In [1]:
```
import pandas as pd
from mlxtend.frequent_patterns import apriori,association_rules
import seaborn as sns
import warnings
warnings.filterwarnings("ignore")
import matplotlib.pyplot as plt
```

```
C:\Users\Narasimhulu E\anaconda3\lib\site-packages\seaborn\rcmod.py:82: Depre
cationWarning: distutils Version classes are deprecated. Use packaging.versio
n instead.
  if LooseVersion(mpl.__version__) >= "3.0":
C:\Users\Narasimhulu E\anaconda3\lib\site-packages\setuptools\_distutils\vers
ion.py:346: DeprecationWarning: distutils Version classes are deprecated. Use
packaging.version instead.
  other = LooseVersion(other)
```

In [2]:
```
ar=pd.read_csv("book.csv", encoding="unicode_escape")
```

In [3]:
```
ar
```

Out[3]:

	ChildBks	YouthBks	CookBks	DoItYBks	RefBks	ArtBks	GeogBks	ItalCook	ItalAtlas	It
0	0	1	0	1	0	0	1	0	0	
1	1	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	0	0	
3	1	1	1	0	1	0	1	0	0	
4	0	0	1	0	0	0	1	0	0	
...	...	...	...	...	...	...	...	...	...	
1995	0	0	1	0	0	1	1	1	0	
1996	0	0	0	0	0	0	0	0	0	
1997	0	0	0	0	0	0	0	0	0	
1998	0	0	1	0	0	0	0	0	0	
1999	0	0	0	0	0	0	0	0	0	

2000 rows × 11 columns

In [4]:
```
ar.shape
```

Out[4]:
```
(2000, 11)
```

In [5]:
```
for i in ar.columns:
    print(i)
    print(ar[i].value_counts())
    print()
```

```
ChildBks
0    1154
1     846
Name: ChildBks, dtype: int64

YouthBks
0    1505
1     495
Name: YouthBks, dtype: int64

CookBks
0    1138
1     862
Name: CookBks, dtype: int64

DoItYBks
0    1436
1     564
Name: DoItYBks, dtype: int64

RefBks
0    1571
1     429
Name: RefBks, dtype: int64

ArtBks
0    1518
1     482
Name: ArtBks, dtype: int64

GeogBks
0    1448
1     552
Name: GeogBks, dtype: int64

ItalCook
0    1773
1     227
Name: ItalCook, dtype: int64

ItalAtlas
0    1926
1      74
Name: ItalAtlas, dtype: int64

ItalArt
0    1903
1      97
Name: ItalArt, dtype: int64

Florence
0    1783
1     217
Name: Florence, dtype: int64
```

APRIORI ALGORITHM

In [6]:
```
frequent_itemsets = apriori(ar,min_support=0.1, use_colnames=True)
frequent_itemsets.tail(5)
```

Out[6]:

	support	itemsets
34	0.1045	(GeogBks, ChildBks, DoItYBks)
35	0.1020	(ArtBks, GeogBks, ChildBks)
36	0.1015	(CookBks, ArtBks, DoItYBks)
37	0.1085	(CookBks, GeogBks, DoItYBks)
38	0.1035	(CookBks, ArtBks, GeogBks)

In [7]:
```
ar[ar['GeogBks']==1].shape[0]/ar.shape[0]
```

Out[7]: 0.276

In [8]:
```
confi_rules = association_rules(frequent_itemsets, metric="confidence", min_th
confi_rules.tail(5)
```

Out[8]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
44	(CookBks, DoItYBks)	(GeogBks)	0.1875	0.276	0.1085	0.578667	2.096618	0.056750
45	(GeogBks, DoItYBks)	(CookBks)	0.1325	0.431	0.1085	0.818868	1.899926	0.051392
46	(CookBks, ArtBks)	(GeogBks)	0.1670	0.276	0.1035	0.619760	2.245509	0.057408
47	(CookBks, GeogBks)	(ArtBks)	0.1925	0.241	0.1035	0.537662	2.230964	0.057107
48	(ArtBks, GeogBks)	(CookBks)	0.1275	0.431	0.1035	0.811765	1.883445	0.048547

In [9]:
```
ru1 = association_rules(frequent_itemsets, metric="lift", min_threshold=0.8)
ru1[ru1["lift"]>1]
```

