hw4

cesong

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```
library(here)
```

```
## here() starts at C:/Users/65980/Desktop/CASA/GIS/WEEK4/homework/hw4
```

```
library(dplyr)
```

```
##
##     'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(readr)  #csv
library(sf)
```

```
## Linking to GEOS 3.12.1, GDAL 3.8.4, PROJ 9.3.1; sf_use_s2() is TRUE
```

```
library(countrycode)
library(ggplot2)
```

#read csv file

```
ggidata <- read.csv(here("hw4_data", "HDR23-24_Composite_indices_complete_time_series.csv"),
                    header = TRUE,
                    sep = ",",
                    encoding = "latin1") %>%
  select(gii_2010, gii_2019, iso3, country)

ggidata$gii_difference <- ggidata$gii_2019 - ggidata$gii_2010
head(ggidata, 4)
```

```
##   gii_2010 gii_2019 iso3     country gii_difference
## 1    0.707    0.676  AFG Afghanistan         -0.031
## 2    0.192    0.131  ALB     Albania         -0.061
## 3    0.517    0.397  DZA     Algeria         -0.120
## 4       NA       NA  AND     Andorra             NA
```

#read geojson file

```
countries_data <- st_read(here("hw4_data","World_Countries_(Generalized)_9029012925078512962.geojson"))
```

```
## Reading layer `World_Countries_(Generalized)_9029012925078512962' from data source `C:\Users\65980\D
##   using driver `GeoJSON'
## Simple feature collection with 251 features and 5 fields
## Geometry type: MULTIPOLYGON
## Dimension:     XY
## Bounding box:  xmin: -180 ymin: -89 xmax: 180 ymax: 83.6236
## Geodetic CRS:  WGS 84
```

```
countries_data <- countries_data %>%
  mutate(iso3 = countrycode(ISO, origin = "iso2c", destination = "iso3c"),
         unmatched = is.na(iso3))

head(countries_data, 4)
```

```
## Simple feature collection with 4 features and 7 fields
## Geometry type: MULTIPOLYGON
## Dimension:     XY
## Bounding box:  xmin: -170.8232 ymin: -14.37555 xmax: 74.91574 ymax: 42.66035
## Geodetic CRS:  WGS 84
##   FID        COUNTRY ISO    COUNTRYAFF AFF_ISO                       geometry
## 1   1    Afghanistan  AF   Afghanistan      AF MULTIPOLYGON (((61.27655 35...
## 2   2        Albania  AL       Albania      AL MULTIPOLYGON (((19.57083 41...
## 3   3        Algeria  DZ       Algeria      DZ MULTIPOLYGON (((4.603354 36...
## 4   4 American Samoa  AS United States      US MULTIPOLYGON (((-170.7439 -...
##   iso3 unmatched
## 1  AFG     FALSE
## 2  ALB     FALSE
## 3  DZA     FALSE
## 4  ASM     FALSE
```

#join data and plot

```
combined_data <- left_join(countries_data, ggidata, by = "iso3")

ggplot(data = combined_data) +
  geom_sf(aes(fill = gii_difference), color = "white", size = 0.2) +
  scale_fill_viridis_c(option = "plasma", name = "2019_2010 GII Difference") +
  labs(title = "2019_2010 Global GII Difference Map",
       subtitle = "Visualizing the change in Gender Inequality Index",
       caption = "Human Development Reports") +
  theme_minimal() +
  theme(
```

```
  plot.title = element_text(hjust = 0.5, size = 14, face = "bold"),
  plot.subtitle = element_text(hjust = 0.5, size = 10),
  plot.caption = element_text(size = 8),
  legend.text = element_text(size = 8),
  legend.title = element_text(size = 8),
  legend.key.size = unit(0.5, "cm"),
  legend.position = "right",
)
```