```
!pip install mlxtend
```

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

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

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

```
dataset[0:10]
```

```
len(dataset)
```

```
7501
```

```
te = TransactionEncoder()
x = te.fit_transform(dataset)
```

```
x
```

```
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]])
```

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

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

```
120
```

```
df.head()
```

| | asparagus | almonds | antioxydant juice | asparagus | avocado | babies food | bacon | barbecue sauce | black tea | blueberries | ... | turkey | vegetables mix | water spray | white wine |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | False | True | True | False | True | False | False | False | False | False | ... | False | True | False | False |
| **1** | False | False | False | False | False | False | False | False | False | False | ... | False | False | False | False |
| **2** | False | False | False | False | False | False | False | False | False | False | ... | False | False | False | False |
| **3** | False | False | False | False | True | False | False | False | False | False | ... | True | False | False | False |
| **4** | False | False | False | False | False | False | False | False | False | False | ... | False | False | False | False |

5 rows × 120 columns

```
#1. find frequent itemsets
freq_itemset = apriori(df, min_support=0.01, use_colnames=True)
```

```
freq_itemset
```

| | 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, mineral water, ground beef) |
| **253** | 0.017064 | (spaghetti, mineral water, ground beef) |
| **254** | 0.015731 | (spaghetti, milk, mineral water) |
| **255** | 0.010265 | (spaghetti, mineral water, olive oil) |

```
#find the rules
rules = association_rules(freq_itemset , metric='confidence',min_threshold=0.25)
```

```
rules
```

| | antecedents | consequents | antecedent support | consequent support | support | confidence | lift | lev |
|---|---|---|---|---|---|---|---|---|
| **0** | (avocado) | (mineral water) | 0.033329 | 0.238368 | 0.011598 | 0.348000 | 1.459926 | 0.0 |
| **1** | (burgers) | (eggs) | 0.087188 | 0.179709 | 0.028796 | 0.330275 | 1.837830 | 0.0 |
| **2** | (burgers) | (french fries) | 0.087188 | 0.170911 | 0.021997 | 0.252294 | 1.476173 | 0.0 |
| **3** | (burgers) | (mineral water) | 0.087188 | 0.238368 | 0.024397 | 0.279817 | 1.173883 | 0.0 |
| **4** | (cake) | (mineral water) | 0.081056 | 0.238368 | 0.027463 | 0.338816 | 1.421397 | 0.0 |
| **...** | ... | ... | ... | ... | ... | ... | ... | |
| **90** | (milk, mineral water) | (spaghetti) | 0.047994 | 0.174110 | 0.015731 | 0.327778 | 1.882589 | 0.0 |
| **91** | (spaghetti, olive oil) | (mineral water) | 0.022930 | 0.238368 | 0.010265 | 0.447674 | 1.878079 | 0.0 |

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

```
rules
```

| | antecedents | consequents | support | confidence |
|---|---|---|---|---|
| **0** | (avocado) | (mineral water) | 0.011598 | 0.348000 |
| **1** | (burgers) | (eggs) | 0.028796 | 0.330275 |
| **2** | (burgers) | (french fries) | 0.021997 | 0.252294 |
| **3** | (burgers) | (mineral water) | 0.024397 | 0.279817 |
| **4** | (cake) | (mineral water) | 0.027463 | 0.338816 |
| **...** | ... | ... | ... | ... |
| **90** | (milk, mineral water) | (spaghetti) | 0.015731 | 0.327778 |
| **91** | (spaghetti, olive oil) | (mineral water) | 0.010265 | 0.447674 |
| **92** | (mineral water, olive oil) | (spaghetti) | 0.010265 | 0.371981 |
| **93** | (spaghetti, pancakes) | (mineral water) | 0.011465 | 0.455026 |
| **94** | (mineral water, pancakes) | (spaghetti) | 0.011465 | 0.339921 |

95 rows × 4 columns

```
rules.head()
```

|   | antecedents | consequents | support | confidence |
|---|---|---|---|---|
| **0** | (avocado) | (mineral water) | 0.011598 | 0.348000 |
| **1** | (burgers) | (eggs) | 0.028796 | 0.330275 |
| **2** | (burgers) | (french fries) | 0.021997 | 0.252294 |
| **3** | (burgers) | (mineral water) | 0.024397 | 0.279817 |
| **4** | (cake) | (mineral water) | 0.027463 | 0.338816 |

```
rules[rules['antecedents']=={'cake'}]
```

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

```
rules[rules['antecedents']=={'cake'}]['consequents']
```

```
4    (mineral water)
Name: consequents, dtype: object
```