Ejercicio 6B

Viacheslav Shalisko

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COVID-19 en México 02.03.2020

Mapas interactivos con *leaflet*

(materiales para solucón del ejercicio 6B)

Colocar datos sobre los casos de COVID-19 conocidos para el dia 02 de abril del 2020 en mapa de México (Cada estado esta representado por su capital)

Datos fuente sobre los casos fueron descargados desde los sitios web https://www.unionguanajuato.mx/articulo/2020/03/29/cultura/casos-de-coronavirus-en-mexico-por-estado-estadisticas-covid-19 (https://www.unionguanajuato.mx/articulo/2020/03/29/cultura/casos-de-coronavirus-en-mexico-por-estado-estadisticas-covid-19) y https://coronavirus.gob.mx/ (https://coronavirus.gob.mx/)

```
library(leaflet)
library(sp)

casos <- read.csv("COVID19_Mexico.csv")

head(casos)
```

```
##                ESTADO.  Latitud   Longitud X29.03.2020 X30.03.2020
## 1       Aguascalientes 21.88234 -102.28259          24          24
## 2      Baja California 32.64690 -115.44600          23          27
## 3 Baja California Sur  24.14437 -110.30050          11          13
## 4             Campeche 19.84386  -90.52554           3           3
## 5             Coahuila 25.42321 -101.00530          32          39
## 6     Ciudad de México 19.42847  -99.12766         196         205
##   X31.03.2020 X01.04.2020 X01.04.2020.1
## 1          36          36            47
## 2          35          37            40
## 3          17          18            19
## 4           5           5             5
## 5          44          57            62
## 6         234         296           327
```

```
names(casos) <- c("estados","latitud","longitud","casos0329","casos0330", "casos0331", "casos0401", "casos0402")

e <- 2.71828182846

casos$casos <- casos$casos0402
casos$radius <- log(casos$casos + 1, e)

str(casos)
```

```
## 'data.frame':    32 obs. of  10 variables:
##  $ estados  : Factor w/ 32 levels "Aguascalientes",..: 1 2 3 4 8 7 5 6 9 10 ...
##  $ latitud  : num  21.9 32.6 24.1 19.8 25.4 ...
##  $ longitud : num  -102.3 -115.4 -110.3 -90.5 -101 ...
##  $ casos0329: num  24 23 11 3 32 196 10 6 2 7 ...
##  $ casos0330: int  24 27 13 3 39 205 11 6 2 7 ...
##  $ casos0331: int  36 35 17 5 44 234 13 7 2 7 ...
##  $ casos0401: int  36 37 18 5 57 296 14 11 3 7 ...
##  $ casos0402: int  47 40 19 5 62 327 15 11 3 8 ...
##  $ casos    : int  47 40 19 5 62 327 15 11 3 8 ...
##  $ radius   : num  3.87 3.71 3 1.79 4.14 ...
```

Mapa con tamaño de circulos proporcional al LN de número de casos registrados

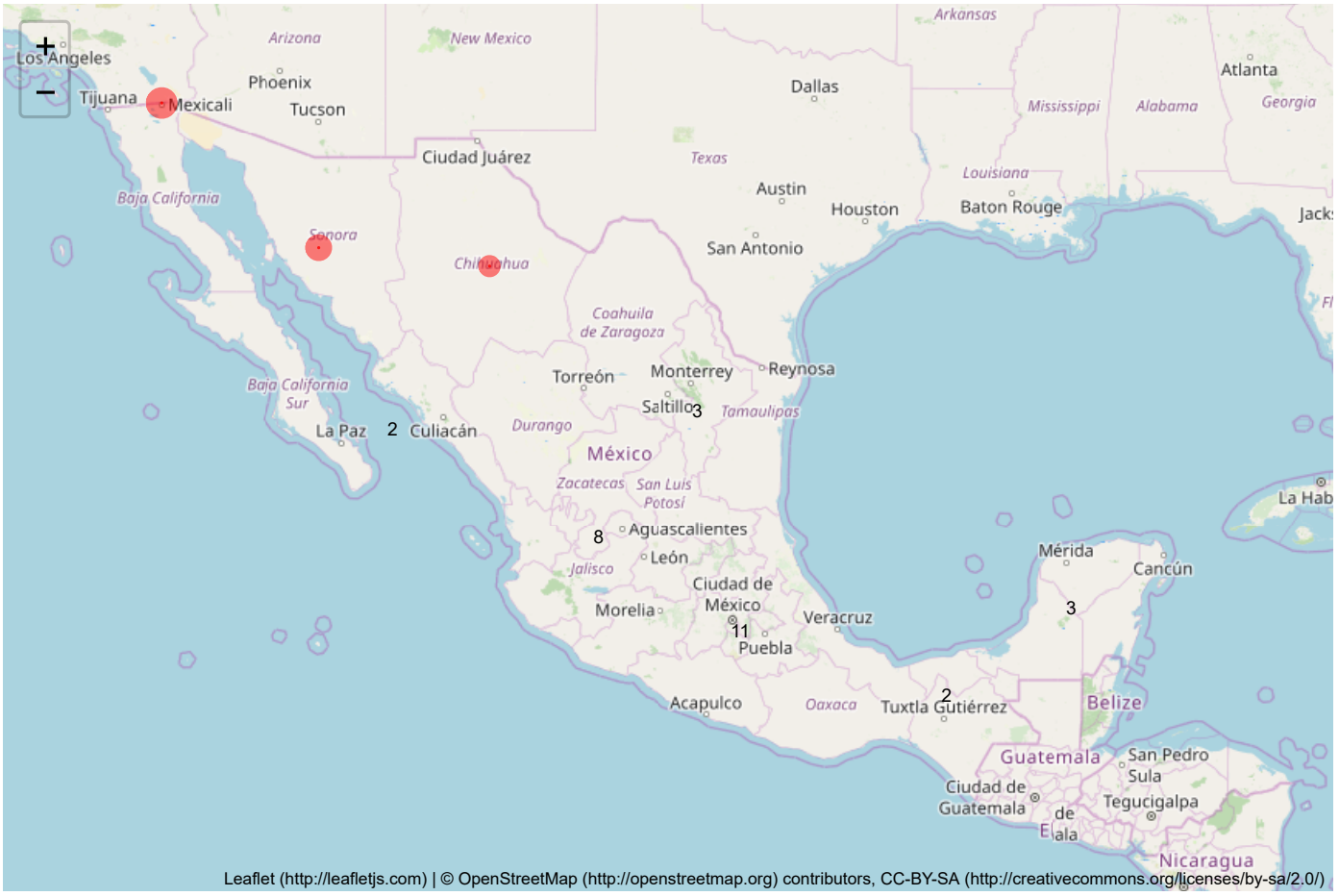
```
m5 <- leaflet()
m5 <- addTiles(m5)
m5 <- setView(m5, lng=-101, lat=24, zoom = 5)
m5 <- addCircleMarkers(m5, lng = casos$longitud, lat = casos$latitud, weight = 5 * casos$radius, radius = 0,
                color= "red", stroke = TRUE, fillOpacity = 0.8)

m5
```

Versión del mismo mapa con agrupación de puntos en clusters

```
m5 <- leaflet()
m5 <- addTiles(m5)
m5 <- setView(m5, lng=-101, lat=24, zoom = 5)
m5 <- addCircleMarkers(m5, lng = casos$longitud, lat = casos$latitud, weight = 5 * casos$radius, radius = 0,
                color= "red", stroke = TRUE, fillOpacity = 0.8, clusterOptions = markerClusterOptions())

m5
```



Versión del mismo mapa con capa que se puede deshabilitar

```
#library(htmltools)

 m1 <- leaflet()
 m1 <- addTiles(m1)
 m1 <- setView(m1, lng=-101, lat=24, zoom = 5)
 m1 <- addCircleMarkers(m1, lng = casos$longitud, lat = casos$latitud, weight = 5 * casos$radius, radius = 0,
                 color= "red", stroke = TRUE, fillOpacity = 0.8, group = "casos")

 addLegendCustom <- function(map, title, colors, labels, sizes, position, group, opacity = 0.5) {
  #colorAdditions <- paste0(colors, "; width:", sizes, "px; height:", sizes, "px")
  colorAdditions <- paste0(colors, "; border-radius: 50%; width:", sizes, "px; height:", sizes, "px")
  labelAdditions <- paste0("<div style='display: inline-block; height: ",
                           sizes, "px; margin-top: 4px; line-height: ", sizes, "px;'>",
                           labels, "</div>")
  return(addLegend(map, colors = colorAdditions,
                   labels = labelAdditions, opacity = opacity,
                   position = position, group = group, title = title))
}

m1 <- addLegendCustom(m1,
                      title = "COVID-19",
                      group = "casos",
                      position = "bottomleft",
                      colors = c("red", "red", "red"),
                      labels = c("1-20", "20-50", ">50"),
                      sizes = c(5 * log(20,e),
                                5 * log(50,e),
                                5 * log(200,e)))

m1 <- addLayersControl(m1, overlayGroups = c("casos"))
m1
```

Versión del mismo mapa con capas en varias fechas

```
#library(htmltools)

 m2 <- leaflet()
 m2 <- addTiles(m2)
 m2 <- setView(m2, lng=-101, lat=24, zoom = 5)
 m2 <- addCircleMarkers(m2, lng = casos$longitud, lat = casos$latitud,
                        weight = 5 * log(casos$casos0329 + 1, e), radius = 0,
                    color= "red", stroke = TRUE, fillOpacity = 1, group = "marzo 29")
 m2 <- addCircleMarkers(m2, lng = casos$longitud, lat = casos$latitud,
                        weight = 5 * log(casos$casos0330 + 1, e), radius = 0,
                    color= "red", stroke = TRUE, fillOpacity = 1, group = "marzo 30")
 m2 <- addCircleMarkers(m2, lng = casos$longitud, lat = casos$latitud,
                        weight = 5 * log(casos$casos0331 + 1, e), radius = 0,
                    color= "red", stroke = TRUE, fillOpacity = 1, group = "marzo 31")
 m2 <- addCircleMarkers(m2, lng = casos$longitud, lat = casos$latitud,
                        weight = 5 * log(casos$casos0401 + 1, e), radius = 0,
                    color= "red", stroke = TRUE, fillOpacity = 1, group = "abril 1")
 m2 <- addCircleMarkers(m2, lng = casos$longitud, lat = casos$latitud,
                        weight = 5 * log(casos$casos0402 + 1, e), radius = 0,
                    color= "red", stroke = TRUE, fillOpacity = 1, group = "abril 2")

m2 <- addLegendCustom(m2,
                      title = "COVID-19",
                      group = "leyenda",
                      position = "bottomleft",
                      colors = c("red", "red", "red"),
                      labels = c("1-20", "20-50", ">50"),
                      sizes = c(5 * log(20,e),
                                5 * log(50,e),
                                5 * log(200,e)))

m2 <- addLayersControl(m2,
                       baseGroups = c("marzo 29", "marzo 30",
                                      "marzo 31", "abril 1",
                                      "abril 2"),
                       overlayGroups = c("leyenda"),
                       options = layersControlOptions(collapsed = FALSE))
m2
```


```
# m1 <- addLegend(m1, position = "bottomleft", title = "COVID-19",   opacity = 1,
#                 colors = c("red","red"),
#                 values = c(1,2),
#                 labels = c(1,2),
#                 group = "circles",
#                # className = "legends_circles"
#                #labFormat = labFormat(
#                #  prefix = "(", suffix = ")%", between = ", ",
#                #  transform = function(x) 100 * x
#                #)
#    )


#browsable(
#  tagList(list(
#    tags$head(
#      # you'll need to be very specific
#        tags$style(type = "text/css",
#                   "html, body {width:100%;height:100%}",
#                   ".leaflet .legend i{
#                   width: 10px;
#                   height: 10px;
#                   margin-top: 4px;
#                   }
#                   "
#                   )
#      # could also use url
#      #tags$link(href="https://maxcdn.bootstrapcdn.com/font-awesome/4.5.0/css/font-awesome.min.css",rel="stylesheet")
#    ),
#    m1
#  ))
#)

 #<- list(
#  htmlDependency(
#    name = "font-awesome"
#    ,version = "4.3.0"
#    # if local file use file instead of href below
#    #  with an absolute path
#    ,src = c(href="http://maxcdn.bootstrapcdn.com/font-awesome/4.5.0/css")
#    ,stylesheet = "font-awesome.min.css"
#  )
#)
```