Project - Olympic Sports Analysis [Data Pre-processing]

- You can find the full project & the dataset at: https://www.kaggle.com/the-guardian/olympic-games

Olympic Sports and Medals, 1896-2014

Which countries and athletes have won the most medals at the Olympic games?

Importing libraries & data

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
sns.set()
```

In [2]:

```
summer = pd.read_csv('summer.csv')
```

In [3]:

```
winter = pd.read_csv('winter.csv')
```

In [4]:

```
countries = pd.read_csv('dictionary.csv')
```

In [ ]:

```

```

Inspecting Datasets

In [12]:

```
summer
```

Out[12]:

	Year	City	Sport	Discipline	Athlete	Country	Gender	Event	Me
0	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	100M Freestyle	G
1	1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Men	100M Freestyle	S
2	1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Men	100M Freestyle For Sailors	Bro
3	1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Men	100M Freestyle For Sailors	G
4	1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Men	100M Freestyle For Sailors	S
...	...	...	...	...	...	...	...	...	
31160	2012	London	Wrestling	Wrestling Freestyle	JANIKOWSKI, Damian	POL	Men	Wg 84 KG	Bro
31161	2012	London	Wrestling	Wrestling Freestyle	REZAEI, Ghasem Gholamreza	IRI	Men	Wg 96 KG	G
31162	2012	London	Wrestling	Wrestling Freestyle	TOTROV, Rustam	RUS	Men	Wg 96 KG	S
31163	2012	London	Wrestling	Wrestling Freestyle	ALEKSANYAN, Artur	ARM	Men	Wg 96 KG	Bro
31164	2012	London	Wrestling	Wrestling Freestyle	LIDBERG, Jimmy	SWE	Men	Wg 96 KG	Bro

31165 rows × 9 columns

In [5]:

```
summer.head()
```

Out[5]:

	Year	City	Sport	Discipline	Athlete	Country	Gender	Event	Medal
0	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	100M Freestyle	Gold
1	1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Men	100M Freestyle	Silver
2	1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Men	100M Freestyle For Sailors	Bronze
3	1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Men	100M Freestyle For Sailors	Gold
4	1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Men	100M Freestyle For Sailors	Silver

In [6]:

```
summer.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 31165 entries, 0 to 31164
Data columns (total 9 columns):
 #   Column      Non-Null Count  Dtype 
---  ------      --------------  ----- 
 0   Year        31165 non-null  int64 
 1   City        31165 non-null  object
 2   Sport       31165 non-null  object
 3   Discipline  31165 non-null  object
 4   Athlete     31165 non-null  object
 5   Country     31161 non-null  object
 6   Gender      31165 non-null  object
 7   Event       31165 non-null  object
 8   Medal       31165 non-null  object
dtypes: int64(1), object(8)
memory usage: 2.1+ MB
```

In [7]:

```
winter.head()
```

Out[7]:

	Year	City	Sport	Discipline	Athlete	Country	Gender	Event	Meda
0	1924	Chamonix	Biathlon	Biathlon	BERTHET, G.	FRA	Men	Military Patrol	Bronze
1	1924	Chamonix	Biathlon	Biathlon	MANDRILLON, C.	FRA	Men	Military Patrol	Bronze
2	1924	Chamonix	Biathlon	Biathlon	MANDRILLON, Maurice	FRA	Men	Military Patrol	Bronze
3	1924	Chamonix	Biathlon	Biathlon	VANDELLE, André	FRA	Men	Military Patrol	Bronze
4	1924	Chamonix	Biathlon	Biathlon	AUFDENBLATTEN, Adolf	SUI	Men	Military Patrol	Gold

In [8]:

```
winter.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5770 entries, 0 to 5769
Data columns (total 9 columns):
 #   Column      Non-Null Count  Dtype 
---  ------      --------------  ----- 
 0   Year        5770 non-null   int64 
 1   City        5770 non-null   object
 2   Sport       5770 non-null   object
 3   Discipline  5770 non-null   object
 4   Athlete     5770 non-null   object
 5   Country     5770 non-null   object
 6   Gender      5770 non-null   object
 7   Event       5770 non-null   object
 8   Medal       5770 non-null   object
dtypes: int64(1), object(8)
memory usage: 405.8+ KB
```

In [9]:

```
countries.head()
```

Out[9]:

	Country	Code	Population	GDP per Capita
0	Afghanistan	AFG	32526562.0	594.323081
1	Albania	ALB	2889167.0	3945.217582
2	Algeria	ALG	39666519.0	4206.031232
3	American Samoa*	ASA	55538.0	NaN
4	Andorra	AND	70473.0	NaN

In [10]:

```
countries.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 201 entries, 0 to 200
Data columns (total 4 columns):
 #   Column          Non-Null Count  Dtype  
---  ------          --------------  -----  
 0   Country         201 non-null    object 
 1   Code            201 non-null    object 
 2   Population      196 non-null    float64
 3   GDP per Capita  176 non-null    float64
dtypes: float64(2), object(2)
memory usage: 6.4+ KB
```

In [11]:

```
summer.Event.value_counts()
```

Out[11]:

```
Event
Football                          1497
Hockey                            1422
Team Competition                  1147
Basketball                        1012
Handball                           973
                                  ... 
Class B Up To 60 Feet                2
65.77 - 71.67KG (Middleweight)       2
- 47.63KG (Flyweight)                2
47.63 - 52.16KG (Bantamweight)       2
Open Class A                         1
Name: count, Length: 666, dtype: int64
```

In [13]:

```
# Listing all of the missing data in the 'countries' dataframe
countries[countries.isnull().any(axis = 1)].reset_index(drop=True)
```

Out[13]:

	Country	Code	Population	GDP per Capita
0	American Samoa*	ASA	55538.0	NaN
1	Andorra	AND	70473.0	NaN
2	Aruba*	ARU	103889.0	NaN
3	Bermuda*	BER	65235.0	NaN
4	British Virgin Islands	IVB	30117.0	NaN
5	Cayman Islands*	CAY	59967.0	NaN
6	Cook Islands	COK	NaN	NaN
7	Cuba	CUB	11389562.0	NaN
8	Eritrea	ERI	NaN	NaN
9	Guam	GUM	169885.0	NaN
10	Iran	IRI	79109272.0	NaN
11	Korea, North	PRK	25155317.0	NaN
12	Libya	LBA	6278438.0	NaN
13	Liechtenstein	LIE	37531.0	NaN
14	Mauritania	MTN	4067564.0	NaN
15	Monaco	MON	37731.0	NaN
16	Netherlands Antilles*	AHO	NaN	NaN
17	Palestine, Occupied Territories	PLE	NaN	NaN
18	Papua New Guinea	PNG	7619321.0	NaN
19	Puerto Rico*	PUR	3474182.0	NaN
20	San Marino	SMR	31781.0	NaN
21	Syria	SYR	18502413.0	NaN
22	Taiwan	TPE	NaN	NaN
23	Venezuela	VEN	31108083.0	NaN
24	Virgin Islands*	ISV	103574.0	NaN

In [ ]:

Proposed Questions

- ***Analysing all Summer editions data***

- Can you find the **highest** male / female **athletes** of all time in the Summer editions?
- Find the highest **athletes** regarding to each **medal type** in the Summer editions?

- ***Which are the most successful countries in both Summer and Winter editions?***

  - What are the **Top 10** Countries by **total medals**?
  - **Split** the total medals of Top 10 Countries into **Summer / Winter**. Are there typical Summer/Winter Games Countries?
  - **Split** the total medals of Top 10 Countries into **Gold, Silver, Bronze**.

In [ ]:

```

```

- ***Analysing all Summer editions data***
  - Can you find the **highest** male / female **athletes** of all time in the Summer editions?
  - Find the highest **athletes** regarding to each **medal type** in the Summer editions?

Q. Can you find the highest male / female athletes of all time in the Summer editions

In [14]:

```
summer.head()
```

Out[14]:

	Year	City	Sport	Discipline	Athlete	Country	Gender	Event	Medal
0	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	100M Freestyle	Gold
1	1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Men	100M Freestyle	Silver
2	1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Men	100M Freestyle For Sailors	Bronze
3	1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Men	100M Freestyle For Sailors	Gold
4	1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Men	100M Freestyle For Sailors	Silver

In [17]:

```
summer.Athlete.str.split(', ').str[::-1] #reverse the name to put first name then L
```

Out[17]:

```
0                    [Alfred, HAJOS]
1                 [Otto, HERSCHMANN]
2                [Dimitrios, DRIVAS]
3               [Ioannis, MALOKINIS]
4               [Spiridon, CHASAPIS]
                    ...
31160           [Damian, JANIKOWSKI]
31161    [Ghasem Gholamreza, REZAEI]
31162               [Rustam, TOTROV]
31163            [Artur, ALEKSANYAN]
31164               [Jimmy, LIDBERG]
Name: Athlete, Length: 31165, dtype: object
```

In [18]:

```
summer.Athlete.str.split(', ').str[::-1].str.join(' ') #to convert list to string a
```

Out[18]:

```
0                    Alfred HAJOS
1                 Otto HERSCHMANN
2                Dimitrios DRIVAS
3               Ioannis MALOKINIS
4               Spiridon CHASAPIS
                   ...
31160           Damian JANIKOWSKI
31161    Ghasem Gholamreza REZAEI
31162               Rustam TOTROV
31163            Artur ALEKSANYAN
31164               Jimmy LIDBERG
Name: Athlete, Length: 31165, dtype: object
```

In [20]:

```
summer['Athlete'] = summer.Athlete.str.split(', ').str[::-1].str.join(' ')
summer
```

Out[20]:

	Year	City	Sport	Discipline	Athlete	Country	Gender	Event	Me
0	1896	Athens	Aquatics	Swimming	Alfred HAJOS	HUN	Men	100M Freestyle	G
1	1896	Athens	Aquatics	Swimming	Otto HERSCHMANN	AUT	Men	100M Freestyle	Si
2	1896	Athens	Aquatics	Swimming	Dimitrios DRIVAS	GRE	Men	100M Freestyle For Sailors	Bro
3	1896	Athens	Aquatics	Swimming	Ioannis MALOKINIS	GRE	Men	100M Freestyle For Sailors	G
4	1896	Athens	Aquatics	Swimming	Spiridon CHASAPIS	GRE	Men	100M Freestyle For Sailors	Si
...	...	...	...	...	...	...	...	...	
31160	2012	London	Wrestling	Wrestling Freestyle	Damian JANIKOWSKI	POL	Men	Wg 84 KG	Bro
31161	2012	London	Wrestling	Wrestling Freestyle	Ghasem Gholamreza REZAEI	IRI	Men	Wg 96 KG	G
31162	2012	London	Wrestling	Wrestling Freestyle	Rustam TOTROV	RUS	Men	Wg 96 KG	Si
31163	2012	London	Wrestling	Wrestling Freestyle	Artur ALEKSANYAN	ARM	Men	Wg 96 KG	Bro
31164	2012	London	Wrestling	Wrestling Freestyle	Jimmy LIDBERG	SWE	Men	Wg 96 KG	Bro

31165 rows × 9 columns

In [21]:

```
countries
```

Out[21]:

	Country	Code	Population	GDP per Capita
0	Afghanistan	AFG	32526562.0	594.323081
1	Albania	ALB	2889167.0	3945.217582
2	Algeria	ALG	39666519.0	4206.031232
3	American Samoa*	ASA	55538.0	NaN
4	Andorra	AND	70473.0	NaN
...	...	...	...	...
196	Vietnam	VIE	91703800.0	2111.138024
197	Virgin Islands*	ISV	103574.0	NaN
198	Yemen	YEM	26832215.0	1406.291651
199	Zambia	ZAM	16211767.0	1304.879014
200	Zimbabwe	ZIM	15602751.0	924.143819

201 rows × 4 columns

In [23]:

```
summer = summer.merge(countries, left_on='Country', right_on='Code', how='left')
summer
```

Out[23]:

	Year	City	Sport	Discipline	Athlete	Country_x	Gender	Event	M
0	1896	Athens	Aquatics	Swimming	Alfred HAJOS	HUN	Men	100M Freestyle	
1	1896	Athens	Aquatics	Swimming	Otto HERSCHMANN	AUT	Men	100M Freestyle	
2	1896	Athens	Aquatics	Swimming	Dimitrios DRIVAS	GRE	Men	100M Freestyle For Sailors	B
3	1896	Athens	Aquatics	Swimming	Ioannis MALOKINIS	GRE	Men	100M Freestyle For Sailors	
4	1896	Athens	Aquatics	Swimming	Spiridon CHASAPIS	GRE	Men	100M Freestyle For Sailors	
...	...	...	...	...	...	...	...	...	
31160	2012	London	Wrestling	Wrestling Freestyle	Damian JANIKOWSKI	POL	Men	Wg 84 KG	B
31161	2012	London	Wrestling	Wrestling Freestyle	Ghasem Gholamreza REZAEI	IRI	Men	Wg 96 KG	
31162	2012	London	Wrestling	Wrestling Freestyle	Rustam TOTROV	RUS	Men	Wg 96 KG	
31163	2012	London	Wrestling	Wrestling Freestyle	Artur ALEKSANYAN	ARM	Men	Wg 96 KG	B
31164	2012	London	Wrestling	Wrestling Freestyle	Jimmy LIDBERG	SWE	Men	Wg 96 KG	B

31165 rows × 13 columns

In [24]:
```
summer.drop(columns=['Code', 'Population', 'GDP per Capita'], inplace= True)
```

In [25]:
```
summer
```

Out[25]:

	Year	City	Sport	Discipline	Athlete	Country_x	Gender	Event	M
0	1896	Athens	Aquatics	Swimming	Alfred HAJOS	HUN	Men	100M Freestyle	
1	1896	Athens	Aquatics	Swimming	Otto HERSCHMANN	AUT	Men	100M Freestyle	
2	1896	Athens	Aquatics	Swimming	Dimitrios DRIVAS	GRE	Men	100M Freestyle For Sailors	B
3	1896	Athens	Aquatics	Swimming	Ioannis MALOKINIS	GRE	Men	100M Freestyle For Sailors	
4	1896	Athens	Aquatics	Swimming	Spiridon CHASAPIS	GRE	Men	100M Freestyle For Sailors	
...	...	...	...	...	...	...	...	...	
31160	2012	London	Wrestling	Wrestling Freestyle	Damian JANIKOWSKI	POL	Men	Wg 84 KG	B
31161	2012	London	Wrestling	Wrestling Freestyle	Ghasem Gholamreza REZAEI	IRI	Men	Wg 96 KG	
31162	2012	London	Wrestling	Wrestling Freestyle	Rustam TOTROV	RUS	Men	Wg 96 KG	
31163	2012	London	Wrestling	Wrestling Freestyle	Artur ALEKSANYAN	ARM	Men	Wg 96 KG	B
31164	2012	London	Wrestling	Wrestling Freestyle	Jimmy LIDBERG	SWE	Men	Wg 96 KG	B

31165 rows × 10 columns

In [26]:

