In [1]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import statsmodels.formula.api as smf
```

In [2]:

```
#Importing the dataset
df = pd.DataFrame (data= {'YearsExperience':[1.1,1.3,1.5,2,2.2,2.9,3,3.2,3.2,3.7,3.9,4,4,4.1,4.5,4.9,5.1,5.3,
                          5.9,6,6.8,7.1,7.9,8.2,8.7,9,9.5,9.6,10.3,10.5],
              'Salary':[39343,46205,37731,43525,39891,56642,60150,54445,64445,57189,63218,55794,
                    56957,57081,61111,67938,66029,83088,81363,93940,91738,98273,101302,113812,
                    109431,105582,116969,112635,122391,121872]})
```

In [3]:

```
df.head()
```

Out[3]:

	YearsExperience	Salary
0	1.1	39343
1	1.3	46205
2	1.5	37731
3	2.0	43525
4	2.2	39891

In [4]:

```
df.describe()
```

Out[4]:

	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 [5]:

```
#Renaming the columns for ease of usage
df1=df.rename({'YearsExperience':'YExp', 'Salary':'Sal'},axis=1)
```

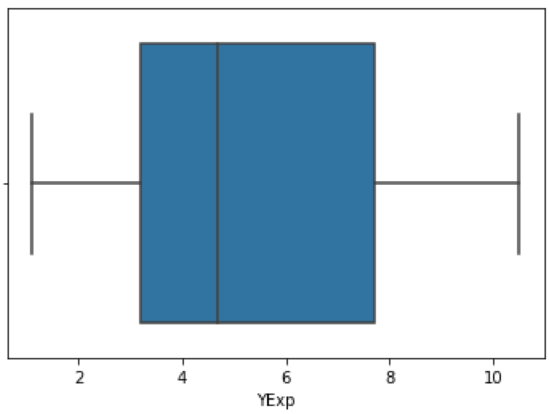
CHECKING FOR OUTLIERS

In [6]:

```
sns.boxplot(x='YExp', data=df1)
```

Out[6]:

```
<AxesSubplot:xlabel='YExp'>
```

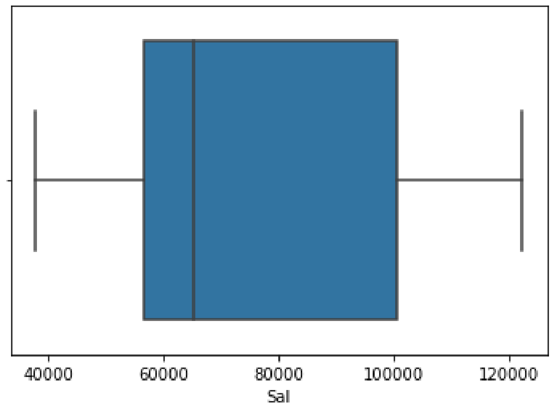


In [7]:

```
sns.boxplot(x='Sal', data=df1)
```

Out[7]:

<AxesSubplot:xlabel='Sal'>

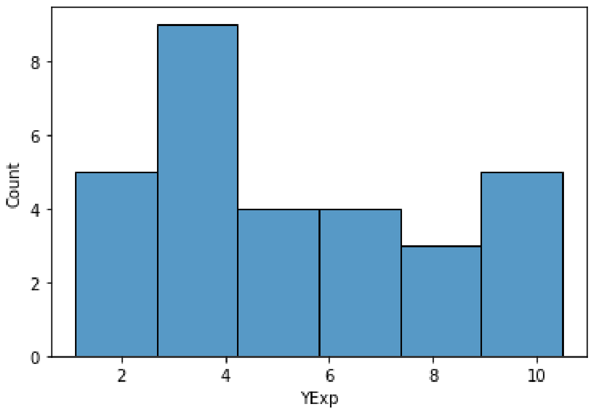


In [8]:

```
sns.histplot(df1.YExp)
```

Out[8]:

<AxesSubplot:xlabel='YExp', ylabel='Count'>

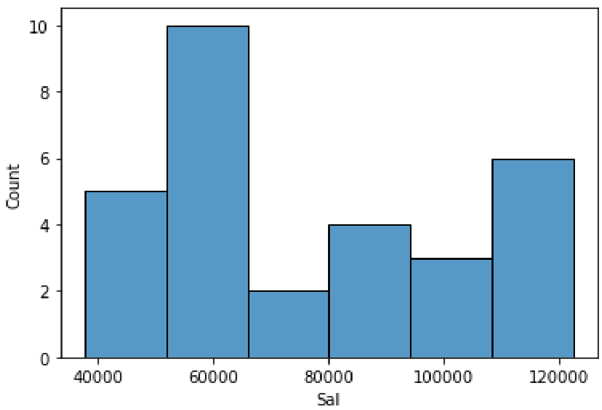


In [9]:

```
sns.histplot(df1.Sal)
```

Out[9]:

<AxesSubplot:xlabel='Sal', ylabel='Count'>



Checking for duplicated rows

In [10]:

```
df1[df1.duplicated()].shape
```

Out[10]:

(0, 2)

Building the model

In [11]:

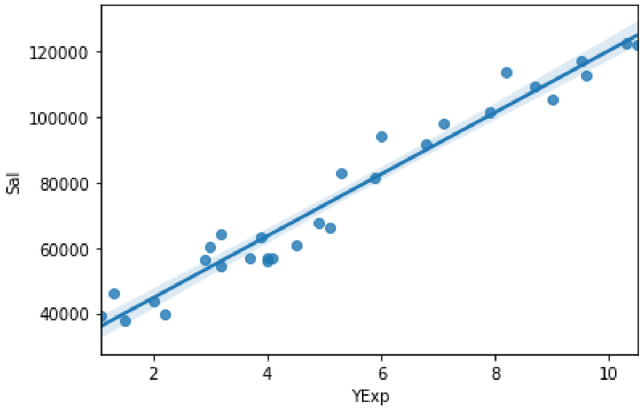
```
model = smf.ols('Sal~YExp', data=df1).fit()
```

In [12]:

