In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

In [2]:
```
pd.__version__
```

Out[2]:
```
'2.2.3'
```

In [3]:
```
emp = pd.read_excel(r"C:\Users\rajendra damahe\Downloads\Rawdata.xlsx")
```

In [4]:
```
emp
```

Out[4]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience#$	34 years	Mumbai	5^00#0	2+
1	Teddy^	Testing	45' yr	Bangalore	10%%000	<3
2	Uma#r	Dataanalyst^^#	NaN	NaN	1$5%000	4> yrs
3	Jane	Ana^^lytics	NaN	Hyderbad	2000^0	NaN
4	Uttam*	Statistics	67-yr	NaN	30000-	5+ year
5	Kim	NLP	55yr	Delhi	6000^$0	10+

In [5]:
```
id(emp)
```

Out[5]:
```
2424344099008
```

In [6]:
```
emp.columns
```

Out[6]:
```
Index(['Name', 'Domain', 'Age', 'Location', 'Salary', 'Exp'], dtype='object')
```

In [7]:
```
emp.shape
```

Out[7]:
```
(6, 6)
```

In [8]:
```
emp.head()
```

Out[8]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience#$	34 years	Mumbai	5^00#0	2+
1	Teddy^	Testing	45' yr	Bangalore	10%%000	<3
2	Uma#r	Dataanalyst^^#	NaN	NaN	1$5%000	4> yrs
3	Jane	Ana^^lytics	NaN	Hyderbad	2000^0	NaN
4	Uttam*	Statistics	67-yr	NaN	30000-	5+ year

In [9]:
```
emp.tail()
```

Out[9]:

	Name	Domain	Age	Location	Salary	Exp
1	Teddy^	Testing	45' yr	Bangalore	10%%000	<3
2	Uma#r	Dataanalyst^^#	NaN	NaN	1$5%000	4> yrs
3	Jane	Ana^^lytics	NaN	Hyderbad	2000^0	NaN
4	Uttam*	Statistics	67-yr	NaN	30000-	5+ year
5	Kim	NLP	55yr	Delhi	6000^$0	10+

In [10]:
```
emp.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6 entries, 0 to 5
Data columns (total 6 columns):
 #   Column    Non-Null Count  Dtype 
---  ------    --------------  ----- 
 0   Name      6 non-null      object
 1   Domain    6 non-null      object
 2   Age       4 non-null      object
 3   Location  4 non-null      object
 4   Salary    6 non-null      object
 5   Exp       5 non-null      object
dtypes: object(6)
memory usage: 420.0+ bytes
```

In [11]:
```
emp.isnull()
```

Out[11]:

	Name	Domain	Age	Location	Salary	Exp
0	False	False	False	False	False	False
1	False	False	False	False	False	False
2	False	False	True	True	False	False
3	False	False	True	False	False	True
4	False	False	False	True	False	False
5	False	False	False	False	False	False

In [12]:
```
emp.isnull().sum()
```

Out[12]:
```
Name        0
Domain      0
Age         2
Location    2
Salary      0
Exp         1
dtype: int64
```

DATA CLEANNING

In [13]:
```
emp['Name']
```

Out[13]:
```
0      Mike
1    Teddy^
2     Uma#r
3      Jane
4    Uttam*
5       Kim
Name: Name, dtype: object
```

In [14]:
```
emp['Name'] = emp['Name'].str.replace(r'\W','',regex=True)
```

In [15]:
```
emp['Name']
```

Out[15]:
```
0     Mike
1    Teddy
2     Umar
3     Jane
4    Uttam
5      Kim
Name: Name, dtype: object
```

In [16]:
```
emp.columns
```

Out[16]:
```
Index(['Name', 'Domain', 'Age', 'Location', 'Salary', 'Exp'], dtype='object')
```

In [17]:
```
emp['Domain']
```

Out[17]:
```
0     Datascience#$
1           Testing
2    Dataanalyst^^#
3       Ana^^lytics
4        Statistics
5               NLP
Name: Domain, dtype: object
```

In [18]:
```
emp['Domain']=emp['Domain'].str.replace(r'\W','',regex=True)
```

In [19]:
```
emp['Domain']
```

Out[19]:
```
0    Datascience
1        Testing
2    Dataanalyst
3      Analytics
4     Statistics
5            NLP
Name: Domain, dtype: object
```

In [20]:
```
emp['Location']=emp['Location'].str.replace(r'\W','',regex=True)
```

