FinalProject

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4/27/2022

Input of both region's CSV

```
forestfireregion1 <- read.csv("/Users/jaygupta/Downloads/ForestFireRegion1.csv", sep =
",")
```

Data Preparation Region 1

```
names(forestfireregion1)[names(forestfireregion1)=="ï..day"] <- "day"
dim(forestfireregion1)
```

```
## [1] 122  14
```

```
str(forestfireregion1)
```

```
## 'data.frame':    122 obs. of  14 variables:
##  $ day        : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ month      : int  6 6 6 6 6 6 6 6 6 6 ...
##  $ year       : int  2012 2012 2012 2012 2012 2012 2012 2012 2012 2012 ...
##  $ Temperature: int  29 29 26 25 27 31 33 30 25 28 ...
##  $ RH         : int  57 61 82 89 77 67 54 73 88 79 ...
##  $ Ws         : int  18 13 22 13 16 14 13 15 13 12 ...
##  $ Rain       : num  0 1.3 13.1 2.5 0 0 0 0 0.2 0 ...
##  $ FFMC       : num  65.7 64.4 47.1 28.6 64.8 82.6 88.2 86.6 52.9 73.2 ...
##  $ DMC        : num  3.4 4.1 2.5 1.3 3 5.8 9.9 12.1 7.9 9.5 ...
##  $ DC         : num  7.6 7.6 7.1 6.9 14.2 22.2 30.5 38.3 38.8 46.3 ...
##  $ ISI        : num  1.3 1 0.3 0 1.2 3.1 6.4 5.6 0.4 1.3 ...
##  $ BUI        : num  3.4 3.9 2.7 1.7 3.9 7 10.9 13.5 10.5 12.6 ...
##  $ FWI        : num  0.5 0.4 0.1 0 0.5 2.5 7.2 7.1 0.3 0.9 ...
##  $ Classes    : chr  "not fire" "not fire" "not fire" "not fire" ...
```

```
summary(forestfireregion1)
```

```
##       day            month           year        Temperature          RH
##  Min.   : 1.00   Min.   :6.0   Min.   :2012   Min.   :22.00   Min.   :45.00
##  1st Qu.: 8.00   1st Qu.:7.0   1st Qu.:2012   1st Qu.:29.00   1st Qu.:60.00
##  Median :16.00   Median :7.5   Median :2012   Median :31.00   Median :68.00
##  Mean   :15.75   Mean   :7.5   Mean   :2012   Mean   :31.18   Mean   :67.98
##  3rd Qu.:23.00   3rd Qu.:8.0   3rd Qu.:2012   3rd Qu.:34.00   3rd Qu.:77.75
##  Max.   :31.00   Max.   :9.0   Max.   :2012   Max.   :37.00   Max.   :89.00
##       Ws           Rain            FFMC            DMC
##  Min.   :11   Min.   : 0.0000   Min.   :28.60   Min.   : 0.700
##  1st Qu.:14   1st Qu.: 0.0000   1st Qu.:65.92   1st Qu.: 3.725
##  Median :16   Median : 0.0000   Median :80.90   Median : 9.450
##  Mean   :16   Mean   : 0.8426   Mean   :74.67   Mean   :12.315
##  3rd Qu.:18   3rd Qu.: 0.5000   3rd Qu.:86.78   3rd Qu.:16.300
##  Max.   :26   Max.   :16.8000   Max.   :90.30   Max.   :54.200
##       DC            ISI             BUI            FWI
##  Min.   : 6.90   Min.   : 0.000   Min.   : 1.10   Min.   : 0.000
##  1st Qu.: 10.05  1st Qu.: 1.125   1st Qu.: 5.10   1st Qu.: 0.500
##  Median : 35.55  Median : 2.650   Median :11.20   Median : 3.000
##  Mean   : 53.16  Mean   : 3.656   Mean   :15.43   Mean   : 5.578
##  3rd Qu.: 79.03  3rd Qu.: 5.600   3rd Qu.:21.68   3rd Qu.: 8.700
##  Max.   :220.40  Max.   :12.500   Max.   :67.40   Max.   :30.200
##    Classes
##  Length:122
##  Class :character
##  Mode  :character
##
##
##
```

```
head(forestfireregion1)
```

```
##   day month year Temperature RH Ws Rain FFMC DMC   DC ISI BUI FWI  Classes
## 1   1     6 2012          29 57 18  0.0 65.7 3.4  7.6 1.3 3.4 0.5 not fire
## 2   2     6 2012          29 61 13  1.3 64.4 4.1  7.6 1.0 3.9 0.4 not fire
## 3   3     6 2012          26 82 22 13.1 47.1 2.5  7.1 0.3 2.7 0.1 not fire
## 4   4     6 2012          25 89 13  2.5 28.6 1.3  6.9 0.0 1.7 0.0 not fire
## 5   5     6 2012          27 77 16  0.0 64.8 3.0 14.2 1.2 3.9 0.5 not fire
## 6   6     6 2012          31 67 14  0.0 82.6 5.8 22.2 3.1 7.0 2.5     fire
```

```
sum(is.na(forestfireregion1))
```
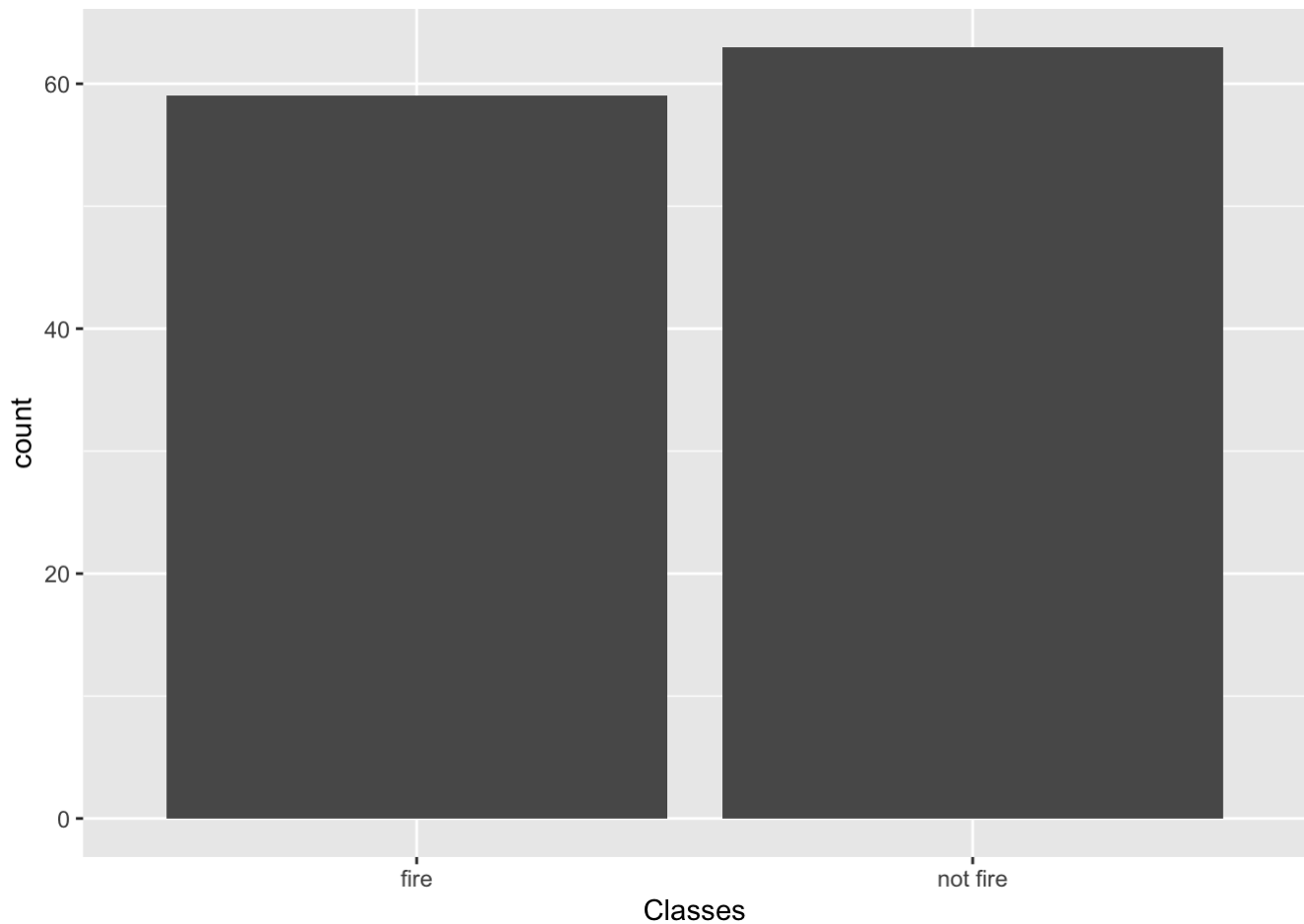
```
## [1] 0
```

```
sum(duplicated(forestfireregion1))
```

```
## [1] 0
```

> Region 1 is a data frame that contains 122 observations and 14 features. There are
> no duplicate or missing values.

