Due: February 8th, 2024,10pm

Reference: https://stat545.com/factors-boss.html

1. Install packages `forcats` and `gapminder`
2. Run the below code in R and explain its output (using the help menu)

```
> library(tidyverse)
> library(gapminder)
> str(gapminder$continent)
> levels(gapminder$continent)
> nlevels(gapminder$continent)
> class(gapminder$continent)
```

3. Describe what the two count commands below do:

```
> gapminder %>%count(continent)
> fct_count(gapminder$continent)
```

4. Describe what the below code achieves:

```
> nlevels(gapminder$country)
> h_countries <- c("Egypt", "Haiti", "Romania", "Thailand", "Venezuela")
> h_gap <- gapminder %>%  filter(country %in% h_countries)
> nlevels(h_gap$country)
```

and what do the below codes intend to achieve:

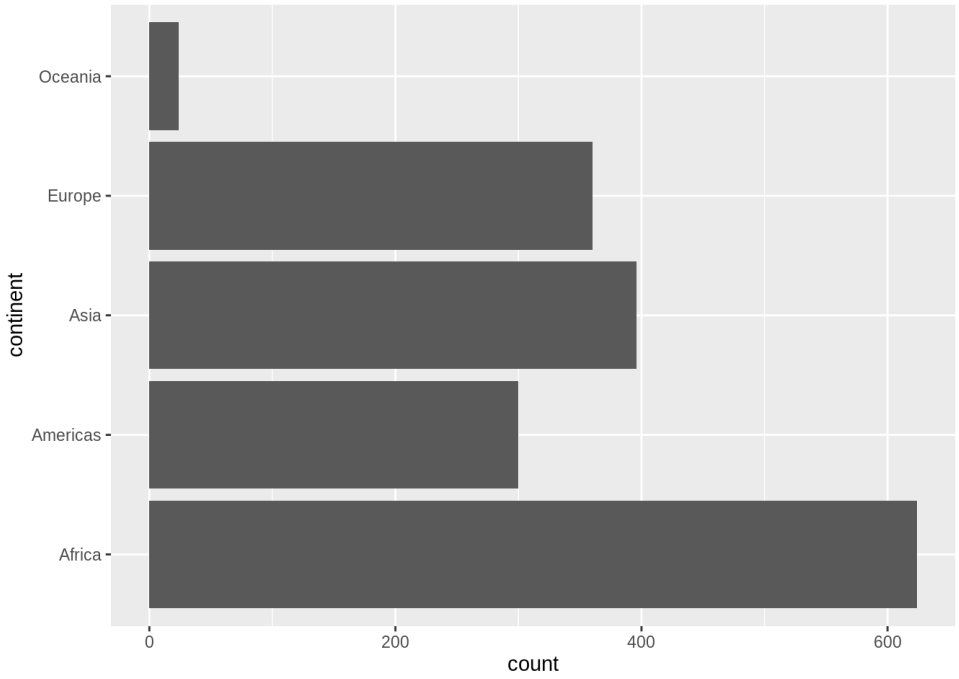
```
> h_gap_dropped <- h_gap %>%droplevels()
> nlevels(h_gap_dropped$country)

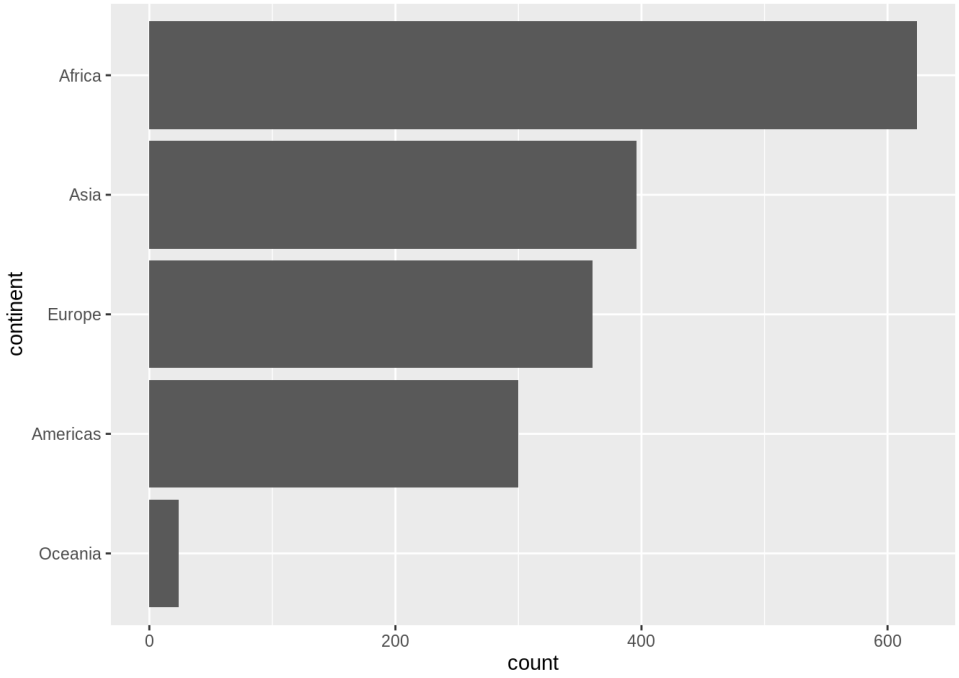

> h_gap$country %>%  fct_drop() %>%levels()
```

5. Each of the below code intends to reorder the levels.

```
> gapminder$continent %>% levels()
> gapminder$continent %>%   fct_infreq() %>% levels()
> gapminder$continent %>%   fct_infreq() %>%
+   fct_rev() %>% levels()
>
```

Explain the default ordering of factors and what do these commands do. Use the above orderings and create the following bar charts using `ggplot`.

