In [1]:
```
import pandas as pd
import numpy as np
```

In [2]:
```
df2=pd.read_csv('C:/Users/ashiq/Desktop/csv/assignment_4/Salary_Data.csv')
```

In [6]:
```
df1_copy=df2.copy()
```

In [7]:
```
df2.head()
```

Out[7]:

	YearsExperience	Salary
0	1.1	39343.0
1	1.3	46205.0
2	1.5	37731.0
3	2.0	43525.0
4	2.2	39891.0

In [8]:
```
df2.shape
```

Out[8]:
```
(30, 2)
```

In [9]:
```
df2.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 30 entries, 0 to 29
Data columns (total 2 columns):
 #   Column           Non-Null Count  Dtype  
---  ------           --------------  -----  
 0   YearsExperience  30 non-null     float64
 1   Salary           30 non-null     float64
dtypes: float64(2)
memory usage: 608.0 bytes
```

In [10]:
```
df2.describe()
```

Out[10]:

	YearsExperience	Salary
count	30.000000	30.000000
mean	5.313333	76003.000000
std	2.837888	27414.429785
min	1.100000	37731.000000
25%	3.200000	56720.750000
50%	4.700000	65237.000000
75%	7.700000	100544.750000
max	10.500000	122391.000000

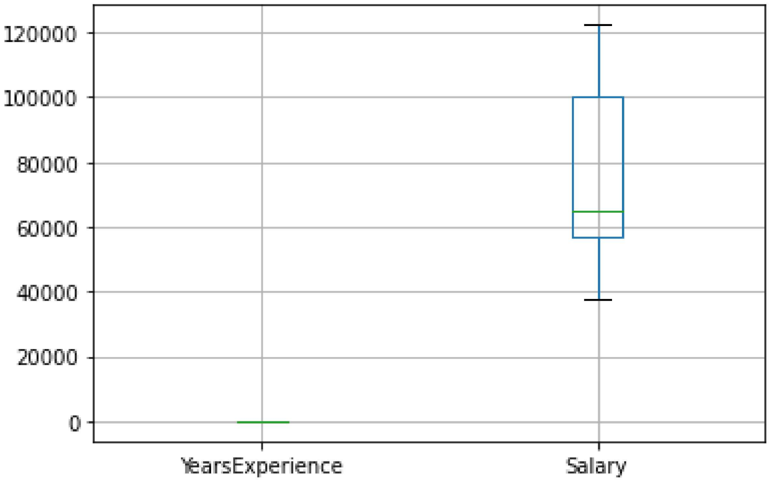
In [11]:
```
df2.corr()
```

Out[11]:

	YearsExperience	Salary
YearsExperience	1.000000	0.978242
Salary	0.978242	1.000000

