How have the Olympic games athletes changed over time?

Introduction

Business Context. You work for a company that specializes in analyzing data for a variety of clients in the sports industry. Some questions that you frequently encounter include determining if a new player is promising enough to invest money in their development, which teams are the most likely to win certain matches, what events will be the most attractive to advertisers, etc.

Business Problem. As part of one of your projects, you have been asked to perform an exploratory data analysis of historical data to **detect patterns in the provenance, physical profile, and other characteristics of the athletes who compete in the Olympic games**. The conclusions of your analysis will help the rest of the team prepare a report for a new client who helps sports gear manufacturers find advertising opportunities.

Analytical Context. You have scraped a dataset from the Internet, which contains data for all the Olympic games from Norway 1994 to Rio 2016. It comprises data for 46,533 individual athletes and has 13 columns for each one of them. There are 68,848 rows instead of 46,533 rows in the `olympics_data` worksheet because some athletes have won multiple medals:

- **ID**: A unique number assigned to each athlete
- **Name**: The athlete's name
- **Sex**: The athlete's sex
- **Age**: The athlete's age at the moment of the games
- **Height**: The athlete's height in centimeters
- **Weight**: The athlete's weight in kilograms
- **Team**: The athlete's team (country)
- **Year**: The year
- **Season**: The season
- **City**: The host city
- **Sport**: The sport the athlete competed in
- **Medal**: The medal that the athlete won, if any (can be Gold, Silver, Bronze, or NA)
- **Won medal?**: 1 if the athlete won a medal, 0 otherwise

The dataset can be downloaded from this link (data/olympics_fellow.xlsx).

Note 1: For this case, you will need to submit the Excel file with your work on it (not the notebook). Please write all your answers (formulas and text responses) in the `calculations` worksheet unless explicitly asked to do it in another sheet. For all answers, please label each answer clearly with the exercise number you are answering.

Note 2: Some individuals have competed in more than one Olympics game, which means that there are duplicate athletes. You don't need to take that into account when solving the exercises.

Height, weight, and age

Exercise 1

1.1

Calculate the average height, weight, and age of athletes in Rio 2016 across all sports.

YOUR ANSWER HERE

1.2

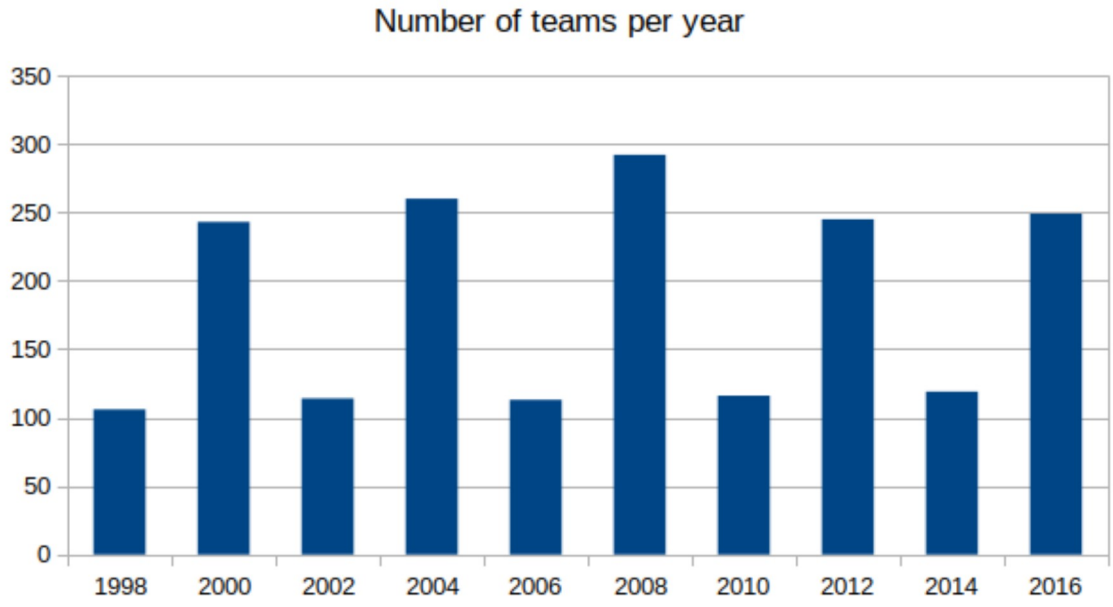
Repeat Exercise 1.1 but for Sydney 2000. Have the averages changed noticeably?

