plot01

01. 변수의 특징을 찾기 위해서 사용하는 그래프

```
(1) 하나의 변수에 대한 것.
히스토그램(hist) : 연속형 변수 표시
Barplot : 명목형 변수 그래프 표시
Boxplot : 데이터의 분포를 본다.

(2) 산포도, 산점도(두변수에 관한 것)
```

02. plot(base), ggplot2 패키지, rCharts 패키지

```
base plot : 빠르게 데이터 탐색용
ggplot2 : 보다 정교한 그래프 특징 나타내기
rCharts(d3, javascript) : Report를 위한 그래프
```

03. 고수준 함수, 저수준 함수

```
plot, boxplot, hist
title, lines, points(그래프 타이틀, X축 이름, Y축 이름, 그래프 색 바꾸기)
```

1-1 데이터 불러오기

```
setwd("D:/dataset/R2_ex")
DF <- read.csv("example_studentlist.csv")
attach(DF)
str(DF)
```

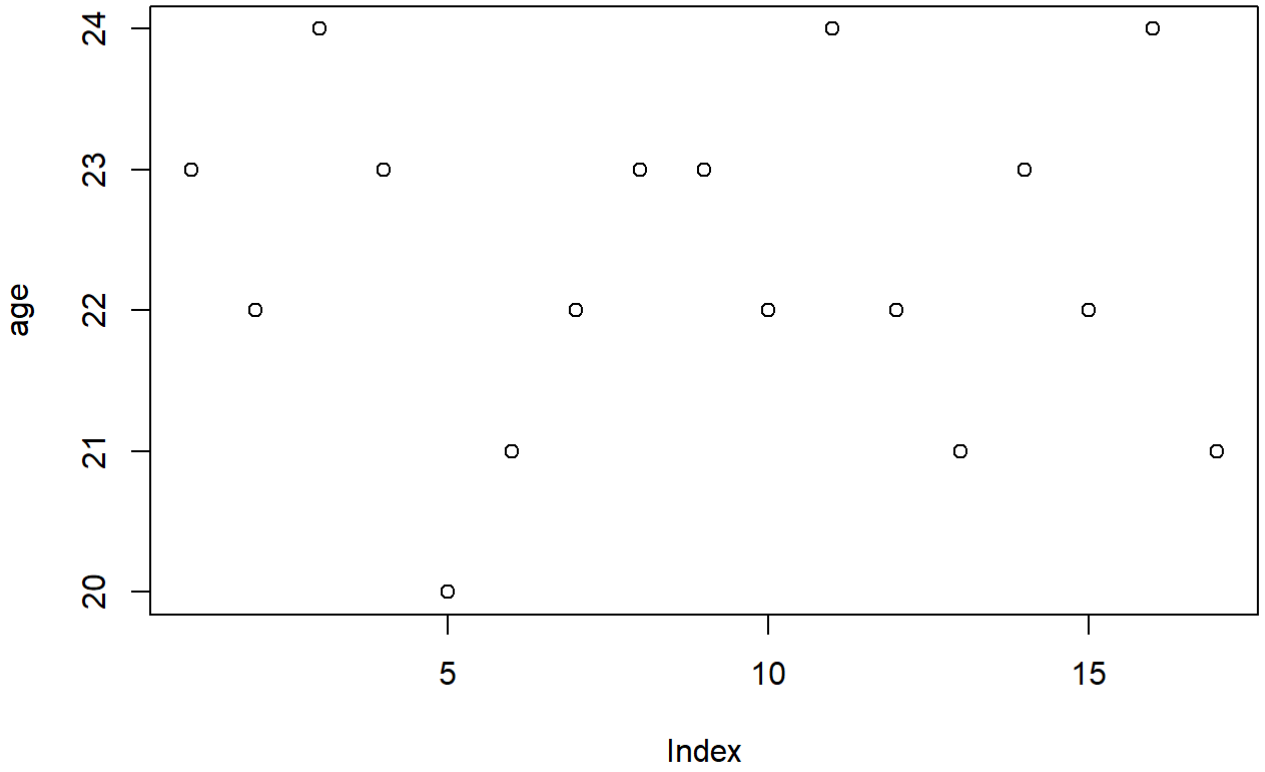
```
## 'data.frame':    17 obs. of  8 variables:
##  $ name     : Factor w/ 17 levels "강수친","김길동",..: 2 12 17 6 10 7 1 14 13 9 ...
##  $ sex      : Factor w/ 2 levels "남자","여자": 1 2 1 1 2 2 2 2 1 1 ...
##  $ age      : int  23 22 24 23 20 21 22 23 23 22 ...
##  $ grade    : int  3 2 4 3 1 2 1 1 3 2 ...
##  $ absence  : Factor w/ 2 levels "무","유": 2 1 1 1 2 1 1 1 1 1 ...
##  $ bloodtype: Factor w/ 4 levels "A","AB","B","O": 4 2 3 2 1 4 4 1 3 3 ...
##  $ height   : num  165 170 175 182 168 ...
##  $ weight   : num  68.2 53 80.1 85.7 49.5 52 45.3 55 64.2 61.3 ...
```

```
DF
```

```
##      name  sex age grade absence bloodtype height weight
## 1  김길동 남자  23     3      유         O  165.3   68.2
## 2  이미린 여자  22     2      무        AB  170.1   53.0
## 3  홍길동 남자  24     4      무         B  175.0   80.1
## 4  김철수 남자  23     3      무        AB  182.1   85.7
## 5  손세수 여자  20     1      유         A  168.0   49.5
## 6  박미희 여자  21     2      무         O  162.0   52.0
## 7  강수친 여자  22     1      무         O  155.2   45.3
## 8  이희수 여자  23     1      무         A  176.9   55.0
## 9  이철린 남자  23     3      무         B  178.5   64.2
## 10 방희철 남자  22     2      무         B  176.1   61.3
## 11 박수호 남자  24     4      유         O  167.1   62.0
## 12 임동민 남자  22     2      무        AB  180.0   75.8
## 13 김민수 남자  21     1      무         A  162.2   55.3
## 14 이희진 여자  23     3      무         O  176.1   53.1
## 15 김미진 여자  22     2      무         B  158.2   45.2
## 16 김동수 남자  24     4      유         B  168.6   70.2
## 17 여수근 남자  21     1      무         A  169.2   62.2
```

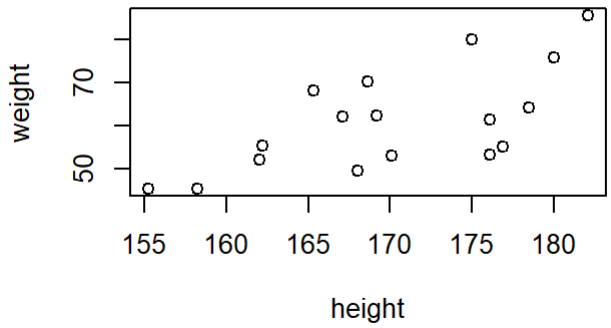
1-2 plot() : 값을 하나 갖는 경우,

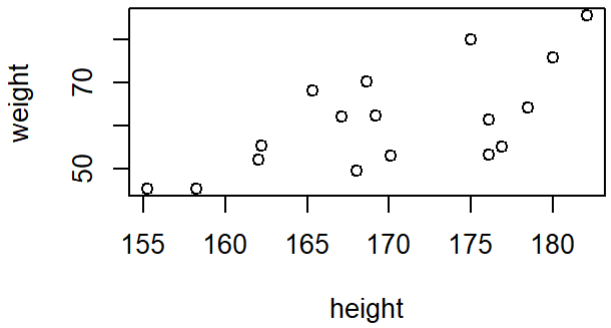
```
plot(age)
```

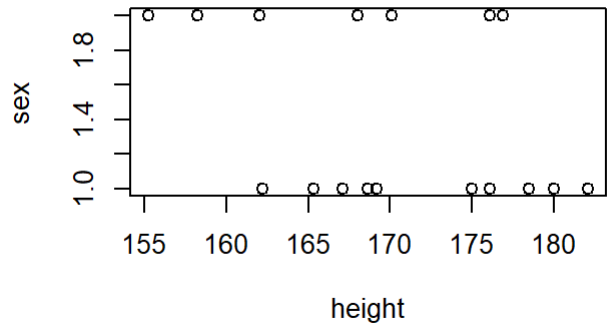


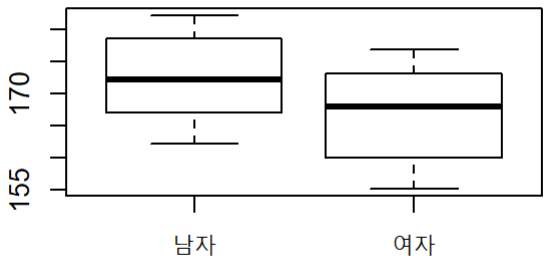
1-2 plot() : 값을 두개 갖는 경우,

```
par(mfrow=c(2,2))
plot(height, weight)
plot(weight~height)
plot(height, sex)
plot(sex,height)  # 성별에 따른 키의 boxplot
```









1-3 plot() : 변수간의 관계를 표시하기 위한 필수. scatter plot

```
names(DF)
```

```
## [1] "name"      "sex"       "age"       "grade"     "absence"   "bloodtype"
## [7] "height"    "weight"
```

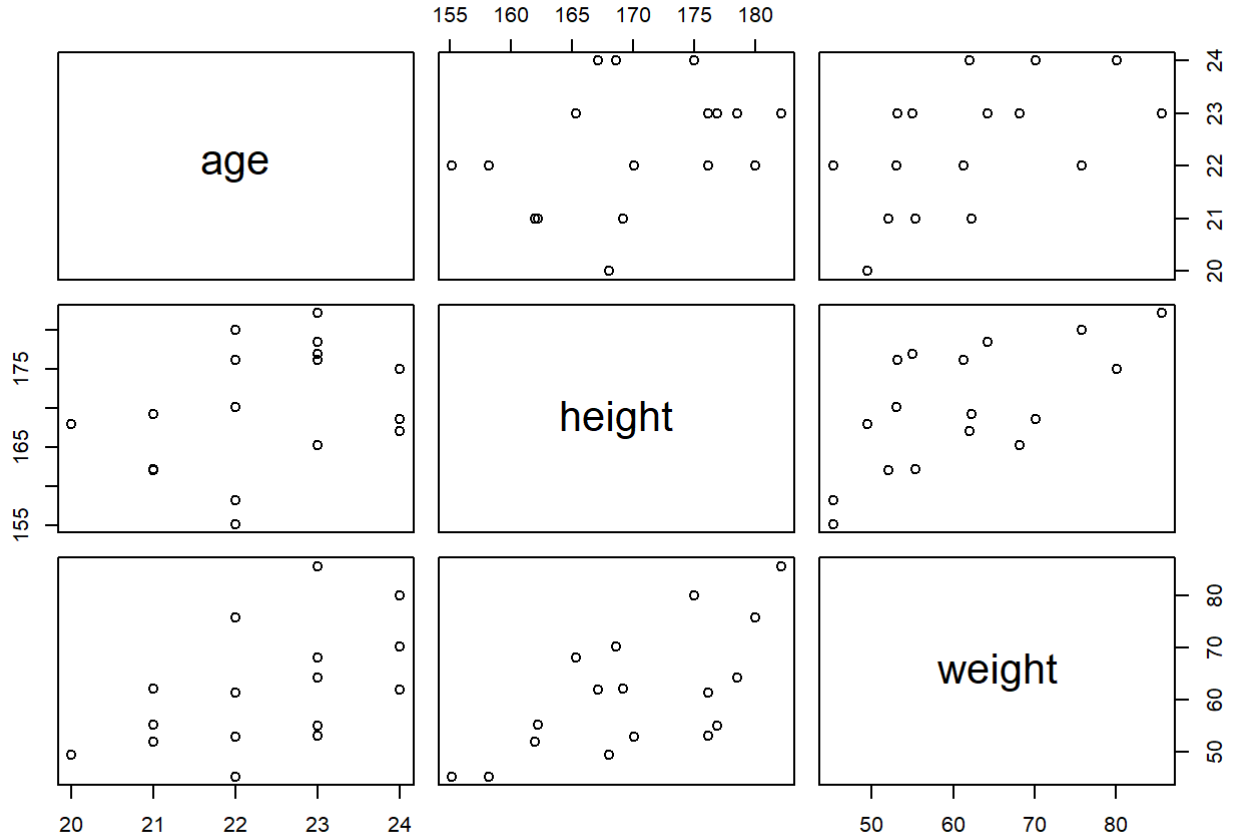
```
str(DF)
```

```
## 'data.frame':    17 obs. of  8 variables:
##  $ name     : Factor w/ 17 levels "강수친","김길동",..: 2 12 17 6 10 7 1 14 13 9 ...
##  $ sex      : Factor w/ 2 levels "남자","여자": 1 2 1 1 2 2 2 2 1 1 ...
##  $ age      : int  23 22 24 23 20 21 22 23 23 22 ...
##  $ grade    : int  3 2 4 3 1 2 1 1 3 2 ...
##  $ absence  : Factor w/ 2 levels "무","유": 2 1 1 1 2 1 1 1 1 1 ...
##  $ bloodtype: Factor w/ 4 levels "A","AB","B","O": 4 2 3 2 1 4 4 1 3 3 ...
##  $ height   : num  165 170 175 182 168 ...
##  $ weight   : num  68.2 53 80.1 85.7 49.5 52 45.3 55 64.2 61.3 ...
```

```
DF2 <- data.frame(age, height, weight)
DF2
```

```
##    age height weight
## 1   23  165.3   68.2
## 2   22  170.1   53.0
## 3   24  175.0   80.1
## 4   23  182.1   85.7
## 5   20  168.0   49.5
## 6   21  162.0   52.0
## 7   22  155.2   45.3
## 8   23  176.9   55.0
## 9   23  178.5   64.2
## 10  22  176.1   61.3
## 11  24  167.1   62.0
## 12  22  180.0   75.8
## 13  21  162.2   55.3
## 14  23  176.1   53.1
## 15  22  158.2   45.2
## 16  24  168.6   70.2
## 17  21  169.2   62.2
```

```
plot(DF2)
```



