

In [1]:

```
import pandas as pd
```

In [57]:

```
movie_data=pd.read_csv('my_movies.csv')
movie_data
```

Out[57]:

	V1	V2	V3	V4	V5	Sixth Sense	Gladiator	LOTR1	Harry Potter1	Patriot	LOT
0	Sixth Sense	LOTR1	Harry Potter1	Green Mile	LOTR2	1	0	1	1	0	
1	Gladiator	Patriot	Braveheart	NaN	NaN	0	1	0	0	1	
2	LOTR1	LOTR2	NaN	NaN	NaN	0	0	1	0	0	
3	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	
4	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	
5	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	
6	Harry Potter1	Harry Potter2	NaN	NaN	NaN	0	0	0	1	0	
7	Gladiator	Patriot	NaN	NaN	NaN	0	1	0	0	1	
8	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	
9	Sixth Sense	LOTR	Gladiator	Green Mile	NaN	1	1	0	0	0	

In [4]:

```
!pip install mlxtend
```

```
Requirement already satisfied: mlxtend in c:\users\rooba\anaconda3\lib\site-
packages (0.18.0)
Requirement already satisfied: scipy>=1.2.1 in c:\users\rooba\anaconda3\lib
\site-packages (from mlxtend) (1.6.2)
Requirement already satisfied: joblib>=0.13.2 in c:\users\rooba\anaconda3\li
b\site-packages (from mlxtend) (1.0.1)
Requirement already satisfied: pandas>=0.24.2 in c:\users\rooba\anaconda3\li
b\site-packages (from mlxtend) (1.2.4)
Requirement already satisfied: setuptools in c:\users\rooba\anaconda3\lib\si
te-packages (from mlxtend) (52.0.0.post20210125)
Requirement already satisfied: numpy>=1.16.2 in c:\users\rooba\anaconda3\lib
\site-packages (from mlxtend) (1.20.1)
Requirement already satisfied: scikit-learn>=0.20.3 in c:\users\rooba\anacon
da3\lib\site-packages (from mlxtend) (0.24.1)
Requirement already satisfied: matplotlib>=3.0.0 in c:\users\rooba\anaconda3
\lib\site-packages (from mlxtend) (3.3.4)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.3 in
c:\users\rooba\anaconda3\lib\site-packages (from matplotlib>=3.0.0->mlxtend)
(2.4.7)
Requirement already satisfied: python-dateutil>=2.1 in c:\users\rooba\anacon
da3\lib\site-packages (from matplotlib>=3.0.0->mlxtend) (2.8.1)
Requirement already satisfied: pillow>=6.2.0 in c:\users\rooba\anaconda3\lib
\site-packages (from matplotlib>=3.0.0->mlxtend) (8.2.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\rooba\anaconda3
\lib\site-packages (from matplotlib>=3.0.0->mlxtend) (1.3.1)
Requirement already satisfied: cycler>=0.10 in c:\users\rooba\anaconda3\lib
\site-packages (from matplotlib>=3.0.0->mlxtend) (0.10.0)
Requirement already satisfied: six in c:\users\rooba\anaconda3\lib\site-pack
ages (from cycler>=0.10->matplotlib>=3.0.0->mlxtend) (1.15.0)
Requirement already satisfied: pytz>=2017.3 in c:\users\rooba\anaconda3\lib
\site-packages (from pandas>=0.24.2->mlxtend) (2021.1)
Requirement already satisfied: threadpoolctl>=2.0.0 in c:\users\rooba\anacon
da3\lib\site-packages (from scikit-learn>=0.20.3->mlxtend) (2.1.0)
```

In [5]:

```
movie_data.dtypes
```

Out[5]:

```
V1          object
V2          object
V3          object
V4          object
V5          object
Sixth Sense  int64
Gladiator   int64
LOTR1       int64
Harry Potter1  int64
Patriot     int64
LOTR2       int64
Harry Potter2  int64
LOTR        int64
Braveheart  int64
Green Mile  int64
dtype: object
```

In [6]:

```
movie_data.isnull().sum()
```

Out[6]:

```
V1          0
V2          0
V3          3
V4          8
V5          9
Sixth Sense 0
Gladiator   0
LOTR1       0
Harry Potter1 0
Patriot     0
LOTR2       0
Harry Potter2 0
LOTR        0
Braveheart  0
Green Mile  0
dtype: int64
```

