

EDA ON ALGERIAN FOREST FIRE

The dataset includes 244 instances that regroup a data of two regions of Algeria,namely the Bejaia region located in the northeast of Algeria and the Sidi Bel-abbes region located in the northwest of Algeria.

122 instances for each region.

The period is from June 2012 to September 2012. The dataset includes 11 attribues and 1 output attribue (class) The 244 instances have been classified into fire (138 classes) and not fire (106 classes) classes.

Attribute Information:

1. Date : (DD/MM/YYYY) Day, month ('june' to 'september'), year (2012) Weather data observations
2. Temp : temperature noon (temperature max) in Celsius degrees: 22 to 42
3. RH : Relative Humidity in %: 21 to 90
4. Ws :Wind speed in km/h: 6 to 29
5. Rain: total day in mm: 0 to 16.8 FWI Components
6. Fine Fuel Moisture Code (FFMC) index from the FWI system: 28.6 to 92.5
7. Duff Moisture Code (DMC) index from the FWI system: 1.1 to 65.9
8. Drought Code (DC) index from the FWI system: 7 to 220.4
9. Initial Spread Index (ISI) index from the FWI system: 0 to 18.5
10. Buildup Index (BUI) index from the FWI system: 1.1 to 68
11. Fire Weather Index (FWI) Index: 0 to 31.1
12. Classes: two classes, namely fire and not fire

In [1]:

```
#Importing the required Libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
from warnings import filterwarnings
filterwarnings('ignore')
```

In [2]:

```
# Loading the dataset to Pandas Dataframe and setting the header to 1
df=pd.read_csv('Algerian_forest_fires_dataset_UPDATE.csv',header=1)
#displaying Max rows and columns
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
```

Data Cleaning

In [3]:

```
# Dropping 122[specifying region name] and 123 Row [ respecifying the header]
df.drop([122,123],inplace=True)
```

```
In [4]: # Resetting the index and dropping the index column  
df.reset_index(inplace=True)  
df.drop('index', axis=1, inplace=True)
```

```
In [5]: # Creating new column called Region.[0- 'Bejaia' and 1 - 'Sidi Bel-abbes']  
df.loc[:122, 'Region']=0  
df.loc[122:, 'Region']=1
```

```
In [6]: #Checking the column Headers  
df.columns
```

```
Out[6]: Index(['day', 'month', 'year', 'Temperature', 'RH', 'Ws', 'Rain', 'FFMC',  
       'DMC', 'DC', 'ISI', 'BUI', 'FWI', 'Classes', 'Region'],  
      dtype='object')
```

```
In [7]: # Removing unnecessary space in column headers using str.strip()  
df.columns = df.columns.str.strip()  
df.columns
```

```
Out[7]: Index(['day', 'month', 'year', 'Temperature', 'RH', 'Ws', 'Rain', 'FFMC',  
       'DMC', 'DC', 'ISI', 'BUI', 'FWI', 'Classes', 'Region'],  
      dtype='object')
```

```
In [8]: # Converting the necessary column Datatype to Int  
df[['month', 'day', 'year', 'Temperature', 'RH', 'Ws', 'Region']] = df[['month', 'day',
```

```
In [9]: df
```

```
Out[9]:
```

	day	month	year	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes
0	1	6	2012	29	57	18	0	65.7	3.4	7.6	1.3	3.4	0.5	not fire
1	2	6	2012	29	61	13	1.3	64.4	4.1	7.6	1	3.9	0.4	not fire
2	3	6	2012	26	82	22	13.1	47.1	2.5	7.1	0.3	2.7	0.1	not fire
3	4	6	2012	25	89	13	2.5	28.6	1.3	6.9	0	1.7	0	not fire
4	5	6	2012	27	77	16	0	64.8	3	14.2	1.2	3.9	0.5	not fire
5	6	6	2012	31	67	14	0	82.6	5.8	22.2	3.1	7	2.5	fire
6	7	6	2012	33	54	13	0	88.2	9.9	30.5	6.4	10.9	7.2	fire
7	8	6	2012	30	73	15	0	86.6	12.1	38.3	5.6	13.5	7.1	fire
8	9	6	2012	25	88	13	0.2	52.9	7.9	38.8	0.4	10.5	0.3	not fire
9	10	6	2012	28	79	12	0	73.2	9.5	46.3	1.3	12.6	0.9	not fire
10	11	6	2012	31	65	14	0	84.5	12.5	54.3	4	15.8	5.6	fire
11	12	6	2012	26	81	19	0	84	13.8	61.4	4.8	17.7	7.1	fire
12	13	6	2012	27	84	21	1.2	50	6.7	17	0.5	6.7	0.2	not fire
13	14	6	2012	30	78	20	0.5	59	4.6	7.8	1	4.4	0.4	not fire
14	15	6	2012	28	80	17	3.1	49.4	3	7.4	0.4	3	0.1	not fire
15	16	6	2012	29	89	13	0.7	36.1	1.7	7.6	0	2.2	0	not fire

	day	month	year	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes
16	17	6	2012	30	89	16	0.6	37.3	1.1	7.8	0	1.6	0	not fire
17	18	6	2012	31	78	14	0.3	56.9	1.9	8	0.7	2.4	0.2	not fire
18	19	6	2012	31	55	16	0.1	79.9	4.5	16	2.5	5.3	1.4	not fire
19	20	6	2012	30	80	16	0.4	59.8	3.4	27.1	0.9	5.1	0.4	not fire
20	21	6	2012	30	78	14	0	81	6.3	31.6	2.6	8.4	2.2	fire
21	22	6	2012	31	67	17	0.1	79.1	7	39.5	2.4	9.7	2.3	not fire
22	23	6	2012	32	62	18	0.1	81.4	8.2	47.7	3.3	11.5	3.8	fire
23	24	6	2012	32	66	17	0	85.9	11.2	55.8	5.6	14.9	7.5	fire
24	25	6	2012	31	64	15	0	86.7	14.2	63.8	5.7	18.3	8.4	fire
25	26	6	2012	31	64	18	0	86.8	17.8	71.8	6.7	21.6	10.6	fire
26	27	6	2012	34	53	18	0	89	21.6	80.3	9.2	25.8	15	fire
27	28	6	2012	32	55	14	0	89.1	25.5	88.5	7.6	29.7	13.9	fire
28	29	6	2012	32	47	13	0.3	79.9	18.4	84.4	2.2	23.8	3.9	not fire
29	30	6	2012	33	50	14	0	88.7	22.9	92.8	7.2	28.3	12.9	fire
30	1	7	2012	29	68	19	1	59.9	2.5	8.6	1.1	2.9	0.4	not fire
31	2	7	2012	27	75	19	1.2	55.7	2.4	8.3	0.8	2.8	0.3	not fire
32	3	7	2012	32	76	20	0.7	63.1	2.6	9.2	1.3	3	0.5	not fire
33	4	7	2012	33	78	17	0	80.1	4.6	18.5	2.7	5.7	1.7	not fire
34	5	7	2012	33	66	14	0	85.9	7.6	27.9	4.8	9.1	4.9	fire
35	6	7	2012	32	63	14	0	87	10.9	37	5.6	12.5	6.8	fire
36	7	7	2012	35	64	18	0.2	80	9.7	40.4	2.8	12.1	3.2	not fire
37	8	7	2012	33	68	19	0	85.6	12.5	49.8	6	15.4	8	fire
38	9	7	2012	32	68	14	1.4	66.6	7.7	9.2	1.1	7.4	0.6	not fire
39	10	7	2012	33	69	13	0.7	66.6	6	9.3	1.1	5.8	0.5	not fire
40	11	7	2012	33	76	14	0	81.1	8.1	18.7	2.6	8.1	2.2	not fire
41	12	7	2012	31	75	13	0.1	75.1	7.9	27.7	1.5	9.2	0.9	not fire
42	13	7	2012	34	81	15	0	81.8	9.7	37.2	3	11.7	3.4	not fire
43	14	7	2012	34	61	13	0.6	73.9	7.8	22.9	1.4	8.4	0.8	not fire
44	15	7	2012	30	80	19	0.4	60.7	5.2	17	1.1	5.9	0.5	not fire
45	16	7	2012	28	76	21	0	72.6	7	25.5	0.7	8.3	0.4	not fire
46	17	7	2012	29	70	14	0	82.8	9.4	34.1	3.2	11.1	3.6	fire
47	18	7	2012	31	68	14	0	85.4	12.1	43.1	4.6	14.2	6	fire
48	19	7	2012	35	59	17	0	88.1	12	52.8	7.7	18.2	10.9	fire
49	20	7	2012	33	65	15	0.1	81.4	12.3	62.1	2.8	16.5	4	fire
50	21	7	2012	33	70	17	0	85.4	18.5	71.5	5.2	22.4	8.8	fire
51	22	7	2012	28	79	18	0.1	73.4	16.4	79.9	1.8	21.7	2.8	not fire

	day	month	year	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes
52	23	7	2012	27	66	22	0.4	68.2	10.5	71.3	1.8	15.4	2.1	not fire
53	24	7	2012	28	78	16	0.1	70	9.6	79.7	1.4	14.7	1.3	not fire
54	25	7	2012	31	65	18	0	84.3	12.5	88.7	4.8	18.5	7.3	fire
55	26	7	2012	36	53	19	0	89.2	17.1	98.6	10	23.9	15.3	fire
56	27	7	2012	36	48	13	0	90.3	22.2	108.5	8.7	29.4	15.3	fire
57	28	7	2012	33	76	15	0	86.5	24.4	117.8	5.6	32.1	11.3	fire
58	29	7	2012	32	73	15	0	86.6	26.7	127	5.6	35	11.9	fire
59	30	7	2012	31	79	15	0	85.4	28.5	136	4.7	37.4	10.7	fire
60	31	7	2012	35	64	17	0	87.2	31.9	145.7	6.8	41.2	15.7	fire
61	1	8	2012	36	45	14	0	78.8	4.8	10.2	2	4.7	0.9	not fire
62	2	8	2012	35	55	12	0.4	78	5.8	10	1.7	5.5	0.8	not fire
63	3	8	2012	35	63	14	0.3	76.6	5.7	10	1.7	5.5	0.8	not fire
64	4	8	2012	34	69	13	0	85	8.2	19.8	4	8.2	3.9	fire
65	5	8	2012	34	65	13	0	86.8	11.1	29.7	5.2	11.5	6.1	fire
66	6	8	2012	32	75	14	0	86.4	13	39.1	5.2	14.2	6.8	fire
67	7	8	2012	32	69	16	0	86.5	15.5	48.6	5.5	17.2	8	fire
68	8	8	2012	32	60	18	0.3	77.1	11.3	47	2.2	14.1	2.6	not fire
69	9	8	2012	35	59	17	0	87.4	14.8	57	6.9	17.9	9.9	fire
70	10	8	2012	35	55	14	0	88.9	18.6	67	7.4	21.9	11.6	fire
71	11	8	2012	35	63	13	0	88.9	21.7	77	7.1	25.5	12.1	fire
72	12	8	2012	35	51	13	0.3	81.3	15.6	75.1	2.5	20.7	4.2	not fire
73	13	8	2012	35	63	15	0	87	19	85.1	5.9	24.4	10.2	fire
74	14	8	2012	33	66	14	0	87	21.7	94.7	5.7	27.2	10.6	fire
75	15	8	2012	36	55	13	0.3	82.4	15.6	92.5	3.7	22	6.3	fire
76	16	8	2012	36	61	18	0.3	80.2	11.7	90.4	2.8	17.6	4.2	fire
77	17	8	2012	37	52	18	0	89.3	16	100.7	9.7	22.9	14.6	fire
78	18	8	2012	36	54	18	0	89.4	20	110.9	9.7	27.5	16.1	fire
79	19	8	2012	35	62	19	0	89.4	23.2	120.9	9.7	31.3	17.2	fire
80	20	8	2012	35	68	19	0	88.3	25.9	130.6	8.8	34.7	16.8	fire
81	21	8	2012	36	58	19	0	88.6	29.6	141.1	9.2	38.8	18.4	fire
82	22	8	2012	36	55	18	0	89.1	33.5	151.3	9.9	43.1	20.4	fire
83	23	8	2012	36	53	16	0	89.5	37.6	161.5	10.4	47.5	22.3	fire
84	24	8	2012	34	64	14	0	88.9	40.5	171.3	9	50.9	20.9	fire
85	25	8	2012	35	60	15	0	88.9	43.9	181.3	8.2	54.7	20.3	fire
86	26	8	2012	31	78	18	0	85.8	45.6	190.6	4.7	57.1	13.7	fire
87	27	8	2012	33	82	21	0	84.9	47	200.2	4.4	59.3	13.2	fire

	day	month	year	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes
88	28	8	2012	34	64	16	0	89.4	50.2	210.4	7.3	62.9	19.9	fire
89	29	8	2012	35	48	18	0	90.1	54.2	220.4	12.5	67.4	30.2	fire
90	30	8	2012	35	70	17	0.8	72.7	25.2	180.4	1.7	37.4	4.2	not fire
91	31	8	2012	28	80	21	16.8	52.5	8.7	8.7	0.6	8.3	0.3	not fire
92	1	9	2012	25	76	17	7.2	46	1.3	7.5	0.2	1.8	0.1	not fire
93	2	9	2012	22	86	15	10.1	30.5	0.7	7	0	1.1	0	not fire
94	3	9	2012	25	78	15	3.8	42.6	1.2	7.5	0.1	1.7	0	not fire
95	4	9	2012	29	73	17	0.1	68.4	1.9	15.7	1.4	2.9	0.5	not fire
96	5	9	2012	29	75	16	0	80.8	3.4	24	2.8	5.1	1.7	fire
97	6	9	2012	29	74	19	0.1	75.8	3.6	32.2	2.1	5.6	0.9	not fire
98	7	9	2012	31	71	17	0.3	69.6	3.2	30.1	1.5	5.1	0.6	not fire
99	8	9	2012	30	73	17	0.9	62	2.6	8.4	1.1	3	0.4	not fire
100	9	9	2012	30	77	15	1	56.1	2.1	8.4	0.7	2.6	0.2	not fire
101	10	9	2012	33	73	12	1.8	59.9	2.2	8.9	0.7	2.7	0.3	not fire
102	11	9	2012	30	77	21	1.8	58.5	1.9	8.4	1.1	2.4	0.3	not fire
103	12	9	2012	29	88	13	0	71	2.6	16.6	1.2	3.7	0.5	not fire
104	13	9	2012	25	86	21	4.6	40.9	1.3	7.5	0.1	1.8	0	not fire
105	14	9	2012	22	76	26	8.3	47.4	1.1	7	0.4	1.6	0.1	not fire
106	15	9	2012	24	82	15	0.4	44.9	0.9	7.3	0.2	1.4	0	not fire
107	16	9	2012	30	65	14	0	78.1	3.2	15.7	1.9	4.2	0.8	not fire
108	17	9	2012	31	52	14	0	87.7	6.4	24.3	6.2	7.7	5.9	fire
109	18	9	2012	32	49	11	0	89.4	9.8	33.1	6.8	11.3	7.7	fire
110	19	9	2012	29	57	14	0	89.3	12.5	41.3	7.8	14.2	9.7	fire
111	20	9	2012	28	84	18	0	83.8	13.5	49.3	4.5	16	6.3	fire
112	21	9	2012	31	55	11	0	87.8	16.5	57.9	5.4	19.2	8.3	fire
113	22	9	2012	31	50	19	0.6	77.8	10.6	41.4	2.4	12.9	2.8	not fire
114	23	9	2012	32	54	11	0.5	73.7	7.9	30.4	1.2	9.6	0.7	not fire
115	24	9	2012	29	65	19	0.6	68.3	5.5	15.2	1.5	5.8	0.7	not fire
116	25	9	2012	26	81	21	5.8	48.6	3	7.7	0.4	3	0.1	not fire
117	26	9	2012	31	54	11	0	82	6	16.3	2.5	6.2	1.7	not fire
118	27	9	2012	31	66	11	0	85.7	8.3	24.9	4	9	4.1	fire
119	28	9	2012	32	47	14	0.7	77.5	7.1	8.8	1.8	6.8	0.9	not fire
120	29	9	2012	26	80	16	1.8	47.4	2.9	7.7	0.3	3	0.1	not fire
121	30	9	2012	25	78	14	1.4	45	1.9	7.5	0.2	2.4	0.1	not fire
122	1	6	2012	32	71	12	0.7	57.1	2.5	8.2	0.6	2.8	0.2	not fire
123	2	6	2012	30	73	13	4	55.7	2.7	7.8	0.6	2.9	0.2	not fire

