

Practice with association rule mining

```
library(arules)
```

```
## Loading required package: Matrix
```

```
##  
## Attaching package: 'arules'
```

```
## The following objects are masked from 'package:base':  
##  
##   abbreviate, write
```

```
library(arulesViz)
```

```
## Loading required package: grid
```

```
library(igraph)
```

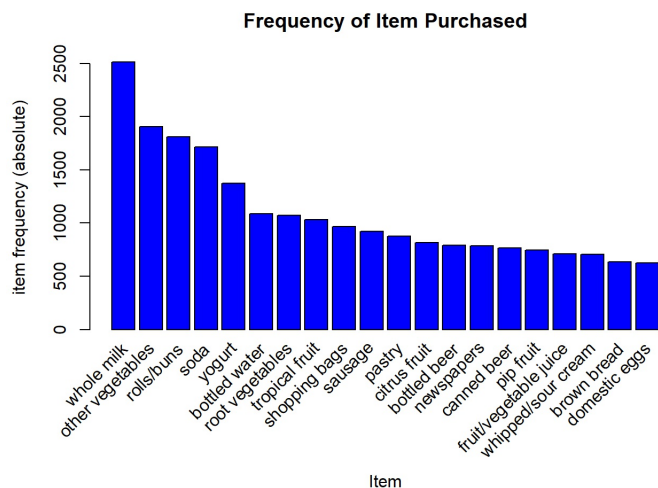
```
##  
## Attaching package: 'igraph'
```

```
## The following object is masked from 'package:arules':  
##  
##   union
```

```
## The following objects are masked from 'package:stats':  
##  
##   decompose, spectrum
```

```
## The following object is masked from 'package:base':  
##  
##   union
```

```
grocery=read.transactions("groceries.txt", format="basket", sep=",")  
#grocery_graph=as.matrix(read.transactions("groceries.txt"))  
itemFrequencyPlot(grocery,topN=20,type="absolute",col='blue',xlab='Item',main='Frequency of Item Purchased')
```



```
## Cast this variable as a special arules "transactions" class.  
gro_trans = as(grocery, "transactions")  
summary(gro_trans)
```

```
## transactions as itemMatrix in sparse format with  
## 9835 rows (elements/itemsets/transactions) and  
## 169 columns (items) and a density of 0.02609146  
##  
## most frequent items:  
##   whole milk other vegetables      rolls/buns      soda  
##      2513      1903      1809      1715  
##   yogurt      (Other)  
##      1372      34055  
##  
## element (itemset/transaction) length distribution:  
## sizes  
##    1    2    3    4    5    6    7    8    9   10   11   12   13   14   15  
## 2159 1643 1299 1005  855  645  545  438  350  246  182  117  78  77  55  
##   16   17   18   19   20   21   22   23   24   26   27   28   29   32  
##   46   29   14   14    9   11    4    6    1    1    1    1    3    1  
##  
##      Min. 1st Qu.  Median    Mean 3rd Qu.    Max.  
##    1.000  2.000  3.000  4.409  6.000 32.000  
##  
## includes extended item information - examples:  
##      labels  
## 1 abrasive cleaner  
## 2 artif. sweetener  
## 3 baby cosmetics
```

```
gro_rules = apriori(gro_trans,parameter=list(support=.005, confidence=.5, maxlen=6))
```

```