```
summer.rename(columns={'Country_x': 'Code', 'Country_y':'Country'}, inplace = True)
summer
```

Out[26]:

	Year	City	Sport	Discipline	Athlete	Code	Gender	Event	Medal
0	1896	Athens	Aquatics	Swimming	Alfred HAJOS	HUN	Men	100M Freestyle	Golc
1	1896	Athens	Aquatics	Swimming	Otto HERSCHMANN	AUT	Men	100M Freestyle	Silvei
2	1896	Athens	Aquatics	Swimming	Dimitrios DRIVAS	GRE	Men	100M Freestyle For Sailors	Bronze
3	1896	Athens	Aquatics	Swimming	Ioannis MALOKINIS	GRE	Men	100M Freestyle For Sailors	Golc
4	1896	Athens	Aquatics	Swimming	Spiridon CHASAPIS	GRE	Men	100M Freestyle For Sailors	Silvei
...	...	...	...	...	...	...	...	...	..
31160	2012	London	Wrestling	Wrestling Freestyle	Damian JANIKOWSKI	POL	Men	Wg 84 KG	Bronze
31161	2012	London	Wrestling	Wrestling Freestyle	Ghasem Gholamreza REZAEI	IRI	Men	Wg 96 KG	Golc
31162	2012	London	Wrestling	Wrestling Freestyle	Rustam TOTROV	RUS	Men	Wg 96 KG	Silvei
31163	2012	London	Wrestling	Wrestling Freestyle	Artur ALEKSANYAN	ARM	Men	Wg 96 KG	Bronze
31164	2012	London	Wrestling	Wrestling Freestyle	Jimmy LIDBERG	SWE	Men	Wg 96 KG	Bronze

31165 rows × 10 columns

In [34]:

```
summer[summer['Gender'] == 'Men']['Athlete'].value_counts()[:10].index[:1]
```

Out[34]:

```
Index(['Michael PHELPS'], dtype='object', name='Athlete')
```

In [35]:

```
summer[summer['Gender'] == 'Men']['Athlete'].value_counts()[:10].values[0] #.max()
```

Out[35]:

```
np.int64(22)
```

In [36]:

```
# The highest female athlete of all Summer editions
summer[summer['Gender']=='Women']['Athlete'].value_counts()[:1].index[0]
```

Out[36]:

```
'Larisa LATYNINA'
```

In [37]:
```
# Her total number of medals
summer[summer['Gender']=='Women']['Athlete'].value_counts()[:1].values[0]
```

Out[37]:
```
np.int64(18)
```

In [ ]:
```

```

Q. Find the highest athletes regarding to each medal type in the Summer editions

In [38]:
```
summer
```

Out[38]:

	Year	City	Sport	Discipline	Athlete	Code	Gender	Event	Medal
0	1896	Athens	Aquatics	Swimming	Alfred HAJOS	HUN	Men	100M Freestyle	Golc
1	1896	Athens	Aquatics	Swimming	Otto HERSCHMANN	AUT	Men	100M Freestyle	Silvei
2	1896	Athens	Aquatics	Swimming	Dimitrios DRIVAS	GRE	Men	100M Freestyle For Sailors	Bronze
3	1896	Athens	Aquatics	Swimming	Ioannis MALOKINIS	GRE	Men	100M Freestyle For Sailors	Golc
4	1896	Athens	Aquatics	Swimming	Spiridon CHASAPIS	GRE	Men	100M Freestyle For Sailors	Silvei
...	...	...	...	...	...	...	...	...	..
31160	2012	London	Wrestling	Wrestling Freestyle	Damian JANIKOWSKI	POL	Men	Wg 84 KG	Bronze
31161	2012	London	Wrestling	Wrestling Freestyle	Ghasem Gholamreza REZAEI	IRI	Men	Wg 96 KG	Golc
31162	2012	London	Wrestling	Wrestling Freestyle	Rustam TOTROV	RUS	Men	Wg 96 KG	Silvei
31163	2012	London	Wrestling	Wrestling Freestyle	Artur ALEKSANYAN	ARM	Men	Wg 96 KG	Bronze
31164	2012	London	Wrestling	Wrestling Freestyle	Jimmy LIDBERG	SWE	Men	Wg 96 KG	Bronze

31165 rows × 10 columns

In [39]:
```
summer[summer['Athlete'] == 'Michael PHELPS']
```

Out[39]:

	Year	City	Sport	Discipline	Athlete	Code	Gender	Event	Medal	Cour
25225	2004	Athens	Aquatics	Swimming	Michael PHELPS	USA	Men	100M Butterfly	Gold	Un Sta
25253	2004	Athens	Aquatics	Swimming	Michael PHELPS	USA	Men	200M Butterfly	Gold	Un Sta
25258	2004	Athens	Aquatics	Swimming	Michael PHELPS	USA	Men	200M Freestyle	Bronze	Un Sta
25265	2004	Athens	Aquatics	Swimming	Michael PHELPS	USA	Men	200M Individual Medley	Gold	Un Sta
25277	2004	Athens	Aquatics	Swimming	Michael PHELPS	USA	Men	400M Individual Medley	Gold	Un Sta
25286	2004	Athens	Aquatics	Swimming	Michael PHELPS	USA	Men	4X100M Freestyle Relay	Bronze	Un Sta
25325	2004	Athens	Aquatics	Swimming	Michael PHELPS	USA	Men	4X100M Medley Relay	Gold	Un Sta
25361	2004	Athens	Aquatics	Swimming	Michael PHELPS	USA	Men	4X200M Freestyle Relay	Gold	Un Sta
27224	2008	Beijing	Aquatics	Swimming	Michael PHELPS	USA	Men	100M Butterfly	Gold	Un Sta
27252	2008	Beijing	Aquatics	Swimming	Michael PHELPS	USA	Men	200M Butterfly	Gold	Un Sta
27258	2008	Beijing	Aquatics	Swimming	Michael PHELPS	USA	Men	200M Freestyle	Gold	Un Sta
27264	2008	Beijing	Aquatics	Swimming	Michael PHELPS	USA	Men	200M Individual Medley	Gold	Un Sta
27276	2008	Beijing	Aquatics	Swimming	Michael PHELPS	USA	Men	400M Individual Medley	Gold	Un Sta
27291	2008	Beijing	Aquatics	Swimming	Michael PHELPS	USA	Men	4X100M Freestyle Relay	Gold	Un Sta
27327	2008	Beijing	Aquatics	Swimming	Michael PHELPS	USA	Men	4X100M Medley Relay	Gold	Un Sta
27366	2008	Beijing	Aquatics	Swimming	Michael PHELPS	USA	Men	4X200M Freestyle Relay	Gold	Un Sta

	Year	City	Sport	Discipline	Athlete	Code	Gender	Event	Medal	Cour
29270	2012	London	Aquatics	Swimming	Michael PHELPS	USA	Men	100M Butterfly	Gold	Un Sta
29298	2012	London	Aquatics	Swimming	Michael PHELPS	USA	Men	200M Butterfly	Silver	Un Sta
29309	2012	London	Aquatics	Swimming	Michael PHELPS	USA	Men	200M Medley	Gold	Un Sta
29340	2012	London	Aquatics	Swimming	Michael PHELPS	USA	Men	4X100M Freestyle	Silver	Un Sta
29370	2012	London	Aquatics	Swimming	Michael PHELPS	USA	Men	4X100M Medley	Gold	Un Sta
29405	2012	London	Aquatics	Swimming	Michael PHELPS	USA	Men	4X200M Freestyle	Gold	Un Sta

In [44]:

