

[0010] DEFAD: Representación y tabulación de datos

Librería ggplot2

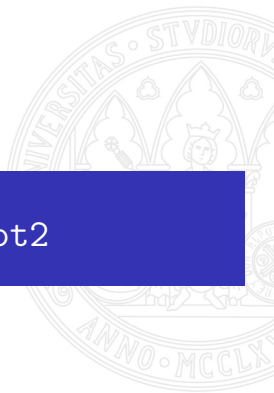
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Antonio Maurandi, amaurandi@um.es

Universidad de Murcia

Marzo 2018



Introducción al paquete ggplot2



Instalación y carga

■ Instalación

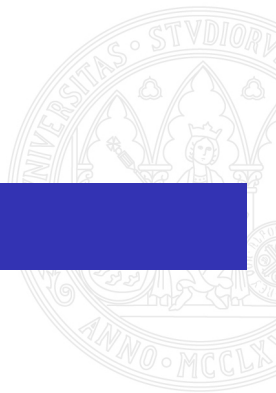
```
install.packages( "ggplot2" )  
# install.packages( "tidyverse" )
```

■ Carga del paquete

```
library( ggplot2 )  
# library( tidyverse )
```

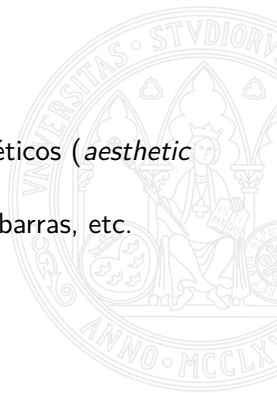


The Grammar of Graphics

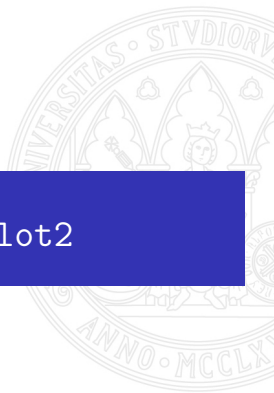


Partes de ggplot:

- datos y vinculación de variables con atributos estéticos (*aesthetic mapping*)
- objeto geométrico, lo que uno ve: puntos, líneas, barras, etc.
- transformaciones estadísticas
- escalas
- sistema de coordenadas
- división en subconjuntos (*facetting*)



Cómo definir un gráfico en ggplot2



Conjunto de datos con el que trabajaremos

Previamente pasamos a factor las variables: cyl, vs, am, gear y carb.

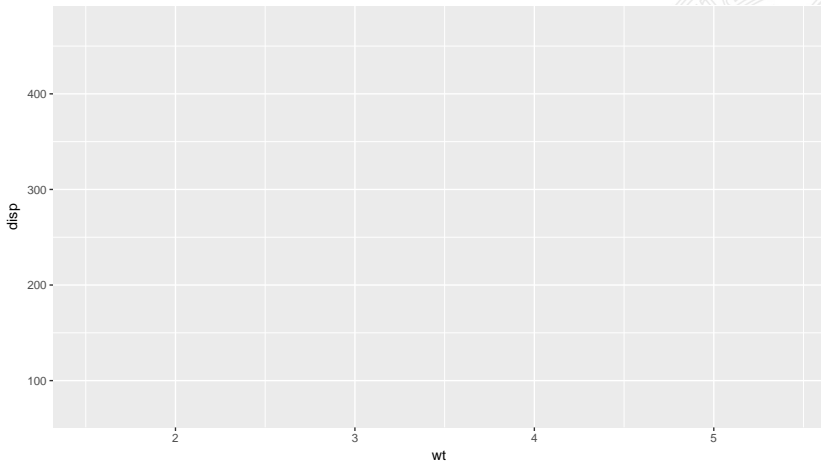
```
head( mtcars, 12 )
```

##	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
## Mazda RX4	21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4
## Mazda RX4 Wag	21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4
## Datsun 710	22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1
## Hornet 4 Drive	21.4	6	258.0	110	3.08	3.215	19.44	1	0	3	1
## Hornet Sportabout	18.7	8	360.0	175	3.15	3.440	17.02	0	0	3	2
## Valiant	18.1	6	225.0	105	2.76	3.460	20.22	1	0	3	1
## Duster 360	14.3	8	360.0	245	3.21	3.570	15.84	0	0	3	4
## Merc 240D	24.4	4	146.7	62	3.69	3.190	20.00	1	0	4	2
## Merc 230	22.8	4	140.8	95	3.92	3.150	22.90	1	0	4	2
## Merc 280	19.2	6	167.6	123	3.92	3.440	18.30	1	0	4	4
## Merc 280C	17.8	6	167.6	123	3.92	3.440	18.90	1	0	4	4
## Merc 450SE	16.4	8	275.8	180	3.07	4.070	17.40	0	0	3	3

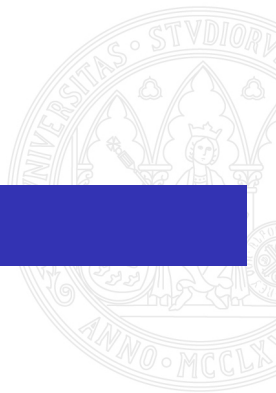
Data and aesthetic mapping



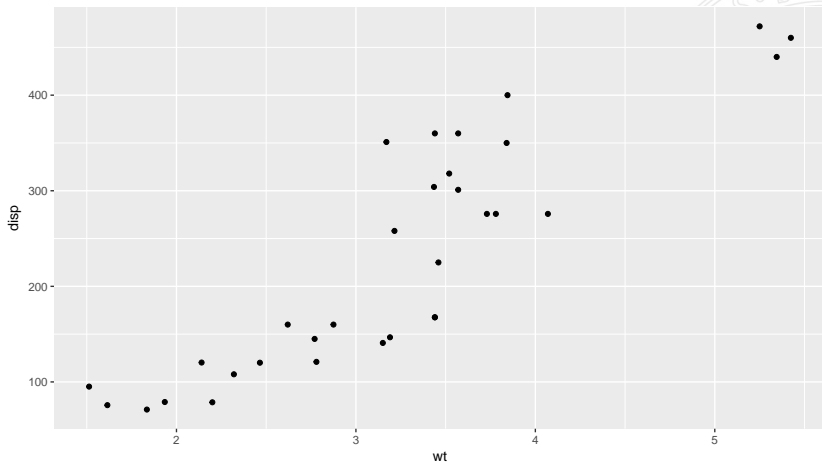

```
gg <- ggplot( data = mtcars, mapping = aes(x = wt, y = disp))  
gg
```



