In [1]:
```
# This Python 3 environment comes with many helpful analytics libraries installed
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker
# For example, here's several helpful packages to load

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking run or pressing Shift+Enter) will list all

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# You can write up to 20GB to the current directory (/kaggle/working/) that gets pr
# You can also write temporary files to /kaggle/temp/, but they won't be saved outs
```

In [2]:
```
#Import the libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [4]:
```
#Load the dataset
data = pd.read_csv("seattle-weather.csv")
```

In [5]:
```
data.head()
```

Out[5]:

	date	precipitation	temp_max	temp_min	wind	weather
0	2012-01-01	0.0	12.8	5.0	4.7	drizzle
1	2012-01-02	10.9	10.6	2.8	4.5	rain
2	2012-01-03	0.8	11.7	7.2	2.3	rain
3	2012-01-04	20.3	12.2	5.6	4.7	rain
4	2012-01-05	1.3	8.9	2.8	6.1	rain

In [6]:
```
data.tail()
```

Out[6]:

	date	precipitation	temp_max	temp_min	wind	weather
1456	2015-12-27	8.6	4.4	1.7	2.9	rain
1457	2015-12-28	1.5	5.0	1.7	1.3	rain
1458	2015-12-29	0.0	7.2	0.6	2.6	fog
1459	2015-12-30	0.0	5.6	-1.0	3.4	sun
1460	2015-12-31	0.0	5.6	-2.1	3.5	sun

In [7]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1461 entries, 0 to 1460
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   date           1461 non-null   object 
 1   precipitation  1461 non-null   float64
 2   temp_max       1461 non-null   float64
 3   temp_min       1461 non-null   float64
 4   wind           1461 non-null   float64
 5   weather        1461 non-null   object 
dtypes: float64(4), object(2)
memory usage: 68.6+ KB
```

In [8]:
```
#Check for null values
data.isnull().sum()
```

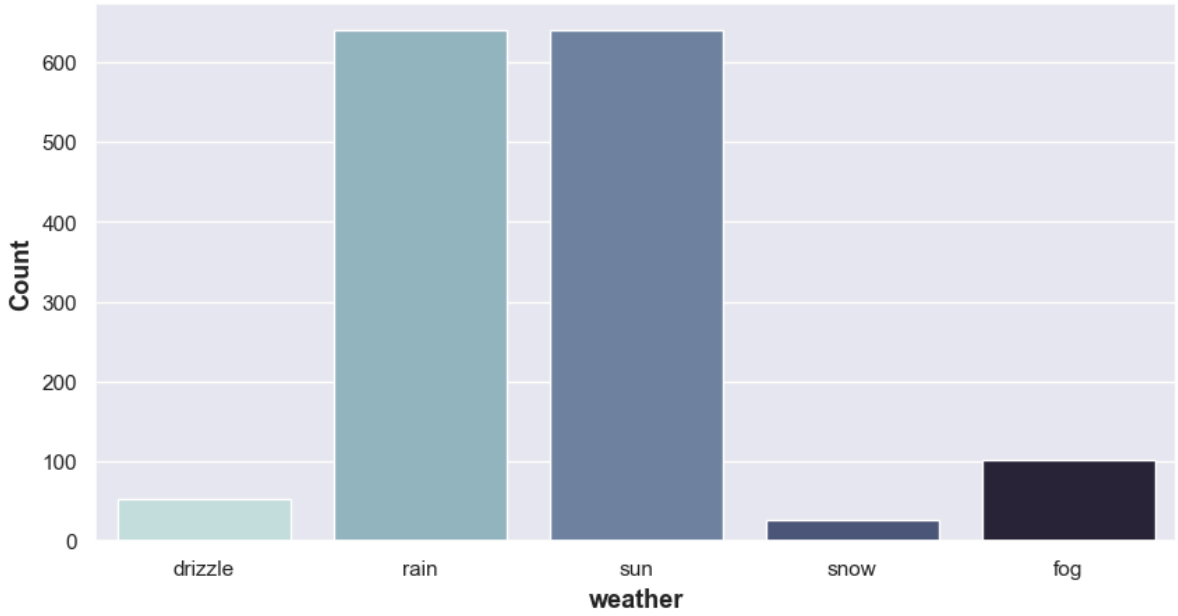
Out[8]:
```
date             0
precipitation    0
temp_max         0
temp_min         0
wind             0
weather          0
dtype: int64
```

In [9]:
```
#convert the data type into datetime
data['date'] = pd.to_datetime(data['date'])
```

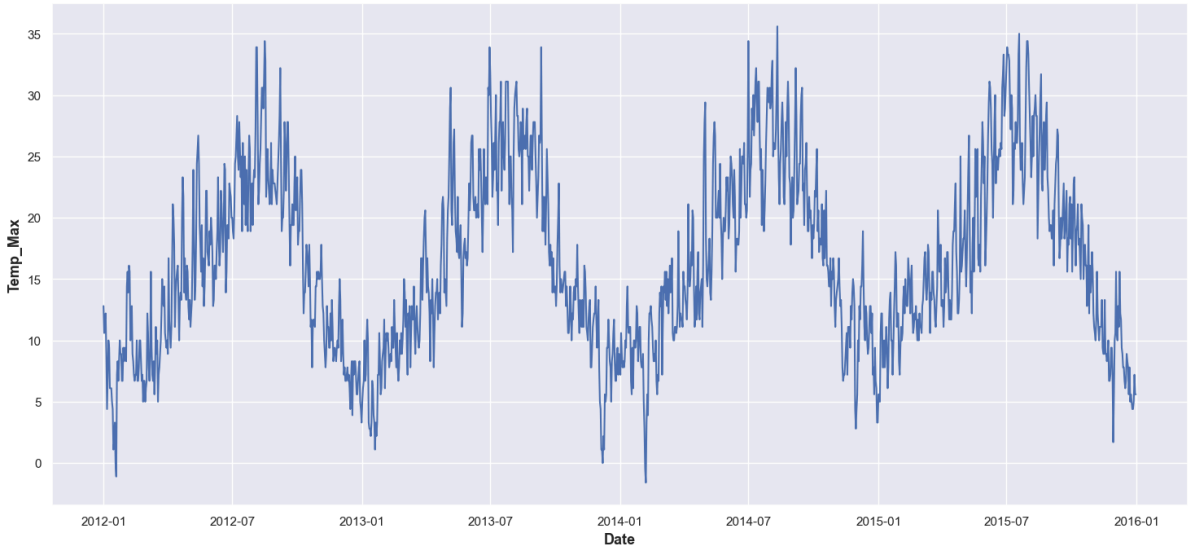
In [10]:
```
data.nunique()
```

Out[10]:
```
date             1461
precipitation     111
temp_max           67
temp_min           55
wind               79
weather             5
dtype: int64
```