Bar Plots Region 1

```
# Region 1 Classes
ggplot(data = forestfireregion1) + geom_bar(mapping = aes(x = Classes))
```



```
# Frequency of rain and temperature to understand them better

as.data.frame(table(forestfireregion1$Temperature))
```

```
##      Var1 Freq
## 1      22    2
## 2      24    1
## 3      25    6
## 4      26    4
## 5      27    4
## 6      28    7
## 7      29   11
## 8      30   10
## 9      31   18
## 10     32   14
## 11     33   13
## 12     34    7
## 13     35   15
## 14     36    9
## 15     37    1
```

```
as.data.frame(table(forestfireregion1$Rain))
```

```
Var1 Freq
1   0   66
2   0.1   9
3   0.2   2
4   0.3   8
5   0.4   5
6   0.5   2
7   0.6   4
8   0.7   4
9   0.8   1
10   0.9   1
11   1   2
12   1.2   2
13   1.3   1
14   1.4   2
15   1.8   3
16   2.5   1
17   3.1   1
18   3.8   1
19   4.6   1
20   5.8   1
21   7.2   1
22   8.3   1
23   10.1   1
24   13.1   1
25   16.8   1
```

```
Temperature has most values concentrated in categories 31, 32, 33 and 35. Only a few o
bservations made for categories 22, 24 and 37.
Rain has most values concentrated in categories 0, 0.1 and 0.3. There are quite a lot
 of observations with less frequencies.

#Classes compared with Wind Speed

ggplot(data = forestfireregion1, aes(x = Ws)) +
  geom_bar(aes(fill = Classes))
```
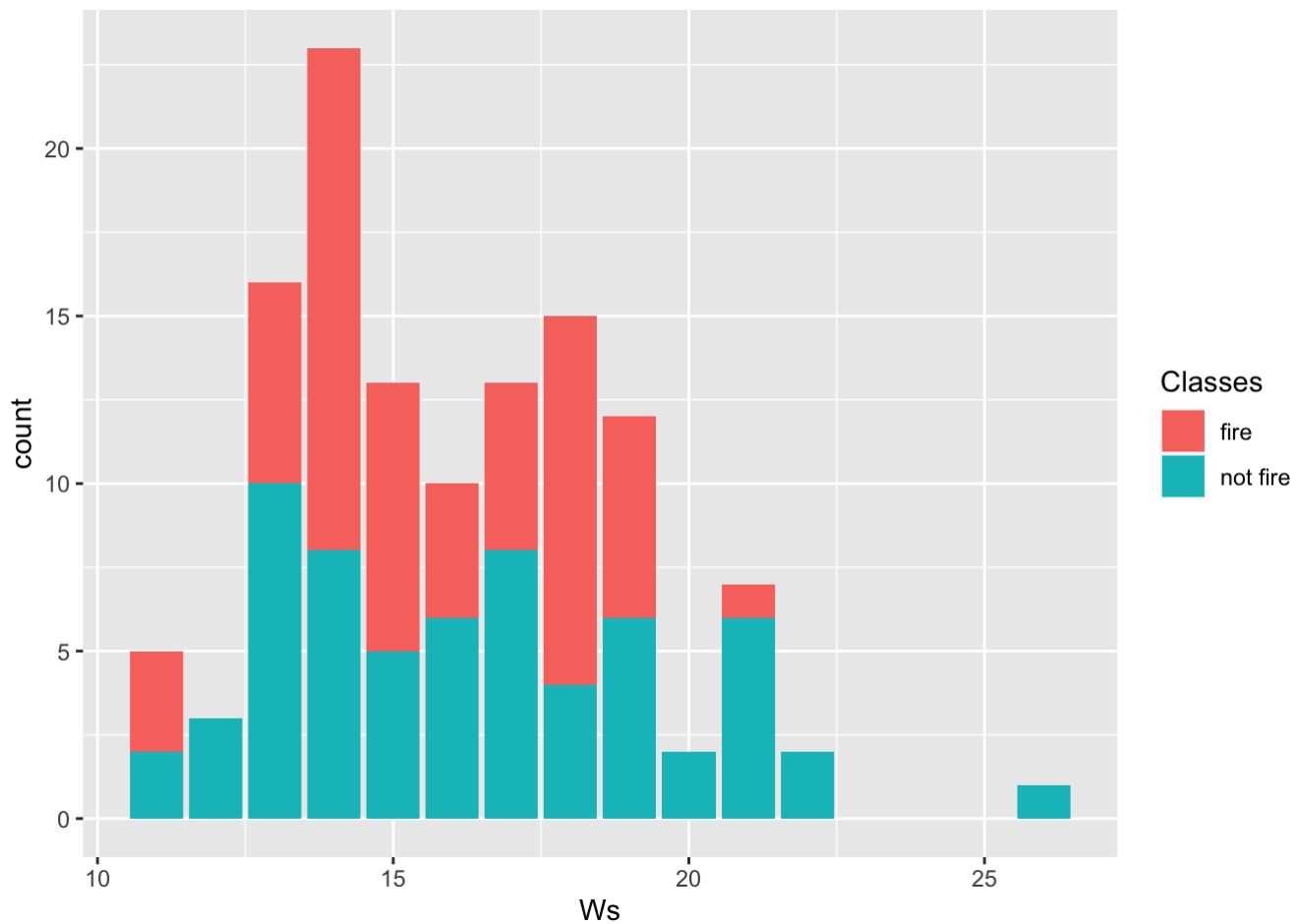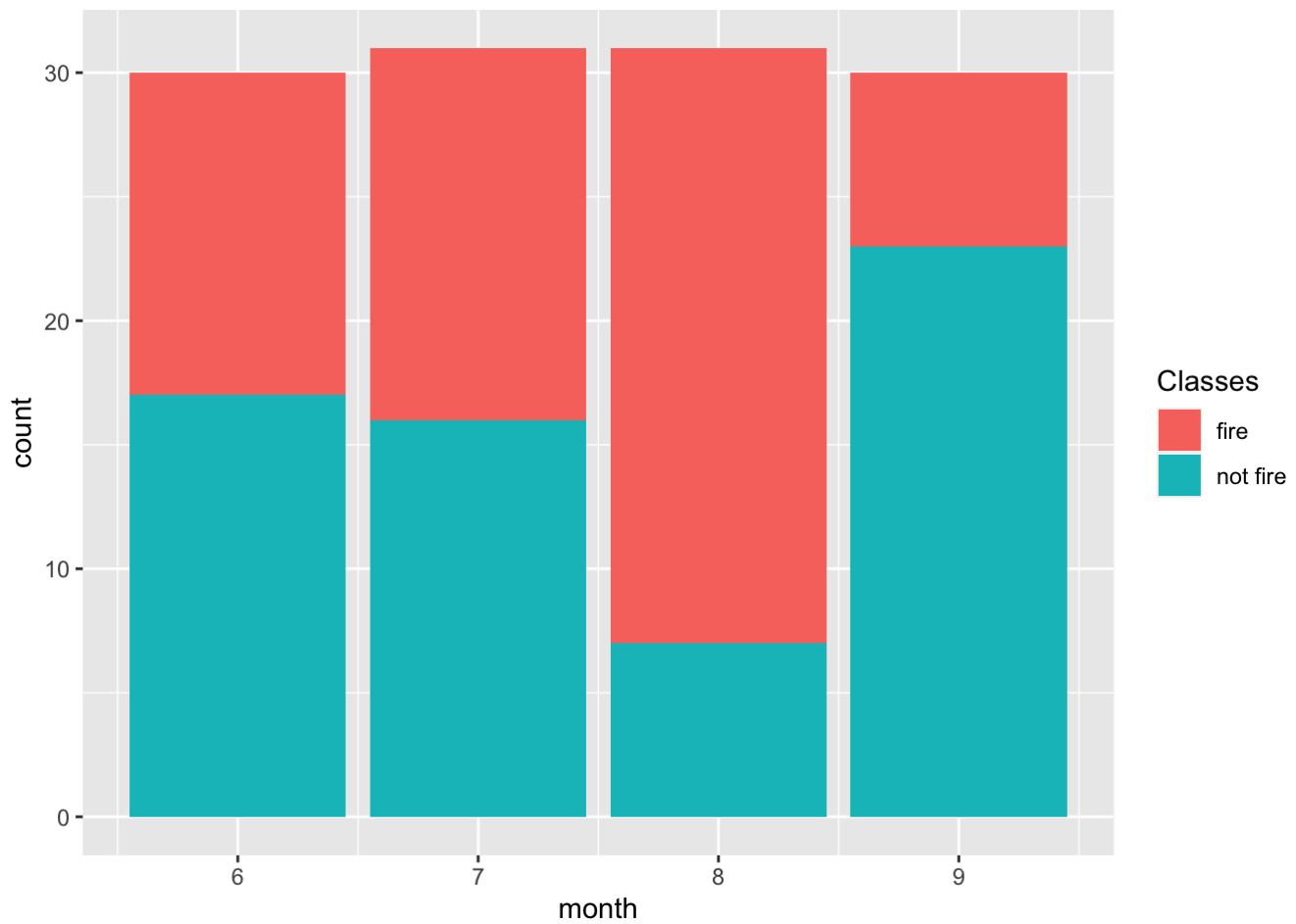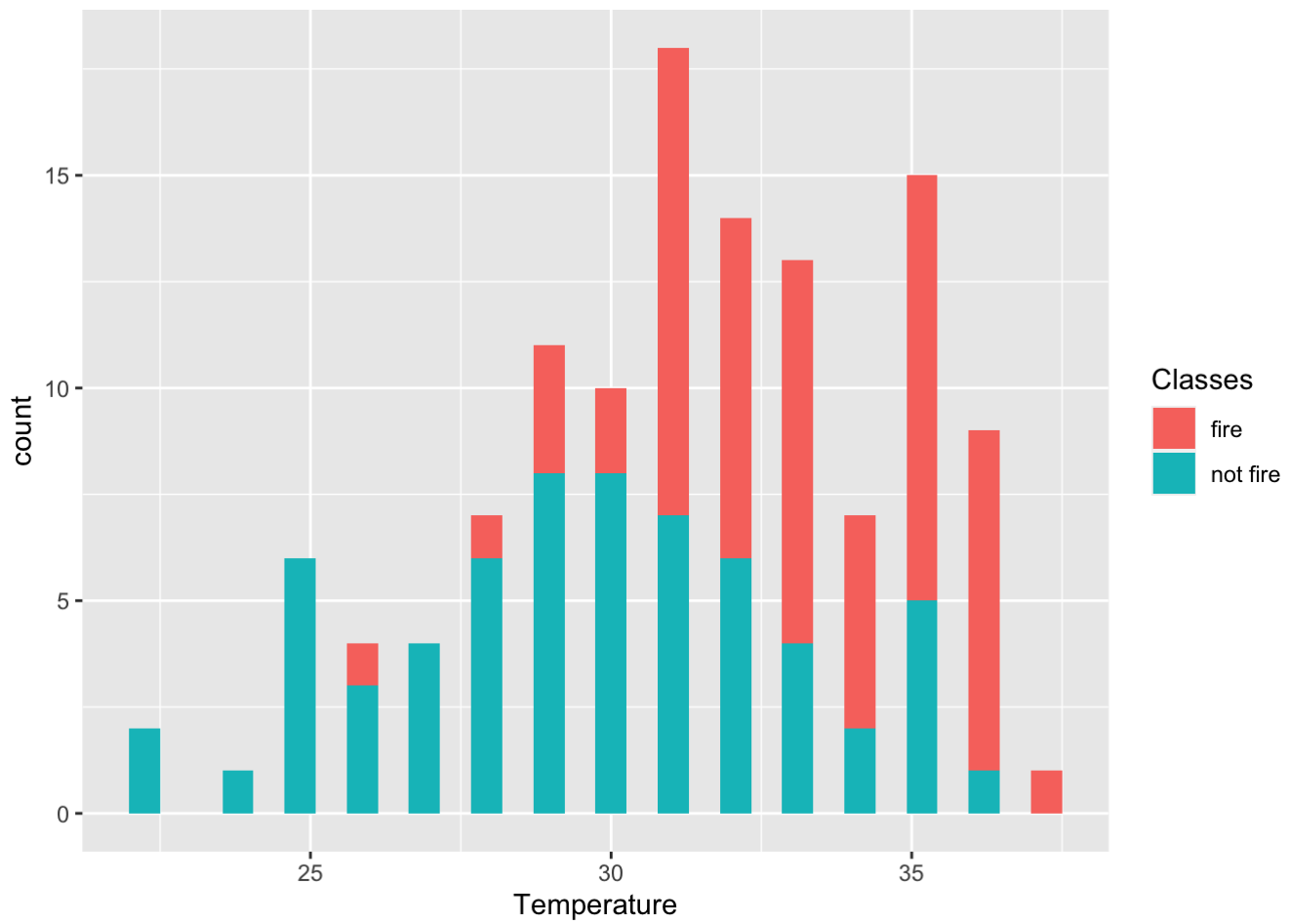


```
#Classes per Month
ggplot(data = forestfireregion1, aes(x = month)) +
  geom_bar(aes(fill = Classes))
```
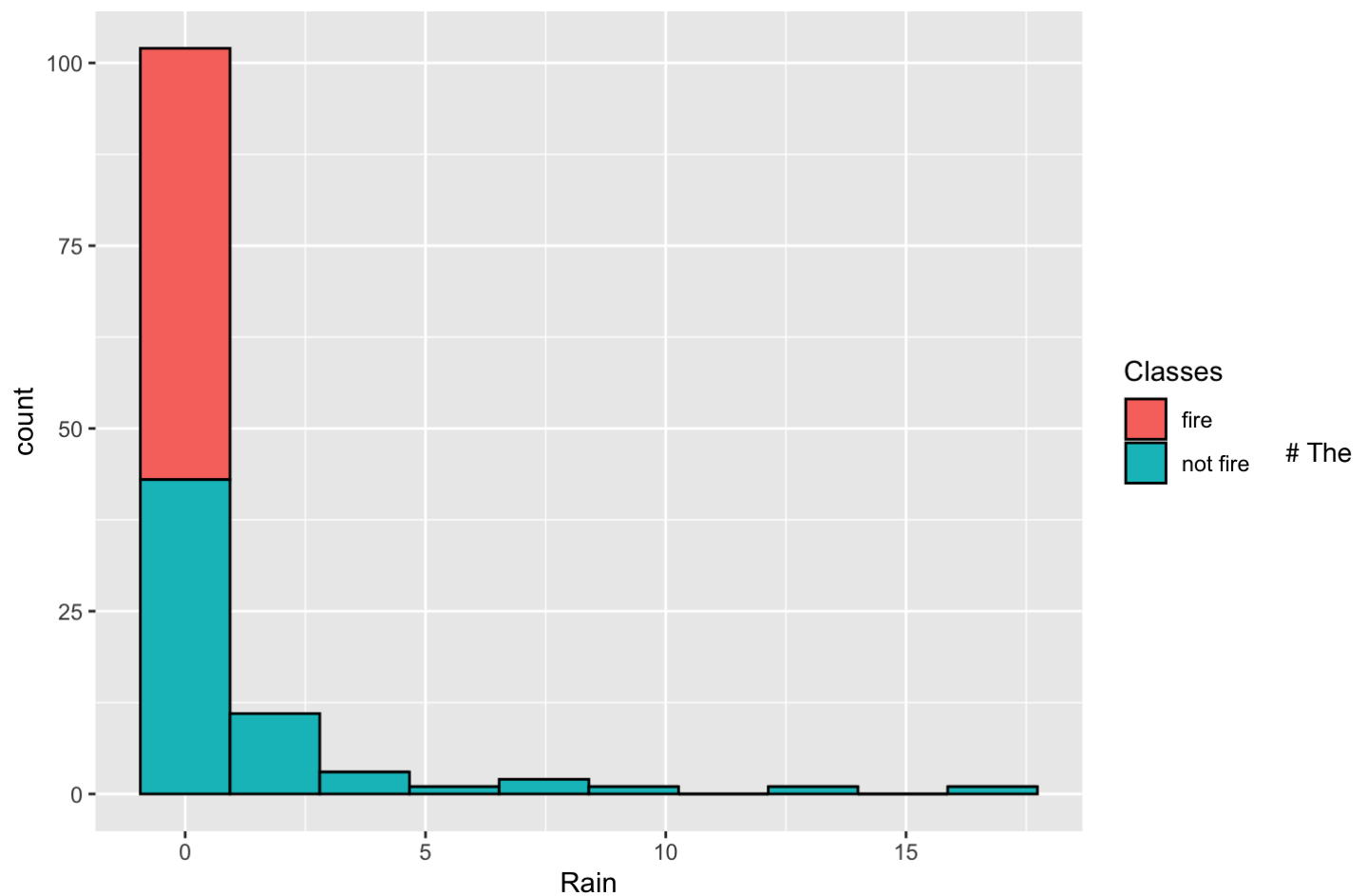
```
#Temperature VS Classes
ggplot(data = forestfireregion1, aes(x = Temperature)) +geom_histogram(aes(fill = Classe
s),bins = 30)
```

```
#Rain vs Fire
ggplot(data = forestfireregion1, aes(x = Rain)) + geom_histogram(aes(fill = Classes), bi
ns =10, color = "black")
```
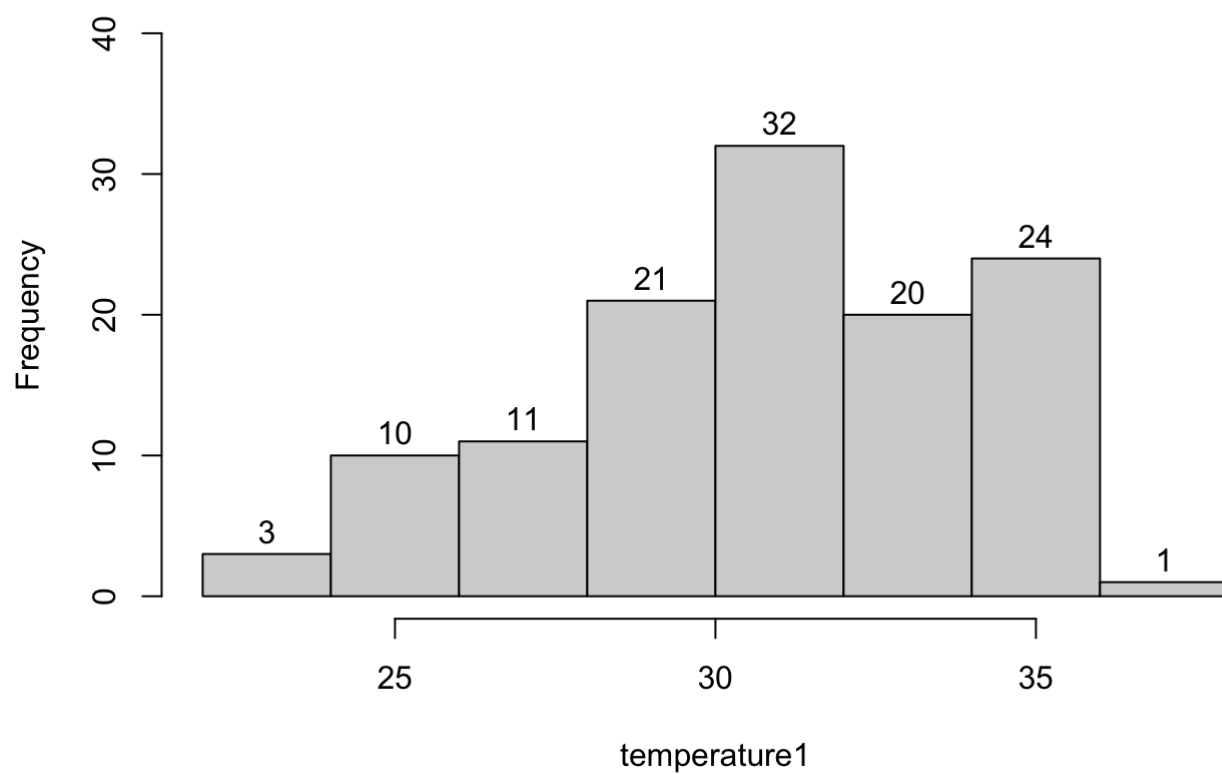
Chances of fire are greater when less Rain Precepiration

