In [1]:

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

In [2]:

```
df1=pd.read_csv(r'C:\Users\user\Downloads\14_Iris.csv')
df1
```

Out[2]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

In [3]:

```
df=df1.head(100)
df
```

Out[3]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...	...
95	96	5.7	3.0	4.2	1.2	Iris-versicolor
96	97	5.7	2.9	4.2	1.3	Iris-versicolor
97	98	6.2	2.9	4.3	1.3	Iris-versicolor
98	99	5.1	2.5	3.0	1.1	Iris-versicolor
99	100	5.7	2.8	4.1	1.3	Iris-versicolor

100 rows × 6 columns

In [4]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 100 entries, 0 to 99
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype  
---  ------         --------------  -----  
 0   Id             100 non-null    int64  
 1   SepalLengthCm  100 non-null    float64
 2   SepalWidthCm   100 non-null    float64
 3   PetalLengthCm  100 non-null    float64
 4   PetalWidthCm   100 non-null    float64
 5   Species        100 non-null    object 
dtypes: float64(4), int64(1), object(1)
memory usage: 4.8+ KB
```

In [5]:

```
df.describe()
```

Out[5]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	100.000000	100.000000	100.000000	100.000000	100.000000
mean	50.500000	5.471000	3.094000	2.862000	0.785000
std	29.011492	0.641698	0.476057	1.448565	0.566288
min	1.000000	4.300000	2.000000	1.000000	0.100000
25%	25.750000	5.000000	2.800000	1.500000	0.200000
50%	50.500000	5.400000	3.050000	2.450000	0.800000
75%	75.250000	5.900000	3.400000	4.325000	1.300000
max	100.000000	7.000000	4.400000	5.100000	1.800000

In [6]:

```
df.columns
```

Out[6]:

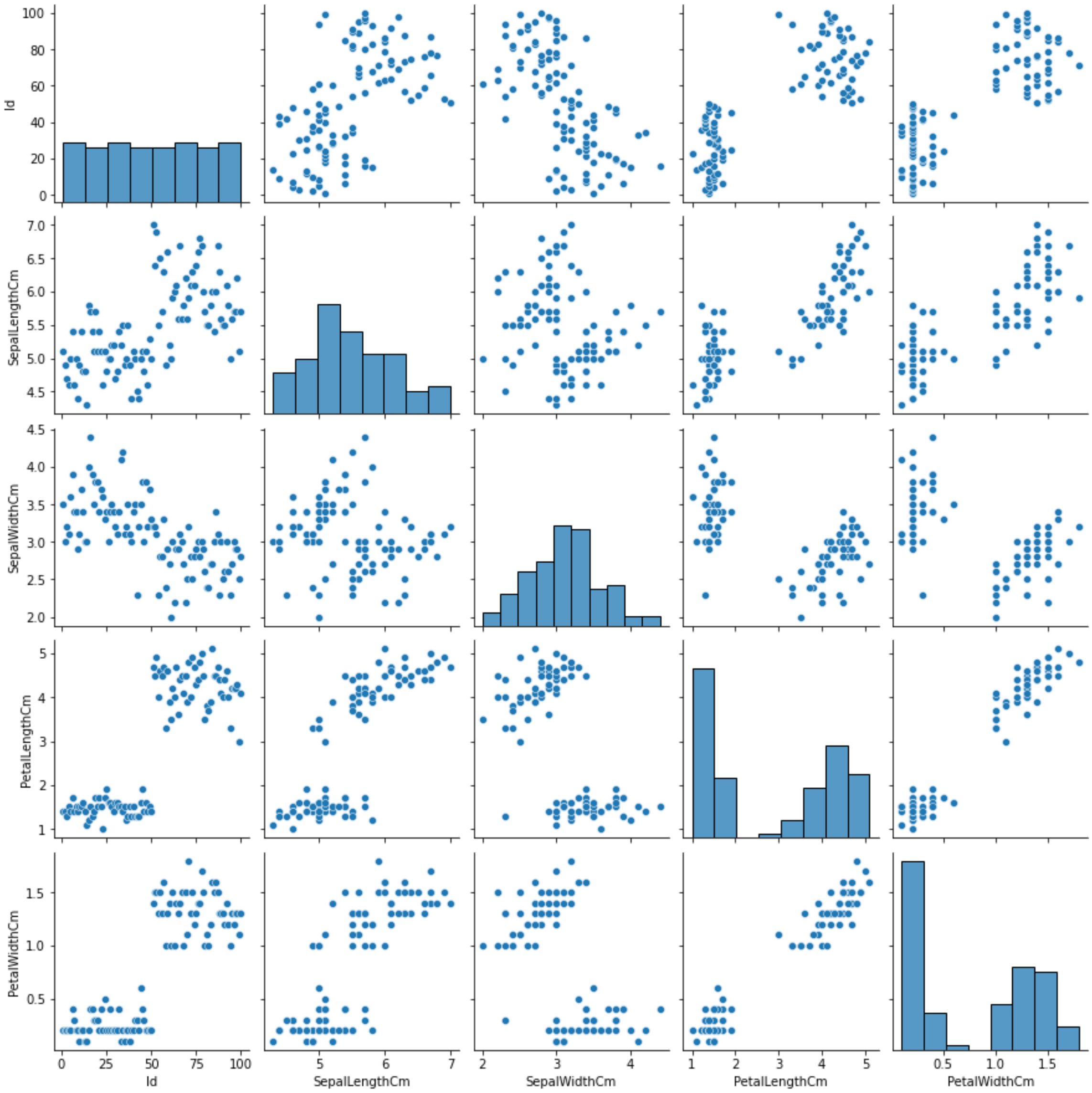
```
Index(['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidth
Cm',
       'Species'],
      dtype='object')
```

In [7]:

```
sns.pairplot(df)
```

Out[7]:

```
<seaborn.axisgrid.PairGrid at 0x2c5f0ade430>
```



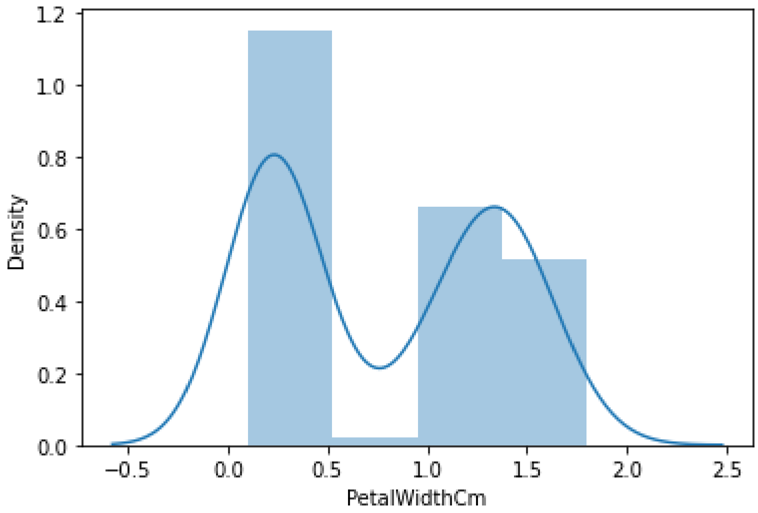
In [8]:

```
sns.distplot(df['PetalWidthCm'])
```

```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2557:
FutureWarning: `distplot` is a deprecated function and will be removed in
a future version. Please adapt your code to use either `displot` (a figure
-level function with similar flexibility) or `histplot` (an axes-level fun
ction for histograms).
  warnings.warn(msg, FutureWarning)
```

Out[8]:

```
<AxesSubplot:xlabel='PetalWidthCm', ylabel='Density'>
```

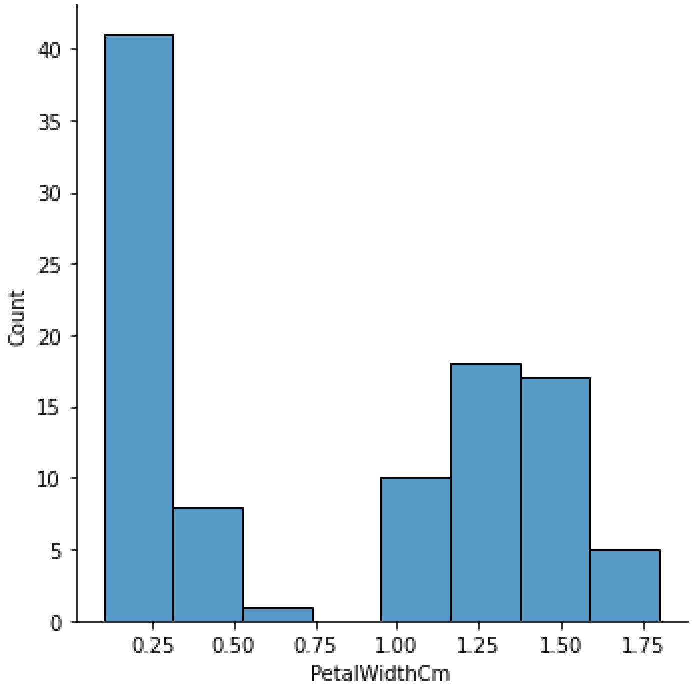


In [9]:

```
sns.displot(df["PetalWidthCm"])
```

Out[9]:

```
<seaborn.axisgrid.FacetGrid at 0x2c5f0adea00>
```



In [10]:

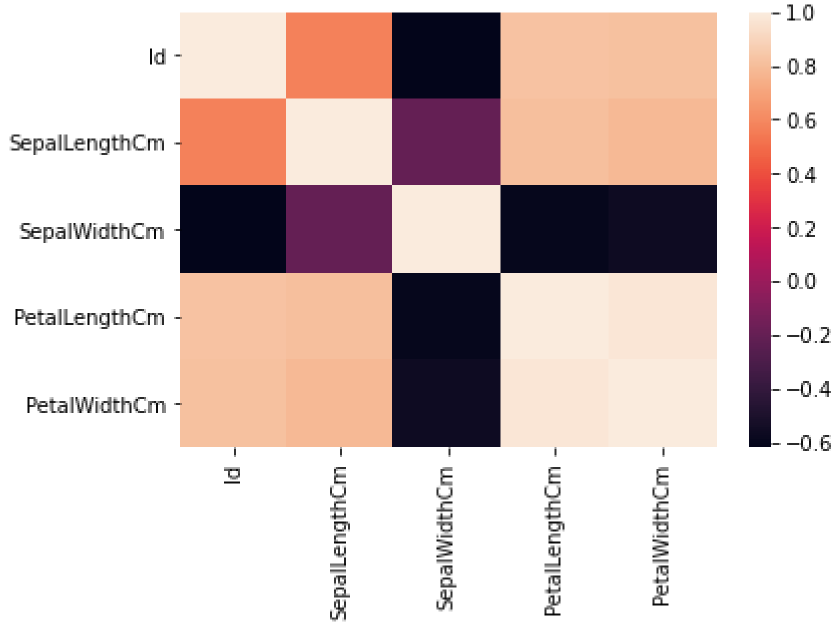
```
df1=df[['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm',
        'Species']]
```

In [11]:

```
sns.heatmap(df1.corr())
```

Out[11]:

```
<AxesSubplot:>
```



In [12]:

```
df2=df.dropna(axis=1)
df2
```

Out[12]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...	...
95	96	5.7	3.0	4.2	1.2	Iris-versicolor
96	97	5.7	2.9	4.2	1.3	Iris-versicolor
97	98	6.2	2.9	4.3	1.3	Iris-versicolor
98	99	5.1	2.5	3.0	1.1	Iris-versicolor
99	100	5.7	2.8	4.1	1.3	Iris-versicolor

100 rows × 6 columns

In [13]:

```
x=df2[['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm']]
y=df2[['PetalWidthCm']]
```

In [14]:

```
from sklearn.model_selection import train_test_split
```

In [15]:

```
x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.3)
```

In [16]:

```
from sklearn.linear_model import LinearRegression

lr=LinearRegression()
lr.fit(x_train,y_train)#ValueError: Input contains NaN, infinity or a value too large for
```

Out[16]:

```
LinearRegression()
```

In [17]:

```
print(lr.intercept_)
```

```
[-0.31660956]
```

In [18]:

```
coef= pd.DataFrame(lr.coef_)
coef
```

Out[18]:

	0	1	2	3
0	0.001277	-0.059526	0.079044	0.394742

In [19]:

```
print(lr.score(x_test,y_test))
```

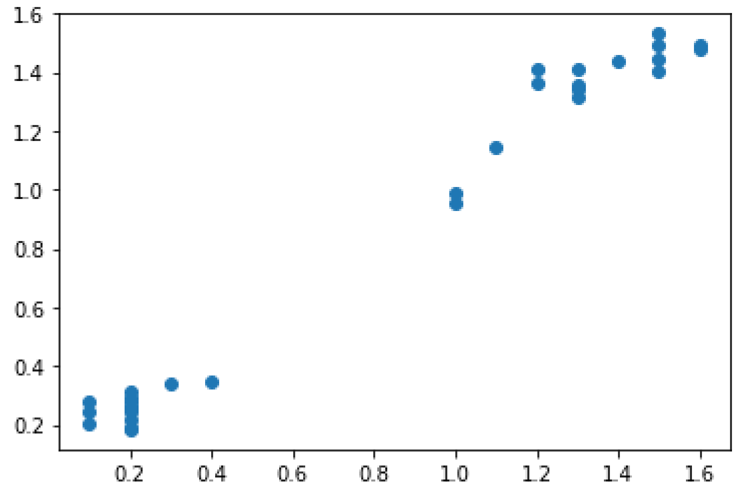
```
0.9767486133710235
```

In [20]:

```
prediction = lr.predict(x_test)
plt.scatter(y_test,prediction)
```

Out[20]:

```
<matplotlib.collections.PathCollection at 0x2c5f3b7ca00>
```



In [21]:

```
lr.score(x_test,y_test)
```

Out[21]:

```
0.9767486133710235
```

In [22]:

```
lr.score(x_train,y_train)
```

Out[22]:

```
0.9521751499397212
```

In [23]:

```
from sklearn.linear_model import Ridge,Lasso
```

In [24]:

```
rr=Ridge(alpha=10)
rr.fit(x_train,y_train)
```

Out[24]:

```
Ridge(alpha=10)
```

In [25]:

```
rr.score(x_test,y_test)
```

Out[25]:

```
0.9564467564018456
```

In [26]:

```
la=Lasso(alpha=10)
la.fit(x_train,y_train)
```

Out[26]:

```
Lasso(alpha=10)
```

In [27]:

```
la.score(x_test,y_test)
```

Out[27]:

```
0.27232056091550005
```

Elastic Net

In [28]:

```
from sklearn.linear_model import ElasticNet
en = ElasticNet()
en.fit(x_train,y_train)
```

Out[28]:

```
ElasticNet()
```

In [29]:

```
print(en.coef_)
```

```
[ 0.01607473  0.          -0.           0.        ]
```

In [30]:

```
print(en.intercept_)
```

```
[-0.02751205]
```

In [31]:

```
prediction=en.predict(x_test)
print(prediction)
```

```
[0.14930995 0.79229903 0.11716049 0.10108577 0.06893631 1.27454084
 1.51566174 0.66370121 0.58332758 0.00463741 1.3709892  0.90482212
 1.49958702 1.48351229 0.1814594  0.27790776 0.42258031 0.13323522
 1.35491447 1.04949466 1.14594302 0.88874739 0.85659794 1.40313865
 0.56725285 0.61547703 1.43528811 1.53173647 0.87267266 0.76014957]
```

In [32]:

```
print(en.score(x_test,y_test))
```

```
0.6372157790265836
```

Evaluation Metrics

In [33]:

```
from sklearn import metrics
```

In [34]:

```
print("Mean Absolute Error:",metrics.mean_absolute_error(y_test,prediction))
```

```
Mean Absolute Error: 0.29383767040477127
```

In [35]:

```
print("Mean Squared Error:",metrics.mean_squared_error(y_test,prediction))
```

```
Mean Squared Error: 0.12346353226883083
```

In [36]:

```
print("Root Mean Squared Error:",np.sqrt(metrics.mean_squared_error(y_test,prediction)))
```

```
Root Mean Squared Error: 0.35137377857323222
```