, Fairy/Ice, Ghost/Ground
74: Dragon/Steel, Fairy/Ice, Ground/Normal
75: Dragon/Steel, Flying/Ground, Ghost/Ice
76: Electric/Fighting, Flying/Ghost, Psychic/Steel
77: Fairy/Fighting, Flying/Normal, Ground/Ice
78: Fairy/Fighting, Ground/Ice, Psychic/Rock
79: Fairy/Ice, Fighting/Poison, Flying/Normal
80: Fairy/Ice, Flying/Ground, Ghost/Rock
81: Fairy/Ice, Flying/Ground, Normal/Rock
82: Fairy/Ice, Flying/Ground, Psychic/Rock
83: Fairy/Rock, Fighting/Ghost, Ground/Ice
84: Fairy/Rock, Fighting/Psychic, Ground/Ice
85: Fairy/Rock, Flying/Ground, Ghost/Ice
86: Fairy/Rock, Flying/Ground, Ice/Psychic
87: Fighting/Ghost, Flying/Rock, Ground/Ice
88: Fighting/Psychic, Flying/Normal, Ground/Ice
89: Fighting/Psychic, Flying/Normal, Ice/Poison
90: Fighting/Psychic, Flying/Rock, Ground/Ice
91: Flying/Ground, Ghost/Rock, Ice/Psychic
92: Flying/Ground, Ice/Psychic, Normal/Rock
Not Very Effective - Neutral
  Mixed Immunities
    Self Not Very Effective:
1: Electric, Steel, Dragon/Psychic
2: Electric, Steel, Dragon/Poison
    No Self Relation
1: Dragon, Electric, Steel
2: Electric, Steel, Bug/Dragon
3: Electric, Steel, Dragon/Normal

Source Code

Code also available at: https://github.com/Chalayyy/starter_types/blob/main/starter_types.py

```python
# This program is designed to find new options for starter pokemon types. Excludes water,fire,grass from options.
# Pokemon are categorized based on their number of immunities and their self relation.
# Trios of pokemon that obey two sets of triangular relationships are put into a specific list
# Pokemon are then displayed based on trio relationship -> number of immunities -> self relation

from termcolor import cprint  # colorize text


class Pokemon:
    # Pokemon are hypothetical combinations of types or individual types

    def __init__(self, *typing):
        # Pokemon have one or two types
        self.typing = typing

    def __repr__(self):
        # Pokemon are represented by their typing
        return "/".join(str(typ) for typ in self.typing)

    # Pokemon may attack other pokemon. Attack considers all types of the attacker and defender
    # and gives a list of damage multipliers from each attacking type against both defending types
    def attack(self, pokemon):
        # Pokemon may attack other pokemon. Attack considers all types of the attacker and defender
        # and gives a list of damage multipliers from each attacking type against both defending types
        offense_set = []
        for attack_type in self.typing:       # one attacking type considered at a time
            offense_set.append(attack_type.attack(pokemon))
        return offense_set


class Type:
    # Types are the different pokemon elemental types.

    def __init__(self, name, se_list, nve_list, noeffect_list):
        # Types have a name, list of types they are super effective, not very effective, or
        # have no effect against
        self.name = name
        self.se_list = se_list
        self.nve_list = nve_list
        self.noeffect_list = noeffect_list

    def __repr__(self):
        # Types are represented by their name
        return str(self.name)

    def attack(self, pokemon):
        # All attacks are a single type; type-effectiveness of an attakc is
        # the product of its effectiveness against both defending types
```

```python
        damage_multiplier = 1
        for defend_type in pokemon.typing:
            if defend_type in self.se_list:  # If attack is SE, multiply by 2
                damage_multiplier *= 2
            elif defend_type in self.nve_list:  # If attack is NVE, divide by 2
                damage_multiplier /= 2
            elif defend_type in self.noeffect_list:  # If defender is immune, change to zero
                damage_multiplier *= 0
        return damage_multiplier


# All types in alphetical order. Lists are empty and filled later because they reference each other
Bug = Type("Bug", [], [], [])
Dark = Type("Dark", [], [], [])
Dragon = Type("Dragon", [], [], [])
Electric = Type("Electric", [], [], [])
Fairy = Type("Fairy", [], [], [])
Fighting = Type("Fighting", [], [], [])
Fire = Type("Fire", [], [], [])
Flying = Type("Flying", [], [], [])
Ghost = Type("Ghost", [], [], [])
Grass = Type("Grass", [], [], [])
Ground = Type("Ground", [], [], [])
Ice = Type("Ice", [], [], [])
Normal = Type("Normal", [], [], [])
Poison = Type("Poison", [], [], [])
Psychic = Type("Psychic", [], [], [])
Rock = Type("Rock", [], [], [])
Steel = Type("Steel", [], [], [])
Water = Type("Water", [], [], [])


# Each type's lists are filled with relevent data
Bug.se_list.extend([Dark, Grass, Psychic])
Bug.nve_list.extend([Fairy, Fighting, Fire, Flying, Ghost, Poison, Steel])

Dark.se_list.extend([Ghost, Psychic])
Dark.nve_list.extend([Dark, Fairy, Fighting])

Dragon.se_list.extend([Dragon])
Dragon.nve_list.extend([Steel])
Dragon.noeffect_list.extend([Fairy])

Electric.se_list.extend([Flying, Water])
Electric.nve_list.extend([Dragon, Electric, Grass])
Electric.noeffect_list.extend([Ground])

Fairy.se_list.extend([Dark, Dragon, Fighting])
Fairy.nve_list.extend([Fire, Poison, Steel])

Fighting.se_list.extend([Dark, Ice, Normal, Rock, Steel])
Fighting.nve_list.extend([Bug, Fairy, Flying, Poison, Psychic])
Fighting.noeffect_list.extend([Ghost])
```

