História das Olimpíadas

Após um ano de atraso por conta da pandemia de Covid-19, as atenções do mundo todo se voltaram para Tóquio, no Japão, para acompanhar mais uma edição das Olimpíadas.

No Brasil não foi diferente, e muitos se uniram para torcer por nossos atletas em diferentes competições, tanto em esportes onde o Brasil já possui tradição quanto em novos esportes.

Vamos aproveitar o clima para estudar um pouco das Olimpíadas! Utilizaremos um *dataset* com 120 anos de dados históricos das Olimpíadas, cobrindo desde os jogos de Atenas 1896 até Rio 2016.

Faça o download do *dataset* em https://www.kaggle.com/heesoo37/120-years-of-olympic-history-athletes-and-results e carregue o arquivo `athlete_events.csv` para um DataFrame utilizando Pandas. Aproveite para explorar seu DataFrame e se familiarizar com a sua estrutura.

OBS: Fique à vontade para acrescentar mais células Python conforme necessário em qualquer etapa do exercício.

In [253…

```
import pandas as pd

# Leitura do arquivo e pequena amostragem para identificar as colunas de dados
dfAtletas = pd.read_csv('athlete_events.csv', encoding='UTF-8', index_col='ID')
dfAtletas.head(5)
```

Out[253]:

	Name	Sex	Age	Height	Weight	Team	NOC	Games	Year	Season	City	Sport	Event	Medal
ID														
1	A Dijiang	M	24.0	180.0	80.0	China	CHN	1992 Summer	1992	Summer	Barcelona	Basketball	Basketball Men's Basketball	NaN
2	A Lamusi	M	23.0	170.0	60.0	China	CHN	2012 Summer	2012	Summer	London	Judo	Judo Men's Extra-Lightweight	NaN
3	Gunnar Nielsen Aaby	M	24.0	NaN	NaN	Denmark	DEN	1920 Summer	1920	Summer	Antwerpen	Football	Football Men's Football	NaN
4	Edgar Lindenau Aabye	M	34.0	NaN	NaN	Denmark/Sweden	DEN	1900 Summer	1900	Summer	Paris	Tug-Of-War	Tug-Of-War Men's Tug-Of-War	Gold
5	Christine Jacoba Aaftink	F	21.0	185.0	82.0	Netherlands	NED	1988 Winter	1988	Winter	Calgary	Speed Skating	Speed Skating Women's 500 metres	NaN

In [254…

```
# Vamos renomear as colunas
dfAtletas = dfAtletas.rename({'Name':'Nome','Sex':'Sexo','Age':'Idade','Height':'Altura','Weight':'Peso',\
                              'Team':'Time','Games':'Edição','Year':'Ano','Season':'Temporada','City':'Cidade','Sport':'Esporte',\
                              'Event':'Categoria','Medal':'Medalha'},axis=1)
dfAtletas.head(1)
```

Out[254]:

	Nome	Sexo	Idade	Altura	Peso	Time	NOC	Edição	Ano	Temporada	Cidade	Esporte	Categoria	Medalha
ID														
1	A Dijiang	M	24.0	180.0	80.0	China	CHN	1992 Summer	1992	Summer	Barcelona	Basketball	Basketball Men's Basketball	NaN

In [255…

```
# Temos dados faltantes, como altura (Height) e peso (Weight). No caso de Medal o NaN significa que o atleta não medalhou. OK.
dfAtletas.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 271116 entries, 1 to 135571
Data columns (total 14 columns):
 #   Column     Non-Null Count   Dtype  
---  ------     --------------   -----  
 0   Nome       271116 non-null  object 
 1   Sexo       271116 non-null  object 
 2   Idade      261642 non-null  float64
 3   Altura     210945 non-null  float64
 4   Peso       208241 non-null  float64
 5   Time       271116 non-null  object 
 6   NOC        271116 non-null  object 
 7   Edição     271116 non-null  object 
 8   Ano        271116 non-null  int64  
 9   Temporada  271116 non-null  object 
 10  Cidade     271116 non-null  object 
 11  Esporte    271116 non-null  object 
 12  Categoria  271116 non-null  object 
 13  Medalha    39783 non-null   object 
dtypes: float64(3), int64(1), object(10)
memory usage: 31.0+ MB
```

In [256…

```
# Vamos analisar se as quantidades são relevantes:
qtdAtletas = 271116
atletasSemAltura = qtdAtletas - 210945
percSemAltura = atletasSemAltura / qtdAtletas * 100
atletasSemPeso = qtdAtletas - 208241
percSemPeso = atletasSemPeso / qtdAtletas * 100
print(f'{atletasSemAltura} atletas sem altura ({percSemAltura:2.2f}%), {atletasSemPeso} atletasSemPeso ({percSemPeso:2.2f}%)')
```

```
60171 atletas sem altura (22.19%), 62875 atletasSemPeso (23.19%)
```

As quantidades faltantes são bastante relevantes. Por agora, vamos apenas lembrar disso, caso alguma pergunta relacionada seja feita.

In [257…

```
# Para identificar os nomes das medalhas para Ouro, Prata e Bronze
dfAtletas[dfAtletas['Medalha'].notna()]['Medalha'].unique()
```

Out[257]:

```
array(['Gold', 'Bronze', 'Silver'], dtype=object)
```

Gold para Ouro, Silver para Prata e Bronze para Bronze. ok.

In [258…

```python
# Vamos usar Time ou NOC para avaliações por país?
dfAtletas['Time']
```

Out[258]:

```
ID
1                    China
2                    China
3                  Denmark
4           Denmark/Sweden
5              Netherlands
                ...
135569            Poland-1
135570              Poland
135570              Poland
135571              Poland
135571              Poland
Name: Time, Length: 271116, dtype: object
```

Denmark/Sweden? Poland-1?... Pelo visto o melhor é utilizarmos o NOC. Vamos ver quais são os distintos NOC existentes nos dados

In [259…

```python
dfValoresNOC = dfAtletas['NOC'].drop_duplicates()
dfValoresNOC = dfValoresNOC.sort_values()
dfValoresNOC
```

Out[259]:

```
ID
502     AFG
1021    AHO
9365    ALB
105     ALG
4594    AND
       ...
1771    YEM
1420    YMD
2383    YUG
6435    ZAM
5529    ZIM
Name: NOC, Length: 230, dtype: object
```

In [260…

```python
# Há um arquivo CSV de NOCs. Devemos obter nomes de países mais descritivos utilizando-o. Vamos carregá-lo e availar.
dfNOC = pd.read_csv('noc_regions.csv', encoding='UTF-8', index_col='NOC')
dfNOC.head(3)
```

Out[260]:

	region	notes
NOC		
AFG	Afghanistan	NaN
AHO	Curacao	Netherlands Antilles
ALB	Albania	NaN

In [261…

```python
# Vamos renomear a coluna 'region' para 'País' e excluir coluna 'notes' que não é relevante
```

```
dfNOC = dfNOC.rename({'region':'País'}, axis=1)
dfNOC = dfNOC.drop('notes', axis=1)
dfNOC.head(3)
```

Out[261]:

	País
NOC	
AFG	Afghanistan
AHO	Curacao
ALB	Albania

In [262…

```
# Vejamos se todos os nomes de país (region) estão preenchidos
dfNOC.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 230 entries, AFG to ZIM
Data columns (total 1 columns):
 #   Column  Non-Null Count  Dtype 
---  ------  --------------  ----- 
 0   País    227 non-null    object
dtypes: object(1)
memory usage: 3.6+ KB
```

Ops, temos 3 NOC sem nome de país. Vejamos quem são

In [263…

```
dfNOC[dfNOC['País'].isna()]
```

Out[263]:

	País
NOC	
ROT	NaN
TUV	NaN
UNK	NaN

ROT é o valor para refugiados. Realmente não representam seus países. Vamos apenas ajustar aqui para "Refugee"

TUV é um pequeno país. Vamos preencher.

UNK não era esperado. Atletas cujo país não é conhecido? Vamos ver quantos são.

In [264…

```
dfNOC.loc['ROT']['País'] = 'Refugee'
dfNOC.loc['TUV']['País'] = 'Tuvalu'
dfAtletas[dfAtletas['NOC'] == 'UNK']
```

Out[264]:

ID	Nome	Sexo	Idade	Altura	Peso	Time	NOC	Edição	Ano	Temporada	Cidade	Esporte	Categoria	Medalha
31292	Fritz Eccard	M	NaN	NaN	NaN	Unknown	UNK	1912 Summer	1912	Summer	Stockholm	Art Competitions	Art Competitions Mixed Architecture	NaN
65813	A. Laffen	M	NaN	NaN	NaN	Unknown	UNK	1912 Summer	1912	Summer	Stockholm	Art Competitions	Art Competitions Mixed Architecture	NaN

São apenas dois atletas cujo país não se sabe, que disputaram as Olimpíadas de 1912. Vamos descartar esses registros.

In [265…

```
dfAtletas = dfAtletas[dfAtletas['NOC'] != 'UNK']
dfAtletas.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 271114 entries, 1 to 135571
Data columns (total 14 columns):
 #   Column     Non-Null Count   Dtype  
---  ------     --------------   -----  
 0   Nome       271114 non-null  object 
 1   Sexo       271114 non-null  object 
 2   Idade      261642 non-null  float64
 3   Altura     210945 non-null  float64
 4   Peso       208241 non-null  float64
 5   Time       271114 non-null  object 
 6   NOC        271114 non-null  object 
 7   Edição     271114 non-null  object 
 8   Ano        271114 non-null  int64  
 9   Temporada  271114 non-null  object 
 10  Cidade     271114 non-null  object 
 11  Esporte    271114 non-null  object 
 12  Categoria  271114 non-null  object 
 13  Medalha    39783 non-null   object 
dtypes: float64(3), int64(1), object(10)
memory usage: 31.0+ MB
```

Vamos adicionar os nomes de país vinculando atletas e NOCs.
Nesse mesmo passo, vamos avaliar a medalha que cada atleta ganho (se ganhou) e criar um contador numérico contendo 1 para o tipo de medalha. Também vamos adicionar uma coluna 'Total' que conterá 1 se o atleta ganhou qualquer medalha ou 0 se não ganhou medalha. Finalmente, vamos adicionar uma coluna 'Ordem' que conterá 1 para ouro, 2 para prata, 3 para bronze e 4 para os não medalhistas (apenas para aprimorar a apresentação de dados nas pesquisas)

In [266…

```
dfAtletas = dfAtletas.join(dfNOC, on='NOC')

dfAtletas['Ouros'], dfAtletas['Pratas'], dfAtletas['Bronzes'], dfAtletas['Total'], dfAtletas['Ordem'] = \
[dfAtletas['Medalha'].apply(lambda x : 1 if x == 'Gold' else 0), \
 dfAtletas['Medalha'].apply(lambda x : 1 if x == 'Silver' else 0), \
 dfAtletas['Medalha'].apply(lambda x : 1 if x == 'Bronze' else 0), \
 dfAtletas['Medalha'].apply(lambda x : 1 if x == 'Gold' or x == 'Silver' or x == 'Bronze' else 0), \
 dfAtletas['Medalha'].apply(lambda x : 1 if x == 'Gold' else 2 if x == 'Silver' else 3 if x == 'Bronze' else 4)]
```

```
dfAtletas[dfAtletas['Total'] > 0].sample(10)
```

Out[266]:

ID	Nome	Sexo	Idade	Altura	Peso	Time	NOC	Edição	Ano	Temporada	Cidade	Esporte	Categoria	Medalha	País	Ouros	Pratas	Bronzes	To
21357	Julie Wu Chu	F	19.0	173.0	67.0	United States	USA	2002 Winter	2002	Winter	Salt Lake City	Ice Hockey	Ice Hockey Women's Ice Hockey	Silver	USA	0	1	0	
106296	Heikki Ilmari Savolainen	M	44.0	172.0	64.0	Finland	FIN	1952 Summer	1952	Summer	Helsinki	Gymnastics	Gymnastics Men's Team All-Around	Bronze	Finland	0	0	1	
50660	Huang Xuechen	F	22.0	175.0	61.0	China	CHN	2012 Summer	2012	Summer	London	Synchronized Swimming	Synchronized Swimming Women's Duet	Bronze	China	0	0	1	
19041	Omar Catari Peraza	M	20.0	170.0	57.0	Venezuela	VEN	1984 Summer	1984	Summer	Los Angeles	Boxing	Boxing Men's Featherweight	Bronze	Venezuela	0	0	1	
106106	Lotte Nicolien Sauerbreij	F	30.0	164.0	58.0	Netherlands	NED	2010 Winter	2010	Winter	Vancouver	Snowboarding	Snowboarding Women's Parallel Giant Slalom	Gold	Netherlands	1	0	0	
1046	Klaus Aeffke	M	24.0	189.0	82.0	Germany	GER	1964 Summer	1964	Summer	Tokyo	Rowing	Rowing Men's Coxed Eights	Silver	Germany	0	1	0	
12214	Edward "Eddie" Blay	M	26.0	172.0	57.0	Ghana	GHA	1964 Summer	1964	Summer	Tokyo	Boxing	Boxing Men's Light-Welterweight	Bronze	Ghana	0	0	1	
135465	Pirmin Zurbriggen	M	25.0	183.0	83.0	Switzerland	SUI	1988 Winter	1988	Winter	Calgary	Alpine Skiing	Alpine Skiing Men's Downhill	Gold	Switzerland	1	0	0	
101044	Major Josiah George Ritchie	M	37.0	NaN	NaN	Great Britain	GBR	1908 Summer	1908	Summer	London	Tennis	Tennis Men's Singles, Covered Courts	Bronze	UK	0	0	1	
80033	Lavinia Corina Miloovici	F	15.0	NaN	NaN	Romania	ROU	1992 Summer	1992	Summer	Barcelona	Gymnastics	Gymnastics Women's Individual All-Around	Bronze	Romania	0	0	1	

Os dados são por atleta. Como fica a contagem de medalhas em esportes coletivos? Vejamos...

In [267…

```
dfAnalise = dfAtletas[(dfAtletas['Esporte'] == 'Basketball') & (dfAtletas['Total'] > 0)]
dfAnalise = dfAnalise.sort_values(['Ano','NOC'])
dfAnalise.head(10)
```

Out[267]:

	Nome	Sexo	Idade	Altura	Peso	Time	NOC	Edição	Ano	Temporada	Cidade	Esporte	Categoria	Medalha	País	Ouros	Pratas	Bronzes	Total	Ordem
ID																				
1530	Gordon "Gord" Aitchison	M	27.0	NaN	NaN	Canada	CAN	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Silver	Canada	0	1	0	1	2
2909	Ian Alistair "Al" Allison	M	27.0	NaN	NaN	Canada	CAN	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Silver	Canada	0	1	0	1	2
19836	Arthur St. Clair "Art" Chapman	M	23.0	191.0	NaN	Canada	CAN	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Silver	Canada	0	1	0	1	2
19838	Charles Winston "Chuck" Chapman	M	25.0	188.0	NaN	Canada	CAN	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Silver	Canada	0	1	0	1	2
25790	Edward John "Ed" Dawson	M	28.0	NaN	NaN	Canada	CAN	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Silver	Canada	0	1	0	1	2
78873	Irving "Toots" Meretsky	M	24.0	NaN	NaN	Canada	CAN	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Silver	Canada	0	1	0	1	2
92595	James Douglas "Doug" Peden	M	20.0	183.0	86.0	Canada	CAN	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Silver	Canada	0	1	0	1	2
115153	James "Jimmy" Stewart	M	26.0	NaN	NaN	Canada	CAN	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Silver	Canada	0	1	0	1	2
131117	Malcolm Edward "Red" Wiseman	M	23.0	NaN	NaN	Canada	CAN	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Silver	Canada	0	1	0	1	2
13519	Carlos Borja Morca	M	23.0	NaN	NaN	Mexico	MEX	1936 Summer	1936	Summer	Berlin	Basketball	Basketball Men's Basketball	Bronze	Mexico	0	0	1	1	3

Como podemos concluir, teremos um problema na contagem de medalhas, pensando no quadro de medalhas usual, porque para os esportes coletivos só devemos contar uma vez, e não por atleta. Para resolver isso, vamos criar um DataFrame "quadro de medalhas" onde essas duplicidades sejam removidas.

In [268…

```
dfQuadroMedalhas = dfAtletas[['Temporada','Ano','NOC','Esporte','Categoria','Ouros','Pratas','Bronzes','Total','Ordem']]
dfQuadroMedalhas = dfQuadroMedalhas.drop_duplicates()
dfQuadroMedalhas = dfQuadroMedalhas.sort_values(['Temporada','Ano','Esporte','Categoria','Ordem'])
dfQuadroMedalhas[(dfQuadroMedalhas['Esporte'] == 'Basketball') & (dfQuadroMedalhas['Total'] > 0)]
```

Out[268]:

	Temporada	Ano	NOC	Esporte	Categoria	Ouros	Pratas	Bronzes	Total	Ordem
ID										
7396	Summer	1936	USA	Basketball	Basketball Men's Basketball	1	0	0	1	1
1530	Summer	1936	CAN	Basketball	Basketball Men's Basketball	0	1	0	1	2
13519	Summer	1936	MEX	Basketball	Basketball Men's Basketball	0	0	1	1	3
7881	Summer	1948	USA	Basketball	Basketball Men's Basketball	1	0	0	1	1
8043	Summer	1948	FRA	Basketball	Basketball Men's Basketball	0	1	0	1	2
...	...	...	...	...	...	...	...	...	...	...
11656	Summer	2016	SRB	Basketball	Basketball Men's Basketball	0	1	0	1	2
576	Summer	2016	ESP	Basketball	Basketball Men's Basketball	0	0	1	1	3
5971	Summer	2016	USA	Basketball	Basketball Women's Basketball	1	0	0	1	1
24028	Summer	2016	ESP	Basketball	Basketball Women's Basketball	0	1	0	1	2
16977	Summer	2016	SRB	Basketball	Basketball Women's Basketball	0	0	1	1	3

90 rows × 10 columns

1. O Brasil nas Olimpíadas

Vamos começar estudando o desempenho do nossos próprio país. Gere um DataFrame novo contendo apenas as informações sobre atletas brasileiros.

In [269…

```
dfAtletasBR = dfAtletas[dfAtletas['NOC'] == 'BRA']
dfAtletasBR.head(5)
```

Out[269]:

	Nome	Sexo	Idade	Altura	Peso	Time	NOC	Edição	Ano	Temporada	Cidade	Esporte	Categoria	Medalha	País	Ouros	Pratas	Bronzes	Total	Ordem
ID																				
386	Alexandre Abeid	M	22.0	194.0	92.0	Brazil	BRA	1972 Summer	1972	Summer	Munich	Volleyball	Volleyball Men's Volleyball	NaN	Brazil	0	0	0	0	4
386	Alexandre Abeid	M	26.0	194.0	92.0	Brazil	BRA	1976 Summer	1976	Summer	Montreal	Volleyball	Volleyball Men's Volleyball	NaN	Brazil	0	0	0	0	4
388	Abel Carlos da Silva Braga	M	19.0	190.0	73.0	Brazil	BRA	1972 Summer	1972	Summer	Munich	Football	Football Men's Football	NaN	Brazil	0	0	0	0	4
451	Diana Monteiro Abla	F	21.0	175.0	75.0	Brazil	BRA	2016 Summer	2016	Summer	Rio de Janeiro	Water Polo	Water Polo Women's Water Polo	NaN	Brazil	0	0	0	0	4
565	Glauclio Serro Abreu	M	26.0	185.0	75.0	Brazil	BRA	2004 Summer	2004	Summer	Athina	Boxing	Boxing Men's Middleweight	NaN	Brazil	0	0	0	0	4

Medalhistas

Vamos focar um pouco nos casos de sucesso do Brasil. Use o seu DataFrame anterior para filtrar apenas informações sobre **medalhistas** brasileiros.

DICA: observe como a coluna `Medal` é representada quando o atleta não ganhou medalha.

In [270…

```
# Os medalhistas são aqueles em que Total é maior que zero
dfMedalhistasBR = dfAtletasBR[dfAtletasBR['Total'] > 0]
dfMedalhistasBR.tail(5)
```

Out[270]:

ID	Nome	Sexo	Idade	Altura	Peso	Time	NOC	Edição	Ano	Temporada	Cidade	Esporte	Categoria	Medalha	País	Ouros	Pratas	Bronzes	Total	Ordem
133931	Arthur Nabarrete Zanetti	M	26.0	156.0	61.0	Brazil	BRA	2016 Summer	2016	Summer	Rio de Janeiro	Gymnastics	Gymnastics Men's Rings	Silver	Brazil	0	1	0	1	2
134186	Jos Elias "Z Elias" Moedim Jnior	M	19.0	178.0	75.0	Brazil	BRA	1996 Summer	1996	Summer	Atlanta	Football	Football Men's Football	Bronze	Brazil	0	0	1	1	3
134190	Jos Marco "Z Marco" Nobrega Ferreira de Melo	M	29.0	190.0	86.0	Brazil-1	BRA	2000 Summer	2000	Summer	Sydney	Beach Volleyball	Beach Volleyball Men's Beach Volleyball	Silver	Brazil	0	1	0	1	2
134191	Jos Marcelo "Z Maria" Ferreira	M	22.0	175.0	71.0	Brazil	BRA	1996 Summer	1996	Summer	Atlanta	Football	Football Men's Football	Bronze	Brazil	0	0	1	1	3
134211	Jos Carlos Cracco Neto	M	22.0	170.0	69.0	Brazil	BRA	2016 Summer	2016	Summer	Rio de Janeiro	Football	Football Men's Football	Gold	Brazil	1	0	0	1	1

Verão vs Inverno

Você deve ter notado que temos duas categorias distintas de jogos olímpicos, representados pela estação: temos os jogos de verão e os jogos de inverno, que ocorrem de maneira intercalada.

Agora que já conhecemos os medalhistas brasileiros, resposta: quantos atletas brasileiros receberam medalha nos jogos de verão e quantos receberam nos jogos de inverno?

In [271…

```python
# O subconjunto de estação e nome de atleta, removendo as duplicidades, respondem a questão
dfMedalhistasBR[['Temporada','Nome']].drop_duplicates().groupby(by='Temporada').count()
```

Out[271]:

Temporada	Nome
Summer	360

Comentário: No total, 360 atletas brasileiros receberam uma medalha nos jogos de verão. Nenhum brasileiro medalhou em Olimpíadas de inverno.

Os jogos de verão são bem mais populares do que os jogos de inverno no Brasil. Portanto, deste ponto em diante iremos focar apenas nos jogos de verão. Descarte de seu DataFrame os dados dos jogos de inverno.

In [272…

```python
# Descartando os jogos de inverno e conferindo
```

```
dfAtletasBR = dfAtletasBR[dfAtletasBR['Temporada'] == 'Summer']
```

Atletas do Brasil

Vamos conhecer um pouco melhor nossos atletas. Descubra a altura e peso médio de nossos medalhistas.

Como visto anteriormente, há uma quantidade relevante de atletas sem altura e peso. Vamos contabilizar quantos são brasileiros

In [273…

```
dfMedalhistasBR = dfAtletasBR[dfAtletasBR['Total'] > 0]
qtdMed = dfMedalhistasBR['Nome'].count()
semAltura = dfMedalhistasBR[dfMedalhistasBR['Altura'].isna()]['Nome'].count()
semPeso   = dfMedalhistasBR[dfMedalhistasBR['Peso'].isna()]['Nome'].count()
percSemAltura = semAltura / qtdMed * 100
percSemPeso = semPeso / qtdMed * 100
print(f'{semAltura} medalhistas sem altura ({percSemAltura:2.2f}%), {semPeso} medalhistas sem peso ({percSemPeso:2.2f}%)')
```

```
18 medalhistas sem altura (3.79%), 28 medalhistas sem peso (5.89%)
```

In [274…

```
# Vamos descartar eles atletas e então calcular as médias
dfMedBRap = dfMedalhistasBR[(dfMedalhistasBR['Altura'].notna()) & (dfMedalhistasBR['Peso'].notna())]
dfMedBRap[['Altura','Peso']].mean()
```

Out[274]:

```
Altura    182.494407
Peso       76.706935
dtype: float64
```

Imaginamos que diferentes esportes podem beneficiar diferentes tipos físicos, certo? Então refaça a análise anterior, mas obtendo os valores médios **por esporte**.

In [275…

```
dfMedsBRporEsporte = dfMedBRap[['Esporte','Altura','Peso']].groupby(by='Esporte').mean()
dfMedsBRporEsporte
```

Out[275]:

	Altura	Peso
Esporte		
Athletics	181.000000	74.576923
Basketball	185.847826	78.478261
Beach Volleyball	184.880000	78.160000
Boxing	170.000000	64.000000
Canoeing	175.000000	83.250000
Equestrianism	179.666667	75.000000
Football	175.671756	69.961832
Gymnastics	162.750000	63.750000
Judo	176.666667	86.285714
Modern Pentathlon	166.000000	55.000000
Sailing	181.588235	80.411765
Shooting	169.000000	69.000000
Swimming	189.388889	81.555556
Taekwondo	184.000000	79.500000
Volleyball	190.591667	81.166667

Será que os dados acima influenciaram no interesse geral dos atletas pelo esporte ou realmente impactaram no desempenho deles? Podemos tentar descobrir se há algum tipo de correlação.

Você ainda possui o dataframe original contendo todos os atletas brasileiros, incluindo os sem medalha? Obtenha os valores médios de peso e altura por esporte daquele dataframe e compare-o com os dos medalhistas. Há alguma diferença significativa em algum esporte?

In [276…

```python
# Temos que juntas as médias dos "não medalhistas" com a média dos medalhistas, agrupando por esporte
# não sem antes excluir os atletas não medalhistas que não têm peso ou altura informados
dfAtletasBRap = dfAtletasBR[(dfAtletasBR['Altura'].notna()) & (dfAtletasBR['Peso'].notna())]
dfAtletasBRporEsporte = dfAtletasBRap[['Esporte','Altura','Peso']].groupby(by='Esporte').mean()
dfCompMediasBR = pd.merge(dfAtletasBRporEsporte, dfMedsBRporEsporte, how='inner', on='Esporte')
```

In [277…

```python
# E vamos adicionar colunas de comparação de alturar e peso entre os não medalhistas (x) e medalhistas (y)
# Vamos exibir a tabela completa para avaliar
dfCompMediasBR['Dif_Altura'], dfCompMediasBR['Dif_Peso'] = \
dfCompMediasBR['Altura_y'] - dfCompMediasBR['Altura_x'], \
dfCompMediasBR['Peso_y'] - dfCompMediasBR['Peso_x']
dfCompMediasBR
```

Out[277]:

Esporte	Altura_x	Peso_x	Altura_y	Peso_y	Dif_Altura	Dif_Peso
Athletics	176.200450	67.795045	181.000000	74.576923	4.799550	6.781878
Basketball	191.473934	85.900474	185.847826	78.478261	-5.626108	-7.422213
Beach Volleyball	185.702128	78.617021	184.880000	78.160000	-0.822128	-0.457021
Boxing	172.015152	64.106061	170.000000	64.000000	-2.015152	-0.106061
Canoeing	177.791667	77.395833	175.000000	83.250000	-2.791667	5.854167
Equestrianism	178.284672	72.313869	179.666667	75.000000	1.381995	2.686131
Football	173.334601	67.760456	175.671756	69.961832	2.337155	2.201376
Gymnastics	157.268041	52.463918	162.750000	63.750000	5.481959	11.286082
Judo	173.925234	80.289720	176.666667	86.285714	2.741433	5.995995
Modern Pentathlon	170.500000	60.666667	166.000000	55.000000	-4.500000	-5.666667
Sailing	179.584416	76.805195	181.588235	80.411765	2.003820	3.606570
Shooting	172.716667	76.916667	169.000000	69.000000	-3.716667	-7.916667
Swimming	181.252475	74.586634	189.388889	81.555556	8.136414	6.968922
Taekwondo	173.769231	63.615385	184.000000	79.500000	10.230769	15.884615
Volleyball	187.762411	78.847518	190.591667	81.166667	2.829255	2.319149

Comentários: Curiosamente os medalhistas no Basquete são relativamente mais baixos. Já na ginástica, os medalhistas são mais pesados, e na natação, mais altos e mais fortes. Também no Taekwondo mais altura e força parece favorecer um melhor desempenho. Porém, os dados do basquete indicam algo que não estamos analisando aqui. Talvez a diferença entre sexos?

Existe um detalhe importante passando batido até agora em nossa análise: as categorias esportivas costumam ser divididas por gênero justamente por conta de diferenças físicas entre homens e mulheres que poderiam influenciar no desempenho. Compare a altura e peso médios de atletas brasileiros por esporte segmentado por sexo.

In [278…

```
# Temos que acrescentar 'Sex' como uma chave de agrupamento, para segregar Feminino e Masculino
mediasMedBResporteSexo = dfMedBRap[['Esporte','Sexo','Altura','Peso']].groupby(by=['Esporte','Sexo']).mean()
mediasAtletasBResporteSexo = dfAtletasBRap[['Esporte','Sexo','Altura','Peso']].groupby(by=['Esporte','Sexo']).mean()
```

In [279…

```
# Juntamos os "não medalhistas" com os medalhistas, agora segmentando por sexo, para nova comparação
dfCompMediasBRes = pd.merge(mediasAtletasBResporteSexo, mediasMedBResporteSexo, how='inner', on=['Esporte','Sexo'])
dfCompMediasBRes['Dif_Altura'], dfCompMediasBRes['Dif_Peso'] = \
dfCompMediasBRes['Altura_y'] - dfCompMediasBRes['Altura_x'], \
dfCompMediasBRes['Peso_y'] - dfCompMediasBRes['Peso_x']
dfCompMediasBRes
```

Out[279]:

Esporte	Sexo	Altura_x	Peso_x	Altura_y	Peso_y	Dif_Altura	Dif_Peso
Athletics	**F**	167.492958	59.809859	173.000000	61.000000	5.507042	1.190141
	M	180.294702	71.549669	181.320000	75.120000	1.025298	3.570331
Basketball	**F**	182.815789	73.381579	183.375000	71.625000	0.559211	-1.756579
	M	196.348148	92.948148	188.545455	85.954545	-7.802694	-6.993603
Beach Volleyball	**F**	176.478261	64.913043	175.000000	64.076923	-1.478261	-0.836120
	M	194.541667	91.750000	195.583333	93.416667	1.041667	1.666667
Boxing	**F**	167.600000	65.000000	167.000000	60.000000	-0.600000	-5.000000
	M	172.377049	64.032787	170.750000	65.000000	-1.627049	0.967213
Canoeing	**M**	178.545455	78.568182	175.000000	83.250000	-3.545455	4.681818
Equestrianism	**M**	179.176000	73.768000	179.666667	75.000000	0.490667	1.232000
Football	**F**	166.663366	60.089109	166.971429	60.742857	0.308062	0.653748
	M	177.493827	72.543210	178.843750	73.322917	1.349923	0.779707
Gymnastics	**M**	168.915493	65.338028	162.750000	63.750000	-6.165493	-1.588028
Judo	**F**	167.117647	66.441176	168.200000	63.600000	1.082353	-2.841176
	M	177.095890	86.739726	179.312500	93.375000	2.216610	6.635274
Modern Pentathlon	**F**	165.750000	54.500000	166.000000	55.000000	0.250000	0.500000
Sailing	**F**	170.000000	62.153846	170.500000	63.250000	0.500000	1.096154
	M	181.531250	79.781250	183.066667	82.700000	1.535417	2.918750
Shooting	**M**	174.680851	81.085106	169.000000	69.000000	-5.680851	-12.085106
Swimming	**F**	169.444444	59.151515	165.000000	52.000000	-4.444444	-7.151515
	M	185.085246	79.596721	190.823529	83.294118	5.738284	3.697396
Taekwondo	**F**	171.857143	61.000000	178.000000	69.000000	6.142857	8.000000
	M	176.000000	66.666667	190.000000	90.000000	14.000000	23.333333
Volleyball	**F**	181.440678	68.906780	183.437500	71.020833	1.996822	2.114054
	M	192.310976	86.000000	195.361111	87.930556	3.050136	1.930556

Comentários: Alguns esportes, como o Boxe por exemplo, possuem categorias por peso, o que não está nessa análise.
Sem considerar isso, somente no Taekwondo altura e força parece favorecer um melhor desempenho. Há uma diferença significativa também em tiro, o que não parece ser relevante, dado que é um esporte muito mais de precisão do que desempenho físico.

Qual foi (ou quais foram) o maior medalhista brasileiro em quantidade total de medalhas?

In [280…

```
# Obtemos o total de medalhas por atleta e listamos apenas aquele(s) com o maior total individual
dfMaisMedBR = dfMedalhistasBR[['Nome','Esporte','Bronzes','Pratas','Ouros','Total']].groupby(by=['Nome','Esporte']).sum()
dfMaioresMedBR = dfMaisMedBR[dfMaisMedBR['Total'] == dfMaisMedBR['Total'].max()]
dfMaioresMedBR
```

Out[280]:

		Bronzes	Pratas	Ouros	Total
Nome	**Esporte**				
Robert Scheidt	**Sailing**	1	2	2	5
Torben Schmidt Grael	**Sailing**	2	1	2	5

Resposta: Robert Scheidt e Torben Grael da vela, com 5 medalhas cada.

E o(s) maior(es) em quantidade de medalhas de ouro?

In [281…

```
# Aproveitando o DataFrame anterior, basta filtrar por aqueles com a maior quantidade de ouros
dfMaioresOurosBR = dfMaisMedBR[dfMaisMedBR['Ouros'] == dfMaisMedBR['Ouros'].max()]
dfMaioresOurosBR
```

Out[281]:

		Bronzes	Pratas	Ouros	Total
Nome	**Esporte**				
Adhemar Ferreira da Silva	**Athletics**	0	0	2	2
Fabiana "Fabi" Alvim de Oliveira	**Volleyball**	0	0	2	2
Fabiana Marcelino Claudino	**Volleyball**	0	0	2	2
Giovane Farinazzo Gvio	**Volleyball**	0	0	2	2
Jaqueline Maria "Jaque" Pereira de Carvalho Endres	**Volleyball**	0	0	2	2
Marcelo Bastos Ferreira	**Sailing**	1	0	2	3
Maurcio Camargo Lima	**Volleyball**	0	0	2	2
Paula Renata Marques Pequeno	**Volleyball**	0	0	2	2
Robert Scheidt	**Sailing**	1	2	2	5
Sheilla Tavares de Castro Blassioli	**Volleyball**	0	0	2	2
Srgio "Escadinha" Dutra dos Santos	**Volleyball**	0	2	2	4
Thasa Daher de Menezes	**Volleyball**	0	0	2	2
Torben Schmidt Grael	**Sailing**	2	1	2	5

Qual esporte rendeu mais medalhas de ouro para o Brasil? E qual rendeu mais medalhas no total?

DICA: tome muito cuidado nessa análise: cada **evento esportivo** rende 1 medalha. Por exemplo, quando a equipe de futebol vence, isso é considerado 1 medalha, mesmo tendo cerca de 20 atletas medalhistas na equipe.

In [282…

```
# Esporte que rendeu mais medalhas de ouro para o Brasil
dfMedEsporteBR = dfQuadroMedalhas[dfQuadroMedalhas['NOC']=='BRA'].groupby(by=['Esporte']).sum()
dfMedEsporteBR = dfMedEsporteBR.drop(['Ano','Ordem'],axis=1)
dfMedEsporteBR[dfMedEsporteBR['Ouros'] == dfMedEsporteBR['Ouros'].max()]
```

Out[282]:

	Ouros	Pratas	Bronzes	Total
Esporte				
Sailing	7	3	8	18

In [283…

```
# Esporte que rendeu mais medalhas no geral para o Brasil
dfMedEsporteBR[dfMedEsporteBR['Total'] == dfMedEsporteBR['Total'].max()]
```

Out[283]:

	Ouros	Pratas	Bronzes	Total
Esporte				
Judo	4	3	15	22

Resposta: O esporte que mais rendeu medalhas de ouro foi a Vela, com 7 medalhas. Já o esporte que mais rendeu medalhas no geral foi o Judô, com 22 medalhas.

Cada "categoria" dentro de um esporte é considerado um evento. Por exemplo, dentro de "atletismo", temos uma competição de 100m masculina, uma de 100m feminino, um revezamento 4 x 100m masculino, um revezamento 4 x 100m feminino, uma competição de 400m masculino, uma de 400m feminino, uma maratona masculina, uma maratona feminina, e assim sucessivamente.

Sabendo disso, qual evento esportivo mais rendeu medalhas de ouro para o Brasil? E total de medalhas?

In [284…

```
# Categoria de esporte que rendeu mais medalhas de ouro para o Brasil
dfMedCategoriaBR = dfQuadroMedalhas[dfQuadroMedalhas['NOC']=='BRA'].groupby(by=['Esporte','Categoria']).sum()
dfMedCategoriaBR = dfMedCategoriaBR.drop(['Ano','Ordem'],axis=1)
dfMedCategoriaBR[dfMedCategoriaBR['Ouros'] == dfMedCategoriaBR['Ouros'].max()]
```

Out[284]:

		Ouros	Pratas	Bronzes	Total
Esporte	**Categoria**				
Volleyball	**Volleyball Men's Volleyball**	3	3	0	6

Resposta: O volei masculino de quadra que ganhou 3 medalhas de ouro no total.

In [285…

```python
# E para obter os eventos com maior número de medalhas no geral, basta trocar Ouros por Total:
dfMedCategoriaBR[dfMedCategoriaBR['Total'] == dfMedCategoriaBR['Total'].max()]
```

Out[285]:

		Ouros	Pratas	Bronzes	Total
Esporte	**Categoria**				
Beach Volleyball	**Beach Volleyball Women's Beach Volleyball**	1	4	2	7

Resposta: O volei de praia feminino, que ganhou 7 medalhas no total.

Para finalizar sobre o Brasil: obtenha o total de medalhas de ouro, prata, bronze e total por ano.

In [286…

```python
# Aproveitando o DataFrame de medalhas por esporte, já descartando as duplicidades, basta totalizar por ano
dfMedEdicaoBR = dfQuadroMedalhas[dfQuadroMedalhas['NOC']=='BRA'].groupby(by=['Ano']).sum()
dfMedEdicaoBR = dfMedEdicaoBR.drop(['Ordem'], axis=1)
dfMedEdicaoBR[dfMedEdicaoBR['Total'] > 0]
```

Out[286]:

	Ouros	Pratas	Bronzes	Total
Ano				
1920	1	1	1	3
1948	0	0	1	1
1952	1	0	2	3
1956	1	0	0	1
1960	0	0	2	2
1964	0	0	1	1
1968	0	1	2	3
1972	0	0	2	2
1976	0	0	2	2
1980	2	0	2	4
1984	1	5	2	8
1988	1	2	3	6
1992	2	1	0	3
1996	3	3	9	15
2000	0	6	6	12
2004	5	2	3	10
2008	3	4	9	16
2012	3	5	9	17
2016	7	6	6	19

In [287…

```
# Não custa obter os totais gerais...
dfMedEdicaoBR.sum()
```

Out[287]:

```
Ouros       30
Pratas      36
Bronzes     62
Total      128
dtype: int64
```

2. O mundo nos jogos de verão

Vamos agora analisar um pouquinho do que aconteceu nas Olimpíadas de verão em todo o mundo.

Retome o DataFrame original e descarte as informações sobre os jogos de inverno.

```
In [288…
dfAtletasVerao = dfAtletas[dfAtletas['Temporada'] == 'Summer']
dfAtletasVerao.head(3)
```

Out[288]:

ID	Nome	Sexo	Idade	Altura	Peso	Time	NOC	Edição	Ano	Temporada	Cidade	Esporte	Categoria	Medalha	País	Ouros	Pratas	Bronzes	Total	Ordem
1	A Dijiang	M	24.0	180.0	80.0	China	CHN	1992 Summer	1992	Summer	Barcelona	Basketball	Basketball Men's Basketball	NaN	China	0	0	0	0	4
2	A Lamusi	M	23.0	170.0	60.0	China	CHN	2012 Summer	2012	Summer	London	Judo	Judo Men's Extra-Lightweight	NaN	China	0	0	0	0	4
3	Gunnar Nielsen Aaby	M	24.0	NaN	NaN	Denmark	DEN	1920 Summer	1920	Summer	Antwerpen	Football	Football Men's Football	NaN	Denmark	0	0	0	0	4

Obtenha a lista de todos os esportes já disputados nas olimpíadas de verão.

```
In [289…
dfEsportesVerao = dfAtletasVerao['Esporte'].unique()
dfEsportesVerao.sort()
dfEsportesVerao
```

```
Out[289]:
array(['Aeronautics', 'Alpinism', 'Archery', 'Art Competitions',
       'Athletics', 'Badminton', 'Baseball', 'Basketball',
       'Basque Pelota', 'Beach Volleyball', 'Boxing', 'Canoeing',
       'Cricket', 'Croquet', 'Cycling', 'Diving', 'Equestrianism',
       'Fencing', 'Figure Skating', 'Football', 'Golf', 'Gymnastics',
       'Handball', 'Hockey', 'Ice Hockey', 'Jeu De Paume', 'Judo',
       'Lacrosse', 'Modern Pentathlon', 'Motorboating', 'Polo',
       'Racquets', 'Rhythmic Gymnastics', 'Roque', 'Rowing', 'Rugby',
       'Rugby Sevens', 'Sailing', 'Shooting', 'Softball', 'Swimming',
       'Synchronized Swimming', 'Table Tennis', 'Taekwondo', 'Tennis',
       'Trampolining', 'Triathlon', 'Tug-Of-War', 'Volleyball',
       'Water Polo', 'Weightlifting', 'Wrestling'], dtype=object)
```

Obtenha a lista de todas as modalidades esportivas já disputadas nas olimpíadas de verão.

```
In [290…
dfEventosVerao = dfAtletasVerao['Categoria'].unique()
dfEventosVerao.sort()
dfEventosVerao
```

```
Out[290]: array(['Aeronautics Mixed Aeronautics', 'Alpinism Mixed Alpinism',
                 "Archery Men's Au Chapelet, 33 metres",
                 "Archery Men's Au Chapelet, 50 metres",
                 "Archery Men's Au Cordon Dore, 33 metres",
                 "Archery Men's Au Cordon Dore, 50 metres",
                 "Archery Men's Championnat Du Monde",
                 "Archery Men's Continental Style",
                 "Archery Men's Double American Round",
                 "Archery Men's Double York Round", "Archery Men's Individual",
                 "Archery Men's Pole Archery, Large Birds, Individual",
                 "Archery Men's Pole Archery, Large Birds, Team",
                 "Archery Men's Pole Archery, Small Birds, Individual",
                 "Archery Men's Pole Archery, Small Birds, Team",
                 "Archery Men's Sur La Perche a La Herse",
                 "Archery Men's Sur La Perche a La Pyramide",
                 "Archery Men's Target Archery, 28 metres, Individual",
                 "Archery Men's Target Archery, 28 metres, Team",
                 "Archery Men's Target Archery, 33 metres, Individual",
                 "Archery Men's Target Archery, 33 metres, Team",
                 "Archery Men's Target Archery, 50 metres, Individual",
                 "Archery Men's Target Archery, 50 metres, Team",
                 "Archery Men's Team", "Archery Men's Team Round",
                 "Archery Men's Unknown Event",
                 "Archery Women's Double Columbia Round",
                 "Archery Women's Double National Round",
                 "Archery Women's Individual", "Archery Women's Team",
                 "Archery Women's Team Round",
                 'Art Competitions Mixed Architecture',
                 'Art Competitions Mixed Architecture, Architectural Designs',
                 'Art Competitions Mixed Architecture, Designs For Town Planning',
                 'Art Competitions Mixed Architecture, Unknown Event',
                 'Art Competitions Mixed Literature',
                 'Art Competitions Mixed Literature, Dramatic Works',
                 'Art Competitions Mixed Literature, Epic Works',
                 'Art Competitions Mixed Literature, Lyric Works',
                 'Art Competitions Mixed Literature, Unknown Event',
                 'Art Competitions Mixed Music',
                 'Art Competitions Mixed Music, Compositions For Orchestra',
                 'Art Competitions Mixed Music, Compositions For Solo Or Chorus',
                 'Art Competitions Mixed Music, Instrumental And Chamber',
                 'Art Competitions Mixed Music, Unknown Event',
                 'Art Competitions Mixed Music, Vocals',
                 'Art Competitions Mixed Painting',
                 'Art Competitions Mixed Painting, Applied Arts',
                 'Art Competitions Mixed Painting, Drawings And Water Colors',
                 'Art Competitions Mixed Painting, Graphic Arts',
                 'Art Competitions Mixed Painting, Paintings',
                 'Art Competitions Mixed Painting, Unknown Event',
                 'Art Competitions Mixed Sculpturing',
                 'Art Competitions Mixed Sculpturing, Medals',
                 'Art Competitions Mixed Sculpturing, Medals And Plaques',
                 'Art Competitions Mixed Sculpturing, Medals And Reliefs',
                 'Art Competitions Mixed Sculpturing, Reliefs',
                 'Art Competitions Mixed Sculpturing, Statues',
                 'Art Competitions Mixed Sculpturing, Unknown Event',
                 'Art Competitions Mixed Unknown Event',
                 "Athletics Men's 1,500 metres",
                 "Athletics Men's 1,500 metres Walk",
                 "Athletics Men's 1,600 metres Medley Relay",
                 "Athletics Men's 10 kilometres Walk",
                 "Athletics Men's 10 mile Walk", "Athletics Men's 10,000 metres",
                 "Athletics Men's 100 metres", "Athletics Men's 110 metres Hurdles",
                 "Athletics Men's 2,500 metres Steeplechase",
                 "Athletics Men's 2,590 metres Steeplechase",
                 "Athletics Men's 20 kilometres Walk", "Athletics Men's 200 metres",
                 "Athletics Men's 200 metres Hurdles",
                 "Athletics Men's 3 mile, Team",
                 "Athletics Men's 3,000 metres Steeplechase",
                 "Athletics Men's 3,000 metres Walk",
                 "Athletics Men's 3,000 metres, Team",
                 "Athletics Men's 3,200 metres Steeplechase",
                 "Athletics Men's 3,500 metres Walk",
                 "Athletics Men's 4 mile, Team",
                 "Athletics Men's 4 x 100 metres Relay",
                 "Athletics Men's 4 x 400 metres Relay",
                 "Athletics Men's 4,000 metres Steeplechase",
                 "Athletics Men's 400 metres", "Athletics Men's 400 metres Hurdles",
                 "Athletics Men's 5 mile", "Athletics Men's 5,000 metres",
                 "Athletics Men's 5,000 metres, Team",
                 "Athletics Men's 50 kilometres Walk",
                 "Athletics Men's 56-pound Weight Throw",
                 "Athletics Men's 60 metres", "Athletics Men's 800 metres",
                 "Athletics Men's All-Around Championship",
                 "Athletics Men's Cross-Country, Individual",
                 "Athletics Men's Cross-Country, Team", "Athletics Men's Decathlon",
                 "Athletics Men's Discus Throw",
                 "Athletics Men's Discus Throw, Both Hands",
                 "Athletics Men's Discus Throw, Greek Style",
                 "Athletics Men's Hammer Throw", "Athletics Men's High Jump",
                 "Athletics Men's Javelin Throw",
                 "Athletics Men's Javelin Throw, Both Hands",
                 "Athletics Men's Javelin Throw, Freestyle",
                 "Athletics Men's Long Jump", "Athletics Men's Marathon",
                 "Athletics Men's Pentathlon",
                 "Athletics Men's Pentathlon (Ancient)",
                 "Athletics Men's Pole Vault", "Athletics Men's Shot Put",
                 "Athletics Men's Shot Put, Both Hands",
                 "Athletics Men's Standing High Jump",
                 "Athletics Men's Standing Long Jump",
                 "Athletics Men's Standing Triple Jump",
                 "Athletics Men's Stone Throw", "Athletics Men's Triple Jump",
                 "Athletics Women's 1,500 metres",
                 "Athletics Women's 10 kilometres Walk",
                 "Athletics Women's 10,000 metres", "Athletics Women's 100 metres",
                 "Athletics Women's 100 metres Hurdles",
                 "Athletics Women's 20 kilometres Walk",
                 "Athletics Women's 200 metres", "Athletics Women's 3,000 metres",
                 "Athletics Women's 3,000 metres Steeplechase",
                 "Athletics Women's 4 x 100 metres Relay",
                 "Athletics Women's 4 x 400 metres Relay",
                 "Athletics Women's 400 metres",
                 "Athletics Women's 400 metres Hurdles",
                 "Athletics Women's 5,000 metres",
                 "Athletics Women's 80 metres Hurdles",
                 "Athletics Women's 800 metres", "Athletics Women's Discus Throw",
                 "Athletics Women's Hammer Throw", "Athletics Women's Heptathlon",
                 "Athletics Women's High Jump", "Athletics Women's Javelin Throw",
                 "Athletics Women's Long Jump", "Athletics Women's Marathon",
                 "Athletics Women's Pentathlon", "Athletics Women's Pole Vault",
                 "Athletics Women's Shot Put", "Athletics Women's Triple Jump",
                 "Badminton Men's Doubles", "Badminton Men's Singles",
                 'Badminton Mixed Doubles', "Badminton Women's Doubles",
                 "Badminton Women's Singles", "Baseball Men's Baseball",
                 "Basketball Men's Basketball", "Basketball Women's Basketball",
                 "Basque Pelota Men's Two-Man Teams With Cesta",
                 "Beach Volleyball Men's Beach Volleyball",
                 "Beach Volleyball Women's Beach Volleyball",
                 "Boxing Men's Bantamweight", "Boxing Men's Featherweight",
                 "Boxing Men's Flyweight", "Boxing Men's Heavyweight",
                 "Boxing Men's Light-Flyweight", "Boxing Men's Light-Heavyweight",
                 "Boxing Men's Light-Middleweight",
                 "Boxing Men's Light-Welterweight", "Boxing Men's Lightweight",
                 "Boxing Men's Middleweight", "Boxing Men's Super-Heavyweight",
                 "Boxing Men's Welterweight", "Boxing Women's Flyweight",
                 "Boxing Women's Lightweight", "Boxing Women's Middleweight",
                 "Canoeing Men's Canadian Doubles, 1,000 metres",
                 "Canoeing Men's Canadian Doubles, 10,000 metres",
                 "Canoeing Men's Canadian Doubles, 500 metres",
                 "Canoeing Men's Canadian Doubles, Slalom",
                 "Canoeing Men's Canadian Singles, 1,000 metres",
                 "Canoeing Men's Canadian Singles, 10,000 metres",
                 "Canoeing Men's Canadian Singles, 200 metres",
                 "Canoeing Men's Canadian Singles, 500 metres",
                 "Canoeing Men's Canadian Singles, Slalom",
                 "Canoeing Men's Folding Kayak Doubles, 10 kilometres",
                 "Canoeing Men's Folding Kayak Singles, 10 kilometres",
                 "Canoeing Men's Kayak Doubles, 1,000 metres",
                 "Canoeing Men's Kayak Doubles, 10,000 metres",
                 "Canoeing Men's Kayak Doubles, 200 metres",
                 "Canoeing Men's Kayak Doubles, 500 metres",
                 "Canoeing Men's Kayak Fours, 1,000 metres",
                 "Canoeing Men's Kayak Relay 4 x 500 metres",
                 "Canoeing Men's Kayak Singles, 1,000 metres",
                 "Canoeing Men's Kayak Singles, 10,000 metres",
                 "Canoeing Men's Kayak Singles, 200 metres",
                 "Canoeing Men's Kayak Singles, 500 metres",
                 "Canoeing Men's Kayak Singles, Slalom",
                 "Canoeing Women's Kayak Doubles, 500 metres",
                 "Canoeing Women's Kayak Fours, 500 metres",
                 "Canoeing Women's Kayak Singles, 200 metres",
                 "Canoeing Women's Kayak Singles, 500 metres",
                 "Canoeing Women's Kayak Singles, Slalom", "Cricket Men's Cricket",
                 'Croquet Mixed Doubles', 'Croquet Mixed Singles, One Ball',
                 'Croquet Mixed Singles, Two Balls', "Cycling Men's 1 mile",
                 "Cycling Men's 1,000 metres Time Trial", "Cycling Men's 1/2 mile",
                 "Cycling Men's 1/3 mile", "Cycling Men's 1/4 mile",
                 "Cycling Men's 10,000 metres", "Cycling Men's 100 kilometres",
                 "Cycling Men's 100 kilometres Team Time Trial",
                 "Cycling Men's 12-Hours Race", "Cycling Men's 2 mile",
                 "Cycling Men's 20 kilometres", "Cycling Men's 25 kilometres",
                 "Cycling Men's 25 mile", "Cycling Men's 333 metres Time Trial",
                 "Cycling Men's 5 mile", "Cycling Men's 5,000 metres",
                 "Cycling Men's 50 kilometres", "Cycling Men's BMX",
                 "Cycling Men's Individual Pursuit, 4,000 metres",
                 "Cycling Men's Individual Time Trial", "Cycling Men's Keirin",
                 "Cycling Men's Madison",
                 "Cycling Men's Mountainbike, Cross-Country",
                 "Cycling Men's Omnium", "Cycling Men's Points Race",
                 "Cycling Men's Road Race, Individual",
                 "Cycling Men's Road Race, Team", "Cycling Men's Sprint",
                 "Cycling Men's Tandem Sprint, 2,000 metres",
                 "Cycling Men's Team Pursuit, 1,980 yards",
                 "Cycling Men's Team Pursuit, 4,000 metres",
                 "Cycling Men's Team Sprint",
                 "Cycling Women's 500 metres Time Trial", "Cycling Women's BMX",
                 "Cycling Women's Individual Pursuit, 3,000 metres",
                 "Cycling Women's Individual Time Trial", "Cycling Women's Keirin",
                 "Cycling Women's Mountainbike, Cross-Country",
                 "Cycling Women's Omnium", "Cycling Women's Points Race",
                 "Cycling Women's Road Race, Individual", "Cycling Women's Sprint",
                 "Cycling Women's Team Pursuit", "Cycling Women's Team Sprint",
                 "Diving Men's Plain High", "Diving Men's Platform",
                 "Diving Men's Springboard", "Diving Men's Synchronized Platform",
                 "Diving Men's Synchronized Springboard",
                 "Diving Women's Plain High", "Diving Women's Platform",
                 "Diving Women's Springboard",
                 "Diving Women's Synchronized Platform",
                 "Diving Women's Synchronized Springboard",
                 "Equestrianism Men's Dressage, Individual",
                 "Equestrianism Men's Dressage, Team",
                 "Equestrianism Men's Jumping, Individual",
                 "Equestrianism Men's Jumping, Team",
                 "Equestrianism Men's Three-Day Event, Individual",
                 "Equestrianism Men's Three-Day Event, Team",
                 "Equestrianism Men's Vaulting, Individual",
                 "Equestrianism Men's Vaulting, Team",
                 'Equestrianism Mixed Dressage, Individual',
                 'Equestrianism Mixed Dressage, Team',
                 'Equestrianism Mixed Four-In-Hand Competition',
                 'Equestrianism Mixed Hacks And Hunter Combined',
                 'Equestrianism Mixed High Jump',
                 'Equestrianism Mixed Jumping, Individual',
                 'Equestrianism Mixed Jumping, Team',
                 'Equestrianism Mixed Long Jump',
                 'Equestrianism Mixed Three-Day Event, Individual',
                 'Equestrianism Mixed Three-Day Event, Team',
                 "Fencing Men's Foil, Individual",
                 "Fencing Men's Foil, Masters, Individual",
                 "Fencing Men's Foil, Team", "Fencing Men's Sabre, Individual",
                 "Fencing Men's Sabre, Individual, Three Hits",
                 "Fencing Men's Sabre, Masters, Individual",
                 "Fencing Men's Sabre, Team",
                 "Fencing Men's Single Sticks, Individual",
                 "Fencing Men's epee, Individual",
                 "Fencing Men's epee, Masters and Amateurs, Individual",
                 "Fencing Men's epee, Masters, Individual",
                 "Fencing Men's epee, Team", "Fencing Women's Foil, Individual",
                 "Fencing Women's Foil, Team", "Fencing Women's Sabre, Individual",
                 "Fencing Women's Sabre, Team", "Fencing Women's epee, Individual",
                 "Fencing Women's epee, Team", "Figure Skating Men's Singles",
                 "Figure Skating Men's Special Figures",
                 'Figure Skating Mixed Pairs', "Figure Skating Women's Singles",
                 "Football Men's Football", "Football Women's Football",
                 "Golf Men's Individual", "Golf Men's Team",
                 "Golf Women's Individual", "Gymnastics Men's Club Swinging",
                 "Gymnastics Men's Floor Exercise",
                 "Gymnastics Men's Horizontal Bar",
                 "Gymnastics Men's Horizontal Bar, Teams",
                 "Gymnastics Men's Horse Vault",
                 "Gymnastics Men's Individual All-Around",
                 "Gymnastics Men's Individual All-Around, 4 Events",
                 "Gymnastics Men's Individual All-Around, 5 Events",
                 "Gymnastics Men's Individual All-Around, Apparatus Work",
                 "Gymnastics Men's Individual All-Around, Field Sports",
                 "Gymnastics Men's Parallel Bars",
                 "Gymnastics Men's Parallel Bars, Teams",
                 "Gymnastics Men's Pommelled Horse", "Gymnastics Men's Rings",
                 "Gymnastics Men's Rope Climbing", "Gymnastics Men's Side Horse",
                 "Gymnastics Men's Team All-Around",
                 "Gymnastics Men's Team All-Around, Free System",
                 "Gymnastics Men's Team All-Around, Swedish System",
                 "Gymnastics Men's Tumbling", "Gymnastics Women's Balance Beam",
                 "Gymnastics Women's Floor Exercise",
                 "Gymnastics Women's Horse Vault",
                 "Gymnastics Women's Individual All-Around",
                 "Gymnastics Women's Team All-Around",
                 "Gymnastics Women's Team Portable Apparatus",
                 "Gymnastics Women's Uneven Bars", "Handball Men's Handball",
                 "Handball Women's Handball", "Hockey Men's Hockey",
                 "Hockey Women's Hockey", "Ice Hockey Men's Ice Hockey",
                 "Jeu De Paume Men's Singles", "Judo Men's Extra-Lightweight",
                 "Judo Men's Half-Heavyweight", "Judo Men's Half-Lightweight",
                 "Judo Men's Half-Middleweight", "Judo Men's Heavyweight",
                 "Judo Men's Lightweight", "Judo Men's Middleweight",
                 "Judo Men's Open Class", "Judo Women's Extra-Lightweight",
                 "Judo Women's Half-Heavyweight", "Judo Women's Half-Lightweight",
                 "Judo Women's Half-Middleweight", "Judo Women's Heavyweight",
                 "Judo Women's Lightweight", "Judo Women's Middleweight",
                 "Lacrosse Men's Lacrosse", "Modern Pentathlon Men's Individual",
                 "Modern Pentathlon Men's Team",
                 "Modern Pentathlon Women's Individual",
                 'Motorboating Mixed A-Class (Open)',
                 'Motorboating Mixed B-Class (Under 60 Feet)',
                 'Motorboating Mixed C-Class', "Polo Men's Polo",
                 "Racquets Men's Doubles", "Racquets Men's Singles",
                 "Rhythmic Gymnastics Women's Group",
                 "Rhythmic Gymnastics Women's Individual", "Roque Men's Singles",
                 "Rowing Men's 17-Man Naval Rowing Boats",
                 "Rowing Men's 6-Man Naval Rowing Boats",
                 "Rowing Men's Coxed Eights", "Rowing Men's Coxed Fours",
                 "Rowing Men's Coxed Fours, Inriggers",
                 "Rowing Men's Coxed Fours, Outriggers", "Rowing Men's Coxed Pairs",
                 "Rowing Men's Coxed Pairs (1 kilometres)",
                 "Rowing Men's Coxed Pairs (1 mile)", "Rowing Men's Coxless Fours",
                 "Rowing Men's Coxless Pairs", "Rowing Men's Double Sculls",
                 "Rowing Men's Lightweight Coxless Fours",
                 "Rowing Men's Lightweight Double Sculls",
                 "Rowing Men's Quadruple Sculls", "Rowing Men's Single Sculls",
                 "Rowing Women's Coxed Eights", "Rowing Women's Coxed Fours",
                 "Rowing Women's Coxed Quadruple Sculls",
                 "Rowing Women's Coxless Fours", "Rowing Women's Coxless Pairs",
                 "Rowing Women's Double Sculls",
                 "Rowing Women's Lightweight Double Sculls",
                 "Rowing Women's Quadruple Sculls", "Rowing Women's Single Sculls",
                 "Rugby Men's Rugby", "Rugby Sevens Men's Rugby Sevens",
                 "Rugby Sevens Women's Rugby Sevens",
                 "Sailing Men's One Person Dinghy",
                 "Sailing Men's One Person Heavyweight Dinghy",
                 "Sailing Men's Skiff", "Sailing Men's Two Person Dinghy",
                 "Sailing Men's Two Person Keelboat", "Sailing Men's Windsurfer",
                 'Sailing Mixed 0-0.5 Ton', 'Sailing Mixed 0.5-1 Ton',
                 'Sailing Mixed 1-2 Ton', 'Sailing Mixed 10 metres',
                 'Sailing Mixed 10-20 Ton', 'Sailing Mixed 12 foot',
                 'Sailing Mixed 12 metres', 'Sailing Mixed 18 foot',
                 'Sailing Mixed 2-3 Ton', 'Sailing Mixed 20+ Ton',
                 'Sailing Mixed 3-10 Ton', 'Sailing Mixed 30 metres',
                 'Sailing Mixed 40 metres', 'Sailing Mixed 5.5 metres',
                 'Sailing Mixed 6 metres', 'Sailing Mixed 6.5 metres',
                 'Sailing Mixed 7 metres', 'Sailing Mixed 8 metres',
                 'Sailing Mixed Multihull', 'Sailing Mixed One Person Dinghy',
                 'Sailing Mixed Open', 'Sailing Mixed Skiff',
                 'Sailing Mixed Three Person Keelboat',
                 'Sailing Mixed Two Person Dinghy',
                 'Sailing Mixed Two Person Heavyweight Dinghy',
                 'Sailing Mixed Two Person Keelboat', 'Sailing Mixed Windsurfer',
                 "Sailing Women's One Person Dinghy", "Sailing Women's Skiff",
                 "Sailing Women's Three Person Keelboat",
                 "Sailing Women's Two Person Dinghy", "Sailing Women's Windsurfer",
                 "Shooting Men's Air Pistol, 10 metres",
                 "Shooting Men's Air Rifle, 10 metres",
                 "Shooting Men's Double Trap",
                 "Shooting Men's Dueling Pistol Au Commandement, 25 metres",
                 "Shooting Men's Dueling Pistol Au Vise 20 metres",
                 "Shooting Men's Dueling Pistol, 30 metres",
                 "Shooting Men's Dueling Pistol, 30 metres, Team",
                 "Shooting Men's Free Pistol, 25 metres",
                 "Shooting Men's Free Pistol, 30 metres",
                 "Shooting Men's Free Pistol, 50 metres",
                 "Shooting Men's Free Pistol, 50 metres, Team",
                 "Shooting Men's Free Pistol, 50 yards",
                 "Shooting Men's Free Pistol, 50 yards, Team",
                 "Shooting Men's Free Rifle, 1,000 Yards",
                 "Shooting Men's Free Rifle, 400, 600 and 800 metres, Team",
                 "Shooting Men's Free Rifle, Any Position, 300 metres",
                 "Shooting Men's Free Rifle, Kneeling, 300 metres",
                 "Shooting Men's Free Rifle, Prone, 300 metres",
                 "Shooting Men's Free Rifle, Prone, 600 metres",
                 "Shooting Men's Free Rifle, Standing, 300 metres",
                 "Shooting Men's Free Rifle, Three Positions, 300 metres",
                 "Shooting Men's Free Rifle, Three Positions, 300 metres, Team",
                 "Shooting Men's Military Pistol, 25 metres",
                 "Shooting Men's Military Pistol, 30 metres",
                 "Shooting Men's Military Pistol, Team",
                 "Shooting Men's Military Revolver, 1873-1874 Gras Model, 20 metres",
                 "Shooting Men's Military Revolver, 20 metres",
                 "Shooting Men's Military Rifle, 1873-1874 Gras Model, Kneeling Or Standing, 200 metres",
                 "Shooting Men's Military Rifle, 200 metres",
                 "Shooting Men's Military Rifle, 200, 400, 500 and 600 metres, Team",
                 "Shooting Men's Military Rifle, 200/500/600/800/900/1,000 Yards, Team",
                 "Shooting Men's Military Rifle, 300 metres and 600 metres, Prone, Team",
                 "Shooting Men's Military Rifle, Any Position, 600 metres",
                 "Shooting Men's Military Rifle, Kneeling Or Standing, 300 metres",
                 "Shooting Men's Military Rifle, Prone, 300 metres",
                 "Shooting Men's Military Rifle, Prone, 300 metres, Team",
                 "Shooting Men's Military Rifle, Prone, 600 metres",
                 "Shooting Men's Military Rifle, Prone, 600 metres, Team",
                 "Shooting Men's Military Rifle, Standing, 300 metres",
                 "Shooting Men's Military Rifle, Standing, 300 metres, Team",
                 "Shooting Men's Military Rifle, Three Positions, 300 metres",
                 "Shooting Men's Muzzle-Loading Pistol, 25 metres",
                 "Shooting Men's Rapid-Fire Pistol, 25 metres",
                 "Shooting Men's Running Target, 10 metres",
                 "Shooting Men's Running Target, 50 metres",
                 "Shooting Men's Running Target, Double Shot",
                 "Shooting Men's Running Target, Double Shot, Team",
                 "Shooting Men's Running Target, Single And Double Shot",
                 "Shooting Men's Running Target, Single Shot",
                 "Shooting Men's Running Target, Single Shot, Team",
                 "Shooting Men's Skeet",
                 "Shooting Men's Small Bore-Rifle, Standing, 50 metres, Team",
                 "Shooting Men's Small-Bore Rifle, 50 and 100 yards, Team",
                 "Shooting Men's Small-Bore Rifle, Any Position, 50 metres",
                 "Shooting Men's Small-Bore Rifle, Disappearing Target, 25 metres",
                 "Shooting Men's Small-Bore Rifle, Disappearing Target, 25 metres, Team",
                 "Shooting Men's Small-Bore Rifle, Disappearing Target, 25 yards",
                 "Shooting Men's Small-Bore Rifle, Moving Target, 25 yards",
                 "Shooting Men's Small-Bore Rifle, Prone, 50 and 100 yards",
                 "Shooting Men's Small-Bore Rifle, Prone, 50 metres",
                 "Shooting Men's Small-Bore Rifle, Prone, 50 metres, Team",
                 "Shooting Men's Small-Bore Rifle, Standing, 50 metres",
                 "Shooting Men's Small-Bore Rifle, Three Positions, 50 metres",
                 "Shooting Men's Trap",
                 "Shooting Men's Trap, Double Shot, 14 metres",
                 "Shooting Men's Trap, Single Shot, 16 metres",
                 "Shooting Men's Trap, Team", "Shooting Men's Unknown Event",
                 'Shooting Mixed Free Pistol, 50 metres',
                 'Shooting Mixed Free Rifle, Three Positions, 300 metres',
                 'Shooting Mixed Rapid-Fire Pistol, 25 metres',
                 'Shooting Mixed Running Target, 50 metres', 'Shooting Mixed Skeet',
                 'Shooting Mixed Small-Bore Rifle, Prone, 50 metres',
                 'Shooting Mixed Small-Bore Rifle, Three Positions, 50 metres',
                 'Shooting Mixed Trap', "Shooting Women's Air Pistol, 10 metres",
                 "Shooting Women's Air Rifle, 10 metres",
                 "Shooting Women's Double Trap", "Shooting Women's Skeet",
                 "Shooting Women's Small-Bore Rifle, Three Positions, 50 metres",
                 "Shooting Women's Sporting Pistol, 25 metres",
                 "Shooting Women's Trap", "Softball Women's Softball",
                 "Swimming Men's 1,000 metres Freestyle",
                 "Swimming Men's 1,200 metres Freestyle",
                 "Swimming Men's 1,500 metres Freestyle",
                 "Swimming Men's 10 kilometres Open Water",
                 "Swimming Men's 100 Yard Backstroke",
                 "Swimming Men's 100 metres Backstroke",
                 "Swimming Men's 100 metres Breaststroke",
                 "Swimming Men's 100 metres Butterfly",
                 "Swimming Men's 100 metres Freestyle",
                 "Swimming Men's 100 metres Freestyle For Sailors",
                 "Swimming Men's 100 yard Freestyle",
                 "Swimming Men's 200 metres Backstroke",
                 "Swimming Men's 200 metres Breaststroke",
                 "Swimming Men's 200 metres Butterfly",
                 "Swimming Men's 200 metres Freestyle",
                 "Swimming Men's 200 metres Individual Medley",
                 "Swimming Men's 200 metres Obstacle Course",
                 "Swimming Men's 200 metres Team Swimming",
                 "Swimming Men's 220 yard Freestyle",
                 "Swimming Men's 4 x 100 metres Freestyle Relay",
                 "Swimming Men's 4 x 100 metres Medley Relay",
                 "Swimming Men's 4 x 200 metres Freestyle Relay",
                 "Swimming Men's 4 x 250 metres Freestyle Relay",
                 "Swimming Men's 4 x 50 Yard Freestyle Relay",
                 "Swimming Men's 4,000 metres Freestyle",
                 "Swimming Men's 400 metres Breaststroke",
                 "Swimming Men's 400 metres Freestyle",
                 "Swimming Men's 400 metres Individual Medley",
                 "Swimming Men's 440 Yard Breaststroke",
                 "Swimming Men's 440 yard Freestyle",
                 "Swimming Men's 50 metres Freestyle",
                 "Swimming Men's 50 yard Freestyle",
                 "Swimming Men's 500 metres Freestyle",
                 "Swimming Men's 880 yard Freestyle",
                 "Swimming Men's One Mile Freestyle",
                 "Swimming Men's Plunge For Distance",
                 "Swimming Men's Underwater Swimming",
                 "Swimming Women's 10 kilometres Open Water",
                 "Swimming Women's 100 metres Backstroke",
                 "Swimming Women's 100 metres Breaststroke",
                 "Swimming Women's 100 metres Butterfly",
                 "Swimming Women's 100 metres Freestyle",
                 "Swimming Women's 200 metres Backstroke",
                 "Swimming Women's 200 metres Breaststroke",
                 "Swimming Women's 200 metres Butterfly",
                 "Swimming Women's 200 metres Freestyle",
                 "Swimming Women's 200 metres Individual Medley",
                 "Swimming Women's 300 metres Freestyle",
                 "Swimming Women's 4 x 100 metres Freestyle Relay",
                 "Swimming Women's 4 x 100 metres Medley Relay",
                 "Swimming Women's 4 x 200 metres Freestyle Relay",
                 "Swimming Women's 400 metres Freestyle",
                 "Swimming Women's 400 metres Individual Medley",
                 "Swimming Women's 50 metres Freestyle",
                 "Swimming Women's 800 metres Freestyle",
                 "Synchronized Swimming Women's Duet",
                 "Synchronized Swimming Women's Solo",
                 "Synchronized Swimming Women's Team", "Table Tennis Men's Doubles",
                 "Table Tennis Men's Singles", "Table Tennis Men's Team",
                 "Table Tennis Women's Doubles", "Table Tennis Women's Singles",
                 "Table Tennis Women's Team", "Taekwondo Men's Featherweight",
                 "Taekwondo Men's Flyweight", "Taekwondo Men's Heavyweight",
                 "Taekwondo Men's Welterweight", "Taekwondo Women's Featherweight",
                 "Taekwondo Women's Flyweight", "Taekwondo Women's Heavyweight",
                 "Taekwondo Women's Welterweight", "Tennis Men's Doubles",
                 "Tennis Men's Doubles, Covered Courts", "Tennis Men's Singles",
                 "Tennis Men's Singles, Covered Courts", 'Tennis Mixed Doubles',
                 'Tennis Mixed Doubles, Covered Courts', "Tennis Women's Doubles",
                 "Tennis Women's Singles", "Tennis Women's Singles, Covered Courts",
                 "Trampolining Men's Individual", "Trampolining Women's Individual",
                 "Triathlon Men's Olympic Distance",
                 "Triathlon Women's Olympic Distance",
                 "Tug-Of-War Men's Tug-Of-War", "Volleyball Men's Volleyball",
                 "Volleyball Women's Volleyball", "Water Polo Men's Water Polo",
                 "Water Polo Women's Water Polo",
                 "Weightlifting Men's All-Around Dumbbell Contest",
                 "Weightlifting Men's Bantamweight",
                 "Weightlifting Men's Featherweight",
                 "Weightlifting Men's Flyweight", "Weightlifting Men's Heavyweight",
                 "Weightlifting Men's Heavyweight I",
                 "Weightlifting Men's Heavyweight II",
                 "Weightlifting Men's Light-Heavyweight",
                 "Weightlifting Men's Lightweight",
                 "Weightlifting Men's Middle-Heavyweight",
                 "Weightlifting Men's Middleweight",
                 "Weightlifting Men's Super-Heavyweight",
                 "Weightlifting Men's Unlimited, One Hand",
                 "Weightlifting Men's Unlimited, Two Hands",
                 "Weightlifting Women's Featherweight",
                 "Weightlifting Women's Flyweight",
                 "Weightlifting Women's Heavyweight",
                 "Weightlifting Women's Light-Heavyweight",
                 "Weightlifting Women's Lightweight",
                 "Weightlifting Women's Middleweight",
                 "Weightlifting Women's Super-Heavyweight",
                 "Wrestling Men's All-Around, Greco-Roman",
                 "Wrestling Men's Bantamweight, Freestyle",
                 "Wrestling Men's Bantamweight, Greco-Roman",
                 "Wrestling Men's Featherweight, Freestyle",
                 "Wrestling Men's Featherweight, Greco-Roman",
                 "Wrestling Men's Flyweight, Freestyle",
                 "Wrestling Men's Flyweight, Greco-Roman",
                 "Wrestling Men's Heavyweight, Freestyle",
                 "Wrestling Men's Heavyweight, Greco-Roman",
                 "Wrestling Men's Light-Flyweight, Freestyle",
                 "Wrestling Men's Light-Flyweight, Greco-Roman",
                 "Wrestling Men's Light-Heavyweight, Freestyle",
                 "Wrestling Men's Light-Heavyweight, Greco-Roman",
                 "Wrestling Men's Lightweight, Freestyle",
                 "Wrestling Men's Lightweight, Greco-Roman",
                 "Wrestling Men's Middleweight A, Greco-Roman",
                 "Wrestling Men's Middleweight B, Greco-Roman",
                 "Wrestling Men's Middleweight, Freestyle",
                 "Wrestling Men's Middleweight, Greco-Roman",
                 "Wrestling Men's Super-Heavyweight, Freestyle",
                 "Wrestling Men's Super-Heavyweight, Greco-Roman",
                 "Wrestling Men's Unlimited Class, Greco-Roman",
                 "Wrestling Men's Welterweight, Freestyle",
                 "Wrestling Men's Welterweight, Greco-Roman",
                 "Wrestling Women's Featherweight, Freestyle",
                 "Wrestling Women's Flyweight, Freestyle",
                 "Wrestling Women's Heavyweight, Freestyle",
                 "Wrestling Women's Light-Heavyweight, Freestyle",
                 "Wrestling Women's Lightweight, Freestyle",
                 "Wrestling Women's Middleweight, Freestyle"], dtype=object)
```

Obtenha a lista de todos os países que já disputaram olimpíadas.

In [291…

```
# Temos apenas que remover os refugiados
dfPaises = dfAtletasVerao[dfAtletasVerao['NOC'] != 'ROT'].sort_values('País')
dfPaises['País'].unique()
```

Out[291]:

```
array(['Afghanistan', 'Albania', 'Algeria', 'American Samoa', 'Andorra',
       'Angola', 'Antigua', 'Argentina', 'Armenia', 'Aruba', 'Australia',
       'Austria', 'Azerbaijan', 'Bahamas', 'Bahrain', 'Bangladesh',
       'Barbados', 'Belarus', 'Belgium', 'Belize', 'Benin', 'Bermuda',
       'Bhutan', 'Boliva', 'Bosnia and Herzegovina', 'Botswana', 'Brazil',
       'Brunei', 'Bulgaria', 'Burkina Faso', 'Burundi', 'Cambodia',
       'Cameroon', 'Canada', 'Cape Verde', 'Cayman Islands',
       'Central African Republic', 'Chad', 'Chile', 'China', 'Colombia',
       'Comoros', 'Cook Islands', 'Costa Rica', 'Croatia', 'Cuba',
       'Curacao', 'Cyprus', 'Czech Republic',
       'Democratic Republic of the Congo', 'Denmark', 'Djibouti',
       'Dominica', 'Dominican Republic', 'Ecuador', 'Egypt',
       'El Salvador', 'Equatorial Guinea', 'Eritrea', 'Estonia',
       'Ethiopia', 'Fiji', 'Finland', 'France', 'Gabon', 'Gambia',
       'Georgia', 'Germany', 'Ghana', 'Greece', 'Grenada', 'Guam',
       'Guatemala', 'Guinea', 'Guinea-Bissau', 'Guyana', 'Haiti',
       'Honduras', 'Hungary', 'Iceland', 'India',
       'Individual Olympic Athletes', 'Indonesia', 'Iran', 'Iraq',
       'Ireland', 'Israel', 'Italy', 'Ivory Coast', 'Jamaica', 'Japan',
       'Jordan', 'Kazakhstan', 'Kenya', 'Kiribati', 'Kosovo', 'Kuwait',
       'Kyrgyzstan', 'Laos', 'Latvia', 'Lebanon', 'Lesotho', 'Liberia',
       'Libya', 'Liechtenstein', 'Lithuania', 'Luxembourg', 'Macedonia',
       'Madagascar', 'Malawi', 'Malaysia', 'Maldives', 'Mali', 'Malta',
       'Marshall Islands', 'Mauritania', 'Mauritius', 'Mexico',
       'Micronesia', 'Moldova', 'Monaco', 'Mongolia', 'Montenegro',
       'Morocco', 'Mozambique', 'Myanmar', 'Namibia', 'Nauru', 'Nepal',
       'Netherlands', 'New Zealand', 'Nicaragua', 'Niger', 'Nigeria',
       'North Korea', 'Norway', 'Oman', 'Pakistan', 'Palau', 'Palestine',
       'Panama', 'Papua New Guinea', 'Paraguay', 'Peru', 'Philippines',
       'Poland', 'Portugal', 'Puerto Rico', 'Qatar', 'Republic of Congo',
       'Romania', 'Russia', 'Rwanda', 'Saint Kitts', 'Saint Lucia',
       'Saint Vincent', 'Samoa', 'San Marino', 'Sao Tome and Principe',
       'Saudi Arabia', 'Senegal', 'Serbia', 'Seychelles', 'Sierra Leone',
       'Slovakia', 'Slovenia', 'Solomon Islands', 'Somalia',
       'South Africa', 'South Korea', 'South Sudan', 'Spain', 'Sri Lanka',
       'Sudan', 'Suriname', 'Swaziland', 'Sweden', 'Switzerland', 'Syria',
       'Taiwan', 'Tajikistan', 'Tanzania', 'Thailand', 'Timor-Leste',
       'Togo', 'Tonga', 'Trinidad', 'Tunisia', 'Turkey', 'Turkmenistan',
       'Tuvalu', 'UK', 'USA', 'Uganda', 'Ukraine', 'United Arab Emirates',
       'Uruguay', 'Uzbekistan', 'Vanuatu', 'Venezuela', 'Vietnam',
       'Virgin Islands, British', 'Virgin Islands, US', 'Yemen', 'Zambia',
       'Zimbabwe', nan], dtype=object)
```

Qual atleta foi o maior medalhista (em medalhas totais) da história das olimpíadas de verão?

In [292…

```
# Basta agrupar por nome e filtrar aquele com a maior quantidade de medalhas
dfMaioresMedMundo = dfAtletasVerao.groupby(['Nome','Esporte','NOC']).sum()
dfMaiorMedMundo = dfMaioresMedMundo[dfMaioresMedMundo['Total'] == dfMaioresMedMundo['Total'].max()]
dfMaiorMedMundo
```

Out[292]:

			Idade	Altura	Peso	Ano	Ouros	Pratas	Bronzes	Total	Ordem
Nome	**Esporte**	**NOC**									
Michael Fred Phelps, II	**Swimming**	**USA**	726.0	5790.0	2730.0	60276	23	3	2	28	43

Resposta: Michael Phelps (EUA) - com 28 medalhas

Qual atleta foi o maior medalhista de ouro da história das olimpíadas de verão?

In [293…

```
# Basta agrupar por nome e filtrar aquele com a maior quantidade de medalhas de ouro
dfMaiorOuroMundo = dfMaioresMedMundo[dfMaioresMedMundo['Ouros'] == dfMaioresMedMundo['Ouros'].max()]
dfMaiorOuroMundo
```

Out[293]:

			Idade	Altura	Peso	Ano	Ouros	Pratas	Bronzes	Total	Ordem
Nome	**Esporte**	**NOC**									
Michael Fred Phelps, II	**Swimming**	**USA**	726.0	5790.0	2730.0	60276	23	3	2	28	43

Resposta: Também Michael Phelps, com 23 medalhas de ouro.

Qual país foi o maior medalhista de ouro da história das olimpíadas de verão? Lembre-se da questão do evento esportivo, para não considerar múltiplas medalhas para um mesmo evento (ex: uma equipe de futebol fazendo parecer que mais de 20 medalhas foram distribuídas).

In [294…

```
dfQuadroMedVerao = dfQuadroMedalhas[dfQuadroMedalhas['Temporada']=='Summer']
dfMedPais = dfQuadroMedVerao.groupby(by='NOC').sum()
dfMedPais = dfMedPais.drop(['Ano','Ordem'],axis=1)
dfMedPais[dfMedPais['Ouros'] == dfMedPais['Ouros'].max()]
```

Out[294]:

	Ouros	Pratas	Bronzes	Total
NOC				
USA	1035	802	707	2544

Resposta: Estados Unidos, com 1035 medalhas de ouro.

Qual país foi o maior medalhista em medalhas totais na história das olimpíadas de verão?

In [295…

```
dfMedPais[dfMedPais['Total'] == dfMedPais['Total'].max()]
```

Out[295]:

	Ouros	Pratas	Bronzes	Total
NOC				
USA	1035	802	707	2544

Resposta: Estados Unidos, com 2544 medalhas no total.

Obtenha o total de medalhas de ouro, prata e total por edição das Olimpíadas de verão. Lembre-se da questão do evento esportivo.

In [296…

```
dfMedEdicao = dfQuadroMedVerao.groupby(by='Ano').sum()
dfMedEdicao = dfMedEdicao.drop('Ordem', axis=1)
dfMedEdicao
```

Out[296]:

	Ouros	Pratas	Bronzes	Total
Ano				
1896	44	41	35	120
1900	101	98	92	291
1904	97	93	89	279
1906	74	77	73	224
1908	109	106	105	320
1912	108	104	104	316
1920	155	152	139	446
1924	129	131	131	391
1928	119	118	119	356
1932	125	125	120	370
1936	141	140	141	422
1948	144	146	149	439
1952	149	151	157	457
1956	153	153	161	467
1960	152	149	160	461
1964	163	166	172	501
1968	174	170	183	527
1972	195	195	210	600
1976	198	199	216	613
1980	204	204	223	631
1984	224	218	243	685
1988	240	234	264	738
1992	260	257	296	813
1996	271	273	297	841
2000	299	300	326	925
2004	301	300	326	927
2008	302	302	353	957
2012	302	304	356	962

	Ouros	Pratas	Bronzes	Total
Ano				
2016	307	306	360	973

3. Brasil vs Mundo

Para finalizar, vamos fazer algumas comparações entre Brasil e mundo. Qual o ranking do Brasil em cada edição das olimpíadas? Lembrando que o ranking é ordenado por medalhas de ouro.

In [297…

```
# Agrupamos o quadro de medalhas das olimpíadas de verão por ano e país, somando as medalhas de todos os esportes e categorias
dfRanking = dfQuadroMedVerao.groupby(['Ano','NOC']).sum()
# Ordenamos por ano e quantidade decrescente de medalhas (1º = mais ouros)
dfRanking = dfRanking.sort_values(['Ano','Ouros','Pratas','Bronzes'], ascending=[True,False,False,False])

# Agora, ano a ano, atualizamos o ranking de cada país
anoAnterior = 0
rank = 0
for linha_ano in dfRanking.iterrows():
    ano = linha_ano[0][0]   # Ano  (edição)
    noc = linha_ano[0][1]   # País (NOC)
    if ano != anoAnterior:
        anoAnterior = ano   # Reiniciamos a cada ano
        rank = 0
    rank += 1
    dfRanking.loc[ano,noc]['Ordem'] = rank  # Atualizamos o ranking na coluna Ordem. Não é necessário adicionar outra!

# Redefinimos o índice para podermos pesquisar/filtrar por ano e país
dfRanking = dfRanking.reset_index()

# Agora listamos só as entradas referentes ao Brasil
dfRanking[(dfRanking['NOC']=='BRA')]
```

Out[297]:

	Ano	NOC	Ouros	Pratas	Bronzes	Total	Ordem
37	1900	BRA	0	0	0	0	26
143	1920	BRA	1	1	1	3	15
189	1924	BRA	0	0	0	0	32
277	1932	BRA	0	0	0	0	29
331	1936	BRA	0	0	0	0	36
379	1948	BRA	0	0	1	1	35
427	1952	BRA	1	0	2	3	24
496	1956	BRA	1	0	0	1	24
583	1960	BRA	0	0	2	2	39
663	1964	BRA	0	0	1	1	35
756	1968	BRA	0	1	2	3	35
874	1972	BRA	0	0	2	2	41
990	1976	BRA	0	0	2	2	36
1063	1980	BRA	2	0	2	4	17
1145	1984	BRA	1	5	2	8	19
1290	1988	BRA	1	2	3	6	24
1450	1992	BRA	2	1	0	3	25
1619	1996	BRA	3	3	9	15	25
1844	2000	BRA	0	6	6	12	53
2007	2004	BRA	5	2	3	10	16
2215	2008	BRA	3	4	9	16	23
2418	2012	BRA	3	5	9	17	22
2614	2016	BRA	7	6	6	19	13

Compare o maior medalhista em ouros do Brasil com o maior medalhista em ouros do mundo.

In [298…

```
# Gerando uma tabela com os atletas do Brasil e do mundo concatenados
dfMaioresOurosBR = dfMaioresOurosBR.reset_index()
dfMaioresOurosBR = dfMaioresOurosBR[['Esporte','Nome','Ouros']]
dfMaioresOurosBR['NOC'] = 'BRA'
dfMaioresOurosBR.set_index('Esporte', inplace=True)
```

```
dfMaiorOuroMundo = dfMaiorOuroMundo.reset_index()
dfMaiorOuroMundo = dfMaiorOuroMundo[['Esporte','NOC','Nome','Ouros']]
dfMaiorOuroMundo.set_index('Esporte', inplace=True)

dfCompOuro = dfMaiorOuroMundo.merge(dfMaioresOurosBR,how='outer')
dfCompOuro
```

Out[298]:

	NOC	Nome	Ouros
0	USA	Michael Fred Phelps, II	23
1	BRA	Adhemar Ferreira da Silva	2
2	BRA	Fabiana "Fabi" Alvim de Oliveira	2
3	BRA	Fabiana Marcelino Claudino	2
4	BRA	Giovane Farinazzo Gvio	2
5	BRA	Jaqueline Maria "Jaque" Pereira de Carvalho En...	2
6	BRA	Marcelo Bastos Ferreira	2
7	BRA	Maurcio Camargo Lima	2
8	BRA	Paula Renata Marques Pequeno	2
9	BRA	Robert Scheidt	2
10	BRA	Sheilla Tavares de Castro Blassioli	2
11	BRA	Srgio "Escadinha" Dutra dos Santos	2
12	BRA	Thasa Daher de Menezes	2
13	BRA	Torben Schmidt Grael	2

Resposta: Michael Phelps (EUA) tem mais que 11 vezes o número de medalhas de ouro dos maiores medalhistas brasileiros.

Compare o maior medalhista em total de medalhas do Brasil com o maior medalhista em total de medalhas do mundo.

In [299…

```
# Gerando uma tabela com os atletas do Brasil e do mundo concatenados
dfMaioresMedBR = dfMaioresMedBR.reset_index()
dfMaioresMedBR = dfMaioresMedBR[['Esporte','Nome','Total']]
dfMaioresMedBR['NOC'] = 'BRA'
dfMaioresMedBR.set_index('Esporte', inplace=True)

dfMaiorMedMundo = dfMaiorMedMundo.reset_index()
dfMaiorMedMundo = dfMaiorMedMundo[['Esporte','NOC','Nome','Total']]
dfMaiorMedMundo.set_index('Esporte', inplace=True)

dfCompTotal = dfMaiorMedMundo.merge(dfMaioresMedBR,how='outer')
dfCompTotal
```

Out[299]:

	NOC	Nome	Total
0	USA	Michael Fred Phelps, II	28
1	BRA	Robert Scheidt	5
2	BRA	Torben Schmidt Grael	5

Michael Phelps (EUA) tem mais que 5 vezes o número de medalhas que os maiores medalhistas brasileiros.

Compare o maior medalhista em ouros do Brasil com o maior medalhista do mundo no mesmo esporte.

In [300…

```
dfMaioresOurosBR
```

Out[300]:

	Nome	Ouros	NOC
Esporte			
Athletics	Adhemar Ferreira da Silva	2	BRA
Volleyball	Fabiana "Fabi" Alvim de Oliveira	2	BRA
Volleyball	Fabiana Marcelino Claudino	2	BRA
Volleyball	Giovane Farinazzo Gvio	2	BRA
Volleyball	Jaqueline Maria "Jaque" Pereira de Carvalho En...	2	BRA
Sailing	Marcelo Bastos Ferreira	2	BRA
Volleyball	Maurcio Camargo Lima	2	BRA
Volleyball	Paula Renata Marques Pequeno	2	BRA
Sailing	Robert Scheidt	2	BRA
Volleyball	Sheilla Tavares de Castro Blassioli	2	BRA
Volleyball	Srgio "Escadinha" Dutra dos Santos	2	BRA
Volleyball	Thasa Daher de Menezes	2	BRA
Sailing	Torben Schmidt Grael	2	BRA

In [301…

```
# Obtemos a relação de esportes dos maiores medalhistas de ouro do Brasil
esportesMaisOurosBR = dfMaioresOurosBR.reset_index()['Esporte'].unique()

# Criamos um DataFrame com as mesmas colunas do DataFrame de atletas brasileiros, contendo apenas aqueles
# atletas dos outros países que praticam os mesmos esportes
dfCompMundo = dfMaioresMedMundo.reset_index()
dfCompMundo = dfCompMundo[['Esporte','Nome','Ouros','NOC']]
dfCompMundo = dfCompMundo[dfCompMundo['Esporte'].isin(esportesMaisOurosBR)]
```

```python
# Obtemos o maior número de ouros por esporte, considerando apenas esses atletas do mundo
dfMaiorOurosEsporteMundo = dfCompMundo[['Esporte','Ouros']].groupby('Esporte').max()

# Para cada atleta, adicionamos uma coluna 'Ouros_max' contendo a maior quantidade de ouros que um atleta
# recebeu naquele esporte
dfCompMundo = dfCompMundo.join(dfMaiorOurosEsporteMundo, on=['Esporte'], how='inner', rsuffix='_max')

# Filtramos apenas aqueles atletas que ganharam o número máximo de medalhas daquele esporte
# e removemos a coluna 'Ouros_max' que não é mais necessária
dfCompMundo = dfCompMundo[dfCompMundo['Ouros'] == dfCompMundo['Ouros_max']]
dfCompMundo = dfCompMundo.drop('Ouros_max', axis=1)

# Juntamos os atletas brasileiros com os maiores medalhistas dos outros países, ordenamos por esporte e apresentamos
# o resultado
dfMaioresBR = dfMaioresOurosBR.reset_index()
dfCompMundo = dfCompMundo.merge(dfMaioresBR, how='outer')
dfCompMundo = dfCompMundo.sort_values(['Esporte','Ouros'],ascending=[True,False])
dfCompMundo
```

Out[301]:

	Esporte	Nome	Ouros	NOC
0	Athletics	Raymond Clarence "Ray" Ewry	10	USA
7	Athletics	Adhemar Ferreira da Silva	2	BRA
1	Sailing	Charles Benedict "Ben" Ainslie	4	GBR
2	Sailing	Paul Bert Elvstrm	4	DEN
12	Sailing	Marcelo Bastos Ferreira	2	BRA
15	Sailing	Robert Scheidt	2	BRA
19	Sailing	Torben Schmidt Grael	2	BRA
3	Volleyball	Alejandrina Mireya Luis Hernndez	3	CUB
4	Volleyball	Marlenis Costa Blanco	3	CUB
5	Volleyball	Regla Maritza Bell McKenzie	3	CUB
6	Volleyball	Regla Radameris Torres Herrera	3	CUB
8	Volleyball	Fabiana "Fabi" Alvim de Oliveira	2	BRA
9	Volleyball	Fabiana Marcelino Claudino	2	BRA
10	Volleyball	Giovane Farinazzo Gvio	2	BRA
11	Volleyball	Jaqueline Maria "Jaque" Pereira de Carvalho En...	2	BRA
13	Volleyball	Maurcio Camargo Lima	2	BRA
14	Volleyball	Paula Renata Marques Pequeno	2	BRA
16	Volleyball	Sheilla Tavares de Castro Blassioli	2	BRA
17	Volleyball	Srgio "Escadinha" Dutra dos Santos	2	BRA
18	Volleyball	Thasa Daher de Menezes	2	BRA

Como podemos verificar, em nenhum esporte o Brasil tem os maiores medalhistas ainda.

Compare o maior medalhista em total de medalhas do Brasil com o maior medalhista do mundo no mesmo esporte.

In [302…

```
# Apenas relembrando...
dfMaioresMedBR
```

Out[302]:

	Nome	Total	NOC
Esporte			
Sailing	Robert Scheidt	5	BRA
Sailing	Torben Schmidt Grael	5	BRA

In [303…

```
dfMaioresMedMundo.head(3)
```

Out[303]:

			Idade	Altura	Peso	Ano	Ouros	Pratas	Bronzes	Total	Ordem
Nome	**Esporte**	**NOC**									
Gabrielle Marie "Gabby" Adcock (White-)	**Badminton**	**GBR**	25.0	167.0	0.0	2016	0	0	0	0	4
Eleonora Margarida Josephina Scmitt	**Swimming**	**BRA**	32.0	0.0	0.0	3896	0	0	0	0	8
Jean Hauptmanns	**Wrestling**	**GER**	26.0	0.0	0.0	1912	0	0	0	0	4

In [304…

```
# Aproveitando o DataFrame de maiores medalhistas do mundo...
dfMundoPEmt = dfMaioresMedMundo.reset_index()
dfMundoPEmt = dfMundoPEmt[(dfMundoPEmt['Total'] > 0) & (dfMundoPEmt['Esporte'] == 'Sailing')]
dfMundoPEmt = dfMundoPEmt[dfMundoPEmt['Total'] == dfMundoPEmt['Total'].max()]
dfMundoPEmt[['Nome','Esporte','NOC','Ouros','Pratas','Bronzes','Total']]
```

Out[304]:

	Nome	Esporte	NOC	Ouros	Pratas	Bronzes	Total
17335	Charles Benedict "Ben" Ainslie	Sailing	GBR	4	1	0	5
94570	Robert Scheidt	Sailing	BRA	2	2	1	5
107633	Torben Schmidt Grael	Sailing	BRA	2	1	2	5

Notamos que os brasileiros têm o mesmo número total de medalhas que os atletas do mesmo esporte de outros países, embora tenham menos ouros.

Calcule o percentual de medalhas de ouro, prata e bronze que o Brasil ganhou em cada olimpíada.

In [305…

```
dfPercMedBrasil = dfMedEdicao.join(dfMedEdicaoBR, on='Ano', how='inner', rsuffix='_BR')
dfPercMedBrasil['% Ouros'] = dfPercMedBrasil['Ouros_BR'] / dfPercMedBrasil['Ouros'] * 100
dfPercMedBrasil['% Pratas'] = dfPercMedBrasil['Pratas_BR'] / dfPercMedBrasil['Pratas'] * 100
dfPercMedBrasil['% Bronzes'] = dfPercMedBrasil['Bronzes_BR'] / dfPercMedBrasil['Bronzes'] * 100
dfPercMedBrasil['% Total'] = dfPercMedBrasil['Total_BR'] / dfPercMedBrasil['Total'] * 100
dfPercMedBrasil
```

Out[305]:

	Ouros	Pratas	Bronzes	Total	Ouros_BR	Pratas_BR	Bronzes_BR	Total_BR	% Ouros	% Pratas	% Bronzes	% Total
Ano												
1900	101	98	92	291	0	0	0	0	0.000000	0.000000	0.000000	0.000000
1920	155	152	139	446	1	1	1	3	0.645161	0.657895	0.719424	0.672646
1924	129	131	131	391	0	0	0	0	0.000000	0.000000	0.000000	0.000000
1932	125	125	120	370	0	0	0	0	0.000000	0.000000	0.000000	0.000000
1936	141	140	141	422	0	0	0	0	0.000000	0.000000	0.000000	0.000000
1948	144	146	149	439	0	0	1	1	0.000000	0.000000	0.671141	0.227790
1952	149	151	157	457	1	0	2	3	0.671141	0.000000	1.273885	0.656455
1956	153	153	161	467	1	0	0	1	0.653595	0.000000	0.000000	0.214133
1960	152	149	160	461	0	0	2	2	0.000000	0.000000	1.250000	0.433839
1964	163	166	172	501	0	0	1	1	0.000000	0.000000	0.581395	0.199601
1968	174	170	183	527	0	1	2	3	0.000000	0.588235	1.092896	0.569260
1972	195	195	210	600	0	0	2	2	0.000000	0.000000	0.952381	0.333333
1976	198	199	216	613	0	0	2	2	0.000000	0.000000	0.925926	0.326264
1980	204	204	223	631	2	0	2	4	0.980392	0.000000	0.896861	0.633914
1984	224	218	243	685	1	5	2	8	0.446429	2.293578	0.823045	1.167883
1988	240	234	264	738	1	2	3	6	0.416667	0.854701	1.136364	0.813008
1992	260	257	296	813	2	1	0	3	0.769231	0.389105	0.000000	0.369004
1996	271	273	297	841	3	3	9	15	1.107011	1.098901	3.030303	1.783591
2000	299	300	326	925	0	6	6	12	0.000000	2.000000	1.840491	1.297297
2004	301	300	326	927	5	2	3	10	1.661130	0.666667	0.920245	1.078749
2008	302	302	353	957	3	4	9	16	0.993377	1.324503	2.549575	1.671891
2012	302	304	356	962	3	5	9	17	0.993377	1.644737	2.528090	1.767152
2016	307	306	360	973	7	6	6	19	2.280130	1.960784	1.666667	1.952724