



**FREE eBook**

# LEARNING ggplot2

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**#ggplot2**

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# About

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# Chapter 1: Getting started with ggplot2

## Remarks

This section provides an overview of what ggplot2 is, and why a developer might want to use it.

It should also mention any large subjects within ggplot2, and link out to the related topics. Since the Documentation for ggplot2 is new, you may need to create initial versions of those related topics.

## Examples

### How to install and run ggplot2

To install and load the current stable version of `ggplot2` for your R installation use:

```
# install from CRAN
install.packages("ggplot2")
```

To install the development version from github use

```
# install.packages("devtools")
devtools::install_github("hadley/ggplot2")
```

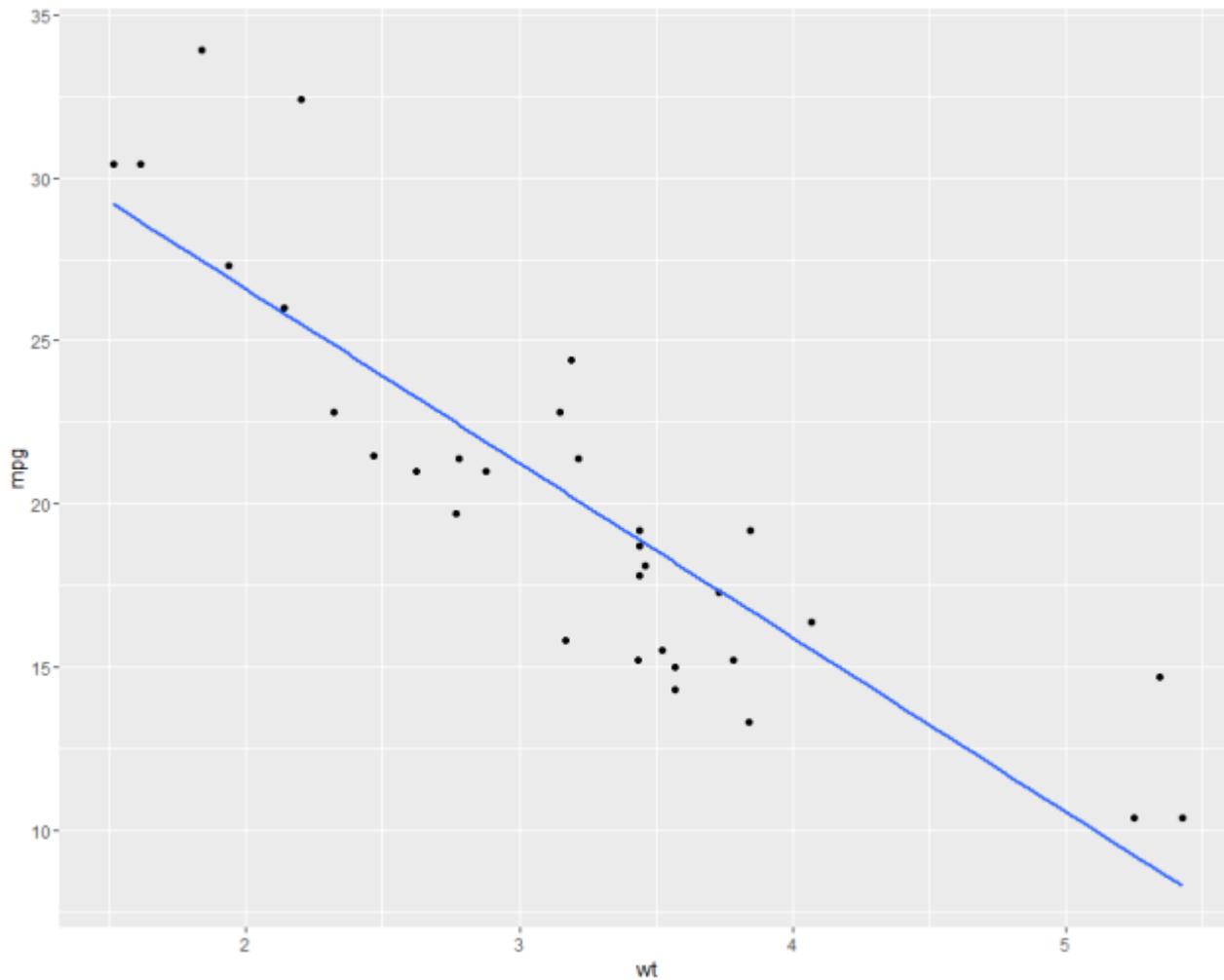
Load into your current R session, and make an example.

### Basic example of ggplot2

We show a plot similar to the showed at [Linear regression on the mtcars dataset](#). First with defaults and the with some customization of the parameters.

```
#help("mtcars")
fit <- lm(mpg ~ wt, data = mtcars)
bs <- round(coef(fit), 3)
lmlab <- paste0("mpg = ", bs[1],
               ifelse(sign(bs[2])==1, " + ", " - "), abs(bs[2]), " wt ")
#range(mtcars$wt)
library("ggplot2")

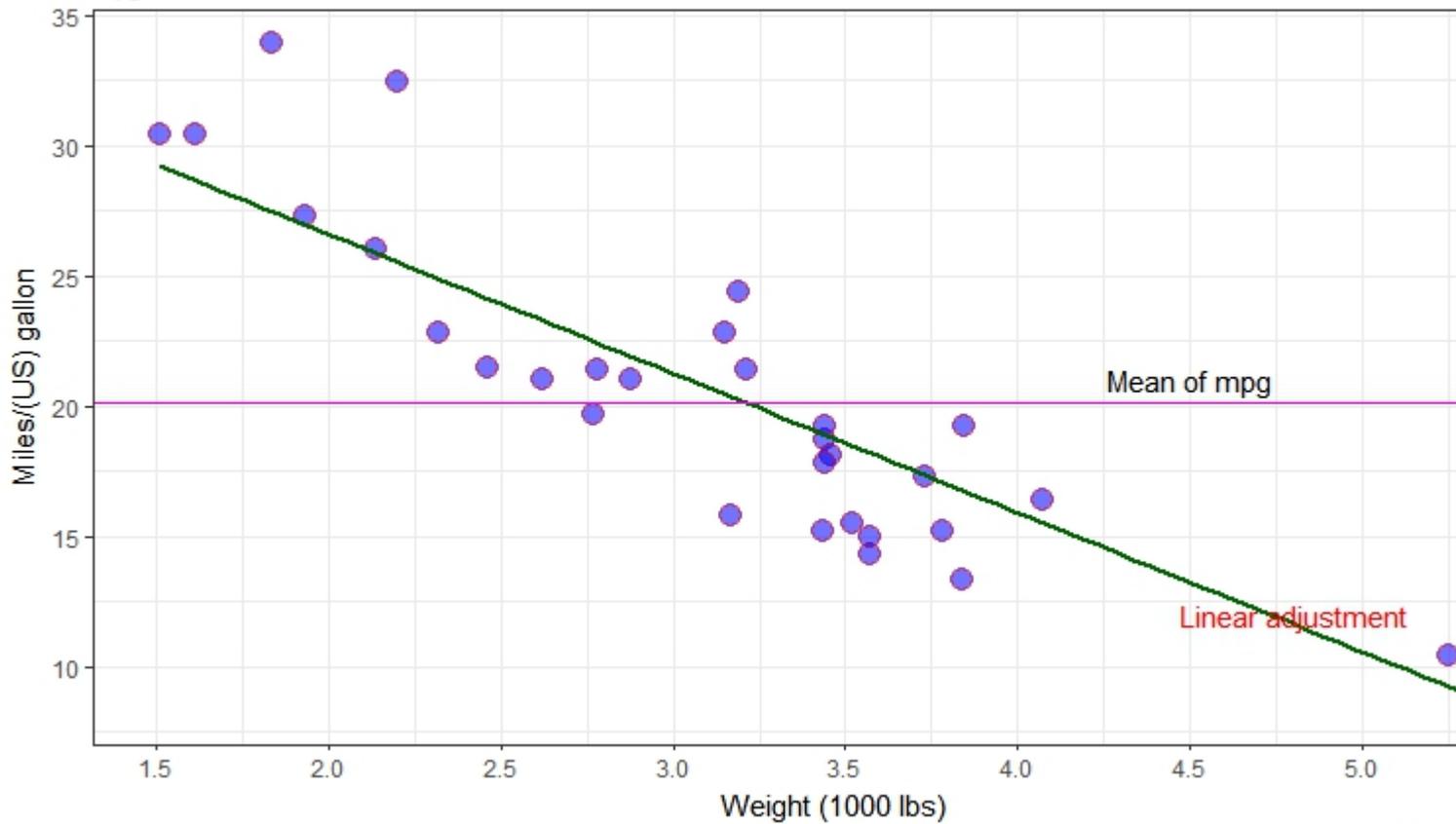
#with defaults
ggplot(aes(x=wt, y=mpg), data = mtcars) +
  geom_point() +
  geom_smooth(method = "lm", se=FALSE, formula = y ~ x)
```



```
#some customizations
ggplot(aes(x=wt, y=mpg, colour="mpg"), data = mtcars) +
  geom_point(shape=21,size=4,fill = "blue",alpha=0.55, color="red") +
  scale_x_continuous(breaks=seq(0,6, by=.5)) +
  geom_smooth(method = "lm", se=FALSE, color="darkgreen", formula = y ~ x) +
  geom_hline(yintercept=mean(mtcars$mpg), size=0.4, color="magenta") +
  xlab("Weight (1000 lbs)") + ylab("Miles/(US) gallon") +
  labs(title='Linear Regression Example',
       subtitle=lmlab,
       caption="Source: mtcars") +
  annotate("text", x = 4.5, y = 21, label = "Mean of mpg") +
  annotate("text", x = 4.8, y = 12, label = "Linear adjustment",color = "red") +
  theme_bw()
```