Out[9]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
0	(YouthBks)	(ChildBks)	0.2475	0.4230	0.1650	0.666667	1.576044	0.060308
1	(ChildBks)	(YouthBks)	0.4230	0.2475	0.1650	0.390071	1.576044	0.060308
2	(CookBks)	(ChildBks)	0.4310	0.4230	0.2560	0.593968	1.404179	0.073687
3	(ChildBks)	(CookBks)	0.4230	0.4310	0.2560	0.605201	1.404179	0.073687
4	(ChildBks)	(DoItYBks)	0.4230	0.2820	0.1840	0.434988	1.542511	0.064714
...	...	...	...	...	...	...	...	...
95	(CookBks, GeogBks)	(ArtBks)	0.1925	0.2410	0.1035	0.537662	2.230964	0.057107
96	(ArtBks, GeogBks)	(CookBks)	0.1275	0.4310	0.1035	0.811765	1.883445	0.048547
97	(CookBks)	(ArtBks, GeogBks)	0.4310	0.1275	0.1035	0.240139	1.883445	0.048547
98	(ArtBks)	(CookBks, GeogBks)	0.2410	0.1925	0.1035	0.429461	2.230964	0.057107
99	(GeogBks)	(CookBks, ArtBks)	0.2760	0.1670	0.1035	0.375000	2.245509	0.057408

100 rows × 9 columns

In [10]:
```
ru1.sort_values('lift',ascending=False)
```

Out[10]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
28	(CookBks)	(ItalCook)	0.4310	0.1135	0.1135	0.263341	2.320186	0.064582
29	(ItalCook)	(CookBks)	0.1135	0.4310	0.1135	1.000000	2.320186	0.064582
77	(ArtBks, ChildBks)	(GeogBks)	0.1625	0.2760	0.1020	0.627692	2.274247	0.057150
80	(GeogBks)	(ArtBks, ChildBks)	0.2760	0.1625	0.1020	0.369565	2.274247	0.057150
86	(ArtBks)	(CookBks, DoItYBks)	0.2410	0.1875	0.1015	0.421162	2.246196	0.056313
...	...	...	...	...	...	...	...	...
5	(DoItYBks)	(ChildBks)	0.2820	0.4230	0.1840	0.652482	1.542511	0.064714
12	(CookBks)	(YouthBks)	0.4310	0.2475	0.1620	0.375870	1.518667	0.055328
13	(YouthBks)	(CookBks)	0.2475	0.4310	0.1620	0.654545	1.518667	0.055328
3	(ChildBks)	(CookBks)	0.4230	0.4310	0.2560	0.605201	1.404179	0.073687
2	(CookBks)	(ChildBks)	0.4310	0.4230	0.2560	0.593968	1.404179	0.073687

100 rows × 9 columns

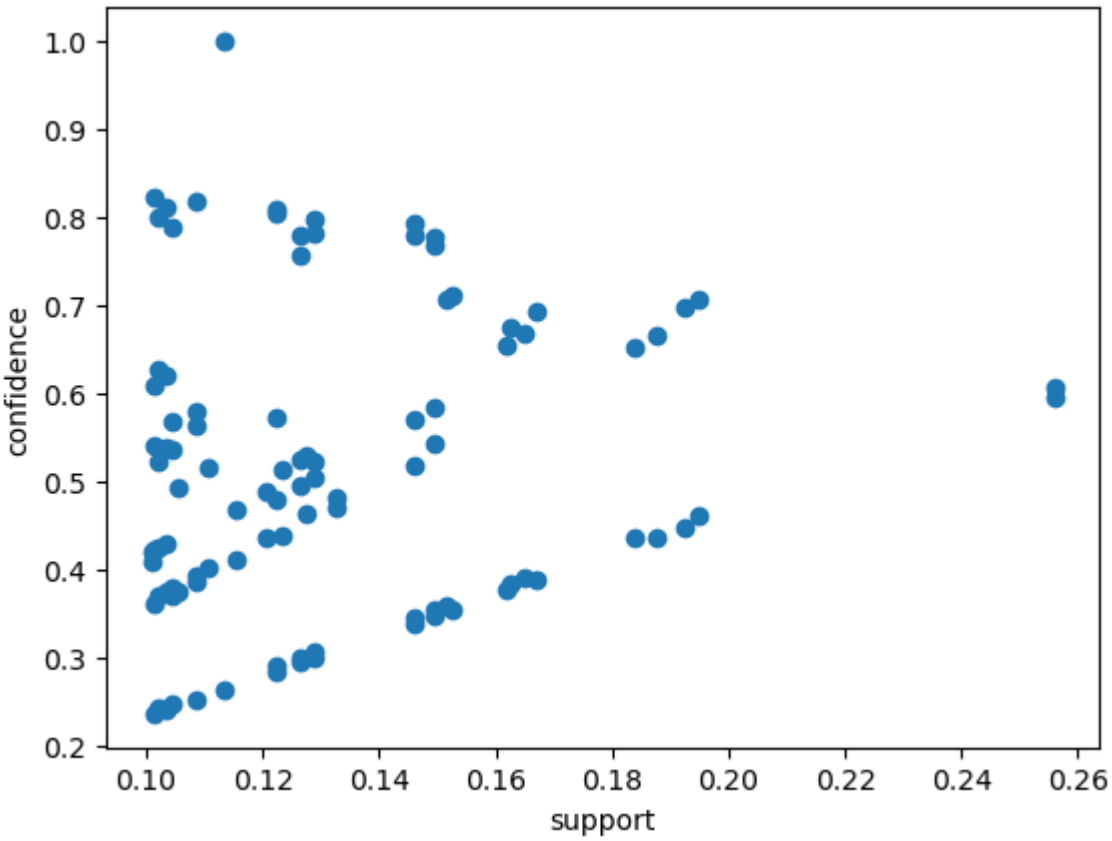
In [11]:
```
ru1=ru1[ru1.lift>1]
ru1
```

Out[11]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
0	(YouthBks)	(ChildBks)	0.2475	0.4230	0.1650	0.666667	1.576044	0.060308
1	(ChildBks)	(YouthBks)	0.4230	0.2475	0.1650	0.390071	1.576044	0.060308
2	(CookBks)	(ChildBks)	0.4310	0.4230	0.2560	0.593968	1.404179	0.073687
3	(ChildBks)	(CookBks)	0.4230	0.4310	0.2560	0.605201	1.404179	0.073687
4	(ChildBks)	(DoItYBks)	0.4230	0.2820	0.1840	0.434988	1.542511	0.064714
...	...	...	...	...	...	...	...	...
95	(CookBks, GeogBks)	(ArtBks)	0.1925	0.2410	0.1035	0.537662	2.230964	0.057107
96	(ArtBks, GeogBks)	(CookBks)	0.1275	0.4310	0.1035	0.811765	1.883445	0.048547
97	(CookBks)	(ArtBks, GeogBks)	0.4310	0.1275	0.1035	0.240139	1.883445	0.048547
98	(ArtBks)	(CookBks, GeogBks)	0.2410	0.1925	0.1035	0.429461	2.230964	0.057107
99	(GeogBks)	(CookBks, ArtBks)	0.2760	0.1670	0.1035	0.375000	2.245509	0.057408

100 rows × 9 columns

In [12]:
```
plt.scatter(ru1['support'],ru1['confidence'])
plt.xlabel('support')
plt.ylabel('confidence')
plt.show()
```



In [13]:
```
frequent_itemsets1 = apriori(ar,min_support=0.16,use_colnames=True)
frequent_itemsets1
```

Out[13]:

	support	itemsets
0	0.4230	(ChildBks)
1	0.2475	(YouthBks)
2	0.4310	(CookBks)
3	0.2820	(DoItYBks)
4	0.2145	(RefBks)
5	0.2410	(ArtBks)
6	0.2760	(GeogBks)
7	0.1650	(YouthBks, ChildBks)
8	0.2560	(CookBks, ChildBks)
9	0.1840	(ChildBks, DoItYBks)
10	0.1625	(ArtBks, ChildBks)
11	0.1950	(GeogBks, ChildBks)
12	0.1620	(CookBks, YouthBks)
13	0.1875	(CookBks, DoItYBks)
14	0.1670	(CookBks, ArtBks)
15	0.1925	(CookBks, GeogBks)

In [14]:
```
ru2 = association_rules(frequent_itemsets1, metric="lift", min_threshold=0.9)
ru2[ru2["lift"]>1]
```

Out[14]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
0	(YouthBks)	(ChildBks)	0.2475	0.4230	0.1650	0.666667	1.576044	0.060308
1	(ChildBks)	(YouthBks)	0.4230	0.2475	0.1650	0.390071	1.576044	0.060308
2	(CookBks)	(ChildBks)	0.4310	0.4230	0.2560	0.593968	1.404179	0.073687
3	(ChildBks)	(CookBks)	0.4230	0.4310	0.2560	0.605201	1.404179	0.073687
4	(ChildBks)	(DoItYBks)	0.4230	0.2820	0.1840	0.434988	1.542511	0.064714
5	(DoItYBks)	(ChildBks)	0.2820	0.4230	0.1840	0.652482	1.542511	0.064714
6	(ArtBks)	(ChildBks)	0.2410	0.4230	0.1625	0.674274	1.594028	0.060557
7	(ChildBks)	(ArtBks)	0.4230	0.2410	0.1625	0.384161	1.594028	0.060557
8	(GeogBks)	(ChildBks)	0.2760	0.4230	0.1950	0.706522	1.670264	0.078252
9	(ChildBks)	(GeogBks)	0.4230	0.2760	0.1950	0.460993	1.670264	0.078252
10	(CookBks)	(YouthBks)	0.4310	0.2475	0.1620	0.375870	1.518667	0.055328
11	(YouthBks)	(CookBks)	0.2475	0.4310	0.1620	0.654545	1.518667	0.055328
12	(CookBks)	(DoItYBks)	0.4310	0.2820	0.1875	0.435035	1.542677	0.065958
13	(DoItYBks)	(CookBks)	0.2820	0.4310	0.1875	0.664894	1.542677	0.065958
14	(CookBks)	(ArtBks)	0.4310	0.2410	0.1670	0.387471	1.607763	0.063129
15	(ArtBks)	(CookBks)	0.2410	0.4310	0.1670	0.692946	1.607763	0.063129
16	(CookBks)	(GeogBks)	0.4310	0.2760	0.1925	0.446636	1.618245	0.073544
17	(GeogBks)	(CookBks)	0.2760	0.4310	0.1925	0.697464	1.618245	0.073544

In [15]:
```
ru2.sort_values('lift',ascending=False)
```

Out[15]:

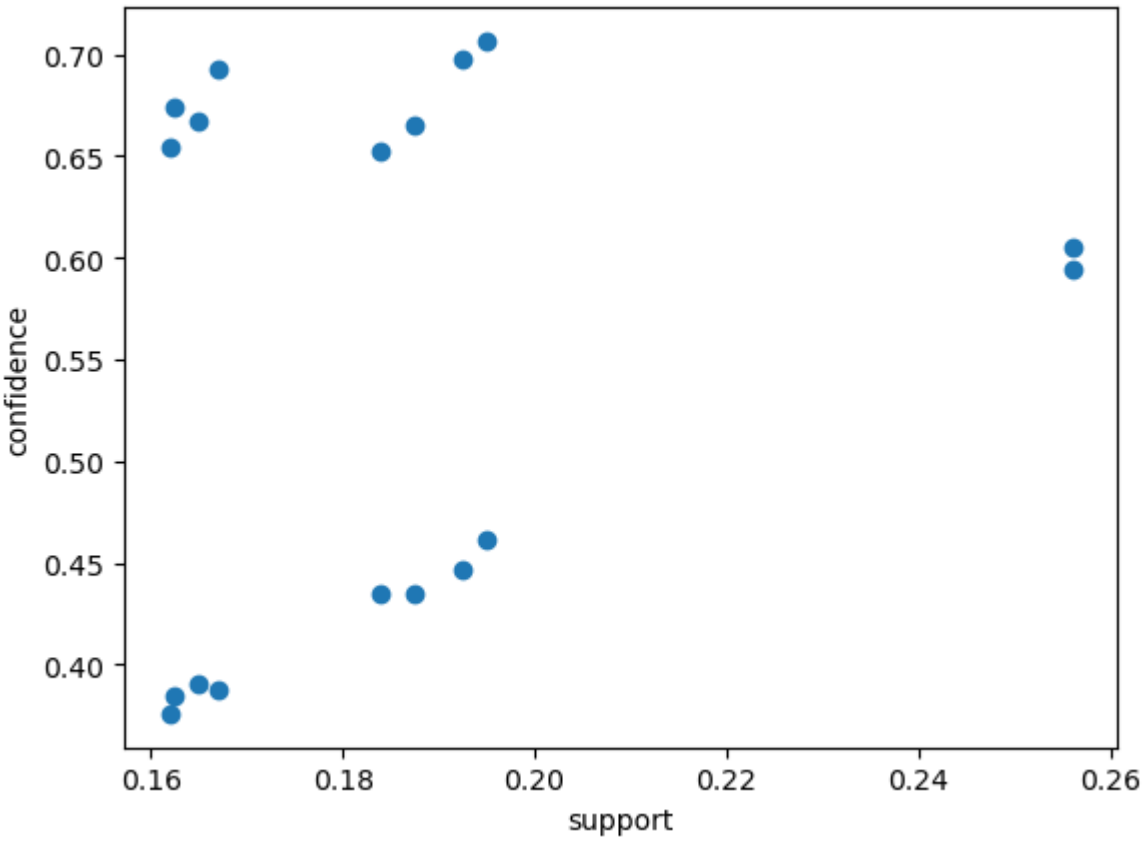
	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
9	(ChildBks)	(GeogBks)	0.4230	0.2760	0.1950	0.460993	1.670264	0.078252
8	(GeogBks)	(ChildBks)	0.2760	0.4230	0.1950	0.706522	1.670264	0.078252
16	(CookBks)	(GeogBks)	0.4310	0.2760	0.1925	0.446636	1.618245	0.073544
17	(GeogBks)	(CookBks)	0.2760	0.4310	0.1925	0.697464	1.618245	0.073544
14	(CookBks)	(ArtBks)	0.4310	0.2410	0.1670	0.387471	1.607763	0.063129
15	(ArtBks)	(CookBks)	0.2410	0.4310	0.1670	0.692946	1.607763	0.063129
6	(ArtBks)	(ChildBks)	0.2410	0.4230	0.1625	0.674274	1.594028	0.060557
7	(ChildBks)	(ArtBks)	0.4230	0.2410	0.1625	0.384161	1.594028	0.060557
0	(YouthBks)	(ChildBks)	0.2475	0.4230	0.1650	0.666667	1.576044	0.060308
1	(ChildBks)	(YouthBks)	0.4230	0.2475	0.1650	0.390071	1.576044	0.060308
12	(CookBks)	(DoItYBks)	0.4310	0.2820	0.1875	0.435035	1.542677	0.065958
13	(DoItYBks)	(CookBks)	0.2820	0.4310	0.1875	0.664894	1.542677	0.065958
4	(ChildBks)	(DoItYBks)	0.4230	0.2820	0.1840	0.434988	1.542511	0.064714
5	(DoItYBks)	(ChildBks)	0.2820	0.4230	0.1840	0.652482	1.542511	0.064714
10	(CookBks)	(YouthBks)	0.4310	0.2475	0.1620	0.375870	1.518667	0.055328
11	(YouthBks)	(CookBks)	0.2475	0.4310	0.1620	0.654545	1.518667	0.055328
3	(ChildBks)	(CookBks)	0.4230	0.4310	0.2560	0.605201	1.404179	0.073687
2	(CookBks)	(ChildBks)	0.4310	0.4230	0.2560	0.593968	1.404179	0.073687

In [16]:
```
ru2=ru2[ru2.lift>1]
ru2
```

Out[16]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
0	(YouthBks)	(ChildBks)	0.2475	0.4230	0.1650	0.666667	1.576044	0.060308
1	(ChildBks)	(YouthBks)	0.4230	0.2475	0.1650	0.390071	1.576044	0.060308
2	(CookBks)	(ChildBks)	0.4310	0.4230	0.2560	0.593968	1.404179	0.073687
3	(ChildBks)	(CookBks)	0.4230	0.4310	0.2560	0.605201	1.404179	0.073687
4	(ChildBks)	(DoItYBks)	0.4230	0.2820	0.1840	0.434988	1.542511	0.064714
5	(DoItYBks)	(ChildBks)	0.2820	0.4230	0.1840	0.652482	1.542511	0.064714
6	(ArtBks)	(ChildBks)	0.2410	0.4230	0.1625	0.674274	1.594028	0.060557
7	(ChildBks)	(ArtBks)	0.4230	0.2410	0.1625	0.384161	1.594028	0.060557
8	(GeogBks)	(ChildBks)	0.2760	0.4230	0.1950	0.706522	1.670264	0.078252
9	(ChildBks)	(GeogBks)	0.4230	0.2760	0.1950	0.460993	1.670264	0.078252
10	(CookBks)	(YouthBks)	0.4310	0.2475	0.1620	0.375870	1.518667	0.055328
11	(YouthBks)	(CookBks)	0.2475	0.4310	0.1620	0.654545	1.518667	0.055328
12	(CookBks)	(DoItYBks)	0.4310	0.2820	0.1875	0.435035	1.542677	0.065958
13	(DoItYBks)	(CookBks)	0.2820	0.4310	0.1875	0.664894	1.542677	0.065958
14	(CookBks)	(ArtBks)	0.4310	0.2410	0.1670	0.387471	1.607763	0.063129
15	(ArtBks)	(CookBks)	0.2410	0.4310	0.1670	0.692946	1.607763	0.063129
16	(CookBks)	(GeogBks)	0.4310	0.2760	0.1925	0.446636	1.618245	0.073544
17	(GeogBks)	(CookBks)	0.2760	0.4310	0.1925	0.697464	1.618245	0.073544

