

R graphics: Basic

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Introduction

R graphic system

- base graphic system:
 - `plot(x, y)`, `barplot(height)`, `boxplot(formula, data)`
 - `lines()`, `axis()`, `points()`, `text()`, `title()`, `abline()`, `mtext()`
- lattice: `xyplot()`, `cloud()`
- `ggplot2`
- `ggvis`, `rCharts`, `googleVis`, `rbokeh`, `htmlwidgets`

Characteristics of R graphic

- Vector graphics (vs. Bitmap)
- High quality
- Various format such as pdf, png, jpg, tiff
- Various OS including Windows, Linux, and Mac

R basic graphics

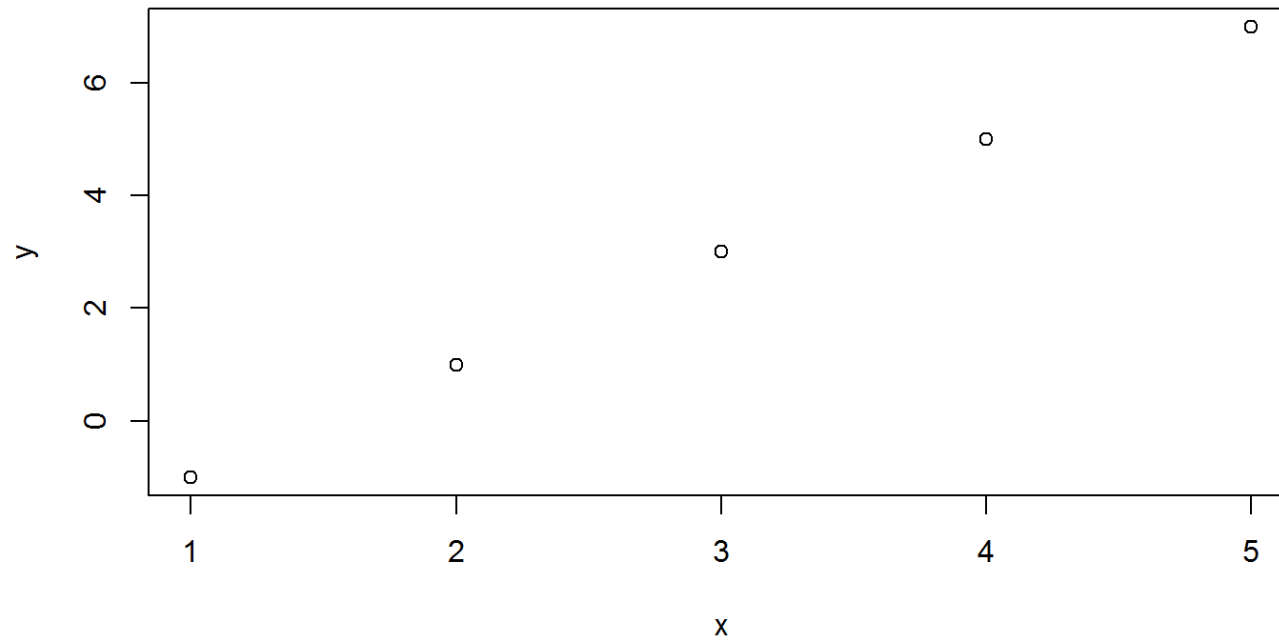
- High level plot: make new plot
 - `plot()`, `hist()`, `barplot()`, `boxplot()`
 - `qqnorm()`, `pairs()`, `curve()`, `symbols()`
- Low level plot: add information
 - `points()`, `lines()`, `abline()`, `arrows()`
 - `text()`, `mtext()`
 - `title()`, `legend()`, `axis()`
 - `box()`, `rug()`

plot(x, y)

```
x <- c(1, 2, 3, 4, 5)
```

```
y <- 2 * x - 3
```

```
plot(x, y)
```