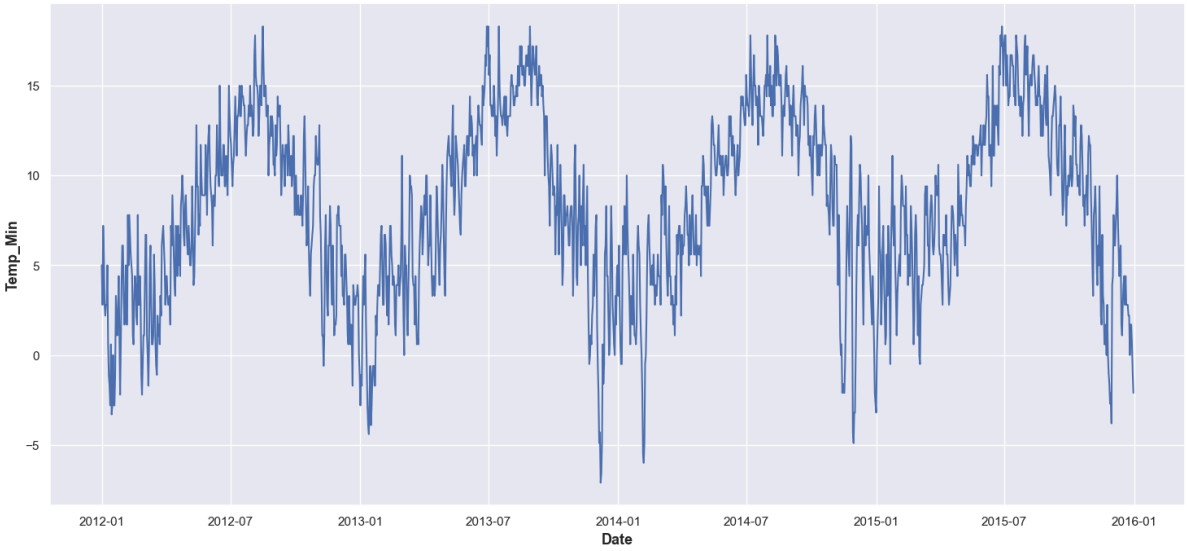
In [11]:
```
plt.figure(figsize=(10,5))
sns.set_theme()
sns.countplot(x = 'weather',data = data,palette="ch:start=.2,rot=-.3")
plt.xlabel("weather",fontweight='bold',size=13)
plt.ylabel("Count",fontweight='bold',size=13)
plt.show()
```



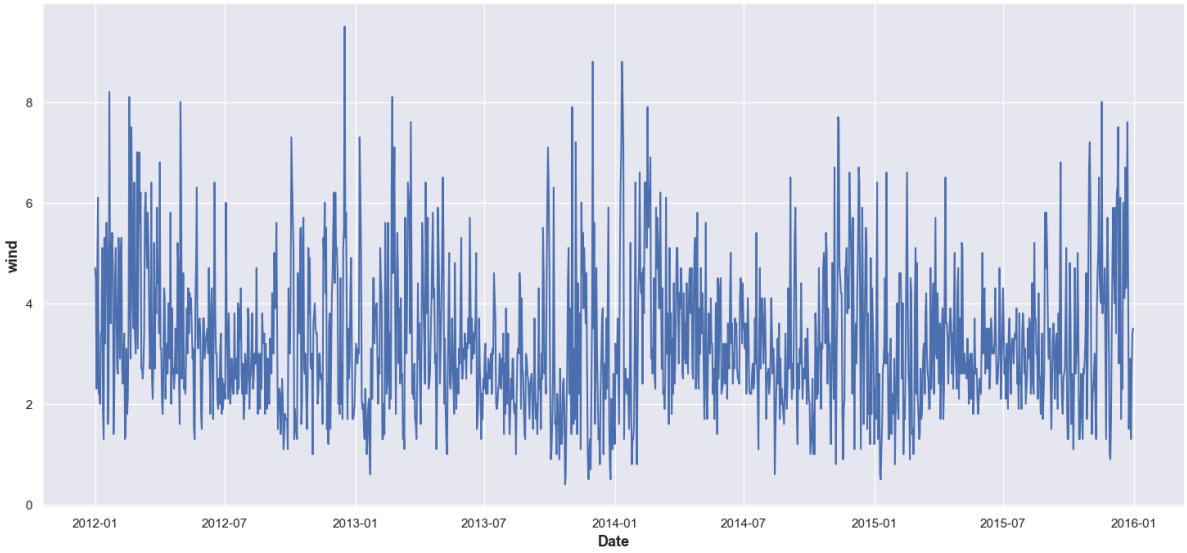
In [12]:
```
plt.figure(figsize=(18,8))
sns.set_theme()
sns.lineplot(x = 'date',y='temp_max',data=data)
plt.xlabel("Date",fontweight='bold',size=13)
plt.ylabel("Temp_Max",fontweight='bold',size=13)
plt.show()
```



In [13]:
```
plt.figure(figsize=(18,8))
sns.set_theme()
sns.lineplot(x = 'date',y='temp_min',data=data)
plt.xlabel("Date",fontweight='bold',size=13)
plt.ylabel("Temp_Min",fontweight='bold',size=13)
plt.show()
```

