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

In [3]:
```
iris=pd.read_csv("C:/Users/USER/Desktop/Datasets/iris_csv.csv")
```

In [4]:
```
iris
```

Out[4]:

	sepallength	sepalwidth	petallength	petalwidth	class
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 5 columns

In [5]:
```
iris.dtypes
```

Out[5]:
```
sepallength    float64
sepalwidth     float64
petallength    float64
petalwidth     float64
class           object
dtype: object
```

In [6]:
```
iris.shape
```

Out[6]:
```
(150, 5)
```

In [7]:
```
iris.describe()
```

Out[7]:

	sepallength	sepalwidth	petallength	petalwidth
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.054000	3.758667	1.198667
std	0.828066	0.433594	1.764420	0.763161
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

In [8]:
```
iris.median(numeric_only=True)
```

Out[8]:
```
sepallength    5.80
sepalwidth     3.00
petallength    4.35
petalwidth     1.30
dtype: float64
```

In [9]:
```
iris.var(numeric_only=True)
```

Out[9]:
```
sepallength    0.685694
sepalwidth     0.188004
petallength    3.113179
petalwidth     0.582414
dtype: float64
```

In [10]:
```
iris.std(numeric_only=True)
```

Out[10]:
```
sepallength    0.828066
sepalwidth     0.433594
petallength    1.764420
petalwidth     0.763161
dtype: float64
```

In [11]:
```
iris.min()
```

Out[11]:
```
sepallength            4.3
sepalwidth             2.0
petallength            1.0
petalwidth             0.1
class          Iris-setosa
dtype: object
```

In [12]:
```
iris.max()
```

Out[12]:
```
sepallength              7.9
sepalwidth               4.4
petallength              6.9
petalwidth               2.5
class          Iris-virginica
dtype: object
```

In [13]:
```
iris.isnull().sum()
```

Out[13]:
```
sepallength    0
sepalwidth     0
petallength    0
petalwidth     0
class          0
dtype: int64
```

In [2]:
```
boxplot=iris.boxplot()
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
~\AppData\Local\Temp/ipykernel_8116/4186683140.py in <module>
----> 1 boxplot=iris.boxplot()

NameError: name 'iris' is not defined
```

In [15]:
```
pip install feature_engine
```

```
Requirement already satisfied: feature_engine in c:\users\user\anaconda3\lib\si
te-packages (1.2.0)Note: you may need to restart the kernel to use updated pack
ages.

Requirement already satisfied: numpy>=1.18.2 in c:\users\user\anaconda3\lib\sit
e-packages (from feature_engine) (1.20.3)
Requirement already satisfied: scipy>=1.4.1 in c:\users\user\anaconda3\lib\site
-packages (from feature_engine) (1.7.1)
Requirement already satisfied: pandas>=1.0.3 in c:\users\user\anaconda3\lib\sit
e-packages (from feature_engine) (1.3.4)
Requirement already satisfied: statsmodels>=0.11.1 in c:\users\user\anaconda3\l
ib\site-packages (from feature_engine) (0.12.2)
Requirement already satisfied: scikit-learn>=0.22.2 in c:\users\user\anaconda3
\lib\site-packages (from feature_engine) (0.24.2)
Requirement already satisfied: python-dateutil>=2.7.3 in c:\users\user\anaconda
3\lib\site-packages (from pandas>=1.0.3->feature_engine) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in c:\users\user\anaconda3\lib\site
-packages (from pandas>=1.0.3->feature_engine) (2021.3)
Requirement already satisfied: six>=1.5 in c:\users\user\anaconda3\lib\site-pac
kages (from python-dateutil>=2.7.3->pandas>=1.0.3->feature_engine) (1.16.0)
Requirement already satisfied: joblib>=0.11 in c:\users\user\anaconda3\lib\site
-packages (from scikit-learn>=0.22.2->feature_engine) (1.1.0)
Requirement already satisfied: threadpoolctl>=2.0.0 in c:\users\user\anaconda3
\lib\site-packages (from scikit-learn>=0.22.2->feature_engine) (2.2.0)
Requirement already satisfied: patsy>=0.5 in c:\users\user\anaconda3\lib\site-p
ackages (from statsmodels>=0.11.1->feature_engine) (0.5.2)
```

In [16]:
```
from feature_engine.outliers import Winsorizer
win=Winsorizer(capping_method="iqr", tail="both", fold=1.5, variables=["sepalwidt
out=win.fit_transform(iris[["sepalwidth"]])
```