In [7]:

```
movie_data.shape
```

Out[7]:

```
(10, 15)
```

In [8]:

```
pd.set_option('max_columns',None)
```

In [9]:

```
movie_data
```

Out[9]:

	V1	V2	V3	V4	V5	Sixth Sense	Gladiator	LOTR1	Harry Potter1	Patriot	LOT
0	Sixth Sense	LOTR1	Harry Potter1	Green Mile	LOTR2	1	0	1	1	0	
1	Gladiator	Patriot	Braveheart	NaN	NaN	0	1	0	0	1	
2	LOTR1	LOTR2	NaN	NaN	NaN	0	0	1	0	0	
3	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	
4	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	
5	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	
6	Harry Potter1	Harry Potter2	NaN	NaN	NaN	0	0	0	1	0	
7	Gladiator	Patriot	NaN	NaN	NaN	0	1	0	0	1	
8	Gladiator	Patriot	Sixth Sense	NaN	NaN	1	1	0	0	1	
9	Sixth Sense	LOTR	Gladiator	Green Mile	NaN	1	1	0	0	0	

In [58]:

```
movie_data.drop('V5',axis=1,inplace=True)
```

In [59]:

```
movie_data.drop('V4',axis=1,inplace=True)
```

In [60]:

```
movie_data.drop('V3',axis=1,inplace=True)
```

In [61]:

```
movie_data.drop('V2',axis=1,inplace=True)
movie_data.drop('V1',axis=1,inplace=True)
```

In [62]:

```
from mlxtend.frequent_patterns import apriori,association_rules
```

In [63]:

```
frequent_itemsets=apriori(df=movie_data,min_support=0.5,use_colnames=True)
frequent_itemsets
```

Out[63]:

	support	itemsets
0	0.6	(Sixth Sense)
1	0.7	(Gladiator)
2	0.6	(Patriot)
3	0.5	(Gladiator, Sixth Sense)
4	0.6	(Gladiator, Patriot)

In [64]:

```
rules=association_rules(frequent_itemsets,min_threshold=0.5)
rules.sort_values('support',ascending=False)
```

Out[64]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
2	(Gladiator)	(Patriot)	0.7	0.6	0.6	0.857143	1.428571	0.18
3	(Patriot)	(Gladiator)	0.6	0.7	0.6	1.000000	1.428571	0.18
0	(Gladiator)	(Sixth Sense)	0.7	0.6	0.5	0.714286	1.190476	0.08
1	(Sixth Sense)	(Gladiator)	0.6	0.7	0.5	0.833333	1.190476	0.08

In [74]:

```

supports=[0.1,0.2,0.3,0.4,0.5,0.6,0.7]
thersholds=[0.5,0.6,0.7]

for i in range(0,7):
    frequent_itemsets=apriori(df=movie_data,min_support=supports[i],use_colnames=True)
    print(supports[i])
    print('frequent items is: ',frequent_itemsets)
    print('')
    for threshold in thersholds:
        rules=association_rules(frequent_itemsets,min_threshold=threshold)
        print('thersholds is: ',threshold)
        rules=rules.sort_values('support',ascending=False)
        print(rules)

```

```

0.1
frequent items is:      support
emsets
0      0.6              (Sixth Sense)
1      0.7              (Gladiator)
2      0.2              (LOTR1)
3      0.2              (Harry Potter1)
4      0.6              (Patriot)
5      0.2              (LOTR2)
6      0.1              (Harry Potter2)
7      0.1              (LOTR)
8      0.1              (Braveheart)
9      0.2              (Green Mile)
10     0.5              (Gladiator, Sixth Sense)
11     0.1              (LOTR1, Sixth Sense)
12     0.1              (Harry Potter1, Sixth Sense)
13     0.4              (Patriot, Sixth Sense)
14     0.1              (LOTR2, Sixth Sense)
15     0.1              (LOTR, Sixth Sense)
16     0.2              (Green Mile, Sixth Sense)
17     0.6              (Gladiator, Patriot)
18     0.1              (Gladiator, LOTR)
19     0.1              (Gladiator, Braveheart)
20     0.1              (Gladiator, Green Mile)
21     0.1              (Harry Potter1, LOTR1)
22     0.2              (LOTR1, LOTR2)
23     0.1              (Green Mile, LOTR1)
24     0.1              (Harry Potter1, LOTR2)
25     0.1              (Harry Potter1, Harry Potter2)
26     0.1              (Harry Potter1, Green Mile)
27     0.1              (Patriot, Braveheart)
28     0.1              (Green Mile, LOTR2)
29     0.1              (LOTR, Green Mile)
30     0.4              (Gladiator, Patriot, Sixth Sense)
31     0.1              (Gladiator, LOTR, Sixth Sense)
32     0.1              (Gladiator, Green Mile, Sixth Sense)
33     0.1              (Harry Potter1, LOTR1, Sixth Sense)
34     0.1              (LOTR2, LOTR1, Sixth Sense)
35     0.1              (Green Mile, LOTR1, Sixth Sense)
36     0.1              (LOTR2, Harry Potter1, Sixth Sense)
37     0.1              (Harry Potter1, Green Mile, Sixth Sense)
38     0.1              (LOTR2, Green Mile, Sixth Sense)
39     0.1              (LOTR, Green Mile, Sixth Sense)
40     0.1              (Gladiator, Patriot, Braveheart)
41     0.1              (Gladiator, Green Mile, LOTR)

```

```

42      0.1      (Harry Potter1, LOTR1, LOTR2)
43      0.1      (Harry Potter1, Green Mile, LOTR1)
44      0.1      (Green Mile, LOTR1, LOTR2)
45      0.1      (Harry Potter1, Green Mile, LOTR2)
46      0.1      (Gladiator, Green Mile, LOTR, Sixth Sense)
47      0.1      (LOTR2, Harry Potter1, LOTR1, Sixth Sense)
48      0.1      (Harry Potter1, Green Mile, LOTR1, Sixth Sense)
49      0.1      (LOTR2, Green Mile, LOTR1, Sixth Sense)
50      0.1      (Harry Potter1, Green Mile, LOTR2, Sixth Sense)
51      0.1      (Harry Potter1, Green Mile, LOTR1, LOTR2)
52      0.1      (Harry Potter1, LOTR2, Green Mile, LOTR1, Sixt...

```

thersholds is: 0.5

	antecedents	consequents
\		
9	(Gladiator)	(Patriot)
10	(Patriot)	(Gladiator)
0	(Gladiator)	(Sixth Sense)
1	(Sixth Sense)	(Gladiator)
36	(Sixth Sense)	(Gladiator, Patriot)
..
83	(LOTR, Green Mile)	(Gladiator)
84	(Green Mile)	(Gladiator, LOTR)
85	(LOTR)	(Gladiator, Green Mile)
86	(Harry Potter1, LOTR1)	(LOTR2)
215	(LOTR1)	(Sixth Sense, Harry Potter1, Green Mile, LOTR2)

	antecedent support	consequent support	support	confidence	lift
\					
9	0.7	0.6	0.6	0.857143	1.428571
10	0.6	0.7	0.6	1.000000	1.428571
0	0.7	0.6	0.5	0.714286	1.190476
1	0.6	0.7	0.5	0.833333	1.190476
36	0.6	0.6	0.4	0.666667	1.111111
..
83	0.1	0.7	0.1	1.000000	1.428571
84	0.2	0.1	0.1	0.500000	5.000000
85	0.1	0.1	0.1	1.000000	10.000000
86	0.1	0.2	0.1	1.000000	5.000000
215	0.2	0.1	0.1	0.500000	5.000000

	leverage	conviction
9	0.18	2.8
10	0.18	inf
0	0.08	1.4
1	0.08	1.8
36	0.04	1.2
..
83	0.03	inf
84	0.08	1.8
85	0.09	inf
86	0.08	inf
215	0.08	1.8

[216 rows x 9 columns]

thersholds is: 0.6

	antecedents	consequents
6	(Gladiator)	(Patriot)
7	(Patriot)	(Gladiator)
0	(Gladiator)	(Sixth Sense)
1	(Sixth Sense)	(Gladiator)

```

15      (Gladiator, Patriot)                                (Sixth Sense)
..      ...
48      (Harry Potter1, LOTR1)                                (LOTR2)
47      (LOTR)                                (Gladiator, Green Mile)
46      (LOTR, Green Mile)                                (Gladiator)
45      (Gladiator, LOTR)                                (Green Mile)
133     (LOTR1, Sixth Sense) (Harry Potter1, Green Mile, LOTR2)

