Weather

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Loading data

```
weather <-readRDS("C:/Users/Adm/Downloads/weather.rds")
```

Exploring data

Let's have a look at the structure of the data.

```
str(weather)
```

```
## 'data.frame':    286 obs. of  35 variables:
##  $ X       : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ year    : int  2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 ...
##  $ month   : int  12 12 12 12 12 12 12 12 12 12 ...
##  $ measure: chr  "Max.TemperatureF" "Mean.TemperatureF" "Min.TemperatureF"
"Max.Dew.PointF" ...
##  $ X1      : chr  "64" "52" "39" "46" ...
##  $ X2      : chr  "42" "38" "33" "40" ...
##  $ X3      : chr  "51" "44" "37" "49" ...
##  $ X4      : chr  "43" "37" "30" "24" ...
##  $ X5      : chr  "42" "34" "26" "37" ...
##  $ X6      : chr  "45" "42" "38" "45" ...
##  $ X7      : chr  "38" "30" "21" "36" ...
##  $ X8      : chr  "29" "24" "18" "28" ...
##  $ X9      : chr  "49" "39" "29" "49" ...
##  $ X10     : chr  "48" "43" "38" "45" ...
##  $ X11     : chr  "39" "36" "32" "37" ...
##  $ X12     : chr  "39" "35" "31" "28" ...
##  $ X13     : chr  "42" "37" "32" "28" ...
##  $ X14     : chr  "45" "39" "33" "29" ...
##  $ X15     : chr  "42" "37" "32" "33" ...
##  $ X16     : chr  "44" "40" "35" "42" ...
##  $ X17     : chr  "49" "45" "41" "46" ...
##  $ X18     : chr  "44" "40" "36" "34" ...
##  $ X19     : chr  "37" "33" "29" "25" ...
##  $ X20     : chr  "36" "32" "27" "30" ...
##  $ X21     : chr  "36" "33" "30" "30" ...
##  $ X22     : chr  "44" "39" "33" "39" ...
##  $ X23     : chr  "47" "45" "42" "45" ...
##  $ X24     : chr  "46" "44" "41" "46" ...
##  $ X25     : chr  "59" "52" "44" "58" ...
##  $ X26     : chr  "50" "44" "37" "31" ...
##  $ X27     : chr  "52" "45" "38" "34" ...
```

```
##  $ X28    : chr  "52" "46" "40" "42" ...
##  $ X29    : chr  "41" "36" "30" "26" ...
##  $ X30    : chr  "30" "26" "22" "10" ...
##  $ X31    : chr  "30" "25" "20" "8" ...
```

```
summary(weather)
```

```
##        X                year          month          measure
##  Min.   :  1.00   Min.   :2014   Min.   : 1.000   Length:286
##  1st Qu.: 72.25   1st Qu.:2015   1st Qu.: 4.000   Class :character
##  Median :143.50   Median :2015   Median : 7.000   Mode  :character
##  Mean   :143.50   Mean   :2015   Mean   : 6.923
##  3rd Qu.:214.75   3rd Qu.:2015   3rd Qu.:10.000
##  Max.   :286.00   Max.   :2015   Max.   :12.000
##       X1                 X2                 X3                 X4
##  Length:286         Length:286         Length:286         Length:286
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##       X5                 X6                 X7                 X8
##  Length:286         Length:286         Length:286         Length:286
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##       X9                X10                X11                X12
##  Length:286         Length:286         Length:286         Length:286
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##      X13                X14                X15                X16
##  Length:286         Length:286         Length:286         Length:286
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##      X17                X18                X19                X20
##  Length:286         Length:286         Length:286         Length:286
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##      X21                X22                X23                X24
##  Length:286         Length:286         Length:286         Length:286
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
```

```
##
##
##
##      X25                X26                X27                X28
##  Length:286         Length:286         Length:286         Length:286
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##      X29                X30                X31
##  Length:286         Length:286         Length:286
##  Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character
##
##
##
```

Tidying data

We see that values are stored in columns, not rows. We need to fix that.

```
library(tidyr)
library(dplyr)

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union

newweather <-weather[,-1] %>% gather(key = day, value = val, X1 : X31)  %>%
  pivot_wider(names_from = measure, values_from = val)
```

Also we need to sort out the date of observation. I decided to keep days, months and years in different columns, because it may be convenient to select certain years/months/days as in the examples below.

```
library(data.table)

##
## Attaching package: 'data.table'

## The following objects are masked from 'package:dplyr':
##
##     between, first, last
```

```
draftday<-data.table(newweather$day)
day<- separate(draftday, V1, c("X", "day"),sep = 1)[,2]
finalweather<-cbind(day, newweather[,-3])[,c(2,3,1,4:25)]
```

We can also see that the columns that should be numeric are actually character. Precipitation column has some T values, but it may not be so, it's not a logical variable. We need to fix that too.

```
finalweather1 <- finalweather %>% mutate_at(vars(-Events), as.numeric) %>%
filter(PrecipitationIn != "T")

## Warning: PI CЂPµP·CґP»CЊC,P°C,Pµ PïCЂPµPsP±CЂP°P·PsPIP°PSPëCЏ CЃPsP·PrP°PSC‹
NA
```

Examples.

```
finalweather1 %>% select(c(1:5)) %>% subset(year==2014)

##     year month day Max.TemperatureF Mean.TemperatureF
## 1   2014    12   1               64                52
## 11  2014    12   2               42                38
## 23  2014    12   3               51                44
## 35  2014    12   4               43                37
## 45  2014    12   5               42                34
## 55  2014    12   6               45                42
## 66  2014    12   7               38                30
## 77  2014    12   8               29                24
## 86  2014    12   9               49                39
## 97  2014    12  10               48                43
## 109 2014    12  11               39                36
## 142 2014    12  14               45                39
## 153 2014    12  15               42                37
## 172 2014    12  17               49                45
## 182 2014    12  18               44                40
## 193 2014    12  19               37                33
## 221 2014    12  22               44                39
## 228 2014    12  23               47                45
## 240 2014    12  24               46                44
## 249 2014    12  25               59                52
## 260 2014    12  26               50                44
## 269 2014    12  27               52                45
## 281 2014    12  28               52                46
## 292 2014    12  29               41                36
## 301 2014    12  30               30                26
## 311 2014    12  31               30                25

finalweather1 %>% select(year, month, day, Events) %>% subset(month==12) %>%
subset(day==1)

##    year month day Events
## 1  2014    12   1   Rain
## 10 2015    12   1   Rain
```

Then we deal with the missing values.

```
finalweather2<-na.omit(finalweather1)
```

Let's have a look at the result we've got

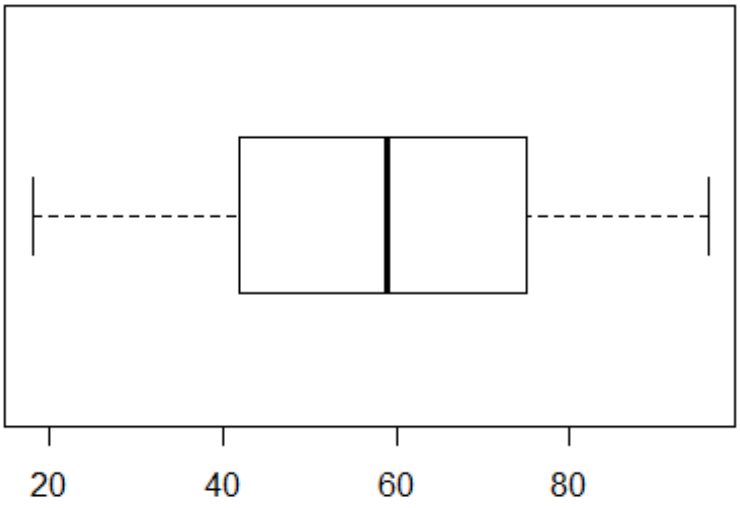
```
summary(finalweather2)
```

```
##       year          month             day       Max.TemperatureF
##  Min.   :2014   Min.   : 1.000   Min.   : 1.0   Min.   :18.00
##  1st Qu.:2015   1st Qu.: 3.000   1st Qu.: 8.0   1st Qu.:42.00
##  Median :2015   Median : 6.000   Median :15.0   Median :59.00
##  Mean   :2015   Mean   : 6.463   Mean   :15.7   Mean   :58.24
##  3rd Qu.:2015   3rd Qu.: 9.500   3rd Qu.:23.5   3rd Qu.:75.00
##  Max.   :2015   Max.   :12.000   Max.   :31.0   Max.   :96.00
##  Mean.TemperatureF Min.TemperatureF Max.Dew.PointF  MeanDew.PointF
##  Min.   : 8.0      Min.   :-3.00    Min.   :-6.00   Min.   :-11.00
##  1st Qu.:36.0      1st Qu.:30.00    1st Qu.:32.00   1st Qu.: 23.00
##  Median :52.0      Median :44.00    Median :46.00   Median : 40.00
##  Mean   :50.7      Mean   :42.59    Mean   :44.79   Mean   : 38.14
##  3rd Qu.:67.5      3rd Qu.:59.50    3rd Qu.:61.00   3rd Qu.: 55.00
##  Max.   :84.0      Max.   :74.00    Max.   :75.00   Max.   : 70.00
##  Min.DewpointF     Max.Humidity     Mean.Humidity    Min.Humidity
##  Min.   :-18.00   Min.   :  39.00   Min.   :28.00   Min.   :16.00
##  1st Qu.: 14.50   1st Qu.:  73.00   1st Qu.:55.50   1st Qu.:34.00
##  Median : 33.00   Median :  86.00   Median :66.00   Median :45.00
##  Mean   : 31.35   Mean   :  85.86   Mean   :65.68   Mean   :47.87
##  3rd Qu.: 51.00   3rd Qu.:  93.00   3rd Qu.:76.00   3rd Qu.:59.00
##  Max.   : 68.00   Max.   :1000.00   Max.   :98.00   Max.   :96.00
##  Max.Sea.Level.PressureIn Mean.Sea.Level.PressureIn Min.Sea.Level.PressureIn
##  Min.   :29.58            Min.   :29.49             Min.   :29.16
##  1st Qu.:30.00            1st Qu.:29.88             1st Qu.:29.75
##  Median :30.14            Median :30.04             Median :29.94
##  Mean   :30.17            Mean   :30.05             Mean   :29.93
##  3rd Qu.:30.32            3rd Qu.:30.20             3rd Qu.:30.09
##  Max.   :30.88            Max.   :30.77             Max.   :30.64
##  Max.VisibilityMiles Mean.VisibilityMiles Min.VisibilityMiles
Max.Wind.SpeedMPH
##  Min.   : 2.000      Min.   :-1.000       Min.   : 0.000      Min.   :10.00
##  1st Qu.:10.000      1st Qu.: 8.000       1st Qu.: 2.000      1st Qu.:16.00
##  Median :10.000      Median :10.000       Median :10.000      Median :20.00
##  Mean   : 9.891      Mean   : 8.727       Mean   : 6.595      Mean   :20.85
##  3rd Qu.:10.000      3rd Qu.:10.000       3rd Qu.:10.000      3rd Qu.:24.00
##  Max.   :10.000      Max.   :10.000       Max.   :10.000      Max.   :38.00
##  Mean.Wind.SpeedMPH Max.Gust.SpeedMPH PrecipitationIn    CloudCover
##  Min.   : 4.00      Min.   : 0.00     Min.   :0.0000   Min.   :0.000
##  1st Qu.: 8.00      1st Qu.:21.00     1st Qu.:0.0000   1st Qu.:3.000
##  Median :10.00      Median :25.00     Median :0.0000   Median :5.000
##  Mean   :10.83      Mean   :27.17     Mean   :0.1195   Mean   :4.598
##  3rd Qu.:13.00      3rd Qu.:32.00     3rd Qu.:0.0700   3rd Qu.:7.000
##  Max.   :22.00      Max.   :94.00     Max.   :2.9000   Max.   :8.000
##     Events          WindDirDegrees
##  Length:311         Min.   :  1.0
##  Class :character   1st Qu.:113.5
```

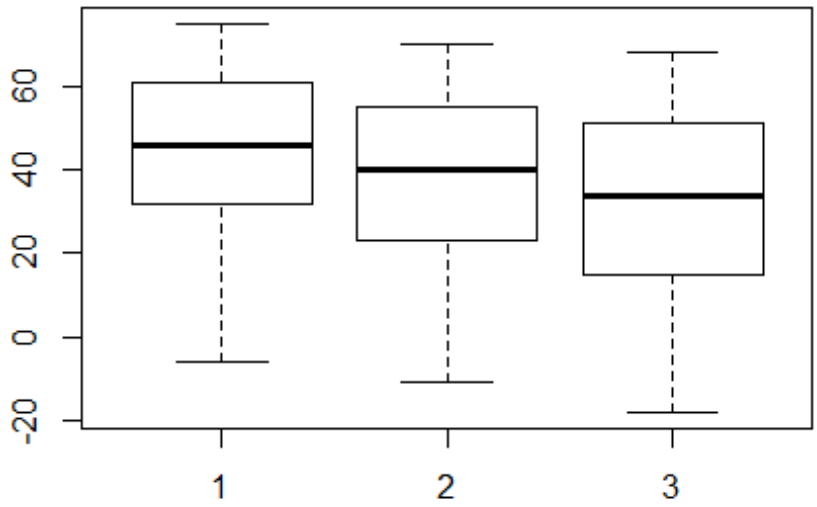
```
##  Mode  :character   Median :223.0
##                     Mean   :201.4
##                     3rd Qu.:278.0
##                     Max.   :360.0
```

Visualising

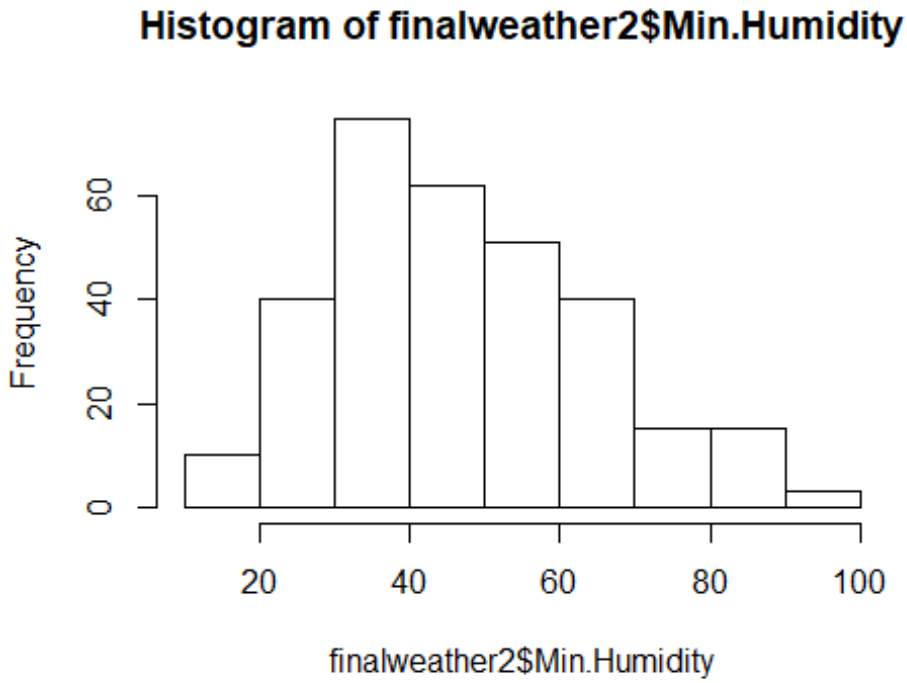
```
boxplot(finalweather2$Max.TemperatureF, horizontal = T)
```



