

```
!pip install mlxtend
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
and should_run_async(code)
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) (0.12.1)
Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.10/dist-packages (from matplotlib>=3.0.0->mlxtend) (4.4.3)
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
import pandas as pd
from mlxtend.preprocessing import TransactionEncoder
from mlxtend.frequent_patterns import apriori, association_rules
```

```
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```

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

```
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```

```
dataset
```

```
['tomatoes',
 'spaghetti',
 'milk',
 'cider',
 'eggs',
 'honey',
 'cake',
 'green tea',
 'french fries',
 'brownies',
 'tomato juice',
 '',
 '',
 '',
 '',
 '',
 '',
 '',
 '',
 '',
 '',
 ''],
...]
```

```
te = TransactionEncoder()

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```

```
df = te.fit_transform(dataset)

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```

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

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```

```
df

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```

		almonds	antioxydant juice	asparagus	avocado	babies food	bacon	barbecue sauce	black tea	blueberries	...	turkey	vegetables mix	water spray	w
0	False	True	True	False	True	False	False	False	False	False	...	False	True	False	F
1	True	False	False	False	False	False	False	False	False	False	...	False	False	False	F
2	True	False	False	False	False	False	False	False	False	False	...	False	False	False	F
3	True	False	False	False	True	False	False	False	False	False	...	True	False	False	F
4	True	False	False	False	False	False	False	False	False	False	...	False	False	False	F
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
7496	True	False	False	False	False	False	False	False	False	False	...	False	False	False	F
7497	True	False	False	False	False	False	False	False	False	False	...	False	False	False	F
7498	True	False	False	False	False	False	False	False	False	False	...	False	False	False	F
7499	True	False	False	False	False	False	False	False	False	False	...	False	False	False	F
7500	True	False	False	False	False	False	False	False	False	False	...	False	False	False	F
7501 rows × 120 columns															

```
item_set = apriori(df, min_support=0.01, use_colnames=True)
item_set
```

```
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```

	support	itemsets	
0	0.999867	()	
1	0.020397	(almonds)	
2	0.033329	(avocado)	
3	0.010799	(barbecue sauce)	
4	0.014265	(black tea)	
...	...	...	
510	0.011065	(, mineral water, ground beef, milk)	
...	...	...	

```
rules= association_rules(item_set, metric="confidence", min_threshold=0.25)
print (f" Confidence Level: 25%, No of rules: {len(rules)}")
rules
```

```
Confidence Level: 25%, No of rules: 542
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_
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```

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	conviction	zhangs_metric	
0	(almonds)	()	0.020397	0.999867	0.020264	0.993464	0.993597	-0.000131	0.020397	-0.006536	
1	(avocado)	()	0.033329	0.999867	0.033196	0.996000	0.996133	-0.000129	0.033329	-0.004000	
2	(barbecue sauce)	()	0.010799	0.999867	0.010799	1.000000	1.000133	0.000001	inf	0.000135	
3	(black tea)	()	0.014265	0.999867	0.014265	1.000000	1.000133	0.000002	inf	0.000135	
4	(body spray)	()	0.011465	0.999867	0.011465	1.000000	1.000133	0.000002	inf	0.000135	
...	...	...	...	...	...	...	...	...	...	...	
537	(, pancakes, mineral water)	(spaghetti)	0.033729	0.174110	0.011465	0.339921	1.952333	0.005593	1.251198	0.504819	
538	(, pancakes, spaghetti)	(mineral water)	0.025197	0.238368	0.011465	0.455026	1.908923	0.005459	1.397557	0.488452	
539	(pancakes, mineral water, spaghetti)	()	0.011465	0.999867	0.011465	1.000000	1.000133	0.000002	inf	0.000135	
540	(pancakes, mineral water)	(, spaghetti)	0.033729	0.174110	0.011465	0.339921	1.952333	0.005593	1.251198	0.504819	
541	(pancakes, spaghetti)	(, mineral water)	0.025197	0.238235	0.011465	0.455026	1.909991	0.005462	1.397802	0.488752	

```
rules= association_rules(item_set, metric="confidence", min_threshold=0.20)
print (f" Confidence Level: 20%, No of rules: {len(rules)}")
rules
```

```
Confidence Level: 20%, No of rules: 744
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```

antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage	conviction	zhangs_metric
-------------	-------------	--------------------	--------------------	---------	------------	------	----------	------------	---------------

```
rules = rules[["antecedents", "consequents", "support", "confidence"]]
rules
```

```
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```

	antecedents	consequents	support	confidence
0	(almonds)	()	0.020264	0.993464
1	(avocado)	()	0.033196	0.996000
2	(barbecue sauce)	()	0.010799	1.000000
3	(black tea)	()	0.014265	1.000000
4	(body spray)	()	0.011465	1.000000
...	...	...	...	...
739	(, pancakes, mineral water)	(spaghetti)	0.011465	0.339921
740	(, pancakes, spaghetti)	(mineral water)	0.011465	0.455026
741	(pancakes, mineral water, spaghetti)	()	0.011465	1.000000
742	(pancakes, mineral water)	(, spaghetti)	0.011465	0.339921
743	(pancakes, spaghetti)	(, mineral water)	0.011465	0.455026

744 rows × 4 columns

```
#Recommendation
ip = "milk"
ip = input("Enter the item to purchase : ")
rules[rules["antecedents"] == {ip}]["consequents"]
```

```
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```

```
Enter the item to purchase : milk
45      ()
103     (chocolate)
125     (eggs)
162    (mineral water)
167    (spaghetti)
289    (, chocolate)
359    (, eggs)
501    (, mineral water)
515    (, spaghetti)
Name: consequents, dtype: object
```