```

	antecedent support	consequent support	support	confidence	lift
\					
6	0.7	0.6	0.6	0.857143	1.428571
7	0.6	0.7	0.6	1.000000	1.428571
0	0.7	0.6	0.5	0.714286	1.190476
1	0.6	0.7	0.5	0.833333	1.190476
15	0.6	0.6	0.4	0.666667	1.111111
..
48	0.1	0.2	0.1	1.000000	5.000000
47	0.1	0.1	0.1	1.000000	10.000000
46	0.1	0.7	0.1	1.000000	1.428571
45	0.1	0.2	0.1	1.000000	5.000000
133	0.1	0.1	0.1	1.000000	10.000000

	leverage	conviction
6	0.18	2.8
7	0.18	inf
0	0.08	1.4
1	0.08	1.8
15	0.04	1.2
..
48	0.08	inf
47	0.09	inf
46	0.03	inf
45	0.08	inf
133	0.09	inf

[134 rows x 9 columns]
 thersholds is: 0.7

	antecedents	consequents
4	(Gladiator)	(Patriot)
5	(Patriot)	(Gladiator)
0	(Gladiator)	(Sixth Sense)
1	(Sixth Sense)	(Gladiator)
13	(Gladiator, Sixth Sense)	(Patriot)
..
43	(Harry Potter1, LOTR1)	(LOTR2)
42	(LOTR)	(Gladiator, Green Mile)
41	(LOTR, Green Mile)	(Gladiator)
40	(Gladiator, LOTR)	(Green Mile)
128	(LOTR1, Sixth Sense)	(Harry Potter1, Green Mile, LOTR2)

	antecedent support	consequent support	support	confidence	lift
\					
4	0.7	0.6	0.6	0.857143	1.428571
5	0.6	0.7	0.6	1.000000	1.428571
0	0.7	0.6	0.5	0.714286	1.190476
1	0.6	0.7	0.5	0.833333	1.190476
13	0.5	0.6	0.4	0.800000	1.333333
..
43	0.1	0.2	0.1	1.000000	5.000000
42	0.1	0.1	0.1	1.000000	10.000000
41	0.1	0.7	0.1	1.000000	1.428571

40	0.1	0.2	0.1	1.000000	5.000000
128	0.1	0.1	0.1	1.000000	10.000000

	leverage	conviction
4	0.18	2.8
5	0.18	inf
0	0.08	1.4
1	0.08	1.8
13	0.10	2.0
..
43	0.08	inf
42	0.09	inf
41	0.03	inf
40	0.08	inf
128	0.09	inf

[129 rows x 9 columns]

0.2

frequent items is:	support	itemsets
0	0.6	(Sixth Sense)
1	0.7	(Gladiator)
2	0.2	(LOTR1)
3	0.2	(Harry Potter1)
4	0.6	(Patriot)
5	0.2	(LOTR2)
6	0.2	(Green Mile)
7	0.5	(Gladiator, Sixth Sense)
8	0.4	(Patriot, Sixth Sense)
9	0.2	(Green Mile, Sixth Sense)
10	0.6	(Gladiator, Patriot)
11	0.2	(LOTR1, LOTR2)
12	0.4	(Gladiator, Patriot, Sixth Sense)

thersholds is: 0.5

\	antecedents	consequents	antecedent support
5	(Gladiator)	(Patriot)	0.7
6	(Patriot)	(Gladiator)	0.6
0	(Gladiator)	(Sixth Sense)	0.7
1	(Sixth Sense)	(Gladiator)	0.6
2	(Patriot)	(Sixth Sense)	0.6
3	(Sixth Sense)	(Patriot)	0.6
9	(Gladiator, Patriot)	(Sixth Sense)	0.6
10	(Gladiator, Sixth Sense)	(Patriot)	0.5
11	(Patriot, Sixth Sense)	(Gladiator)	0.4
12	(Gladiator)	(Patriot, Sixth Sense)	0.7
13	(Patriot)	(Gladiator, Sixth Sense)	0.6
14	(Sixth Sense)	(Gladiator, Patriot)	0.6
4	(Green Mile)	(Sixth Sense)	0.2
7	(LOTR1)	(LOTR2)	0.2
8	(LOTR2)	(LOTR1)	0.2

	consequent support	support	confidence	lift	leverage	conviction
5	0.6	0.6	0.857143	1.428571	0.18	2.8
6	0.7	0.6	1.000000	1.428571	0.18	inf
0	0.6	0.5	0.714286	1.190476	0.08	1.4
1	0.7	0.5	0.833333	1.190476	0.08	1.8
2	0.6	0.4	0.666667	1.111111	0.04	1.2
3	0.6	0.4	0.666667	1.111111	0.04	1.2
9	0.6	0.4	0.666667	1.111111	0.04	1.2
10	0.6	0.4	0.800000	1.333333	0.10	2.0

