

Import Library

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

Load Dataset from Local Directory

```
from google.colab import files
uploaded = files.upload()
```

Choose Files

Market_Ba...imisat...sv

- Market_Basket_Optimisation.csv(text/csv) - 302908 bytes, last modified: 4/15/2023 - 100% done

Saving Market_Basket_Optimisation.csv to Market_Basket_Optimisation.csv

Importing the dataset

```
dataset = pd.read_csv('Market_Basket_Optimisation.csv')
print(dataset.shape)
print(dataset.head(5))
```

(7500, 20)

0	shrimp	almonds	avocado	vegetables mix	green grapes	\
1	burgers	meatballs	eggs		NaN	NaN
2	chutney	NaN	NaN		NaN	NaN
3	turkey	avocado	NaN		NaN	NaN
4	mineral water	milk	energy bar	whole wheat rice	green tea	
5	low fat yogurt	NaN	NaN		NaN	NaN

0	whole weat flour	yams	cottage cheese	energy drink	tomato juice	\
1	NaN	NaN	NaN	NaN	NaN	
2	NaN	NaN	NaN	NaN	NaN	
3	NaN	NaN	NaN	NaN	NaN	
4	NaN	NaN	NaN	NaN	NaN	

0	low fat yogurt	green tea	honey	salad	mineral water	salmon	antioxydant	juice	\
1	NaN	NaN	NaN	NaN	NaN	NaN		NaN	
2	NaN	NaN	NaN	NaN	NaN	NaN		NaN	
3	NaN	NaN	NaN	NaN	NaN	NaN		NaN	
4	NaN	NaN	NaN	NaN	NaN	NaN		NaN	

0	frozen smoothie	spinach	olive oil
1	NaN	NaN	NaN
2	NaN	NaN	NaN
3	NaN	NaN	NaN
4	NaN	NaN	NaN

Data Pre-Processing

```
transactions = []
for i in range(0, 7500):
    transactions.append([str(dataset.values[i,j]) for j in range(0, 20)])
transactions
```



```
nan ,
'nan'],
['herb & pepper',
'red wine',
'spaghetti',
'eggs',
'whole wheat rice',
'chocolate',
'french fries',
'escalope',
'cookies',
'nan',
'nan',
'nan',
'nan',
'nan',
'nan',
'nan',
'nan',
'nan',
'nan'],
...]
```

Training APRIORI

```
!pip install apyori
from apyori import apriori
rules = apriori(transactions = transactions, min_support = 0.003, min_confidence = 0.2, min_lift = 3, min_length = 2, max_length = 2)

Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting apyori
  Downloading apyori-1.1.2.tar.gz (8.6 kB)
  Preparing metadata (setup.py) ... done
Building wheels for collected packages: apyori
  Building wheel for apyori (setup.py) ... done
  Created wheel for apyori: filename=apyori-1.1.2-py3-none-any.whl size=5976 sha256=0611b6435d0c7e626f7029b8256667a6876c4548f63d9ef4268d4343b1e89f4d
  Stored in directory: /root/.cache/pip/wheels/32/2a/54/10c595515f385f3726642b10c60bf788029e8f3a1323e3913a
Successfully built apyori
Installing collected packages: apyori
Successfully installed apyori-1.1.2
```

Result

```
results = list(rules)
results

[RelationRecord(items=frozenset({'chicken', 'light cream'}), support=0.0045333333333334, ordered_statistics=[OrderedStatistic(items_base=frozenset({'light cream'}),
items_add=frozenset({'chicken'}), confidence=0.2905982905982906, lift=4.843304843304844)]),
RelationRecord(items=frozenset({'mushroom cream sauce', 'escalope'}), support=0.0057333333333333, ordered_statistics=
[OrderedStatistic(items_base=frozenset({'mushroom cream sauce'}), items_add=frozenset({'escalope'}), confidence=0.30069930069930073, lift=3.7903273197390845)]),
RelationRecord(items=frozenset({'pasta', 'escalope'}), support=0.0058666666666667, ordered_statistics=[OrderedStatistic(items_base=frozenset({'pasta'}),
items_add=frozenset({'escalope'}), confidence=0.37288135593220345, lift=4.700185158809287)]),
RelationRecord(items=frozenset({'fromage blanc', 'honey'}), support=0.0033333333333333, ordered_statistics=[OrderedStatistic(items_base=frozenset({'fromage
blanc'}), items_add=frozenset({'honey'}), confidence=0.2450980392156863, lift=5.178127589063795)]),
RelationRecord(items=frozenset({'ground beef', 'herb & pepper'}), support=0.016, ordered_statistics=[OrderedStatistic(items_base=frozenset({'herb & pepper'}),
items_add=frozenset({'ground beef'}), confidence=0.3234501347708895, lift=3.2915549671393096)]),
RelationRecord(items=frozenset({'ground beef', 'tomato sauce'}), support=0.0053333333333333, ordered_statistics=[OrderedStatistic(items_base=frozenset({'tomato
sauce'}), items_add=frozenset({'ground beef'}), confidence=0.37735849056603776, lift=3.840147461662528)]),
RelationRecord(items=frozenset({'olive oil', 'light cream'}), support=0.0032, ordered_statistics=[OrderedStatistic(items_base=frozenset({'light cream'}),
items_add=frozenset({'olive oil'}), confidence=0.20512820512820515, lift=3.120611639881417)]),
RelationRecord(items=frozenset({'olive oil', 'whole wheat pasta'}), support=0.008, ordered_statistics=[OrderedStatistic(items_base=frozenset({'whole wheat pasta'}),
items_add=frozenset({'olive oil'}), confidence=0.2714932126696833, lift=4.130221280078346)]),
RelationRecord(items=frozenset({'pasta', 'shrimp'}), support=0.0050666666666667, ordered_statistics=[OrderedStatistic(items_base=frozenset({'pasta'}),
items_add=frozenset({'shrimp'}), confidence=0.3220338983050848, lift=4.514493901473151)])]
```

Result in DataFrame

```
lhs      = [tuple(result[2][0][0])[0] for result in results]
rhs      = [tuple(result[2][0][1])[0] for result in results]
supports = [result[1] for result in results]
confidence = [result[2][0][2] for result in results]
lifts     = [result[2][0][3] for result in results]
resultsinDataFrame = pd.DataFrame(zip(lhs, rhs, supports, confidence, lifts),
                                columns = ['Left Hand Side', 'Right Hand Side', 'Support', 'Confidence', 'Lift'])
resultsinDataFrame
```

	Left Hand Side	Right Hand Side	Support	Confidence	Lift
0	light cream	chicken	0.004533	0.290598	4.843305
1	mushroom cream sauce	escalope	0.005733	0.300699	3.790327
2	pasta	escalope	0.005867	0.372881	4.700185
3	fromage blanc	honey	0.003333	0.245098	5.178128
4	herb & pepper	ground beef	0.016000	0.323450	3.291555
5	tomato sauce	ground beef	0.005333	0.377358	3.840147
6	light cream	olive oil	0.003200	0.205128	3.120612
7	whole wheat pasta	olive oil	0.008000	0.271493	4.130221
8	pasta	shrimp	0.005067	0.322034	4.514494

```
resultsinDataFrame.nlargest(n = 10, columns = 'Support')
```

	Left Hand Side	Right Hand Side	Support	Confidence	Lift	
4	herb & pepper	ground beef	0.016000	0.323450	3.291555	
7	whole wheat pasta	olive oil	0.008000	0.271493	4.130221	
2	pasta	escalope	0.005867	0.372881	4.700185	
1	mushroom cream sauce	escalope	0.005733	0.300699	3.790327	
5	tomato sauce	ground beef	0.005333	0.377358	3.840147	
8	pasta	shrimp	0.005067	0.322034	4.514494	
0	light cream	chicken	0.004533	0.290598	4.843305	
3	fromage blanc	honey	0.003333	0.245098	5.178128	
6	light cream	olive oil	0.003200	0.205128	3.120612	

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