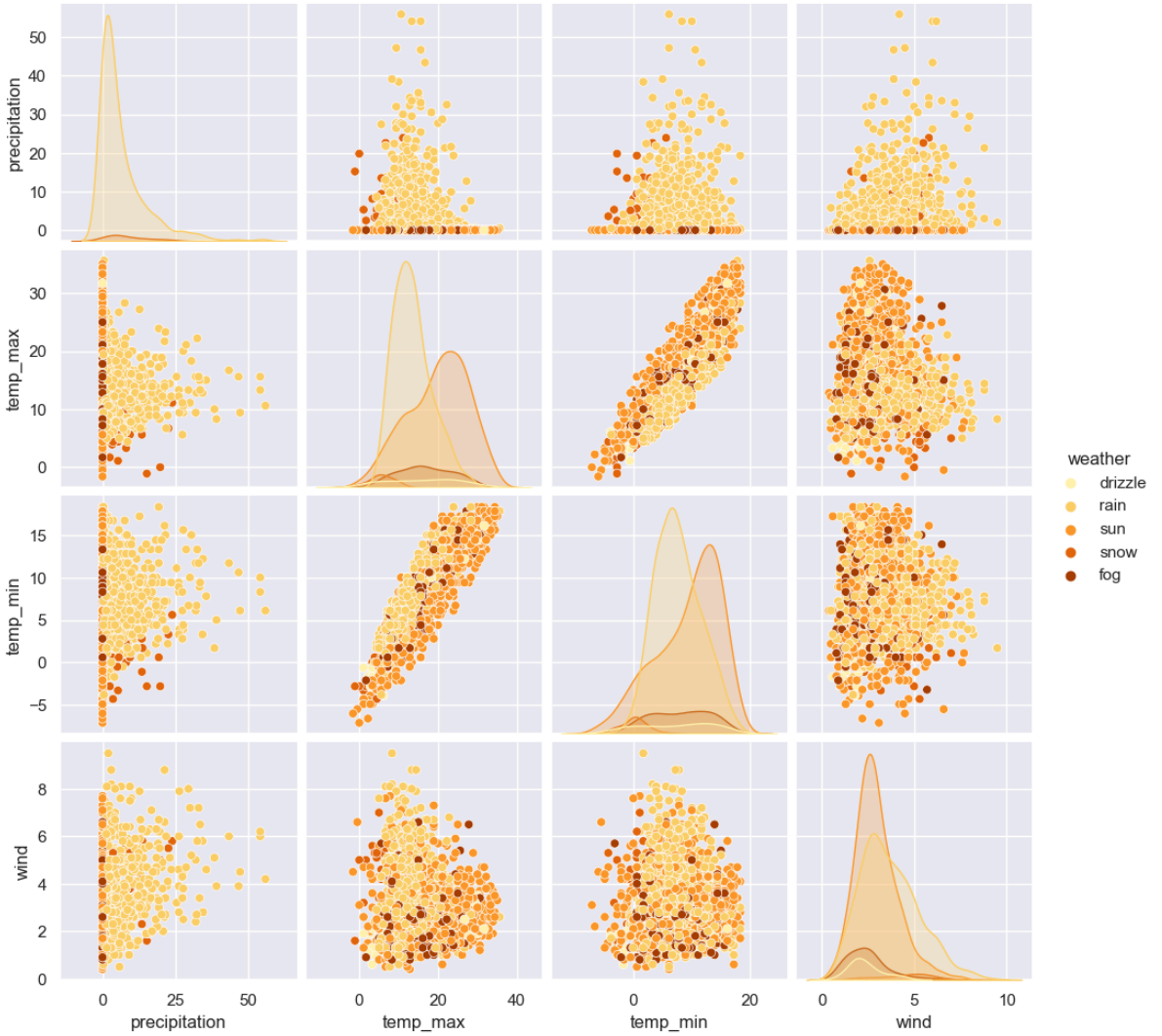


In [14]:
```
plt.figure(figsize=(18,8))
sns.set_theme()
sns.lineplot(x = 'date',y='wind',data=data)
plt.xlabel("Date",fontweight='bold',size=13)
plt.ylabel("wind",fontweight='bold',size=13)
plt.show()
```



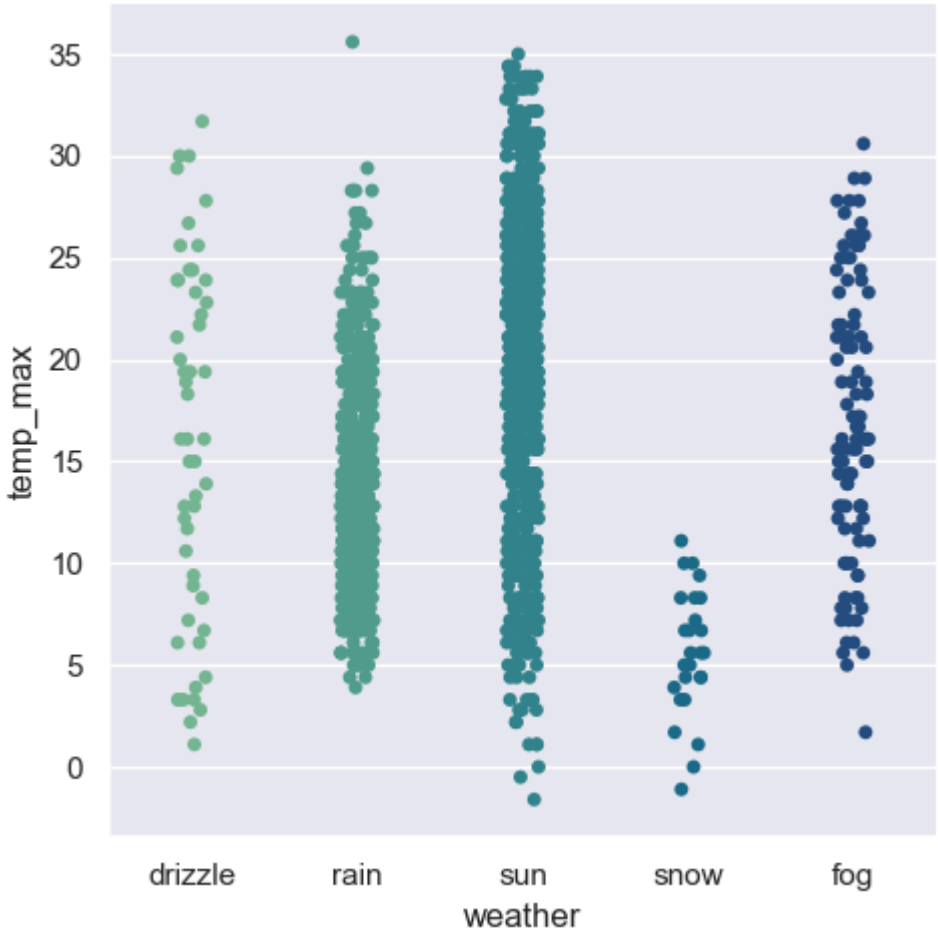
In [15]:
```
plt.figure(figsize=(14,8))
sns.pairplot(data.drop('date',axis=1),hue='weather',palette="YlOrBr")
plt.show()
```

```
<Figure size 1400x800 with 0 Axes>
```



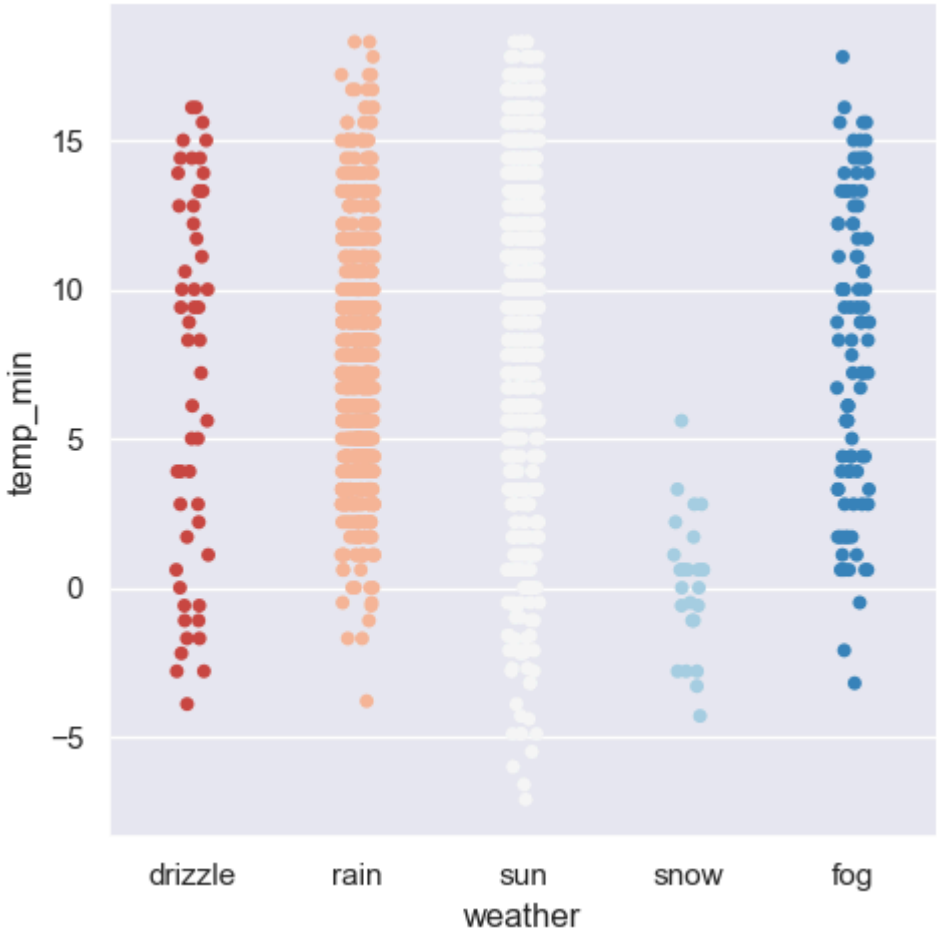
In [16]:
```
plt.figure(figsize=(10,5))
sns.catplot(x='weather',y ='temp_max',data=data,palette="crest")
plt.show()
```

```
<Figure size 1000x500 with 0 Axes>
```



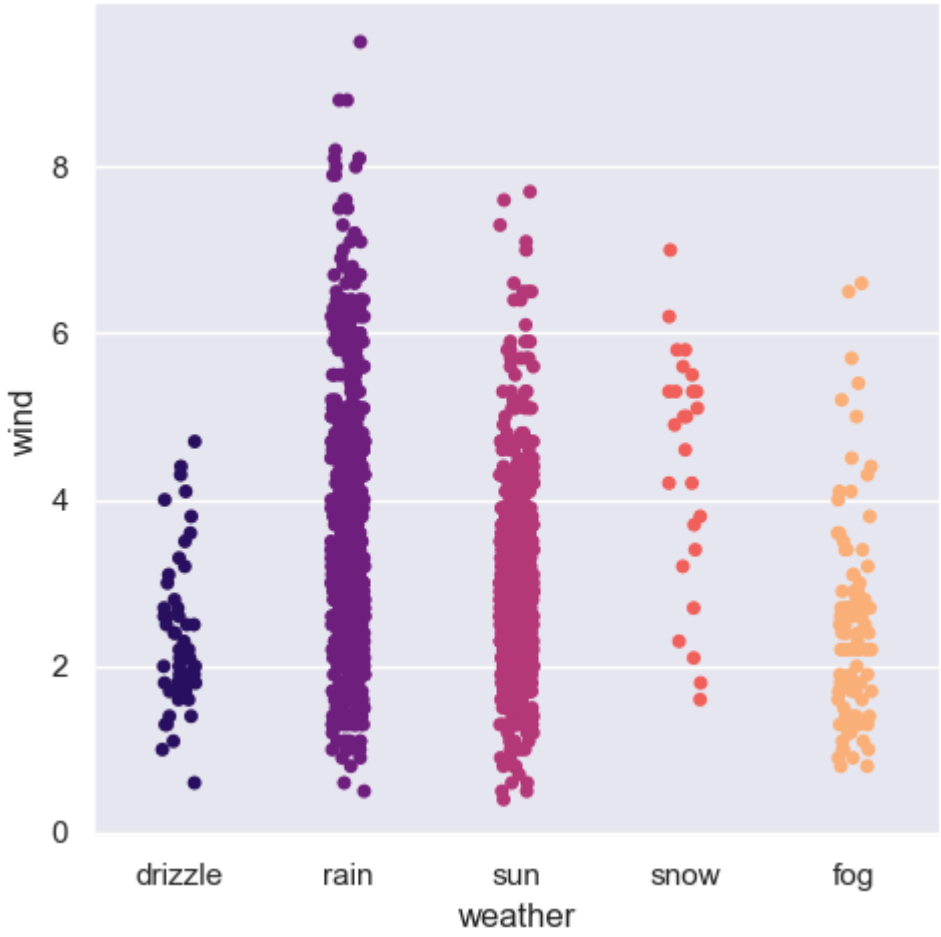
In [17]:
```
plt.figure(figsize=(10,5))
sns.catplot(x='weather',y ='temp_min',data=data,palette = "RdBu")
plt.show()
```

```
<Figure size 1000x500 with 0 Axes>
```

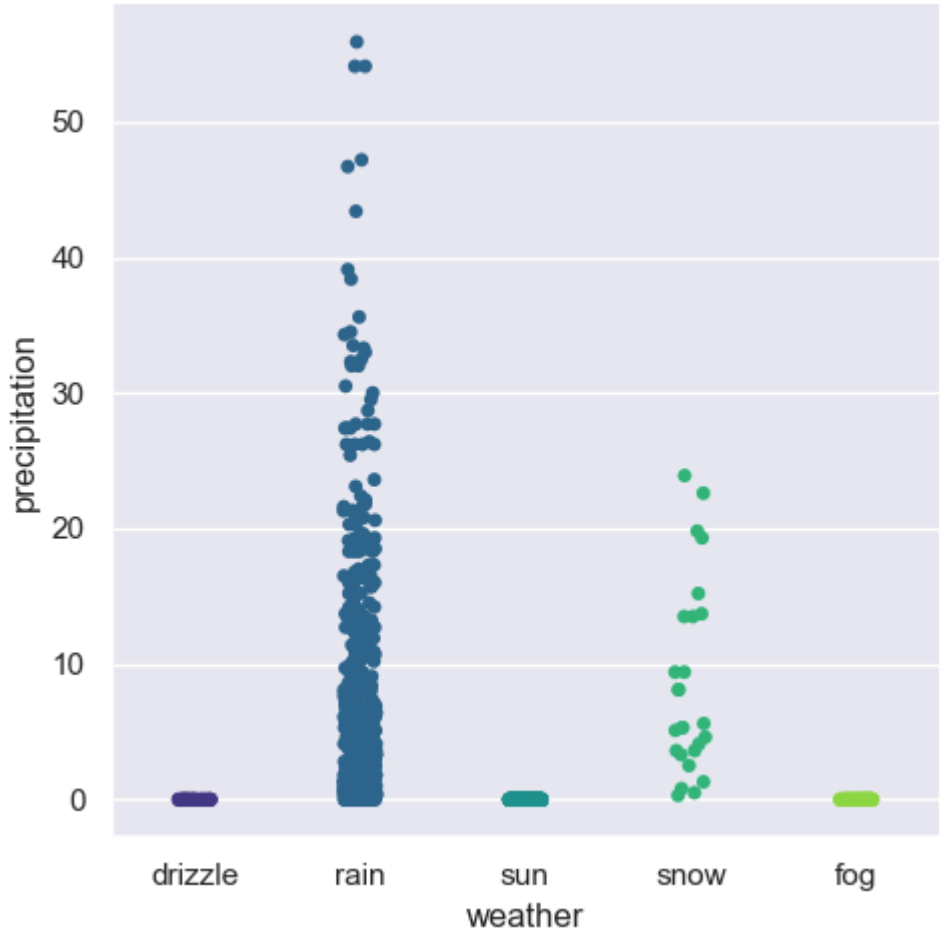


In [18]:
```
plt.figure(figsize=(10,5))
sns.catplot(x='weather',y ='wind',data=data,palette = "magma")
plt.show()
```

```
<Figure size 1000x500 with 0 Axes>
```