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```python
Fire.se_list.extend([Grass, Steel, Bug, Ice])
Fire.nve_list.extend([Fire, Water, Rock, Dragon])

Flying.se_list.extend([Bug, Fighting, Grass])
Flying.nve_list.extend([Electric, Rock, Steel])

Ghost.se_list.extend([Ghost, Psychic])
Ghost.nve_list.extend([Dark])
Ghost.noeffect_list.extend([Normal])

Grass.se_list.extend([Water, Rock, Ground])
Grass.nve_list.extend([Fire, Grass, Steel, Bug, Dragon, Flying, Poison, Steel])

Ground.se_list.extend([Electric, Fire, Poison, Rock, Steel])
Ground.nve_list.extend([Bug, Grass])
Ground.noeffect_list.extend([Flying])

Ice.se_list.extend([Dragon, Flying, Grass, Ground])
Ice.nve_list.extend([Ice, Water, Fire, Steel])

Normal.nve_list.extend([Steel, Rock])
Normal.noeffect_list.extend([Ghost])

Psychic.se_list.extend([Fighting, Poison])
Psychic.nve_list.extend([Psychic, Steel])
Psychic.noeffect_list.extend([Dark])

Poison.se_list.extend([Fairy, Grass])
Poison.nve_list.extend([Poison, Ground, Rock, Ghost])
Poison.noeffect_list.extend([Steel])

Rock.se_list.extend([Bug, Fire, Flying, Ice])
Rock.nve_list.extend([Fighting, Ground, Steel])

Steel.se_list.extend([Ice, Rock, Fairy])
Steel.nve_list.extend([Steel, Water, Fire, Electric])

Water.se_list.extend([Fire, Rock, Ground])
Water.nve_list.extend([Grass, Water, Dragon])


# List containing all non-traditional starter types
# type_list_trad = [Water, Fire, Grass]  # add these types to consider all 18 types
type_list = [
    Bug, Dark, Dragon, Electric, Fairy, Fighting, Flying,
    Ghost, Ground, Ice, Normal, Psychic, Poison, Rock, Steel
]