In [21]:
```
emp['Location']
```

Out[21]:
```
0       Mumbai
1    Bangalore
2          NaN
3     Hyderbad
4          NaN
5        Delhi
Name: Location, dtype: object
```

In [22]:
```
emp['Age'] = emp['Age'].str.extract('(\\d+)') # r(r'(\\d+)')
```

In [23]:
```
emp['Age']
```

Out[23]:
```
0     34
1     45
2    NaN
3    NaN
4     67
5     55
Name: Age, dtype: object
```

In [24]:
```
emp
```

Out[24]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5^00#0	2+
1	Teddy	Testing	45	Bangalore	10%%000	<3
2	Umar	Dataanalyst	NaN	NaN	1$5%000	4> yrs
3	Jane	Analytics	NaN	Hyderbad	2000^0	NaN
4	Uttam	Statistics	67	NaN	30000-	5+ year
5	Kim	NLP	55	Delhi	6000^$0	10+

In [25]:
```
emp['Salary'] = emp['Salary'].str.replace(r'\W','',regex=True)
```

In [26]:
```
emp['Salary']
```

Out[26]:
```
0     5000
1    10000
2    15000
3    20000
4    30000
5    60000
Name: Salary, dtype: object
```

In [27]:
```
emp['Exp'] = emp['Exp'].str.extract('(\\d+)')
```

In [28]:
```
emp['Exp']
```

Out[28]:
```
0      2
1      3
2      4
3    NaN
4      5
5     10
Name: Exp, dtype: object
```

In [29]:
```
clean_data=emp.copy()
```

In [30]:
```
clean_data
```

Out[30]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5000	2
1	Teddy	Testing	45	Bangalore	10000	3
2	Umar	Dataanalyst	NaN	NaN	15000	4
3	Jane	Analytics	NaN	Hyderbad	20000	NaN
4	Uttam	Statistics	67	NaN	30000	5
5	Kim	NLP	55	Delhi	60000	10

In [31]:
```
clean_data.isnull().sum()
```

Out[31]:
```
Name        0
Domain      0
Age         2
Location    2
Salary      0
Exp         1
dtype: int64
```

In [32]:
```
clean_data['Age']
```

Out[32]:
```
0     34
1     45
2    NaN
3    NaN
4     67
5     55
Name: Age, dtype: object
```

In [39]:
```
clean_data['Age'] = clean_data['Age'].fillna(np.mean(pd.to_numeric(clean_data['Age'
```

In [40]:
```
clean_data['Age']
```

Out[40]:
```
0       34
1       45
2    50.25
3    50.25
4       67
5       55
Name: Age, dtype: object
```

In [41]:
```
clean_data['Exp']
```

Out[41]:
```
0      2
1      3
2      4
3    4.8
4      5
5     10
Name: Exp, dtype: object
```

In [42]:
```
clean_data['Exp'] = clean_data['Exp'].fillna(np.mean(pd.to_numeric(clean_data['Exp'
```

In [43]:
```
clean_data['Exp']
```

Out[43]:
```
0      2
1      3
2      4
3    4.8
4      5
5     10
Name: Exp, dtype: object
```

In [44]:
```
clean_data
```

Out[44]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5000	2
1	Teddy	Testing	45	Bangalore	10000	3
2	Umar	Dataanalyst	50.25	NaN	15000	4
3	Jane	Analytics	50.25	Hyderbad	20000	4.8
4	Uttam	Statistics	67	NaN	30000	5
5	Kim	NLP	55	Delhi	60000	10

In [45]:
```
clean_data['Location'].isnull().sum()
```

Out[45]:
```
np.int64(2)
```

In [46]:
```
clean_data['Location']
```

Out[46]:
```
0       Mumbai
1    Bangalore
2          NaN
3     Hyderbad
4          NaN
5        Delhi
Name: Location, dtype: category
Categories (4, object): ['Bangalore', 'Delhi', 'Hyderbad', 'Mumbai']
```

In [47]:
```
clean_data['Location'] = clean_data['Location'].fillna(clean_data['Location'].mode(
```

In [48]:
```
clean_data['Location']
```

Out[48]:
```
0       Mumbai
1    Bangalore
2    Bangalore
3     Hyderbad
4    Bangalore
5        Delhi
Name: Location, dtype: category
Categories (4, object): ['Bangalore', 'Delhi', 'Hyderbad', 'Mumbai']
```