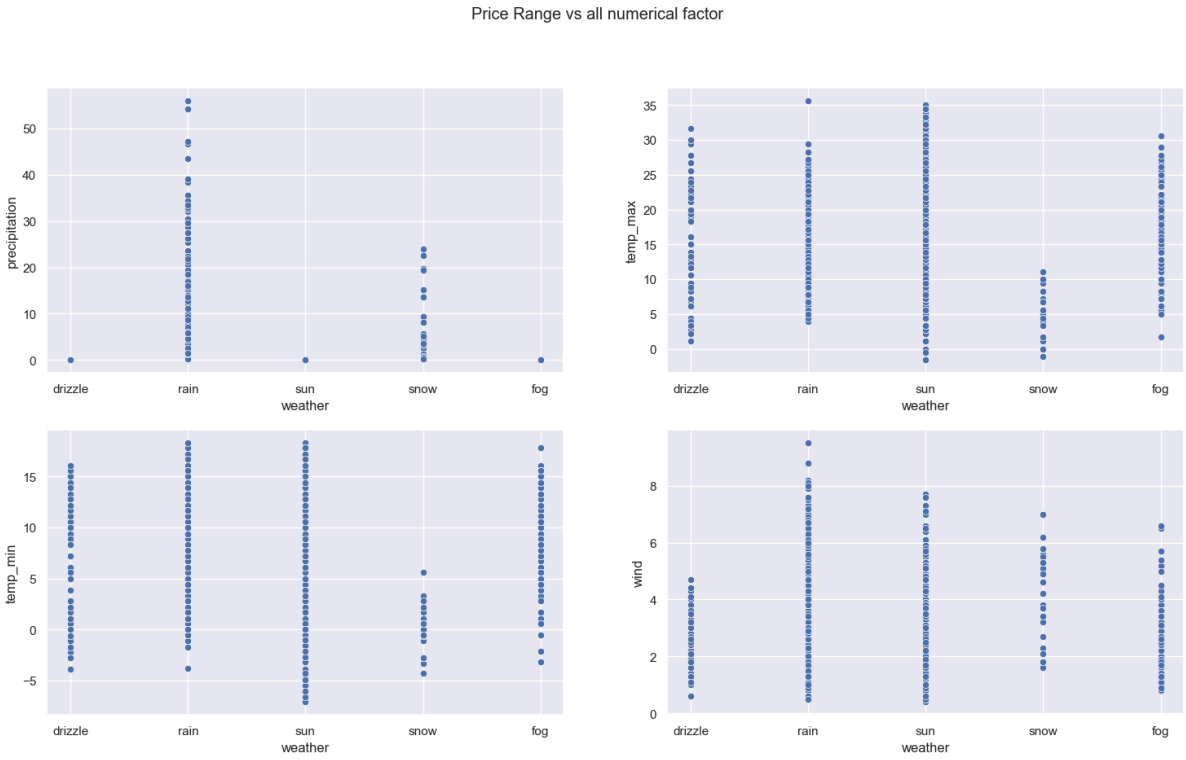
In [19]:
```
sns.catplot(x='weather',y ='precipitation',data=data,palette = "viridis")
plt.show()
```



In [20]:
```
fig, axes = plt.subplots(2, 2, figsize=(18, 10))

fig.suptitle('Price Range vs all numerical factor')

sns.scatterplot(ax=axes[0, 0], data=data, x='weather', y='precipitation')
sns.scatterplot(ax=axes[0, 1], data=data, x='weather', y='temp_max')
sns.scatterplot(ax=axes[1, 0], data=data, x='weather', y='temp_min')
sns.scatterplot(ax=axes[1, 1], data=data, x='weather', y='wind')
plt.show()
```



In [21]:
```
def LABEL_ENCODING(c1):
    from sklearn import preprocessing
    label_encoder = preprocessing.LabelEncoder()
    data[c1]= label_encoder.fit_transform(data[c1])
    data[c1].unique()
LABEL_ENCODING("weather")
data
```

Out[21]:

	date	precipitation	temp_max	temp_min	wind	weather
0	2012-01-01	0.0	12.8	5.0	4.7	0
1	2012-01-02	10.9	10.6	2.8	4.5	2
2	2012-01-03	0.8	11.7	7.2	2.3	2
3	2012-01-04	20.3	12.2	5.6	4.7	2
4	2012-01-05	1.3	8.9	2.8	6.1	2
...	...	...	...	...	...	...
1456	2015-12-27	8.6	4.4	1.7	2.9	2
1457	2015-12-28	1.5	5.0	1.7	1.3	2
1458	2015-12-29	0.0	7.2	0.6	2.6	1
1459	2015-12-30	0.0	5.6	-1.0	3.4	4
1460	2015-12-31	0.0	5.6	-2.1	3.5	4

1461 rows × 6 columns

In [22]:
```
data = data.drop('date',axis=1)
```

In [23]:
```
x = data.drop('weather',axis=1)
y = data['weather']
```

In [24]:
```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(x, y, test_size = 0.25, random_
```

In [25]:
```
print(X_train.shape)
print(X_test.shape)
print(y_train.shape)
print(y_test.shape)
```

```
(1095, 4)
(366, 4)
(1095,)
(366,)
```

In [26]:
```
from sklearn.preprocessing import StandardScaler
sc = StandardScaler()
X_train = sc.fit_transform(X_train)
X_test = sc.transform(X_test)
```

In [27]:
```
from sklearn.linear_model import LogisticRegression
classifier = LogisticRegression(random_state = 0)
classifier.fit(X_train, y_train)
```