### EDA Region 1 Temperature

```
temperature1=forestfireregion1$Temperature
h1=hist(temperature1,ylim=c(0,40))
text(h1$mids,h1$counts,labels=h1$counts, adj=c(0.5, -0.5))
```

Histogram of temperature1


```
hist(temperature1,main="Maximum daily temperature",xlab="Temperature in degrees Fahrenhe
it",xlim=c(0,40),col="darkmagenta",freq=FALSE)
```

Maximum daily temperature


```
boxplot(day~Temperature,data=forestfireregion1,main="Measure of temperature per day",xla
b="Temperature",ylab="Days")
```

Measure of temperature per day


```
boxplot(Rain~Temperature,data=forestfireregion1,main="Measure of rain according to the t
emperature",xlab="Temperature",ylab="Rain")
```

Measure of rain according to the temperature
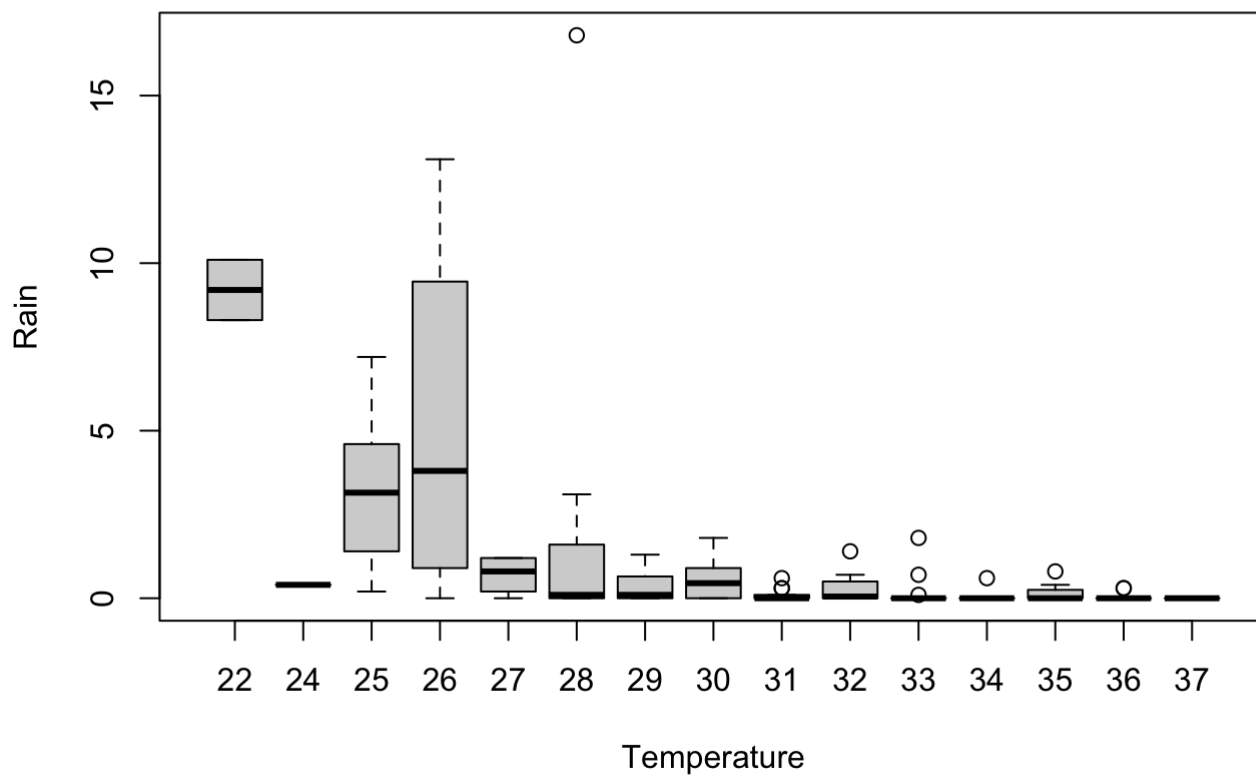

```
ggplot(data = forestfireregion1, aes(x = Temperature)) +geom_histogram(aes(fill = Classe
s),bins = 30)
```
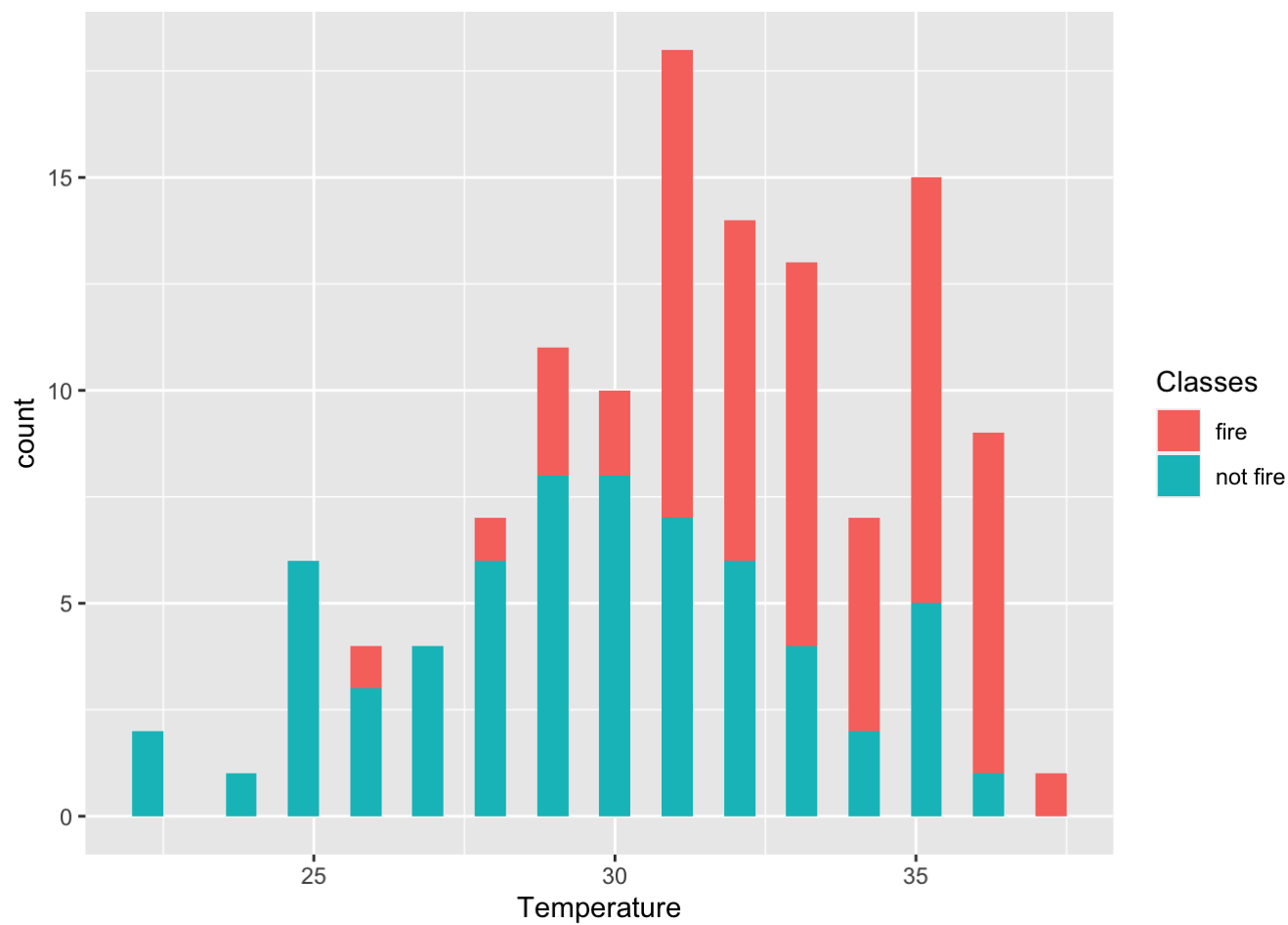
EDA Region 1 Ws
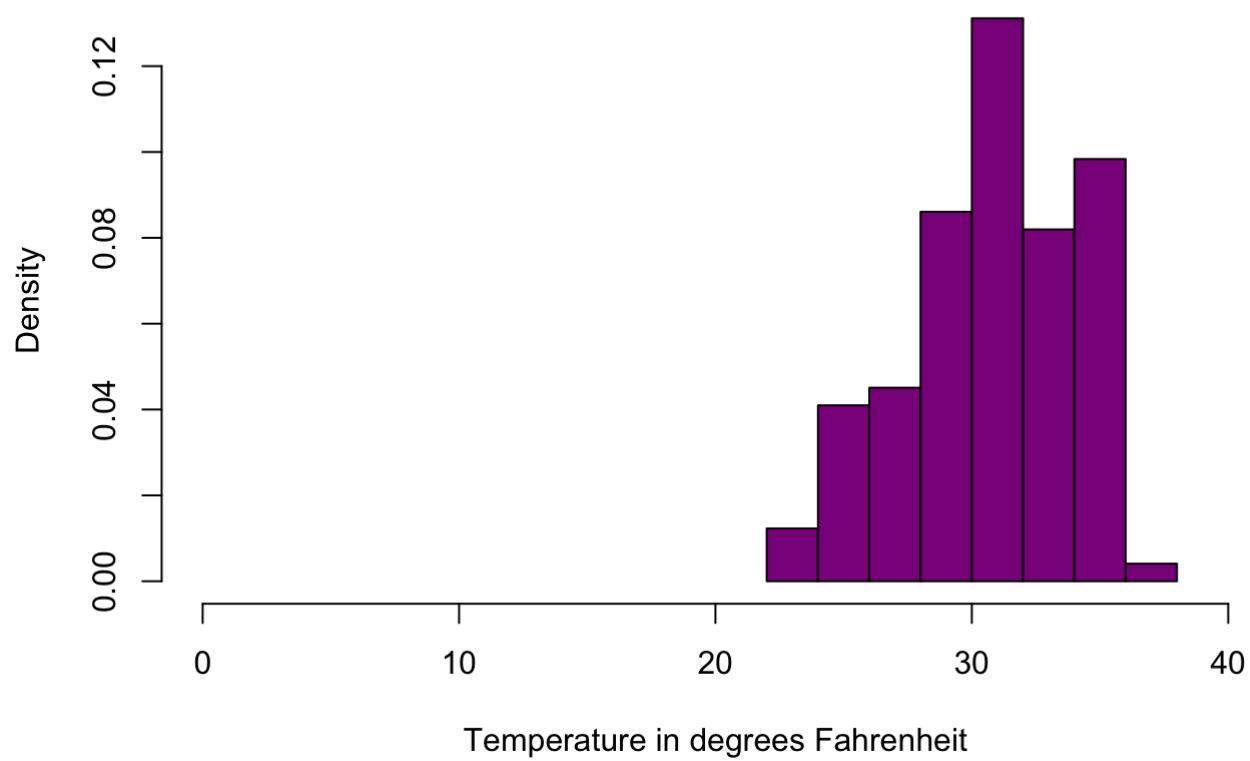
```
ws1=forestfireregion1$Ws
h1=hist(ws1,ylim=c(0,40))
text(h1$mids,h1$counts,labels=h1$counts, adj=c(0.5, -0.5))
```
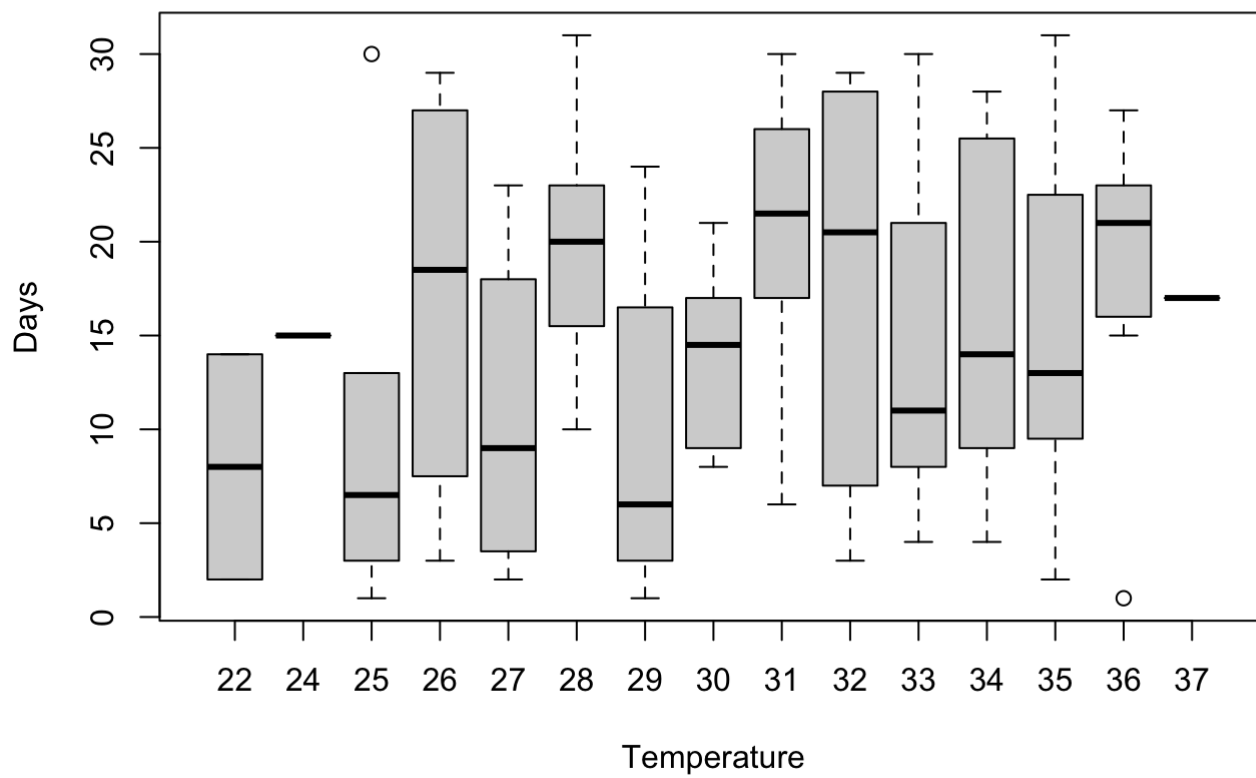
Histogram of ws1
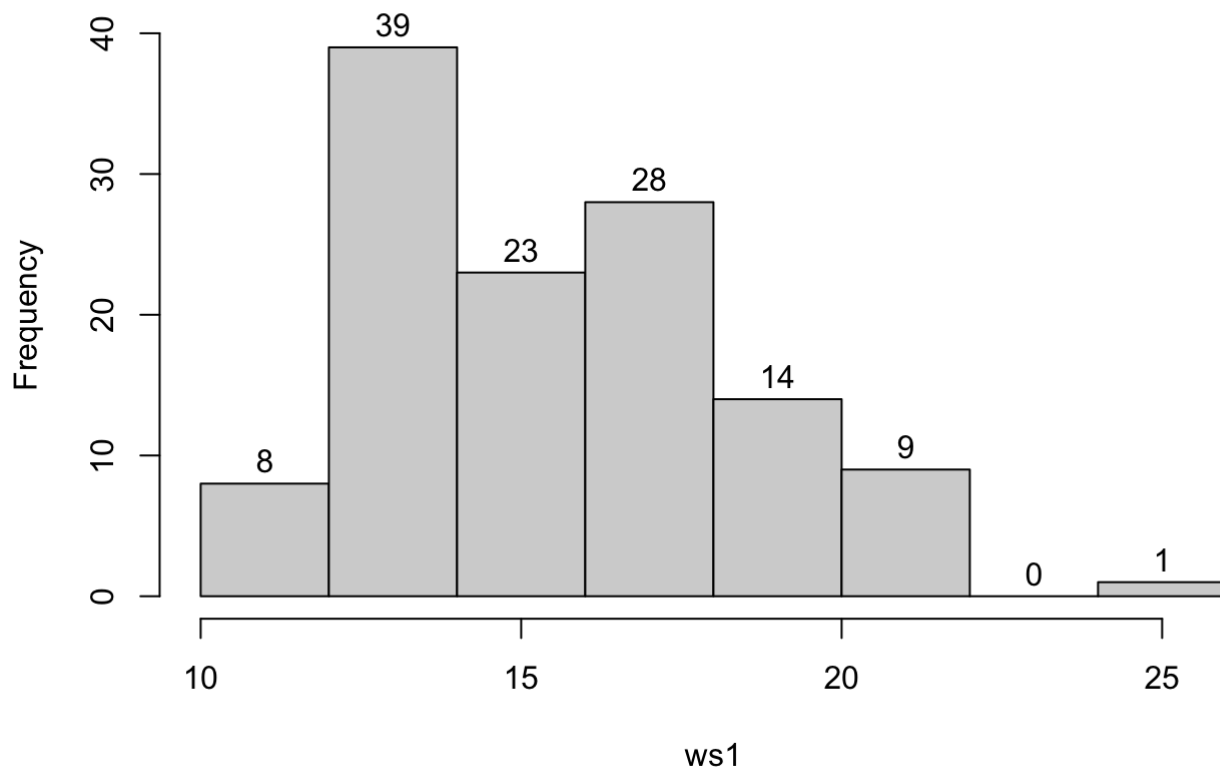

```
hist(ws1,main="Maximum daily Wind Speed",xlab="Wind Speed",xlim=c(0,30),col="darkmagent
a",freq=FALSE)
```

