Semantic Pokédex

By 146 and 208

In this project we have used an API to fetch data about all sorts of creatures from the Pokémon universe. We've constructed an ontology which is used to explain how each creature either isOrganism Pokémon or Human, how different Pokémon isType, how each type isWeakAgainst and isStrongAgainst, etc.
This Pokédex uses the API to gather data, and using our Pokémon ontology there is a vast amount of information you can gather about all of the 887 Pokémon that exist today. There are some more pokemon, but they are special variations. Simple information like their type(s) or more specific things like each Pokémon's height and/or weight.

What drove us to make this?
For a very long time we had no clue what to make and we were stuck. 208 found an API about pokemon and started making a program for it just for fun. Then we both thought it was a really good idea to make a pokedex for our semester assignment. We thought that it was something rarely made for a project so we stuck with it. It wasn't too hard to get the information we needed from the api, we both knew a decent amount about pokemon, and we both had a passion for it.

Why?

The reason we made this program is so it would be easier to find a lot of things. For example it would be much easier to find out whether a pokemon can learn a specific move, what types of pokemon that can learn that move and if you need the pokemon to have a specific ability and that move it can also be found. If you're looking for a big pokemon with the ability "Blaze" you can search for all pokemon that have that ability and are above 1m. If you need to know what's good against a pokemon type(which is relatively easy), but the pokemon has two types, then it's a little harder, but our program can find that easily. This way we could in the future make a calculator that tells you which pokemons are best against another pokemon and rank them after damage booster(1.5x, 2x, 3x etc...).
Each pokemon also has moves they can learn and a specific level and method they can learn it, but we had some trouble getting that into the graf so we cut it. If we could manage to get this information into the graf we could also find out when a pokemon can learn a set of moves and rank them after damage or when the pokemon can get it.
During programming we quickly realized that the code has a very long runtime. If we had more time, or for future projects that will definitely be one of our priorities to try and sort out.

Example Query:

```
PREFIX bulb: <https://bulbapedia.bulbagarden.net/wiki/>
PREFIX pdb: <https://pokemondb.net/pokedex/>
PREFIX ex: <https://example.org/>


SELECT DISTINCT ?pokemon WHERE {
        ?pokemon ex:canLearnMove bulb:Tackle .
        ?pokemon ex:canLearnMove bulb:Quick_Attack .
        ?pokemon ex:canLearnMove bulb:Bite .
        ?pokemon ex:canLearnMove bulb:Snarl .
        ?pokemon ex:canLearnMove bulb:Spark .
        ?pokemon ex:hasAbility bulb:Lightning_Rod .
        ?pokemon ex:isType bulb:electric
} LIMIT 100
```

This query selects all pokemon that can learn this set of moves and ability, and is electric type. It will then print electrike and manectric

We decided to create this Pokédex because it spans a topic that we initially knew more about and felt like we could successfully develop. We figured this was a project that could be well executed with semantic technologies because there are so many different pokémon each with a lot of different attributes. So if you wanted to know exactly how many pokémon had a specific height, or could learn a specific move, this project should be able to grant you an answer by showing you the pokémon in question through queries.

Namespaces we used:

papi = Namespace("pokeapi.co/api/v2/pokemon/")
bulb = Namespace("https://bulbapedia.bulbagarden.net/wiki/")
ex = Namespace("https://example.org/")
pdb = Namespace("https://pokemondb.net/pokedex/")

Papi is where we get all our information from. Here you can request a JSON file of all the different pokemons. Bulb is our pokemon wiki. Everything you need to know about pokemon you can find at this page. Pdb is more specialised towards pokemons as a species.

Language:

We wrote in python because that is the programming language we are the most familiar with. Like we've briefly mentioned previously in this report, we used an API called "pokeapi" to fetch all of the data required. This api was by far the most extensive api we found for pokémon data that we could find.

Ontology:

We constructed an ontology for our project while taking inspiration from Maulik Kamdar's post about "Fictional Universes and OWL! – Part 1":
(https://maulik-kamdar.com/2018/03/12/fictional-universes-and-owl-part-i/)
We only took some ideas from it like: "there are two species: pokemon and humans" and some other small ones. The rest of our ontology we created out of what we had to work with from the api and what we could think of out of our heads like, everyone knows that team rocket is the villain, that Ashs' first pokemon was Pikachu and that a pokeball can catch a pokemon. Therefore we just wrote it with g.add() at the start.

