Trabajo Práctico 0

Grupo 1

Comenzamos importando las librerías y funciones necesarias para el trabajo.

In [ ]:
```
from src.catching import attempt_catch
from src.pokemon import PokemonFactory, StatusEffect
import json
import pandas as pd
import matplotlib
import matplotlib.pyplot as plt
```

Inicializamos un vector con los nombres de las pokebolas y el factory con el .json.

Adicionalmente modificamos el archivo .json con los pokemones para incluir nuevos pokemones y quitar del listado pokemones cuyos catch-rates modifican de manera desproporcionada los datos (ej: mewtwo).

In [ ]:
```
pokeballs = ['pokeball','ultraball','fastball','heavyball']
with open('pokemon_clean.json') as f:
    pokes = json.load(f)
factory = PokemonFactory('pokemon_clean.json')
```

Confirmamos el listado de pokemones a estudiar.

In [ ]:
```
aux = []
for pok, detail in pokes.items():
    print(pok)
```

```
jolteon
snorlax
onix
charizard
bulbasaur
squirtle
gyarados
machamp
alakazam
lapras
arcanine
dragonite
```

Ejercicio 1.a

Se pide analizar la efectividad de cada pokebola en condiciones ideales (nivel 100 y HP 100%).

In [ ]:
```
aux = []
for pok, detail in pokes.items():
    beast = factory.create(pok,100,StatusEffect.NONE,1) #pokemon con nivel 100 y
    for ball in pokeballs:
        for _ in range(1000):
            success, catch_rate = attempt_catch(beast,ball,0) #attempt_success
            aux.append({'pokemon': pok, 'pokeball': ball, 'success': success, 'r
```

```
df = pd.DataFrame(aux)
df
```

Out[ ]:

	pokemon	pokeball	success	noise	weight	speed	catch_rate
0	jolteon	pokeball	False	0	54.0	130	0.0586
1	jolteon	pokeball	False	0	54.0	130	0.0586
2	jolteon	pokeball	False	0	54.0	130	0.0586
3	jolteon	pokeball	False	0	54.0	130	0.0586
4	jolteon	pokeball	False	0	54.0	130	0.0586
...	...	...	...	...	...	...	...
47995	dragonite	heavyball	False	0	210.0	80	0.0326
47996	dragonite	heavyball	False	0	210.0	80	0.0326
47997	dragonite	heavyball	False	0	210.0	80	0.0326
47998	dragonite	heavyball	False	0	210.0	80	0.0326
47999	dragonite	heavyball	False	0	210.0	80	0.0326