YOUR ANSWER HERE

Geographic representation

Exercise 2

This is a chart of the number of countries that participated in the games from 1998 to 2016. What can you conclude from it?

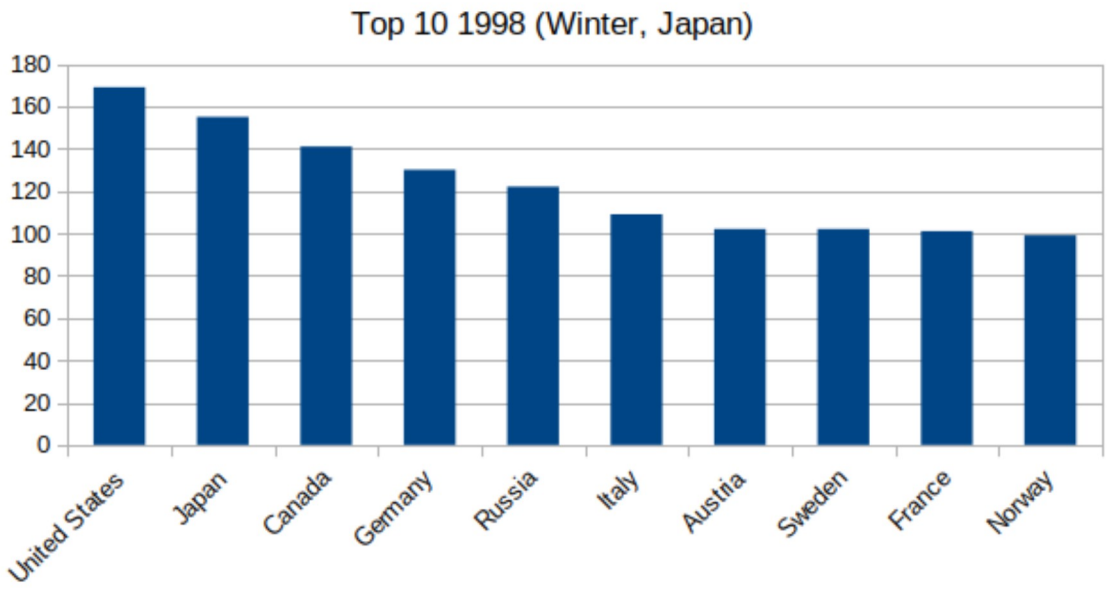


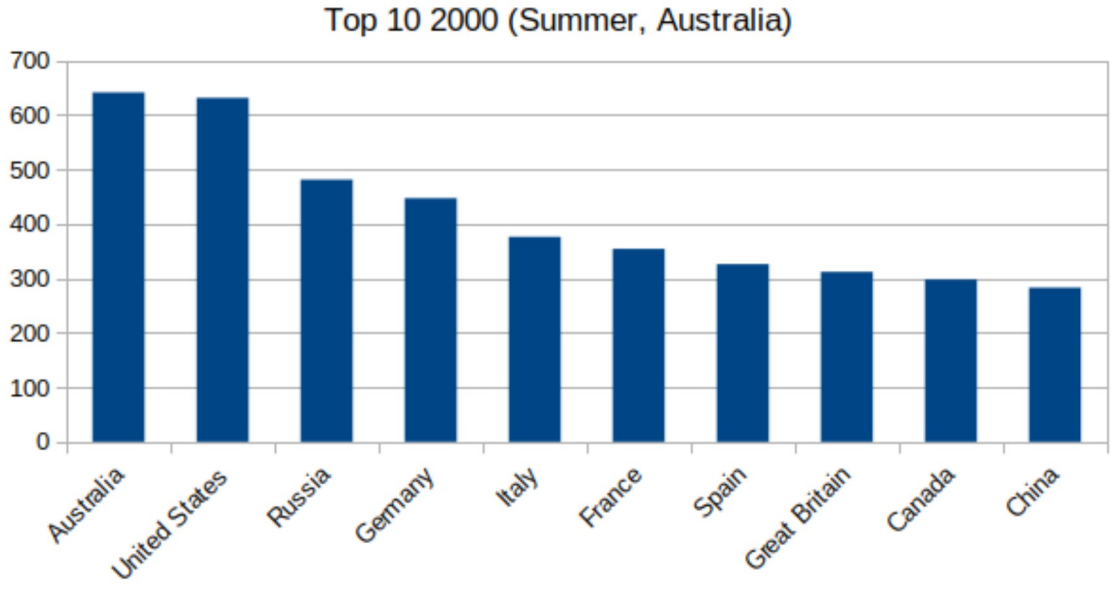
Hint: Keep in mind that Summer and Winter games are not held in the same year. In the Winter games, the number of teams is typically lower than in the Summer games.

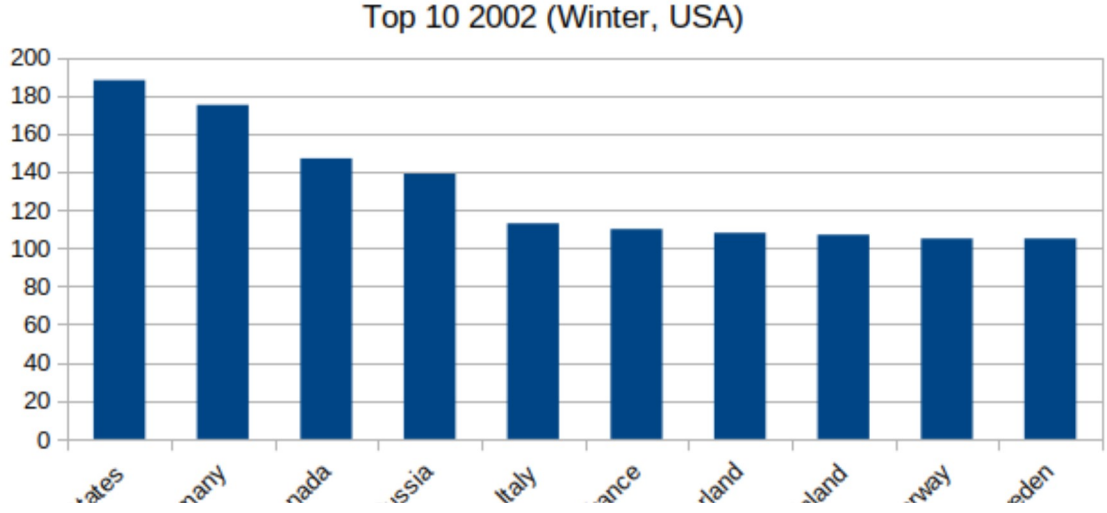
YOUR ANSWER HERE

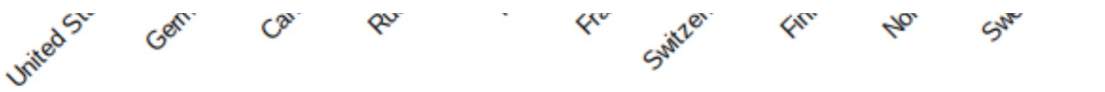
Exercise 3

Below are bar charts for the top 10 countries by number of athletes sent for all the games between 1998 and 2016. Examine the bar charts and look for similarities and differences in the data over the years and the seasons (Winter vs. Summer). What trends do you notice?