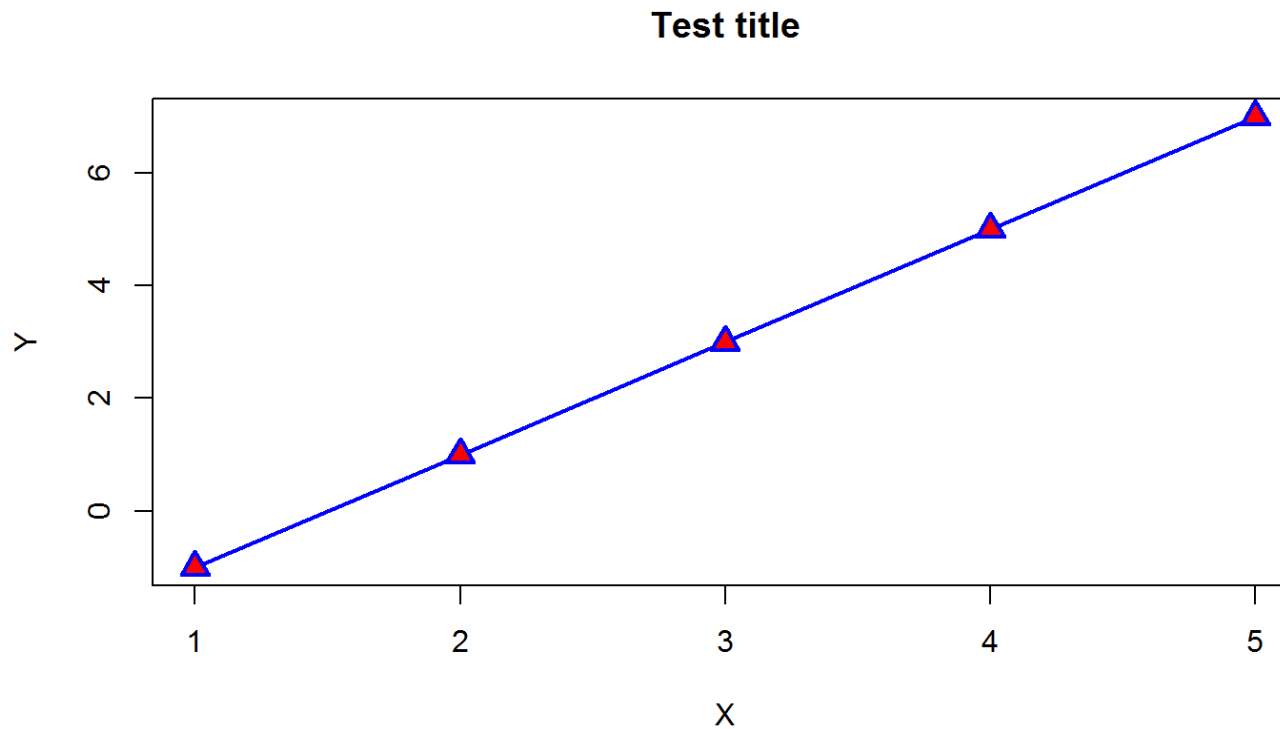


`plot(x, y, main = , xlab = , ylab = , col = , type =)`

- main: title
- xlab and ylab: label of x and y axis
- type: p, l, b, c, o, h, s, S, n
- lty: 1 to 6
- lwd, cex
- col: colors()
- pch: 1 to 25, o, O, 0, a, A, *, +, -, |
- bg; pch 21 to 25
- help(par): help file for the parameters

