Homework 2

Will Scheib

Problem 1

Part a

```
commutes <- matrix(
  data=c(25, 22, 36, 23, 21, 36, 34, 33, 25, 32),
  ncol=2,
  byrow=TRUE
)
commutes
```

```
##      [,1] [,2]
## [1,]   25   22
## [2,]   36   23
## [3,]   21   36
## [4,]   34   33
## [5,]   25   32
```

Part b

```
colnames(commutes) <- c("Week1", "Week2")
rownames(commutes) <- c("Monday", "Tuesday", "wednesday", "Thursday", "Friday")
commutes
```

```
##           Week1 Week2
## Monday       25    22
## Tuesday      36    23
## wednesday    21    36
## Thursday     34    33
## Friday       25    32
```

Part c

```
apply(commutes, 1, function(row) {row["Week1"]>row["Week2"]})
```

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

Part d

```
apply(commutes, 1, mean)
```

```
##    Monday   Tuesday wednesday  Thursday    Friday
##      23.5      29.5      28.5      33.5      28.5
```

Part e

```
diff <- commutes - 27
diff
```

```
##           Week1 Week2
## Monday       -2    -5
## Tuesday       9    -4
## wednesday    -6     9
## Thursday      7     6
## Friday       -2     5
```

Part f

```
apply(diff, 2, mean)
```

```
## Week1 Week2
##   1.2   2.2
```

Part g

```
apply(diff, 2, max)
```

```
## Week1 Week2
##     9     9
```

Part h

```
rownames(commutes)[commutes[,2]<30]
```

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

Part i

```
apply(diff, 2, function(col) {sum(col<=0)})
```

```
## Week1 Week2
##     3     2
```

Part j

```
rownames(diff)[diff[,1]==min(diff[,1])]
```

```
## [1] "wednesday"
```

Part k

```
diff[diff[,1]*diff[,2]>0,]
```

```
##          Week1 Week2
## Monday      -2    -5
## Thursday     7     6
```

Problem 2

Part a

```
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
```

Part b

```
weight.imp <- weight.metric * 2.2
head(weight.imp)
```

```
##   weight repwt
## 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
```

Part 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
```

Part d

```
height.imp <- round(height.metric / 2.54, 1)
head(height.imp)
```

```
##   height repht
## 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
```

Part e

```
Davis.imp <- data.frame(
  sex=Davis$sex,
  rec.weight=weight.imp$weight,
  rep.weight=weight.imp$repwt,
  rec.height=height.imp$height,
  rep.height=height.imp$repht
)
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
```

Part f

```
apply(Davis.imp, 2, function(col) {sum(is.na(col))})
```

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

Part g

```
nrow(Davis.imp[is.na(Davis.imp$rep.weight) | is.na(Davis.imp$rep.height),])
```

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

Part h

```
Davis.imp[is.na(Davis.imp$rep.weight) | is.na(Davis.imp$rep.height), "sex"]
```

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

Problem 3

Part a

```
planets <- data.frame(
  name=c("Mercury", "Venus", "Earth", "Mars",
         "Jupiter", "Saturn", "Uranus", "Neptune"),
  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("N", "N", "N", "N", "Y", "Y", "Y", "Y"),
  moons=c("0", "0", "1", "2+", "2+", "2+", "2+", "2+"),
  stringsAsFactors=TRUE
)
planets
```

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

Part b

```
planets[planets$diameter<5,]
```

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

Part c

```
planets[planets$rotation<0, "distance"]
```

```
## [1]  0.72 19.18
```

Part d

```
planets[planets$diameter>1, c("name", "rings", "type")]
```

```
##      name rings type
## 5 Jupiter     Y  gas
## 6  Saturn     Y  gas
## 7  Uranus     Y  gas
## 8 Neptune     Y  gas
```

Part e

```
planets[planets$moons=="2+", c("rings", "type")]
```

```
##   rings        type
## 4     N terrestrial
## 5     Y         gas
## 6     Y         gas
## 7     Y         gas
## 8     Y         gas
```