```
top_medals = summer.groupby(['Athlete', 'Medal'])['Sport'].count().reset_index().so
top_medals
```

Out[44]:

	Athlete	Medal	Sport
17347	Michael PHELPS	Gold	18
16587	Mark SPITZ	Gold	9
14741	Larisa LATYNINA	Gold	9
3521	Carl LEWIS	Gold	9
19234	Paavo NURMI	Gold	9
...	...	...	...
15	A. LAWREY	Silver	1
16	A. MARA	Gold	1
17	A. MARIACHER	Silver	1
18	A. MCEVOY	Silver	1
1	- JOHNSON	Gold	1

26724 rows × 3 columns

In [45]:

```
top_medals.rename(columns={'Sport':'Count'}, inplace=True)
```

In [46]:

```
top_medals
```

Out[46]:

	Athlete	Medal	Count
17347	Michael PHELPS	Gold	18
16587	Mark SPITZ	Gold	9
14741	Larisa LATYNINA	Gold	9
3521	Carl LEWIS	Gold	9
19234	Paavo NURMI	Gold	9
...	...	...	...
15	A. LAWREY	Silver	1
16	A. MARA	Gold	1
17	A. MARIACHER	Silver	1
18	A. MCEVOY	Silver	1
1	- JOHNSON	Gold	1

26724 rows × 3 columns

In [47]:
```
top_medals[top_medals['Athlete'] == 'Michael PHELPS']
```

Out[47]:

	Athlete	Medal	Count
17347	Michael PHELPS	Gold	18
17346	Michael PHELPS	Bronze	2
17348	Michael PHELPS	Silver	2

In [48]:
```
top_medals = top_medals.drop_duplicates(subset=['Medal'],keep='first')
top_medals.columns = [['Athlete','Medal','Count']]
top_medals
```

Out[48]:

	Athlete	Medal	Count
17347	Michael PHELPS	Gold	18
17182	Merlene OTTEY-PAGE	Bronze	6
17607	Mikhail VORONIN	Silver	6

In [ ]:
```

```

Q. Which are the most successful countries in both Summer and Winter editions?

- What are the **Top 10** Countries by **total medals**?
- **Split** the total medals of Top 10 Countries into **Summer / Winter**. Are there typical Summer/Winter Games Countries?

- **Split** the total medals of Top 10 Countries into **Gold, Silver, Bronze**.

1] Data Merging

In [50]:
```
summer = pd.read_csv('summer.csv')
```

In [51]:
```
summer.head()
```

Out[51]:

	Year	City	Sport	Discipline	Athlete	Country	Gender	Event	Medal
0	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	100M Freestyle	Gold
1	1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Men	100M Freestyle	Silver
2	1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Men	100M Freestyle For Sailors	Bronze
3	1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Men	100M Freestyle For Sailors	Gold
4	1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Men	100M Freestyle For Sailors	Silver

In [52]:
```
winter.head()
```

Out[52]:

	Year	City	Sport	Discipline	Athlete	Country	Gender	Event	Meda
0	1924	Chamonix	Biathlon	Biathlon	BERTHET, G.	FRA	Men	Military Patrol	Bronz
1	1924	Chamonix	Biathlon	Biathlon	MANDRILLON, C.	FRA	Men	Military Patrol	Bronz
2	1924	Chamonix	Biathlon	Biathlon	MANDRILLON, Maurice	FRA	Men	Military Patrol	Bronz
3	1924	Chamonix	Biathlon	Biathlon	VANDELLE, André	FRA	Men	Military Patrol	Bronz
4	1924	Chamonix	Biathlon	Biathlon	AUFDENBLATTEN, Adolf	SUI	Men	Military Patrol	Gol

In [55]:
```
olympics = pd.concat([summer, winter], keys=['Summer','Winter'], names=['Edition'])
olympics
```

Out[55]:

	Edition	Year	City	Sport	Discipline	Athlete	Country	Gender	
0	Summer	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	Fr
1	Summer	1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Men	Fr
2	Summer	1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Men	Fr For
3	Summer	1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Men	Fr For
4	Summer	1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Men	Fr For
...	...	...	...	...	...	...	...	...	
36930	Winter	2014	Sochi	Skiing	Snowboard	JONES, Jenny	GBR	Women	Slo
36931	Winter	2014	Sochi	Skiing	Snowboard	ANDERSON, Jamie	USA	Women	Slo
36932	Winter	2014	Sochi	Skiing	Snowboard	MALTAIS, Dominique	CAN	Women	Sno
36933	Winter	2014	Sochi	Skiing	Snowboard	SAMKOVA, Eva	CZE	Women	Sno
36934	Winter	2014	Sochi	Skiing	Snowboard	TRESPEUCH, Chloe	FRA	Women	Sno

36935 rows × 10 columns

In [57]:

```
olympics = olympics.merge(countries.iloc[:,:2], how='left', left_on = 'Country', ri
olympics
```

Out[57]:

	Edition	Year	City	Sport	Discipline	Athlete	Code	Gender	Ev
0	Summer	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	1 Frees
1	Summer	1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Men	1 Frees
2	Summer	1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Men	1 Frees For Sa
3	Summer	1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Men	1 Frees For Sa
4	Summer	1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Men	1 Frees For Sa
...	...	...	...	...	...	...	...	...	
36930	Winter	2014	Sochi	Skiing	Snowboard	JONES, Jenny	GBR	Women	Slopes
36931	Winter	2014	Sochi	Skiing	Snowboard	ANDERSON, Jamie	USA	Women	Slopes
36932	Winter	2014	Sochi	Skiing	Snowboard	MALTAIS, Dominique	CAN	Women	Snowb C
36933	Winter	2014	Sochi	Skiing	Snowboard	SAMKOVA, Eva	CZE	Women	Snowb C
36934	Winter	2014	Sochi	Skiing	Snowboard	TRESPEUCH, Chloe	FRA	Women	Snowb C

36935 rows × 11 columns

In [ ]:

2] Data Cleaning

In [58]:

```
olympics.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 36935 entries, 0 to 36934
Data columns (total 11 columns):
 #   Column      Non-Null Count  Dtype 
---  ------      --------------  ----- 
 0   Edition     36935 non-null  object
 1   Year        36935 non-null  int64 
 2   City        36935 non-null  object
 3   Sport       36935 non-null  object
 4   Discipline  36935 non-null  object
 5   Athlete     36935 non-null  object
 6   Code        36931 non-null  object
 7   Gender      36935 non-null  object
 8   Event       36935 non-null  object
 9   Medal       36935 non-null  object
 10  Country     30568 non-null  object
dtypes: int64(1), object(10)
memory usage: 3.1+ MB
```

In [64]:

```
olympics[olympics['Country'].isna()]['Code'].value_counts()
```

Out[64]:

```
Code
URS    2489
GDR     987
ROU     642
FRG     584
TCH     487
YUG     442
EUN     283
EUA     281
ZZX      48
SRB      31
ANZ      29
RU1      17
MNE      14
TTO      10
BOH       7
BWI       5
SGP       4
IOP       3
Name: count, dtype: int64
```

In [67]:

```
old_codes = olympics[olympics['Country'].isna()]['Code'].value_counts().index
old_codes
```

Out[67]:

```
Index(['URS', 'GDR', 'ROU', 'FRG', 'TCH', 'YUG', 'EUN', 'EUA', 'ZZX', 'SRB',
       'ANZ', 'RU1', 'MNE', 'TTO', 'BOH', 'BWI', 'SGP', 'IOP'],
      dtype='object', name='Code')
```

In [ ]:

```
{'URS': 'Soviet Union',
 'GDR': 'East Germany',
 'ROU': 'Romania',
 'FRG': 'West Germany',
 'TCH': 'Czechoslovakia',
 'YUG': 'Yugoslavia',
 'EUN': 'Unified Team',
 'EUA': 'Unified Team of Germany',
 'ZZX': 'Mixed teams',
 'SRB': 'Serbia',
 'ANZ': 'Australasia',
 'RU1': 'Russian Empire',
 'MNE': 'Montenegro',
 'TTO': 'Trinidad and Tobago',
 'BOH': 'Bohemia',
 'BWI': 'West Indies Federation',
 'SGP': 'Singapore',
 'IOP': 'Independent Olympic Participants'}
```

In [70]:
```
# Create a mapper to match the old countries' codes with their corresponding names
mapper = pd.Series(index=old_codes, name = "Country", data = ["Soviet Union", "East
                               "Yugoslavia", "Unified Team", "Unified Team of Germa
                              "Australasia", "Russian Empire", "Montenegro", "Trini
                              "West Indies Federation", "Singapore", "Independent O

mapper
```

Out[70]:
```
Code
URS                        Soviet Union
GDR                        East Germany
ROU                             Romania
FRG                        West Germany
TCH                      Czechoslovakia
YUG                          Yugoslavia
EUN                        Unified Team
EUA             Unified Team of Germany
ZZX                         Mixed teams
SRB                              Serbia
ANZ                         Australasia
RU1                      Russian Empire
MNE                          Montenegro
TTO                 Trinidad and Tobago
BOH                             Bohemia
BWI              West Indies Federation
SGP                           Singapore
IOP    Independent Olympic Participants
Name: Country, dtype: object
```

In [71]:
```
# Let's get all the missing data indicies to map them to countries
missing_indices = olympics.loc[olympics.Country.isnull()].index
missing_indices
```

Out[71]:
```
Index([  132,   133,   134,   135,   136,   137,   257,   258,   259,   260,
       ...
       33939, 33947, 33949, 33953, 33954, 33961, 33977, 33978, 33979, 33980],
      dtype='int64', length=6367)
```

In [72]:
```
# Now, we need to map the names
olympics.loc[missing_indices, "Code"].map(mapper)
```

Out[72]:
```
132         Mixed teams
133         Mixed teams
134         Mixed teams
135         Mixed teams
136         Mixed teams
              ...     
33961      Unified Team
33977    Czechoslovakia
33978    Czechoslovakia
33979    Czechoslovakia
33980    Czechoslovakia
Name: Code, Length: 6367, dtype: object
```

In [73]:
```
# Filling the missing data with the new names
olympics.Country.fillna(olympics.Code.map(mapper), inplace = True)
```

```
C:\Users\alhef\AppData\Local\Temp\ipykernel_13088\2437805990.py:2: FutureWarning: A
value is trying to be set on a copy of a DataFrame or Series through chained assignm
ent using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work because
the intermediate object on which we are setting values always behaves as a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method
({col: value}, inplace=True)' or df[col] = df[col].method(value) instead, to perform
the operation inplace on the original object.


  olympics.Country.fillna(olympics.Code.map(mapper), inplace = True)
```

In [74]:
```
olympics.loc[missing_indices]
```

Out[74]:

	Edition	Year	City	Sport	Discipline	Athlete	Code	Gender	Ever
132	Summer	1896	Athens	Tennis	Tennis	FLACK, Edwin	ZZX	Men	Double
133	Summer	1896	Athens	Tennis	Tennis	ROBERTSON, George Stuart	ZZX	Men	Double
134	Summer	1896	Athens	Tennis	Tennis	BOLAND, John	ZZX	Men	Double
135	Summer	1896	Athens	Tennis	Tennis	TRAUN, Friedrich	ZZX	Men	Double
136	Summer	1896	Athens	Tennis	Tennis	KASDAGLIS, Dionysios	ZZX	Men	Double
...	...	...	...	...	...	...	...	...	
33961	Winter	1992	Albertville	Skiing	Freestyle Skiing	KOZHEVNIKOVA, Yelizaveta	EUN	Women	Mogu
33977	Winter	1992	Albertville	Skiing	Ski Jumping	GODER, Tomas	TCH	Men	K12 Tea (90M
33978	Winter	1992	Albertville	Skiing	Ski Jumping	JEZ, Frantisek	TCH	Men	K12 Tea (90M
33979	Winter	1992	Albertville	Skiing	Ski Jumping	PARMA, Jiri	TCH	Men	K12 Tea (90M
33980	Winter	1992	Albertville	Skiing	Ski Jumping	SAKALA, Jaroslav	TCH	Men	K12 Tea (90M

6367 rows × 11 columns

In [75]:

```
olympics['Country'].isnull().sum()
```

Out[75]:

```
np.int64(4)
```

In [77]:

```
olympics[olympics['Country'].isnull()]
```

Out[77]:

	Edition	Year	City	Sport	Discipline	Athlete	Code	Gender	Ev
29603	Summer	2012	London	Athletics	Athletics	Pending	NaN	Women	150
31072	Summer	2012	London	Weightlifting	Weightlifting	Pending	NaN	Women	63
31091	Summer	2012	London	Weightlifting	Weightlifting	Pending	NaN	Men	94
31110	Summer	2012	London	Wrestling	Wrestling Freestyle	KUDUKHOV, Besik	NaN	Men	Wf

In [ ]:

```

```

Remove rows from olympics where the Country code is unknown

In [78]:

```
olympics.dropna(subset=['Code'], inplace=True)
```

In [79]:

```
olympics.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 36931 entries, 0 to 36934
Data columns (total 11 columns):
 #   Column      Non-Null Count  Dtype 
---  ------      --------------  ----- 
 0   Edition     36931 non-null  object
 1   Year        36931 non-null  int64 
 2   City        36931 non-null  object
 3   Sport       36931 non-null  object
 4   Discipline  36931 non-null  object
 5   Athlete     36931 non-null  object
 6   Code        36931 non-null  object
 7   Gender      36931 non-null  object
 8   Event       36931 non-null  object
 9   Medal       36931 non-null  object
 10  Country     36931 non-null  object
dtypes: int64(1), object(10)
memory usage: 3.4+ MB
```

In [81]:

```
olympics.reset_index(drop=True, inplace=True)
olympics
```

Out[81]:

	Edition	Year	City	Sport	Discipline	Athlete	Code	Gender	Ev
0	Summer	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	1 Free
1	Summer	1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Men	1 Free
2	Summer	1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Men	1 Free For Sa
3	Summer	1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Men	1 Free For Sa
4	Summer	1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Men	1 Free For Sa
...	...	...	...	...	...	...	...	...	
36926	Winter	2014	Sochi	Skiing	Snowboard	JONES, Jenny	GBR	Women	Slope
36927	Winter	2014	Sochi	Skiing	Snowboard	ANDERSON, Jamie	USA	Women	Slope
36928	Winter	2014	Sochi	Skiing	Snowboard	MALTAIS, Dominique	CAN	Women	Snowb C
36929	Winter	2014	Sochi	Skiing	Snowboard	SAMKOVA, Eva	CZE	Women	Snowb C
36930	Winter	2014	Sochi	Skiing	Snowboard	TRESPEUCH, Chloe	FRA	Women	Snowb C

36931 rows × 11 columns

In [ ]:

3] Data Analysis & Visualization (EDA)

Q. What are the Top 10 Countries by total medals?

In [82]:

```
olympics
```

Out[82]:

	Edition	Year	City	Sport	Discipline	Athlete	Code	Gender	Ev
0	Summer	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	10 Frees
1	Summer	1896	Athens	Aquatics	Swimming	HERSCHMANN, Otto	AUT	Men	10 Frees
2	Summer	1896	Athens	Aquatics	Swimming	DRIVAS, Dimitrios	GRE	Men	10 Frees For Sa
3	Summer	1896	Athens	Aquatics	Swimming	MALOKINIS, Ioannis	GRE	Men	10 Frees For Sa
4	Summer	1896	Athens	Aquatics	Swimming	CHASAPIS, Spiridon	GRE	Men	10 Frees For Sa
...	...	...	...	...	...	...	...	...	
36926	Winter	2014	Sochi	Skiing	Snowboard	JONES, Jenny	GBR	Women	Slopes
36927	Winter	2014	Sochi	Skiing	Snowboard	ANDERSON, Jamie	USA	Women	Slopes
36928	Winter	2014	Sochi	Skiing	Snowboard	MALTAIS, Dominique	CAN	Women	Snowb C
36929	Winter	2014	Sochi	Skiing	Snowboard	SAMKOVA, Eva	CZE	Women	Snowb C
36930	Winter	2014	Sochi	Skiing	Snowboard	TRESPEUCH, Chloe	FRA	Women	Snowb C

36931 rows × 11 columns

In [83]:

```
olympics.Country.value_counts()
```

Out[83]:

```
Country
United States     5238
Soviet Union      2489
United Kingdom    1799
Germany           1665
France            1548
                  ...
Guatemala            1
Botswana             1
Grenada              1
Cyprus               1
Gabon                1
Name: count, Length: 145, dtype: int64
```

In [84]:

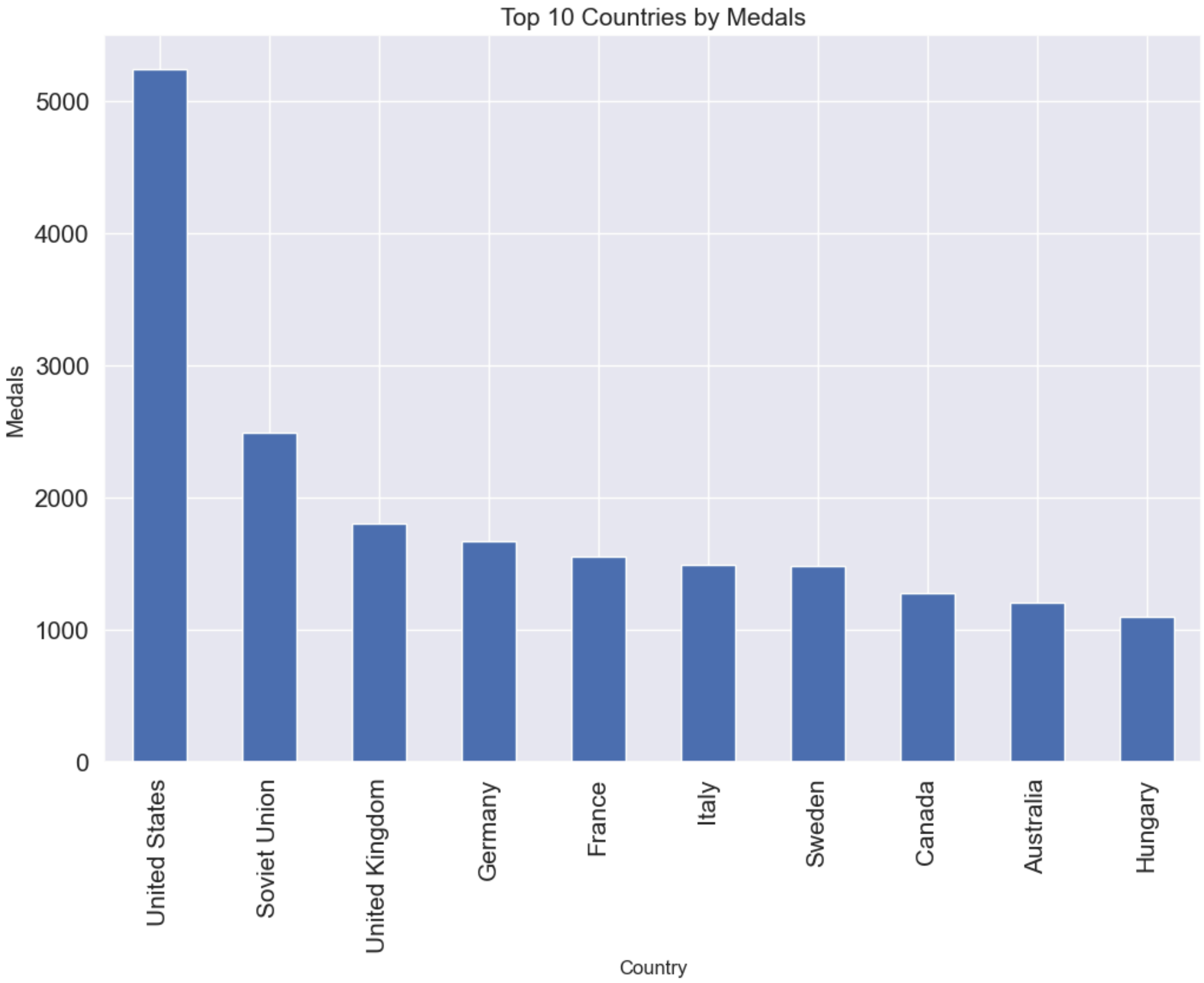
```python
top_10 = olympics.Country.value_counts().nlargest(10)
top_10
```

Out[84]:

```
Country
United States     5238
Soviet Union      2489
United Kingdom    1799
Germany           1665
France            1548
Italy             1488
Sweden            1477
Canada            1274
Australia         1204
Hungary           1091
Name: count, dtype: int64
```

In [85]:

```python
top_10.plot(kind = "bar", fontsize = 15, figsize=(12,8))
plt.title("Top 10 Countries by Medals", fontsize = 15)
plt.ylabel("Medals", fontsize = 14)
plt.show()
```



In [ ]:

Q. Split the total medals of Top 10 Countries into Summer / Winter. Are there typical Summer/Winter Games Countries?

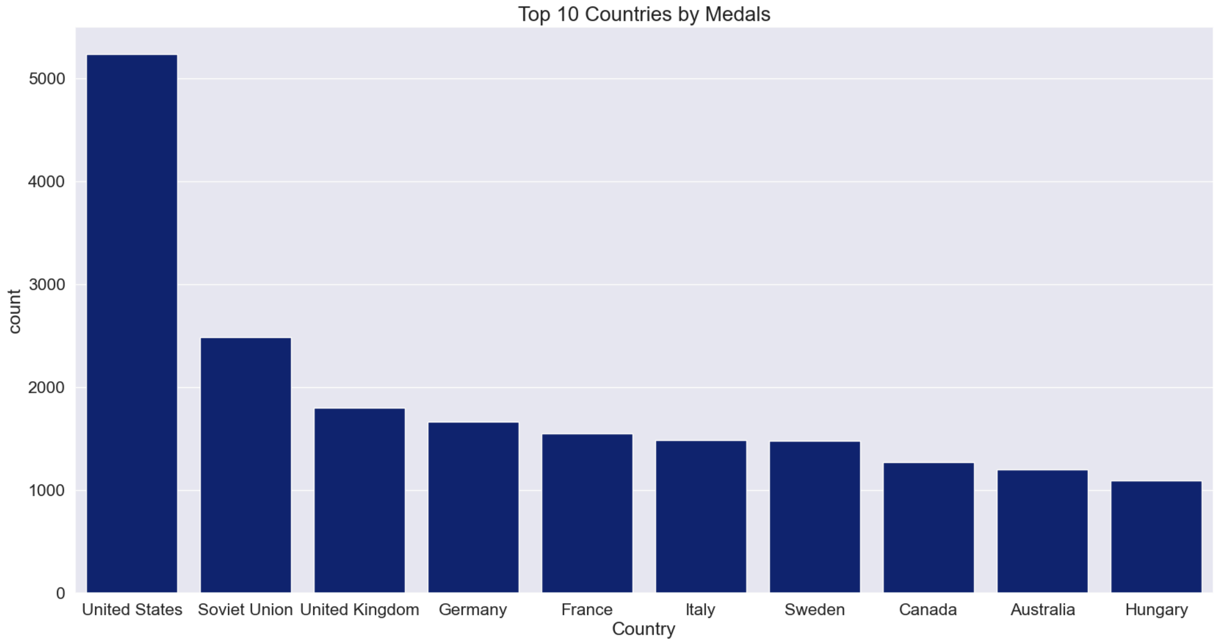
In [86]:
```
# Gathering the top10 data
olympics_10 = olympics[olympics.Country.isin(top_10.index)]
olympics_10
```

Out[86]:

	Edition	Year	City	Sport	Discipline	Athlete	Code	Gender	Even
0	Summer	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	100M Freestyl
6	Summer	1896	Athens	Aquatics	Swimming	HAJOS, Alfred	HUN	Men	1200M Freestyl
11	Summer	1896	Athens	Athletics	Athletics	LANE, Francis	USA	Men	100M
12	Summer	1896	Athens	Athletics	Athletics	SZOKOLYI, Alajos	HUN	Men	100M
13	Summer	1896	Athens	Athletics	Athletics	BURKE, Thomas	USA	Men	100M
...	...	...	...	...	...	...	...	...	.
36924	Winter	2014	Sochi	Skiing	Snowboard	KOBER, Amelie	GER	Women	Paralle Slalon
36926	Winter	2014	Sochi	Skiing	Snowboard	JONES, Jenny	GBR	Women	Slopestyl
36927	Winter	2014	Sochi	Skiing	Snowboard	ANDERSON, Jamie	USA	Women	Slopestyl
36928	Winter	2014	Sochi	Skiing	Snowboard	MALTAIS, Dominique	CAN	Women	Snowboar Cros
36930	Winter	2014	Sochi	Skiing	Snowboard	TRESPEUCH, Chloe	FRA	Women	Snowboar Cros

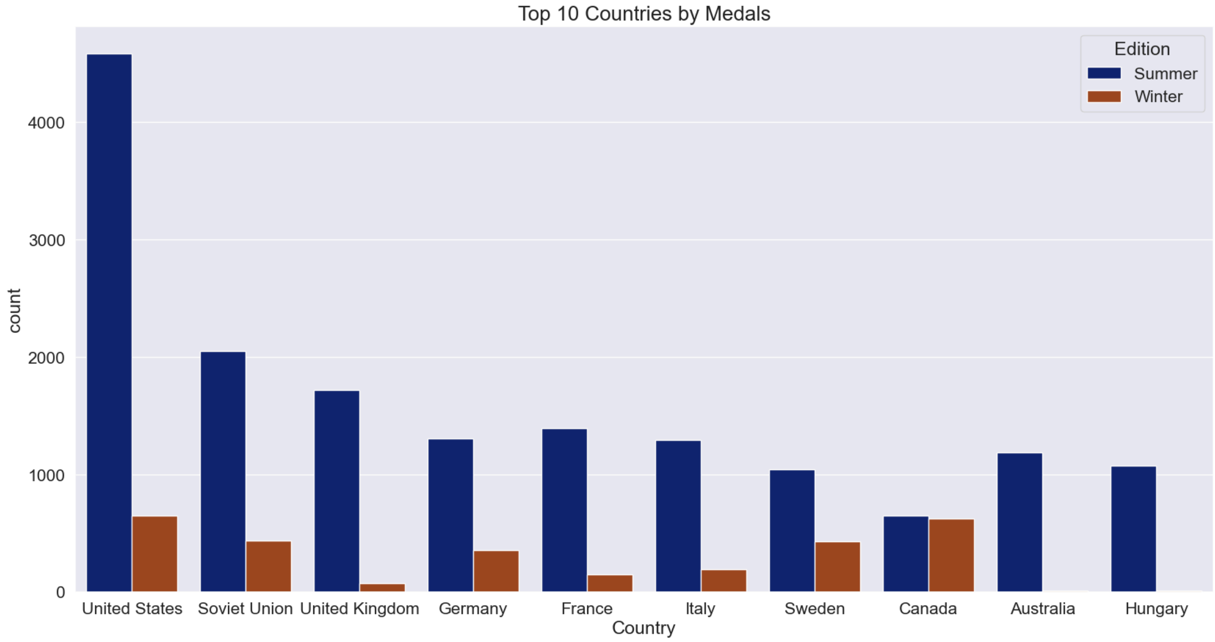
19273 rows × 11 columns

In [87]:
```
plt.figure(figsize=(20,10))
sns.set(font_scale=1.5, palette= "dark")
sns.countplot(data = olympics_10, x = "Country", order = top_10.index)
plt.title("Top 10 Countries by Medals", fontsize = 20)
plt.show()
```



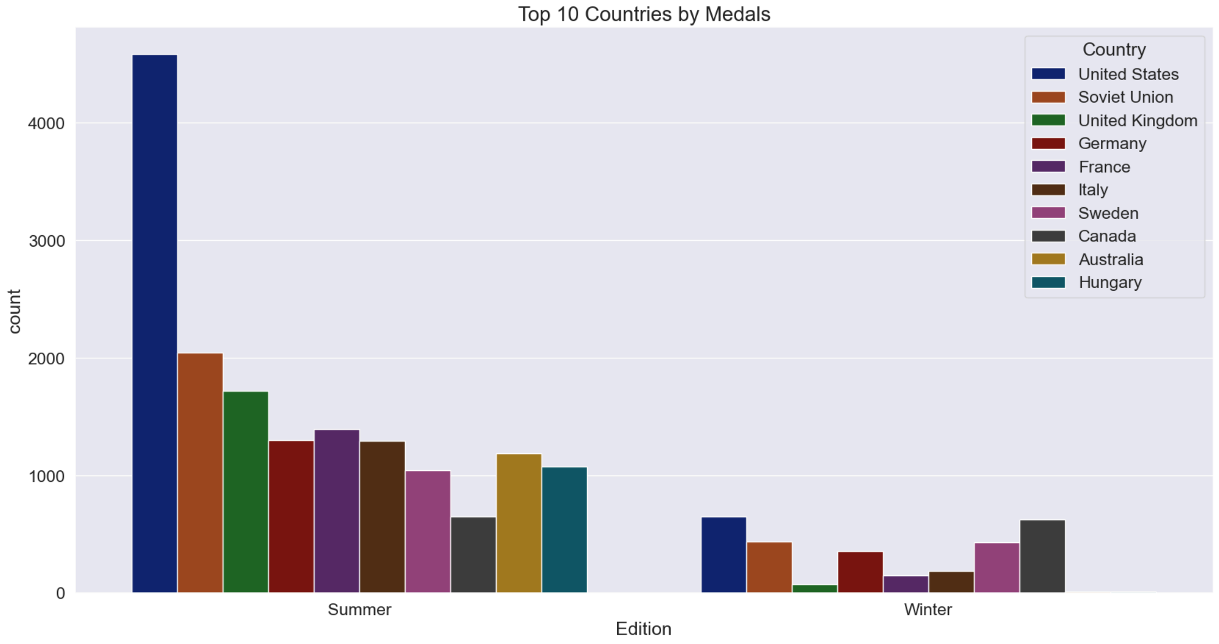
In [88]:

```
plt.figure(figsize=(20,10))
sns.set(font_scale=1.5, palette= "dark")
sns.countplot(data = olympics_10, x = "Country", hue = "Edition", order = top_10.in
plt.title("Top 10 Countries by Medals", fontsize = 20)
plt.show()
```



In [89]:

```
plt.figure(figsize=(20,10))
sns.set(font_scale=1.5, palette= "dark")
sns.countplot(data = olympics_10, x = "Edition", hue = "Country", hue_order = top_1
plt.title("Top 10 Countries by Medals", fontsize = 20)
plt.show()
```

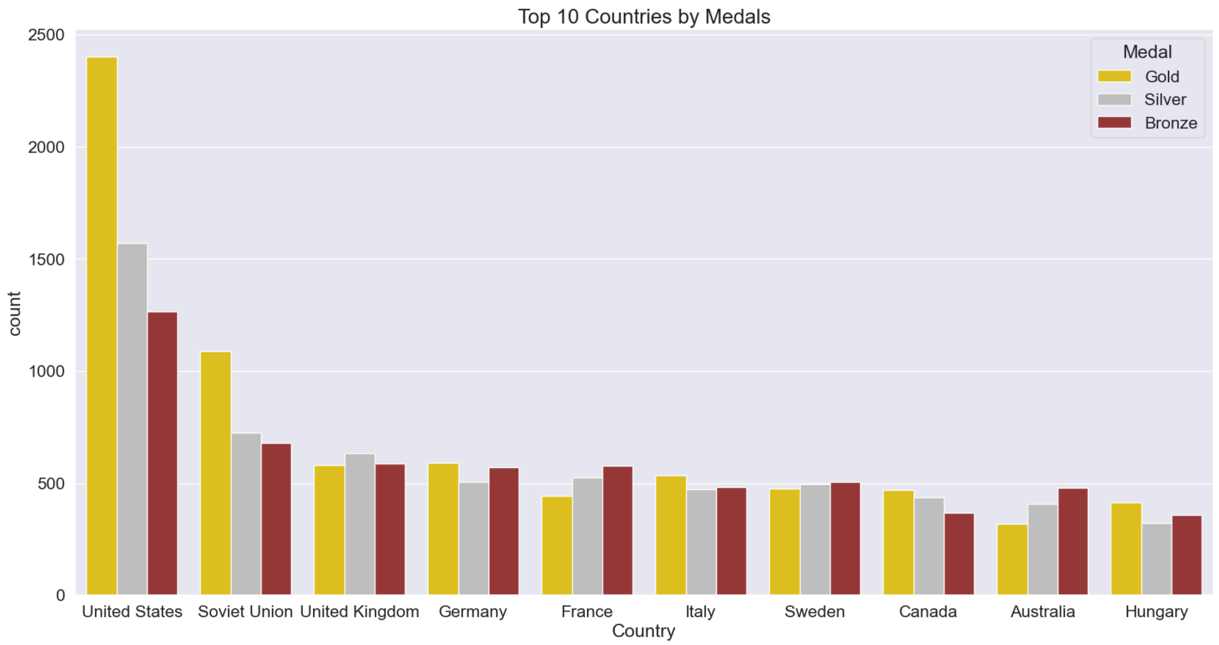


In [ ]:

Q. Split the total medals of Top 10 Countries into Gold, Silver, Bronze

In [90]:

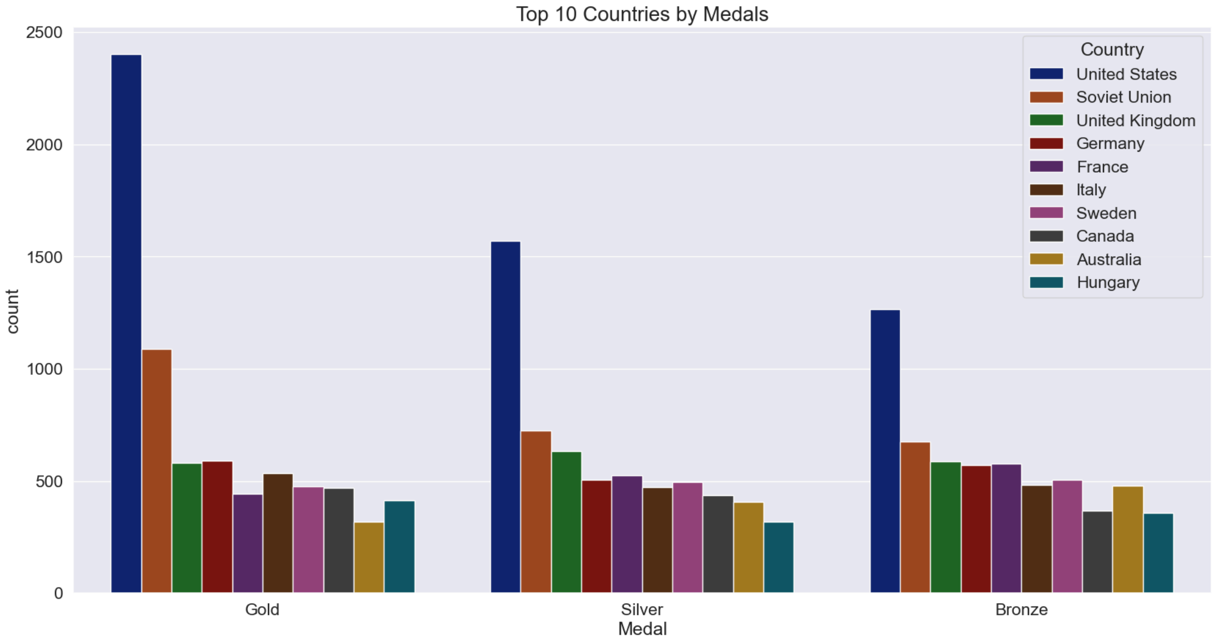
```
plt.figure(figsize=(20,10))
sns.set(font_scale=1.5, palette= "dark")
sns.countplot(data = olympics_10, x = "Country", hue = "Medal", order = top_10.inde
              hue_order = ["Gold", "Silver", "Bronze"], palette = ["gold", "silver"
plt.title("Top 10 Countries by Medals", fontsize = 20)
plt.show()
```



In [91]:

```
plt.figure(figsize=(20,10))
sns.set(font_scale=1.5, palette= "dark")
sns.countplot(data = olympics_10, x = "Medal", hue = "Country",
              order = ["Gold", "Silver", "Bronze"], hue_order= top_10.index)
```

```
plt.title("Top 10 Countries by Medals", fontsize = 20)
plt.show()
```



```
In [ ]:
```