Challenges

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Challenge one

Load the `Australia_proj` and `koala` data and plot them on top of each other in `Mercator projection`. Note: check the spatial reference of the maps first!

Directory of the data:
`data/Australia/Australia_proj.shp`
`data/koala.csv`

```
library(sf)

states <- st_read("data/Australia/Australia_proj.shp")
```

```
## Reading layer `Australia_proj' from data source `/Users/rvalavi/Dropbox/MyProjects/Intro_Spatial_Anal
## Simple feature collection with 8 features and 15 fields
## geometry type:  POLYGON
## dimension:      XY
## bbox:           xmin: -2063975 ymin: -4965263 xmax: 1891143 ymax: -1285856
## epsg (SRID):    NA
## proj4string:    +proj=lcc +lat_1=-18 +lat_2=-36 +lat_0=0 +lon_0=134 +x_0=0 +y_0=0 +ellps=GRS80 +units
```

```
st_crs(states)
```

```
## Coordinate Reference System:
##   No EPSG code
##   proj4string: "+proj=lcc +lat_1=-18 +lat_2=-36 +lat_0=0 +lon_0=134 +x_0=0 +y_0=0 +ellps=GRS80 +units
```

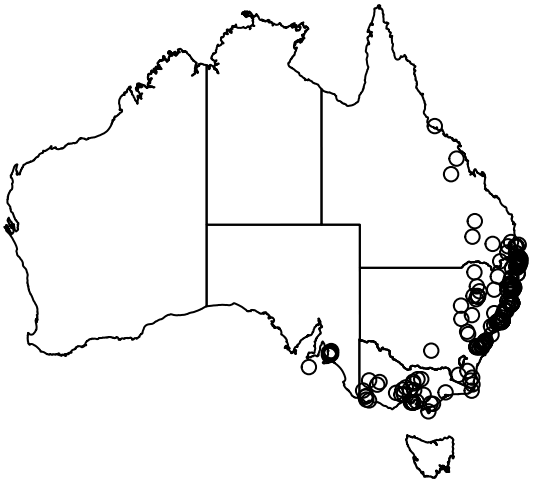
```
# reading csv file
koala <- read.csv("data/koala.csv")
# convert to sf
koala_sf <- st_as_sf(koala, coords = c("Longitude", "Latitude"), crs = 4326)

st_crs(koala_sf)
```

```
## Coordinate Reference System:
##   EPSG: 4326
##   proj4string: "+proj=longlat +datum=WGS84 +no_defs"
```

```
states_proj <- st_transform(states, crs = 4326)

plot(states_proj$geometry)
plot(koala_sf$geometry, add = TRUE)
```



Challenge two

Load the city maps and calculate the nearest straight distance to the coastline of the cities with 0.5 m population and plot the distance.

```
library(sf)
library(maps)
library(tidyverse)

# load city data
data(world.cities)


cities <- st_as_sf(world.cities, coords = c("long", "lat"), crs = 4326) %>%
  filter(country.etc == "Australia") %>%
  filter(pop > 1e6)

australia <- st_read("data/Australia/Australia_proj.shp") %>%
  st_union() %>%
  st_transform(crs = 4326)
```

```
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```

```
aus_line <- st_cast(australia, "MULTILINESTRING")

cities$coast <- as.numeric(st_distance(cities, aus_line))

plot(st_geometry(australia))
```

```
plot(cities["coast"], add = TRUE)
```