In [49]:
```
clean_data
```

Out[49]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5000	2
1	Teddy	Testing	45	Bangalore	10000	3
2	Umar	Dataanalyst	50.25	Bangalore	15000	4
3	Jane	Analytics	50.25	Hyderbad	20000	4.8
4	Uttam	Statistics	67	Bangalore	30000	5
5	Kim	NLP	55	Delhi	60000	10

In [50]:
```
clean_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6 entries, 0 to 5
Data columns (total 6 columns):
 #   Column    Non-Null Count  Dtype
---  ------    --------------  -----
 0   Name      6 non-null      object
 1   Domain    6 non-null      category
 2   Age       6 non-null      object
 3   Location  6 non-null      category
 4   Salary    6 non-null      object
 5   Exp       6 non-null      object
dtypes: category(2), object(4)
memory usage: 760.0+ bytes
```

In [51]:
```
# clean_data['Name'] = clean_data['Name'].astype('category')
# clean_data['Domain'] = clean_data['Domain'].astype('category')
```

```
# clean_data['Location'] = clean_data['Location'].astype('category')
```

In [52]:
```
clean_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 6 entries, 0 to 5
Data columns (total 6 columns):
 #   Column    Non-Null Count  Dtype   
---  ------    --------------  -----   
 0   Name      6 non-null      object  
 1   Domain    6 non-null      category
 2   Age       6 non-null      object  
 3   Location  6 non-null      category
 4   Salary    6 non-null      object  
 5   Exp       6 non-null      object  
dtypes: category(2), object(4)
memory usage: 760.0+ bytes
```

In [53]:
```
clean_data.to_csv('clean_data.csv')
```

In [54]:
```
import os
os.getcwd()
```

Out[54]:
```
'C:\\Users\\rajendra damahe\\DATA SCIENCE'
```

In [55]:
```
clean_data
```

Out[55]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5000	2
1	Teddy	Testing	45	Bangalore	10000	3
2	Umar	Dataanalyst	50.25	Bangalore	15000	4
3	Jane	Analytics	50.25	Hyderbad	20000	4.8
4	Uttam	Statistics	67	Bangalore	30000	5
5	Kim	NLP	55	Delhi	60000	10

EDA TECHNIQUE LETS APPLY

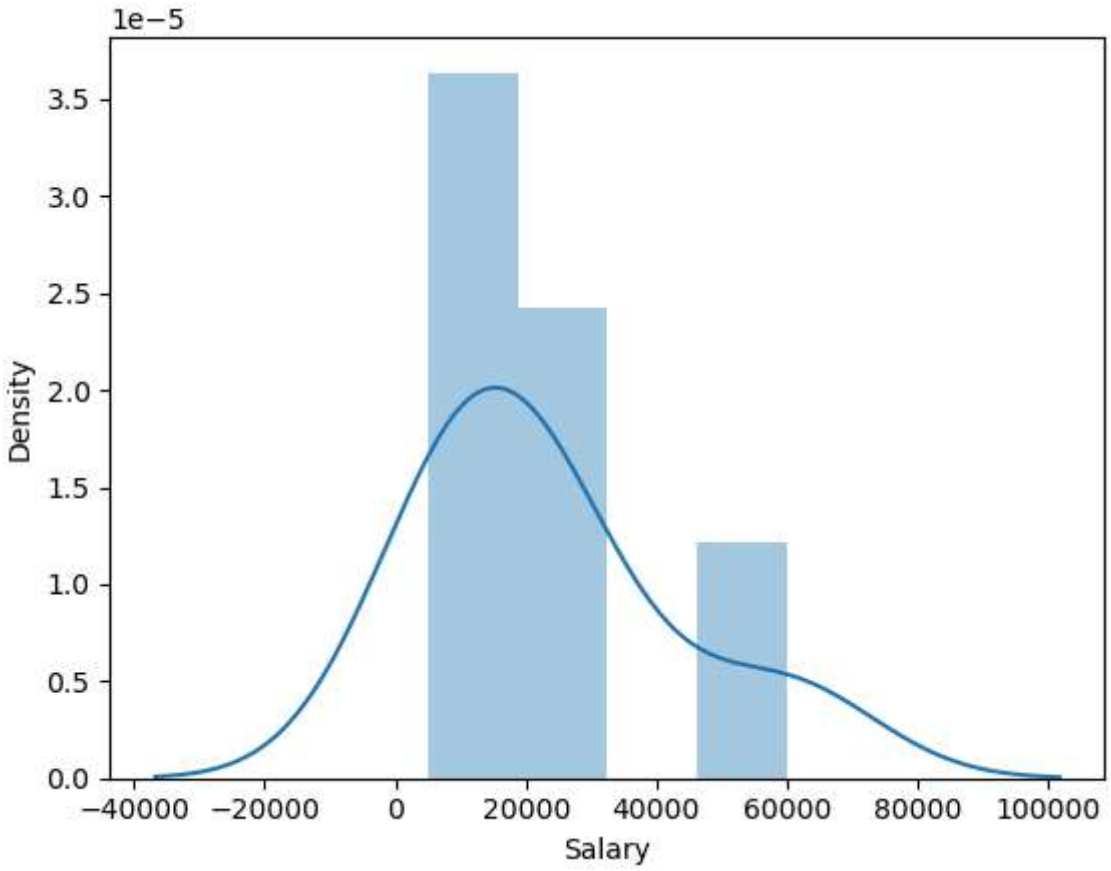
In [71]:
```
import matplotlib.pyplot as plt # visualization
import seaborn as sns
```