## Linear Regression Example

$$\text{mpg} = 37.285 - 5.344 \text{ wt}$$



See other examples at [ggplot2](#)

Read Getting started with ggplot2 online: <https://riptutorial.com/ggplot2/topic/3324/getting-started-with-ggplot2>

# Chapter 2: Customizing axes, titles, and legends

## Introduction

In this topic, we'll look to explain how to Customise axes, titles and legends whilst using the `ggplot2` library.

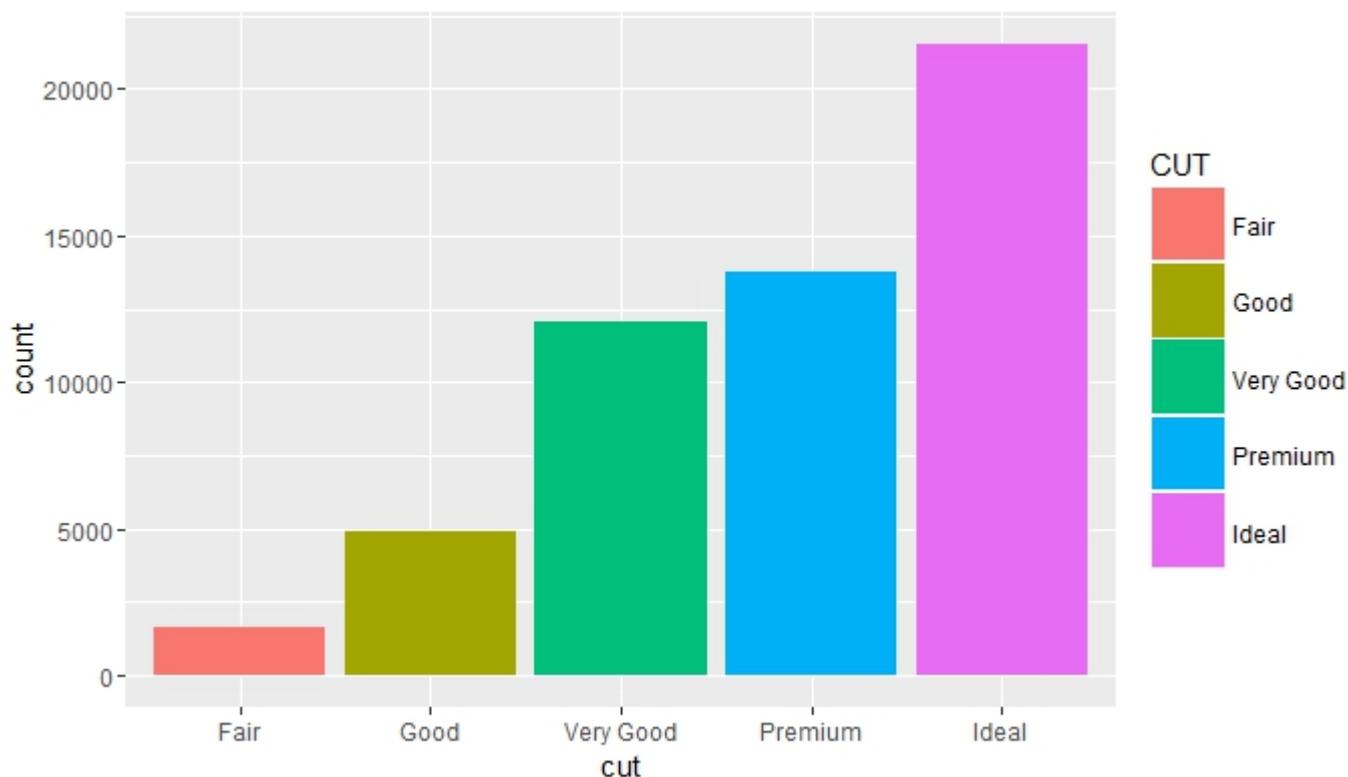