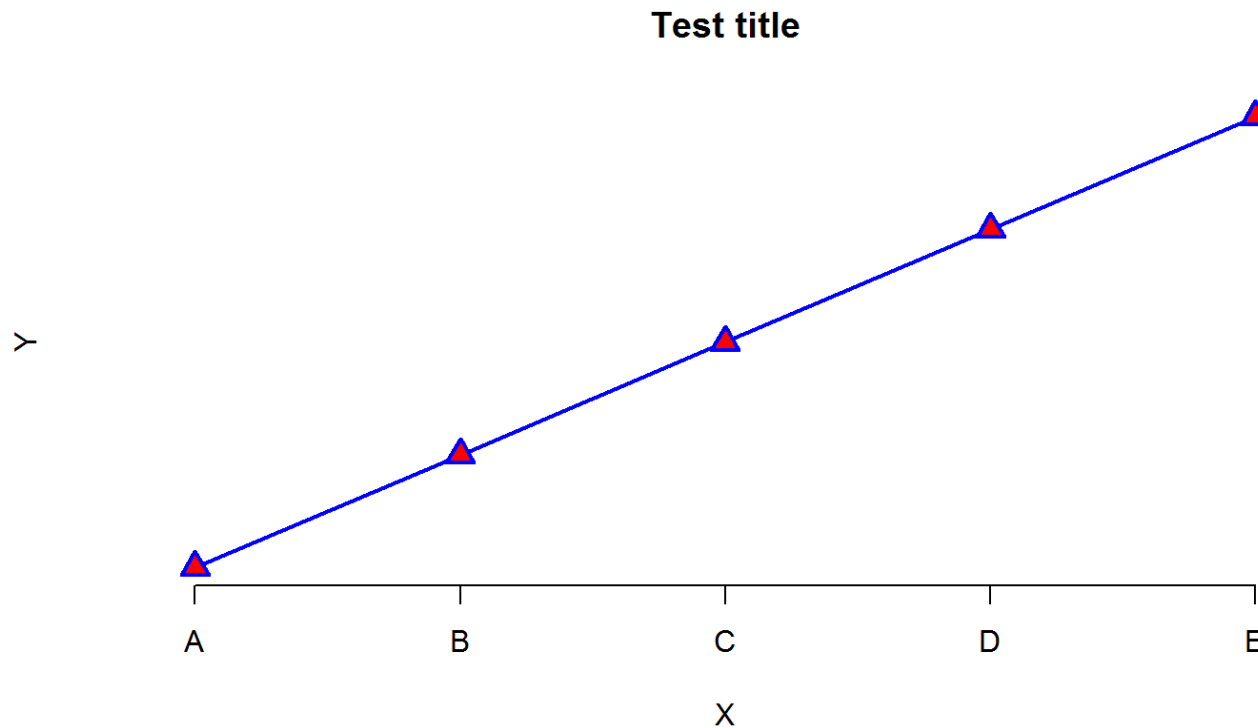
You can change the options

```
plot(x, y, main = "Test title", xlab = "X", ylab = "Y",  
     type = "o", lwd = 2, col = "blue", pch = 24, bg = "red", cex = 1.5)
```



axis()

```
plot(x, y, main = "Test title", xlab = "X", ylab = "Y",  
     type = "o", lwd = 2, col = "blue", pch = 24, bg = "red", cex = 1.5,  
     axes = F)  
axis(1, at = 1:5, lab=c("A", "B", "C", "D", "E"))
```



Add lines using lines()

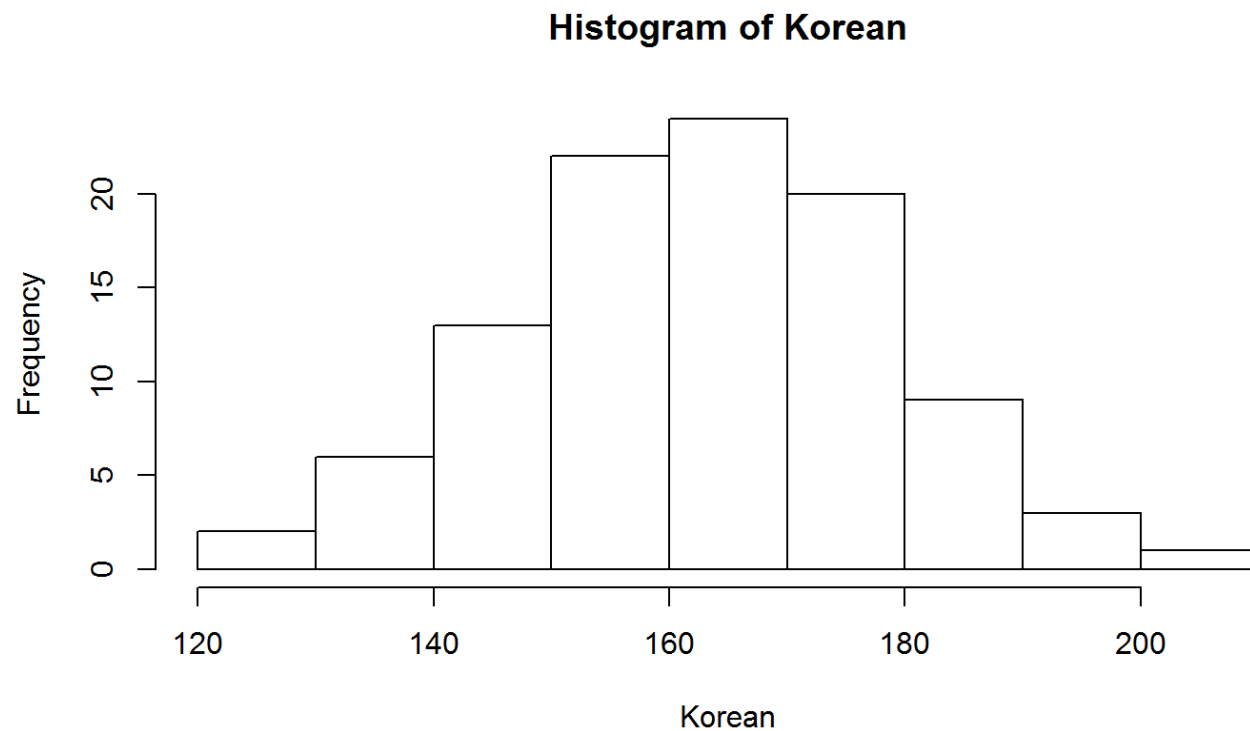
```
plot(x, y, main = "Test title", xlab = "X", ylab = "Y",  
     type = "o", lwd = 2, col = "blue", pch = 24, bg = "red", cex = 1.5,  
     axes = F)  
axis(1, at = 1:5, lab=c("A", "B", "C", "D", "E"))  
lines(c(1, 3, 4, 7, 2), type = "o", pch = 23, lty = 2, col = "red")
```

Add titles using title()

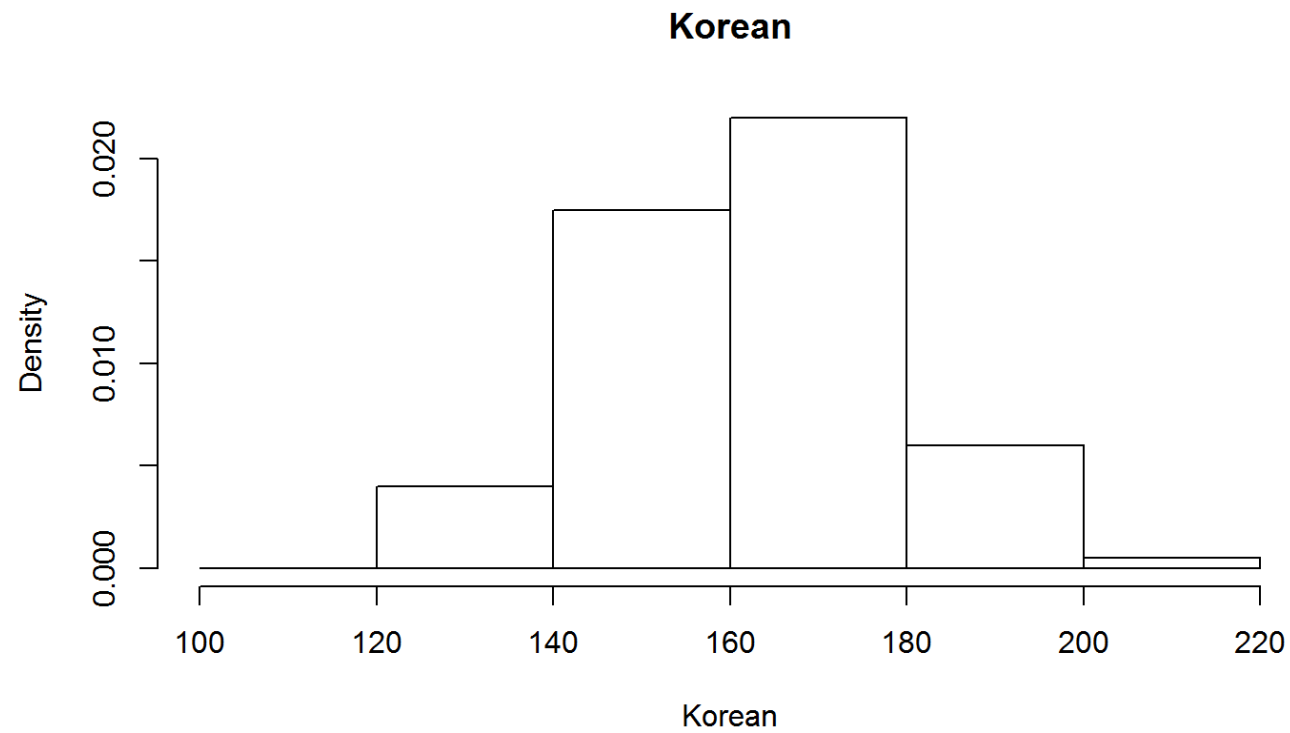
```
plot(x, y, xlab = "X", ylab = "Y",  
     type = "o", lwd = 2, col = "blue", pch = 24, bg = "red", cex = 1.5,  
     axes = F)  
axis(1, at = 1:5, lab=c("A", "B", "C", "D", "E"))  
lines(c(1, 3, 4, 7, 2), type = "o", pch = 23, lty = 2, col = "red")  
title(main = "New titles", col.main = "red")
```

histogram using hist()

```
Korean <- rnorm(100, mean = 160, sd = 15)  
hist(Korean)
```

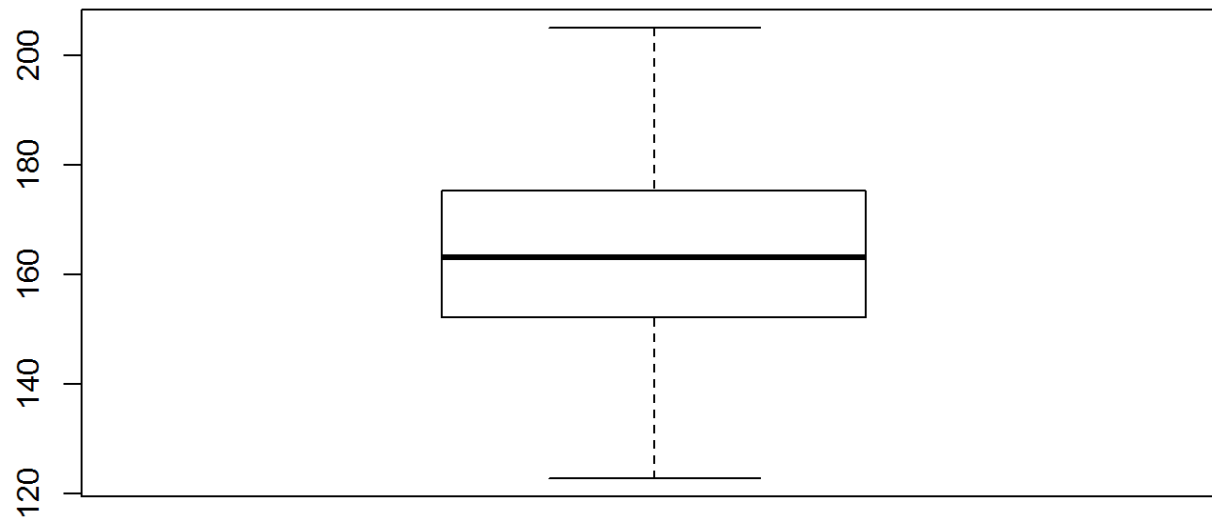


```
hist(Korean, freq = F, breaks = c(100, 120, 140, 160, 180, 200, 220), main = "Korean")
```

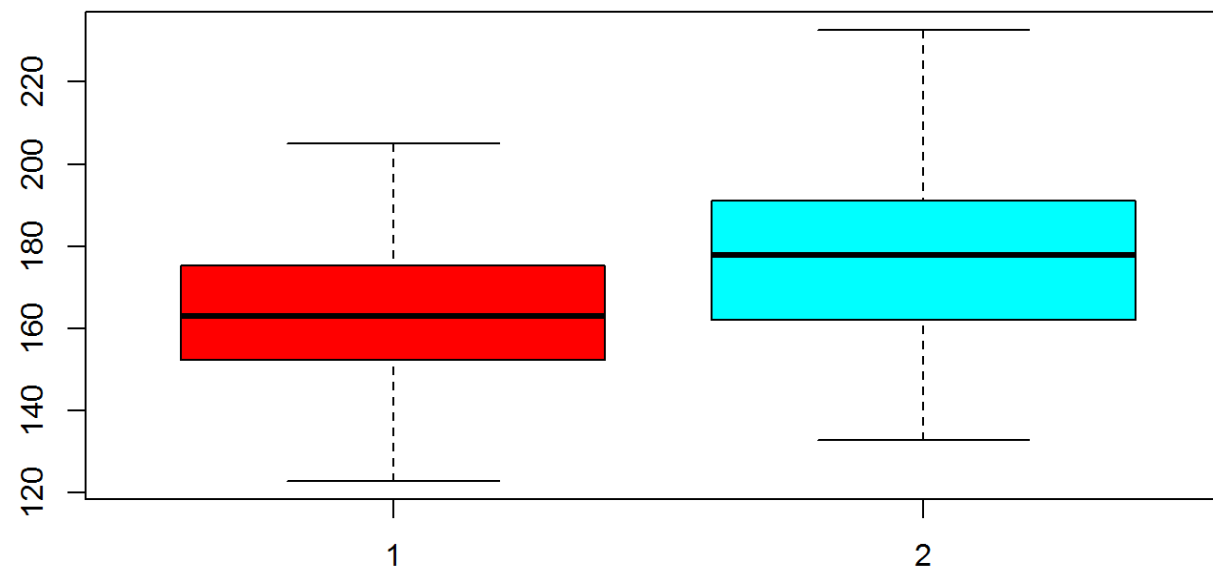


boxplot()

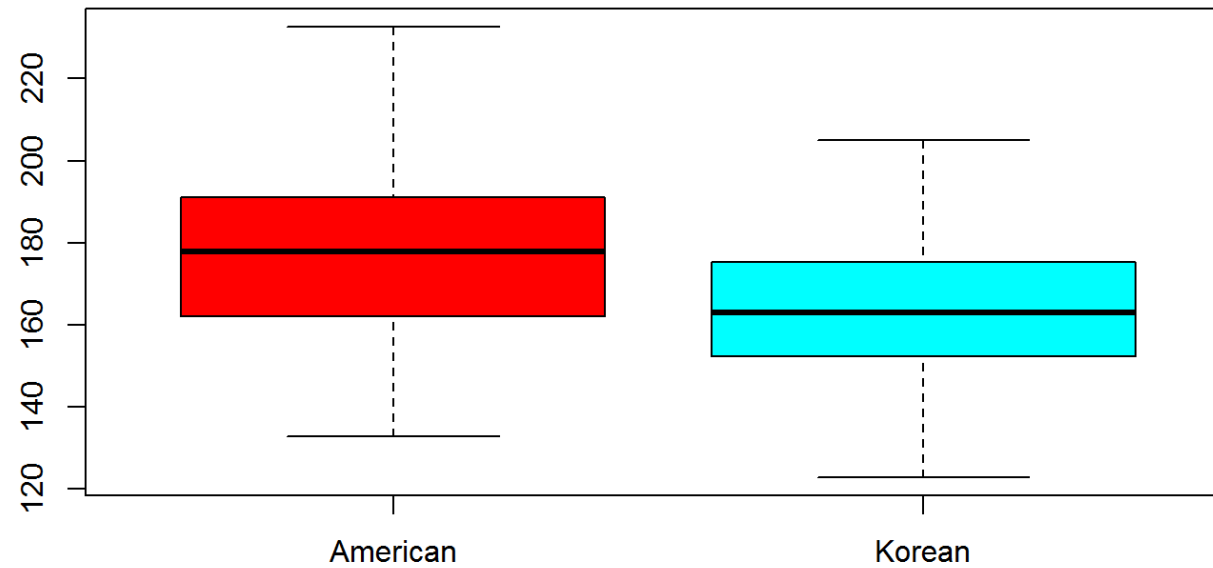
boxplot(Korean)



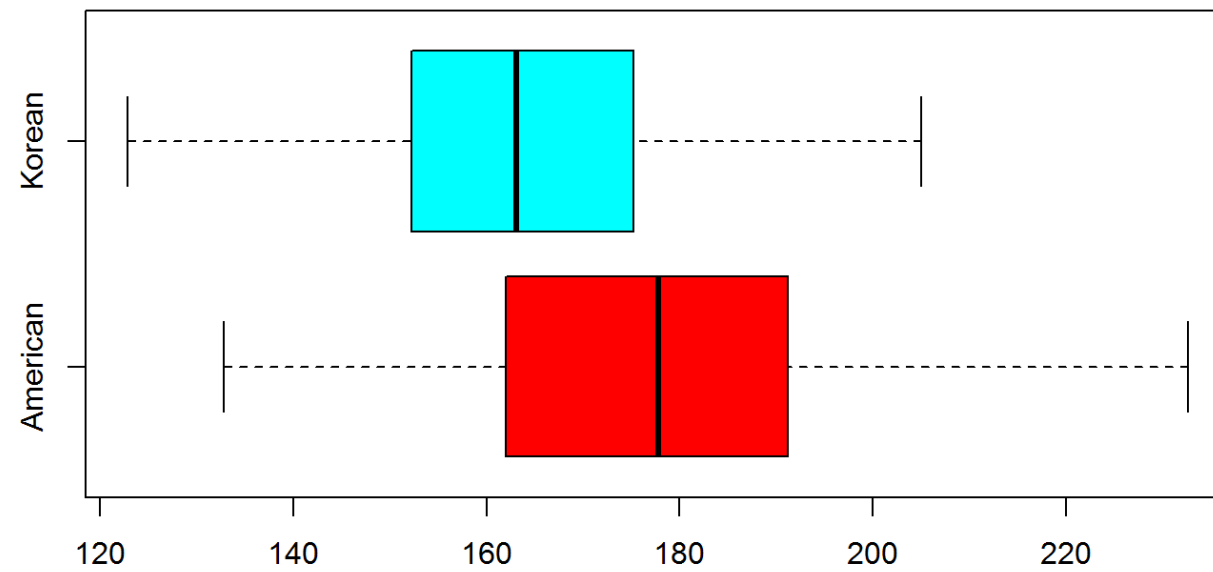
```
American <- rnorm(100, mean = 180, sd = 20)  
boxplot(Korean, American, col = rainbow(2))
```



```
Height = c(Korean, American)
Race = rep(c("Korean", "American"), each = 100)
boxplot(Height ~ Race, col = rainbow(2))
```

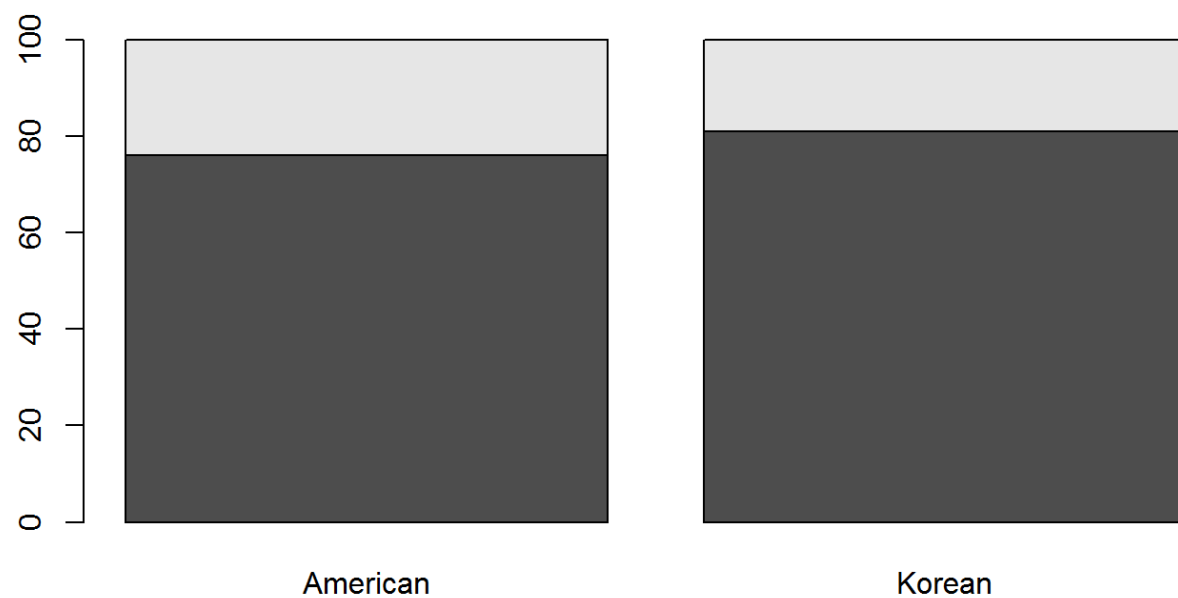



```
boxplot(Height ~ Race, col = rainbow(2), horizontal = T)
```



Barplot

```
smoke <- sample(c("Smoke", "Non-smoke"), size = 200, replace = T, prob = c(0.25, 0.75))  
tx <- table(smoke, Race)  
barplot(tx)
```



```
barplot(tx, col = c("red", "blue"), legend.text = rownames(tx))
```