# List containing all possible pokemon type combinations (not permutations). Total of 120 pokemon
pokemon_list = [Pokemon(x) for x in type_list]  # 15 pokemon
pokemon_list.extend([Pokemon(x, y) for x in type_list for y in type_list[type_list.index(
    x)+1:] if x != y])  # 105 pokemon; remove this line to only consider mono type pokemon
```

```python
# # Dictionary containing all pokemon matchups
# # For example:  {Pokemon1: {Type1: Damage, Type2: Damage, ...}, Pokemon2: {Type1: Damage, Type2: Damage, ...}}
# effectiveness_dict = {}
# for defender in pokemon_list:
#          pokemon_damages = {}  # Dictionary for effectivnesses against a single pokemon
#          for attacker in pokemon_list:
#                   pokemon_damages[attacker] = attacker.attack(defender)  # Pair attacking type with its effectiveness
#          effectiveness_dict[defender] = pokemon_damages  # Pair defending type with dictionary of attacking effectiveness

# Lists of pokemon with given number of immunities
no_immunity_list = []  # 36 pokemon
one_immunity_list = []  # 54 pokemon
two_immunity_list = []  # 24 pokemon
three_immunity_list = []  # 6 pokemon

# Fills immunity lists
for pokemon in pokemon_list:
    counter_immunity = 0
    for attacker in type_list:
        damage = attacker.attack(pokemon)
        if damage == 0:
            counter_immunity += 1
    if counter_immunity == 0:
        no_immunity_list.append(pokemon)
    elif counter_immunity == 1:
        one_immunity_list.append(pokemon)
    elif counter_immunity == 2:
        two_immunity_list.append(pokemon)
    else:
        three_immunity_list.append(pokemon)

multiple_immunity_list = two_immunity_list+three_immunity_list
immunity_lists = [no_immunity_list, one_immunity_list, multiple_immunity_list]

# Lists of pokemon trios with given effectiveness relationships.
all_se = []  # 42 options
all_nve = []  # 0 options
all_neu = []  # 725 options
se_nve = []  # 74 options
se_neu = []  # 126 options
nve_neu = []  # 5 options
# doesn't include all_nve since it is empty
effectiveness_lists = [all_se, all_neu, se_nve, se_neu, nve_neu]

# Fills effectiveness relationship lists
for pokemon1 in pokemon_list:
    for pokemon2 in pokemon_list[pokemon_list.index(pokemon1)+1:]:
        for pokemon3 in pokemon_list[pokemon_list.index(pokemon2)+1:]:

            # ensure no type is in 2 pokemon
            set1 = set(list(pokemon1.typing))
            set2 = set(list(pokemon2.typing))
            set3 = set(list(pokemon3.typing))
```

```python
        if not (set1 & set2) and not (set1 & set3) and not (set2 & set3):

            p1p2 = pokemon1.attack(pokemon2)
            p1p3 = pokemon1.attack(pokemon3)
            p2p1 = pokemon2.attack(pokemon1)
            p2p3 = pokemon2.attack(pokemon3)
            p3p1 = pokemon3.attack(pokemon1)
            p3p2 = pokemon3.attack(pokemon2)
            all_attacks = [p1p2, p1p3, p2p1, p2p3, p3p1, p3p2]
            cycle1 = [p1p2, p2p3, p3p1]
            cycle2 = [p1p3, p3p2, p2p1]
            if all(map(lambda x: any(y > 1 for y in x), all_attacks)):  # All can deal SE to other 2
                all_se.append([pokemon1, pokemon2, pokemon3])

            # All only deal NVE or 0 to other 2
            if all(map(lambda x: all(y < 1 for y in x), all_attacks)):
                all_nve.append([pokemon1, pokemon2, pokemon3])

            # All only deal neutral to other 2
            if all(map(lambda x: all(y == 1 for y in x), all_attacks)):
                all_neu.append([pokemon1, pokemon2, pokemon3])