## Examples

### Change legend title and increase keysize

```
# load the library
library(ggplot2)

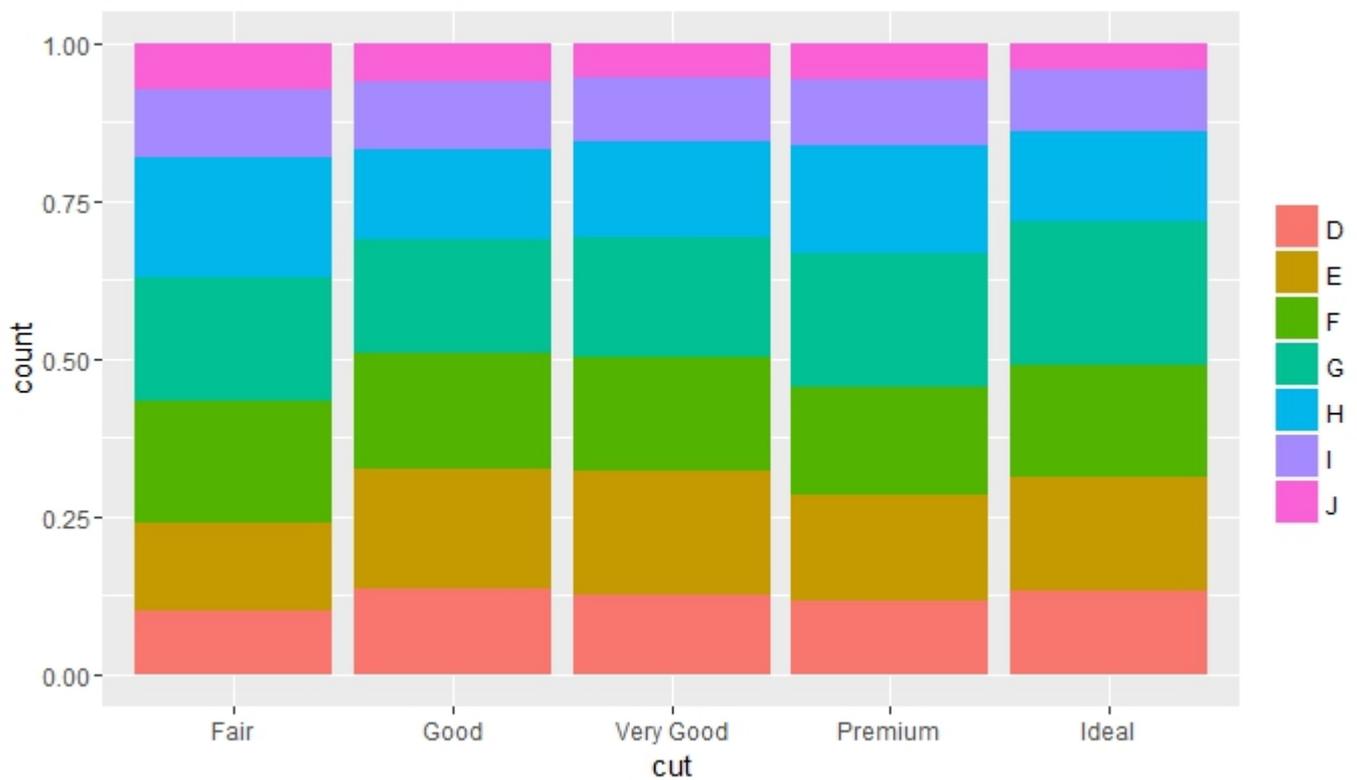
# create a blank canvas
g <- ggplot(data = diamonds)

g + geom_bar(aes(x = cut, fill = cut)) +
  scale_fill_discrete(guide = guide_legend(title = "CUT",
                                           keywidth = 2,
                                           keyheight = 2))
```



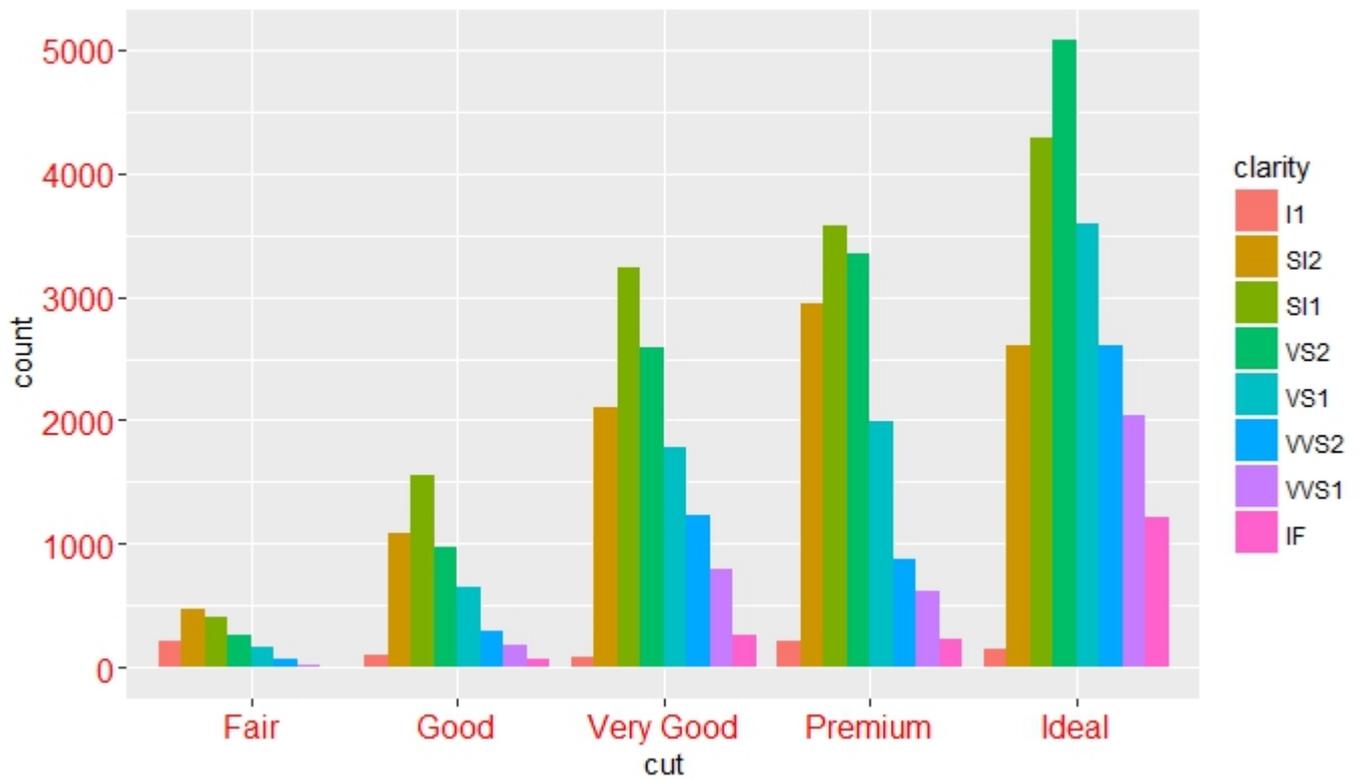
### Compare frequencies across groups and remove legend title

```
g + geom_bar(aes(x = cut, fill = color), position = "fill") +  
  guides(fill = guide_legend(title = NULL))
```