## Apriori
##
## Parameter specification:
## confidence minval smax arem aval originalSupport maxtime support minlen
##      0.5      0.1      1 none FALSE          TRUE      5   0.005      1
## maxlen target  ext
##      6 rules FALSE
##
## Algorithmic control:
## filter tree heap memopt load sort verbose
##      0.1 TRUE TRUE  FALSE TRUE      2    TRUE
##
## Absolute minimum support count: 49
##
## set item appearances ...[0 item(s)] done [0.00s].
## set transactions ...[169 item(s), 9835 transaction(s)] done [0.00s].
## sorting and recoding items ... [120 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2 3 4 done [0.00s].
## writing ... [120 rule(s)] done [0.00s].
## creating S4 object ... done [0.00s].

```

```
inspect(gro_rules)
```

	lhs	rhs	support	confidence	lift	count
## [1]	{baking powder}	=> {whole milk}	0.009252669	0.5229885	2.046793	91
## [2]	{oil, other vegetables}	=> {whole milk}	0.005083884	0.5102041	1.996760	50
## [3]	{onions, root vegetables}	=> {other vegetables}	0.005693950	0.6021505	3.112008	56
## [4]	{onions, whole milk}	=> {other vegetables}	0.006609049	0.5462185	2.822942	65
## [5]	{hygiene articles, other vegetables}	=> {whole milk}	0.005185562	0.5425532	2.123363	51
## [6]	{other vegetables, sugar}	=> {whole milk}	0.006304016	0.5849057	2.289115	62
## [7]	{long life bakery product, other vegetables}	=> {whole milk}	0.005693950	0.5333333	2.087279	56
## [8]	{cream cheese, yogurt}	=> {whole milk}	0.006609049	0.5327869	2.085141	65
## [9]	{chicken, root vegetables}	=> {other vegetables}	0.005693950	0.5233645	2.704829	56
## [10]	{chicken, root vegetables}	=> {whole milk}	0.005998983	0.5514019	2.157993	59
## [11]	{chicken, rolls/buns}	=> {whole milk}	0.005287239	0.5473684	2.142208	52
## [12]	{coffee, yogurt}	=> {whole milk}	0.005083884	0.5208333	2.038359	50
## [13]	{frozen vegetables, root vegetables}	=> {other vegetables}	0.006100661	0.5263158	2.720082	60
## [14]	{frozen vegetables, root vegetables}	=> {whole milk}	0.006202339	0.5350877	2.094146	61
## [15]	{frozen vegetables, rolls/buns}	=> {whole milk}	0.005083884	0.5000000	1.956825	50
## [16]	{frozen vegetables, other vegetables}	=> {whole milk}	0.009659380	0.5428571	2.124552	95
## [17]	{beef, yogurt}	=> {whole milk}	0.006100661	0.5217391	2.041904	60
## [18]	{beef, rolls/buns}	=> {whole milk}	0.006812405	0.5000000	1.956825	67
## [19]	{curd, whipped/sour cream}	=> {whole milk}	0.005897306	0.5631068	2.203802	58
## [20]	{curd, tropical fruit}	=> {yogurt}	0.005287239	0.5148515	3.690645	52
## [21]	{curd, tropical fruit}	=> {other vegetables}	0.005287239	0.5148515	2.660833	52
## [22]	{curd, tropical fruit}	=> {whole milk}	0.006507372	0.6336634	2.479936	64
## [23]	{curd, root vegetables}	=> {other vegetables}	0.005490595	0.5046729	2.608228	54
## [24]	{curd, root vegetables}	=> {whole milk}	0.006202339	0.5700935	2.231146	61
## [25]	{curd, yogurt}	=> {whole milk}	0.010066090	0.5823529	2.279125	99
## [26]	{curd, rolls/buns}	=> {whole milk}	0.005897306	0.5858586	2.292845	58
## [27]	{curd, other vegetables}	=> {whole milk}	0.009862735	0.5739645	2.246296	97
## [28]	{pork, root vegetables}	=> {other vegetables}	0.007015760	0.5149254	2.661214	69
## [29]	{pork, root vegetables}	