In [17]:
```
plt.scatter(ru2['support'],ru2['confidence'])
plt.xlabel('support')
plt.ylabel('confidence')
plt.show()
```



In [18]:
```
frequent_itemsets2 = apriori(ar,min_support=0.15,use_colnames=True)
frequent_itemsets2
```

Out[18]:

	support	itemsets
0	0.4230	(ChildBks)
1	0.2475	(YouthBks)
2	0.4310	(CookBks)
3	0.2820	(DoItYBks)
4	0.2145	(RefBks)
5	0.2410	(ArtBks)
6	0.2760	(GeogBks)
7	0.1650	(YouthBks, ChildBks)
8	0.2560	(CookBks, ChildBks)
9	0.1840	(ChildBks, DoItYBks)
10	0.1515	(RefBks, ChildBks)
11	0.1625	(ArtBks, ChildBks)
12	0.1950	(GeogBks, ChildBks)
13	0.1620	(CookBks, YouthBks)
14	0.1875	(CookBks, DoItYBks)
15	0.1525	(CookBks, RefBks)
16	0.1670	(CookBks, ArtBks)
17	0.1925	(CookBks, GeogBks)

In [19]:
```
ru3 = association_rules(frequent_itemsets2, metric="lift", min_threshold=0.95)
ru3[ru3["lift"]>1]
```

Out[19]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
0	(YouthBks)	(ChildBks)	0.2475	0.4230	0.1650	0.666667	1.576044	0.060308
1	(ChildBks)	(YouthBks)	0.4230	0.2475	0.1650	0.390071	1.576044	0.060308
2	(CookBks)	(ChildBks)	0.4310	0.4230	0.2560	0.593968	1.404179	0.073687
3	(ChildBks)	(CookBks)	0.4230	0.4310	0.2560	0.605201	1.404179	0.073687
4	(ChildBks)	(DoItYBks)	0.4230	0.2820	0.1840	0.434988	1.542511	0.064714
5	(DoItYBks)	(ChildBks)	0.2820	0.4230	0.1840	0.652482	1.542511	0.064714
6	(RefBks)	(ChildBks)	0.2145	0.4230	0.1515	0.706294	1.669725	0.060767
7	(ChildBks)	(RefBks)	0.4230	0.2145	0.1515	0.358156	1.669725	0.060767
8	(ArtBks)	(ChildBks)	0.2410	0.4230	0.1625	0.674274	1.594028	0.060557
9	(ChildBks)	(ArtBks)	0.4230	0.2410	0.1625	0.384161	1.594028	0.060557
10	(GeogBks)	(ChildBks)	0.2760	0.4230	0.1950	0.706522	1.670264	0.078252
11	(ChildBks)	(GeogBks)	0.4230	0.2760	0.1950	0.460993	1.670264	0.078252
12	(CookBks)	(YouthBks)	0.4310	0.2475	0.1620	0.375870	1.518667	0.055328
13	(YouthBks)	(CookBks)	0.2475	0.4310	0.1620	0.654545	1.518667	0.055328
14	(CookBks)	(DoItYBks)	0.4310	0.2820	0.1875	0.435035	1.542677	0.065958
15	(DoItYBks)	(CookBks)	0.2820	0.4310	0.1875	0.664894	1.542677	0.065958
16	(CookBks)	(RefBks)	0.4310	0.2145	0.1525	0.353828	1.649549	0.060050
17	(RefBks)	(CookBks)	0.2145	0.4310	0.1525	0.710956	1.649549	0.060050
18	(CookBks)	(ArtBks)	0.4310	0.2410	0.1670	0.387471	1.607763	0.063129
19	(ArtBks)	(CookBks)	0.2410	0.4310	0.1670	0.692946	1.607763	0.063129
20	(CookBks)	(GeogBks)	0.4310	0.2760	0.1925	0.446636	1.618245	0.073544
21	(GeogBks)	(CookBks)	0.2760	0.4310	0.1925	0.697464	1.618245	0.073544