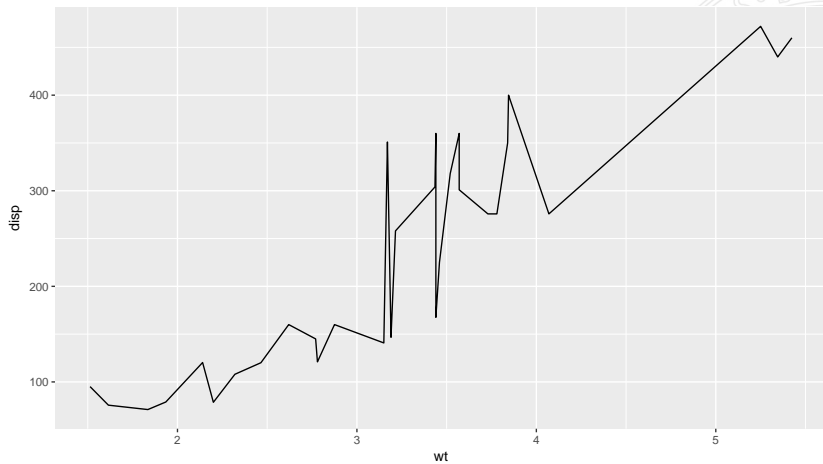
Geoms



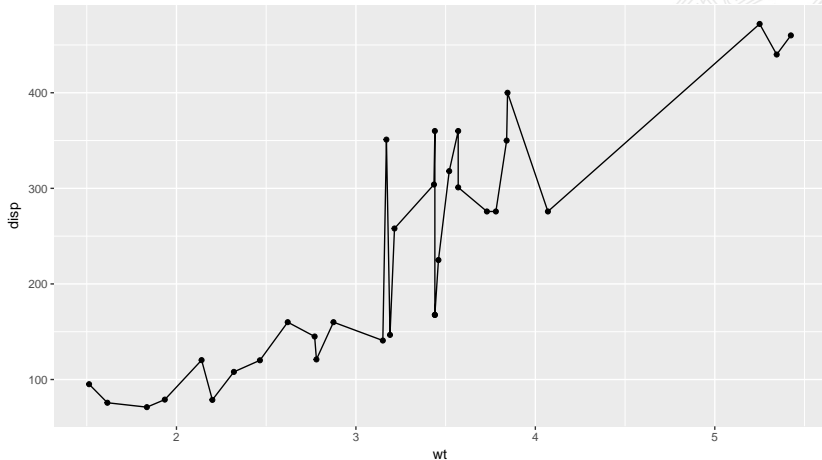
```
gg + geom_point()
```



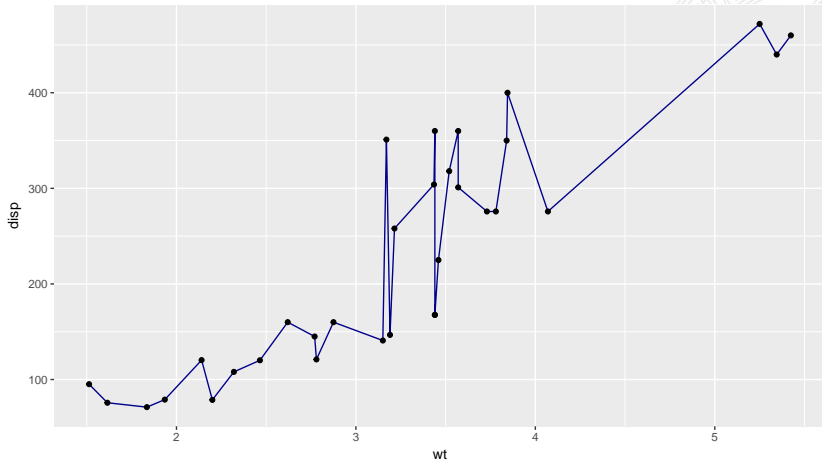
```
gg + geom_line()
```



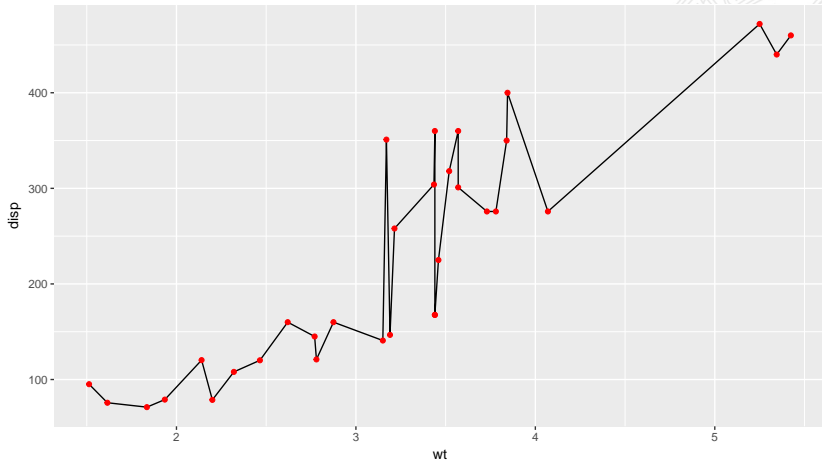
```
gg + geom_line() +  
  geom_point()
```



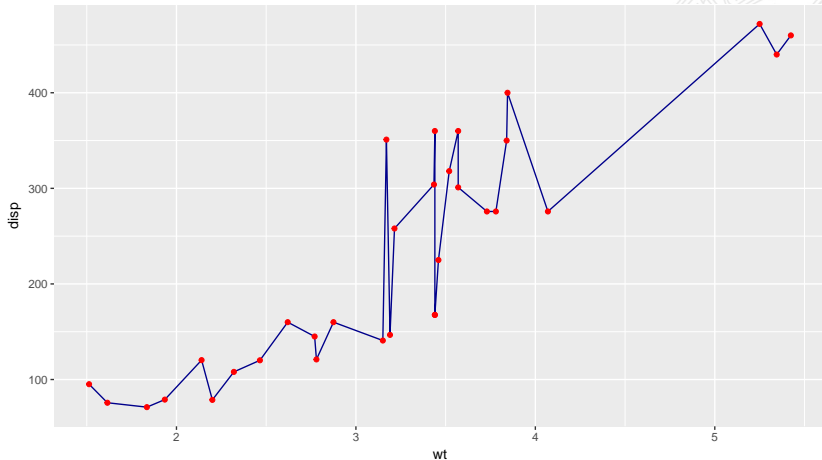
```
gg + geom_line( colour = "darkblue" )+  
  geom_point()
```



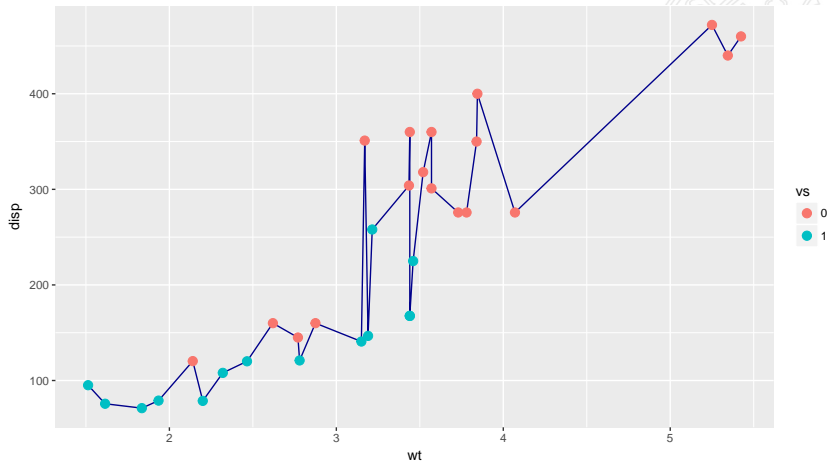
```
gg + geom_line( ) +  
  geom_point( colour = "red" )
```



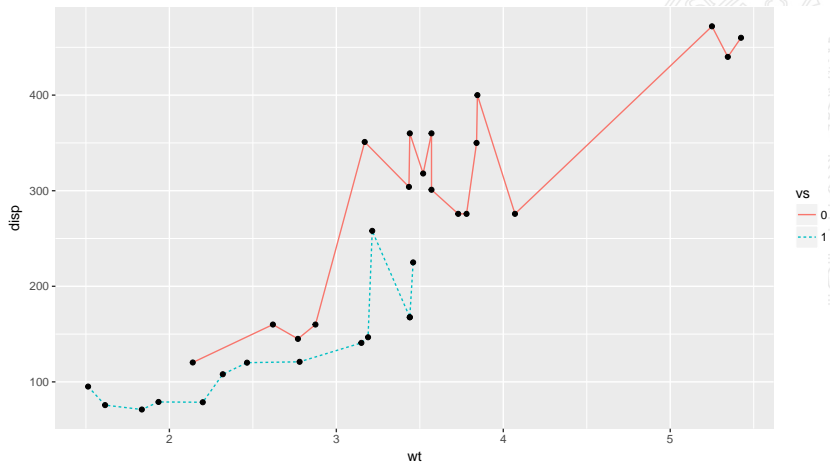
```
gg + geom_line( colour = "darkblue" ) +  
  geom_point( colour = "red" )
```



