cm007 Exercises: Practice with `dplyr`

```
suppressPackageStartupMessages(library(tidyverse))
suppressPackageStartupMessages(library(gapminder))
suppressPackageStartupMessages(library(tsibble))
```

1.

(a) What's the minimum life expectancy for each continent and each year?
(b) Add the corresponding country to the tibble, too.
(c) Arrange by min life expectancy.

```
gapminder %>%
  group_by(continent, year) %>%
  summarise(min_life = min(lifeExp),
            country = country[lifeExp==min_life]) %>%
  arrange(min_life)
```

```
## # A tibble: 60 x 4
## # Groups:   continent [5]
##    continent  year min_life country
##    <fct>     <int>    <dbl> <fct>
##  1 Africa     1992     23.6 Rwanda
##  2 Asia       1952     28.8 Afghanistan
##  3 Africa     1952     30   Gambia
##  4 Asia       1957     30.3 Afghanistan
##  5 Asia       1977     31.2 Cambodia
##  6 Africa     1957     31.6 Sierra Leone
##  7 Asia       1962     32.0 Afghanistan
##  8 Africa     1962     32.8 Sierra Leone
##  9 Asia       1967     34.0 Afghanistan
## 10 Africa     1967     34.1 Sierra Leone
## # ... with 50 more rows
```

2. Calculate the growth in population since the first year on record *for each country* by rearranging the following lines, and filling in the `FILL_THIS_IN`. Here's another convenience function for you: `dplyr::first()`.

```
gapminder %>%
  group_by(country) %>%
  arrange(year) %>%
  mutate(rel_growth = last(pop) - first(pop))
```

```
## # A tibble: 1,704 x 7
## # Groups:   country [142]
##    country     continent  year lifeExp      pop gdpPercap rel_growth
##    <fct>       <fct>     <int>   <dbl>    <int>     <dbl>      <int>
##  1 Afghanistan Asia       1952    28.8  8425333      779.   23464590
##  2 Albania     Europe     1952    55.2  1282697     1601.    2317826
##  3 Algeria     Africa     1952    43.1  9279525     2449.   24053691
##  4 Angola      Africa     1952    30.0  4232095     3521.    8188381
##  5 Argentina   Americas   1952    62.5 17876956     5911.   22424971
##  6 Australia   Oceania    1952    69.1  8691212    10040.   11742964
##  7 Austria     Europe     1952    66.8  6927772     6137.    1272011
##  8 Bahrain     Asia       1952    50.9   120447     9867.     588126
```

```
##  9 Bangladesh  Asia       1952    37.5 46886859      684.  103561480
## 10 Belgium     Europe     1952    68    8730405     8343.    1661821
## # ... with 1,694 more rows
```

3. Determine the country that experienced the sharpest 5-year drop in life expectancy, in each continent, sorted by the drop, by rearranging the following lines of code. Ensure there are no `NA`'s. Instead of using `lag()`, use the convenience function provided by the `tsibble` package, `tsibble::difference()`:

```
gapminder %>%
group_by(country) %>%
  arrange(year) %>%
  mutate(inc_life_exp = difference(lifeExp)) %>%
  drop_na() %>%
  ungroup() %>%
  group_by(continent) %>%
  filter(inc_life_exp == min(inc_life_exp)) %>%
  arrange(inc_life_exp) %>%
  knitr::kable()
```

country	continent	year	lifeExp	pop	gdpPercap	inc_life_exp
Rwanda	Africa	1992	23.599	7290203	737.0686	-20.421
Cambodia	Asia	1977	31.220	6978607	524.9722	-9.097
El Salvador	Americas	1977	56.696	4282586	5138.9224	-1.511
Montenegro	Europe	2002	73.981	720230	6557.1943	-1.464
Australia	Oceania	1967	71.100	11872264	14526.1246	0.170