=> {whole milk}	0.006812405	0.5000000	1.956825	67
## [30]	{pork, rolls/buns}	=> {whole milk}	0.006202339	0.5495495	2.150744	61
## [31]	{frankfurter, tropical fruit}	=> {whole milk}	0.005185562	0.5483871	2.146195	51
## [32]	{frankfurter, root vegetables}	=> {whole milk}	0.005083884	0.5000000	1.956825	50
## [33]	{frankfurter, yogurt}	=> {whole milk}	0.006202339	0.5545455	2.170296	61
## [34]	{bottled beer, yogurt}	=> {whole milk}	0.005185562	0.5604396	2.193364	51
## [35]	{brown bread, tropical fruit}	=> {whole milk}	0.005693950	0.5333333	2.087279	56
## [36]	{brown bread, root vegetables}	=> {whole milk}	0.005693950	0.5600000	2.191643	56
## [37]	{brown bread, other vegetables}	=> {whole milk}	0.009354347	0.5000000	1.956825	92
## [38]	{domestic eggs, margarine}	=> {whole milk}	0.005185562	0.6219512	2.434099	51
## [39]	{margarine, root vegetables}	=> {other vegetables}	0.005897306	0.5321101	2.750028	58
## [40]	{margarine, rolls/buns}	=> {whole milk}	0.007930859	0.5379310	2.105273	78
## [41]	{butter, domestic eggs}	=> {whole milk}	0.005998983	0.6210526	2.430582	59
## [42]	{butter, whipped/sour cream}	=> {other vegetables}	0.005795628	0.5700000	2.945849	57
## [43]	{butter, whipped/sour cream}	=> {whole milk}	0.006710727	0.6600000	2.583008	66
## [44]	{butter, citrus fruit}	=> {whole milk}	0.005083884	0.5555556	2.174249	50

## [45]	{bottled water, butter}	=> {whole milk}	0.005388917	0.6022727	2.357084	53
## [46]	{butter, tropical fruit}	=> {other vegetables}	0.005490595	0.5510204	2.847759	54
## [47]	{butter, tropical fruit}	=> {whole milk}	0.006202339	0.6224490	2.436047	61
## [48]	{butter, root vegetables}	=> {other vegetables}	0.006609049	0.5118110	2.645119	65
## [49]	{butter, root vegetables}	=> {whole milk}	0.008235892	0.6377953	2.496107	81
## [50]	{butter, yogurt}	=> {whole milk}	0.009354347	0.6388889	2.500387	92
## [51]	{butter, other vegetables}	=> {whole milk}	0.011489578	0.5736041	2.244885	113
## [52]	{newspapers, root vegetables}	=> {other vegetables}	0.005998983	0.5221239	2.698417	59
## [53]	{newspapers, root vegetables}	=> {whole milk}	0.005795628	0.5044248	1.974142	57
## [54]	{domestic eggs, whipped/sour cream}	=> {other vegetables}	0.005083884	0.5102041	2.636814	50
## [55]	{domestic eggs, whipped/sour cream}	=> {whole milk}	0.005693950	0.5714286	2.236371	56
## [56]	{domestic eggs, pip fruit}	=> {whole milk}	0.005388917	0.6235294	2.440275	53
## [57]	{citrus fruit, domestic eggs}	=> {whole milk}	0.005693950	0.5490196	2.148670	56
## [58]	{domestic eggs, tropical fruit}	=> {whole milk}	0.006914082	0.6071429	2.376144	68
## [59]	{domestic eggs, root vegetables}	=> {other vegetables}	0.007320793	0.5106383	2.639058	72
## [60]	{domestic eggs, root vegetables}	=> {whole milk}	0.008540925	0.5957447	2.331536	84
## [61]	{domestic eggs, yogurt}	=> {whole milk}	0.007727504	0.5390071	2.109485	76
## [62]	{domestic eggs, other vegetables}	=> {whole milk}	0.012302999	0.5525114	2.162336	121
## [63]	{fruit/vegetable juice, root vegetables}	=> {other vegetables}	0.006609049	0.5508475	2.846865	65
## [64]	{fruit/vegetable juice, root vegetables}	=> {whole milk}	0.006507372	0.5423729	2.122657	64
## [65]	{fruit/vegetable juice, yogurt}	=> {whole milk}	0.009456024	