## Place overlapping objects next to each other and change colours of axes texts

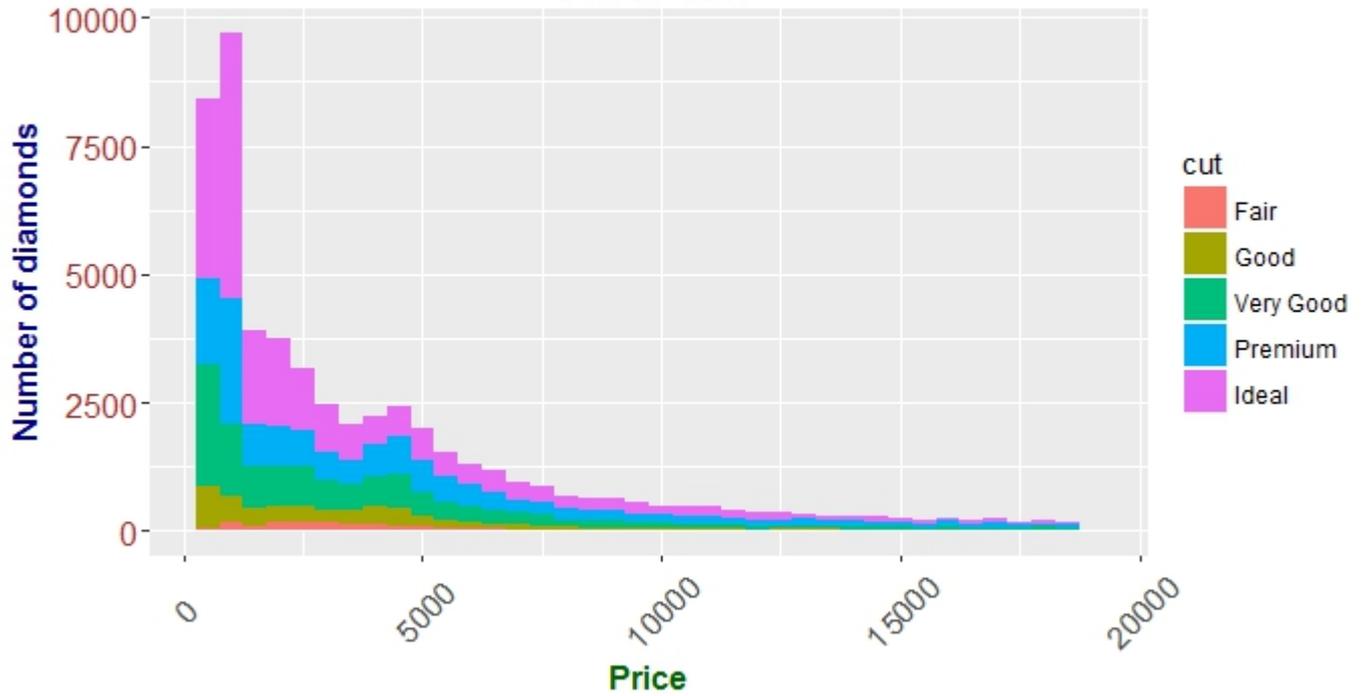
```
g + geom_bar(mapping = aes(x = cut, fill = clarity), position = "dodge") +  
  theme(axis.text = element_text(colour = "red", size = 12))
```



## Fine tuning axes ticks, texts, and titles

```
g + geom_histogram(aes(price, fill = cut), binwidth = 500) +
  labs(x = "Price", y = "Number of diamonds",
       title = "Distribution of prices \n across Cuts") +
  theme(plot.title = element_text(colour = "red", face = "italic"),
        axis.title.x = element_text(face="bold",
                                     colour="darkgreen", size = 12),
        axis.text.x = element_text(angle = 45, vjust = 0.5, size = 12),
        axis.title.y = element_text(face="bold",
                                     colour="darkblue", size = 12),
        axis.text.y = element_text(size = 12, colour = "brown"))
```

*Distribution of prices  
across Cuts*



Read Customizing axes, titles, and legends online:

<https://riptutorial.com/ggplot2/topic/9117/customizing-axes--titles--and-legends>

---

# Chapter 3: Plot a subset of data

## Syntax

- `xlim(left.limit,right.limit)`
- `data.frame[data.frame$variable == "desired.variable",]`

## Examples

### Using xlim / ylim

```
> library(ggplot2)
> ggplot(iris,aes(Sepal.Width)) + geom_density() + xlim(1,3.5)
```

Using `xlim` or `ylim` the plot is not cutted, `ggplot` subsets the data before calling the `stat` function (`stat_density` in this case). You can see it in the warning message.

```
Warning message:
Removed 19 rows containing non-finite values (stat_density).
```

### Inline Subsetting for categorical variables

```
ggplot(iris[iris$Species == "setosa",],aes(Sepal.Width)) +
  geom_density()
```

Here, we are subsetting the dataframe before passing it to `ggplot`. It is a very useful tool derived from the data frame data structure.

To make the code more readable, one can also use `dplyr`'s `filter`:

```
library(dplyr)
iris %>% filter(Species == "setosa") %>% ggplot(aes(Sepal.Width)) +
  geom_density()
```

Read Plot a subset of data online: <https://riptutorial.com/ggplot2/topic/6585/plot-a-subset-of-data>

---

# Chapter 4: Plotting time series

## Examples

### Plotting time series

This example illustrates how to plot a time series of temperature from a csv data file.

```
library(ggplot2)

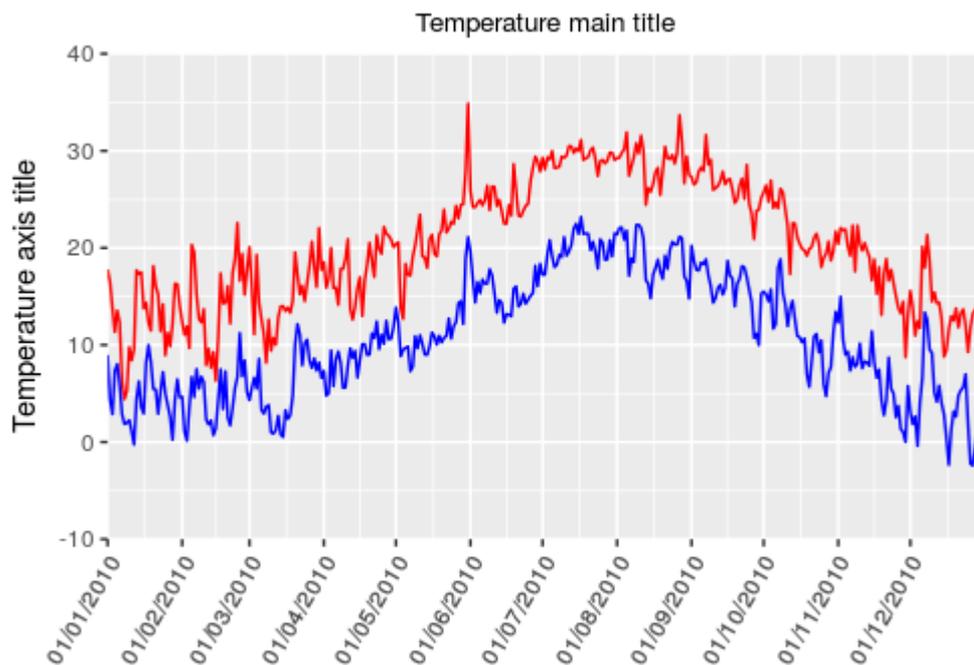
# Original data not provided, see subset/plotted data below
datos.orig<-read.csv("data.csv",header=TRUE) # read csv data

# Change dates to POSIXct
fecha<-as.data.frame(as.POSIXct(datos.orig$Fecha))

# Build a new and shorter data frame for temperature
datos.graf<-cbind.data.frame(fecha,datos.orig$Temp_Max,datos.orig$Temp_Min)
colnames(datos.graf)<-c("fecha","TMax","Tmin")

# Plot
ggplot() +
  geom_line(data=datos.graf,aes(x=fecha, y=TMax),colour="red") +
  geom_line(data=datos.graf,aes(x=fecha, y=Tmin),colour="blue") +
  ylab("Temperature axis title") +
  xlab(" ") +
  scale_x_datetime(
    expand=c(0,0), # avoid blank space around plot
    date_breaks = "1 month", # main axis breaks
    date_labels="%d/%m/%Y") + # axis labels date format
  scale_y_continuous(expand=c(0,0), limits=c(-10,40)) +
  theme(axis.text.x = element_text(angle = 60, hjust = 1)) +
  ggtitle("Temperature main title") +
  theme(plot.title = element_text(size=10, vjust=0.5, hjust=0.5))
```

giving this plot



### Data used for the plot

```
dput (datos.graf)
structure(list (fecha = structure(c(1262300400, 1262386800, 1262473200,
1262559600, 1262646000, 1262732400, 1262818800, 1262905200, 1262991600,
1263078000, 1263164400, 1263250800, 1263337200, 1263423600, 1263510000,
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1278626400, 1278712800, 1278799200, 1278885600, 1278972000, 1279058400,
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```

```

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1290553200, 1290639600, 1290726000, 1290812400, 1290898800, 1290985200,
1291071600, 1291158000, 1291244400, 1291330800, 1291417200, 1291503600,
1291590000, 1291676400, 1291762800, 1291849200, 1291935600, 1292022000,
1292108400, 1292194800, 1292281200, 1292367600, 1292454000, 1292540400,
1292626800, 1292713200, 1292799600, 1292886000, 1292972400, 1293058800,
1293145200, 1293231600, 1293318000, 1293404400, 1293490800, 1293577200,
1293663600, 1293750000), class = c("POSIXct", "POSIXt"), tzzone = ""),
  TMax = c(17.78, 16.47, 13.8, 11.34, 13.55, 12.33, 6.32, 4.43,
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9.27, 6.3, 10.72, 17.38, 14.29, 14.34, 16.08, 12.21, 17.42,
18.87, 22.57, 16.61, 19.4, 15.18, 17.79, 20.08, 16.04, 11.11,
19.28, 14.35, 12.67, 11.13, 8.17, 12.62, 9.42, 10.72, 10.03,
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17.76, 18.53, 15.9, 16.81, 20, 15.86, 15.91, 14.14, 17.83,
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17.23, 17.16, 19.08, 20.26, 21.81, 23.42, 19.13, 18.99, 17.95,
20.9, 21.35, 19.42, 19.13, 21.4, 21.8, 23.95, 21.59, 21.98,
22.69, 22.48, 24.33, 23.04, 24.42, 24.5, 27.92, 34.87, 25.89,
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26.27, 24.34, 24.96, 23.8, 22.51, 22.49, 24.41, 23.34, 28.63,
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28.36, 29.4, 29.29, 29.51, 30.49, 30.45, 29.78, 30.24, 29.96,
31.12, 29.06, 29.24, 29.37, 30.07, 30.33, 29.14, 27.41, 28.92,
29.06, 28.71, 28.99, 29.82, 29.8, 29.05, 29.26, 29.29, 29.82,
30.16, 31.9, 27.43, 28.4, 29.33, 30.78, 29.72, 31.57, 29.96,
24.44, 26.18, 25.78, 26.57, 27.81, 28.25, 25.45, 27.91, 30.42,
29.24, 29.16, 29.57, 28.68, 29.78, 33.67, 31.02, 26.66, 29.42,
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26.02, 24.63, 25.01, 26.4, 27.13, 25.05, 28.55, 24.55, 23.51,
20.91, 23.79, 23.95, 25.16, 25.71, 26.44, 24.76, 26.94, 24.11,
24.7, 24.08, 26.09, 25.71, 23.99, 22.26, 17.3, 22.54, 22.52,
21.1, 20.43, 19.92, 19.74, 19.19, 19.9, 20.08, 21.05, 21.46,

```

```

20.49, 18.02, 18.97, 19.42, 20.66, 18.7, 19.66, 21.7, 20.41,
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17.27, 18.87, 16.63, 17.74, 16.38, 15.04, 13.83, 13.27, 14.47,
8.75, 13.13, 15.58, 13.86, 10.97, 12.44, 11.76, 20.13, 17.97,
21.33, 18.67, 14.47, 15.42, 14.31, 14.35, 12.71, 8.8, 9.45,
11.58, 12.96, 12.53, 13.77, 11.81, 13.25, 13.68, 11.97, 9.27,
11.79, 13.21, 13.63, 14.02, 14.61, 14.65), Tmin = c(8.98,
4.36, 2.88, 7.35, 8.04, 5.95, 2.87, 1.86, 1.98, 2.26, 1.1,
-0.26, 4.41, 6.26, 3.58, 2.94, 8.23, 9.99, 8.26, 5.48, 5.41,
2.92, 5.2, 7.21, 5.01, 3.8, 2.61, 0.24, 4.32, 6.46, 4.61,
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17.97, 16.98, 15.68, 14.41, 10.73, 11.17, 9.99, 15.28, 15.51,
15.21, 14.49, 15.73, 11.68, 12.16, 17.96, 18.84, 15.35, 14.22,
11.94, 13.7, 14.55, 12.69, 10.95, 10.79, 10.28, 10.67, 6.96,
5.69, 8.35, 10.88, 11.14, 9.24, 10.46, 5.95, 4.72, 7.13,
7.72, 11.25, 13.43, 12.29, 14.97, 10.54, 9, 9.33, 7.36, 8.76,
7.74, 8.08, 10.15, 7.6, 8.29, 8.22, 7.85, 11.41, 8.22, 6.62,
7.46, 4.34, 2.77, 4.29, 8.71, 5.5, 5.02, 2.56, 3.74, 1.36,
1.02, 0.02, 5.78, 3.13, 1.84, 2.65, -0.39, 4.1, 6.62, 13.35,
12.57, 9.56, 9.16, 5.1, 4.15, 5.82, 3.99, 2.89, 0.44, -2.35,
1.26, 3.16, 2.62, 4.8, 5.33, 5.66, 6.99, 1.88, -2.21, -2.43,
-0.51, 1.76, 6.76, 6.82)), .Names = c("fecha", "TMax", "Tmin"
), row.names = c(NA, -365L), class = "data.frame")

```

Read Plotting time series online: <https://riptutorial.com/ggplot2/topic/9035/plotting-time-series>

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# Credits

S. No	Chapters	Contributors
1	Getting started with ggplot2	<a href="#">CMichael</a> , <a href="#">Community</a> , <a href="#">James</a> , <a href="#">rcs</a> , <a href="#">Robert</a> , <a href="#">theArun</a>
2	Customizing axes, titles, and legends	<a href="#">Sumedh</a> , <a href="#">theArun</a>
3	Plot a subset of data	<a href="#">David Mas</a> , <a href="#">slhck</a>
4	Plotting time series	<a href="#">pacomet</a>