Homework 7

a)

Code:

```
setwd("C:/Users/tracy/Desktop/Multivariate Statistical Analysis/作业/作业 7/di
rectory")
install.packages("ade4")
library(ade4)
data<-read.table("WG93_full.txt",header=T,sep='\t')
acm.disjonctif(data)
```

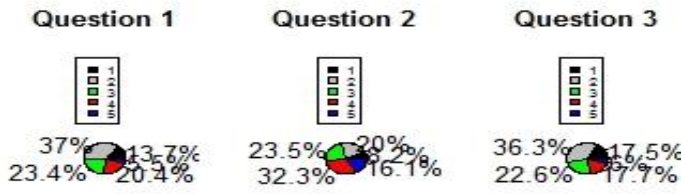
complete disjunctive table:

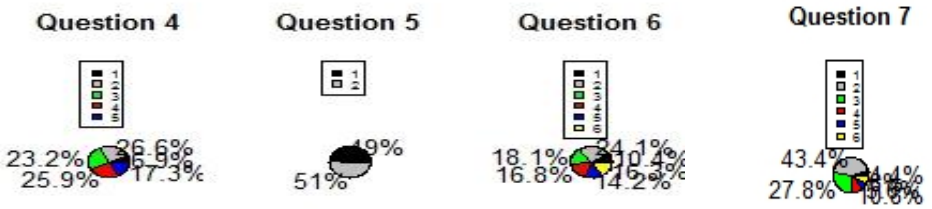
	A.1	A.2	A.3	A.4	A.5	B.1	B.2	B.3	B.4	B.5	C.1	C.2	C.3	C.4	C.5	D.1	D.2	D.3	D.4
1	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0
2	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0
3	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1

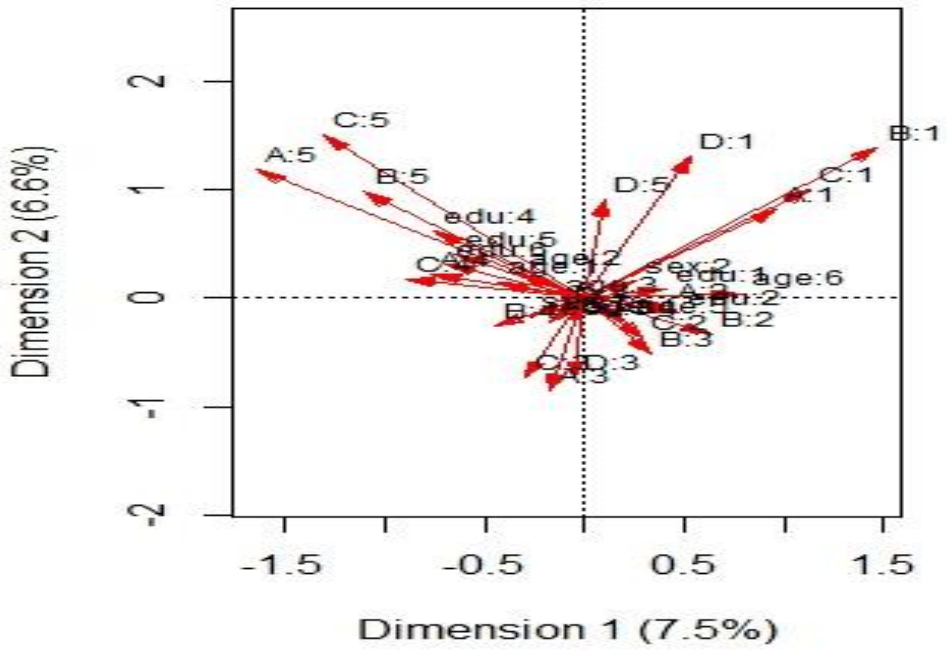
	D.5	sex.1	sex.2	age.1	age.2	age.3	age.4	age.5	age.6	edu.1	edu.2	edu.3	edu.4
1	0	0	1	0	1	0	0	0	0	0	0	1	0
2	0	1	0	0	0	1	0	0	0	0	0	0	1
3	0	0	1	0	0	1	0	0	0	0	1	0	0

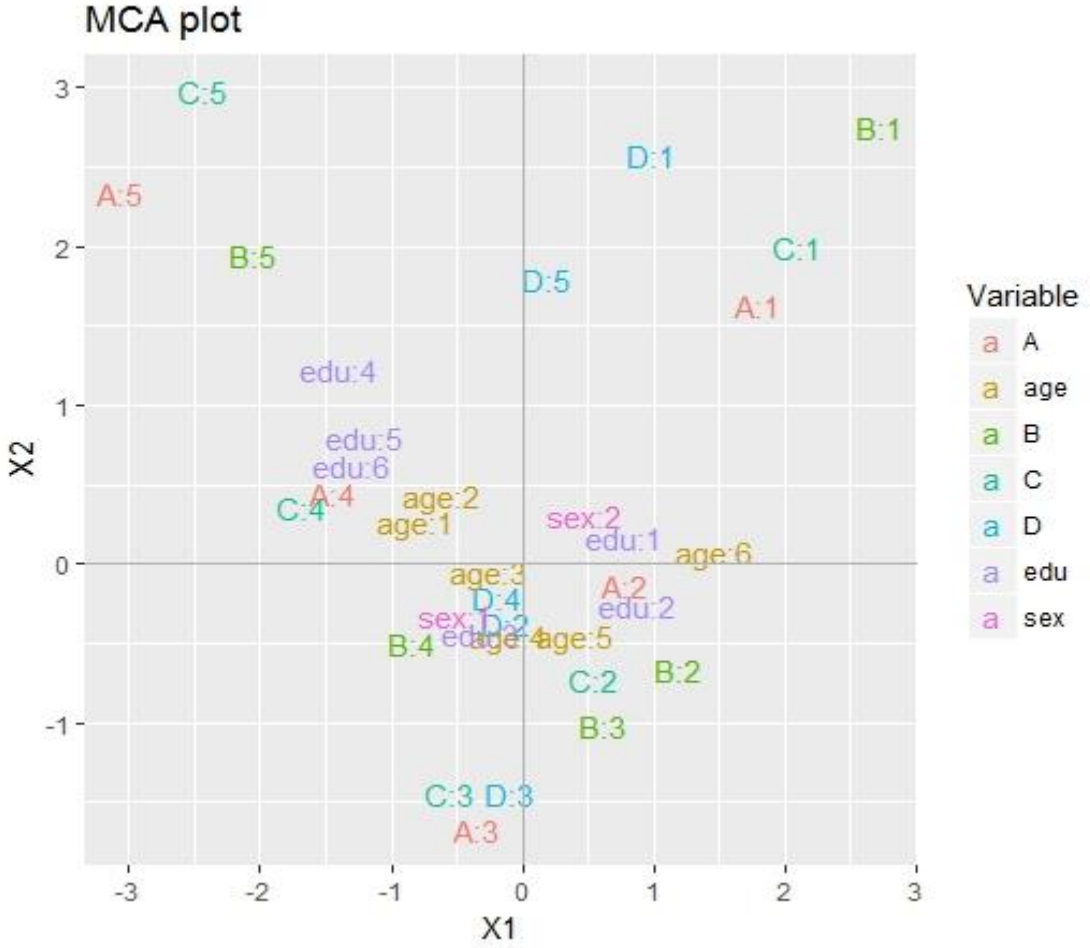
	edu.5	edu.6
1	0	0
2	0	0
3	0	0

b)






C:5
A:5
B:5
D:1
B:1
D:5
C:1
edu:4
edu:5
age:6
B:2
B:3
D:3
Dimension 2 (6.6%)
Dimension 1 (7.5%)
-1.5
-0.5
0.5
1.5
2
1
0
-1
-2


MCA plot
C:5
B:1
D:1
A:5
B:5
C:1
D:5
A:1
edu:4
edu:5
edu:6
A:4
C:4
age:2
age:1
sex:2
edu:1
age:6
age:3
D:4
A:2
edu:2
sex:2
B:4
age:5
C:2
B:2
B:3
C:3
D:3
A:3
X1
X2
3
2
1
0
-1
-2
-3
Variable
A
age
B
C
D
edu
sex

Between different categories:
1. less than 90 degrees = attraction
2. more than 90 degrees = repulsion
3. 90 degrees = independent

Among the same category:
1. less than 90 degrees = similar profile
2. more than 90 degrees = profile differs

Code:

```
install.packages("ca")
library(ca)
dim(data)
View(data)
par(mfrow=c(2,3))
for(i in 1:dim(data)[2]){

   tmp <- table(data[,i])

   lab <- round(100*tmp/sum(tmp),1)

   pielabels <- paste(lab,"%",sep="")

   cols <- c("black","grey","green","red","blue","yellow")

   title <- paste("Question",i,sep=" ")
   pie(tmp, main=title,col=cols,labels=pielabels,cex=1.2)

   legend("topleft",names(lab),fill=cols,horiz=F,cex=0.7)
}
par(mfrow=c(1,1))
data.mca <- mjca(data,lambda="indicator")
names(data.mca)
data.mca$factors
data.mca$levels.n
data.mca$sv^2
(data.mca$sv[1]^2 + data.mca$sv[2]^2) / sum(data.mca$sv^2)
summary(data.mca)
plot(data.mca,arrows=c(T,T),map="symmetric")
points(data.mca$rowcoord)

install.packages("ggplot2")
```

```
library(ggplot2)
cats <- apply(data,2, function(x) nlevels(as.factor(x)) )
data.vars <- data.frame(data.mca$colcoord,Variable= rep(names(cats),cats))
data.obs <- data.frame(data.mca$rowcoord)
rownames(data.vars) <- data.mca$levelnames

ggplot()+
   geom_text(data=data.vars,aes(x=X1,y=X2,colour = Variable,label=rownames(data.vars)))+
   geom_hline(yintercept=0,colour="gray70")+
   geom_vline(xintercept=0,colour="gray70")+
   ggtitle("MCA plot")
```