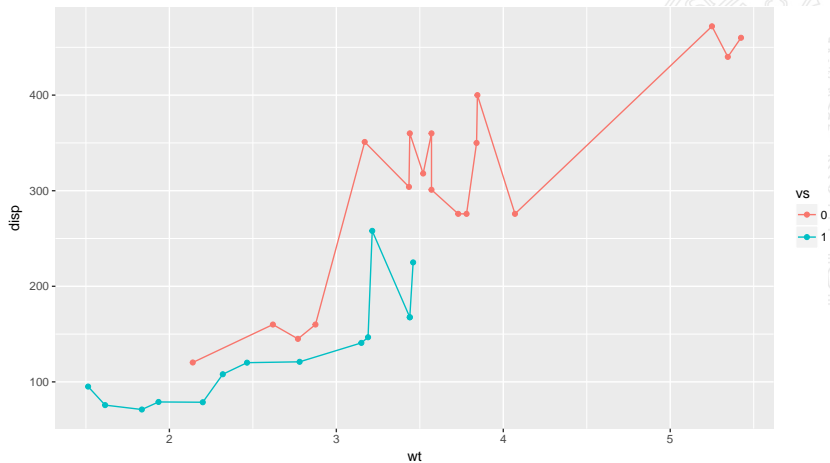

```
gg + geom_line( colour = "darkblue" ) +  
  geom_point( mapping = aes( colour = vs ),  
             size = 3 )
```



```
gg + geom_line( mapping = aes( colour = vs ,  
                               linetype = vs ) ) +  
geom_point()
```



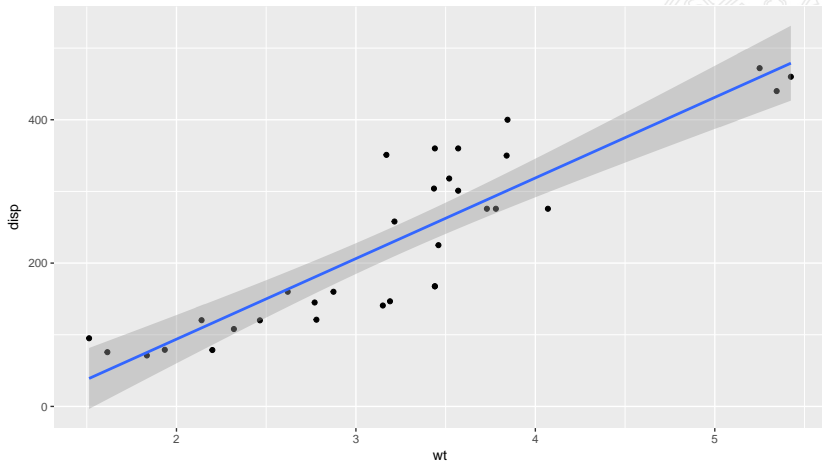
```
ggplot(mtcars, aes(x = wt, y = disp, colour = vs )) +  
  geom_point( ) +  
  geom_line()
```



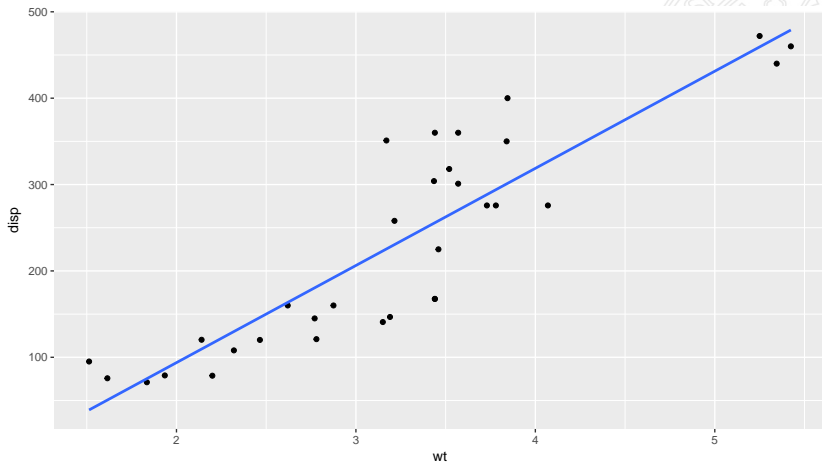
Stats



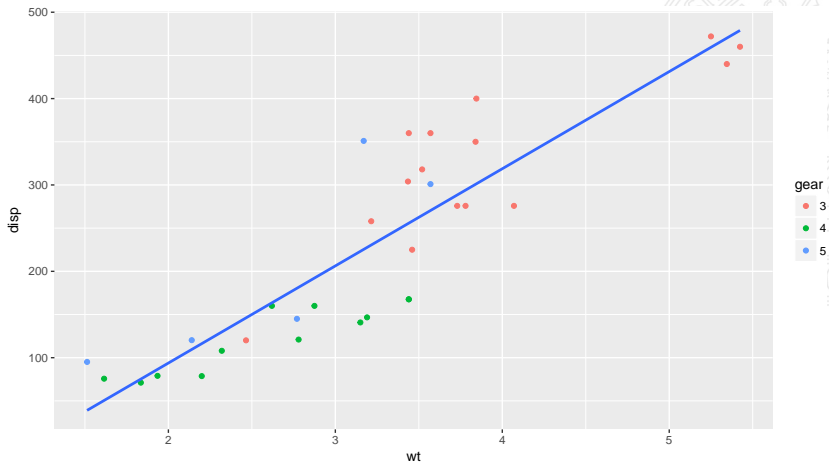
```
ggplot( mtcars, aes( x = wt, y = disp ) ) +  
  geom_point() +  
  stat_smooth( method = "lm" )
```



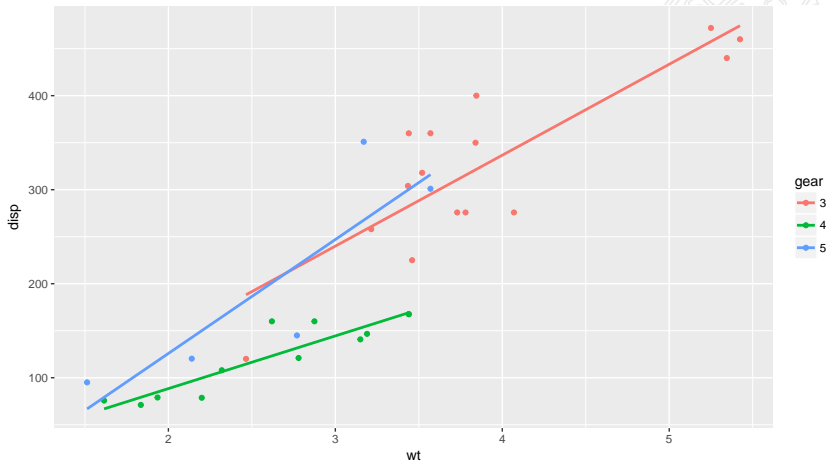
```
ggplot( mtcars, aes( x = wt, y = disp ) ) +  
  geom_point() +  
  geom_smooth( method = "lm", se = FALSE )
```



```
ggplot( mtcars, aes( x = wt, y = disp ) ) +  
  geom_point( aes( colour = gear ) ) +  
  stat_smooth( method = "lm", se = FALSE )
```



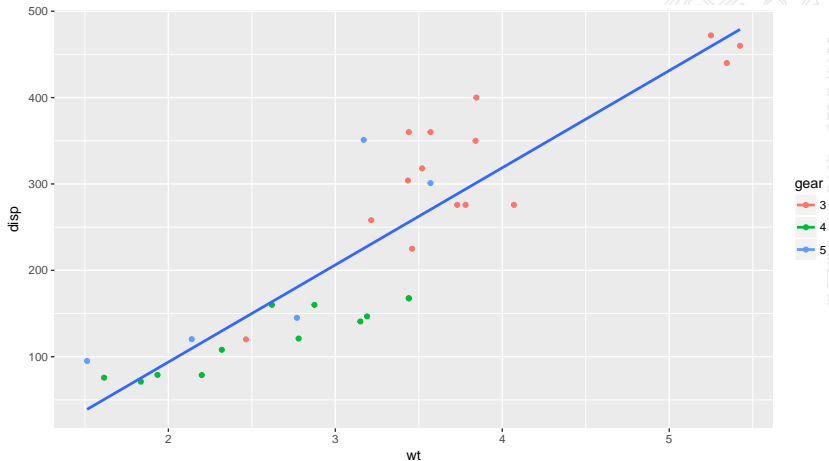
```
ggplot( mtcars, aes( x = wt, y = disp, colour = gear ) ) +  
  geom_point() +  
  stat_smooth( method = "lm", se = F )
```



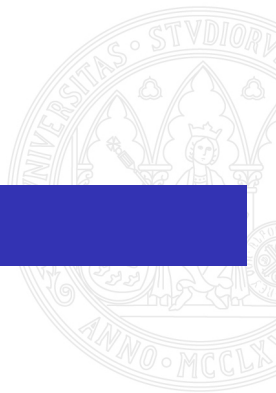
gear

- 3
- 4
- 5

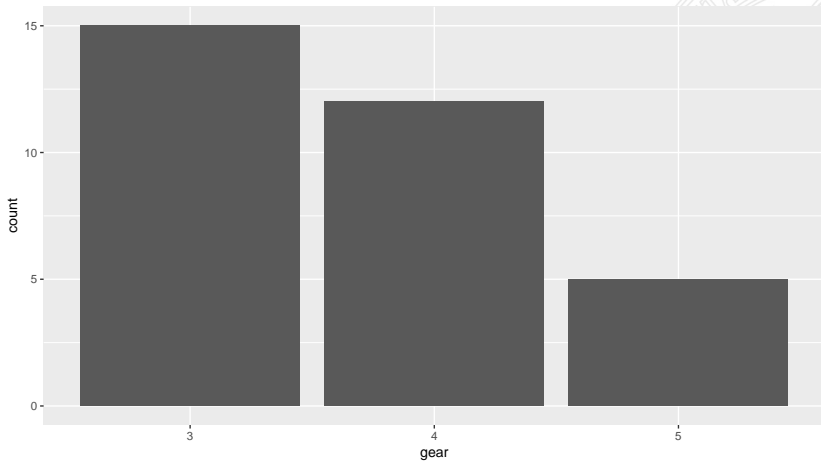

```
ggplot( mtcars, aes( x = wt, y = disp, colour = gear ) ) +  
  geom_point() +  
  stat_smooth( aes( colour = NULL ), method = "lm", se = F )
```



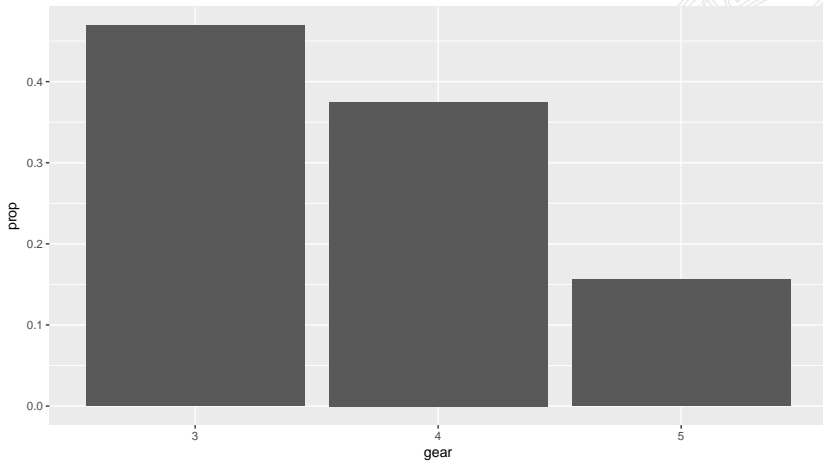
Gráficos de barras



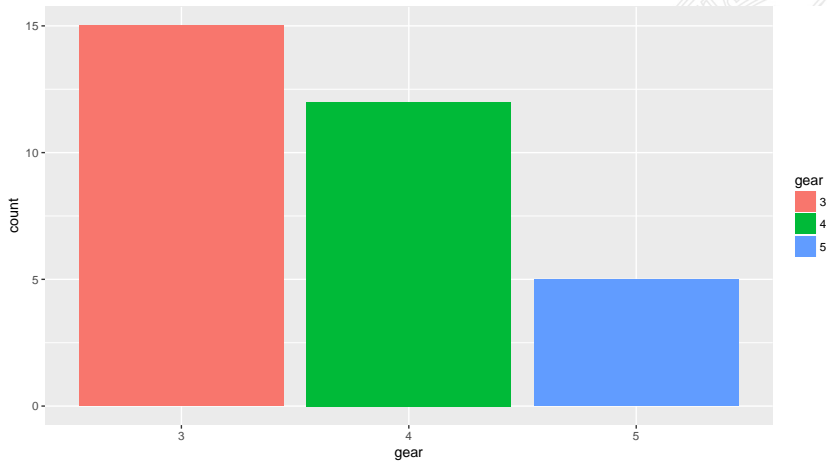
```
ggplot( data = mtcars, aes( x = gear) ) +  
  geom_bar()
```



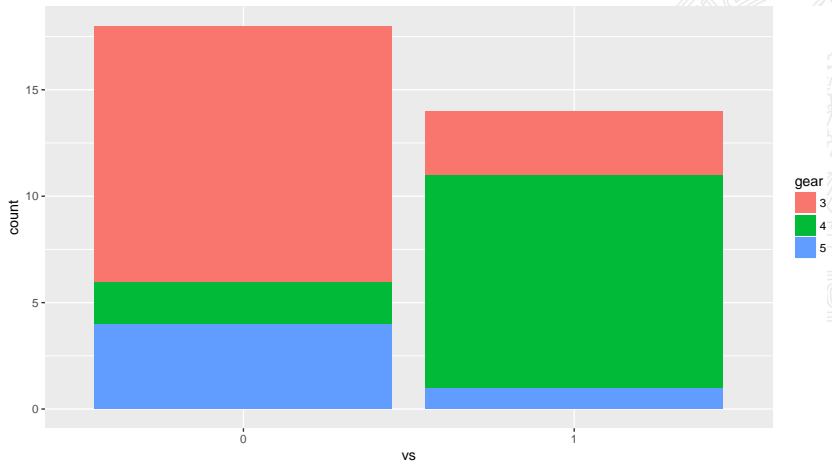
```
ggplot( data = mtcars ) +  
geom_bar( mapping = aes( x = gear, y = ..prop.., group = 1 ) )
```



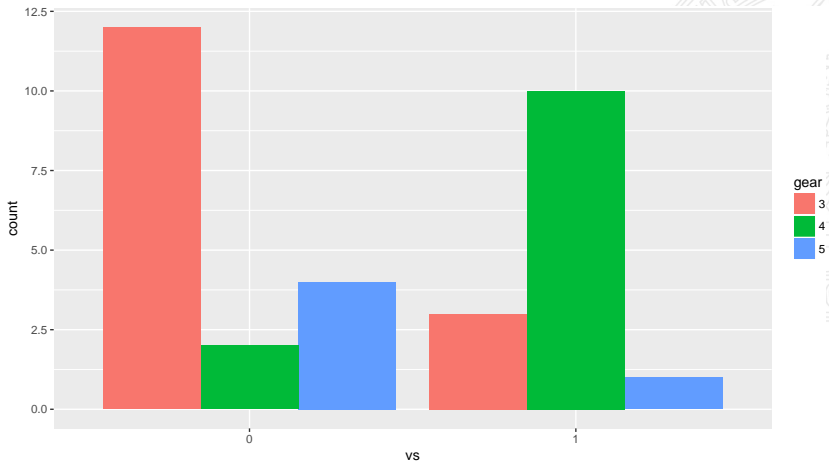
```
ggplot( data = mtcars ) +  
  geom_bar( aes( x = gear, fill = gear ) )
```



```
ggplot( data = mtcars, aes( x = vs, fill = gear ) ) +  
  geom_bar()
```



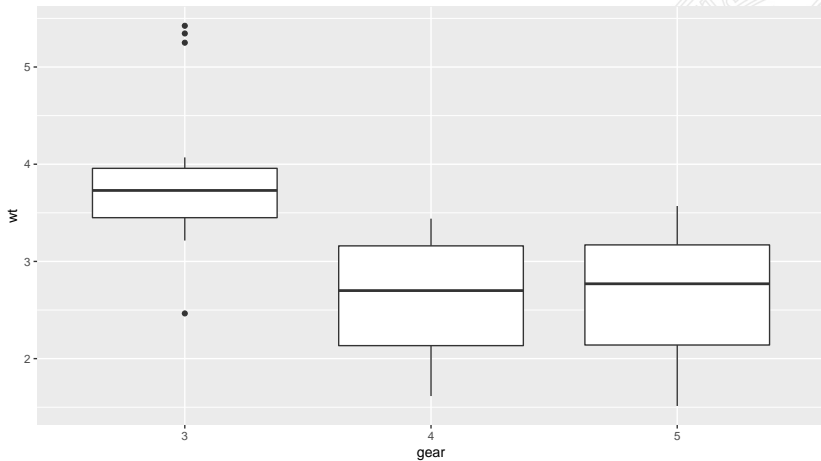
```
ggplot( data = mtcars, aes( x = vs, fill = gear ) ) +  
  geom_bar( position = position_dodge() )
```



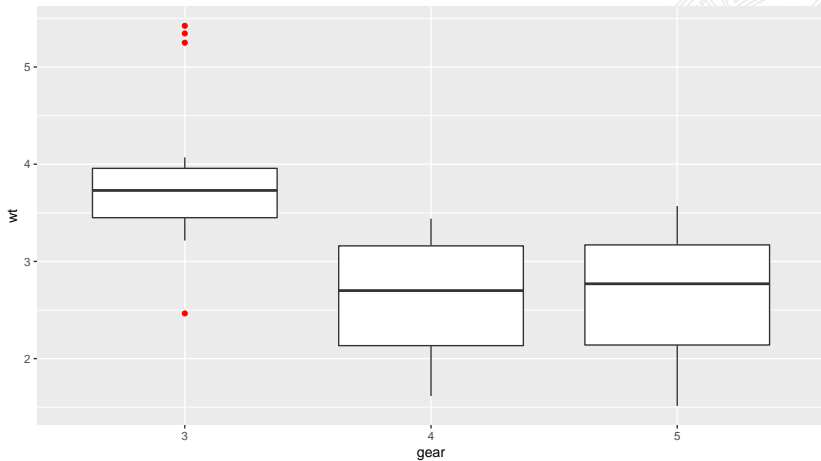
Boxplot



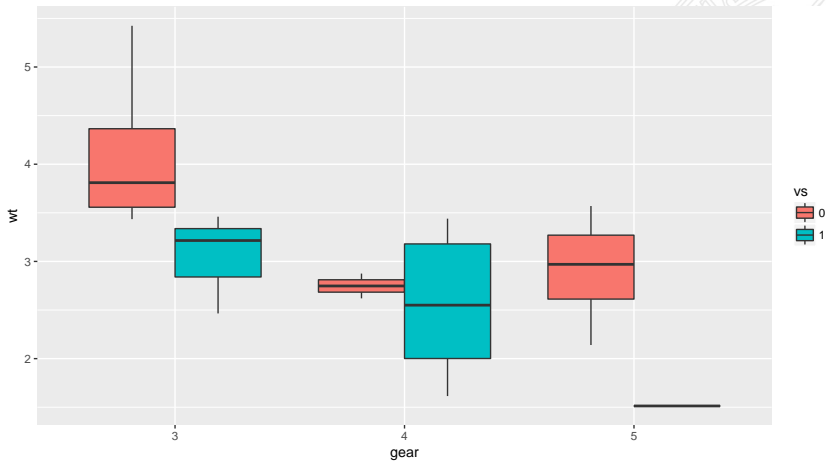

```
ggplot( mtcars, aes( x = gear , y = wt ) ) +  
  geom_boxplot()
```



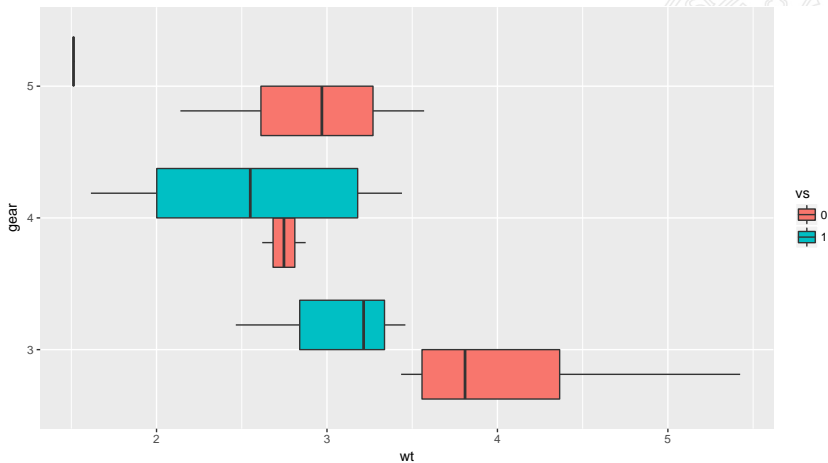
```
ggplot( mtcars, aes( x = gear , y = wt ) ) +  
  geom_boxplot( outlier.colour = "red" )
```



```
ggplot( mtcars, aes( x = gear , y = wt, fill = vs ) ) +  
  geom_boxplot()
```



```
ggplot( mtcars, aes( x = gear, y = wt, fill = vs ) ) +  
  geom_boxplot() +  
  coord_flip()
```

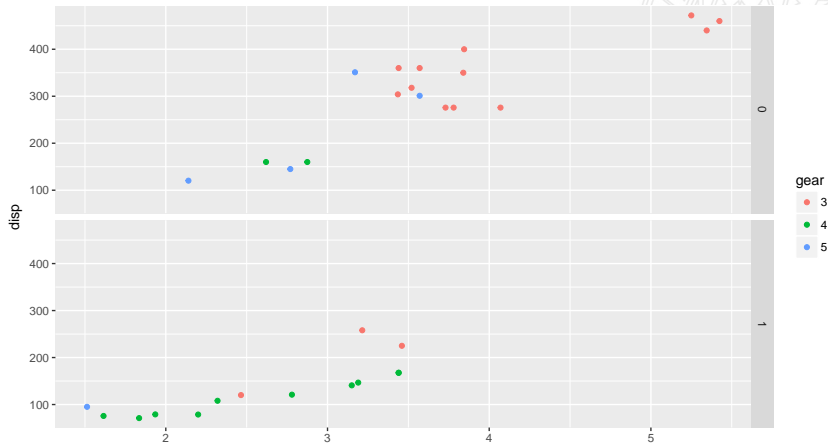


Facetting



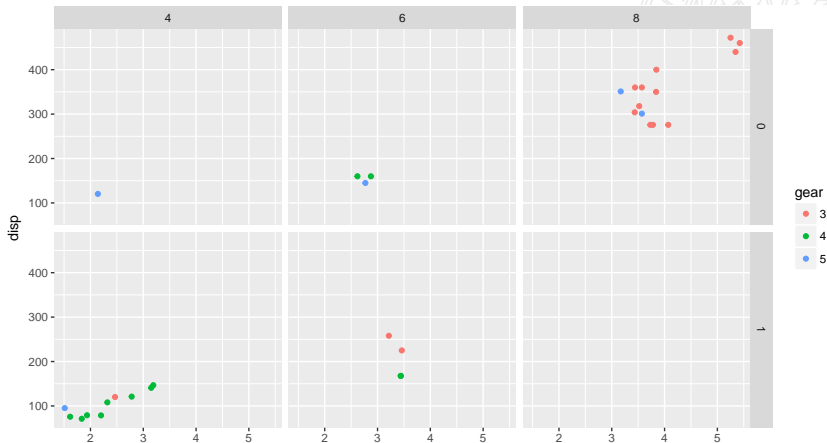
Dividir por factores

```
ggplot( mtcars, aes( x = wt, y = disp ) ) +  
  geom_point( aes( colour = gear ) ) +  
  facet_grid( vs ~ . )
```



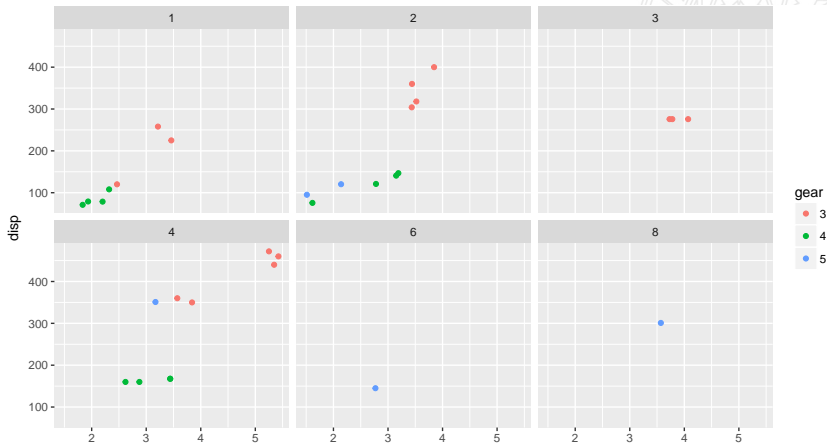
facet_grid(v ~ h)

```
ggplot( mtcars, aes( x = wt, y = disp ) ) +  
  geom_point( aes( colour = gear ) ) +  
  facet_grid( vs ~ cyl )
```



Dividir por filas o columnas

```
ggplot( mtcars, aes( x = wt, y = disp ) ) +  
  geom_point( aes( colour = gear ) ) +  
  facet_wrap( ~ carb, nrow = 2 )
```



Colors

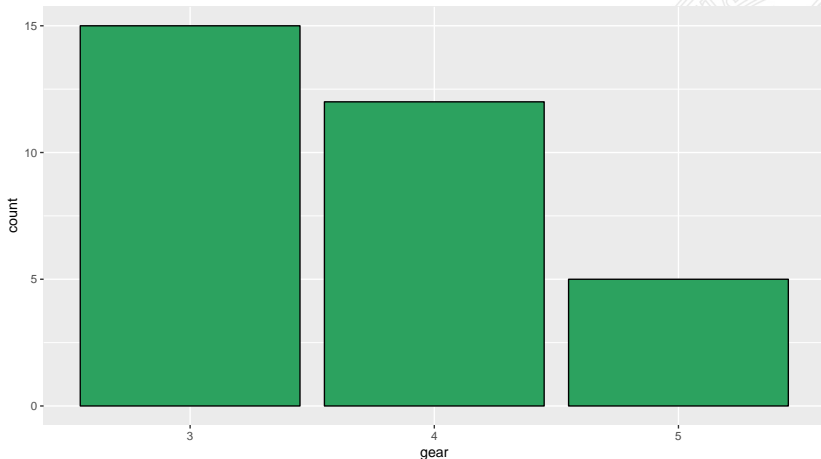


Existen dos argumentos principales para añadir color a los gráficos, `colour` y `fill` .

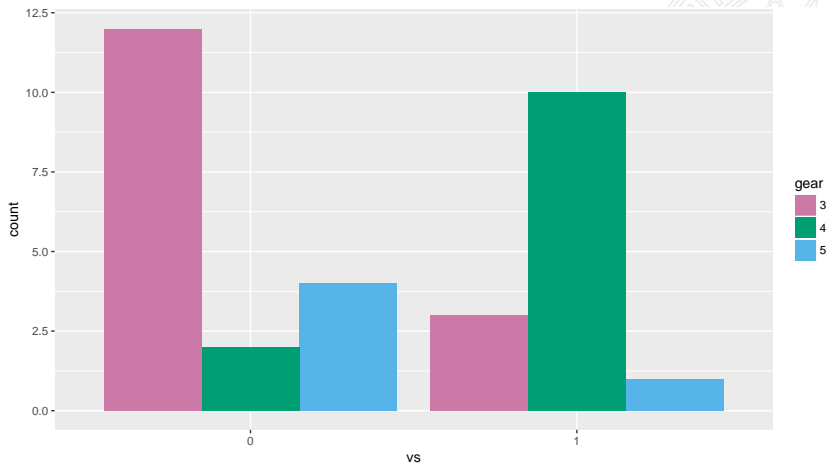
- Puntos y líneas: `colour = "red"`
- Objetos con relleno: `fill = "red"`



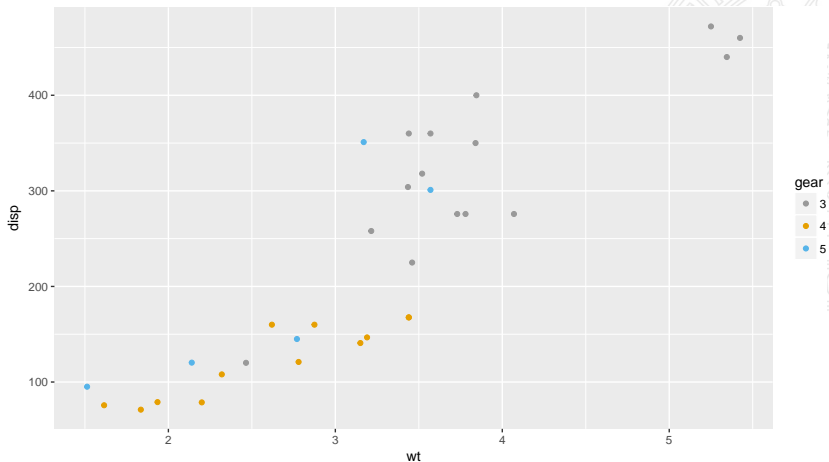
```
ggplot( mtcars, aes( x = gear ) ) +  
  geom_bar( stat="count", fill="#2CA25F", colour="black")
```



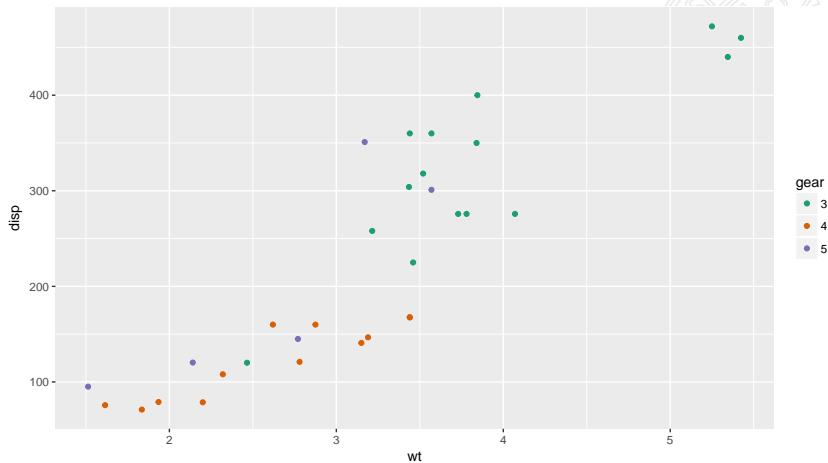
```
ggplot( data = mtcars, aes( x = vs, fill = gear ) ) +  
geom_bar( position = position_dodge() ) +  
scale_fill_manual(values = c("#CC79A7", "#009E73", "#56B4E9"))
```



