Q1. Delivery_time -> Predict delivery time using sorting time

1. Import necessary libraries

In [7]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt

import warnings
warnings.filterwarnings('ignore')
```

2. Importing Dataset

In [8]:
```
delivery_data=pd.read_csv('delivery_time.csv')
delivery_data
```

Out[8]:

	Delivery_Time	Sorting_Time
0	21.00	10
1	13.50	4
2	19.75	6
3	24.00	9
4	29.00	10
5	15.35	6
6	19.00	7
7	9.50	3
8	17.90	10
9	18.75	9
10	19.83	8
11	10.75	4
12	16.68	7
13	11.50	3
14	12.03	3
15	14.88	4
16	13.75	6
17	18.11	7
18	8.00	2
19	17.83	7
20	21.50	5

3. EDA

In [9]:
```
delivery_data.shape
```

Out[9]:
```
(21, 2)
```

In [10]:
```
delivery_data.isna().sum()
```

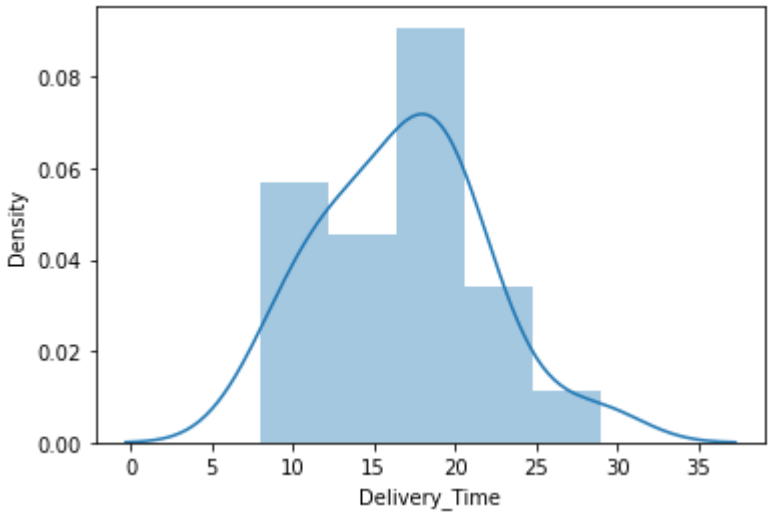
Out[10]:
```
Delivery_Time    0
Sorting_Time     0
dtype: int64
```

In [11]:
```
1 delivery_data.dtypes
```

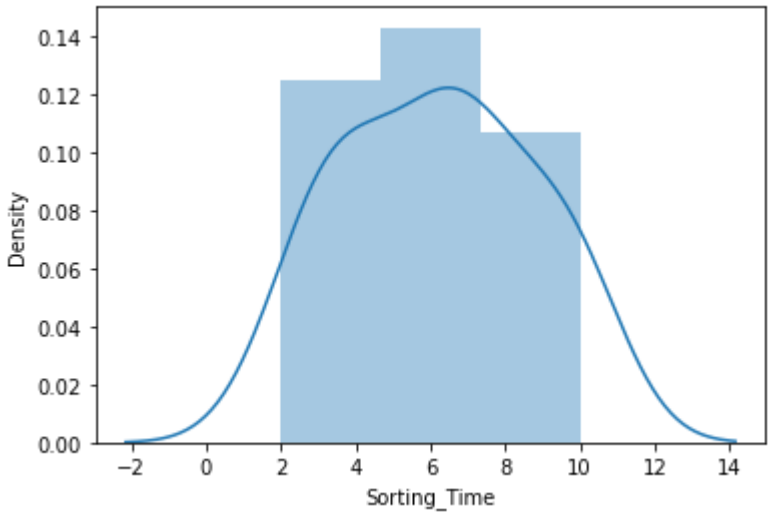
Out[11]:
```
Delivery_Time    float64
Sorting_Time       int64
dtype: object
```

4. Data Visualization

In [13]:
```
1 sns.distplot(delivery_data['Delivery_Time'])
2 plt.show()
```



In [14]:
```
1 sns.distplot(delivery_data['Sorting_Time'])
2 plt.show()
```



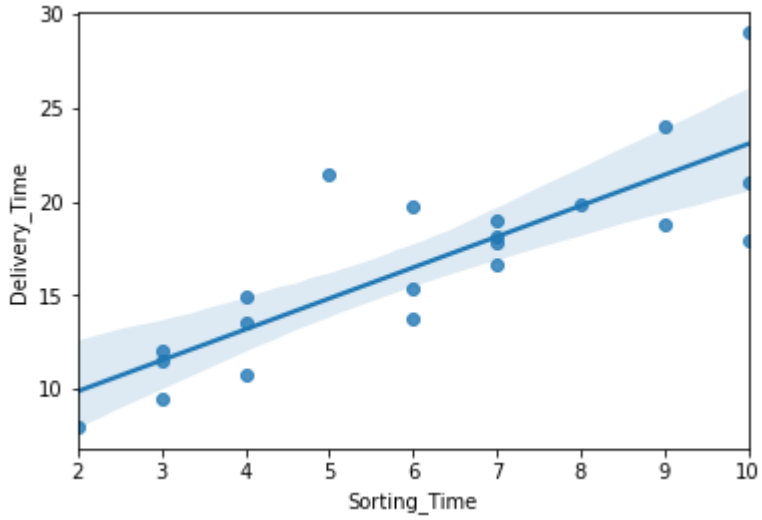
5. Correlation check

In [15]:
```
1 delivery_data.corr()
```

Out[15]:

	Delivery_Time	Sorting_Time
Delivery_Time	1.000000	0.825997
Sorting_Time	0.825997	1.000000

In [17]:
```
1 sns.regplot(x=delivery_data['Sorting_Time'],y=delivery_data['Delivery_Time']
2 plt.show()
```



6. Model Building

In [44]:
```
1 import statsmodels.formula.api as smf
2 del_model=smf.ols("Delivery_Time~Sorting_Time",data=delivery_data).fit()
```

7. Model Testing

In [45]:
```
1 del_model.params
```

Out[45]:
```
Intercept       6.582734
Sorting_Time    1.649020
dtype: float64
```

In [46]:
```
del_model.tvalues, del_model.pvalues
```

Out[46]:
```
(Intercept       3.823349
 Sorting_Time    6.387447
 dtype: float64,
 Intercept       0.001147
 Sorting_Time    0.000004
 dtype: float64)
```

In [47]:
```
del_model.rsquared , del_model.rsquared_adj
```

Out[47]:
```
(0.6822714748417231, 0.6655489208860244)
```

8. Model Prediction

In [48]:
```
# Manual prediction for sorting time (x=3)
delivery_time = ((1.649020)*3) + (6.582734)  #y=mx+c
delivery_time
```

Out[48]:
```
11.529793999999999
```

In [49]:
```
# System prediction for 2 values
new_pred = pd.Series([3,5])
new_pred
```

Out[49]:
```
0    3
1    5
dtype: int64
```

In [50]:
```
predicted_data = pd.DataFrame(new_pred,columns=['Sorting_Time'])
predicted_data
```

Out[50]:

	Sorting_Time
0	3
1	5

In [51]:
```
del_model.predict(predicted_data)
```

Out[51]:
```
0    11.529794
1    14.827833
dtype: float64
```

In [ ]:
```

```

Q2. Salary_hike -> Build a prediction model for Salary_hike

2. Importing Dataset

In [52]:
```
sal_data = pd.read_csv('Salary_Data.csv')
sal_data
```

Out[52]:

	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
5	2.9	56642.0
6	3.0	60150.0
7	3.2	54445.0
8	3.2	64445.0
9	3.7	57189.0
10	3.9	63218.0
11	4.0	55794.0
12	4.0	56957.0
13	4.1	57081.0
14	4.5	61111.0
15	4.9	67938.0
16	5.1	66029.0
17	5.3	83088.0
18	5.9	81363.0
19	6.0	93940.0
20	6.8	91738.0
21	7.1	98273.0
22	7.9	101302.0
23	8.2	113812.0
24	8.7	109431.0
25	9.0	105582.0
26	9.5	116969.0
27	9.6	112635.0
28	10.3	122391.0
29	10.5	121872.0

3. EDA

In [53]:
```
1 sal_data.dtypes
```

Out[53]:
```
YearsExperience    float64
Salary             float64
dtype: object
```

In [54]:
```
1 sal_data.isna().sum()
```

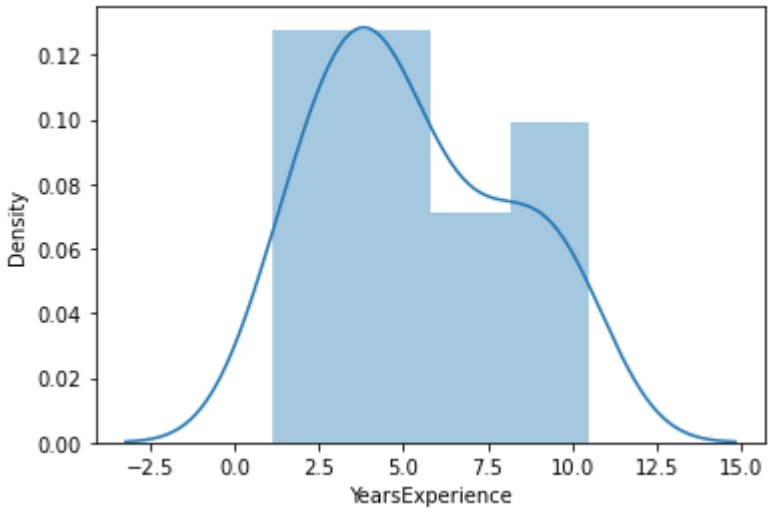
Out[54]:
```
YearsExperience    0
Salary             0
dtype: int64
```

In [55]:
```
1 sal_data.shape
```

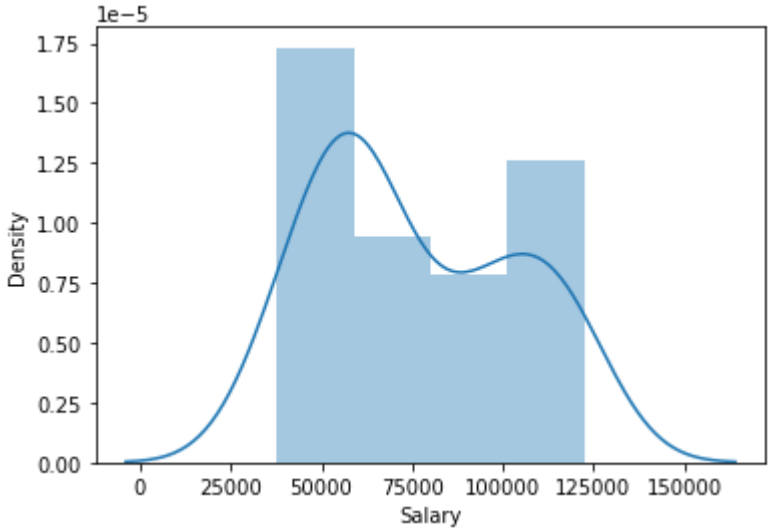
Out[55]:
```
(30, 2)
```

4. Data Visualization

In [56]:
```
1 sns.distplot(sal_data['YearsExperience'])
2 plt.show()
```



In [57]:
```
1 sns.distplot(sal_data['Salary'])
2 plt.show()
```



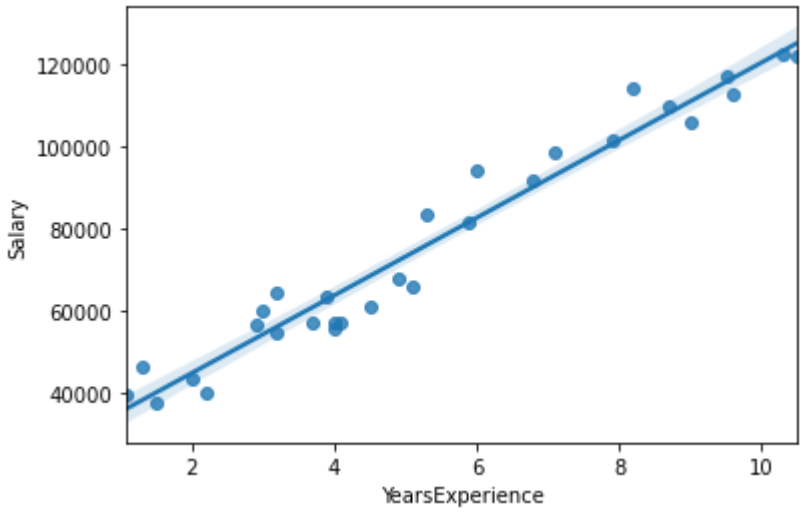
5.Correlation check

In [58]:
```
1 sal_data.corr()
```

Out[58]:

	YearsExperience	Salary
YearsExperience	1.000000	0.978242
Salary	0.978242	1.000000

In [59]:
```
sns.regplot(x=sal_data['YearsExperience'],y=sal_data['Salary'])
plt.show()
```



6. Model Building

In [60]:
```
sal_model = smf.ols("Salary~YearsExperience",data=sal_data).fit()
```

7. Model Testing

In [62]:
```
sal_model.params
```

Out[62]:
```
Intercept          25792.200199
YearsExperience     9449.962321
dtype: float64
```

In [63]:
```
sal_model.tvalues,sal_model.pvalues
```

Out[63]:
```
(Intercept          11.346940
 YearsExperience    24.950094
 dtype: float64,
 Intercept          5.511950e-12
 YearsExperience    1.143068e-20
 dtype: float64)
```

In [64]:
```
1 sal_model.rsquared,sal_model.rsquared_adj
```

Out[64]: (0.9569566641435086, 0.9554194021486339)

8. Model Prediction

In [66]:
```
1 #Manual prediction for say 5 years of experience
2 salary = (25792.200199) + (9449.962321)*(3)  #y=mx+c
3 salary
```

Out[66]: 54142.087162

In [67]:
```
1 #System prediction for 5 and 7 years
2 new_pred=pd.Series([5,7])
3 new_pred
```

Out[67]:
```
0    5
1    7
dtype: int64
```

In [68]:
```
1 predicted_data = pd.DataFrame(new_pred,columns=['YearsExperience'])
2 predicted_data
```

Out[68]:

	YearsExperience
0	5
1	7

In [69]:
```
1 sal_model.predict(predicted_data)
```

Out[69]:
```
0    73042.011806
1    91941.936449
dtype: float64
```

In [ ]:
```
1
```