In [12]:
```
df2.boxplot()
```

Out[12]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1abb8f804f0>
```



In [13]:
```
array=df2.values
```

In [14]:
```
from sklearn.preprocessing import MinMaxScaler
scaler = MinMaxScaler(feature_range=(0,1))
rescaledX = scaler.fit_transform(array[:,0:2])
```

In [15]:
```
rescaledX
```

Out[15]:
```
array([[0.        , 0.01904087],
       [0.0212766 , 0.1000945 ],
       [0.04255319, 0.        ],
       [0.09574468, 0.06843846],
       [0.11702128, 0.02551382],
       [0.19148936, 0.22337586],
       [0.20212766, 0.26481219],
       [0.22340426, 0.19742499],
       [0.22340426, 0.31554453],
       [0.27659574, 0.229837  ],
       [0.29787234, 0.30105126],
       [0.30851064, 0.21335932],
       [0.30851064, 0.22709662],
       [0.31914894, 0.2285613 ],
       [0.36170213, 0.27616348],
       [0.40425532, 0.35680369],
       [0.42553191, 0.33425467],
       [0.44680851, 0.53575478],
       [0.5106383 , 0.51537916],
       [0.5212766 , 0.66393811],
       [0.60638298, 0.63792818],
       [0.63829787, 0.7151193 ],
       [0.72340426, 0.75089771],
       [0.75531915, 0.89866525],
       [0.80851064, 0.84691708],
       [0.84042553, 0.80145287],
       [0.89361702, 0.93595559],
       [0.90425532, 0.88476258],
       [0.9787234 , 1.        ],
       [1.        , 0.9938696 ]])
```

In [16]:
```
column_values = ['YearsExperience','Salary']
df = pd.DataFrame(data = rescaledX,
                  columns = column_values)
```

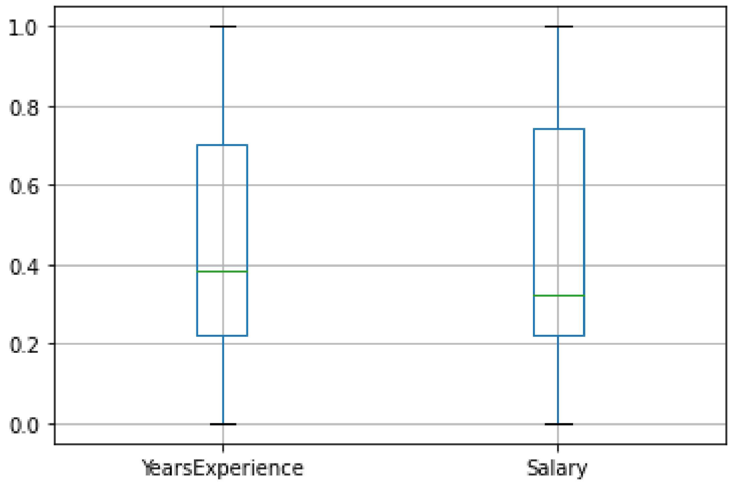
```
In [17]: df
```

Out[17]:

	YearsExperience	Salary
0	0.000000	0.019041
1	0.021277	0.100094
2	0.042553	0.000000
3	0.095745	0.068438
4	0.117021	0.025514
5	0.191489	0.223376
6	0.202128	0.264812
7	0.223404	0.197425
8	0.223404	0.315545
9	0.276596	0.229837
10	0.297872	0.301051
11	0.308511	0.213359
12	0.308511	0.227097
13	0.319149	0.228561
14	0.361702	0.276163
15	0.404255	0.356804
16	0.425532	0.334255
17	0.446809	0.535755
18	0.510638	0.515379
19	0.521277	0.663938
20	0.606383	0.637928
21	0.638298	0.715119
22	0.723404	0.750898
23	0.755319	0.898665
24	0.808511	0.846917
25	0.840426	0.801453
26	0.893617	0.935956
27	0.904255	0.884763
28	0.978723	1.000000
29	1.000000	0.993870

In [18]:
```
df.boxplot()
```

Out[18]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1abbb6b7c40>
```



In [19]:
```
df.corr()
```

Out[19]:

	YearsExperience	Salary
YearsExperience	1.000000	0.978242
Salary	0.978242	1.000000

In [20]:
```
from scipy.stats import kurtosis
from scipy.stats import skew
(kurtosis(df['YearsExperience']),skew(df['Salary']))
```

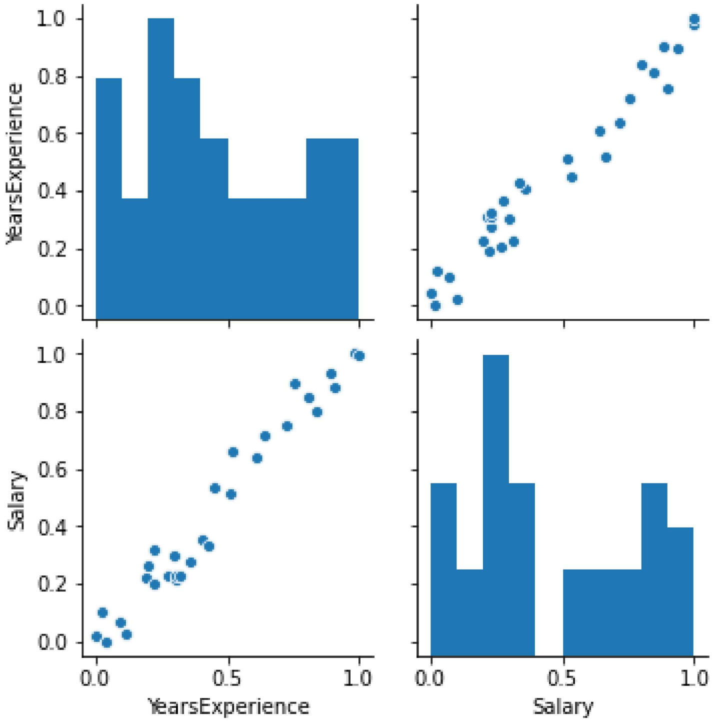
Out[20]:
```
(-1.0447521989892934, 0.3361618825592921)
```

In [21]:
```
(skew(df['YearsExperience']),skew(df['Salary']))
```

Out[21]:
```
(0.3603123252525565, 0.3361618825592921)
```

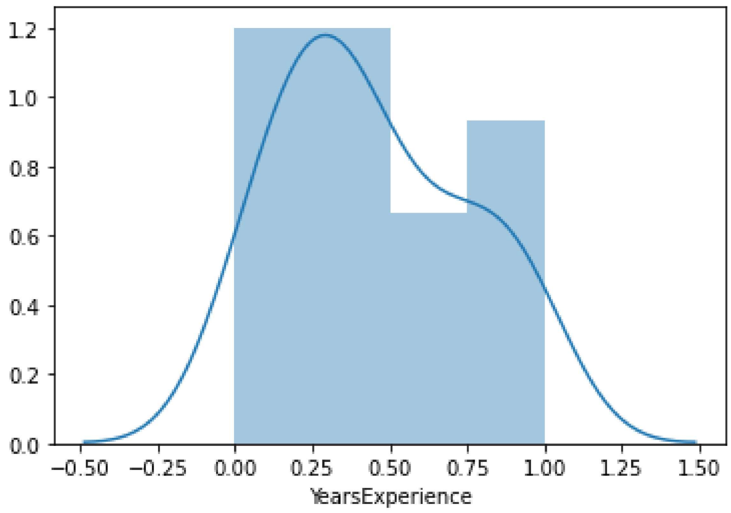
In [22]:
```
import seaborn as sns
sns.pairplot(df)
```

Out[22]:
```
<seaborn.axisgrid.PairGrid at 0x1abbb7346d0>
```



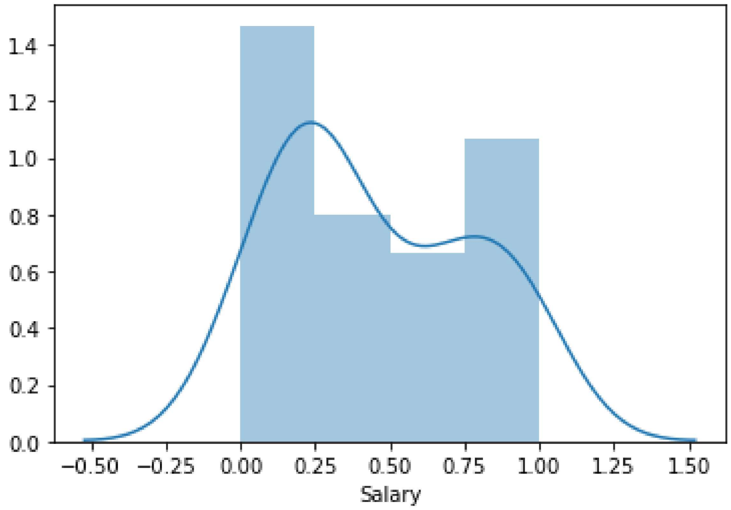
In [23]:
```
sns.distplot(df.YearsExperience)
```

Out[23]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1abbbb5c070>
```



In [24]:
```
sns.distplot(df.Salary)
```

Out[24]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x1abbbc2a760>
```



In [25]:

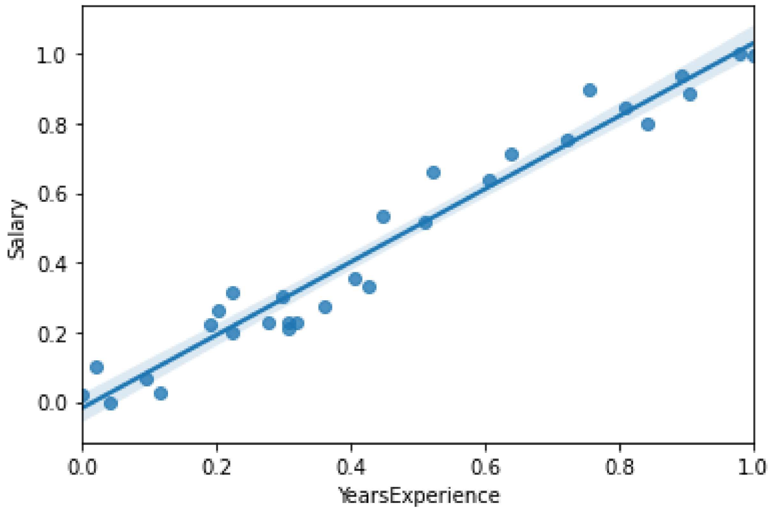
```
import statsmodels.formula.api as smf
model1=smf.ols('df.Salary~df.YearsExperience', data= df).fit()
```