            # Check if trio deals SE one way
            if any((all(map(lambda x: 2 in x or 4 in x, cycle1)), all(map(lambda x: 2 in x or 4 in x, cycle2)))):
                # Check if trio deals neutral the other way
                if any((all(map(lambda x: [1, 1] == x or [1] == x, cycle1)), all(map(lambda x: [1, 1] == x or [1] == x, cycle2)))):
                    se_neu.append([pokemon1, pokemon2, pokemon3])
                # Check if trio deals nve or 0 the other way
                if any((all(map(lambda x: all(y < 1 for y in x), cycle1)), all(map(lambda x: all(y < 1 for y in x), cycle2)))):
                    se_nve.append([pokemon1, pokemon2, pokemon3])

            # Check if trio deals nve or 0 one way
            if any((all(map(lambda x: all(y < 1 for y in x), cycle1)), all(map(lambda x: all(y < 1 for y in x), cycle2)))):
                # Check if trio deals neutral the other way
                if any((all(map(lambda x: [1, 1] == x or [1] == x, cycle1)), all(map(lambda x: [1, 1] == x or [1] == x, cycle2)))):
                    nve_neu.append([pokemon1, pokemon2, pokemon3])


# Lists of pokemon with the given self-relationship. Some pokemon fall into multiple categories
self_se = []  # Can deal SE to self; 44 pokemon
self_nve = []  # Resists at least one of own types; 80 pokemon
self_neu = []  # Only deals neutral to self; 18 pokemon
self_imm = []  # Immune to one of own types; 7 pokemon
self_relationships_lists = [self_se, self_nve, self_neu, self_imm]

# Fill self-relationship lists
for pokemon in pokemon_list:
    self_attack = pokemon.attack(pokemon)
    if 0.5 in self_attack or 0.25 in self_attack:  # Pokemon may doubly resist attack
        self_nve.append(pokemon)
    if 2 in self_attack or 4 in self_attack:  # Pokemon may be doubly weak to attack
        self_se.append(pokemon)
    if self_attack == [1, 1] or self_attack == [1]:
        self_neu.append(pokemon)
```

```python
            if 0 in self_attack:
                self_imm.append(pokemon)



    # Displays information on which relationship we are looking at
    # (nve-nve with 0 options is not displayed here)
    # Layers: Trio relationship > Number of immunities > Self-relationship
    for trio_list in effectiveness_lists:
        if trio_list is all_se:
            cprint("Super Effective - Super Effective", "blue", None, [])
        elif trio_list is all_neu:
            cprint("Neutral - Neutral", "blue",  None, [])
        elif trio_list is se_neu:
            cprint("Super Effective - Neutral", "blue",  None, [])
        elif trio_list is se_nve:
            cprint("Super Effective - Not Very Effective", "blue",  None, [])
        elif trio_list is nve_neu:
            cprint("Not Very Effective - Neutral", "blue",  None, [])

        # will contain TRIOS (not individual pokemon) of given trio effectiveness with mixed number of immunities
        mixed_immunity = []

        # identify which immunity list we're looking at
        for imm in immunity_lists:

            # printed variable ensures layer is displayed only once for all relevent trios
            printed = False

            # will contain TRIOS (not individual pokemon) of given immunity value with no uniform self relation
            no_self_relation = []

            # identify which self relation list we're looking at
            for self_relation in self_relationships_lists+[no_self_relation]:

                # All pokemon in given trio from trio_list moved to:
                #   current list if it obeys immunity and self relations
                #   placed in no_self_relation if it obeys immunity but aren't all in same self_relation, including non-current ones
                #   placed in mixed_immunity if it doesn't obey immunity
                if self_relation is not no_self_relation:
                    # contains trios of pokemon with current trio relationship, immunitiy, self relation
                    current_list = []

                    for trio in trio_list:
                        if all(pokemon in imm for pokemon in trio):  # obeys immunity requirement
                            # obeys self relation requirement
                            if all(pokemon in self_relation for pokemon in trio):
                                current_list.append(trio)
                            elif not any(all(pokemon in self_relationships_lists[i] for pokemon in trio) for i in range(4)):
                                # obeys immunity, but not any self-relation
                                if trio not in no_self_relation:
                                    no_self_relation.append(trio)
                        elif not any(all(pokemon in immunity_lists[i] for pokemon in trio) for i in range(len(immunity_lists))):
                            # does not obey immunity requirement
                            if trio not in mixed_immunity:
```

