```
!pip install apyori
```

```
Collecting apyori
  Downloading apyori-1.1.2.tar.gz (8.6 kB)
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=5974 sha256=eb4
  Stored in directory: /root/.cache/pip/wheels/cb/f6/e1/57973c631d27efd1a2f375bd6a83b2a
Successfully built apyori
Installing collected packages: apyori
Successfully installed apyori-1.1.2
```

```
import pandas as pd
from apyori import apriori
```

```
pd.options.mode.chained_assignment = None  # default='warn' ---- ignores false warning for da
```

```
# write csv into datafile
df = pd.read_csv('medical_market_basket.csv')
print(df.head())
```

```
      Presc01            Presc02  ...       Presc19    Presc20
0         NaN                NaN  ...           NaN        NaN
1  amlodipine  albuterol aerosol  ...  promethazine  glipizide
2         NaN                NaN  ...           NaN        NaN
3  citalopram            benicar  ...           NaN        NaN
4         NaN                NaN  ...           NaN        NaN

[5 rows x 20 columns]
```

```
print(df.isnull().sum())
```

```
Presc01     7501
Presc02     9255
Presc03    10613
Presc04    11657
Presc05    12473
Presc06    13138
Presc07    13633
Presc08    14021
Presc09    14348
Presc10    14607
Presc11    14746
Presc12    14848
Presc13    14915
Presc14    14955
Presc15    14977
Presc16    14994
Presc17    14998
```

```
Presc18    14998
Presc19    14999
Presc20    15001
dtype: int64
```

```
df = df.dropna(how='all')
df = df.fillna(0)
print(df.head())
print(df.shape)
print(df.info())
```

```
      Presc01            Presc02  ...       Presc19    Presc20
1  amlodipine  albuterol aerosol  ...  promethazine  glipizide
3  citalopram            benicar  ...             0          0
5   enalapril                  0  ...             0          0
7  paroxetine        allopurinol  ...             0          0
9     abilify       atorvastatin  ...             0          0

[5 rows x 20 columns]
(7501, 20)
<class 'pandas.core.frame.DataFrame'>
Int64Index: 7501 entries, 1 to 15001
Data columns (total 20 columns):
 #   Column   Non-Null Count  Dtype 
---  ------   --------------  ----- 
 0   Presc01  7501 non-null   object
 1   Presc02  7501 non-null   object
 2   Presc03  7501 non-null   object
 3   Presc04  7501 non-null   object
 4   Presc05  7501 non-null   object
 5   Presc06  7501 non-null   object
 6   Presc07  7501 non-null   object
 7   Presc08  7501 non-null   object
 8   Presc09  7501 non-null   object
 9   Presc10  7501 non-null   object
 10  Presc11  7501 non-null   object
 11  Presc12  7501 non-null   object
 12  Presc13  7501 non-null   object
 13  Presc14  7501 non-null   object
 14  Presc15  7501 non-null   object
 15  Presc16  7501 non-null   object
 16  Presc17  7501 non-null   object
 17  Presc18  7501 non-null   object
 18  Presc19  7501 non-null   object
 19  Presc20  7501 non-null   object
dtypes: object(20)
memory usage: 1.2+ MB
None
```

```
# converting datafram into list for iteration
medication_list = []
for i in range(len(df.index)):
  medication_list.append([str(df.values[i,j]) for j in range (len(df.columns))])
```

```
df_cleaned = pd.DataFrame(medication_list)
df_cleaned.to_csv('medical_market_basket_cleaned.csv')
print(medication_list[:1])
```

```
[['amlodipine', 'albuterol aerosol', 'allopurinol', 'pantoprazole', 'lorazepam', 'omepr
```

```
#applying apriori algorithm
association_rules = apriori(medication_list, min_support=0.0045, min_confidence=0.2, min_lift
association_results = list(association_rules)


# show results
for i in range(0, len(association_results)):
    print(association_results[i][0])
```

```
frozenset({'acetaminophen', 'alprazolam'})
frozenset({'acetaminophen', 'amlodipine'})
frozenset({'hydrocodone', 'alprazolam'})
frozenset({'salmeterol inhaler', 'clopidogrel'})
frozenset({'glipizide', 'hydrochlorothiazide'})
frozenset({'lisinopril', 'methylprednisone'})
frozenset({'potassium Chloride', 'lisinopril'})
frozenset({'acetaminophen', 'alprazolam', '0'})
frozenset({'acetaminophen', '0', 'amlodipine'})
frozenset({'hydrocodone', 'alprazolam', '0'})
frozenset({'salmeterol inhaler', '0', 'clopidogrel'})
frozenset({'glipizide', '0', 'hydrochlorothiazide'})
frozenset({'lisinopril', '0', 'methylprednisone'})
frozenset({'potassium Chloride', 'lisinopril', '0'})
frozenset({'metoprolol', 'abilify', 'amlodipine'})
frozenset({'metformin', 'glipizide', 'abilify'})
frozenset({'lisinopril', 'methylprednisone', 'abilify'})
frozenset({'lisinopril', 'amlodipine', 'carvedilol'})
frozenset({'metoprolol', 'amlodipine', 'carvedilol'})
frozenset({'metoprolol', 'diazepam', 'amlodipine'})
frozenset({'metoprolol', 'amphetamine salt combo', 'carvedilol'})
frozenset({'glipizide', 'carvedilol', 'atorvastatin'})
frozenset({'glipizide', 'lisinopril', 'atorvastatin'})
frozenset({'metoprolol', 'glipizide', 'atorvastatin'})
frozenset({'glipizide', 'doxycycline hyclate', 'carvedilol'})
frozenset({'lisinopril', 'fenofibrate', 'carvedilol'})
frozenset({'lisinopril', 'furosemide', 'carvedilol'})
frozenset({'metoprolol', 'glipizide', 'carvedilol'})
frozenset({'lisinopril', 'methylprednisone', 'carvedilol'})
frozenset({'metoprolol', 'lisinopril', 'carvedilol'})
frozenset({'metoprolol', '0', 'abilify', 'amlodipine'})
frozenset({'metformin', 'glipizide', '0', 'abilify'})
frozenset({'lisinopril', '0', 'methylprednisone', 'abilify'})
frozenset({'lisinopril', '0', 'amlodipine', 'carvedilol'})
frozenset({'metoprolol', '0', 'amlodipine', 'carvedilol'})
frozenset({'metoprolol', 'diazepam', '0', 'amlodipine'})
frozenset({'metoprolol', 'amphetamine salt combo', '0', 'carvedilol'})
frozenset({'glipizide', '0', 'carvedilol', 'atorvastatin'})
frozenset({'glipizide', '0', 'lisinopril', 'atorvastatin'})
frozenset({'metoprolol', 'glipizide', '0', 'atorvastatin'})
frozenset({'glipizide', 'doxycycline hyclate', '0', 'carvedilol'})
frozenset({'lisinopril', '0', 'fenofibrate', 'carvedilol'})
frozenset({'lisinopril', '0', 'furosemide', 'carvedilol'})
frozenset({'metoprolol', 'glipizide', '0', 'carvedilol'})
frozenset({'lisinopril', '0', 'methylprednisone', 'carvedilol'})
frozenset({'metoprolol', 'lisinopril', '0', 'carvedilol'})
frozenset({'metoprolol', 'abilify', 'carvedilol', 'atorvastatin'})
frozenset({'metoprolol', 'abilify', 'carvedilol', 'atorvastatin', '0'})
```

```
for item in association_results:
    # first index of the inner list
    # Contains base item and add item
    pair = item[0]
    items = [x for x in pair]
    print("Rule: " + items[0] + " -> " + items[1])
    # second index of the inner list
    print("Support: " + str(item[1]))
    # third index of the list located at 0th position
    # of the third index of the inner list
    print("Confidence: " + str(item[2][0][2]))
    print("Lift: " + str(item[2][0][3]))
    print("-----------------------------------------------------")
```

```
Rule: acetaminophen -> alprazolam
Support: 0.005865884548726837
Confidence: 0.3728813559322034
Lift: 4.700811850163794
-----------------------------------------------------
Rule: acetaminophen -> amlodipine
Support: 0.005065991201173177
Confidence: 0.3220338983050847
Lift: 4.506672147735896
-----------------------------------------------------
Rule: hydrocodone -> alprazolam
Support: 0.005732568990801226
Confidence: 0.3006993006993007
Lift: 3.790832696715049
-----------------------------------------------------
Rule: salmeterol inhaler -> clopidogrel
Support: 0.004532728969470737
Confidence: 0.29059829059829057
Lift: 4.84395061728395
-----------------------------------------------------
Rule: glipizide -> hydrochlorothiazide
Support: 0.007998933475536596
Confidence: 0.2714932126696833
Lift: 4.122410097642296
-----------------------------------------------------
Rule: lisinopril -> methylprednisone
Support: 0.015997866951073192
Confidence: 0.3234501347708895
```

```
Lift: 3.2919938411349285
-----------------------------------------------------
Rule: potassium Chloride -> lisinopril
Support: 0.005332622317024397
Confidence: 0.3773584905660377
Lift: 3.840659481324083
-----------------------------------------------------
Rule: acetaminophen -> alprazolam
Support: 0.005865884548726837
Confidence: 0.3728813559322034
Lift: 4.700811850163794
-----------------------------------------------------
Rule: acetaminophen -> 0
Support: 0.005065991201173177
Confidence: 0.3220338983050847
Lift: 4.515095833993347
-----------------------------------------------------
Rule: hydrocodone -> alprazolam
Support: 0.005732568990801226
Confidence: 0.3006993006993007
Lift: 3.790832696715049
-----------------------------------------------------
Rule: salmeterol inhaler -> 0
Support: 0.004532728969470737
Confidence: 0.29059829059829057
Lift: 4.84395061728395
-----------------------------------------------------
Rule: glipizide -> 0
Support: 0.007998933475536596
Confidence: 0.2714932126696833
```

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