In [20]:
```
ru3.sort_values('lift',ascending=False)
```

Out[20]:

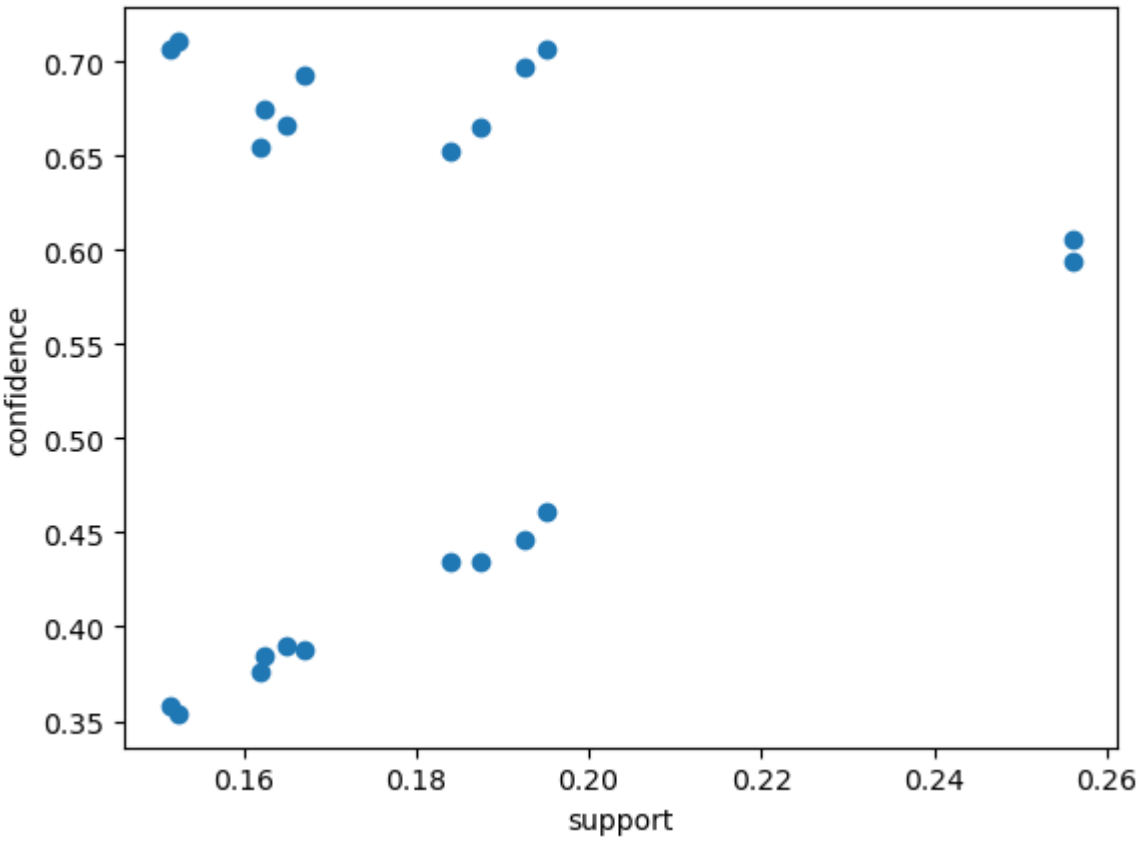
	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
11	(ChildBks)	(GeogBks)	0.4230	0.2760	0.1950	0.460993	1.670264	0.078252
10	(GeogBks)	(ChildBks)	0.2760	0.4230	0.1950	0.706522	1.670264	0.078252
7	(ChildBks)	(RefBks)	0.4230	0.2145	0.1515	0.358156	1.669725	0.060767
6	(RefBks)	(ChildBks)	0.2145	0.4230	0.1515	0.706294	1.669725	0.060767
17	(RefBks)	(CookBks)	0.2145	0.4310	0.1525	0.710956	1.649549	0.060050
16	(CookBks)	(RefBks)	0.4310	0.2145	0.1525	0.353828	1.649549	0.060050
20	(CookBks)	(GeogBks)	0.4310	0.2760	0.1925	0.446636	1.618245	0.073544
21	(GeogBks)	(CookBks)	0.2760	0.4310	0.1925	0.697464	1.618245	0.073544
18	(CookBks)	(ArtBks)	0.4310	0.2410	0.1670	0.387471	1.607763	0.063129
19	(ArtBks)	(CookBks)	0.2410	0.4310	0.1670	0.692946	1.607763	0.063129
8	(ArtBks)	(ChildBks)	0.2410	0.4230	0.1625	0.674274	1.594028	0.060557
9	(ChildBks)	(ArtBks)	0.4230	0.2410	0.1625	0.384161	1.594028	0.060557
0	(YouthBks)	(ChildBks)	0.2475	0.4230	0.1650	0.666667	1.576044	0.060308
1	(ChildBks)	(YouthBks)	0.4230	0.2475	0.1650	0.390071	1.576044	0.060308
14	(CookBks)	(DoItYBks)	0.4310	0.2820	0.1875	0.435035	1.542677	0.065958
15	(DoItYBks)	(CookBks)	0.2820	0.4310	0.1875	0.664894	1.542677	0.065958
4	(ChildBks)	(DoItYBks)	0.4230	0.2820	0.1840	0.434988	1.542511	0.064714
5	(DoItYBks)	(ChildBks)	0.2820	0.4230	0.1840	0.652482	1.542511	0.064714
12	(CookBks)	(YouthBks)	0.4310	0.2475	0.1620	0.375870	1.518667	0.055328
13	(YouthBks)	(CookBks)	0.2475	0.4310	0.1620	0.654545	1.518667	0.055328
3	(ChildBks)	(CookBks)	0.4230	0.4310	0.2560	0.605201	1.404179	0.073687
2	(CookBks)	(ChildBks)	0.4310	0.4230	0.2560	0.593968	1.404179	0.073687