```
                    mixed_immunity.append(trio)
else:
    current_list = no_self_relation  # OPTIONAL 1/2: NO SELF-RELATION: PT 1/2


# Display relationships which satisfy requirements by checking if the current_list is non-empty
# "printed" variable ensures layer is displayed only once for all relevent trios
color = "green"
if current_list:
    if imm is no_immunity_list and not printed:
        cprint("  No Immunities", "magenta",
            None, [])
        printed = True
    elif imm is one_immunity_list and not printed:
        cprint("  One Immunity", "magenta",
            None, [])
        printed = True
    elif imm is multiple_immunity_list and not printed:
        cprint("  Multiple Immunities", "magenta",
            None, [])
        printed = True


    # print self relation name and trios obeying all 3 requirements
    if self_relation is self_se:
        cprint("     Self Super Effective:", "red",
            None, ["underline"])
    if self_relation is self_nve:
        cprint("     Self Not Very Effective:", "red",
            None, ["underline"])
    if self_relation is self_neu:
        cprint("     Self Neutral:", "red",
            None, ["underline"])
    if self_relation is self_imm:
        cprint("     Self Immune:", "red",
            None, ["underline"])
    if self_relation is no_self_relation:  # OPTIONAL 1/2: NO SELF RELATION: PT 2/2
        color = "cyan"
        cprint("     No Self Relation", "red",
            None, ["underline"])


    # check number of immunities given for each pokemon in trio
    for trio in current_list:
        text_options = []
        highlight = None
        p1immune = sum(len(trio[0].typing[y].noeffect_list)
                for y in range(len(trio[0].typing)))
        p2immune = sum(len(trio[1].typing[y].noeffect_list)
                for y in range(len(trio[1].typing)))
        p3immune = sum(len(trio[2].typing[y].noeffect_list)
                for y in range(len(trio[2].typing)))

        # if all 3 pokemon have the same number of types that are immune to them, bold the text
        if (p1immune == p2immune and p2immune == p3immune):
            text_options.append("bold")
```

```python
    # # otherwise if they all have similar number of types immune to them (within one of each other), underline the text
    # elif (p1immune > 0 and p2immune > 0 and p3immune > 0) or (p1immune < 2 and p2immune < 2 and p3immune < 2):
    #               text_options.append("underline")


    # if any pokemon is immune to another pokemon within the trio, darken (soften) the text
    # but if each pokemon is immune to another pokemon in trio, blacklight the text instead
    imm_in_trio1 = [0 in trio[x].attack(
        trio[(x+1) % 3]) for x in range(3)]
    imm_in_trio2 = [
        0 in trio[(x+1) % 3].attack(trio[(x)]) for x in range(3)]
    if all(imm_in_trio1) or all(imm_in_trio2):
        highlight = "on_grey"
    elif any(imm_in_trio1) or any(imm_in_trio2):
        text_options.append("dark")


    # display the trio
    cprint(f"{current_list.index(trio) +1}: {str(trio)[1:-1]}",
            color, highlight, text_options)


# OPTIONAL 2/2: MIXED IMMUNITY
# after running through all same-value immunity trios, deal with trios that didn't share the exact same number of immunities
# We only look at trios placed in the mixed_immunity list

# printed variable ensures layer is displayed only once for all relevent trios
printed = False

# contains TRIOS (not individual pokemon) of given immunity (mixed) that don't share the same self-relation
no_self_relation = []

# identify what the each pokemon in the trio relationship to itself is
for self_relation in self_relationships_lists+[no_self_relation]:

  # All pokemon in given trio eff moved to:
  #   current list if it obeys self relations
  #   placed in no_self_relation if it obeys immunity but aren't all in same self_relation, including non-current ones
  if self_relation is not no_self_relation:
    # contains trios of pokemon with current trio relationship, immunitiy, self relation
    current_list = []

    for trio in mixed_immunity:
      # obeys self relation requirement
      if all(pokemon in self_relation for pokemon in trio):
        current_list.append(trio)
      elif not any(all(pokemon in self_relationships_lists[i] for pokemon in trio) for i in range(4)):
        # does not obey self relation requirements
        if trio not in no_self_relation:
          no_self_relation.append(trio)
  else:
    current_list = self_relation  # OPTIONAL 2A: NO SELF RELATION: PT 1/2

  # Display which immunity type we're looking at only if it has any pokemon in it
  if current_list:
    if not printed:
      cprint("   Mixed Immunities", "magenta",
```

```
            None, [])
        printed = True


# print self relation
if self_relation is self_se:
    cprint("     Self Super Effective:",
        "red", None, ["underline"])
if self_relation is self_nve:
    cprint("     Self Not Very Effective:",
        "red", None, ["underline"])
if self_relation is self_neu:
    cprint("     Self Neutral:",
        "red", None, ["underline"])
if self_relation is self_imm:
    cprint("     Self Immune:",
        "red", None, ["underline"])
if self_relation is no_self_relation:  # OPTIONAL 2A: NO SELF RELATION: PT 2/2
    cprint("     No Self Relation",
        "red", None, ["underline"])


# check number of immunities each pokemon gives
for trio in current_list:
    text_options = []
    highlight = None
    color = "cyan"
    p1immune = sum(len(trio[0].typing[y].noeffect_list)
            for y in range(len(trio[0].typing)))
    p2immune = sum(len(trio[1].typing[y].noeffect_list)
            for y in range(len(trio[1].typing)))
    p3immune = sum(len(trio[2].typing[y].noeffect_list)
            for y in range(len(trio[2].typing)))

    # # if all 3 pokemon have the same number of types that are immune to them, bold the text
    # if (p1immune == p2immune and p2immune == p3immune):
    #   text_options.append("bold")

    # # otherwise if they all have similar number of types immune to them (within one of each other), underline the text
    # elif (p1immune > 0 and p2immune > 0 and p3immune > 0) or (p1immune < 2 and p2immune < 2 and p3immune < 2):
    #               text_options.append("underline")

    # if any pokemon is immune to another pokemon within the trio, darken (soften) the text
    # but if each pokemon is immune to another pokemon in trio, blacklight the text instead
    imm_in_triangle1 = [0 in trio[x].attack(
        trio[(x+1) % 3]) for x in range(3)]
    imm_in_triangle2 = [
        0 in trio[(x+1) % 3].attack(trio[(x)]) for x in range(3)]
    if all(imm_in_triangle1) or all(imm_in_triangle2):
        highlight = "on_grey"
    elif any(imm_in_triangle1) or any(imm_in_triangle2):
        text_options.append("dark")

    # # if all pokemon have a similar number of immunities (within one of each other), change text color
    # if all(pokemon in one_immunity_list or pokemon in multiple_immunity_list for pokemon in trio) or all(
    #   pokemon in one_immunity_list or pokemon in no_immunity_list for pokemon in trio) :
```

```python
#   if self_relation is not no_self_relation:
#                   color = "yellow"


# if each pokemon has/gives an equal number of immunities
imm_difference = []
for pokemon in trio:
    counter_immunity = 0  # number of immunities possessed
    for attacker in type_list:
        damage = attacker.attack(pokemon)
        if damage == 0:
            counter_immunity += 1
    # find the difference between immunities given/had for each pokemon.
    imm_difference.append(sum(len(pokemon.typing[y].noeffect_list) for y in range(
        len(pokemon.typing))) - (counter_immunity))


# if each pokemon has same value for immunity difference, turn text yellow (semi-obeys immunity requirement)
if len(set(imm_difference)) == 1:
    text_options.append("bold")
    if self_relation is not no_self_relation:
        color = "yellow"


# display trio
cprint(f"{current_list.index(trio) +1}: {str(trio)[1:-1]}",
    color, highlight, text_options)
```