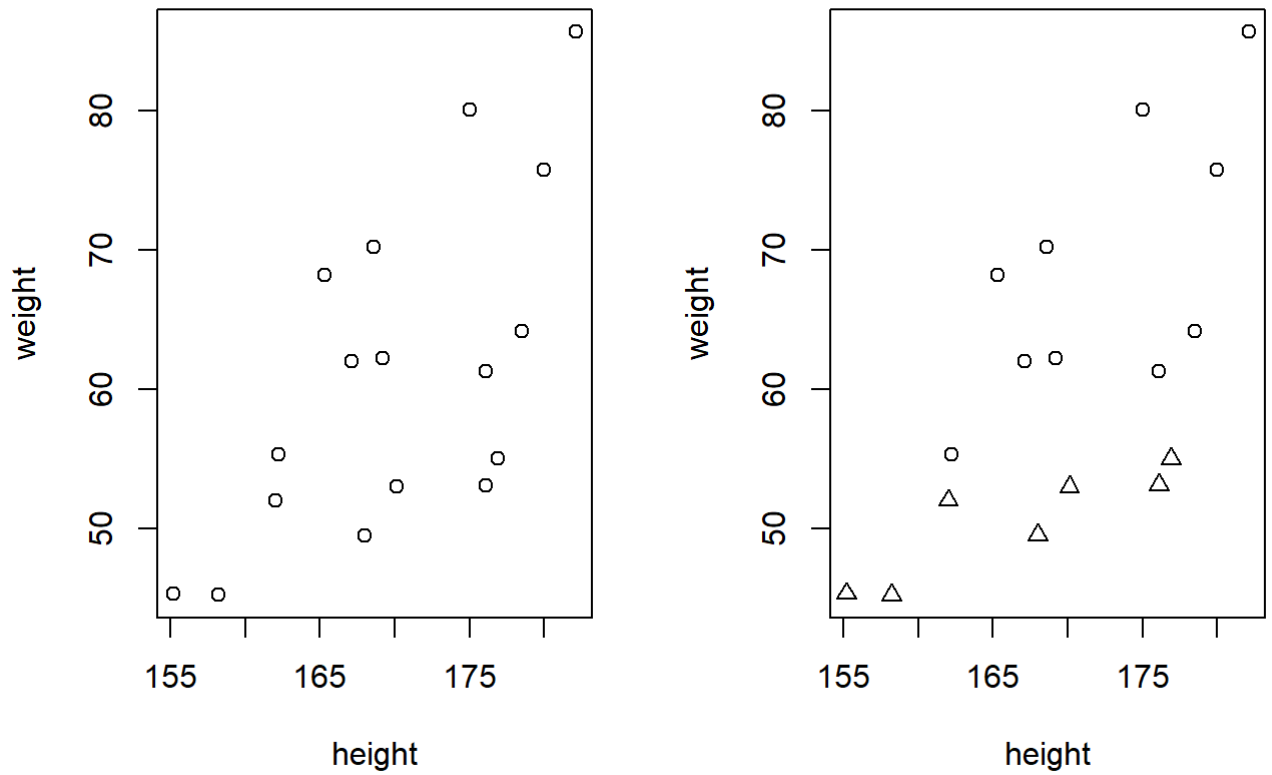
1-4 plot() : pch 속성

점의 형태를 이용해서 남자와 여자를 구분하여 표시

```
dat <- data.frame(sex, height, weight)
dat
```

```
##     sex height weight
## 1  남자  165.3   68.2
## 2  여자  170.1   53.0
## 3  남자  175.0   80.1
## 4  남자  182.1   85.7
## 5  여자  168.0   49.5
## 6  여자  162.0   52.0
## 7  여자  155.2   45.3
## 8  여자  176.9   55.0
## 9  남자  178.5   64.2
## 10 남자  176.1   61.3
## 11 남자  167.1   62.0
## 12 남자  180.0   75.8
## 13 남자  162.2   55.3
## 14 여자  176.1   53.1
## 15 여자  158.2   45.2
## 16 남자  168.6   70.2
## 17 남자  169.2   62.2
```

```
par(mfrow=c(1,2))
plot(weight~height)
plot(weight~height, pch=as.integer(sex))
```



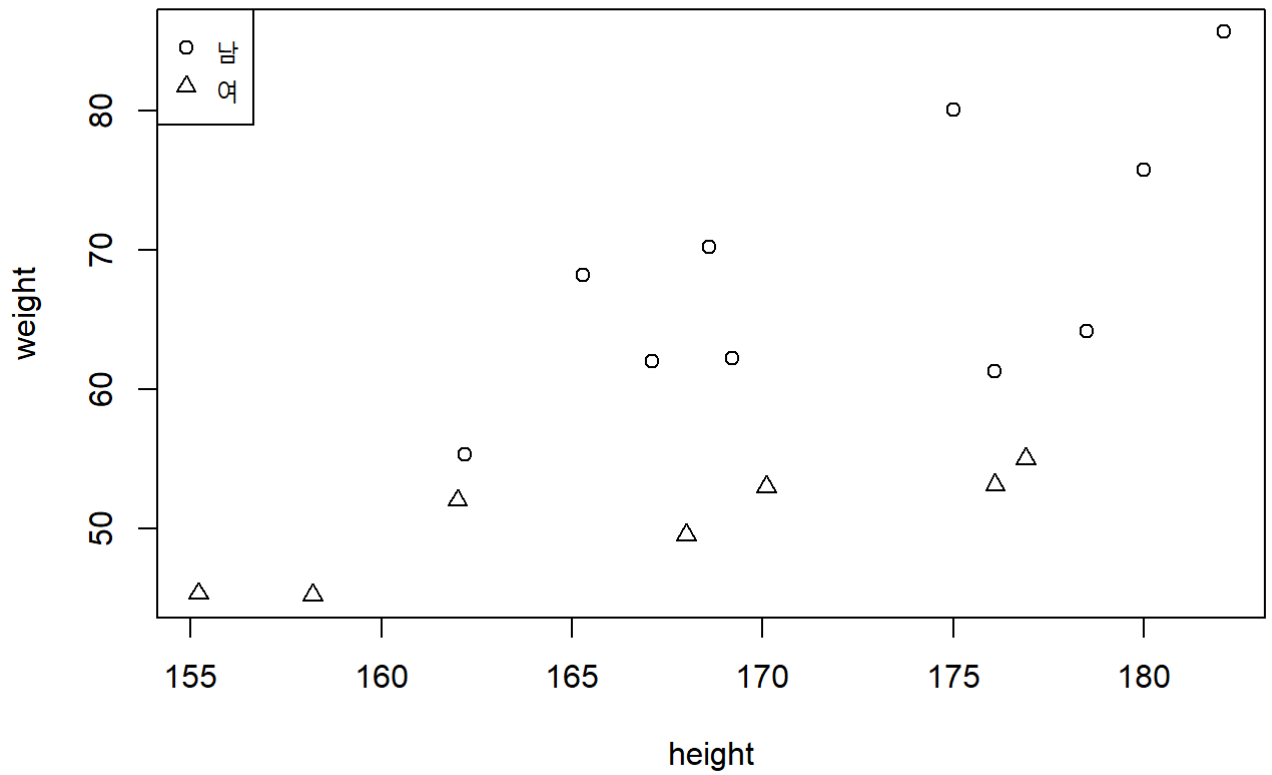
pch

총 18개까지 가능하다.

```
dat
```

```
##     sex height weight
## 1  남자  165.3   68.2
## 2  여자  170.1   53.0
## 3  남자  175.0   80.1
## 4  남자  182.1   85.7
## 5  여자  168.0   49.5
## 6  여자  162.0   52.0
## 7  여자  155.2   45.3
## 8  여자  176.9   55.0
## 9  남자  178.5   64.2
## 10 남자  176.1   61.3
## 11 남자  167.1   62.0
## 12 남자  180.0   75.8
## 13 남자  162.2   55.3
## 14 여자  176.1   53.1
## 15 여자  158.2   45.2
## 16 남자  168.6   70.2
## 17 남자  169.2   62.2
```

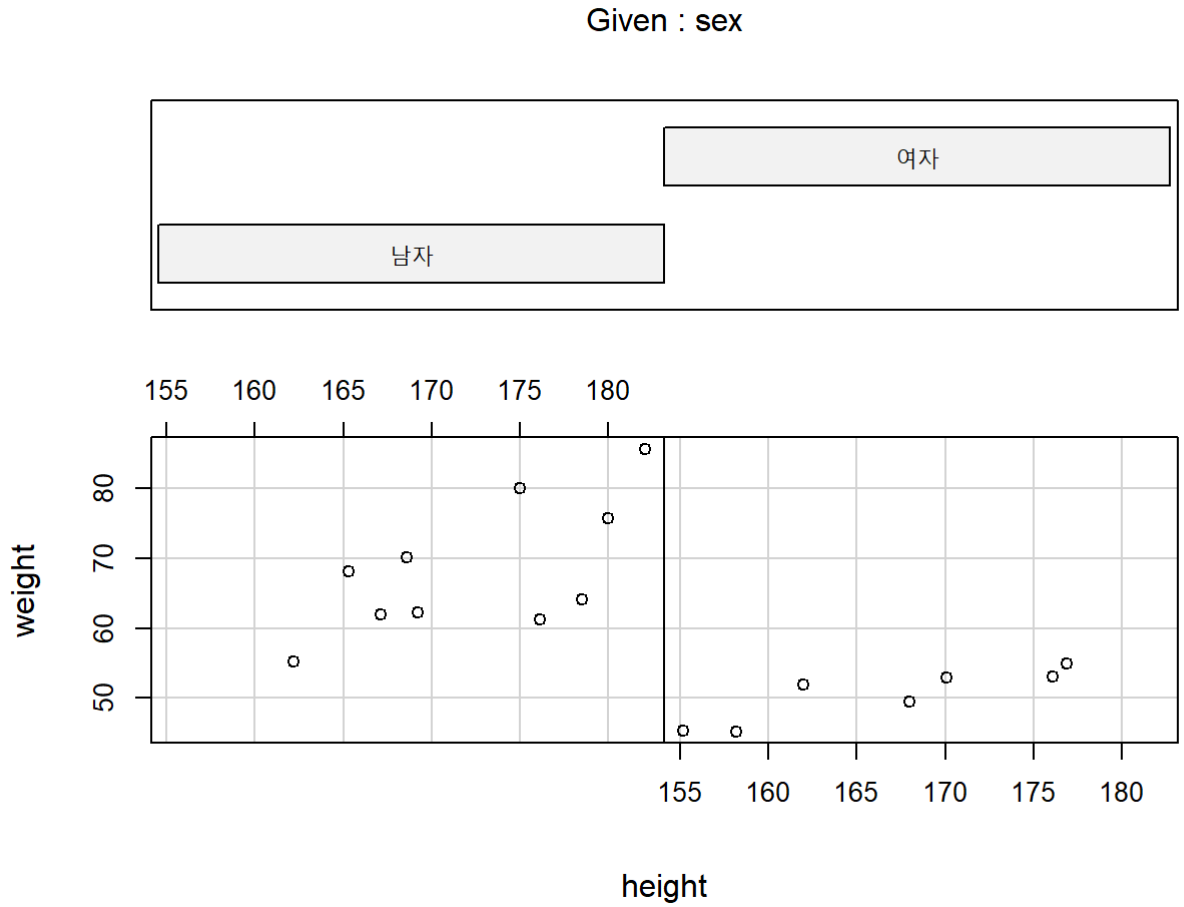
```
plot(weight~height, pch=as.integer(sex))
legend("topleft", c("남", "여"), pch=dat$sex)  # 범례
```



1-5 coplot() 함수

(가) 명목형 변수(범주형)에 대한 그래프
(나) Levels별 그래프를 보는 것이 목적이다.
(다) 남녀 성별에 따른 키와 몸무게의 상관관계

```
coplot(weight~height | sex)
```

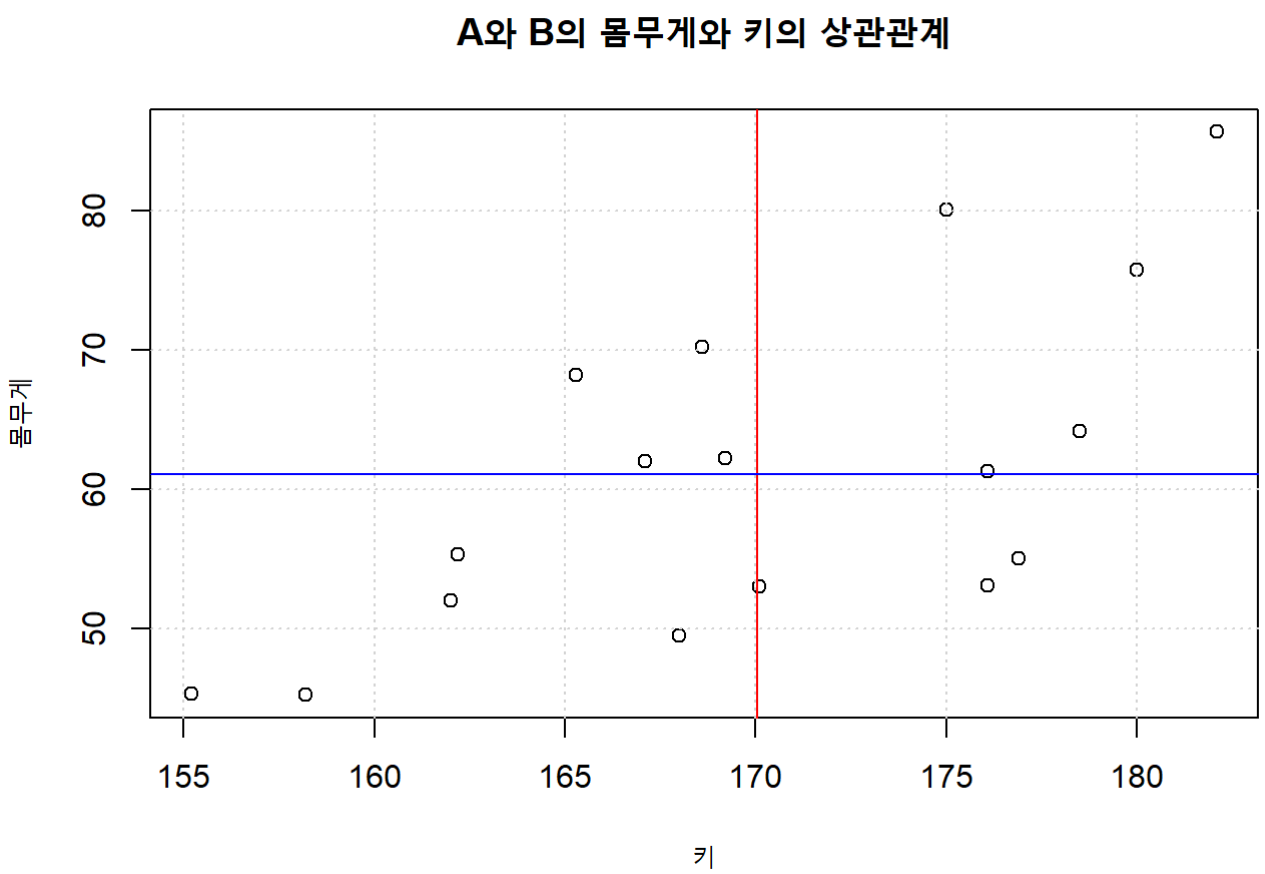


1-6 저수준 함수 사용

```
title() : 그래프의 타이틀 함수
grid()  : 격자 추가 함수
abline() : 수직선, 수평선 추가
```

```
plot(weight~height, ann=FALSE)
title(main="A와 B의 몸무게와 키의 상관관계")
title(xlab="키", ylab="몸무게")
grid()  # 격자 추가

hMean <- mean(height)
wMean <- mean(weight)
abline(v=hMean, col="red")
abline(h=wMean, col="blue")
```



