In [256]:
```
%matplotlib inline

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

In [257]:
```
df = pd.read_csv("transistors.csv")
df.head()
```

Out[257]:

	Year	Transistors
0	1971.875000	2.308242
1	1972.307692	3.554522
2	1974.326923	6.097562
3	1979.567308	29.163776
4	1982.307692	135.772714

In [259]:
```
df.dtypes
```

Out[259]:
```
Year            float64
Transistors     float64
dtype: object
```

In [260]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 94 entries, 0 to 93
Data columns (total 2 columns):
Year            94 non-null float64
Transistors     94 non-null float64
dtypes: float64(2)
memory usage: 1.5 KB
```

In [261]:
```
df.describe()
```

Out[261]:

	Year	Transistors
count	94.000000	9.400000e+01
mean	2002.756170	1.789723e+06
std	10.255492	5.175470e+06
min	1971.875000	2.308242e+00
25%	1996.538462	5.803409e+03
50%	2004.230769	1.139410e+05
75%	2009.699519	1.078961e+06
max	2019.800000	3.950000e+07

In [263]:
```
df["Transistors"].mean()
```

Out[263]:
```
1789723.3063059782
```

In [264]:
```
df.skew()
```

Out[264]:
```
Year            -0.830479
Transistors      5.293559
dtype: float64
```

In [265]:
```
df.kurtosis()
```

Out[265]:
```
Year             0.860388
Transistors     33.022052
dtype: float64
```

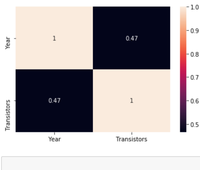
In [266]:
```
df.corr()
```

Out[266]:

	Year	Transistors
Year	1.000000	0.465537
Transistors	0.465537	1.000000

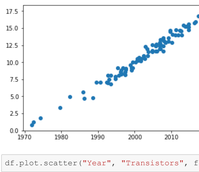
In [267]:
```
import seaborn as sns
sns.heatmap(df.corr(), annot=True)
```

Out[267]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x23dd711d5c0>
```



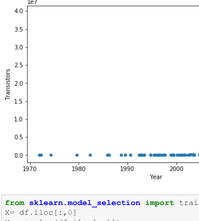
In [273]:
```

```

Out[273]:
```
<matplotlib.collections.PathCollection at 0x23dd4ca85c0>
```



In [276]:
```
df.plot.scatter("Year", "Transistors", figsize=(8,5))
```

Out[276]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x23dd74224e0>
```



In [287]:
```
from sklearn.model_selection import train_test_split
X= df.iloc[:,0]
Y = np.log(df.iloc[:,1])
X_train, X_test, Y_train, Y_test = train_test_split(X,Y,test_size=1/3.0, random_state=0)
X_train = X_train.values.reshape(-1,1)
```

In [288]:
```
from sklearn.linear_model import LinearRegression

regressor = LinearRegression()
regressor.fit(X_train, Y_train)
```

Out[288]:
```
LinearRegression(copy_X=True, fit_intercept=True, n_jobs=None,
         normalize=False)
```

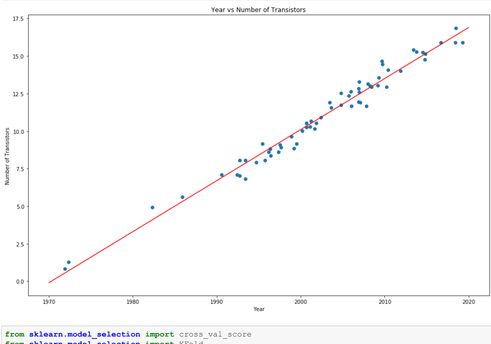
In [289]:
```
Y_pred = regressor.predict(X_test.values.reshape(-1,1))
Y_pred
```

Out[289]:
```
array([ 1.37428051,  9.80750108, 12.4551401 ,  8.30390362,  7.73188284,
        12.73297876, 12.74932221, 14.48695789,  9.92190524, 14.41896914,
        14.31698601,  6.24462883, 12.07924073, 16.05069926, 16.83256994,
        12.70029186,  6.52246749,  8.85958094, 13.89545573, 11.2947551 ,
         9.23548031, 11.08229024,  9.02301545,  5.42745629, 11.04960334,
        11.73602827, 13.94984673, 14.91528705, 14.32038544, 15.65296504,
        15.13964994,  3.15571664])
```

In [290]:
```
Y_test
```

Out[290]:
```
2      1.807889
30     9.147379
56    12.412373
16     7.555357
13     7.447424
61    12.358406
62    13.599643
79    13.997832
33     9.983865
78    14.557448
76    14.690979
7      4.803049
51    11.629854
89    16.770421
93    17.491811
60    13.275842
8      7.096639
22     8.202959
73    13.972514
45    10.901301
26     8.175976
43    12.304439
24     9.174362
6      4.695115
42    10.550517
48    11.575887
74    14.771022
82    15.274126
77    14.648420
87    15.789592
86    15.555977
3      3.372927
Name: Transistors, dtype: float64
```

In [291]:
```
fig = plt.figure(figsize = (16,10))
plt.scatter(X_train, Y_train)
plt.plot(np.arange(1970,2021, 1), regressor.predict(np.arange(1970,2021,1).reshape(-1,1)),color="red")
plt.title("Year vs Number of Transistors")
plt.xlabel("Year")
plt.ylabel("Number of Transistors")
plt.show()
```



In [292]:
```
from sklearn.model_selection import cross_val_score
from sklearn.model_selection import KFold
```

In [294]:
```
k=5
kf =KFold(n_splits=k, random_state=None)
result = cross_val_score(regressor, X_train, Y_train, cv =kf)
print("Avg accuracy : {}".format(result.mean()))
```

```
Avg accuracy : 0.9684925935287408
```

In [ ]:
```

```