ex-16

In [1]:

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

In [13]:

```
ir = pd.read_csv("iris.csv")
```

In [14]:

```
ir.head()
```

Out[14]:

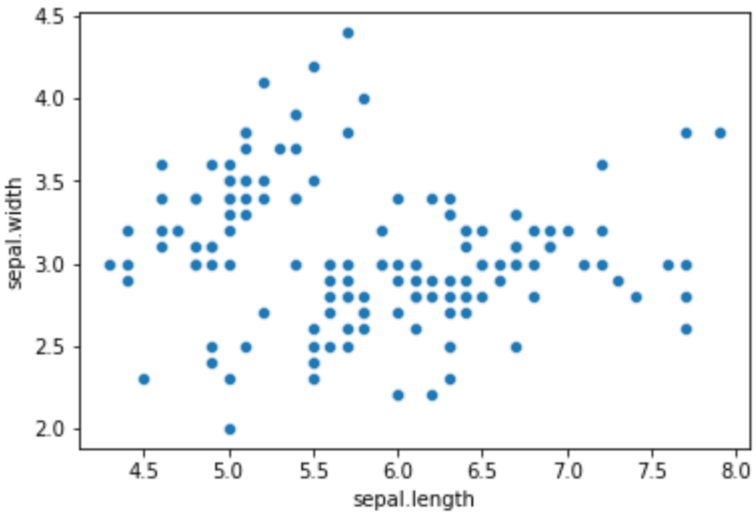
	sepal.length	sepal.width	petal.length	petal.width	variety
0	5.1	3.5	1.4	0.2	Setosa
1	4.9	3.0	1.4	0.2	Setosa
2	4.7	3.2	1.3	0.2	Setosa
3	4.6	3.1	1.5	0.2	Setosa
4	5.0	3.6	1.4	0.2	Setosa

In [39]:

```
sns.scatterplot(data=ir,x='sepal.length',y='sepal.width')
```

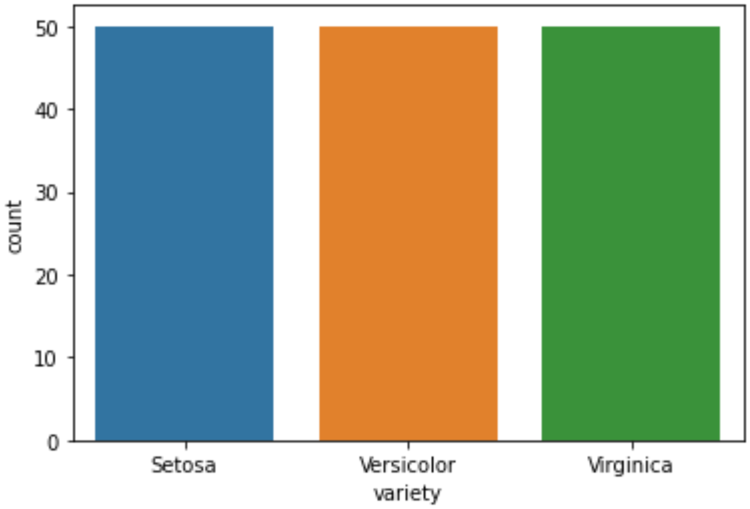
Out[39]:

```
<AxesSubplot:xlabel='sepal.length', ylabel='sepal.width'>
```



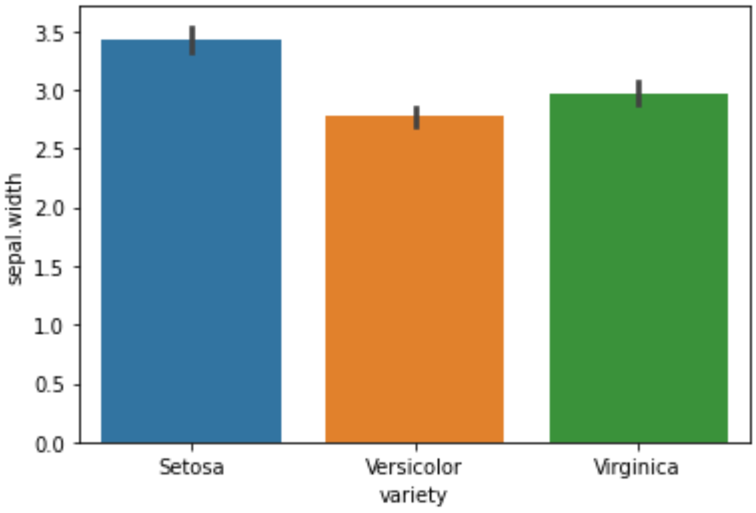
In [18]:
```
sns.countplot(data=ir,x='variety')
```

Out[18]:
```
<AxesSubplot:xlabel='variety', ylabel='count'>
```

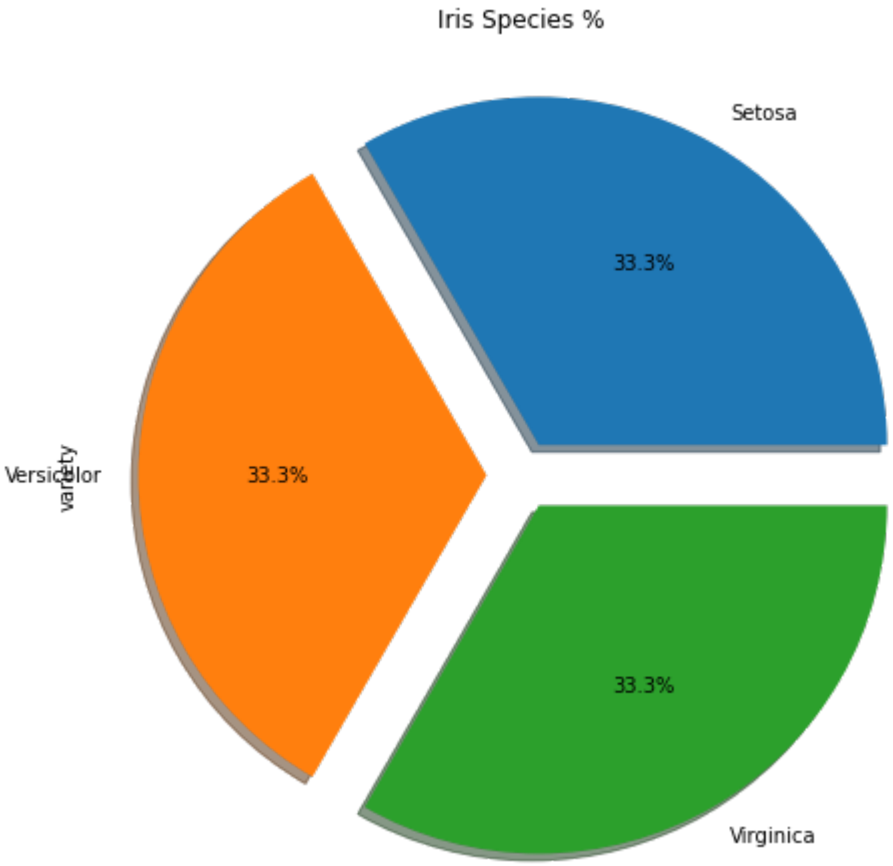


In [41]:
```
sns.barplot(data=ir,x='variety',y='sepal.width')
```

Out[41]:
```
<AxesSubplot:xlabel='variety', ylabel='sepal.width'>
```

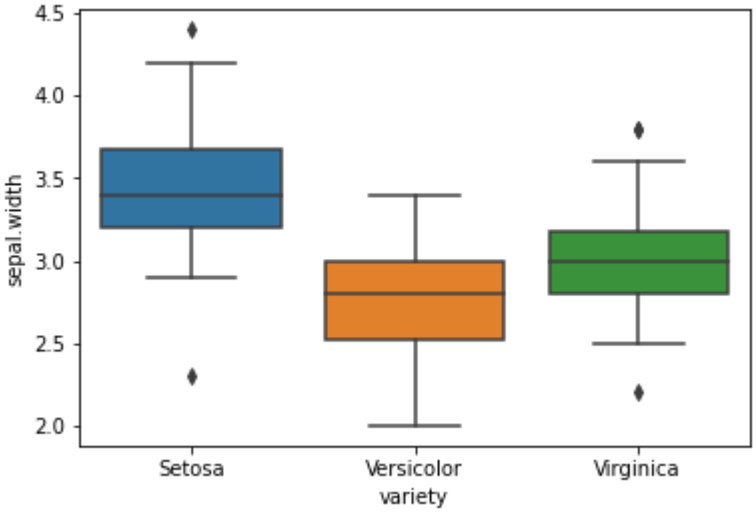


In [33]:
```
ax=plt.subplots(1,1,figsize=(10,8))
ir['variety'].value_counts().plot.pie(explode=[0.1,0.1,0.1],autopct='%1.1f%%',
plt.title("Iris Species %")
plt.show()
```



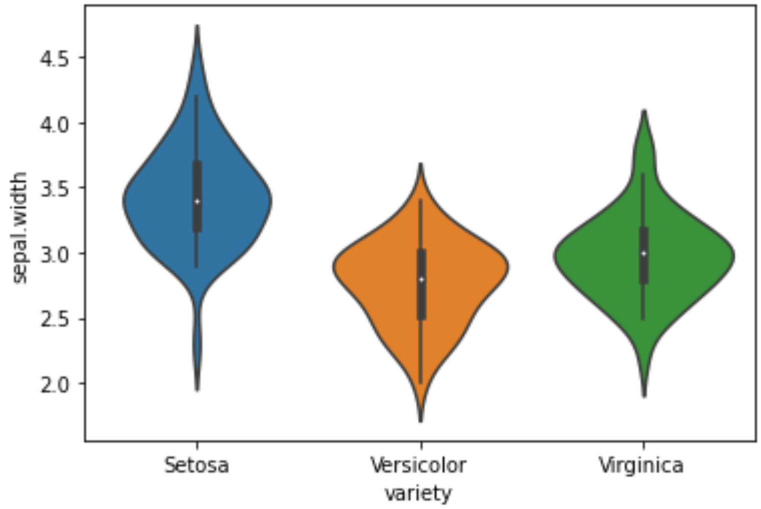
In [28]:
```
sns.boxplot(data=ir,x='variety',y='sepal.width')
```

Out[28]:
```
<AxesSubplot:xlabel='variety', ylabel='sepal.width'>
```



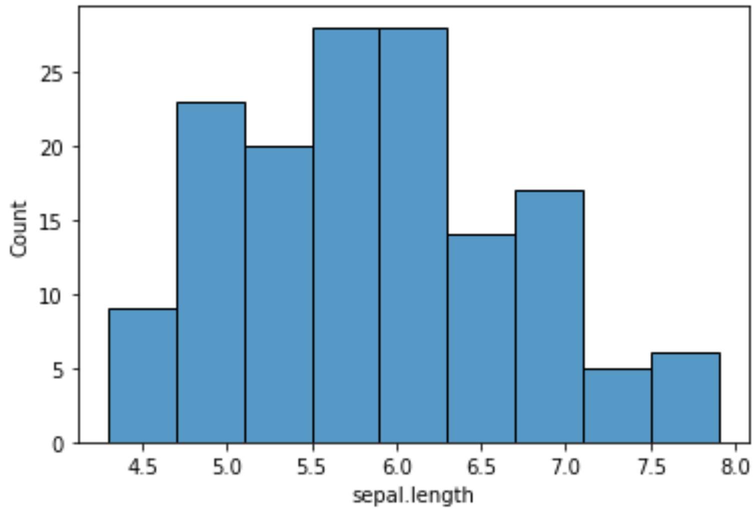
```
In [43]: sns.violinplot(data=ir,x='variety',y='sepal.width')
```

```
Out[43]: <AxesSubplot:xlabel='variety', ylabel='sepal.width'>
```



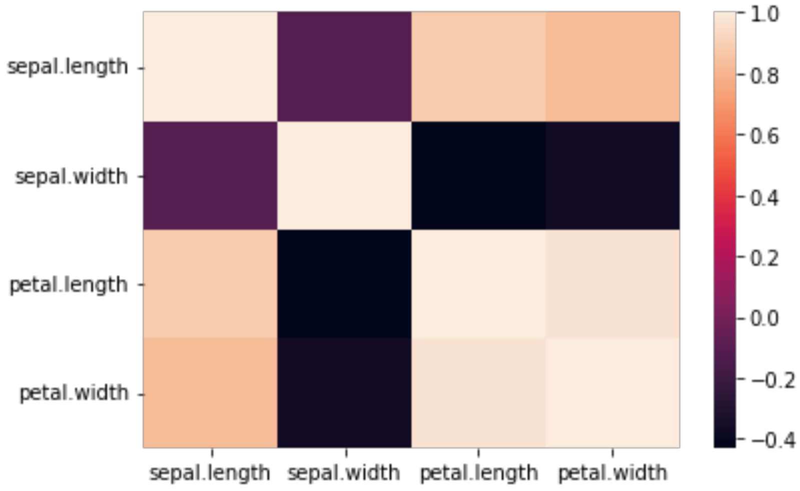
```
In [35]: sns.histplot(data=ir,x='sepal.length')
```

```
Out[35]: <AxesSubplot:xlabel='sepal.length', ylabel='Count'>
```



```
In [37]: sns.heatmap(ir.drop('variety',axis=1).corr())
```

```
Out[37]: <AxesSubplot:>
```



chi-square

```
In [44]: observed = list(map(int,input('Enter Observed Values :').split()))
         expected = list(map(int,input('Enter Expected Values :').split()))
         chi_square = 0
         for o,e in zip(observed,expected):
             chi_square += (((o - e) ** 2) / e)
         print(chi_square)
```

```
Enter Observed Values :1 2 3
Enter Expected Values :3 2 1
5.333333333333333
```

ex-9

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

In [3]:
```
df = pd.read_csv('Groceries.csv',header=None)
df.head()
```

Out[3]:

	0	1	2	3	4	5	6	7	8	9	10	
0	shrimp	almonds	avocado	vegetables mix	green grapes	whole weat flour	yams	cottage cheese	energy drink	tomato juice	low fat yogurt	g
1	burgers	meatballs	eggs	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	
2	chutney	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	
3	turkey	avocado	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	
4	mineral water	milk	energy bar	whole wheat rice	green tea	NaN	NaN	NaN	NaN	NaN	NaN	

In [4]:
```
trans = []
for i in range(7501):
    trans.append([df.values[i,j] for j in range(20) if df.values[i,j] is not n
```

In [5]:
```
rules = apriori(transactions=trans,min_support=0.0045,min_confidence=0.3,min_l
association_rule = list(rules)
```

In [6]:

```
for item in association_rule:
    items = [x for x in item[0]]
    print("Rule: " + items[0] + " -> " + items[1])
    print("Support: " + str(item[1]))
    print("Confidence: " + str(item[2][0][2]))
    print("Lift: " + str(item[2][0][3]))
    print("=====================================")
```

```
Rule: escalope -> mushroom cream sauce
Support: 0.005732568990801226
Confidence: 0.3006993006993007
Lift: 3.790832696715049
=====================================
Rule: escalope -> pasta
Support: 0.005865884548726837
Confidence: 0.3728813559322034
Lift: 4.700811850163794
=====================================
Rule: herb & pepper -> ground beef
Support: 0.015997866951073192
Confidence: 0.3234501347708895
Lift: 3.2919938411349285
=====================================
Rule: ground beef -> tomato sauce
Support: 0.005332622317024397
Confidence: 0.3773584905660377
Lift: 3.840659481324083
=====================================
Rule: shrimp -> pasta
Support: 0.005065991201173177
Confidence: 0.3220338983050847
Lift: 4.506672147735896
=====================================
```

ex-10

In [7]:

```
import pandas as pd
import scipy.stats as stats
```

In [8]:
```
df = pd.read_csv('tips.csv')
df.head()
```

Out[8]:

	total_bill	tip	sex	smoker	day	time	size	price_per_person	Payer Name	CC I
0	16.99	1.01	Female	No	Sun	Dinner	2	8.49	Christy Cunningham	3560325168
1	10.34	1.66	Male	No	Sun	Dinner	3	3.45	Douglas Tucker	4478071379
2	21.01	3.50	Male	No	Sun	Dinner	3	7.00	Travis Walters	6011812112
3	23.68	3.31	Male	No	Sun	Dinner	2	11.84	Nathaniel Harris	4676137647
4	24.59	3.61	Female	No	Sun	Dinner	4	6.15	Tonya Carter	4832732618

In [9]:
```
tab = pd.crosstab(df['sex'],df['time'])
print(tab)
chi2,p,dof,expected = stats.chi2_contingency(tab)
print('Chi-Square Value :',round(chi2,5))
print('P Value :',round(p,5))
print('Relation') if p <= 0.05 else print('No Relation')
```

```
time    Dinner  Lunch
sex
Female      52     35
Male       124     33
Chi-Square Value : 9.34381
P Value : 0.00224
Relation
```

ex-15

In [10]:
```
from scipy.spatial import distance_matrix
import numpy as np
def GetMatrix(text, metric):
    rows = text.split('\n')
    rows = [row.strip() for row in rows if row.strip() != '']
    mat = [list(map(int, row.split(' '))) for row in rows]
    dist_mat = distance_matrix(mat, mat, p=metric)
    dist_mat = np.round(np.matrix(dist_mat), 2)
    return dist_mat
```

In [11]:

```
print('-------Metrics-------')
print('1. Manhattan Distance')
print('2. Euclidean Distance')
print('3. Mahalanobis Distance')
text = '''
 1 2 3
 4 5 6
 7 8 9
 1 4 5
 '''
metirc = int(input('Enter Metric : '))
print(GetMatrix(text, metirc))
```

```
-------Metrics-------
1. Manhattan Distance
2. Euclidean Distance
3. Mahalanobis Distance
Enter Metric : 2
[[ 0.    5.2  10.39  2.83]
 [ 5.2   0.    5.2   3.32]
 [10.39  5.2   0.    8.25]
 [ 2.83  3.32  8.25  0.  ]]
```

ex-11

In [12]:

```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [13]:

```
df = pd.read_csv("../DATA/airline_tweets.csv")
```

In [14]:
```
df.head()
```

Out[14]:

	tweet_id	airline_sentiment	airline_sentiment_confidence	negativereason	negativer
0	570306133677760513	neutral	1.0000	NaN	
1	570301130888122368	positive	0.3486	NaN	
2	570301083672813571	neutral	0.6837	NaN	
3	570301031407624196	negative	1.0000	Bad Flight	
4	570300817074462722	negative	1.0000	Can't Tell	

In [16]:
```
data = df[['airline_sentiment','text']]
```

In [17]:
```
data.head()
```

Out[17]:

	airline_sentiment	text
0	neutral	@VirginAmerica What @dhepburn said.
1	positive	@VirginAmerica plus you've added commercials t...
2	neutral	@VirginAmerica I didn't today... Must mean I n...
3	negative	@VirginAmerica it's really aggressive to blast...
4	negative	@VirginAmerica and it's a really big bad thing...

In [18]:
```
y = df['airline_sentiment']
X = df['text']
```

In [19]:
```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, rando
```

In [20]:
```
from sklearn.feature_extraction.text import TfidfVectorizer
tfidf = TfidfVectorizer(stop_words='english')
tfidf.fit(X_train)
```

Out[20]:
```
TfidfVectorizer(stop_words='english')
```

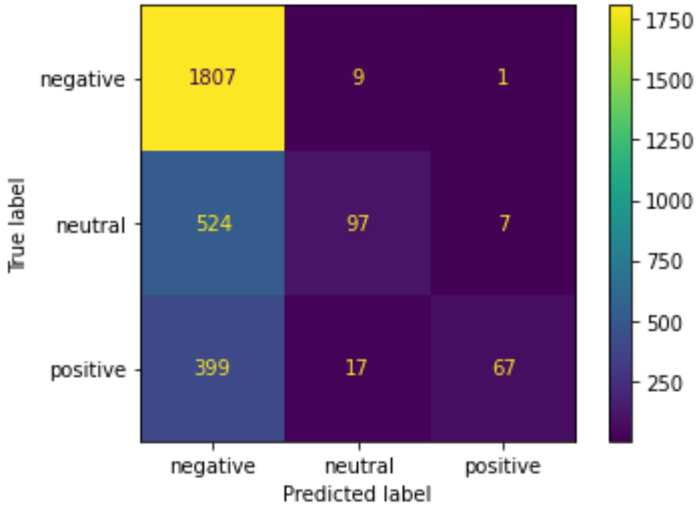
In [21]:
```
X_train_tfidf = tfidf.transform(X_train)
X_test_tfidf = tfidf.transform(X_test)
```

```
In [22]: X_train_tfidf

Out[22]: <11712x12971 sparse matrix of type '<class 'numpy.float64'>'
                 with 107073 stored elements in Compressed Sparse Row format>
```

```
In [23]: from sklearn.naive_bayes import MultinomialNB
         nb = MultinomialNB()
         nb.fit(X_train_tfidf,y_train)

Out[23]: MultinomialNB()
```

```
In [24]: from sklearn.metrics import plot_confusion_matrix,classification_report
In [25]: def report(model):
             preds = model.predict(X_test_tfidf)
             print(classification_report(y_test,preds))
             plot_confusion_matrix(model,X_test_tfidf,y_test)


         print("NB MODEL")
         report(nb)
```

```
NB MODEL
              precision    recall  f1-score   support

    negative       0.66      0.99      0.79      1817
     neutral       0.79      0.15      0.26       628
    positive       0.89      0.14      0.24       483

    accuracy                           0.67      2928
   macro avg       0.78      0.43      0.43      2928
weighted avg       0.73      0.67      0.59      2928


C:\Users\dell\AppData\Local\Programs\Python\Python310\lib\site-packages\sklea
rn\utils\deprecation.py:87: FutureWarning: Function plot_confusion_matrix is
deprecated; Function `plot_confusion_matrix` is deprecated in 1.0 and will be
removed in 1.2. Use one of the class methods: ConfusionMatrixDisplay.from_pre
dictions or ConfusionMatrixDisplay.from_estimator.
  warnings.warn(msg, category=FutureWarning)
```



```
In [ ]:
```