My Portfolio

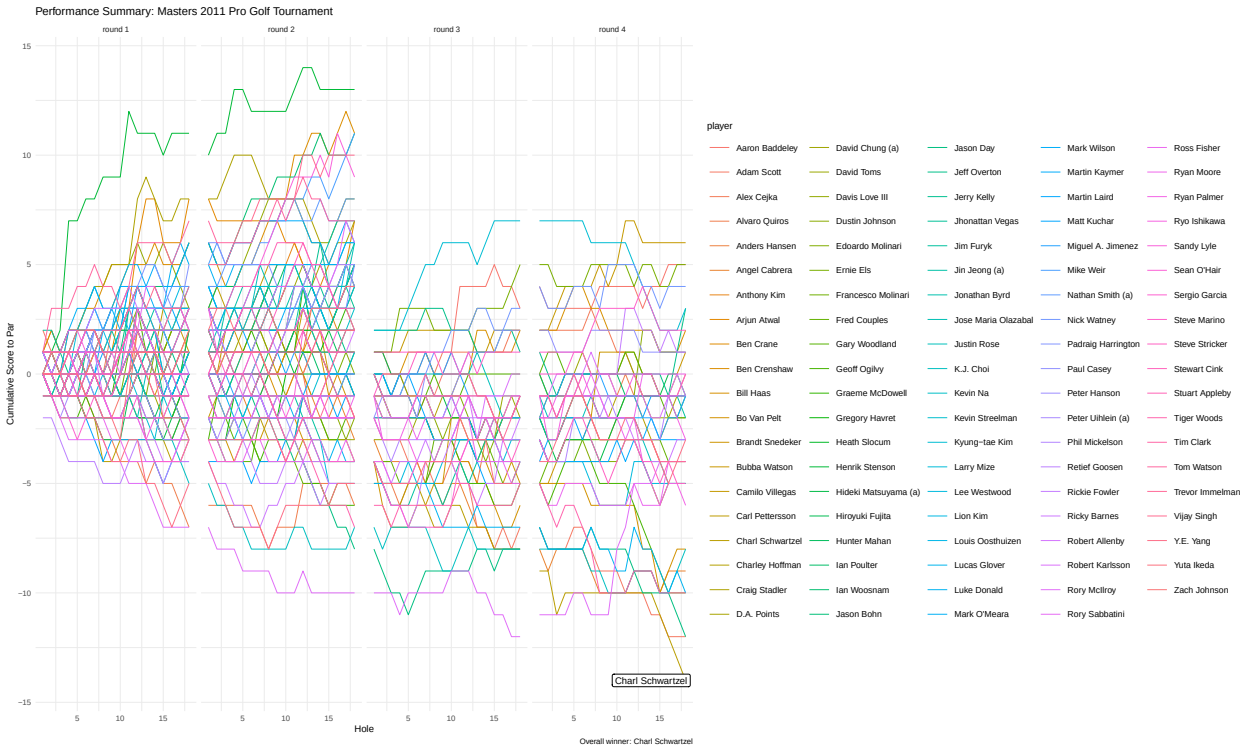
Andre Contreras

2023-2024

2011 Masters Golf Tournament Project

The plot below is a line graph I created visualizing the summary of the Masters 2011 Pro Golf Tournament, along with the performance of each golfer and the overall winner of the comptetition (Charl Schwartzel).

```
# Binds the rows of round1, round2,round3, and round4; specifies the name of the new column that will b
rounds <- bind_rows(round1, round2, round3, round4, .id = "round")


scorecard <- rounds %>%
  pivot_longer(cols = "1":"18", names_to = "hole", values_to = "score") %>%
  mutate(round = as.integer(round), hole = as.integer(hole), score = as.integer(score))


performance <- scorecard %>%
  left_join(course, by = "hole") %>%
  mutate(difference_to_par = score - par) %>%
  group_by(player) %>%
  mutate(cumulative_to_par = cumsum(difference_to_par)) %>%
  ungroup() %>%
  select(player, round, hole, difference_to_par, cumulative_to_par)

winner <- performance %>%
  filter(round == 4) %>%
  top_n(1, wt = -cumulative_to_par)

ggplot(performance) +
  geom_line(aes(x = hole, y = cumulative_to_par, col = player)) +
  facet_grid(. ~ round, labeller = labeller(round = c("1" = "round 1", "2" = "round 2", "3" = "round 3"
  geom_label(aes(x = hole - 4, y = cumulative_to_par, label = player), data = winner) +
  labs(title = "Performance Summary: Masters 2011 Pro Golf Tournament", x = "Hole", y = "Cumulative Sco
  theme_minimal() +
  theme(legend.position = "right", legend.key.size = unit(c(1, 1), "cm"), legend.text = element_text(si
```

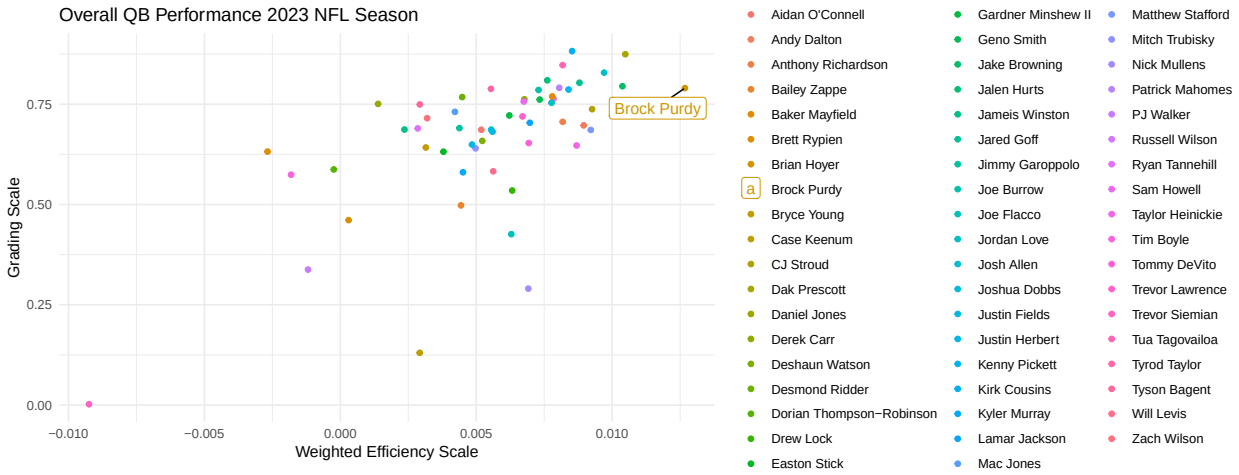


NFL 2023 QB Performance Project

Overall QB Performance:

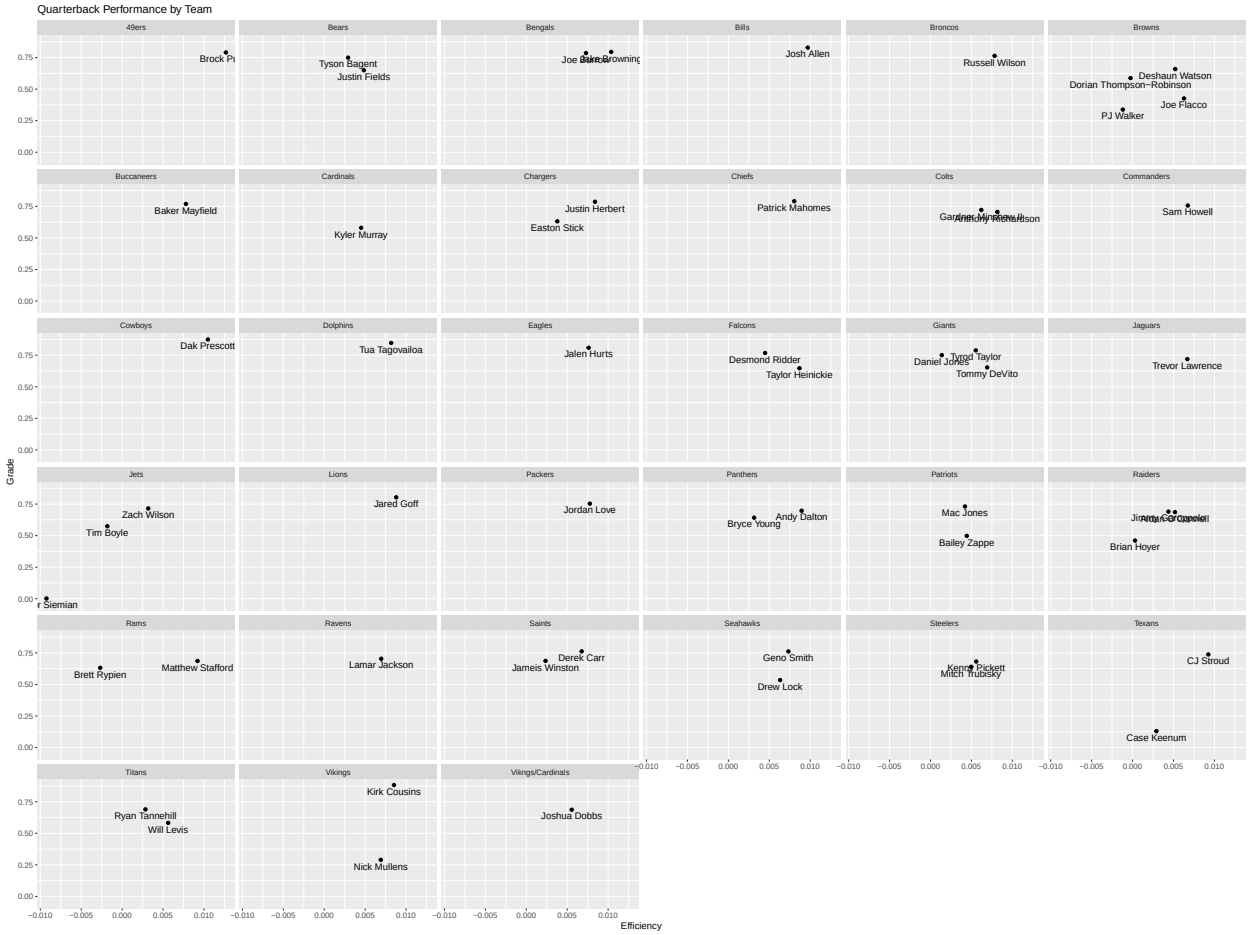
I created a spreadsheet of all the NFL Quarterbacks that played a minimum of one game in the 2023-2024 season and compiled all of their advanced statistics. I then developed a formula in Excel aiming to grade their efficiency, MVP rating, and overall grade, and transferred the file into R to visualize my findings. The name displayed is my MVP according to my grading system and efficiency formula

```
qbdata <- read_excel("C:\\Users\\ajcon\\Downloads\\Portfolio\\qbdata.xlsx")

mvp <- qbdata %>%
  top_n(1, qbdata$Grade*qbdata$Efficiency)

ggplot(qbdata, aes(x = Efficiency, y = Grade, col = QB)) +
  geom_point() +
  geom_label_repel(data = mvp, aes(label = QB), nudge_x = -0.001, nudge_y = -0.05, segment.color = "bla
  labs(x = "Weighted Efficiency Scale", y = "Grading Scale", title = "Overall QB Performance 2023 NFL S
  theme_minimal() +
  theme(legend.position = "right")
```



QB Performance by Team:

```
ggplot(qbdata, aes(x = Efficiency, y = Grade)) +
  geom_point() +
  geom_text(aes(label = QB), nudge_x = 0, nudge_y = -0.05) +
  facet_wrap(. ~ Team) +
  labs(x = "Efficiency", y = "Grade", title = "Quarterback Performance by Team")
```



A Data-led Look into the History of the Olympics

After gaining access to mulitple datasets of the Olympics containing every instance throughout every competition since the inaugural season back in 1896 (Greece) up until the 2016 Games in Brazil, I decided my free time would be well spent answering a couple of questions I, like many others (I think), have been wondering:

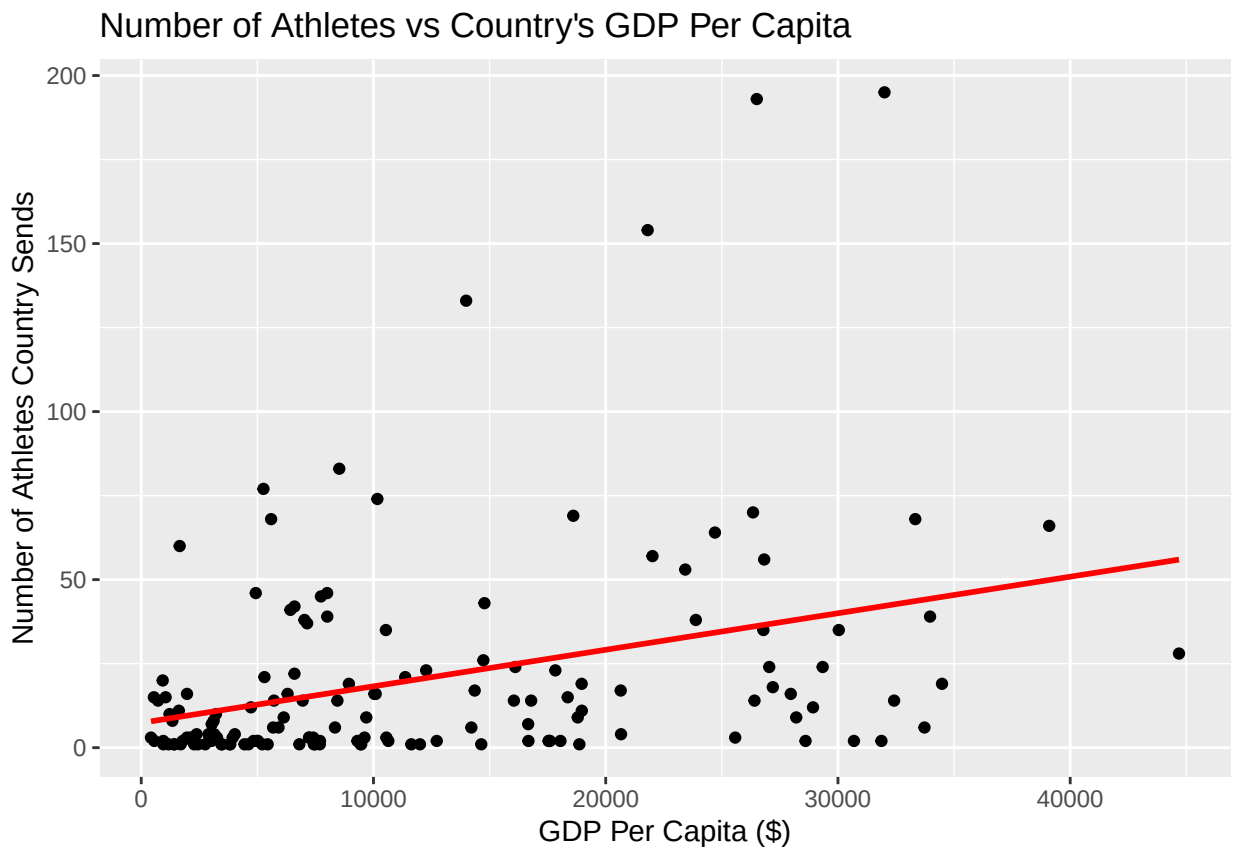
1. Does the economical stability of a country affect the number of athletes it sends to the olympics and the number of medals it wins?

2. Does hosting the olympics correlate to winning more medals that year?

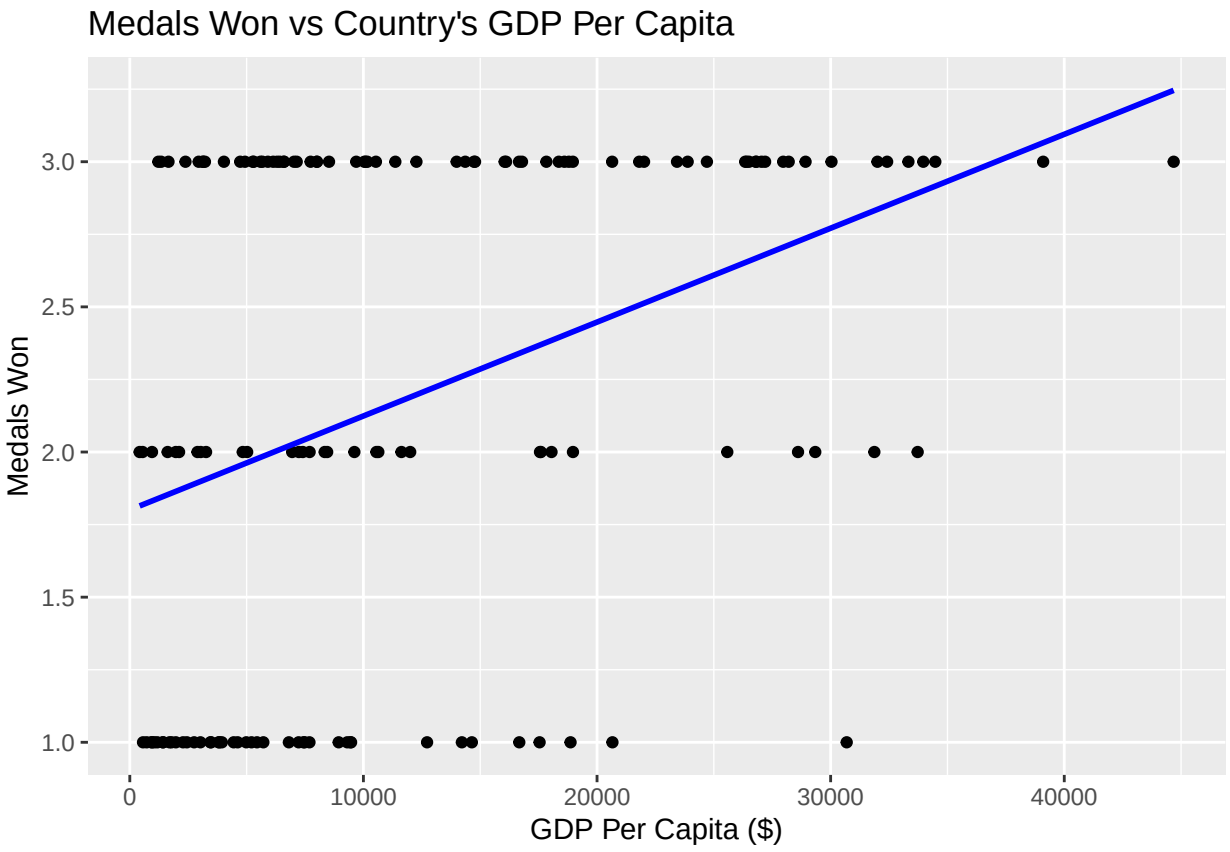
Part I

Below are the results I found for the first question, along with the code I wrote to filter and manipulate the data so I can visualize it in a more effective manner.

```r
athlete_events <- read_csv(
   file = 'athlete_events.csv',
   col_types = cols(ID = 'i', Age = 'i', Height = 'i', Year = 'i')
)

nearest_year <- function(olympics_year) {
  gapminder_year <- seq(1952, 2007, by = 5)
  nearest_year <- gapminder_year[which.min(abs(olympics_year - gapminder_year))]
  return(nearest_year)
}

olympics_data <-
  athlete_events %>%
  filter(!is.na(Medal)) %>%
  count(Games, Event, NOC, Medal, Team, Year, Name) %>%
  mutate(year = nearest_year(Year))

country_money <- gapminder %>%
  group_by(country) %>%
  select(country, year, gdpPercap)


athletes_by_country_year <- olympics_data %>%
  group_by(Team, Year) %>%
  summarise(Total_Athletes = n_distinct(Name), .groups = 'drop')

medals_by_country_year <- olympics_data %>%
  group_by(Team, Year) %>%
  summarise(Total_Medals = n_distinct(Medal), .groups = 'drop')

joined_data_athletes <- inner_join(athletes_by_country_year, country_money, by = c("Year" = "year", "Tea
  filter(!is.na(gdpPercap))

joined_data_medals <- inner_join(medals_by_country_year, country_money, by = c("Year" = "year", "Team" =
  filter(!is.na(gdpPercap))

ggplot(joined_data_athletes, aes(x = gdpPercap , y = Total_Athletes)) +
  geom_point() +
  geom_smooth(method = "lm", color = "red", se = FALSE) + #Plotting the athlete correlation
  labs(title = "Number of Athletes vs Country's GDP Per Capita", x = "GDP Per Capita ($)", y = "Number
```




```
ggplot(joined_data_medals, aes(x = gdpPercap , y = Total_Medals)) +
  geom_point() +
  geom_smooth(method = "lm", color = "blue", se = FALSE) + #lm creates a smooth line to show a clear re
    labs(title = "Medals Won vs Country's GDP Per Capita", x = "GDP Per Capita ($)", y = "Medals Won")
```



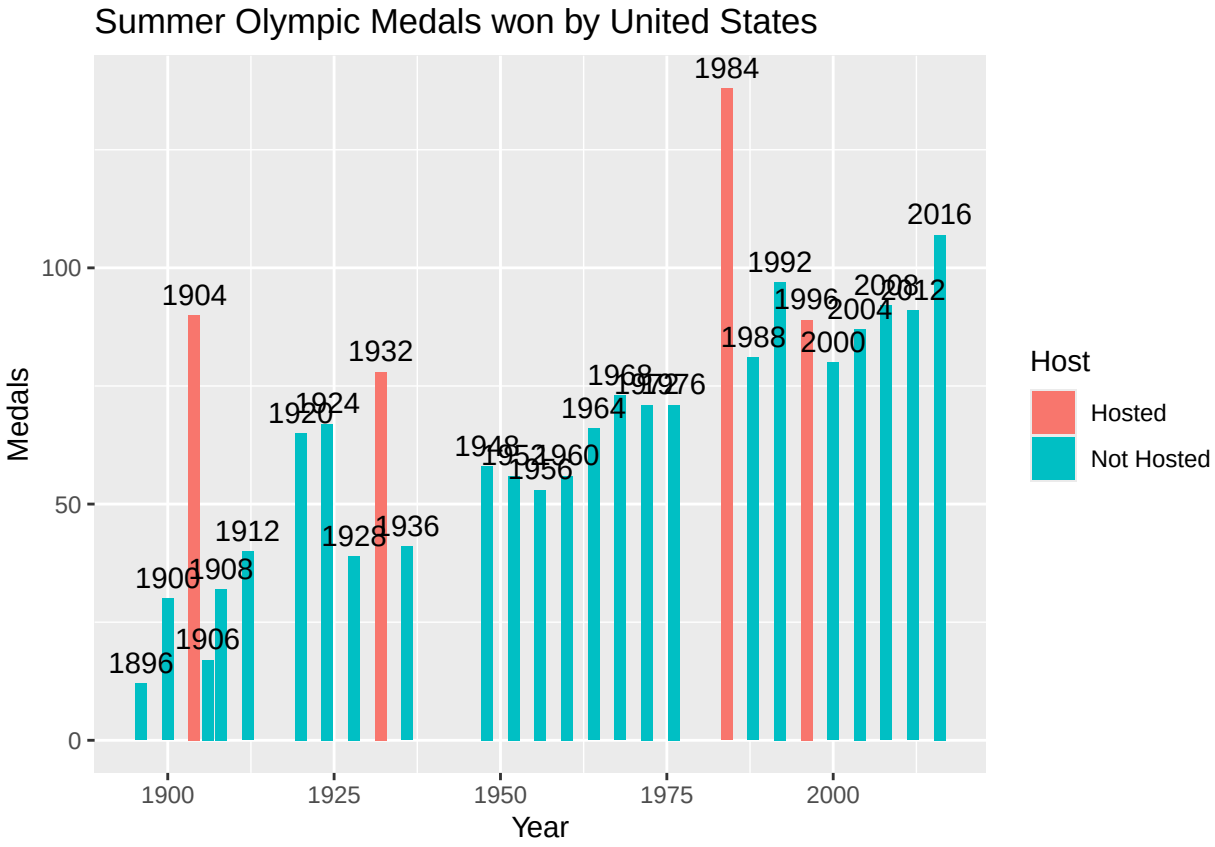
As we can see, there is in fact a positive correlation between a country's gdp per capita and the number of medals and athletes a country has. This means that the higher the gdp is, the more medals it wins and more athletes it sends to the Olympics.

Part II

For the second question... I started by joining data sets together and creating a function that will filter the joint dataset for each country and in each of the seasons: determine whether they hosted or not. The function also displays a plot to compare the amount of medals that country won when they hosted vs when they did not. We will then compare and draw reasonable conclusions by creating a histogram containing the average number of medals all countries combined have won when they host vs in the competitions before.

```
generate_country_medals_plot <- function(country_code, country_name, summer_hosts, winter_hosts) {

  # SUMMER
  summer_plot <- NULL

  if (length(summer_hosts) > 0) {
    summer_medals <- data %>%
      filter(NOC == country_code & !is.na(Medal) & Season == "Summer" & Year %in% c(1896:2016)) %>%
      distinct(Year, Event) %>%
      group_by(Year) %>%
      summarise(Medal_Count = n())

    summer_medals$Host <- ifelse(summer_medals$Year %in% summer_hosts, "Hosted", "Not Hosted")
```

```
    summer_plot <- ggplot(summer_medals, aes(x = Year, y = Medal_Count, fill = Host)) +
      geom_bar(stat = "identity", position = "dodge") +
      geom_text(aes(label = Year), vjust = -0.5, position = position_dodge(width = 0.9)) +
      labs(x = "Year", y = "Medals", title = paste("Summer Olympic Medals won by", country_name))
  }

  # WINTER
  winter_plot <- NULL

  if (length(winter_hosts) > 0) {
    winter_medals <- data %>%
      filter(NOC == country_code & !is.na(Medal) & Season == "Winter" & Year %in% c(1896:2016)) %>%
      distinct(Year, Event) %>%
      group_by(Year) %>%
      summarise(Medal_Count = n())

    winter_medals$Host <- ifelse(winter_medals$Year %in% winter_hosts, "Hosted", "Not Hosted")

    winter_plot <- ggplot(winter_medals, aes(x = Year, y = Medal_Count, fill = Host)) +
      geom_bar(stat = "identity", position = "dodge") +
      geom_text(aes(label = Year), position = position_dodge(width = 0.9)) +
      labs(x = "Year", y = "Medals", title = paste("Winter Olympic Medals won by", country_name))
  }

  list(summer_plot = summer_plot, winter_plot = winter_plot)
}
```


Summer Olympic Medals won by United States
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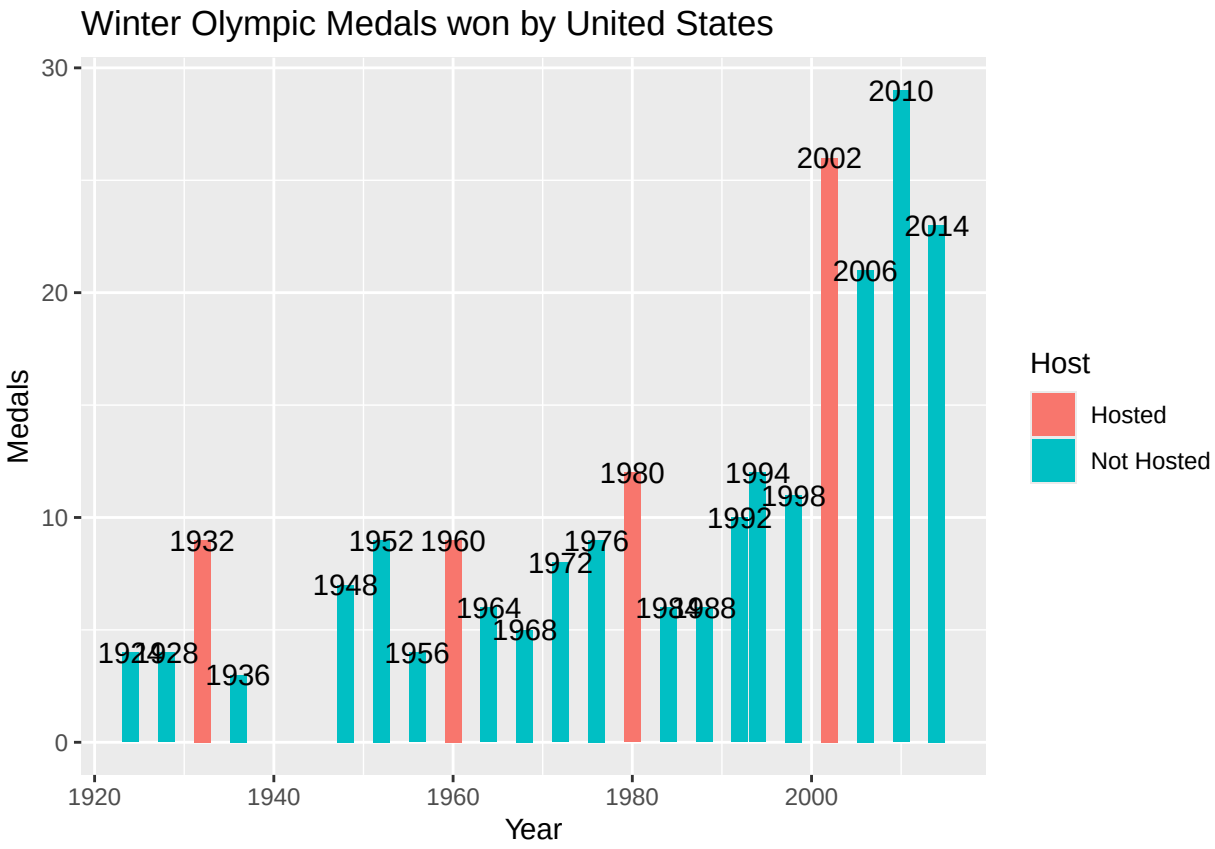
Winter Olympic Medals won by United States
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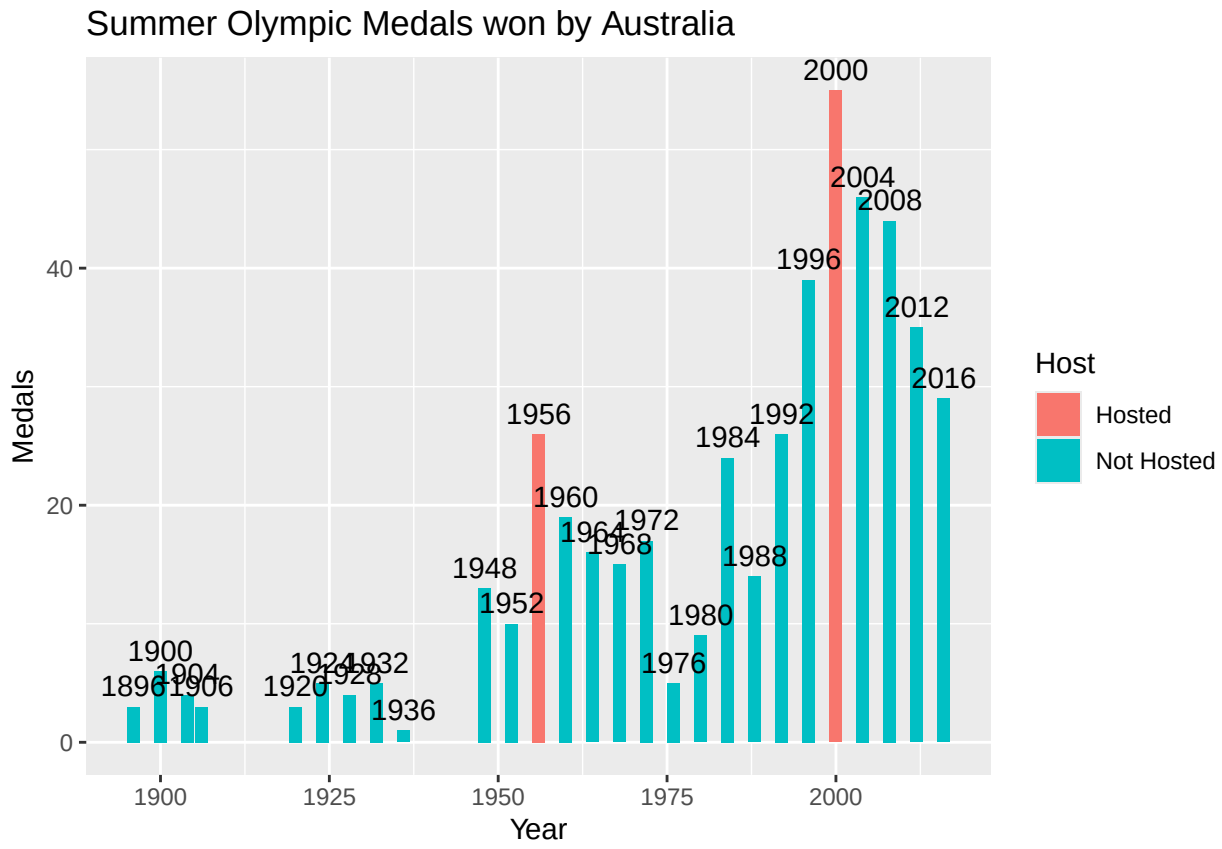
Summer Olympic Medals won by Australia
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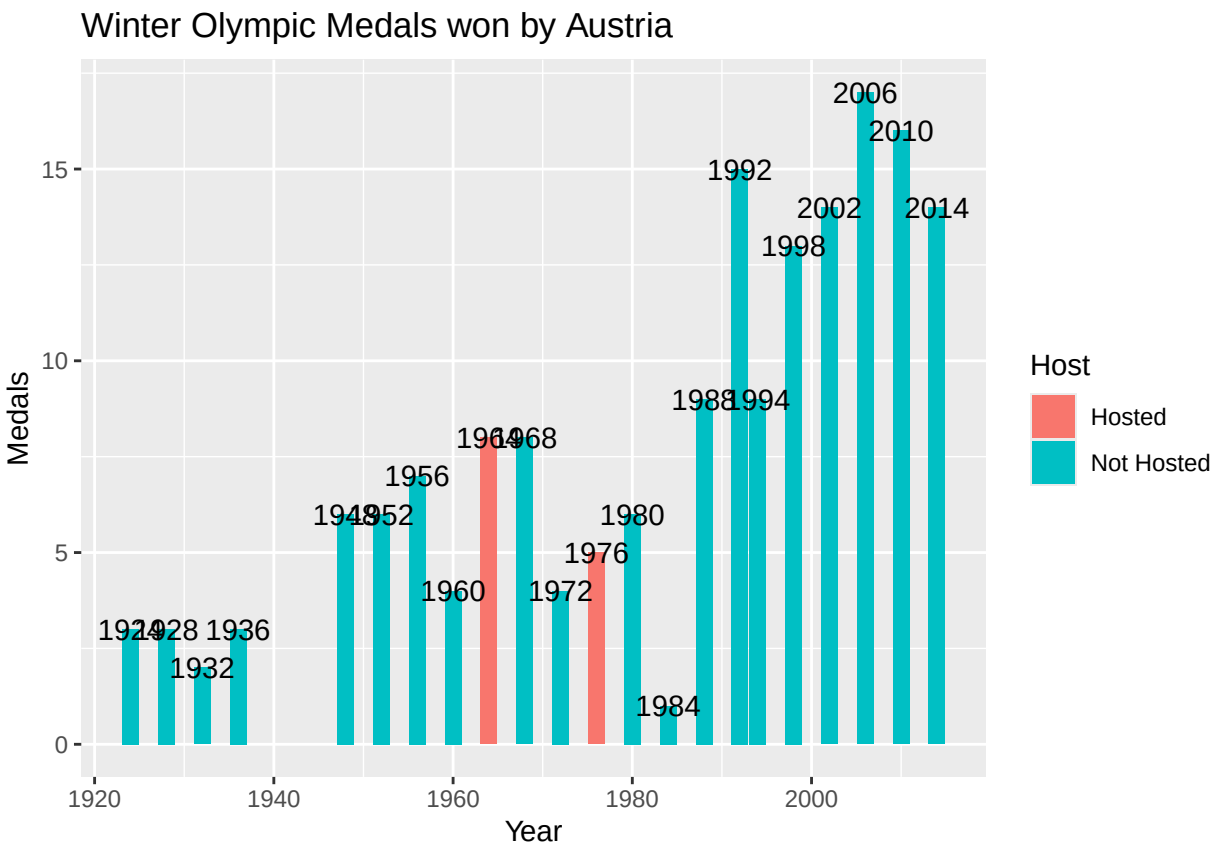
Winter Olympic Medals won by Austria
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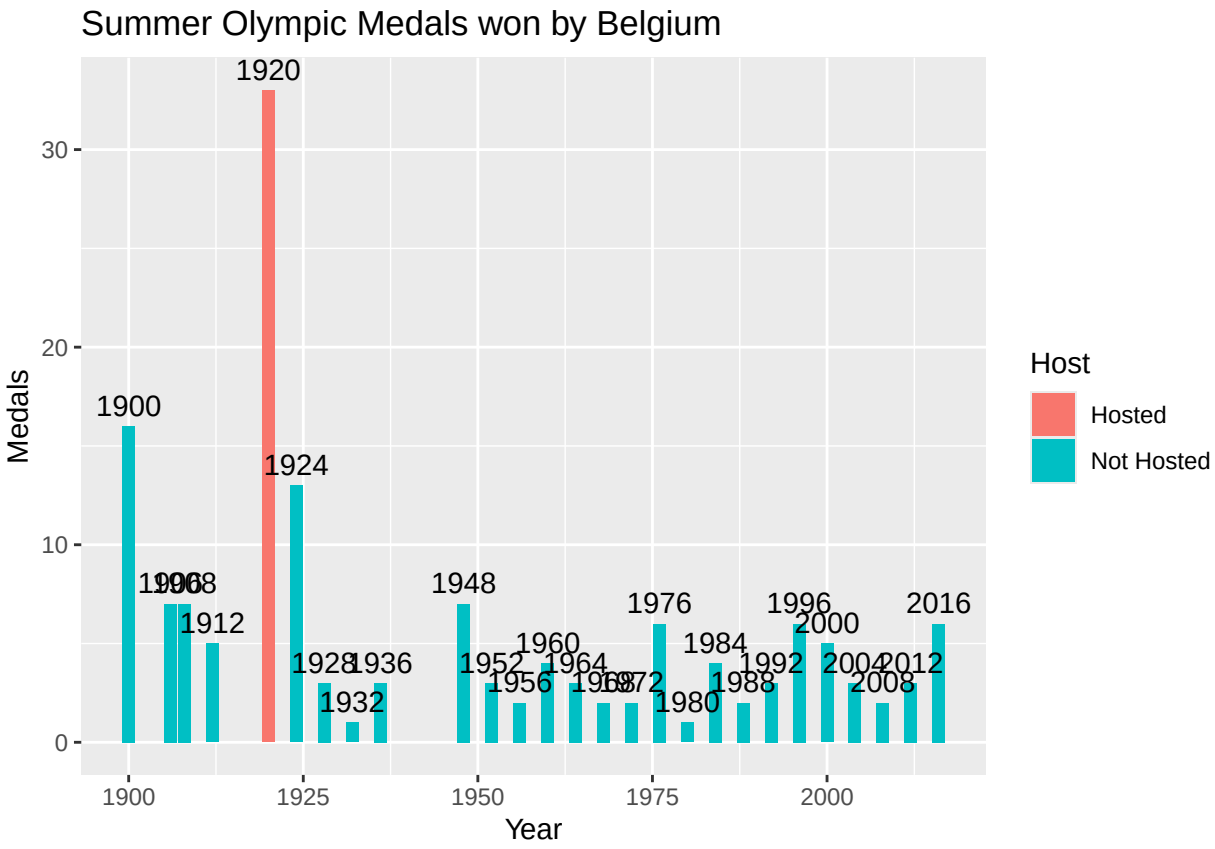
Summer Olympic Medals won by Belgium
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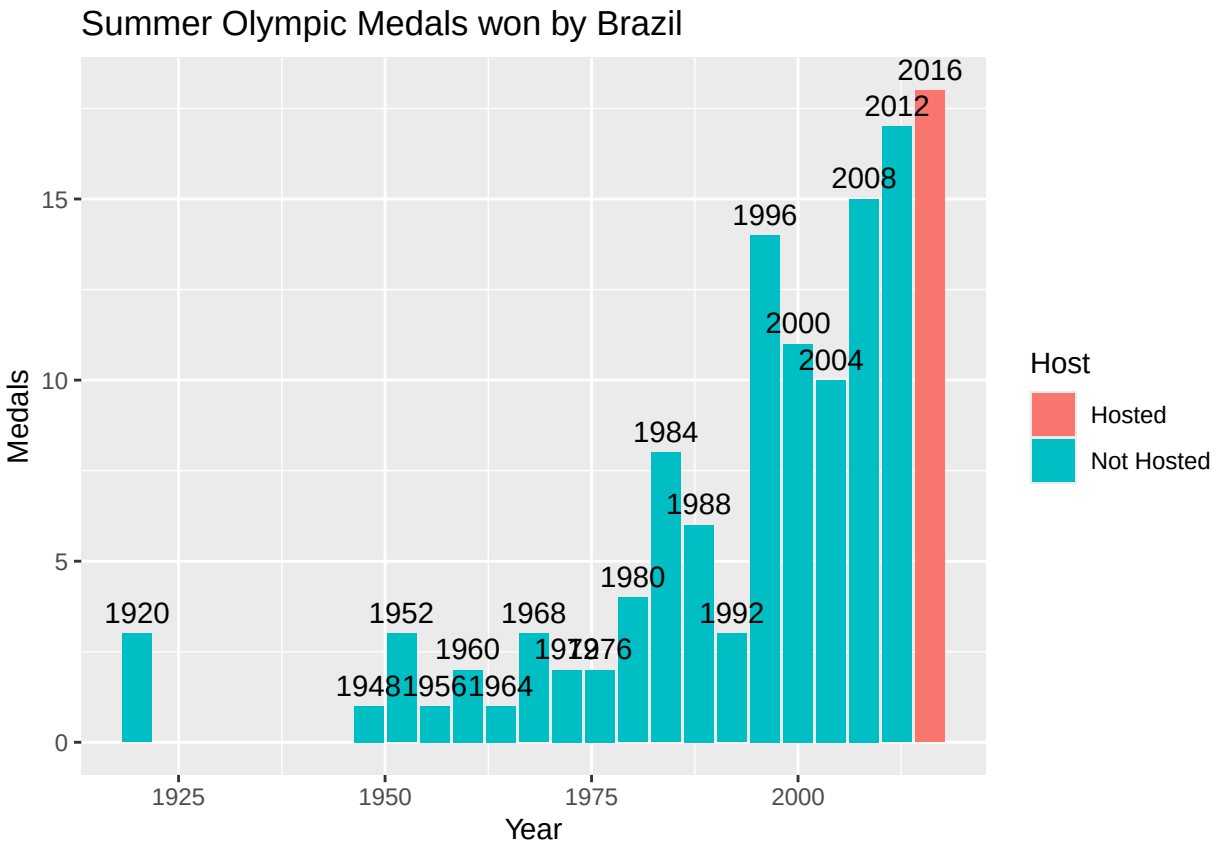
Summer Olympic Medals won by Brazil
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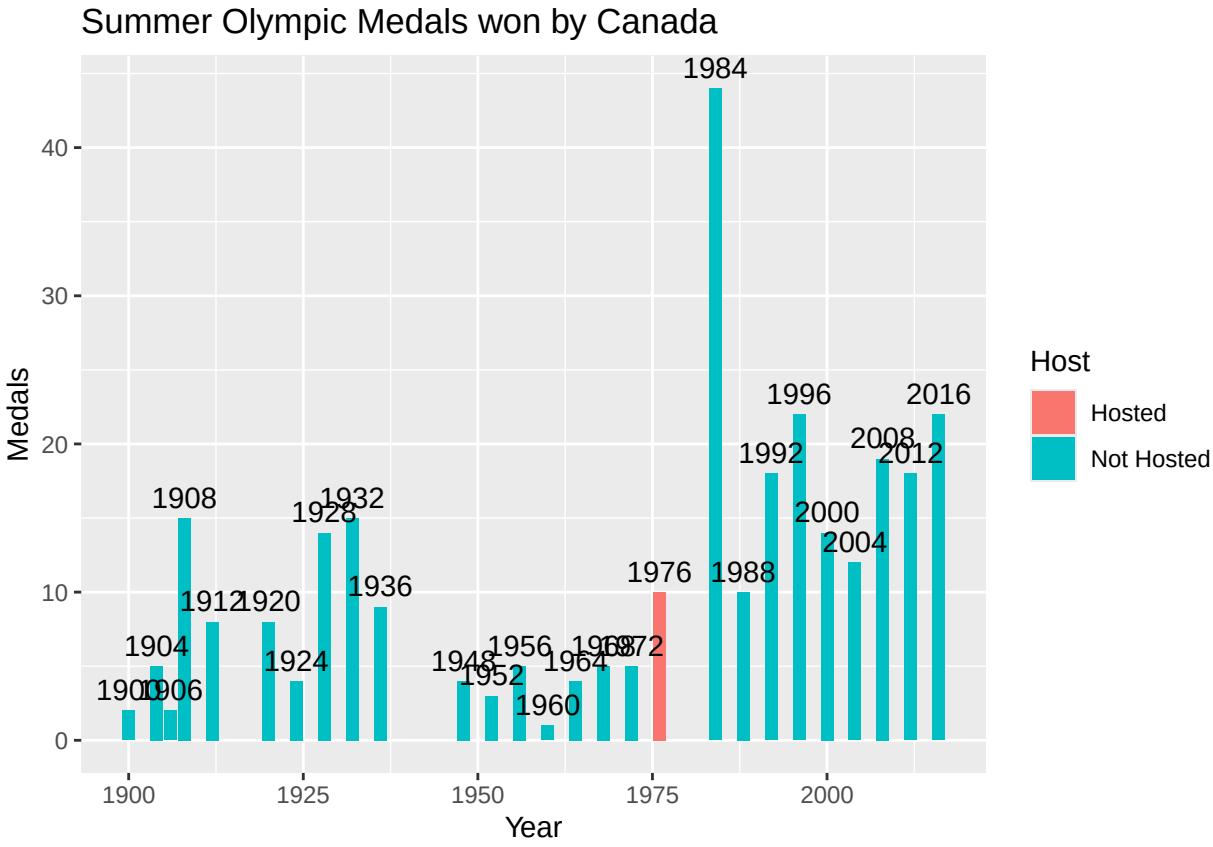
Summer Olympic Medals won by Canada
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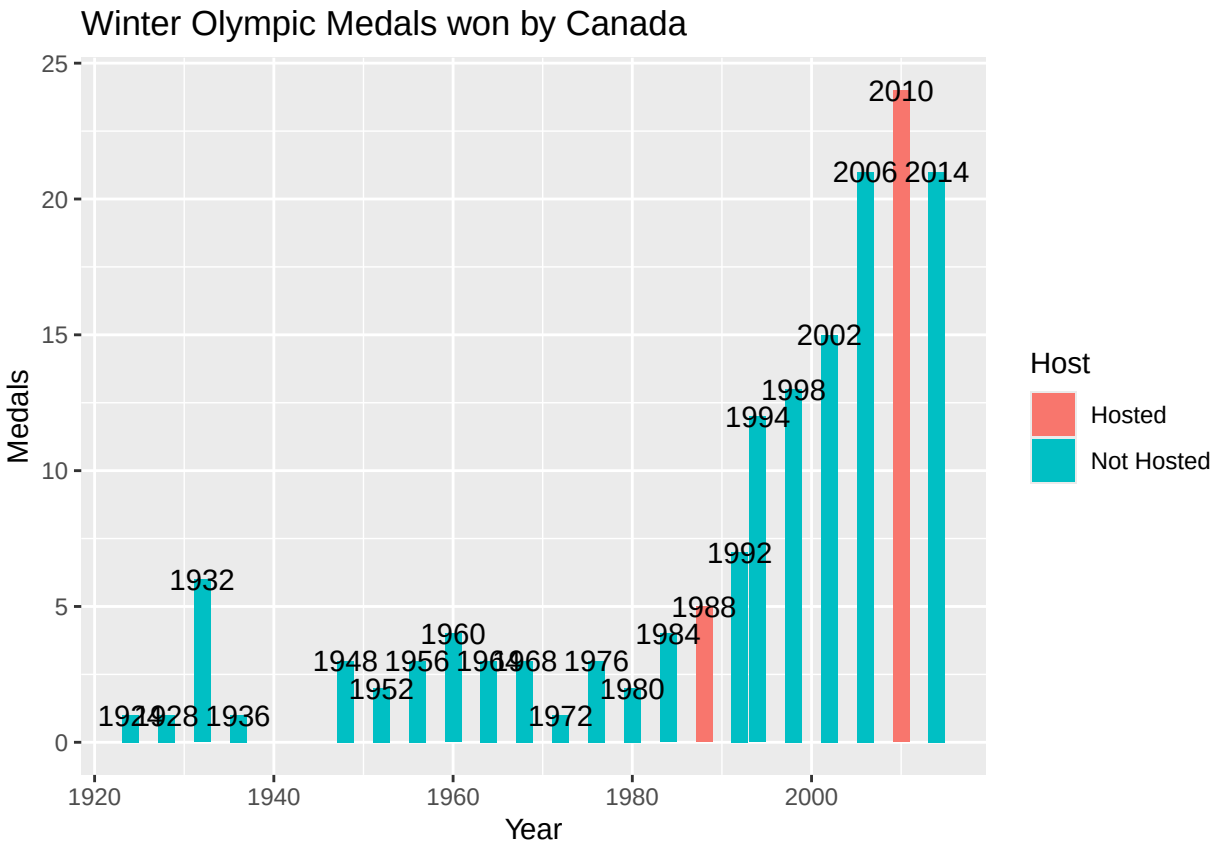
Winter Olympic Medals won by Canada
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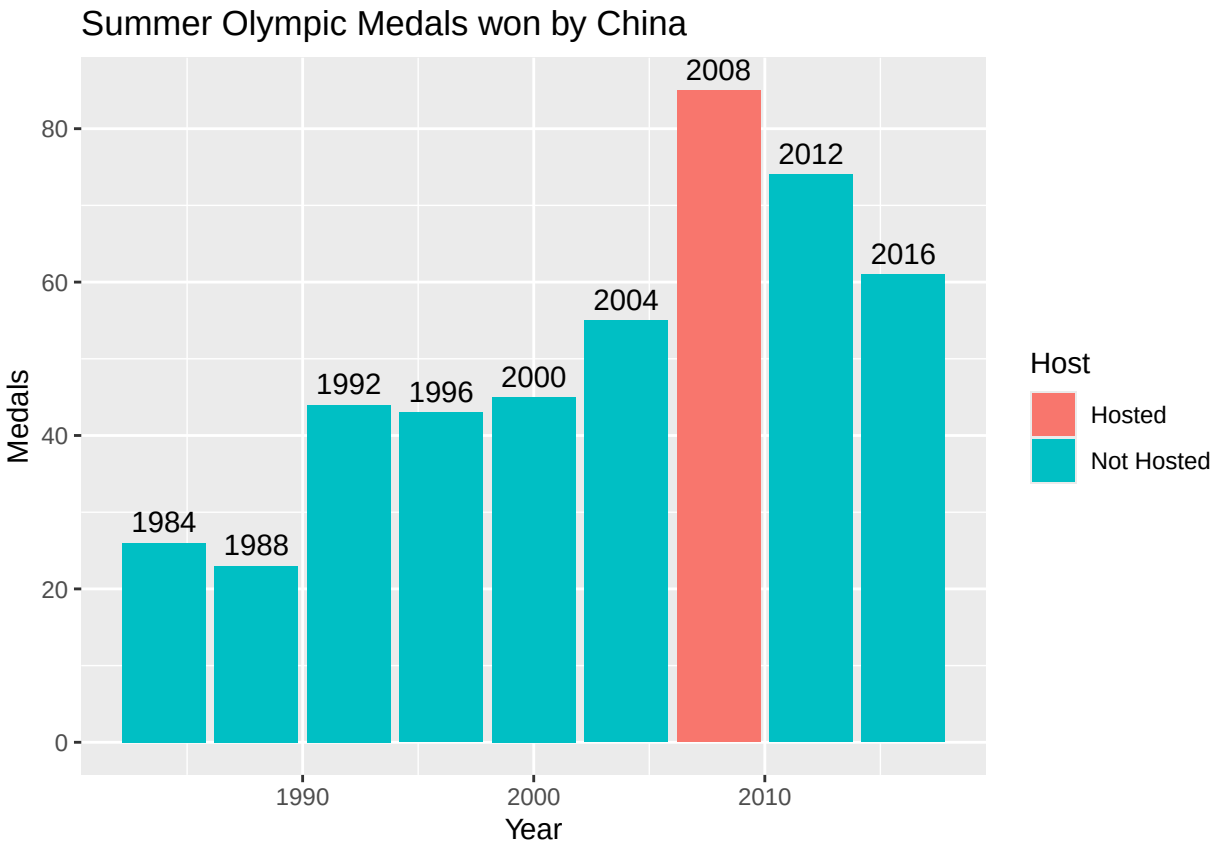
Summer Olympic Medals won by China
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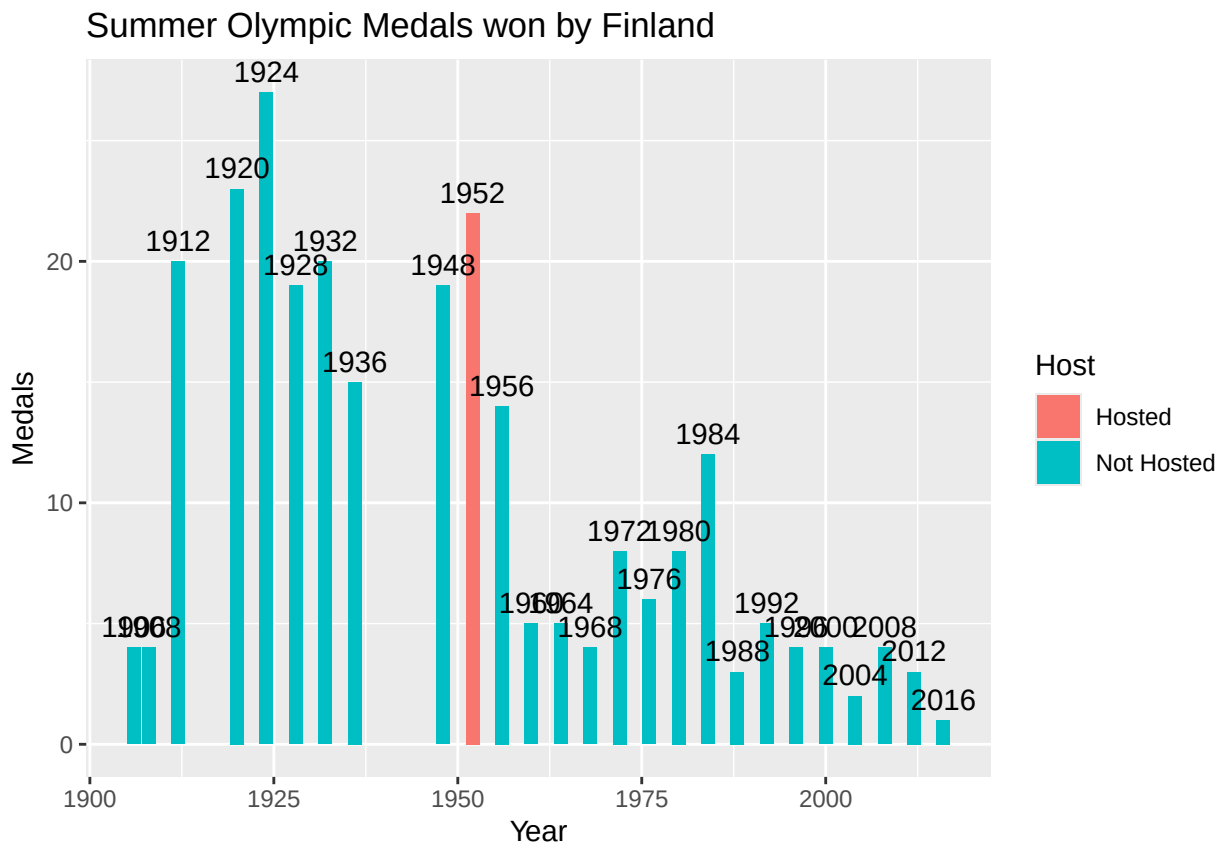
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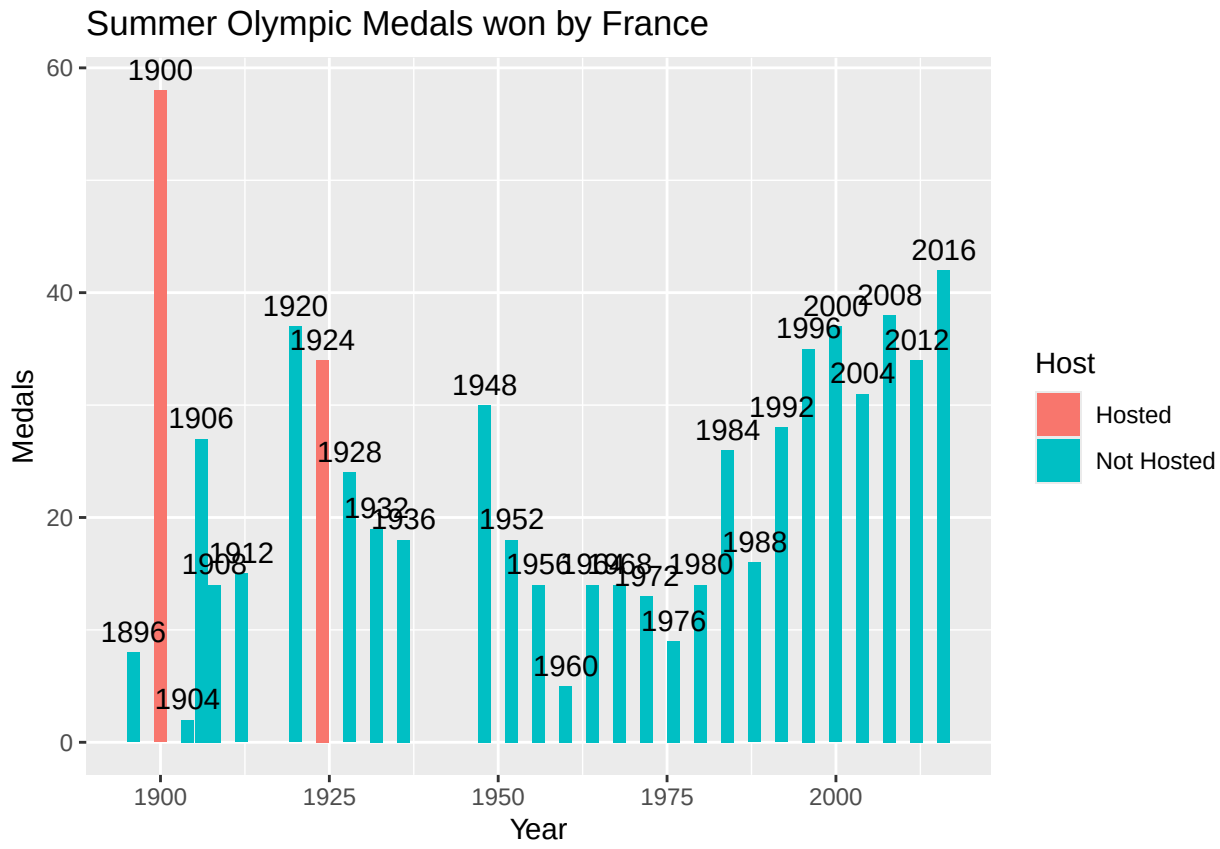
Summer Olympic Medals won by France
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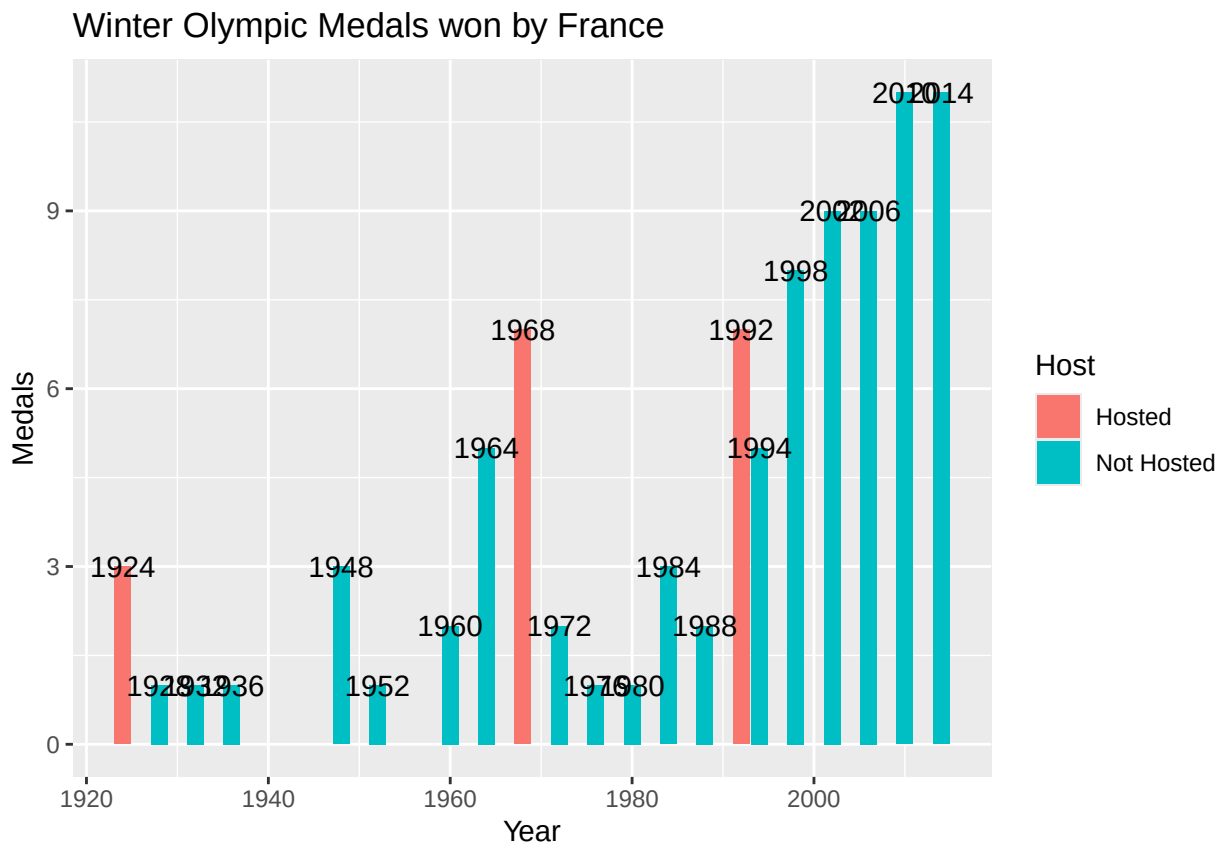
Winter Olympic Medals won by France
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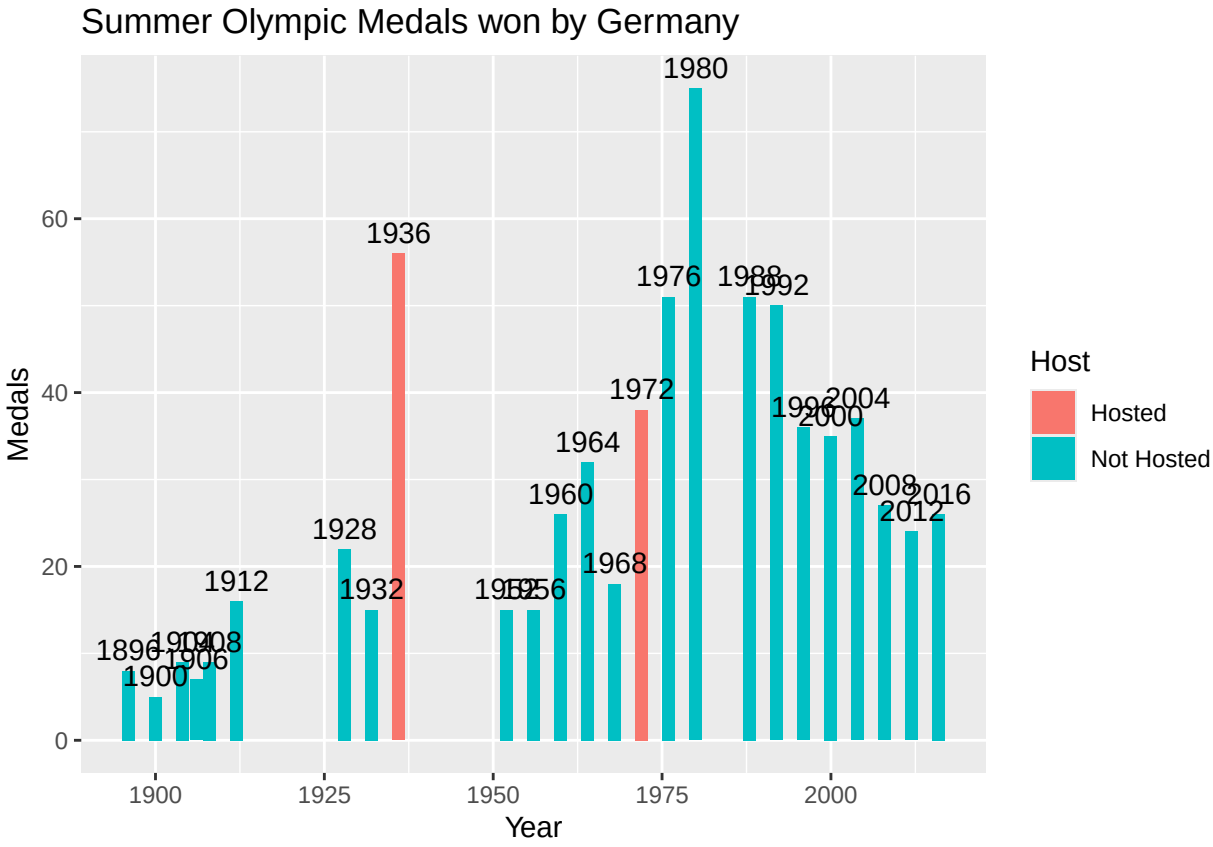
Summer Olympic Medals won by Germany
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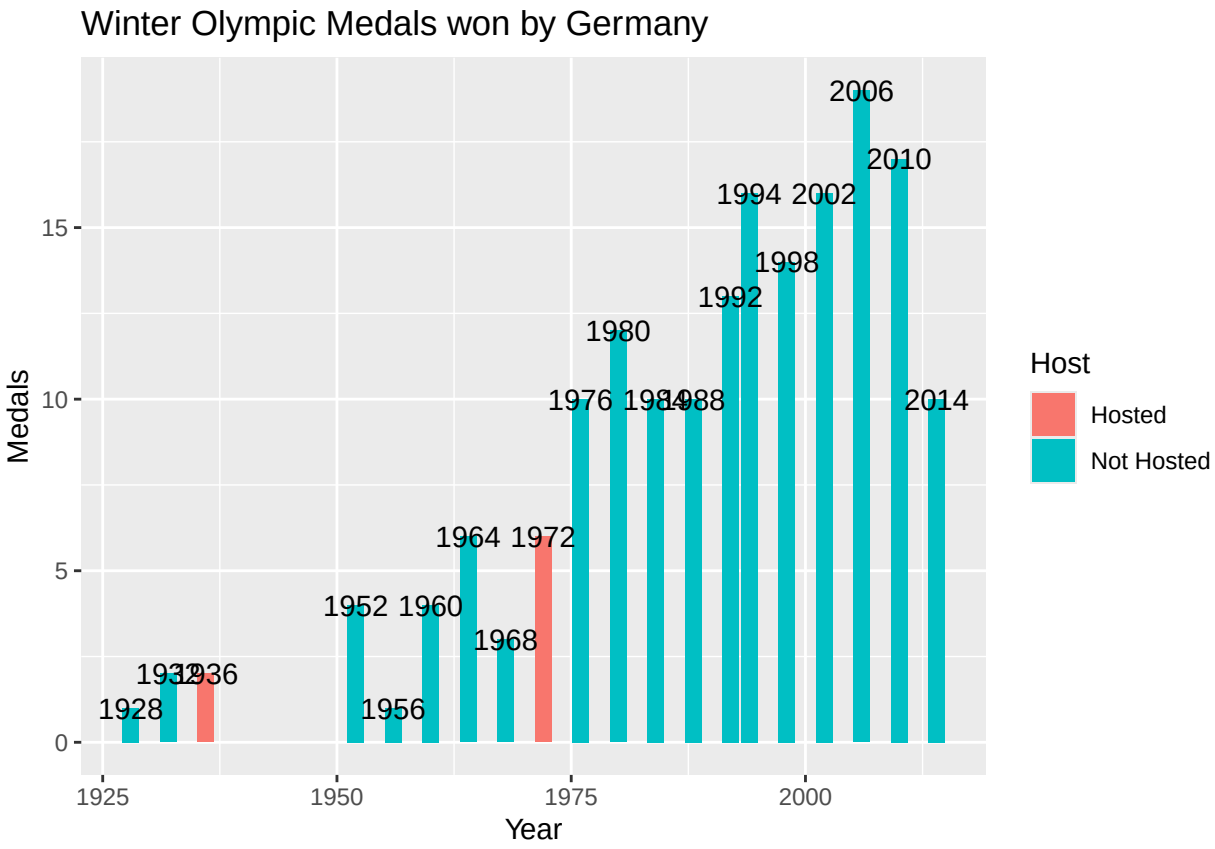
Winter Olympic Medals won by Germany
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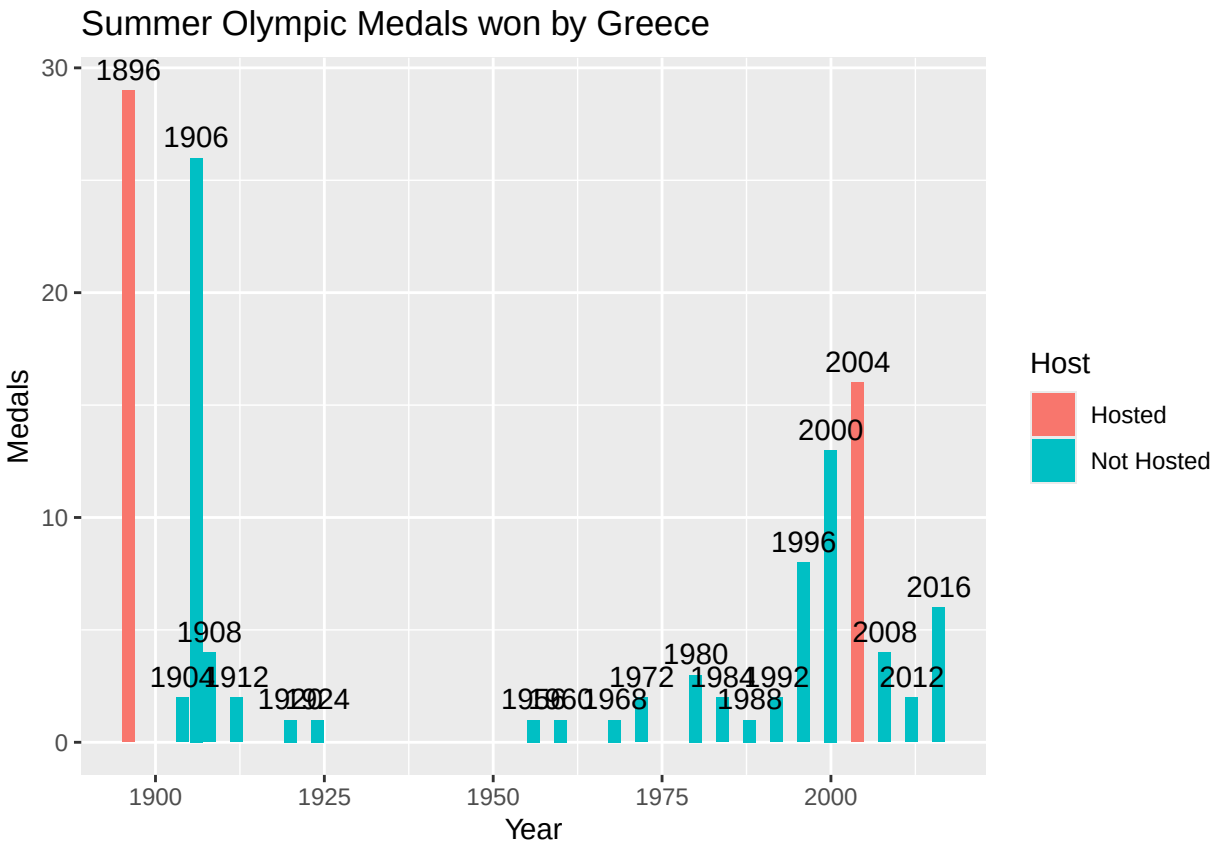
Summer Olympic Medals won by Greece
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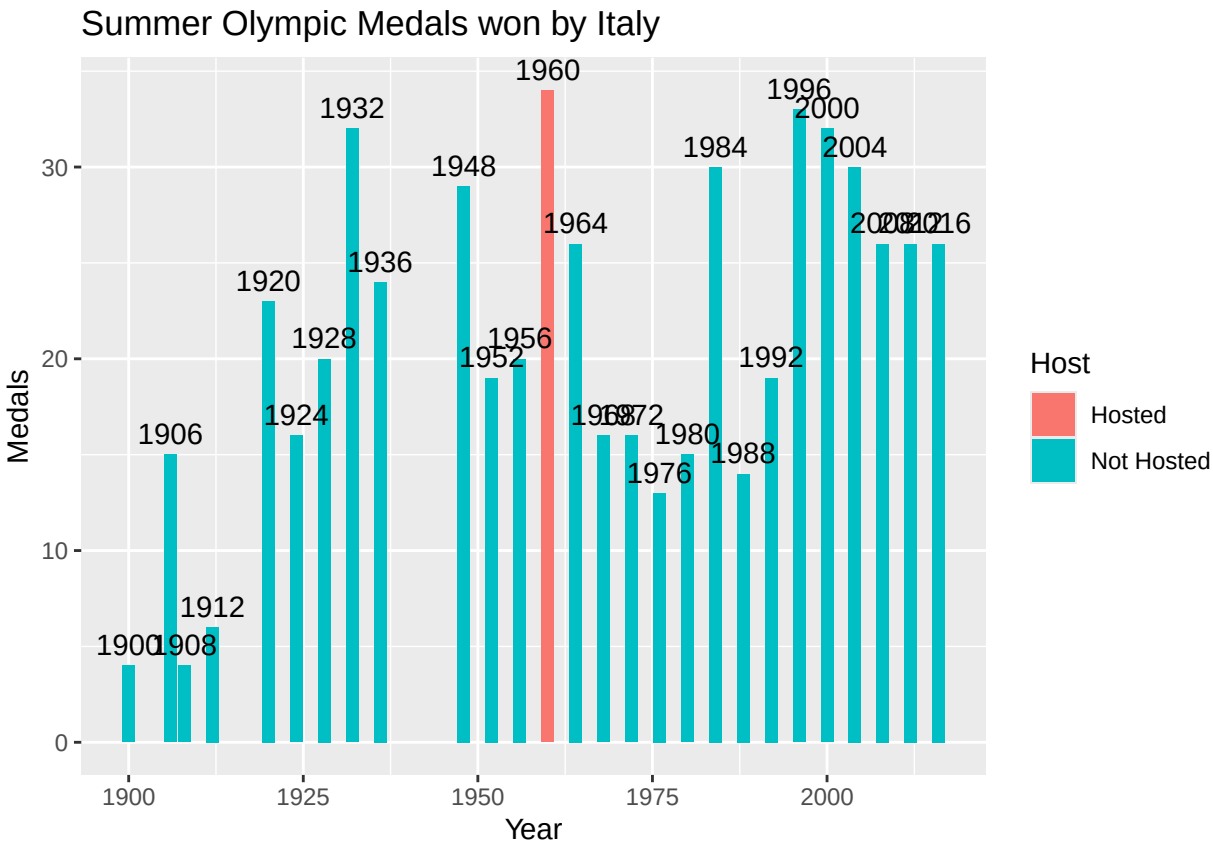
Summer Olympic Medals won by Italy
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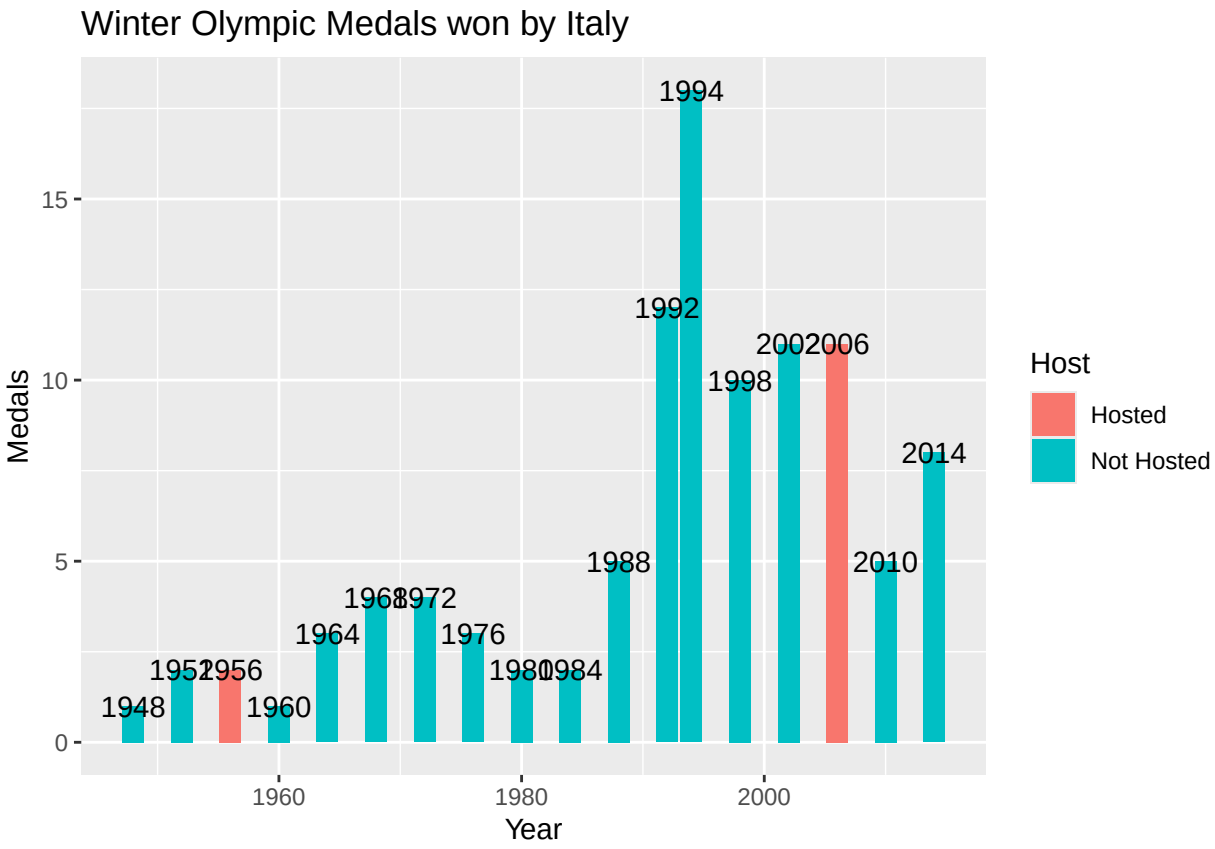
Winter Olympic Medals won by Italy
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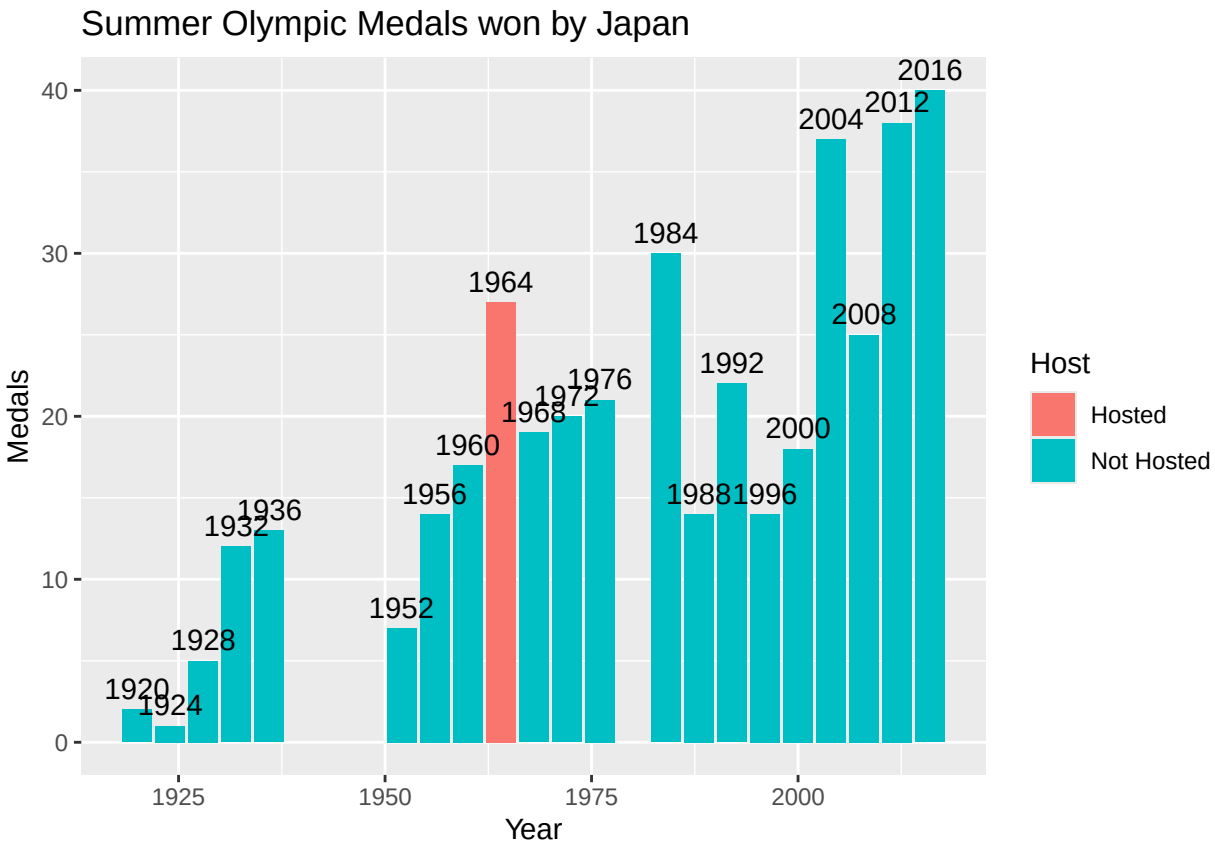
Summer Olympic Medals won by Japan
Medals
Year
Host
Hosted
Not Hosted
0
10
20
30
40
1925
1950
1975
2000
1920
1924
1928
1932
1936
1952
1956
1960
1964
1968
1972
1976
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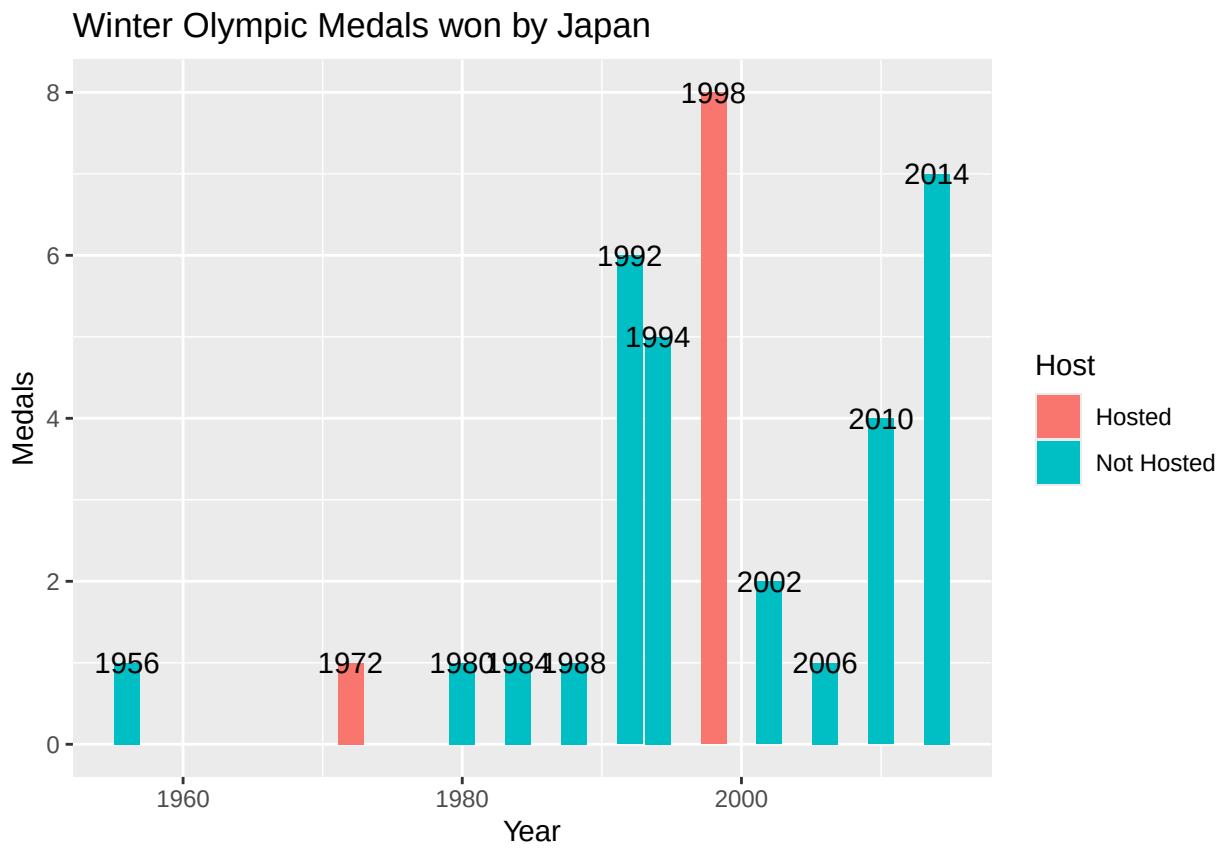
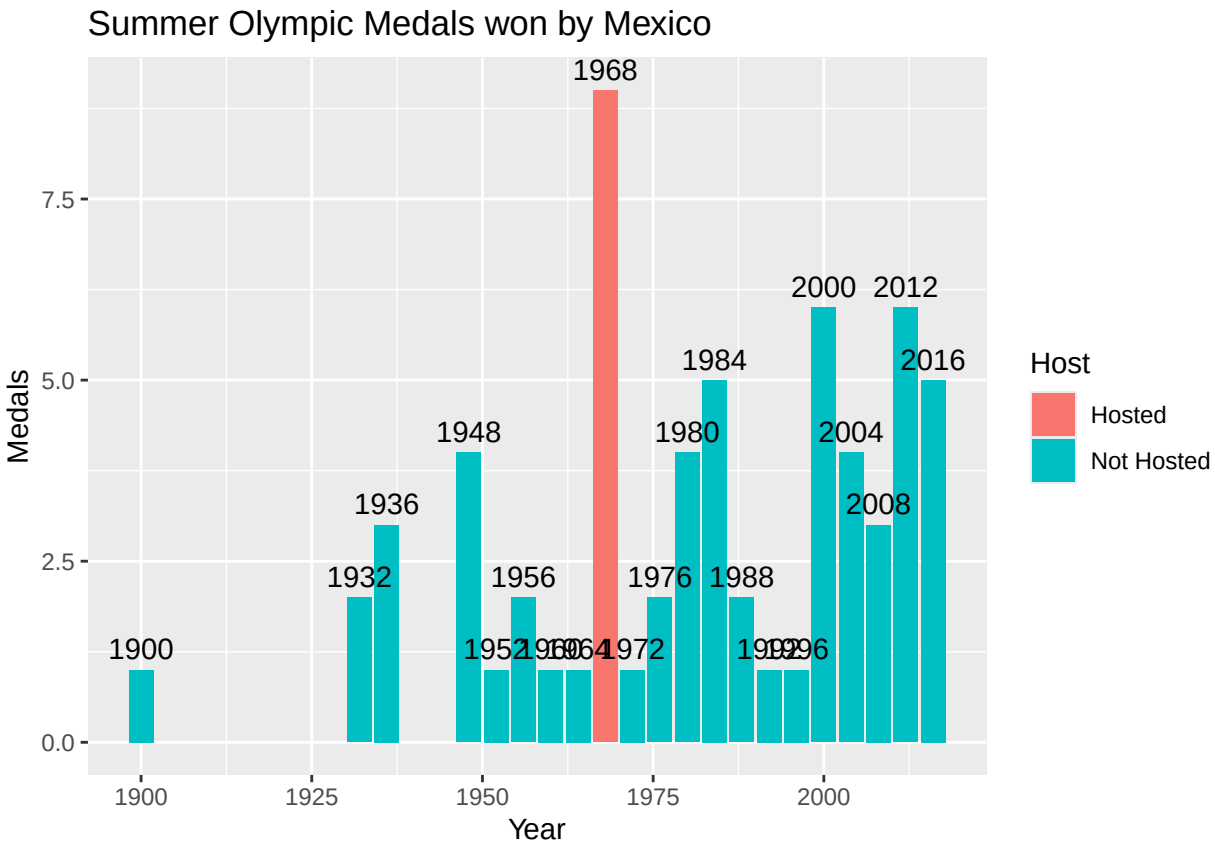
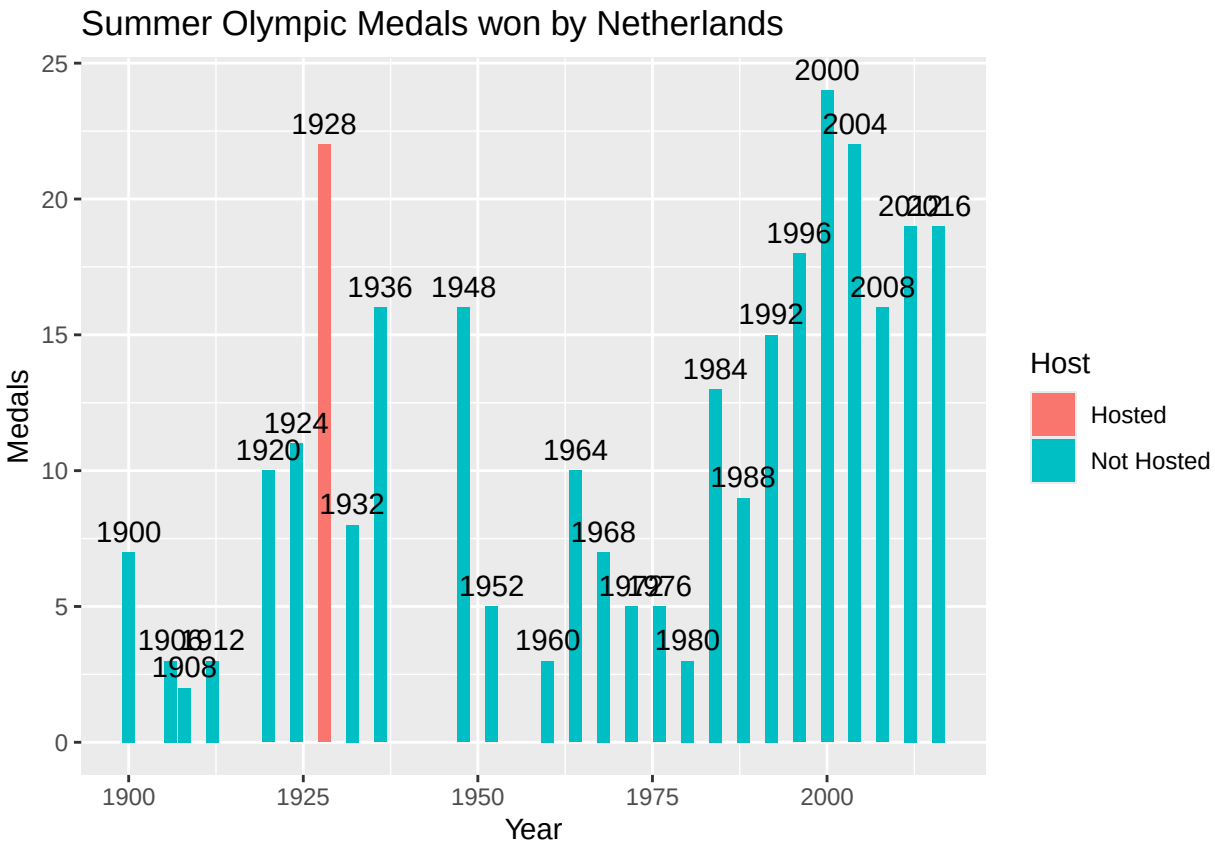
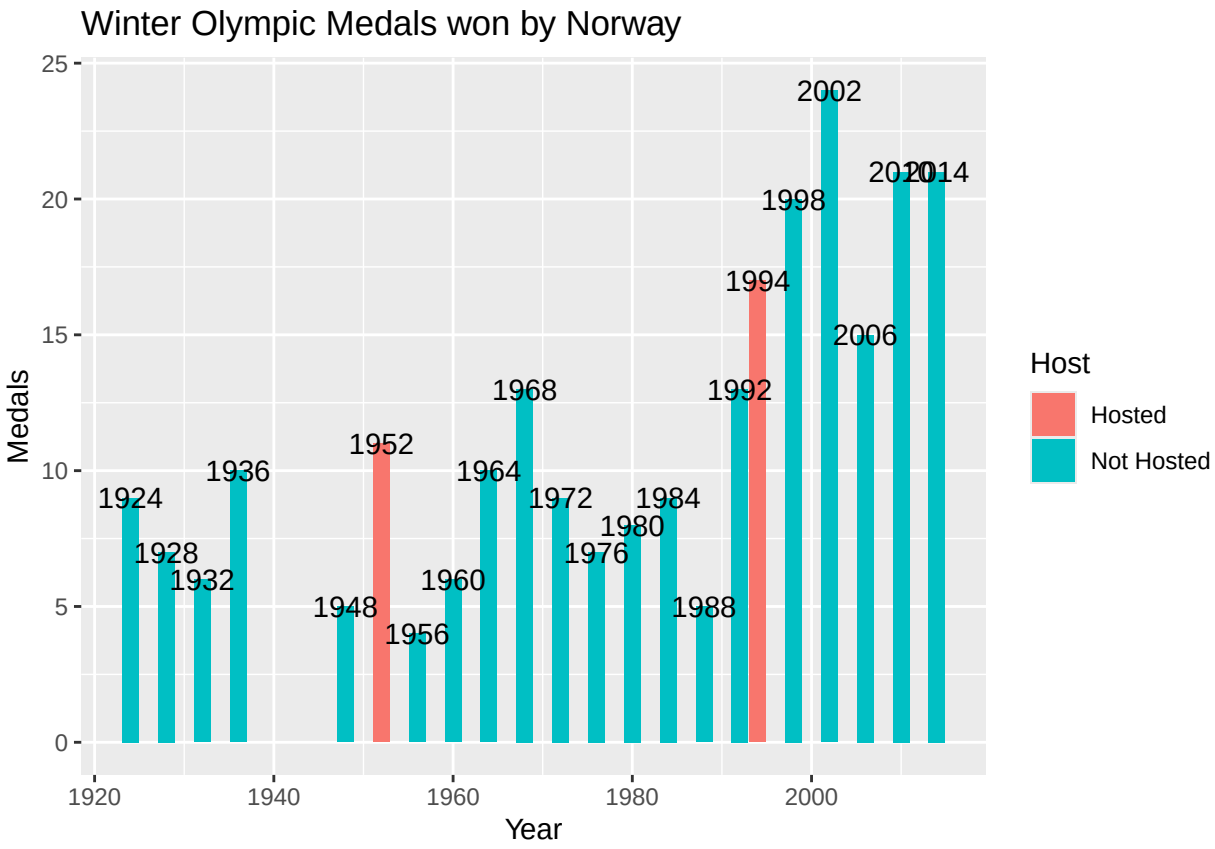
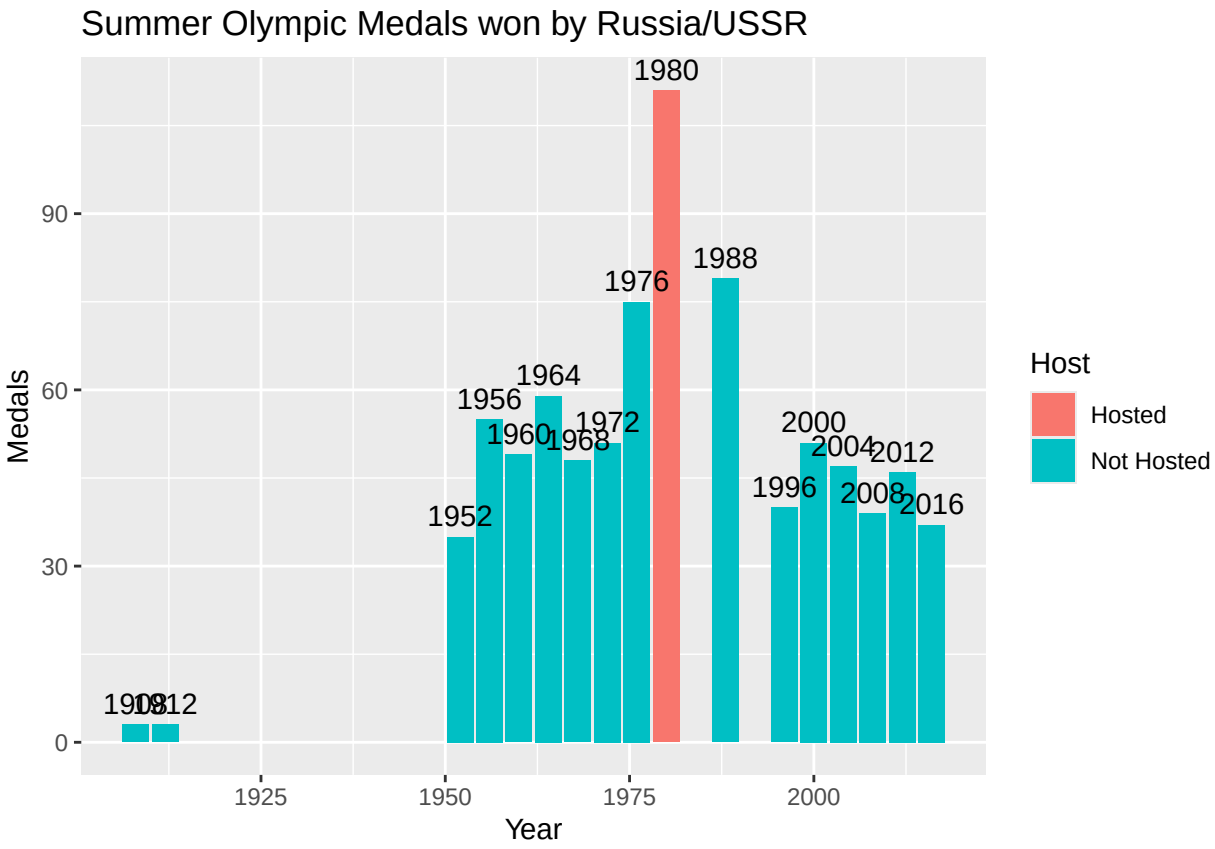
1996
2000
2004
2008
2012
2016

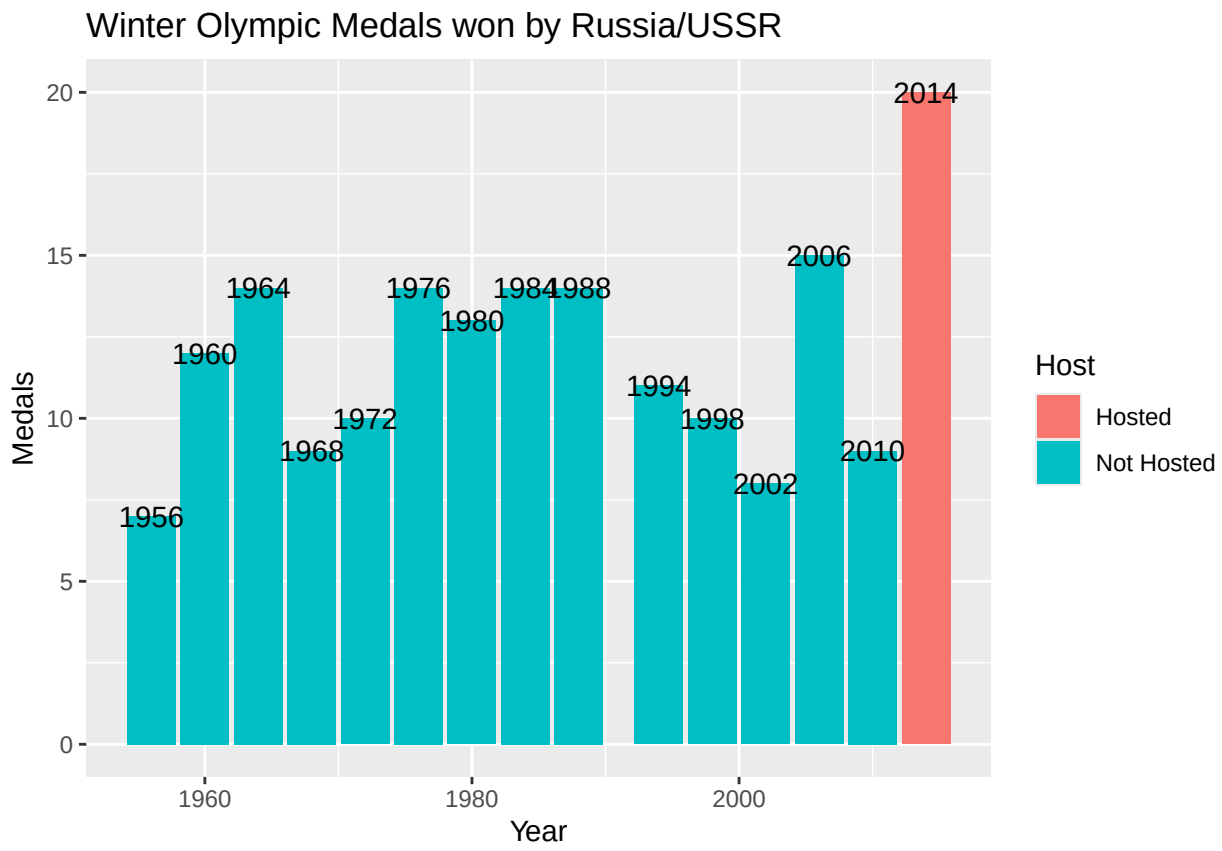

Winter Olympic Medals won by Japan
Medals
Year
Host
Hosted
Not Hosted
1956
1972
1980
1984
1988
1992
1994
1998
2002
2006
2010
2014
0
2
4
6
8
1960
1980
2000


Summer Olympic Medals won by Mexico
Medals
Year
Host
Hosted
Not Hosted
0.0
2.5
5.0
7.5
1900
1925
1950
1975
2000
1900
1932
1936
1948
1956
1968
1972
1976
1980
1984
1988
2000
2004
2008
2012
2016


Summer Olympic Medals won by Netherlands
Medals
Year
Host
Hosted
Not Hosted
25
20
15
10
5
0
1900
1925
1950
1975
2000
1900
1908
1912
1920
1924
1928
1932
1936
1948
1952
1960
1964
1968
1980
1984
1988
1992
1996
2000
2004
2008
2016


Winter Olympic Medals won by Norway
Medals
Year
Host
Hosted
Not Hosted
0
5
10
15
20
25
1920
1940
1960
1980
2000
1924
1928
1932
1936
1948
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1994
1998
2002
2006
2010
2014


Summer Olympic Medals won by Russia/USSR
Medals
Year
Host
Hosted
Not Hosted
0
30
60
90
1925
1950
1975
2000
1908
1912
1952
1956
1960
1964
1968
1972
1976
1980
1988
1996
2000
2004
2008
2012
2016


Winter Olympic Medals won by Russia/USSR
Medals
Year
Host
Hosted
Not Hosted
0
5
10
15
20
1960
1980
2000
1956
1960
1964
1968
1972
1976
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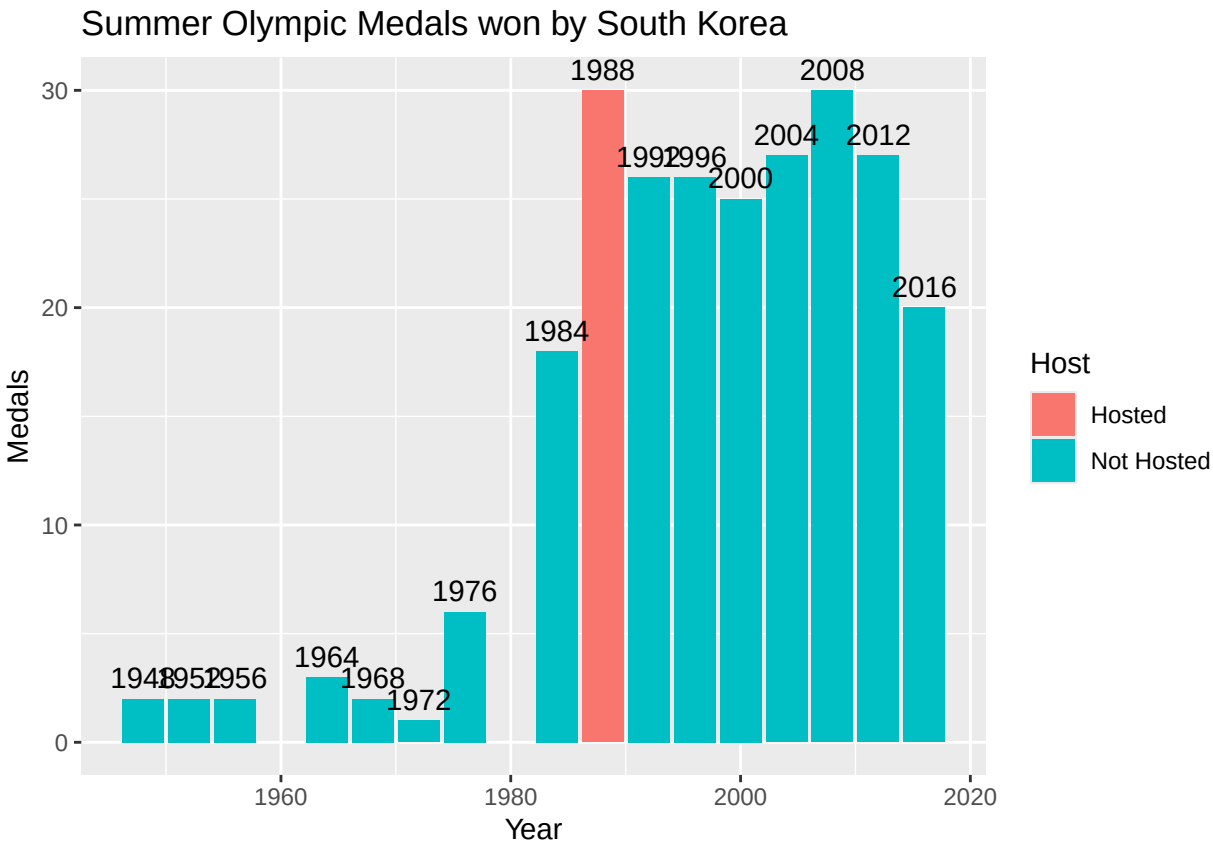
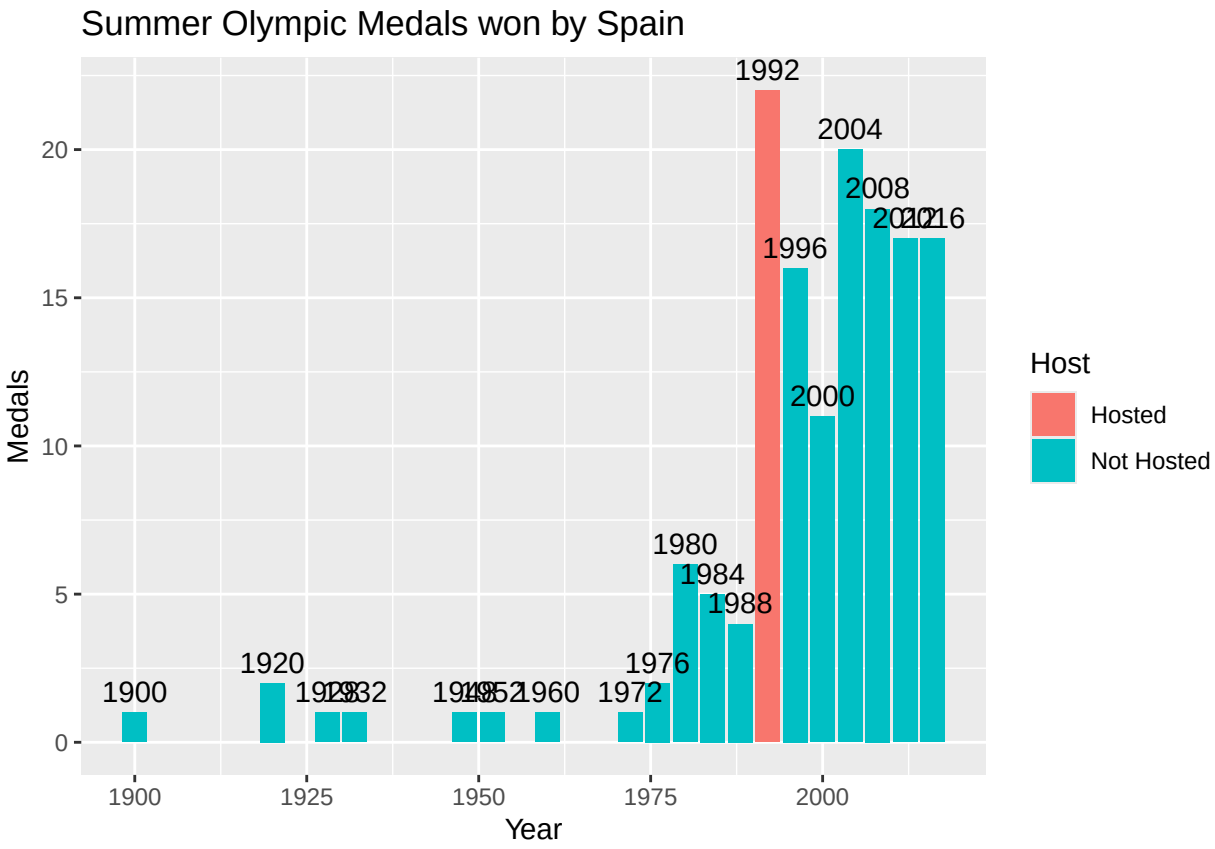
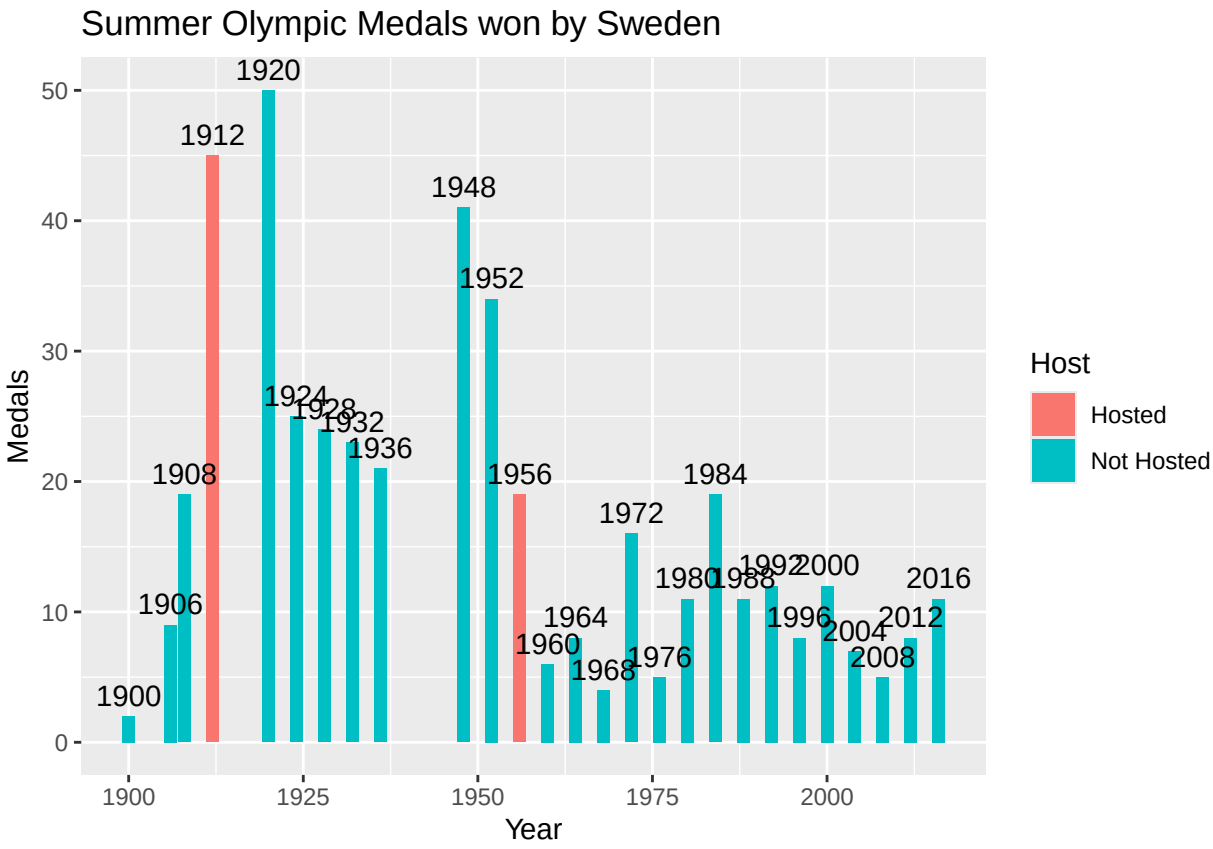
1984
1988
1994
1998
2002
2006
2010
2014


Summer Olympic Medals won by South Korea
Medals
Year
Host
Hosted
Not Hosted
0
10
20
30
1960
1980
2000
2020
1948
1952
1956
1964
1968
1972
1976
1984
1988
1992
1996
2000
2004
2008
2012
2016


Summer Olympic Medals won by Spain
Medals
Year
Host
Hosted
Not Hosted
0
5
10
15
20
1900
1925
1950
1975
2000
1900
1920
1960
1972
1976
1980
1984
1988
1992
1996
2000
2004
2008


Summer Olympic Medals won by Sweden
Medals
Year
Host
Hosted
Not Hosted
0
10
20
30
40
50
1900
1925
1950
1975
2000
1900
1906
1908
1912
1920
1924
1928
1932
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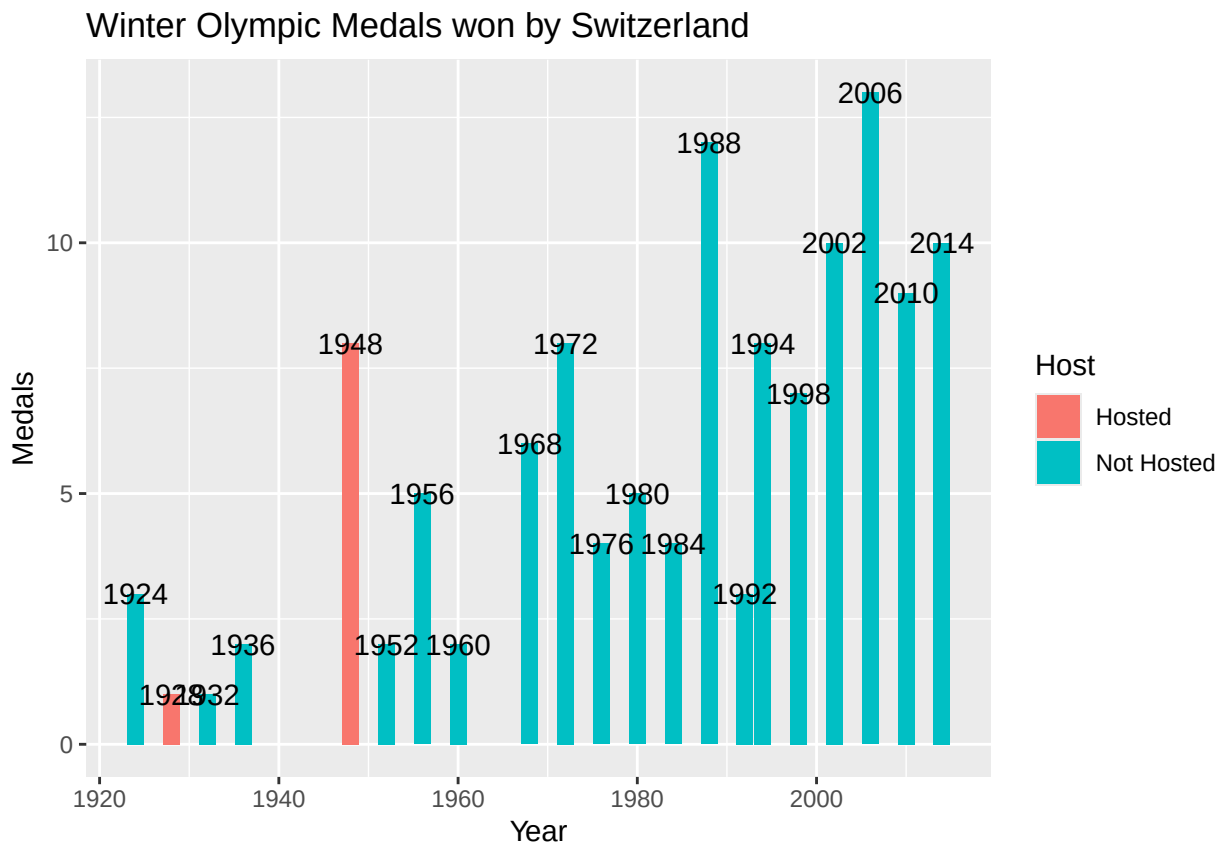
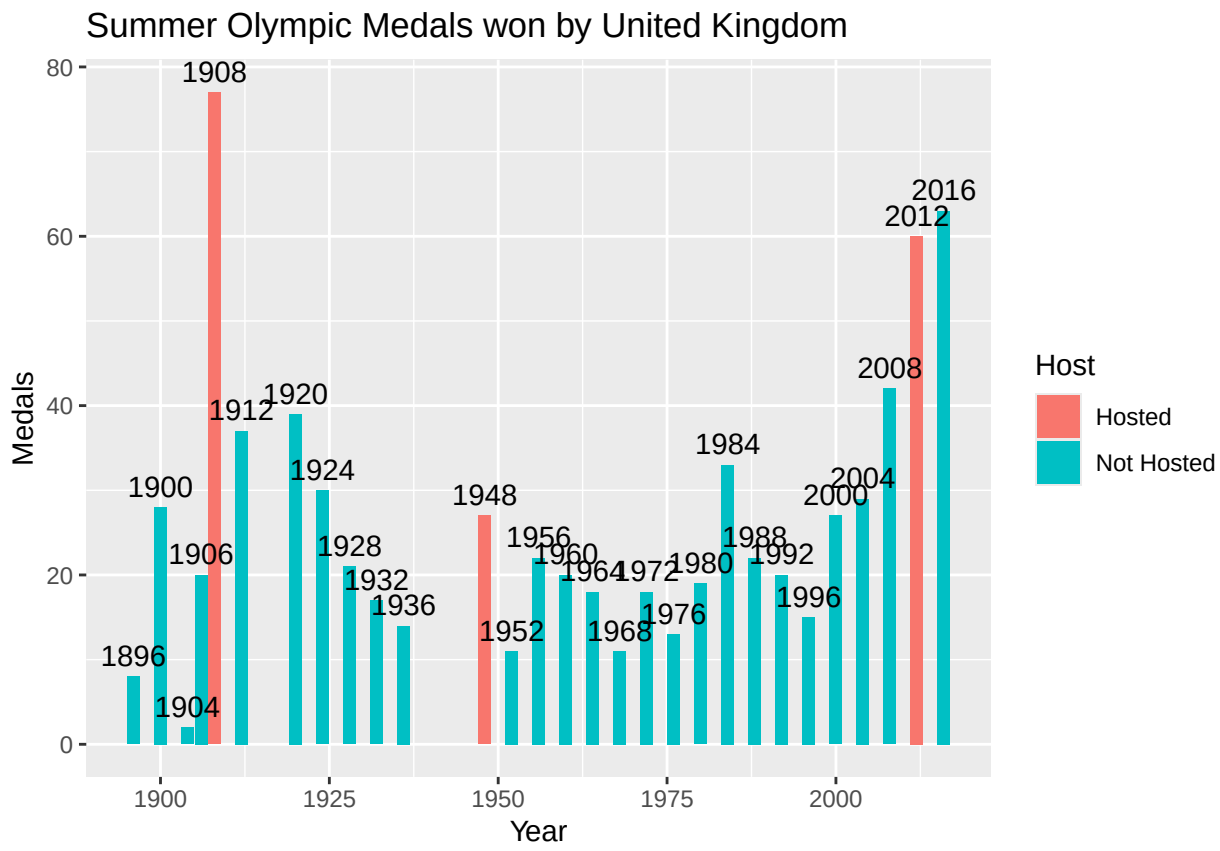
2012
2016


Winter Olympic Medals won by Switzerland
Medals
Year
Host
Hosted
Not Hosted
0
5
10
1920
1940
1960
1980
2000
1924
1928
1932
1936
1948
1952
1956
1960
1968
1972
1976
1980
1984
1988
1992
1994
1998
2002
2006
2010
2014


Summer Olympic Medals won by United Kingdom
Medals
Year
Host
Hosted
Not Hosted
80
60
40
20
0
1900
1925
1950
1975
2000
1896
1900
1904
1906
1908
1912
1920
1924
1928
1932
1936
1948
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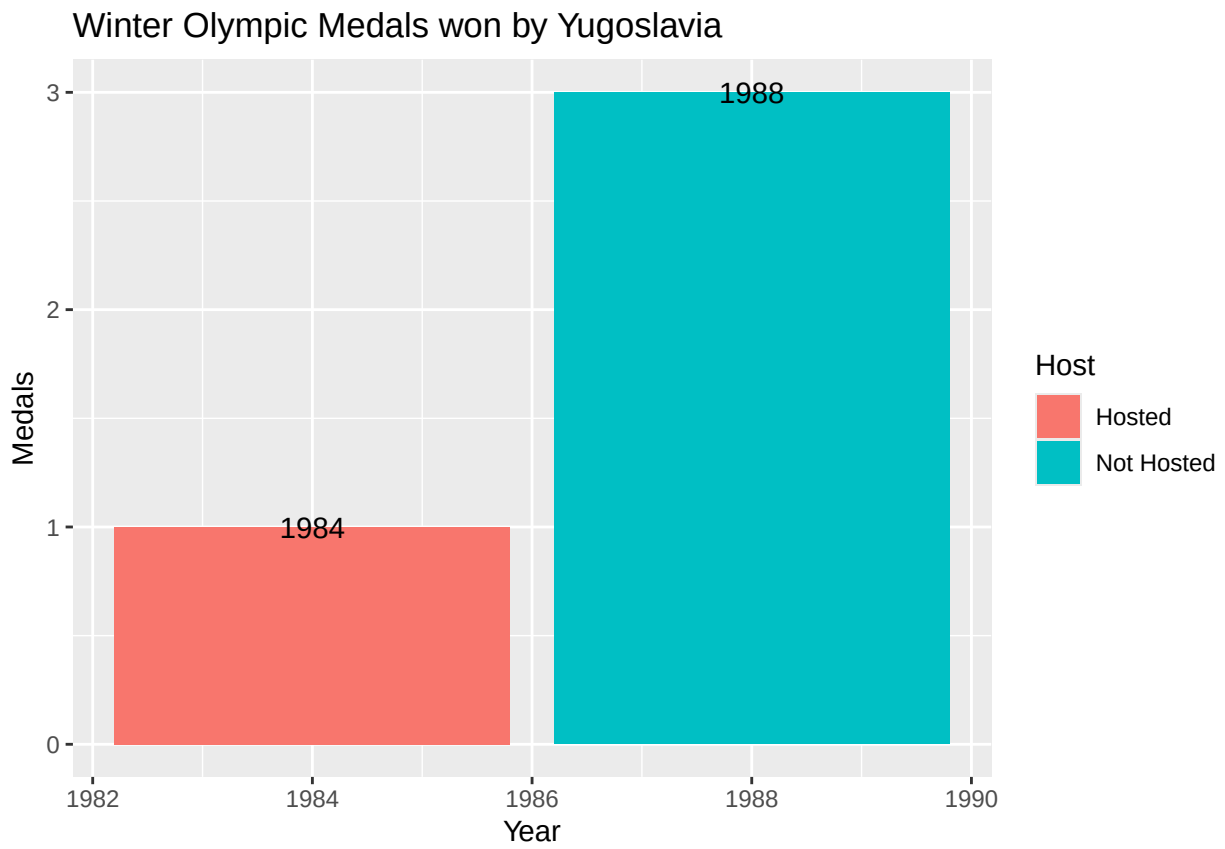
2012
2016

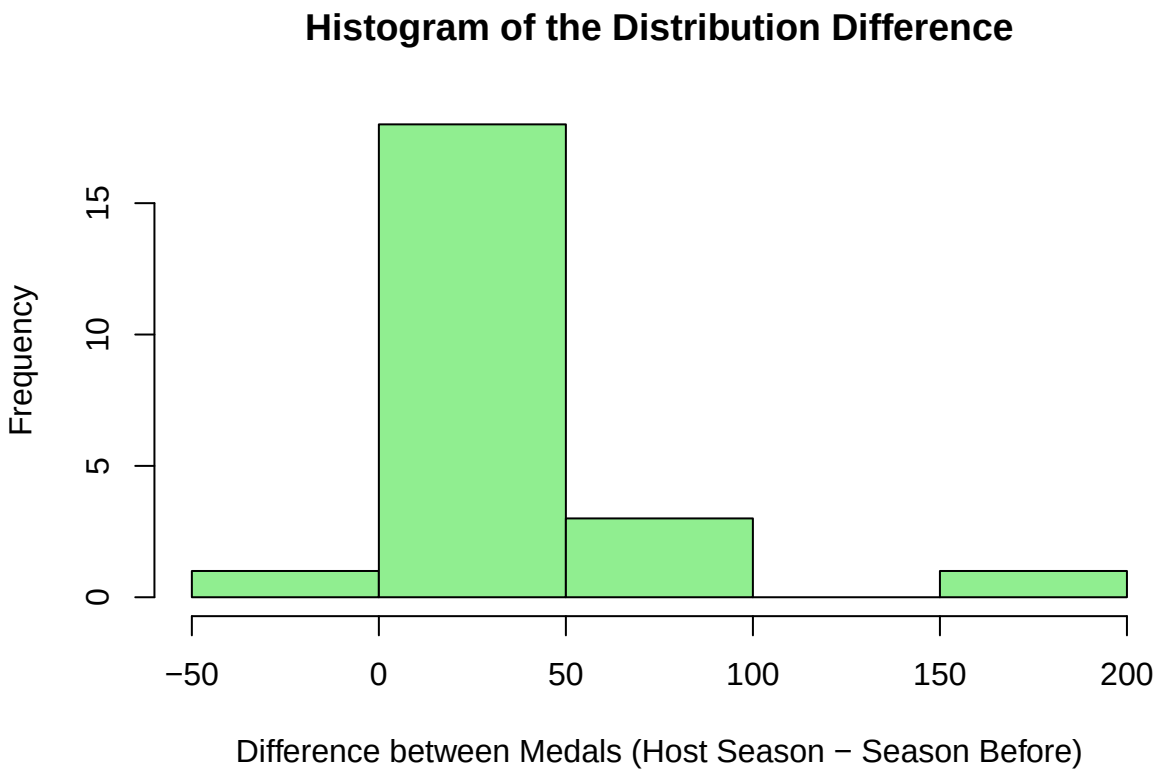


As stated earlier, I created a histogram of the difference of medals **(by subtracting the medals won when they host minus the medals won in the olympic season directly prior)** to draw a reasonable conclusion.

```
hist_data <- tibble(
  NOC = c("USA", "AUS", "AUT", "BEL", "BRA", "CAN", "CHN", "FIN", "FRA", "GER", "GRE", "ITA", "JPN", "M
  Medals_Won_Host = c(451, 83, 13, 33, 18, 39, 85, 22, 109, 102, 45, 47, 36, 9, 22, 29, 130, 30, 22, 64
  Medals_Won_Year_Before = c(265, 49, 8, 5, 17, 29, 55, 19, 52, 39, 16, 33, 22, 1, 11, 18, 84, 18, 4, 5

new <- hist_data %>%
  mutate(Distribution_difference = Medals_Won_Host - Medals_Won_Year_Before)

hist(new$Distribution_difference, xlab = "Difference between Medals (Host Season - Season Before)", mai
```



We can see there is a positive host effect country on the amount of medals won when a country hosts the olympics vs when they don't because there is an overall positive difference.

I am also currently in the process of completing my fourth project - Analyzing the passing networks of the undefeated 2003-2004 Arsenal FC soccer team to use Graph Theory concepts and techniques in hopes of optimizing strategies that will lead to better results and more wins in present day soccer.

I am also planning on undertaking a Machine Learning Project later this summer!