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### PM25_USA_EPA_NEI ###

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# Question 1 : Have total emissions from PM2.5 decreased in the United States from 1999 to 2008?
# Using the base plotting system, make a plot showing the total PM2.5 emission from all sources for each of the years 1999, 2002, 2005, and 2008.

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###    Resources     ###

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# EPA Government references
# Reference 1. 2011 National Emissions Inventory, version 1 Technical Support Document November 2013 - DRAFT
# http://www.epa.gov/ttn/chief/net/2008neiv3/2008_neiv3_tsd_draft.pdf
# Reference 2. 2008 National Emissions Inventory, version 3 Technical Support Document September 2013 - DRAFT
# http://www.epa.gov/ttn/chief/net/2011nei/2011_neiv1_tsd_draft.pdf

# STATE Government references
# Reference 3. Methodologies for U.S. Greenhouse Gas Emissions Projections: Non-CO2 and Non-Energy CO2 Sources DECEMBER, 2013
# http://www.state.gov/documents/organization/219472.pdf

# barplot
# 1 - http://www.ats.ucla.edu/stat/r/faq/barplotplus.htm
# 2 - http://www.spw.uzh.ch/vangijn/teaching/typologyinpractice/weekbyweek/R_Bar_plots.pdf

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###   plot1 R code   ###

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# Create a function called plot1_TotalEmissionsPM2.5_USA_1999_to_2008() to do the requested plot

plot1_TotalEmissionsPM2.5_USA_1999_to_2008 = function()
{
  # Set the working directory on my local machine
  setwd("~/Desktop/Data Science Specialization/Exploratory Data Analysis/Course project 2")

  # Read the PM2.5 Emissions Data in summarySCC_PM25.rds file with readRDS() function
  NEI <- readRDS("summarySCC_PM25.rds")

  # Read the Source Classification Code Table in Source_Classification_Code.rds file with readRDS() function
  SCC <- readRDS("Source_Classification_Code.rds")

  # Sum emissions by year: use the function tapply()
  NEI_Emmissions_Year <- tapply(NEI$Emissions,NEI$year,sum)

  # Plot barplot
  barplot(NEI_Emmissions_Year,
          names.arg = toupper(names(NEI_Emmissions_Year)),
          legend.text = TRUE,
          col = c("darkviolet", "orangered", "deeppink", "gold"),
          border = "blue",
          xlab = "Year",
          ylab = "PM2.5 Emissions (Tons)",
          ylim = c(0,8000000),
          main = "USA Total PM25 Emissions from 1999 to 2008",
          font.main = 3,
          cex.main = 1.5,
          sub = "source : summarySCC_PM25.rds",
          cex.sub = 0.8,
          cex.names = 0.8,
          cex.axis = 0.8,
          args.legend = list(title = "Legend: Color - Year", x = "topright", cex = 1.0))
  # Add a dashed line relying each total emissions from PM2.5 for 1999, 2002, 2005, 2008
  lines(NEI_Emmissions_Year,lw = 2,col = "navyblue",lty = 2,cex = 1)
  # Add points to each total emissions from PM2.5 for 1999, 2002, 2005, 2008
  points(NEI_Emmissions_Year,lw = 4,col= "navyblue", pch = 15)
  # Add all values for total emissions from PM2.5 for 1999, 2002, 2005, 2008 next to the points
  text(1, NEI_Emmissions_Year[1], labels = NEI_Emmissions_Year[1], pos = 3,cex = 0.7)
  text(2, NEI_Emmissions_Year[2], labels = NEI_Emmissions_Year[2], pos = 3,cex = 0.7)
  text(3, NEI_Emmissions_Year[3], labels = NEI_Emmissions_Year[3], pos = 3,cex = 0.7)
  text(4, NEI_Emmissions_Year[4], labels = NEI_Emmissions_Year[4], pos = 3,cex = 0.7)

  # Save png
  dev.copy(png, filename = "plot1.png", height = 600, width = 800, unit = "px", bg = "transparent")

  # Release screen
  dev.off()
}

plot1_TotalEmissionsPM2.5_USA_1999_to_2008()

# Answer 1: PM2.5 Total Emissions decreased in the USA between 1999 and 2008.
```