Out[27]:
```
LogisticRegression(random_state=0)
```

In [28]:
```
y_pred = classifier.predict(X_test)
```

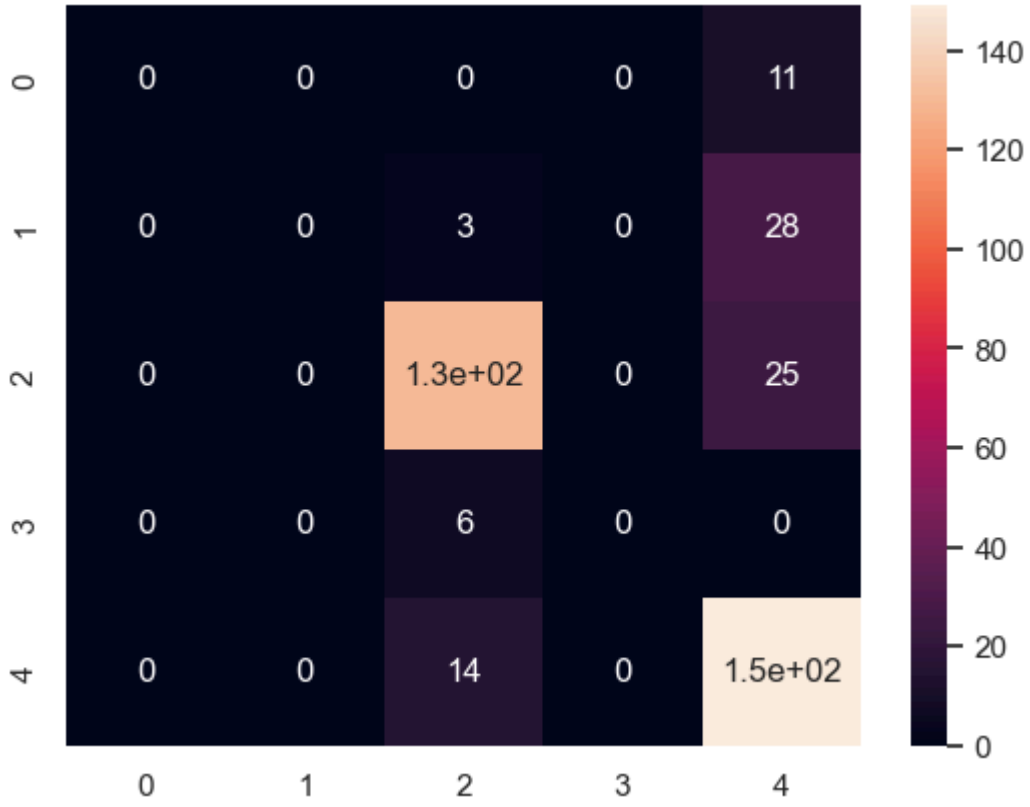
In [29]:
```
y_pred
```

Out[29]:
```
array([4, 2, 2, 4, 4, 2, 2, 2, 4, 4, 4, 2, 4, 4, 4, 4, 4, 2, 2, 2, 2, 2,
       2, 4, 4, 4, 4, 2, 4, 4, 2, 4, 2, 2, 2, 2, 4, 2, 4, 2, 4, 2, 2, 2,
       4, 4, 4, 4, 4, 4, 4, 4, 4, 2, 4, 4, 4, 2, 4, 2, 4, 4, 4, 4, 4, 2,
       4, 4, 4, 2, 2, 2, 2, 4, 4, 4, 4, 2, 4, 4, 4, 2, 2, 2, 4, 4, 2,
       4, 4, 4, 4, 2, 4, 2, 2, 4, 4, 4, 4, 2, 2, 4, 2, 2, 4, 2, 2, 4, 4,
       2, 4, 2, 4, 4, 4, 4, 2, 2, 2, 4, 2, 4, 4, 4, 4, 4, 4, 4, 2, 4, 2,
       4, 2, 2, 2, 4, 2, 4, 4, 2, 2, 4, 4, 4, 4, 2, 4, 4, 4, 4, 4, 4, 2,
       4, 2, 4, 4, 4, 4, 4, 2, 2, 2, 2, 2, 4, 2, 2, 2, 4, 4, 4, 4, 2, 2,
       4, 4, 4, 4, 4, 4, 2, 4, 2, 4, 4, 2, 2, 4, 4, 4, 4, 4, 2, 2, 4, 2,
       4, 4, 2, 2, 4, 4, 2, 4, 2, 4, 4, 2, 2, 2, 2, 2, 4, 4, 4, 2, 2, 2,
       4, 4, 4, 2, 4, 4, 4, 4, 4, 4, 2, 2, 2, 2, 2, 4, 2, 4, 2, 2, 4, 2,
       4, 2, 2, 4, 4, 4, 4, 4, 4, 4, 2, 2, 4, 4, 4, 4, 4, 4, 2, 2, 4, 4,
       4, 2, 4, 2, 4, 2, 4, 4, 2, 2, 4, 4, 4, 4, 2, 4, 2, 2, 2, 4, 4, 4,
       4, 4, 2, 4, 4, 2, 4, 2, 4, 2, 2, 4, 2, 4, 2, 4, 4, 4, 2, 4, 4, 2,
       2, 4, 2, 4, 2, 2, 4, 4, 2, 2, 2, 4, 2, 4, 2, 2, 4, 4, 2, 2, 2, 4,
       4, 2, 4, 4, 2, 2, 4, 4, 2, 4, 2, 4, 4, 2, 4, 2, 2, 2, 4, 2, 4, 4,
       4, 4, 4, 4, 2, 2, 4, 4, 4, 2, 4, 2, 2, 4])
```

In [30]:
```
from sklearn.metrics import confusion_matrix, accuracy_score
cm = confusion_matrix(y_test, y_pred)
print(cm)
```

```
[[  0   0   0   0  11]
 [  0   0   3   0  28]
 [  0   0 130   0  25]
 [  0   0   6   0   0]
 [  0   0  14   0 149]]
```

In [36]:
```
sns.heatmap(cm,annot=True)
plt.show()
```



In [33]:
```
acc1 = accuracy_score(y_test, y_pred)
print(f"Accuracy score: {acc1}")
```

```
Accuracy score: 0.7622950819672131
```

In [34]:
```
from sklearn.svm import SVC
classifier = SVC(kernel = 'linear', random_state = 0)
```

```
classifier.fit(X_train, y_train)
```

Out[34]:
```
SVC(kernel='linear', random_state=0)
```

In [35]:
```
y_pred = classifier.predict(X_test)
```

In [37]:
```
cm = confusion_matrix(y_test, y_pred)
print(cm)
acc2 = accuracy_score(y_test, y_pred)
```

```
[[  0   0   0   0  11]
 [  0   0   0   0  31]
 [  0   0 126   0  29]
 [  0   0   4   2   0]
 [  0   0   0   0 163]]
```

In [38]:
```
print(f"Accuracy score: {acc2}")
```

```
Accuracy score: 0.7950819672131147
```

In [39]:
```
from sklearn.neighbors import KNeighborsClassifier
classifier = KNeighborsClassifier(n_neighbors = 5, metric = 'minkowski', p = 2)
classifier.fit(X_train, y_train)
```

Out[39]:
```
KNeighborsClassifier()
```

In [43]:
```
cm = confusion_matrix(y_test, y_pred)
print(cm)
```

```
[[  1   1   3   0   6]
 [  1   4   5   0  21]
 [  0   3 127   0  25]
 [  0   0   3   1   2]
 [  5  17  26   0 115]]
```

In [44]:
```
acc3 = accuracy_score(y_test, y_pred)
print(f"Accuracy score: {acc3}")
```

```
Accuracy score: 0.6775956284153005
```

In [45]:
```
from sklearn.naive_bayes import GaussianNB
classifier = GaussianNB()
classifier.fit(X_train, y_train)
```

Out[45]:
```
GaussianNB()
```

In [46]:
```
y_pred = classifier.predict(X_test)
```

In [47]:
```
cm = confusion_matrix(y_test, y_pred)
print(cm)
```

```
[[  0   0   0   0  11]
 [  0   0   0   0  31]
 [  0   0 141   2  12]
 [  0   0   2   4   0]
 [  0   0   0   0 163]]
```

In [48]:
```
acc4 = accuracy_score(y_test, y_pred)
print(f"Accuracy score : {acc4}")
```

```
Accuracy score : 0.8415300546448088
```

In [49]:
```
from sklearn.tree import DecisionTreeClassifier
classifier = DecisionTreeClassifier(criterion = 'entropy', random_state = 0)
```

```
classifier.fit(X_train, y_train)
```

Out[49]:
```
DecisionTreeClassifier(criterion='entropy', random_state=0)
```

In [50]:
```
y_pred = classifier.predict(X_test)
```

In [51]:
```
y_pred
```

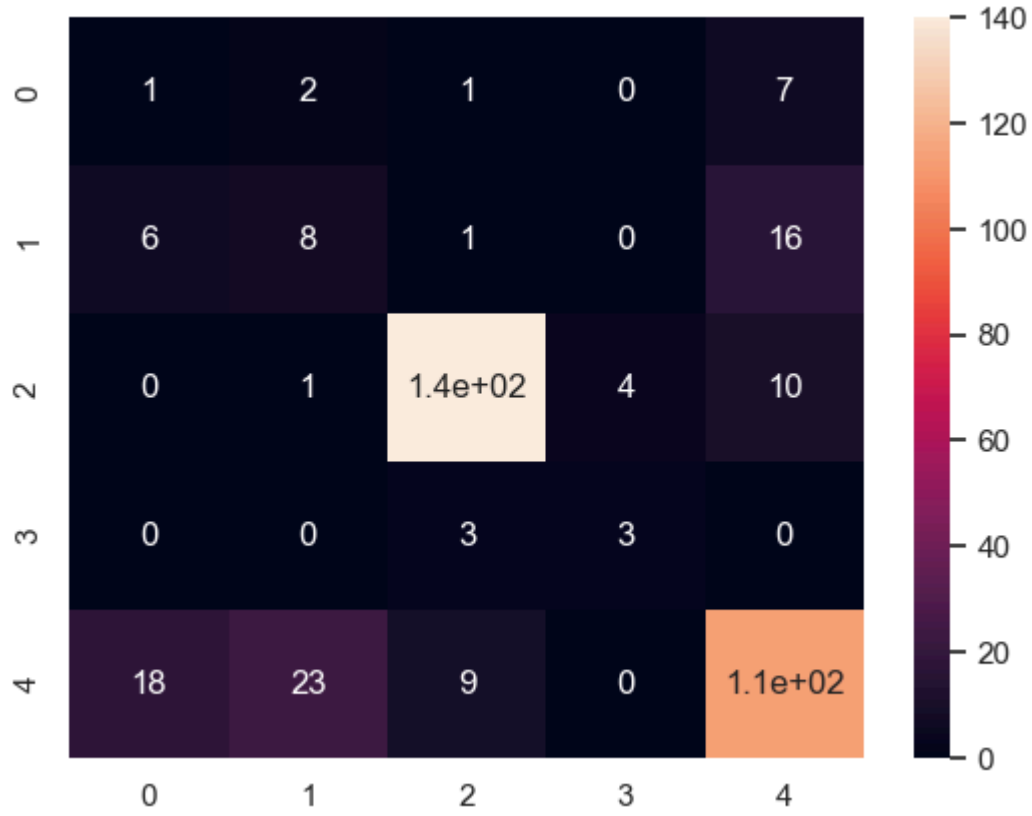
Out[51]:
```
array([4, 0, 2, 4, 4, 2, 2, 2, 4, 2, 0, 2, 4, 1, 0, 4, 1, 2, 2, 2, 2, 2,
       2, 4, 4, 0, 4, 2, 0, 4, 2, 4, 3, 2, 2, 2, 0, 2, 0, 2, 4, 2, 2, 2,
       4, 0, 4, 4, 4, 4, 4, 4, 4, 2, 2, 4, 4, 3, 4, 2, 4, 4, 4, 1, 1, 2,
       4, 1, 4, 2, 2, 3, 2, 0, 1, 4, 2, 0, 2, 2, 4, 4, 2, 2, 2, 4, 4, 2,
       4, 2, 4, 1, 2, 1, 2, 3, 4, 0, 4, 4, 2, 2, 4, 2, 2, 2, 2, 2, 4, 4,
       2, 4, 2, 4, 4, 4, 4, 4, 2, 2, 4, 2, 2, 1, 2, 4, 4, 0, 4, 2, 4, 2,
       4, 2, 2, 2, 2, 4, 4, 4, 2, 3, 4, 4, 4, 2, 2, 4, 4, 4, 4, 1, 4, 2,
       1, 2, 0, 4, 2, 4, 4, 0, 2, 1, 2, 2, 4, 2, 2, 2, 1, 1, 2, 4, 2, 2,
       4, 4, 4, 4, 4, 4, 2, 1, 2, 1, 4, 2, 2, 4, 4, 4, 1, 4, 2, 2, 4, 0,
       2, 4, 2, 2, 1, 4, 2, 2, 2, 4, 1, 1, 3, 2, 2, 2, 1, 4, 1, 2, 2, 2,
       1, 4, 4, 2, 4, 4, 2, 4, 2, 0, 0, 2, 2, 2, 2, 1, 2, 4, 2, 2, 4, 2,
       4, 2, 2, 0, 2, 4, 0, 4, 4, 4, 2, 3, 4, 4, 4, 4, 4, 4, 2, 1, 4, 4,
       1, 2, 4, 2, 4, 1, 4, 4, 2, 2, 0, 1, 2, 4, 2, 4, 2, 2, 2, 0, 0, 4,
       2, 4, 2, 2, 1, 2, 4, 2, 1, 2, 2, 4, 2, 4, 2, 4, 4, 4, 2, 4, 4, 2,
       2, 4, 2, 0, 2, 2, 4, 1, 2, 2, 2, 0, 2, 1, 2, 2, 4, 4, 2, 2, 2, 4,
       4, 2, 0, 4, 2, 4, 4, 4, 2, 2, 4, 4, 4, 2, 4, 4, 2, 2, 1, 2, 4, 4,
       4, 4, 2, 4, 4, 2, 4, 4, 4, 2, 1, 2, 2, 4])
```

In [52]:
```
cm = confusion_matrix(y_test, y_pred)
print(cm)
```

```
[[  1   2   1   0   7]
 [  6   8   1   0  16]
 [  0   1 140   4  10]
 [  0   0   3   3   0]
 [ 18  23   9   0 113]]
```

In [53]:
```
sns.heatmap(cm,annot=True)
```

Out[53]:
```
<AxesSubplot:>
```



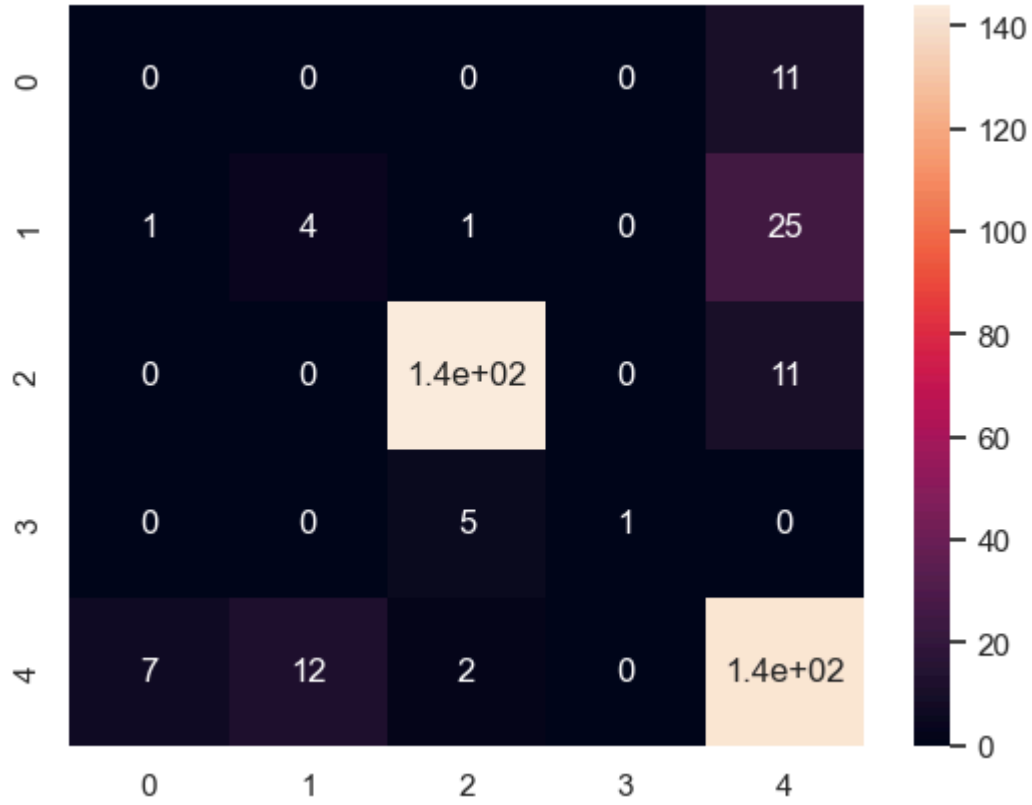
In [54]:
```
acc5 = accuracy_score(y_test, y_pred)
print(f"Accuracy score: {acc5}")
```

```
Accuracy score: 0.7240437158469946
```

In [55]:
```
from sklearn.ensemble import RandomForestClassifier
forest= RandomForestClassifier(n_estimators =40, random_state = 0)
forest.fit(X_train,y_train)
RandomForestClassifier(n_estimators=40, random_state=0)
y_pred = forest.predict(X_test)
cm = confusion_matrix(y_test,y_pred)
```

In [56]:
```
sns.heatmap(cm,annot=True)
```

Out[56]:
```
<AxesSubplot:>
```



In [57]:
```
from sklearn.metrics import classification_report
print(classification_report(y_test,y_pred))
```

```
              precision    recall  f1-score   support

           0       0.00      0.00      0.00        11
           1       0.25      0.13      0.17        31
           2       0.95      0.93      0.94       155
           3       1.00      0.17      0.29         6
           4       0.75      0.87      0.81       163

    accuracy                           0.80       366
   macro avg       0.59      0.42      0.44       366
weighted avg       0.77      0.80      0.78       366
```

In [58]:
```
acc6 = forest.score(X_test,y_test)
print(acc6)
```

```
0.7950819672131147
```

In [62]:
```
y_pred = classifier.predict(X_test)
cm = confusion_matrix(y_test, y_pred)
print(cm)
acc7 = accuracy_score(y_test, y_pred)
```

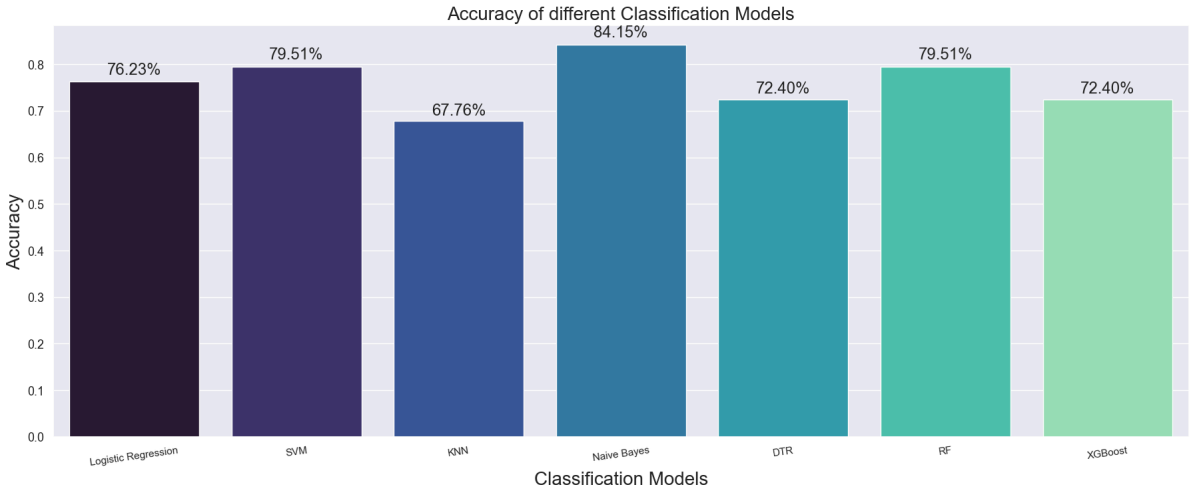
```
[[  1   2   1   0   7]
 [  6   8   1   0  16]
 [  0   1 140   4  10]
 [  0   0   3   3   0]
 [ 18  23   9   0 113]]
```

In [63]:
```
print(acc7)
```

```
0.7240437158469946
```

In [64]:
```
mylist=[]
mylist2=[]
```

```
mylist.append(acc1)
mylist2.append("Logistic Regression")
mylist.append(acc2)
mylist2.append("SVM")
mylist.append(acc3)
mylist2.append("KNN")
mylist.append(acc4)
mylist2.append("Naive Bayes")
mylist.append(acc5)
mylist2.append("DTR")
mylist.append(acc6)
mylist2.append("RF")
mylist.append(acc7)
mylist2.append("XGBoost")
plt.rcParams['figure.figsize']=8,6
sns.set_style("darkgrid")
plt.figure(figsize=(22,8))
ax = sns.barplot(x=mylist2, y=mylist, palette = "mako", saturation =1.5)
plt.xlabel("Classification Models", fontsize = 20 )
plt.ylabel("Accuracy", fontsize = 20)
plt.title("Accuracy of different Classification Models", fontsize = 20)
plt.xticks(fontsize = 11, horizontalalignment = 'center', rotation = 8)
plt.yticks(fontsize = 13)
for p in ax.patches:
    width, height = p.get_width(), p.get_height()
    x, y = p.get_xy()
    ax.annotate(f'{height:.2%}', (x + width/2, y + height*1.02), ha='center', fonts
plt.show()
```



In [ ]: