Project Title	**Olympics Data Analysis**
Tools	Python, ML, SQL, Excel
Domain	Data Analyst
Project Difficulties level	Beginner

Dataset : Dataset is available in the given link. You can download it at your convenience.

[Click here to download data set]()

About Dataset

This dataset is a list of all the medal winners in the Summer Olympics from 1976 Montreal to 2008 Beijing. It includes each and every medal awarded within the period. This dataset is intended for beginners so that they can get a taste of advanced Excel functions which is perhaps one of the key skills required to be a great data scientist. I too got my hands dirty with the dataset and played with some advanced Excel functions. Further, this dataset can also be used for a predictive model as to which country is likely to fetch the highest number of gold in a particular sports category (just an example), etc.

Example: Olympics Data Analysis

Olympics Data Analysis Using Machine Learning

For a project based on Olympics data analysis, the primary focus will be on exploring and understanding the dataset, performing exploratory data analysis (EDA), and uncovering trends and insights related to athletes, countries, and sports over the years.

We'll use the following columns for our analysis:

- **City**: The city where the Olympics took place.
- **Year**: The year of the Olympics.
- **Sport**: The sport the event is categorized under.
- **Discipline**: A subcategory of the sport.
- **Event**: The specific event within a discipline.
- **Athlete**: The name of the athlete who participated.
- **Gender**: The gender of the athlete.
- **Country_Code**: The country code (abbreviation).
- **Country**: The full name of the country.
- **Event_gender**: The gender category of the event.
- **Medal**: The medal won (Gold, Silver, Bronze).

Objective

The primary goal is to:

1. Analyze the dataset to understand trends in medal distribution.
2. Identify the top-performing countries and athletes.
3. Study the gender distribution of events and medals.
4. Visualize the data using Python.

Steps:

1. **Data Preparation**:
   - Import libraries.
   - Load the dataset.
   - Clean the dataset (handling missing values, if any).
2. **Exploratory Data Analysis (EDA)**:
   - Summary statistics of the dataset.
   - Plot and analyze trends of medals across years.
   - Identify the top-performing athletes and countries.
3. **Visualizing Key Insights**:
   - Visualize the distribution of medals by country, year, and sport.
   - Analyze gender distribution in different sports/events.
4. **Predictive Analysis**:
   - Train a machine learning model to predict whether an athlete will win a medal based on their country, sport, and other attributes.

Step-by-Step Code with Explanation

Step 1: Data Preparation

```
# Import necessary libraries
import pandas as pd
import numpy as np
```

```python
import matplotlib.pyplot as plt
import seaborn as sns

# Load the dataset (assume CSV format)
df = pd.read_csv('olympics_data.csv')

# Check the first few rows of the dataset
print(df.head())

# Summary of the dataset
print(df.info())
print(df.describe())
```

Step 2: Data Cleaning

Check for missing values and remove or impute them if necessary.

```python
# Check for missing values
print(df.isnull().sum())

# Drop rows with missing values if any
df_cleaned = df.dropna()

# After cleaning, check the dataset again
print(df_cleaned.info())
```

Step 3: Exploratory Data Analysis (EDA)

3.1 Total Medal Count by Country

```
# Total medals won by each country
medals_by_country =
df_cleaned.groupby('Country')['Medal'].count().sort_values(asce
nding=False)

# Plotting the top 10 countries by medals
plt.figure(figsize=(10, 6))
medals_by_country.head(10).plot(kind='bar', color='gold')
plt.title("Top 10 Countries by Medal Count")
plt.xlabel("Country")
plt.ylabel("Total Medals")
plt.show()
```

3.2 Medals Won Over the Years

```
# Grouping by Year and counting the medals won
medals_over_years = df_cleaned.groupby('Year')['Medal'].count()

# Plotting the trend of medals won over the years
plt.figure(figsize=(10, 6))
plt.plot(medals_over_years.index,     medals_over_years.values,
```

```
marker='o', linestyle='-', color='b')
plt.title("Total Medals Won Over the Years")
plt.xlabel("Year")
plt.ylabel("Total Medals")
plt.grid(True)
plt.show()
```

3.3 Gender Distribution in Events

```
# Gender distribution in events
gender_distribution = df_cleaned['Gender'].value_counts()

# Plotting gender distribution
plt.figure(figsize=(6, 4))
gender_distribution.plot(kind='pie',          autopct='%1.1f%%',
colors=['#ff9999','#66b3ff'], explode=[0.05, 0])
plt.title("Gender Distribution in Olympics Events")
plt.ylabel('')
plt.show()
```

3.4 Top Athletes with Most Medals

```
# Group by Athlete and count the number of medals
athlete_medal_count                                              =
df_cleaned.groupby('Athlete')['Medal'].count().sort_values(asce
```

```
nding=False)


# Plotting the top 10 athletes with most medals
plt.figure(figsize=(10, 6))
athlete_medal_count.head(10).plot(kind='bar', color='silver')
plt.title("Top 10 Athletes by Medal Count")
plt.xlabel("Athlete")
plt.ylabel("Total Medals")
plt.show()
```

Step 4: Predictive Analysis (Machine Learning)

We will build a simple logistic regression model to predict whether an athlete will win a medal based on their country, sport, and other attributes.

4.1 Preprocessing for Machine Learning

```
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, confusion_matrix,
classification_report


# Encode categorical variables using LabelEncoder
le = LabelEncoder()
df_cleaned['Country_Code'] =
```

```
le.fit_transform(df_cleaned['Country_Code'])
df_cleaned['Sport'] = le.fit_transform(df_cleaned['Sport'])
df_cleaned['Gender'] = le.fit_transform(df_cleaned['Gender'])
df_cleaned['Event_gender'] =
le.fit_transform(df_cleaned['Event_gender'])
df_cleaned['Medal'] = df_cleaned['Medal'].map({'Gold': 1,
'Silver': 1, 'Bronze': 1, np.nan: 0})

# Features and target
X = df_cleaned[['Country_Code', 'Sport', 'Gender',
'Event_gender']]
y = df_cleaned['Medal']

# Split the dataset into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y,
test_size=0.3, random_state=42)

# Initialize and train a logistic regression model
model = LogisticRegression()
model.fit(X_train, y_train)

# Predict on the test data
y_pred = model.predict(X_test)

# Model evaluation
```

```
print("Accuracy Score:", accuracy_score(y_test, y_pred))
print("Confusion Matrix:\n", confusion_matrix(y_test, y_pred))
print("Classification Report:\n", classification_report(y_test,
y_pred))
```

Step 5: Conclusion and Insights

- **Top Performing Countries**: We identified which countries won the most medals.
- **Top Athletes**: We identified athletes who won the most medals.
- **Gender Participation**: The gender distribution in different sports events was explored.
- **Trend of Medals Over Years**: We visualized the trend of medal wins over the years.

