Hw2-2

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Table 1:

```
data(mpg)     ## load the data

mpg$cyl <- as.factor(mpg$cyl)   ## convert discrete variables to factors so that they plot
mpg$drv <- as.factor(mpg$drv)   ## as different colors, not gradations of one color

mpg$cty <- as.double(mpg$cty)

class <- unique(mpg$class)      ## define a vector for car classes
class <- c("2seater","compact","midsize","minivan","pickup","subcompact","suv")
cty_mean <- by(mpg,mpg$class,function(x) c(mean(x$cty)))
hwy_mean <- by(mpg,mpg$class,function(x) c(mean(x$hwy)))

cty_mean <- round(cty_mean,2)
hwy_mean <- round(hwy_mean,2)

tbl_1 <- cbind(class,cty_mean,hwy_mean)
rownames(tbl_1) <- c()
kable(tbl_1, format = "latex", booktabs=TRUE, digits = 2,     ## call kable to make the table
      col.names = c("Class", "City", "Highway"),
      caption = "Mean City and Highway MPG by Car Class" )
```

Table 2:

```
c1 <- c("new beetle","civic","corolla")
c2 <- c("new beetle","corolla","civic")
c3 <- c("corolla","civic","gti")
c4 <- c("corolla","civic","camry")
mod_99 <- unique(mpg$model[mpg$year=='1999'])
mod_08 <- unique(mpg$model[mpg$year=='2008'])

mpg_99 <- mpg[which(mpg$year==1999),]
mpg_08 <- mpg[which(mpg$year==2008),]

mod_99_cty_mean <- by(mpg_99,mpg_99$model, function(x) c(mean(x$cty)))
mod_99_hwy_mean <- by(mpg_99,mpg_99$model, function(x) c(mean(x$hwy)))
mod_08_cty_mean <- by(mpg_08,mpg_08$model, function(x) c(mean(x$cty)))
mod_08_hwy_mean <- by(mpg_08,mpg_08$model, function(x) c(mean(x$hwy)))

ind_srt_99_cty <- order(mod_99_cty_mean)
miles_cty_99 <- rev(mod_99_cty_mean[ind_srt_99_cty])

ind_srt_08_cty <- order(mod_08_cty_mean)
miles_cty_08 <- rev(mod_08_cty_mean[ind_srt_08_cty])


ind_srt_99_hwy <- order(mod_99_hwy_mean)
```

Table 1: Mean City and Highway MPG by Car Class

Class	City	Highway
2seater	15.4	24.8
compact	20.13	28.3
midsize	18.76	27.29
minivan	15.82	22.36
pickup	13	16.88
subcompact	20.37	28.14
suv	13.5	18.13

```
miles_hwy_99 <- rev(mod_99_hwy_mean[ind_srt_99_hwy])


ind_srt_08_hwy <- order(mod_08_hwy_mean)
miles_hwy_08 <- rev(mod_08_hwy_mean[ind_srt_08_hwy])

miles_cty_08 <- round(miles_cty_08, 2)
miles_cty_99 <- round(miles_cty_99, 2)

miles_hwy_08 <- round(miles_hwy_08, 2)
miles_hwy_99 <- round(miles_hwy_99, 2)



tbl_2 <- cbind(c1,
               miles_cty_99[1:3],
               c2,
               miles_hwy_99[1:3],
               c3,
               miles_cty_08[1:3],
               c4,
               miles_hwy_08[1:3])
colnames(tbl_2) <- c('Model', 'Milage',
                     "Model", "Milage",
                     'Model', 'Milage',
                     "Model", "Milage"
)

rownames(tbl_2) <- c()

kable(tbl_2, digits = 2, format = "latex", booktabs=TRUE, ,caption = "Top 3 MPG Performing Cars: 1999, 
  add_header_above(c("City 1999"=2,
                     "Highway 1999"=2,
                     "City 2008"=2,
                     "Highway 2008"=2))
```

