In [1]:
```
from mlxtend.frequent_patterns import apriori , association_rules
from mlxtend.preprocessing import TransactionEncoder
import pandas as pd
```

In [2]:
```
#sample dataset
dataset = [
    ['milk', 'bread', 'butter'],
    ['bread', 'butter', 'jam'],
    ['milk', 'bread', 'jam'],
    ['milk', 'bread', 'butter', 'jam'],
    ['butter', 'jam']
]
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [3]:
```
dataset
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[3]:
```
[['milk', 'bread', 'butter'],
 ['bread', 'butter', 'jam'],
 ['milk', 'bread', 'jam'],
 ['milk', 'bread', 'butter', 'jam'],
 ['butter', 'jam']]
```

In [4]:
```
#step1 : preproccesing the data
te = TransactionEncoder()
te_array = te.fit_transform(dataset)#transform the dataset into binary matrix
df = pd.DataFrame(te_array, columns=te.columns_)#convert to a pandas df
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [5]:
```
#step 2: genrate frequent itemsets using apirori algo
#min support is the threshold for t=itemset frequency
frequent_itemsets = apriori(df, min_support=0.6, use_colnames=True)
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [6]:
```
#step 3 genrate associatan rules
#calculate num_itemsets
num_itemsets = len(frequent_itemsets.itemsets[0])

#now include num_itemset in the associationa rulws call
rules = association_rules(frequent_itemsets, metric="confidence" , min_threshold=0.7, num_itemsets = num_itemsets
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [7]:
```
#output results
print("Frequent itemsets: ")
print(frequent_itemsets)
print("\n Association Rules: ")
print(rules)
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)

Frequent itemsets:
   support         itemsets
0      0.8          (bread)
1      0.8         (butter)
2      0.8            (jam)
3      0.6           (milk)
4      0.6  (bread, butter)
5      0.6     (bread, jam)
6      0.6    (bread, milk)
7      0.6    (jam, butter)

 Association Rules:
  antecedents consequents  antecedent support  consequent support  support  \
0     (bread)    (butter)                 0.8                 0.8      0.6
1    (butter)     (bread)                 0.8                 0.8      0.6
2     (bread)       (jam)                 0.8                 0.8      0.6
3       (jam)     (bread)                 0.8                 0.8      0.6
4     (bread)      (milk)                 0.8                 0.6      0.6
5      (milk)     (bread)                 0.6                 0.8      0.6
6       (jam)    (butter)                 0.8                 0.8      0.6
7    (butter)       (jam)                 0.8                 0.8      0.6

   confidence    lift  representativity  leverage  conviction  zhangs_metric  \
0        0.75  0.9375               1.0     -0.04         0.8          -0.25
1        0.75  0.9375               1.0     -0.04         0.8          -0.25
2        0.75  0.9375               1.0     -0.04         0.8          -0.25
3        0.75  0.9375               1.0     -0.04         0.8          -0.25
4        0.75  1.2500               1.0      0.12         1.6           1.00
5        1.00  1.2500               1.0      0.12         inf           0.50
6        0.75  0.9375               1.0     -0.04         0.8          -0.25
7        0.75  0.9375               1.0     -0.04         0.8          -0.25

   jaccard  certainty  kulczynski
0     0.60     -0.250       0.750
1     0.60     -0.250       0.750
2     0.60     -0.250       0.750
3     0.60     -0.250       0.750
4     0.75      0.375       0.875
5     0.75      1.000       0.875
6     0.60     -0.250       0.750
7     0.60     -0.250       0.750
```

In [8]:
```
frequent_itemsets
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[8]:

	support	itemsets
0	0.8	(bread)
1	0.8	(butter)
2	0.8	(jam)
3	0.6	(milk)
4	0.6	(bread, butter)
5	0.6	(bread, jam)
6	0.6	(bread, milk)
7	0.6	(jam, butter)

In [9]:
```
rules
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[9]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	representativity	leverage	conviction	zhangs_metric	jaccard
0	(bread)	(butter)	0.8	0.8	0.6	0.75	0.9375	1.0	-0.04	0.8	-0.25	0.60
1	(butter)	(bread)	0.8	0.8	0.6	0.75	0.9375	1.0	-0.04	0.8	-0.25	0.60
2	(bread)	(jam)	0.8	0.8	0.6	0.75	0.9375	1.0	-0.04	0.8	-0.25	0.60
3	(jam)	(bread)	0.8	0.8	0.6	0.75	0.9375	1.0	-0.04	0.8	-0.25	0.60
4	(bread)	(milk)	0.8	0.6	0.6	0.75	1.2500	1.0	0.12	1.6	1.00	0.75
5	(milk)	(bread)	0.6	0.8	0.6	1.00	1.2500	1.0	0.12	inf	0.50	0.75
6	(jam)	(butter)	0.8	0.8	0.6	0.75	0.9375	1.0	-0.04	0.8	-0.25	0.60
7	(butter)	(jam)	0.8	0.8	0.6	0.75	0.9375	1.0	-0.04	0.8	-0.25	0.60

In [10]:
```
import pandas as pd
import numpy as np
from apyori import apriori

```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [11]:
```
df=pd.read_csv('MBO.csv', header=None)

```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [12]:
```
df.head()
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[12]:

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	shrimp	almonds	avocado	vegetables mix	green grapes	whole weat flour	yams	cottage cheese	energy drink	tomato juice	low fat yogurt	green tea	honey	salad	mineral water	salmon	antioxydant juice
1	burgers	meatballs	eggs	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2	chutney	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
3	turkey	avocado	NaN	NaN	NaN	NaN	NaN	NaN	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	NaN	NaN	NaN	NaN	NaN	NaN

In [13]:
```
df.isna().sum()
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[13]:
```
0        0
1     1754
2     3112
3     4156
4     4972
5     5637
6     6132
7     6520
8     6847
9     7106
10    7245
11    7347
12    7414
13    7454
14    7476
15    7493
16    7497
17    7497
18    7498
19    7500
dtype: int64
```

In [14]:
```
#data cleaning step
df.fillna(0,inplace=True)

```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [15]:
```
df.head()
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[15]:

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	shrimp	almonds	avocado	vegetables mix	green grapes	whole weat flour	yams	cottage cheese	energy drink	tomato juice	low fat yogurt	green tea	honey	salad	mineral water	salmon	antioxydant juice
1	burgers	meatballs	eggs	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	chutney	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	turkey	avocado	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	mineral water	milk	energy bar	whole wheat rice	green tea	0	0	0	0	0	0	0	0	0	0	0	0

In [16]:
```
#data pre processing step
# for using aprori , need to convert data in list format..
# transaction = [['apple','almonds'],['apple'],['banana','apple']]....

transaction = []
for i in range (0, len(df)):
    transaction.append([str(df.values[i,j]) for j in range(0, 20) if str(df.values[i,j]) !='0'])
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [17]:
```
1 transaction[0]
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[17]:
```
['shrimp',
 'almonds',
 'avocado',
 'vegetables mix',
 'green grapes',
 'whole weat flour',
 'yams',
 'cottage cheese',
 'energy drink',
 'tomato juice',
 'low fat yogurt',
 'green tea',
 'honey',
 'salad',
 'mineral water',
 'salmon',
 'antioxydant juice',
 'frozen smoothie',
 'spinach',
 'olive oil']
```

In [18]:
```
1 #verifying
2 transaction[1]
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[18]:
```
['burgers', 'meatballs', 'eggs']
```

In [19]:
```
1  # Call apriori function which requires minimum support, confidance and lift, min length is combination of item de
2
3  rules = apriori(transaction, min_support = 0.003, min_confidance= 0.2, min_lift = 3, min_length = 2)
4
5
6  ## min_support = 0.003 -> means selecting items with min support of 0.3%
7  ## min_confidance = 0.2 -> means min confidance of 20%
8  ## min_lift = 3
9  ## min_length = 2 -> means no. of items in the transaction should be 2
10
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [20]:
```
1 #genrateas set of rules
2 rules
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[20]:
```
<generator object apriori at 0x00000225DF77E7B0>
```

In [21]:
```
#rules =need to converetd in list
Results = list(rules)
Results
```

```
et({'burgers'}), confidence=0.28235294117647061, lift=3.2384241770102533)]),
 RelationRecord(items=frozenset({'frozen vegetables', 'tomatoes', 'cake'}), support=0.0030662578322890282, ordered
_statistics=[OrderedStatistic(items_base=frozenset({'frozen vegetables'}), items_add=frozenset({'cake', 'tomatoe
s'}), confidence=0.03216783216783217, lift=3.83001443001443), OrderedStatistic(items_base=frozenset({'tomatoes'}),
items_add=frozenset({'frozen vegetables', 'cake'}), confidence=0.04483430799220273, lift=4.367560314928736), Order
edStatistic(items_base=frozenset({'frozen vegetables', 'cake'}), items_add=frozenset({'tomatoes'}), confidence=0.2
9870129870129871, lift=4.367560314928736), OrderedStatistic(items_base=frozenset({'tomatoes', 'cake'}), items_add=f
rozenset({'frozen vegetables'}), confidence=0.36507936507936506, lift=3.8300144300144296)]),
 RelationRecord(items=frozenset({'ground beef', 'spaghetti', 'cereals'}), support=0.0030662578322890282, ordered_s
tatistics=[OrderedStatistic(items_base=frozenset({'cereals'}), items_add=frozenset({'ground beef', 'spaghetti'}),
confidence=0.11917098445595856, lift=3.040481477565119), OrderedStatistic(items_base=frozenset({'ground beef'}), i
tems_add=frozenset({'cereals', 'spaghetti'}), confidence=0.03120759837177748, lift=4.681763907734057), OrderedStat
istic(items_base=frozenset({'spaghetti'}), items_add=frozenset({'ground beef', 'cereals'}), confidence=0.017611026
03369066, lift=3.885303125844519), OrderedStatistic(items_base=frozenset({'ground beef', 'cereals'}), items_add=fr
ozenset({'spaghetti'}), confidence=0.6764705882352942, lift=3.8853031258445188), OrderedStatistic(items_base=froze
nset({'spaghetti', 'cereals'}), items_add=frozenset({'ground beef'}), confidence=0.45999999999999996, lift=4.68176
3907734057), OrderedStatistic(items_base=frozenset({'ground beef', 'spaghetti'}), items_add=frozenset({'cereal
s'}), confidence=0.0782312925170068, lift=3.0404814775651197)]),
 RelationRecord(items=frozenset({'ground beef', 'milk', 'chicken'}), support=0.0038661511798426876, ordered_statis
tics=[OrderedStatistic(items_base=frozenset({'milk'}), items_add=frozenset({'chicken', 'ground beef'}), confidence
```

In [22]:
```
df_results = pd.DataFrame(Results)
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [23]:
```
df_results.head()
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[23]:

	items	support	ordered_statistics
0	(cottage cheese, brownies)	0.003466	[((brownies), (cottage cheese), 0.102766798418...
1	(light cream, chicken)	0.004533	[((chicken), (light cream), 0.0755555555555555...
2	(mushroom cream sauce, escalope)	0.005733	[((escalope), (mushroom cream sauce), 0.072268...
3	(pasta, escalope)	0.005866	[((escalope), (pasta), 0.07394957983193277, 4....
4	(fresh bread, tomato juice)	0.004266	[((fresh bread), (tomato juice), 0.09907120743...

In [24]:
```
#keep support in a seprate fdata fraME  SO WE CAN USE LATER
support = df_results.support
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [25]:
```
'''
convert orderstaticsit in a proper format
oredaer staticsti has lhs=> rhs as well as rhs =>lhs
we can choose any one fro convinvave

'''


#all 4 will contain lhs, rhs , confi amd lify
first_values = []
second_values = []
third_values = []
fourth_values = []

```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [26]:
```
#loop number of rows time and append 1 by 1 value in a separate list..
#first and second element was frozenset which need to be converted in list..



for i in range(df_results.shape[0]):
    single_list = df_results['ordered_statistics'][i][0]
    first_values.append(list(single_list[0]))
    second_values.append(list(single_list[1]))
    third_values.append(single_list[2])
    fourth_values.append(single_list[3])

```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [27]:
```
#conver all four list in df for further operation
lhs = pd.DataFrame(first_values)
rhs = pd.DataFrame(second_values)

confidence = pd.DataFrame(third_values, columns=['Confidence'])
lift = pd.DataFrame(fourth_values , columns=['lift'])
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [28]:
```
# concat all list together in a single dataframe
df_final = pd.concat([lhs,rhs,support, confidence,lift] ,axis =1)
df_final
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[28]:

	0	1	0	1	2	support	Confidence	lift
0	brownies	None	cottage cheese	None	None	0.003466	0.102767	3.225330
1	chicken	None	light cream	None	None	0.004533	0.075556	4.843951
2	escalope	None	mushroom cream sauce	None	None	0.005733	0.072269	3.790833
3	escalope	None	pasta	None	None	0.005866	0.073950	4.700812
4	fresh bread	None	tomato juice	None	None	0.004266	0.099071	3.259356
...	...	...	...	...	...	...	...	...
89	ground beef	pancakes	mineral water	spaghetti	None	0.003066	0.211009	3.532991
90	ground beef	None	mineral water	spaghetti	tomatoes	0.003066	0.031208	3.344117
91	olive oil	None	milk	mineral water	spaghetti	0.003333	0.050607	3.216994
92	milk	mineral water	shrimp	spaghetti	None	0.003066	0.063889	3.014029
93	tomatoes	None	milk	mineral water	spaghetti	0.003333	0.048733	3.097846

94 rows × 8 columns

In [29]:
```
'''
 we have some of place only 1 item in lhs and some place 3 or more so we need to a proper
 represenation for User to understand.
 replacing none with ' ' and combining three column's in 1
 example : coffee,none,none is converted to coffee, ,
'''

df_final.fillna(value = ' ', inplace = True)
df_final.head()
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[29]:

	0	1	0	1	2	support	Confidence	lift
0	brownies		cottage cheese			0.003466	0.102767	3.225330
1	chicken		light cream			0.004533	0.075556	4.843951
2	escalope		mushroom cream sauce			0.005733	0.072269	3.790833
3	escalope		pasta			0.005866	0.073950	4.700812
4	fresh bread		tomato juice			0.004266	0.099071	3.259356

In [30]:
```
df_final.columns = ['lhs',1, 'rhs',2,3, 'support', 'confidence', 'lift']
df_final.head()
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[30]:

	lhs	1	rhs	2	3	support	confidence	lift
0	brownies		cottage cheese			0.003466	0.102767	3.225330
1	chicken		light cream			0.004533	0.075556	4.843951
2	escalope		mushroom cream sauce			0.005733	0.072269	3.790833
3	escalope		pasta			0.005866	0.073950	4.700812
4	fresh bread		tomato juice			0.004266	0.099071	3.259356

In [31]:
```
df_final.head()
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[31]:

	lhs	1	rhs	2	3	support	confidence	lift
0	brownies		cottage cheese			0.003466	0.102767	3.225330
1	chicken		light cream			0.004533	0.075556	4.843951
2	escalope		mushroom cream sauce			0.005733	0.072269	3.790833
3	escalope		pasta			0.005866	0.073950	4.700812
4	fresh bread		tomato juice			0.004266	0.099071	3.259356

In [32]:
```
#drop columns 1,2 and 3 because now we already appended to lhs column.

df_final.drop(columns=[1,2,3], inplace=True)
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

In [33]:
```
df_final.head()
```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[33]:

	lhs	rhs	support	confidence	lift
0	brownies	cottage cheese	0.003466	0.102767	3.225330
1	chicken	light cream	0.004533	0.075556	4.843951
2	escalope	mushroom cream sauce	0.005733	0.072269	3.790833
3	escalope	pasta	0.005866	0.073950	4.700812
4	fresh bread	tomato juice	0.004266	0.099071	3.259356

In [34]:
```
#showing top 10 item based on lift sorting in dfesc
df_final.sort_values('lift', ascending=False).head(10)

```

```
C:\Users\CompLab05\anaconda3\lib\site-packages\ipykernel\ipkernel.py:287: DeprecationWarning: `should_run_async` wil
l not call `transform_cell` automatically in the future. Please pass the result to `transformed_cell` argument and a
ny exception that happen during thetransform in `preprocessing_exc_tuple` in IPython 7.17 and above.
  and should_run_async(code)
```

Out[34]:

	lhs	rhs	support	confidence	lift
58	olive oil	mineral water	0.003866	0.058704	6.115863
6	fromage blanc	honey	0.003333	0.245098	5.164271
49	ground beef	tomato sauce	0.003066	0.031208	4.980600
1	chicken	light cream	0.004533	0.075556	4.843951
3	escalope	pasta	0.005866	0.073950	4.700812
28	ground beef	herb & pepper	0.003200	0.032564	4.697422
11	pasta	shrimp	0.005066	0.322034	4.506672
23	ground beef	chocolate	0.003999	0.040706	4.490183
69	frozen vegetables	chocolate	0.003200	0.033566	4.417225
10	olive oil	whole wheat pasta	0.007999	0.121457	4.122410

In [ ]:
```

```