In [72]:
```
import warnings
warnings.filterwarnings('ignore')
```

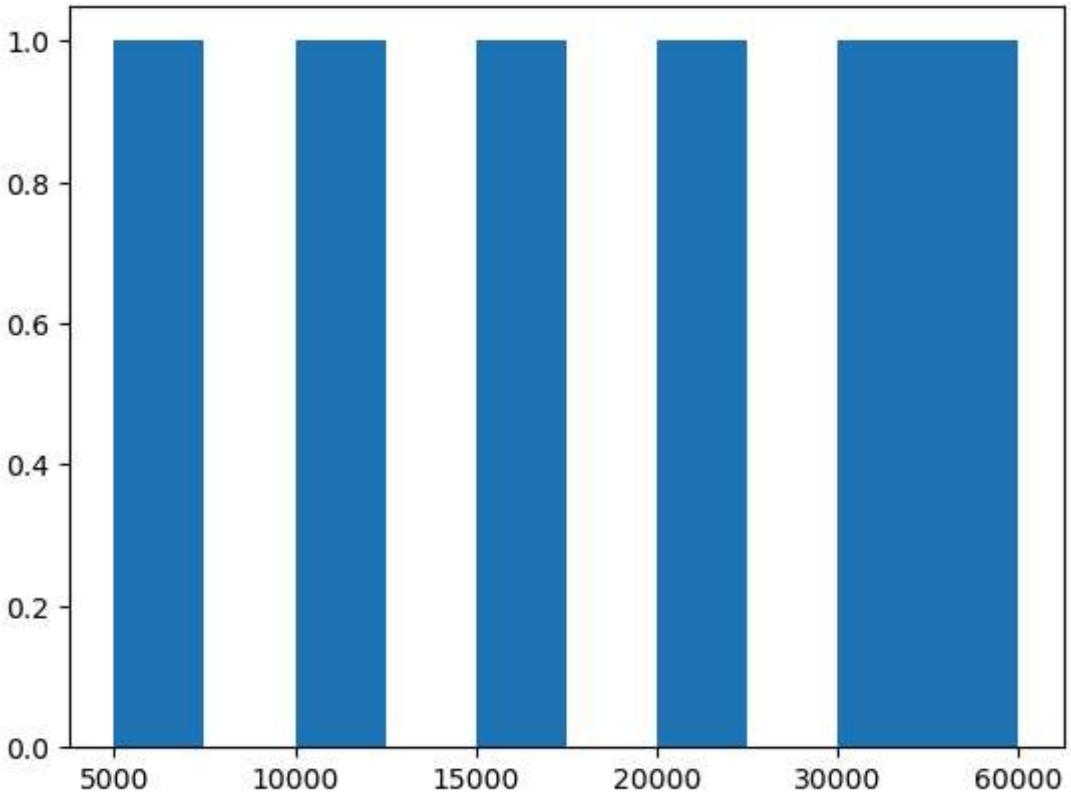
In [73]:
```
clean_data['Salary']
```

Out[73]:
```
0     5000
1    10000
2    15000
3    20000
4    30000
5    60000
Name: Salary, dtype: object
```

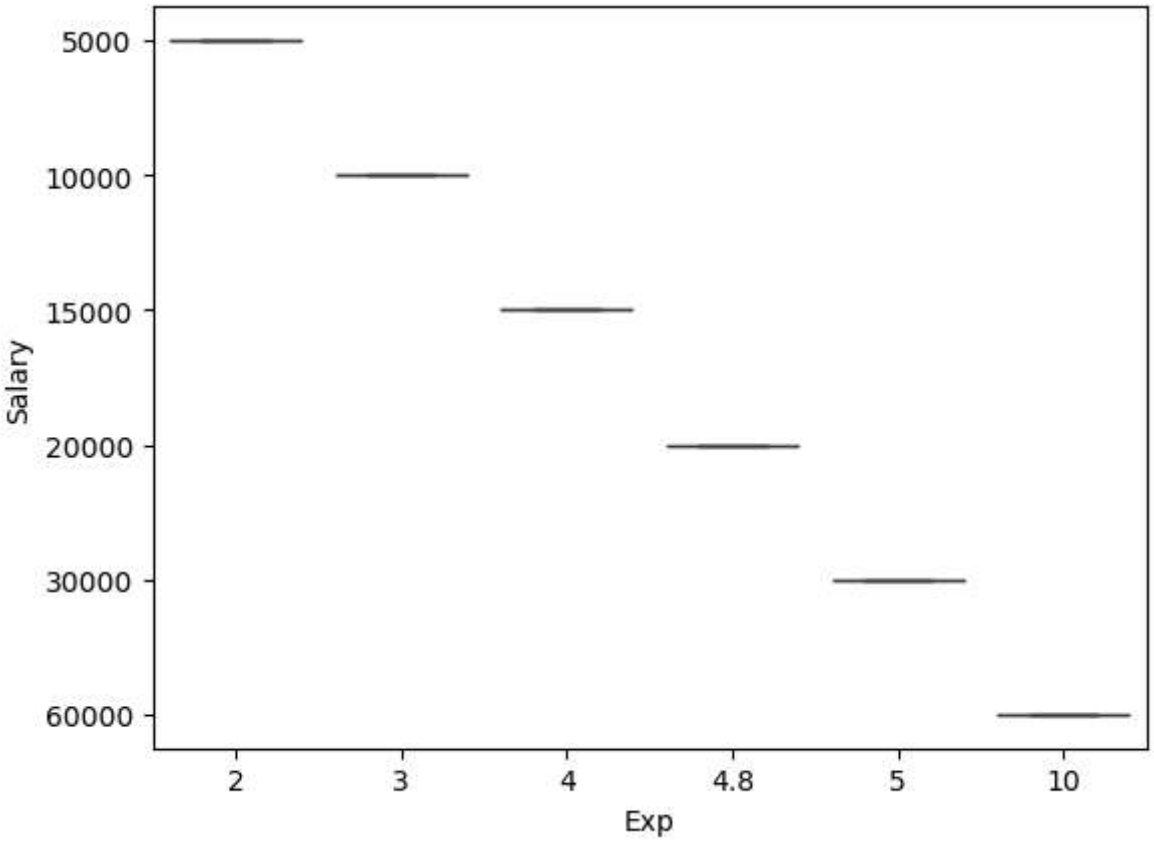
In [74]:
```
vis1 = sns.distplot(clean_data['Salary'])
```



In [75]:
```
vis2 = plt.hist(clean_data['Salary'])
```



In [56]:
```
vis4 = sns.boxplot(data=clean_data,x = 'Exp', y='Salary')
```



In [57]:
```
clean_data[0:6:2]
```

Out[57]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5000	2
2	Umar	Dataanalyst	50.25	Bangalore	15000	4
4	Uttam	Statistics	67	Bangalore	30000	5

In [58]:
```
clean_data[0:6:3]
```

Out[58]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5000	2
3	Jane	Analytics	50.25	Hyderbad	20000	4.8

In [59]:
```
clean_data[::-1]
```

Out[59]:

	Name	Domain	Age	Location	Salary	Exp
5	Kim	NLP	55	Delhi	60000	10
4	Uttam	Statistics	67	Bangalore	30000	5
3	Jane	Analytics	50.25	Hyderbad	20000	4.8
2	Umar	Dataanalyst	50.25	Bangalore	15000	4
1	Teddy	Testing	45	Bangalore	10000	3
0	Mike	Datascience	34	Mumbai	5000	2

In [61]:
```
clean_data[::+1]
```

Out[61]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5000	2
1	Teddy	Testing	45	Bangalore	10000	3
2	Umar	Dataanalyst	50.25	Bangalore	15000	4
3	Jane	Analytics	50.25	Hyderbad	20000	4.8
4	Uttam	Statistics	67	Bangalore	30000	5
5	Kim	NLP	55	Delhi	60000	10

In [63]:
```
clean_data[0:4:2]
```

Out[63]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5000	2
2	Umar	Dataanalyst	50.25	Bangalore	15000	4

In [84]:
```
clean_data.columns
```

Out[84]:
```
Index(['Name', 'Domain', 'Age', 'Location', 'Salary', 'Exp',
       'Age].fillna(np.mean(pd.))'],
      dtype='object')
```

In [85]:
```
X_iv = clean_data[['Name', 'Domain', 'Age', 'Location', 'Exp']]
```

In [86]:
```
X_iv
```

Out[86]:

	Name	Domain	Age	Location	Exp
0	Mike	Datascience	34	Mumbai	2
1	Teddy	Testing	45	Bangalore	3
2	Umar	Dataanalyst	NaN	Bangalore	4
3	Jane	Analytics	NaN	Hyderbad	4.8
4	Uttam	Statistics	67	Bangalore	5
5	Kim	NLP	55	Delhi	10

In [87]:
```
y_dv = clean_data[['Salary']] = clean_data[['Salary']]
```

In [88]:
```
y_dv
```

Out[88]:

	Salary
0	5000
1	10000
2	15000
3	20000
4	30000
5	60000

In [89]:
```
emp
```

Out[89]:

	Name	Domain	Age	Location	Salary	Exp
0	Mike	Datascience	34	Mumbai	5000	2
1	Teddy	Testing	45	Bangalore	10000	3
2	Umar	Dataanalyst	NaN	NaN	15000	4
3	Jane	Analytics	NaN	Hyderbad	20000	NaN
4	Uttam	Statistics	67	NaN	30000	5
5	Kim	NLP	55	Delhi	60000	10

In [90]:
```
clean_data
```

Out[90]:

	Name	Domain	Age	Location	Salary	Exp	Age].fillna(np.mean(pd.))
0	Mike	Datascience	34	Mumbai	5000	2	34
1	Teddy	Testing	45	Bangalore	10000	3	45
2	Umar	Dataanalyst	NaN	Bangalore	15000	4	50.25
3	Jane	Analytics	NaN	Hyderbad	20000	4.8	50.25
4	Uttam	Statistics	67	Bangalore	30000	5	67
5	Kim	NLP	55	Delhi	60000	10	55

In [91]:
```
X_iv
```

Out[91]:

	Name	Domain	Age	Location	Exp
0	Mike	Datascience	34	Mumbai	2
1	Teddy	Testing	45	Bangalore	3
2	Umar	Dataanalyst	NaN	Bangalore	4
3	Jane	Analytics	NaN	Hyderbad	4.8
4	Uttam	Statistics	67	Bangalore	5
5	Kim	NLP	55	Delhi	10

In [92]:
```
y_dv
```

Out[92]:

	Salary
0	5000
1	10000
2	15000
3	20000
4	30000
5	60000

In [93]:
```
clean_data
```

Out[93]:

	Name	Domain	Age	Location	Salary	Exp	Age].fillna(np.mean(pd.))
0	Mike	Datascience	34	Mumbai	5000	2	34
1	Teddy	Testing	45	Bangalore	10000	3	45
2	Umar	Dataanalyst	NaN	Bangalore	15000	4	50.25
3	Jane	Analytics	NaN	Hyderbad	20000	4.8	50.25
4	Uttam	Statistics	67	Bangalore	30000	5	67
5	Kim	NLP	55	Delhi	60000	10	55

In [94]:
```
imputation = pd.get_dummies(clean_data)
```

In [95]:
```
imputation
```

Out[95]:

	Name_Jane	Name_Kim	Name_Mike	Name_Teddy	Name_Umar	Name_Uttam	Domain_
0	False	False	True	False	False	False	
1	False	False	False	True	False	False	
2	False	False	False	False	True	False	
3	True	False	False	False	False	False	
4	False	False	False	False	False	True	
5	False	True	False	False	False	False	

6 rows × 37 columns

In [96]:
```
clean_data
```

Out[96]:

	Name	Domain	Age	Location	Salary	Exp	Age].fillna(np.mean(pd.))
0	Mike	Datascience	34	Mumbai	5000	2	34
1	Teddy	Testing	45	Bangalore	10000	3	45
2	Umar	Dataanalyst	NaN	Bangalore	15000	4	50.25
3	Jane	Analytics	NaN	Hyderbad	20000	4.8	50.25
4	Uttam	Statistics	67	Bangalore	30000	5	67
5	Kim	NLP	55	Delhi	60000	10	55

In [97]:
```
imputation
```

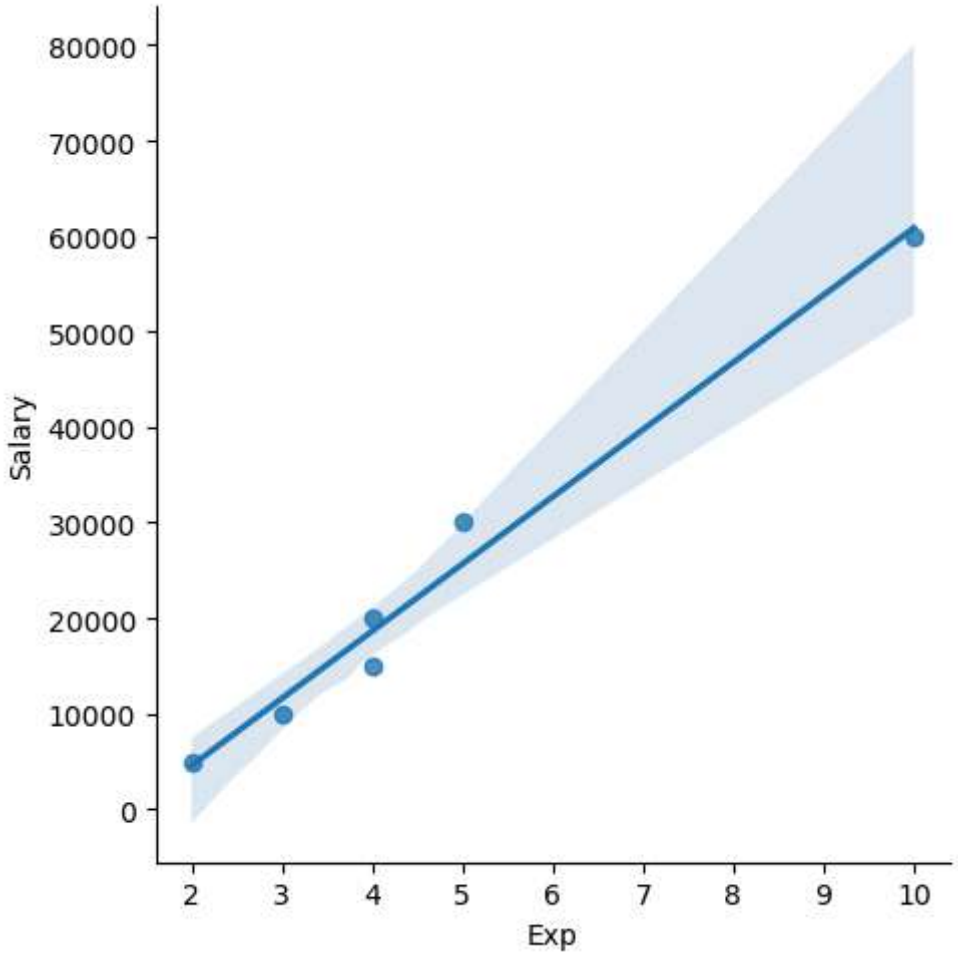
Out[97]:

	Name_Jane	Name_Kim	Name_Mike	Name_Teddy	Name_Umar	Name_Uttam	Domain_
0	False	False	True	False	False	False	
1	False	False	False	True	False	False	
2	False	False	False	False	True	False	
3	True	False	False	False	False	False	
4	False	False	False	False	False	True	
5	False	True	False	False	False	False	

6 rows × 37 columns

In [64]:
```
clean_data['Salary'] = clean_data['Salary'].round().astype(int)
clean_data['Exp'] = clean_data['Exp'].round().astype(int)
vis4 =sns.lmplot(data = clean_data, x='Exp', y ='Salary')
vis4
```

Out[64]:
```
<seaborn.axisgrid.FacetGrid at 0x23476456510>
```


80000
70000
60000
50000
40000
30000
20000
10000
0
Salary
2
3
4
5
6
7
8
9
10
Exp

In [ ]: