STA 141 Worksheet 9

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Due Date: Tuesday, November 28, 2023 before 11:00am.

Instructions

Worksheets must be turned in as a PDF file through Canvas. The worksheet is worth a total of **15 points**, which is 3 percent of your overall grade.

Exercises

Begin by running the following code block to add the packages we need to use to our library. If you didn't install the `maps` package previsouly then you will need to run `install.packages("maps")` before adding it to your library.

Exercise 1

(a) This question will use the `Gapminder` dataset, which is available as a csv file on Canvas. We want to use this data to create a choropleth map showing the GDP per Capita of each country in 2005. Import the dataset here:

```
gap.data <- read_csv( 'Gapminder.csv' )
```

```
## Rows: 42900 Columns: 16
## -- Column specification --------------------------------------------------------
## Delimiter: ","
## chr  (4): country, region4, region6, region8
## dbl (12): Latitude, Longitude, year, population, population_growth, fertilit...
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

(b) Filter your data so that you only have data from the year 2005.

```
gap.data.2005 <- gap.data %>% filter( year==2005 )
```

(c) Subset your data to only keep `Country` and `GDP_per_capita` variables.

```
gap.data.2005 <- gap.data.2005 %>%
  subset( select = c( country, GDP_per_capita ) )
```

(d) Now import the world map from the `maps` package. (Run `?map_data` if you need help).

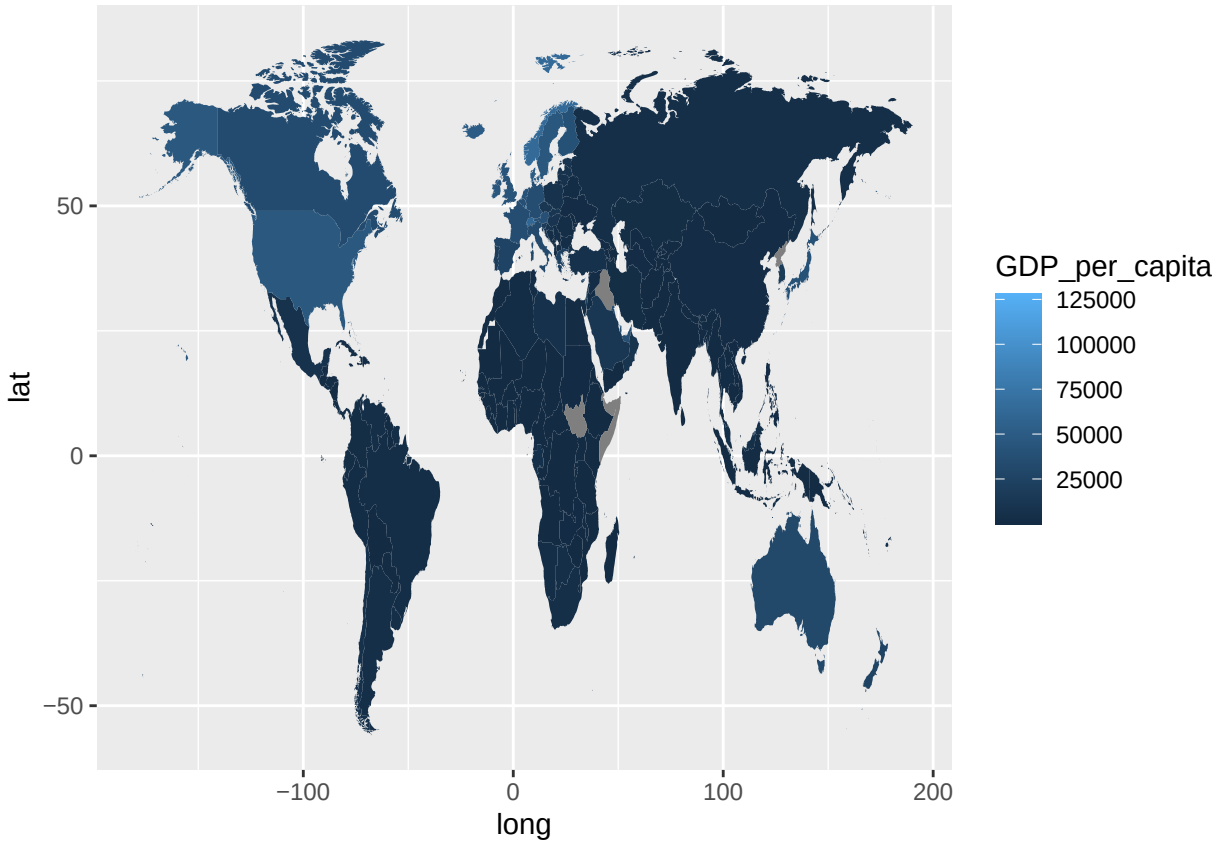
```
world <- map_data( "world" )
```

(e) Merge your GDP dataset with the world map dataset. Hint: Don't forget the arrange step!

```
gap.data.merged <- merge( world, gap.data.2005, by.x="region", by.y="country" )
gap.data.merged <- arrange( gap.data.merged, group, order )
```

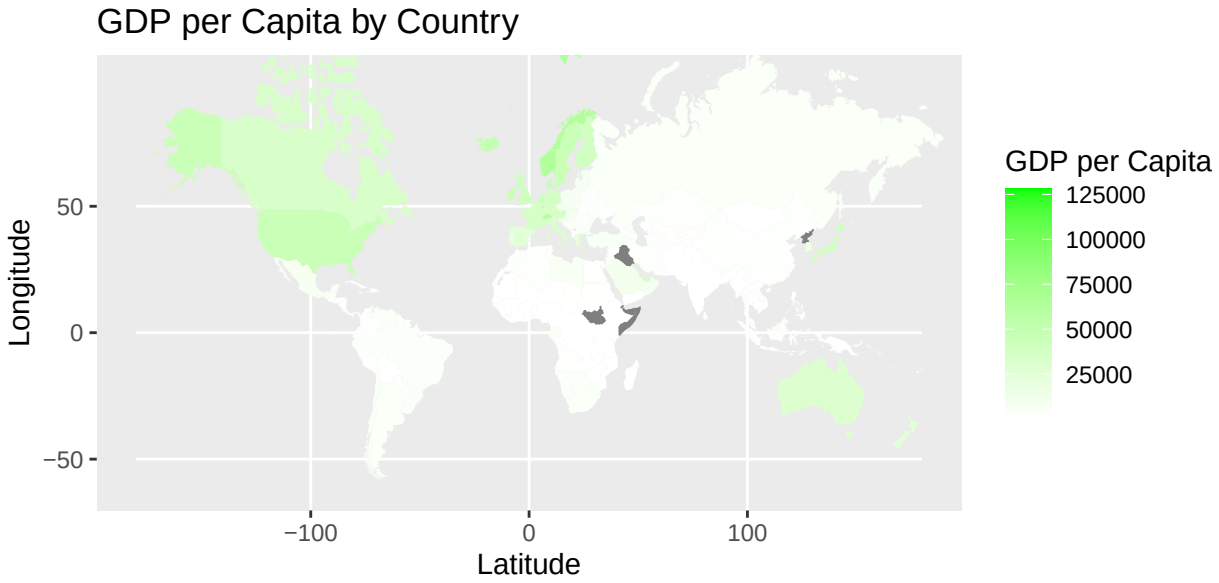
(f) Plot your data as a choropleth map using `geom_polygon()`.

```
ggplot( data=gap.data.merged,
        aes( long, lat, group=group, fill=GDP_per_capita ) ) +
  geom_polygon()
```



(g) Change the color scale so that it goes from white (low GDP) to a color of your choosing (high GDP), and change the projection to the Mercator projection.

```
ggplot( data=gap.data.merged,
        aes( long, lat, group=group, fill=GDP_per_capita ) ) +
  geom_polygon() +
  scale_fill_gradient( low="white", high="green" ) +
  labs( title="GDP per Capita by Country", x="Latitude", y="Longitude",
        fill="GDP per Capita") +
    coord_map( "mercator", xlim=c( -180, 180 ) )
```



(h) GDP per capita is a general measure of a country's wealth. With this knowledge, make 3 observations about your map.

1. Countries further from the equator tend to have higher GDP.
2. Countries with less natural resources or more civil strife tend to have lower GDP.
3. Highest GDP's tend to be in Europe.