Examples for queries:

Listed below are a couple of example queries, to see more queries (and a couple ones that are more advanced), see the additional "ASK_THESE_IN_BLAZEGRAPH.txt" file for queries you can test in blazegraph your selfe.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX bulb: <https://bulbapedia.bulbagarden.net/wiki/>
PREFIX pdb: <https://pokemondb.net/pokedex/>
PREFIX ex: <https://example.org/>

SELECT ?pokemon WHERE {
  ?pokemon ex:canLearnMove bulb:Tailwind .
} LIMIT 100000
```

Example Query that fetches all Pokémon that can learn the Tailwind.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX bulb: <https://bulbapedia.bulbagarden.net/wiki/>
PREFIX pdb: <https://pokemondb.net/pokedex/>
PREFIX ex: <https://example.org/>

SELECT ?move WHERE {
  pdb:charizard ex:canLearnMove ?move .
} LIMIT 100
```

Example Query that fetches all moves that Charizard can learn.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX bulb: <https://bulbapedia.bulbagarden.net/wiki/>
PREFIX pdb: <https://pokemondb.net/pokedex/>
PREFIX ex: <https://example.org/>

SELECT ?type WHERE {
  pdb:charizard ex:isType ?type .
} LIMIT 100
```

Example Query which fetches Charizard's type.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX bulb: <https://bulbapedia.bulbagarden.net/wiki/>
PREFIX pdb: <https://pokemondb.net/pokedex/>
PREFIX ex: <https://example.org/>

SELECT ?pokemon WHERE {
  ?pokemon ex:isType bulb:fairy .
  ?pokemon ex:isType bulb:ghost
} LIMIT 100000
```

Example Query which fetches all Pokémon who have both fairy and ghost type.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX bulb: <https://bulbapedia.bulbagarden.net/wiki/>
PREFIX pdb: <https://pokemondb.net/pokedex/>
PREFIX ex: <https://example.org/>

SELECT ?isOrganism WHERE {
  pdb:charizard ?isOrganism bulb:Pokémon_species .
} LIMIT 100000
```

Example Query checking if Charizard is an organism of the Pokémon species.

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX bulb: <https://bulbapedia.bulbagarden.net/wiki/>
PREFIX pdb: <https://pokemondb.net/pokedex/>
PREFIX ex: <https://example.org/>

SELECT ?move WHERE {
  pdb:charizard ex:canLearnMove ?move .
} LIMIT 100
```

Advanced features

<

move
<https://bulbapedia.bulbagarden.net/wiki/Aerial_Ace_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Air_Cutter_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Air_Slash_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Attract_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Bide_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Blast_Burn_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Body_Slam_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Brick_Break_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Brutal_Swing_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Bulldoze_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Captivate_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Confide_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Counter_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Curse_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Cut_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Defense_Curl_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Defog_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Dig_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Double_Edge_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Double_Team_(move)>
<https://bulbapedia.bulbagarden.net/wiki/Dragon_Breath_(move)>

Triples:

Here you can see a triple of a pokemon. You can't see his type since it's under hasMove:

```
<https://pokemondb.net/pokedex/scyther> schema:height "1,5" ;
    schema:weight 560 ;
    ex:baseExp 100 ;
    ex:hasAbility <https://bulbapedia.bulbagarden.net/wiki/Steadfast_(Ability)>,
        <https://bulbapedia.bulbagarden.net/wiki/Swarm_(Ability)>,
        <https://bulbapedia.bulbagarden.net/wiki/Technician_(Ability)> ;
    ex:hasID 123 ;
    ex:hasMove <https://bulbapedia.bulbagarden.net/wiki/Aerial_Ace_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Agility_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Air_Slash_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Attract_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Baton_Pass_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Bide_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Brick_Break_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Brutal_Swing_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Bug_Bite_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Bug_Buzz_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Captivate_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Confide_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Counter_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Curse_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Cut_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Defog_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Detect_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Double_Edge_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Double_Hit_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Double_Team_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Endure_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Facade_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/False_Swipe_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Feint_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Focus_Energy_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Frustration_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Fury_Cutter_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Giga_Impact_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Headbutt_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Hidden_Power_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Hyper_Beam_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Knock_Off_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Leer_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Light_Screen_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Mimic_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Natural_Gift_(move)>,
        <https://bulbapedia.bulbagarden.net/wiki/Night_Slash_(move)>,
```

Here you can see both pokemon triple, Oragnism and weakness/strength triple.

```
<https://pokemondb.net/pokedex/zubat> ns1:height 8 ;
    ns1:weight 75 ;
    :baseExp 49 ;
    :hasID 41 ;
    :isOrganism <https://bulbapedia.bulbagarden.net/wiki/Pokémon_species> ;
    :isType <https://bulbapedia.bulbagarden.net/wiki/flying_type>,
        <https://bulbapedia.bulbagarden.net/wiki/poison_type> .

<https://pokemondb.net/pokedex/zweilous> ns1:height 14 ;
    ns1:weight 500 ;
    :baseExp 147 ;
    :hasID 634 ;
    :isOrganism <https://bulbapedia.bulbagarden.net/wiki/Pokémon_species> ;
    :isType <https://bulbapedia.bulbagarden.net/wiki/dark_type>,
        <https://bulbapedia.bulbagarden.net/wiki/dragon_type> .

<https://pokemondb.net/pokedex/zygarde> ns1:height 50 ;
    ns1:weight 3050 ;
    :baseExp 270 ;
    :hasID 718 ;
    :isOrganism <https://bulbapedia.bulbagarden.net/wiki/Pokémon_species> ;
    :isType <https://bulbapedia.bulbagarden.net/wiki/dragon_type>,
        <https://bulbapedia.bulbagarden.net/wiki/ground_type> .

<http://dbpedia.org/resource/Organisms> rdf:first <https://bulbapedia.bulbagarden.net/wiki/Human> ;
    rdf:rest ( <https://bulbapedia.bulbagarden.net/wiki/Pokémon_species> ) .

<https://bulbapedia.bulbagarden.net/wiki/ice_type> :isStrongAgainst <https://bulbapedia.bulbagarden.net/wiki/dragon_type>,
        <https://bulbapedia.bulbagarden.net/wiki/flying_type>,
        <https://bulbapedia.bulbagarden.net/wiki/grass_type>,
        <https://bulbapedia.bulbagarden.net/wiki/ground_type>,
        <https://bulbapedia.bulbagarden.net/wiki/ice_type> ;
    :isWeakTo <https://bulbapedia.bulbagarden.net/wiki/fighting_type>,
        <https://bulbapedia.bulbagarden.net/wiki/fire_type>,
        <https://bulbapedia.bulbagarden.net/wiki/ice_type>,
        <https://bulbapedia.bulbagarden.net/wiki/rock_type>,
        <https://bulbapedia.bulbagarden.net/wiki/steel_type>,
        <https://bulbapedia.bulbagarden.net/wiki/water_type> .

<https://bulbapedia.bulbagarden.net/wiki/ghost_type> :isStrongAgainst <https://bulbapedia.bulbagarden.net/wiki/bug_type>,
        <https://bulbapedia.bulbagarden.net/wiki/fighting_type>,
        <https://bulbapedia.bulbagarden.net/wiki/ghost_type>,
        <https://bulbapedia.bulbagarden.net/wiki/normal_type>,
        <https://bulbapedia.bulbagarden.net/wiki/poison_type>,
        <https://bulbapedia.bulbagarden.net/wiki/psychic_type> ;
    :isWeakTo <https://bulbapedia.bulbagarden.net/wiki/dark_type>,
        <https://bulbapedia.bulbagarden.net/wiki/ghost_type>,
        <https://bulbapedia.bulbagarden.net/wiki/normal_type> .
```

Conclusion:

We created a program that creates a pokemon ontology and makes triples for every pokemon. It adds weaknesses and strengths, abilities and moves, height, weight, id and type.
It starts with just adding some simple triples to g just to get started. It then gets all the pokemons and adds them to a list which will then be used to search up the specific pokemon in the api.
Ite then searches the pokemon up in the api and gets all the information it needs through for-loops and adds the information to the graph.

We have been working well but for next time we should plan a little better so we don’t need to waste a lot of time trying to find out what we want to make. We spent a lot of time on another idea before we switched to pokemon.

Contributions:

208: Focus on programming and testing

146: Focus on raport and testing