0.5054348	1.978094	93
## [66]	{pip fruit, whipped/sour cream}	=> {other vegetables}	0.005592272	0.6043956	3.123610	55
## [67]	{pip fruit, whipped/sour cream}	=> {whole milk}	0.005998983	0.6483516	2.537421	59
## [68]	{citrus fruit, whipped/sour cream}	=> {other vegetables}	0.005693950	0.5233645	2.704829	56
## [69]	{citrus fruit, whipped/sour cream}	=> {whole milk}	0.006304016	0.5794393	2.267722	62
## [70]	{sausage, whipped/sour cream}	=> {whole milk}	0.005083884	0.5617978	2.198679	50
## [71]	{tropical fruit, whipped/sour cream}	=> {other vegetables}	0.007829181	0.5661765	2.926088	77
## [72]	{tropical fruit, whipped/sour cream}	=> {whole milk}	0.007930859	0.5735294	2.244593	78
## [73]	{root vegetables, whipped/sour cream}	=> {other vegetables}	0.008540925	0.5000000	2.584078	84
## [74]	{root vegetables, whipped/sour cream}	=> {whole milk}	0.009456024	0.5535714	2.166484	93
## [75]	{whipped/sour cream, yogurt}	=> {whole milk}	0.010879512	0.5245098	2.052747	107
## [76]	{rolls/buns, whipped/sour cream}	=> {whole milk}	0.007829181	0.5347222	2.092715	77
## [77]	{other vegetables, whipped/sour cream}	=> {whole milk}	0.014641586	0.5070423	1.984385	144
## [78]	{pip fruit, sausage}	=> {whole milk}	0.005592272	0.5188679	2.030667	55
## [79]	{pip fruit, root vegetables}	=> {other vegetables}	0.008134215	0.5228758	2.702304	80
## [80]	{pip fruit, root vegetables}	=> {whole milk}	0.008947636	0.5751634	2.250988	88
## [81]	{pip fruit, yogurt}	=> {whole milk}	0.009557702	0.5310734	2.078435	94
## [82]	{other vegetables, pip fruit}	=> {whole milk}	0.013523132	0.5175097	2.025351	133
## [83]	{pastry, tropical fruit}	=> {whole milk}	0.006710727	0.5076923	1.986930	66
## [84]	{pastry, root vegetables}	=> {other vegetables}	0.005897306	0.5370370	2.775491	58
## [85]	{pastry, root vegetables}	=> {whole milk}	0.005693950	0.5185185	2.029299	56
## [86]	{pastry, yogurt}	=> {whole milk}	0.009150991	0.5172414	2.024301	90
## [87]	{citrus fruit, root vegetables}	=> {other vegetables}	0.010371124	0.5862069	3.029608	102
## [88]	{citrus fruit, root vegetables}	=> {whole milk}	0.009150991	0.5172414	2.024301	90
## [89]	{root vegetables, shopping bags}	=> {other vegetables}	0.006609049	0.5158730	2.666112	65
## [90]	{sausage, tropical fruit}	=> {whole milk}	0.007219115	0.5182482	2.028241	71
## [91]	{root vegetables, sausage}	=> {whole milk}	0.007727504	0.5170068	2.023383	76
## [92]	{root vegetables, tropical fruit}	=> {other vegetables}	0.012302999	0.5845411	3.020999	121
## [93]	{root vegetables, tropical fruit}	=> {whole milk}	0.011997966	0.5700483	2.230969	118
## [94]	{tropical fruit, yogurt}	=> {whole milk}	0.015149975	0.5173611	2.024770	149
## [95]	{root vegetables, yogurt}	=> {other vegetables}	0.012913066	0.5000000	2.584078	127
## [96]	{root vegetables, yogurt}	=> {whole milk}	0.014539908	0.5629921	2.203354	143
## [97]	{rolls/buns, root vegetables}	=> {other vegetables}	0.012201322	0.5020921	2.594890	120
## [98]	{rolls/buns, root vegetables}	=> {whole milk}	0.012709710	0.5230126	2.046888	125
## [99]	{other vegetables, yogurt}	=> {whole milk}	0.022267412	0.5128806	2.007235	219
## [100]	{fruit/vegetable juice, other vegetables, yogurt}	=> {whole milk}	0.005083884	0.6172840	2.415833	50