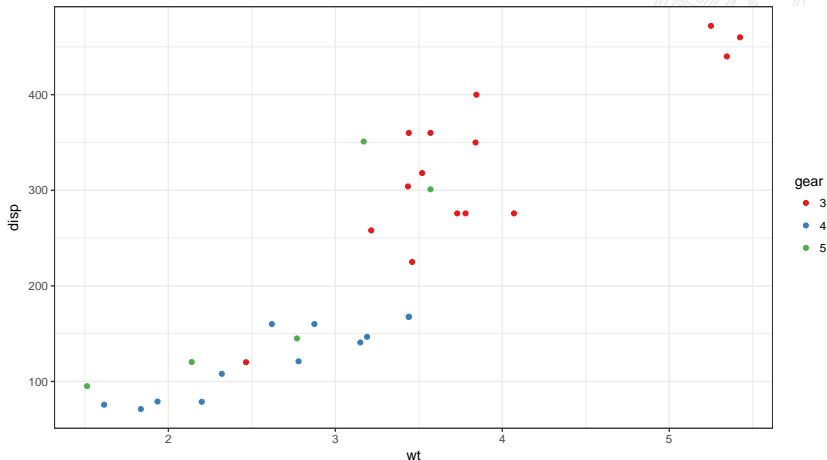
```
ggplot( mtcars, aes( x = wt, y = disp ) ) +  
geom_point( aes( colour = gear ) ) +  
scale_color_manual(values = c("#999999", "#E69F00", "#56B4E9"))
```



```
ggplot( mtcars, aes( x = wt, y = disp ) ) +  
  geom_point( aes( colour = gear ) ) +  
  scale_color_brewer( palette = "Dark2" )
```



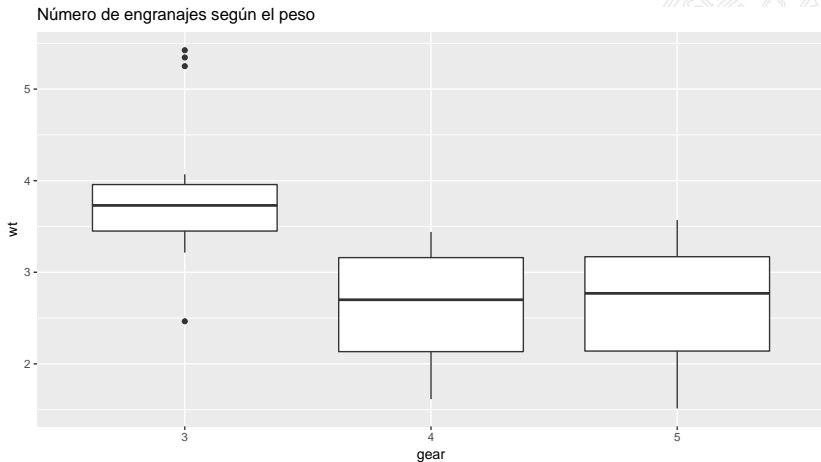
```
ggplot( mtcars, aes( x = wt, y = disp ) ) +  
  geom_point( aes( colour = gear ) ) +  
  scale_color_brewer( palette = "Set1" ) +  
  theme_bw()
```



Títulos y etiquetas

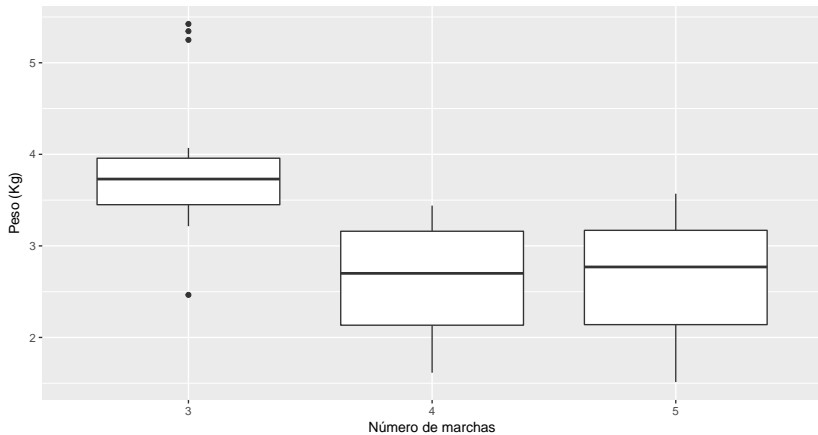



```
ggplot( mtcars, aes( x = gear , y = wt ) ) +  
  geom_boxplot() +  
  labs( title = "Número de engranajes según el peso")
```



```
ggplot( mtcars, aes( x = gear , y = wt ) ) +  
  geom_boxplot() +  
  labs( title = "Número de engranajes según el peso",  
        x = "Número de marchas", y = "Peso (Kg)" )
```

Número de engranajes según el peso

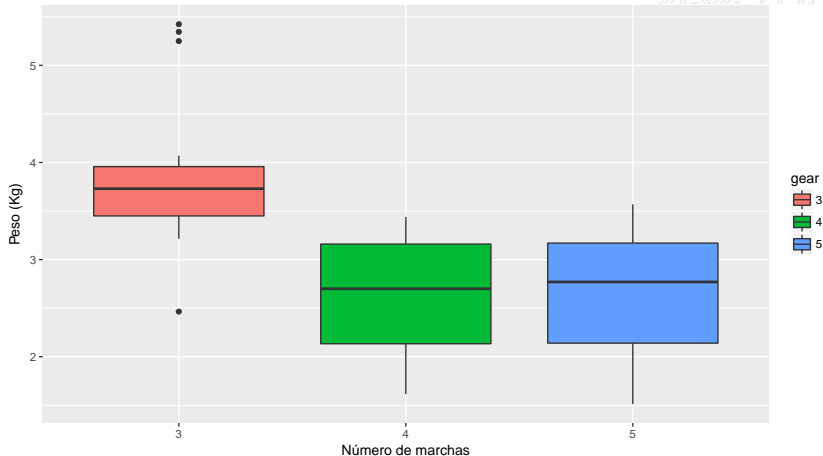


```
bp <- ggplot( mtcars, aes( x = gear , y = wt, fill = gear ) )  
  geom_boxplot() +  
  labs( x = "Número de marchas", y = "Peso (Kg)" )
```

Ejes

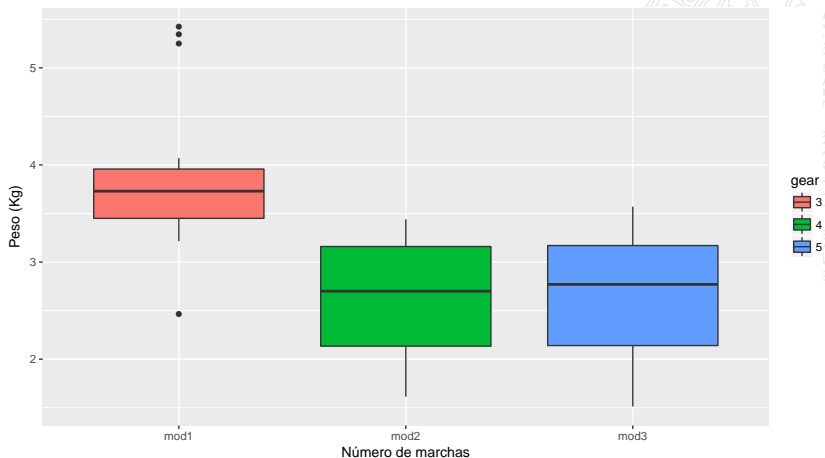


```
bp <- ggplot( mtcars, aes( x = gear , y = wt, fill = gear ) )  
  geom_boxplot() +  
  labs( x = "Número de marchas", y = "Peso (Kg)" )
```



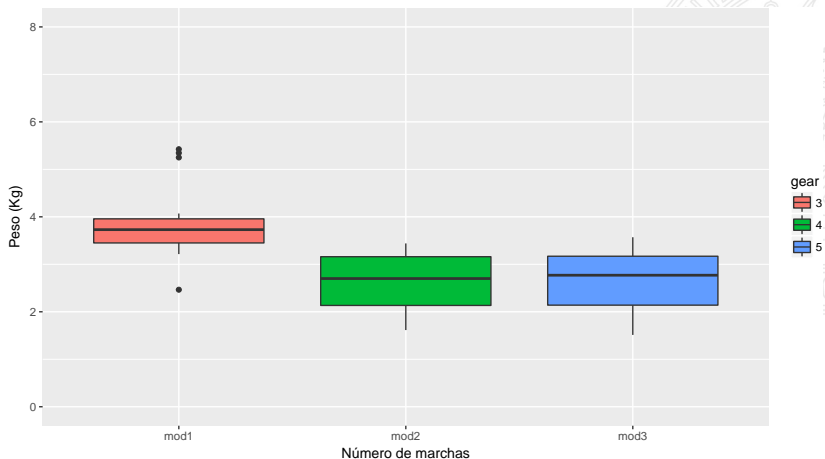
Ejes discretos

```
bp + scale_x_discrete( breaks = c( "3", "4", "5" ),  
                       labels = c( "mod1", "mod2", "mod3"))
```

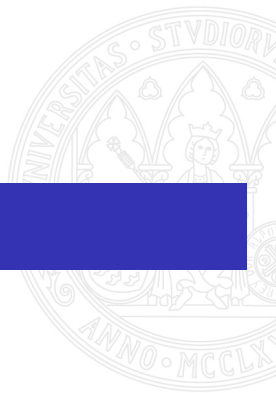


Ejes continuos

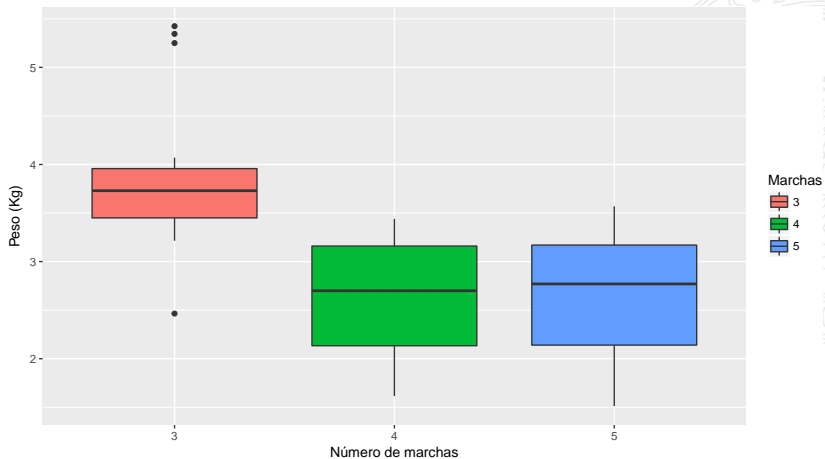
```
bp + scale_y_continuous( limits = c( 0, 8 ) )
```



Leyendas

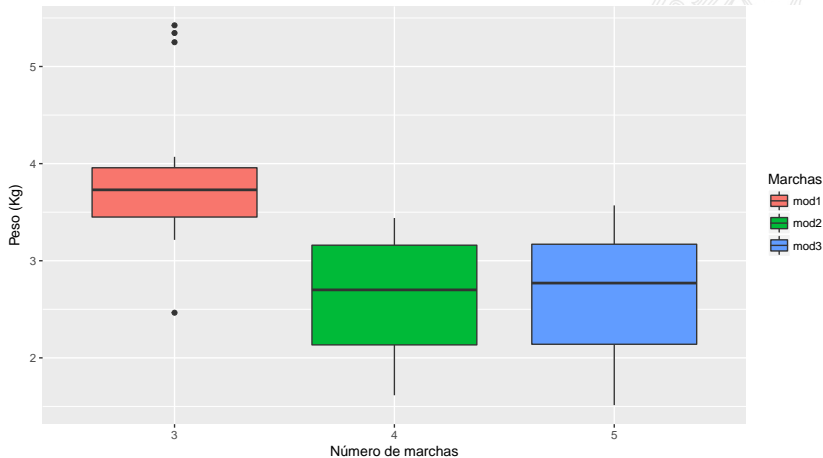


```
bp + scale_fill_discrete( name = "Marchas" )
```

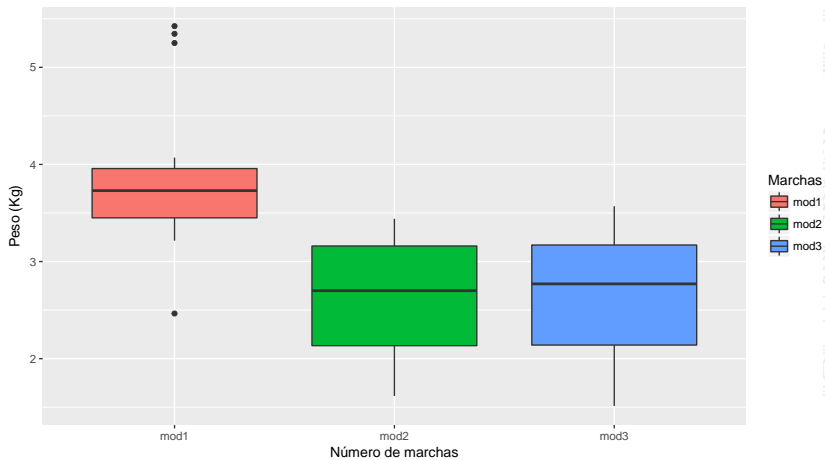


bp +

```
scale_fill_discrete( name = "Marchas",  
                    breaks = c( "3", "4", "5" ),  
                    labels = c( "mod1", "mod2", "mod3" ) ) )
```



```
bp + scale_x_discrete( breaks = c( "3", "4", "5" ),  
                      labels = c( "mod1", "mod2", "mod3" )) +  
  
  scale_fill_discrete( name = "Marchas",  
                      breaks = c( "3", "4", "5" ),  
                      labels = c( "model1", "model2", "model3" ))
```



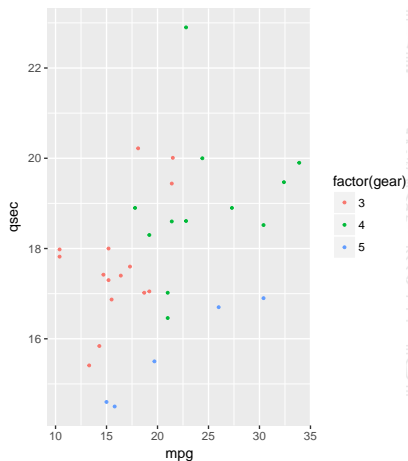
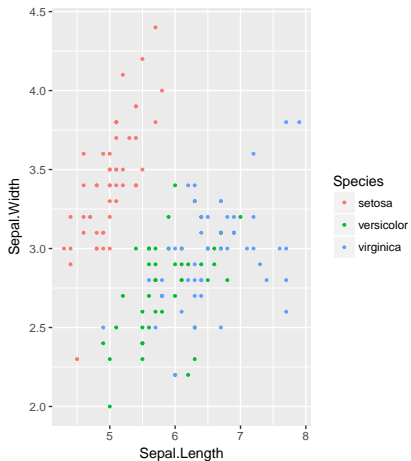
Más de un gráfico por device



```
# library(gridExtra)
p1 <- ggplot( data = iris,
              aes(x = Sepal.Length, y = Sepal.Width,
                 col = Species ) ) +
  geom_point(size = 0.7)

p2 <- ggplot( data = mtcars,
              aes( x = mpg, y = qsec,
                 col = factor( gear ) ) ) +
  geom_point( size = 0.7 )

grid.arrange( p1, p2, nrow = 1 )
```



Enlaces y referencias



Enlaces y referencias

- Enlace a la página de CRAN
- Página oficial
- Manual
- A Layered Grammar of Graphics, Hadley Wickham
- Cookbook-R
- A Simple Introduction to the Graphing Philosophy of ggplot2
- Color Brewer: Color advice for cartography

