In [1]:

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

df = pd.read_csv('basketok4.csv', sep=',')
df.head()
```

Out[1]:

	ID	MovieBoxes	TShirts	CollegeShirts	Caps	Hats	Mugs	Music	Posters	Books	...	F
0	1	0	0	0	0	0	0	0	0	1	...	
1	2	0	1	0	0	0	0	0	0	1	...	
2	3	0	0	0	0	0	0	1	0	0	...	
3	4	1	0	0	1	0	0	0	0	0	...	
4	5	0	0	0	0	0	0	0	0	1	...	

5 rows × 21 columns

In [2]:

```
# save header
colnames = df.columns
colnames
```

Out[2]:

```
Index(['ID', 'MovieBoxes', 'TShirts', 'CollegeShirts', 'Caps', 'Hats', 'Mu
gs',
       'Music', 'Posters', 'Books', 'Scarves', 'PintsAndWhiskeyGlasses',
       'ScaleModels', 'CollectorCards', 'BoardGames', 'FlagsAndStandards',
       'Stickers', 'Toys', 'Sweets', 'FridgeMagnets', 'UnderwearAndSock
s'],
      dtype='object')
```

Turn data into transaction format

In [3]:

```
tdata = []
for i in range(0, df.shape[0]):
    transaction = []
    for j in range(1,df.shape[1]):
        if df.values[i,j]==1:
            transaction.append(colnames[j])
    if (i<=5):
        print(transaction)
    tdata.append(transaction)
```

```
['Books', 'FlagsAndStandards', 'UnderwearAndSocks']
['TShirts', 'Books', 'FlagsAndStandards', 'Stickers', 'Toys', 'Sweets', 'F
ridgeMagnets', 'UnderwearAndSocks']
['Music', 'FridgeMagnets', 'UnderwearAndSocks']
['MovieBoxes', 'Caps', 'PintsAndWhiskeyGlasses', 'FridgeMagnets', 'Underwe
arAndSocks']
['Books', 'FlagsAndStandards', 'FridgeMagnets', 'UnderwearAndSocks']
['TShirts', 'Music', 'PintsAndWhiskeyGlasses']
```

Mine for rules

In [4]:

```
results = list(apriori(tdata, min_support = 0.05, min_confidence = 0.05))
if len(results) >= 5:
        print(results[:5])
```

```
[RelationRecord(items=frozenset({'BoardGames'}), support=0.14557, ordered_
statistics=[OrderedStatistic(items_base=frozenset(), items_add=frozenset
({'BoardGames'}), confidence=0.14557, lift=1.0)]), RelationRecord(items=fr
ozenset({'Books'}), support=0.19853, ordered_statistics=[OrderedStatistic
(items_base=frozenset(), items_add=frozenset({'Books'}), confidence=0.1985
3, lift=1.0)]), RelationRecord(items=frozenset({'FlagsAndStandards'}), sup
port=0.1188, ordered_statistics=[OrderedStatistic(items_base=frozenset(),
items_add=frozenset({'FlagsAndStandards'}), confidence=0.1188, lift=1.
0)]), RelationRecord(items=frozenset({'FridgeMagnets'}), support=0.20626,
ordered_statistics=[OrderedStatistic(items_base=frozenset(), items_add=fro
zenset({'FridgeMagnets'}), confidence=0.20626, lift=1.0)]), RelationRecord
(items=frozenset({'Hats'}), support=0.10459, ordered_statistics=[OrderedSt
atistic(items_base=frozenset(), items_add=frozenset({'Hats'}), confidence=
0.10459, lift=1.0)])]
```

Exctract the rules into a simple list

In [5]:

```
rlist = []
for a in results:
    support = a.support
    items = a.items
    rules = a.ordered_statistics
    for b in rules:
        lhs = b.items_base
        rhs = b.items_add
        conf = b.confidence
        rlist.append([conf, support, lhs, rhs])
```

Sort by confidence in decreasing order

In [6]:

```
rlist.sort(key = lambda rlist:rlist[0], reverse=True)
```

List the rules

In [7]:

```
print("Conf.  Supp.  Rule")
print(80*"-")
for a in rlist:
        print("%6.4f %6.4f %s ---> %s" % (a[0], a[1], a[2], a[3]))
```

```
Conf.  Supp.  Rule
--------------------------------------------------------------------------------
------
0.9381 0.1114 frozenset({'FlagsAndStandards'}) ---> frozenset({'Books'})
0.9107 0.1348 frozenset({'UnderwearAndSocks'}) ---> frozenset({'FridgeMagn
ets'})
0.6534 0.1348 frozenset({'FridgeMagnets'}) ---> frozenset({'UnderwearAndSo
cks'})
0.6390 0.0668 frozenset({'Hats'}) ---> frozenset({'ScaleModels'})
0.5614 0.1114 frozenset({'Books'}) ---> frozenset({'FlagsAndStandards'})
0.4184 0.0668 frozenset({'ScaleModels'}) ---> frozenset({'Hats'})
0.2063 0.2063 frozenset() ---> frozenset({'FridgeMagnets'})
0.1985 0.1985 frozenset() ---> frozenset({'Books'})
0.1618 0.1618 frozenset() ---> frozenset({'Posters'})
0.1597 0.1597 frozenset() ---> frozenset({'ScaleModels'})
0.1480 0.1480 frozenset() ---> frozenset({'UnderwearAndSocks'})
0.1456 0.1456 frozenset() ---> frozenset({'BoardGames'})
0.1350 0.1350 frozenset() ---> frozenset({'Music'})
0.1348 0.1348 frozenset() ---> frozenset({'UnderwearAndSocks', 'FridgeMagn
ets'})
0.1310 0.1310 frozenset() ---> frozenset({'Stickers'})
0.1310 0.1310 frozenset() ---> frozenset({'TShirts'})
0.1217 0.1217 frozenset() ---> frozenset({'Sweets'})
0.1188 0.1188 frozenset() ---> frozenset({'FlagsAndStandards'})
0.1114 0.1114 frozenset() ---> frozenset({'Books', 'FlagsAndStandards'})
0.1100 0.1100 frozenset() ---> frozenset({'MovieBoxes'})
0.1085 0.1085 frozenset() ---> frozenset({'PintsAndWhiskeyGlasses'})
0.1046 0.1046 frozenset() ---> frozenset({'Hats'})
0.0934 0.0934 frozenset() ---> frozenset({'Scarves'})
0.0668 0.0668 frozenset() ---> frozenset({'ScaleModels', 'Hats'})
0.0562 0.0562 frozenset() ---> frozenset({'Toys'})
```

In [ ]:

```
```