```
###################### exercice 3 ##############################
# vecteur V1 contient les effectifs
V1=c(60,90,170,320,230,130)
# sum(V1): somme des valeurs de V1
# cumsum(V1):somme cumulée
#Data frame : sorte de matrice. Les colonnes représentent les variables et les lignes les individus.
data.frame(Eff=V1,EffCum=cumsum(V1),Freq=V1/sum(V1),FreqCum=cumsum(V1/sum(V1)))
#commande pour la diagramme circulaire
pie(V1,radius=1)
#commande pour la diagramme en barres
barplot(V1)

###################### exercice 3 ##############################

Z=c(20, 21, 25, 25, 26, 26,26, 27, 27, 27,28, 29, 30, 30, 30,31, 31,32, 32, 32, 32,
+  33, 33, 33, 33, 33, 34, 34, 35, 35,36, 37, 37, 38, 38, 39, 40, 40, 40, 41, 41,
+ 46, 48, 48, 49, 50, 50, 53, 53, 53, 53, 53, 53, 54, 54)
stem(Z,0.5)

###################### exercice 4 ##############################
Notes=c(10 ,8  ,3  ,12 ,13    ,9  , 12 ,9 , 12 ,11,11 ,11  ,8  ,5 ,13    ,14  ,14 ,6,
 +12 ,16 ,7  ,11  ,10  ,10 , 2  ,15  ,12  ,10 ,1 ,14,11  ,7  ,8  ,10 ,13,9,13,
 +9,7,13,11     ,19  , 9 , 4,  10 , 8 ,  9, 6,7,14)
T5=table(cut(Notes, right=FALSE,breaks=c(0,5,7,9,11,13,15,20)))
T5c=c(T5)
data.frame(Eff=T5c,EffCum=cumsum(T5c),Freq=T5c/sum(T5c),FreqCum=cumsum(T5c/sum(T5c)))
hist(Notes,right=FALSE,breaks=c(0,5,7,9,11,13,15,20),col="blue")
```

```
y=c(0,0,cumsum(T5c/sum(T5c)),1)

x=c(-5,0,5,7,9,11,13,15,20,25)

plot(x,y,type="b",xlab=" x label",ylab="y label",xaxt = "n",col="blue")

axis(1, c(0,5,7,9,11,13,15,20))

summary(T5c)

################################

S1=c(12 ,13  ,15  ,16 ,18    ,19  , 22 ,24 , 25 ,27,28 ,34)

mean(S1)

median(S1)

quantile(S1,type=2)

## summary(S1)

S2=c(12 ,13  ,15  ,16 ,18    ,19  , 22 ,24 , 25 ,27)

mean(S2)

median(S2)

quantile(S2,type=2)

##quantile(S2,c(0.25,0.5,0.75))



#####################################################################

ex60=c(5.0 ,0.8  ,1.8  ,1.8 ,2.5    ,3.7  , 3.5 ,1.6 , 1.5 ,0.7)

sort(ex60)

mean(ex60)

median(ex60)

quantile(ex60,type=2)

#############################################################################

ex64=c(995.5,48.8  ,175.0  ,263.5 ,298.0    ,218.9  , 209.0 ,

+ 628.3 , 111.0 ,212.9,92.6,2325.0,958.0,212.5)
```

```
sort(ex64)
mean(ex64)
median(ex64)
quantile(ex64,type=2)
 ##############################################################################
S1=c(15, 10, 17, 11, 15, 12, 13, 16, 12, 14, 14, 16, 15, 18, 11, 16, 13, 17, 12, 16, 18, 15, 17, 15, 19,
13, 14, 17, 16, 15, 12, 11, 17, 16, 15, 10, 14, 15, 13, 16, 18, 15, 17, 11, 14, 17, 15, 14, 13, 16)
mean(S1)
median(S1)
quantile(S1,type=2)
barplot(S1)
boxplot(S1,horizontal=TRUE)
 ##############################################################################
#   exercice 5
 x<-c(19, 17, 17, 14, 16, 12, 15, 12, 13)
 y<-c(32, 28, 29, 24, 26, 20, 24, 20, 22)
 mean(x)
 mean(y)
 plot(x,y)
 cov(x,y)
 cor(x,y)
a<-(cov(x,y)/var(x))
b<- (mean(y)-a*mean(x))
# Graphique avec le residus
segments(12,a*12+b,19,a*19+b)
segments(15,0,15,30,col="blue")
segments(0,25,19,25,col="blue")
```

```
text(15.2,1,expression(x))
text(15,1.5,"-")
##############################################################################

X<-c('Marié(e)','Marié(e)','Divorcée(e)','Célibataire','Célibataire','Marié(e)','Célibataire','Célibataire',
'Célibataire', 'Marié(e)','Célibataire', 'Marié(e)','Veuf(ve)','Marié(e)', 'Veuf(ve)','Divorcée(e)',
'Célibataire', 'Célibataire', 'Célibataire', 'Marié(e)')
T1<-table(X)
V1<-c(T1)
data.frame(Eff=V1,Freq=V1/sum(V1))
pie(T1,radius=1.0)
m<-max(V1)
barplot(T1, ylim=c(0,m+1))
 ###############################################################################
YY<-c("Sd","Sd","Sd","Sd","P","P","P","P","P","P","P","P","P","P","P",
"Se","Se","Se","Se","Se","Se","Se","Se","Se","Se","Se","Se","Se","Se",
"Su","Su","Su","Su","Su","Su","Su","Su","Su",
"U","U","U","U","U","U","U","U","U","U","U","U")
YF<-factor(YY,levels=c("Sd","P","Se","Su","U"))
T2<-table(YF)
V2<-c(T2)
data.frame(Eff=V2,EffCum=cumsum(V2),Freq=V2/sum(V2),FreqCum=cumsum(V2/sum(V2)))
pie(T2,radius=1)
T3<-cumsum(T2)
barplot(T3)
##############################################################################
Z<-c(1,1,1,1,1,2,2,2,2,2,2,2,2,3,3,3,3,3,3,3,3,3,3,3,3,3,3,4,
```

```
+ 4,4,4,4,4,4,4,4,4,5,5,5,5,5,5,6,6,6,8,8)

T4<-table(Z)

T4c<-c(T4)

data.frame(Eff=T4c,EffCum=cumsum(T4c),Freq=T4c/sum(T4c),FreqCum=cumsum(T4c/sum(T4c)))

plot(T4,type="h",xlab="",ylab="",main="",frame=0,lwd=3)

plot(ecdf(Z),xlab="",ylab="",main="",frame=0)

################################################################################

S<-c(152,152,152,153,153,154,154,154,155,155,156,156,156,156,156,

+ 157,157,157,158,158,159,159,160,160,160,161,160,160,161,162, +

162,162,163,164,164,164,164,165,166,167,168,168,168,169,169, +

170,171,171,171,171)

T5<-table(cut(S,right=FALSE, breaks=c(151,155,159,163,167,171)))

T5c<-c(T5)

data.frame(Eff=T5c,EffCum=cumsum(T5c),Freq=T5c/sum(T5c),FreqCum=cumsum(T5c/sum(T5c)))

hist(S,breaks=c(151.5,155.5,159.5,163.5,167.5,171.5), freq=FALSE, xlab="",ylab="",main="",xaxt =
"n")

axis(1, c(151.5,155.5,159.5,163.5,167.5,171.5))

y=c(0,0,cumsum(T5c/sum(T5c)),1)

x=c(148,151.5,155.5,159.5,163.5,167.5,171.5,175)

plot(x,y,type="b",xlab="",ylab="",xaxt = "n")

axis(1, c(151.5,155.5,159.5,163.5,167.5,171.5))

################################################################################


yeux<- c(rep("bleu",times=10),rep("vert",times=50),rep("marron",times=20),

rep("bleu",times=20),rep("vert",times=60),rep("marron",times=40))

sexe<- c(rep("homme",times=80),rep("femme",times=120))

yeux<-factor(yeux,levels=c("bleu","vert","marron"))

sexe<-factor(sexe,levels=c("homme","femme"))
```

```
T<-table(sexe,yeux)
T
plot(T,main="")
summary(T)

################################################################################
# nuage de points
poids<-c(60,61,64,67,68,69,70,70,72,73,75,76,78,80,85,90,96,96,98,101)
taille<-c(155,162,157,170,164,162,169,170,178,173,180,175,173,175,179,175,180,185,189,187)
plot(taille,poids)
# Graphique avec le residus
plot(taille,poids)
b<-(cov(taille,poids)/var(taille))
a<- mean(poids)-b*mean(taille)
# Graphique avec le residus
plot(taille,poids)
segments(158,a+b*158,190,a+b*190)
segments(180,a+b*180,180,96,col="red")
#
text(178,90,expression(e))
text(178.7,89.5,"i")
#
arrows(180,a+b*180,156,a+b*180,col="blue",length=0.14)
arrows(180,60,180,a+b*180,col="blue",length=0.14)
arrows(180,96,156,96,col="blue",length=0.14)
#
text(154.8,86,expression(y))
```

```
text(155.5,85.5,"i")

#

text(154.8,97,expression(y))

text(155.5,97.8,"*")

text(155.5,96.5,"i")
```