HW5

#######1#######  
###a###  
x <- matrix(c("x1","x2"),nrow=2)  
var <- matrix(c(5,2,2,2),nrow=2,dimnames=NULL)  
  
eigen(var)

## eigen() decomposition  
## $values  
## [1] 6 1  
##   
## $vectors  
## [,1] [,2]  
## [1,] -0.8944272 0.4472136  
## [2,] -0.4472136 -0.8944272

eigen(var)$vectors[c(1,2)]

## [1] -0.8944272 -0.4472136

eigen(var)$vectors[c(3,4)]

## [1] 0.4472136 -0.8944272

###b###  
eigen(var)$values[1]/(eigen(var)$values[1]+eigen(var)$values[2])

## [1] 0.8571429

###c###  
r12<- 2/(sqrt(5)\*sqrt(2))  
r <- matrix(c(1,r12,r12,1),nrow=2)  
r

## [,1] [,2]  
## [1,] 1.0000000 0.6324555  
## [2,] 0.6324555 1.0000000

###d###  
eigen(r)

## eigen() decomposition  
## $values  
## [1] 1.6324555 0.3675445  
##   
## $vectors  
## [,1] [,2]  
## [1,] 0.7071068 -0.7071068  
## [2,] 0.7071068 0.7071068

###e###  
eigen(r)$values[1]/(eigen(r)$values[1]+eigen(r)$values[2])

## [1] 0.8162278

###f###비교

###g###  
corr1.1 <- eigen(var)$vectors[1]\*sqrt(eigen(var)$values[1])/sqrt(5)  
corr1.2 <- eigen(var)$vectors[2]\*sqrt(eigen(var)$values[1])/sqrt(2)  
corr1.z1 <- eigen(r)$vectors[1]\*sqrt(eigen(r)$values[1])  
corr1.z2 <- eigen(r)$vectors[2]\*sqrt(eigen(r)$values[1])  
corr1.1;corr1.2

## [1] -0.9797959

## [1] -0.7745967

corr1.z1;corr1.z2

## [1] 0.9034532

## [1] 0.9034532

#######2############  
  
var2<- diag(c(2,4,4))  
var2

## [,1] [,2] [,3]  
## [1,] 2 0 0  
## [2,] 0 4 0  
## [3,] 0 0 4

eigen(var2)

## eigen() decomposition  
## $values  
## [1] 4 4 2  
##   
## $vectors  
## [,1] [,2] [,3]  
## [1,] 0 0 1  
## [2,] 0 1 0  
## [3,] 1 0 0