11	0.7	0.4	1.000000	1.428571	0.12	inf
12	0.4	0.4	0.571429	1.428571	0.12	1.4
13	0.5	0.4	0.666667	1.333333	0.10	1.5
14	0.6	0.4	0.666667	1.111111	0.04	1.2
4	0.6	0.2	1.000000	1.666667	0.08	inf
7	0.2	0.2	1.000000	5.000000	0.16	inf
8	0.2	0.2	1.000000	5.000000	0.16	inf

thresholds is: 0.6

	antecedents	consequents	antecedent support
\			
5	(Gladiator)	(Patriot)	0.7
6	(Patriot)	(Gladiator)	0.6
0	(Gladiator)	(Sixth Sense)	0.7
1	(Sixth Sense)	(Gladiator)	0.6
2	(Patriot)	(Sixth Sense)	0.6
3	(Sixth Sense)	(Patriot)	0.6
9	(Gladiator, Patriot)	(Sixth Sense)	0.6
10	(Gladiator, Sixth Sense)	(Patriot)	0.5
11	(Patriot, Sixth Sense)	(Gladiator)	0.4
12	(Patriot)	(Gladiator, Sixth Sense)	0.6
13	(Sixth Sense)	(Gladiator, Patriot)	0.6
4	(Green Mile)	(Sixth Sense)	0.2
7	(LOTR1)	(LOTR2)	0.2
8	(LOTR2)	(LOTR1)	0.2

	consequent support	support	confidence	lift	leverage	conviction
5	0.6	0.6	0.857143	1.428571	0.18	2.8
6	0.7	0.6	1.000000	1.428571	0.18	inf
0	0.6	0.5	0.714286	1.190476	0.08	1.4
1	0.7	0.5	0.833333	1.190476	0.08	1.8
2	0.6	0.4	0.666667	1.111111	0.04	1.2
3	0.6	0.4	0.666667	1.111111	0.04	1.2
9	0.6	0.4	0.666667	1.111111	0.04	1.2
10	0.6	0.4	0.800000	1.333333	0.10	2.0
11	0.7	0.4	1.000000	1.428571	0.12	inf
12	0.5	0.4	0.666667	1.333333	0.10	1.5
13	0.6	0.4	0.666667	1.111111	0.04	1.2
4	0.6	0.2	1.000000	1.666667	0.08	inf
7	0.2	0.2	1.000000	5.000000	0.16	inf
8	0.2	0.2	1.000000	5.000000	0.16	inf

thresholds is: 0.7

	antecedents	consequents	antecedent support
3	(Gladiator)	(Patriot)	0.7
4	(Patriot)	(Gladiator)	0.6
0	(Gladiator)	(Sixth Sense)	0.7
1	(Sixth Sense)	(Gladiator)	0.6
7	(Gladiator, Sixth Sense)	(Patriot)	0.5
8	(Patriot, Sixth Sense)	(Gladiator)	0.4
2	(Green Mile)	(Sixth Sense)	0.2
5	(LOTR1)	(LOTR2)	0.2
6	(LOTR2)	(LOTR1)	0.2

	consequent support	support	confidence	lift	leverage	conviction
3	0.6	0.6	0.857143	1.428571	0.18	2.8
4	0.7	0.6	1.000000	1.428571	0.18	inf
0	0.6	0.5	0.714286	1.190476	0.08	1.4
1	0.7	0.5	0.833333	1.190476	0.08	1.8
7	0.6	0.4	0.800000	1.333333	0.10	2.0
8	0.7	0.4	1.000000	1.428571	0.12	inf
2	0.6	0.2	1.000000	1.666667	0.08	inf
5	0.2	0.2	1.000000	5.000000	0.16	inf

```

6          0.2      0.2      1.000000  5.000000      0.16      inf
0.3
frequent items is:      support      itemsets
0      0.6      (Sixth Sense)
1      0.7      (Gladiator)
2      0.6      (Patriot)
3      0.5      (Gladiator, Sixth Sense)
4      0.4      (Patriot, Sixth Sense)
5      0.6      (Gladiator, Patriot)
6      0.4      (Gladiator, Patriot, Sixth Sense)

```

thersholds is: 0.5

	antecedents	consequents	antecedent support
\			
4	(Gladiator)	(Patriot)	0.7
5	(Patriot)	(Gladiator)	0.6
0	(Gladiator)	(Sixth Sense)	0.7
1	(Sixth Sense)	(Gladiator)	0.6
2	(Patriot)	(Sixth Sense)	0.6
3	(Sixth Sense)	(Patriot)	0.6
6	(Gladiator, Patriot)	(Sixth Sense)	0.6
7	(Gladiator, Sixth Sense)	(Patriot)	0.5
8	(Patriot, Sixth Sense)	(Gladiator)	0.4
9	(Gladiator)	(Patriot, Sixth Sense)	0.7
10	(Patriot)	(Gladiator, Sixth Sense)	0.6
11	(Sixth Sense)	(Gladiator, Patriot)	0.6

	consequent support	support	confidence	lift	leverage	conviction
4	0.6	0.6	0.857143	1.428571	0.18	2.8
5	0.7	0.6	1.000000	1.428571	0.18	inf
0	0.6	0.5	0.714286	1.190476	0.08	1.4
1	0.7	0.5	0.833333	1.190476	0.08	1.8
2	0.6	0.4	0.666667	1.111111	0.04	1.2
3	0.6	0.4	0.666667	1.111111	0.04	1.2
6	0.6	0.4	0.666667	1.111111	0.04	1.2
7	0.6	0.4	0.800000	1.333333	0.10	2.0
8	0.7	0.4	1.000000	1.428571	0.12	inf
9	0.4	0.4	0.571429	1.428571	0.12	1.4
10	0.5	0.4	0.666667	1.333333	0.10	1.5
11	0.6	0.4	0.666667	1.111111	0.04	1.2

thersholds is: 0.6

	antecedents	consequents	antecedent support
\			
4	(Gladiator)	(Patriot)	0.7
5	(Patriot)	(Gladiator)	0.6
0	(Gladiator)	(Sixth Sense)	0.7
1	(Sixth Sense)	(Gladiator)	0.6
2	(Patriot)	(Sixth Sense)	0.6
3	(Sixth Sense)	(Patriot)	0.6
6	(Gladiator, Patriot)	(Sixth Sense)	0.6
7	(Gladiator, Sixth Sense)	(Patriot)	0.5
8	(Patriot, Sixth Sense)	(Gladiator)	0.4
9	(Patriot)	(Gladiator, Sixth Sense)	0.6
10	(Sixth Sense)	(Gladiator, Patriot)	0.6

	consequent support	support	confidence	lift	leverage	conviction
4	0.6	0.6	0.857143	1.428571	0.18	2.8
5	0.7	0.6	1.000000	1.428571	0.18	inf
0	0.6	0.5	0.714286	1.190476	0.08	1.4
1	0.7	0.5	0.833333	1.190476	0.08	1.8
2	0.6	0.4	0.666667	1.111111	0.04	1.2

3	0.6	0.4	0.666667	1.111111	0.04	1.2
6	0.6	0.4	0.666667	1.111111	0.04	1.2
7	0.6	0.4	0.800000	1.333333	0.10	2.0
8	0.7	0.4	1.000000	1.428571	0.12	inf
9	0.5	0.4	0.666667	1.333333	0.10	1.5
10	0.6	0.4	0.666667	1.111111	0.04	1.2

thresholds is: 0.7

	antecedents	consequents	antecedent support \
2	(Gladiator)	(Patriot)	0.7
3	(Patriot)	(Gladiator)	0.6
0	(Gladiator)	(Sixth Sense)	0.7
1	(Sixth Sense)	(Gladiator)	0.6
4	(Gladiator, Sixth Sense)	(Patriot)	0.5
5	(Patriot, Sixth Sense)	(Gladiator)	0.4

	consequent support	support	confidence	lift	leverage	conviction
2	0.6	0.6	0.857143	1.428571	0.18	2.8
3	0.7	0.6	1.000000	1.428571	0.18	inf
0	0.6	0.5	0.714286	1.190476	0.08	1.4
1	0.7	0.5	0.833333	1.190476	0.08	1.8
4	0.6	0.4	0.800000	1.333333	0.10	2.0
5	0.7	0.4	1.000000	1.428571	0.12	inf

0.4

support	itemsets
0.6	(Sixth Sense)
0.7	(Gladiator)
0.6	(Patriot)
0.5	(Gladiator, Sixth Sense)
0.4	(Patriot, Sixth Sense)
0.6	(Gladiator, Patriot)
0.4	(Gladiator, Patriot, Sixth Sense)

thresholds is: 0.5

	antecedents	consequents	antecedent support
4	(Gladiator)	(Patriot)	0.7
5	(Patriot)	(Gladiator)	0.6
0	(Gladiator)	(Sixth Sense)	0.7
1	(Sixth Sense)	(Gladiator)	0.6
2	(Patriot)	(Sixth Sense)	0.6
3	(Sixth Sense)	(Patriot)	0.6
6	(Gladiator, Patriot)	(Sixth Sense)	0.6
7	(Gladiator, Sixth Sense)	(Patriot)	0.5
8	(Patriot, Sixth Sense)	(Gladiator)	0.4
9	(Gladiator)	(Patriot, Sixth Sense)	0.7
10	(Patriot)	(Gladiator, Sixth Sense)	0.6
11	(Sixth Sense)	(Gladiator, Patriot)	0.6

	consequent support	support	confidence	lift	leverage	conviction
4	0.6	0.6	0.857143	1.428571	0.18	2.
8	0.7	0.6	1.000000	1.428571	0.18	in
5	0.6	0.5	0.714286	1.190476	0.08	1.
4	0.7	0.5	0.833333	1.190476	0.08	1.
8	0.6	0.4	0.666667	1.111111	0.04	1.
2	0.6	0.4	0.666667	1.111111	0.04	1.

```

2
3          0.6      0.4      0.666667  1.111111      0.04      1.
2
6          0.6      0.4      0.666667  1.111111      0.04      1.
2
7          0.6      0.4      0.800000  1.333333      0.10      2.
0
8          0.7      0.4      1.000000  1.428571      0.12      in
f
9          0.4      0.4      0.571429  1.428571      0.12      1.
4
10         0.5      0.4      0.666667  1.333333      0.10      1.
5
11         0.6      0.4      0.666667  1.111111      0.04      1.
2

```

thresholds is: 0.6

	antecedents	consequents	antecedent support
\			
4	(Gladiator)	(Patriot)	0.7
5	(Patriot)	(Gladiator)	0.6
0	(Gladiator)	(Sixth Sense)	0.7
1	(Sixth Sense)	(Gladiator)	0.6
2	(Patriot)	(Sixth Sense)	0.6
3	(Sixth Sense)	(Patriot)	0.6
6	(Gladiator, Patriot)	(Sixth Sense)	0.6
7	(Gladiator, Sixth Sense)	(Patriot)	0.5
8	(Patriot, Sixth Sense)	(Gladiator)	0.4
9	(Patriot)	(Gladiator, Sixth Sense)	0.6
10	(Sixth Sense)	(Gladiator, Patriot)	0.6

	consequent support	support	confidence	lift	leverage	conviction
n						
4	0.6	0.6	0.857143	1.428571	0.18	2.
8						
5	0.7	0.6	1.000000	1.428571	0.18	in
f						
0	0.6	0.5	0.714286	1.190476	0.08	1.
4						
1	0.7	0.5	0.833333	1.190476	0.08	1.
8						
2	0.6	0.4	0.666667	1.111111	0.04	1.
2						
3	0.6	0.4	0.666667	1.111111	0.04	1.
2						
6	0.6	0.4	0.666667	1.111111	0.04	1.
2						
7	0.6	0.4	0.800000	1.333333	0.10	2.
0						
8	0.7	0.4	1.000000	1.428571	0.12	in
f						
9	0.5	0.4	0.666667	1.333333	0.10	1.
5						
10	0.6	0.4	0.666667	1.111111	0.04	1.
2						

thresholds is: 0.7

	antecedents	consequents	antecedent support	\
2	(Gladiator)	(Patriot)	0.7	
3	(Patriot)	(Gladiator)	0.6	
0	(Gladiator)	(Sixth Sense)	0.7	
1	(Sixth Sense)	(Gladiator)	0.6	
4	(Gladiator, Sixth Sense)	(Patriot)	0.5	

5 (Patriot, Sixth Sense) (Gladiator) 0.4

	consequent	support	support	confidence	lift	leverage	conviction
2		0.6	0.6	0.857143	1.428571	0.18	2.8
3		0.7	0.6	1.000000	1.428571	0.18	inf
0		0.6	0.5	0.714286	1.190476	0.08	1.4
1		0.7	0.5	0.833333	1.190476	0.08	1.8
4		0.6	0.4	0.800000	1.333333	0.10	2.0
5		0.7	0.4	1.000000	1.428571	0.12	inf

0.5

frequent items is:	support	itemsets
0 0.6	(Sixth Sense)	
1 0.7	(Gladiator)	
2 0.6	(Patriot)	
3 0.5	(Gladiator, Sixth Sense)	
4 0.6	(Gladiator, Patriot)	

thresholds is: 0.5

	antecedents	consequents	antecedent support	consequent support	\
2	(Gladiator)	(Patriot)	0.7	0.6	
3	(Patriot)	(Gladiator)	0.6	0.7	
0	(Gladiator)	(Sixth Sense)	0.7	0.6	
1	(Sixth Sense)	(Gladiator)	0.6	0.7	

	support	confidence	lift	leverage	conviction
2	0.6	0.857143	1.428571	0.18	2.8
3	0.6	1.000000	1.428571	0.18	inf
0	0.5	0.714286	1.190476	0.08	1.4
1	0.5	0.833333	1.190476	0.08	1.8

thresholds is: 0.6

	antecedents	consequents	antecedent support	consequent support	\
2	(Gladiator)	(Patriot)	0.7	0.6	
3	(Patriot)	(Gladiator)	0.6	0.7	
0	(Gladiator)	(Sixth Sense)	0.7	0.6	
1	(Sixth Sense)	(Gladiator)	0.6	0.7	

	support	confidence	lift	leverage	conviction
2	0.6	0.857143	1.428571	0.18	2.8
3	0.6	1.000000	1.428571	0.18	inf
0	0.5	0.714286	1.190476	0.08	1.4
1	0.5	0.833333	1.190476	0.08	1.8

thresholds is: 0.7

	antecedents	consequents	antecedent support	consequent support	\
2	(Gladiator)	(Patriot)	0.7	0.6	
3	(Patriot)	(Gladiator)	0.6	0.7	
0	(Gladiator)	(Sixth Sense)	0.7	0.6	
1	(Sixth Sense)	(Gladiator)	0.6	0.7	

	support	confidence	lift	leverage	conviction
2	0.6	0.857143	1.428571	0.18	2.8
3	0.6	1.000000	1.428571	0.18	inf
0	0.5	0.714286	1.190476	0.08	1.4
1	0.5	0.833333	1.190476	0.08	1.8

0.6

frequent items is:	support	itemsets
0 0.6	(Sixth Sense)	
1 0.7	(Gladiator)	
2 0.6	(Patriot)	
3 0.6	(Gladiator, Patriot)	

thresholds is: 0.5

```

    antecedents consequents antecedent support consequent support support
rt \
0 (Gladiator) (Patriot) 0.7 0.6
0.6
1 (Patriot) (Gladiator) 0.6 0.7
0.6

```

```

    confidence lift leverage conviction
0 0.857143 1.428571 0.18 2.8
1 1.000000 1.428571 0.18 inf

```

thersholds is: 0.6

```

    antecedents consequents antecedent support consequent support support
rt \
0 (Gladiator) (Patriot) 0.7 0.6
0.6
1 (Patriot) (Gladiator) 0.6 0.7
0.6

```

```

    confidence lift leverage conviction
0 0.857143 1.428571 0.18 2.8
1 1.000000 1.428571 0.18 inf

```

thersholds is: 0.7

```

    antecedents consequents antecedent support consequent support support
rt \
0 (Gladiator) (Patriot) 0.7 0.6
0.6
1 (Patriot) (Gladiator) 0.6 0.7
0.6

```

```

    confidence lift leverage conviction
0 0.857143 1.428571 0.18 2.8
1 1.000000 1.428571 0.18 inf

```

0.7

```

frequent items is: support itemsets
0 0.7 (Gladiator)

```

thersholds is: 0.5

Empty DataFrame

Columns: [antecedents, consequents, antecedent support, consequent support, support, confidence, lift, leverage, conviction]

Index: []

thersholds is: 0.6

Empty DataFrame

Columns: [antecedents, consequents, antecedent support, consequent support, support, confidence, lift, leverage, conviction]

Index: []

thersholds is: 0.7

Empty DataFrame

Columns: [antecedents, consequents, antecedent support, consequent support, support, confidence, lift, leverage, conviction]

Index: []

