Data Visualization in R

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Data visualization homework

I'm creating simple charts from diamonds dataset

preview data

```
library(ggplot2)
```

```
## Warning: package 'ggplot2' was built under R version 4.2.2
```

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 4.2.2
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
glimpse(diamonds)
```

```
## Rows: 53,940
## Columns: 10
## $ carat   <dbl> 0.23, 0.21, 0.23, 0.29, 0.31, 0.24, 0.24, 0.26, 0.22, 0.23, 0.~
## $ cut     <ord> Ideal, Premium, Good, Premium, Good, Very Good, Very Good, Ver~
## $ color   <ord> E, E, E, I, J, J, I, H, E, H, J, J, F, J, E, E, I, J, J, J, I,~
## $ clarity <ord> SI2, SI1, VS1, VS2, SI2, VVS2, VVS1, SI1, VS2, VS1, SI1, VS1, ~
## $ depth   <dbl> 61.5, 59.8, 56.9, 62.4, 63.3, 62.8, 62.3, 61.9, 65.1, 59.4, 64~
## $ table   <dbl> 55, 61, 65, 58, 58, 57, 57, 55, 61, 61, 55, 56, 61, 54, 62, 58~
## $ price   <int> 326, 326, 327, 334, 335, 336, 336, 337, 337, 338, 339, 340, 34~
## $ x       <dbl> 3.95, 3.89, 4.05, 4.20, 4.34, 3.94, 3.95, 4.07, 3.87, 4.00, 4.~
## $ y       <dbl> 3.98, 3.84, 4.07, 4.23, 4.35, 3.96, 3.98, 4.11, 3.78, 4.05, 4.~
## $ z       <dbl> 2.43, 2.31, 2.31, 2.63, 2.75, 2.48, 2.47, 2.53, 2.49, 2.39, 2.~
```
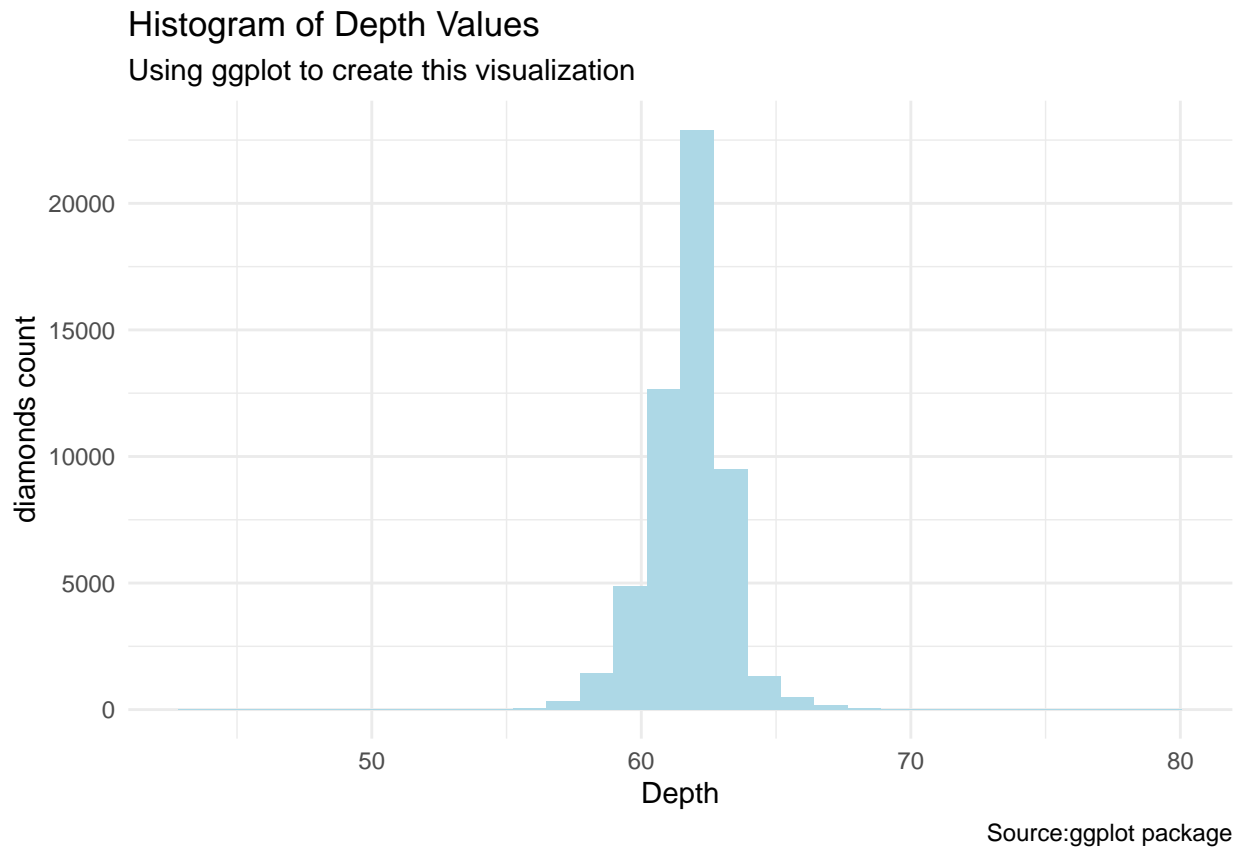
Create New Visualization

```
ggplot(diamonds,aes(depth))+
  geom_histogram(fill="light blue")+
  theme_minimal()+
  labs(
    title="Histogram of Depth Values",
    x="Depth",
    y="diamonds count",
    subtitle = "Using ggplot to create this visualization",
    caption = "Source:ggplot package"
  )
```

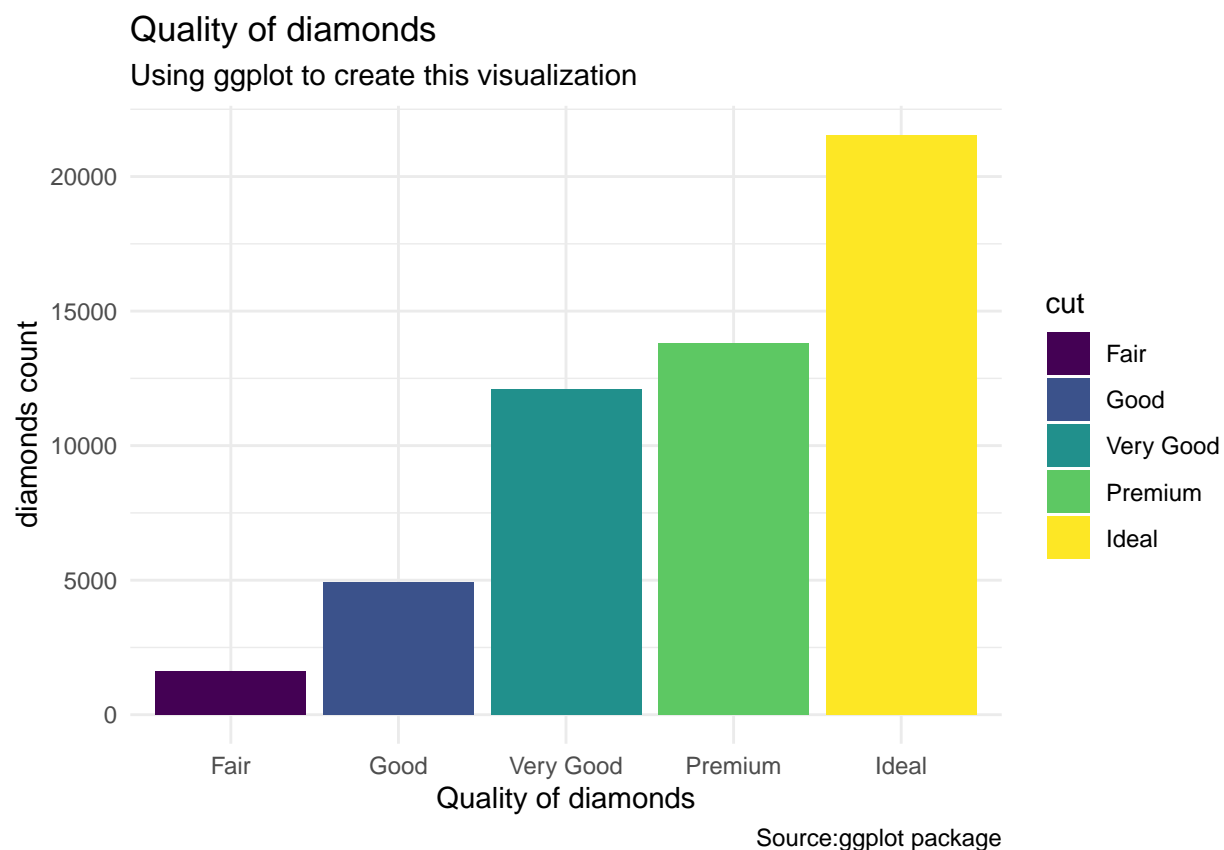## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

this is a Chart shows Quality of diamonds

```
library(ggplot2)
library(dplyr)
set.seed(14)
ggplot(diamonds,aes(x=cut,fill=cut))+
  geom_bar()+
  theme_minimal()+
  labs(
```

```
    title="Quality of diamonds",
    x="Quality of diamonds",
    y="diamonds count",
    subtitle = "Using ggplot to create this visualization",
    caption = "Source:ggplot package"
)
```
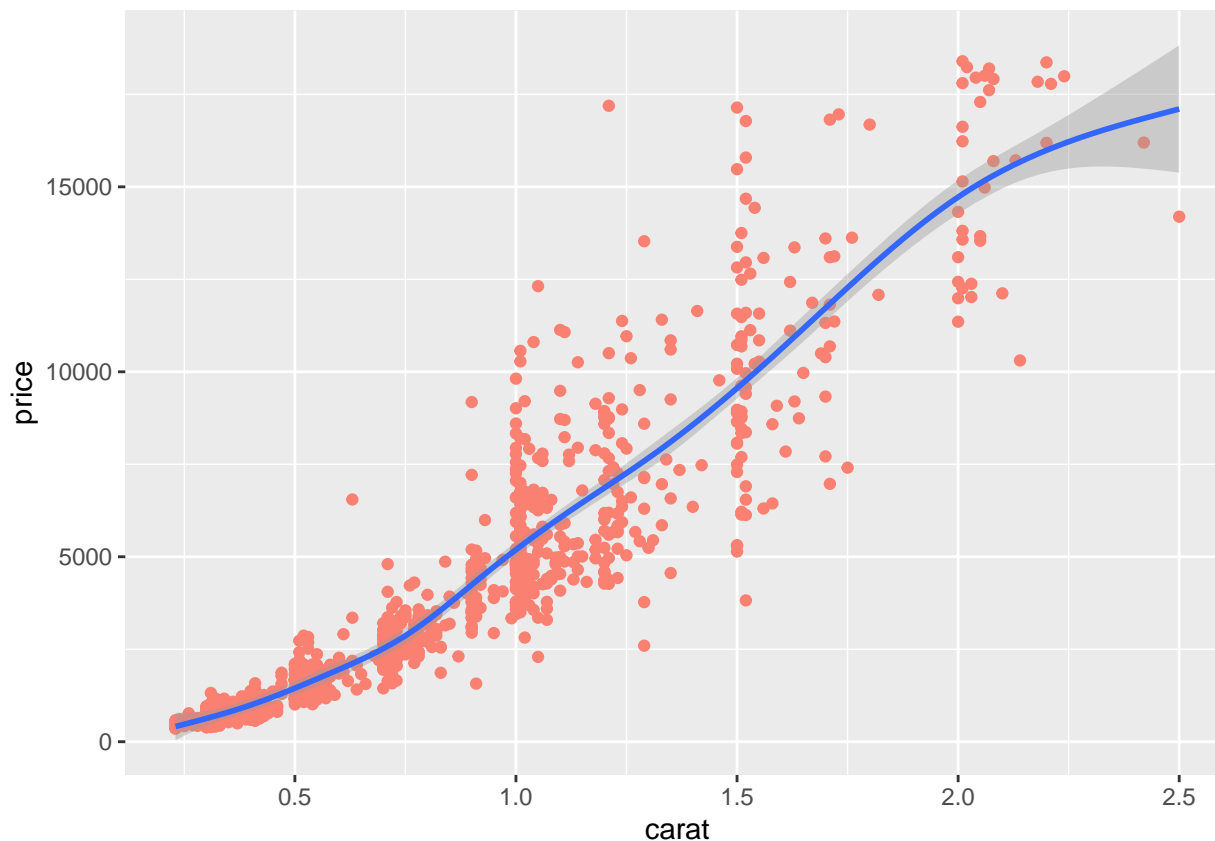

Relationship between Carat and Price

```
set.seed(14)
ggplot(sample_n(diamonds,1000),aes(x=carat,y=price))+
  geom_point(color="salmon")+
  geom_smooth()
```

```
## 'geom_smooth()' using method = 'gam' and formula = 'y ~ s(x, bs = "cs")'
```

```
  theme_minimal()+
    labs(
    x="Carat",
    y="Price(USD)",
  )
```

```
## List of 96
##  $ line                    :List of 6
##   ..$ colour      : chr "black"
##   ..$ linewidth   : num 0.5
##   ..$ linetype    : num 1
##   ..$ lineend     : chr "butt"
##   ..$ arrow       : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ rect                    :List of 5
##   ..$ fill        : chr "white"
##   ..$ colour      : chr "black"
##   ..$ linewidth   : num 0.5
##   ..$ linetype    : num 1
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ text                    :List of 11
##   ..$ family      : chr ""
##   ..$ face        : chr "plain"
##   ..$ colour      : chr "black"
```

```
##   ..$ size         : num 11
##   ..$ hjust        : num 0.5
##   ..$ vjust        : num 0.5
##   ..$ angle        : num 0
##   ..$ lineheight   : num 0.9
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ title                   : NULL
##  $ aspect.ratio            : NULL
##  $ axis.title              : NULL
##  $ axis.title.x            :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 2.75points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x.top        :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 2.75points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x.bottom     : NULL
##  $ axis.title.y            :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 2.75points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
```

```
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ axis.title.y.left        : NULL
## $ axis.title.y.right       :List of 11
##   ..$ family     : NULL
##   ..$ face       : NULL
##   ..$ colour     : NULL
##   ..$ size       : NULL
##   ..$ hjust      : NULL
##   ..$ vjust      : num 0
##   ..$ angle      : num -90
##   ..$ lineheight : NULL
##   ..$ margin     : 'margin' num [1:4] 0points 0points 0points 2.75points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug      : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ axis.text                :List of 11
##   ..$ family     : NULL
##   ..$ face       : NULL
##   ..$ colour     : chr "grey30"
##   ..$ size       : 'rel' num 0.8
##   ..$ hjust      : NULL
##   ..$ vjust      : NULL
##   ..$ angle      : NULL
##   ..$ lineheight : NULL
##   ..$ margin     : NULL
##   ..$ debug      : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ axis.text.x              :List of 11
##   ..$ family     : NULL
##   ..$ face       : NULL
##   ..$ colour     : NULL
##   ..$ size       : NULL
##   ..$ hjust      : NULL
##   ..$ vjust      : num 1
##   ..$ angle      : NULL
##   ..$ lineheight : NULL
##   ..$ margin     : 'margin' num [1:4] 2.2points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug      : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ axis.text.x.top          :List of 11
##   ..$ family     : NULL
##   ..$ face       : NULL
##   ..$ colour     : NULL
##   ..$ size       : NULL
##   ..$ hjust      : NULL
##   ..$ vjust      : num 0
##   ..$ angle      : NULL
##   ..$ lineheight : NULL
##   ..$ margin     : 'margin' num [1:4] 0points 0points 2.2points 0points
```

```
##    .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ axis.text.x.bottom       : NULL
## $ axis.text.y              :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 1
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 2.2points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ axis.text.y.left         : NULL
## $ axis.text.y.right        :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 0points 0points 0points 2.2points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ axis.ticks               : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
## $ axis.ticks.x             : NULL
## $ axis.ticks.x.top         : NULL
## $ axis.ticks.x.bottom      : NULL
## $ axis.ticks.y             : NULL
## $ axis.ticks.y.left        : NULL
## $ axis.ticks.y.right       : NULL
## $ axis.ticks.length        : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
## $ axis.ticks.length.x        : NULL
## $ axis.ticks.length.x.top    : NULL
## $ axis.ticks.length.x.bottom: NULL
## $ axis.ticks.length.y        : NULL
## $ axis.ticks.length.y.left   : NULL
## $ axis.ticks.length.y.right  : NULL
## $ axis.line                : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
## $ axis.line.x              : NULL
## $ axis.line.x.top          : NULL
```

```
##  $ axis.line.x.bottom        : NULL
##  $ axis.line.y               : NULL
##  $ axis.line.y.left          : NULL
##  $ axis.line.y.right         : NULL
##  $ legend.background         : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ legend.margin             : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing            : 'simpleUnit' num 11points
##   ..- attr(*, "unit")= int 8
##  $ legend.spacing.x          : NULL
##  $ legend.spacing.y          : NULL
##  $ legend.key                : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ legend.key.size           : 'simpleUnit' num 1.2lines
##   ..- attr(*, "unit")= int 3
##  $ legend.key.height         : NULL
##  $ legend.key.width          : NULL
##  $ legend.text               :List of 11
##   ..$ family     : NULL
##   ..$ face       : NULL
##   ..$ colour     : NULL
##   ..$ size       : 'rel' num 0.8
##   ..$ hjust      : NULL
##   ..$ vjust      : NULL
##   ..$ angle      : NULL
##   ..$ lineheight : NULL
##   ..$ margin     : NULL
##   ..$ debug      : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.text.align         : NULL
##  $ legend.title              :List of 11
##   ..$ family     : NULL
##   ..$ face       : NULL
##   ..$ colour     : NULL
##   ..$ size       : NULL
##   ..$ hjust      : num 0
##   ..$ vjust      : NULL
##   ..$ angle      : NULL
##   ..$ lineheight : NULL
##   ..$ margin     : NULL
##   ..$ debug      : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.title.align        : NULL
##  $ legend.position           : chr "right"
##  $ legend.direction          : NULL
##  $ legend.justification      : chr "center"
##  $ legend.box                : NULL
##  $ legend.box.just           : NULL
##  $ legend.box.margin         : 'margin' num [1:4] 0cm 0cm 0cm 0cm
##   ..- attr(*, "unit")= int 1
##  $ legend.box.background      : list()
```

```
##    ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ legend.box.spacing        : 'simpleUnit' num 11points
##    ..- attr(*, "unit")= int 8
##  $ panel.background          : list()
##    ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ panel.border              : list()
##    ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ panel.spacing             : 'simpleUnit' num 5.5points
##    ..- attr(*, "unit")= int 8
##  $ panel.spacing.x           : NULL
##  $ panel.spacing.y           : NULL
##  $ panel.grid                :List of 6
##   ..$ colour      : chr "grey92"
##   ..$ linewidth   : NULL
##   ..$ linetype    : NULL
##   ..$ lineend     : NULL
##   ..$ arrow       : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major          : NULL
##  $ panel.grid.minor          :List of 6
##   ..$ colour      : NULL
##   ..$ linewidth   : 'rel' num 0.5
##   ..$ linetype    : NULL
##   ..$ lineend     : NULL
##   ..$ arrow       : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.major.x        : NULL
##  $ panel.grid.major.y        : NULL
##  $ panel.grid.minor.x        : NULL
##  $ panel.grid.minor.y        : NULL
##  $ panel.ontop               : logi FALSE
##  $ plot.background           : list()
##    ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ plot.title                :List of 11
##   ..$ family      : NULL
##   ..$ face        : NULL
##   ..$ colour      : NULL
##   ..$ size        : 'rel' num 1.2
##   ..$ hjust       : num 0
##   ..$ vjust       : num 1
##   ..$ angle       : NULL
##   ..$ lineheight  : NULL
##   ..$ margin      : 'margin' num [1:4] 0points 0points 5.5points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug       : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.title.position       : chr "panel"
##  $ plot.subtitle             :List of 11
##   ..$ family      : NULL
##   ..$ face        : NULL
##   ..$ colour      : NULL
```

```
##   ..$ size        : NULL
##   ..$ hjust       : num 0
##   ..$ vjust       : num 1
##   ..$ angle       : NULL
##   ..$ lineheight   : NULL
##   ..$ margin      : 'margin' num [1:4] 0points 0points 5.5points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug       : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ plot.caption           :List of 11
##   ..$ family      : NULL
##   ..$ face        : NULL
##   ..$ colour      : NULL
##   ..$ size        : 'rel' num 0.8
##   ..$ hjust       : num 1
##   ..$ vjust       : num 1
##   ..$ angle       : NULL
##   ..$ lineheight   : NULL
##   ..$ margin      : 'margin' num [1:4] 5.5points 0points 0points 0points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug       : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ plot.caption.position   : chr "panel"
## $ plot.tag               :List of 11
##   ..$ family      : NULL
##   ..$ face        : NULL
##   ..$ colour      : NULL
##   ..$ size        : 'rel' num 1.2
##   ..$ hjust       : num 0.5
##   ..$ vjust       : num 0.5
##   ..$ angle       : NULL
##   ..$ lineheight   : NULL
##   ..$ margin      : NULL
##   ..$ debug       : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ plot.tag.position       : chr "topleft"
## $ plot.margin            : 'margin' num [1:4] 5.5points 5.5points 5.5points 5.5points
##   ..- attr(*, "unit")= int 8
## $ strip.background        : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
## $ strip.background.x      : NULL
## $ strip.background.y      : NULL
## $ strip.clip             : chr "inherit"
## $ strip.placement         : chr "inside"
## $ strip.text             :List of 11
##   ..$ family      : NULL
##   ..$ face        : NULL
##   ..$ colour      : chr "grey10"
##   ..$ size        : 'rel' num 0.8
##   ..$ hjust       : NULL
##   ..$ vjust       : NULL
```
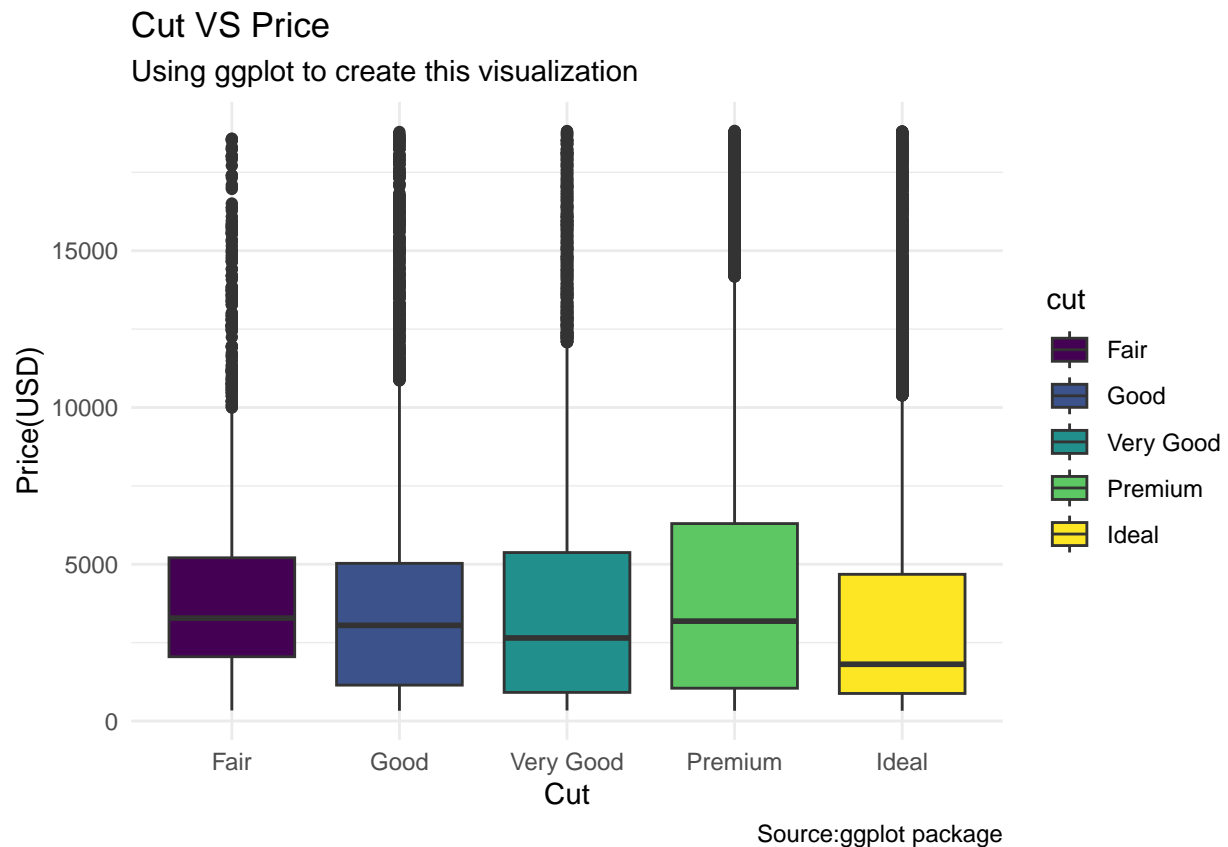
```
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : 'margin' num [1:4] 4.4points 4.4points 4.4points 4.4points
##   .. ..- attr(*, "unit")= int 8
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ strip.text.x          : NULL
## $ strip.text.y          :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ strip.switch.pad.grid : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
## $ strip.switch.pad.wrap : 'simpleUnit' num 2.75points
##   ..- attr(*, "unit")= int 8
## $ strip.text.y.left     :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
## $ x                     : chr "Carat"
## $ y                     : chr "Price(USD)"
## - attr(*, "class")= chr [1:2] "theme" "gg"
## - attr(*, "complete")= logi TRUE
## - attr(*, "validate")= logi TRUE
```

```r
ggplot(diamonds,aes(cut,price,fill=cut))+
  geom_boxplot()+
  theme_minimal()+
  labs(
    title="Cut VS Price",
    x="Cut",
    y="Price(USD)",
    subtitle = "Using ggplot to create this visualization",
    caption = "Source:ggplot package"
  )
```

Cut VS Price
Using ggplot to create this visualization
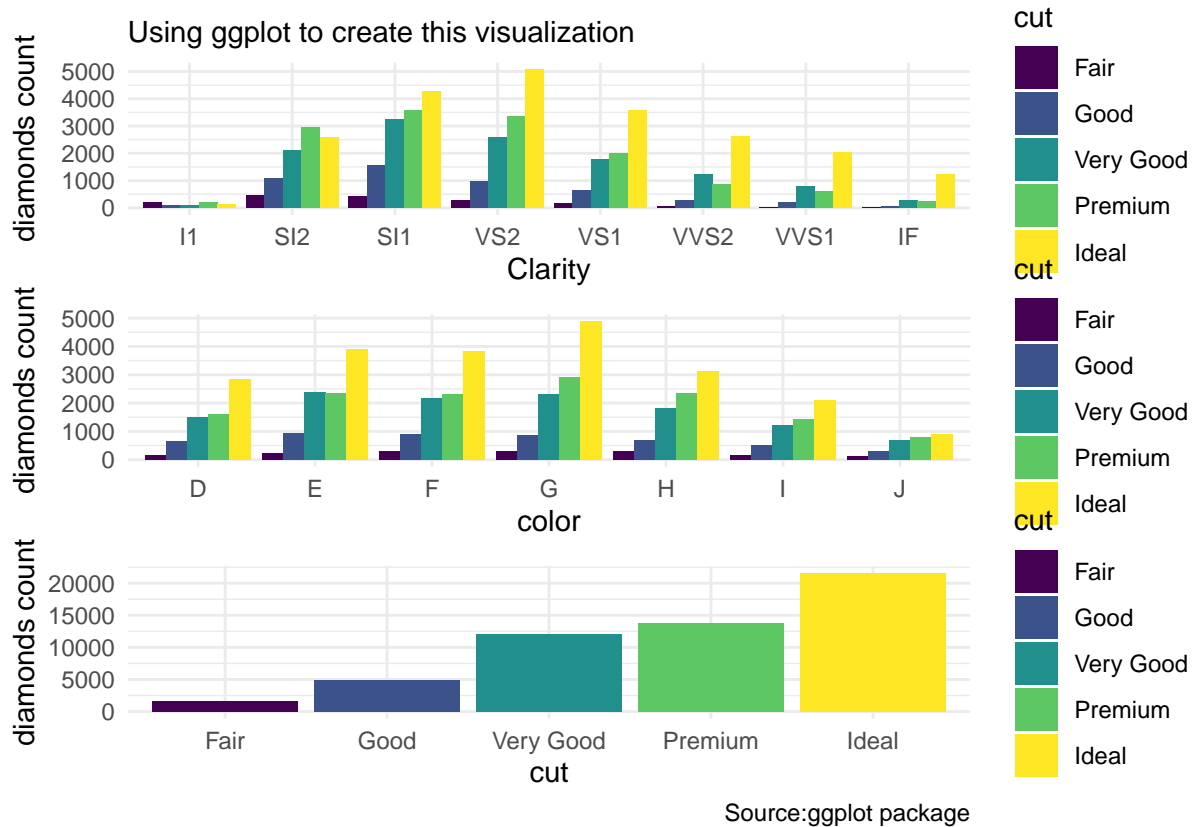

Source:ggplot package

```
library(patchwork)
```

```
## Warning: package 'patchwork' was built under R version 4.2.2
```

```
ch1<-ggplot(diamonds,aes(clarity,fill=cut))+
  geom_bar(position="dodge")+
  theme_minimal()+
  labs(
    x="Clarity",
    y="diamonds count",
    subtitle = "Using ggplot to create this visualization"
  )
ch2<-ggplot(diamonds,aes(color,fill=cut))+
  geom_bar(position="dodge")+
  theme_minimal()+
  labs(
    x="color",
    y="diamonds count"
  )
ch3<-ggplot(diamonds,aes(cut,fill=cut))+
  geom_bar()+
  theme_minimal()+
  labs(
    x="cut",
    y="diamonds count",
```

```
      caption = "Source:ggplot package"
  )
ch1/ch2/ch3
```
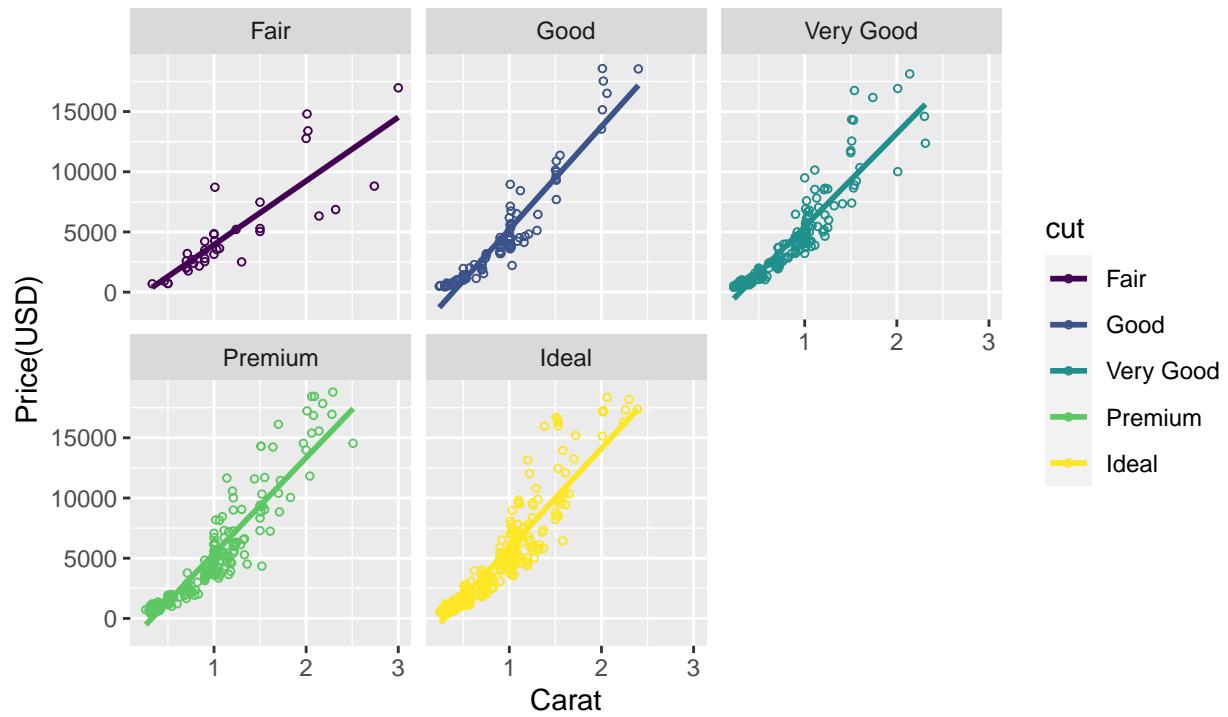


```
library(ggplot2)
library(dplyr)
set.seed(39)
ggplot(sample_n(diamonds, 1000),
       aes(carat, price, color=cut)) +
  geom_point(alpha=1,
             shape=21,
             size=1) +
  geom_smooth(method="lm",se=F) +
  labs(
    title="Relationship between carat and price of diamonds",
    x="Carat",
    y="Price(USD)",
    subtitle = "Using ggplot to create this visualization",
    caption = "Source:ggplot package"
  )+
  facet_wrap(~ cut)
```

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

13

Relationship between carat and price of diamonds

Using ggplot to create this visualization

Source:ggplot package

```
" "
```