pokemon

May 18, 2024

[2]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

[3]:
```
pokemon = pd.read_csv('/content/Pokemon.csv')
pokemon.head()
```

[3]:

	#	Name	Type 1	Type 2	Total	HP	Attack	Defense	Sp. Atk	Sp. Def	Speed	Generation	Legendary
0	1	Bulbasaur	Grass	Poison	318	45	49	49	65	65	45	1	False
1	2	Ivysaur	Grass	Poison	405	60	62	63	80	80	60	1	False
2	3	Venusaur	Grass	Poison	525	80	82	83	100	100	80	1	False
3	3	VenusaurMega Venusaur	Grass	Poison	625	80	100	123	122	120	80	1	False
4	4	Charmander	Fire	NaN	309	39	52	43	60	50	65	1	False

[4]:
```
pokemon.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 800 entries, 0 to 799
Data columns (total 13 columns):
 #   Column      Non-Null Count  Dtype
---  ------      --------------  -----
 0   #           800 non-null    int64
 1   Name        800 non-null    object
 2   Type 1      800 non-null    object
 3   Type 2      414 non-null    object
 4   Total       800 non-null    int64
 5   HP          800 non-null    int64
 6   Attack      800 non-null    int64
 7   Defense     800 non-null    int64
 8   Sp. Atk     800 non-null    int64
```

```
 9   Sp. Def     800 non-null    int64
 10  Speed       800 non-null    int64
 11  Generation  800 non-null    int64
 12  Legendary   800 non-null    bool
dtypes: bool(1), int64(9), object(3)
memory usage: 75.9+ KB
```

[5]:
```
pokemon.columns
```

[5]:
```
Index(['#', 'Name', 'Type 1', 'Type 2', 'Total', 'HP', 'Attack', 'Defense',
       'Sp. Atk', 'Sp. Def', 'Speed', 'Generation', 'Legendary'],
      dtype='object')
```

0.0.1 Dropped the column "#" as it was adding no information

[9]:
```
pokemon.drop('#',axis='columns',inplace=True)
```

[10]:
```
pokemon
```

[10]:

	Name	Type 1	Type 2	Total	HP	Attack	Defense	Sp. Atk	Sp. Def	Speed	Generation	Legendary
0	Bulbasaur	Grass	Poison	318	45	49	49	65	65	45	1	False
1	Ivysaur	Grass	Poison	405	60	62	63	80	80	60	1	False
2	Venusaur	Grass	Poison	525	80	82	83	100	100	80	1	False
3	VenusaurMega Venusaur	Grass	Poison	625	80	100	123	122	120	80	1	False
4	Charmander	Fire	NaN	309	39	52	43	60	50	65	1	False
..	…	…	…	…	..	…	…	…	…	…	…	…
795	Diancie	Rock	Fairy	600	50	100	150	100	150	50	6	True
796	DiancieMega Diancie	Rock	Fairy	700	50	160	110	160	110	110	6	True
797	HoopaHoopa Confined	Psychic	Ghost	600	80	110	60	150	130	70	6	True
798	HoopaHoopa Unbound	Psychic	Dark	680	80	160	60	170	130	80	6	True
799	Volcanion	Fire	Water	600	80	110	120	130	90	70	6	True

[800 rows x 12 columns]

[13]:
```
pokemon.isnull().sum()
```

[13]:
```
Name            0
Type 1          0
Type 2        386
Total           0
HP              0
Attack          0
Defense         0
Sp. Atk         0
Sp. Def         0
Speed           0
Generation      0
Legendary       0
dtype: int64
```

[14]:
```
nan_count = pokemon['Type 2'].isna().sum()
total_count = pokemon['Type 2'].shape[0]
nan_percentage = (nan_count / total_count) * 100
nan_percentage
```