In [21]:
```
ru3=ru3[ru3.lift>1]
ru3
```

Out[21]:

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	leverage
0	(YouthBks)	(ChildBks)	0.2475	0.4230	0.1650	0.666667	1.576044	0.060308
1	(ChildBks)	(YouthBks)	0.4230	0.2475	0.1650	0.390071	1.576044	0.060308
2	(CookBks)	(ChildBks)	0.4310	0.4230	0.2560	0.593968	1.404179	0.073687
3	(ChildBks)	(CookBks)	0.4230	0.4310	0.2560	0.605201	1.404179	0.073687
4	(ChildBks)	(DoItYBks)	0.4230	0.2820	0.1840	0.434988	1.542511	0.064714
5	(DoItYBks)	(ChildBks)	0.2820	0.4230	0.1840	0.652482	1.542511	0.064714
6	(RefBks)	(ChildBks)	0.2145	0.4230	0.1515	0.706294	1.669725	0.060767
7	(ChildBks)	(RefBks)	0.4230	0.2145	0.1515	0.358156	1.669725	0.060767
8	(ArtBks)	(ChildBks)	0.2410	0.4230	0.1625	0.674274	1.594028	0.060557
9	(ChildBks)	(ArtBks)	0.4230	0.2410	0.1625	0.384161	1.594028	0.060557
10	(GeogBks)	(ChildBks)	0.2760	0.4230	0.1950	0.706522	1.670264	0.078252
11	(ChildBks)	(GeogBks)	0.4230	0.2760	0.1950	0.460993	1.670264	0.078252
12	(CookBks)	(YouthBks)	0.4310	0.2475	0.1620	0.375870	1.518667	0.055328
13	(YouthBks)	(CookBks)	0.2475	0.4310	0.1620	0.654545	1.518667	0.055328
14	(CookBks)	(DoItYBks)	0.4310	0.2820	0.1875	0.435035	1.542677	0.065958
15	(DoItYBks)	(CookBks)	0.2820	0.4310	0.1875	0.664894	1.542677	0.065958
16	(CookBks)	(RefBks)	0.4310	0.2145	0.1525	0.353828	1.649549	0.060050
17	(RefBks)	(CookBks)	0.2145	0.4310	0.1525	0.710956	1.649549	0.060050
18	(CookBks)	(ArtBks)	0.4310	0.2410	0.1670	0.387471	1.607763	0.063129
19	(ArtBks)	(CookBks)	0.2410	0.4310	0.1670	0.692946	1.607763	0.063129
20	(CookBks)	(GeogBks)	0.4310	0.2760	0.1925	0.446636	1.618245	0.073544
21	(GeogBks)	(CookBks)	0.2760	0.4310	0.1925	0.697464	1.618245	0.073544

In [22]:
```
plt.scatter(ru3['support'],ru3['confidence'])
plt.xlabel('support')
plt.ylabel('confidence')
plt.show()
```



In [ ]:
```
```