W6\_functions

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# Load packages and data

library(pacman)

## Warning: package 'pacman' was built under R version 3.6.3

p\_load(tidyverse, gapminder)  
  
# gapminder as df  
d <- gapminder

# 1. Define a defensive function that calculates the Gross Domestic Product of a nation from the data available in the gapminder dataset. Using that function, calculate the GDP of Denmark in the following years: 1967, 1977, 1987, 1997, 2007, and 2017.

# Create function  
calcGDP <- function(data, country = NULL, year = NULL){  
   
   
 if (!is.na(country)){  
 data <- data[data$country %in% country, ]  
 # if 'country' is not NA, subset all rows with that or those countries  
 }  
   
 if (!is.na(year)){  
 data <- data[data$year %in% year, ]  
 }  
   
 gdp <- data$gdpPercap \* data$pop  
   
 new = cbind(data, gdp)  
   
 return(new)  
   
}  
  
# Create empty df and make a list of years  
DK <- d[0,]  
years <- c(1967, 1977, 1987, 1997, 2007)  
  
# loop thorugh all years and gather in a single df  
for (i in 1:length(years)){  
  
 new <- calcGDP(d, "Denmark", years[i])  
   
 if (length(DK) == 0){  
 DK <- new  
 } else{  
 DK <- rbind(DK, new)  
 }  
  
}  
  
# The results  
DK

## country continent year lifeExp pop gdpPercap gdp  
## 1 Denmark Europe 1967 72.960 4838800 15937.21 77116977700  
## 2 Denmark Europe 1977 74.690 5088419 20422.90 103920280028  
## 3 Denmark Europe 1987 74.800 5127024 25116.18 128771236166  
## 4 Denmark Europe 1997 76.110 5283663 29804.35 157476118456  
## 5 Denmark Europe 2007 78.332 5468120 35278.42 192906627081

# 2. Write a script that loops over each country in the gapminder dataset, tests whether the country starts with a ‘B’ , and print out whether the life expectancy is smaller than 50, between 50 and 70, or greater than 70.

# one column df with countries on the list in 2007 (newest)  
countries <- d %>% filter(year == 2007)  
  
list <- as.list(countries[,1])  
list <- list[["country"]]  
length(list)

## [1] 142

# Loop through all countries (existing in 2007) and print information  
for (i in 1:length(list)){  
   
 x <- list[i]  
 first <- substr(x, start = 1, stop = 1)  
   
 if (isTRUE(first == "B") == TRUE){  
 sentence1 <- paste("The first letter of the country", x, "is B.")  
 } else {  
 sentence1 <- paste("The first letter of the country", x, "is not B.")  
 }  
  
 if (countries$lifeExp[i] <= 50){  
 sentence2 <- paste("In", x, "the life expectancy was under 50 years in 2007.")  
   
 } else if (countries$lifeExp[i] >= 70){  
 sentence2 <- paste("In", x, "the life expectancy was greater than 70 years in 2007.")  
   
 } else {  
 sentence2 <- paste("In", x, "the life expectancy was between 50 and 70 years in 2007.")  
   
 }  
  
 print(paste(sentence1,sentence2))  
   
}

## [1] "The first letter of the country Afghanistan is not B. In Afghanistan the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Albania is not B. In Albania the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Algeria is not B. In Algeria the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Angola is not B. In Angola the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Argentina is not B. In Argentina the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Australia is not B. In Australia the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Austria is not B. In Austria the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Bahrain is B. In Bahrain the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Bangladesh is B. In Bangladesh the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Belgium is B. In Belgium the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Benin is B. In Benin the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Bolivia is B. In Bolivia the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Bosnia and Herzegovina is B. In Bosnia and Herzegovina the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Botswana is B. In Botswana the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Brazil is B. In Brazil the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Bulgaria is B. In Bulgaria the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Burkina Faso is B. In Burkina Faso the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Burundi is B. In Burundi the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Cambodia is not B. In Cambodia the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Cameroon is not B. In Cameroon the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Canada is not B. In Canada the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Central African Republic is not B. In Central African Republic the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Chad is not B. In Chad the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Chile is not B. In Chile the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country China is not B. In China the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Colombia is not B. In Colombia the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Comoros is not B. In Comoros the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Congo, Dem. Rep. is not B. In Congo, Dem. Rep. the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Congo, Rep. is not B. In Congo, Rep. the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Costa Rica is not B. In Costa Rica the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Cote d'Ivoire is not B. In Cote d'Ivoire the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Croatia is not B. In Croatia the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Cuba is not B. In Cuba the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Czech Republic is not B. In Czech Republic the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Denmark is not B. In Denmark the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Djibouti is not B. In Djibouti the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Dominican Republic is not B. In Dominican Republic the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Ecuador is not B. In Ecuador the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Egypt is not B. In Egypt the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country El Salvador is not B. In El Salvador the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Equatorial Guinea is not B. In Equatorial Guinea the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Eritrea is not B. In Eritrea the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Ethiopia is not B. In Ethiopia the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Finland is not B. In Finland the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country France is not B. In France the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Gabon is not B. In Gabon the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Gambia is not B. In Gambia the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Germany is not B. In Germany the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Ghana is not B. In Ghana the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Greece is not B. In Greece the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Guatemala is not B. In Guatemala the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Guinea is not B. In Guinea the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Guinea-Bissau is not B. In Guinea-Bissau the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Haiti is not B. In Haiti the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Honduras is not B. In Honduras the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Hong Kong, China is not B. In Hong Kong, China the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Hungary is not B. In Hungary the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Iceland is not B. In Iceland the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country India is not B. In India the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Indonesia is not B. In Indonesia the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Iran is not B. In Iran the life expectancy was greater than 70 years in 2007."  
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## [1] "The first letter of the country Reunion is not B. In Reunion the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Romania is not B. In Romania the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Rwanda is not B. In Rwanda the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Sao Tome and Principe is not B. In Sao Tome and Principe the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Saudi Arabia is not B. In Saudi Arabia the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Senegal is not B. In Senegal the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Serbia is not B. In Serbia the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Sierra Leone is not B. In Sierra Leone the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Singapore is not B. In Singapore the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Slovak Republic is not B. In Slovak Republic the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Slovenia is not B. In Slovenia the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Somalia is not B. In Somalia the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country South Africa is not B. In South Africa the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Spain is not B. In Spain the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Sri Lanka is not B. In Sri Lanka the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Sudan is not B. In Sudan the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Swaziland is not B. In Swaziland the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Sweden is not B. In Sweden the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Switzerland is not B. In Switzerland the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Syria is not B. In Syria the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Taiwan is not B. In Taiwan the life expectancy was greater than 70 years in 2007."  
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## [1] "The first letter of the country Thailand is not B. In Thailand the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Togo is not B. In Togo the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Trinidad and Tobago is not B. In Trinidad and Tobago the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Tunisia is not B. In Tunisia the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Turkey is not B. In Turkey the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Uganda is not B. In Uganda the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country United Kingdom is not B. In United Kingdom the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country United States is not B. In United States the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Uruguay is not B. In Uruguay the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Venezuela is not B. In Venezuela the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Vietnam is not B. In Vietnam the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country West Bank and Gaza is not B. In West Bank and Gaza the life expectancy was greater than 70 years in 2007."  
## [1] "The first letter of the country Yemen, Rep. is not B. In Yemen, Rep. the life expectancy was between 50 and 70 years in 2007."  
## [1] "The first letter of the country Zambia is not B. In Zambia the life expectancy was under 50 years in 2007."  
## [1] "The first letter of the country Zimbabwe is not B. In Zimbabwe the life expectancy was under 50 years in 2007."