


























3. R 시각화 : 기본 패키지(graphics)

3.1 시각화 함수의 종류

- **고수준 함수** – plot(), boxplot(), hist(), pie(), barplot()
- **저수준 함수** – title(), lines(), axis(), legend(), points(), text()
- **칼라팔레트 함수** – rainbow(), cm.colors(), topo.colors(), terrain.colors(), heat.colors()

pch

0: 	10: 	20: 	A: A
1: 	11: 	21: 	a: a
2: 	12: 	22: 	B: B
3: 	13: 	23: 	b: b
4: 	14: 	24: 	S: S
5: 	15: 	25: 	`: `
6: 	16: 	@: @	.: .
7: 	17: 	+: +	,: ,
8: 	18: 	?: ?	
9: 	19: 	#: #	*: *

->

->

F00 () 가
가

lty

0. "blank"

1. "solid"

2. "dashed"

3. "dotted"

4. "dotdash"

5. "longdash"

6. "twodash"

lty :

pch:

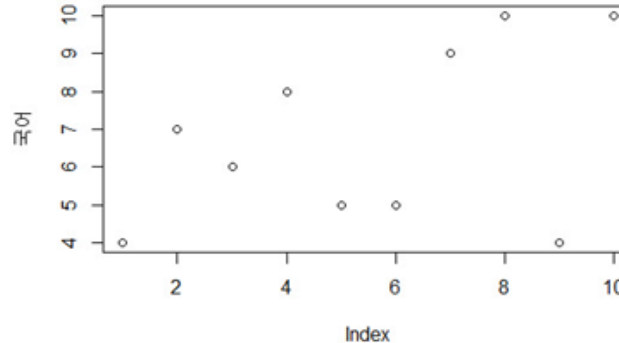
3. R 시각화 : 기본 패키지(graphics)

3.2 산포도

```
국어 <- c(4,7,6,8,5,5,9,10,4,10)
```

```
plot(국어)
```

```
가      index  
plot(   )
```



```
plot(국어, type="o", col="blue")
```

```
title(main="성적그래프", col.main="red", font.main=4)
```

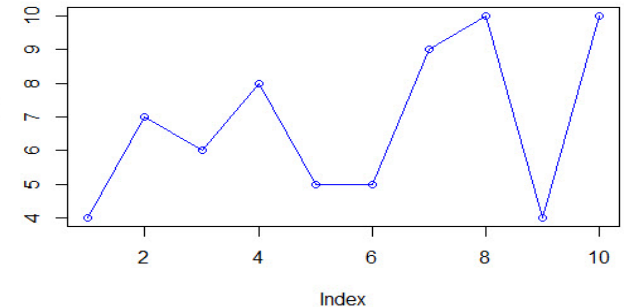
```
title  
가      가
```

```
type->
```

```
가 /
```

```
col ->
```

```
p type
```



성적그래프

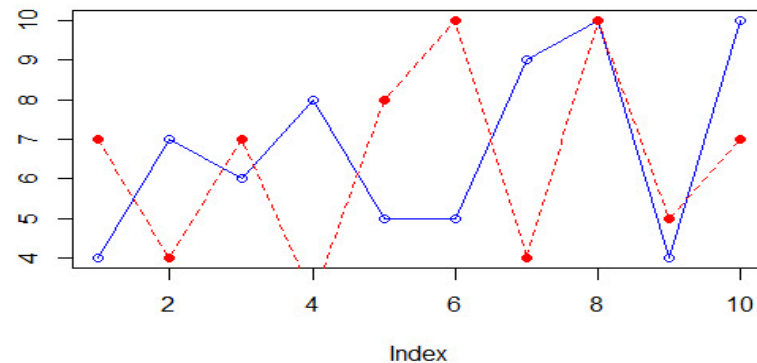
```
수학 <- c(7,4,7,3,8,10,4,10,5,7)
```

```
plot(국어, type="o", col="blue")
```

```
lines(수학, type="o", pch=16, lty=2, col="red")
```

```
title(main="성적그래프", col.main="red", font.main=4)
```

```
type      pch( ),  
lty( )가  
plot  
lines
```



성적그래프

3. R 시각화 : 기본 패키지(graphics)

3.2 산포도

8

```
par(mar=c(1,1,1,1), mfrow=c(4,2))
```

```
plot(국어, type="p", col="blue", main="type = p", xaxt="n", yaxt="n")
```

```
plot(국어, type="l", col="blue", main="type = l", xaxt="n", yaxt="n")
```

```
plot(국어, type="b", col="blue", main="type = b", xaxt="n", yaxt="n")
```

```
plot(국어, type="c", col="blue", main="type = c", xaxt="n", yaxt="n")
```

```
plot(국어, type="o", col="blue", main="type = o", xaxt="n", yaxt="n")
```

```
plot(국어, type="h", col="blue", main="type = h", xaxt="n", yaxt="n")
```

```
plot(국어, type="s", col="blue", main="type = s", xaxt="n", yaxt="n")
```