Maximum daily Wind Speed
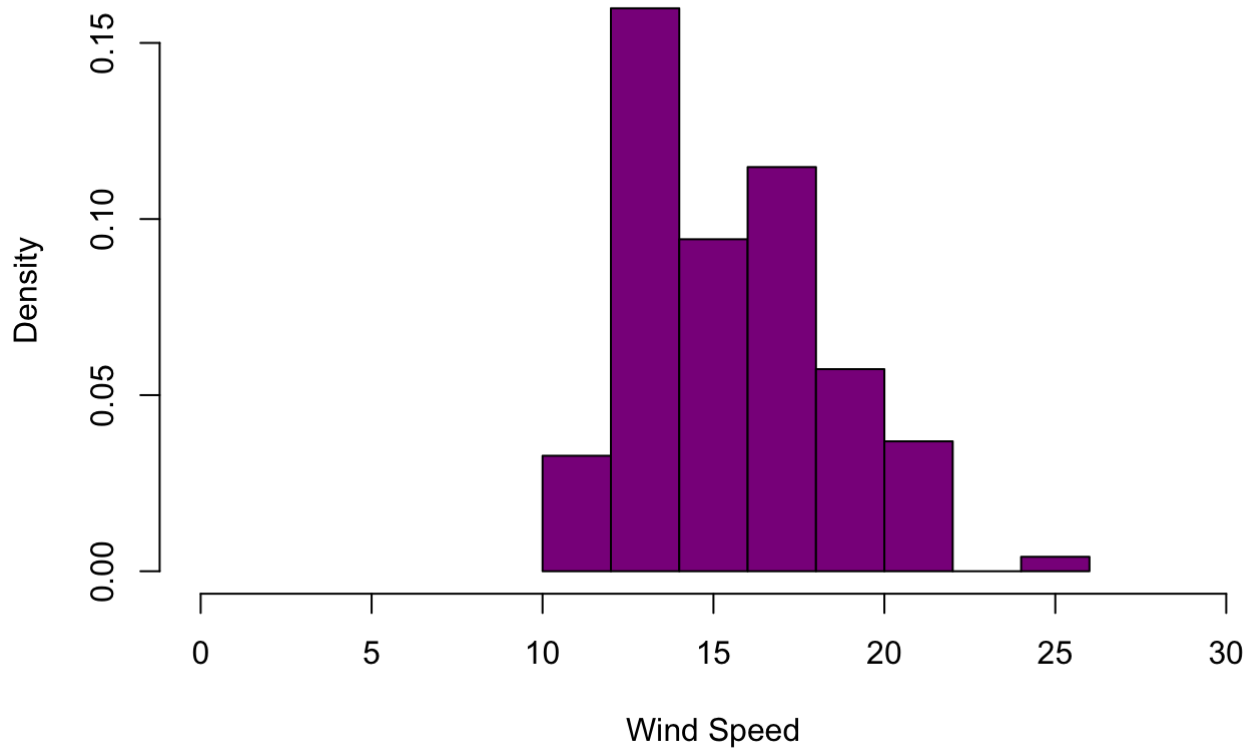

```
boxplot(day~Ws,data=forestfireregion1,main="Measure of wind speed per day",xlab="Wind Sp
eed",ylab="Days")
```

Measure of wind speed per day
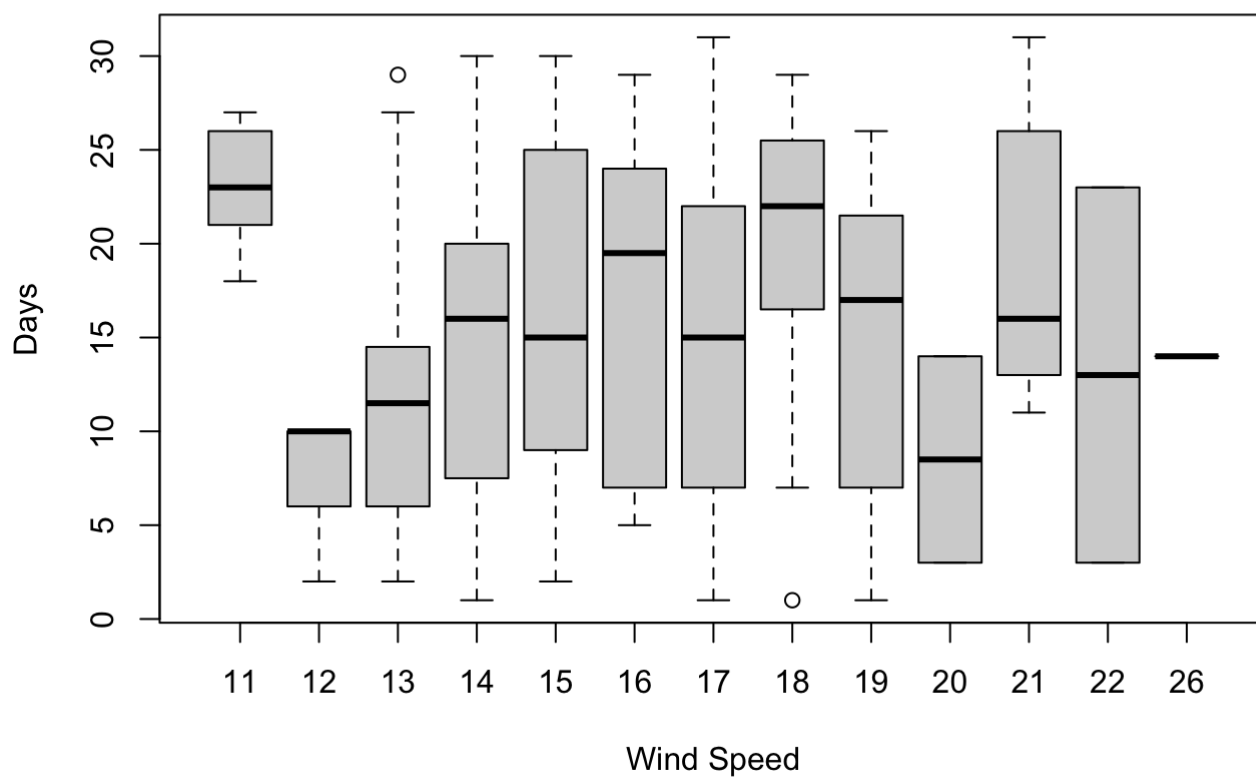

```
boxplot(Rain~Ws,data=forestfireregion1,main="Measure of rain according to the wind spee
d",xlab="Wind Speed",ylab="Rain")
```

Measure of rain according to the wind speed
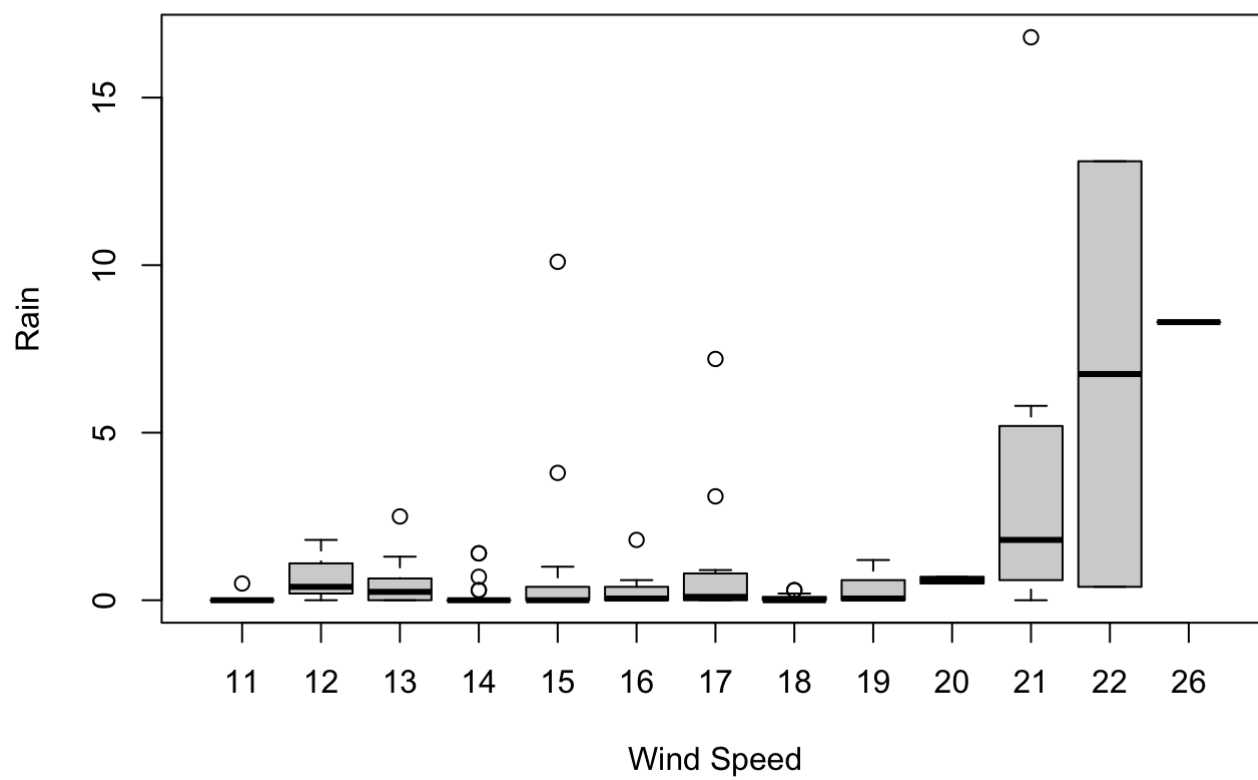

```
ggplot(data = forestfireregion1, aes(x = Ws)) +geom_histogram(aes(fill = Classes),bins =
30)
```
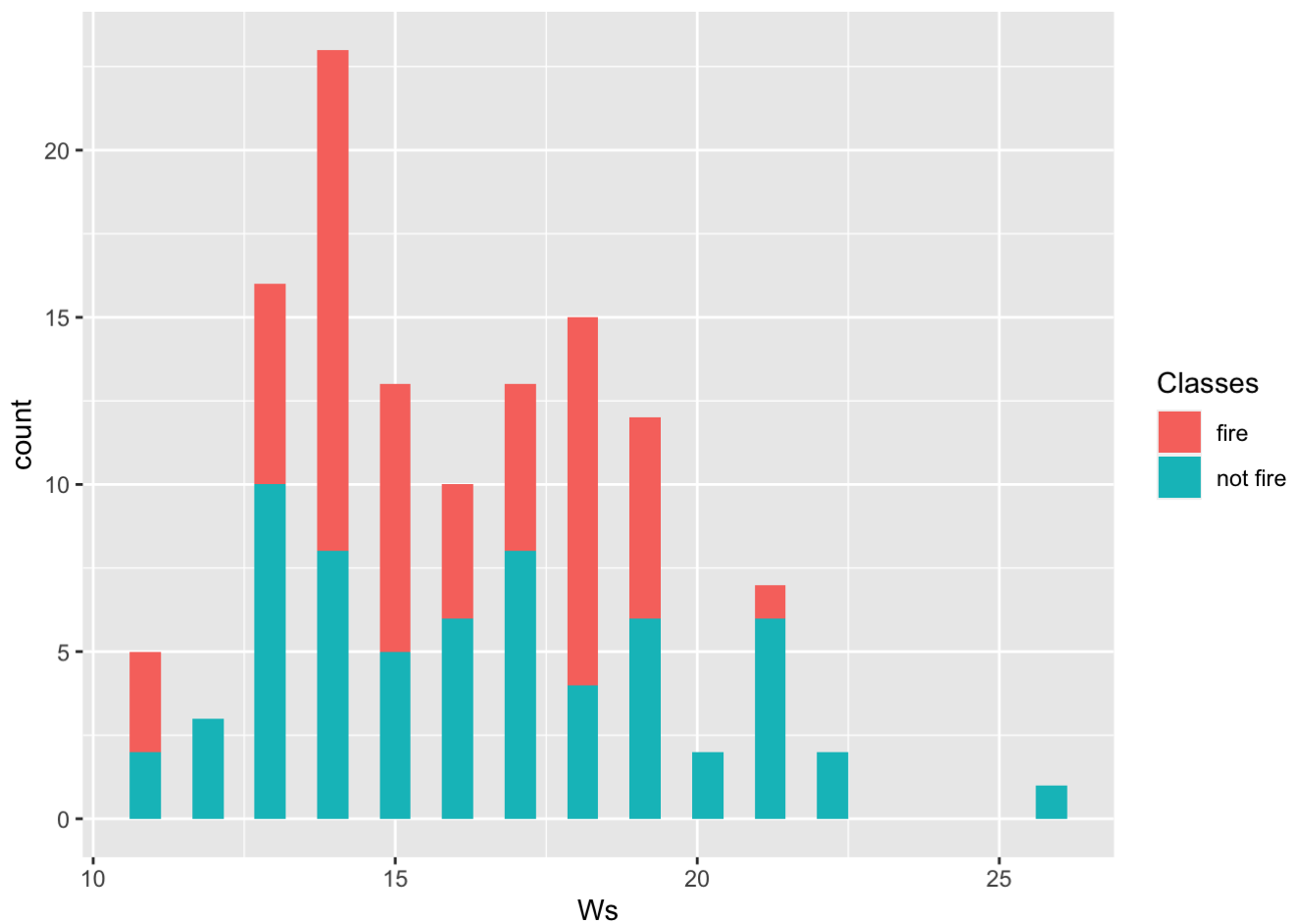
Data Analysis

QQplot

```
qqnorm(forestfireregion1$Temperature, pch=2)
qqline(forestfireregion1$Temperature, col ="green")
```

Normal Q-Q Plot
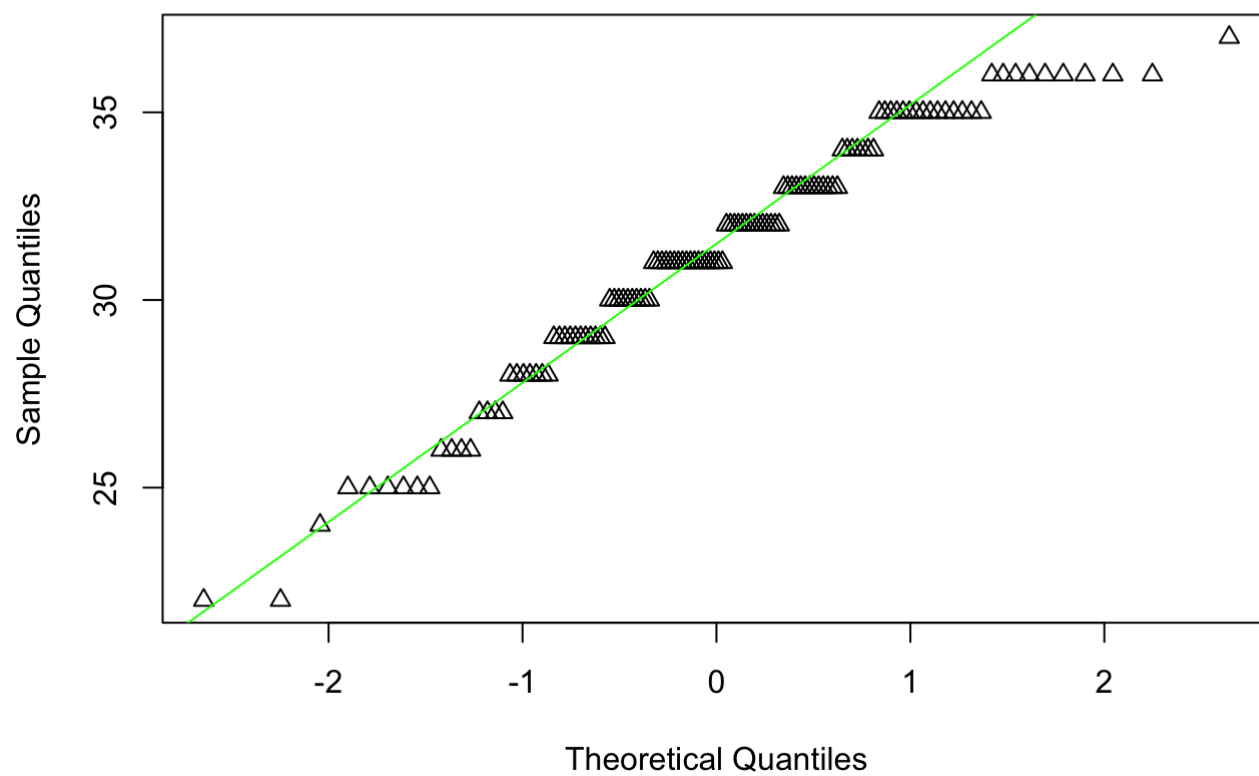

```
qqnorm(forestfireregion1$Rain, pch=2)
qqline(forestfireregion1$Rain, col ="green")
```

Normal Q-Q Plot
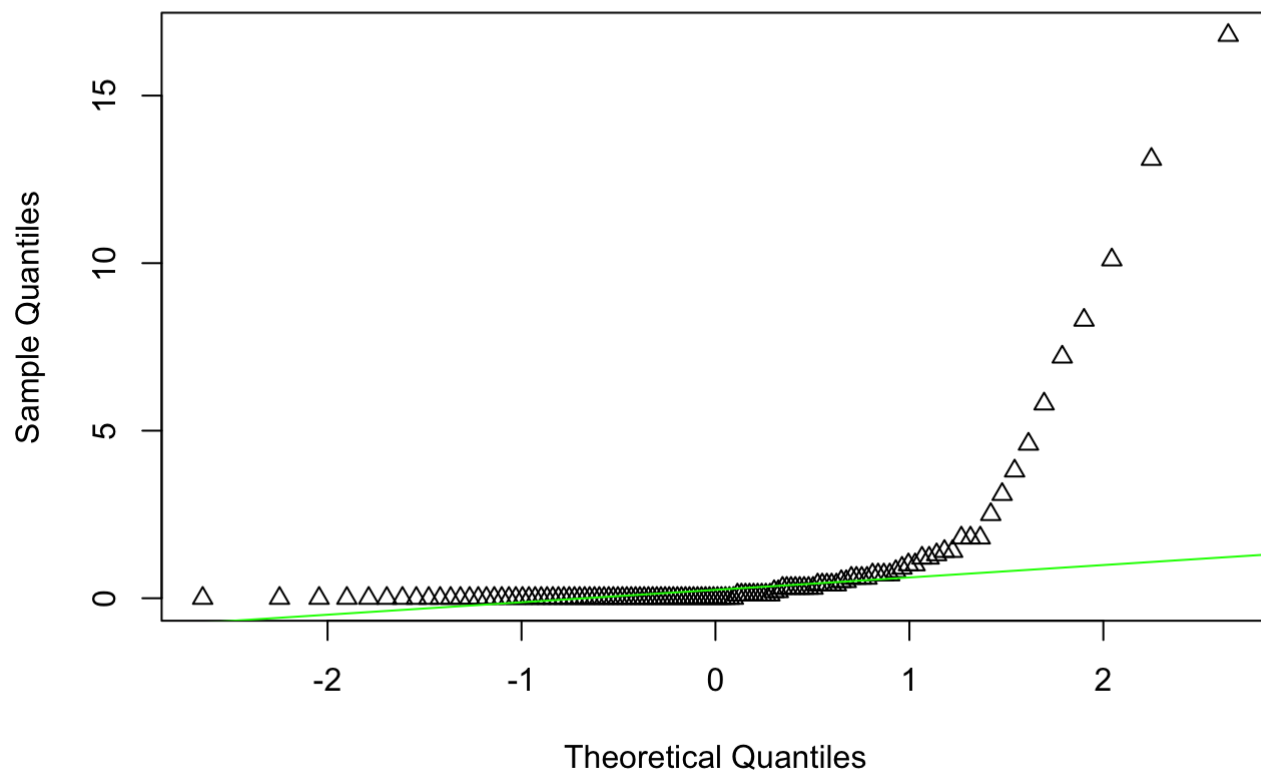

```
qqnorm(forestfireregion1$RH, pch=2)
qqline(forestfireregion1$RH, col ="green")
```

Normal Q-Q Plot
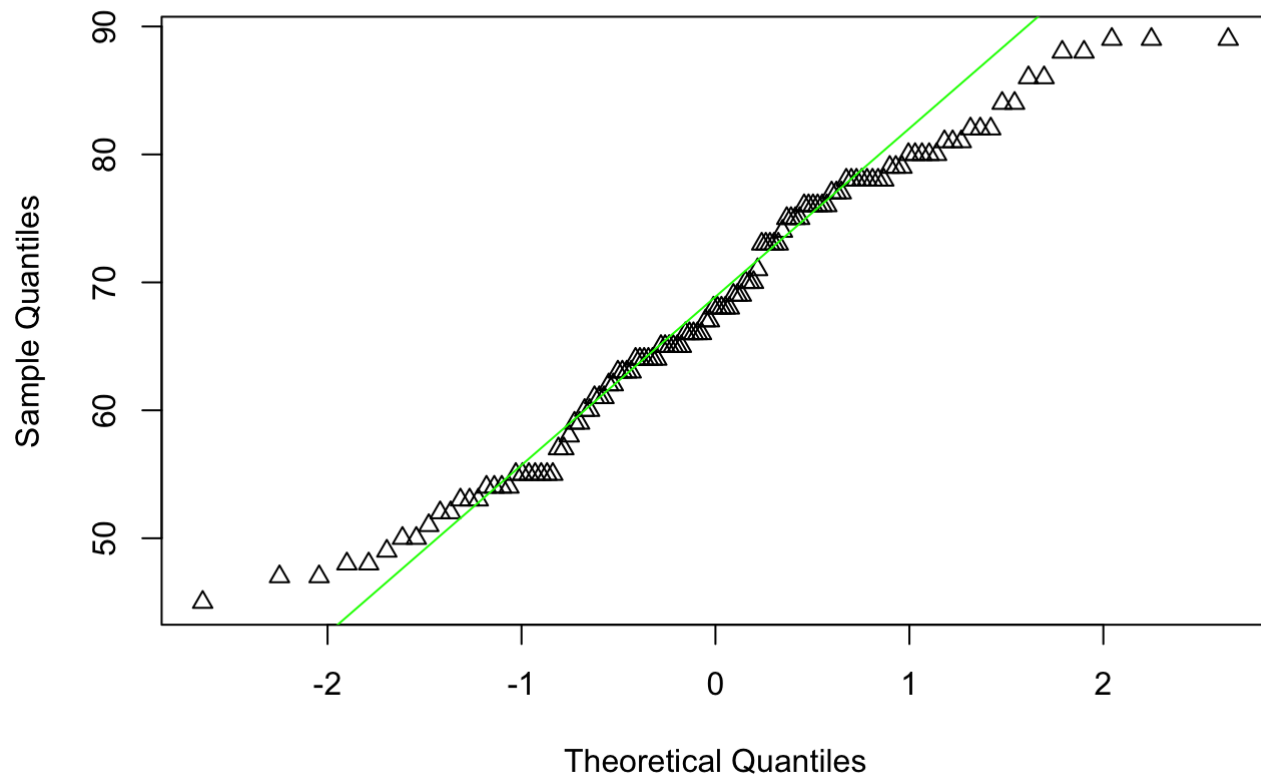

```
qqnorm(forestfireregion1$Ws, pch=2)
qqline(forestfireregion1$Ws, col ="green")
```

Normal Q-Q Plot

`##`
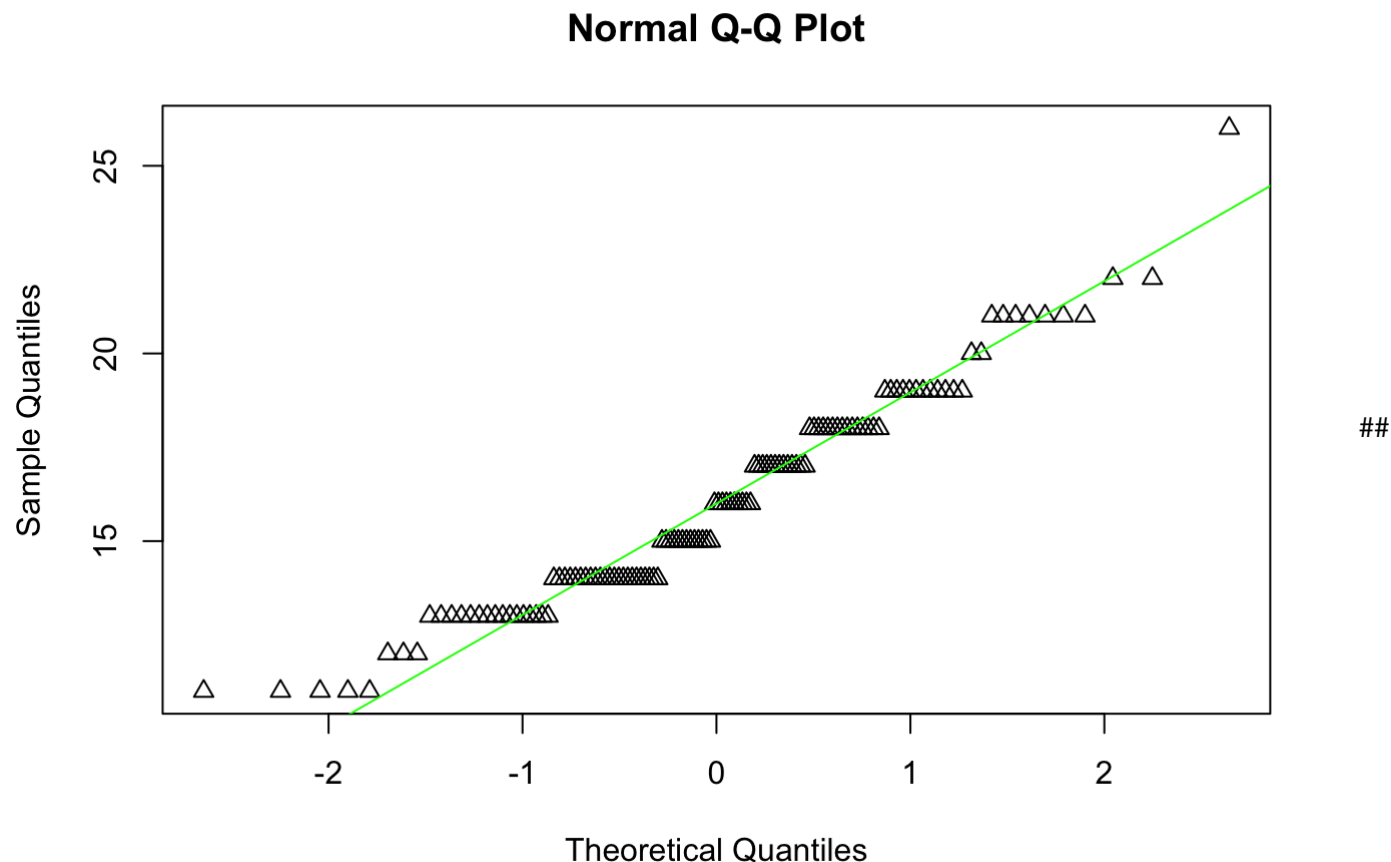
qqplot gives us the idea about the distribution of data. In the above graphs it can be seen that Tempreture, Rain, RH and Ws are having data, aproximatly noramlly distributed as most of the points lies on the qqline.

Hypothesis Testing:

Consider the hypothesis as given below,

H0: $\sigma(junemonth\,Rain) = \sigma(julymonth\,Rain)$ H1: $\sigma(junemonth\,Rain) \neq \sigma(julymonth\,Rain)$

```
junemonth=subset.data.frame(forestfireregion1,forestfireregion1$month==6)
summary(junemonth)
```

```
##       day              month              year          Temperature           RH
##  Min.   : 1.00    Min.   :6     Min.    :2012    Min.   :25.00    Min.   :47.00
##  1st Qu.: 8.25    1st Qu.:6     1st Qu.:2012     1st Qu.:28.25    1st Qu.:61.25
##  Median :15.50    Median :6     Median :2012     Median :30.00    Median :70.00
##  Mean   :15.50    Mean   :6     Mean   :2012     Mean   :29.80    Mean   :70.40
##  3rd Qu.:22.75    3rd Qu.:6     3rd Qu.:2012     3rd Qu.:31.00    3rd Qu.:80.00
##  Max.   :30.00    Max.   :6     Max.   :2012     Max.   :34.00    Max.   :89.00
##       Ws               Rain              FFMC             DMC
##  Min.   :12.00    Min.   : 0.0000   Min.   :28.60    Min.   : 1.10
##  1st Qu.:14.00    1st Qu.: 0.0000   1st Qu.:57.42    1st Qu.: 3.40
##  Median :15.50    Median : 0.0500   Median :79.50    Median : 6.85
##  Mean   :15.77    Mean   : 0.8167   Mean   :69.95    Mean   : 8.86
##  3rd Qu.:17.75    3rd Qu.: 0.4750   3rd Qu.:85.55    3rd Qu.:12.40
##  Max.   :22.00    Max.   :13.1000   Max.   :89.10    Max.   :25.50
##       DC               ISI              BUI              FWI
##  Min.   : 6.90    Min.   :0.00     Min.   : 1.60    Min.   : 0.000
##  1st Qu.: 7.85    1st Qu.:0.75     1st Qu.: 3.90    1st Qu.: 0.325
##  Median :31.05    Median :2.30     Median : 9.05    Median : 1.800
##  Mean   :36.34    Mean   :2.93     Mean   :10.88    Mean   : 3.847
##  3rd Qu.:55.42    3rd Qu.:5.40     3rd Qu.:15.57    3rd Qu.: 7.100
##  Max.   :92.80    Max.   :9.20     Max.   :29.70    Max.   :15.000
##    Classes
##  Length:30
##  Class :character
##  Mode  :character
##
##
##
```

```
julymonth=subset.data.frame(forestfireregion1,forestfireregion1$month==7)
summary(julymonth)
```

```
##        day          month         year        Temperature         RH
##   Min.   : 1.0   Min.   :7   Min.   :2012   Min.   :27.00   Min.   :48.00
##   1st Qu.: 8.5   1st Qu.:7   1st Qu.:2012   1st Qu.:30.50   1st Qu.:65.00
##   Median :16.0   Median :7   Median :2012   Median :32.00   Median :69.00
##   Mean   :16.0   Mean   :7   Mean   :2012   Mean   :31.84   Mean   :69.58
##   3rd Qu.:23.5   3rd Qu.:7   3rd Qu.:2012   3rd Qu.:33.00   3rd Qu.:76.00
##   Max.   :31.0   Max.   :7   Max.   :2012   Max.   :36.00   Max.   :81.00
##        Ws             Rain             FFMC            DMC
##   Min.   :13.00   Min.   :0.0000   Min.   :55.70   Min.   : 2.40
##   1st Qu.:14.00   1st Qu.:0.0000   1st Qu.:71.30   1st Qu.: 7.65
##   Median :16.00   Median :0.0000   Median :81.40   Median : 9.70
##   Mean   :16.35   Mean   :0.2258   Mean   :78.06   Mean   :12.14
##   3rd Qu.:18.50   3rd Qu.:0.3000   3rd Qu.:85.75   3rd Qu.:14.45
##   Max.   :22.00   Max.   :1.4000   Max.   :90.30   Max.   :31.90
##        DC             ISI             BUI             FWI
##   Min.   :  8.30   Min.   : 0.700   Min.   : 2.80   Min.   : 0.300
##   1st Qu.: 20.80   1st Qu.: 1.400   1st Qu.: 8.20   1st Qu.: 0.850
##   Median : 40.40   Median : 2.800   Median :12.50   Median : 3.400
##   Mean   : 54.32   Mean   : 3.623   Mean   :15.48   Mean   : 5.229
##   3rd Qu.: 79.80   3rd Qu.: 5.400   3rd Qu.:20.10   3rd Qu.: 8.400
##   Max.   :145.70   Max.   :10.000   Max.   :41.20   Max.   :15.700
##      Classes
##   Length:31
##   Class :character
##   Mode  :character
##
##
##
```

```
s1=sd(junemonth$Rain)
s2=sd(julymonth$Rain)
n1=length(junemonth$Rain)
n2=length(julymonth$Rain)
fvalue=s1^2/s2^2
fvalue
```

```
## [1] 39.04855
```

```
alpha=0.05
f1=qf(alpha/2,n1-1,n2-1)
f1
```

```
## [1] 0.4779391
```

```
f2=qf(1-alpha/2,n1-1,n2-1)
f2
```

```
## [1] 2.082661
```

```
var.test(julymonth$Rain,junemonth$Rain,alternative = "two.sided",conf.level = 0.95)
```

```
##
##   F test to compare two variances
##
## data:  julymonth$Rain and junemonth$Rain
## F = 0.025609, num df = 30, denom df = 29, p-value < 2.2e-16
## alternative hypothesis: true ratio of variances is not equal to 1
## 95 percent confidence interval:
##   0.01223961 0.05333515
## sample estimates:
## ratio of variances
##           0.02560914
```

The variances are not equal because the p value is much lesser than significance level and the fvalue doesn't lie between f1 and f2, hence we reject the hypothesis.

For unknown mean and unequal variances

Consider the hypothesis as given below, H0: μ(junemonth $Rain) = \mu(julymonth$Rain) H1: μ(junemonth $Rain) \neq \mu(julymonth$Rain)

```
t.test(junemonth$Rain,julymonth$Rain,var.equal = FALSE,conf.level = 0.95)
```

```
##
##   Welch Two Sample t-test
##
## data:  junemonth$Rain and julymonth$Rain
## t = 1.3123, df = 30.437, p-value = 0.1992
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##   -0.3281092  1.5098296
## sample estimates:
## mean of x mean of y
## 0.8166667 0.2258065
```

We are using t.test because we have two means and the variance are unknown and are not equal. The p-value is greater than alpha i.e., 0.05. So we can accept the null hypothesis H0 and agree that the increase of total rain in the month of June is equal to the increase of total rain in the month of July.

Hypothesis testing on one sample:

Consider the hypothesis as given below, H0: **μ**(RH) = 68 H1: **μ**(RH) ≠ 68

```
fr<- forestfireregion1 %>% subset(Classes == "fire", select= RH)
nofr <- forestfireregion1 %>% subset(Classes == "not fire", select= RH)
t.test(nofr, mu = 68)
```

```
##
##  One Sample t-test
##
## data:  nofr
## t = 2.7857, df = 62, p-value = 0.007077
## alternative hypothesis: true mean is not equal to 68
## 95 percent confidence interval:
##  69.13861 74.92488
## sample estimates:
## mean of x
##  72.03175
```

According to p value we should reject H0, when there is no fire average relative humidity would not be equal to 68.

Corelation

r<0.3, weak correlation

0.3<r<0.7, moderate correlation

r>0.7, high correlation

Multiple Regression Testing Region 1

```
i <- sample(2, nrow(forestfireregion1), replace=TRUE, prob=c(0.8, 0.2))
Region1Training = forestfireregion1[i==1,]
Region1Testing = forestfireregion1[i==2,]
```

Correlation of training dataset attributes except Classes.

```
cor(subset(Region1Training, select=-Classes))
```

```
## Warning in stats::cor(x, y, ...): the standard deviation is zero
```

```
##                    day         month year Temperature           RH          Ws
## day         1.00000000  0.022589036   NA  0.23147737 -0.20199676  0.07338286
## month       0.02258904  1.000000000   NA -0.05610978 -0.08505445 -0.02161315
## year                NA           NA    1          NA          NA          NA
## Temperature 0.23147737 -0.056109777   NA  1.00000000 -0.64675987 -0.24591649
## RH         -0.20199676 -0.085054450   NA -0.64675987  1.00000000  0.24380727
## Ws          0.07338286 -0.021613153   NA -0.24591649  0.24380727  1.00000000
## Rain       -0.09882452  0.143139530   NA -0.51543325  0.35093784  0.36979365
## FFMC        0.34538815 -0.059127234   NA  0.76486498 -0.63917120 -0.22966662
## DMC         0.57771701 -0.007364115   NA  0.53444396 -0.30469719  0.03825274
## DC          0.59734153 -0.006994125   NA  0.52216938 -0.26057494  0.09830025
## ISI         0.42547758 -0.050187172   NA  0.64769936 -0.56494233 -0.06529742
## BUI         0.58931662 -0.009370392   NA  0.53451196 -0.29190736  0.06135681
## FWI         0.51447846 -0.024150461   NA  0.59005650 -0.44034398  0.01288655
##                    Rain         FFMC          DMC           DC          ISI
## day         -0.09882452  0.34538815  0.577717013  0.597341527  0.42547758
## month        0.14313953 -0.05912723 -0.007364115 -0.006994125 -0.05018717
## year                NA           NA           NA           NA           NA
## Temperature -0.51543325  0.76486498  0.534443960  0.522169380  0.64769936
## RH           0.35093784 -0.63917120 -0.304697193 -0.260574935 -0.56494233
## Ws           0.36979365 -0.22966662  0.038252744  0.098300251 -0.06529742
## Rain         1.00000000 -0.59726720 -0.268669430 -0.287810952 -0.38864834
## FFMC        -0.59726720  1.00000000  0.599345585  0.565338763  0.79930094
## DMC         -0.26866943  0.59934558  1.000000000  0.965437901  0.74845956
## DC          -0.28781095  0.56533876  0.965437901  1.000000000  0.71100369
## ISI         -0.38864834  0.79930094  0.748459563  0.711003693  1.00000000
## BUI         -0.27544619  0.59170717  0.995996533  0.983827085  0.74400032
## FWI         -0.30617396  0.67675526  0.907353593  0.872972922  0.93943728
##                     BUI          FWI
## day         0.589316618  0.51447846
## month      -0.009370392 -0.02415046
## year                 NA           NA
## Temperature 0.534511958  0.59005650
## RH         -0.291907362 -0.44034398
## Ws          0.061356807  0.01288655
## Rain       -0.275446193 -0.30617396
## FFMC        0.591707166  0.67675526
## DMC         0.995996533  0.90735359
## DC          0.983827085  0.87297292
## ISI         0.744000322  0.93943728
## BUI         1.000000000  0.90524462
## FWI         0.905244617  1.00000000
```

Forward Step Regression Testing Region 1

```
intercept_only <- lm(Temperature~1, data=Region1Training[,1:14])
all <- lm(Temperature~., data=Region1Training[,1:14])
forward <- stepAIC (intercept_only, direction='forward',scope = formula(all))
```

```
## Start:  AIC=248.73
## Temperature ~ 1
##
##           Df Sum of Sq      RSS     AIC
## + FFMC     1     661.20   469.02 160.14
## + ISI      1     474.14   656.07 194.71
## + RH       1     472.77   657.45 194.92
## + FWI      1     393.50   736.71 206.65
## + BUI      1     322.91   807.31 216.07
## + DMC      1     322.82   807.39 216.09
## + DC       1     308.17   822.05 217.94
## + Rain     1     300.27   829.95 218.92
## + Classes  1     259.00   871.21 223.92
## + Ws       1      68.35  1061.86 244.30
## + day      1      60.56  1069.65 245.06
## <none>                   1130.21 248.73
## + month    1       3.56  1126.66 250.41
##
## Step:  AIC=160.14
## Temperature ~ FFMC
##
##           Df Sum of Sq    RSS    AIC
## + RH       1    47.631 421.39 151.11
## + Classes  1    27.230 441.79 155.98
## + DC       1    13.384 455.63 159.16
## + BUI      1    11.675 457.34 159.54
## + FWI      1    10.940 458.08 159.71
## + DMC      1    10.195 458.82 159.88
## <none>                 469.02 160.14
## + Rain     1     6.034 462.98 160.81
## + Ws       1     5.889 463.13 160.84
## + ISI      1     4.134 464.88 161.23
## + day      1     1.372 467.65 161.84
## + month    1     0.134 468.88 162.11
##
## Step:  AIC=151.11
## Temperature ~ FFMC + RH
##
##           Df Sum of Sq    RSS    AIC
## + DC       1   23.1929 398.19 147.28
## + BUI      1   19.5415 401.85 148.22
## + DMC      1   16.8515 404.54 148.91
## + Classes  1   11.2675 410.12 150.32
## + FWI      1   10.3230 411.06 150.55
## <none>                 421.39 151.11
## + Rain     1    7.8669 413.52 151.17
## + Ws       1    2.3877 419.00 152.52
## + month    1    2.2205 419.17 152.56
## + ISI      1    1.5238 419.86 152.74
## + day      1    0.9845 420.40 152.87
##
## Step:  AIC=147.28
```

```
## Temperature ~ FFMC + RH + DC
##
##           Df Sum of Sq    RSS    AIC
## + Classes  1   22.4185 375.78 143.31
## + day      1   16.9037 381.29 144.81
## + Rain     1   10.3882 387.81 146.56
## + Ws       1    8.7076 389.49 147.00
## <none>                   398.19 147.28
## + month    1    3.1595 395.03 148.46
## + ISI      1    2.9187 395.28 148.52
## + DMC      1    2.1278 396.07 148.73
## + BUI      1    1.6663 396.53 148.85
## + FWI      1    1.6596 396.53 148.85
##
## Step:  AIC=143.31
## Temperature ~ FFMC + RH + DC + Classes
##
##          Df Sum of Sq    RSS    AIC
## + day     1   15.7395 360.04 140.90
## + Ws      1   10.7305 365.04 142.32
## <none>                 375.78 143.31
## + Rain    1    5.5557 370.22 143.78
## + month   1    4.7106 371.06 144.01
## + FWI     1    3.0338 372.74 144.47
## + ISI     1    2.4674 373.31 144.63
## + DMC     1    0.4497 375.33 145.19
## + BUI     1    0.1931 375.58 145.26
##
## Step:  AIC=140.9
## Temperature ~ FFMC + RH + DC + Classes + day
##
##          Df Sum of Sq    RSS    AIC
## + Ws      1    9.9197 350.12 140.02
## <none>                 360.04 140.90
## + month   1    4.2761 355.76 141.67
## + Rain    1    3.6735 356.36 141.85
## + FWI     1    2.0973 357.94 142.30
## + ISI     1    1.8105 358.23 142.38
## + DMC     1    0.4951 359.54 142.76
## + BUI     1    0.1993 359.84 142.84
##
## Step:  AIC=140.02
## Temperature ~ FFMC + RH + DC + Classes + day + Ws
##
##          Df Sum of Sq    RSS    AIC
## <none>                 350.12 140.02
## + month   1    4.8141 345.30 140.60
## + ISI     1    3.6466 346.47 140.95
## + FWI     1    3.0171 347.10 141.13
## + DMC     1    1.2610 348.86 141.65
## + Rain    1    0.9506 349.17 141.74
## + BUI     1    0.6374 349.48 141.84
```

```
forward$anova
```

```
## Stepwise Model Path
## Analysis of Deviance Table
##
## Initial Model:
## Temperature ~ 1
##
## Final Model:
## Temperature ~ FFMC + RH + DC + Classes + day + Ws
##
##
##         Step Df   Deviance Resid. Df Resid. Dev      AIC
## 1                                 102  1130.2136 248.7296
## 2    + FFMC  1 661.195790       101   469.0178 160.1389
## 3       + RH  1  47.631071       100   421.3867 151.1087
## 4       + DC  1  23.192890        99   398.1938 147.2776
## 5 + Classes  1  22.418527        98   375.7753 143.3090
## 6      + day  1  15.739451        97   360.0359 140.9019
## 7       + Ws  1   9.919657        96   350.1162 140.0242
```

```
summary(forward)
```

```
##
## Call:
## lm(formula = Temperature ~ FFMC + RH + DC + Classes + day + Ws,
##     data = Region1Training[, 1:14])
##
## Residuals:
##     Min       1Q  Median      3Q      Max
## -4.6316 -1.4494 -0.0612  1.4442  4.3241
##
## Coefficients:
##                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)     27.137155   3.433332   7.904 4.53e-12 ***
## FFMC             0.131299   0.024421   5.376 5.33e-07 ***
## RH              -0.074126   0.023610  -3.140 0.002248 **
## DC               0.021101   0.005308   3.975 0.000136 ***
## Classesnot fire  1.577210   0.625699   2.521 0.013360 *
## day             -0.052359   0.025879  -2.023 0.045833 *
## Ws              -0.115672   0.070137  -1.649 0.102372
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.91 on 96 degrees of freedom
## Multiple R-squared:  0.6902, Adjusted R-squared:  0.6709
## F-statistic: 35.65 on 6 and 96 DF,  p-value: < 2.2e-16
```

Backwards Step Regression Testing Region 1

```
backward <- stepAIC (all, direction='backward')
```

```
## Start:  AIC=147.55
## Temperature ~ day + month + year + RH + Ws + Rain + FFMC + DMC +
##     DC + ISI + BUI + FWI + Classes
##
##
## Step:  AIC=147.55
## Temperature ~ day + month + RH + Ws + Rain + FFMC + DMC + DC +
##     ISI + BUI + FWI + Classes
##
##           Df Sum of Sq    RSS    AIC
## - DC       1     0.003 335.24 145.55
## - Rain     1     0.019 335.25 145.56
## - ISI      1     0.806 336.04 145.80
## - BUI      1     1.078 336.31 145.88
## - FWI      1     2.041 337.28 146.18
## - DMC      1     2.455 337.69 146.30
## - month    1     4.279 339.51 146.86
## <none>           335.23 147.55
## - Ws       1    11.228 346.46 148.94
## - day      1    12.444 347.68 149.30
## - Classes  1    21.391 356.63 151.92
## - RH       1    22.003 357.24 152.10
## - FFMC     1    45.936 381.17 158.78
##
## Step:  AIC=145.55
## Temperature ~ day + month + RH + Ws + Rain + FFMC + DMC + ISI +
##     BUI + FWI + Classes
##
##           Df Sum of Sq    RSS    AIC
## - Rain     1     0.021 335.26 143.56
## - ISI      1     0.814 336.05 143.80
## - FWI      1     2.117 337.35 144.20
## - month    1     4.299 339.54 144.86
## <none>           335.24 145.55
## - Ws       1    11.229 346.47 146.94
## - DMC      1    11.957 347.19 147.16
## - day      1    12.448 347.69 147.31
## - BUI      1    12.456 347.69 147.31
## - Classes  1    21.391 356.63 149.92
## - RH       1    22.014 357.25 150.10
## - FFMC     1    46.579 381.82 156.95
##
## Step:  AIC=143.56
## Temperature ~ day + month + RH + Ws + FFMC + DMC + ISI + BUI +
##     FWI + Classes
##
##           Df Sum of Sq    RSS    AIC
## - ISI      1     0.838 336.10 141.81
## - FWI      1     2.167 337.42 142.22
## - month    1     4.513 339.77 142.94
## <none>           335.26 143.56
## - day      1    12.672 347.93 145.38
```

```
## - DMC         1      13.151 348.41 145.52
## - Ws          1      13.174 348.43 145.53
## - BUI         1      13.410 348.67 145.60
## - RH          1      22.117 357.38 148.14
## - Classes     1      22.235 357.49 148.17
## - FFMC        1      55.511 390.77 157.34
##
## Step:  AIC=141.81
## Temperature ~ day + month + RH + Ws + FFMC + DMC + BUI + FWI +
##       Classes
##
##            Df Sum of Sq    RSS    AIC
## - month     1      4.333 340.43 141.13
## - FWI       1      4.843 340.94 141.29
## <none>                   336.10 141.81
## - DMC       1     12.317 348.41 143.52
## - day       1     13.323 349.42 143.82
## - Ws        1     14.492 350.59 144.16
## - BUI       1     15.513 351.61 144.46
## - RH        1     21.374 357.47 146.16
## - Classes   1     27.461 363.56 147.90
## - FFMC      1    108.560 444.66 168.65
##
## Step:  AIC=141.13
## Temperature ~ day + RH + Ws + FFMC + DMC + BUI + FWI + Classes
##
##            Df Sum of Sq    RSS    AIC
## - FWI       1      4.866 345.29 140.60
## <none>                   340.43 141.13
## - DMC       1     12.595 353.02 142.88
## - day       1     13.815 354.24 143.23
## - Ws        1     14.007 354.44 143.29
## - BUI       1     15.682 356.11 143.77
## - RH        1     19.437 359.87 144.85
## - Classes   1     26.095 366.52 146.74
## - FFMC      1    112.110 452.54 168.46
##
## Step:  AIC=140.6
## Temperature ~ day + RH + Ws + FFMC + DMC + BUI + Classes
##
##            Df Sum of Sq    RSS    AIC
## <none>                   345.29 140.60
## - DMC       1     11.685 356.98 142.02
## - Ws        1     11.939 357.23 142.10
## - day       1     15.672 360.97 143.17
## - BUI       1     18.569 363.86 143.99
## - Classes   1     22.109 367.40 144.99
## - RH        1     36.857 382.15 149.04
## - FFMC      1    107.263 452.56 166.46
```

```
backward$anova
```

```
## Stepwise Model Path
## Analysis of Deviance Table
##
## Initial Model:
## Temperature ~ day + month + year + RH + Ws + Rain + FFMC + DMC +
##      DC + ISI + BUI + FWI + Classes
##
## Final Model:
## Temperature ~ day + RH + Ws + FFMC + DMC + BUI + Classes
##
##
##        Step Df    Deviance Resid. Df Resid. Dev      AIC
## 1                                90     335.2342 147.5503
## 2    - year  0 0.000000000        90     335.2342 147.5503
## 3      - DC  1 0.002932131        91     335.2371 145.5512
## 4    - Rain  1 0.020625955        92     335.2578 143.5576
## 5     - ISI  1 0.838013123        93     336.0958 141.8147
## 6   - month  1 4.332750202        94     340.4285 141.1341
## 7     - FWI  1 4.866421511        95     345.2950 140.5960
```

```
summary(backward)
```

```
##
## Call:
## lm(formula = Temperature ~ day + RH + Ws + FFMC + DMC + BUI +
##      Classes, data = Region1Training[, 1:14])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -4.6895 -1.4088 -0.0979  1.5340  4.2311
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept)   27.51304    3.45577   7.961 3.63e-12 ***
## day           -0.05367    0.02585  -2.076  0.04055 *
## RH            -0.07531    0.02365  -3.184  0.00196 **
## Ws            -0.12875    0.07104  -1.812  0.07309 .
## FFMC           0.13214    0.02432   5.432 4.27e-07 ***
## DMC           -0.33718    0.18806  -1.793  0.07616 .
## BUI            0.33447    0.14798   2.260  0.02609 *
## Classesnot fire 1.55798   0.63170   2.466  0.01544 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.906 on 95 degrees of freedom
## Multiple R-squared:  0.6945, Adjusted R-squared:  0.672
## F-statistic: 30.85 on 7 and 95 DF,  p-value: < 2.2e-16
```

Response as Wind

Forward Step Regression Testing Region 1

Backwards Step Regression Testing Region 1

```
backward <- stepAIC (all, direction='backward')
```

```
## Start:  AIC=147.55
## Temperature ~ day + month + year + RH + Ws + Rain + FFMC + DMC +
##     DC + ISI + BUI + FWI + Classes
##
##
## Step:  AIC=147.55
## Temperature ~ day + month + RH + Ws + Rain + FFMC + DMC + DC +
##     ISI + BUI + FWI + Classes
##
##            Df Sum of Sq    RSS    AIC
## - DC        1     0.003 335.24 145.55
## - Rain      1     0.019 335.25 145.56
## - ISI       1     0.806 336.04 145.80
## - BUI       1     1.078 336.31 145.88
## - FWI       1     2.041 337.28 146.18
## - DMC       1     2.455 337.69 146.30
## - month     1     4.279 339.51 146.86
## <none>               335.23 147.55
## - Ws        1    11.228 346.46 148.94
## - day       1    12.444 347.68 149.30
## - Classes   1    21.391 356.63 151.92
## - RH        1    22.003 357.24 152.10
## - FFMC      1    45.936 381.17 158.78
##
## Step:  AIC=145.55
## Temperature ~ day + month + RH + Ws + Rain + FFMC + DMC + ISI +
##     BUI + FWI + Classes
##
##            Df Sum of Sq    RSS    AIC
## - Rain      1     0.021 335.26 143.56
## - ISI       1     0.814 336.05 143.80
## - FWI       1     2.117 337.35 144.20
## - month     1     4.299 339.54 144.86
## <none>               335.24 145.55
## - Ws        1    11.229 346.47 146.94
## - DMC       1    11.957 347.19 147.16
## - day       1    12.448 347.69 147.31
## - BUI       1    12.456 347.69 147.31
## - Classes   1    21.391 356.63 149.92
## - RH        1    22.014 357.25 150.10
## - FFMC      1    46.579 381.82 156.95
##
## Step:  AIC=143.56
## Temperature ~ day + month + RH + Ws + FFMC + DMC + ISI + BUI +
##     FWI + Classes
##
##            Df Sum of Sq    RSS    AIC
## - ISI       1     0.838 336.10 141.81
## - FWI       1     2.167 337.42 142.22
## - month     1     4.513 339.77 142.94
## <none>               335.26 143.56
## - day       1    12.672 347.93 145.38
```

```
## - DMC       1      13.151 348.41 145.52
## - Ws        1      13.174 348.43 145.53
## - BUI       1      13.410 348.67 145.60
## - RH        1      22.117 357.38 148.14
## - Classes   1      22.235 357.49 148.17
## - FFMC      1      55.511 390.77 157.34
##
## Step:  AIC=141.81
## Temperature ~ day + month + RH + Ws + FFMC + DMC + BUI + FWI +
##     Classes
##
##            Df Sum of Sq    RSS    AIC
## - month    1       4.333 340.43 141.13
## - FWI      1       4.843 340.94 141.29
## <none>                   336.10 141.81
## - DMC      1      12.317 348.41 143.52
## - day      1      13.323 349.42 143.82
## - Ws       1      14.492 350.59 144.16
## - BUI      1      15.513 351.61 144.46
## - RH       1      21.374 357.47 146.16
## - Classes  1      27.461 363.56 147.90
## - FFMC     1     108.560 444.66 168.65
##
## Step:  AIC=141.13
## Temperature ~ day + RH + Ws + FFMC + DMC + BUI + FWI + Classes
##
##            Df Sum of Sq    RSS    AIC
## - FWI      1       4.866 345.29 140.60
## <none>                   340.43 141.13
## - DMC      1      12.595 353.02 142.88
## - day      1      13.815 354.24 143.23
## - Ws       1      14.007 354.44 143.29
## - BUI      1      15.682 356.11 143.77
## - RH       1      19.437 359.87 144.85
## - Classes  1      26.095 366.52 146.74
## - FFMC     1     112.110 452.54 168.46
##
## Step:  AIC=140.6
## Temperature ~ day + RH + Ws + FFMC + DMC + BUI + Classes
##
##            Df Sum of Sq    RSS    AIC
## <none>                   345.29 140.60
## - DMC      1      11.685 356.98 142.02
## - Ws       1      11.939 357.23 142.10
## - day      1      15.672 360.97 143.17
## - BUI      1      18.569 363.86 143.99
## - Classes  1      22.109 367.40 144.99
## - RH       1      36.857 382.15 149.04
## - FFMC     1     107.263 452.56 166.46
```

```
backward$anova
```

```
## Stepwise Model Path
## Analysis of Deviance Table
##
## Initial Model:
## Temperature ~ day + month + year + RH + Ws + Rain + FFMC + DMC +
##     DC + ISI + BUI + FWI + Classes
##
## Final Model:
## Temperature ~ day + RH + Ws + FFMC + DMC + BUI + Classes
##
##
##       Step Df    Deviance Resid. Df Resid. Dev      AIC
## 1                                 90   335.2342 147.5503
## 2   - year  0 0.000000000        90   335.2342 147.5503
## 3     - DC  1 0.002932131        91   335.2371 145.5512
## 4   - Rain  1 0.020625955        92   335.2578 143.5576
## 5    - ISI  1 0.838013123        93   336.0958 141.8147
## 6  - month  1 4.332750202        94   340.4285 141.1341
## 7    - FWI  1 4.866421511        95   345.2950 140.5960
```

```
summary(backward)
```

```
##
## Call:
## lm(formula = Temperature ~ day + RH + Ws + FFMC + DMC + BUI +
##     Classes, data = Region1Training[, 1:14])
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -4.6895 -1.4088 -0.0979  1.5340  4.2311
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    27.51304    3.45577   7.961 3.63e-12 ***
## day            -0.05367    0.02585  -2.076  0.04055 *
## RH             -0.07531    0.02365  -3.184  0.00196 **
## Ws             -0.12875    0.07104  -1.812  0.07309 .
## FFMC            0.13214    0.02432   5.432 4.27e-07 ***
## DMC            -0.33718    0.18806  -1.793  0.07616 .
## BUI             0.33447    0.14798   2.260  0.02609 *
## Classesnot fire 1.55798    0.63170   2.466  0.01544 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.906 on 95 degrees of freedom
## Multiple R-squared:  0.6945, Adjusted R-squared:  0.672
## F-statistic: 30.85 on 7 and 95 DF,  p-value: < 2.2e-16
```

According to MAE, MSE, R-Square and Resedual Standard Error Backward stepwise model would be suitable fit over the forward stepwise model.

Confidence and Predection Intervals

```
fitLmtest1 <- lm(FFMC~ Ws, data=forestfireregion1)
new <- data.frame(Ws = 22)
predict(fitLmtest1 , new)
```

```
##        1
## 67.75645
```

```
predict(fitLmtest1, new, interval="confidence")
```

```
##        fit      lwr      upr
## 1 67.75645 61.35258 74.16033
```

```
predict(fitLmtest1, new, interval="prediction")
```

```
##        fit      lwr      upr
## 1 67.75645 36.84937 98.66353
```

Association between the Numerical Variable and Categorical Variable

```
aov1 <- aov(Rain ~Classes, data=forestfireregion1)
summary(aov1)
```

```
##              Df Sum Sq Mean Sq F value   Pr(>F)
## Classes       1   78.5   78.53   15.11 0.000167 ***
## Residuals   120  623.8    5.20
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
aov2 <- aov(FFMC ~Classes, data=forestfireregion1)
summary(aov2)
```

```
##                 Df Sum Sq Mean Sq F value Pr(>F)
## Classes         1  16198   16198   148.5 <2e-16 ***
## Residuals     120  13093     109
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Performing SVM (Support Vector Machine) Regression on forestfireregion1 dataset to predict the attribute "Classes".

Applying SVM to the data to predict "Classes" and reporting the accuracy using 10-fold cross validation.

```
intrain= createDataPartition(y=forestfireregion1$Classes,p=0.7,list=F)
# Creating a data partition for training and testing the dataset.
training=forestfireregion1[intrain,]
testing=forestfireregion1[-intrain,]

training[["Classes"]]=factor(training[["Classes"]])
trctrl = trainControl(method = "repeatedcv", number = 10, repeats = 3)
svm_Linear = train(Classes ~., data = training, method = "svmLinear",
trControl=trctrl,preProcess = c("center", "scale"),tuneLength = 10)
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
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## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
svm_Linear
```

```
## Support Vector Machines with Linear Kernel
##
## 87 samples
## 13 predictors
##  2 classes: 'fire', 'not fire'
##
## Pre-processing: centered (13), scaled (13)
## Resampling: Cross-Validated (10 fold, repeated 3 times)
## Summary of sample sizes: 79, 78, 78, 78, 79, 79, ...
## Resampling results:
##
##   Accuracy   Kappa
##   0.9499074  0.898571
##
## Tuning parameter 'C' was held constant at a value of 1
```

```
test_pred = predict(svm_Linear, newdata = testing)
test_pred
```

```
##  [1] not fire not fire fire     not fire not fire not fire not fire fire
##  [9] fire     fire     fire     not fire not fire not fire fire     not fire
## [17] not fire fire     fire     fire     fire     fire     fire     fire
## [25] not fire not fire fire     not fire not fire not fire fire     not fire
## [33] not fire not fire not fire
## Levels: fire not fire
```

```
confusionMatrix(table(test_pred, testing$Classes))
```

```
## Confusion Matrix and Statistics
##
##
## test_pred  fire not fire
##    fire        15        0
##    not fire     2       18
##
##                  Accuracy : 0.9429
##                    95% CI : (0.8084, 0.993)
##       No Information Rate : 0.5143
##       P-Value [Acc > NIR] : 4.406e-08
##
##                     Kappa : 0.8852
##
##    Mcnemar's Test P-Value : 0.4795
##
##               Sensitivity : 0.8824
##               Specificity : 1.0000
##            Pos Pred Value : 1.0000
##            Neg Pred Value : 0.9000
##                Prevalence : 0.4857
##            Detection Rate : 0.4286
##      Detection Prevalence : 0.4286
##         Balanced Accuracy : 0.9412
##
##          'Positive' Class : fire
##
```

Using the grid search functionality when training to optimize the C parameter of the SVM.

```
grid <- expand.grid(C = c(0,0.01, 0.05, 0.1, 0.25, 0.5, 0.75, 1, 1.25, 1.5, 1.75, 2,5))
svm_Linear_Grid = train(Classes ~., data = training, method = "svmLinear", trControl=trc
trl, preProcess = c("center", "scale"), tuneGrid = grid,
tuneLength = 10)
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold01.Rep1: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
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```
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```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold02.Rep1: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
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## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
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```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
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```
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## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
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```

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```

```
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```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold03.Rep1: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
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```

```
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```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
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```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
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## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold04.Rep1: C=0.00 Error in .local(x, ...) :
##   No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
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```
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```
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```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold05.Rep1: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
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## 10, : These variables have zero variances: year
```

```
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```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
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```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
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## 10, : These variables have zero variances: year
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```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold06.Rep1: C=0.00 Error in .local(x, ...) :
##     No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold07.Rep1: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold08.Rep1: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold09.Rep1: C=0.00 Error in .local(x, ...) :
##   No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold10.Rep1: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold01.Rep2: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold02.Rep2: C=0.00 Error in .local(x, ...) :
##     No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold03.Rep2: C=0.00 Error in .local(x, ...) :
##   No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold04.Rep2: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold05.Rep2: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold06.Rep2: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold07.Rep2: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold08.Rep2: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold09.Rep2: C=0.00 Error in .local(x, ...) :
##   No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold10.Rep2: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold01.Rep3: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold02.Rep3: C=0.00 Error in .local(x, ...) :
##   No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
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```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
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```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold03.Rep3: C=0.00 Error in .local(x, ...) :
##   No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold04.Rep3: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold05.Rep3: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold06.Rep3: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold07.Rep3: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold08.Rep3: C=0.00 Error in .local(x, ...) :
##   No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold09.Rep3: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning: model fit failed for Fold10.Rep3: C=0.00 Error in .local(x, ...) :
##    No Support Vectors found. You may want to change your parameters
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
## Warning in .local(x, ...): Variable(s) `' constant. Cannot scale data.
```

```
## Warning in preProcess.default(thresh = 0.95, k = 5, freqCut = 19, uniqueCut =
## 10, : These variables have zero variances: year
```

```
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```

```
## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo, :
## There were missing values in resampled performance measures.
```

```
## Warning in train.default(x, y, weights = w, ...): missing values found in
## aggregated results
```

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```
svm_Linear_Grid
```

```
## Support Vector Machines with Linear Kernel
##
## 87 samples
## 13 predictors
##  2 classes: 'fire', 'not fire'
##
## Pre-processing: centered (13), scaled (13)
## Resampling: Cross-Validated (10 fold, repeated 3 times)
## Summary of sample sizes: 77, 78, 79, 79, 79, 79, ...
## Resampling results across tuning parameters:
##
##   C      Accuracy   Kappa
##   0.00        NaN         NaN
##   0.01  0.9166667  0.8333959
##   0.05  0.9423148  0.8847154
##   0.10  0.9538889  0.9076829
##   0.25  0.9575926  0.9149906
##   0.50  0.9501852  0.9010801
##   0.75  0.9427778  0.8864460
##   1.00  0.9390741  0.8794774
##   1.25  0.9315741  0.8644774
##   1.50  0.9315741  0.8644774
##   1.75  0.9278704  0.8567850
##   2.00  0.9278704  0.8567850
##   5.00  0.9212963  0.8458399
##
## Accuracy was used to select the optimal model using the largest value.
## The final value used for the model was C = 0.25.
```

```
plot(svm_Linear_Grid)
```
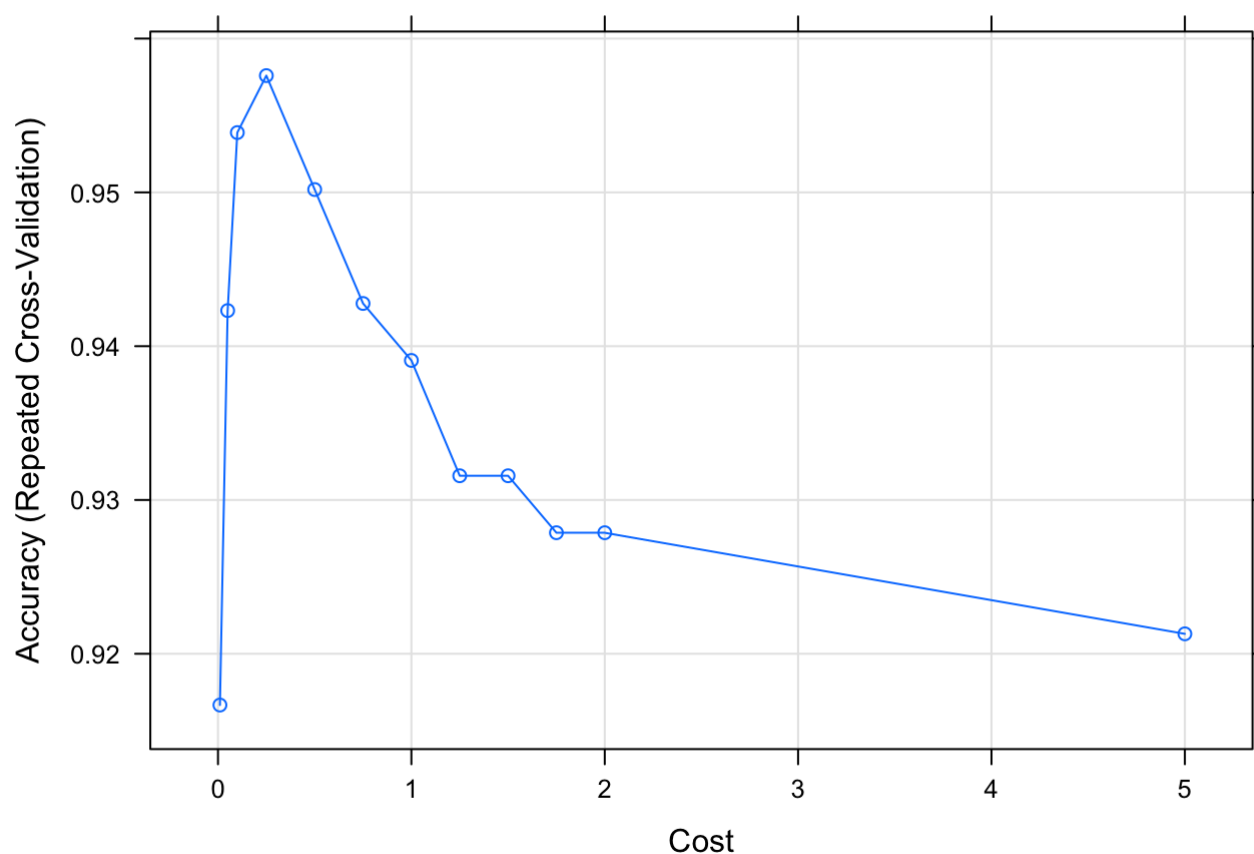
```
## We chose the C value as displayed above and the final C value used for optimal model
  was C = 5.
test_pred_grid = predict(svm_Linear_Grid, newdata = testing)
test_pred_grid
```

```
##  [1] not fire not fire fire     not fire not fire not fire not fire not fire
##  [9] fire     fire     fire     not fire not fire not fire fire     not fire
## [17] not fire fire     fire     fire     fire     fire     fire     fire
## [25] not fire not fire not fire not fire not fire not fire fire     not fire
## [33] not fire not fire not fire
## Levels: fire not fire
```

```
confusionMatrix(table(test_pred_grid, testing$Classes))
```

```
## Confusion Matrix and Statistics
##
##
## test_pred_grid fire not fire
##        fire        13        0
##        not fire     4       18
##
##                Accuracy : 0.8857
##                  95% CI : (0.7326, 0.968)
##     No Information Rate : 0.5143
##     P-Value [Acc > NIR] : 3.724e-06
##
##                   Kappa : 0.7697
##
##  Mcnemar's Test P-Value : 0.1336
##
##             Sensitivity : 0.7647
##             Specificity : 1.0000
##          Pos Pred Value : 1.0000
##          Neg Pred Value : 0.8182
##              Prevalence : 0.4857
##          Detection Rate : 0.3714
##    Detection Prevalence : 0.3714
##       Balanced Accuracy : 0.8824
##
##        'Positive' Class : fire
##
```

```
## The final model accuracy is 94.29% for the test set.
```