```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd



from sklearn import metrics
from sklearn.metrics import classification_report,confusion_matrix

import warnings
warnings.filterwarnings(action="ignore")
%matplotlib inline
pd.set_option("display.max_rows", 1000)
pd.set_option("display.max_columns", 1000)



fires = pd.read_csv("forestfires.csv")    #reading the dataset
fires.head(15)    #show the first 15 instances of dataset
```

	X	Y	month	day	FFMC	DMC	DC	ISI	temp	RH	wind	rain	area
0	7	5	mar	fri	86.2	26.2	94.3	5.1	8.2	51	6.7	0.0	0.0
1	7	4	oct	tue	90.6	35.4	669.1	6.7	18.0	33	0.9	0.0	0.0
2	7	4	oct	sat	90.6	43.7	686.9	6.7	14.6	33	1.3	0.0	0.0
3	8	6	mar	fri	91.7	33.3	77.5	9.0	8.3	97	4.0	0.2	0.0
4	8	6	mar	sun	89.3	51.3	102.2	9.6	11.4	99	1.8	0.0	0.0
5	8	6	aug	sun	92.3	85.3	488.0	14.7	22.2	29	5.4	0.0	0.0
6	8	6	aug	mon	92.3	88.9	495.6	8.5	24.1	27	3.1	0.0	0.0
7	8	6	aug	mon	91.5	145.4	608.2	10.7	8.0	86	2.2	0.0	0.0
8	8	6	sep	tue	91.0	129.5	692.6	7.0	13.1	63	5.4	0.0	0.0
9	7	5	sep	sat	92.5	88.0	698.6	7.1	22.8	40	4.0	0.0	0.0
10	7	5	sep	sat	92.5	88.0	698.6	7.1	17.8	51	7.2	0.0	0.0
11	7	5	sep	sat	92.8	73.2	713.0	22.6	19.3	38	4.0	0.0	0.0
12	6	5	aug	fri	63.5	70.8	665.3	0.8	17.0	72	6.7	0.0	0.0
13	6	5	sep	mon	90.9	126.5	686.5	7.0	21.3	42	2.2	0.0	0.0

```
14  6  5   sep  wed  92.9  133.3  699.6   9.2  26.4  21   4.5   0.0
0.0
```

```
#show the last 10 instances of dataset
fires.tail(10)
```

```
     X  Y month  day  FFMC    DMC     DC   ISI  temp  RH  wind  rain
area
507  2  4   aug  fri  91.0  166.9  752.6   7.1  25.9  41   3.6   0.0
0.00
508  1  2   aug  fri  91.0  166.9  752.6   7.1  25.9  41   3.6   0.0
0.00
509  5  4   aug  fri  91.0  166.9  752.6   7.1  21.1  71   7.6   1.4
2.17
510  6  5   aug  fri  91.0  166.9  752.6   7.1  18.2  62   5.4   0.0
0.43
511  8  6   aug  sun  81.6   56.7  665.6   1.9  27.8  35   2.7   0.0
0.00
512  4  3   aug  sun  81.6   56.7  665.6   1.9  27.8  32   2.7   0.0
6.44
513  2  4   aug  sun  81.6   56.7  665.6   1.9  21.9  71   5.8   0.0
54.29
514  7  4   aug  sun  81.6   56.7  665.6   1.9  21.2  70   6.7   0.0
11.16
515  1  4   aug  sat  94.4  146.0  614.7  11.3  25.6  42   4.0   0.0
0.00
516  6  3   nov  tue  79.5    3.0  106.7   1.1  11.8  31   4.5   0.0
0.00
```

```
#generate descriptive statistics of each attribute
fires.describe().T
```

```
       count        mean         std   min    25%     50%     75%
max
X      517.0    4.669246    2.313778   1.0    3.0    4.00    7.00
9.00
Y      517.0    4.299807    1.229900   2.0    4.0    4.00    5.00
9.00
month  517.0    7.475822    2.275990   1.0    7.0    8.00    9.00
12.00
day    517.0    4.259188    2.072929   1.0    2.0    5.00    6.00
7.00
FFMC   517.0   90.644681    5.520111  18.7   90.2   91.60   92.90
96.20
DMC    517.0  110.872340   64.046482   1.1   68.6  108.30  142.40
291.30
DC     517.0  547.940039  248.066192   7.9  437.7  664.20  713.90
```

```
860.60
ISI    517.0    9.021663    4.559477   0.0    6.5    8.40   10.80
56.10
temp   517.0   18.889168    5.806625   2.2   15.5   19.30   22.80
33.30
RH     517.0   44.288201   16.317469  15.0   33.0   42.00   53.00
100.00
wind   517.0    4.017602    1.791653   0.4    2.7    4.00    4.90
9.40
rain   517.0    0.021663    0.295959   0.0    0.0    0.00    0.00
6.40
area   517.0   12.847292   63.655818   0.0    0.0    0.52    6.57
1090.84
```

```
#given area of land burnt, but we have to predict if there is fire or
not so changing values of area to 0 and 1 only
#here 0 represet there is not fire and 1 represent fire, changing all
values of area which are greater than 0 to 1
fires['area'].values[fires['area'].values > 0] = 1

#renaming the area attribute to output for clear understanding
fires = fires.rename(columns={'area': 'output'})
fires.head(5)
```

```
   X  Y  month  day  FFMC   DMC     DC  ISI  temp  RH  wind  rain
output
0  7  5      3    5  86.2  26.2   94.3  5.1   8.2  51   6.7   0.0
0.0
1  7  4     10    2  90.6  35.4  669.1  6.7  18.0  33   0.9   0.0
0.0
2  7  4     10    6  90.6  43.7  686.9  6.7  14.6  33   1.3   0.0
0.0
3  8  6      3    5  91.7  33.3   77.5  9.0   8.3  97   4.0   0.2
0.0
4  8  6      3    7  89.3  51.3  102.2  9.6  11.4  99   1.8   0.0
0.0
```

```
#Compute pairwise correlation of columns
fires.corr()
```

```
                X         Y     month       day      FFMC       DMC
DC  \
X       1.000000  0.539548 -0.065003 -0.024922 -0.021039 -0.048384 -
0.085916
Y       0.539548  1.000000 -0.066292 -0.005453 -0.046308  0.007782 -
0.101178
month  -0.065003 -0.066292  1.000000 -0.050837  0.291477  0.466645
```

```
0.868698
day    -0.024922 -0.005453 -0.050837  1.000000 -0.041068  0.062870
0.000105
FFMC   -0.021039 -0.046308  0.291477 -0.041068  1.000000  0.382619
0.330512
DMC    -0.048384  0.007782  0.466645  0.062870  0.382619  1.000000
0.682192
DC     -0.085916 -0.101178  0.868698  0.000105  0.330512  0.682192
1.000000
ISI     0.006210 -0.024488  0.186597  0.032909  0.531805  0.305128
0.229154
temp   -0.051258 -0.024103  0.368842  0.052190  0.431532  0.469594
0.496208
RH      0.085223  0.062221 -0.095280  0.092151 -0.300995  0.073795 -
0.039192
wind    0.018798 -0.020341 -0.086368  0.032478 -0.028485 -0.105342 -
0.203466
rain    0.065387  0.033234  0.013438 -0.048340  0.056702  0.074790
0.035861
output  0.062491  0.056892  0.130329 -0.042970  0.073823  0.062672
0.096724

              ISI      temp        RH      wind      rain    output
X       0.006210 -0.051258  0.085223  0.018798  0.065387  0.062491
Y      -0.024488 -0.024103  0.062221 -0.020341  0.033234  0.056892
month   0.186597  0.368842 -0.095280 -0.086368  0.013438  0.130329
day     0.032909  0.052190  0.092151  0.032478 -0.048340 -0.042970
FFMC    0.531805  0.431532 -0.300995 -0.028485  0.056702  0.073823
DMC     0.305128  0.469594  0.073795 -0.105342  0.074790  0.062672
DC      0.229154  0.496208 -0.039192 -0.203466  0.035861  0.096724
ISI     1.000000  0.394287 -0.132517  0.106826  0.067668  0.035663
temp    0.394287  1.000000 -0.527390 -0.227116  0.069491  0.076047
RH     -0.132517 -0.527390  1.000000  0.069410  0.099751 -0.035587
wind    0.106826 -0.227116  0.069410  1.000000  0.061119  0.055702
rain    0.067668  0.069491  0.099751  0.061119  1.000000  0.025550
output  0.035663  0.076047 -0.035587  0.055702  0.025550  1.000000
```