

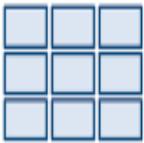


Vector



- 1 column or row of data
- 1 type (numeric or text)

Matrix



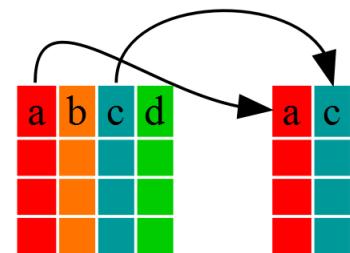
- multiple columns and/or rows of data
- 1 type (numeric or text)

Data Frame

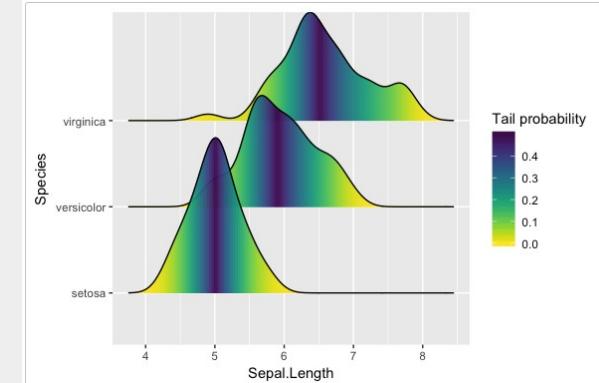
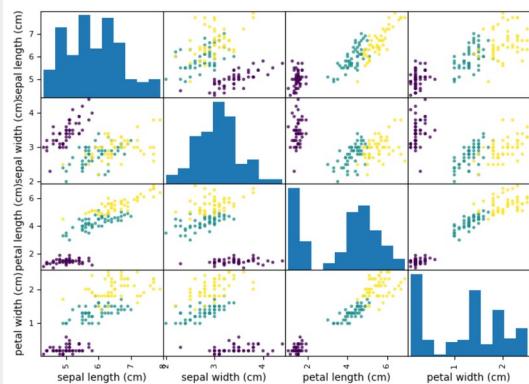
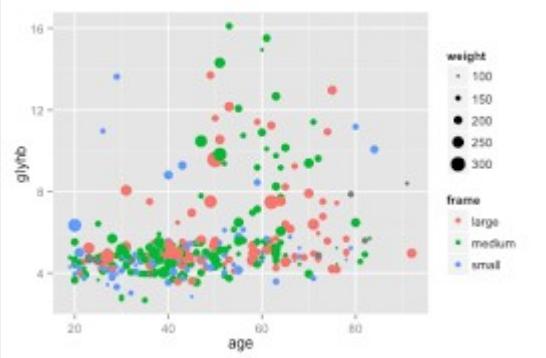


- multiple columns and/or rows of data
- multiple types

`select(data.frame,a,c)`



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Data Set

A base de dados mtcars é comumente usada em exemplos de regressão, ela constitui de informações retiradas da revista 1974 Motor Trend US e resume 10 aspectos do design de 32 carros assim como o consumo de gasolina.

Column	Description
mpg	Miles/(US) gallon
cyl	Number of cylinders
disp	Displacement (cu.in.)
hp	Gross horsepower
drat	Rear axle ratio
wt	Weight (1000 lbs)
qsec	1/4 mile time
vs	V/S
am	Transmission (0 = automatic, 1 = manual)
gear	Number of forward gears
carb	Number of carburetors

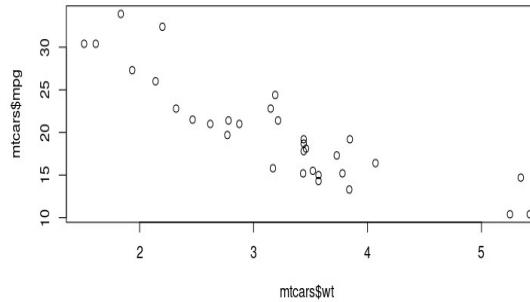


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BASE

```
mtcars <- mtcars
```

```
plot(mtcars$wt, mtcars$mpg)
```

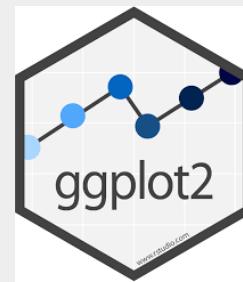
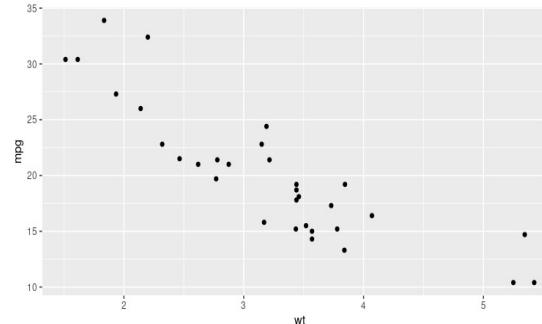


GGPLOT

```
g <- ggplot(mtcars, aes(x=wt, y=mpg))
```

```
g <- g+ geom_point()
```

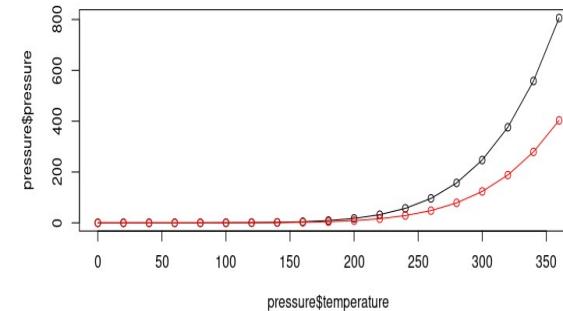
```
g
```



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BASE

```
pressure <- pressure  
  
plot(pressure$temperature, pressure$pressure, type="l")  
points(pressure$temperature, pressure$pressure)  
lines(pressure$temperature, pressure$pressure/2, col="red")  
points(pressure$temperature, pressure$pressure/2, col="red")
```



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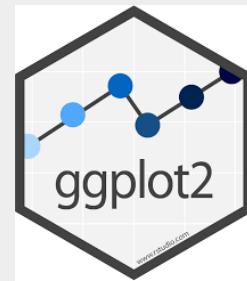
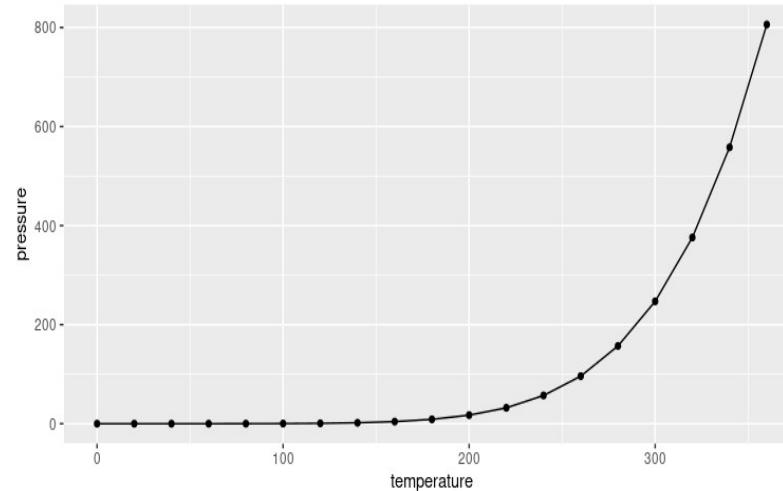
GGPLOT2

```
g<- ggplot(pressure, aes(x=temperature, y=pressure))
```

```
g<- g + geom_line()
```

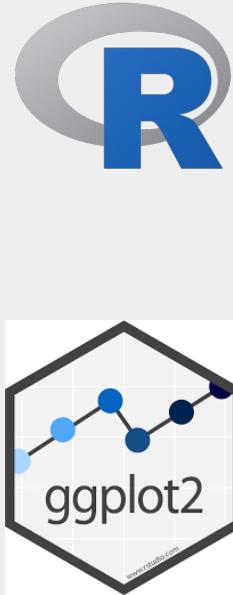
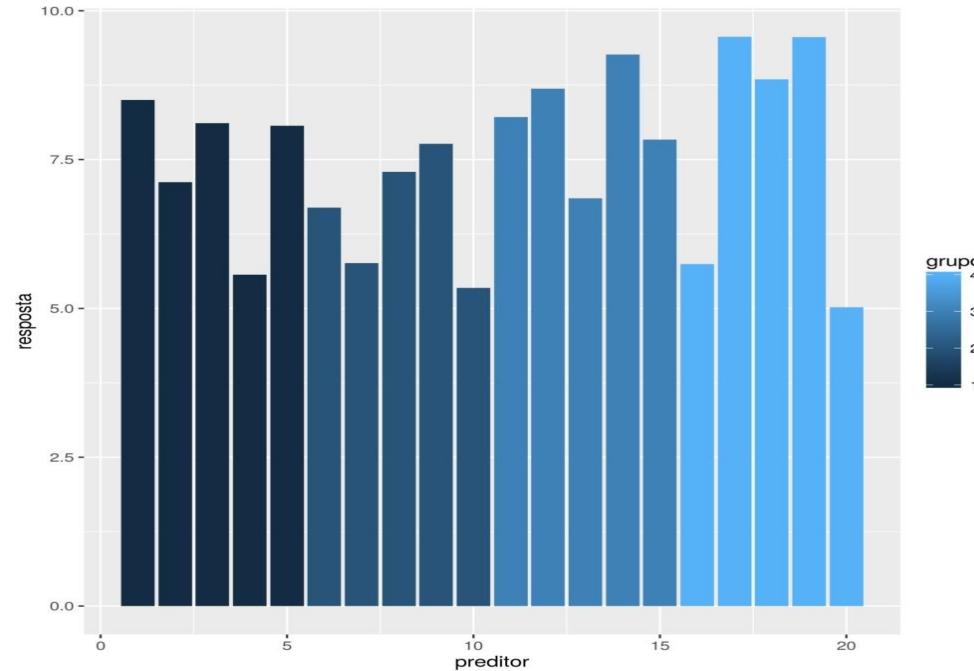
```
g<- g + + geom_point()
```

```
g
```



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Bar Graph



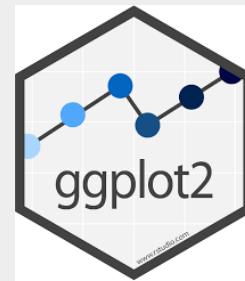
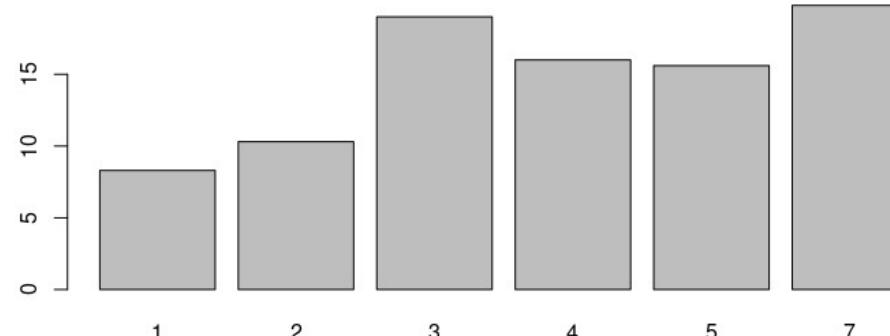
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Bar Graph

> BOD

Time demand

1	1	8.3
2	2	10.3
3	3	19.0
4	4	16.0
5	5	15.6
6	7	19.8

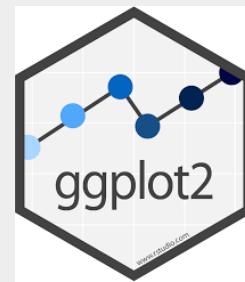
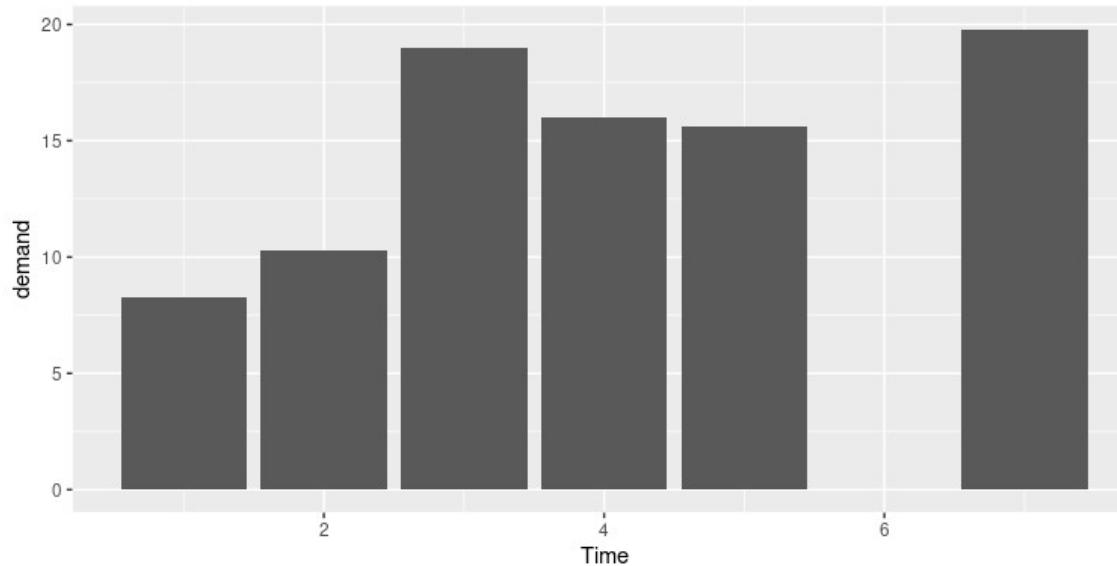


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```
ggplot(BOD, aes(x=Time, y=demand)) + geom_bar(stat="identity")
```

Time demand

1	1	8.3
2	2	10.3
3	3	19.0
4	4	16.0
5	5	15.6
6	7	19.8



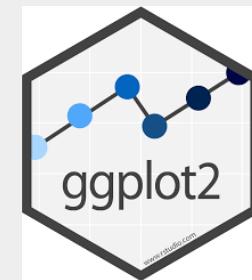
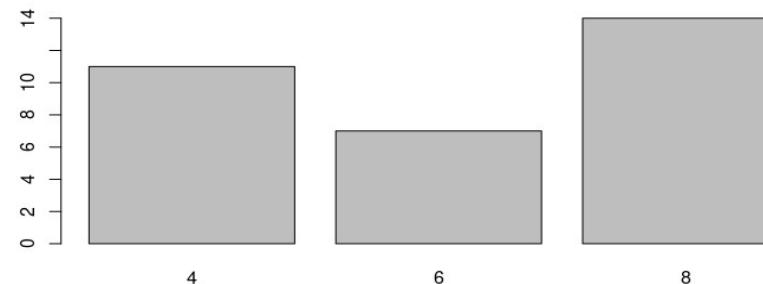
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```
table(mtcars$cyl)
```

```
4 6 8
```

```
11 7 14
```

```
barplot(table(mtcars$cyl))
```



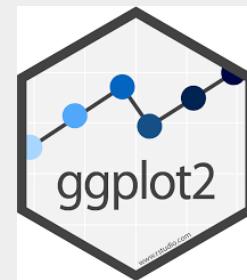
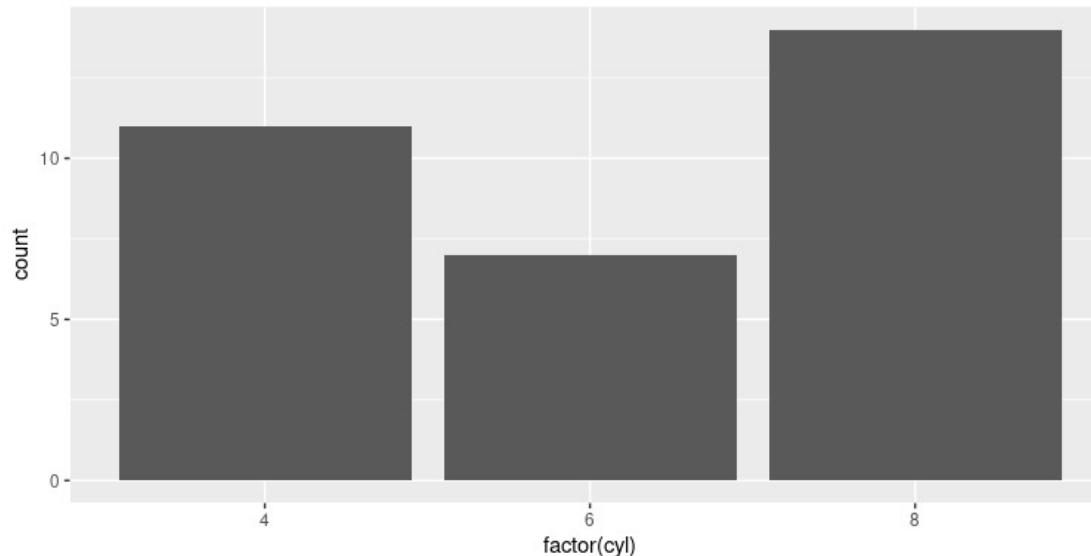
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```
ggplot(mtcars, aes(x=factor(cyl))) + geom_bar()
```