## [101]	{fruit/vegetable juice,					

##	whole milk,					
##	yogurt}	=> {other vegetables}	0.005083884	0.5376344	2.778578	50
## [102]	{other vegetables,					
##	root vegetables,					
##	whipped/sour cream}	=> {whole milk}	0.005185562	0.6071429	2.376144	51
## [103]	{root vegetables,					
##	whipped/sour cream,					
##	whole milk}	=> {other vegetables}	0.005185562	0.5483871	2.834150	51
## [104]	{other vegetables,					
##	whipped/sour cream,					
##	yogurt}	=> {whole milk}	0.005592272	0.5500000	2.152507	55
## [105]	{whipped/sour cream,					
##	whole milk,					
##	yogurt}	=> {other vegetables}	0.005592272	0.5140187	2.656529	55
## [106]	{other vegetables,					
##	pip fruit,					
##	root vegetables}	=> {whole milk}	0.005490595	0.6750000	2.641713	54
## [107]	{pip fruit,					
##	root vegetables,					
##	whole milk}	=> {other vegetables}	0.005490595	0.6136364	3.171368	54
## [108]	{other vegetables,					
##	pip fruit,					
##	yogurt}	=> {whole milk}	0.005083884	0.6250000	2.446031	50
## [109]	{pip fruit,					
##	whole milk,					
##	yogurt}	=> {other vegetables}	0.005083884	0.5319149	2.749019	50
## [110]	{citrus fruit,					
##	other vegetables,					
##	root vegetables}	=> {whole milk}	0.005795628	0.5588235	2.187039	57
## [111]	{citrus fruit,					
##	root vegetables,					
##	whole milk}	=> {other vegetables}	0.005795628	0.6333333	3.273165	57
## [112]	{root vegetables,					
##	tropical fruit,					
##	yogurt}	=> {whole milk}	0.005693950	0.7000000	2.739554	56
## [113]	{other vegetables,					
##	root vegetables,					
##	tropical fruit}	=> {whole milk}	0.007015760	0.5702479	2.231750	69
## [114]	{root vegetables,					
##	tropical fruit,					
##	whole milk}	=> {other vegetables}	0.007015760	0.5847458	3.022057	69
## [115]	{other vegetables,					
##	tropical fruit,					
##	yogurt}	=> {whole milk}	0.007625826	0.6198347	2.425816	75
## [116]	{tropical fruit,					
##	whole milk,					
##	yogurt}	=> {other vegetables}	0.007625826	0.5033557	2.601421	75
## [117]	{other vegetables,					
##	root vegetables,					
##	yogurt}	=> {whole milk}	0.007829181	0.6062992	2.372842	77
## [118]	{root vegetables,					
##	whole milk,					
##	yogurt}	=> {other vegetables}	0.007829181	0.5384615	2.782853	77
## [119]	{other vegetables,					
##	rolls/buns,					
##	root vegetables}	=> {whole milk}	0.006202339	0.5083333	1.989438	61
## [120]	{other vegetables,					
##	rolls/buns,					
##	yogurt}	=> {whole milk}	0.005998983	0.5221239	2.043410	59

```
inspect(subset(gro_rules, subset=lift > 3))
```

##	lhs	rhs	support	confidence	lift	count
## [1]	{onions,	=> {other vegetables}	0.005693950	0.6021505	3.112008	56
##	root vegetables}					
## [2]	{curd,	=> {yogurt}	0.005287239	0.5148515	3.690645	52
##	tropical fruit}					
## [3]	{pip fruit,	=> {other vegetables}	0.005592272	0.6043956	3.123610	55
##	whipped/sour cream}					
## [4]	{citrus fruit,	=> {other vegetables}	0.010371124	0.5862069	3.029608	102
##	root vegetables}					
## [5]	{root vegetables,	=> {other vegetables}	0.012302999	0.5845411	3.020999	121
##	tropical fruit}					
## [6]	{pip fruit,	=> {other vegetables}	0.005490595	0.6136364	3.171368	54
##	root vegetables,					
##	whole milk}					
## [7]	{citrus fruit,	=> {other vegetables}	0.005795628	0.6333333	3.273165	57
##	root vegetables,					
##	whole milk}					
## [8]	{root vegetables,	=> {other vegetables}	0.007015760	0.5847458	3.022057	69
##	tropical fruit,					
##	whole milk}					

```
inspect(subset(gro_rules, subset=confidence > 0.5))
```

##	lhs	rhs	support	confidence	lift	count
## [1]	{baking powder}	=> {whole milk}	0.009252669	0.5229885	2.046793	91
## [2]	{oil,	=> {whole milk}	0.005083884	0.5102041	1.996760	50
##	other vegetables}					
## [3]	{onions,	=> {other vegetables}	0.005693950	0.6021505	3.112008	56
##	root vegetables}					
## [4]	{onions,	=> {other vegetables}	0.006609049	0.5462185	2.822942	65
##	whole milk}					
## [5]	{hygiene articles,	=> {whole milk}	0.005185562	0.5425532	2.123363	51
##	other vegetables}					
## [6]	{other vegetables,	=> {whole milk}	0.006304016	0.5849057	2.289115	62
##	sugar}					
## [7]	{long life bakery product,	=> {whole milk}	0.005693950	0.5333333	2.087279	56
##	other vegetables}					
## [8]	{cream cheese,	=> {whole milk}	0.006609049	0.5327869	2.085141	65
##	yogurt}					
## [9]	{chicken,	=> {other vegetables}	0.005693950	0.5233645	2.704829	56
##	root vegetables}					
## [10]	{chicken,	=> {whole milk}	0.005998983	0.5514019	2.157993	59
##	root vegetables}					
## [11]	{chicken,	=> {whole milk}	0.005287239	0.5473684	2.142208	52
##	rolls/buns}					
## [12]	{coffee,	=> {whole milk}	0.005083884	0.5208333	2.038359	50
##	yogurt}					
## [13]	{frozen vegetables,	=> {other vegetables}	0.006100661	0.5263158	2.720082	60
##	root vegetables}					

## [14]	{frozen vegetables, root vegetables}	=> {whole milk}	0.006202339	0.5350877	2.094146	61
## [15]	{frozen vegetables, other vegetables}	=> {whole milk}	0.009659380	0.5428571	2.124552	95
## [16]	{beef, yogurt}	=> {whole milk}	0.006100661	0.5217391	2.041904	60
## [17]	{curd, whipped/sour cream}	=> {whole milk}	0.005897306	0.5631068	2.203802	58
## [18]	{curd, tropical fruit}	=> {yogurt}	0.005287239	0.5148515	3.690645	52
## [19]	{curd, tropical fruit}	=> {other vegetables}	0.005287239	0.5148515	2.660833	52
## [20]	{curd, tropical fruit}	=> {whole milk}	0.006507372	0.6336634	2.479936	64
## [21]	{curd, root vegetables}	=> {other vegetables}	0.005490595	0.5046729	2.608228	54
## [22]	{curd, root vegetables}	=> {whole milk}	0.006202339	0.5700935	2.231146	61
## [23]	{curd, yogurt}	=> {whole milk}	0.010066090	0.5823529	2.279125	99
## [24]	{curd, rolls/buns}	=> {whole milk}	0.005897306	0.5858586	2.292845	58
## [25]	{curd, other vegetables}	=> {whole milk}	0.009862735	0.5739645	2.246296	97
## [26]	{pork, root vegetables}	=> {other vegetables}	0.007015760	0.5149254	2.661214	69
## [27]	{pork, rolls/buns}	=> {whole milk}	0.006202339	0.5495495	2.150744	61
## [28]	{frankfurter, tropical fruit}	=> {whole milk}	0.005185562	0.5483871	2.146195	51
## [29]	{frankfurter, yogurt}	=> {whole milk}	0.006202339	0.5545455	2.170296	61
## [30]	{bottled beer, yogurt}	=> {whole milk}	0.005185562	0.5604396	2.193364	51
## [31]	{brown bread, tropical fruit}	=> {whole milk}	0.005693950	0.5333333	2.087279	56
## [32]	{brown bread, root vegetables}	=> {whole milk}	0.005693950	0.5600000	2.191643	56
## [33]	{domestic eggs, margarine}	=> {whole milk}	0.005185562	0.6219512	2.434099	51
## [34]	{margarine, root vegetables}	=> {other vegetables}	0.005897306	0.5321101	2.750028	58
## [35]	{margarine, rolls/buns}	=> {whole milk}	0.007930859	0.5379310	2.105273	78
## [36]	{butter, domestic eggs}	=> {whole milk}	0.005998983	0.6210526	2.430582	59
## [37]	{butter, whipped/sour cream}	=> {other vegetables}	0.005795628	0.5700000	2.945849	57
## [38]	{butter, whipped/sour cream}	=> {whole milk}	0.006710727	0.6600000	2.583008	66
## [39]	{butter, citrus fruit}	=> {whole milk}	0.005083884	0.5555556	2.174249	50
## [40]	{bottled water, butter}	=> {whole milk}	0.005388917	0.6022727	2.357084	53
## [41]	{butter, tropical fruit}	=> {other vegetables}	0.005490595	0.5510204	2.847759	54
## [42]	{butter, tropical fruit}	=> {whole milk}	0.006202339	0.6224490	2.436047	61
## [43]	{butter, root vegetables}	=> {other vegetables}	0.006609049	0.5118110	2.645119	65
## [44]	{butter, root vegetables}	=> {whole milk}	0.008235892	0.6377953	2.496107	81
## [45]	{butter, yogurt}	=> {whole milk}	0.009354347	0.6388889	2.500387	92
## [46]	{butter, other vegetables}	=> {whole milk}	0.011489578	0.5736041	2.244885	113
## [47]	{newspapers, root vegetables}	=> {other vegetables}	0.005998983	0.5221239	2.698417	59
## [48]	{newspapers, root vegetables}	=> {whole milk}	0.005795628	0.5044248	1.974142	57
## [49]	{domestic eggs, whipped/sour cream}	=> {other vegetables}	0.005083884	0.5102041	2.636814	50
## [50]	{domestic eggs, whipped/sour cream}	=> {whole milk}	0.005693950	0.5714286	2.236371	56
## [51]	{domestic eggs, pip fruit}	=> {whole milk}	0.005388917	0.6235294	2.440275	53
## [52]	{citrus fruit, domestic eggs}	=> {whole milk}	0.005693950	0.5490196	2.148670	56
## [53]	{domestic eggs, tropical fruit}	=> {whole milk}	0.006914082	0.6071429	2.376144	68
## [54]	{domestic eggs, root vegetables}	=> {other vegetables}	0.007320793	0.5106383	2.639058	72
## [55]	{domestic eggs, root vegetables}	=> {whole milk}	0.008540925	0.5957447	2.331536	84
## [56]	{domestic eggs, yogurt}	=> {whole milk}	0.007727504	0.5390071	2.109485	76
## [57]	{domestic eggs, other vegetables}	=> {whole milk}	0.012302999	0.5525114	2.162336	121
## [58]	{fruit/vegetable juice, root vegetables}	=> {other vegetables}	0.006609049	0.5508475	2.846865	65
## [59]	{fruit/vegetable juice, root vegetables}	=> {whole milk}	0.006507372	0.5423729	2.122657	64
## [60]	{fruit/vegetable juice, yogurt}	=> {whole milk}	0.009456024	0.5054348	1.978094	93
## [61]	{pip fruit, whipped/sour cream}	=> {other vegetables}	0.005592272	0.6043956	3.123610	55
## [62]	{pip fruit, whipped/sour cream}	=> {whole milk}	0.005998983	0.6483516	2.537421	59
## [63]	{citrus fruit, whipped/sour cream}	=> {other vegetables}	0.005693950	0.5233645	2.704829	56
## [64]	{citrus fruit, whipped/sour cream}	=> {whole milk}	0.006304016	0.5794393	2.267722	62
## [65]	{sausage, whipped/sour cream}	=> {whole milk}	0.005083884	0.5617978	2.198679	50
## [66]	{tropical fruit, whipped/sour cream}	=> {other vegetables}	0.007829181	0.5661765	2.926088	77
## [67]	{tropical fruit, whipped/sour cream}	=> {whole milk}	0.007930859	0.5735294	2.244593	78
## [68]	{root vegetables, whipped/sour cream}	=> {whole milk}	0.009456024	0.5535714	2.166484	93
## [69]	{whipped/sour cream, yogurt}	=> {whole milk}	