In [26]:

```
sns.regplot(x=df.YearsExperience,y=df.Salary, data=df)
```

Out[26]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x1abbbf990d0>
```



In [27]:

```
model1.params
```

Out[27]:

```
Intercept             -0.018236
df.YearsExperience     1.049252
dtype: float64
```

In [28]:

```
(model1.tvalues, model1.pvalues)
```

Out[28]:

```
(Intercept              -0.806598
 df.YearsExperience     24.950094
 dtype: float64,
 Intercept              4.266967e-01
 df.YearsExperience     1.143068e-20
 dtype: float64)
```

In [29]:

```
(model1.rsquared,model1.rsquared_adj)
```

Out[29]:

```
(0.9569566641435086, 0.9554194021486339)
```

In [ ]:

standard scalar

In [30]:

```
from sklearn.preprocessing import StandardScaler
```

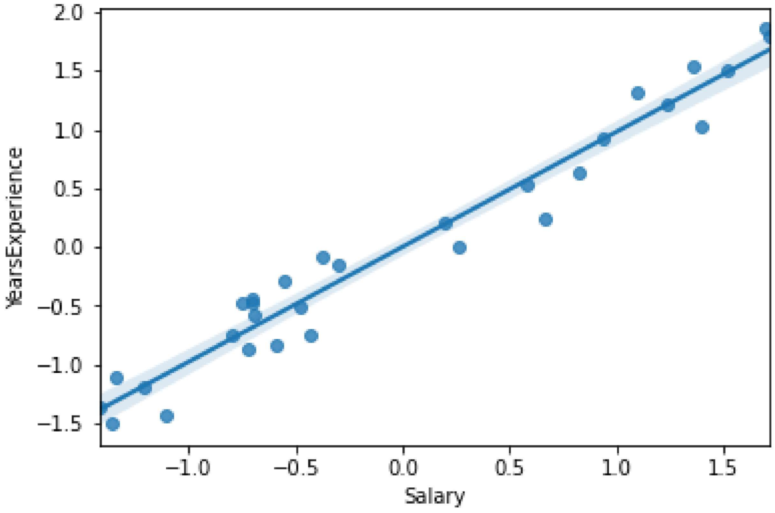
```
In [31]: array = df1_copy.values
         scaler = StandardScaler().fit(array)
         rescaledX = scaler.transform(array)
```

```
In [32]: column_values = ['YearsExperience','Salary']
         df3 = pd.DataFrame(data = rescaledX,
                           columns = column_values)
```

```
In [35]: model2=smf.ols('df.Salary~df.YearsExperience', data= df3).fit()
```

```
In [36]: sns.regplot(x=df3.Salary,y=df3.YearsExperience, data=df3)

Out[36]: <matplotlib.axes._subplots.AxesSubplot at 0x1abbc3f2d00>
```



```
In [37]: model2.params

Out[37]: Intercept            -0.018236
         df.YearsExperience    1.049252
         dtype: float64
```

```
In [38]: (model2.tvalues, model2.pvalues)

Out[38]: (Intercept             -0.806598
          df.YearsExperience    24.950094
          dtype: float64,
          Intercept             4.266967e-01
          df.YearsExperience    1.143068e-20
          dtype: float64)
```

```
In [39]: (model2.rsquared,model2.rsquared_adj)

Out[39]: (0.9569566641435086, 0.9554194021486339)
```

```
In [ ]:
```

log

```
In [48]: from numpy import log
```

```
In [49]: data4 = log(df1_copy)
```

```
In [50]: data4
```

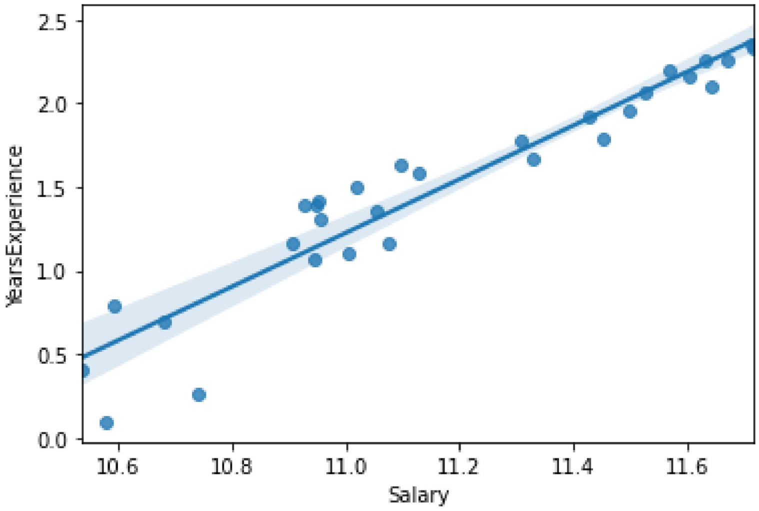
```
...
```

```
In [ ]:
```

```
In [51]: model3=smf.ols('data4.Salary~data4.YearsExperience', data= data4).fit()
```

```
In [52]: sns.regplot(x=data4.Salary,y=data4.YearsExperience, data=data4)
```

```
Out[52]: <matplotlib.axes._subplots.AxesSubplot at 0x1abbc65b910>
```



```
In [53]: model3.params
```

```
Out[53]: Intercept               10.328043
         data4.YearsExperience    0.562089
         dtype: float64
```

```
In [54]: (model3.tvalues, model3.pvalues)
```

```
Out[54]: (Intercept                184.867959
          data4.YearsExperience     16.352542
          dtype: float64,
          Intercept                9.073132e-45
          data4.YearsExperience    7.395278e-16
          dtype: float64)
```

```
In [55]: (model3.rsquared,model3.rsquared_adj)
```

```
Out[55]: (0.9052150725817149, 0.9018298966024904)
```

```
In [ ]:
```

robust scalar

```
In [56]: from sklearn.preprocessing import RobustScaler
         array = df1_copy.values
```

```
In [57]:  transformer = RobustScaler().fit_transform(array)
```

```
In [58]: column_values = ['Salary','YearsExperience']
         df4 = pd.DataFrame(data = transformer,
                           columns = column_values)
```

```
In [59]: model4=smf.ols('df4.Salary~df4.YearsExperience', data= df4).fit()
```

```
In [60]: model4.params
```

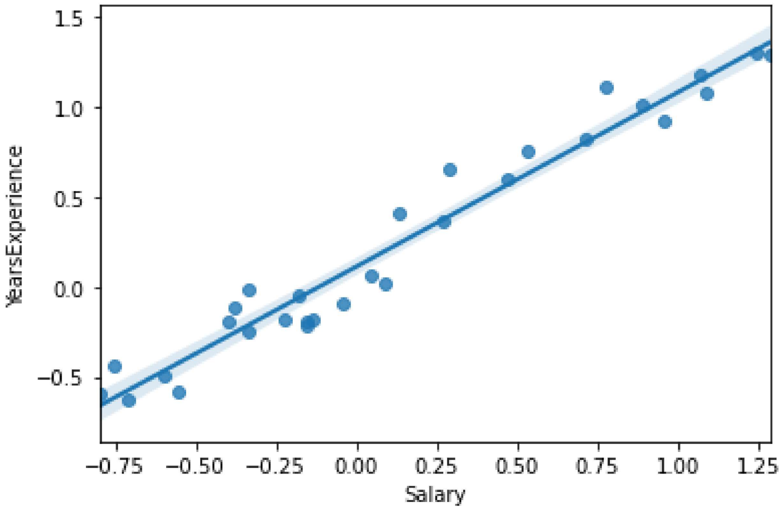
```
Out[60]: Intercept             -0.105976
         df4.YearsExperience    0.986192
         dtype: float64
```

```
In [61]: (model4.tvalues, model4.pvalues)
```

```
Out[61]: (Intercept              -4.048275
          df4.YearsExperience    24.950094
          dtype: float64,
          Intercept              3.691400e-04
          df4.YearsExperience    1.143068e-20
          dtype: float64)
```

```
In [63]: sns.regplot(x=df4.Salary,y=df4.YearsExperience, data=df4)
```

```
Out[63]: <matplotlib.axes._subplots.AxesSubplot at 0x1abbc6cba60>
```



```
In [64]: (model4.rsquared,model4.rsquared_adj)
```

```
Out[64]: (0.9569566641435086, 0.9554194021486339)
```

```
In [ ]:
```