	day	month	year	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes
124	3	6	2012	29	80	14	2	48.7	2.2	7.6	0.3	2.6	0.1	not fire
125	4	6	2012	30	64	14	0	79.4	5.2	15.4	2.2	5.6	1	not fire
126	5	6	2012	32	60	14	0.2	77.1	6	17.6	1.8	6.5	0.9	not fire
127	6	6	2012	35	54	11	0.1	83.7	8.4	26.3	3.1	9.3	3.1	fire
128	7	6	2012	35	44	17	0.2	85.6	9.9	28.9	5.4	10.7	6	fire
129	8	6	2012	28	51	17	1.3	71.4	7.7	7.4	1.5	7.3	0.8	not fire
130	9	6	2012	27	59	18	0.1	78.1	8.5	14.7	2.4	8.3	1.9	not fire
131	10	6	2012	30	41	15	0	89.4	13.3	22.5	8.4	13.1	10	fire
132	11	6	2012	31	42	21	0	90.6	18.2	30.5	13.4	18	16.7	fire
133	12	6	2012	27	58	17	0	88.9	21.3	37.8	8.7	21.2	12.9	fire
134	13	6	2012	30	52	15	2	72.3	11.4	7.8	1.4	10.9	0.9	not fire
135	14	6	2012	27	79	16	0.7	53.4	6.4	7.3	0.5	6.1	0.3	not fire
136	15	6	2012	28	90	15	0	66.8	7.2	14.7	1.2	7.1	0.6	not fire
137	16	6	2012	29	87	15	0.4	47.4	4.2	8	0.2	4.1	0.1	not fire
138	17	6	2012	31	69	17	4.7	62.2	3.9	8	1.1	3.8	0.4	not fire
139	18	6	2012	33	62	10	8.7	65.5	4.6	8.3	0.9	4.4	0.4	not fire
140	19	6	2012	32	67	14	4.5	64.6	4.4	8.2	1	4.2	0.4	not fire
141	20	6	2012	31	72	14	0.2	60.2	3.8	8	0.8	3.7	0.3	not fire
142	21	6	2012	32	55	14	0	86.2	8.3	18.4	5	8.2	4.9	fire
143	22	6	2012	33	46	14	1.1	78.3	8.1	8.3	1.9	7.7	1.2	not fire
144	23	6	2012	33	59	16	0.8	74.2	7	8.3	1.6	6.7	0.8	not fire
145	24	6	2012	35	68	16	0	85.3	10	17	4.9	9.9	5.3	fire
146	25	6	2012	34	70	16	0	86	12.8	25.6	5.4	12.7	6.7	fire
147	26	6	2012	36	62	16	0	87.8	16.5	34.5	7	16.4	9.5	fire
148	27	6	2012	36	55	15	0	89.1	20.9	43.3	8	20.8	12	fire
149	28	6	2012	37	37	13	0	92.5	27.2	52.4	11.7	27.1	18.4	fire
150	29	6	2012	37	36	13	0.6	86.2	17.9	36.7	4.8	17.8	7.2	fire
151	30	6	2012	34	42	15	1.7	79.7	12	8.5	2.2	11.5	2.2	not fire
152	1	7	2012	28	58	18	2.2	63.7	3.2	8.5	1.2	3.3	0.5	not fire
153	2	7	2012	33	48	16	0	87.6	7.9	17.8	6.8	7.8	6.4	fire
154	3	7	2012	34	56	17	0.1	84.7	9.7	27.3	4.7	10.3	5.2	fire
155	4	7	2012	34	58	18	0	88	13.6	36.8	8	14.1	9.9	fire
156	5	7	2012	34	45	18	0	90.5	18.7	46.4	11.3	18.7	15	fire
157	6	7	2012	35	42	15	0.3	84.7	15.5	45.1	4.3	16.7	6.3	fire
158	7	7	2012	38	43	13	0.5	85	13	35.4	4.1	13.7	5.2	fire
159	8	7	2012	35	47	18	6	80.8	9.8	9.7	3.1	9.4	3	fire

	day	month	year	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes
160	9	7	2012	36	43	15	1.9	82.3	9.4	9.9	3.2	9	3.1	fire
161	10	7	2012	34	51	16	3.8	77.5	8	9.5	2	7.7	1.3	not fire
162	11	7	2012	34	56	15	2.9	74.8	7.1	9.5	1.6	6.8	0.8	not fire
163	12	7	2012	36	44	13	0	90.1	12.6	19.4	8.3	12.5	9.6	fire
164	13	7	2012	39	45	13	0.6	85.2	11.3	10.4	4.2	10.9	4.7	fire
165	14	7	2012	37	37	18	0.2	88.9	12.9	14.6 9	12.5	10.4	fire	NaN
166	15	7	2012	34	45	17	0	90.5	18	24.1	10.9	17.7	14.1	fire
167	16	7	2012	31	83	17	0	84.5	19.4	33.1	4.7	19.2	7.3	fire
168	17	7	2012	32	81	17	0	84.6	21.1	42.3	4.7	20.9	7.7	fire
169	18	7	2012	33	68	15	0	86.1	23.9	51.6	5.2	23.9	9.1	fire
170	19	7	2012	34	58	16	0	88.1	27.8	61.1	7.3	27.7	13	fire
171	20	7	2012	36	50	16	0	89.9	32.7	71	9.5	32.6	17.3	fire
172	21	7	2012	36	29	18	0	93.9	39.6	80.6	18.5	39.5	30	fire
173	22	7	2012	32	48	18	0	91.5	44.2	90.1	13.2	44	25.4	fire
174	23	7	2012	31	71	17	0	87.3	46.6	99	6.9	46.5	16.3	fire
175	24	7	2012	33	63	17	1.1	72.8	20.9	56.6	1.6	21.7	2.5	not fire
176	25	7	2012	39	64	9	1.2	73.8	11.7	15.9	1.1	11.4	0.7	not fire
177	26	7	2012	35	58	10	0.2	78.3	10.8	19.7	1.6	10.7	1	not fire
178	27	7	2012	29	87	18	0	80	11.8	28.3	2.8	11.8	3.2	not fire
179	28	7	2012	33	57	16	0	87.5	15.7	37.6	6.7	15.7	9	fire
180	29	7	2012	34	59	16	0	88.1	19.5	47.2	7.4	19.5	10.9	fire
181	30	7	2012	36	56	16	0	88.9	23.8	57.1	8.2	23.8	13.2	fire
182	31	7	2012	37	55	15	0	89.3	28.3	67.2	8.3	28.3	14.5	fire
183	1	8	2012	38	52	14	0	78.3	4.4	10.5	2	4.4	0.8	not fire
184	2	8	2012	40	34	14	0	93.3	10.8	21.4	13.8	10.6	13.5	fire
185	3	8	2012	39	33	17	0	93.7	17.1	32.1	17.2	16.9	19.5	fire
186	4	8	2012	38	35	15	0	93.8	23	42.7	15.7	22.9	20.9	fire
187	5	8	2012	34	42	17	0.1	88.3	23.6	52.5	19	23.5	12.6	fire
188	6	8	2012	30	54	14	3.1	70.5	11	9.1	1.3	10.5	0.8	not fire
189	7	8	2012	34	63	13	2.9	69.7	7.2	9.8	1.2	6.9	0.6	not fire
190	8	8	2012	37	56	11	0	87.4	11.2	20.2	5.2	11	5.9	fire
191	9	8	2012	39	43	12	0	91.7	16.5	30.9	9.6	16.4	12.7	fire
192	10	8	2012	39	39	15	0.2	89.3	15.8	35.4	8.2	15.8	10.7	fire
193	11	8	2012	40	31	15	0	94.2	22.5	46.3	16.6	22.4	21.6	fire
194	12	8	2012	39	21	17	0.4	93	18.4	41.5	15.5	18.4	18.8	fire

	day	month	year	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes
195	13	8	2012	35	34	16	0.2	88.3	16.9	45.1	7.5	17.5	10.5	fire
196	14	8	2012	37	40	13	0	91.9	22.3	55.5	10.8	22.3	15.7	fire
197	15	8	2012	35	46	13	0.3	83.9	16.9	54.2	3.5	19	5.5	fire
198	16	8	2012	40	41	10	0.1	92	22.6	65.1	9.5	24.2	14.8	fire
199	17	8	2012	42	24	9	0	96	30.3	76.4	15.7	30.4	24	fire
200	18	8	2012	37	37	14	0	94.3	35.9	86.8	16	35.9	26.3	fire
201	19	8	2012	35	66	15	0.1	82.7	32.7	96.8	3.3	35.5	7.7	fire
202	20	8	2012	36	81	15	0	83.7	34.4	107	3.8	38.1	9	fire
203	21	8	2012	36	71	15	0	86	36.9	117.1	5.1	41.3	12.2	fire
204	22	8	2012	37	53	14	0	89.5	41.1	127.5	8	45.5	18.1	fire
205	23	8	2012	36	43	16	0	91.2	46.1	137.7	11.5	50.2	24.5	fire
206	24	8	2012	35	38	15	0	92.1	51.3	147.7	12.2	54.9	26.9	fire
207	25	8	2012	34	40	18	0	92.1	56.3	157.5	14.3	59.5	31.1	fire
208	26	8	2012	33	37	16	0	92.2	61.3	167.2	13.1	64	30.3	fire
209	27	8	2012	36	54	14	0	91	65.9	177.3	10	68	26.1	fire
210	28	8	2012	35	56	14	0.4	79.2	37	166	2.1	30.6	6.1	not fire
211	29	8	2012	35	53	17	0.5	80.2	20.7	149.2	2.7	30.6	5.9	fire
212	30	8	2012	34	49	15	0	89.2	24.8	159.1	8.1	35.7	16	fire
213	31	8	2012	30	59	19	0	89.1	27.8	168.2	9.8	39.3	19.4	fire
214	1	9	2012	29	86	16	0	37.9	0.9	8.2	0.1	1.4	0	not fire
215	2	9	2012	28	67	19	0	75.4	2.9	16.3	2	4	0.8	not fire
216	3	9	2012	28	75	16	0	82.2	4.4	24.3	3.3	6	2.5	fire
217	4	9	2012	30	66	15	0.2	73.5	4.1	26.6	1.5	6	0.7	not fire
218	5	9	2012	30	58	12	4.1	66.1	4	8.4	1	3.9	0.4	not fire
219	6	9	2012	34	71	14	6.5	64.5	3.3	9.1	1	3.5	0.4	not fire
220	7	9	2012	31	62	15	0	83.3	5.8	17.7	3.8	6.4	3.2	fire
221	8	9	2012	30	88	14	0	82.5	6.6	26.1	3	8.1	2.7	fire
222	9	9	2012	30	80	15	0	83.1	7.9	34.5	3.5	10	3.7	fire
223	10	9	2012	29	74	15	1.1	59.5	4.7	8.2	0.8	4.6	0.3	not fire
224	11	9	2012	30	73	14	0	79.2	6.5	16.6	2.1	6.6	1.2	not fire
225	12	9	2012	31	72	14	0	84.2	8.3	25.2	3.8	9.1	3.9	fire
226	13	9	2012	29	49	19	0	88.6	11.5	33.4	9.1	12.4	10.3	fire
227	14	9	2012	28	81	15	0	84.6	12.6	41.5	4.3	14.3	5.7	fire
228	15	9	2012	32	51	13	0	88.7	16	50.2	6.9	17.8	9.8	fire
229	16	9	2012	33	26	13	0	93.9	21.2	59.2	14.2	22.4	19.3	fire
230	17	9	2012	34	44	12	0	92.5	25.2	63.3	11.2	26.2	17.5	fire

	day	month	year	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes
231	18	9	2012	36	33	13	0.1	90.6	25.8	77.8	9	28.2	15.4	fire
232	19	9	2012	29	41	8	0.1	83.9	24.9	86	2.7	28.9	5.6	fire
233	20	9	2012	34	58	13	0.2	79.5	18.7	88	2.1	24.4	3.8	not fire
234	21	9	2012	35	34	17	0	92.2	23.6	97.3	13.8	29.4	21.6	fire
235	22	9	2012	33	64	13	0	88.9	26.1	106.3	7.1	32.4	13.7	fire
236	23	9	2012	35	56	14	0	89	29.4	115.6	7.5	36	15.2	fire
237	24	9	2012	26	49	6	2	61.3	11.9	28.1	0.6	11.9	0.4	not fire
238	25	9	2012	28	70	15	0	79.9	13.8	36.1	2.4	14.1	3	not fire
239	26	9	2012	30	65	14	0	85.4	16	44.5	4.5	16.9	6.5	fire
240	27	9	2012	28	87	15	4.4	41.1	6.5	8	0.1	6.2	0	not fire
241	28	9	2012	27	87	29	0.5	45.9	3.5	7.9	0.4	3.4	0.2	not fire
242	29	9	2012	24	54	18	0.1	79.7	4.3	15.2	1.7	5.1	0.7	not fire
243	30	9	2012	24	64	15	0.2	67.3	3.8	16.5	1.2	4.8	0.5	not fire



In [10]:

```
#Values in df['Classes'] has unnecessary spaces that are removed by str.strip()
df.Classes = df.Classes.str.strip()
df.DC=df.DC.str.strip()
```

In [11]:

```
#Removing rows/columns with null values
df[df.isnull().any(axis=1)]
df =df.dropna().reset_index(drop=True)
```

In [12]:

```
# Converting the necessary column Datatype to Float
df['Rain']=df['Rain'].astype(float)
df['FFMC']=df['FFMC'].astype(float)
df['DMC']=df['DMC'].astype(float)
df['BUI']=df['BUI'].astype(float)
df['ISI']=df['ISI'].astype(float)
df['Ws']=df['Ws'].astype(float)
df['DC']=df['DC'].astype(float)
df['FWI']=df['FWI'].astype(float)
```

In [13]:

```
#checking the data types
df.dtypes
```

Out[13]:

day	int32
month	int32
year	int32
Temperature	int32
RH	int32
Ws	float64
Rain	float64
FFMC	float64
DMC	float64
DC	float64
ISI	float64

```
BUI           float64
FWI           float64
Classes       object
Region        int32
dtype: object
```

In [14]:

```
#Dataframe Info
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 243 entries, 0 to 242
Data columns (total 15 columns):
 #   Column      Non-Null Count  Dtype  
 --- 
  0   day         243 non-null    int32  
  1   month        243 non-null    int32  
  2   year         243 non-null    int32  
  3   Temperature  243 non-null    int32  
  4   RH           243 non-null    int32  
  5   Ws           243 non-null    float64 
  6   Rain          243 non-null    float64 
  7   FFMC          243 non-null    float64 
  8   DMC           243 non-null    float64 
  9   DC            243 non-null    float64 
  10  ISI           243 non-null    float64 
  11  BUI           243 non-null    float64 
  12  FWI           243 non-null    float64 
  13  Classes       243 non-null    object  
  14  Region        243 non-null    int32  
dtypes: float64(8), int32(6), object(1)
memory usage: 22.9+ KB
```

In [15]:

```
# Dataframe Shape (i.e)Rows and Columns
df.shape
```

Out[15]: (243, 15)

In [16]:

```
#Dataframe description
df.describe().T
```

Out[16]:

	count	mean	std	min	25%	50%	75%	max
day	243.0	15.761317	8.842552	1.0	8.00	16.0	23.00	31.0
month	243.0	7.502058	1.114793	6.0	7.00	8.0	8.00	9.0
year	243.0	2012.000000	0.000000	2012.0	2012.00	2012.0	2012.00	2012.0
Temperature	243.0	32.152263	3.628039	22.0	30.00	32.0	35.00	42.0
RH	243.0	62.041152	14.828160	21.0	52.50	63.0	73.50	90.0
Ws	243.0	15.493827	2.811385	6.0	14.00	15.0	17.00	29.0
Rain	243.0	0.762963	2.003207	0.0	0.00	0.0	0.50	16.8
FFMC	243.0	77.842387	14.349641	28.6	71.85	83.3	88.30	96.0
DMC	243.0	14.680658	12.393040	0.7	5.80	11.3	20.80	65.9
DC	243.0	49.430864	47.665606	6.9	12.35	33.1	69.10	220.4
ISI	243.0	4.742387	4.154234	0.0	1.40	3.5	7.25	19.0

	count	mean	std	min	25%	50%	75%	max
BUI	243.0	16.690535	14.228421	1.1	6.00	12.4	22.65	68.0
FWI	243.0	7.035391	7.440568	0.0	0.70	4.2	11.45	31.1
Region	243.0	0.497942	0.501028	0.0	0.00	0.0	1.00	1.0

In [17]:

```
#Dropping Year feature as the data is for the same year
df1 = df.drop(['year'], axis=1)
#Display the dataframe after dropping year
df1
```

Out[17]:

	day	month	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes	Reg
0	1	6	29	57	18.0	0.0	65.7	3.4	7.6	1.3	3.4	0.5	not fire	
1	2	6	29	61	13.0	1.3	64.4	4.1	7.6	1.0	3.9	0.4	not fire	
2	3	6	26	82	22.0	13.1	47.1	2.5	7.1	0.3	2.7	0.1	not fire	
3	4	6	25	89	13.0	2.5	28.6	1.3	6.9	0.0	1.7	0.0	not fire	
4	5	6	27	77	16.0	0.0	64.8	3.0	14.2	1.2	3.9	0.5	not fire	
5	6	6	31	67	14.0	0.0	82.6	5.8	22.2	3.1	7.0	2.5	fire	
6	7	6	33	54	13.0	0.0	88.2	9.9	30.5	6.4	10.9	7.2	fire	
7	8	6	30	73	15.0	0.0	86.6	12.1	38.3	5.6	13.5	7.1	fire	
8	9	6	25	88	13.0	0.2	52.9	7.9	38.8	0.4	10.5	0.3	not fire	
9	10	6	28	79	12.0	0.0	73.2	9.5	46.3	1.3	12.6	0.9	not fire	
10	11	6	31	65	14.0	0.0	84.5	12.5	54.3	4.0	15.8	5.6	fire	
11	12	6	26	81	19.0	0.0	84.0	13.8	61.4	4.8	17.7	7.1	fire	
12	13	6	27	84	21.0	1.2	50.0	6.7	17.0	0.5	6.7	0.2	not fire	
13	14	6	30	78	20.0	0.5	59.0	4.6	7.8	1.0	4.4	0.4	not fire	
14	15	6	28	80	17.0	3.1	49.4	3.0	7.4	0.4	3.0	0.1	not fire	
15	16	6	29	89	13.0	0.7	36.1	1.7	7.6	0.0	2.2	0.0	not fire	
16	17	6	30	89	16.0	0.6	37.3	1.1	7.8	0.0	1.6	0.0	not fire	
17	18	6	31	78	14.0	0.3	56.9	1.9	8.0	0.7	2.4	0.2	not fire	
18	19	6	31	55	16.0	0.1	79.9	4.5	16.0	2.5	5.3	1.4	not fire	
19	20	6	30	80	16.0	0.4	59.8	3.4	27.1	0.9	5.1	0.4	not fire	
20	21	6	30	78	14.0	0.0	81.0	6.3	31.6	2.6	8.4	2.2	fire	
21	22	6	31	67	17.0	0.1	79.1	7.0	39.5	2.4	9.7	2.3	not fire	
22	23	6	32	62	18.0	0.1	81.4	8.2	47.7	3.3	11.5	3.8	fire	
23	24	6	32	66	17.0	0.0	85.9	11.2	55.8	5.6	14.9	7.5	fire	
24	25	6	31	64	15.0	0.0	86.7	14.2	63.8	5.7	18.3	8.4	fire	
25	26	6	31	64	18.0	0.0	86.8	17.8	71.8	6.7	21.6	10.6	fire	
26	27	6	34	53	18.0	0.0	89.0	21.6	80.3	9.2	25.8	15.0	fire	
27	28	6	32	55	14.0	0.0	89.1	25.5	88.5	7.6	29.7	13.9	fire	

	day	month	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes	Reg
28	29	6	32	47	13.0	0.3	79.9	18.4	84.4	2.2	23.8	3.9	not fire	
29	30	6	33	50	14.0	0.0	88.7	22.9	92.8	7.2	28.3	12.9	fire	
30	1	7	29	68	19.0	1.0	59.9	2.5	8.6	1.1	2.9	0.4	not fire	
31	2	7	27	75	19.0	1.2	55.7	2.4	8.3	0.8	2.8	0.3	not fire	
32	3	7	32	76	20.0	0.7	63.1	2.6	9.2	1.3	3.0	0.5	not fire	
33	4	7	33	78	17.0	0.0	80.1	4.6	18.5	2.7	5.7	1.7	not fire	
34	5	7	33	66	14.0	0.0	85.9	7.6	27.9	4.8	9.1	4.9	fire	
35	6	7	32	63	14.0	0.0	87.0	10.9	37.0	5.6	12.5	6.8	fire	
36	7	7	35	64	18.0	0.2	80.0	9.7	40.4	2.8	12.1	3.2	not fire	
37	8	7	33	68	19.0	0.0	85.6	12.5	49.8	6.0	15.4	8.0	fire	
38	9	7	32	68	14.0	1.4	66.6	7.7	9.2	1.1	7.4	0.6	not fire	
39	10	7	33	69	13.0	0.7	66.6	6.0	9.3	1.1	5.8	0.5	not fire	
40	11	7	33	76	14.0	0.0	81.1	8.1	18.7	2.6	8.1	2.2	not fire	
41	12	7	31	75	13.0	0.1	75.1	7.9	27.7	1.5	9.2	0.9	not fire	
42	13	7	34	81	15.0	0.0	81.8	9.7	37.2	3.0	11.7	3.4	not fire	
43	14	7	34	61	13.0	0.6	73.9	7.8	22.9	1.4	8.4	0.8	not fire	
44	15	7	30	80	19.0	0.4	60.7	5.2	17.0	1.1	5.9	0.5	not fire	
45	16	7	28	76	21.0	0.0	72.6	7.0	25.5	0.7	8.3	0.4	not fire	
46	17	7	29	70	14.0	0.0	82.8	9.4	34.1	3.2	11.1	3.6	fire	
47	18	7	31	68	14.0	0.0	85.4	12.1	43.1	4.6	14.2	6.0	fire	
48	19	7	35	59	17.0	0.0	88.1	12.0	52.8	7.7	18.2	10.9	fire	
49	20	7	33	65	15.0	0.1	81.4	12.3	62.1	2.8	16.5	4.0	fire	
50	21	7	33	70	17.0	0.0	85.4	18.5	71.5	5.2	22.4	8.8	fire	
51	22	7	28	79	18.0	0.1	73.4	16.4	79.9	1.8	21.7	2.8	not fire	
52	23	7	27	66	22.0	0.4	68.2	10.5	71.3	1.8	15.4	2.1	not fire	
53	24	7	28	78	16.0	0.1	70.0	9.6	79.7	1.4	14.7	1.3	not fire	
54	25	7	31	65	18.0	0.0	84.3	12.5	88.7	4.8	18.5	7.3	fire	
55	26	7	36	53	19.0	0.0	89.2	17.1	98.6	10.0	23.9	15.3	fire	
56	27	7	36	48	13.0	0.0	90.3	22.2	108.5	8.7	29.4	15.3	fire	
57	28	7	33	76	15.0	0.0	86.5	24.4	117.8	5.6	32.1	11.3	fire	
58	29	7	32	73	15.0	0.0	86.6	26.7	127.0	5.6	35.0	11.9	fire	
59	30	7	31	79	15.0	0.0	85.4	28.5	136.0	4.7	37.4	10.7	fire	
60	31	7	35	64	17.0	0.0	87.2	31.9	145.7	6.8	41.2	15.7	fire	
61	1	8	36	45	14.0	0.0	78.8	4.8	10.2	2.0	4.7	0.9	not fire	
62	2	8	35	55	12.0	0.4	78.0	5.8	10.0	1.7	5.5	0.8	not fire	
63	3	8	35	63	14.0	0.3	76.6	5.7	10.0	1.7	5.5	0.8	not fire	

	day	month	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes	Reg
64	4	8	34	69	13.0	0.0	85.0	8.2	19.8	4.0	8.2	3.9	fire	
65	5	8	34	65	13.0	0.0	86.8	11.1	29.7	5.2	11.5	6.1	fire	
66	6	8	32	75	14.0	0.0	86.4	13.0	39.1	5.2	14.2	6.8	fire	
67	7	8	32	69	16.0	0.0	86.5	15.5	48.6	5.5	17.2	8.0	fire	
68	8	8	32	60	18.0	0.3	77.1	11.3	47.0	2.2	14.1	2.6	not fire	
69	9	8	35	59	17.0	0.0	87.4	14.8	57.0	6.9	17.9	9.9	fire	
70	10	8	35	55	14.0	0.0	88.9	18.6	67.0	7.4	21.9	11.6	fire	
71	11	8	35	63	13.0	0.0	88.9	21.7	77.0	7.1	25.5	12.1	fire	
72	12	8	35	51	13.0	0.3	81.3	15.6	75.1	2.5	20.7	4.2	not fire	
73	13	8	35	63	15.0	0.0	87.0	19.0	85.1	5.9	24.4	10.2	fire	
74	14	8	33	66	14.0	0.0	87.0	21.7	94.7	5.7	27.2	10.6	fire	
75	15	8	36	55	13.0	0.3	82.4	15.6	92.5	3.7	22.0	6.3	fire	
76	16	8	36	61	18.0	0.3	80.2	11.7	90.4	2.8	17.6	4.2	fire	
77	17	8	37	52	18.0	0.0	89.3	16.0	100.7	9.7	22.9	14.6	fire	
78	18	8	36	54	18.0	0.0	89.4	20.0	110.9	9.7	27.5	16.1	fire	
79	19	8	35	62	19.0	0.0	89.4	23.2	120.9	9.7	31.3	17.2	fire	
80	20	8	35	68	19.0	0.0	88.3	25.9	130.6	8.8	34.7	16.8	fire	
81	21	8	36	58	19.0	0.0	88.6	29.6	141.1	9.2	38.8	18.4	fire	
82	22	8	36	55	18.0	0.0	89.1	33.5	151.3	9.9	43.1	20.4	fire	
83	23	8	36	53	16.0	0.0	89.5	37.6	161.5	10.4	47.5	22.3	fire	
84	24	8	34	64	14.0	0.0	88.9	40.5	171.3	9.0	50.9	20.9	fire	
85	25	8	35	60	15.0	0.0	88.9	43.9	181.3	8.2	54.7	20.3	fire	
86	26	8	31	78	18.0	0.0	85.8	45.6	190.6	4.7	57.1	13.7	fire	
87	27	8	33	82	21.0	0.0	84.9	47.0	200.2	4.4	59.3	13.2	fire	
88	28	8	34	64	16.0	0.0	89.4	50.2	210.4	7.3	62.9	19.9	fire	
89	29	8	35	48	18.0	0.0	90.1	54.2	220.4	12.5	67.4	30.2	fire	
90	30	8	35	70	17.0	0.8	72.7	25.2	180.4	1.7	37.4	4.2	not fire	
91	31	8	28	80	21.0	16.8	52.5	8.7	8.7	0.6	8.3	0.3	not fire	
92	1	9	25	76	17.0	7.2	46.0	1.3	7.5	0.2	1.8	0.1	not fire	
93	2	9	22	86	15.0	10.1	30.5	0.7	7.0	0.0	1.1	0.0	not fire	
94	3	9	25	78	15.0	3.8	42.6	1.2	7.5	0.1	1.7	0.0	not fire	
95	4	9	29	73	17.0	0.1	68.4	1.9	15.7	1.4	2.9	0.5	not fire	
96	5	9	29	75	16.0	0.0	80.8	3.4	24.0	2.8	5.1	1.7	fire	
97	6	9	29	74	19.0	0.1	75.8	3.6	32.2	2.1	5.6	0.9	not fire	
98	7	9	31	71	17.0	0.3	69.6	3.2	30.1	1.5	5.1	0.6	not fire	
99	8	9	30	73	17.0	0.9	62.0	2.6	8.4	1.1	3.0	0.4	not fire	

	day	month	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes	Reg
100	9	9	30	77	15.0	1.0	56.1	2.1	8.4	0.7	2.6	0.2	not fire	
101	10	9	33	73	12.0	1.8	59.9	2.2	8.9	0.7	2.7	0.3	not fire	
102	11	9	30	77	21.0	1.8	58.5	1.9	8.4	1.1	2.4	0.3	not fire	
103	12	9	29	88	13.0	0.0	71.0	2.6	16.6	1.2	3.7	0.5	not fire	
104	13	9	25	86	21.0	4.6	40.9	1.3	7.5	0.1	1.8	0.0	not fire	
105	14	9	22	76	26.0	8.3	47.4	1.1	7.0	0.4	1.6	0.1	not fire	
106	15	9	24	82	15.0	0.4	44.9	0.9	7.3	0.2	1.4	0.0	not fire	
107	16	9	30	65	14.0	0.0	78.1	3.2	15.7	1.9	4.2	0.8	not fire	
108	17	9	31	52	14.0	0.0	87.7	6.4	24.3	6.2	7.7	5.9	fire	
109	18	9	32	49	11.0	0.0	89.4	9.8	33.1	6.8	11.3	7.7	fire	
110	19	9	29	57	14.0	0.0	89.3	12.5	41.3	7.8	14.2	9.7	fire	
111	20	9	28	84	18.0	0.0	83.8	13.5	49.3	4.5	16.0	6.3	fire	
112	21	9	31	55	11.0	0.0	87.8	16.5	57.9	5.4	19.2	8.3	fire	
113	22	9	31	50	19.0	0.6	77.8	10.6	41.4	2.4	12.9	2.8	not fire	
114	23	9	32	54	11.0	0.5	73.7	7.9	30.4	1.2	9.6	0.7	not fire	
115	24	9	29	65	19.0	0.6	68.3	5.5	15.2	1.5	5.8	0.7	not fire	
116	25	9	26	81	21.0	5.8	48.6	3.0	7.7	0.4	3.0	0.1	not fire	
117	26	9	31	54	11.0	0.0	82.0	6.0	16.3	2.5	6.2	1.7	not fire	
118	27	9	31	66	11.0	0.0	85.7	8.3	24.9	4.0	9.0	4.1	fire	
119	28	9	32	47	14.0	0.7	77.5	7.1	8.8	1.8	6.8	0.9	not fire	
120	29	9	26	80	16.0	1.8	47.4	2.9	7.7	0.3	3.0	0.1	not fire	
121	30	9	25	78	14.0	1.4	45.0	1.9	7.5	0.2	2.4	0.1	not fire	
122	1	6	32	71	12.0	0.7	57.1	2.5	8.2	0.6	2.8	0.2	not fire	
123	2	6	30	73	13.0	4.0	55.7	2.7	7.8	0.6	2.9	0.2	not fire	
124	3	6	29	80	14.0	2.0	48.7	2.2	7.6	0.3	2.6	0.1	not fire	
125	4	6	30	64	14.0	0.0	79.4	5.2	15.4	2.2	5.6	1.0	not fire	
126	5	6	32	60	14.0	0.2	77.1	6.0	17.6	1.8	6.5	0.9	not fire	
127	6	6	35	54	11.0	0.1	83.7	8.4	26.3	3.1	9.3	3.1	fire	
128	7	6	35	44	17.0	0.2	85.6	9.9	28.9	5.4	10.7	6.0	fire	
129	8	6	28	51	17.0	1.3	71.4	7.7	7.4	1.5	7.3	0.8	not fire	
130	9	6	27	59	18.0	0.1	78.1	8.5	14.7	2.4	8.3	1.9	not fire	
131	10	6	30	41	15.0	0.0	89.4	13.3	22.5	8.4	13.1	10.0	fire	
132	11	6	31	42	21.0	0.0	90.6	18.2	30.5	13.4	18.0	16.7	fire	
133	12	6	27	58	17.0	0.0	88.9	21.3	37.8	8.7	21.2	12.9	fire	
134	13	6	30	52	15.0	2.0	72.3	11.4	7.8	1.4	10.9	0.9	not fire	
135	14	6	27	79	16.0	0.7	53.4	6.4	7.3	0.5	6.1	0.3	not fire	

	day	month	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes	Reg
136	15	6	28	90	15.0	0.0	66.8	7.2	14.7	1.2	7.1	0.6	not fire	
137	16	6	29	87	15.0	0.4	47.4	4.2	8.0	0.2	4.1	0.1	not fire	
138	17	6	31	69	17.0	4.7	62.2	3.9	8.0	1.1	3.8	0.4	not fire	
139	18	6	33	62	10.0	8.7	65.5	4.6	8.3	0.9	4.4	0.4	not fire	
140	19	6	32	67	14.0	4.5	64.6	4.4	8.2	1.0	4.2	0.4	not fire	
141	20	6	31	72	14.0	0.2	60.2	3.8	8.0	0.8	3.7	0.3	not fire	
142	21	6	32	55	14.0	0.0	86.2	8.3	18.4	5.0	8.2	4.9	fire	
143	22	6	33	46	14.0	1.1	78.3	8.1	8.3	1.9	7.7	1.2	not fire	
144	23	6	33	59	16.0	0.8	74.2	7.0	8.3	1.6	6.7	0.8	not fire	
145	24	6	35	68	16.0	0.0	85.3	10.0	17.0	4.9	9.9	5.3	fire	
146	25	6	34	70	16.0	0.0	86.0	12.8	25.6	5.4	12.7	6.7	fire	
147	26	6	36	62	16.0	0.0	87.8	16.5	34.5	7.0	16.4	9.5	fire	
148	27	6	36	55	15.0	0.0	89.1	20.9	43.3	8.0	20.8	12.0	fire	
149	28	6	37	37	13.0	0.0	92.5	27.2	52.4	11.7	27.1	18.4	fire	
150	29	6	37	36	13.0	0.6	86.2	17.9	36.7	4.8	17.8	7.2	fire	
151	30	6	34	42	15.0	1.7	79.7	12.0	8.5	2.2	11.5	2.2	not fire	
152	1	7	28	58	18.0	2.2	63.7	3.2	8.5	1.2	3.3	0.5	not fire	
153	2	7	33	48	16.0	0.0	87.6	7.9	17.8	6.8	7.8	6.4	fire	
154	3	7	34	56	17.0	0.1	84.7	9.7	27.3	4.7	10.3	5.2	fire	
155	4	7	34	58	18.0	0.0	88.0	13.6	36.8	8.0	14.1	9.9	fire	
156	5	7	34	45	18.0	0.0	90.5	18.7	46.4	11.3	18.7	15.0	fire	
157	6	7	35	42	15.0	0.3	84.7	15.5	45.1	4.3	16.7	6.3	fire	
158	7	7	38	43	13.0	0.5	85.0	13.0	35.4	4.1	13.7	5.2	fire	
159	8	7	35	47	18.0	6.0	80.8	9.8	9.7	3.1	9.4	3.0	fire	
160	9	7	36	43	15.0	1.9	82.3	9.4	9.9	3.2	9.0	3.1	fire	
161	10	7	34	51	16.0	3.8	77.5	8.0	9.5	2.0	7.7	1.3	not fire	
162	11	7	34	56	15.0	2.9	74.8	7.1	9.5	1.6	6.8	0.8	not fire	
163	12	7	36	44	13.0	0.0	90.1	12.6	19.4	8.3	12.5	9.6	fire	
164	13	7	39	45	13.0	0.6	85.2	11.3	10.4	4.2	10.9	4.7	fire	
165	15	7	34	45	17.0	0.0	90.5	18.0	24.1	10.9	17.7	14.1	fire	
166	16	7	31	83	17.0	0.0	84.5	19.4	33.1	4.7	19.2	7.3	fire	
167	17	7	32	81	17.0	0.0	84.6	21.1	42.3	4.7	20.9	7.7	fire	
168	18	7	33	68	15.0	0.0	86.1	23.9	51.6	5.2	23.9	9.1	fire	
169	19	7	34	58	16.0	0.0	88.1	27.8	61.1	7.3	27.7	13.0	fire	
170	20	7	36	50	16.0	0.0	89.9	32.7	71.0	9.5	32.6	17.3	fire	
171	21	7	36	29	18.0	0.0	93.9	39.6	80.6	18.5	39.5	30.0	fire	

	day	month	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes	Reg
172	22	7	32	48	18.0	0.0	91.5	44.2	90.1	13.2	44.0	25.4	fire	
173	23	7	31	71	17.0	0.0	87.3	46.6	99.0	6.9	46.5	16.3	fire	
174	24	7	33	63	17.0	1.1	72.8	20.9	56.6	1.6	21.7	2.5	not fire	
175	25	7	39	64	9.0	1.2	73.8	11.7	15.9	1.1	11.4	0.7	not fire	
176	26	7	35	58	10.0	0.2	78.3	10.8	19.7	1.6	10.7	1.0	not fire	
177	27	7	29	87	18.0	0.0	80.0	11.8	28.3	2.8	11.8	3.2	not fire	
178	28	7	33	57	16.0	0.0	87.5	15.7	37.6	6.7	15.7	9.0	fire	
179	29	7	34	59	16.0	0.0	88.1	19.5	47.2	7.4	19.5	10.9	fire	
180	30	7	36	56	16.0	0.0	88.9	23.8	57.1	8.2	23.8	13.2	fire	
181	31	7	37	55	15.0	0.0	89.3	28.3	67.2	8.3	28.3	14.5	fire	
182	1	8	38	52	14.0	0.0	78.3	4.4	10.5	2.0	4.4	0.8	not fire	
183	2	8	40	34	14.0	0.0	93.3	10.8	21.4	13.8	10.6	13.5	fire	
184	3	8	39	33	17.0	0.0	93.7	17.1	32.1	17.2	16.9	19.5	fire	
185	4	8	38	35	15.0	0.0	93.8	23.0	42.7	15.7	22.9	20.9	fire	
186	5	8	34	42	17.0	0.1	88.3	23.6	52.5	19.0	23.5	12.6	fire	
187	6	8	30	54	14.0	3.1	70.5	11.0	9.1	1.3	10.5	0.8	not fire	
188	7	8	34	63	13.0	2.9	69.7	7.2	9.8	1.2	6.9	0.6	not fire	
189	8	8	37	56	11.0	0.0	87.4	11.2	20.2	5.2	11.0	5.9	fire	
190	9	8	39	43	12.0	0.0	91.7	16.5	30.9	9.6	16.4	12.7	fire	
191	10	8	39	39	15.0	0.2	89.3	15.8	35.4	8.2	15.8	10.7	fire	
192	11	8	40	31	15.0	0.0	94.2	22.5	46.3	16.6	22.4	21.6	fire	
193	12	8	39	21	17.0	0.4	93.0	18.4	41.5	15.5	18.4	18.8	fire	
194	13	8	35	34	16.0	0.2	88.3	16.9	45.1	7.5	17.5	10.5	fire	
195	14	8	37	40	13.0	0.0	91.9	22.3	55.5	10.8	22.3	15.7	fire	
196	15	8	35	46	13.0	0.3	83.9	16.9	54.2	3.5	19.0	5.5	fire	
197	16	8	40	41	10.0	0.1	92.0	22.6	65.1	9.5	24.2	14.8	fire	
198	17	8	42	24	9.0	0.0	96.0	30.3	76.4	15.7	30.4	24.0	fire	
199	18	8	37	37	14.0	0.0	94.3	35.9	86.8	16.0	35.9	26.3	fire	
200	19	8	35	66	15.0	0.1	82.7	32.7	96.8	3.3	35.5	7.7	fire	
201	20	8	36	81	15.0	0.0	83.7	34.4	107.0	3.8	38.1	9.0	fire	
202	21	8	36	71	15.0	0.0	86.0	36.9	117.1	5.1	41.3	12.2	fire	
203	22	8	37	53	14.0	0.0	89.5	41.1	127.5	8.0	45.5	18.1	fire	
204	23	8	36	43	16.0	0.0	91.2	46.1	137.7	11.5	50.2	24.5	fire	
205	24	8	35	38	15.0	0.0	92.1	51.3	147.7	12.2	54.9	26.9	fire	
206	25	8	34	40	18.0	0.0	92.1	56.3	157.5	14.3	59.5	31.1	fire	
207	26	8	33	37	16.0	0.0	92.2	61.3	167.2	13.1	64.0	30.3	fire	

	day	month	Temperature	RH	Ws	Rain	FFMC	DMC	DC	ISI	BUI	FWI	Classes	Reg
208	27	8	36	54	14.0	0.0	91.0	65.9	177.3	10.0	68.0	26.1	fire	
209	28	8	35	56	14.0	0.4	79.2	37.0	166.0	2.1	30.6	6.1	not fire	
210	29	8	35	53	17.0	0.5	80.2	20.7	149.2	2.7	30.6	5.9	fire	
211	30	8	34	49	15.0	0.0	89.2	24.8	159.1	8.1	35.7	16.0	fire	
212	31	8	30	59	19.0	0.0	89.1	27.8	168.2	9.8	39.3	19.4	fire	
213	1	9	29	86	16.0	0.0	37.9	0.9	8.2	0.1	1.4	0.0	not fire	
214	2	9	28	67	19.0	0.0	75.4	2.9	16.3	2.0	4.0	0.8	not fire	
215	3	9	28	75	16.0	0.0	82.2	4.4	24.3	3.3	6.0	2.5	fire	
216	4	9	30	66	15.0	0.2	73.5	4.1	26.6	1.5	6.0	0.7	not fire	
217	5	9	30	58	12.0	4.1	66.1	4.0	8.4	1.0	3.9	0.4	not fire	
218	6	9	34	71	14.0	6.5	64.5	3.3	9.1	1.0	3.5	0.4	not fire	
219	7	9	31	62	15.0	0.0	83.3	5.8	17.7	3.8	6.4	3.2	fire	
220	8	9	30	88	14.0	0.0	82.5	6.6	26.1	3.0	8.1	2.7	fire	
221	9	9	30	80	15.0	0.0	83.1	7.9	34.5	3.5	10.0	3.7	fire	
222	10	9	29	74	15.0	1.1	59.5	4.7	8.2	0.8	4.6	0.3	not fire	
223	11	9	30	73	14.0	0.0	79.2	6.5	16.6	2.1	6.6	1.2	not fire	
224	12	9	31	72	14.0	0.0	84.2	8.3	25.2	3.8	9.1	3.9	fire	
225	13	9	29	49	19.0	0.0	88.6	11.5	33.4	9.1	12.4	10.3	fire	
226	14	9	28	81	15.0	0.0	84.6	12.6	41.5	4.3	14.3	5.7	fire	
227	15	9	32	51	13.0	0.0	88.7	16.0	50.2	6.9	17.8	9.8	fire	
228	16	9	33	26	13.0	0.0	93.9	21.2	59.2	14.2	22.4	19.3	fire	
229	17	9	34	44	12.0	0.0	92.5	25.2	63.3	11.2	26.2	17.5	fire	
230	18	9	36	33	13.0	0.1	90.6	25.8	77.8	9.0	28.2	15.4	fire	
231	19	9	29	41	8.0	0.1	83.9	24.9	86.0	2.7	28.9	5.6	fire	
232	20	9	34	58	13.0	0.2	79.5	18.7	88.0	2.1	24.4	3.8	not fire	
233	21	9	35	34	17.0	0.0	92.2	23.6	97.3	13.8	29.4	21.6	fire	
234	22	9	33	64	13.0	0.0	88.9	26.1	106.3	7.1	32.4	13.7	fire	
235	23	9	35	56	14.0	0.0	89.0	29.4	115.6	7.5	36.0	15.2	fire	
236	24	9	26	49	6.0	2.0	61.3	11.9	28.1	0.6	11.9	0.4	not fire	
237	25	9	28	70	15.0	0.0	79.9	13.8	36.1	2.4	14.1	3.0	not fire	
238	26	9	30	65	14.0	0.0	85.4	16.0	44.5	4.5	16.9	6.5	fire	
239	27	9	28	87	15.0	4.4	41.1	6.5	8.0	0.1	6.2	0.0	not fire	
240	28	9	27	87	29.0	0.5	45.9	3.5	7.9	0.4	3.4	0.2	not fire	
241	29	9	24	54	18.0	0.1	79.7	4.3	15.2	1.7	5.1	0.7	not fire	
242	30	9	24	64	15.0	0.2	67.3	3.8	16.5	1.2	4.8	0.5	not fire	

Exploratory Data Analysis

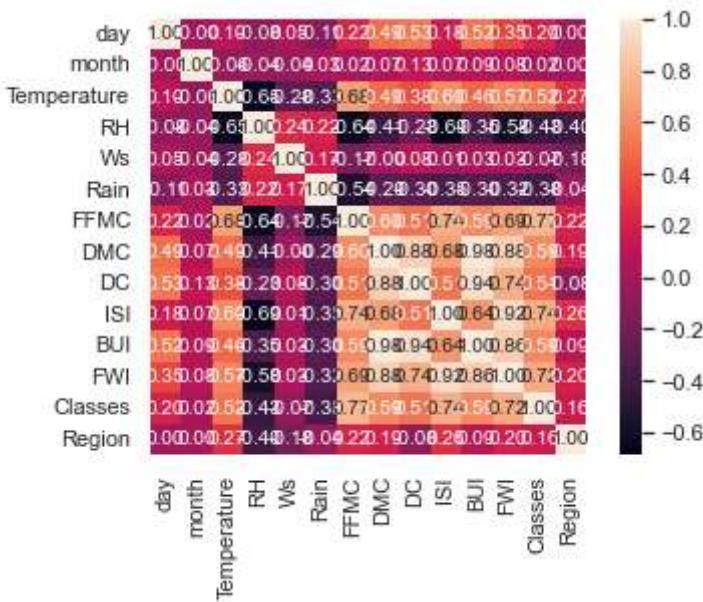
In [18]:

```
# Encoding Not fire as 0 and Fire as 1  
df1['Classes']= np.where(df1['Classes']=='not fire',0,1)
```

In [19]:

```
# Relationship Analysis  
# HEATMAP  
  
#A heatmap is a graphical representation of data that uses a system of color-coding  
sns.set(font_scale=1)  
sns.heatmap(df1.corr(),square=True, fmt='.2f', annot_kws={'size': 10},annot=True)
```

Out[19]: <AxesSubplot:>

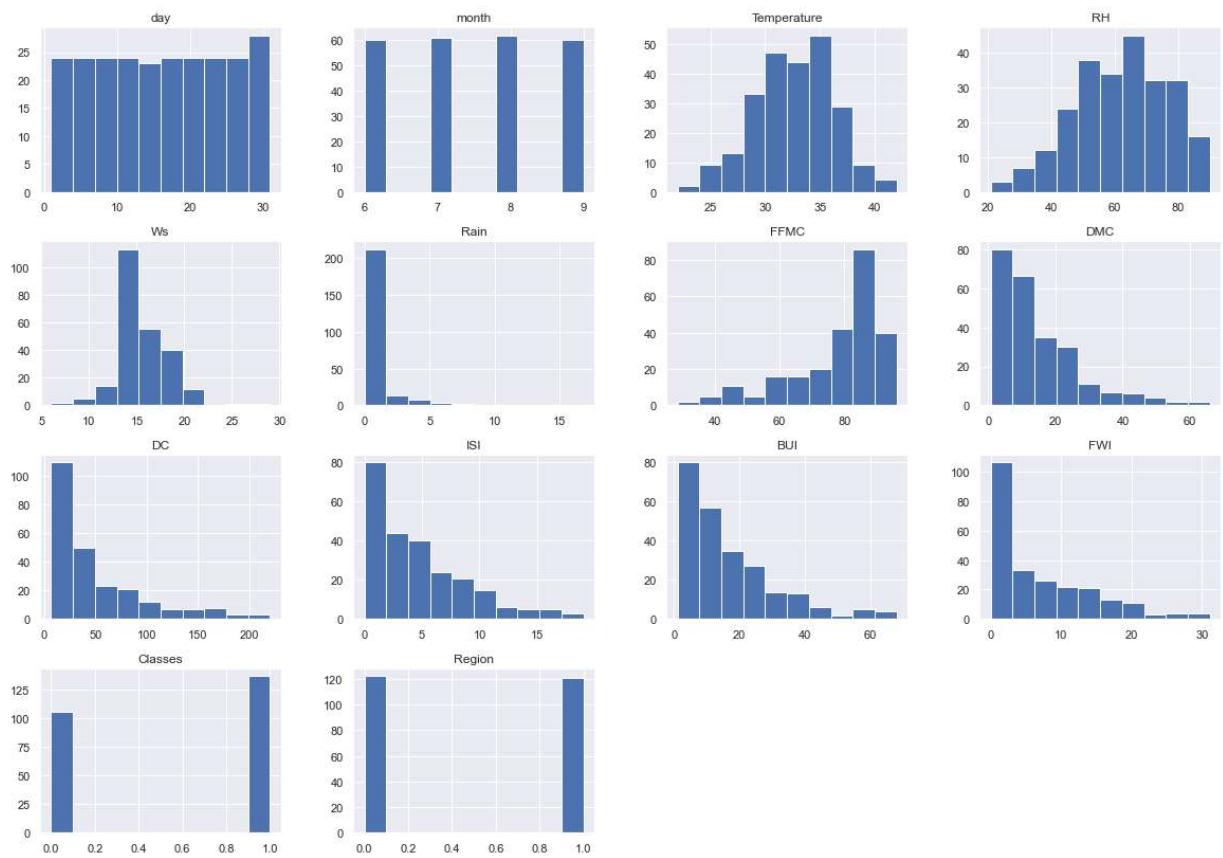


In [20]:

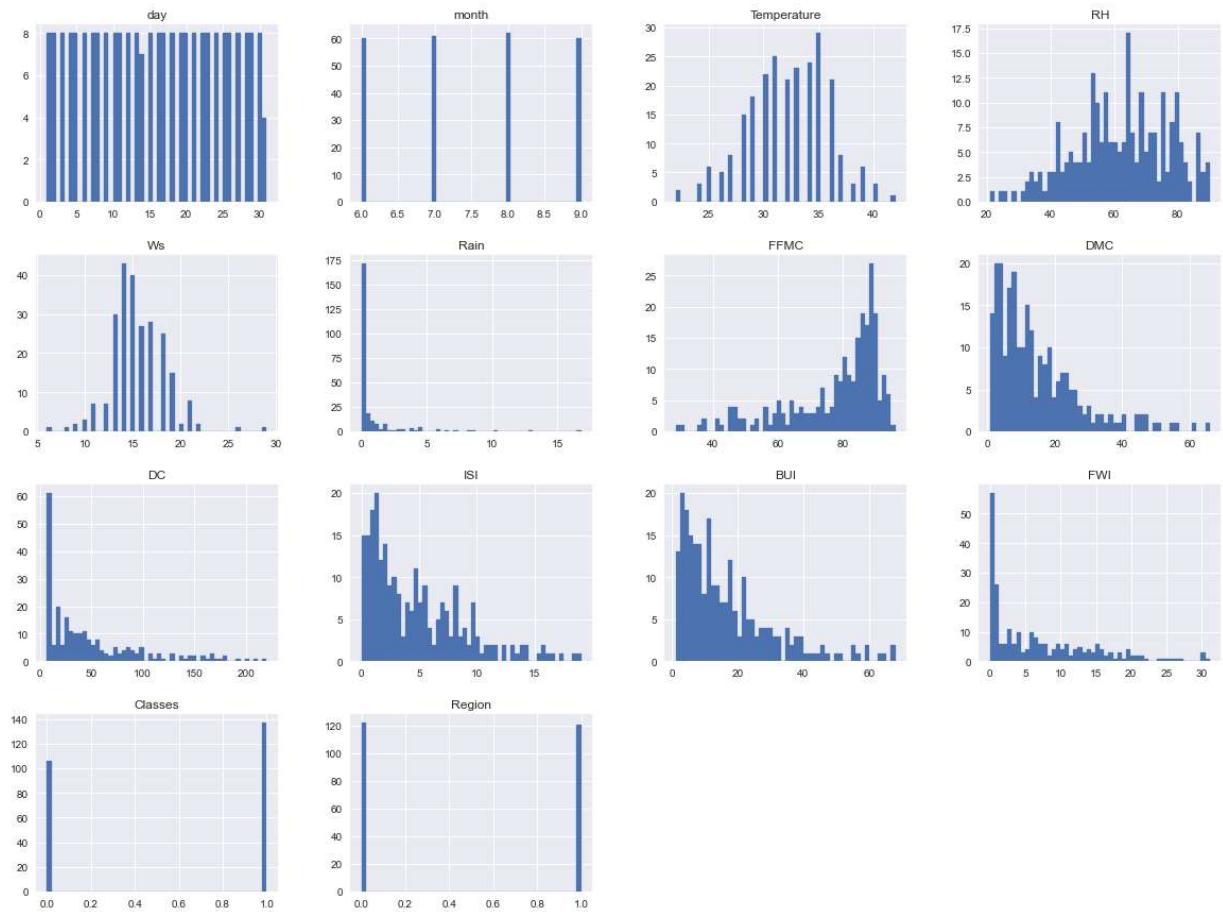
```
# HISTOGRAM  
  
# A histogram is basically used to represent data provided in a form of some groups.  
df1.hist(figsize=(20,14),color='b')
```

Out[20]:

```
array([[<AxesSubplot:title={'center':'day'}>,  
       <AxesSubplot:title={'center':'month'}>,  
       <AxesSubplot:title={'center':'Temperature'}>,  
       <AxesSubplot:title={'center':'RH'}>],  
      [<AxesSubplot:title={'center':'Ws'}>,  
       <AxesSubplot:title={'center':'Rain'}>,  
       <AxesSubplot:title={'center':'FFMC'}>,  
       <AxesSubplot:title={'center':'DMC'}>],  
      [<AxesSubplot:title={'center':'DC'}>,  
       <AxesSubplot:title={'center':'ISI'}>,  
       <AxesSubplot:title={'center':'BUI'}>,  
       <AxesSubplot:title={'center':'FWI'}>],  
      [<AxesSubplot:title={'center':'Classes'}>,  
       <AxesSubplot:title={'center':'Region'}>, <AxesSubplot:>,  
       <AxesSubplot:>]], dtype=object)
```



```
In [21]: # Plot density plot for all features
plt.style.use('seaborn')
df1.hist(bins=50, figsize=(20,15), ec = 'b')
plt.show()
```

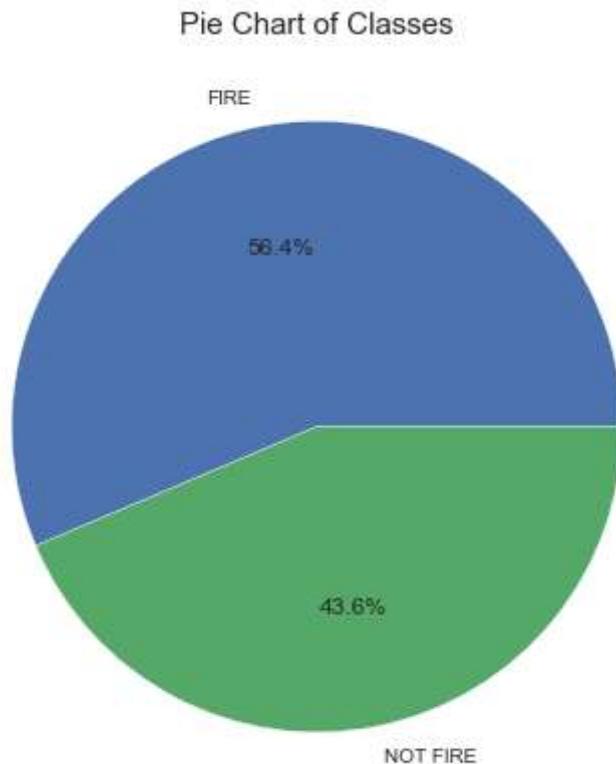


```
In [22]: # Percentage for PieChart
```

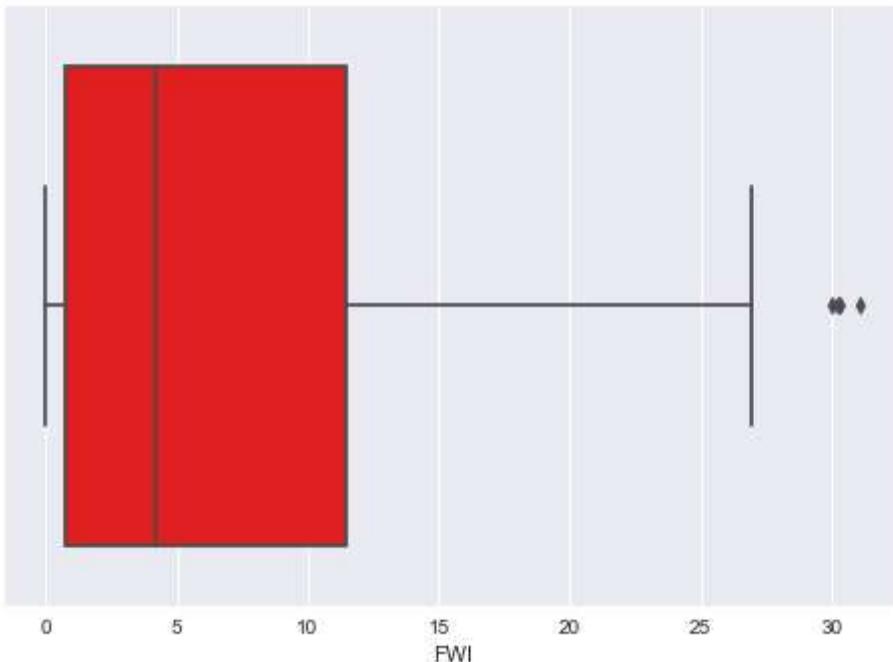
```
percentage = df.Classes.value_counts(normalize=True)*100  
percentage
```

```
Out[22]: fire      56.378601  
not fire    43.621399  
Name: Classes, dtype: float64
```

```
In [23]: #plotting PieChart  
classeslabels = ["FIRE", "NOT FIRE"]  
plt.figure(figsize =(12, 7))  
plt.pie(percentage, labels = classeslabels, autopct='%1.1f%%')  
plt.title ("Pie Chart of Classes", fontsize = 15)  
plt.show()
```



```
In [24]: # Forest Fire Weather Index System [FWI]  
#Boxplot  
ax = sns.boxplot(df['FWI'], color= 'red')
```

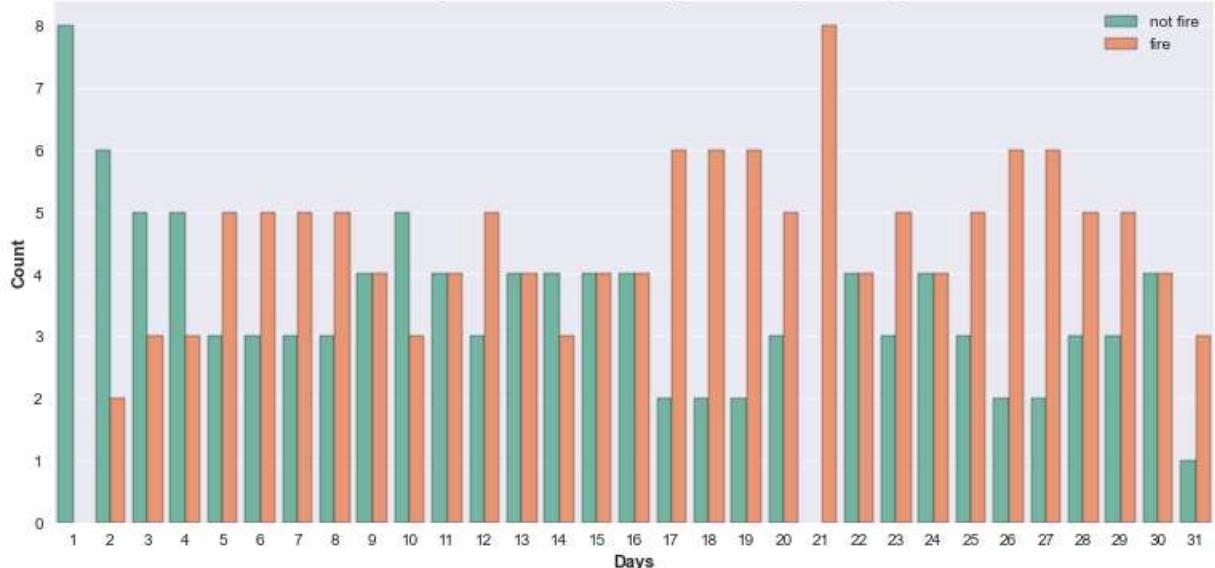


Fire Analysis for Bejaia Region

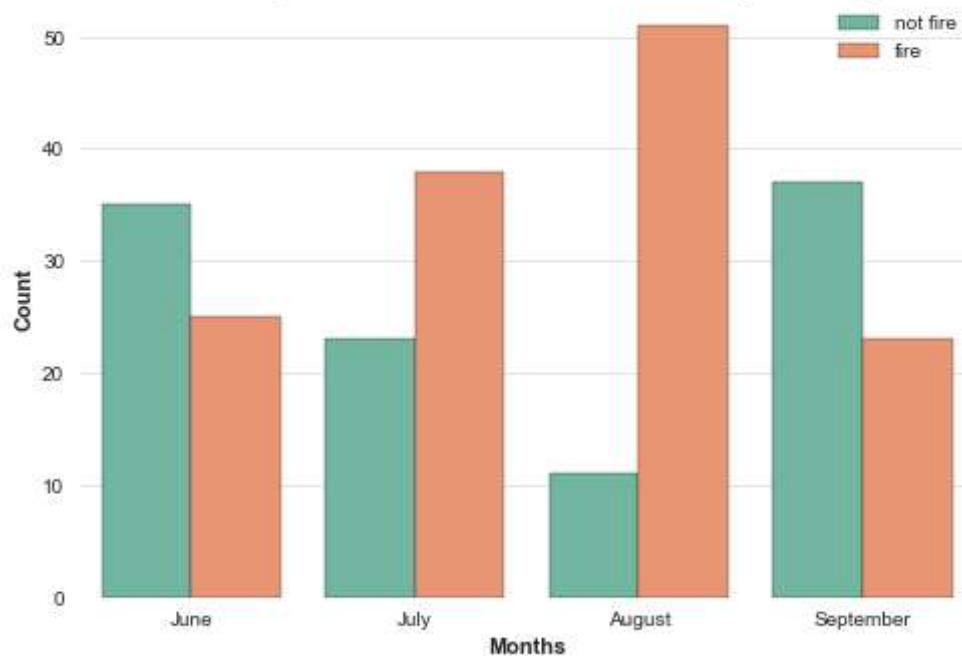
In [25]:

```
dftemp= df.loc[df['Region']== 0]
plt.subplots(figsize=(13,6))
sns.set_style('whitegrid')
#Fire Analysis based on Day
sns.countplot(x='day',hue='Classes',data= df,ec = 'black', palette= 'Set2')
plt.title('Fire Analysis based on Days for Bejaia Region', fontsize=18, weight='bold')
plt.ylabel('Count', weight = 'bold')
plt.xlabel('Days', weight= 'bold')
plt.legend(loc='upper right')
plt.grid(alpha = 0.5,axis = 'y')
plt.show()
#Fire Analysis based on Month
sns.countplot(x='month',hue='Classes',data= df,ec = 'black', palette= 'Set2')
plt.title('Fire Analysis based on Month for Bejaia Region', fontsize=18, weight='bold')
plt.ylabel('Count', weight = 'bold')
plt.xlabel('Months', weight= 'bold')
plt.legend(loc='upper right')
plt.xticks(np.arange(4), ['June','July', 'August', 'September'])
plt.grid(alpha = 0.5,axis = 'y')
plt.show()
```

Fire Analysis based on Days for Bejaia Region



Fire Analysis based on Month for Bejaia Region



Observations

No Fire - Day 1 Maximum Fire - Day 21 Fire Analysis in Ascending Order - August, July, June, September

Fire Analysis for Sidi Bel-abbes Region

In [26]:

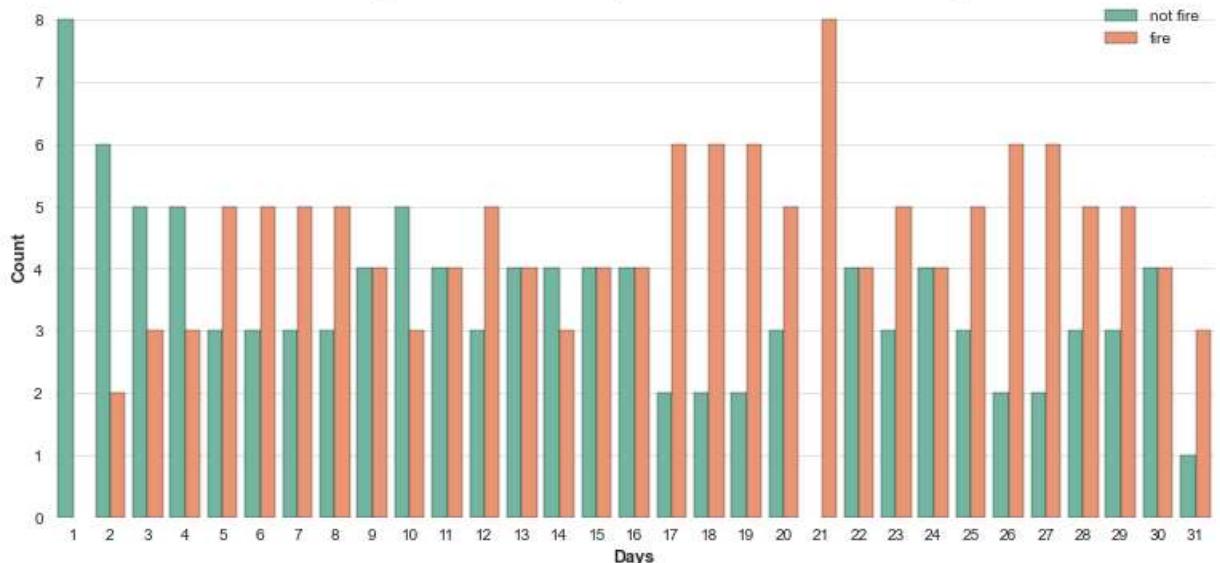
```
dftemp= df.loc[df['Region']== 1]
plt.subplots(figsize=(13,6))
sns.set_style('whitegrid')
#Fire Analysis based on Day
sns.countplot(x='day',hue='Classes',data= df,ec = 'black', palette= 'Set2')
plt.title('Fire Analysis based on Days for Sidi Bel-abbes Region', fontsize=18, weight = 'bold')
plt.ylabel('Count', weight = 'bold')
plt.xlabel('Days', weight= 'bold')
plt.legend(loc='upper right')
```

```

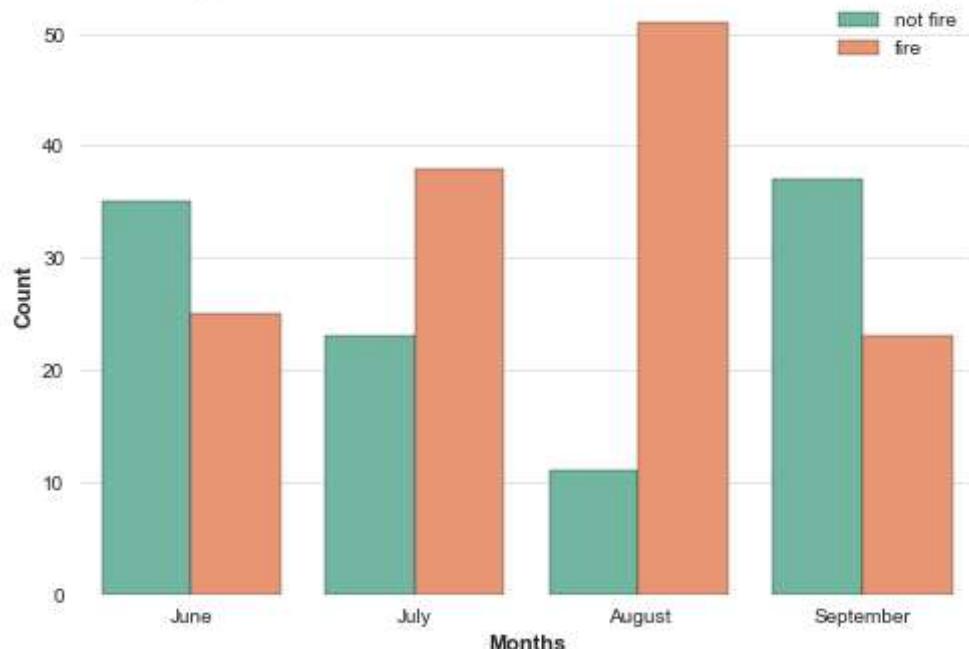
plt.grid(alpha = 0.5,axis = 'y')
plt.show()
#Fire Analysis based on Month
sns.countplot(x='month',hue='Classes',data= df,ec = 'black', palette= 'Set2')
plt.title('Fire Analysis based on Month for Sidi Bel-abbes Region', fontsize=18, weight = 'bold')
plt.ylabel('Count', weight = 'bold')
plt.xlabel('Months', weight= 'bold')
plt.legend(loc='upper right')
plt.xticks(np.arange(4), ['June', 'July', 'August', 'September'])
plt.grid(alpha = 0.5,axis = 'y')
plt.show()

```

Fire Analysis based on Days for Sidi Bel-abbes Region



Fire Analysis based on Month for Sidi Bel-abbes Region



Observations

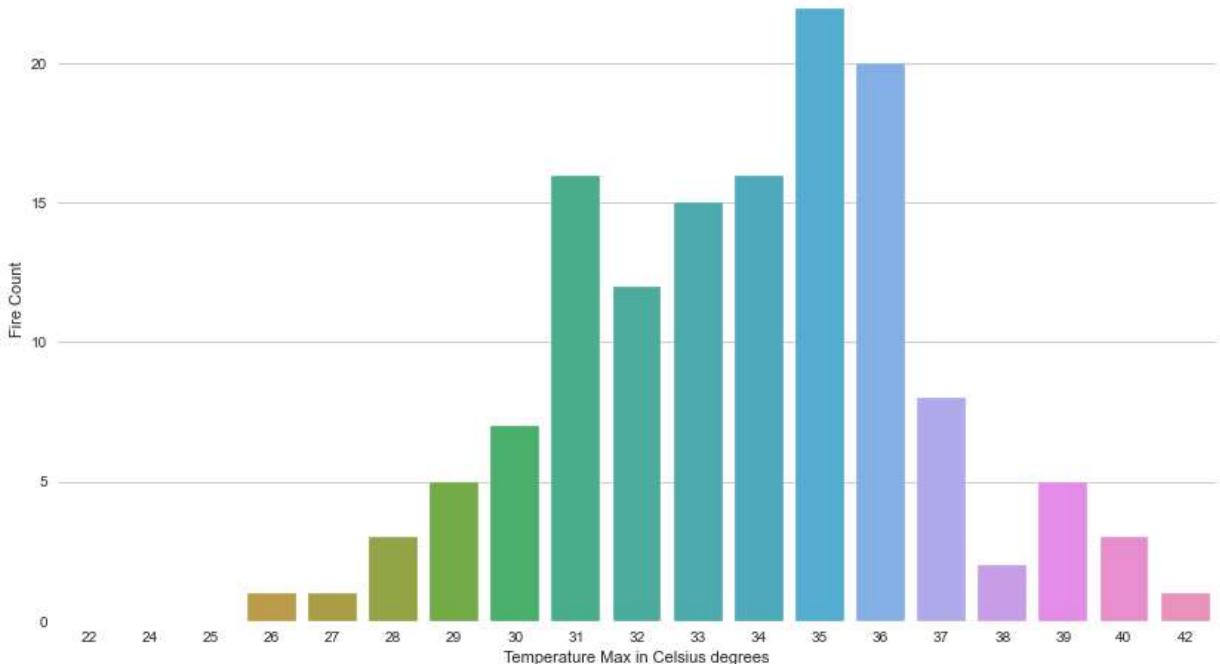
No Fire - Day 1
 Maximum Fire - Day 21
 Fire Analysis in Ascending Order - August, July, June, September

In [27]: `def barchart(feature,xlabel):`

```
plt.figure(figsize=[14,8])
by_feature = df1.groupby([feature], as_index=False)[['Classes']].sum()
ax = sns.barplot(x=feature, y="Classes", data=by_feature[[feature,'Classes']], e
ax.set(xlabel=xlabel, ylabel='Fire Count')
```

In [28]:

```
# Fire Analysis based on Temperature
barchart('Temperature', 'Temperature Max in Celsius degrees')
```

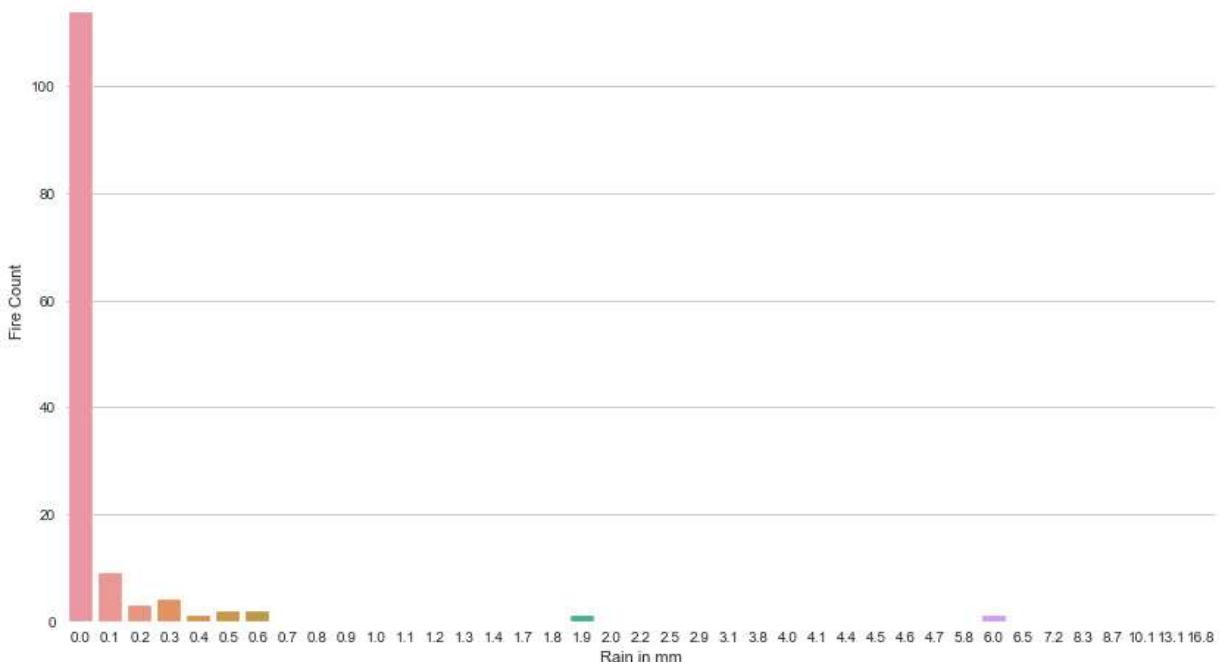


Observation

Maximum fire occurred when temperature was inbetween 30-37 degree Celsius

In [29]:

```
#Fire Analysis based on Rain
barchart('Rain', 'Rain in mm')
```

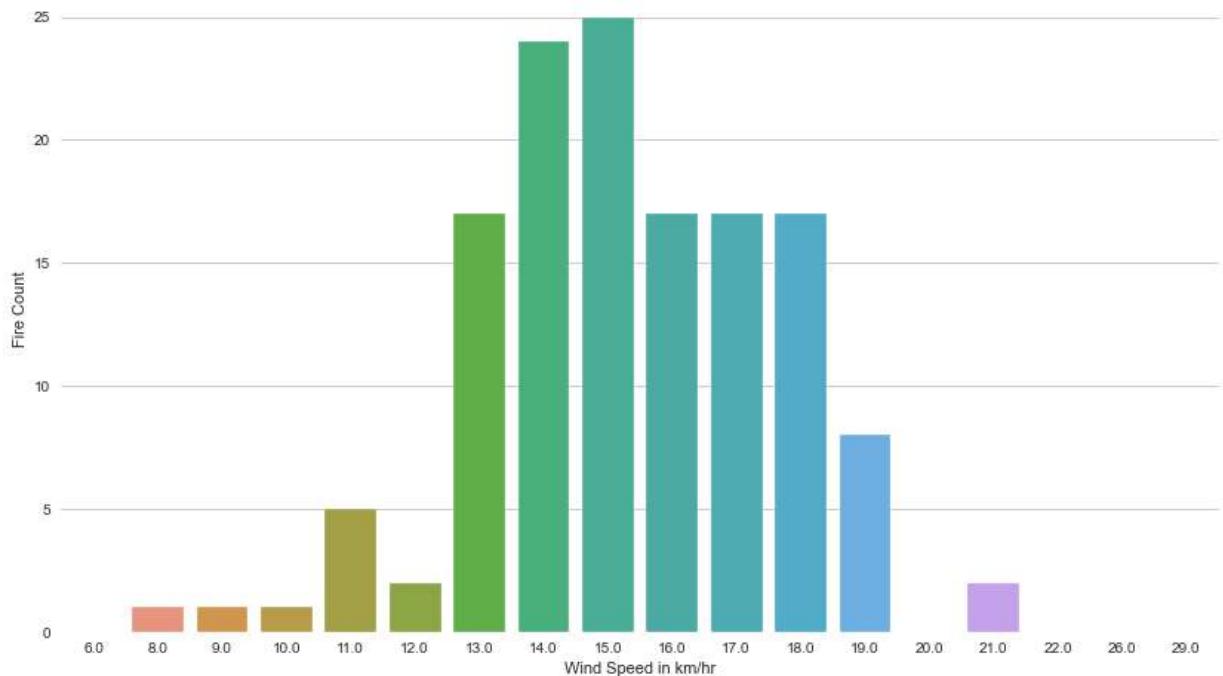


Observation

Maximum fire occurred when there was no rain or when the rain was very minimal(i.e) 0 to 0.3mm

In [30]:

```
# Fire Analysis based on Wind Speed  
barchart('Ws', 'Wind Speed in km/hr')
```

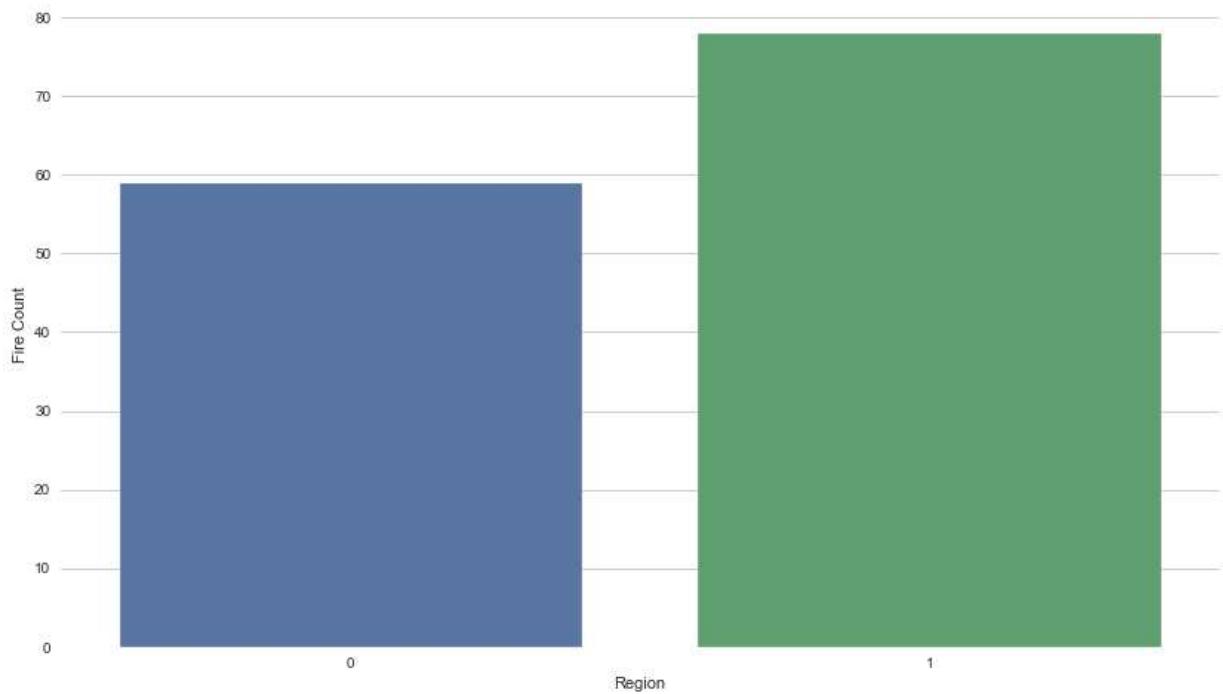


Observation

Maximum fire occurred when the windspeed was inbetween 13 to 19 Km/Hr.

In [31]:

```
# Fire Analysis based on Region  
barchart('Region','Region')
```

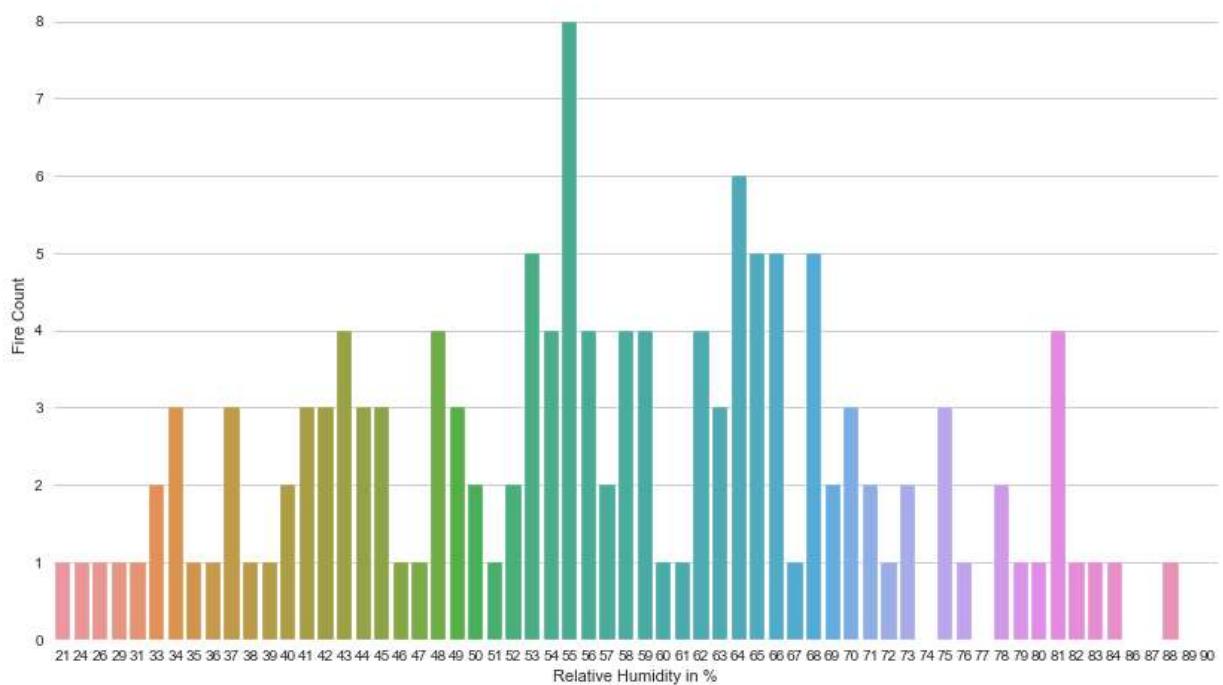


Observation

The region that is most affected by fire is Sidi Bel-abbes region.

In [32]:

```
# Fire Analysis based on Relative Humidity
barchart('RH','Relative Humidity in %')
```



Observation

Maximum fire occurred when relative humidity was inbetween 43 to 81 %.

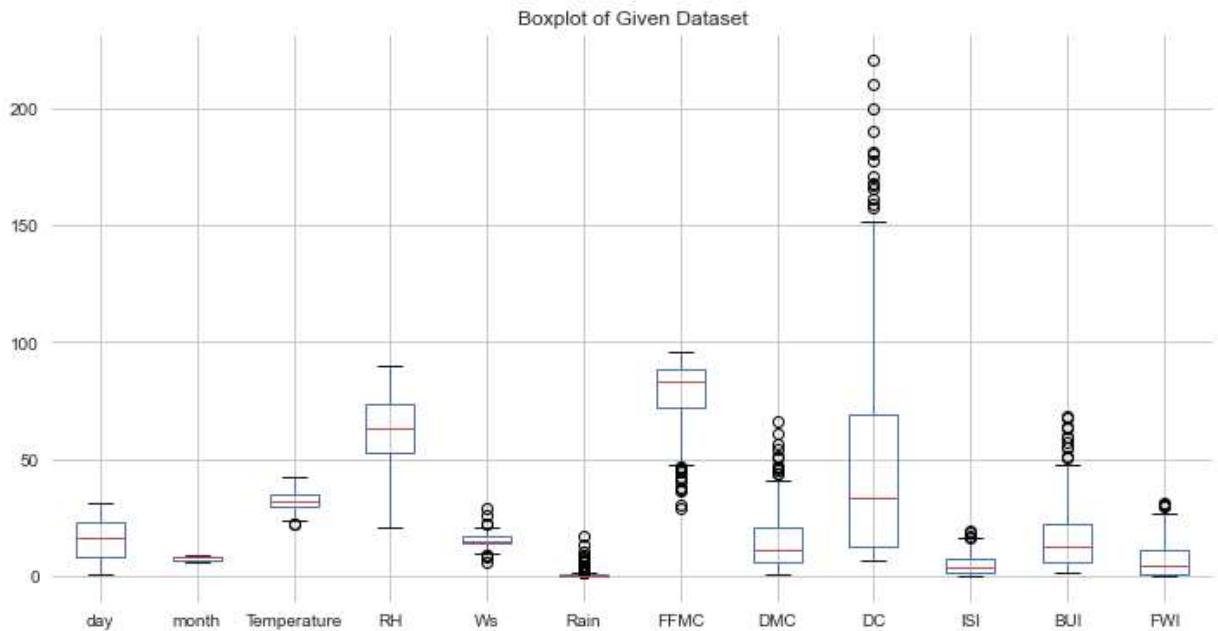
In [33]:

```
# Box plots for all features in dataset
```

```

dftemp = df1.drop(['Classes', 'Region'], axis=1)
fig = plt.figure(figsize =(12, 6))
ax = dftemp.boxplot()
ax.set_title("Boxplot of Given Dataset")
plt.show()

```

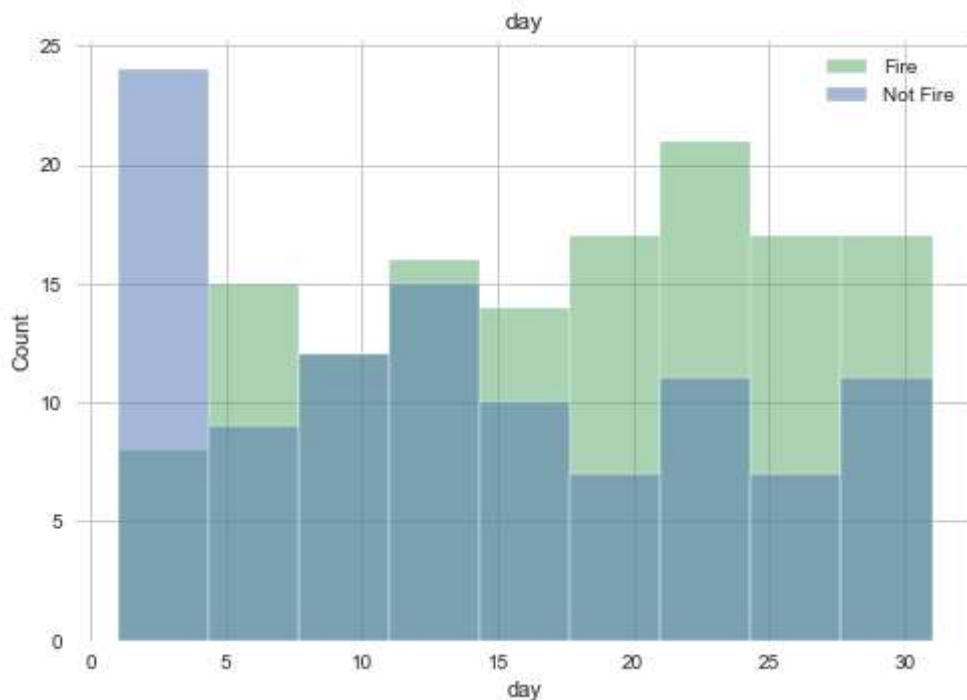


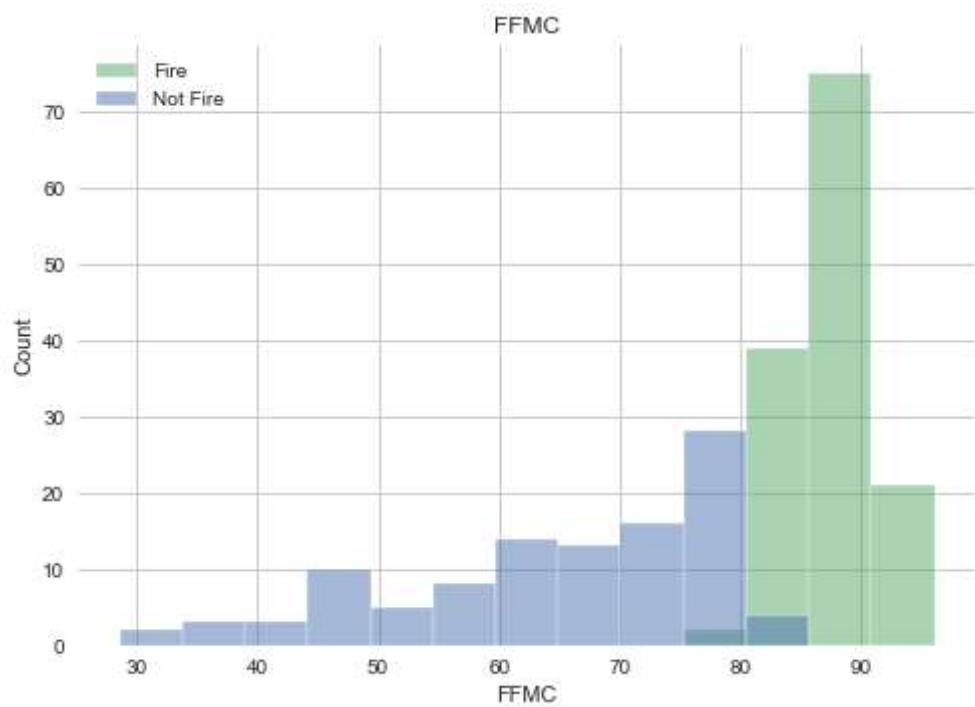
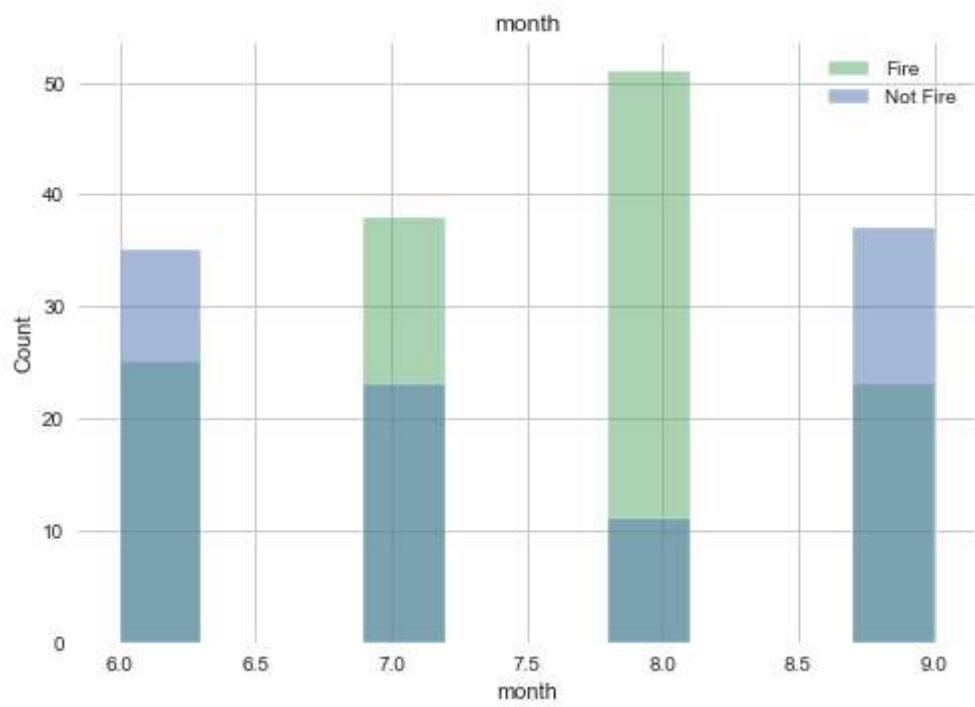
In [34]:

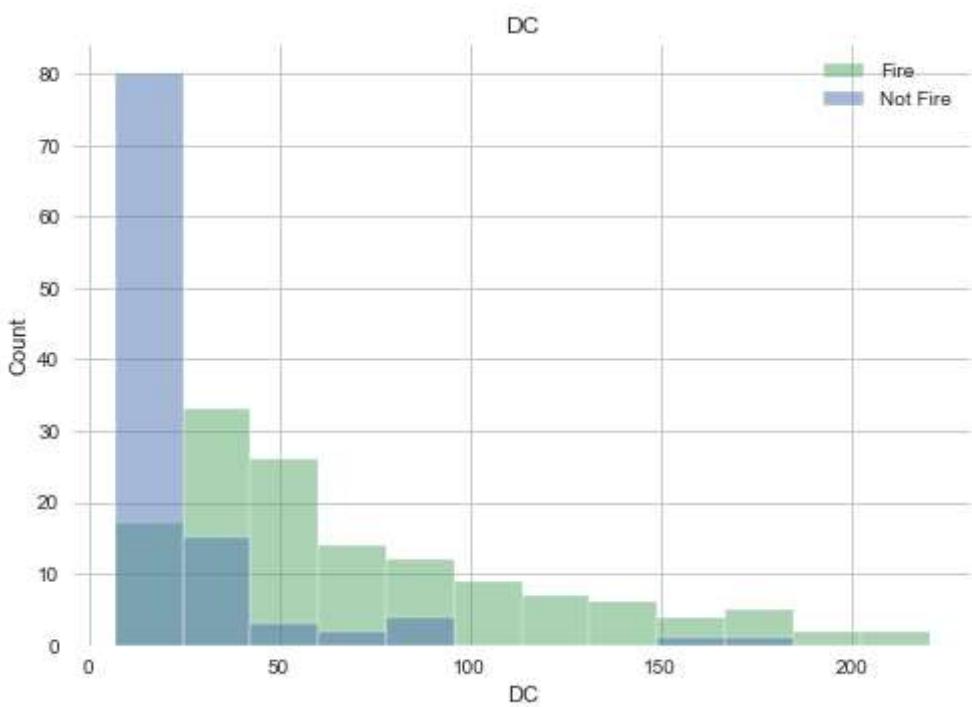
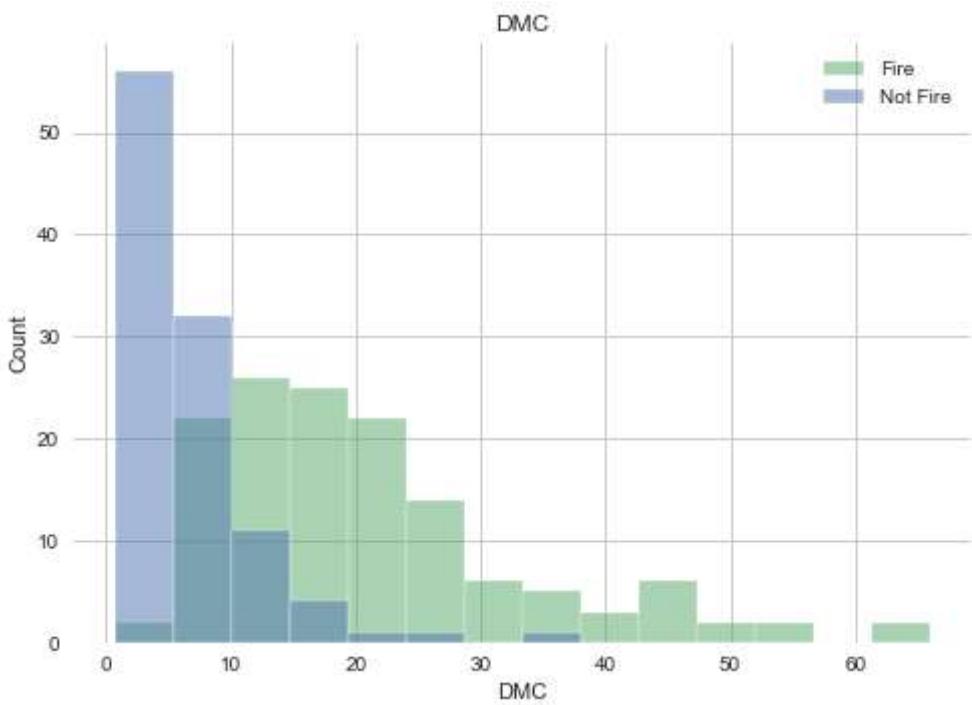
```

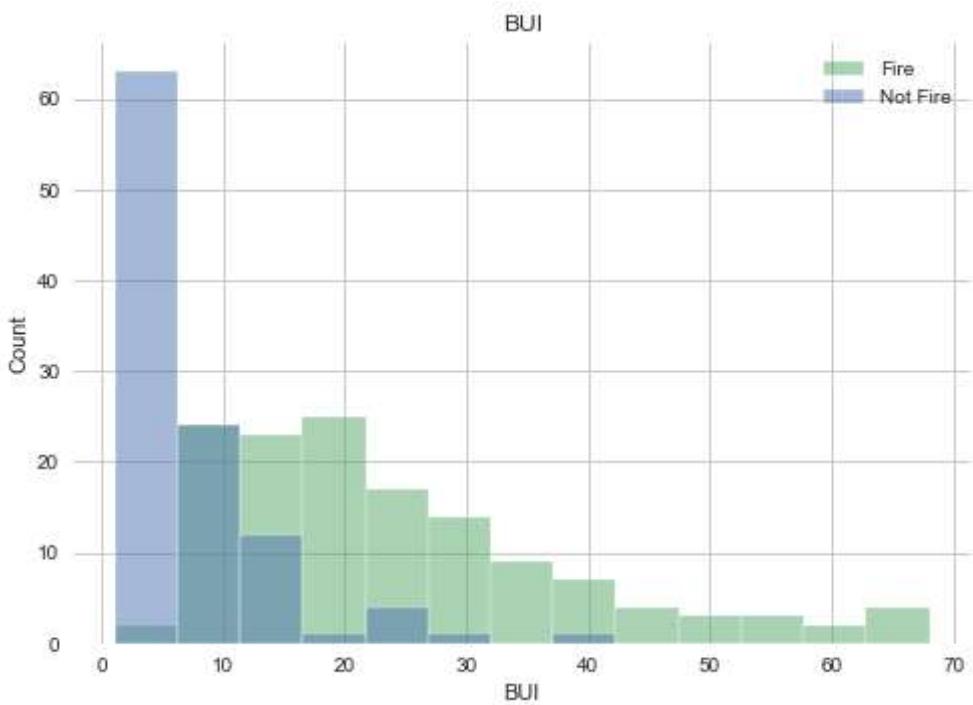
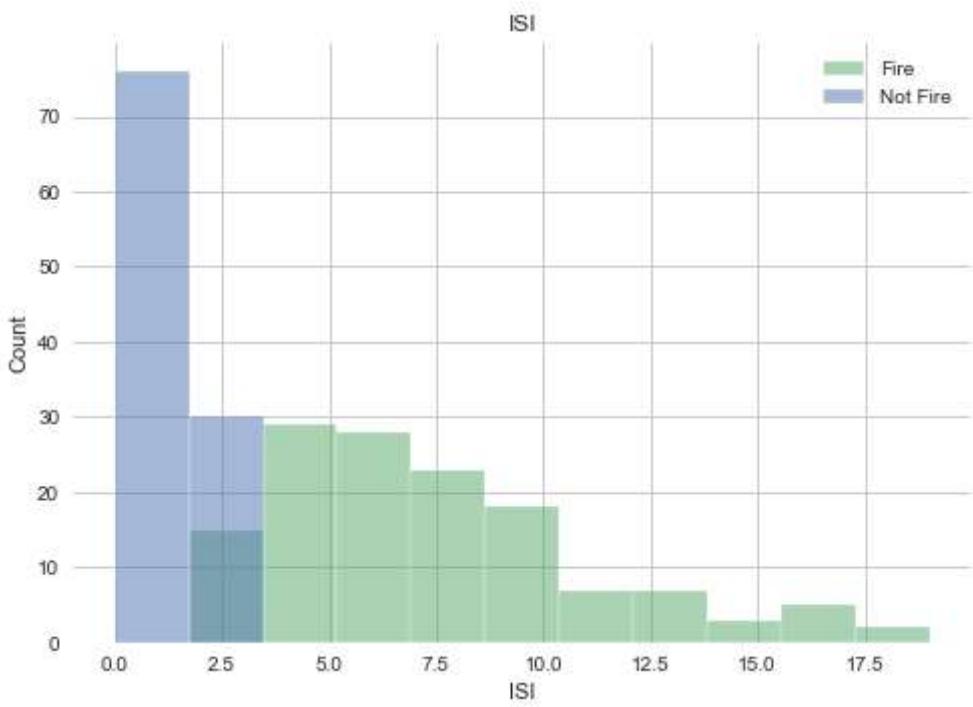
#Fire Analysis based on Day, Month, FFMC(Fine Fuel Moisture code) Index,DMC,DC,ISI,B
dftemp = dftemp = df1.drop(['Region', 'Temperature', 'Rain', 'Ws', 'RH'], axis=1)
for feature in dftemp:
    sns.histplot(data = dftemp,x=feature, hue = 'Classes')
    plt.legend(labels=['Fire', 'Not Fire'])
    plt.title(feature)
    plt.show()

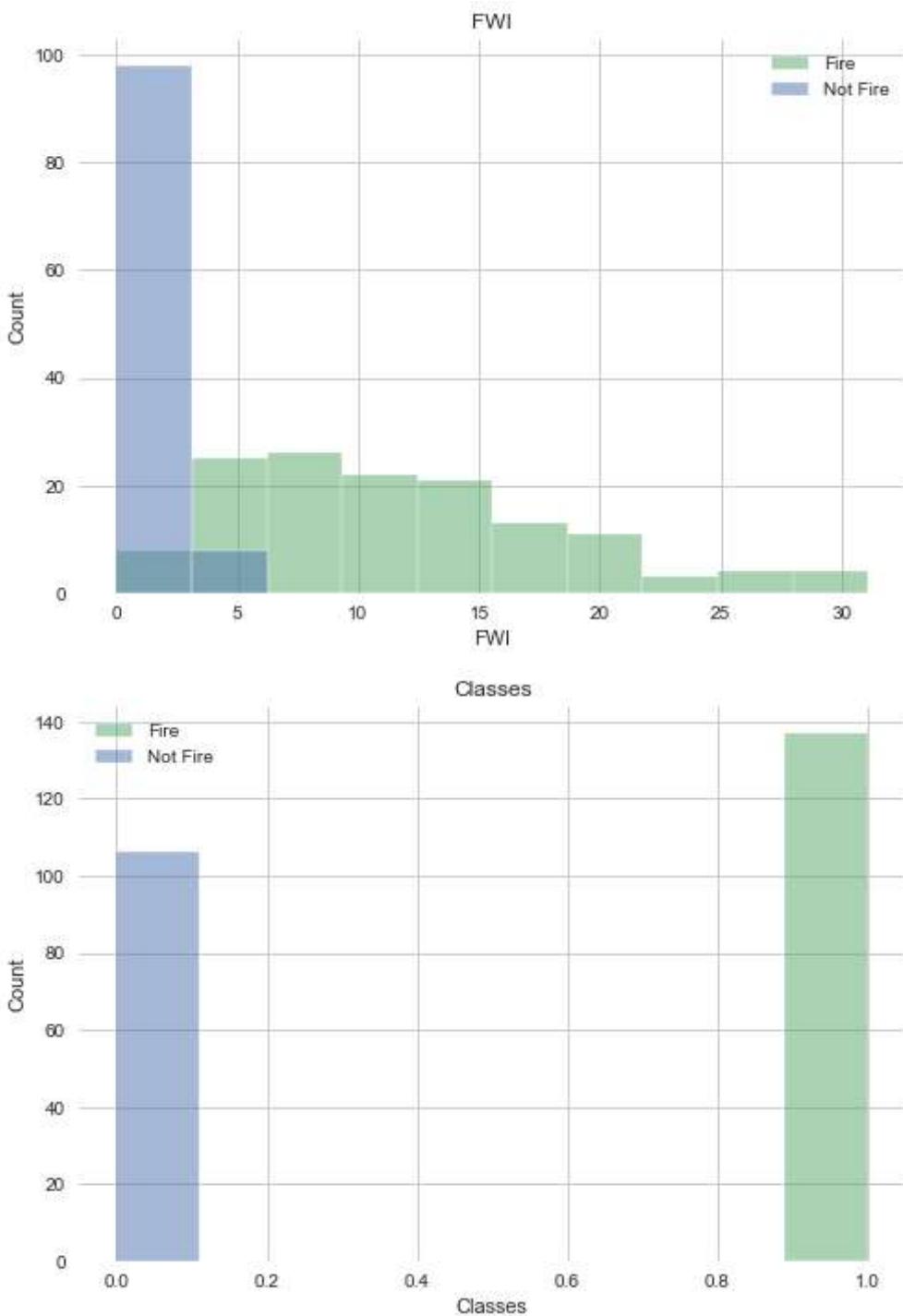
```











REPORT

Based on the data the following observations are made. The data is captured for the year 2012 for 4 month June to September.

1. The region that is most affected by fire is Sidi Bel-abbes region.
2. Day 1 of any month in Bejaia Region and Sidi Bel-abbes Region is the only day with no fires reported.
3. On day 21 of any month in Bejaia Region and Sidi Bel-abbes Region, there are only fires reported. Also Day 21 in Bejaia region and Sidi Bel-abbes Region is when maximum fires have occurred.
4. Most Fires in Bejaia Region have occurred during the month of August.

5. Fire Analysis based on Month for Bejaia Region and Sidi Bel-abbes Region in Ascending Order - August, July, June, September.

Weather System Report

1. Temperature - Maximum fire occurred when temperature was inbetween 30-37 degree Celsius
2. Rain - Maximum fire occurred when there was no rain or when the rain was very minimal(i.e) 0 to 0.3mm .
3. Wind Speed - Maximum fire occurred when the windspeed was inbetween 13 to 19 Km/Hr.
4. Relative Humidity - Maximum fire occurred when relative humidity was inbetween 43 to 81 %.

FWI System Components Report

1. Fine Fuel Moisture Code (FFMC) index - Maximum fire occurred when the index is 75 and above.
2. Duff Moisture Code (DMC) index - Maximum Fire occurred when the index is inbetween 5 to 20.
3. Drought Code (DC) index - Maximum Fire occurred when the index is inbetween 0 to 185.
4. Initial Spread Index (ISI) index - Maximum Fire occurred when the index is above 2.
5. Buildup Index (BUI) index - Maximum Fire occurred when the index is inbetween 5 to 42.
6. Fire Weather Index (FWI) Index - Maximum Fire occurred when the index is inbetween 2.5 to 23.