

Homework 2

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##Problem 1 ### a)

```
commutes<-matrix(c(25,24,36,27,21,36,34,33,25,32),nrow=5,ncol=2)
row.names(commutes)<-c("Monday","Tuesday","Wednesday","Thursday","Friday")
print(commutes)
```

```
##           [,1] [,2]
## Monday      25   36
## Tuesday     24   34
## Wednesday   36   33
## Thursday    27   25
## Friday      21   32
```

b)

```
colnames(commutes)<-c("Week1","Week2")
print(commutes)
```

```
##           Week1 Week2
## Monday      25   36
## Tuesday     24   34
## Wednesday   36   33
## Thursday    27   25
## Friday      21   32
```

c)

```
comparison<-commutes[, "Week1"]<commutes[, "Week2"]
print(comparison)
```

```
##      Monday  Tuesday Wednesday Thursday  Friday
##      TRUE      TRUE      FALSE      FALSE      TRUE
```

d)

```
mean_commutes<-rowMeans(commutes)
print(mean_commutes)
```

```
##      Monday   Tuesday Wednesday  Thursday   Friday
##      30.5      29.0      34.5      26.0      26.5
```

e)

```
diff<-commutes-30
print(diff)
```

```
##           Week1 Week2
## Monday      -5     6
## Tuesday     -6     4
## Wednesday     6     3
## Thursday    -3    -5
## Friday      -9     2
```

f)

```
mean_diff<-colMeans(diff)
print(mean_diff)
```

```
## Week1 Week2
##  -3.4   2.0
```

g)

```
max_delay<-apply(diff,2,max)
print(max_delay)
```

```
## Week1 Week2
##      6     6
```

h)

```
week2_fast_arrival<-row.names(commutes[diff[, "Week2"]<=-5,])
print(week2_fast_arrival)
```

```
## NULL
```

i)

```
days_within_budget<-colSums(diff<=0)
print(days_within_budget)
```

```
## Week1 Week2
##      4      1
```

j)

```
week1_fast_arrival<-row.names(commutes[diff[, "Week1"]<=0,])
print(week1_fast_arrival)
```

```
## [1] "Monday"    "Tuesday"    "Thursday"   "Friday"
```

k)

```
similar_commutes<-diff[diff[, "Week1"]==diff[, "Week2"],]
print(similar_commutes)
```

```
##      Week1 Week2
```

```
##Problem 2 ### a)
```

```
library(car)
```

```
## Loading required package: carData
```

```
data(Davis)
```

```
weight.metric <- Davis[, c("weight", "repwt")]
head(weight.metric)
```

```
##  weight repwt
## 1      77    77
## 2      58    51
## 3      53    54
## 4      68    70
## 5      59    59
## 6      76    76
```

b)

```
weight.imp<-weight.metric*2.2
names(weight.imp)<-c("rec.weight", "rep.weight")

head(weight.imp)
```

```
##   rec.weight rep.weight
## 1    169.4    169.4
## 2    127.6    112.2
## 3    116.6    118.8
## 4    149.6    154.0
## 5    129.8    129.8
## 6    167.2    167.2
```

c)

```
height.metric<-Davis[,c("height","repht")]
head(height.metric)
```

```
##   height repht
## 1    182    180
## 2    161    159
## 3    161    158
## 4    177    175
## 5    157    155
## 6    170    165
```

d)

```
height.imp<-round(height.metric/2.54,1)
names(height.imp)<-c("rec.height","rep.height")
head(height.imp)
```

```
##   rec.height rep.height
## 1     71.7     70.9
## 2     63.4     62.6
## 3     63.4     62.2
## 4     69.7     68.9
## 5     61.8     61.0
## 6     66.9     65.0
```

e)

```
Davis.imp<-cbind(sex=Davis$sex,weight.imp,height.imp)
head(Davis.imp)
```

```
##   sex rec.weight rep.weight rec.height rep.height
## 1   M    169.4    169.4     71.7     70.9
## 2   F    127.6    112.2     63.4     62.6
## 3   F    116.6    118.8     63.4     62.2
```

```
## 4   M      149.6      154.0      69.7      68.9
## 5   F      129.8      129.8      61.8      61.0
## 6   M      167.2      167.2      66.9      65.0
```

f)

```
apply(Davis.imp,2,function(x)sum(is.na(x)))
```

```
##      sex rec.weight rep.weight rec.height rep.height
##      0         0         17         0         17
```

g)

```
sum(apply(Davis.imp,1,function(x)any(is.na(x))))
```

```
## [1] 19
```

h)

```
Davis.imp[which(apply(Davis.imp,1,function(x)any(is.na(x)))),"sex"]
```

```
## [1] M F M F F F M F F F F F F M F F M M
## Levels: F M
```

###Problem 3 ### a)

```
planets<-data.frame(name=c("Mercury","Venus","Earth","Mars","Jupiter","Saturn","Uranus",
distance=c(0.39,0.72,1,1.52,5.2,9.54,19.18,30.06),
type=c("terrestrial","terrestrial","terrestrial","terrestrial","gas","gas","gas","gas"),
diameter=c(0.382,0.949,1,0.532,11.209,9.449,4.007,3.883),
rotation=c(58.64,-243.02,1,1.03,0.41,0.43,-0.72,0.67),
rings=c(FALSE,FALSE,FALSE,FALSE,TRUE,TRUE,TRUE,TRUE),
moons=c(0,0,1,2,67,62,27,14))
```

```
#remember to print
print(planets)
```

```
##      name distance      type diameter rotation rings moons
## 1 Mercury    0.39 terrestrial    0.382    58.64 FALSE     0
## 2  Venus     0.72 terrestrial    0.949   -243.02 FALSE     0
## 3  Earth     1.00 terrestrial    1.000     1.00 FALSE     1
## 4   Mars     1.52 terrestrial    0.532     1.03 FALSE     2
## 5 Jupiter     5.20          gas   11.209     0.41  TRUE    67
## 6  Saturn     9.54          gas    9.449     0.43  TRUE    62
## 7  Uranus    19.18          gas    4.007    -0.72  TRUE    27
## 8 Neptune    30.06          gas    3.883     0.67  TRUE    14
```

b)

```
small_planets<-subset(planets,diameter<5)
print(small_planets)
```

```
##      name distance      type diameter rotation rings moons
## 1 Mercury    0.39 terrestrial    0.382    58.64 FALSE     0
## 2  Venus    0.72 terrestrial    0.949   -243.02 FALSE     0
## 3   Earth    1.00 terrestrial    1.000     1.00 FALSE     1
## 4    Mars    1.52 terrestrial    0.532     1.03 FALSE     2
## 7  Uranus   19.18          gas    4.007    -0.72  TRUE    27
## 8 Neptune   30.06          gas    3.883     0.67  TRUE    14
```

c)

```
same_rotation_planets<-subset(planets,rotation==1)
print(same_rotation_planets)
```

```
##      name distance      type diameter rotation rings moons
## 3  Earth          1 terrestrial          1          1 FALSE     1
```

d)

```
large_diameter_planets<-subset(planets,diameter>1,select=c("name","moons","type"))
print(large_diameter_planets)
```

```
##      name moons type
## 5 Jupiter    67  gas
## 6  Saturn    62  gas
## 7  Uranus    27  gas
## 8 Neptune    14  gas
```

e)

```
ringed_planets<-subset(planets,moons>1,select=c("rings","type"))
print(ringed_planets)
```

```
##      rings      type
## 4 FALSE terrestrial
## 5  TRUE          gas
## 6  TRUE          gas
## 7  TRUE          gas
## 8  TRUE          gas
```