Data/IO

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Graphing the start location vs end location of trips (Green points are starting trip locations, red points are end locations)

```
library(ggplot2)
library(ggmap)
```

```
## i Google's Terms of Service: < ]8;;https://mapsplatform.google.com https://mapsplatform.google.com ]8;; >
```

```
## i Please cite ggmap if you use it! Use `citation("ggmap")` for details.
```

```
library(maps)
```

```
## Warning: package 'maps' was built under R version 4.1.3
```

```
library(mapdata)
```

```
## Warning: package 'mapdata' was built under R version 4.1.3
```

```
df <- read.csv(file.choose())
usa <- map_data("usa")
states <- map_data("state")

graph <- subset(states, region %in% c("ohio", "michigan", "west virginia",
                                      "virginia", "north carolina",
                                      "indiana", "kentucky", "tennessee",
                                      "south carolina", "illinois",
                                      "pennsylvania", "maryland"))

#This row had incorrect data for longitude and latitude
df <- df[-c(977),]
gg1 <- ggplot(data = graph) +
  geom_polygon(aes(x = long, y = lat, group = group), fill = "grey", color = "black") +
  coord_fixed(1.3)

gg1 +
  geom_point(data = df, aes(x = startlongitude, y = startlatitude), color = "green", size = .5)
 +
  geom_point(data = df, aes(x = endlongitude, y = endlatitude), color = "red", size = .5)
```
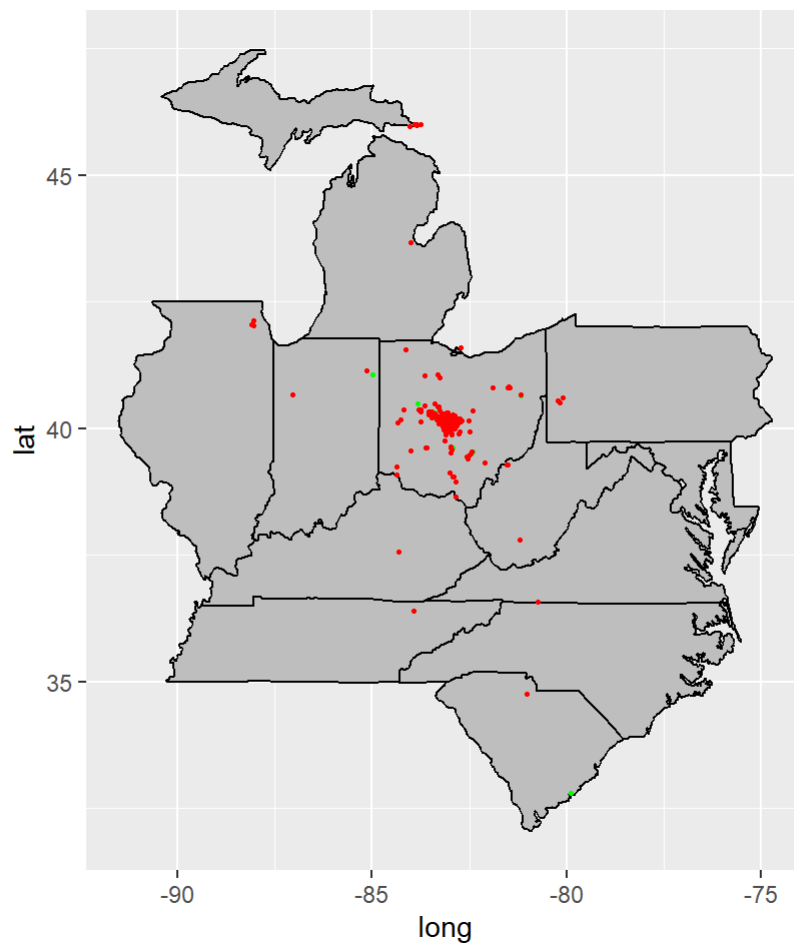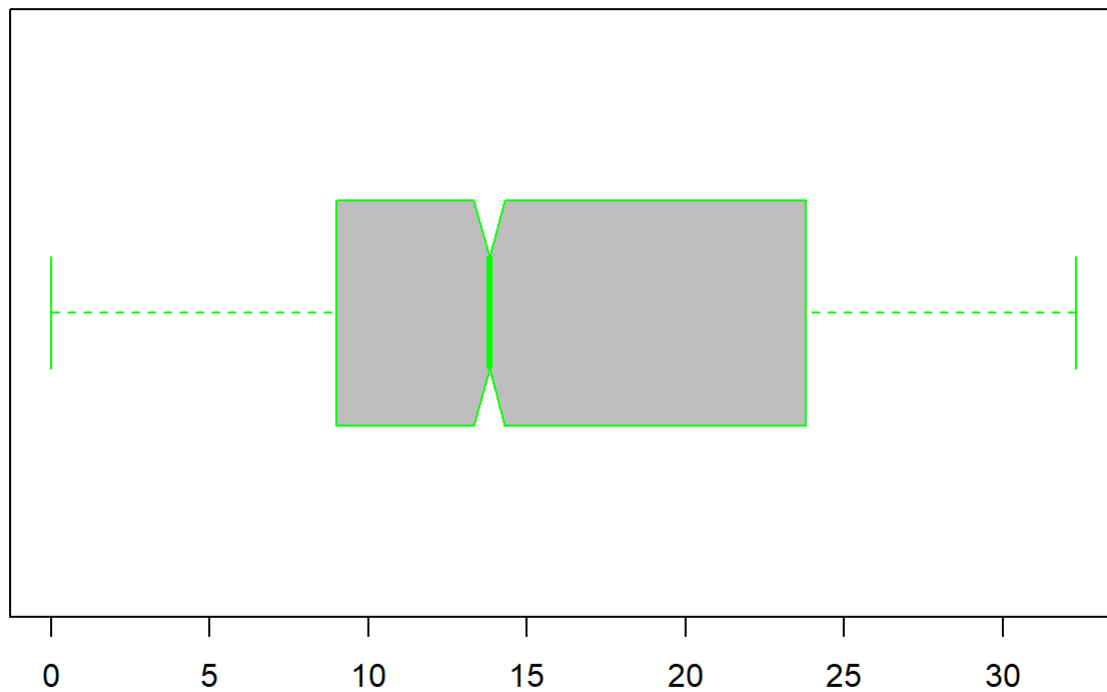
Boxplot of average speed

```
boxplot(df$avgspeed, main = "Average speed", col = "gray", border = "green", horizontal = TRUE,
  notch = TRUE)
```

Average speed

ggmap citation:

D. Kahle and H. Wickham. ggmap: Spatial Visualization with ggplot2. The R Journal, 5(1), 144-161. URL http://journal.r-project.org/archive/2013-1/kahle-wickham.pdf (http://journal.r-project.org/archive/2013-1/kahle-wickham.pdf)