```
sns.regplot(x='YExp', y='Sal', data=df1)
```

Out[12]:

<AxesSubplot:xlabel='YExp', ylabel='Sal'>



In [13]:

```
model.params
```

Out[13]:

```
Intercept    25792.200199
YExp          9449.962321
dtype: float64
```

In [14]:

```
print('pvalue:', model.pvalues, '\n','\n','Rsquared value is:', model.rsquared, '\n','\n',
      'Adjusted Rsquared value is:', model.rsquared_adj)
```

```
pvalue: Intercept    5.511950e-12
YExp         1.143068e-20
dtype: float64

 Rsquared value is: 0.9569566641435086

 Adjusted Rsquared value is: 0.9554194021486339
```

In [15]:

```
#The R-Squared value is >0.95, hence we can say it's an excellent model and there's no need for any interation.
```

Predicting the existing data

In [16]:

```
pred = pd.DataFrame (model.predict(df1), columns=['Predicted Salary'])
```

In [17]:

```
pred
```

Out[17]:

	Predicted Salary
0	36187.158752
1	38077.151217
2	39967.143681
3	44692.124842
4	46582.117306
5	53197.090931
6	54142.087163
7	56032.079627
8	56032.079627
9	60757.060788
10	62647.053252
11	63592.049484
12	63592.049484
13	64537.045717
14	68317.030645
15	72097.015574
16	73987.008038
17	75877.000502
18	81546.977895
19	82491.974127
20	90051.943985
21	92886.932681
22	100446.902538
23	103281.891235
24	108006.872395
25	110841.861092
26	115566.842252
27	116511.838485
28	123126.812110
29	125016.804574

In [18]:

```
pred1 = pd.concat([df1, pred], axis=1)
```

In [20]:

```
pred1
```

Out[20]:

	YExp	Sal	Predicted Salary
0	1.1	39343	36187.158752
1	1.3	46205	38077.151217
2	1.5	37731	39967.143681
3	2.0	43525	44692.124842
4	2.2	39891	46582.117306
5	2.9	56642	53197.090931
6	3.0	60150	54142.087163
7	3.2	54445	56032.079627
8	3.2	64445	56032.079627
9	3.7	57189	60757.060788
10	3.9	63218	62647.053252
11	4.0	55794	63592.049484
12	4.0	56957	63592.049484
13	4.1	57081	64537.045717
14	4.5	61111	68317.030645
15	4.9	67938	72097.015574
16	5.1	66029	73987.008038
17	5.3	83088	75877.000502
18	5.9	81363	81546.977895
19	6.0	93940	82491.974127
20	6.8	91738	90051.943985
21	7.1	98273	92886.932681
22	7.9	101302	100446.902538
23	8.2	113812	103281.891235
24	8.7	109431	108006.872395
25	9.0	105582	110841.861092
26	9.5	116969	115566.842252
27	9.6	112635	116511.838485
28	10.3	122391	123126.812110
29	10.5	121872	125016.804574

In [21]:

```
Error = pd.DataFrame ((pred1['Sal']- pred1['Predicted Salary']), columns=['Error'])
```

In [22]:

```
final = pd.concat ([pred1, Error], axis=1)
```

In [23]:

```
final
```

Out[23]:

	YExp	Sal	Predicted Salary	Error
0	1.1	39343	36187.158752	3155.841248
1	1.3	46205	38077.151217	8127.848783
2	1.5	37731	39967.143681	-2236.143681
3	2.0	43525	44692.124842	-1167.124842
4	2.2	39891	46582.117306	-6691.117306
5	2.9	56642	53197.090931	3444.909069
6	3.0	60150	54142.087163	6007.912837
7	3.2	54445	56032.079627	-1587.079627
8	3.2	64445	56032.079627	8412.920373
9	3.7	57189	60757.060788	-3568.060788
10	3.9	63218	62647.053252	570.946748
11	4.0	55794	63592.049484	-7798.049484
12	4.0	56957	63592.049484	-6635.049484
13	4.1	57081	64537.045717	-7456.045717
14	4.5	61111	68317.030645	-7206.030645
15	4.9	67938	72097.015574	-4159.015574
16	5.1	66029	73987.008038	-7958.008038
17	5.3	83088	75877.000502	7210.999498
18	5.9	81363	81546.977895	-183.977895
19	6.0	93940	82491.974127	11448.025873
20	6.8	91738	90051.943985	1686.056015
21	7.1	98273	92886.932681	5386.067319
22	7.9	101302	100446.902538	855.097462
23	8.2	113812	103281.891235	10530.108765
24	8.7	109431	108006.872395	1424.127605
25	9.0	105582	110841.861092	-5259.861092
26	9.5	116969	115566.842252	1402.157748
27	9.6	112635	116511.838485	-3876.838485
28	10.3	122391	123126.812110	-735.812110
29	10.5	121872	125016.804574	-3144.804574

Predicting the new data

In [24]:

```
new_data= pd.Series([5,7,11,15,20])
```

In [25]:

```
pred_new = pd.DataFrame(new_data, columns=['YExp'])
```

In [26]:

```
model.predict(pred_new)
```

Out[26]:

```
0     73042.011806
1     91941.936449
2    129741.785735
3    167541.635020
4    214791.446628
dtype: float64
```

In [ ]: