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#ROLL NO :9037

#TE IT

from google.colab import drive
drive.mount('/content/drive')

Mounted at /content/drive

#Importing libraries
import pandas as pd
import numpy as np

data\_set=pd.read\_csv("/content/drive/MyDrive/Colab Notebooks/sample/Market\_Basket\_Optimisation.csv")
data\_set

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|      | shrimp            | almonds              | avocado        | vegetables<br>mix   | green<br>grapes | whole<br>weat<br>flour | yams | cottage<br>cheese | energy<br>drink | tomato<br>juice | low<br>fat<br>yogurt | green<br>tea | honey | Si |
|------|-------------------|----------------------|----------------|---------------------|-----------------|------------------------|------|-------------------|-----------------|-----------------|----------------------|--------------|-------|----|
| 0    | burgers           | meatballs            | eggs           | NaN                 | NaN             | NaN                    | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |
| 1    | chutney           | NaN                  | NaN            | NaN                 | NaN             | NaN                    | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |
| 2    | turkey            | avocado              | NaN            | NaN                 | NaN             | NaN                    | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |
| 3    | mineral<br>water  | milk                 | energy<br>bar  | whole<br>wheat rice | green tea       | NaN                    | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |
| 4    | low fat<br>yogurt | NaN                  | NaN            | NaN                 | NaN             | NaN                    | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |
|      |                   |                      |                |                     |                 |                        |      |                   |                 |                 |                      |              |       |    |
| 7495 | butter            | light mayo           | fresh<br>bread | NaN                 | NaN             | NaN                    | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |
| 7496 | burgers           | frozen<br>vegetables | eggs           | french fries        | magazines       | green<br>tea           | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |
| 7497 | chicken           | NaN                  | NaN            | NaN                 | NaN             | NaN                    | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |
| 7498 | escalope          | green tea            | NaN            | NaN                 | NaN             | NaN                    | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |
| 7499 | eggs              | frozen<br>smoothie   | yogurt<br>cake | low fat<br>yogurt   | NaN             | NaN                    | NaN  | NaN               | NaN             | NaN             | NaN                  | NaN          | NaN   |    |

7500 rows × 20 columns

data\_set.isnull().sum()

```
shrimp
                        0
almonds
                    1754
avocado
                    3112
vegetables mix
                    4156
                    4972
green grapes
whole weat flour
                    5637
                    6132
yams
cottage cheese
                    6520
                     6847
energy drink
tomato juice
                     7106
low fat yogurt
                    7245
green tea
honey
                     7414
                     7454
salad
mineral water
                     7476
salmon
                     7493
antioxydant juice
                     7497
frozen smoothie
                     7497
spinach
                     7498
                     7500
olive oil
dtype: int64
```

import matplotlib.pyplot as plt

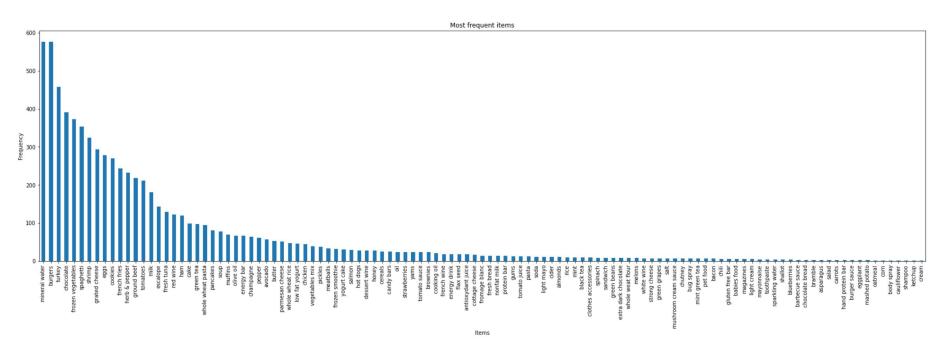
```
plt.rcParams[ 'figure.figsize'] = (30,8)
data_set["shrimp"].value_counts().plot.bar()
```

plt.title('Most frequent items')

plt.ylabel('Frequency')

plt.xlabel('Items')

plt.show()



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

pip install apyori
    Requirement already satisfied: apyori in /usr/local/lib/python3.7/dist-packages (1.1.2)

from apyori import apriori
rules=apriori(transaction,min_support=0.003,min_confidence=0.2,min_lift=2,min_length=2, max_length=2)
rules
    <generator object apriori at 0x7f9dc50b42d0>

result=list(rules)
result
```

[RelationRecord(items=frozenset({'almonds', 'burgers'}), support=0.0052, ordered\_statistics=[OrderedStatistic(items\_based)] RelationRecord(items=frozenset({'bacon', 'spaghetti'}), support=0.0032, ordered\_statistics=[OrderedStatistic(items\_based)] RelationRecord(items=frozenset({'blueberries', 'spaghetti'}), support=0.00346666666666666665, ordered\_statistics=[Order RelationRecord(items=frozenset({'ham', 'burgers'}), support=0.0056, ordered\_statistics=[OrderedStatistic(items\_base=fr RelationRecord(items=frozenset({'light cream', 'chicken'}), support=0.004533333333333334, ordered\_statistics=[OrderedS RelationRecord(items=frozenset({'milk', 'cider'}), support=0.00333333333333333, ordered\_statistics=[OrderedStatistic RelationRecord(items=frozenset({'mushroom cream sauce', 'escalope'}), support=0.005733333333333333, ordered\_statistics RelationRecord(items=frozenset({'extra dark chocolate', 'mineral water'}), support=0.005733333333333333, ordered\_stati RelationRecord(items=frozenset({'green tea', 'flax seed'}), support=0.00306666666666666666, ordered\_statistics=[Orderec RelationRecord(items=frozenset({'fromage blanc', 'honey'}), support=0.003333333333333333, ordered\_statistics=[Orderec RelationRecord(items=frozenset({'frozen vegetables', 'tomatoes'}), support=0.01613333333333333, ordered\_statistics=[C RelationRecord(items=frozenset({'grated cheese', 'ground beef'}), support=0.01133333333333334, ordered\_statistics=[Or RelationRecord(items=frozenset({'green beans', 'spaghetti'}), support=0.00346666666666666665, ordered\_statistics=[Order RelationRecord(items=frozenset({'herb & pepper', 'ground beef'}), support=0.016, ordered\_statistics=[OrderedStatistic( RelationRecord(items=frozenset({'light cream', 'ground beef'}), support=0.00333333333333333, ordered\_statistics=[Orc RelationRecord(items=frozenset({'olive oil', 'ground beef'}), support=0.01413333333333333, ordered\_statistics=[Ordered\_statist RelationRecord(items=frozenset({'pepper', 'ground beef'}), support=0.006533333333333334, ordered\_statistics=[OrderedSt RelationRecord(items=frozenset({'rice', 'ground beef'}), support=0.0044, ordered statistics=[OrderedStatistic(items ba RelationRecord(items=frozenset({'salmon', 'ground beef'}), support=0.00893333333333333, ordered\_statistics=[OrderedSt RelationRecord(items=frozenset({'spaghetti', 'ground beef'}), support=0.0392, ordered\_statistics=[OrderedStatistic(items=frozenset({'spaghetti', 'ground beef'}), support=0.0392, ordered\_statistics=[OrderedStatistic(items=frozenset({'spaghetti', 'ground beef'}), support=0.0392, ordered\_statistics=[OrderedStatistic(items=frozenset({'spaghetti', 'ground beef'})]) RelationRecord(items=frozenset({'tomato sauce', 'ground beef'}), support=0.00533333333333333, ordered\_statistics=[Orc RelationRecord(items=frozenset({'olive oil', 'light cream'}), support=0.0032, ordered\_statistics=[OrderedStatistic(items=frozenset({'olive oil', 'light cream'}), support=0.0032, ordered\_statistics=[OrderedStatistic(items=frozenset({'olive oil', 'light cream'}), support=0.0032, ordered\_statistics=[OrderedStatistic(items=frozenset({'olive oil', 'light cream'})]) RelationRecord(items=frozenset({'light cream', 'pancakes'}), support=0.00346666666666666665, ordered\_statistics=[Ordere 

```
Assignment5.ipynb - Colaboratory
   RelationRecord(items=frozenset({'milk', 'soup'}), support=0.0152, ordered_statistics=[OrderedStatistic(items_base=frozenset(
   RelationRecord(items=frozenset({'milk', 'whole wheat pasta'}), support=0.0098666666666666666666666, ordered_statistics=[Order
   RelationRecord(items=frozenset({'strong cheese', 'spaghetti'}), support=0.003733333333333333, ordered_statistics=[Orc
   for item in result:
  pair = item[0]
  items = [x for x in pair]
  print("Rule: " + items[0] + " -> " + items[1])
  print("Support: " + str(item[1]))
  print("Confidence: " + str(item[2][0][2]))
  print("Lift: " + str(item[2][0][3]))
  print("======="")
  Confidence: 0.2611464968152866
  Lift: 2.0150192655500514
  _____
  Rule: milk -> olive oil
  Support: 0.017066666666666667
  Confidence: 0.25963488843813387
  Lift: 2.0033556206646135
  _____
  Rule: milk -> soup
  Support: 0.0152
  Confidence: 0.3007915567282322
  Lift: 2.320922505619076
  _____
  Rule: milk -> whole wheat pasta
  Confidence: 0.334841628959276
  Lift: 2.583654544438858
  _____
  Rule: mineral water -> nonfat milk
  Confidence: 0.48717948717948717
  Lift: 2.044681675347596
  _____
  Rule: olive oil -> spaghetti
  Support: 0.0229333333333333333
  Confidence: 0.3488843813387424
  Lift: 2.0035473660341254
```

\_\_\_\_\_ Rule: olive oil -> whole wheat pasta

Support: 0.008

Lift: 4.130221288078346 \_\_\_\_\_

Confidence: 0.2714932126696833

Rule: shrimp -> pasta Confidence: 0.3220338983050848

Lift: 4.514493901473151

Rule: pepper -> spaghetti Support: 0.009866666666666666 Confidence: 0.37185929648241206

Lift: 2.1354860058331475

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Rule: spaghetti -> red wine Support: 0.01026666666666667 Confidence: 0.36492890995260663 Lift: 2.0956866957462097

Rule: strong cheese -> spaghetti Support: 0.00373333333333333333 Confidence: 0.48275862068965514 Lift: 2.7723504250937316

Rule: tomato sauce -> spaghetti Support: 0.00626666666666667 Confidence: 0.44339622641509435

Lift: 2.546302984772747

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✓ 1s completed at 11:40 AM

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