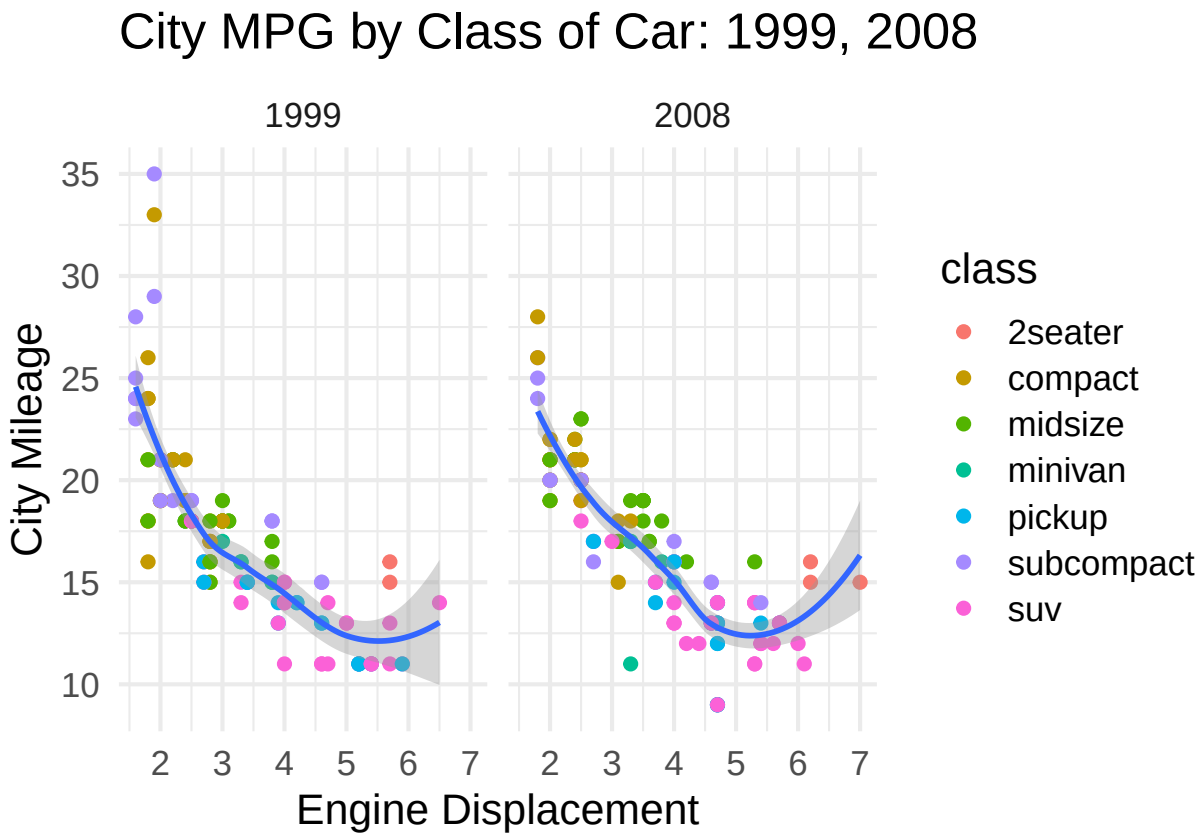
```
library(ggplot2)

ggplot(mpg) +
 aes(x = displ, y = cty) +
 geom_point(aes(color=class),size=2) + geom_smooth() +
```

Table 2: Top 3 MPG Performing Cars: 1999, 2008

City 1999		Highway 1999		City 2008		Highway 2008	
Model	Milage	Model	Milage	Model	Milage	Model	Milage
new beetle	26	new beetle	35	corolla	27	corolla	36
civic	24.8	corolla	32.67	civic	24	civic	33.75
corolla	24.67	civic	31.6	gti	21.5	camry	30

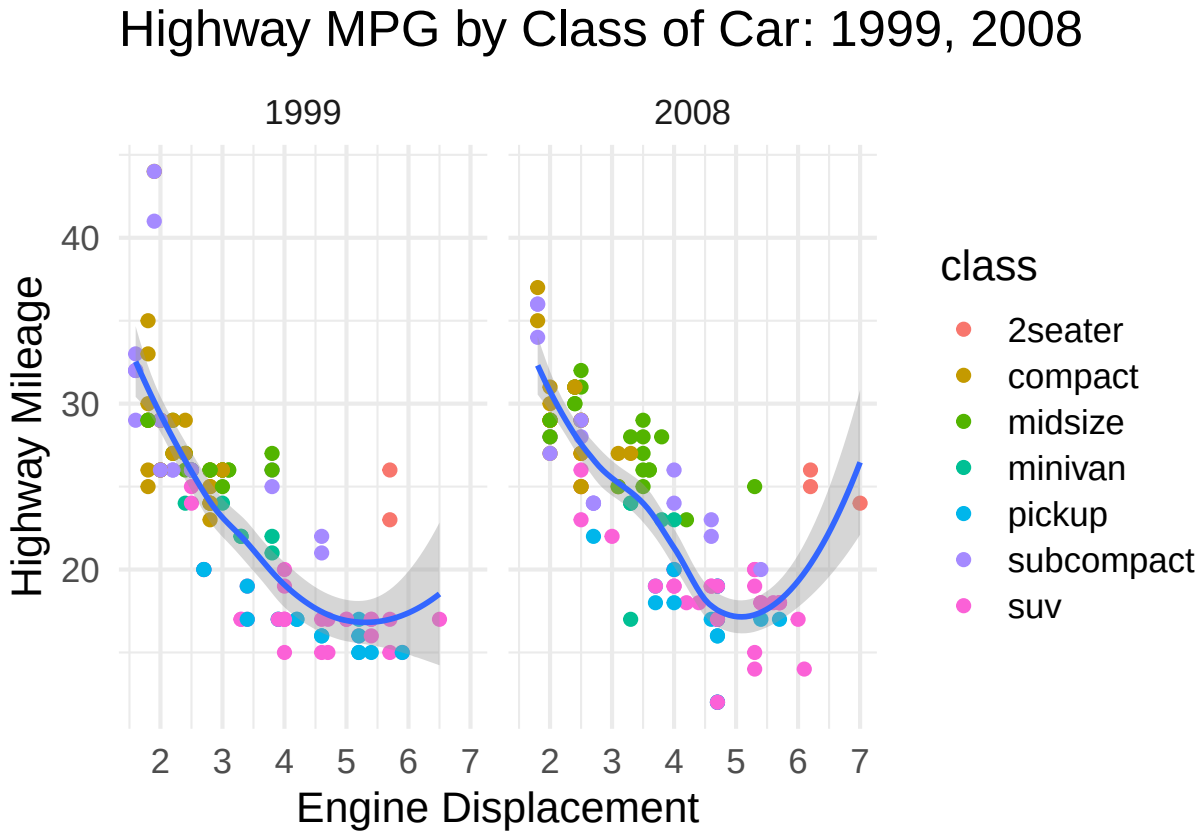
```
scale_color_hue() +
theme_minimal(base_size = 16) +
facet_wrap(vars(year)) +
 labs(x = "Engine Displacement",y = "City Mileage" ,title = "City MPG by Class of Car: 1999, 2008")
```

```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```




```
ggplot(mpg) +
aes(x = displ, y = hwy) +
geom_point(aes(color=class),size=2) + geom_smooth() +
scale_color_hue() +
theme_minimal(base_size = 16) +
facet_wrap(vars(year)) +
 labs(x = "Engine Displacement", y = "Highway Mileage", title = "Highway MPG by Class of Car: 1999, 20
```

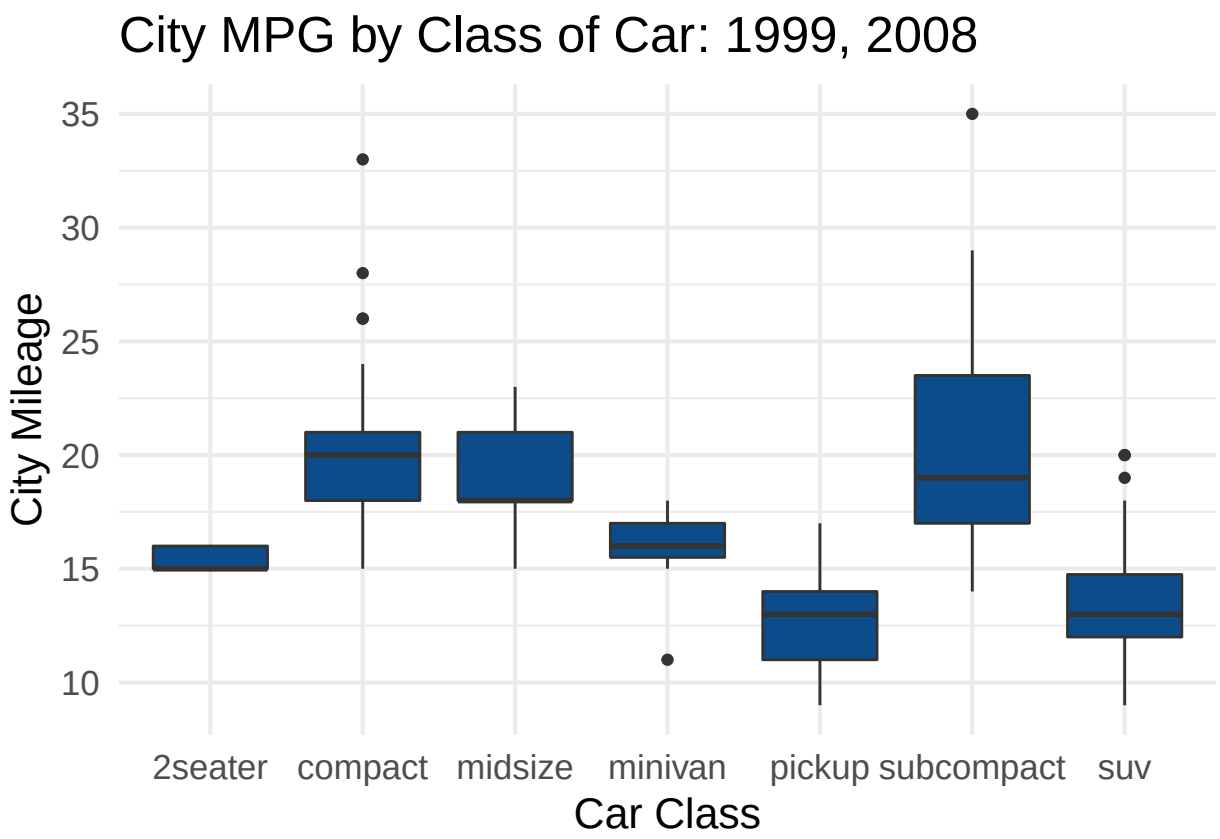
```
## `geom_smooth()` using method = 'loess' and formula 'y ~ x'
```



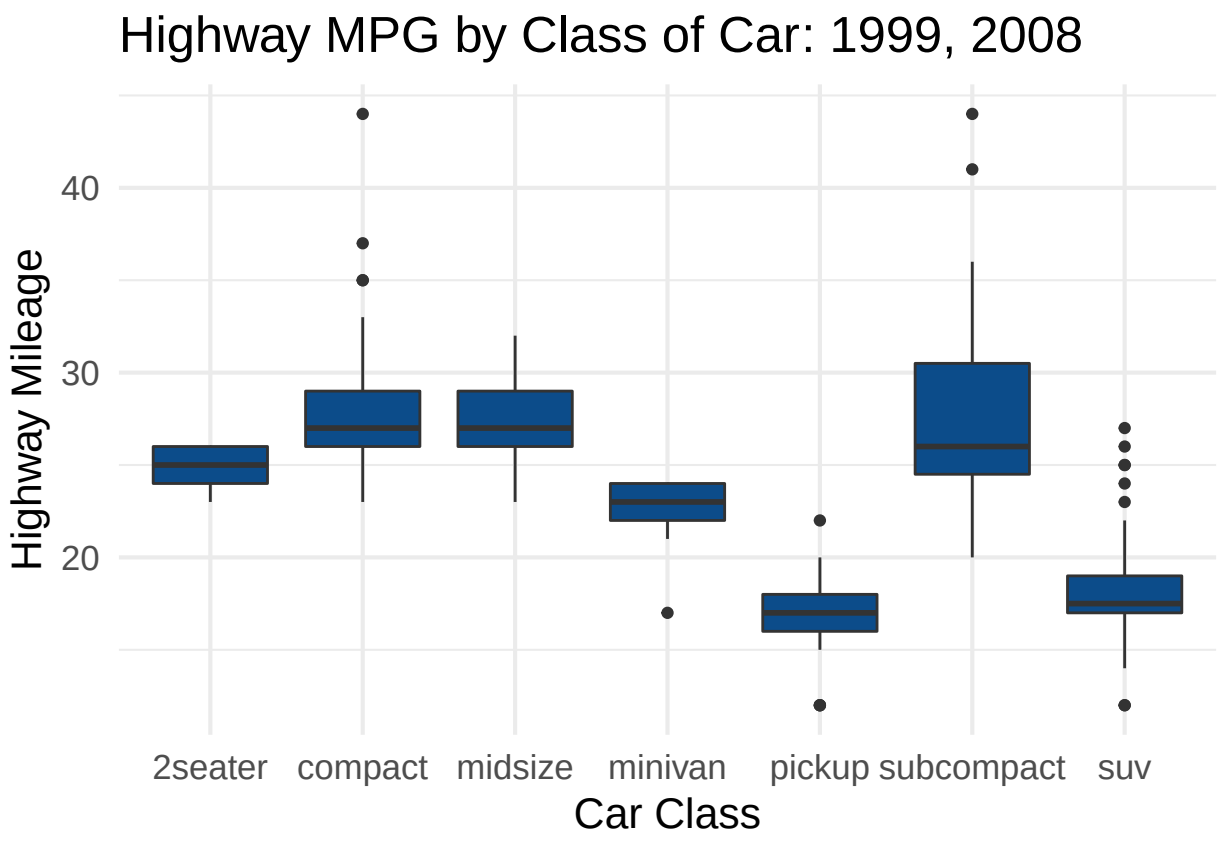

```
##esquisser(mpg)
```

Boxplots

```
ggplot(mpg) +
 aes(x = class, y = cty) +
 geom_boxplot(fill = "#0c4c8a") +
 theme_minimal(base_size=16) +
  labs(x = "Car Class", y = "City Mileage", title = "City MPG by Class of Car: 1999, 2008")
```




```
ggplot(mpg) +
 aes(x = class, y = hwy) +
 geom_boxplot(fill = "#0c4c8a") +
 theme_minimal(base_size=16) +
  labs(x = "Car Class", y = "Highway Mileage", title = "Highway MPG by Class of Car: 1999, 2008")
```


Highway MPG by Class of Car: 1999, 2008
Highway Mileage
40
30
20
2seater
compact
midsize
minivan
pickup
subcompact
suv
Car Class