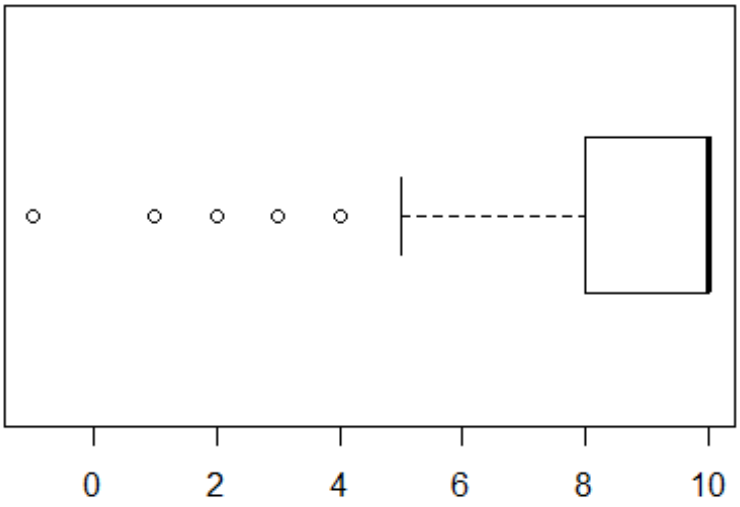

```
boxplot(finalweather2$Max.Dew.PointF,finalweather1$MeanDew.PointF,finalweather1$
Min.DewpointF)
```



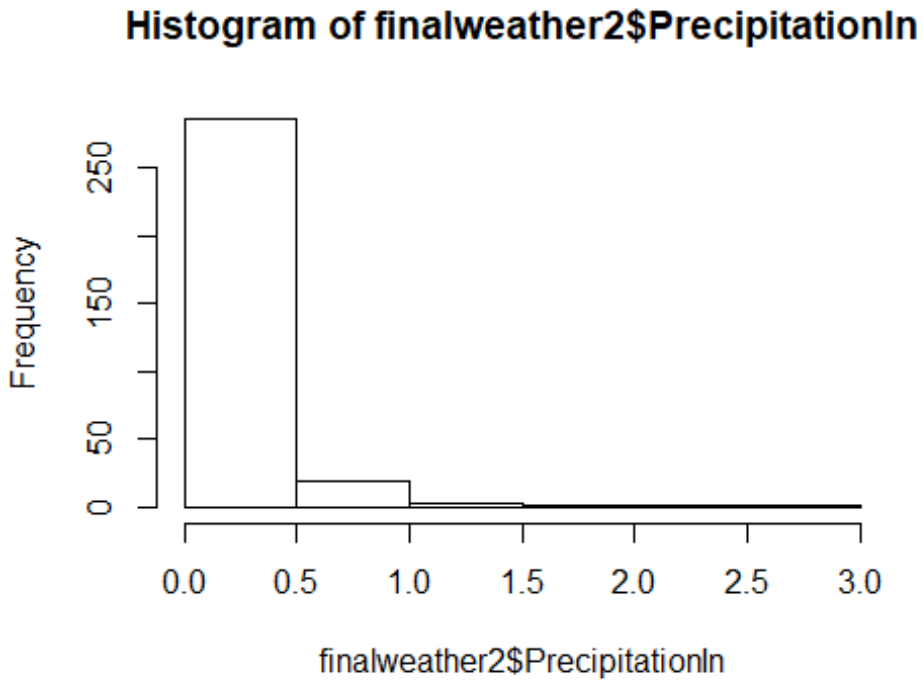

```
hist(finalweather2$Min.Humidity)
```




```
boxplot(finalweather2$Mean.VisibilityMiles, horizontal = T)
```




```
hist(finalweather2$PrecipitationIn)
```



The End