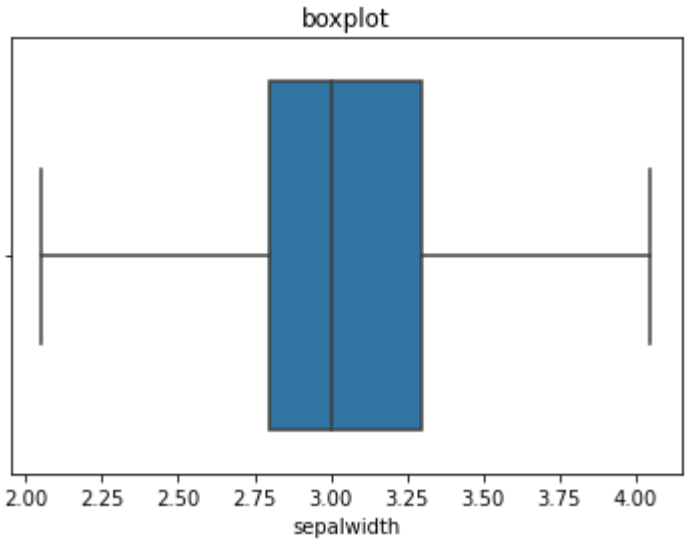
In [17]:
```
print(win.left_tail_caps_, win.left_tail_caps_)
```

```
{'sepalwidth': 2.05} {'sepalwidth': 2.05}
```

In [18]:
```
sns.boxplot(out.sepalwidth)
plt.title("boxplot")
plt.show
```

```
C:\Users\USER\anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarn
ing: Pass the following variable as a keyword arg: x. From version 0.12, the on
ly valid positional argument will be `data`, and passing other arguments withou
t an explicit keyword will result in an error or misinterpretation.
  warnings.warn(
```

Out[18]: <function matplotlib.pyplot.show(close=None, block=None)>



In [19]:
```
out
```

Out[19]:

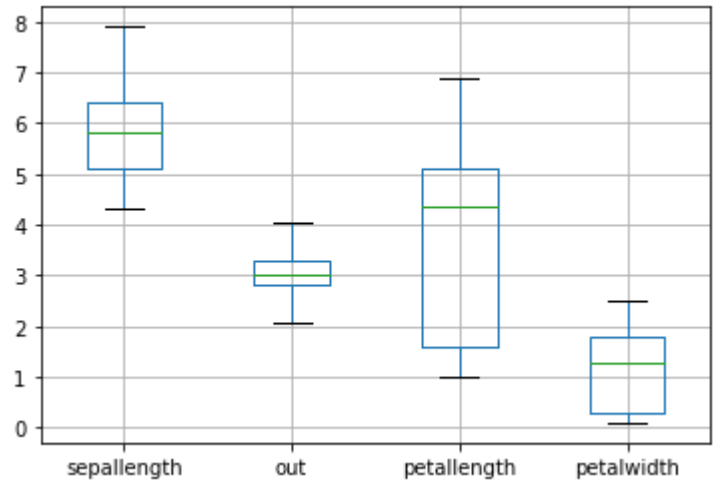
	sepalwidth
0	3.5
1	3.0
2	3.2
3	3.1
4	3.6
...	...
145	3.0
146	2.5
147	3.0
148	3.4
149	3.0

150 rows × 1 columns

In [20]:
```
iris.insert(loc=1,column='out', value=out)
```

In [21]:
```
del iris["sepalwidth"]
```

In [22]:
```
boxplot=iris.boxplot()
```



In [23]:
```
from scipy.stats import kurtosis, skew
```

In [24]:
```
skew(iris["sepallength"])
```

Out[24]:
```
0.3117530585022963
```

In [25]:
```
kurtosis(iris["out"])
```

Out[25]:
```
-0.14855695431390803
```

In [28]:
```
iris_setosa=iris.iloc[0:50,0:5]
iris_versicolour=iris.iloc[50:100,0:5]
iris_verginia=iris.iloc[100:150, 0:5]
```

In [29]:
```
a= pd.DataFrame(iris_setosa.iloc[0:25,0:5])
b= pd.DataFrame(iris_setosa.iloc[25:50,0:5])
c= pd.DataFrame(iris_versicolour.iloc[0:25,0:5])
d= pd.DataFrame(iris_versicolour.iloc[25:50,0:5])
e= pd.DataFrame(iris_verginia.iloc[0:25,0:5])
f= pd.DataFrame(iris_verginia.iloc[25:50,0:5])
```

In [31]:
```
iris_train = pd.concat([a,c,e])
iris_train
```

Out[31]:

	sepallength	out	petallength	petalwidth	class
0	5.1	3.5	1.4	0.2	Iris-setosa
1	4.9	3.0	1.4	0.2	Iris-setosa
2	4.7	3.2	1.3	0.2	Iris-setosa
3	4.6	3.1	1.5	0.2	Iris-setosa
4	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...
120	6.9	3.2	5.7	2.3	Iris-virginica
121	5.6	2.8	4.9	2.0	Iris-virginica
122	7.7	2.8	6.7	2.0	Iris-virginica
123	6.3	2.7	4.9	1.8	Iris-virginica
124	6.7	3.3	5.7	2.1	Iris-virginica

75 rows × 5 columns

In [33]:
```
X_train = iris_train.iloc[:,0:4]
X_train
```

Out[33]:

	sepallength	out	petallength	petalwidth
0	5.1	3.5	1.4	0.2
1	4.9	3.0	1.4	0.2
2	4.7	3.2	1.3	0.2
3	4.6	3.1	1.5	0.2
4	5.0	3.6	1.4	0.2
...	...	...	...	...
120	6.9	3.2	5.7	2.3
121	5.6	2.8	4.9	2.0
122	7.7	2.8	6.7	2.0
123	6.3	2.7	4.9	1.8
124	6.7	3.3	5.7	2.1

75 rows × 4 columns

In [34]:
```
y_train = iris_train.iloc[:,4]
y_train
```

Out[34]:
```
0         Iris-setosa
1         Iris-setosa
2         Iris-setosa
3         Iris-setosa
4         Iris-setosa
            ...
120    Iris-virginica
121    Iris-virginica
122    Iris-virginica
123    Iris-virginica
124    Iris-virginica
Name: class, Length: 75, dtype: object
```

In [35]:
```
iris_test= pd.concat([b,d,f])
iris_test
```

Out[35]:

	sepallength	out	petallength	petalwidth	class
25	5.0	3.0	1.6	0.2	Iris-setosa
26	5.0	3.4	1.6	0.4	Iris-setosa
27	5.2	3.5	1.5	0.2	Iris-setosa
28	5.2	3.4	1.4	0.2	Iris-setosa
29	4.7	3.2	1.6	0.2	Iris-setosa
...	...	...	...	...	...
145	6.7	3.0	5.2	2.3	Iris-virginica
146	6.3	2.5	5.0	1.9	Iris-virginica
147	6.5	3.0	5.2	2.0	Iris-virginica
148	6.2	3.4	5.4	2.3	Iris-virginica
149	5.9	3.0	5.1	1.8	Iris-virginica

75 rows × 5 columns

In [36]:
```
X_test = iris_test.iloc[:,0:4]
X_test
```

Out[36]:

	sepallength	out	petallength	petalwidth
25	5.0	3.0	1.6	0.2
26	5.0	3.4	1.6	0.4
27	5.2	3.5	1.5	0.2
28	5.2	3.4	1.4	0.2
29	4.7	3.2	1.6	0.2
...	...	...	...	...
145	6.7	3.0	5.2	2.3
146	6.3	2.5	5.0	1.9
147	6.5	3.0	5.2	2.0
148	6.2	3.4	5.4	2.3
149	5.9	3.0	5.1	1.8

75 rows × 4 columns

In [37]:
```
y_test = iris_test.iloc[:,4]
y_test
```

Out[37]:
```
25        Iris-setosa
26        Iris-setosa
27        Iris-setosa
28        Iris-setosa
29        Iris-setosa
            ...
145    Iris-virginica
146    Iris-virginica
147    Iris-virginica
148    Iris-virginica
149    Iris-virginica
Name: class, Length: 75, dtype: object
```

In [38]:
```
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score
```

In [39]:
```
clf=SVC(kernel="linear")
```

In [41]:
```
clf.fit(X_train, y_test)
```

Out[41]:
```
SVC(kernel='linear')
```

In [42]:
```
y_pred=clf.predict(X_test)
```

In [43]:
```
y_pred
```

Out[43]:
```
array(['Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-setosa', 'Iris-setosa', 'Iris-setosa',
       'Iris-setosa', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-virginica', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-versicolor',
       'Iris-versicolor', 'Iris-versicolor', 'Iris-virginica',
       'Iris-versicolor', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-versicolor', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-versicolor', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica',
       'Iris-virginica', 'Iris-virginica', 'Iris-virginica'], dtype=object)
```

In [44]:
```
accuracy_score(y_pred,y_test)
```

Out[44]:
```
0.9466666666666667
```

In [ ]:
```

```