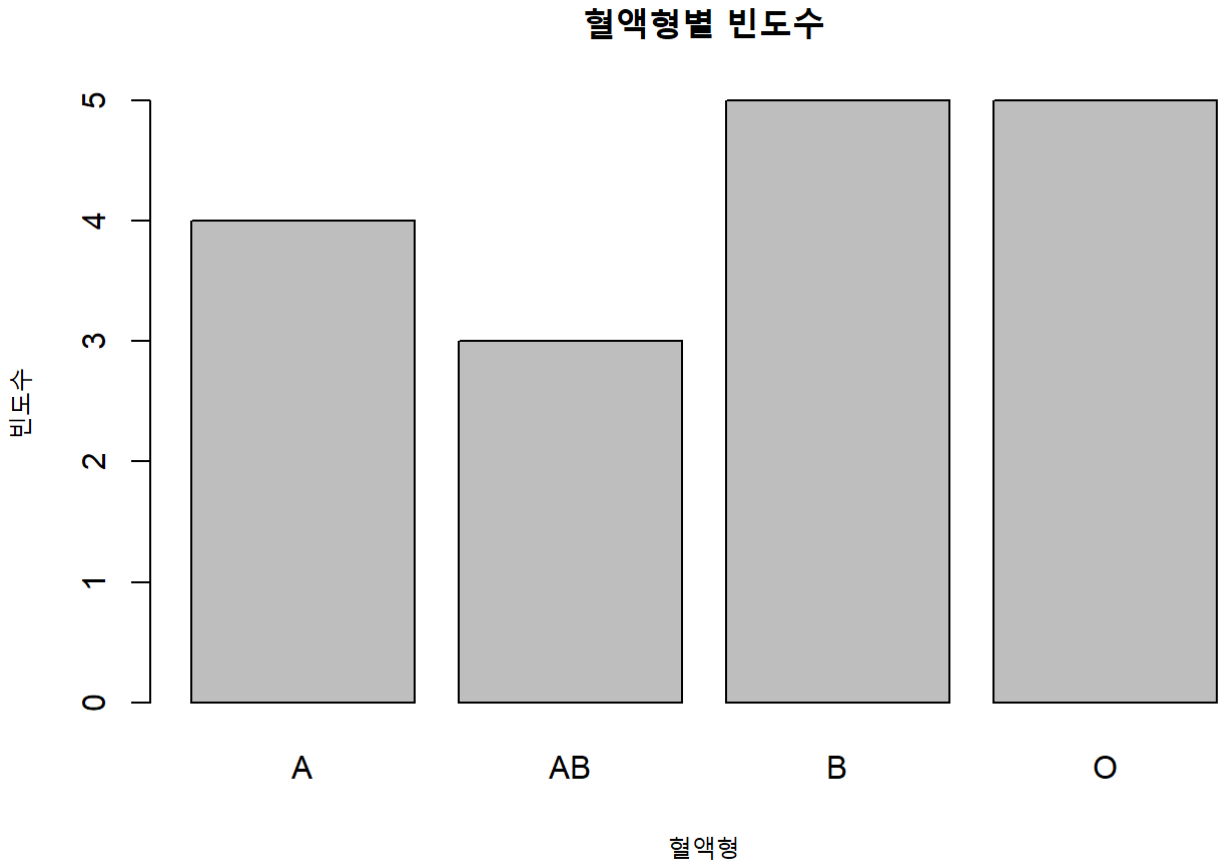
1-7 barplot(막대 그래프)

```
(가) 범주형(명목형) 변수 데이터 특징 살펴 보기
(나) 먼저 빈도수를 확인해야 한다. 이를 위해 table() 함수 이용
(다) 사용법 : barplot(변수객체)
```

```
tblBlood <- table(DF$bloodtype)
tblBlood
```

```
##
##  A AB  B  O
##  4  3  5  5
```

```
barplot(tblBlood)
title(main="혈액형별 빈도수")
title(xlab="혈액형", ylab="빈도수" )
```



1-7 barplot(막대 그래프)

barplot 혈액형별 키의 평균

```
[사용법]
tapply(X, INDEX, FUN = NULL, ...,)
X : 객체
INDEX : 하나 또는 그 이상의 범주형 리스트 (factor)
...
FUN : 적용할 함수
```

```
?tapply
```

```
## starting httpd help server ... done
```

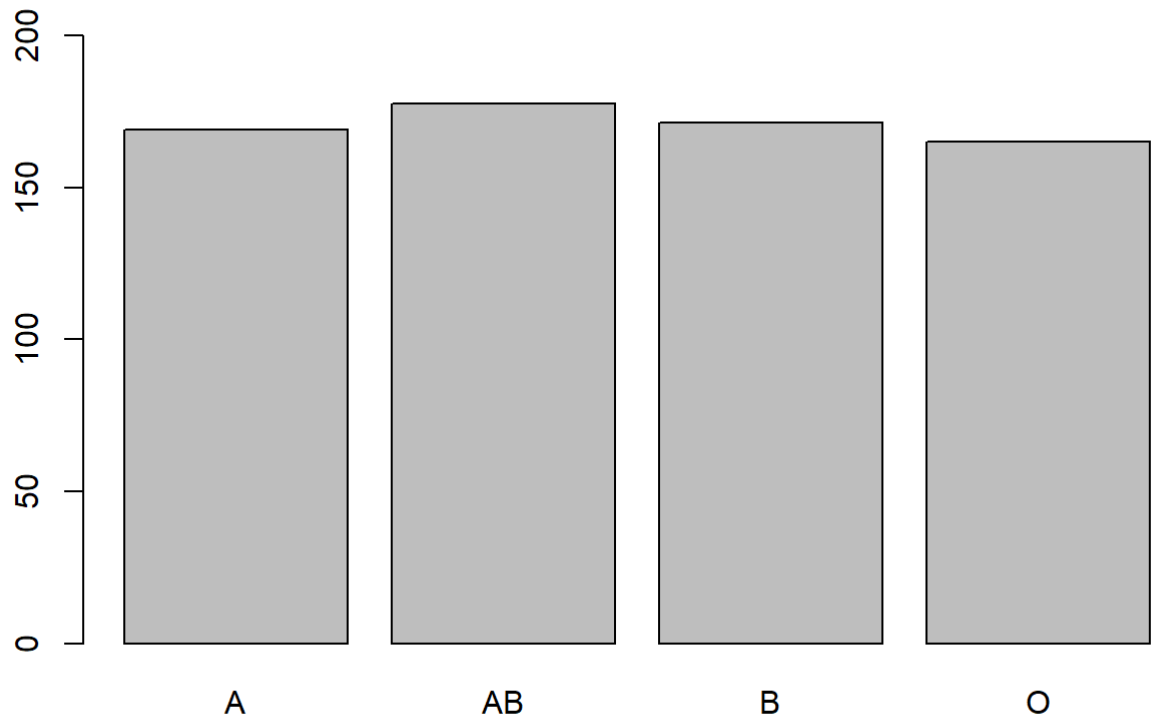
```
class(bloodtype)
```

```
## [1] "factor"
```

```
Height = tapply(height, bloodtype, mean )
Height
```

```
##       A      AB       B       O
## 169.075 177.400 171.280 165.140
```

```
barplot(Height, ylim=c(0,200))
```

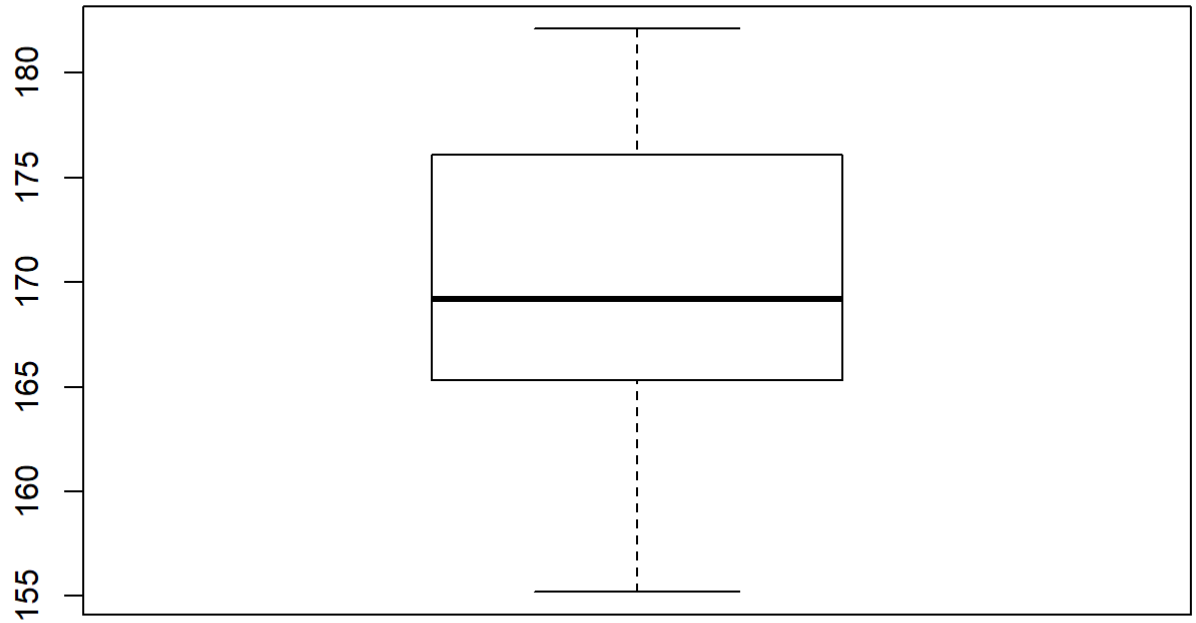


1-7 barplot(막대 그래프)

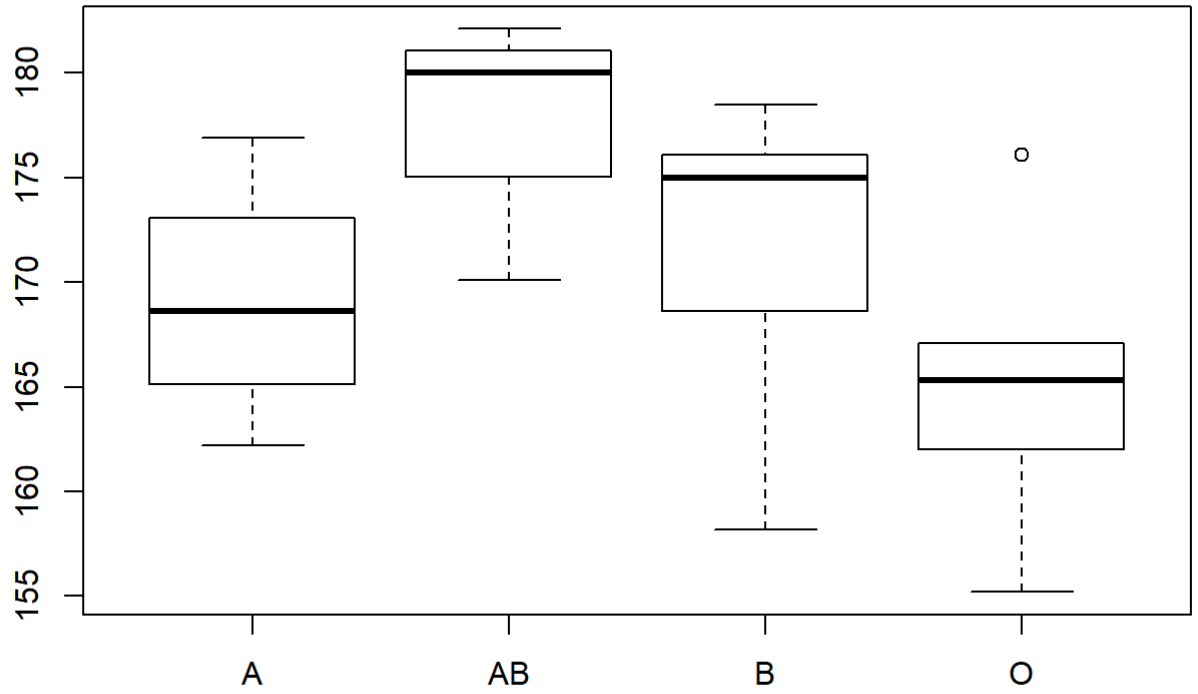
boxplot 혈액형별(levels) 키에 대한 분포 그려보기

```
boxplot(VariableA)  => 변수 하나의 경우, 분포
boxplot(A ~ B) => B(독립변수,설명변수), A(종속변수)의 분포 (B는 범주형 변수이어야 함.)
```

```
boxplot(height)
```




```
boxplot(height~bloodtype)
```



1-7 hist() : 히스토 그램 살펴보기

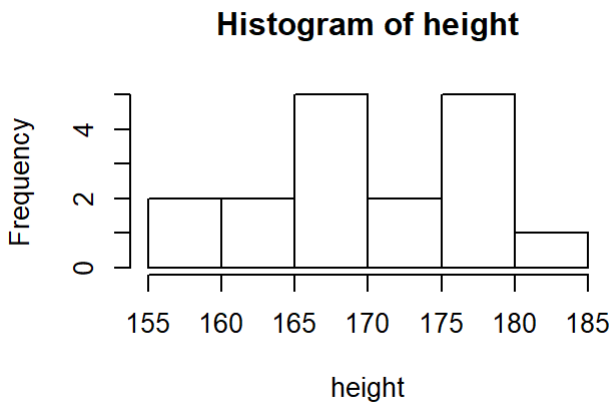
hist

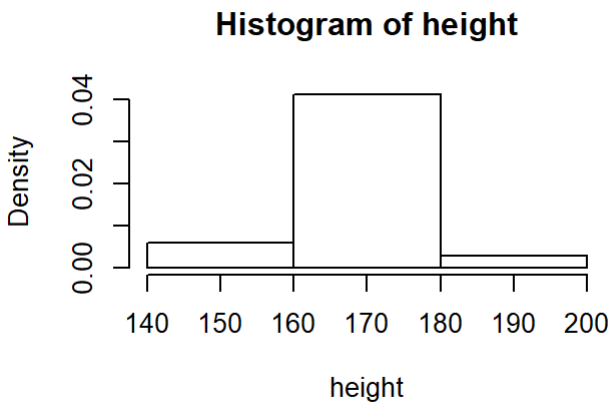
```
hist(하나의 변수) # 연속형변수
prob : 확률(상대도수)
breaks : 나누기
```

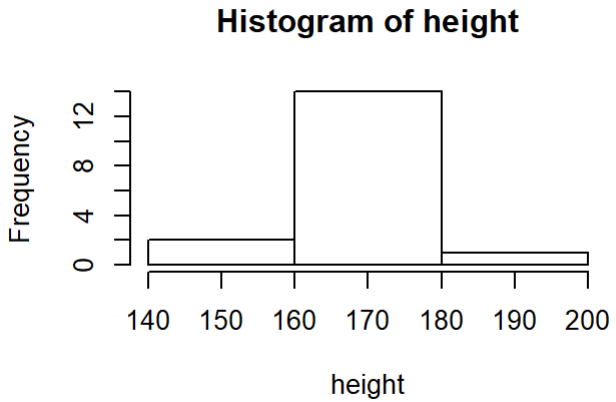
```
height
```

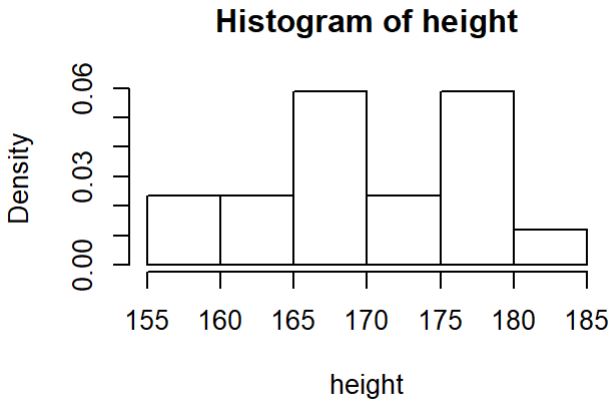
```
##  [1] 165.3 170.1 175.0 182.1 168.0 162.0 155.2 176.9 178.5 176.1 167.1
## [12] 180.0 162.2 176.1 158.2 168.6 169.2
```

```
par(mfrow=c(2,2))  # 2행 2열
hist(height)  # 하나의 변수
hist(height, breaks=1, prob=T)
hist(height, breaks=1)
hist(height, prob=T)
```





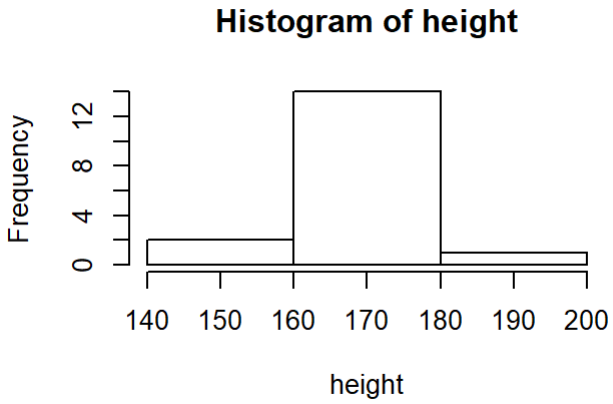


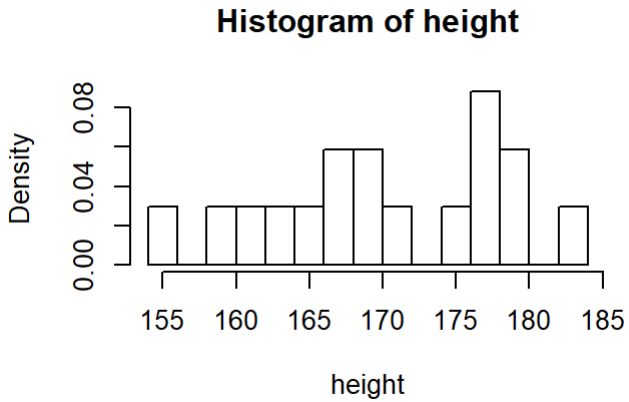


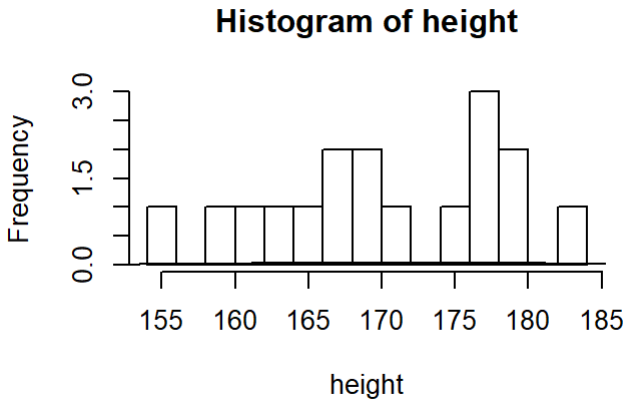
density(밀도) vs frequency(빈도)

```
par(mfrow=c(2,2))
hist(height, breaks=1, prob=T)
hist(height, breaks=1)

hist(height, breaks=10, prob=T)
hist(height, breaks=10)
lines(density(height))
```








```
length(height)
```

```
## [1] 17
```

```
print(2/34)
```

```
## [1] 0.05882353
```

```
print(14/34)
```

```
## [1] 0.4117647
```

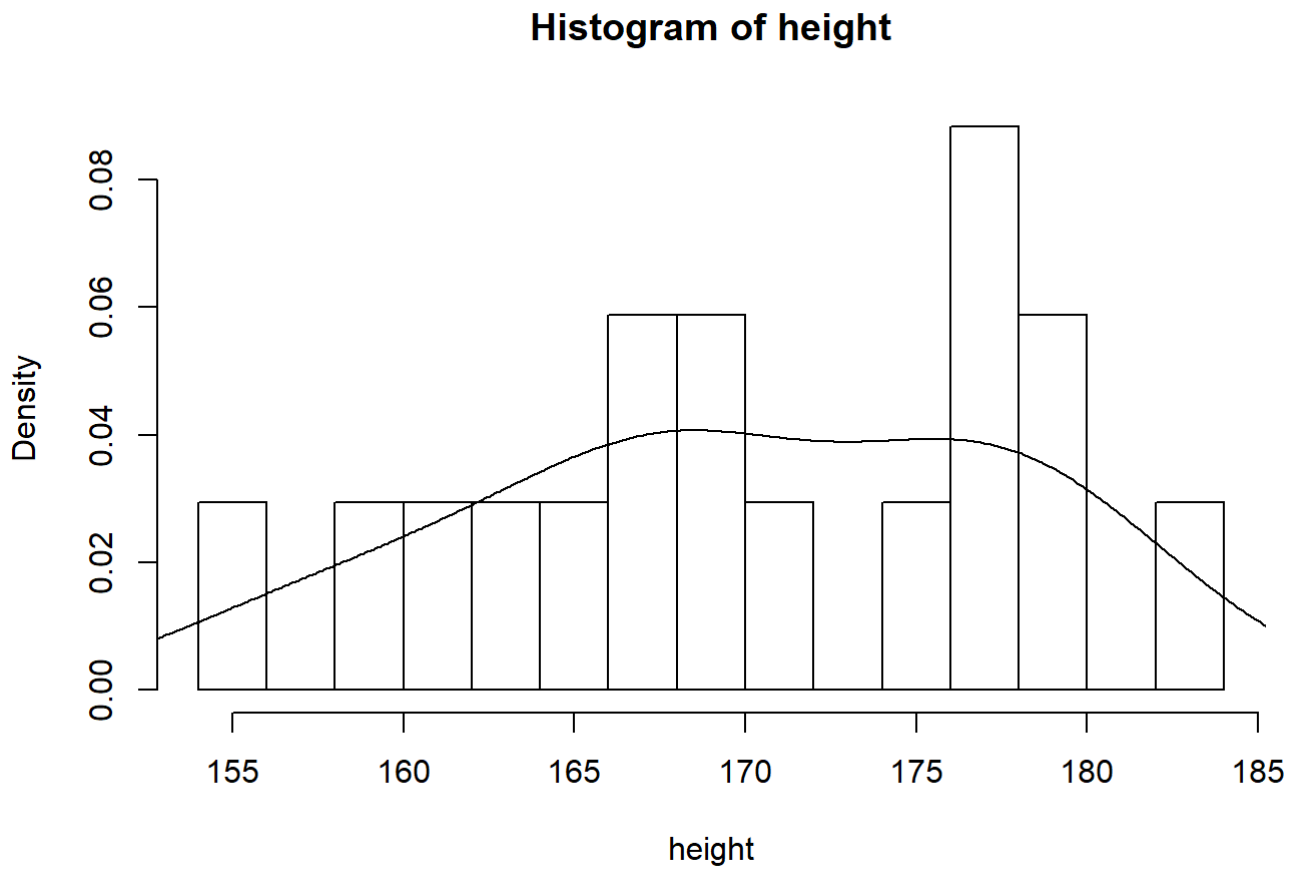
```
print(1/34)
```

```
## [1] 0.02941176
```

1-7 hist() : 히스토 그램 살펴보기

저수준 함수- 추세선 보기

```
par(mfrow=c(1,1))
hist(height, breaks=10, prob=T)
lines(density(height))
```



1-7 hist() : 히스토 그램 살펴보기

```
(가) seq() 함수
seq(시작, 끝, by=증가)

(나) hist(객체, breaks=직접지정)
```

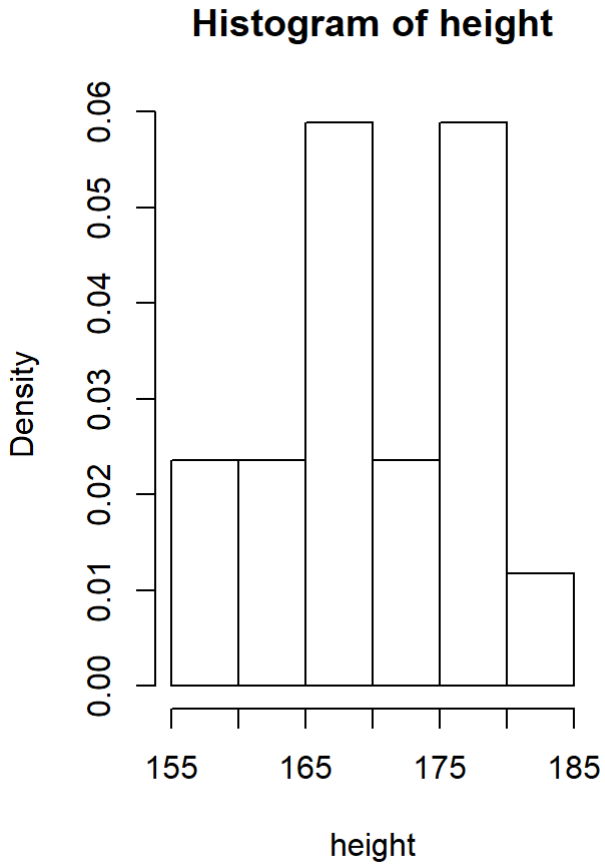
```
range(height)
```

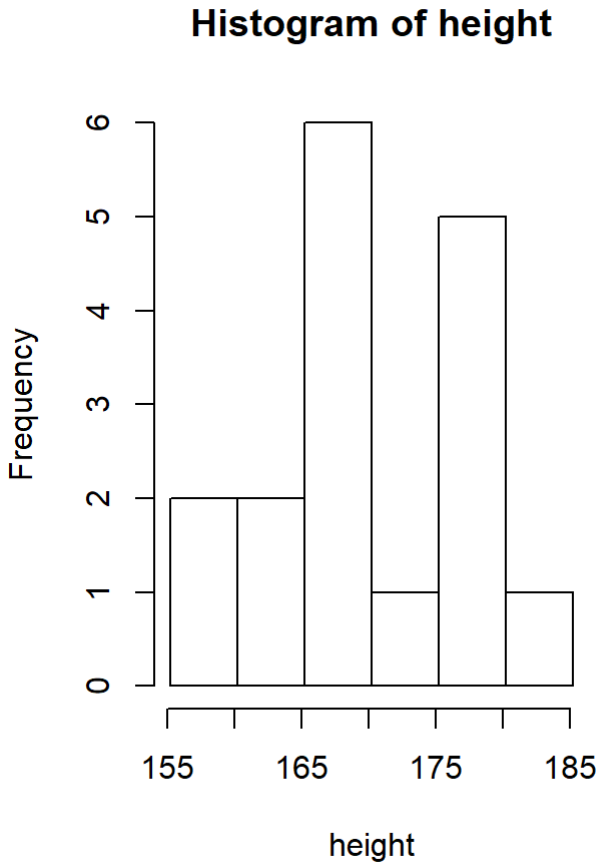
```
## [1] 155.2 182.1
```

```
BPoint = seq(min(height), max(height)+5, by=5)
BPoint
```

```
## [1] 155.2 160.2 165.2 170.2 175.2 180.2 185.2
```

```
par(mfrow=c(1,2))
hist(height, breaks=5, prob=T)
hist(height, breaks=BPoint)
```



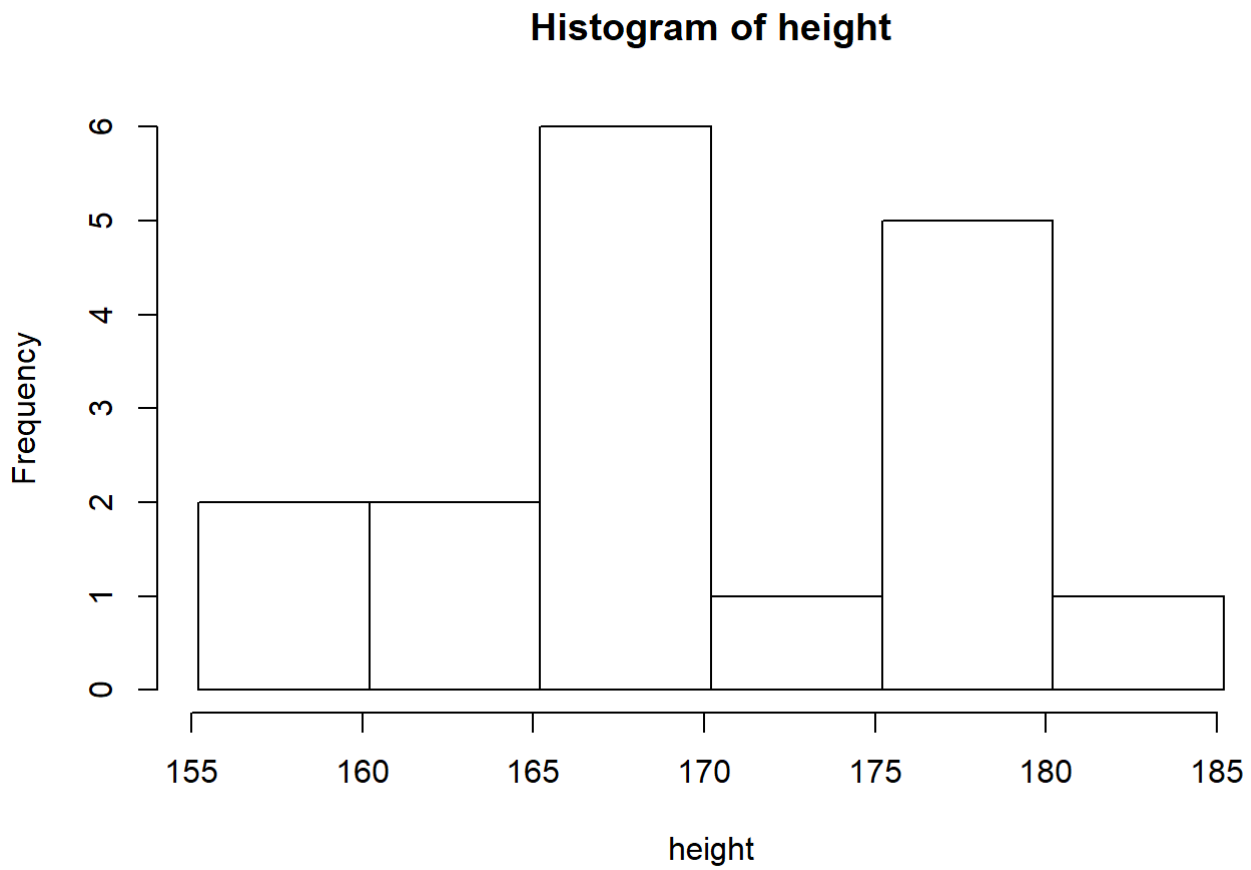


breaks 포인트를 5로 나누기

```
BPoint = seq(min(height), max(height)+5, by=5)
BPoint
```

```
## [1] 155.2 160.2 165.2 170.2 175.2 180.2 185.2
```

```
hist(height, breaks=BPoint)
```

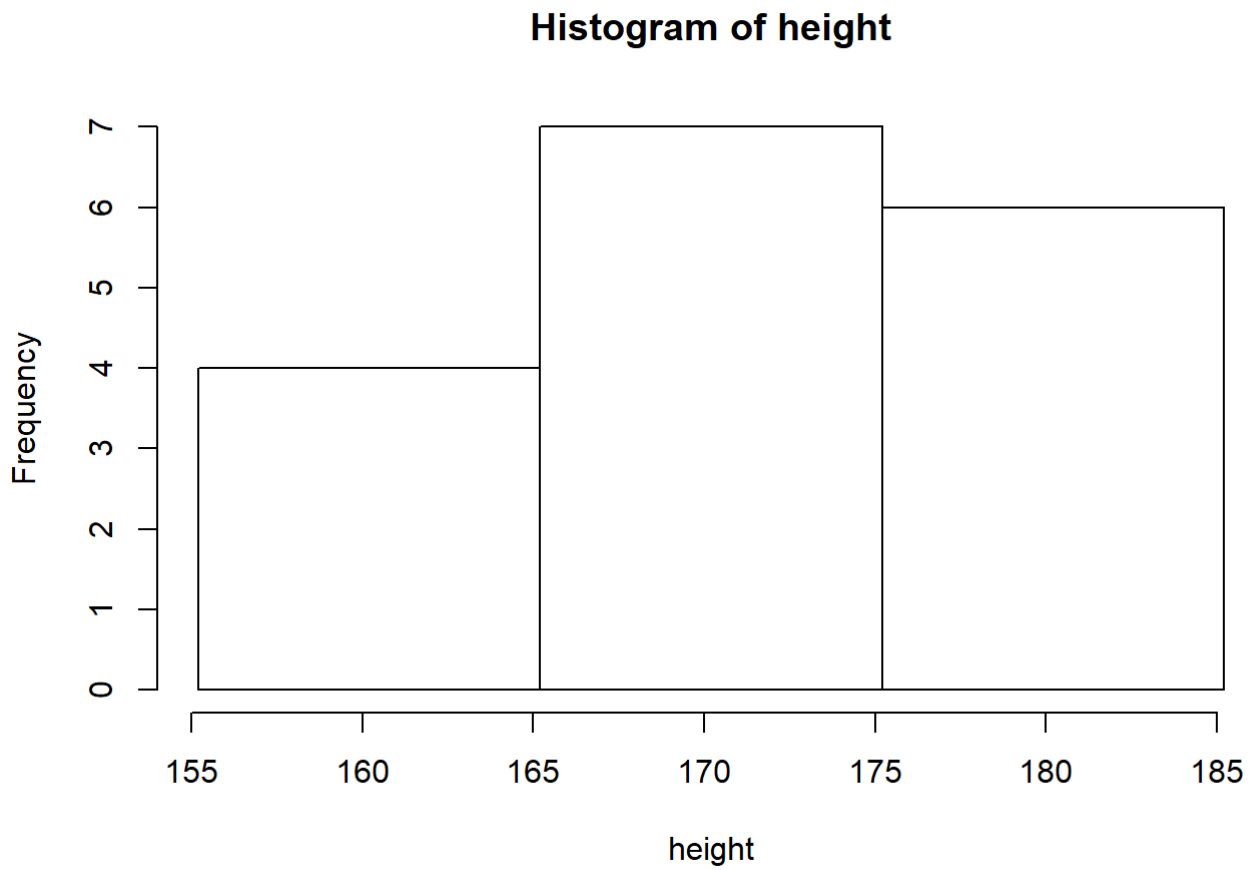


breaks 포인트를 10로 나누기

```
BPoint = seq(min(height), max(height)+10, by=10)
BPoint
```

```
## [1] 155.2 165.2 175.2 185.2
```

```
hist(height, breaks=BPoint)
```



2,3 열의 그래프를 그린다.

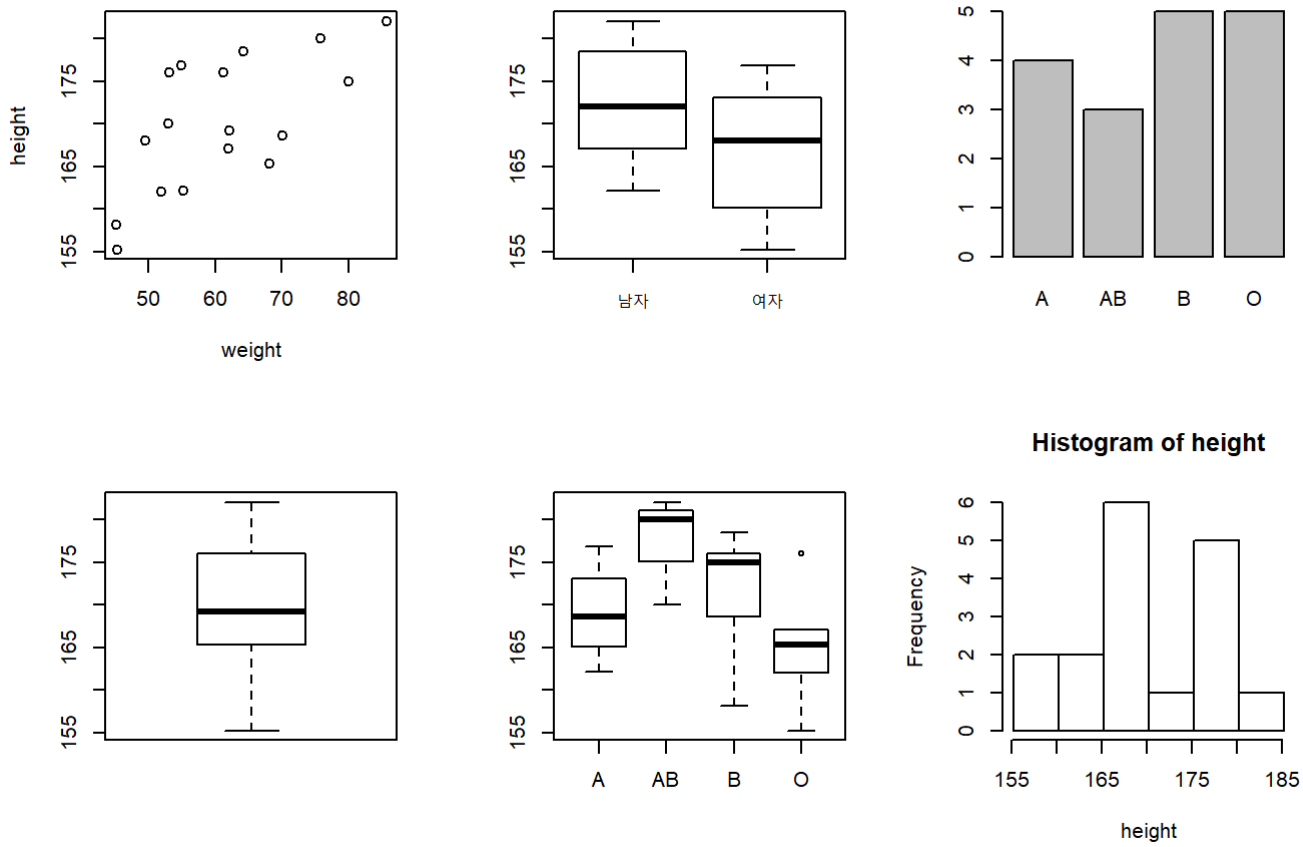
1행 1열 height, weight 에 대한 산점도 1행 2열 성별, weight에 대한 Boxplot 그리기 1행 3열에는 혈액형별 빈도수 구하기 barplot 2행 1열 boxplo

```
par(mfrow=c(2,3))

plot(weight, height)
plot(sex, height)
barplot(table(bloodtype))
boxplot(height)
boxplot(height~bloodtype)
BPoint = seq(min(height), max(height)+5, by=5)
BPoint
```

```
## [1] 155.2 160.2 165.2 170.2 175.2 180.2 185.2
```

```
hist(height, breaks=BPoint)
```



한 그래프에 두개의 그래프 그려보기

```
TS1 <- c(round(runif(30)*100))
TS2 <- c(round(runif(30)*100))
TS3 <- c(round(runif(30)*100))
TS1
```

```
##  [1]  8 47  1 50 13 10  3 34 66 26 26 38 24 31 14 35 88  4 95  8 30 64 66
## [24] 48 46 51 59 57 75 51
```

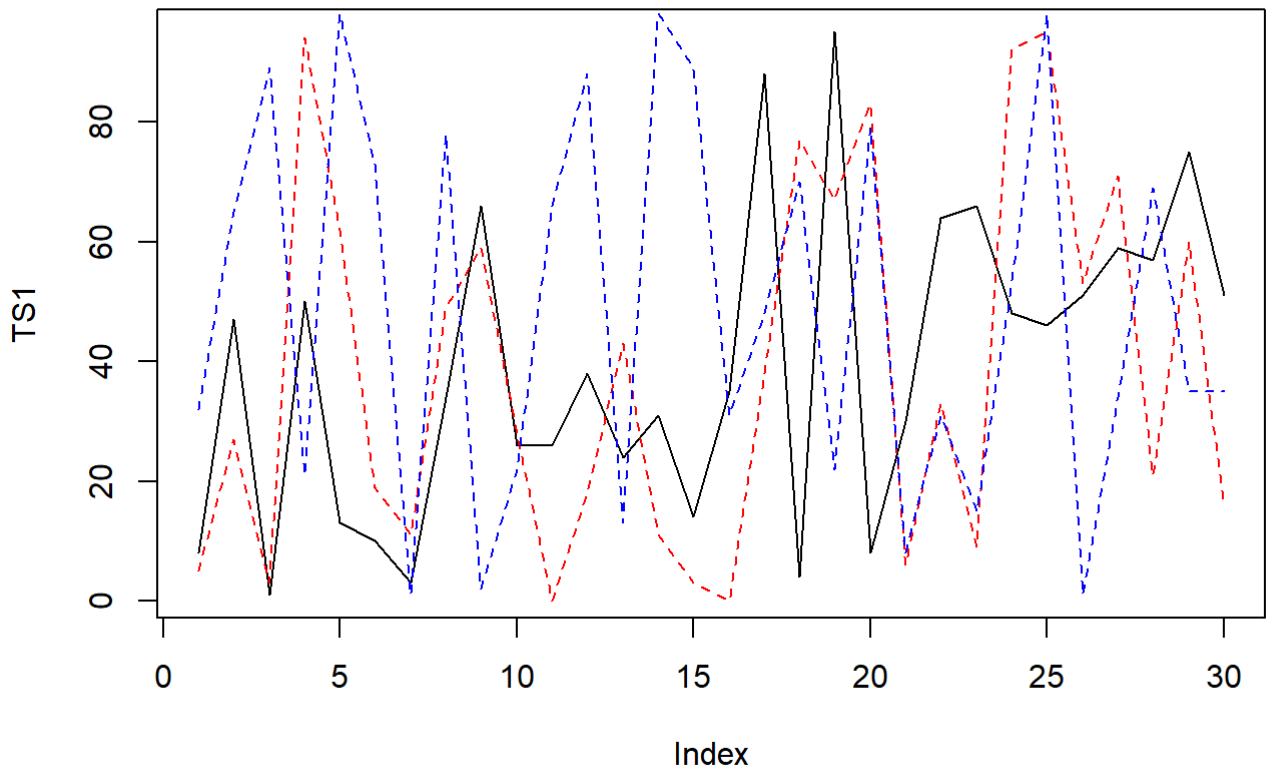
```
TS2
```

```
##  [1]  5 27  3 94 62 19 11 49 59 28  0 18 43 11  3  0 38 77 67 83  6 33  9
## [24] 92 95 53 71 21 60 16
```

```
TS3
```

```
##  [1] 32 65 89 21 98 73  1 78  2 22 66 88 13 98 89 31 48 70 22 79  8 31 15
## [24] 53 98  1 34 69 35 35
```