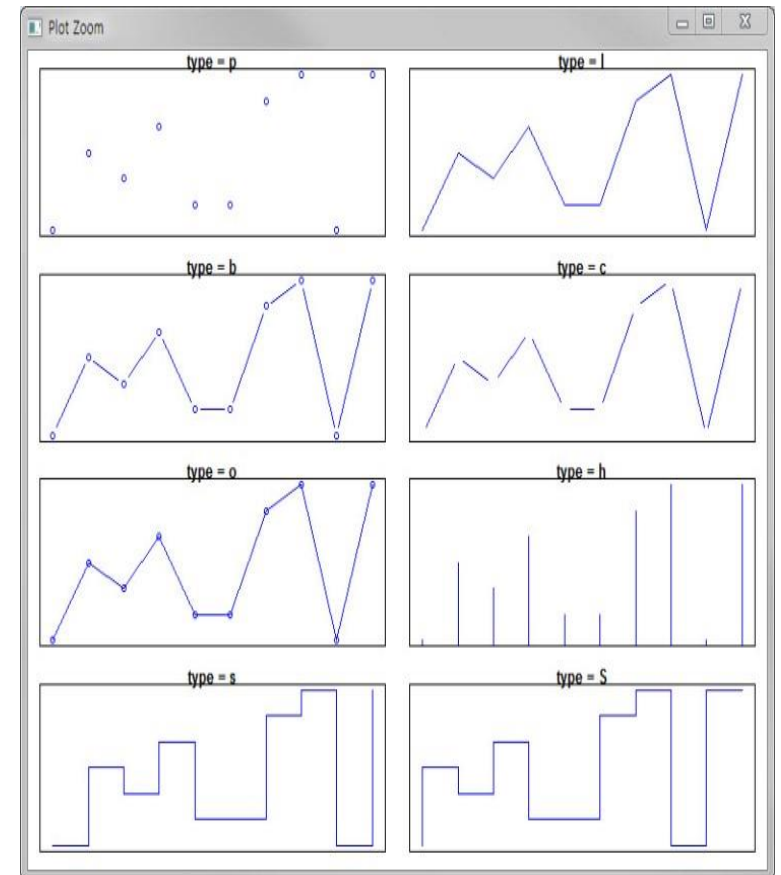
```
plot(국어, type="S", col="blue", main="type = S", xaxt="n", yaxt="n")
```

```
par ->
mfrow ->
mar ->

plot      1  1  1  2      5

가

par      1  1
```



3. R 시각화 : 기본 패키지(graphics)

3.2 산포도

```
par(mar=c(5,5,5,5), mfrow=c(1,1))  
plot(국어, type="o", col="blue", ylim=c(0,12), axes=F, ann=FALSE)
```

```
axis  
1 -> x  2-> y
```

```
axis(1, at=1:10, lab=c("01","02","03","04","05","06","07","08","09","10")) # x축 추가  
axis(2, at=c(0,2,4,6,8,10)) # y축 추가
```

```
lines(수학, type="o", pch=16, lty=2, col="red")
```

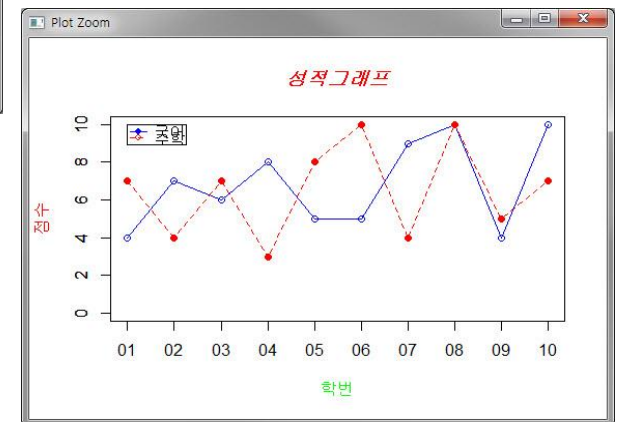
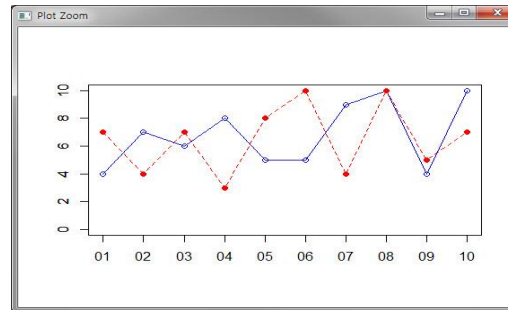
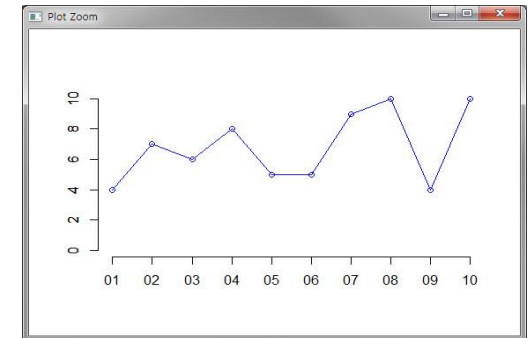
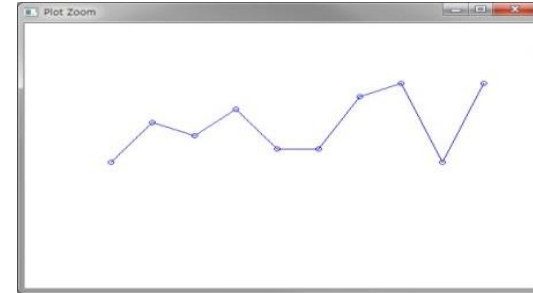
```
box()
```

```
title(main="성적그래프", col.main="red", font.main=4)  
title(xlab="학번", col.lab=rgb(0,1,0))  
title(ylab="점수", col.lab=rgb(1,0,0))
```

```
legend(1, 10, c("국어","수학"), cex=0.8, col=c("blue","red"), pch=c(16,21), lty=c(1,2))
```

```
legend
```

```
(1):x , (10):y
```



