

# Assignment 2

Andrea Lovisolo 19205880

30/10/2019

```
library(readr)
DublinAirport <- read_csv("mly532.csv", skip = 19)

## Parsed with column specification:
## cols(
##   year = col_double(),
##   month = col_double(),
##   meant = col_double(),
##   maxtp = col_double(),
##   mintp = col_double(),
##   mnmax = col_double(),
##   mnmin = col_double(),
##   rain = col_double(),
##   gmin = col_double(),
##   wdsp = col_double(),
##   maxgt = col_double(),
##   sun = col_double()
## )

View(DublinAirport)

DublinAirport$month = factor(DublinAirport$month, 1:12, month.name)

Q = aggregate(DublinAirport$rain, by = list(DublinAirport$month), mean)
colnames(Q) = c("Month", "Rain")
Q[which.max(Q$Rain),]

##      Month      Rain
## 12 December 75.37564

Q[which.min(Q$Rain),]

##      Month      Rain
##  2 February 49.70256

DublinAirport$new.col = factor(DublinAirport$month, month.name, labels = c("Winter", "Winter", "Spring", "Spring", "Summer", "Summer", "Autumn", "Autumn", "Winter", "Winter", "Spring", "Spring"))
colnames(DublinAirport)[13] = "Seasons"

class(DublinAirport) = c("WeatherData", "data.frame")
class(DublinAirport)

## [1] "WeatherData" "data.frame"

summary.WeatherData = function(x) {

  #RainData
  a = aggregate(x$rain, by = list(x$Seasons), mean)
  colnames(a) = c("Season", "Mean(Rain)")
  a2 = aggregate(x$rain, by = list(x$Seasons), sd)
  colnames(a2) = c("Season", "Sd(Rain)")
}
```

```

a3 = aggregate(x$rain, by = list(x$Seasons),min)
colnames(a3) = c("Season", "Min(Rain)")
a4 = aggregate(x$rain, by = list(x$Seasons),max)
colnames(a4) = c("Season", "Max(Rain)")

a = merge(a,a2)
a = merge(a,a3)
a = merge(a,a4)

#Mintp data

b= aggregate(x$mintp, by = list(x$Seasons),mean)
colnames(b) = c("Season", "Mean(Mintp)")
b2= aggregate(x$mintp, by = list(x$Seasons),sd)
colnames(b2) = c("Season", "Sd(Mintp)")
b3= aggregate(x$mintp, by = list(x$Seasons),min)
colnames(b3) = c("Season", "Min(Mintp)")
b4= aggregate(x$mintp, by = list(x$Seasons),max)
colnames(b4) = c("Season", "Max(Mintp)")

b = merge(b,b2)
b = merge(b,b3)
b = merge(b,b4)

#Maxtp Data

c= aggregate(x$maxtp, by = list(x$Seasons),mean,na.rm = T)
colnames(c) = c("Season", "Mean(Maxtp)")
c2= aggregate(x$maxtp, by = list(x$Seasons),sd,na.rm = T)
colnames(c2) = c("Season", "Sd(Maxtp)")
c3= aggregate(x$maxtp, by = list(x$Seasons),min,na.rm = T)
colnames(c3) = c("Season", "Min(Maxtp)")
c4= aggregate(x$maxtp, by = list(x$Seasons),max,na.rm = T)
colnames(c4) = c("Season", "Max(Maxtp)")

c = merge(c,c2)
c = merge(c,c3)
c = merge(c,c4)

#Maxgt Data

d= aggregate(x$maxgt,by = list(x$Seasons),mean,na.rm = T)
colnames(d) = c("Season", "Mean(Maxgt)")
d2= aggregate(x$maxgt,by = list(x$Seasons),sd,na.rm = T)
colnames(d2) = c("Season", "Sd(Maxgt)")
d3= aggregate(x$maxgt,by = list(x$Seasons),min,na.rm = T)
colnames(d3) = c("Season", "Min(Maxgt)")
d4= aggregate(x$maxgt,by = list(x$Seasons),max,na.rm = T)
colnames(d4) = c("Season", "Max(Maxgt)")

d = merge(d,d2)
d = merge(d,d3)

```

```

d = merge(d,d4)

print(a)
print(b)
print(c)
print(d)
}

summary(DublinAirport)

##   Season Mean(Rain) Sd(Rain) Min(Rain) Max(Rain)
## 1 Autumn   70.20948 38.11011     3.6   185.8
## 2 Spring   53.54915 27.30880     3.6   151.8
## 3 Summer   63.92165 35.43135     4.0   189.9
## 4 Winter   63.89017 32.87200     4.7   217.0
##   Season Mean(Mintp) Sd(Mintp) Min(Mintp) Max(Mintp)
## 1 Autumn    1.2551724  2.799624     -8.4     7.5
## 2 Spring   -0.5871795  2.401950     -7.9     6.9
## 3 Summer    5.9303030  1.735196      0.7    10.0
## 4 Winter   -3.1931624  2.369322    -12.2     1.8
##   Season Mean(Maxtp) Sd(Maxtp) Min(Maxtp) Max(Maxtp)
## 1 Autumn    18.02198  3.038054     12.1    25.1
## 2 Spring    17.16239  2.798734      9.9    23.5
## 3 Summer    23.02511  1.787048     18.4    28.7
## 4 Winter    12.73761  1.638288      4.8    17.1
##   Season Mean(Maxgt) Sd(Maxgt) Min(Maxgt) Max(Maxgt)
## 1 Autumn    47.23661  7.875278      27     73
## 2 Spring    45.57333  7.426136      28     66
## 3 Summer    39.49333  6.263642      27     56
## 4 Winter    53.04933  8.767892      35     80

#DataFrame1 = Every year the dublin airport faces a high average rainfall
#regardless of the season.
#The minimum and historical maximum are between 4mm to 200mm
#with a total average of 65mm with a variation range of 35mm.

#Dataframe2-3 = The dublin airport historically faces temperatures
#lower than the European average but these do not represent
#a risk for the circulation of aircraft.
#Winters face temperatures with average minimum values around -3 degrees
#with and maximums around 2 degrees.
#While the average maximum values during the summer are around 23 degrees.
#Except in special situations therefore the temperature does not represent
#a danger for the circulation of the aircraft.

#Dataframe4 = The power of the gusts is the most critical data for Dublin airport.
#In every season the airport faces medium gusts of around 45 knots
#and this can represent a danger for the moving aircraft
#during take-off and landing.

plot.WeatherData = function(z, x, y,plot1=T,plot2=T,plot3=T) {

  if(missing(x)) {x = 2015}
  if(missing(y)) {y = 2018}

```

```

a = x:y
q = z[z$year %in% a,]
par(mfrow = c(1,3))

if (plot1 != FALSE){plot(q$month, q$min tp, col=rgb(1,1,0,1/4), xlab= "Month",ylab= "MinTemp",las = 2)

par(new = TRUE)

plot(q$month, q$maxtp, type = "l", axes = FALSE, bty = "n",xlab= "Month",ylab=NULL,col=rgb(1,0,0,1/4)
axis(side=4, at = pretty(range(q$maxtp)))
legend("topleft",legend= c("Maxtp = RightValue", "Mintp= LeftValue"),text.col = c(rgb(1,0,0,1/2),rgb(
mtext("Maxtemp",4,0.5,cex = 0.8) } else {plot(NULL)}

nCol = 12

if (plot2 != FALSE) {plot(q$year,q$rain,type="p",col=rep(1:nCol, each = 12),xlab = "Years",ylab="Rain(

if (plot3 != FALSE) { plot(q$year,q$maxgt,type="p",col=rep(1:nCol, each = 12),xlab="Years",ylab="Maxgt(
}

plot(DublinAirport)

```

