

## Ex 1

```
taille=c(160,180,175)
poids=c(52,96,60)
age=c(18,43,29)
c.yeux=c("vert","bleu","bleu")
personne=data.frame(taille,poids,age,c.yeux)
```

### 1.1

```
> personnel=personne
*> names(personnel)[3]="new.age"
> personnel
  taille poids new.age c.yeux
1   160   52    18  vert
2   180   96    43  bleu
3   175   60    29  bleu
*****
*> dimnames(personnel)[[2]][3]="new"
> personnel
  taille poids new c.yeux
1   160   52 18  vert
2   180   96 43  bleu
3   175   60 29  bleu
```

### 1.2

```
*> row.names(personnel)[2]="Marie"
> personnel
  new.taille poids new c.yeux
1         160   52 18  vert
Marie      180   96 43  bleu
3         175   60 29  bleu
*> dimnames(personnel)[[1]][2]="new"
> personnel
  new.taille poids new c.yeux
1         160   52 18  vert
new        180   96 43  bleu
3         175   60 29  bleu
```

### 1.3

```
> row.names(personnel)=NULL
> personnel
  new.taille poids new c.yeux
1         160   52 18  vert
2         180   96 43  bleu
3         175   60 29  bleu
```

### 1.4

```
> names(personnel)=c("a","b","c","d")
> personnel
```

### 1.5

```
> personnel[1,3]
[1] 18
> personnel[1,"c"]
[1] 18
```

## 1.6

```
*> personnel[2]
b
1 52
2 96
3 60
```

```
*> personnel[,2]
[1] 52 96 60
```

## 1.7

```
*> personnel$c[c(1,3)]
[1] 18 29
*> personnel[,3][c(1,3)]
[1] 18 29
```

## 1.8

```
*> personnel$a[personnel$a>160 &personnel$a<180]
[1] 175
*> personnel[,1][personnel[,1]>160 &personnel[,1]<180]
[1] 175
```

## 1.9

```
> personnel$b[personnel$a>170]
[1] 96 60
> personnel[,2][personnel[,1]>170]
[1] 96 60
```

## 1.10

```
*> personnel[personne$poids>52,]
  taille poids age c.yeux
2   180   96 43  bleu
3   175   60 29  bleu
*> personnel[personnel[,2]>52,]
  taille poids age c.yeux
2   180   96 43  bleu
3   175   60 29  bleu
*> subset(personnel,poids>52)
  taille poids age c.yeux
2   180   96 43  bleu
3   175   60 29  bleu
*****
```

```
> personnel[,2][personnel[,2]>52]
[1] 96 60
```

```
> personnel
  new.taille poids new c.yeux
1      160   52 18  vert
new      180   96 43  bleu
3      175   60 29  bleu
```

## 1.11

```
> personnel$a[c(1,2)]=c(190,158)
> personnel
*> personnel[,1][c(1,2)]=c(15,20)
```

## Ex2

```
Moyenne.vec<-function(x){
s<-sum(x) ;# sommes des éléments de x
n<-length(x) ;#nombre d'éléments de x
resultat<-round(s/n,4) ; #Résultat arrondi
return(resultat)
}
```

## Ex 3

```
for
fact<-function(n){
if (n<0) stop ("on a besoin d'un entier strictement positif ")
if (n==0) return(1)
if (floor(n)!=n) {
warning(paste("arrondi de",n, "en",floor(n)))
n<-floor(n)
}
res=1
for(i in 1:n) res <-res*i
res
}
```

## prod

```
fact<-function(n){
if (n<0) stop ("on a besoin d'un entier strictement positif ")
if (n==0) return(1)
if (floor(n)!=n) warning(paste("arrondi de",n, "en",floor(n)))
res<-prod(1:n)
res
}
```

## Ex 4

```
> y=5
> taille=c(160,180,175)
> matrice=matrix(1:12, ncol=3)
> ma_liste=list(y,taille, matrice, personne)
> ma_liste
```

### 4.1

```
> names(ma_liste)=c("a","b","c","d")
> ma_liste
$a
[1] 5
```

```
$b
[1] 160 180 175
```

```
$c
[,1] [,2] [,3]
[1,] 1 5 9
```

```
[2,] 2 6 10
[3,] 3 7 11
[4,] 4 8 12
```

\$d

```
taille poids age c.yeux
1 160 52 18 vert
2 180 96 43 bleu
3 175 60 29 bleu
```

#### 4.2

\*en vecteur

```
> ma_liste[[2]]
[1] 160 180 175
> ma_liste$b
[1] 160 180 175
```

\*en liste

```
> ma_liste[2]
$b
[1] 160 180 175
```

#### 4.3

\*> ma\_liste[c(1,3)]

```
$a
[1] 5
```

\$c

```
 [,1] [,2] [,3]
[1,] 1 5 9
[2,] 2 6 10
[3,] 3 7 11
[4,] 4 8 12
*> c(ma_liste[1], ma_liste[4])
$a
[1] 5
```

\$d

```
taille poids age c.yeux
1 160 52 18 vert
2 180 96 43 bleu
3 175 60 29 bleu
```

#### 4.4

```
*> ma_liste[[4]][,2][3]
[1] 60
*> ma_liste$d$poids[3]
[1] 60
```

### Ex5

```
> centre <- function(x, type) {
+ switch(type,
```

```

+ mean = mean(x),
+ median = median(x),
+ std = std(x))
+ }
> x <- rcauchy(10)
> centre(x, "mean")
[1] 0.8760325
> centre(x, "median")
[1] 0.5360891

```

#### #Ex4

```

Centrereduire<-function(X){
sd.X<-apply(X,2,sd)
mean.X<-apply(X,2,mean)
Xc<-sweep(X,2,mean.X,FUN= "-")
Xcr<-sweep(Xc,2,sd.X,FUN= "/")
Xcr
}

```

#### Ex 6

```

Abs<-function(X){
for(i in 1:length(X)){
if (X[i]<0)
X[i]=abs(X[i])
}
X
}

```

```

> X=matrix(-5:6,ncol=3)
> X
      [,1] [,2] [,3]
[1,]  -5  -1   3
[2,]  -4   0   4
[3,]  -3   1   5
[4,]  -2   2   6

```

#### Ex7

```

binomplot <- function(size, prob, colour){
x <- 0:size
y <- dbinom(x, size, prob)
plot(x, y, type="h", col=colour)
}

```

```

binomplot(20, 0.2, 2)
binomplot(20, 0.2, 5)

```

### Ex8

a)

```
> matrice<- matrix(c(2,3,1,1),nr=2,nc=2,byrow=T)
```

```
> matrice
```

```
  [,1] [,2]
```

```
[1,]  2   3
```

```
[2,]  1   1
```

```
> layout(matrice)
```

```
> plot(1:7,7:1,pch=2)
```

```
> plot(rep(1,4),type="l")
```

```
> plot(c(2,3,-1,0),type="b")
```

b)

```
> layout(matrice,widths=c(3,1))
```

```
> plot(c(2,3,-1,0),type="b")
```

```
> plot(rep(1,4),type="l")
```

```
> plot(1:7,7:1,pch=2)
```

### Ex9

```
> attach(Orange)
```

```
> plot(age,circumference,type="p",pch=25,
```

```
col="green",col.main="blue",col.sub="red",
```

```
col.axis="blue",xlab="age",
```

```
ylab="circumference",
```

```
main="Le jeux de données Orange",
```

```
sub="Auteur : Michel XXXXXX")
```