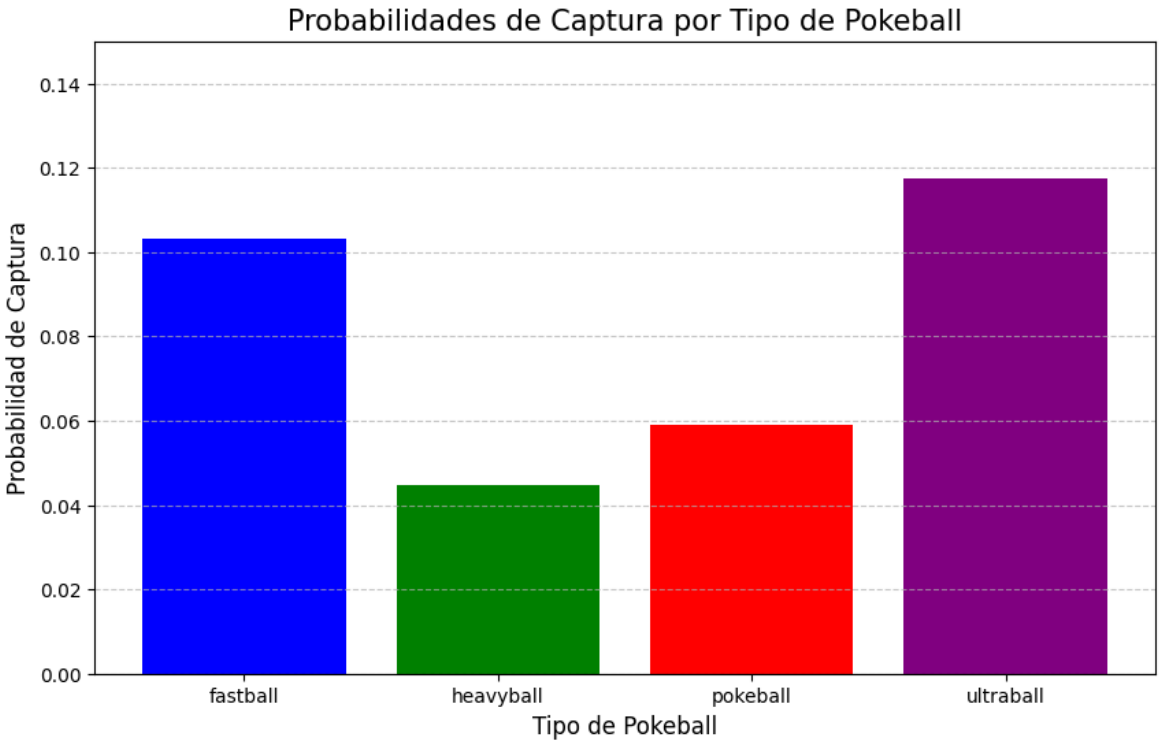
48000 rows × 7 columns

Agrupamos los datos por pokebolas y calculamos la tasa de exito promedio.

In [ ]:
```
probabilidades = df.groupby(['pokeball'])['success'].mean()
probabilidades
```

Out[ ]:
```
pokeball
fastball     0.103000
heavyball    0.044750
pokeball     0.058917
ultraball    0.117500
Name: success, dtype: float64
```

In [ ]:
```
plt.figure(figsize=(10,6))
plt.bar(pokeballs, probabilidades, color=['blue', 'green', 'red', 'purple'])
plt.title('Probabilidades de Captura por Tipo de Pokeball', fontsize=15)
plt.xlabel('Tipo de Pokeball', fontsize=12)
plt.ylabel('Probabilidad de Captura', fontsize=12)
plt.ylim(0, 0.15)
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.show()
```



Ejercicio 1.b

Analizar las pokebolas respecto a las estadísticas del pokemon. Debido a nuestro conocimiento de pokemon, sabemos que solo la velocidad y el peso afectan al catch-rate.

Agrupamos por estadística y pokebola para analizar cada pokebola de forma independiente.

In [ ]:
```
probs_w = df.groupby(['pokeball','weight',])['success'].mean()
probs_w
```

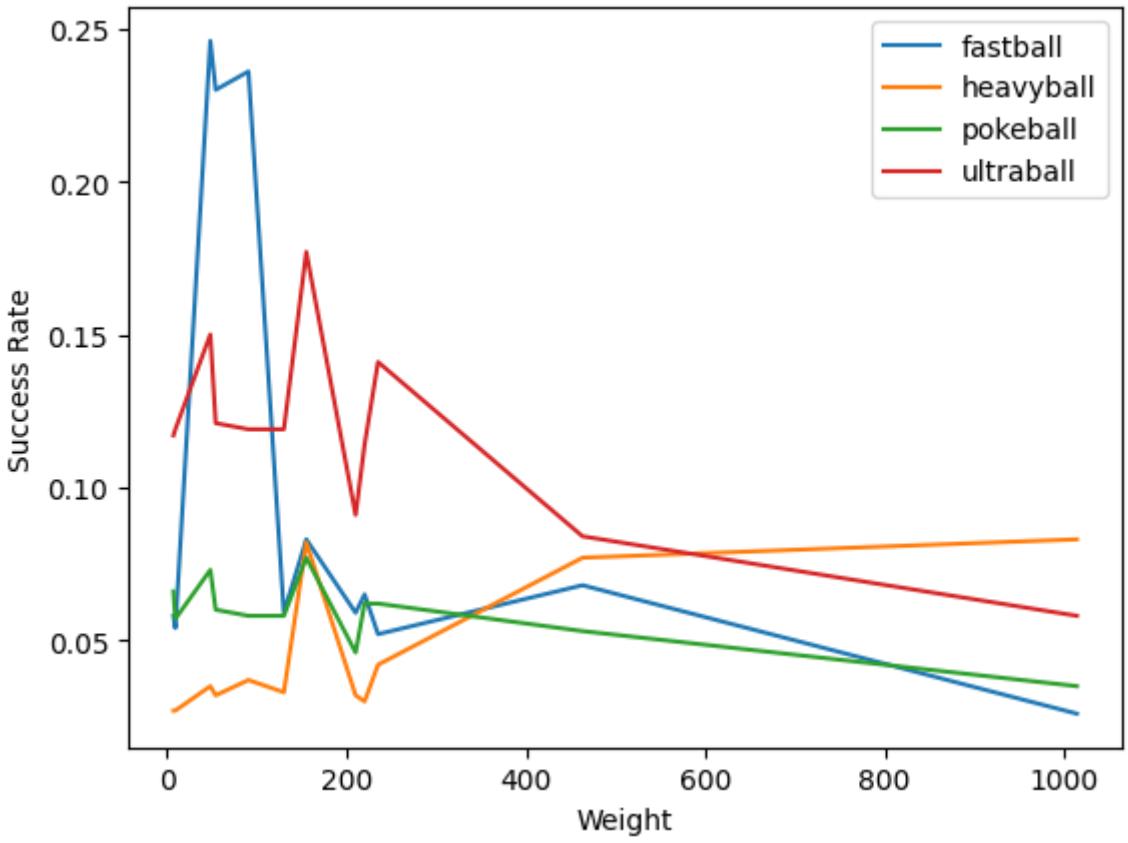
Out[ ]:
```
pokeball   weight
fastball   6.9       0.058
           9.0       0.054
           48.0      0.246
           54.0      0.230
           90.5      0.236
           130.0     0.059
           155.0     0.083
           210.0     0.059
           220.0     0.065
           235.0     0.052
           463.0     0.068
           1014.1    0.026
heavyball  6.9       0.027
           9.0       0.027
           48.0      0.035
           54.0      0.032
           90.5      0.037
           130.0     0.033
           155.0     0.082
           210.0     0.032
           220.0     0.030
           235.0     0.042
           463.0     0.077
           1014.1    0.083
pokeball   6.9       0.066
           9.0       0.057
           48.0      0.073
           54.0      0.060
           90.5      0.058
           130.0     0.058
           155.0     0.077
           210.0     0.046
           220.0     0.062
           235.0     0.062
           463.0     0.053
           1014.1    0.035
ultraball  6.9       0.117
           9.0       0.119
           48.0      0.150
           54.0      0.121
           90.5      0.119
           130.0     0.119
           155.0     0.177
           210.0     0.091
           220.0     0.114
           235.0     0.141
           463.0     0.084
           1014.1    0.058
Name: success, dtype: float64
```

In [ ]:
```python
df_reset = probs_w.reset_index()
pokeballs = df_reset['pokeball'].unique()

for pokeball in pokeballs:
    subset = df_reset[df_reset['pokeball'] == pokeball]
    plt.plot(subset['weight'], subset['success'], label=pokeball)

plt.xlabel('Weight')
plt.ylabel('Success Rate')
```

```
plt.legend()
plt.show()
```



Se puede observar que para pesos pequeños, el tipo de pokebola no parece tener un efecto muy claro. La Ultraball parece tene un success rate constantemente superior al resto, pero a medida que el peso aumenta, la HeavyBall se vuelve la mejor opción.

In [ ]:
```
probs_s = df.groupby(['pokeball','speed',]).mean()
probs_s
```

```
C:\Users\juana\AppData\Local\Temp\ipykernel_9852\526806195.py:1: FutureWarning: T
he default value of numeric_only in DataFrameGroupBy.mean is deprecated. In a fut
ure version, numeric_only will default to False. Either specify numeric_only or s
elect only columns which should be valid for the function.
  probs_s = df.groupby(['pokeball','speed',]).mean()
```

Out[ ]:

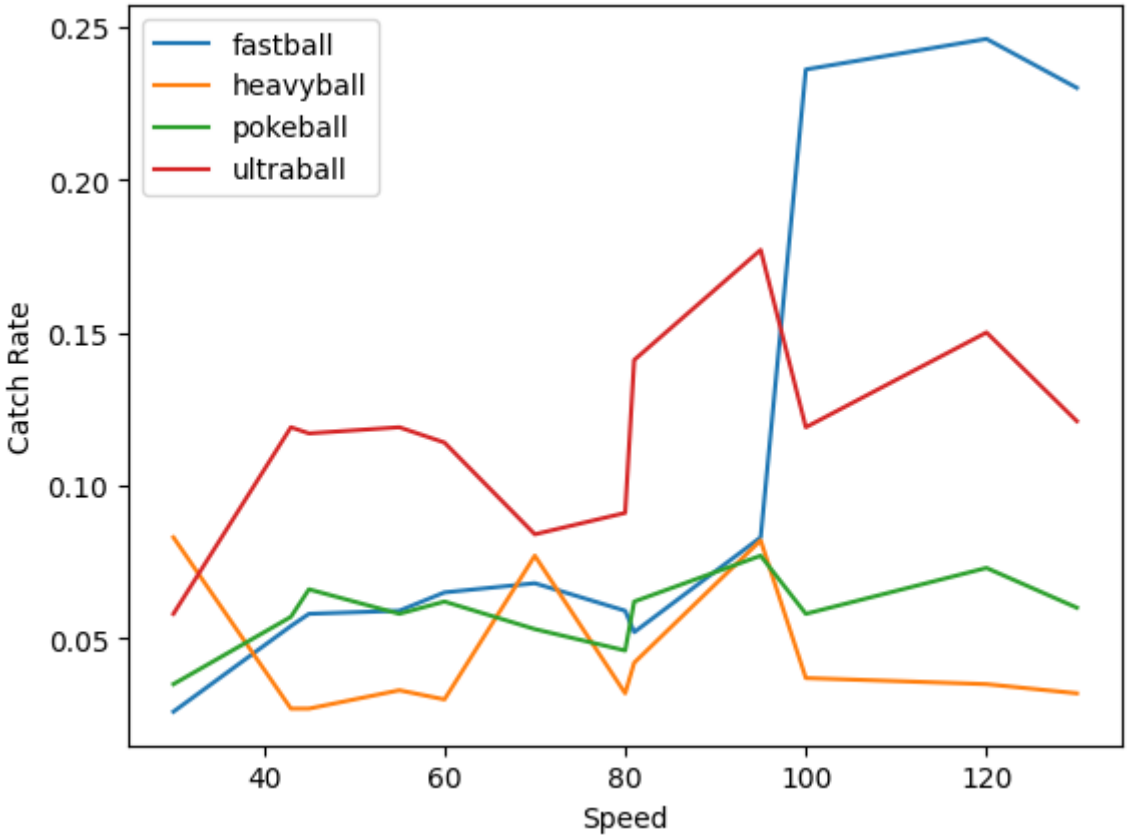
		success	weight	catch_rate
pokeball	**speed**			
fastball	**30**	0.026	1014.1	0.0326
	43	0.054	9.0	0.0586
	45	0.058	6.9	0.0586
	55	0.059	130.0	0.0586
	60	0.065	220.0	0.0586
	70	0.068	463.0	0.0586
	80	0.059	210.0	0.0586
	81	0.052	235.0	0.0586
	95	0.083	155.0	0.0977
	100	0.236	90.5	0.2344
	120	0.246	48.0	0.2604
	130	0.230	54.0	0.2344
heavyball	**30**	0.083	1014.1	0.0846
	43	0.027	9.0	0.0326
	45	0.027	6.9	0.0326
	55	0.033	130.0	0.0326
	60	0.030	220.0	0.0326
	70	0.077	463.0	0.0846
	80	0.032	210.0	0.0326
	81	0.042	235.0	0.0326
	95	0.082	155.0	0.0716
	100	0.037	90.5	0.0326
	120	0.035	48.0	0.0391
	130	0.032	54.0	0.0326
pokeball	**30**	0.035	1014.1	0.0326
	43	0.057	9.0	0.0586
	45	0.066	6.9	0.0586
	55	0.058	130.0	0.0586
	60	0.062	220.0	0.0586
	70	0.053	463.0	0.0586
	80	0.046	210.0	0.0586
	81	0.062	235.0	0.0586

		success	weight	catch_rate
pokeball	**speed**			
	95	0.077	155.0	0.0977
	100	0.058	90.5	0.0586
	120	0.073	48.0	0.0651
	130	0.060	54.0	0.0586
ultraball	**30**	0.058	1014.1	0.0651
	43	0.119	9.0	0.1172
	45	0.117	6.9	0.1172
	55	0.119	130.0	0.1172
	60	0.114	220.0	0.1172
	70	0.084	463.0	0.1172
	80	0.091	210.0	0.1172
	81	0.141	235.0	0.1172
	95	0.177	155.0	0.1953
	100	0.119	90.5	0.1172
	120	0.150	48.0	0.1302
	130	0.121	54.0	0.1172

In [ ]:
```
df_reset = probs_s.reset_index()
pokeballs = df_reset['pokeball'].unique()

for pokeball in pokeballs:
    subset = df_reset[df_reset['pokeball'] == pokeball]
    plt.plot(subset['speed'], subset['success'], label=pokeball)

plt.xlabel('Speed')
plt.ylabel('Success Rate')
plt.legend()
plt.show()
```



La velocidad tiene un efecto muy similar al peso, donde para velocidades pequeñas los datos no muestran una pokebola preferible (ademas de la Ultraball) pero a medida que aumenta se vuelve idea utilizar la Fastball.

También cabe notar que parece haber una pequeña correlación entre poca velocidad y mucho peso que no estamos investigando.