```
!pip install mlxtend
```

```
Requirement already satisfied: mlxtend in /usr/local/lib/python3.10/dist-packages (0.22.0)
Requirement already satisfied: scipy>=1.2.1 in /usr/local/lib/python3.10/dist-packages (from mlxtend) (1.11.3)
Requirement already satisfied: numpy>=1.16.2 in /usr/local/lib/python3.10/dist-packages (from mlxtend) (1.23.5)
Requirement already satisfied: pandas>=0.24.2 in /usr/local/lib/python3.10/dist-packages (from mlxtend) (1.5.3)
Requirement already satisfied: scikit-learn>=1.0.2 in /usr/local/lib/python3.10/dist-packages (from mlxtend) (1.2.2)
Requirement already satisfied: matplotlib>=3.0.0 in /usr/local/lib/python3.10/dist-packages (from mlxtend) (3.7.1)
Requirement already satisfied: joblib>=0.13.2 in /usr/local/lib/python3.10/dist-packages (from mlxtend) (1.3.2)
Requirement already satisfied: setuptools in /usr/local/lib/python3.10/dist-packages (from mlxtend) (67.7.2)
Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.0.0->mlxtend) (1.1.1
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.0.0->mlxtend) (0.12.0)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.0.0->mlxtend) (4.43
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.0.0->mlxtend) (1.4.
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.0.0->mlxtend) (23.2)
Requirement already satisfied: pillow>=6.2.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.0.0->mlxtend) (9.4.0)
Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.0.0->mlxtend) (3.1.1
Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.0.0->mlxtend) (2
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=0.24.2->mlxtend) (2023.3.post1
Requirement already satisfied: threadpoolctl>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn>=1.0.2->mlxtend)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.7->matplotlib>=3.0.0->m
```

```
import csv
from mlxtend.preprocessing import TransactionEncoder
from mlxtend.frequent_patterns import apriori,association_rules
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
  and should_run_async(code)
```

```
import pandas as pd
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
  and should_run_async(code)
```

```
df=pd.read_csv('/content/Market_Basket_Optimisation.csv')
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
  and should_run_async(code)
```

```
dataset=[]
with open("/content/Market_Basket_Optimisation.csv") as file:
  reader=csv.reader(file,delimiter=',')
  for row in reader:
    dataset+=[row]
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
  and should_run_async(code)
```

```
print("The DataSet is:")
dataset
```

```
 'zucchini',
 'green tea'],
['shrimp',
 'spaghetti',
 'mineral water',
 'soup',
 'milk',
 'olive oil',
 'chicken',
 'cake',
 'burger sauce',
 'oil'],
['chicken', 'cooking oil', 'tea'],
['burgers',
 'soup',
 'vegetables mix',
 'pancakes',
 'body spray',
 'melons',
 'protein bar',
 'asparagus',
 'mayonnaise',
 'mint',
 'green tea'],
['shrimp', 'pepper'],
['spaghetti', 'olive oil', 'blueberries'],
['muffins'],
['grated cheese', 'herb & pepper', 'muffins', 'eggs', 'low fat yogurt'],
['grated cheese',
 'frozen vegetables',
 'spaghetti',
 'milk'.
```

```python
te=TransactionEncoder()
x=te.fit_transform(dataset)
#for converting dataset into structured list form TransactionEncoder is used
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
  and should_run_async(code)
```

```python
print("The structured list is:\n")
x
```

```
The structured list is:

/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
  and should_run_async(code)
array([[False,  True,  True, ...,  True, False, False],
       [False, False, False, ..., False, False, False],
       [False, False, False, ..., False, False, False],
       ...,
       [False, False, False, ..., False, False, False],
       [False, False, False, ..., False, False, False],
       [False, False, False, ..., False,  True, False]])
```

```python
len(te.columns_)
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
  and should_run_async(code)
120
```

```python
df=pd.DataFrame(x,columns=te.columns_)
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
  and should_run_async(code)
```

```python
print("Printing firset 10 rows of Structured Dataset:")
df.head()
#trasaction Encoding required for Association rule
```

Printing firset 10 rows of Structured Dataset:
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_c
  and should_run_async(code)

	asparagus	almonds	antioxydant juice	asparagus	avocado	babies food	bacon	barbecue sauce	black tea	blueberries	body spray	bramble	brownies	bug spray
0	False	True	True	False	True	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False	False	False	False	False

```
#hyper Parameters
#parameters which are passed by us to model
frequency_items=apriori(df,min_support=0.01,use_colnames=True)
```

/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
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frequency_items

/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning
  and should_run_async(code)

	support	itemsets
0	0.020397	(almonds)
1	0.033329	(avocado)
2	0.010799	(barbecue sauce)
3	0.014265	(black tea)
4	0.011465	(body spray)
...	...	...
252	0.011065	(milk, ground beef, mineral water)
253	0.017064	(ground beef, spaghetti, mineral water)
254	0.015731	(milk, spaghetti, mineral water)
255	0.010265	(olive oil, spaghetti, mineral water)
256	0.011465	(spaghetti, pancakes, mineral water)

257 rows × 2 columns

```
#Find the rules

rules=association_rules(frequency_items,metric='confidence',
                        min_threshold=0.25)
```

/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
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```
rules=rules[['antecedents','consequents','support','confidence']]
```

/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
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```
print("The Association Rule is:\n")
rules.head()
```

The Association Rule is:

```
filtered_rules = rules[rules['antecedents'].apply(lambda x: 'cake' in x)]
consequents_column = filtered_rules['consequents']
```

/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
  and should_run_async(code)

1	(burgers)	(eggs) 0.028796	0.330275

```
filtered_rules
```

/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_c
  and should_run_async(code)

	antecedents	consequents	support	confidence
4	(cake)	(mineral water)	0.027463	0.338816