

1. How can I get the Data for Charizard?

```
pprint.pprint(pokedex.find_one({'name': {'language': 'english', 'language name': 'Charizard', }}))

{'_id': ObjectId('63f7f165627b4b80698b7908'),
 'base': {'Attack': 84,
          'Defense': 78,
          'HP': 78,
          'Sp': {'Attack': 109, 'Defense': 85},
          'Speed': 100},
 'id': 6,
 'name': [{'language': 'english', 'language name': 'Charizard'},
          {'language': 'japanese', 'language name': 'リザードン'},
          {'language': 'chinese', 'language name': '喷火龙'},
          {'language': 'french', 'language name': 'Dracaufeu'}],
 'type': ['Fire', 'Flying']}
```

2. How can I get the names of all pokemon Charizard has a type advantage over?

```
char_types = pokedex.find_one({'name': {'language': 'english', 'language name': 'Charizard', }})['type']
weak_types = set()
for char_type in char_types:
    for weak_type in [name['name'] for name in types.find({'weaknesses': char_type}, {'name': 1})]:
        weak_types.add(weak_type)
weak_pkmn = [pkmn['name'][0]['language name'] for pkmn in pokedex.find({'type': {'$in': [elem for elem in weak_types]}})]
print(weak_pkmn[:15])

['Bulbasaur', 'Ivysaur', 'Venusaur', 'Charmander', 'Charmeleon', 'Charizard', 'Caterpie', 'Metapod', 'Butterfree', 'Weedle', 'Kakuna', 'Beedrill', 'Clefairy', 'Clefable', 'Vulpix']
```

3. How can I get the names of all pokemon Charizard has a type disadvantage to?

```
char_types = pokedex.find_one({'name': {'language': 'english', 'language name': 'Charizard', }})['type']
strong_types = set()
for char_type in char_types:
    for strong_type in [name['name'] for name in types.find({'strengths': char_type}, {'name': 1})]:
        strong_types.add(strong_type)
strong_pkmn = [pkmn['name'][0]['language name'] for pkmn in pokedex.find({'type': {'$in': [elem for elem in strong_types]}})]
print(strong_pkmn[:15])

['Squirtle', 'Wartortle', 'Blastoise', 'Pikachu', 'Raichu', 'Sandshrew', 'Sandslash', 'Nidoqueen', 'Nidoking', 'Diglett', 'Dugtrio', 'Psyduck', 'Golduck', 'Poliwag', 'Poliwhirl']
```

4. How can I get the names of all Water type pokemon?

```
water_pkmn = pokedex.find({'type': 'Water'})
for pkmn in water_pkmn[:15]:
    print(pkmn['name'][0]['language name'])

Squirtle
Wartortle
Blastoise
Psyduck
Golduck
Poliwag
Poliwhirl
Poliwrath
Tentacool
Tentacruel
Slowpoke
Slowbro
Seel
Dewgong
Shellder
```

5. A sweeper is a pokemon with high speed and either high special attack or high attack. They are typically used to quickly knock out opposing pokemon with a few powerful attacks. How can I get the data for all Water type sweepers?

```

spc_sweepers = pokedex.find({'$or': [{'base.Attack': {'$gt': 100}}, {'base.Sp. Attack': {'$gt': 100}}],
                             'base.Speed': {'$gt': 100}, 'type': 'Water', })

for pkmn in spc_sweepers:
    pprint.pprint(pkmn)

{'_id': ObjectId('63f7f165627b4b80698b7aa5'),
 'base': {'Attack': 105,
          'Defense': 55,
          'HP': 85,
          'Sp': {'Attack': 85, 'Defense': 50},
          'Speed': 115},
 'id': 419,
 'name': [{'language': 'english', 'language name': 'Floatzel'},
          {'language': 'japanese', 'language name': 'フローゼル'},
          {'language': 'chinese', 'language name': '浮潛鼬'},
          {'language': 'french', 'language name': 'Mustéflott'}],
 'type': ['Water']}
{'_id': ObjectId('63f7f165627b4b80698b7b89'),
 'base': {'Attack': 72,
          'Defense': 90,
          'HP': 91,
          'Sp': {'Attack': 129, 'Defense': 90},
          'Speed': 108},
 'id': 647,
 'name': [{'language': 'english', 'language name': 'Keldeo'},
          {'language': 'japanese', 'language name': 'ケルディオ'},
          {'language': 'chinese', 'language name': '凯路迪欧'},
          {'language': 'french', 'language name': 'Keldeo'}],
 'type': ['Water', 'Fighting']}

```

6. Tanks are pokemon with high HP and either high special defense or defense. How can I find the pokemon types best suited to be a tank?

```

: tank_types = []
  stat_avgs = {}
  for elem in pokedex.aggregate([{'$project': {
                                  'stat sum': {
                                      '$add': [
                                          '$base.HP',
                                          '$base.Defense',
                                          '$base.Sp. Defense'
                                      ]
                                      'type': 1}},
                                  {'$unwind': '$type'},
                                  {'$group': {
                                      '_id': '$type',
                                      'stat avg': {
                                          '$avg': '$stat sum'
                                      }
                                  }},
                                  {'$sort': {
                                      'stat avg': -1
                                  }}]):

    tank_types.append(elem['_id'])
    stat_avgs[elem['_id']] = elem['stat avg']
print(tank_types[:5])
plt.bar(stat_avgs.keys(), stat_avgs.values())
plt.title('Average Tank Stats Across PKMN Types')
plt.xlabel('Pokemon Type')
plt.ylabel('Average Tank Stats')
plt.xticks(rotation=70)
plt.savefig('pkmn_tank_stats.png')
plt.show()

['Steel', 'Rock', 'Dragon', 'Ice', 'Psychic']

```

7. How can I find the best tank pokemon for each of the three best tank pokemon types?

```

: for elem in pokedex.aggregate([{'$unwind': '$type'},
                                {'$match': {
                                    'type': {'$in': tank_types[:3]}},
                                {'$project': {'avg tank stat':
                                              {'$avg': [
                                                  '$base.HP',
                                                  '$base.Defense',
                                                  '$base.Sp. Defense']},
                                              'type': 1,
                                              'name': 1}}},
                                {'$group': {
                                    '_id': '$type',
                                    'items': {
                                        '$push': '$$CURRENT',
                                        'max tank stat': {
                                            '$max': '$avg tank stat'}}},
                                {'$project': {
                                    'max tank stat': 1,
                                    'name': {
                                        '$map': {
                                            'input': {
                                                '$filter': {
                                                    'input': '$items', 'as': 'i',
                                                    'cond': {
                                                        '$eq': [ '$$i.avg tank stat', '$max tank
                                                                    'in': '$name' ]}}}}}}}}}}:
                                    'in': '$name' ]}}}}}}}}:
                                'in': '$name' ]}}}}}}}}:

pkmn_type = elem['_id']
pkmn_tank_stat = elem['max tank stat']
for pkmn in pokedex.aggregate([{'$match': {'type': {'$in': [pkmn_type]}},
                                {'$project': {'avg tank stat':
                                              {'$avg': [
                                                  '$base.HP',
                                                  '$base.Defense',
                                                  '$base.Sp. Defense']},
                                              'type': 1,
                                              'name': 1}}},
                                {'$match': {'avg tank stat': {'$eq': pkmn_tank_stat}}}],
                                {'$project': {'name': {'$first': '$name'}}}],
                                {'$sort': {'name': -1}},
                                {'$limit': 1}]):
    print(pkmn['name'][0]['language name'])

```

Giratina
Shuckle
Registeel

8. How can I find the pokemon type with the highest average stats?

```

for elem in pokedex.aggregate([{'$project': {
                                'stat sum': {
                                    '$add': [
                                        '$base.HP',
                                        '$base.Speed',
                                        '$base.Attack',
                                        '$base.Defense',
                                        '$base.Sp. Attack',
                                        '$base.Sp. Defense']},
                                'type': 1}},
                                {'$unwind': '$type'},
                                {'$group': {
                                    '_id': '$type',
                                    'stat avg': {
                                        '$avg': '$stat sum'}}},
                                {'$sort': {
                                    'stat avg': -1}},
                                {'$limit': 1}]):

    print(elem)

{'_id': 'Dragon', 'stat avg': 496.97777777777776}

```

9. How can I insert a new pokemon type into the types collection?

```
types.insert_one({"name": "Frenetic", "immunes": ['Normal'], "weaknesses": ["Normal", "Bug", "Fairy", 'Frenetic'],
                 "strengths": ['Fighting', 'Psychic', "Dark"]})
```

```
# to verify it was added to the collection
[pprint.pprint(elem) for elem in types.find({'name': 'Frenetic'})]
```

```
{'_id': ObjectId('63f95df48bc87e4668ac8981'),
 'immunes': ['Normal'],
 'name': 'Frenetic',
 'strengths': ['Fighting', 'Psychic', 'Dark'],
 'weaknesses': ['Normal', 'Bug', 'Fairy', 'Frenetic']}
```

10. How can I update the types collection to account for a new pokemon type?

```
# update other pkmn weaknesses
types.update_many({'name': {'$in': types.find_one({'name': 'Frenetic'})['strengths']}}, {'$push': \
                                                    {'weaknesses': 'Frenetic'}})
```

```
# update other pkmn strengths
types.update_many({'name': {'$in': types.find_one({'name': 'Frenetic'})['weaknesses']}}, {'$push': \
                                                    {'strengths': 'Frenetic'}})
```

```
# to verify other pkmn were altered, test a fairy type and a fighting type
[pprint.pprint(elem) for elem in types.find({'name': 'Fairy'})]
[pprint.pprint(elem) for elem in types.find({'name': 'Fighting'})]
```

```
{'_id': ObjectId('63f95d5e627b4b80698b7c3e'),
 'immunes': [],
 'name': 'Fairy',
 'strengths': ['Fighting', 'Dragon', 'Dark', 'Frenetic'],
 'weaknesses': ['Fire', 'Poison', 'Steel']}
{'_id': ObjectId('63f95d5e627b4b80698b7c33'),
 'immunes': ['Ghost'],
 'name': 'Fighting',
 'strengths': ['Normal', 'Ice', 'Rock', 'Dark', 'Steel'],
 'weaknesses': ['Poison', 'Flying', 'Psychic', 'Bug', 'Fairy', 'Frenetic']}
```