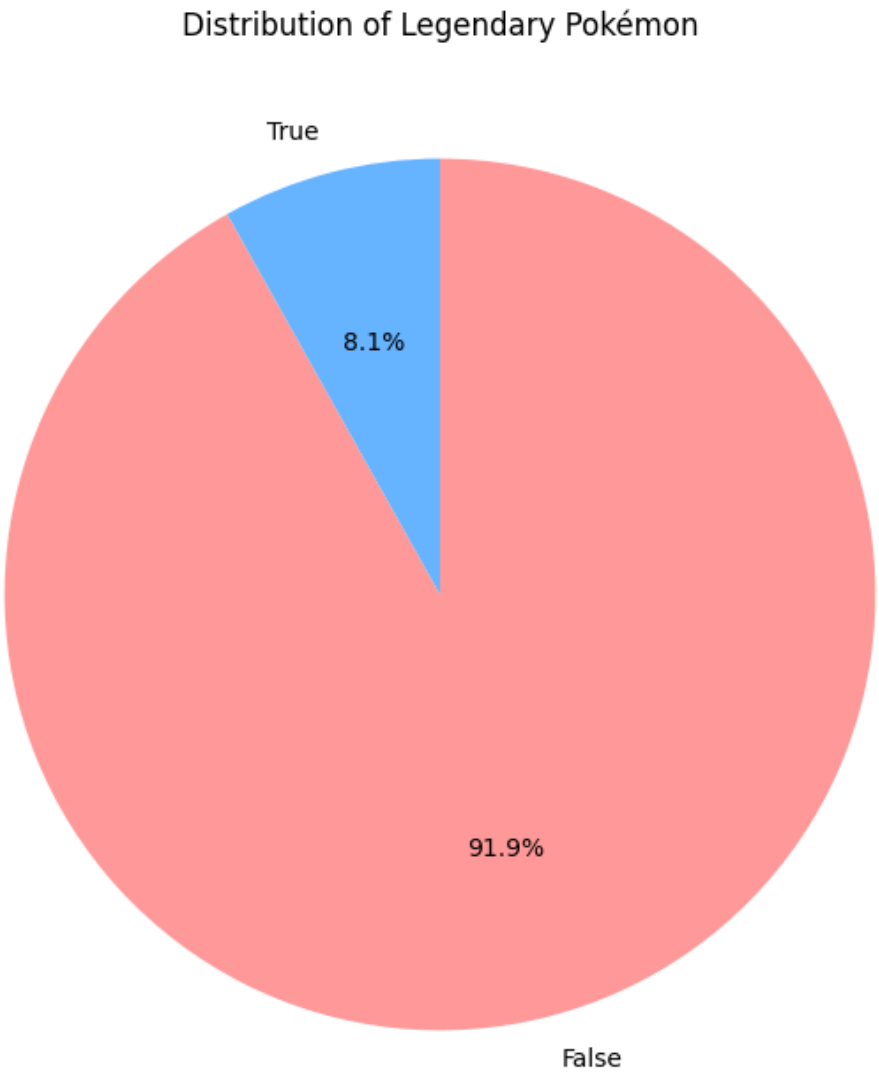
[14]:
```
48.25
```

0.0.2 48.25%(386 out of 800) of the pokemon in the dataset are of only one type.

[19]:
```
pokemon['Legendary'].value_counts()
```

[19]:
```
Legendary
False    735
True      65
Name: count, dtype: int64
```

[22]:
```
legendary_counts = pokemon['Legendary'].value_counts()
plt.figure(figsize=(8, 8))
legendary_counts.plot.pie(autopct='%1.1f%%', startangle=90, counterclock=False,␣
↪colors=['#ff9999','#66b3ff'])
plt.title('Distribution of Legendary Pokémon')
plt.ylabel('')
plt.show()
```



0.1 Insight: There are 65 legendary pokemon in the dataset

[15]:
```
pokemon['Generation'].unique()
```

[15]:
```
array([1, 2, 3, 4, 5, 6])
```

0.1.1 There are total of 6 generations of pokemon.

0.1.2 Top 5 Pokemon with maximum HP

[16]:
```
pokemon.nlargest(5,'HP')
```

[16]:

	Name	Type 1	Type 2	Total	HP	Attack	Defense	Sp. Atk	Sp. Def	Speed	Generation	Legendary
261	Blissey	Normal	NaN	540	255	10	10	75	135	55	2	False
121	Chansey	Normal	NaN	450	250	5	5	35	105	50	1	False
217	Wobbuffet	Psychic	NaN	405	190	33	58	33	58	33	2	False
351	Wailord	Water	NaN	500	170	90	45	90	45	60	3	False
655	Alomomola	Water	NaN	470	165	75	80	40	45	65	5	False

0.1.3 Top 5 pokemons with highest HP are

- Blissey
- Chansey
- Wobbuffett
- Wailord
- Alomomola

0.1.4 Top 5 pokemons with maximum Attack

[17]:
```
pokemon.nlargest(5,'Attack')
```

[17]:

	Name	Type 1	Type 2	Total	HP	Attack	Defense	Sp. Atk	Sp. Def	Speed	Generation	Legendary
163	MewtwoMega Mewtwo X	Psychic	Fighting	780	106	190	100	154	100	130	1	True
232	HeracrossMega Heracross	Bug	Fighting	600	80	185	115	40	105	75	2	False
424	GroudonPrimal Groudon	Ground	Fire	770	100	180	160	150	90	90	3	True
426	RayquazaMega Rayquaza	Dragon	Flying	780	105	180	100	180	100	115	3	True
429	DeoxysAttack Forme	Psychic	NaN	600	50	180	20	180	20	150	3	True

0.1.5 Top 5 pokemons with maximum Attack are

- MewtwoMega Mewtwo X
- HeracrossMega Heracross
- GroudonPrimal Groudon
- RayquazaMega Rayquaza
- DeoxysAttack Forme ### Also out the top 5, HeracrossMega Heracross is only the non-legendary pokemon

0.1.6 Top 5 pokemon with highest Defense

[18]:
```
pokemon.nlargest(5,'Defense')
```

[18]:

	Name	Type 1	Type 2	Total	HP	Attack	Defense	Sp. Atk	Sp. Def	Speed	Generation	Legendary
224	SteelixMega Steelix	Steel	Ground	610	75	125	230	55	95	30	2	False
230	Shuckle	Bug	Rock	505	20	10	230	10	230	5	2	False
333	AggronMega Aggron	Steel	NaN	630	70	140	230	60	80	50	3	False
223	Steelix	Steel	Ground	510	75	85	200	55	65	30	2	False
414	Regirock	Rock	NaN	580	80	100	200	50	100	50	3	True

0.1.7 Top 5 pokemons with maximum Attack are

- SteelixMega Steelix
- Shuckle
- AggronMega Aggron
- Steelix
- Regirock ### Also out the top 5, Regirock is only the legendary pokemon

0.1.8 Top 20 pokemon according to their stats

[33]:
```
pokemon.nlargest(20,'Total')
```

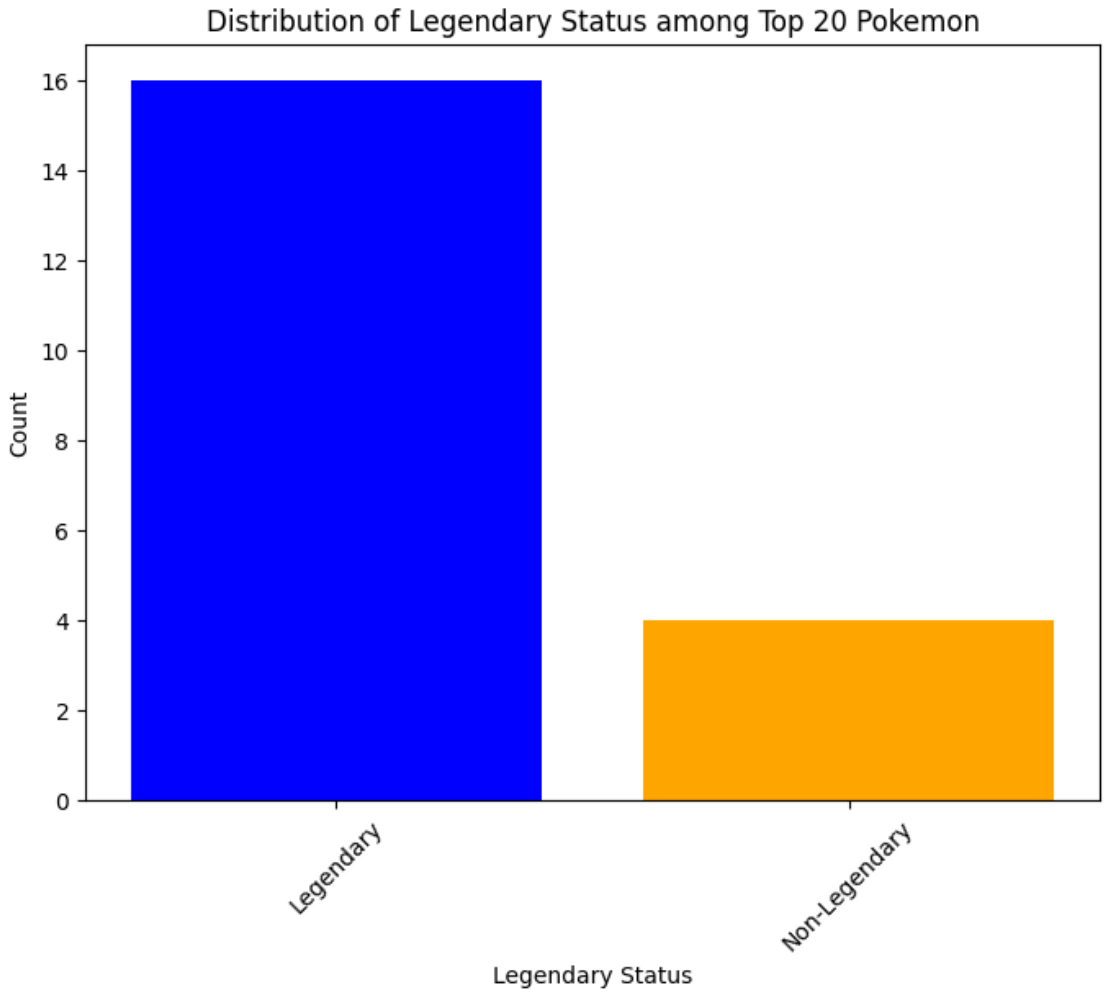
[33]:

	Name	Type 1	Type 2	Total	HP	Attack	Defense	Sp. Atk	Sp. Def	Speed	Generation	Legendary
163	MewtwoMega Mewtwo X	Psychic	Fighting	780	106	190	100	154	100	130	1	False
164	MewtwoMega Mewtwo Y	Psychic	NaN	780	106	150	70	194	120	140	1	False
426	RayquazaMega Rayquaza	Dragon	Flying	780	105	180	100	180	100	115	3	True
422	KyogrePrimal Kyogre	Water	NaN	770	100	150	90	180	160	90	3	True
424	GroudonPrimal Groudon	Ground	Fire	770	100	180	160	150	90	90	3	True
552	Arceus	Normal	NaN	720	120	120	120	120	120	120	4	True
268	TyranitarMega Tyranitar	Rock	Dark	700	100	164	150	95	120	71	2	False
409	SalamenceMega Salamence	Dragon	Flying	700	95	145	130	120	90	120	3	True

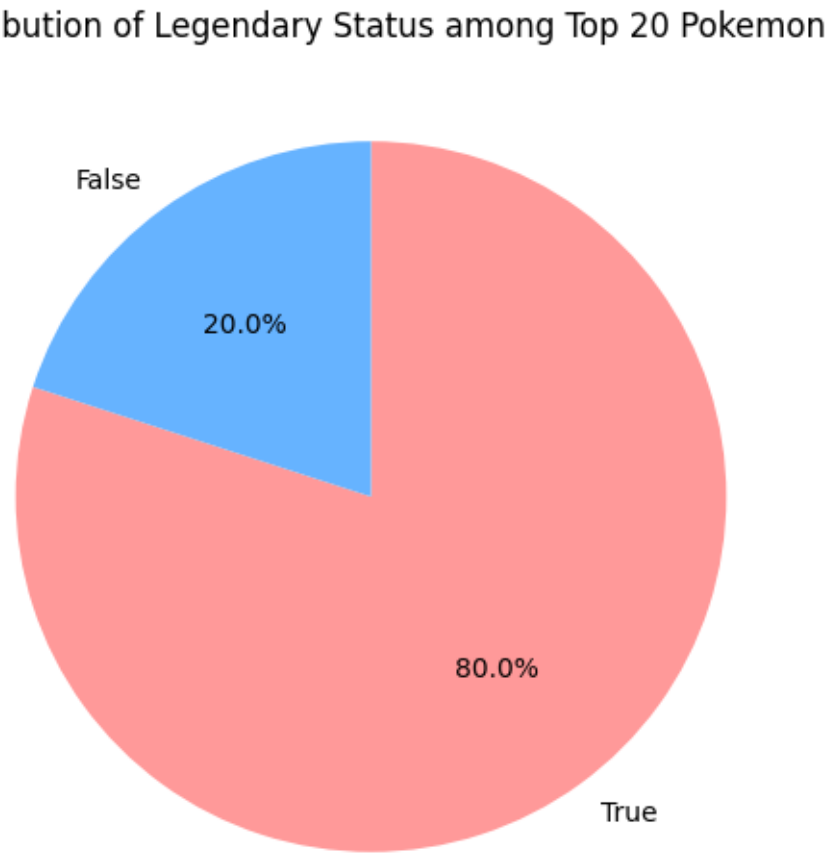
413	MetagrossMega Metagross	Steel	Psychic	700	80	145	150
418	LatiasMega Latias	Dragon	Psychic	700	80	100	120
420	LatiosMega Latios	Dragon	Psychic	700	80	130	100
494	GarchompMega Garchomp	Dragon	Ground	700	108	170	115
711	KyuremBlack Kyurem	Dragon	Ice	700	125	170	100
712	KyuremWhite Kyurem	Dragon	Ice	700	125	120	90
796	DiancieMega Diancie	Rock	Fairy	700	50	160	110
162	Mewtwo	Psychic	NaN	680	106	110	90
269	Lugia	Psychic	Flying	680	106	90	130
270	Ho-oh	Fire	Flying	680	106	130	90
425	Rayquaza	Dragon	Flying	680	105	150	90
540	Dialga	Steel	Dragon	680	100	120	120

	Sp. Atk	Sp. Def	Speed	Generation	Legendary
163	154	100	130	1	True
164	194	120	140	1	True
426	180	100	115	3	True
422	180	160	90	3	True
424	150	90	90	3	True
552	120	120	120	4	True
268	95	120	71	2	False
409	120	90	120	3	False
413	105	110	110	3	False
418	140	150	110	3	True
420	160	120	110	3	True
494	120	95	92	4	False
711	120	90	95	5	True
712	170	100	95	5	True
796	160	110	110	6	True
162	154	90	130	1	True
269	90	154	110	2	True
270	110	154	90	2	True
425	150	90	95	3	True
540	150	100	90	4	True

[48]:
```
top_20_pokemon = pokemon.nlargest(20, 'Total')
legendary_counts = top_20_pokemon['Legendary'].value_counts()

plt.figure(figsize=(8, 6))
plt.bar(legendary_counts.index.map({True: 'Legendary', False:␣
↪'Non-Legendary'}), legendary_counts.values, color=['blue', 'orange'])
plt.xlabel('Legendary Status')
plt.ylabel('Count')
plt.title('Distribution of Legendary Status among Top 20 Pokemon')
plt.xticks(rotation=45)
plt.show()
```

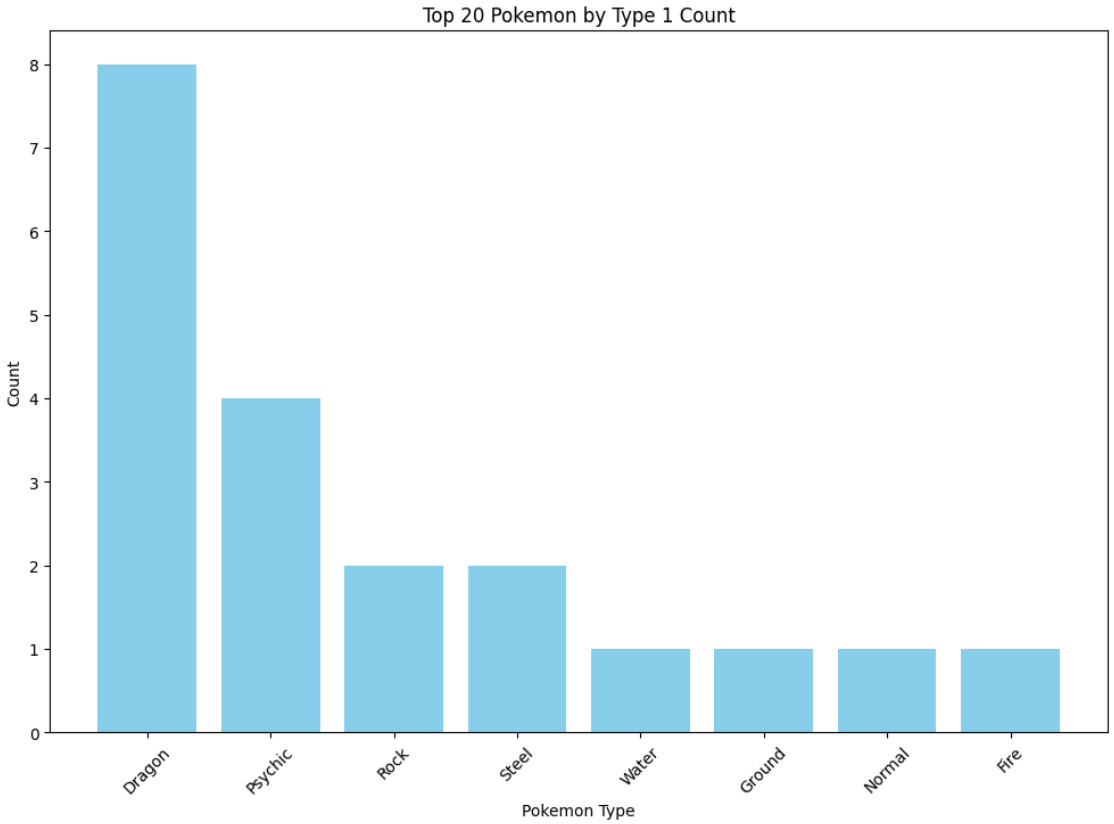


[47]:
```
plt.figure(figsize=(8, 6))
legendary_counts.plot.pie(autopct='%1.1f%%', startangle=90, counterclock=False,␣
↪colors=['#ff9999', '#66b3ff'])
plt.title('Distribution of Legendary Status among Top 20 Pokemon')
plt.ylabel('')
plt.show()
```

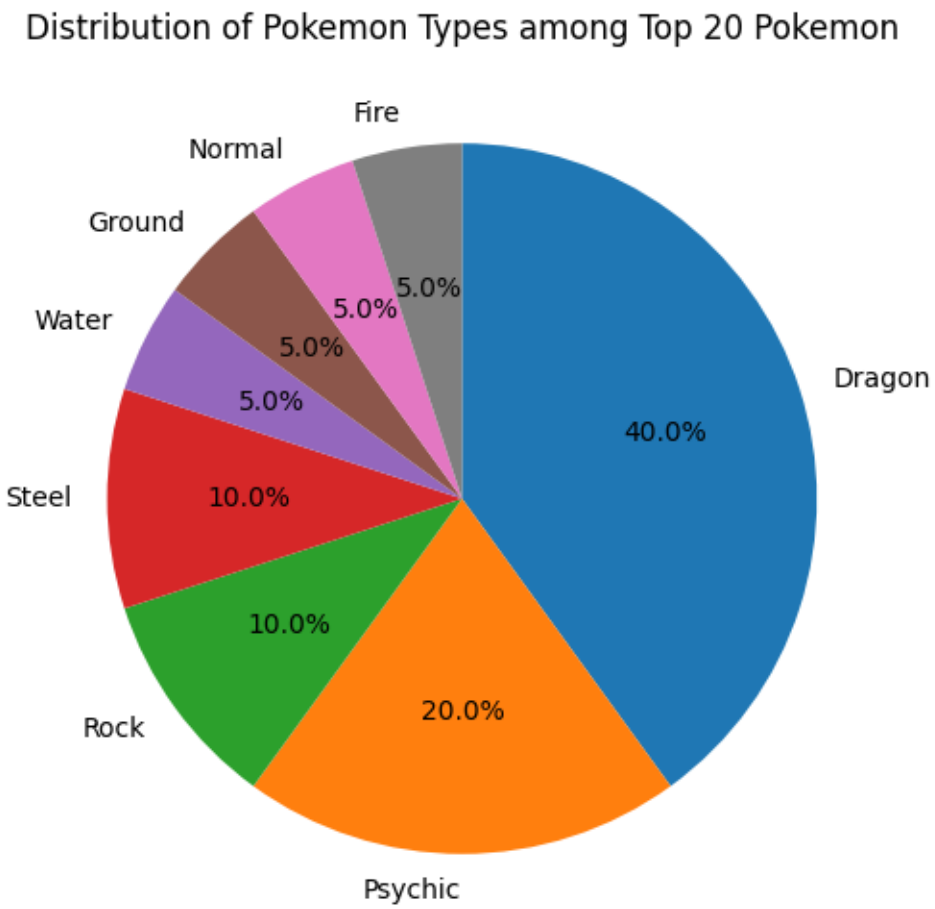


0.1.9 80% of the top 20 pokemon are legendary

[49]:
```
op_20_pokemon = pokemon.nlargest(20, 'Total')
type_counts = top_20_pokemon['Type 1'].value_counts()

plt.figure(figsize=(12, 8))
plt.bar(type_counts.index, type_counts.values, color='skyblue')
plt.xlabel('Pokemon Type')
plt.ylabel('Count')
plt.title('Top 20 Pokemon by Type 1 Count')
plt.xticks(rotation=45)
plt.show()
```



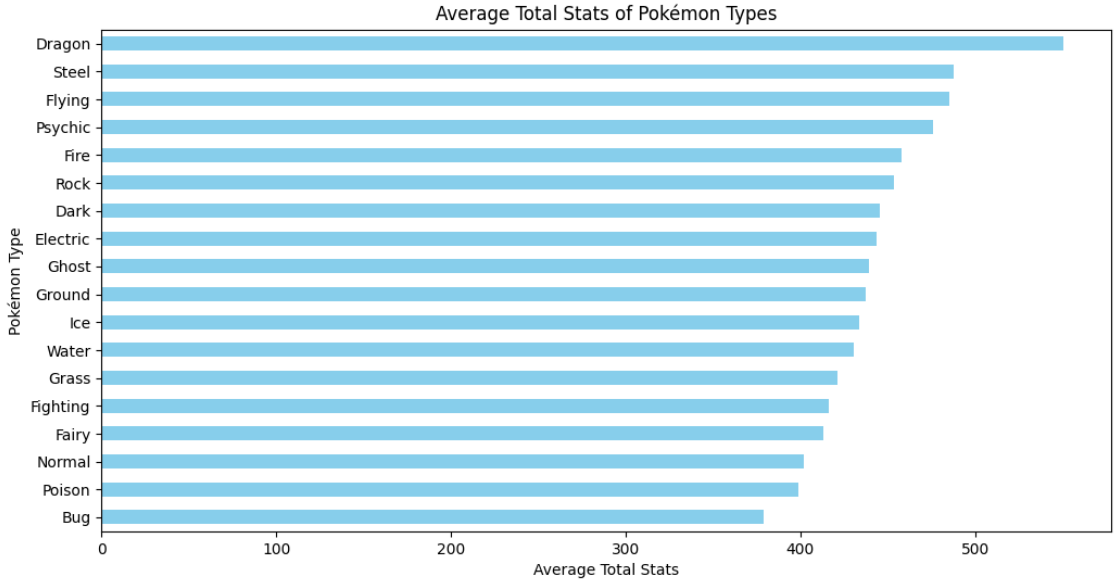
[51]:
```
plt.figure(figsize=(8, 6))
type_counts.plot.pie(autopct='%1.1f%%', startangle=90, counterclock=False)
plt.title('Distribution of Pokemon Types among Top 20 Pokemon')
plt.ylabel('')
plt.show()
```



0.1.10 Drogon type contributes 40% among top 20 followed by Psychic, 10%

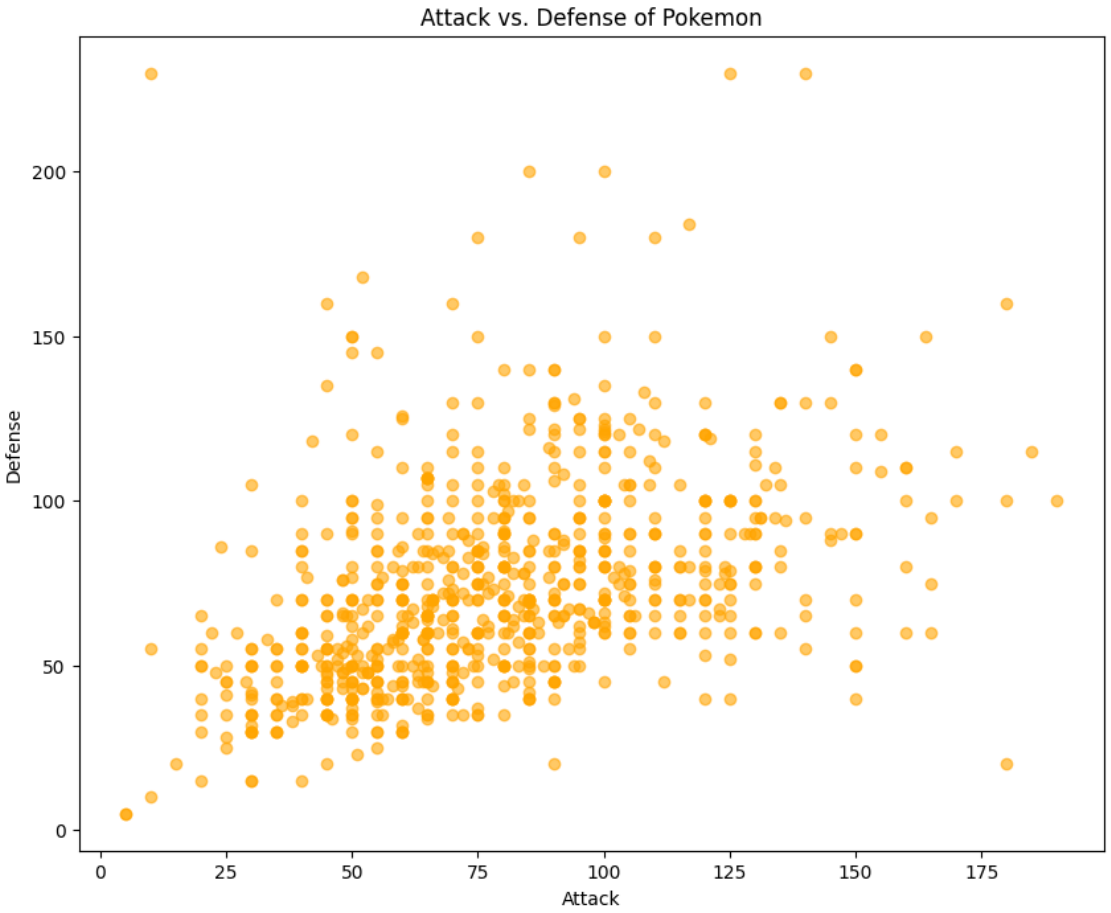
0.1.11 Bar Chart of Pokemon Type 1 with Average Total Stats

[52]:
```
average_stats = pokemon.groupby('Type 1')['Total'].mean()

plt.figure(figsize=(12, 6))
average_stats.sort_values().plot(kind='barh', color='skyblue')
plt.xlabel('Average Total Stats')
plt.ylabel('Pokémon Type')
plt.title('Average Total Stats of Pokémon Types')
plt.show()
```



0.1.12 Realtionship betweem Attack vs. Defense stats of Pokemon

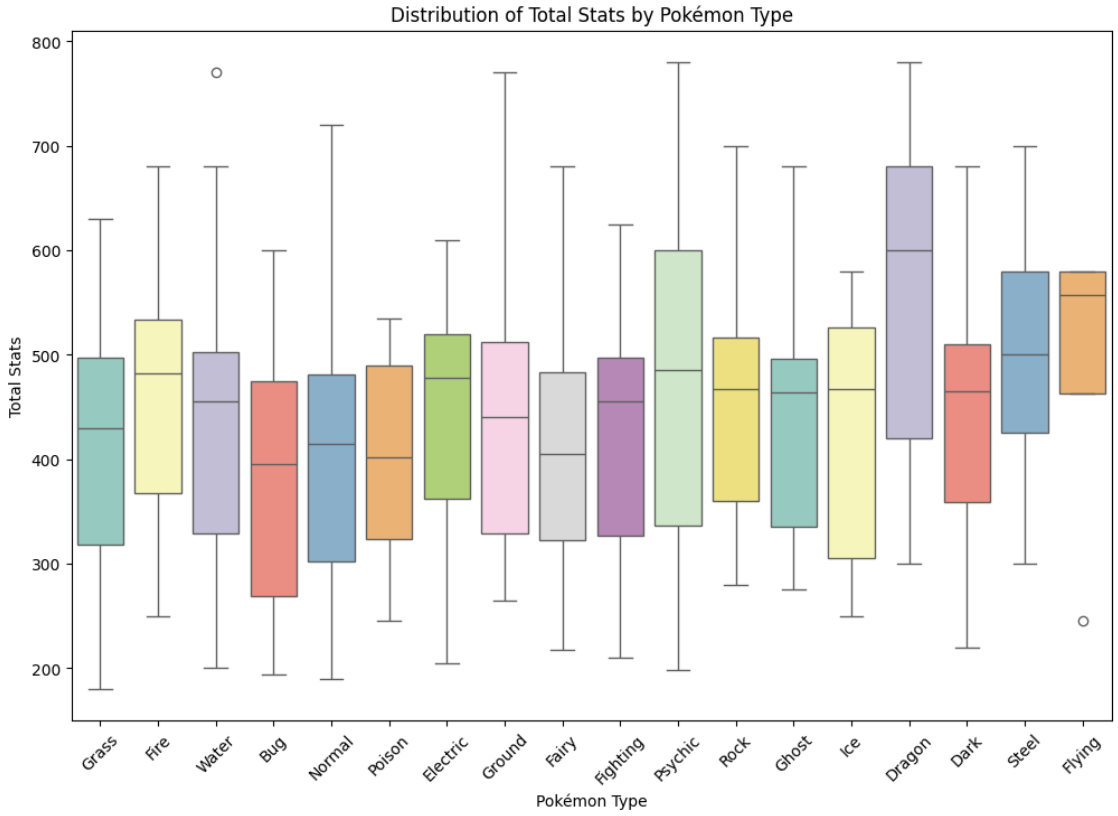
[55]:
```
plt.figure(figsize=(10, 8))
plt.scatter(pokemon['Attack'], pokemon['Defense'], color='orange', alpha=0.6)
plt.xlabel('Attack')
plt.ylabel('Defense')
plt.title('Attack vs. Defense of Pokemon')
plt.show()
```



0.1.13 Box Plot of total stats by Pokemon Type 1

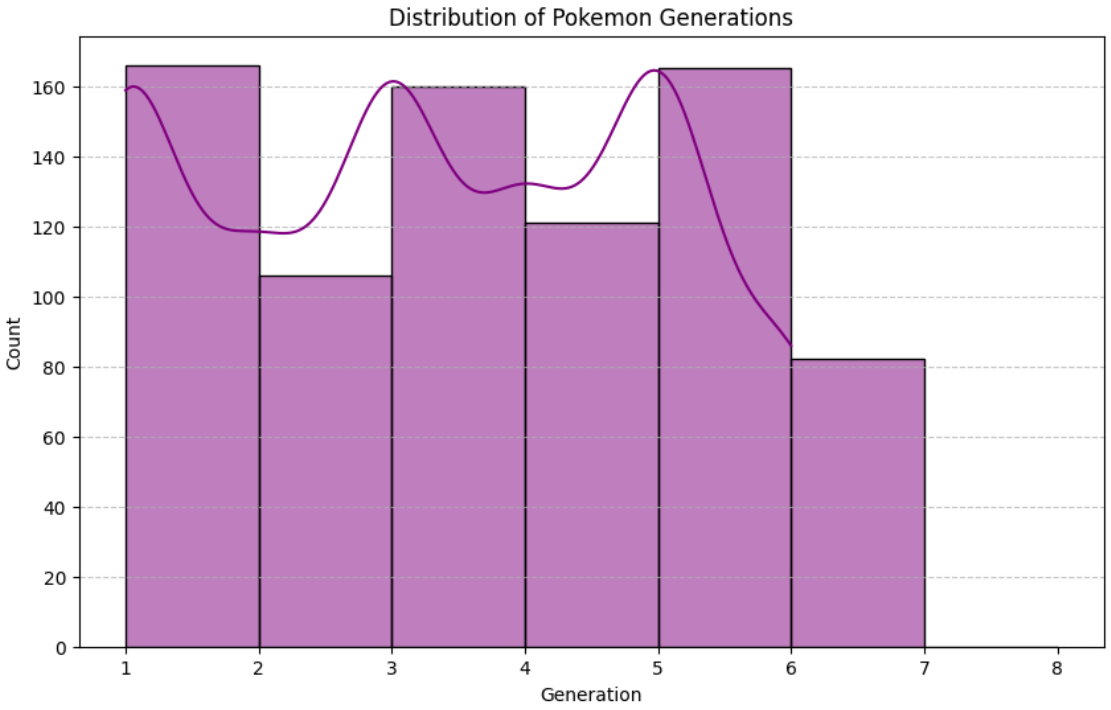
[56]:
```
plt.figure(figsize=(12, 8))
sns.boxplot(x='Type 1', y='Total', data=pokemon, palette='Set3')
plt.xlabel('Pokémon Type')
plt.ylabel('Total Stats')
plt.title('Distribution of Total Stats by Pokémon Type')
plt.xticks(rotation=45)
plt.show()
```

```
<ipython-input-56-60d939c46f56>:2: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in
v0.14.0. Assign the `x` variable to `hue` and set `legend=False` for the same
effect.

  sns.boxplot(x='Type 1', y='Total', data=pokemon, palette='Set3')
```



0.1.14 Count of Pokemon Generation

[59]:
```
plt.figure(figsize=(10, 6))
sns.histplot(pokemon['Generation'], bins=range(1, 9), color='purple',␣
 ↪edgecolor='black', kde=True)
plt.xlabel('Generation')
plt.ylabel('Count')
plt.title('Distribution of Pokemon Generations')
plt.xticks(range(1, 9))
plt.grid(axis='y', linestyle='--', alpha=0.7)
plt.show()
```



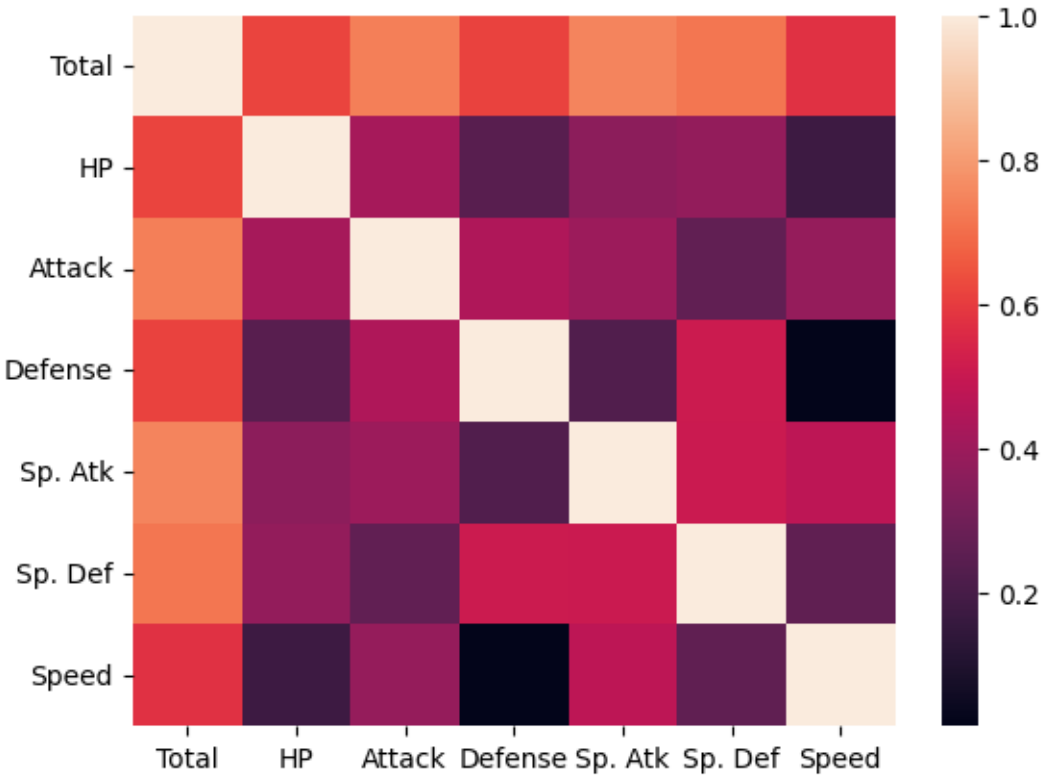
0.1.15 Correlation Analysis

[60]:
```
numeric_attributes = ['Total', 'HP', 'Attack', 'Defense', 'Sp. Atk', 'Sp. Def',␣
↪'Speed']

correlation_matrix = pokemon[numeric_attributes].corr()
print("Correlation Matrix:")
print(correlation_matrix)
```

```
Correlation Matrix:
              Total        HP    Attack   Defense   Sp. Atk   Sp. Def     Speed
Total      1.000000  0.618748  0.736211  0.612787  0.747250  0.717609  0.575943
HP         0.618748  1.000000  0.422386  0.239622  0.362380  0.378718  0.175952
Attack     0.736211  0.422386  1.000000  0.438687  0.396362  0.263990  0.381240
Defense    0.612787  0.239622  0.438687  1.000000  0.223549  0.510747  0.015227
Sp. Atk    0.747250  0.362380  0.396362  0.223549  1.000000  0.506121  0.473018
Sp. Def    0.717609  0.378718  0.263990  0.510747  0.506121  1.000000  0.259133
Speed      0.575943  0.175952  0.381240  0.015227  0.473018  0.259133  1.000000
```

[61]:
```
sns.heatmap(correlation_matrix)
```

[61]: <Axes: >


Total
HP
Attack
Defense
Sp. Atk
Sp. Def
Speed
1.0
0.8
0.6
0.4
0.2

[ ]: