Introduction

As the world's attention converges on the grand stage of the ongoing Asian Games, I embark on an exploration into the historical narratives and contemporary athletic achievements of Asian nations.
The **Asian Games**, also known as the Asiad, is a multi-sport event held every four years, with athletes from countries across Asia participating. It is one of the largest and most prestigious sporting events in the world. In the realm of sports, the Asian Games stand as a testament to the athletic prowess and competitive spirit of nations across Asia. Delving into a comprehensive dataset spanning the Asian Games' history since ***1951***, I set out on a journey to uncover the dynamics of dominance in 28 athletic events. While the primary goal was to uncover which countries excel in each event, the data revealed a richer narrative — one that conveys the historical narratives of Asian countries.

Data Source

- Asian Games medal tally dataset:- https://www.kaggle.com/datasets/srikarkashyap/asiangamestop10
- Athletic Records:- https://www.kaggle.com/datasets/kavya2099/asian-games-athletics-winning-countries19512018

Plotly upgrade

In [ ]:
```
# %pip install --upgrade plotly
```

Import Statements

In [ ]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import plotly.express as px
import matplotlib.pyplot as plt
import plotly.io as pio
```

Notebook Presentation

In [ ]:
```
pd.options.display.float_format = '{:,.2f}'.format
```

Reading the data

In [ ]:
```
medal_tally_df = pd.read_csv("asiangamestop10.csv")
```

Data Exploration and Cleaning

In [ ]:
```
print(f"The shape of the medal_tally DataFrame is {medal_tally_df.shape}")
```

```
The shape of the medal_tally DataFrame is (444, 6)
```

In [ ]:
```
medal_tally_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 444 entries, 0 to 443
Data columns (total 6 columns):
 #   Column  Non-Null Count  Dtype 
---  ------  --------------  ----- 
 0   Year    444 non-null    int64 
 1   NOC     444 non-null    object
 2   Gold    444 non-null    int64 
 3   Silver  444 non-null    int64 
 4   Bronze  444 non-null    int64 
 5   Total   444 non-null    int64 
dtypes: int64(5), object(1)
memory usage: 20.9+ KB
```

Columns in the DataFrame

In [ ]:
```
medal_tally_df.columns
```

Out[ ]:
```
Index(['Year', 'NOC', 'Gold', 'Silver', 'Bronze', 'Total'], dtype='object')
```

In [ ]:
```
print(f"The First Asian Games were held in {medal_tally_df.Year.min()}.")
```

```
The First Asian Games were held in 1951.
```

In [ ]:
```
print(f"The latest data regarding Asian Games in the dataset is of {medal_tally_df.Year
```

```
The latest data regarding Asian Games in the dataset is of 2018.
```

Checking Duplicates

In [ ]:
```
medal_tally_df[medal_tally_df.duplicated()].values.any()
```

Out[ ]:
```
False
```

There is no duplicated row in the dataframe.

Checking NaN Values

In [ ]:
```
medal_tally_df.isna().values.any()
```

Out[ ]:
```
False
```

There is no NaN values in the dataframe.

In [ ]:
```
medal_tally_df.head(10)
```

Out[ ]:

	Year	NOC	Gold	Silver	Bronze	Total
0	1951	Japan (JPN)	24	21	15	60
1	1951	India (IND)	15	16	20	51
2	1951	Iran (IRI)	8	6	2	16
3	1951	Singapore (SGP)	5	7	2	14
4	1951	Philippines (PHI)	5	6	8	19
5	1951	Ceylon (CEY)	0	1	0	1
6	1951	Indonesia (INA)	0	0	5	5
7	1951	Burma (BIR)	0	0	3	3
8	1954	Japan (JPN)	38	36	24	98
9	1954	Philippines (PHI)	14	14	17	45

Here, we can see all the first 20 records of the dataframe.

Medal Counts year by year

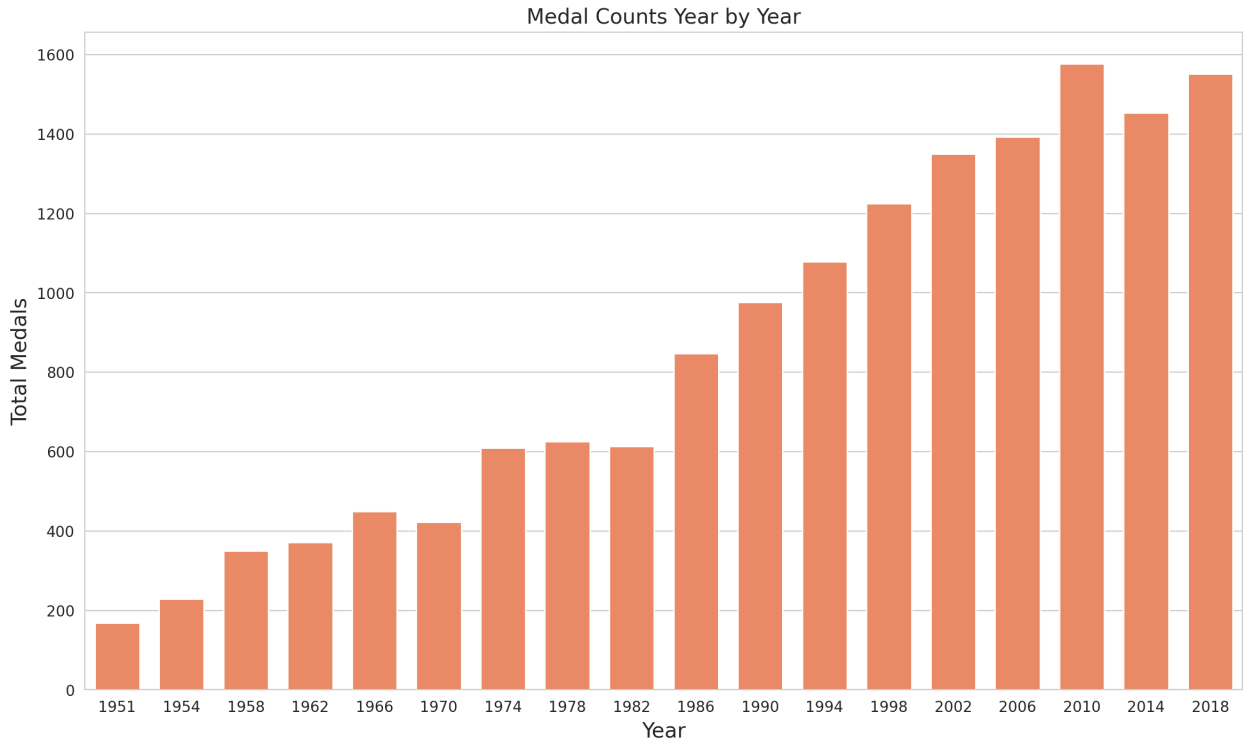
In [ ]:
```
medal_count_data = medal_tally_df.groupby("Year", as_index=False).agg({'Total': pd.Seri
medal_count_data
```

Out[ ]:

	Year	Total
0	1951	169
1	1954	229
2	1958	350
3	1962	372
4	1966	450
5	1970	423
6	1974	609
7	1978	626
8	1982	614
9	1986	848
10	1990	976
11	1994	1079
12	1998	1225
13	2002	1350
14	2006	1393
15	2010	1577
16	2014	1454
17	2018	1551

In [ ]:

```
plt.figure(figsize=(14, 8), dpi=200)
with sns.axes_style("whitegrid"):
  sns.barplot(medal_count_data,
           x="Year",
           y="Total",
           color='#FF7F50',
           width=0.7)

plt.xlabel("Year", fontsize=14)
plt.ylabel("Total Medals", fontsize=14)

plt.title("Medal Counts Year by Year", fontsize=14)
plt.show()
```



We can see the medal count increased year by year. The increase can be due to many reasons, such as an increase in participation, the introduction of new game events, and new rules regarding medal distribution.

Countries

Let's get to know the participation of countries in the Asian Games.

Countries participating in the Asian Games by year

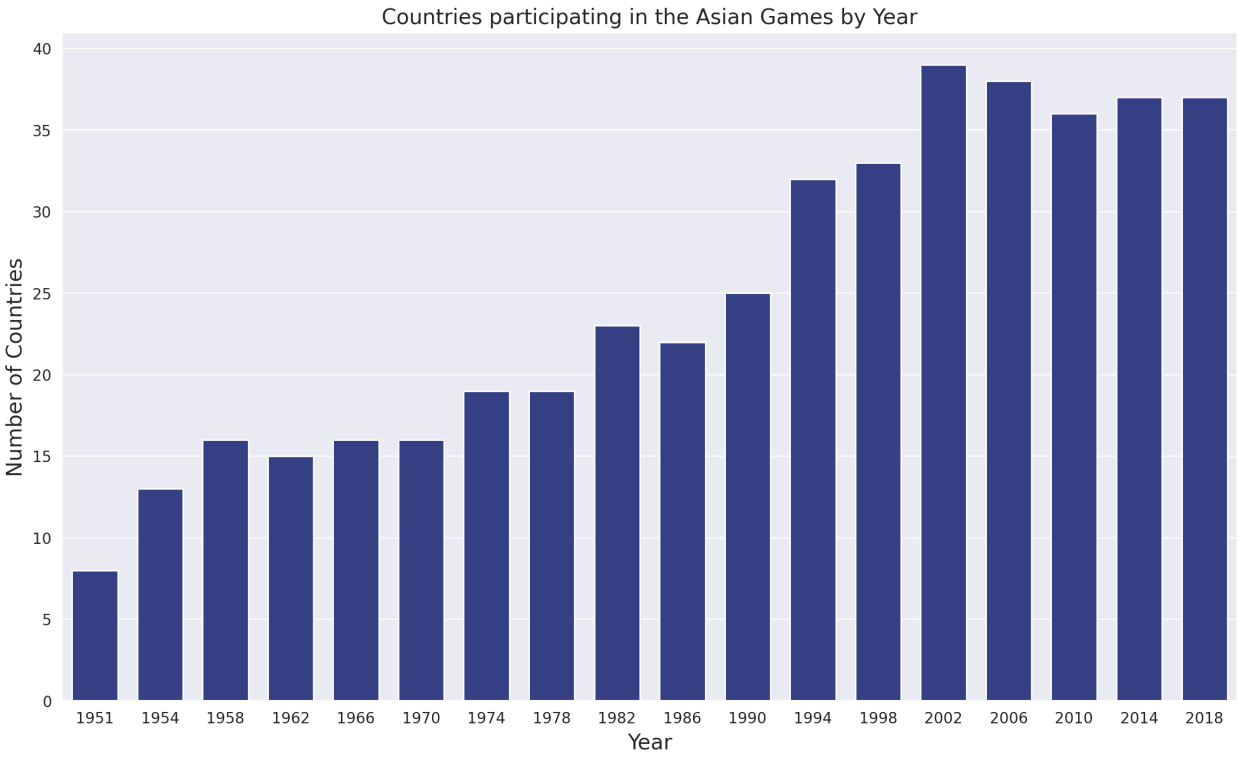
In [ ]:
```
no_countries = medal_tally_df.groupby("Year", as_index=False).agg({"NOC": pd.Series.cou
no_countries
```

Out[ ]:

	Year	NOC
0	1951	8
1	1954	13
2	1958	16
3	1962	15
4	1966	16
5	1970	16
6	1974	19
7	1978	19
8	1982	23
9	1986	22
10	1990	25
11	1994	32
12	1998	33
13	2002	39
14	2006	38
15	2010	36
16	2014	37
17	2018	37

In [ ]:

```
plt.figure(figsize=(14, 8), dpi=200)
with sns.axes_style("darkgrid"):
  sns.barplot(no_countries,
              x="Year",
              y="NOC",
              color="#283791",
              width=0.7)

plt.xlabel("Year", fontsize=14)
plt.ylabel("Number of Countries", fontsize=14)

plt.title("Countries participating in the Asian Games by Year", fontsize=14)
plt.show()
```



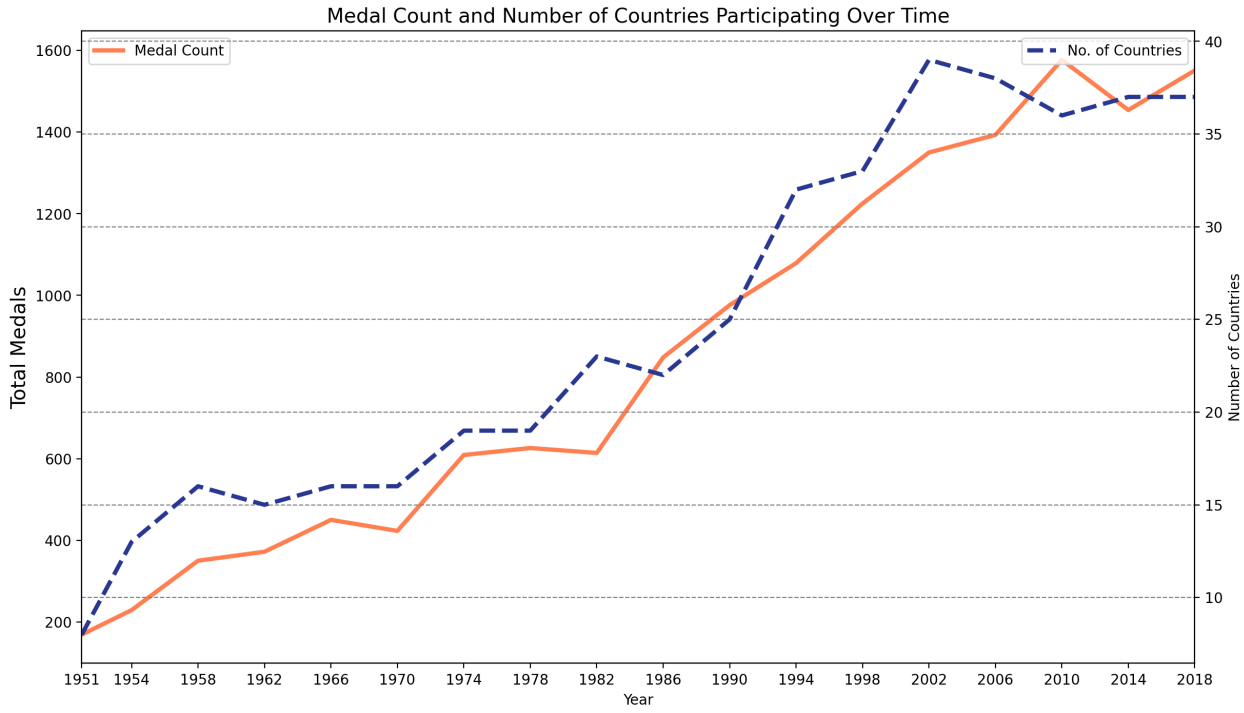
We can analyze with this bar chart of an increase in participation over the years. The increase can be due to the following reasons:-

- Globalization
- Nationalism
- Development of Sports infrastructure over the years

Relationship between Medal Count Increase and Number of Countries Participating in Asian Games (Year by Year)

In [ ]:
```
years = np.insert(np.arange(1954, 2019, step=4), 0, 1951)
plt.figure(figsize=(14, 8), dpi=200)

ax1 = plt.gca()
ax2 = ax1.twinx()

plt.grid(color="grey", linestyle="--")

sns.lineplot(medal_count_data,
             x="Year",
             y="Total",
             color='#FF7F50',
             linewidth=3,
             ax=ax1,
             label="Medal Count")
sns.lineplot(no_countries,
             x="Year",
             y="NOC",
             color='#283791',
             linestyle="--",
             linewidth=3,
             ax=ax2,
             label='No. of Countries')

plt.xlabel("Year", fontsize=14)
ax1.set_ylabel("Total Medals", fontsize=14)
```

```
ax2.set_ylabel("Number of Countries")
plt.xticks(years)
plt.xlim(medal_count_data["Year"].min(), medal_count_data["Year"].max())
plt.title("Medal Count and Number of Countries Participating Over Time", fontsize=14)
plt.legend()
plt.show()
```



The increase in medal count appears to be positively correlated with the increase in the number of participating countries. However, it's important to note that this relationship may be influenced by additional factors such as the introduction of new events due to the development of sports infrastructure, government supports and many more.

Countries with Name Changes, Politics, Reunification, and Suspension: Historical Transitions

Beyond the Glory, By analyzing the medal tally, we can identify countries that have undergone name changes, mergers, or suspensions over the years.
What 😐 Medal tally is informing us about the history of Asian Countries.
Yes! Asian Games Medal Tally unveils the past that tells about the political dynamics.

In [ ]:
```
medal_tally_df.groupby("NOC", as_index=False).count()["NOC"]
```

Out[ ]:
```
0              Afghanistan (AFG)
1     Athletes from Kuwait (IOC)
2                 Bahrain (BRN)
3              Bangladesh (BAN)
4                  Brunei (BRU)
5                   Burma (BIR)
6                Cambodia (CAM)
7                  Ceylon (CEY)
8                   China (CHN)
9           Chinese Taipei (TPE)
10              Hong Kong (HKG)
11                  India (IND)
12              Indonesia (INA)
13                   Iran (IRI)
14                   Iraq (IRQ)
15                 Israel (ISR)
16                  Japan (JPN)
17                 Jordan (JOR)
18              Kazakhstan (KAZ)
19          Khmer Republic (KHM)
20                  Korea (COR)
21                 Kuwait (KUW)
22              Kyrgyzstan (KGZ)
23                    Laos (LAO)
24                Lebanon (LBN)
25                  Macau (MAC)
26                 Malaya (MAL)
27               Malaysia (MAS)
28               Mongolia (MGL)
29                Myanmar (MYA)
30                  Nepal (NEP)
31             North Korea (PRK)
32                   Oman (OMA)
33                Pakistan (PAK)
34               Palestine (PLE)
35             Philippines (PHI)
36                   Qatar (QAT)
37       Republic of China (ROC)
38             Saudi Arabia (KSA)
39                Singapore (SGP)
40              South Korea (KOR)
41            South Vietnam (VNM)
42                Sri Lanka (SRI)
43                   Syria (SYR)
44               Tajikistan (TJK)
45                 Thailand (THA)
46             Turkmenistan (TKM)
47    United Arab Emirates (UAE)
48              Uzbekistan (UZB)
49                 Vietnam (VIE)
50                   Yemen (YEM)
Name: NOC, dtype: object
```

Name Change:-

- In the year 1989, The military government of Burma, which ruled the country at that time, announced the change in the English name of the country from "Burma" to "Myanmar".
- Cambodia was known as the Khmer Republic for a period in its history.

Politics:-

- In 1971, Due, to political issues, Taiwan(Republic of China) was prohibited from using or displaying any of its national symbols such as national name, anthem and flag. Therefore, "Chinese Taipei" term is used by the Republic of China (ROC) to participate in international organizations and events where the People's Republic of China (PRC) insists on its "One China" policy.

Separation:-

- Malaya was a region in Southeast Asia. This region was a British colony and later, It became part of the modern country of Malaysia. Singapore was part of Malaysia for a brief period but separated from Malaysia in 1965 to become an independent and sovereign nation.

Reunification:-

- South Vietnam existed as a separate political entity from 1955 to 1975. In 1975, it was reunified with North Vietnam, resulting in the formation of the modern-day Vietnam.

Suspension:-

- In 2010, Kuwait was suspended from participating in the 16th Asian Games, which were held in Guangzhou, China. As a result of the suspension, Kuwaiti athletes were not able to compete under their country's flag and named under "Athletes from Kuwait".

Top 15 countries at Asian Games

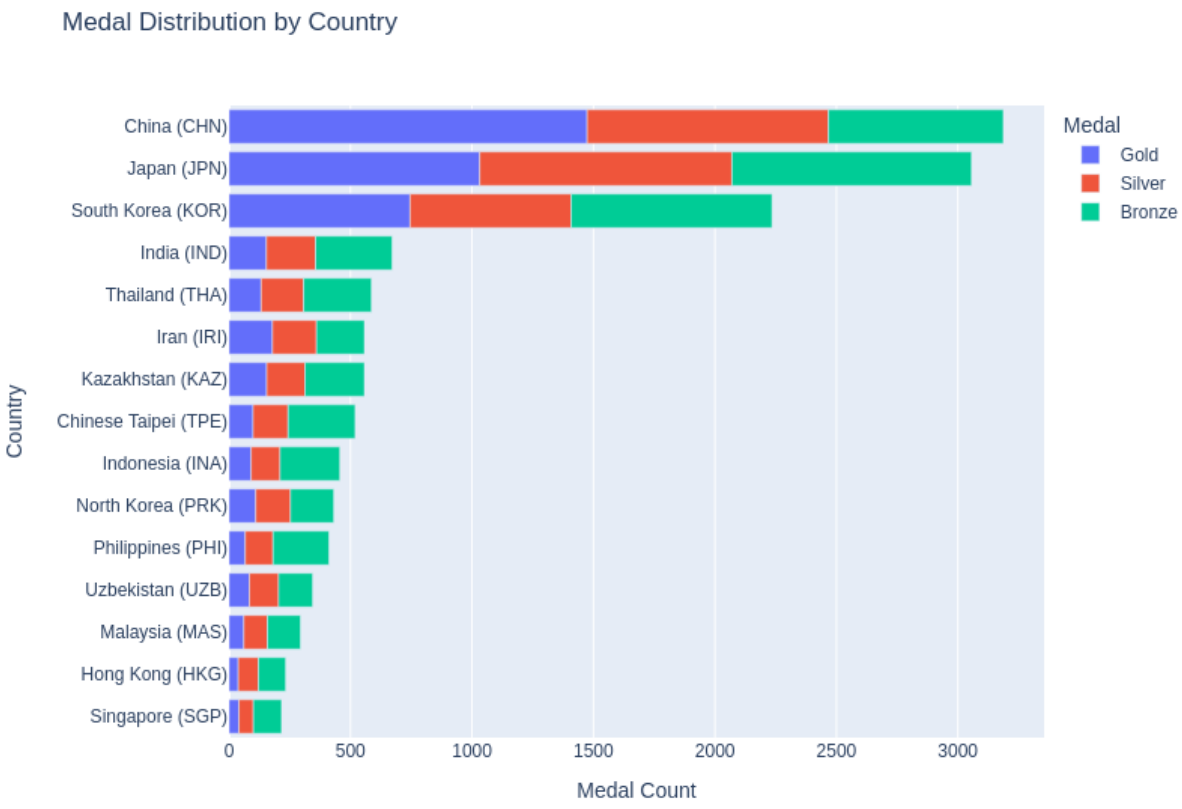
In [ ]:
```
old_one = ["Burma (BIR)", "Khmer Republic (KHM)", "South Vietnam (VNM)", "Athletes from
new_one = ["Myanmar (MYA)", "Cambodia (CAM)", "Vietnam (VIE)", "Kuwait (KUW)", "Chinese
for i in range(len(old_one)):
  medal_tally_df.loc[medal_tally_df["NOC"] == old_one[i], "NOC"] = new_one[i]

countries = medal_tally_df.groupby("NOC", as_index=False).agg({"Gold": pd.Series.sum, '
countries.sort_values('Total', inplace=True)
top15_countries = countries[-15:]
top15_countries
```

Out[ ]:

	NOC	Gold	Silver	Bronze	Total
35	Singapore (SGP)	41	59	116	216
8	Hong Kong (HKG)	38	83	112	233
24	Malaysia (MAS)	61	97	136	294
43	Uzbekistan (UZB)	84	120	140	344
32	Philippines (PHI)	67	114	230	411
28	North Korea (PRK)	110	143	178	431
10	Indonesia (INA)	91	119	246	456
7	Chinese Taipei (TPE)	99	144	276	519
16	Kazakhstan (KAZ)	155	158	244	557
11	Iran (IRI)	179	181	197	557
40	Thailand (THA)	132	175	279	586
9	India (IND)	154	202	315	671
36	South Korea (KOR)	745	663	827	2235
14	Japan (JPN)	1032	1038	986	3056
6	China (CHN)	1474	993	720	3187

In [ ]:
```
country_perf_df = pd.melt(top15_countries, id_vars=['NOC', 'Total'], var_name='Medal',
medal_order = ['Gold', 'Silver', 'Bronze']
country_perf_df['Medal'] = pd.Categorical(country_perf_df['Medal'], categories=medal_or
country_perf_df.sort_values(['Total'], inplace=True)
# country_perf_df.sort_values(["Total"], inplace=True)
country_perf_df = country_perf_df[["NOC", "Medal", "Count", "Total"]]
country_perf_df.reset_index(drop=True, inplace=True)
```

In [53]:
```
filename = "medal_chart.png"
image_format = "png"
category_h_bar = px.bar(country_perf_df,
                        x='Count',
                        y='NOC',
                        color='Medal',
                        orientation='h',
                        title="Medal Distribution by Country")
category_h_bar.update_layout(xaxis_title="Medal Count",
                             yaxis_title="Country",
                             width=800,
                             height=600)

pio.write_image(category_h_bar, filename, format=image_format)
```



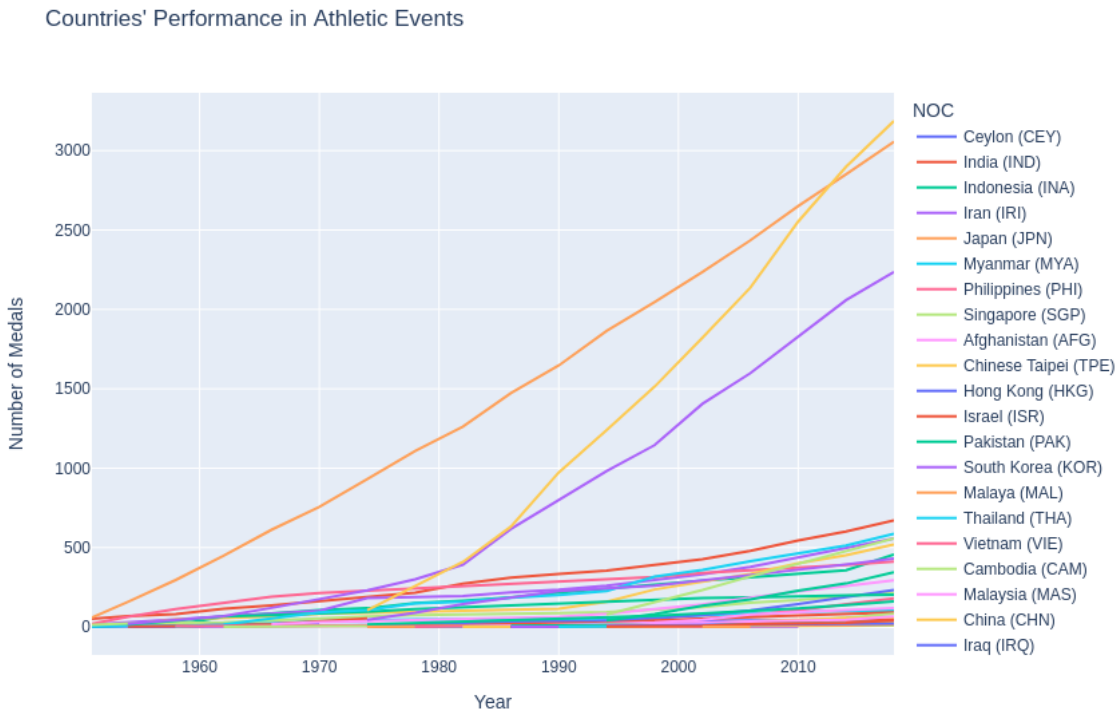
China, Japan, and South Korea have historically performed exceptionally well and often compete for the top positions in the medal tally in every Asian Games. It is only possible Due to their strong sports programs, large athlete pools, and significant financial investments in sports,

Tracing the country's performance over the years

In this section, we will dive into the country's performance over the years. We will put together all the countries and compare their performance throughout all the organized Asian games.

In [ ]:
```
medals_by_year = medal_tally_df.groupby(["Year", "NOC"]).sum().groupby(level=[1]).cumsu
medals_by_year.reset_index(inplace=True)
```

In [52]:
```
filename = "Country_performance.png"
image_format = "png"

fig = px.line(medals_by_year,
              x="Year",
              y="Total",
              color="NOC",
              hover_name="NOC",
              title="Countries' Performance in Athletic Events")

fig.update_layout(xaxis_title="Year",
                  yaxis_title="Number of Medals",
                  width=900,
                  height=600)


pio.write_image(fig, filename, format=image_format)
```



1. The orange line represents Japan's performance in the Asian Games. Japan has consistently dominated these games over the years, maintaining a significant lead over other countries. But, It was before China started competing at the Asian Games.
2. China's rise began in 1978, gradually setting itself apart from other countries in terms of performance. This marked a significant shift in the Asian Games landscape.
3. In the year 2014, represented by the yellow line, China made a remarkable breakthrough by surpassing Japan's total medal count.
4. By 1986, represented by the purple line, China had even surpassed South Korea, solidifying its position as a major contender in the Asian Games.

China still outperforms every country even after starting its Asian Games journey in 1974 😲

Does the country enjoy host advantage?

In this section, we will study the Host Countries getting a significant advantage because Local athletes having knowledge of local venues can give host nations an edge, as athletes feel right at home.
We will compare their performance during the hosting year with their previous and subsequent years.

In [ ]:
```
host_country_data = {
    "Year": medals_by_year.groupby("Year").count().index,
    "Host Country": ["India (IND)", "Philippines (PHI)", "Japan (JPN)", "Indonesia (INA
}


host_country_df = pd.DataFrame(host_country_data)
host_country_df
```

Out[ ]:

	Year	Host Country
0	1951	India (IND)
1	1954	Philippines (PHI)
2	1958	Japan (JPN)
3	1962	Indonesia (INA)
4	1966	Thailand (THA)
5	1970	Thailand (THA)
6	1974	Iran (IRI)
7	1978	Thailand (THA)
8	1982	India (IND)
9	1986	South Korea (KOR)
10	1990	China (CHN)
11	1994	Japan (JPN)
12	1998	Thailand (THA)
13	2002	South Korea (KOR)
14	2006	Qatar (QAT)
15	2010	China (CHN)
16	2014	South Korea (KOR)
17	2018	Indonesia (INA)

In [ ]:

```
Prev_Year = host_country_df["Year"] - 4
Next_Year = host_country_df["Year"] + 4

Prev_Year[1] = 1951
Next_Year[0] = 1954

Prev_Year_Performance = []
Next_Year_Performance = []
Host_Year_Performance = []

for i in range(len(host_country_df["Year"])):
    host_medal_condition = (medal_tally_df["Year"] == host_country_df["Year"][i]) & (me
    if not host_medal_condition.any():
        Host_Year_Performance.append(None)
    else:
        Host_Year_Performance.append(medal_tally_df.loc[host_medal_condition, "Total"].

    prev_medal_condition = (medal_tally_df["Year"] == Prev_Year[i]) & (medal_tally_df['
    if not prev_medal_condition.any():
        Prev_Year_Performance.append(None)
    else:
        Prev_Year_Performance.append(medal_tally_df.loc[prev_medal_condition, "Total"].

    next_medal_condition = (medal_tally_df["Year"] == Next_Year[i]) & (medal_tally_df['
    if not next_medal_condition.any():
        Next_Year_Performance.append(None)
    else:
        Next_Year_Performance.append(medal_tally_df.loc[next_medal_condition, "Total"].
```

```
host_country_df["Previous Year Performance"] = Prev_Year_Performance
host_country_df["Host Year Performance"] = Host_Year_Performance
host_country_df["Next Year Performance"] = Next_Year_Performance
```

In [ ]:
```
host_country_df
```

Out[ ]:

	Year	Host Country	Previous Year Performance	Host Year Performance	Next Year Performance
0	1951	India (IND)	NaN	51	17.00
1	1954	Philippines (PHI)	19.00	45	48.00
2	1958	Japan (JPN)	98.00	138	152.00
3	1962	Indonesia (INA)	6.00	51	22.00
4	1966	Thailand (THA)	12.00	37	39.00
5	1970	Thailand (THA)	37.00	39	14.00
6	1974	Iran (IRI)	23.00	81	NaN
7	1978	Thailand (THA)	14.00	42	10.00
8	1982	India (IND)	28.00	57	37.00
9	1986	South Korea (KOR)	93.00	224	181.00
10	1990	China (CHN)	222.00	341	266.00
11	1994	Japan (JPN)	174.00	218	181.00
12	1998	Thailand (THA)	26.00	90	43.00
13	2002	South Korea (KOR)	164.00	260	193.00
14	2006	Qatar (QAT)	17.00	32	15.00
15	2010	China (CHN)	316.00	416	345.00
16	2014	South Korea (KOR)	232.00	228	177.00
17	2018	Indonesia (INA)	20.00	98	NaN

In the majority of the part(Later Asian Games), we can see that the Host country gets home advantage. But, we can't see the same during the earlier Asian Games.

Athletics Performances

In this section, we will study which country excels at which athletic-based sports event. From sprints and relays to field events and marathons, we'll uncover which nations excel in specific disciplines.

In [ ]:
```
athletics_df = pd.read_csv("Athletics_record.csv", index_col=0)
```

Exloring the dataset

In [ ]:
```
athletics_df
```

Out[ ]:

	Year	Gold	Silver	Bronze	Category	Sports
0	1951	IND	JPN	JPN	Men	100 m
1	1954	PAK	PHI	IND	Men	100 m
2	1958	PAK	JPN	PHI	Men	100 m
3	1962	INA	MAL	PHI	Men	100 m
4	1966	MAL	SIN	JPN	Men	100 m
...	...	...	...	...	...	...
727	2006	KAZ	IND	IND	Women	Heptathlon
728	2010	UZB	JPN	IND	Women	Heptathlon
729	2014	UZB	CHN	UZB	Women	Heptathlon
730	2018	IND	CHN	JPN	Women	Heptathlon
731	2018	IND	KAZ	CHN	Mixed	4 × 400 m relay

732 rows × 6 columns

Checking NaN values and duplicated values

In [ ]:
```
athletics_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 732 entries, 0 to 731
Data columns (total 6 columns):
 #   Column    Non-Null Count  Dtype 
---  ------    --------------  ----- 
 0   Year      732 non-null    int64 
 1   Gold      732 non-null    object
 2   Silver    732 non-null    object
 3   Bronze    717 non-null    object
 4   Category  732 non-null    object
 5   Sports    732 non-null    object
dtypes: int64(1), object(5)
memory usage: 40.0+ KB
```

Athletics events at the Asian Games

The dataset has the data of **28** athletic events

In [ ]:
```
athletics_df["Sports"].nunique()
```

Out[ ]:
```
28
```

The athletic events for which we have data are:

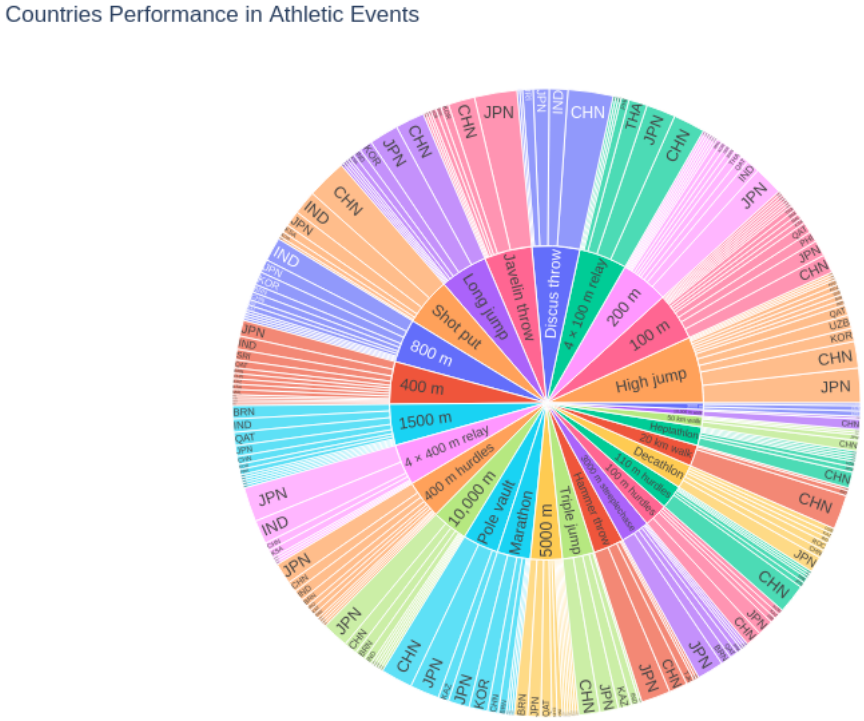
In [ ]:
```
athletics_df["Sports"].value_counts()
```

Out[ ]:
```
High jump              50
100 m                  36
4 × 100 m relay        36
Discus throw           36
Shot put               36
Long jump              36
200 m                  36
Javelin throw          36
800 m                  33
400 m                  32
4 × 400 m relay        31
1500 m                 31
400 m hurdles          29
Pole vault             27
10,000 m               27
Marathon               25
Triple jump            24
5000 m                 24
Hammer throw           23
3000 m steeplechase    22
100 m hurdles          18
Decathlon              18
110 m hurdles          18
20 km walk             16
Heptathlon             14
50 km walk              8
3000 m                  5
10,000 m walk           5
Name: Sports, dtype: int64
```

What Countries dominating which event

In [ ]:
```
athletics_data = athletics_df.groupby(["Sports", "Gold"], as_index=False).count()[["Spo
athletics_data.rename(columns={'Category': 'Count'}, inplace=True)
```

In [ ]:
```
filename = 'sunburst_performance.png'
image_format = 'png'

sunburst = px.sunburst(athletics_data,
                       path=["Sports", "Gold"],
                       values='Count',
                       color='Sports',
                       title="Countries Performance in Athletic Events")

sunburst.update_layout(xaxis_title='Number of Gold Medals',
                       yaxis_title='Country',
                       width=900,
                       height=650)

pio.write_image(sunburst, filename, format=image_format)
```



After observing the sunburst chart, it's evident that China and Japan dominate the athletic events.

Athletic Dominance (China Vs Japan):

(CHN) **China**:

- 100m
- 4x100m Relay
- Discus Throw
- Long Jump
- 110m hurdles
- 100m hurdles
- Shot Put
- 20km walk
- Pole Vault
- Triple Jump

(JPN) **Japan**:

- High Jump
- 200m
- Javelin Throw
- Hammer throw
- 400m hurdles
- 3000m Steeplechase
- Decathlon
- 400m

- 10,000m Race
- 4x400m Relay

Understanding China's Dominance on sporting events

Despite China's late entry into the Asian Games in 1974, it consistently manages to surpass Japan in medal counts, even though the Asian Games began in 1951.
How is this achieved? China's excellence extends beyond the Asian Games, it also presents a formidable challenge to sporting giant USA at the Olympics. What are the reasons behind China's juggernaut status in sporting events?

- Whooping Sports Expenditure
- Gruelling Training Schedule
- International Coaching Staff
- Identifying talent based on physical attributes since childhood
- Strong Sense of belonging
- State Control

want to read it in detail:- https://www.indiatoday.in/magazine/cover-story/story/20080908-how-china-became-a-superpower-737410-2008-08-28

What We learned after this analysis:-

- We have learned a positive correlation between the increase in the medal count and the number of countries participating in the Asian Games.
- The Asian Games medal tally is evidence of historical narratives, tracing the intricate tapestry of nations in their quest for athletic excellence.
- We've compiled the performances of the top 15 countries, and China has outperformed them all since 1974.
- We've come to know that the host country performs better when it competes at its local venues.
- We have analyzed 28 athletic events at the Asian Games and found that the competition is primarily between China and Japan.