The **logistic regression model** allowed us to predict whether an athlete would win a medal based on various attributes like country, sport, and gender.

This project can be extended by adding more sophisticated machine learning models (like decision trees or random forests), and further fine-tuning the models by including more features.

NOTE :

1. this project is only for your guidance, not exactly the same you have to create. Here I am trying to show the way or idea of what steps you can follow and how

your projects look. Some projects are very advanced (because it will be made with the help of flask, nlp, advance ai, advance DL and some advanced things) which you can not understand .

2. You can make or analyze your project with yourself, with your idea, make it more creative from where we can get some information and understand about our business. make sure what overall things you have created all things you understand very well.

Example: You can get the basic idea how you can create a project from here

Sample code and output

```
import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g.
pd.read_csv)
import matplotlib.pyplot as plt
pd.options.display.max_rows = 4000
pd.options.display.max_columns= None
# Input data files are available in the read-only "../input/"
directory
# For example, running this (by clicking run or pressing
Shift+Enter) will list all files under the input directory

import os
```

```
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# You can write up to 20GB to the current directory (/kaggle/working/) that gets preserved as output when you create a version using "Save & Run All"
# You can also write temporary files to /kaggle/temp/, but they won't be saved outside of the current session
```

```
/kaggle/input/summer-olympics-medals/Summer-Olympic-medals-1976-to-2008.csv
```

Lets start with loading the dataset and print few rows.

In [2]:

```
data = pd.read_csv('/kaggle/input/summer-olympics-medals/Summer-Olympic-medals-1976-to-2008.csv', encoding = 'latin1')
data.head()
```

Out[2]:

	City	Year	Sport	Discipline	Event	Athlete	Gender	Country_Code	Country	Event_gender	Medal
0	Montreal	1976.0	Aquatics	Diving	3m springboard	KÖHLER, Christa	Women	GDR	East Germany	W	Silver
1	Montreal	1976.0	Aquatics	Diving	3m springboard	KOSENKOV, Aleksandr	Men	URS	Soviet Union	M	Bronze
2	Montreal	1976.0	Aquatics	Diving	3m springboard	BOGGS, Philip George	Men	USA	United States	M	Gold
3	Montreal	1976.	Aquatics	Diving	3m spring	CAGNOTTO, Giorgio	Men	ITA	Italy	M	Silver

		0			board	Franco					
4	Montreal	1976.0	Aquatics	Diving	10m platform	WILSON, Deborah Keplar	Women	USA	United States	W	Bronze

Lets first see if we can drop any column or not. See that, Gender and Event_gender. Lets see if these two actaully hold value or just duplicates.

We will do that first by looking at unique values.

In [3]:

```
print(data.Gender.unique())
print(data.Event_gender.unique())
```

```
['Women' 'Men' nan]
['W' 'M' 'X' nan]
```

Okay, we have an 'X' category for event gender. But since it is not an impacting factor neither there is not much to analyse, we can safe drop off 'Event_gender' column.

Also the Country code is of no much use since we have Country column.

Also the Year has to be in proper data type i.e., int. W

In [4]:

```
data= data.drop('Event_gender', axis  = 1)
data= data.drop('Country_Code', axis  = 1)
data.head()
```

Out[4]:

	City	Year	Sport	Discipline	Event	Athlete	Gender	Country	Medal
0	Montreal	1976.0	Aquatics	Diving	3m springboard	KÖHLER, Christa	Women	East Germany	Silver
1	Montreal	1976.0	Aquatics	Diving	3m springboard	KOSENKOV, Aleksandr	Men	Soviet Union	Bronze
2	Mont	197	Aqu	Divin	3m springbo	BOGGS, Philip	Men	United	Gol

	real	6.0	atics	g	ard	George		States	d
3	Mont real	197 6.0	Aqu atics	Divin g	3m springbo ard	CAGNOTTO, Giorgio Franco	Men	Italy	Silv er
4	Mont real	197 6.0	Aqu atics	Divin g	10m platform	WILSON, Deborah Keplar	Wo men	United States	Bro nze

Lets find null values and try to deal with them. Also, lets fix the data type of the columns.

In [5]:

```
print(data.isnull().sum())
data = data.dropna(how = 'all')
print(data.isnull().sum())
data = data.astype({'Year':'int'})
data.head()
```

```
City          117
Year          117
Sport         117
Discipline    117
Event         117
```

```
Athlete       117
Gender        117
Country       117
Medal         117
dtype: int64
City          0
Year          0
Sport         0
Discipline    0
Event         0
Athlete       0
Gender        0
Country       0
Medal         0
dtype: int64
```

Out[5]:

	City	Year	Sport	Discipline	Event	Athlete	Gender	Country	Medal
0	Montreal	1976	Aquatics	Diving	3m springbo	KÖHLER, Christa	Women	East German	Silver

					ard			y	
1	Montreal	1976	Aquatics	Diving	3m springboard	KOSENKOV, Aleksandr	Men	Soviet Union	Bronze
2	Montreal	1976	Aquatics	Diving	3m springboard	BOGGS, Philip George	Men	United States	Gold
3	Montreal	1976	Aquatics	Diving	3m springboard	CAGNOTTO, Giorgio Franco	Men	Italy	Silver
4	Montreal	1976	Aquatics	Diving	10m platform	WILSON, Deborah Keplar	Women	United States	Bronze

Q1. Which city hosted maximum number of olympics

Logic : Focus on City and Year. Get unique Year. Print the data.

In [6]:

```
q1_data = data[["City", 'Year']]
q1_data = q1_data.drop_duplicates('Year')
```

```
q1_data
```

Out[6]:

	City	Year
0	Montreal	1976
1422	Moscow	1980
2809	Los Angeles	1984
4268	Seoul	1988
581	Barcelo	19

4	na	92
7519	Atlanta	1996
9378	Sydney	2000
11393	Athens	2004
13391	Beijing	2008

Ans : So It seems like, since 1976 no city has hosteed Olympics twice.

Q2. Which city hosted most events.

logic: Focus on City.Find count of unique values.Print the count

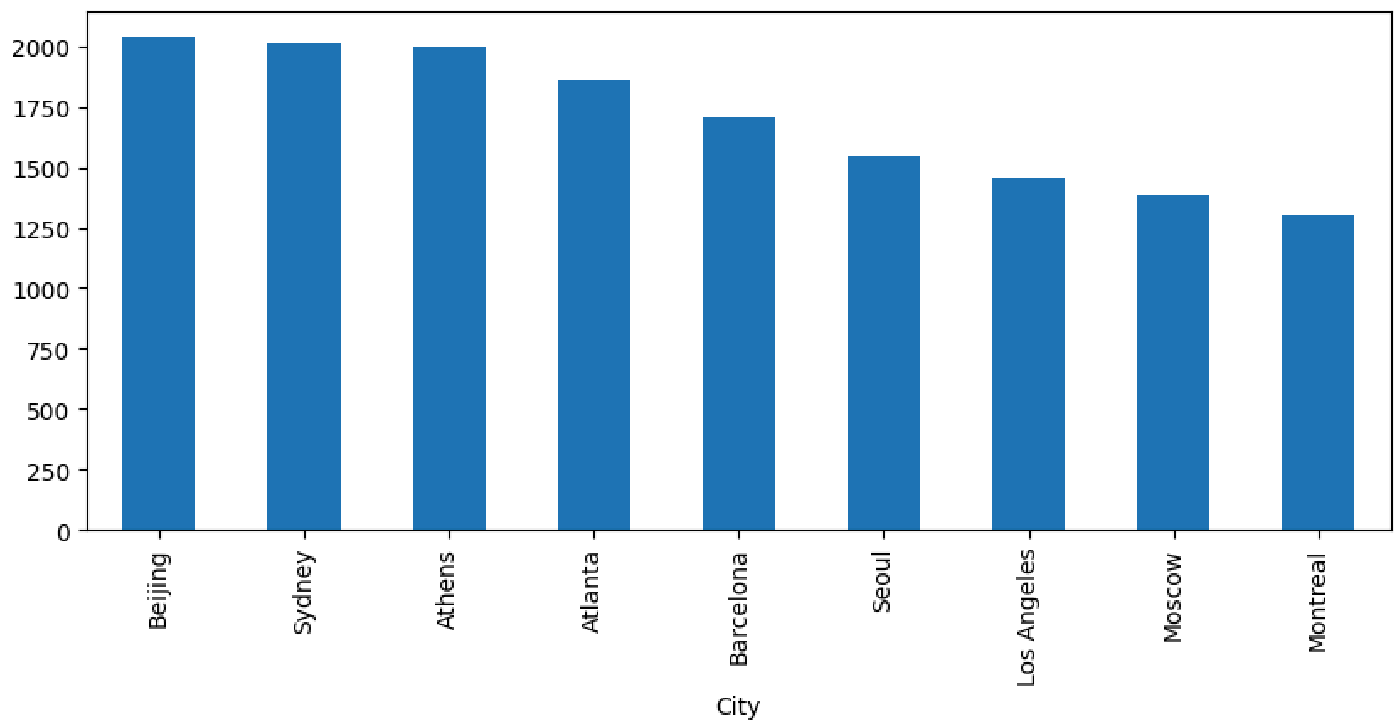
In [7]:

```
q2_data = data['City'].value_counts()
q2_data.columns = ['City', 'Count']
plt.figure(figsize = (10,4))
```

```python
q2_data.plot.bar(x = 'City', y = 'Count') # q2_data.plot(kind = 'bar', x= 'City', y = 'Count')
```

Out[7]:

```
<Axes: xlabel='City'>
```



Ans : Beijing has the hosted the biggest Olympics since 1976 till 2008. Followed by Sydney and Athens.

Q3. Understand the events themselves.

logic : Focus on Sport, Discipline and Event. Use groupby and see how many kinds and variations are there.

In [8]:

```
q3_data = data[['Sport', 'Discipline',
'Event']].drop_duplicates()
print("Total number of unique events are held so far are :
",len(q3_data))
q3_data
```

```
Total number of unique events are held so far are :  334
```

Out[8]:

	Sport	Discipline	Event
0	Aquatics	Diving	3m springboard
4	Aquatics	Diving	10m platform

12	Aquatics	Swimming	4x100m freestyle relay
13	Aquatics	Swimming	400m freestyle
15	Aquatics	Swimming	1500m freestyle
16	Aquatics	Swimming	400m individual medley
17	Aquatics	Swimming	4x100m medley relay
18	Aquatics	Swimming	800m freestyle
21	Aqua	Swim	200m

	tics	ming	backstroke
25	Aqua tics	Swim ming	200m freestyle
26	Aqua tics	Swim ming	100m butterfly
27	Aqua tics	Swim ming	100m backstroke
32	Aqua tics	Swim ming	4x200m freestyle relay
39	Aqua tics	Swim ming	200m breaststroke
46	Aqua tics	Swim ming	100m breaststroke

53	Aquatics	Swimming	200m butterfly
84	Aquatics	Swimming	100m freestyle
126	Aquatics	Water polo	water polo
159	Archery	Archery	individual FITA round
165	Athletics	Athletics	4x400m relay
166	Athletics	Athletics	4x100m relay
167	Athletics	Athletics	long jump

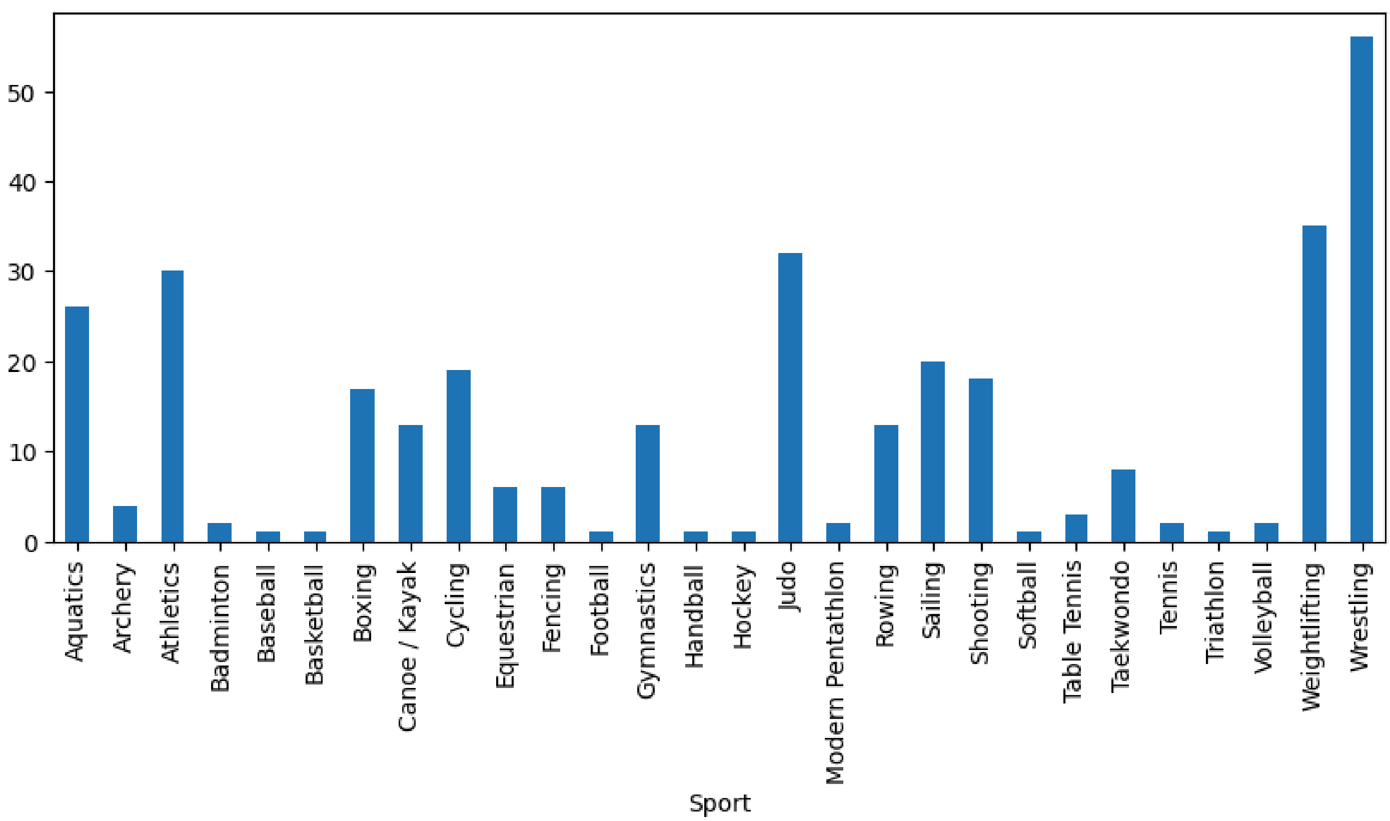
170	Athletics	Athletics	high jump
171	Athletics	Athletics	100m hurdles
172	Athletics	Athletics	400m
173	Athletics	Athletics	5000m
174	Athletics	Athletics	100m
176	Athletics	Athletics	pentathlon
178	Athletics	Athletics	200m

180	Athletics	Athletics	hammer throw
182	Athletics	Athletics	decathlon
184	Athletics	Athletics	800m
190	Athletics	Athletics	shot put
195	Athletics	Athletics	3000m steeplechase
196	Athletics	Athletics	1500m
198	Athletics	Athletics	

```
q3_data = q3_data.groupby(['Sport'])['Sport'].size()
plt.figure(figsize = (10,4))
q3_data.plot.bar(x = 'Sport', y = 'Count')
```

Out[9]:

```
<Axes: xlabel='Sport'>
```



Ans. Sports with most events are Wrestling, Weightlifting and Judo. Total number of unique events are held: 334

Q4. Which Athlete has win most medal from given period?

In [10]:

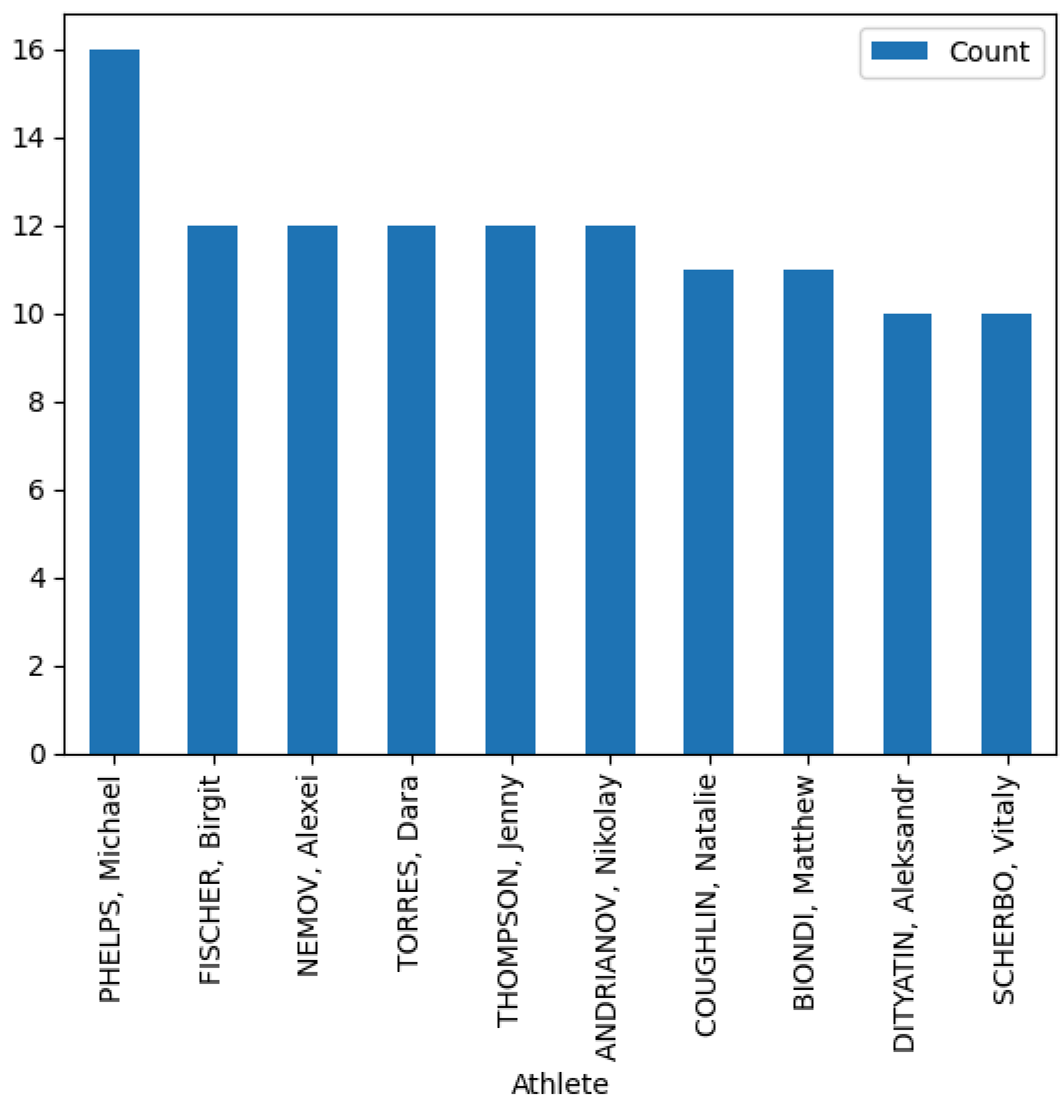
```
q4_data =
data.groupby(['Athlete'])['Athlete'].count().reset_index(name =
'Count').sort_values(ascending = False , by = ['Count'])
q4_data = q4_data[:10]
```

In [11]:

```
q4_data.plot.bar(x = 'Athlete', y = 'Count')
```

Out[11]:

```
<Axes: xlabel='Athlete'>
```



Ans. So Michael Phelps won 16 mdeal durin 1976 to 2008. Clearly mindblowing record !!

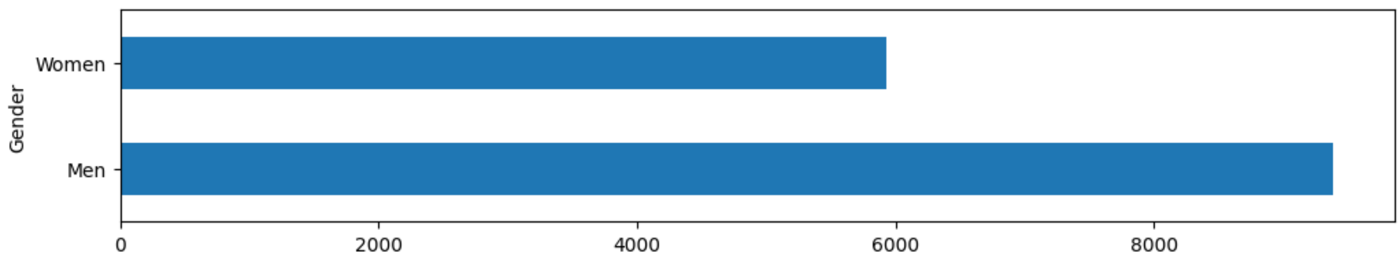
Q5. Put some light on gender ratio in winning teams?

In [12]:

```
q5_data = data.groupby(['Gender'])['Gender'].count()
plt.figure(figsize = (12,2))
q5_data.plot.barh(x = 'Athlete', y = 'Count')
```

Out[12]:

```
<Axes: ylabel='Gender'>
```



It seems that there are some events which are made only for male.

In [13]:

```
q5_data = data[['Event', 'Gender']]
q5_data = q5_data.groupby(['Event',
'Gender'])['Gender'].count()
q5_data
```

Out[13]:

```
Event                                  Gender
+ 100kg (heavyweight)                  Men          16
+ 100kg (super heavyweight)            Men          18
+ 105kg                                Men           9
+ 108kg, total (super heavyweight)     Men           3
+ 110kg, total (super heavyweight)     Men          15
```

+ 67 kg	Women	10
+ 72kg (heavyweight)	Women	8
+ 75kg	Women	9
+ 78kg (heavyweight)	Women	12
+ 80 kg	Men	10
+ 81kg (heavyweight)	Men	8
+ 91kg (super heavyweight)	Men	28
+ 93kg (heavyweight)	Men	4
+ 95kg (heavyweight)	Men	16
- 48 kg	Women	8
- 48kg	Women	7
- 48kg (extra-lightweight)	Women	12
- 48kg (light-flyweight)	Men	64
- 49 kg	Women	10
- 52kg, total (flyweight)	Men	15
- 54kg, total (flyweight)	Men	3
- 55kg	Men	14
- 56kg, total (bantamweight)		

Ans. So there is a huge difference in number of male winners and female winners implying number of sporting event for male are way more than for female¶

(This bust the myth of someone like me who thought that every sport has both male and female version. But thats not true. Some are reserved for male and some are for female at various year.)

Q6. Which country has win most medal and how many in each year?

In [14]:

```
q6_data = data[['Year', 'Country', 'Medal']]
q6_data = q6_data.groupby(['Year', 'Country',
'Medal'])['Country'].count().reset_index(name = 'Count')
q6_data['Medal'] = pd.Categorical(q6_data['Medal'],
categories=['Gold', 'Silver', 'Bronze'], ordered=True)
q6_data = q6_data.sort_values(ascending  = [True, True, True],
by = ['Year', 'Country','Medal'])
q6_data = q6_data.pivot( index = ['Year','Country'], columns =
['Medal'], values = ['Count']).reset_index()
q6_data = q6_data.replace(np.nan, 0)
q6_data['Sum'] = q6_data['Count', 'Bronze'] +
q6_data['Count','Gold'] + q6_data['Count','Silver']
q6_data = q6_data.sort_values(ascending  = [True, False],by =
['Year','Sum'])
q6_data.columns  = q6_data.columns.droplevel(0)
q6_data.columns = ['Year', 'Country', 'Gold', 'Silver',
'Bronze', 'Sum']
print(q6_data.Country.unique())
q6_data
```

```
['Soviet Union' 'East Germany' 'United States' 'West Germany'
'Poland'
 'Hungary' 'Romania' 'Japan' 'Bulgaria' 'United Kingdom'
'Italy'
 'New Zealand' 'Australia' 'Cuba' 'Canada' 'France'
'Yugoslavia'
 'Korea, South' 'Pakistan' 'Czechoslovakia' 'Netherlands'
'Sweden'
 'Switzerland' 'Belgium' 'Denmark' 'Finland' 'Norway' 'Spain'
'Brazil'
 'Iran' 'Jamaica' 'Korea, North' 'Mexico' 'Portugal' 'Austria'
'Bermuda*'
 'Mongolia' 'Puerto Rico*' 'Thailand' 'Trinidad and Tobago'
'Venezuela'
 'India' 'Zimbabwe' 'Greece' 'Ethiopia' 'Ireland' 'Tanzania'
'Guyana'
 'Lebanon' 'Uganda' 'China' 'Nigeria' 'Kenya' 'Turkey'
'Algeria' 'Morocco'
 'Cameroon' 'Colombia' "Cote d'Ivoire" 'Dominican Republic'
'Egypt'
 'Iceland' 'Peru' 'Syria' 'Taiwan' 'Zambia' 'Argentina'
'Indonesia'
 'Chile' 'Costa Rica' 'Djibouti' 'Netherlands Antilles*'
```

```
'Philippines'
 'Senegal' 'Suriname' 'Virgin Islands*' 'Unified team'
'Germany' 'Croatia'
 'Ghana' 'Lithuania' 'Slovenia' 'Estonia'
 'Independent Olympic Participants (1992)' 'Latvia' 'South
Africa'
 'Israel' 'Malaysia' 'Namibia' 'Bahamas' 'Qatar' 'Russia'
'Ukraine'
 'Belarus' 'Czech Republic' 'Kazakhstan' 'Moldova' 'Slovakia'
'Armenia'
 'Georgia' 'Uzbekistan' 'Azerbaijan' 'Burundi' 'Ecuador' 'Hong
Kong*'
 'Mozambique' 'Tonga' 'Tunisia' 'Saudi Arabia' 'Barbados'
'Kuwait'
 'Kyrgyzstan' 'Macedonia' 'Sri Lanka' 'Uruguay' 'Vietnam'
'Paraguay'
 'Serbia' 'Eritrea' 'United Arab Emirates' 'Singapore'
'Tajikistan'
 'Afghanistan' 'Mauritius' 'Panama' 'Sudan' 'Togo']
```

Out[14]:

	Ye	Country	Gol	Silv	Bro	Su

	ar		d	er	nze	m
30	1976	Soviet Union	113.0	93.0	79.0	285.0
10	1976	East Germany	99.0	51.0	42.0	192.0
37	1976	United States	63.0	56.0	36.0	155.0
39	1976	West Germany	21.0	24.0	30.0	75.0
26	1976	Poland	18.0	29.0	26.0	73.0
13	1976	Hungary	14.0	6.0	35.0	55.0

29	1976	Romania	4.0	28.0	23.0	55.0
17	1976	Japan	25.0	6.0	10.0	41.0
5	1976	Bulgaria	8.0	13.0	18.0	39.0
36	1976	United Kingdom	6.0	15.0	11.0	32.0
15	1976	Italy	2.0	25.0	4.0	31.0
23	1976	New Zealand	17.0	1.0	9.0	27.0
0	1976	Australia	0.0	16.0	8.0	24.0

7	1976	Cuba	6.0	4.0	14.0	24.0
6	1976	Canada	0.0	8.0	12.0	20.0
12	1976	France	5.0	7.0	8.0	20.0
40	1976	Yugoslavia	2.0	14.0	3.0	19.0
19	1976	Korea, South	1.0	1.0	15.0	17.0
25	1976	Pakistan	0.0	0.0	16.0	16.0
8	1976	Czechoslovakia	2.0	4.0	9.0	15.0

22	1976	Netherlands	0.0	2.0	13.0	15.0
32	1976	Sweden	9.0	1.0	0.0	10.0
33	1976	Switzerland	1.0	3.0	6.0	10.0
2	1976	Belgium	0.0	3.0	6.0	9.0
9	1976	Denmark	3.0	0.0	5.0	8.0
11	1976	Finland	4.0	2.0	0.0	6.0
24	1976	Norway	2.0	4.0	0.0	6.0

31	1976	Spain	0.0	6.0	0.0	6.0
4	1976	Brazil	0.0	0.0	3.0	3.0
14	1976	Iran	0.0	1.0	1.0	2.0
16	1976	Jamaica	1.0	1.0	0.0	2.0
18	1976	Korea, North	1.0	1.0	0.0	2.0
20	1976	Mexico	1.0	0.0	1.0	2.0
27	1976	Portugal	0.0	2.0	0.0	2.0

1	1976	Austria	

Ans. So I created an interactive solution here. Input the country name from above list. And check its performance over year.¶

Note : This may not resemble actual table tally because for eg., a gold in hockey is just one gold in table but here it is 16 gold because sixteen people got it. So it is more like how many people got a medal instead of how many gold medal a country got.

Q7. Can you tell me which country has dominated any particular sport?

In [16]:

```
q7_data = data.groupby(['Sport',
'Country'])['Country'].count().reset_index(name =
'Count').sort_values(ascending = [True, False],by =
['Sport','Count'])
q7_data.Sport.unique()
```

Out[16]:

```
array(['Aquatics', 'Archery', 'Athletics', 'Badminton',
'Baseball',
```

```
       'Basketball', 'Boxing', 'Canoe / Kayak', 'Cycling',
'Equestrian',
       'Fencing', 'Football', 'Gymnastics', 'Handball',
'Hockey', 'Judo',
       'Modern Pentathlon', 'Rowing', 'Sailing', 'Shooting',
'Softball',
       'Table Tennis', 'Taekwondo', 'Tennis', 'Triathlon',
'Volleyball',

       'Weightlifting', 'Wrestling'], dtype=object)
```

In [17]:

```
inp = 'Archery'
try:
    inp = input("Select a Sport from above list")
except:
    print("Input is interrupted")
temp = q7_data[q7_data['Sport'] == inp].head(3)
print(temp)
```

```
Input is interrupted
      Sport        Country  Count
56  Archery   Korea, South     52
67  Archery  United States     19
49  Archery          China     15
```

Ans. So Here we have an interactive way to see which country has dominated which sport. For e.g., Netherland and Australia dominated Hockey in the given period.

Note : This may not resemble actual table tally because for eg., a gold in hockey is just one gold in table but here it is 16 gold because sixteen people got it. So it is more like how many people got a medal instead of how many gold medal a country got.

Q8. Has any athlete changed his or her Event or Discipline or sport and still win the medal?

In [18]:

```
temp = data[['Athlete','Sport']].drop_duplicates()
temp = temp.groupby(['Athlete'])
for k,v in temp:
    if len(v['Sport'].tolist()) >1:
        print(k,v['Sport'].tolist())
```

```
('BELOVA, Irina',) ['Athletics', 'Gymnastics']
('CHEN, Jing',) ['Table Tennis', 'Volleyball']
('DIMITROV, Stefan',) ['Volleyball', 'Weightlifting']
('GAVRILOV, Yuri',) ['Football', 'Handball']
('GONZALEZ, Raul',) ['Athletics', 'Handball']
('KOLESNIKOV, Nikolai',) ['Athletics', 'Weightlifting']
('KOVACS, Istvan',) ['Wrestling', 'Boxing']
```

```
('KOVALENKO, Alexandre',) ['Athletics', 'Aquatics']
('KUZNETSOV, Mikhail',) ['Rowing', 'Canoe / Kayak']
('KUZNETSOV, Nikolai',) ['Rowing', 'Cycling']
('LEE, Eun Kyung',) ['Archery', 'Hockey']
('LI, Na',) ['Aquatics', 'Fencing']
('LI, Ting',) ['Aquatics', 'Tennis']
('OVCHINNIKOVA, Elena',) ['Volleyball', 'Aquatics']
('ROMERO, Rebecca',) ['Rowing', 'Cycling']
('THOMPSON, Richard',) ['Baseball', 'Athletics']
('TOMA, Sanda',) ['Rowing', 'Canoe / Kayak']
('WANG, Liping',) ['Football', 'Athletics']
('WELLS, Matthew',) ['Hockey', 'Rowing']
('YANG, Wei',) ['Badminton', 'Gymnastics']
('YOUNG, Tim',) ['Rowing', 'Baseball']
```

Ans. So there has been quite a few player who has changed the sport and still won a medal. Kudos to them !!

Note : Here two different person had same name. for eg., Yang Wei from Gymanstic and from Badminton are different player. From thr given data we cannot distinguish between them. So take it with a pinch of salt

Q9. (Follow up of Q6) Elaborate the result and dive into detials.(Pick any 5 country for this

In [19]:

```python
q9_data = q6_data[['Year', 'Country',
'Sum']].groupby(['Year']).apply(lambda x : x.nlargest(5,'Sum'))

q9_data = q9_data.pivot( index = ['Year'], columns =
['Country'], values = ['Sum']).reset_index()
q9_data.columns  = q9_data.columns.droplevel(0)
# q9_data.columns = ['Year', 'Country', 'Gold', 'Silver',
'Bronze', 'Sum']
q9_data = q9_data.rename(columns={ q9_data.columns[0]: "Year"
})
q9_data

# temp =
q6_data.where(q6_data.Country.isin(q9_data.columns)).dropna()[["
Year", "Country", "Sum"]]
# temp
```

Out[19]:

Country	Year	Australia	Bulgaria	Canada	China	Cuba	East German	Germany	Hungary	Italy	Korea,	Poland	Romania	Russia	Soviet	Unified	United S	West German	Yugoslavia

							y				South				Union	team	tates	y	
0	1976	NaN	NaN	NaN	NaN	NaN	192.0	NaN	NaN	NaN	NaN	73.0	NaN	NaN	285.0	NaN	155.0	75.0	NaN
1	1980	NaN	94.0	NaN	NaN	NaN	260.0	NaN	61.0	NaN	NaN	NaN	72.0	NaN	442.0	NaN	NaN	NaN	NaN
2	1984	NaN	NaN	86.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	106.0	NaN	NaN	NaN	333.0	157.0	87.0
3	19	Na	Na	Na	Na	Na	174.	Na	Na	Na	77.	Na	Na	Na	29	Na	19	113.	Na

	88	N	N	N	N	N	0	N	N	N	0	N	N	N	4.0	N	3.0	0	N
4	1992	NaN	NaN	NaN	83.0	71.0	NaN	198.0	NaN	NaN	NaN	NaN	NaN	NaN	NaN	223.0	224.0	NaN	NaN
5	1996	132.0	NaN	NaN	110.0	NaN	NaN	124.0	NaN	NaN	NaN	NaN	NaN	115.0	NaN	NaN	260.0	NaN	NaN
6	2000	183.0	NaN	NaN	79.0	NaN	NaN	119.0	NaN	NaN	NaN	NaN	NaN	188.0	NaN	NaN	248.0	NaN	NaN
7	200	157.0	NaN	NaN	NaN	NaN	NaN	149.0	NaN	102.	NaN	NaN	NaN	192.	NaN	NaN	264.	NaN	NaN

	4									0				0			0		
8	2008	149.0	NaN	NaN	1884.0	NaN	NaN	101.0	NaN	NaN	NaN	NaN	NaN	143.0	NaN	NaN	315.0	NaN	NaN

In [20]:

```
q9_data = q6_data[['Year', 'Country',
'Sum']].groupby(['Year']).apply(lambda x :
x.nlargest(5,'Sum'))['Country'].drop_duplicates()
temp =
q6_data.where(q6_data.Country.isin(q9_data)).dropna()[["Year",
"Country", "Sum"]]
temp = temp.pivot(index = ['Year'], columns = ['Country'],
values = ['Sum']).reset_index()
temp.columns = temp.columns.droplevel(0)
temp = temp.rename(columns={ temp.columns[0]: "Year" })
q9_data = temp.replace(np.nan, 0)
q9_data
```

Out[20]:

Country	Year	Australia	Bulgaria	Canada	China	Cuba	East Germany	Germany	Hungary	Italy	Korea, South	Poland	Romania	Russia	Soviet Union	Unified team	United States	West Germany	Yugoslavia
0	1976.0	24.0	39.0	20.0	0.0	24.0	192.0	0.0	55.0	31.0	17.0	73.0	55.0	0.0	285.0	0.0	155.0	75.0	19.0
1	1980.0	12.0	94.0	0.0	0.0	20.0	260.0	0.0	61.0	37.0	0.0	50.0	72.0	0.0	442.0	0.0	0.0	0.0	57.0

2	1984.0	50.0	0.0	86.0	76.0	0.0	0.0	0.0	0.0	63.0	42.0	0.0	106.0	0.0	0.0	0.0	333.0	157.0	87.0
3	1988.0	34.0	41.0	21.0	53.0	0.0	174.0	0.0	44.0	29.0	77.0	21.0	51.0	0.0	294.0	0.0	193.0	113.0	63.0
4	1992.0	57.0	17.0	44.0	83.0	71.0	0.0	198.0	45.0	46.0	49.0	42.0	53.0	0.0	0.0	223.0	224.0	0.0	0.0
5	1996.0	132.0	21.0	51.0	110.0	57.0	0.0	124.0	43.0	71.0	66.0	21.0	38.0	115.0	0.0	0.0	260.0	0.0	26.0

6	2000.0	183.0	13.0	31.0	79.0	69.0	0.0	119.0	53.0	65.0	73.0	24.0	46.0	188.0	0.0	0.0	248.0	0.0	26.0
7	2004.0	157.0	17.0	17.0	94.0	61.0	0.0	149.0	40.0	102.0	52.0	12.0	39.0	192.0	0.0	0.0	264.0	0.0	0.0
8	2008.0	149.0	5.0	34.0	184.0	47.0	0.0	101.0	27.0	42.0	78.0	20.0	22.0	143.0	0.0	0.0	315.0	0.0	0.0

So these are the top 5 countries in each olympic game. Lets Combine Soviet Union + Unified Team +Russia and East Germany + West Germany + Germany.

Also lets drop Yugoslavia, Poland, South Korea, Italy, Hungary, Cuba, Canada, Bulgaria as they are only shown up once in top 5.

In [21]:

```python
q9_data.Germany = q9_data.Germany + q9_data['East Germany'] + q9_data['West Germany']
q9_data.Russia = q9_data['Soviet Union'] + q9_data.Russia + q9_data['Unified team']
q9_data = q9_data.drop(['Yugoslavia','Poland','Korea, South','Italy','Hungary','Cuba','Canada','Bulgaria','East Germany', 'West Germany', 'Soviet Union', 'Unified team'], axis = 1)
q9_data =q9_data.set_index('Year')
q9_data
```

Out[21]:

Country	Australia	China	Germany	Romania	Russia	United States
Year						
1976.0	24.0	0.0	267.0	55.0	285.0	155.0

1980.0	12.0	0.0	260.0	72.0	442.0	0.0
1984.0	50.0	76.0	157.0	106.0	0.0	333.0
1988.0	34.0	53.0	287.0	51.0	294.0	193.0
1992.0	57.0	83.0	198.0	53.0	223.0	224.0
1996.0	132.0	110.0	124.0	38.0	115.0	260.0
2000.0	183.0	79.0	119.0	46.0	188.0	248.0
2004.0	157.0	94.0	149.0	39.0	192.0	264.0

2008.0	149.0	184.0	101.0	22.0	143.0	315.0

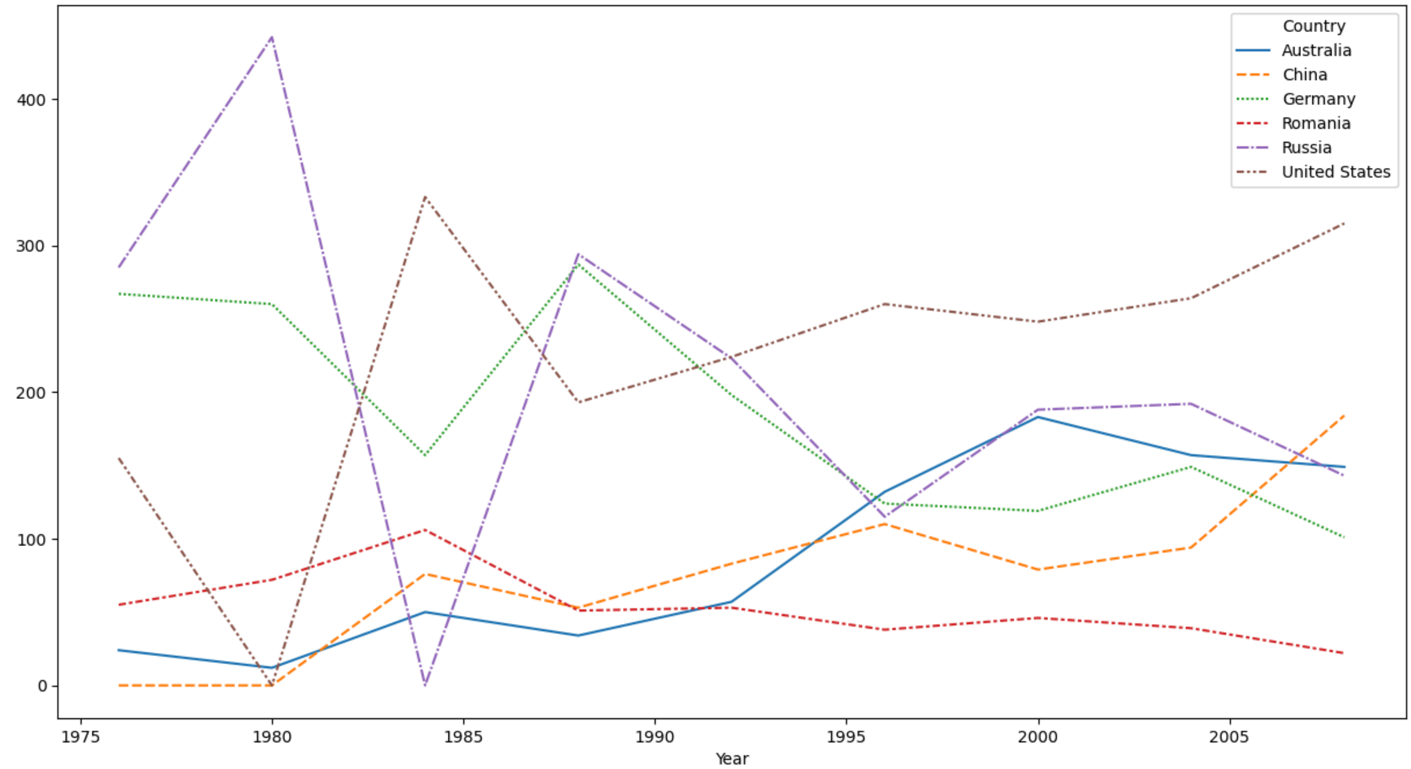
Lets plot line graph for this

In [22]:

```
# q9_data.plot(x = 'Year', y= q9_data.columns[1:])
import seaborn as sns
plt.figure(figsize=(15,8))
sns.lineplot(data = q9_data)
```

Out[22]:

```
<Axes: xlabel='Year'>
```



Ans. We can clearly see some pattern here.

- Soviet Union(Russia here) dominated Olypics with decline over time except 1982 where it boycotted entire olypics.
- US after boycotting 1980 olypics, rose up to be the dominating player here.
- Germany as a whole country inlcuding (west and east), saw continous decline over period of time.
- China and Australia has witnessed steady rise in their medal tally
- Romania has been same overpeiod with little decline.

Note: The number do not represent number of medal but the total people who won it. E.g., Winner in hockey gets one gold, but 16 people are given the medal. So here we are counting 16.

Any comments or suggestion or correction is most welcomed. Thank you very much.

The End.

Reference link