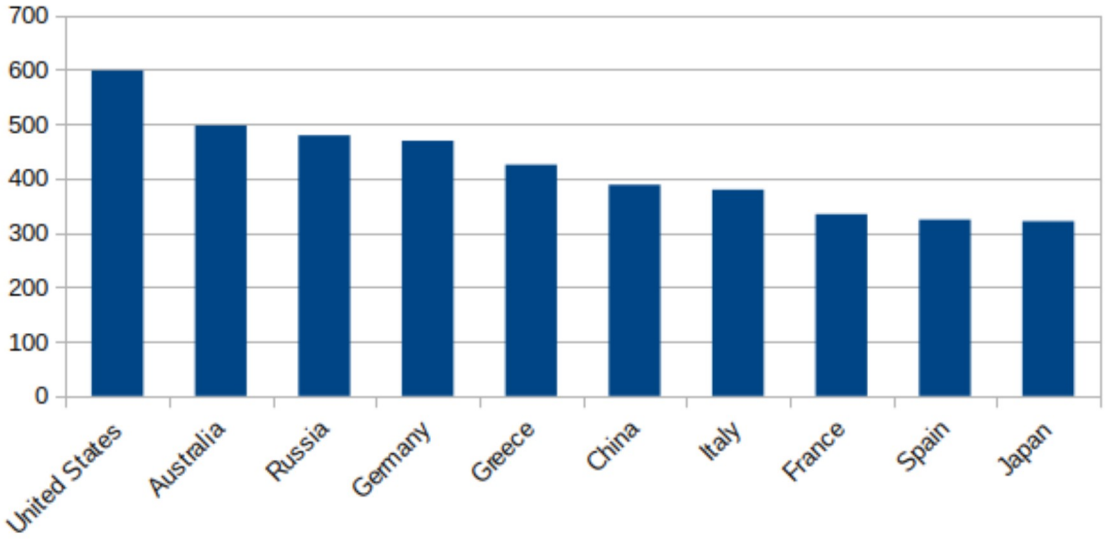




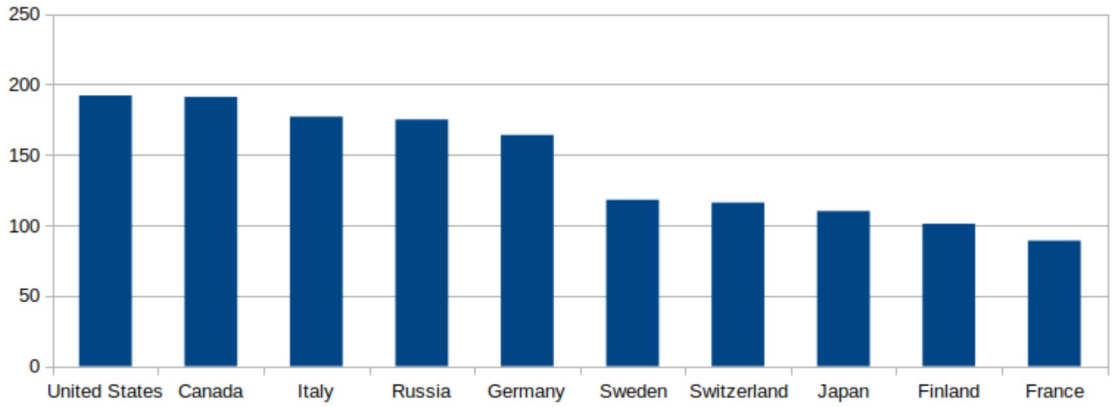




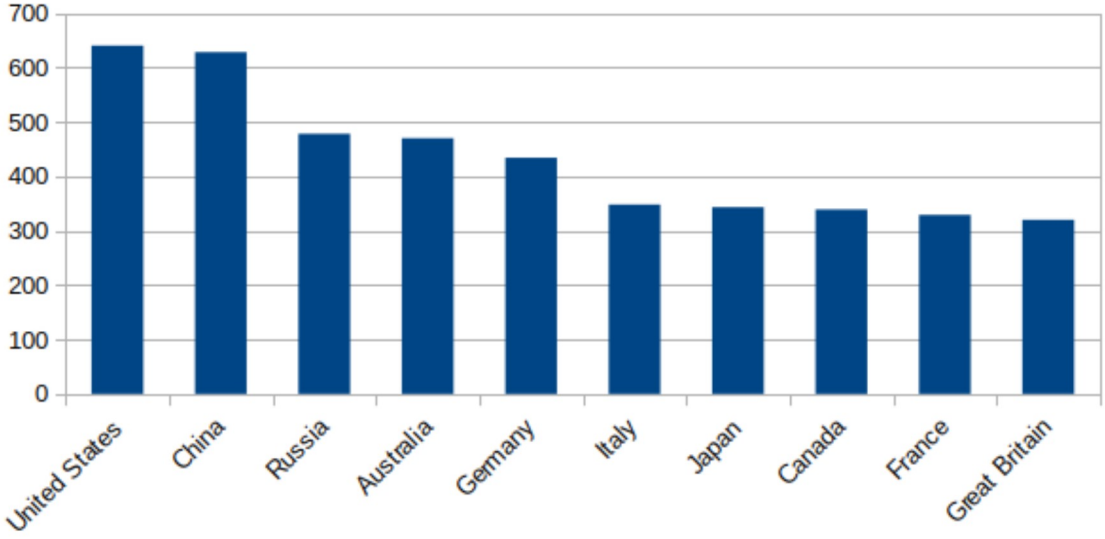
Top 10 2004 (Summer, Greece)



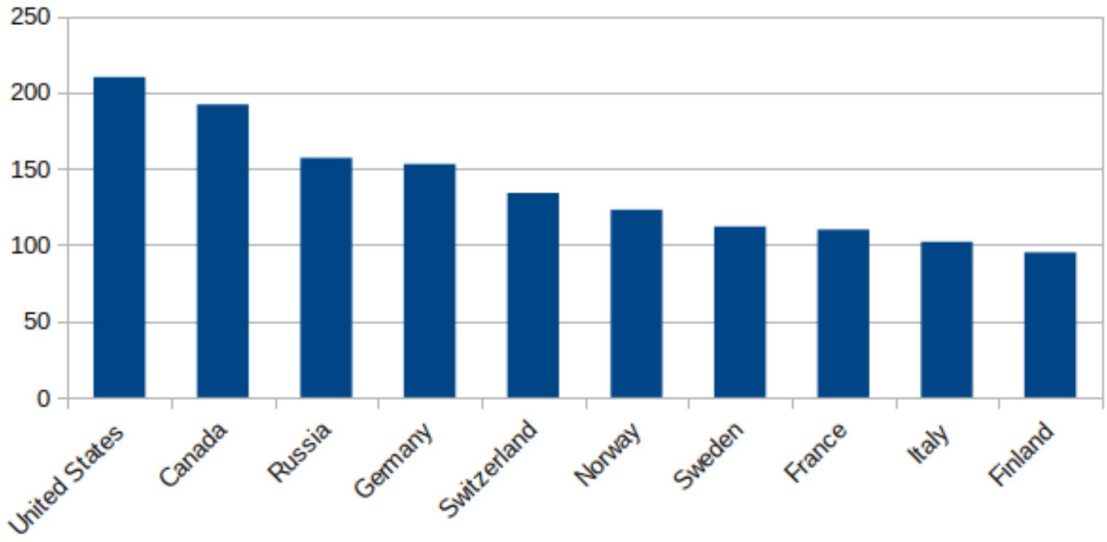
Top 10 2006 (Winter, Italy)



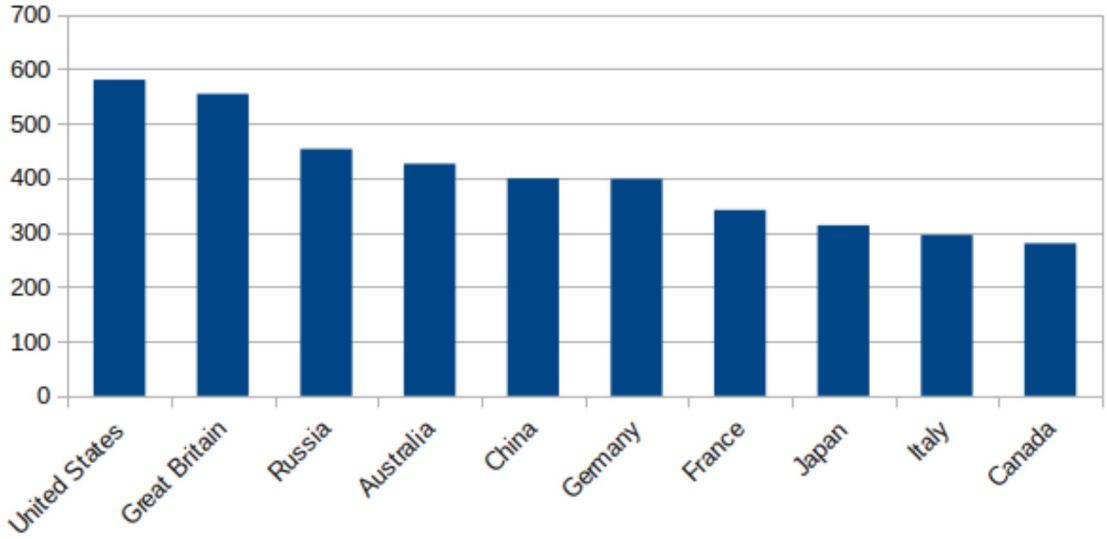
Top 10 2008 (Summer, China)



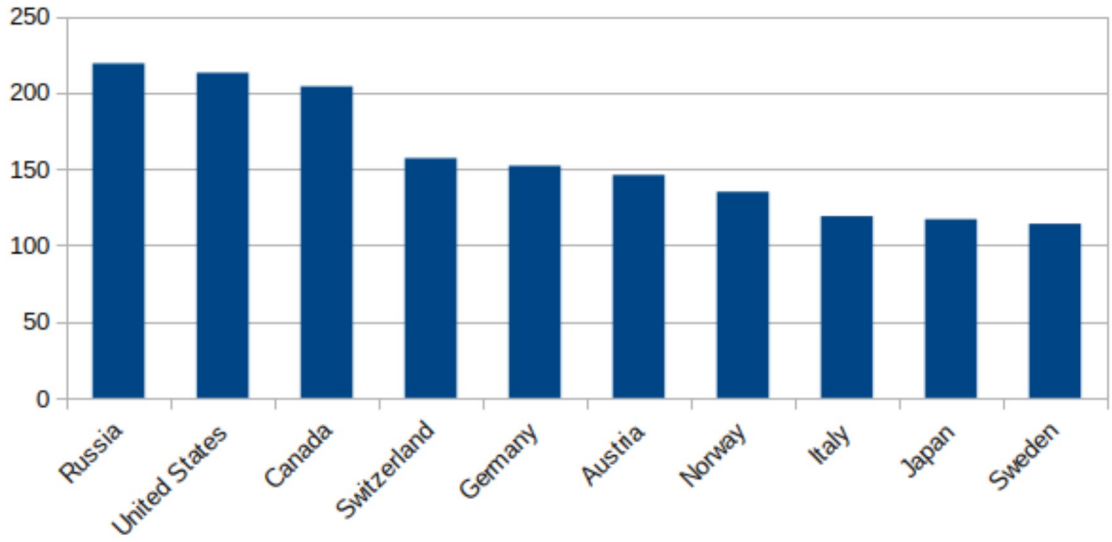
Top 10 2010 (Winter, Canada)



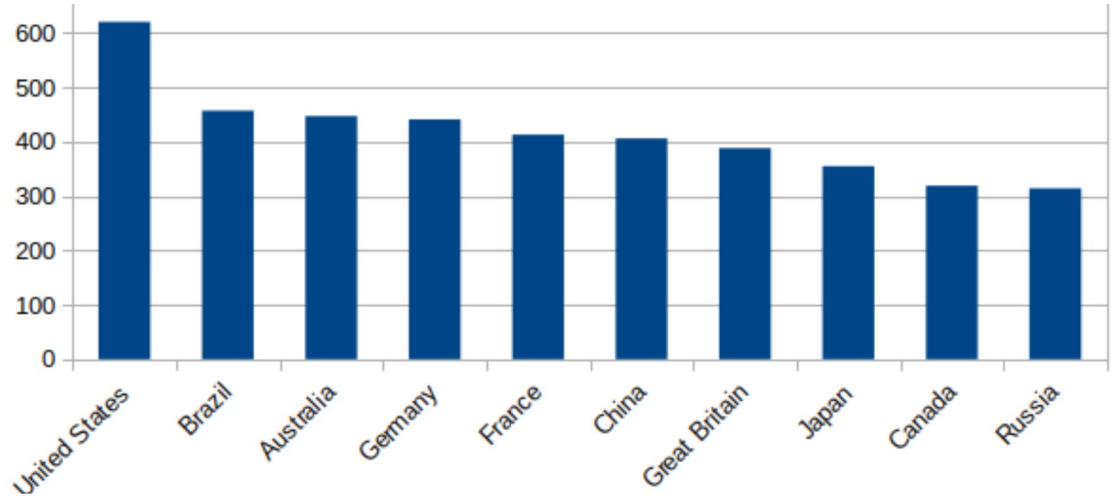
Top 10 2012 (Summer, UK)



Top 10 2014 (Winter, Russia)



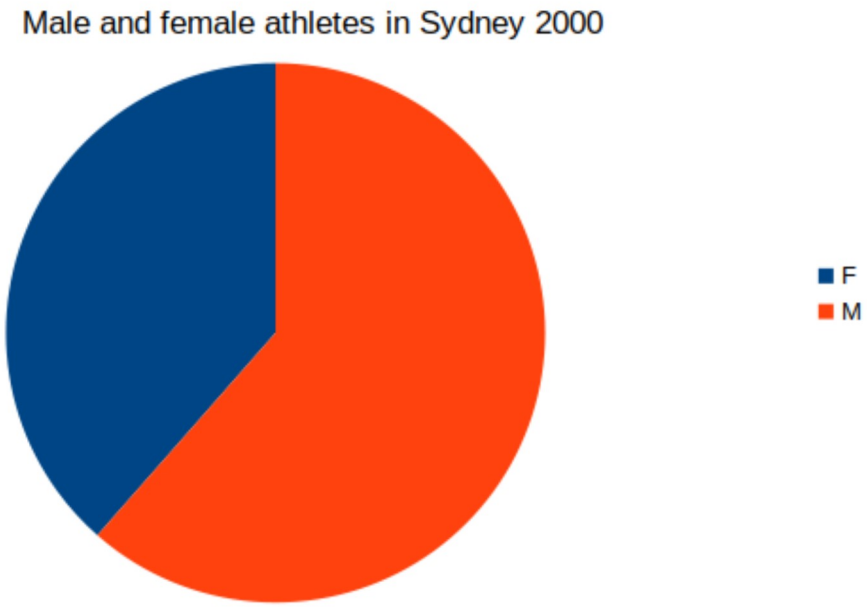
Top 10 2016 (Summer, Rio)

