Lab 6 solutions

19-20th February 2018

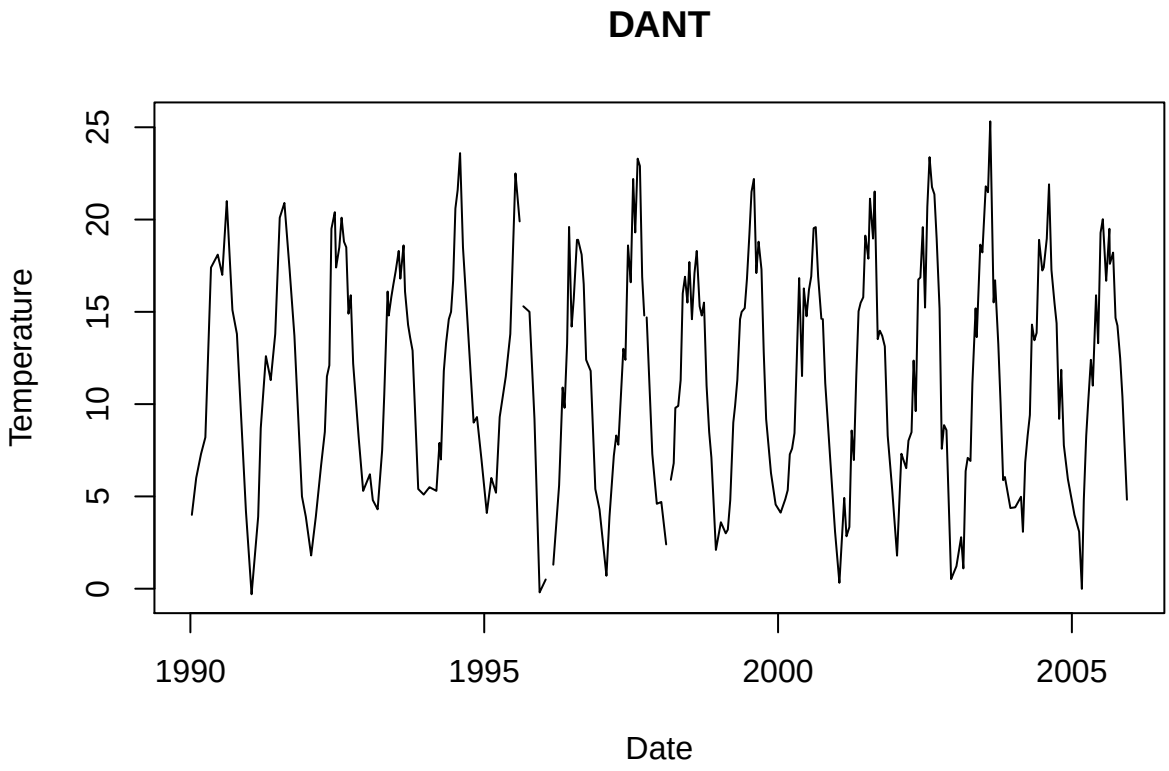
Exercise 1

```
Env = read.table("http://www.massey.ac.nz/~jcmarsha/rcourse/EnvData.txt",header=T)
summary(Env)
```

```
##            Sample        Station          Area           Year
##  DANT.19900110:   1   N10    : 665   KZ     :2094   Min.   :1990
##  DANT.19900206:   1   VLIS   : 421   OS     :1181   1st Qu.:1994
##  DANT.19900308:   1   N02    : 402   NC     :1139   Median :1998
##  DANT.19900404:   1   T004   : 339   WZ     : 899   Mean   :1998
##  DANT.19900509:   1   HANS   : 309   VD     : 741   3rd Qu.:2002
##  DANT.19900620:   1   ZUID   : 303   WS     : 730   Max.   :2005
##  (Other)      :8522   (Other):6089   (Other):1744
##      Month            dDay3          Season          SAL
##  Min.   : 1.000   Min.   :  0.0   autumn:1882   Min.   : 2.52
##  1st Qu.: 4.000   1st Qu.:100.0   spring:2396   1st Qu.:29.02
##  Median : 6.000   Median :177.0   summer:2544   Median :31.00
##  Mean   : 6.412   Mean   :178.7   winter:1706   Mean   :29.70
##  3rd Qu.: 9.000   3rd Qu.:257.0                 3rd Qu.:32.84
##  Max.   :12.000   Max.   :363.0                 Max.   :35.96
##                                                 NA's   :798
##        T             CHLFa            MyTime
##  Min.   :-1.10   Min.   :  0.04   Min.   :1990
##  1st Qu.: 7.40   1st Qu.:  1.48   1st Qu.:1995
##  Median :12.41   Median :  3.52   Median :1998
##  Mean   :12.21   Mean   :  6.96   Mean   :1998
##  3rd Qu.:16.90   3rd Qu.:  8.60   3rd Qu.:2002
##  Max.   :25.32   Max.   :183.30   Max.   :2006
##  NA's   :927     NA's   :813
```

A plot of the DANT station can be done using

```
TempDant <- Env[Env$Station == "DANT" ,]
plot(TempDant$MyTime,TempDant$T,type="l", xlab="Date", ylab="Temperature", main="DANT")
```



We can loop through them all using

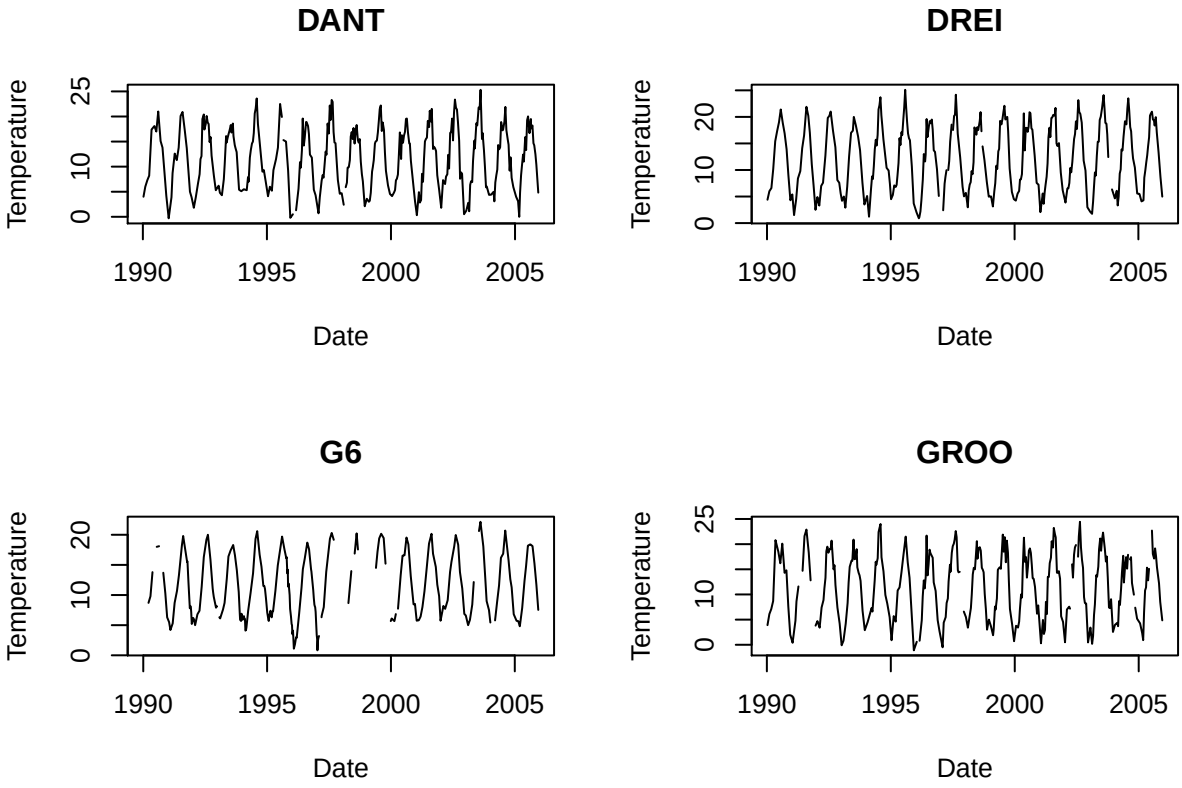
```
par(mfrow=c(2,2))
AllStations = unique(Env$Station)
N = length(AllStations)
for (i in 1:N) {
  Station.i = as.character(AllStations[i])
  print(Station.i)
  TPi = Env[Env$Station == Station.i,]
  plot(TPi$MyTime, TPi$T, type="l", xlab="Date", ylab="Temperature", main=Station.i)
}
```

```
## [1] "DANT"
```

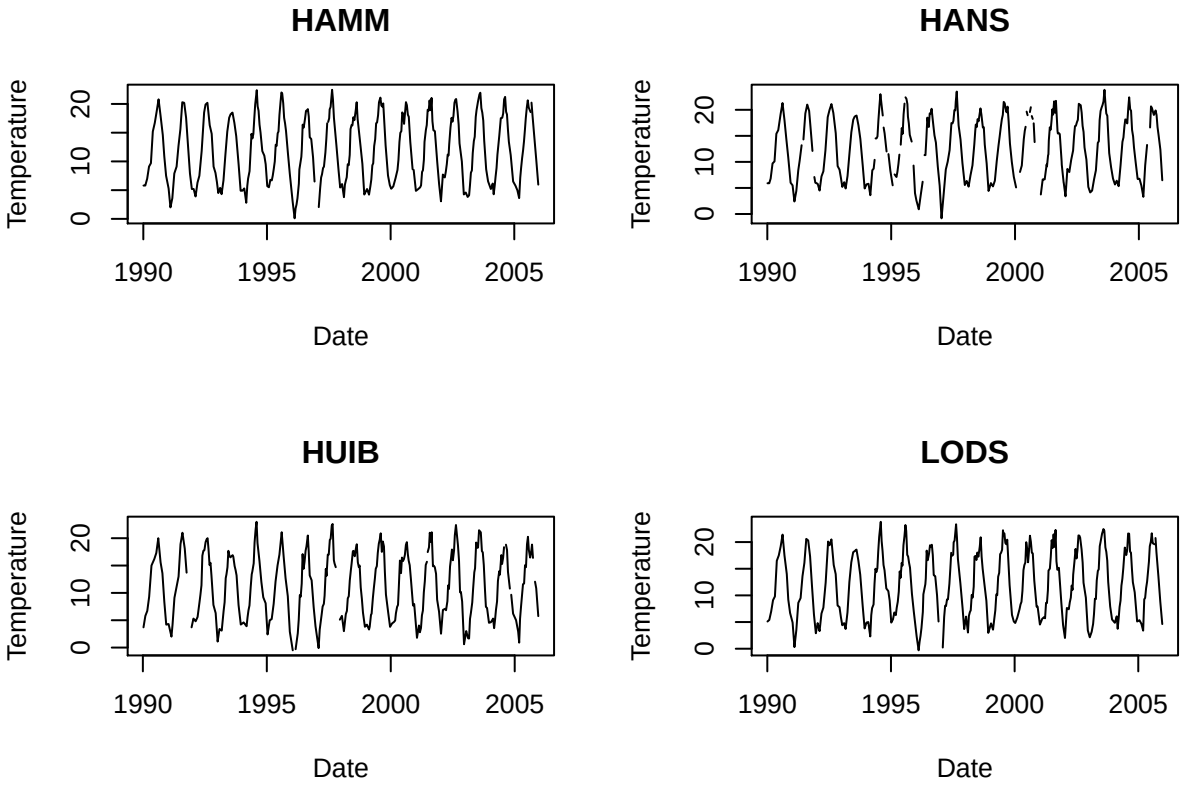
```
## [1] "DREI"
```

```
## [1] "G6"
```

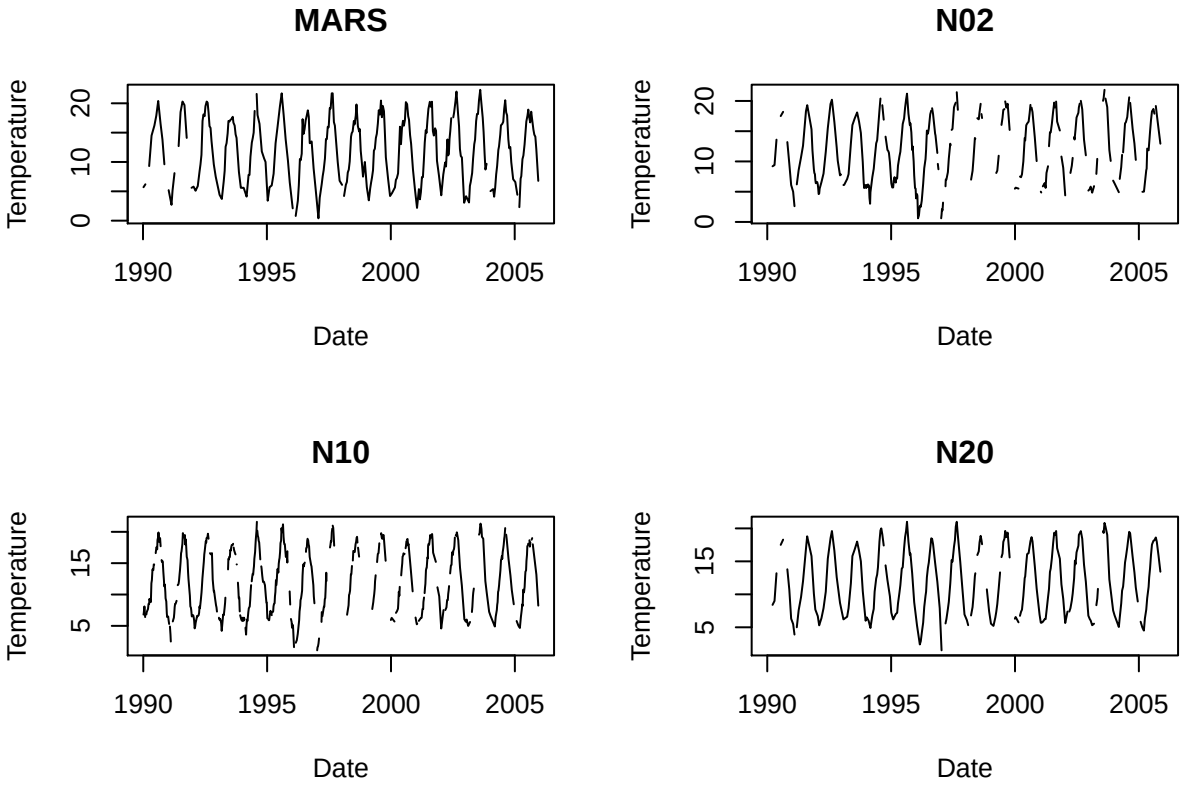
```
## [1] "GROO"
```



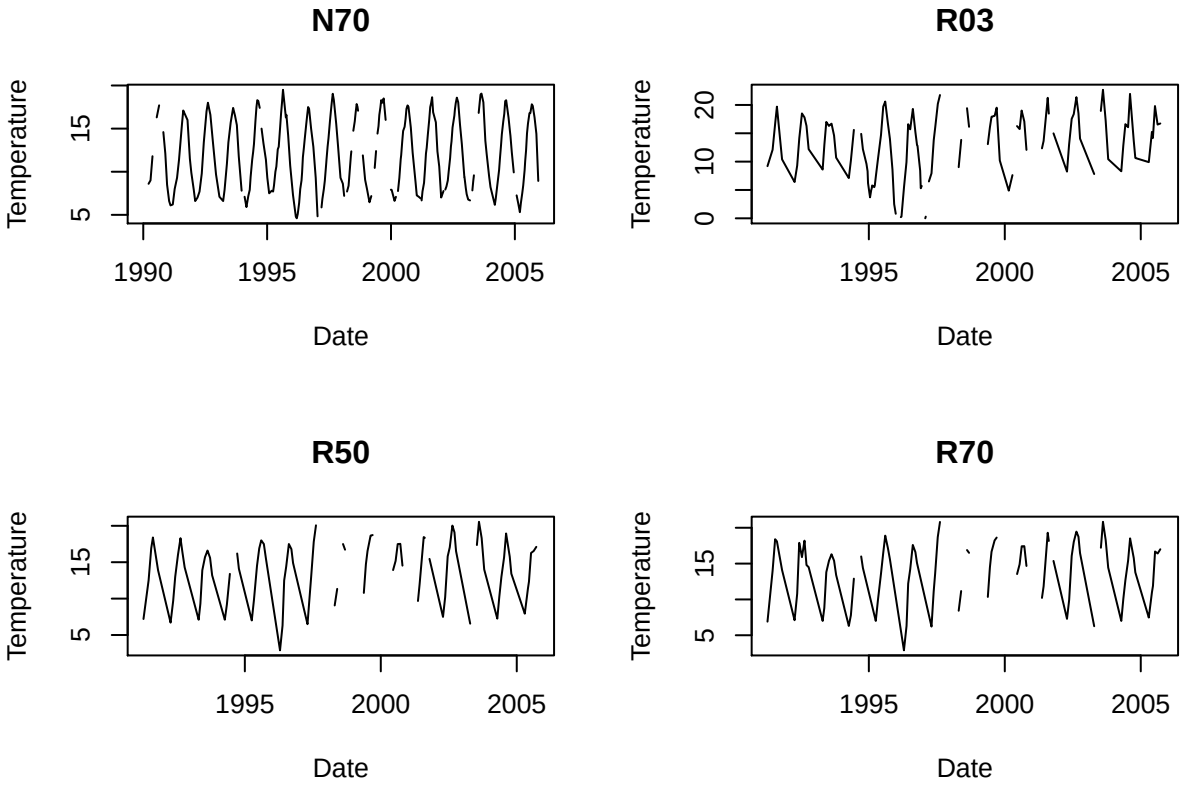

```
## [1] "HAMM"
## [1] "HANS"
## [1] "HUIB"
## [1] "LODS"
```



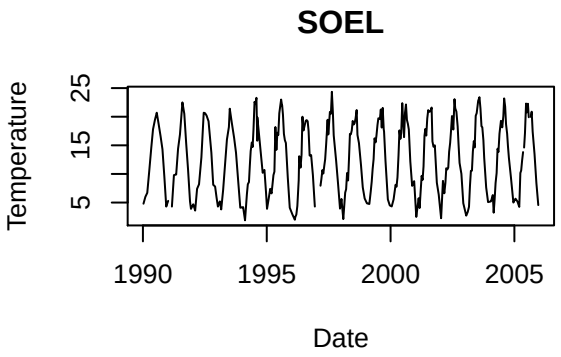

```
## [1] "MARS"
## [1] "NO2"
## [1] "N10"
## [1] "N20"
```

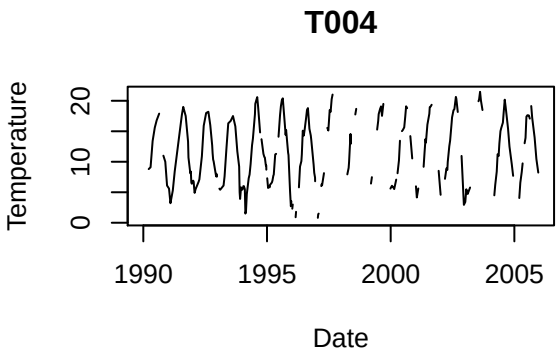


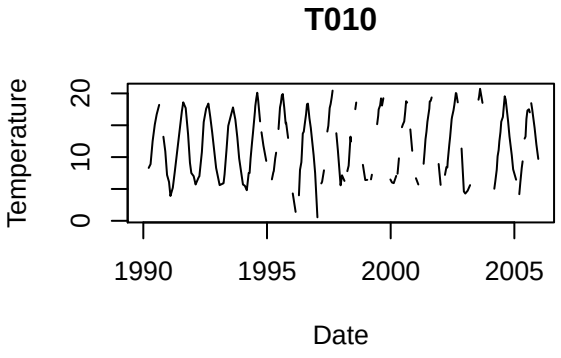

```
## [1] "N70"
## [1] "R03"
## [1] "R50"
## [1] "R70"
```

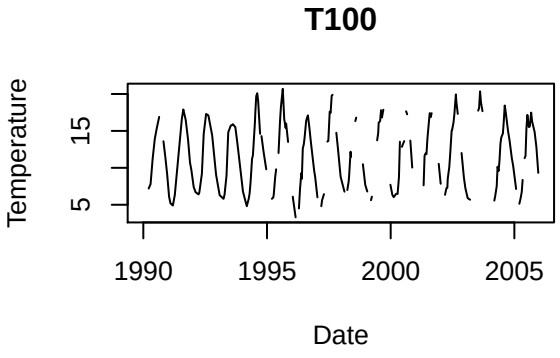



```
## [1] "SOEL"
## [1] "T004"
## [1] "T010"
## [1] "T100"
```

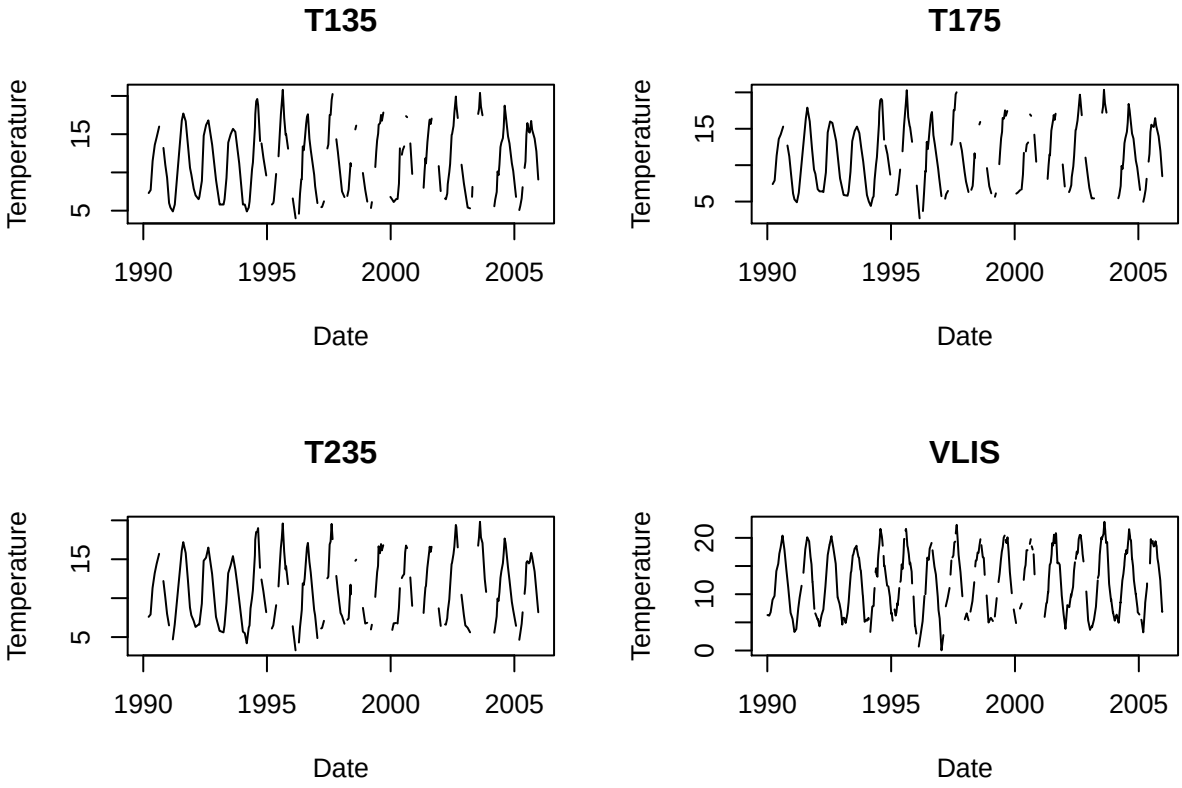




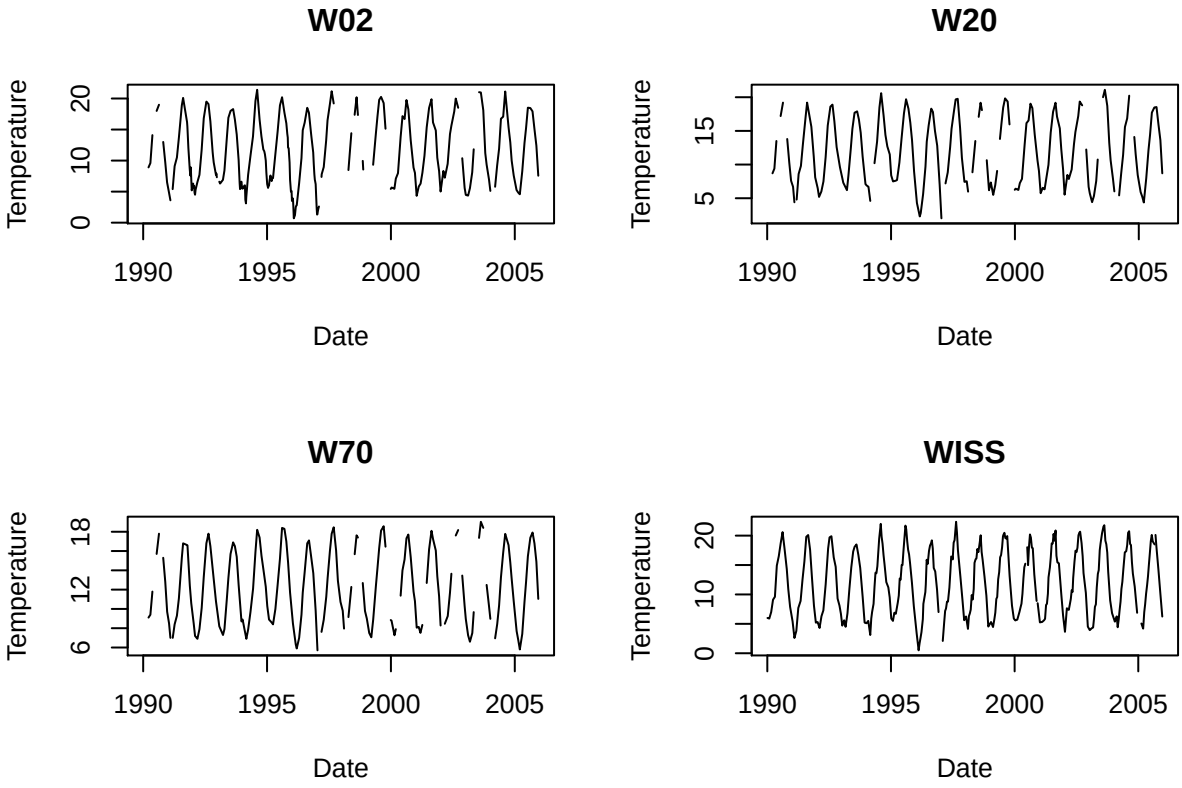




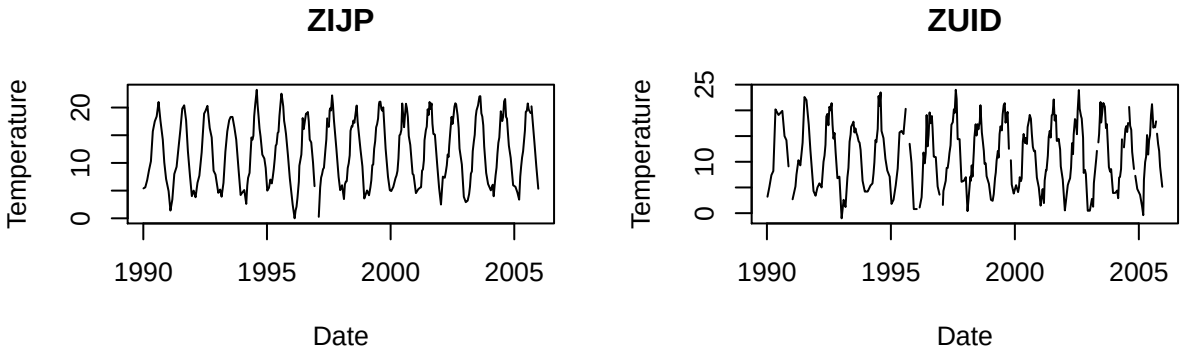

```
## [1] "T135"
## [1] "T175"
## [1] "T235"
## [1] "VLIS"
```




```
## [1] "W02"
## [1] "W20"
## [1] "W70"
## [1] "WISS"
```


W02
Temperature
0
10
20
1990
1995
2000
2005
Date
W20
Temperature
5
15
1990
1995
2000
2005
Date
W70
Temperature
6
12
18
1990
1995
2000
2005
Date
WISS
Temperature
0
10
20
1990
1995
2000
2005
Date

```
## [1] "ZIJP"
## [1] "ZUID"
```



Exercise 2

The following function counts the number of NA fields in a data frame.

```
NAcount = function(DF) {
  D1 = is.na(DF)
  x = colSums(D1)
  return(x)
}
NAcount(Env)
```

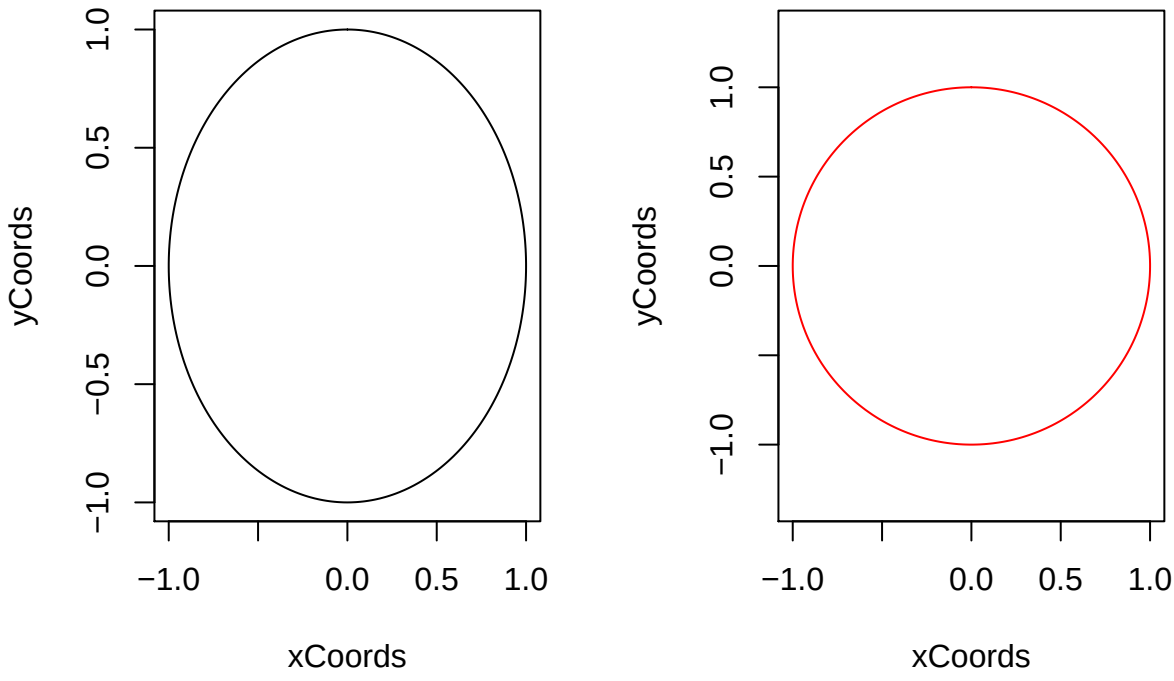
```
##  Sample Station    Area    Year   Month   dDay3  Season     SAL       T
##       0       0       0       0       0       0       0     798     927
##   CHLFa  MyTime
##     813       0
```

Exercise 3

This function plots a circle.

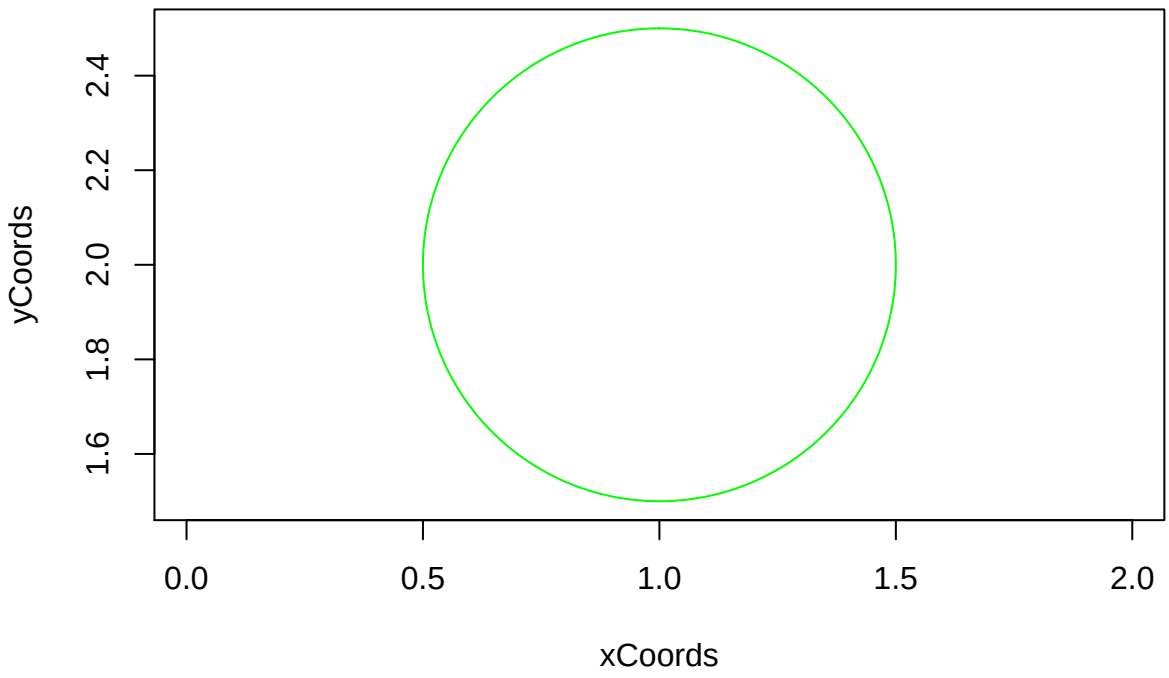
```
circ = function(...) {
  r = seq(0, 2*pi, length=1000)
  xCoords = sin(r)
  yCoords = cos(r)
  plot(xCoords, yCoords, type="l", ...)
```

```
}
par(mfrow=c(1,2))
circ()
circ(col="red", asp=1)
```



We can alter it to change the radius and coordinates by adding additional parameters

```
circ = function(radius=1, centerx=0, centery=0, ...) {
  r = seq(0, 2*pi, length=1000)
  xCoords = centerx + radius*sin(r)
  yCoords = centery + radius*cos(r)
  plot(xCoords, yCoords, type="l", ...)
}
circ(0.5, 1, 2, col="green", asp=1)
```


yCoords
2.4
2.2
2.0
1.8
1.6
0.0
0.5
1.0
1.5
2.0
xCoords