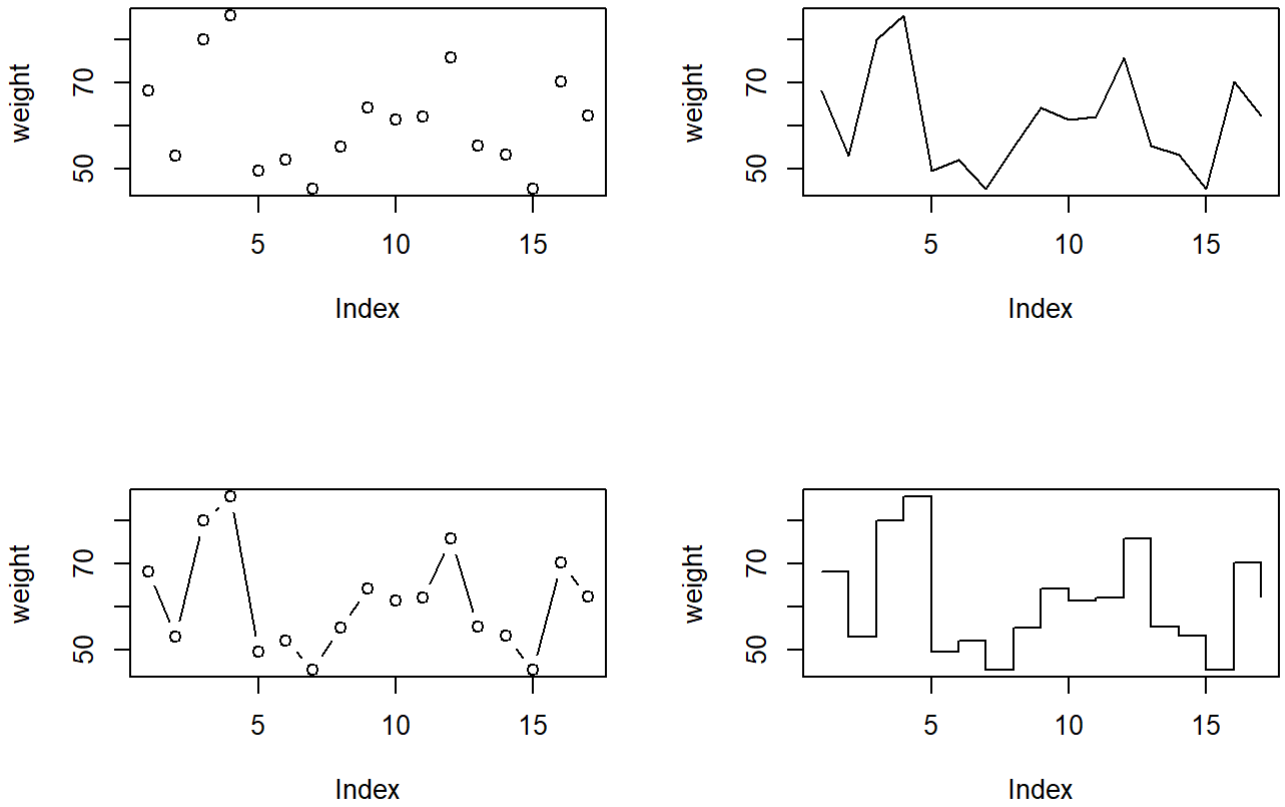
```
plot(TS1, type="l")
lines(TS2, col="red", lty="dashed")
lines(TS3, col="blue", lty="dashed")
```




```
runif(30)*100
```

```
##  [1] 93.655458 90.014450 84.940736 11.199889 62.069550 16.474411 51.390581
##  [8] 24.615840 39.604869 15.786344 98.682077 52.043595 44.352451 83.154918
## [15] 75.744201 31.107438 88.280991  5.842717 30.018740 19.615069 64.291585
## [22] 27.565219 83.704453  3.334375 27.892400 80.308224 14.779039 40.538484
## [29] 76.571974 90.488745
```

```
#help(plot)
par(mfrow=c(2,2))
plot(weight, type="p")
plot(weight, type="l")
plot(weight, type="b")
plot(weight, type="s")
```



ggplot2

```
#install.packages("ggplot2")
#install.packages("ggthemes")
library(ggplot2)
library(ggthemes)
```

ggplot2

```
dataset : diamond
```

```
dim(diamonds)
```

```
## [1] 53940    10
```

```
str(diamonds)
```

```
## Classes 'tbl_df', 'tbl' and 'data.frame':    53940 obs. of  10 variables:
##  $ carat  : num  0.23 0.21 0.23 0.29 0.31 0.24 0.24 0.26 0.22 0.23 ...
##  $ cut    : Ord.factor w/ 5 levels "Fair"<"Good"<..: 5 4 2 4 2 3 3 3 1 3 ...
##  $ color  : Ord.factor w/ 7 levels "D"<"E"<"F"<"G"<..: 2 2 2 6 7 7 6 5 2 5 ...
##  $ clarity: Ord.factor w/ 8 levels "I1"<"SI2"<"SI1"<..: 2 3 5 4 2 6 7 3 4 5 ...
##  $ depth  : num  61.5 59.8 56.9 62.4 63.3 62.8 62.3 61.9 65.1 59.4 ...
##  $ table  : num  55 61 65 58 58 57 57 55 61 61 ...
##  $ price  : int  326 326 327 334 335 336 336 337 337 338 ...
##  $ x      : num  3.95 3.89 4.05 4.2 4.34 3.94 3.95 4.07 3.87 4 ...
##  $ y      : num  3.98 3.84 4.07 4.23 4.35 3.96 3.98 4.11 3.78 4.05 ...
##  $ z      : num  2.43 2.31 2.31 2.63 2.75 2.48 2.47 2.53 2.49 2.39 ...
```

```
head(diamonds)
```

```
## # A tibble: 6 x 10
##   carat cut       color clarity depth table price     x     y     z
##   <dbl> <ord>     <ord> <ord>   <dbl> <dbl> <int> <dbl> <dbl> <dbl>
## 1 0.23  Ideal     E     SI2      61.5    55   326  3.95  3.98  2.43
## 2 0.21  Premium   E     SI1      59.8    61   326  3.89  3.84  2.31
## 3 0.23  Good      E     VS1      56.9    65   327  4.05  4.07  2.31
## 4 0.290 Premium   I     VS2      62.4    58   334  4.2   4.23  2.63
## 5 0.31  Good      J     SI2      63.3    58   335  4.34  4.35  2.75
## 6 0.24  Very Good J     VVS2     62.8    57   336  3.94  3.96  2.48
```

```
summary(diamonds)
```

```
##      carat               cut        color        clarity     
##  Min.   :0.2000   Fair      : 1610   D: 6775   SI1    :13065  
##  1st Qu.:0.4000   Good      : 4906   E: 9797   VS2    :12258  
##  Median :0.7000   Very Good:12082   F: 9542   SI2    : 9194  
##  Mean   :0.7979   Premium   :13791   G:11292   VS1    : 8171  
##  3rd Qu.:1.0400   Ideal     :21551   H: 8304   VVS2   : 5066  
##  Max.   :5.0100                     I: 5422   VVS1   : 3655  
##                                     J: 2808   (Other): 2531  
##      depth           table           price             x         
##  Min.   :43.00   Min.   :43.00   Min.   :  326   Min.   : 0.000  
##  1st Qu.:61.00   1st Qu.:56.00   1st Qu.:  950   1st Qu.: 4.710  
##  Median :61.80   Median :57.00   Median : 2401   Median : 5.700  
##  Mean   :61.75   Mean   :57.46   Mean   : 3933   Mean   : 5.731  
##  3rd Qu.:62.50   3rd Qu.:59.00   3rd Qu.: 5324   3rd Qu.: 6.540  
##  Max.   :79.00   Max.   :95.00   Max.   :18823   Max.   :10.740  
##                                                                  
##        y               z         
##  Min.   : 0.000   Min.   : 0.000  
##  1st Qu.: 4.720   1st Qu.: 2.910  
##  Median : 5.710   Median : 3.530  
##  Mean   : 5.735   Mean   : 3.539  
##  3rd Qu.: 6.540   3rd Qu.: 4.040  
##  Max.   :58.900   Max.   :31.800  
##
```

```
names(diamonds)
```

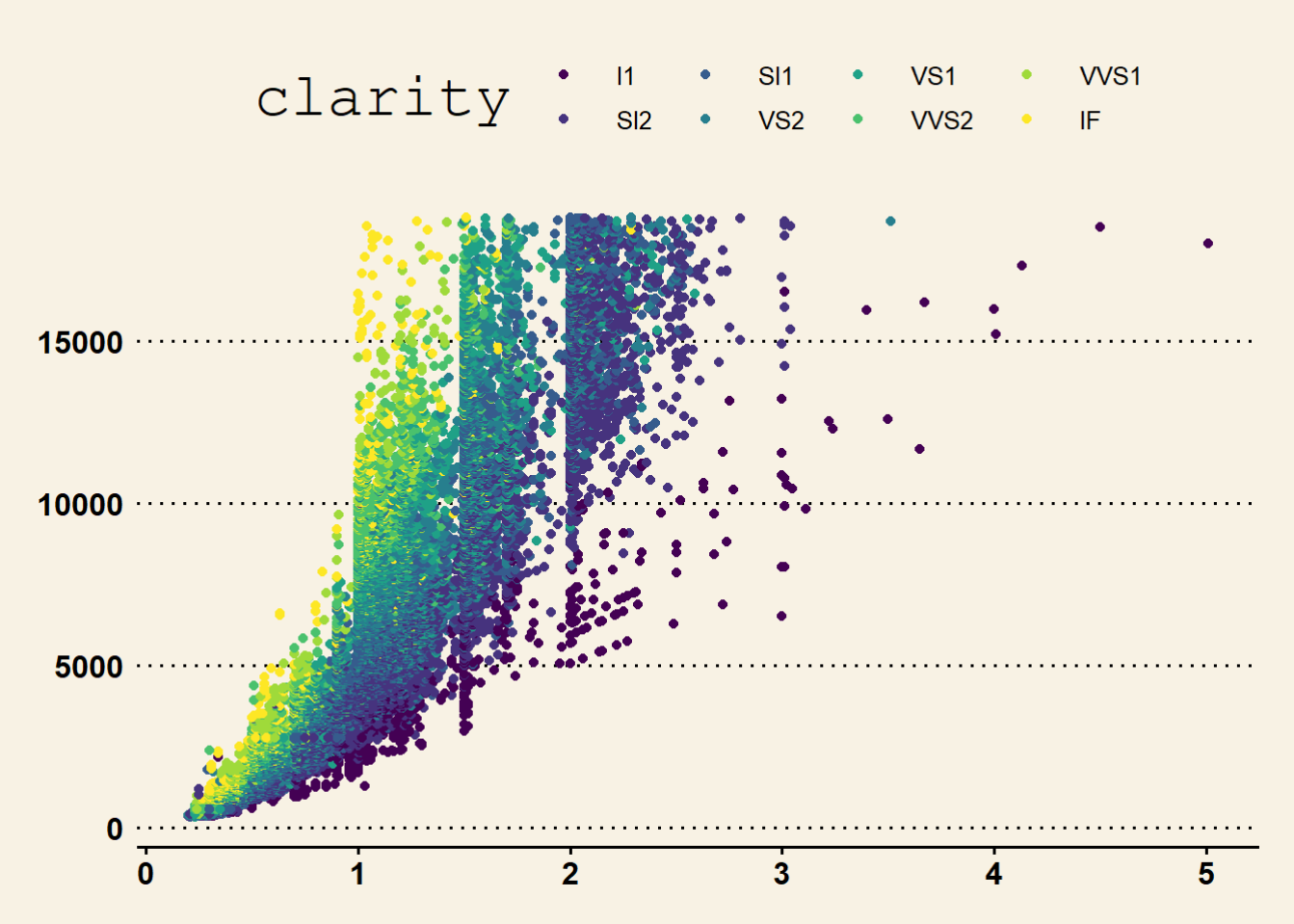
```
##  [1] "carat"   "cut"     "color"   "clarity" "depth"   "table"   "price"
##  [8] "x"       "y"       "z"
```

```
ggplot()
geom_point()
theme_wsj
```

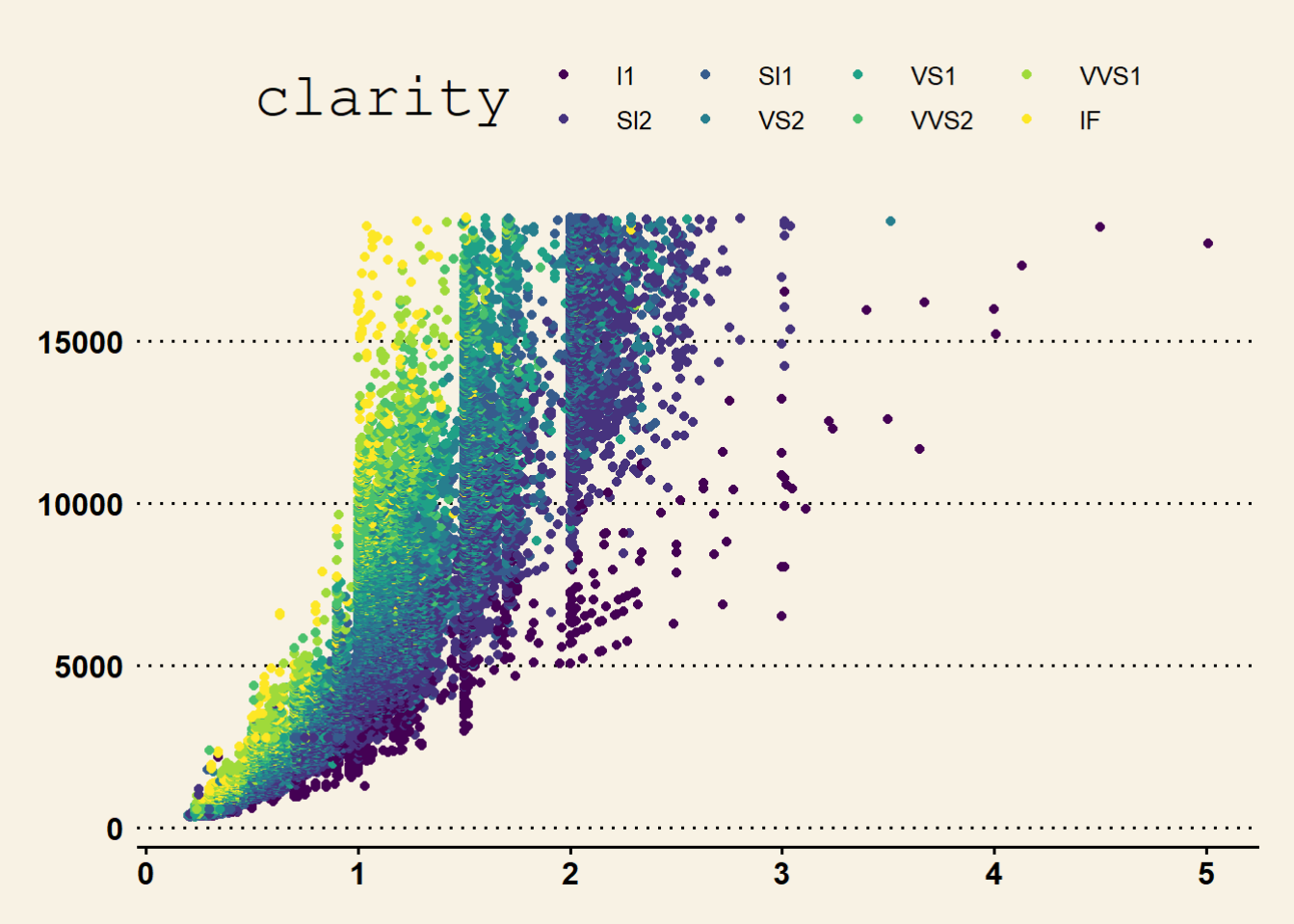
```
#help(diamonds)
names(diamonds)
```

```
##  [1] "carat"   "cut"     "color"   "clarity" "depth"   "table"   "price"
##  [8] "x"       "y"       "z"
```

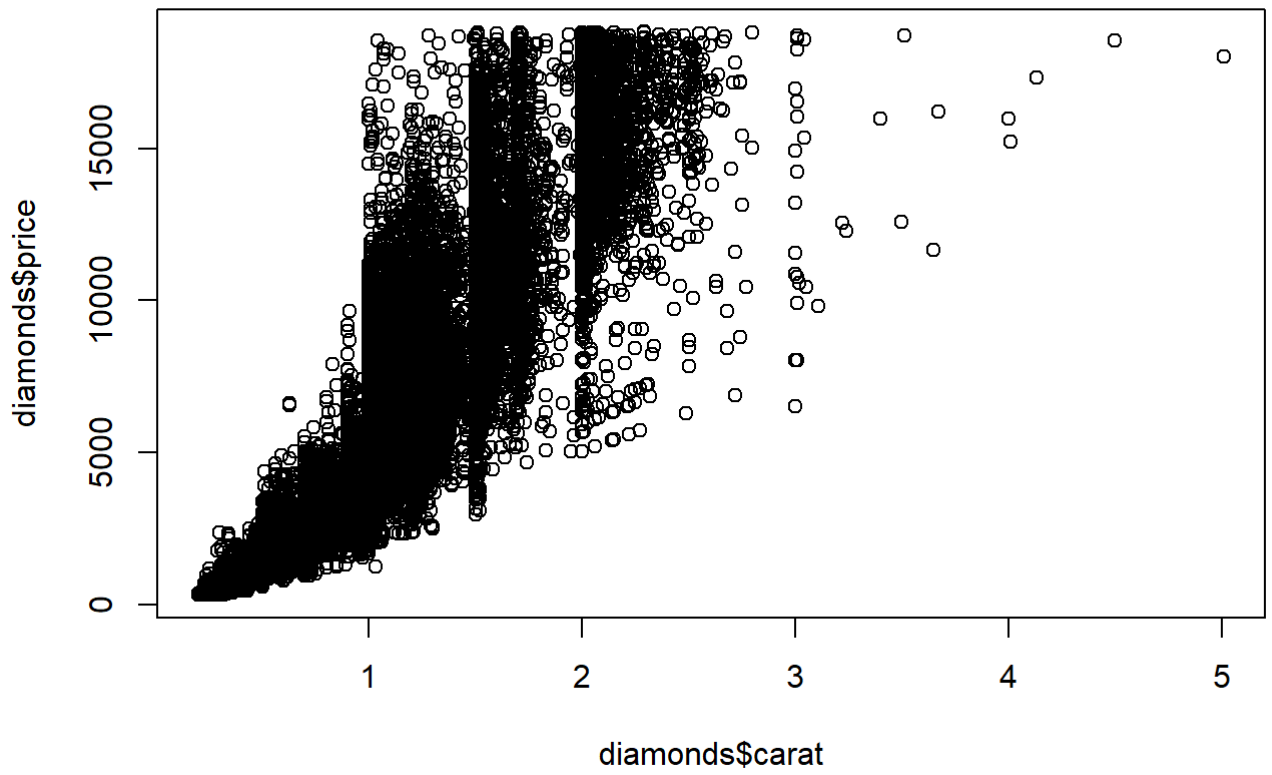
```
ggplot(data=diamonds,
       aes(x=carat, y=price, colour=clarity)) +
       geom_point() +
       theme_wsj()
```



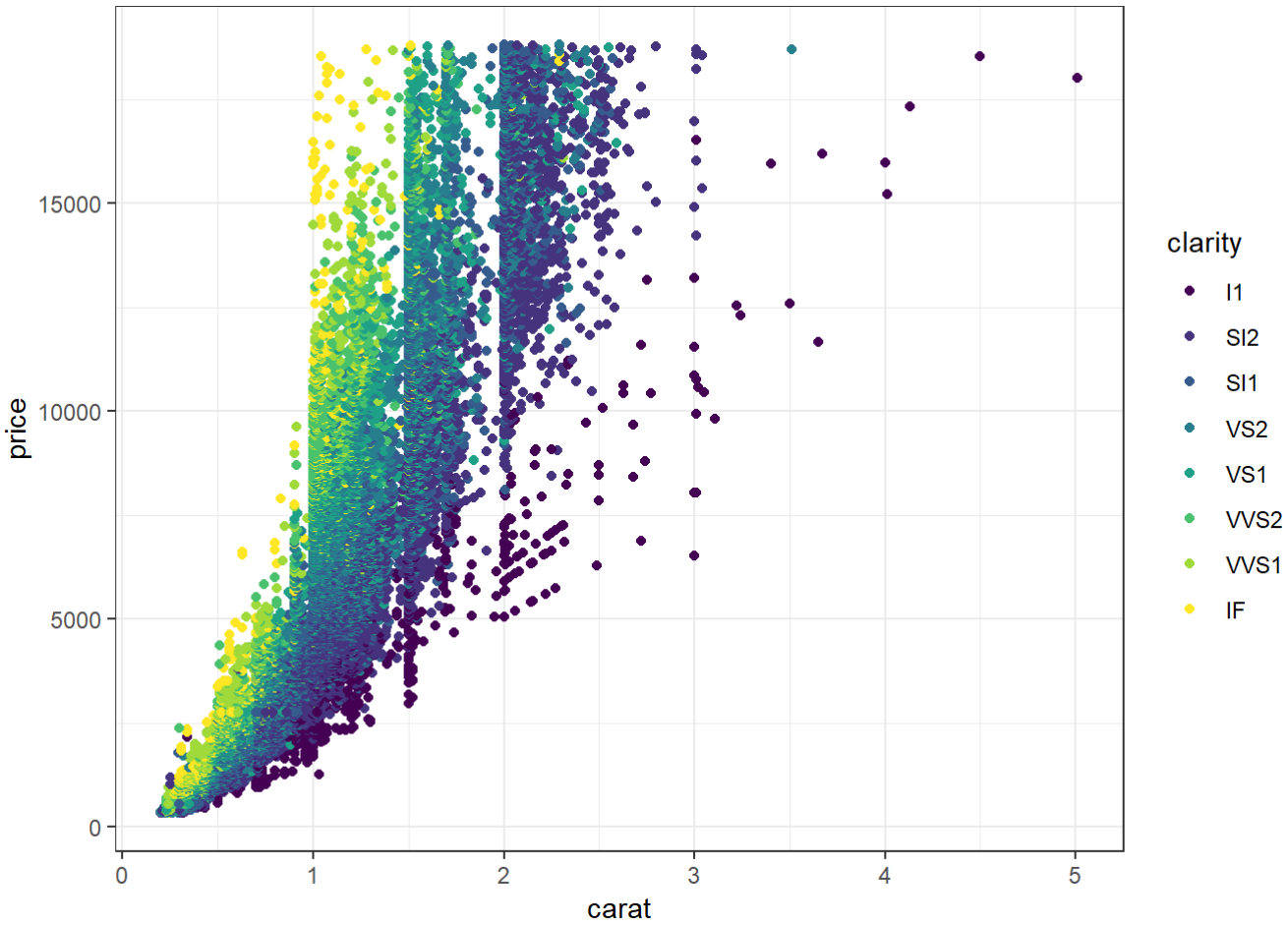

```
g1 <- ggplot(data=diamonds,
       aes(x=carat, y=price, colour=clarity))
g2 <- geom_point()
g3 <- theme_wsj()
g1 + g2 + g3
```




```
plot(diamonds$carat, diamonds$price)
```




```
g1 + g2 + theme_bw()
```


price
15000
10000
5000
0
0
1
2
3
4
5
carat
clarity
I1
SI2
SI1
VS2
VS1
VVS2
VVS1
IF

DF

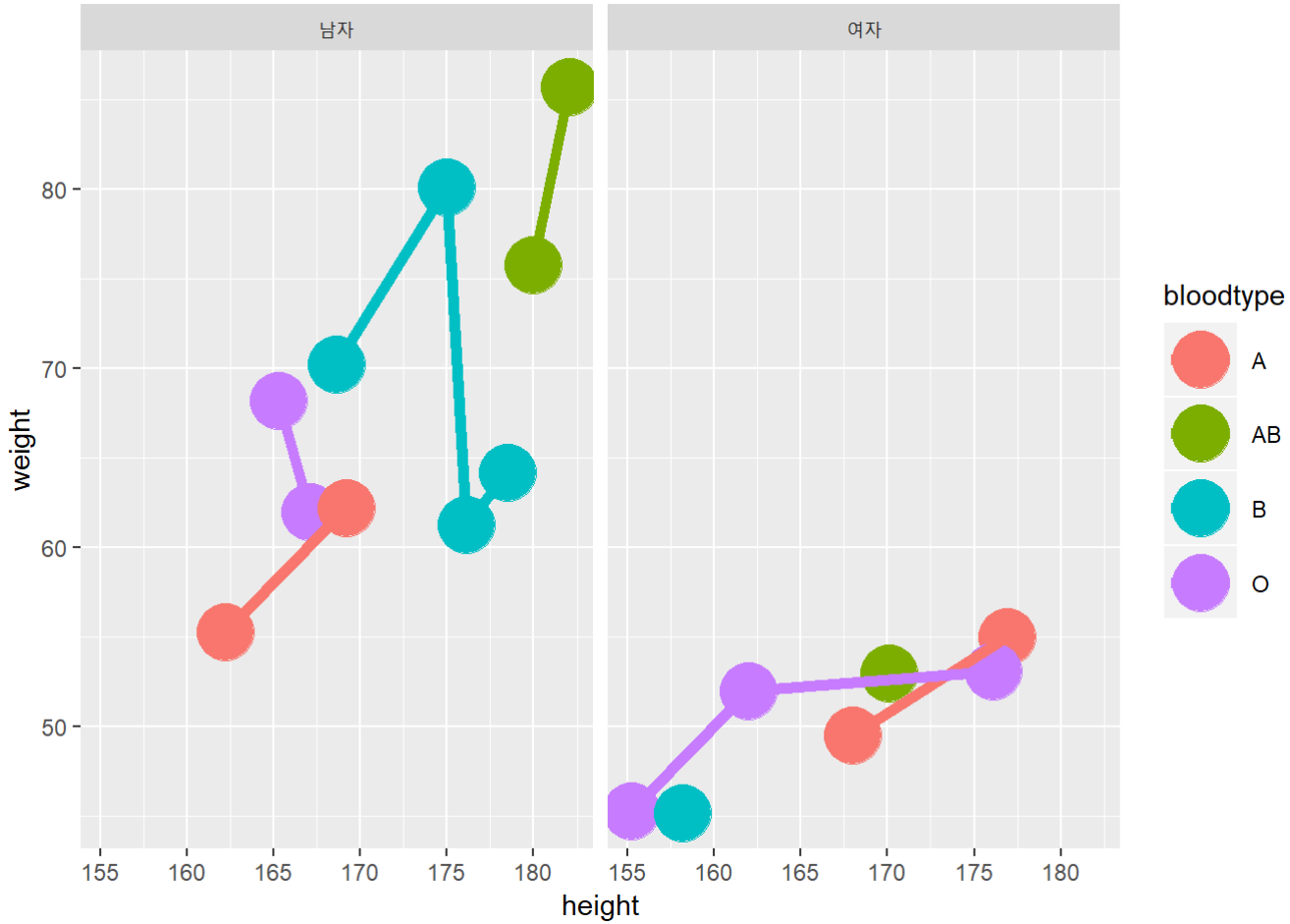
```
##      name  sex age grade absence bloodtype height weight
## 1  김길동 남자  23     3      유         0  165.3   68.2
## 2  이미린 여자  22     2      무        AB  170.1   53.0
## 3  홍길동 남자  24     4      무         B  175.0   80.1
## 4  김철수 남자  23     3      무        AB  182.1   85.7
## 5  손세수 여자  20     1      유         A  168.0   49.5
## 6  박미희 여자  21     2      무         0  162.0   52.0
## 7  강수친 여자  22     1      무         0  155.2   45.3
## 8  이희수 여자  23     1      무         A  176.9   55.0
## 9  이철린 남자  23     3      무         B  178.5   64.2
## 10 방희철 남자  22     2      무         B  176.1   61.3
## 11 박수호 남자  24     4      유         0  167.1   62.0
## 12 임동민 남자  22     2      무        AB  180.0   75.8
## 13 김민수 남자  21     1      무         A  162.2   55.3
## 14 이희진 여자  23     3      무         0  176.1   53.1
## 15 김미진 여자  22     2      무         B  158.2   45.2
## 16 김동수 남자  24     4      유         B  168.6   70.2
## 17 여수근 남자  21     1      무         A  169.2   62.2
```

```
g1 <- ggplot(DF)
```

ggplot2, point, line, size

```
x축 weight, y축 height, 색구분 : bloodtype
(1) 점으로 해보기
(2) 선으로 그려보기
(3) 점의 사이즈를 키워보기
(4) 성별로 나눠서 그래프를 보기
facet_grid() : facet_grid(.~sex)
```

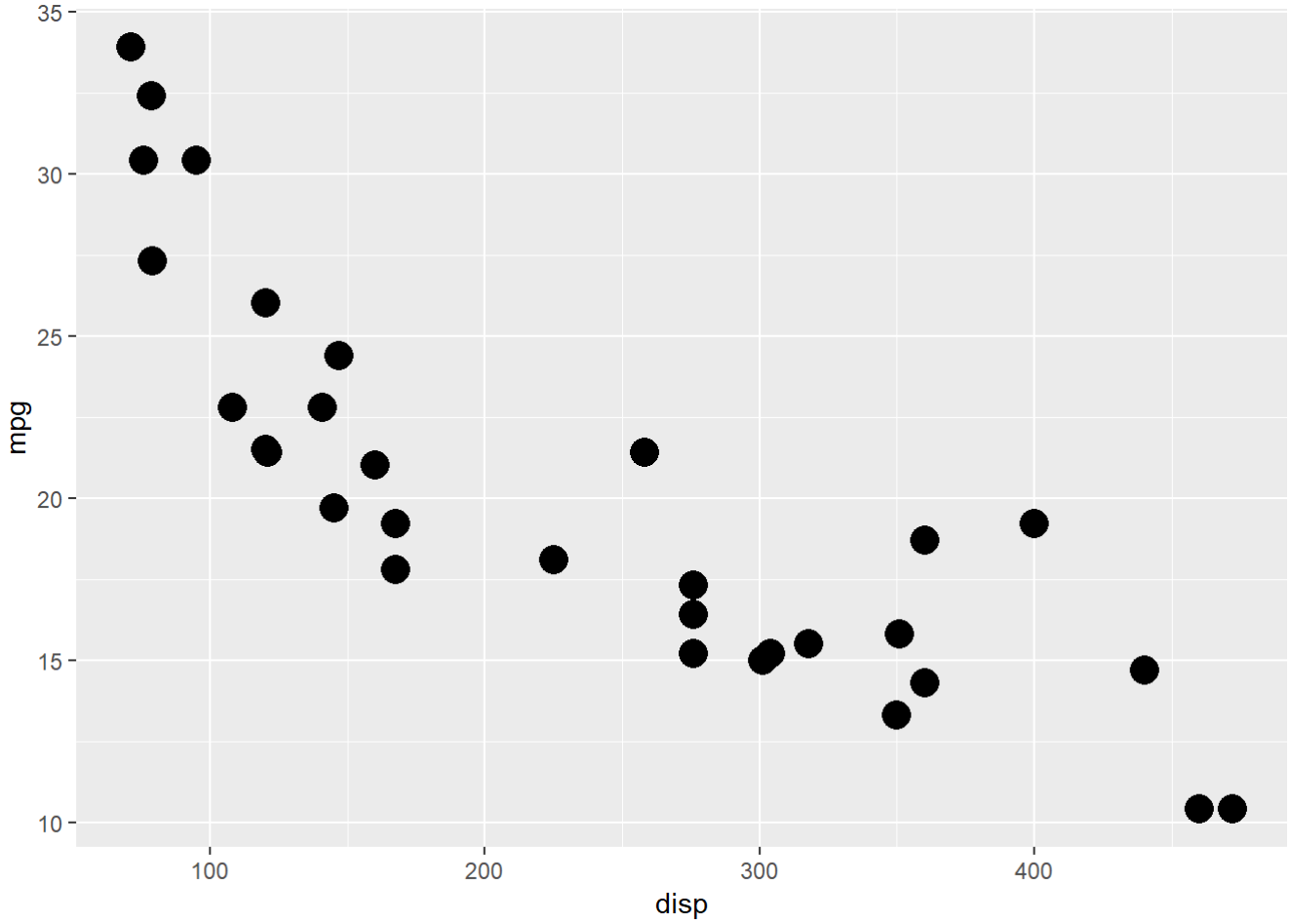
```
g1 <- ggplot(DF, aes(x=height, y=weight,           colour=bloodtype))
g2_p <- geom_point(size=10)
g2_l <- geom_line(size=2)
g3 <- facet_grid(.~sex)
g1 + g2_p + g2_l + g3
```


남자
여자
weight
height
80
70
60
50
155
160
165
170
175
180
bloodtype
A
AB
B
O

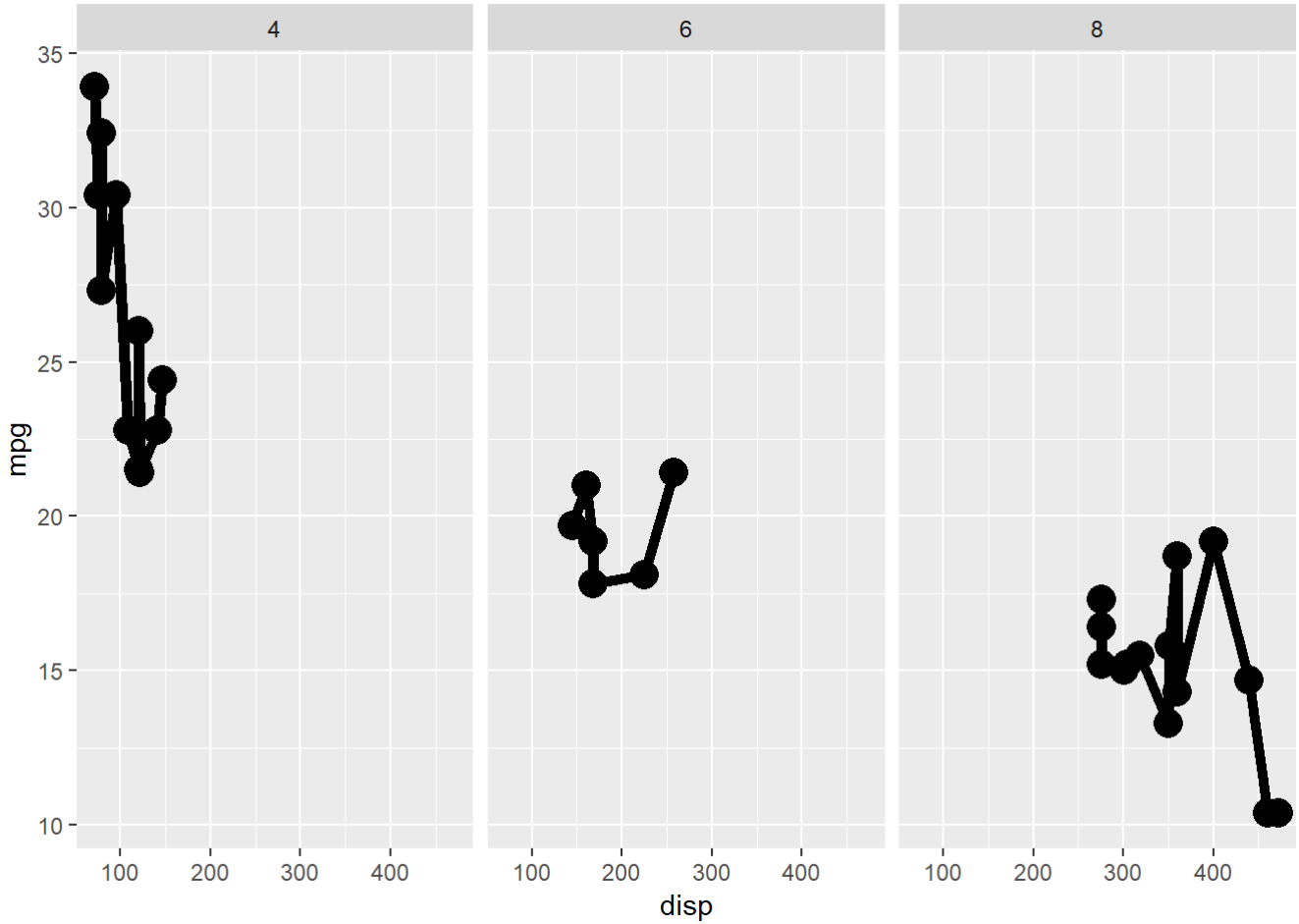
```
mtcars
```

```
##                    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
## Merc 450SL        17.3   8 275.8 180 3.07 3.730 17.60  0  0    3    3
## Merc 450SLC       15.2   8 275.8 180 3.07 3.780 18.00  0  0    3    3
## Cadillac Fleetwood  10.4   8 472.0 205 2.93 5.250 17.98  0  0    3    4
## Lincoln Continental 10.4   8 460.0 215 3.00 5.424 17.82  0  0    3    4
## Chrysler Imperial   14.7   8 440.0 230 3.23 5.345 17.42  0  0    3    4
## Fiat 128          32.4   4  78.7  66 4.08 2.200 19.47  1  1    4    1
## Honda Civic       30.4   4  75.7  52 4.93 1.615 18.52  1  1    4    2
## Toyota Corolla    33.9   4  71.1  65 4.22 1.835 19.90  1  1    4    1
## Toyota Corona     21.5   4 120.1  97 3.70 2.465 20.01  1  0    3    1
## Dodge Challenger  15.5   8 318.0 150 2.76 3.520 16.87  0  0    3    2
## AMC Javelin       15.2   8 304.0 150 3.15 3.435 17.30  0  0    3    2
## Camaro Z28        13.3   8 350.0 245 3.73 3.840 15.41  0  0    3    4
## Pontiac Firebird  19.2   8 400.0 175 3.08 3.845 17.05  0  0    3    2
## Fiat X1-9         27.3   4  79.0  66 4.08 1.935 18.90  1  1    4    1
## Porsche 914-2     26.0   4 120.3  91 4.43 2.140 16.70  0  1    5    2
## Lotus Europa      30.4   4  95.1 113 3.77 1.513 16.90  1  1    5    2
## Ford Pantera L    15.8   8 351.0 264 4.22 3.170 14.50  0  1    5    4
## Ferrari Dino      19.7   6 145.0 175 3.62 2.770 15.50  0  1    5    6
## Maserati Bora     15.0   8 301.0 335 3.54 3.570 14.60  0  1    5    8
## Volvo 142E        21.4   4 121.0 109 4.11 2.780 18.60  1  1    4    2
```

```
g1 <- ggplot(mtcars, aes(disp, mpg))
g2_p <- geom_point(size=5)
#g2_l <- geom_line(size=2)
g3 <- facet_grid(.~cyl)
#g
g1 + g2_p
```




```
g1 + g2_p + g2_l + g3
```

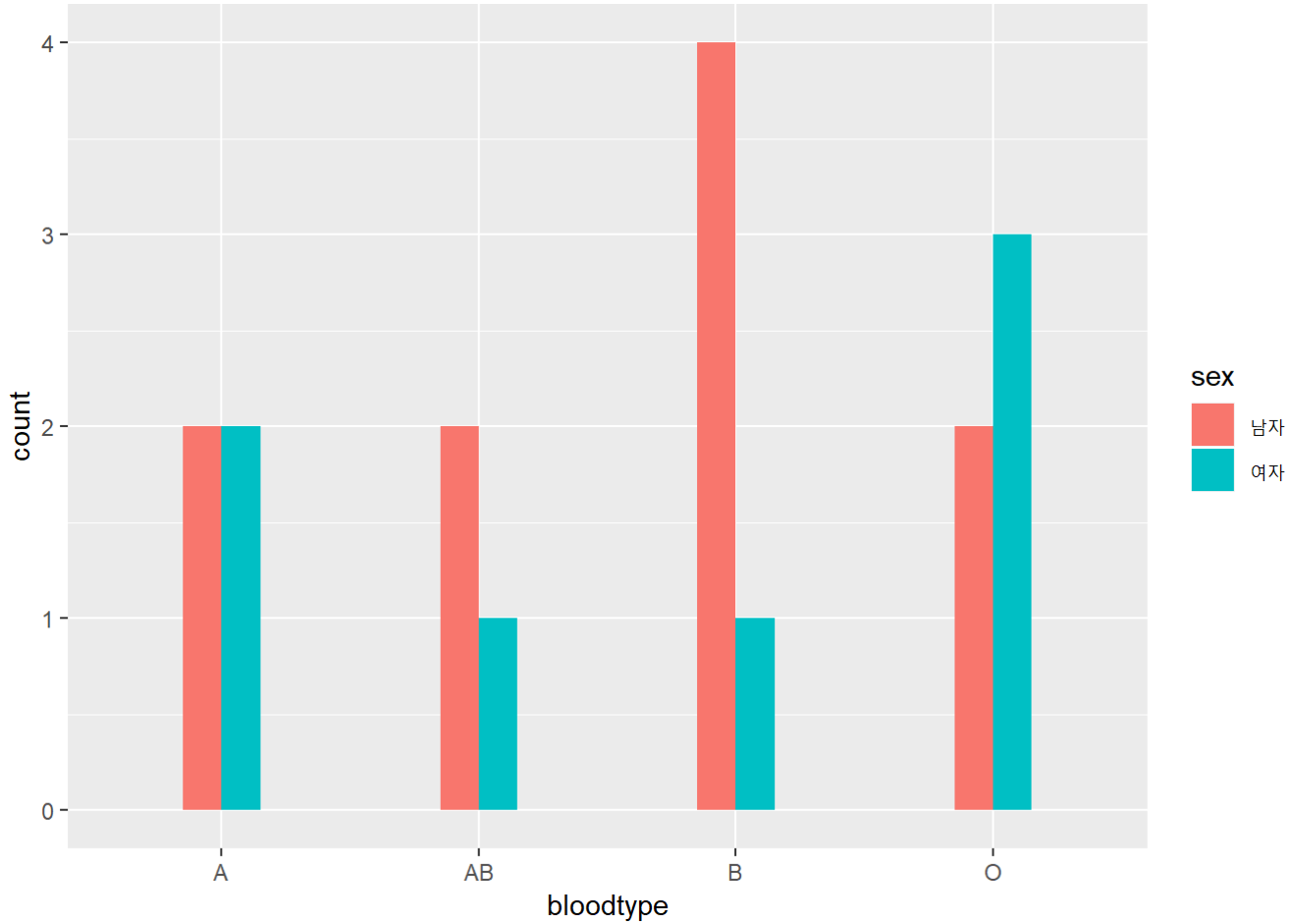


barplot를 ggplot로

DF

```
##      name  sex age grade absence bloodtype height weight
## 1  김길동 남자  23     3      유         0  165.3   68.2
## 2  이미린 여자  22     2      무        AB  170.1   53.0
## 3  홍길동 남자  24     4      무         B  175.0   80.1
## 4  김철수 남자  23     3      무        AB  182.1   85.7
## 5  손세수 여자  20     1      유         A  168.0   49.5
## 6  박미희 여자  21     2      무         0  162.0   52.0
## 7  강수친 여자  22     1      무         0  155.2   45.3
## 8  이희수 여자  23     1      무         A  176.9   55.0
## 9  이철린 남자  23     3      무         B  178.5   64.2
## 10 방희철 남자  22     2      무         B  176.1   61.3
## 11 박수호 남자  24     4      유         0  167.1   62.0
## 12 임동민 남자  22     2      무        AB  180.0   75.8
## 13 김민수 남자  21     1      무         A  162.2   55.3
## 14 이희진 여자  23     3      무         0  176.1   53.1
## 15 김미진 여자  22     2      무         B  158.2   45.2
## 16 김동수 남자  24     4      유         B  168.6   70.2
## 17 여수근 남자  21     1      무         A  169.2   62.2
```

```
g1 <- ggplot(DF, aes(x=bloodtype, fill=sex))
#g2_p <- geom_point(size=5)
#g2_l <- geom_line(size=2)
g2_b <- geom_bar(position = "dodge", width=0.3)
#g3 <- facet_grid(.~cyl)
#g
g1 + g2_b
```




```
table(bloodtype,sex)
```

```
##           sex
## bloodtype 남자 여자
##         A    2    2
##         AB   2    1
##         B    4    1
##         O    2    3
```