3. R 시각화 : 기본 패키지(graphics)

3.2 산포도

x	y
-----	-----

```
(성적 <- read.table("성적.txt", header=TRUE));
```

```
plot(성적$학번, 성적$국어, main="성적그래프", xlab="학번", ylab="점수", xlim=c(0, 11), ylim=c(0, 11))
```

#이미지 파일로 출력

```
ymax <- max(성적$국어) #성적 데이터 중에서 최대값을 찾는다(y 축의 크기 제한)
```

```
pcols<- c("red","blue","green")
```

```
png(filename="성적.png", height=400, width=700, bg="white") # 출력을 png파일로 설정
```

```
plot(성적$국어, type="o", col=pcols[1], ylim=c(0, ymax), axes=FALSE, ann=FALSE)
```

```
axis(1, at=1:10, lab=c("01","02","03","04","05","06","07","08","09","10"))
```

```
axis(2, at=0:5, lab=c(0,2,4,6,8,10))
```

box()

```
lines(성적$수학, type="o", pch=16, lty=2, col=pcols[2])
```

```
lines(성적$영어, type="o", pch=23, lty=3, col=pcols[3] )
```

```
title(main="성적그래프", col.main="red", font.main=4)
```

```
title(xlab="학번", col.lab=rgb(1,0,0))
```

```
title(ylab="점수", col.lab=rgb(0,0,1))
```

```
legend(1, ymax, names(성적)[-1], cex=0.8, col=pcols, pch=c(21,16,23), lty=c(1,2,3))
```

dev.off() #출력 종료

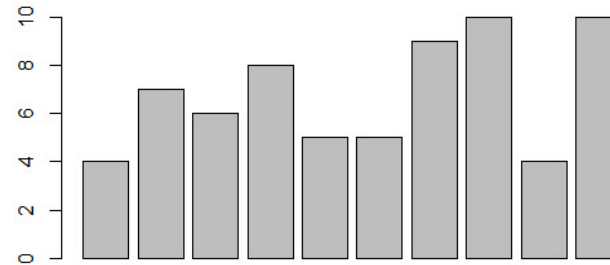
close()

```
R
png
400 700 backgroundColor = "white"
```

3. R 시각화 : 기본 패키지(graphics)

3.3 바 그래프 그리기

barplot(국어)



```
coldens <- seq(from=10, to=100, by=10) # 막대그래프의 색밀도 설정을 위한 벡터
```

```
xname <- 성적$학번 # X 축 값 설정위한 벡터
```

```
barplot(성적$국어, main="성적그래프", xlab="학번", ylab="점수", border="red", col="green", density=coldens,  
names.arg=xname)
```



density = colodens ->
seq -> 10 가

3. R 시각화 : 기본 패키지(graphics)

3.3 바 그래프 그리기

```
성적1 <- 성적[3:5]
```

```
barplot(as.matrix(성적1), main="성적그래프", ylab="점수",
```

```
beside=TRUE, col=rainbow(10))
```

```
beside 가 f .
```

```
xname <- 성적$학번; # x축 레이블용 벡터
```

```
barplot(t(성적1), main="성적그래프", ylab="점수", col=rainbow(3)
```

```
space=0.1, cex.axis=0.8, names.arg=xname, cex=0.8)
```

```
legend(0,28, names(성적1), cex=0.8, fill=rainbow(3));
```

```
t .
```

```
barplot(t(성적1), main="성적그래프",
```

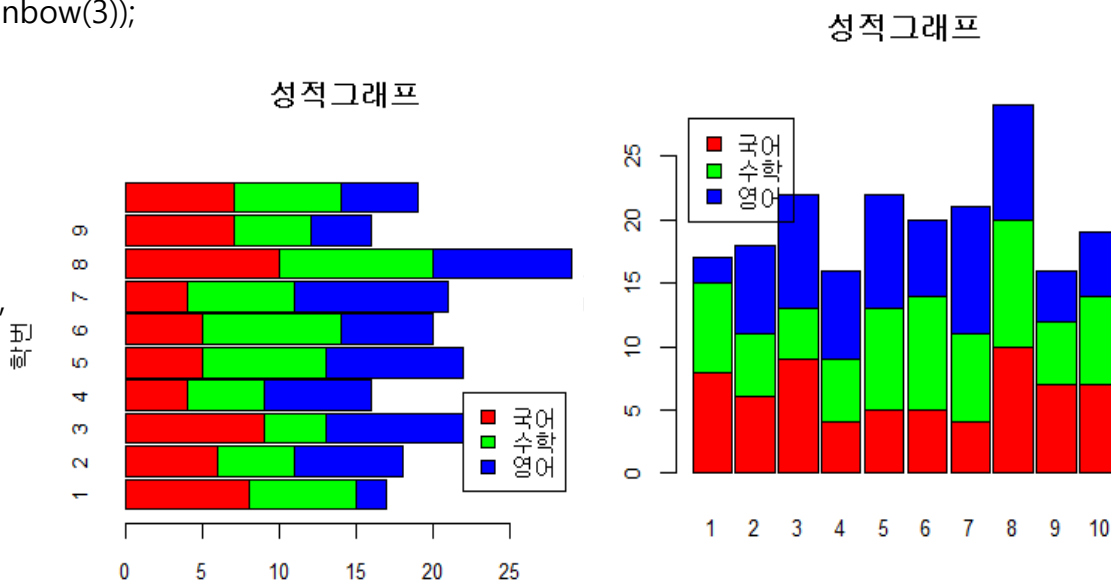
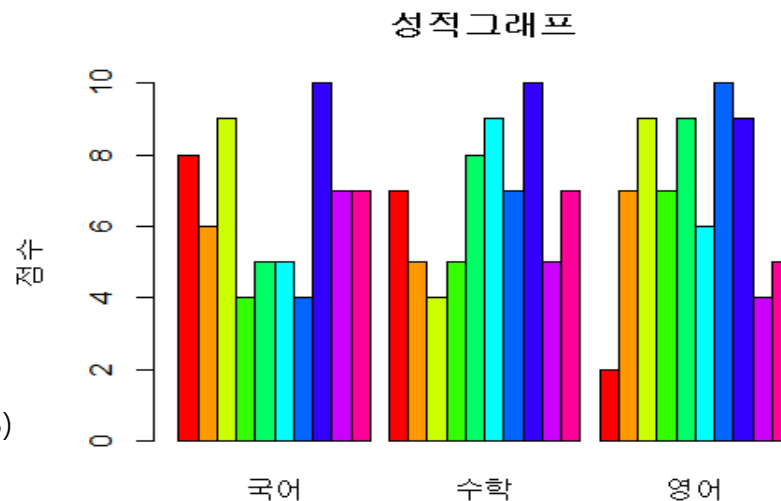
```
ylab="학번", col=rainbow(3),
```

```
space=0.1, cex.axis=0.8, names.arg=xname,
```

```
cex=0.8, horiz=T)
```

```
legend(22, 4, names(성적1), cex=0.8,
```

```
fill=rainbow(3));
```



3. R 시각화 : 기본 패키지(graphics)

3.4 히스토그램그리기

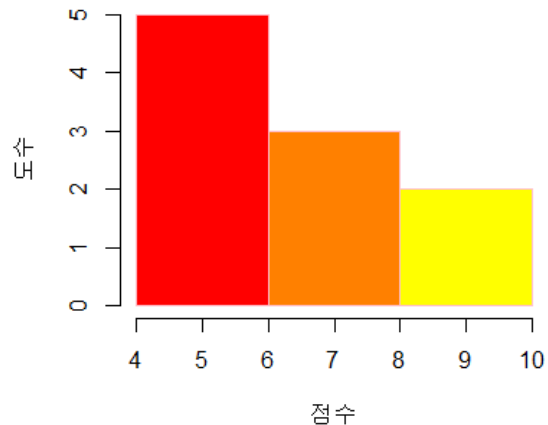
```
hist(성적$수학, main="성적분포-수학", xlab="점수", col = "lightblue",  
border = "pink")
```

```
hist(성적$국어, main="성적분포-국어", xlab="점수", ylab="도수",  
breaks=6, col=rainbow(12), border = "pink")
```

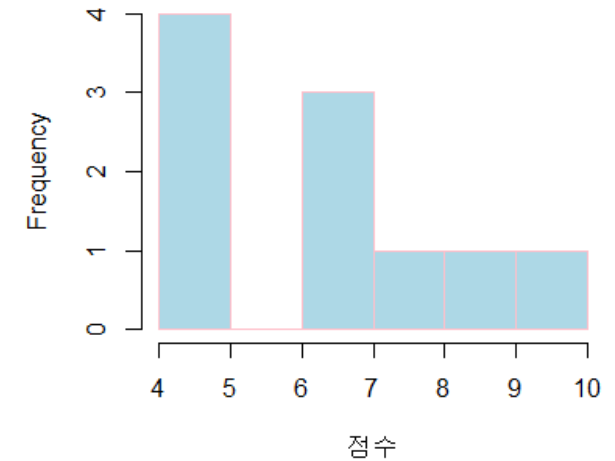
```
hist(성적$국어, main="성적분포-국어", xlab="점수", ylab="도수",  
breaks=3, col=rainbow(12), border = "pink")
```

breaks

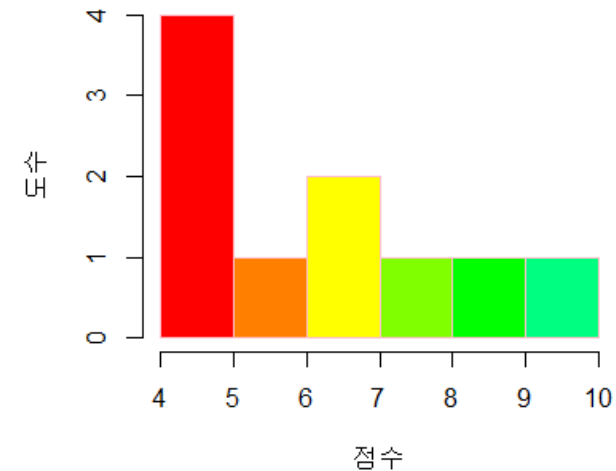
성적분포-국어



성적분포-수학



성적분포-국어

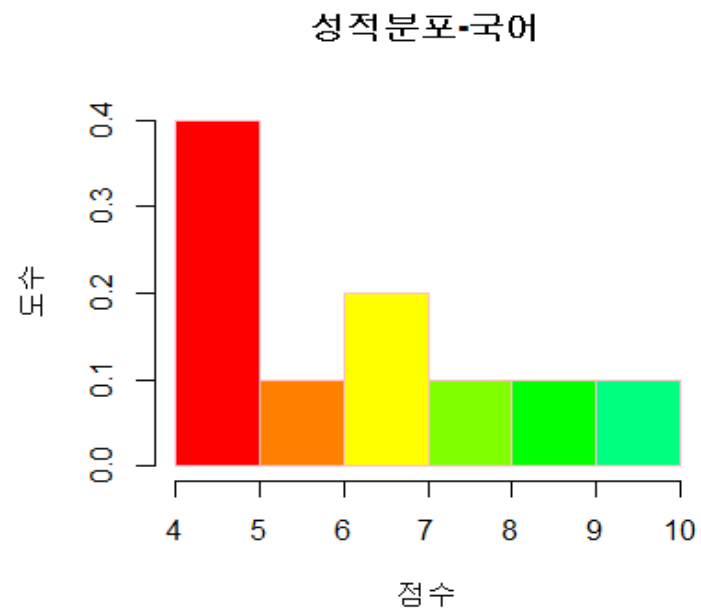


3. R 시각화 : 기본 패키지(graphics)

3.4 히스토그램그리기

```
hist(성적$국어, main="성적분포-국어", xlab="점수", ylab="도수",  
breaks=6, col=rainbow(12), border = "pink", prob=T)
```

```
prob=T  
% .
```



3. R 시각화 : 기본 패키지(graphics)

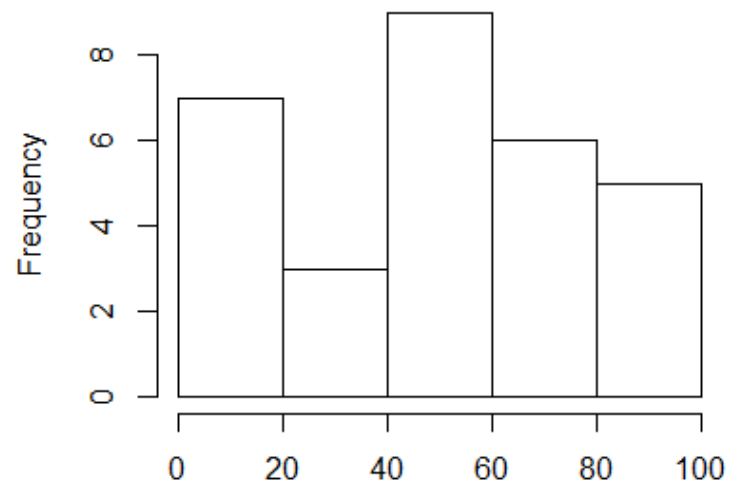
3.4 히스토그램그리기

```
nums <- sample(1:100, 30)  
hist(nums)
```

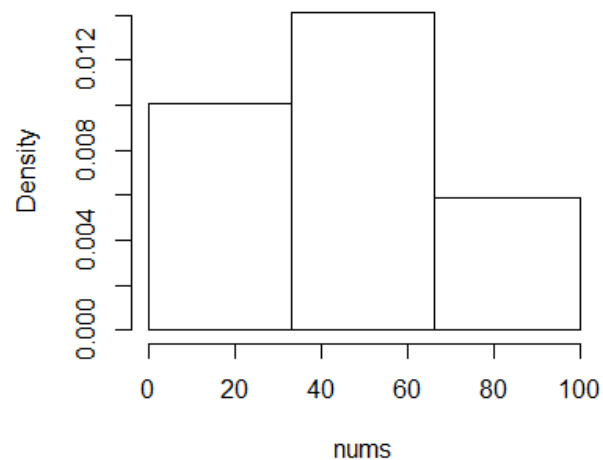
```
hist(nums, breaks=c(0,33,66,100))
```



Histogram of nums



Histogram of nums



3. R 시각화 : 기본 패키지(graphics)

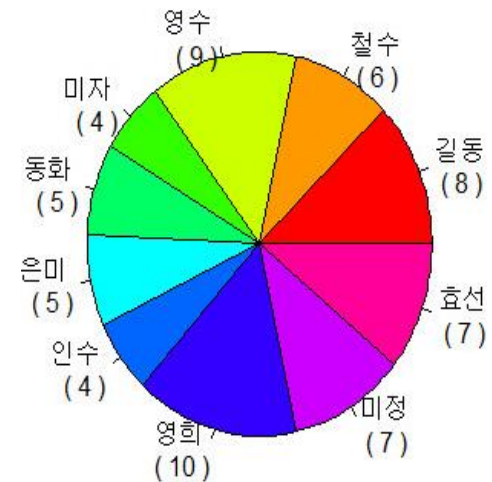
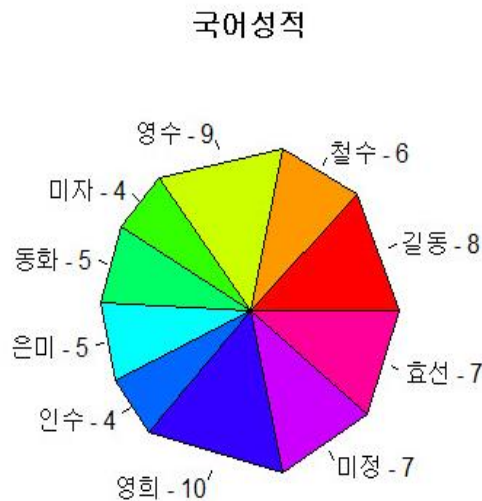
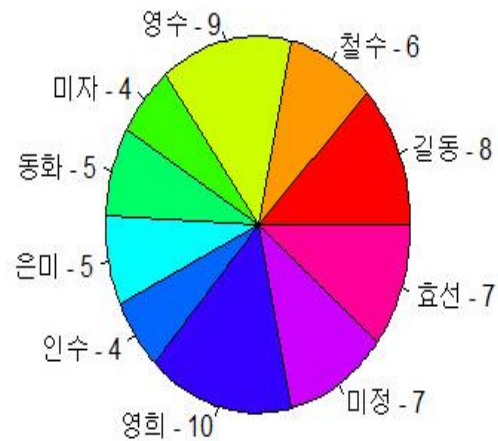
3.5 파이 그래프 그리기

```
pie(성적$국어, labels=paste(성적$성명, "-", 성적$국어), col=rainbow(10))
```

```
pie(성적$국어, labels=paste(성적$성명, "-", 성적$국어), col=rainbow(10), main="국어성적", edges=10)
```

```
pie(성적$국어, labels=paste(성적$성명, "\n", "(", 성적$국어, ")"), col=rainbow(10))
```

default
clockwise=T



3. R 시각화 : 기본 패키지(graphics)

3.6 박스 그래프 그리기

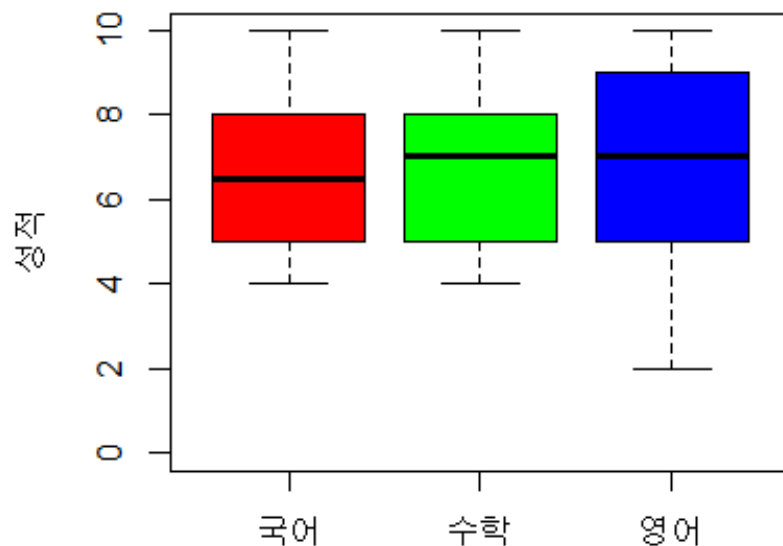
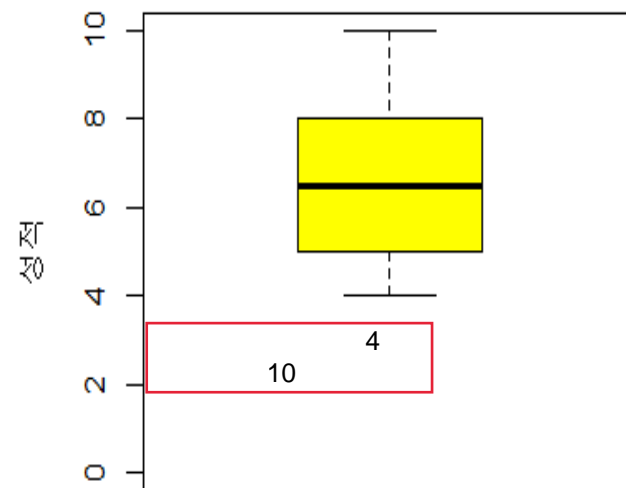
가

```
summary(성적$국어)
```

```
boxplot(성적$국어, col="yellow", ylim=c(0,10), xlab="국어",  
ylab="성적")
```

```
성적2 <- 성적[3:5]
```

```
boxplot(성적2, col=rainbow(3), ylim=c(0,10), ylab="성적")
```



가

국어

3. R 시각화 : 기본 패키지(graphics)

3.6 박스 그래프 그리기

```
data <- read.table("온도.txt", header=TRUE, sep=",")
```

```
head(data, n=5);
```

```
boxplot(data)
```

```
las -1 -> 가  
las -2 ->
```

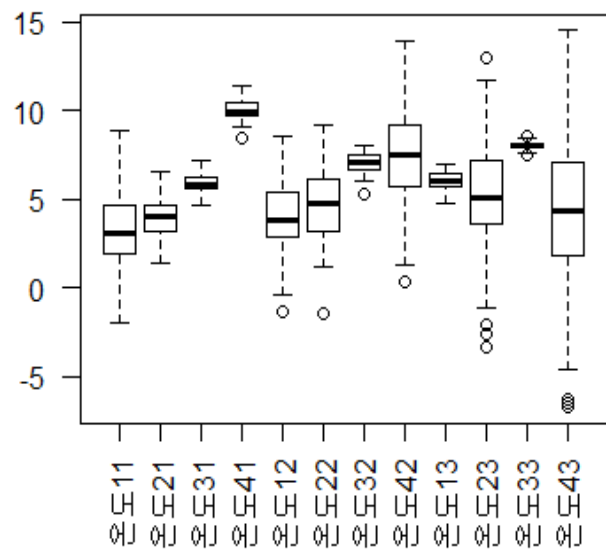
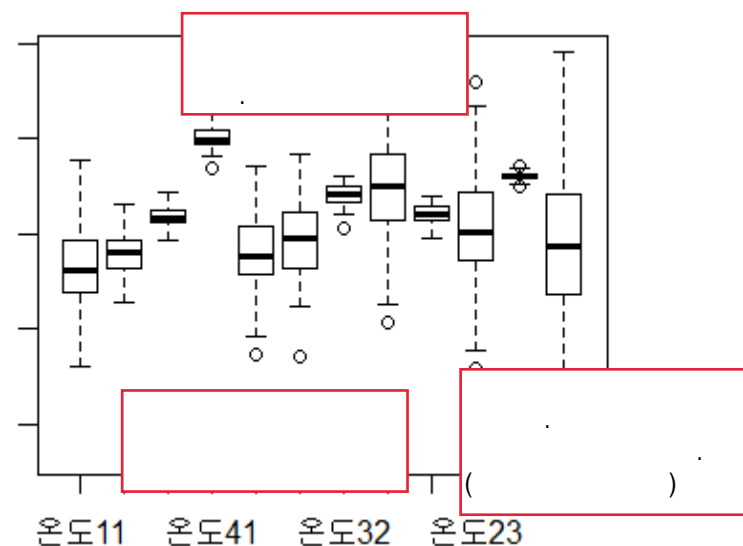
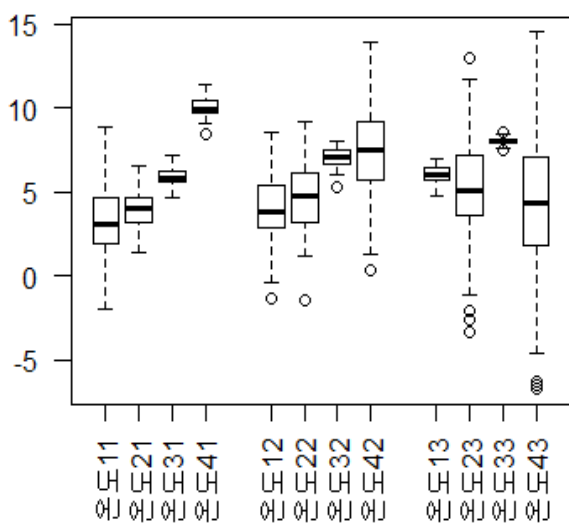
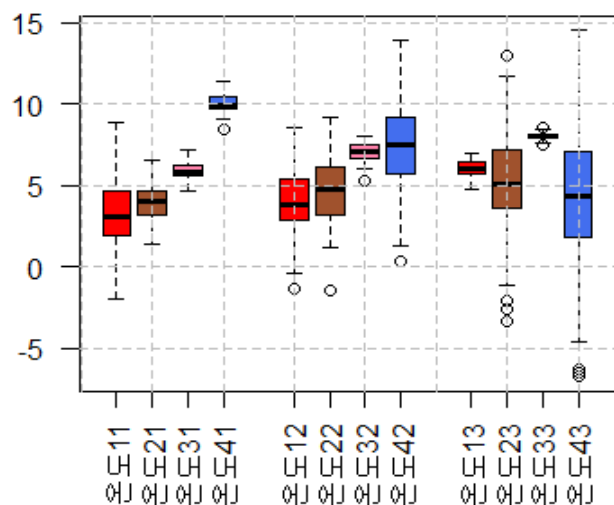
```
boxplot(data, las = 2)
```

```
boxplot(data, las = 2, at = c(1,2,3,4, 6,7,8,9, 11,12,13,14))
```

```
chtcols = rep(c("red","sienna","palevioletred1","royalblue2"), times=3);
```

```
boxplot(data, las = 2, at = c(1,2,3,4, 6,7,8,9, 11,12,13,14), col=chtcols)
```

```
grid(col="gray", lty=2, lwd=1)
```



3. R 시각화 : 기본 패키지(graphics)

3.7 그래프를 파일에 저장하기

[그려지는 그래프를 파일에 저장하는 방법1]

```
png("mytest.png", 500, 400)
```

그래프를 그린다.

```
dev.off()
```



[그래프를 그린 후에 파일에도 저장하는 방법2]

그래프를 그린다.

```
dev.copy(png, "mytest.png") 또는 dev.copy(pdf, "mytest.pdf")
```

```
dev.off()
```



3. R 시각화 : 기본 패키지(graphics)

3.8 Built-in 칼라 팔레트

R이 디폴트로 내장(grDevices)하고 있는 칼라 팔레트 함수는 다음과 같다.

`rainbow()`

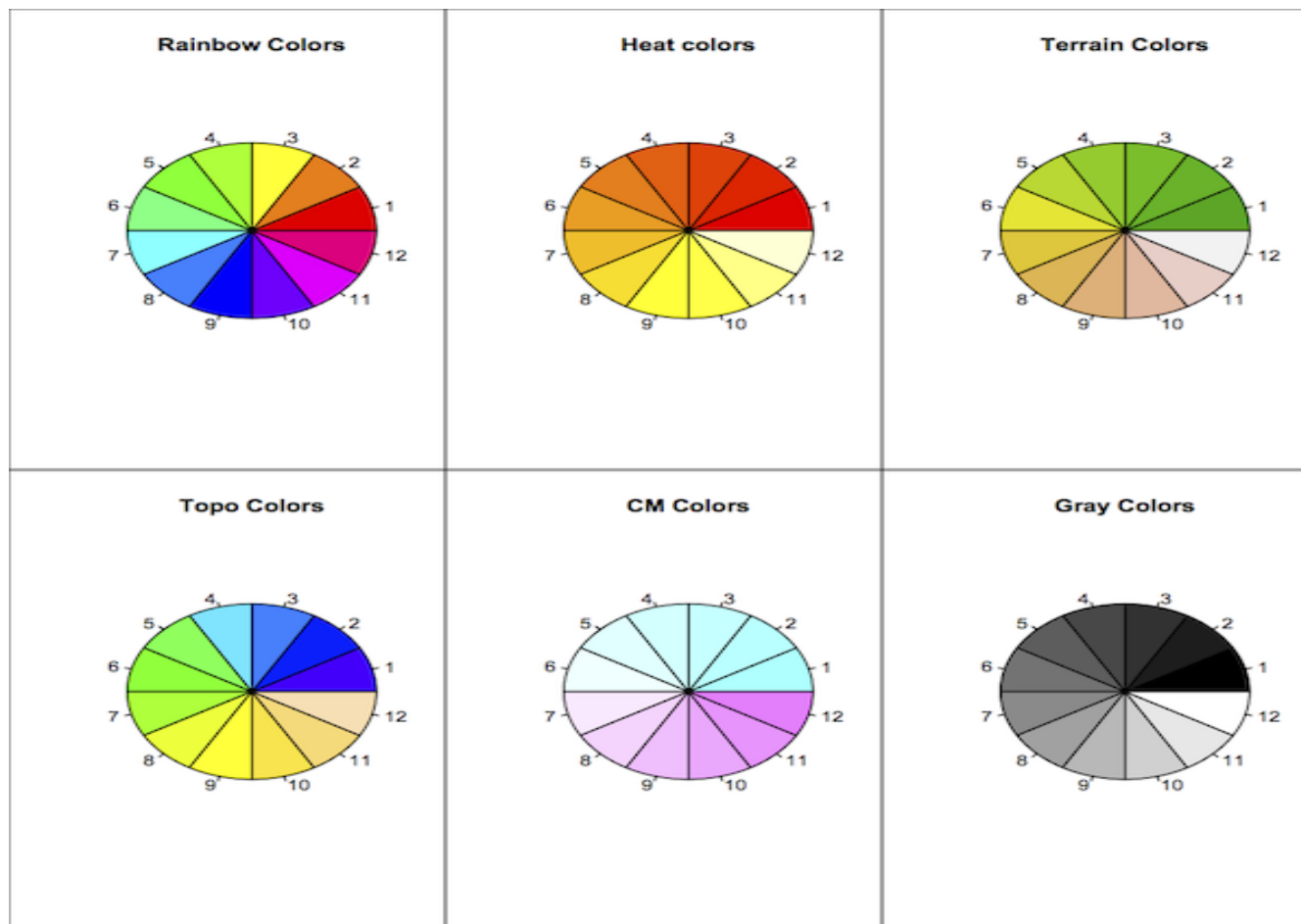
`heat.colors()`

`terrain.colors()`

`topo.colors()`

`cm.colors()`

`gray.colors()`



3. R 시각화 : 기본 패키지(graphics)

3.9 RColorBrewer 패키지를 설치하면 사용 가능한 칼라 팔레트