```
table(mtcars$cyl)
```

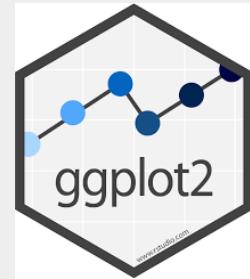
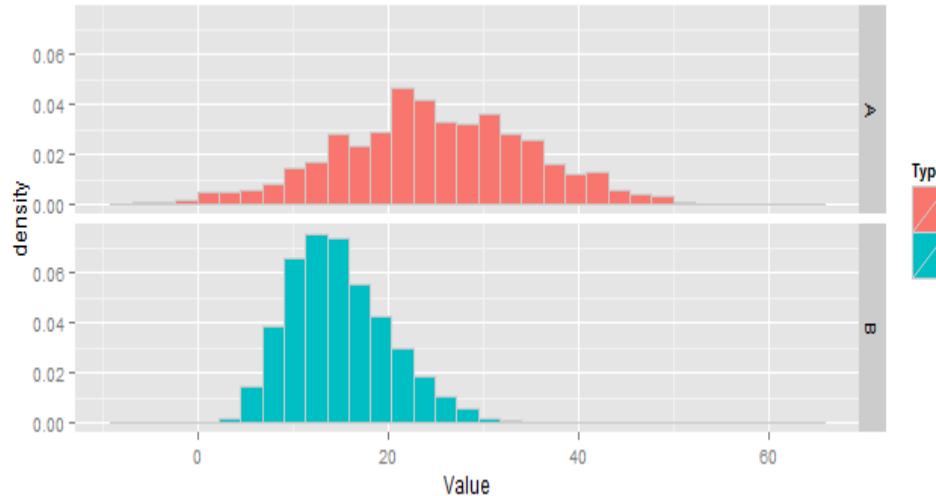
4 6 8

11 7 14



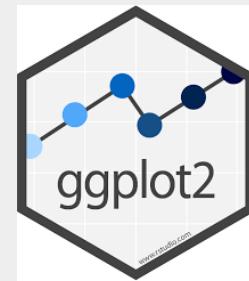
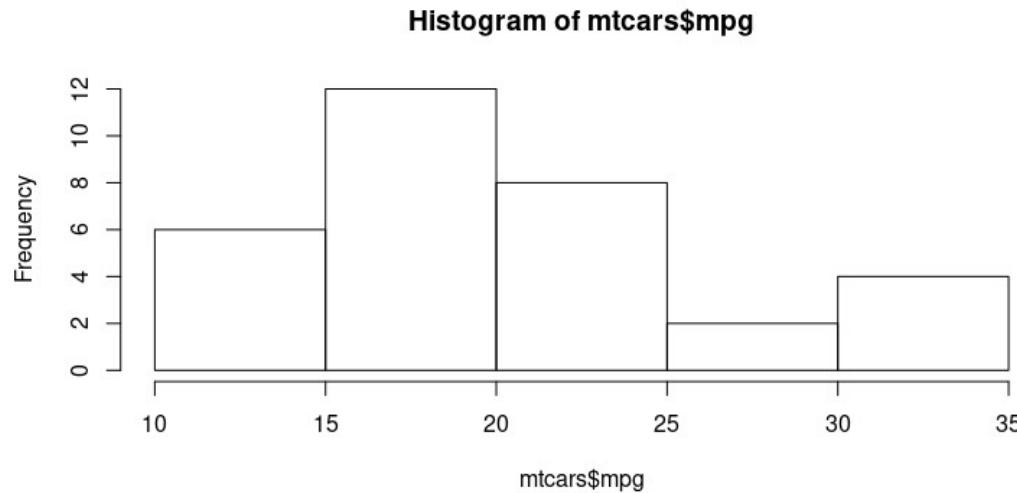
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Histogram Graph



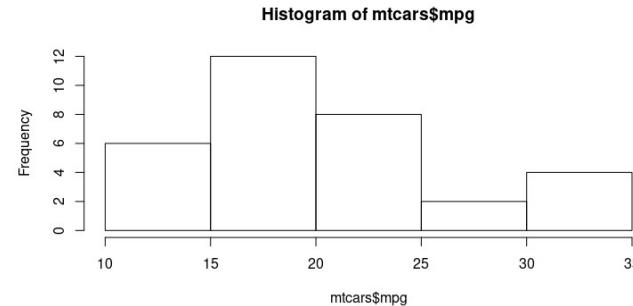
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```
hist(mtcars$mpg)
```

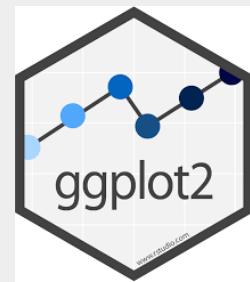
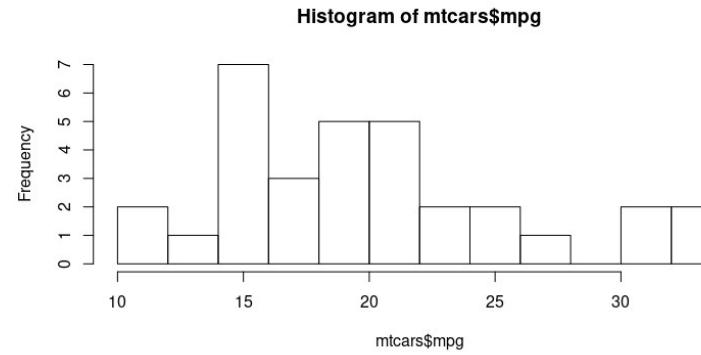


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```
hist(mtcars$mpg)
```

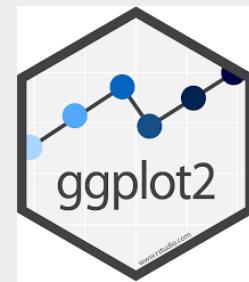
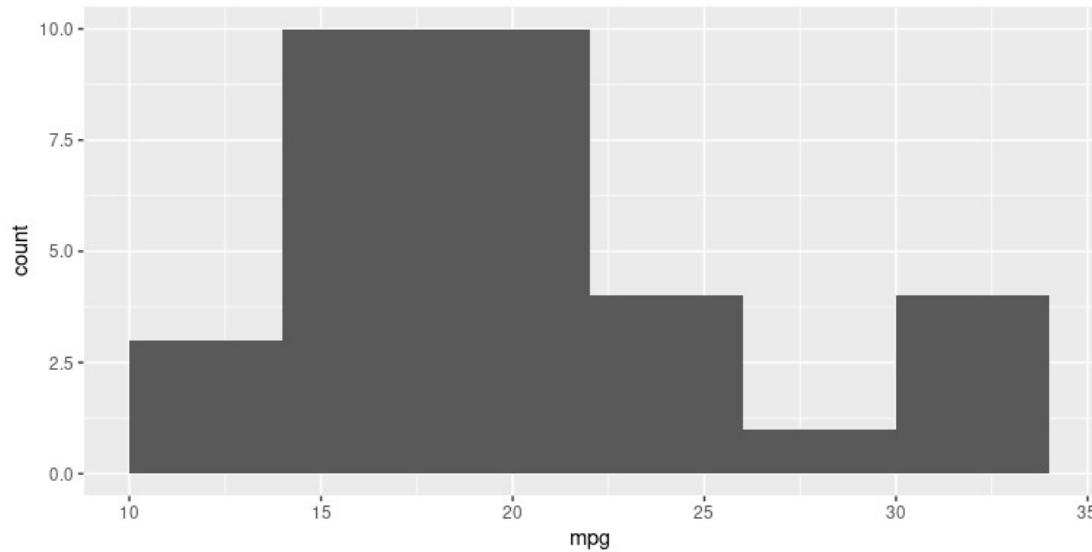


```
hist(mtcars$mpg, breaks=10)
```



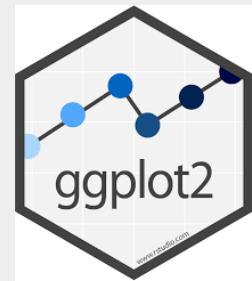
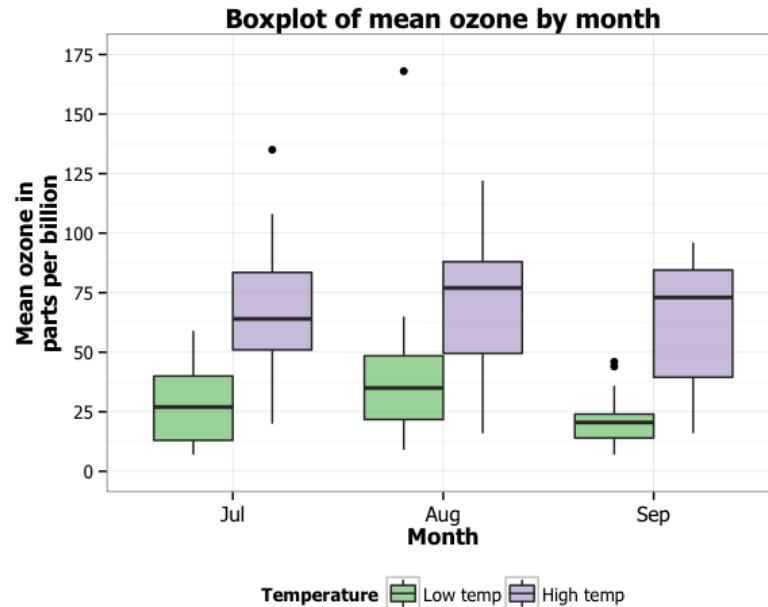
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```
ggplot(mtcars, aes(x=mpg)) + geom_histogram(binwidth=4)
```



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Boxplot Graph



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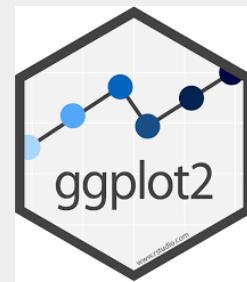
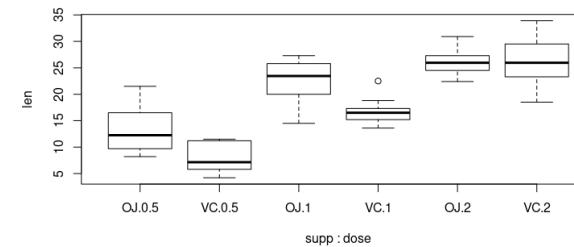
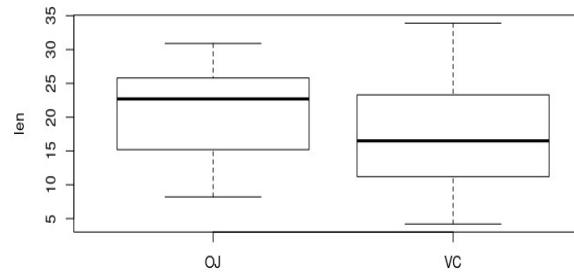
```
ToothGrowth <- ToothGrowth
```

```
# Formula syntax
```

```
boxplot(len ~ supp, data = ToothGrowth)
```

```
# Put interaction of two variables on x-axis
```

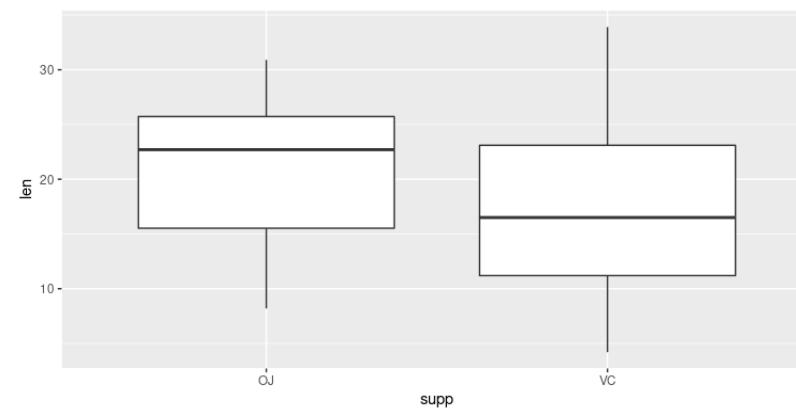
```
boxplot(len ~ supp + dose, data = ToothGrowth)
```



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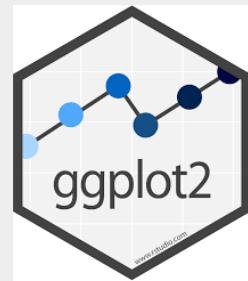
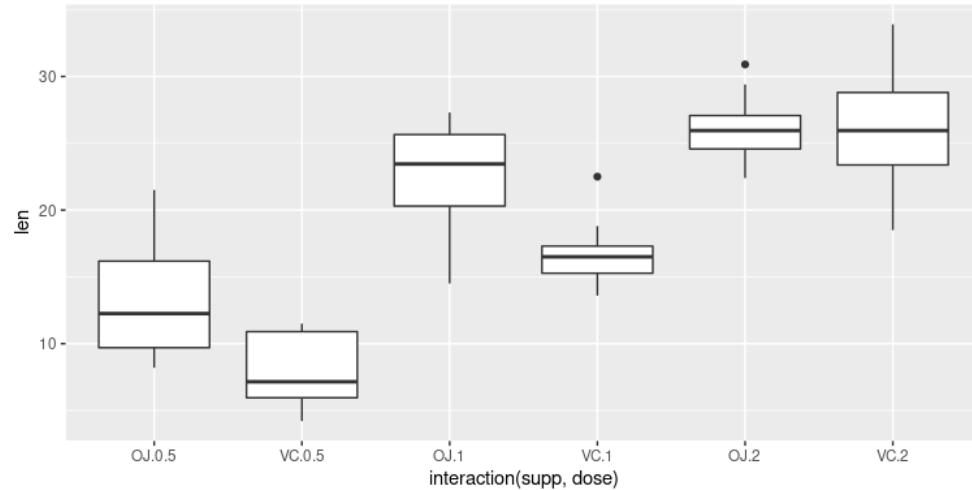
```
ggplot(ToothGrowth, aes(x=supp, y=len)) + geom_boxplot()
```



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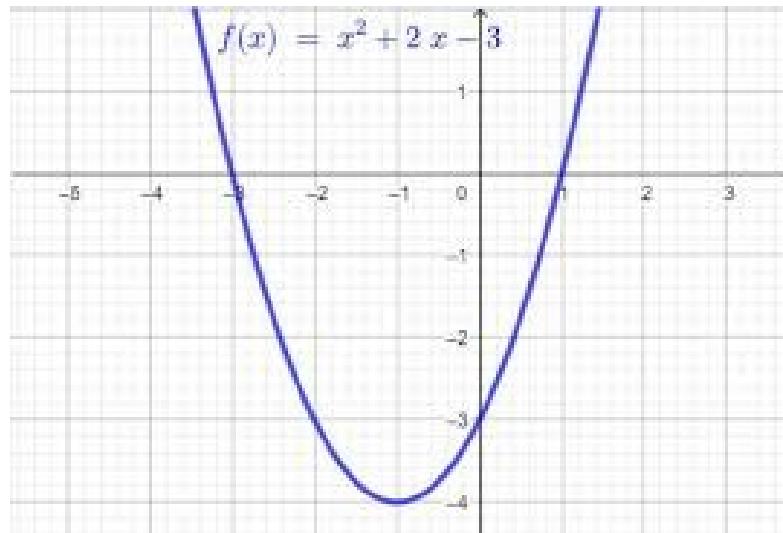
ToothGrowth

```
ggplot(ToothGrowth, aes(x=interaction(supp, dose), y=len)) + geom_boxplot()
```



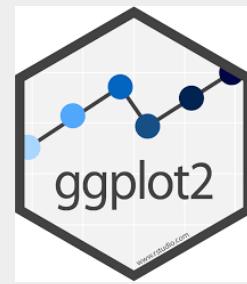
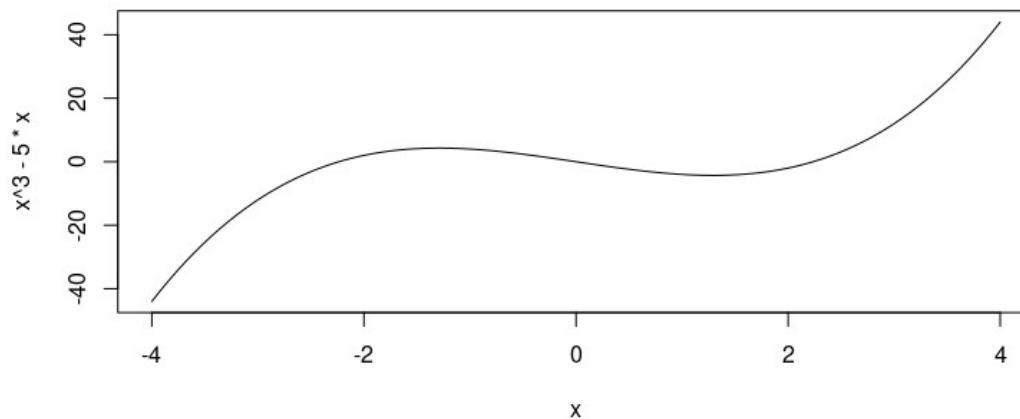
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Plotting a Function Curve



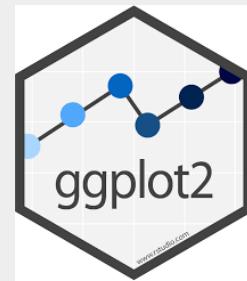
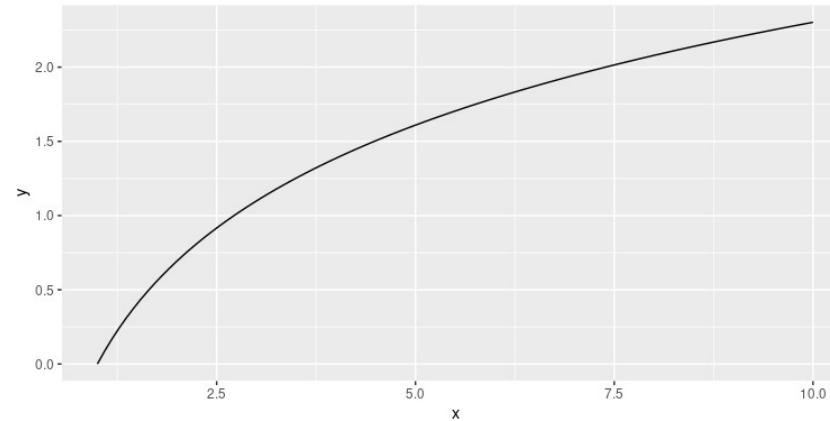
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```
curve(x^3 - 5*x, from=-4, to=4)
```



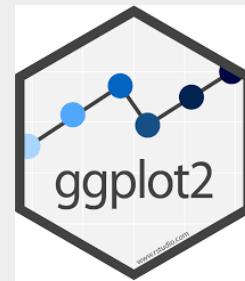
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```
x <- 1:10  
df <- data.frame(x)  
ggplot(df,aes(x))+ stat_function(fun=function(x) log(x))
```



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Os gráficos de barras são talvez o tipo de visualização de dados mais comumente usado. Eles estão normalmente usado para exibir valores numéricos (no eixo y), para diferentes categorias (no eixo x). Por exemplo, um gráfico de barras seria bom para mostrar os preços de quatro diferentes tipos de itens. Um gráfico de barras geralmente não seria tão bom para mostrar os preços ao longo do tempo, onde o tempo é uma variável contínua - embora isso possa ser feito.



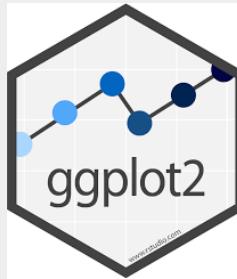
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Problema

Você tem um data frame onde uma coluna representa a posição x de cada barra, e outra coluna representa a altura vertical (y) de cada barra.

Solução

Use `ggplot ()` com `geom_bar (stat = "identity")` e especifique quais variáveis você deseja nos eixos x e y .



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```
library(gcookbook)
```

```
> pg_mean
```

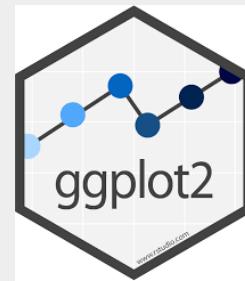
```
group weight
```

```
1 ctrl 5.032
```

```
2 trt1 4.661
```

```
3 trt2 5.526
```

```
ggplot(pg_mean, aes(x=group, y=weight)) + geom_bar(stat="identity")
```



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```
library(gcookbook)
```

```
> pg_mean
```

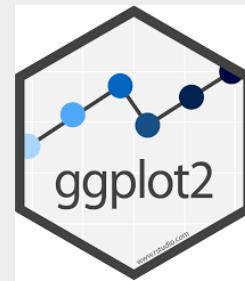
```
group weight
```

```
1 ctrl 5.032
```

```
2 trt1 4.661
```

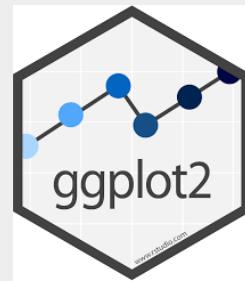
```
3 trt2 5.526
```

```
ggplot(pg_mean, aes(x=group, y=weight)) + geom_bar(stat="identity")
```



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Quando x é uma variável contínua (ou numérica), as barras se comportam de maneira um pouco diferente. Em vez de ter uma barra em cada valor x real, há uma barra em cada valor x possível entre o mínimo e o máximo, como na Figura. Você pode converter a variável contínua para uma variável discreta usando fator ():



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```
> BOD
```

Time demand

1 1 8.3

2 2 10.3

3 3 19.0

4 4 16.0

5 5 15.6

6 7 19.8

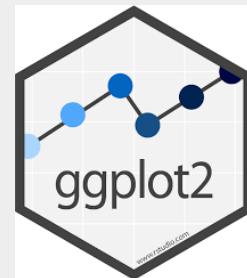
```
> str(BOD)
```

'data.frame': 6 obs. of 2 variables:

 \$ Time : num 1 2 3 4 5 7

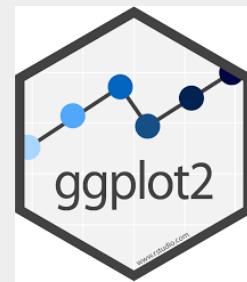
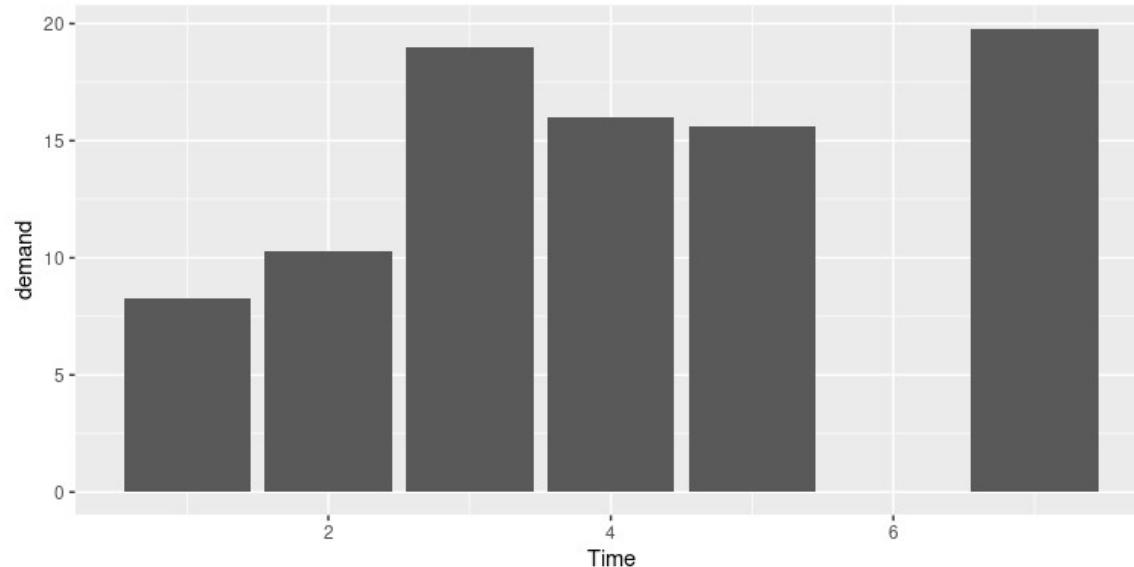
 \$ demand: num 8.3 10.3 19 16 15.6 19.8

- attr(*, "reference")= chr "A1.4, p. 270"



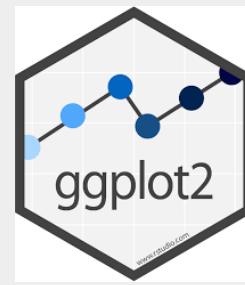
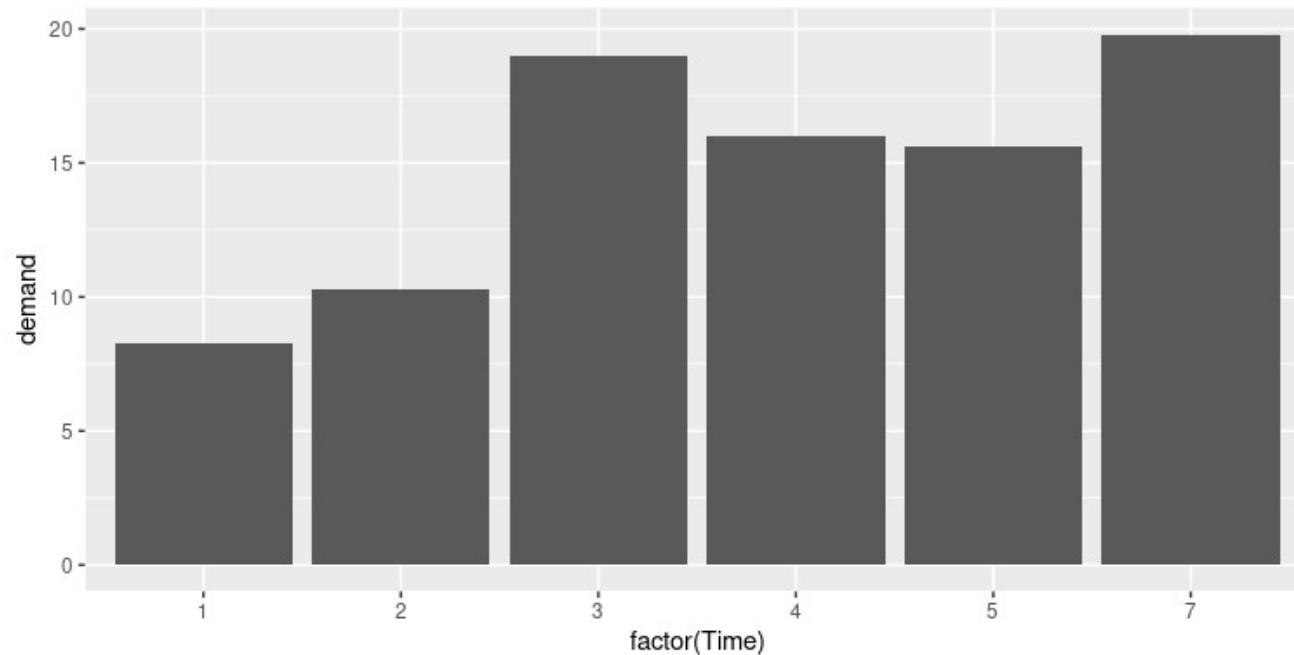
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```
ggplot(BOD, aes(x=Time, y=demand)) + geom_bar(stat="identity")
```

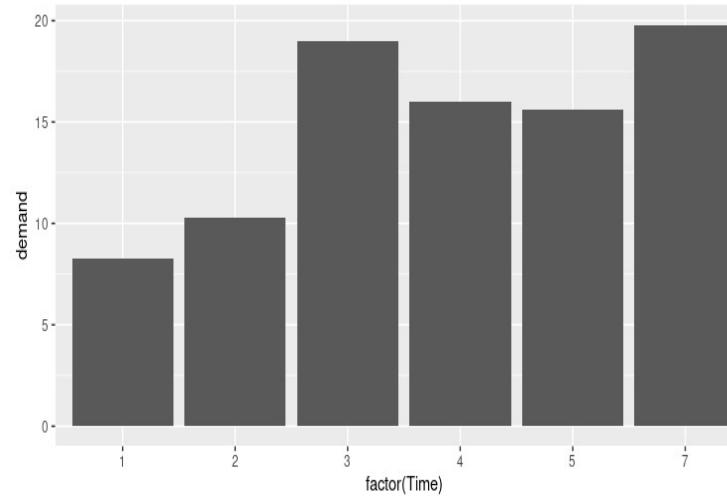
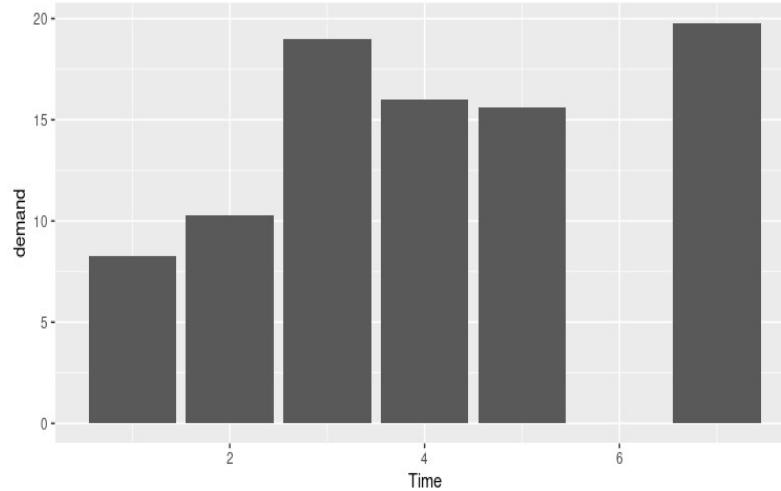


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```
ggplot(BOD, aes(x=factor(Time), y=demand)) + geom_bar(stat="identity")
```



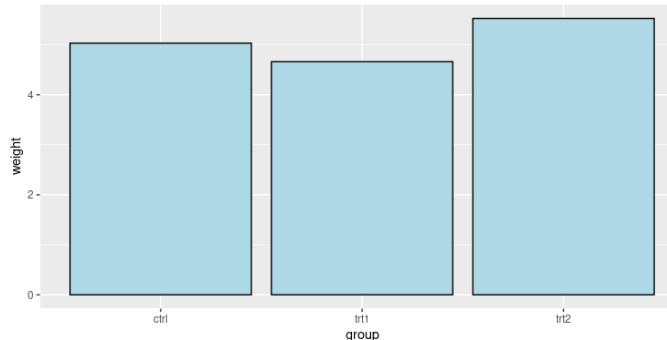
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Um guia para iniciantes em R

```
> pg_mean  
group weight  
1 ctrl 5.032  
2 trt1 4.661  
3 trt2 5.526
```

```
ggplot(pg_mean, aes(x=group, y=weight)) +  
  geom_bar(stat="identity", fill="lightblue", colour="black")
```



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Os gráficos de barras mais básicos têm uma variável categórica no eixo x e uma variável contínua no eixo y. Às vezes você vai querer usar outra variável categórica para dividir os dados, além da variável no eixo x. Você pode produzir um agrupamento de barras mapeando essa variável para preencher, que representa a cor de preenchimento das barras.

Você também deve usar `position = "dodge"`, que diz para as barras para "desviarem" umas das outras. Se não o fizer, você vai acabar com um gráfico de barras empilhadas.

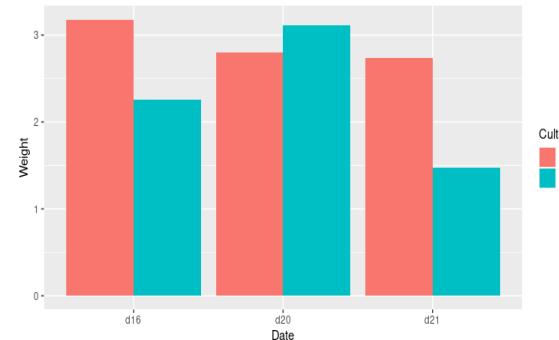
Tal como acontece com as variáveis mapeadas para o eixo x de um gráfico de barras, as variáveis que são mapeadas para a cor de preenchimento das barras deve ser categórica em vez de variáveis contínuas



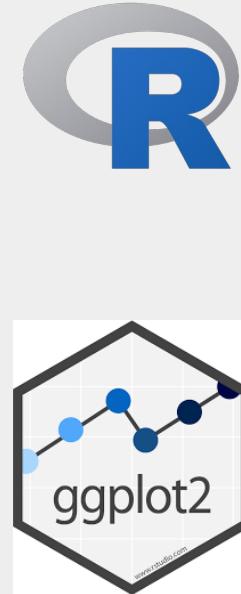
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```
library(gcookbook) # For the data set  
cabbage_exp
```

	Cultivar	Date	Weight	sd	n	se
1	c39	d16	3.18	0.9566144	10	0.30250803
2	c39	d20	2.80	0.2788867	10	0.08819171
3	c39	d21	2.74	0.9834181	10	0.31098410
4	c52	d16	2.26	0.4452215	10	0.14079141
5	c52	d20	3.11	0.7908505	10	0.25008887
6	c52	d21	1.47	0.2110819	10	0.06674995

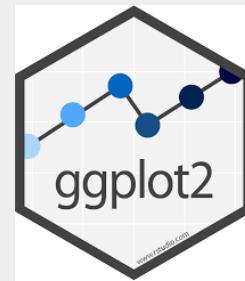
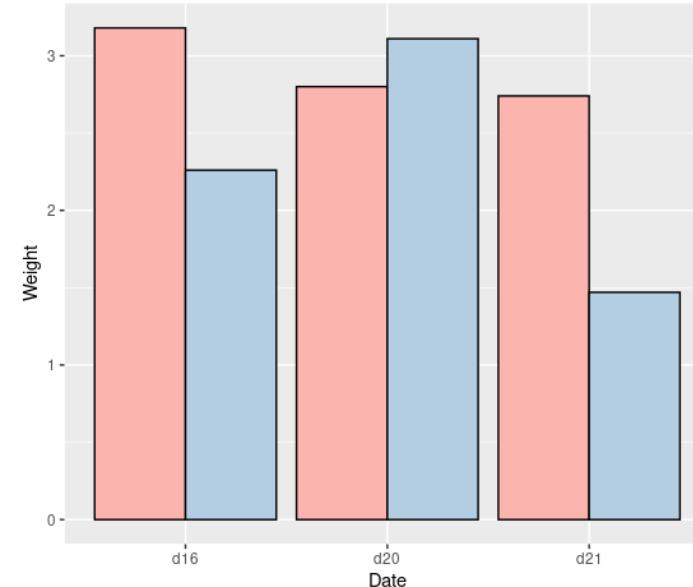


```
ggplot(cabbage_exp, aes(x=Date, y=Weight, fill=Cultivar)) +  
  geom_bar(stat="identity", position="dodge")
```



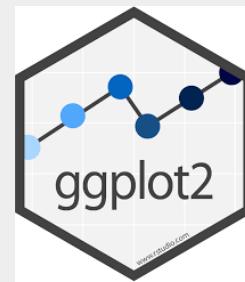
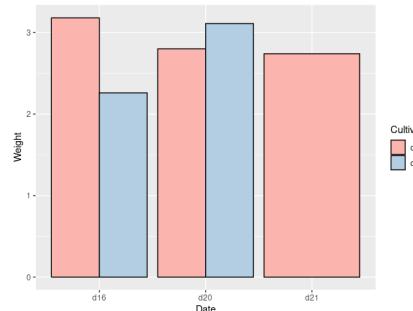
Um guia para iniciantes em R

- Para adicionar um contorno preto, use `color = "black"` dentro de `geom_bar ()`.
- Para definir as cores, você pode usar `scale_fill_brewer ()` ou `scale_fill_manual ()`.



Um guia para iniciantes em R

- `ce <- cabbage_exp[1:5,]`
- `ggplot(ce, aes(x=Date, y=Weight, fill=Cultivar)) +
geom_bar(stat="identity", position="dodge",
colour="black") + scale_fill_brewer(palette="Pastel1")`

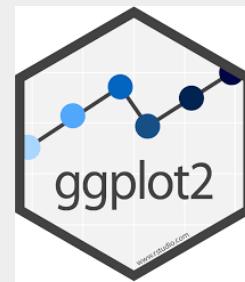
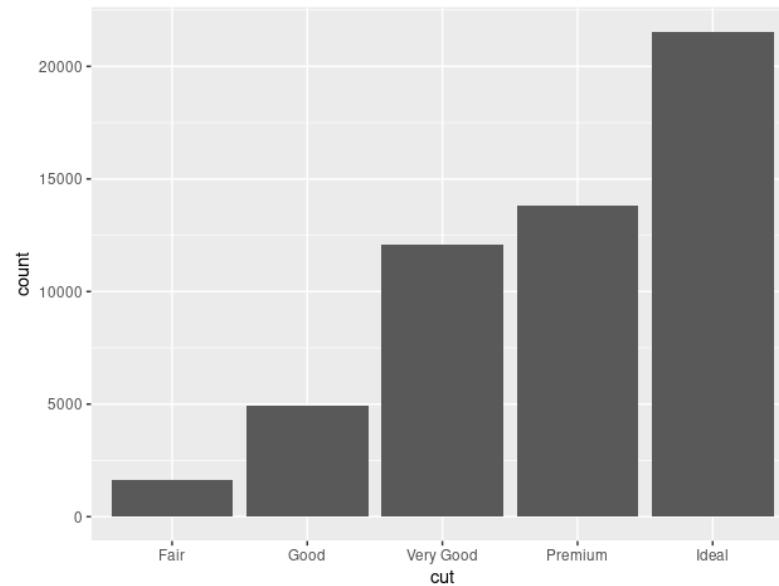


Um guia para iniciantes em R

Fazendo um gráfico de barras de contagens

```
diamonds <- diamonds
```

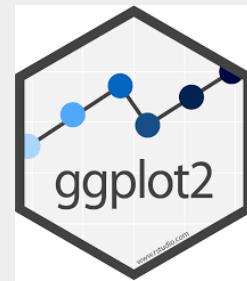
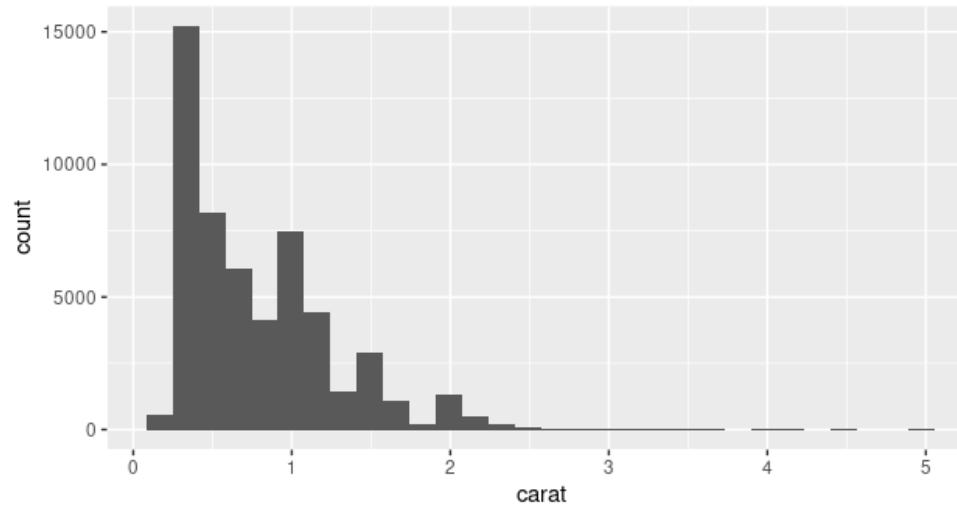
```
ggplot(diamonds, aes(x=cut)) +  
  geom_bar(stat="count")
```



Um guia para iniciantes em R

Fazendo um gráfico de barras de contagens

```
ggplot(diamonds, aes(x=carat)) + geom_histogram()
```

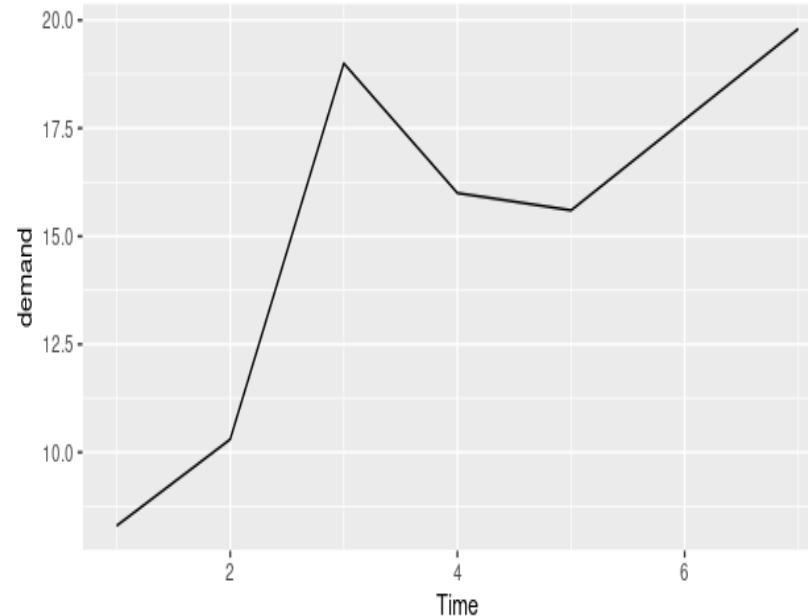


Um guia para iniciantes em R

Line Graphs

BOD

```
gplot(BOD, aes(x=Time,  
y=demand)) + geom_line()
```



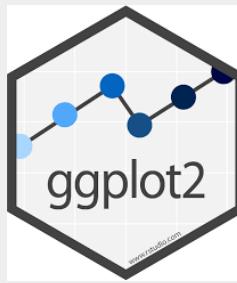
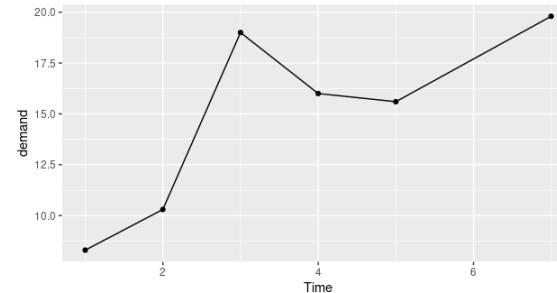
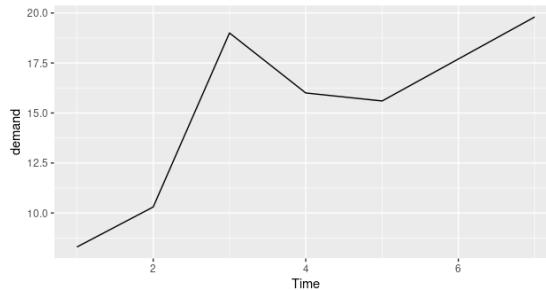
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Line Graphs

BOD

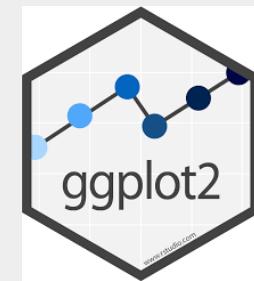
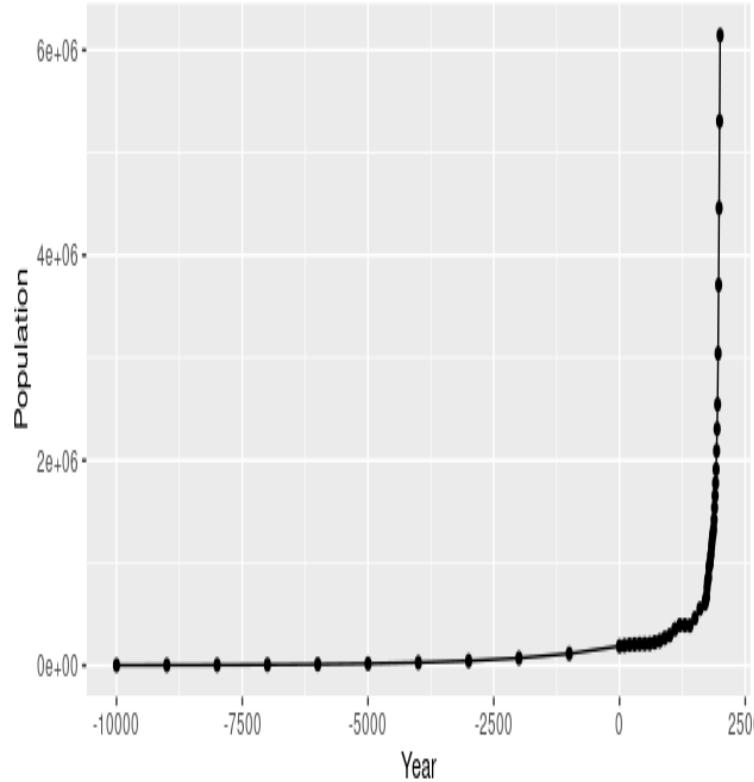
```
gplot(BOD, aes(x=Time, y=demand)) + geom_line()
```

```
ggplot(BOD, aes(x=Time, y=demand)) + geom_line() + geom_point()
```



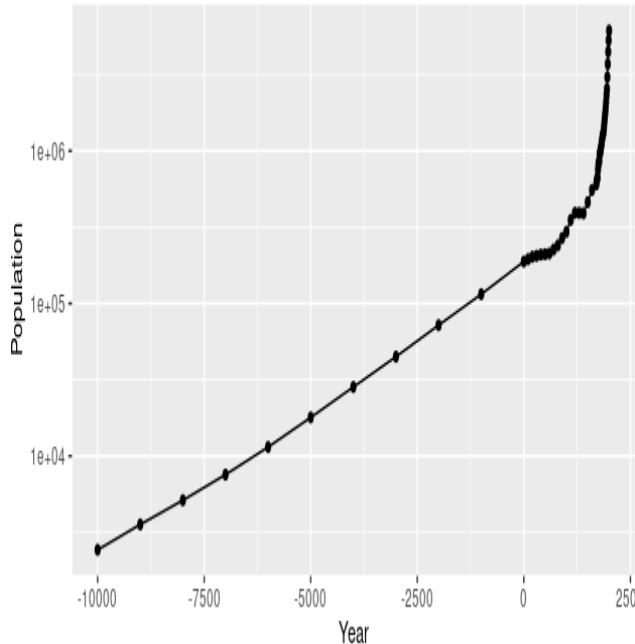
Um guia para iniciantes em R

- `worldpop<-worldpop`
- `ggplot(worldpop,
aes(x=Year, y=Population))
+ geom_line() +
geom_point()`



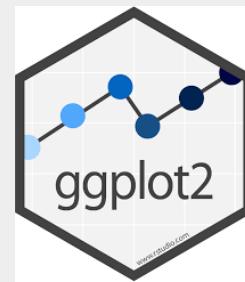
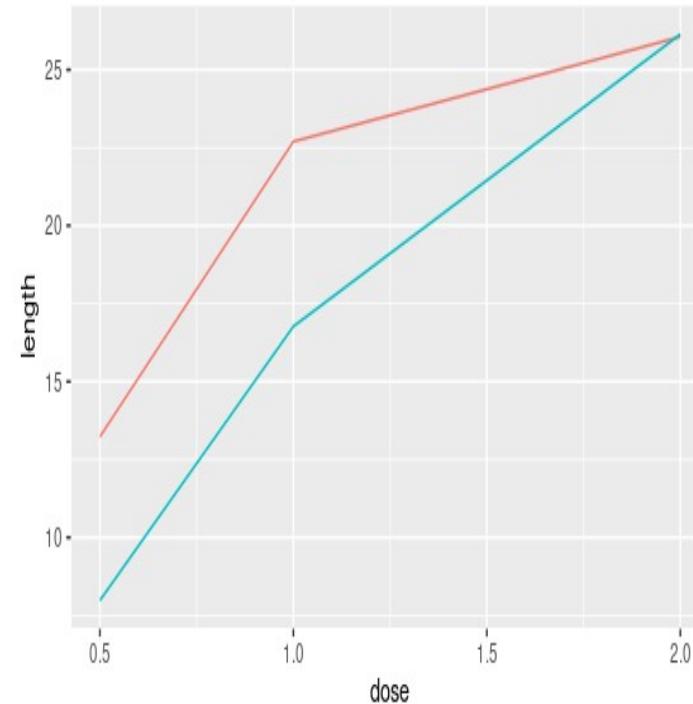
Um guia para iniciantes em R

- `worldpop<-worldpop`
- `ggplot(worldpop,
aes(x=Year, y=Population))
+ geom_line() +
geom_point() +
scale_y_log10()`



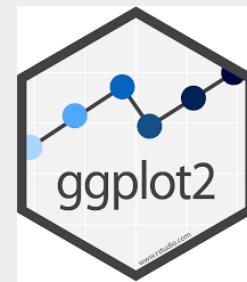
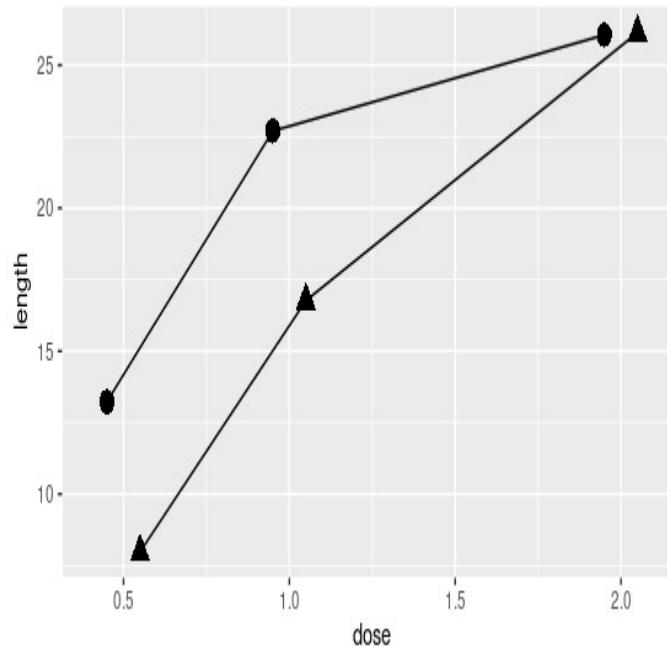
Um guia para iniciantes em R

- Fazendo um gráfico de linha com várias linhas
- ```
ggplot(tg, aes(x=dose, y=length, colour=supp)) +
 geom_line()
```
- ```
ggplot(tg, aes(x=dose, y=length, linetype=supp)) +  
  geom_line()
```



Um guia para iniciantes em R

- ```
ggplot(tg, aes(x=dose,
y=length, shape=supp))
+geom_line(position=positio
n_dodge(0.2))
+geom_point(position=positi
on_dodge(0.2), size=4)
```

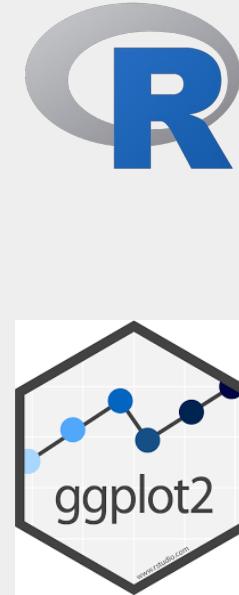
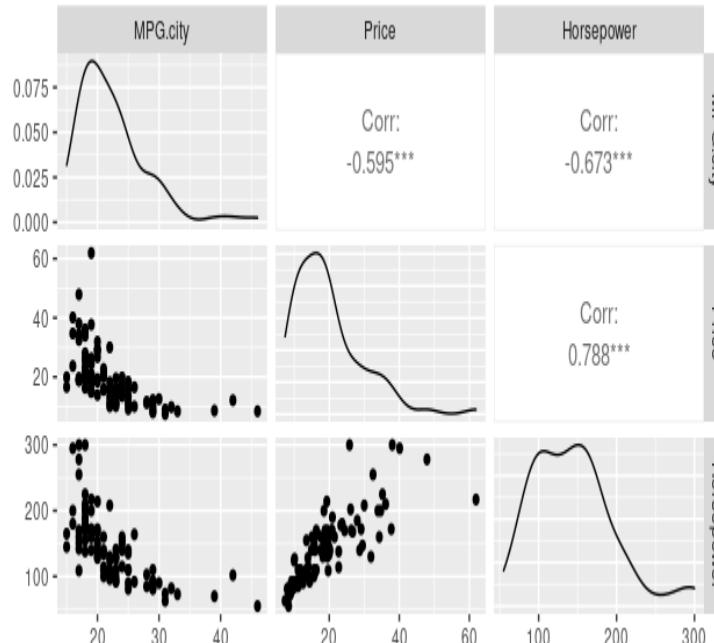


# Um guia para iniciantes em R

```
library(MASS)
library(GGally)
```

```
Cars93 <- Cars93
```

```
cars.subset <- subset(x = Cars93, select
= c(MPG.city, Price, Horsepower))
ggpairs(cars.subset)
```



# Um guia para iniciantes em R

```
ggplot(data = Cars93, aes(x=Cylinders,
y= Horsepower)) + geom_boxplot()
```