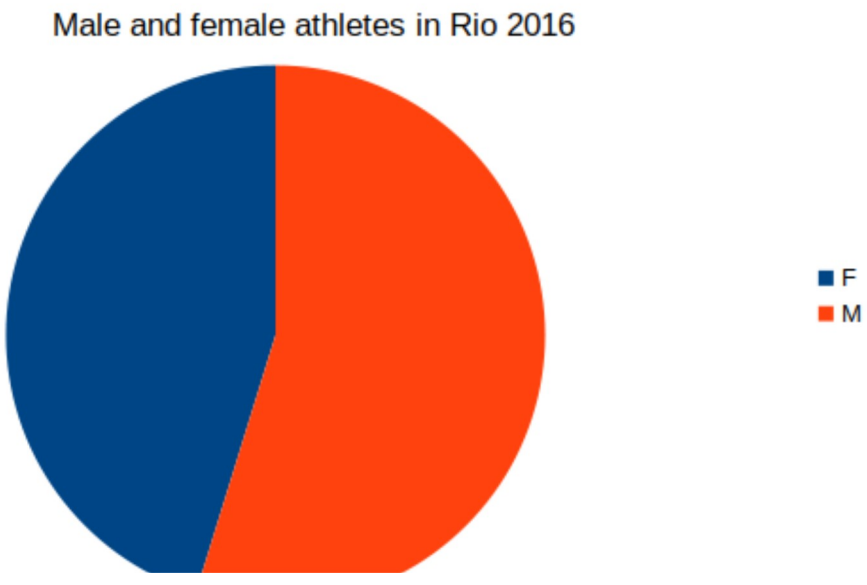


YOUR ANSWER HERE

Athletes by sex

These pie charts show the number of athletes by sex in Sydney 2000 and Rio 2016:





Exercise 4

4.1

We want to be more precise. How many male and female athletes were there in Rio 2016 and Sydney 2000?

Hint: You can use the **`COUNTIF()`** function to solve this exercise. This function works very similarly to the `COUNTA()` function, with the difference that it only counts those cells that meet a certain condition. Feel free to look this function up on the Internet!

YOUR ANSWER HERE

4.2

Use Excel to calculate the ratio of $\frac{male}{female}$ athletes in both Rio and Sydney. Has it changed?

YOUR ANSWER HERE

4.3

Complete the table in the `sport_by_sex` worksheet.

Hint: Use the **`COUNTIFS()`** function. It works like `COUNTIF()` but allows you to have more than one condition over more than one column.

4.4

Interpret the results of your completed table from Exercise 4.3. What can you say?

YOUR ANSWER HERE

Medals

Exercise 5

5.1

How many medals were awarded between 1998 and 2016?

Hint: Use the `Won a medal?` column.

YOUR ANSWER HERE

5.2

What is the average number of medals won per athlete in Rio 2016?

YOUR ANSWER HERE

5.3

What is the average number of medals won per athlete in Sydney 2000? Is this higher or lower than the average in Rio 2016?

YOUR ANSWER HERE

Exercise 6

6.1

Complete the table in the `medals_sport` worksheet to find the top 10 sports with the most medals per athlete in Rio 2016 and Sydney 2000.

Hint 1: To find the top tens, you will need to sort the table by multiple columns, namely year and medals per athlete. Again, use the Internet to help you with how to do this!

Hint 2: You can use `COUNTIF()` and `SUMIF()`.

YOUR ANSWER HERE

6.2

Which sports are included in both rankings? What could be the reason that these sports show up in both tables?

YOUR ANSWER HERE

Attribution

"120 years of Olympic history: athletes and results", June 15, 2018, Kaggle (user rgriffin, with data from www.sports-reference.com (http://www.sports-reference.com)), Sports Reference Terms of Use (https://www.sports-reference.com/termsofuse.html), https://www.kaggle.com/heesoo37/120-years-of-olympic-history-athletes-and-results (https://www.kaggle.com/heesoo37/120-years-of-olympic-history-athletes-and-results)