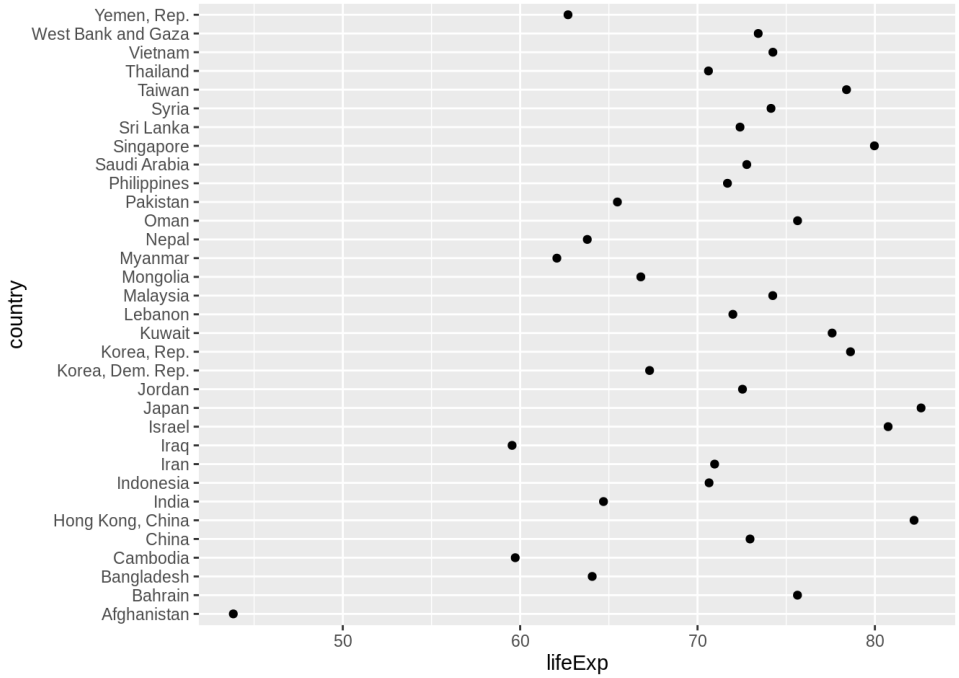


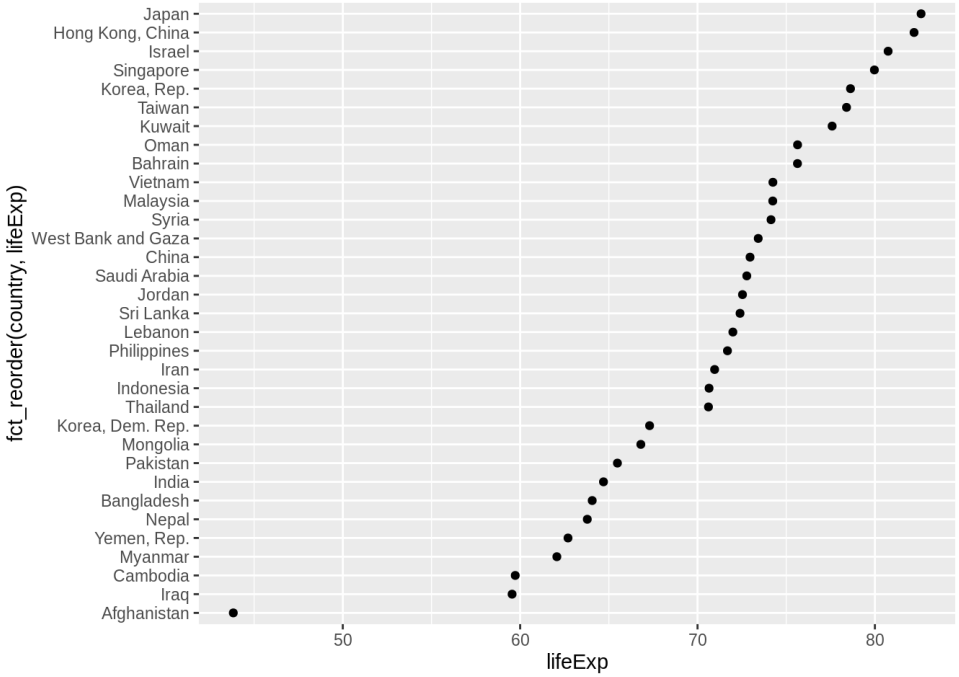


6. Explain the ordering below.

```
> fct_reorder(gapminder$country, gapminder$lifeExp) %>%
+   levels() %>% head()
> fct_reorder(gapminder$country, gapminder$lifeExp, min) %>%
+   levels() %>% head()
> fct_reorder(gapminder$country, gapminder$lifeExp, .desc = TRUE) %>%
+   levels() %>% head()
```

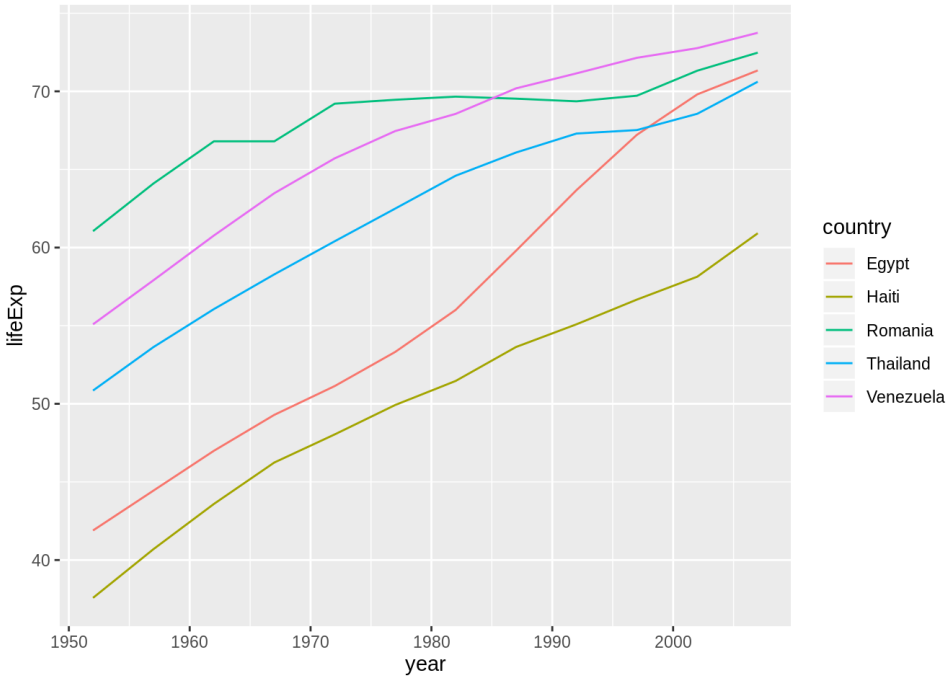
Use the above orderings and create the following scatter plot using `ggplot`.

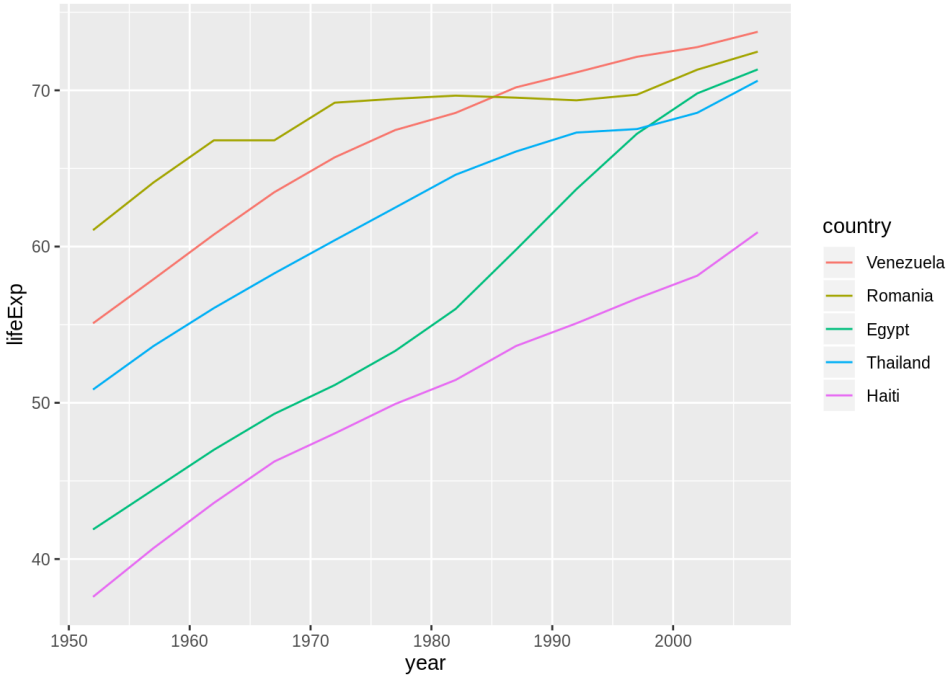




Now, create the above without using `fct_reorder`.

7. Without using `fct_reorder2` create the following line charts using `ggplot`.





8. Read Section 10.8 and 10.9