0.010879512	0.5245098	2.052747	107
## [70]	{rolls/buns, whipped/sour cream}	=> {whole milk}	0.007829181	0.5347222	2.092715	77

## [71]	{other vegetables, whipped/sour cream}	=> {whole milk}	0.014641586	0.5070423	1.984385	144
## [72]	{pip fruit, sausage}	=> {whole milk}	0.005592272	0.5188679	2.030667	55
## [73]	{pip fruit, root vegetables}	=> {other vegetables}	0.008134215	0.5228758	2.702304	80
## [74]	{pip fruit, root vegetables}	=> {whole milk}	0.008947636	0.5751634	2.250988	88
## [75]	{pip fruit, yogurt}	=> {whole milk}	0.009557702	0.5310734	2.078435	94
## [76]	{other vegetables, pip fruit}	=> {whole milk}	0.013523132	0.5175097	2.025351	133
## [77]	{pastry, tropical fruit}	=> {whole milk}	0.006710727	0.5076923	1.986930	66
## [78]	{pastry, root vegetables}	=> {other vegetables}	0.005897306	0.5370370	2.775491	58
## [79]	{pastry, root vegetables}	=> {whole milk}	0.005693950	0.5185185	2.029299	56
## [80]	{pastry, yogurt}	=> {whole milk}	0.009150991	0.5172414	2.024301	90
## [81]	{citrus fruit, root vegetables}	=> {other vegetables}	0.010371124	0.5862069	3.029608	102
## [82]	{citrus fruit, root vegetables}	=> {whole milk}	0.009150991	0.5172414	2.024301	90
## [83]	{root vegetables, shopping bags}	=> {other vegetables}	0.006609049	0.5158730	2.666112	65
## [84]	{sausage, tropical fruit}	=> {whole milk}	0.007219115	0.5182482	2.028241	71
## [85]	{root vegetables, sausage}	=> {whole milk}	0.007727504	0.5170068	2.023383	76
## [86]	{root vegetables, tropical fruit}	=> {other vegetables}	0.012302999	0.5845411	3.020999	121
## [87]	{root vegetables, tropical fruit}	=> {whole milk}	0.011997966	0.5700483	2.230969	118
## [88]	{tropical fruit, yogurt}	=> {whole milk}	0.015149975	0.5173611	2.024770	149
## [89]	{root vegetables, yogurt}	=> {whole milk}	0.014539908	0.5629921	2.203354	143
## [90]	{rolls/buns, root vegetables}	=> {other vegetables}	0.012201322	0.5020921	2.594890	120
## [91]	{rolls/buns, root vegetables}	=> {whole milk}	0.012709710	0.5230126	2.046888	125
## [92]	{other vegetables, yogurt}	=> {whole milk}	0.022267412	0.5128806	2.007235	219
## [93]	{fruit/vegetable juice, other vegetables, yogurt}	=> {whole milk}	0.005083884	0.6172840	2.415833	50
## [94]	{fruit/vegetable juice, whole milk, yogurt}	=> {other vegetables}	0.005083884	0.5376344	2.778578	50
## [95]	{other vegetables, root vegetables, whipped/sour cream}	=> {whole milk}	0.005185562	0.6071429	2.376144	51
## [96]	{root vegetables, whipped/sour cream, whole milk}	=> {other vegetables}	0.005185562	0.5483871	2.834150	51
## [97]	{other vegetables, whipped/sour cream, yogurt}	=> {whole milk}	0.005592272	0.5500000	2.152507	55
## [98]	{whipped/sour cream, whole milk, yogurt}	=> {other vegetables}	0.005592272	0.5140187	2.656529	55
## [99]	{other vegetables, pip fruit, root vegetables}	=> {whole milk}	0.005490595	0.6750000	2.641713	54
## [100]	{pip fruit, root vegetables, whole milk}	=> {other vegetables}	0.005490595	0.6136364	3.171368	54
## [101]	{other vegetables, pip fruit, yogurt}	=> {whole milk}	0.005083884	0.6250000	2.446031	50
## [102]	{pip fruit, whole milk, yogurt}	=> {other vegetables}	0.005083884	0.5319149	2.749019	50
## [103]	{citrus fruit, other vegetables, root vegetables}	=> {whole milk}	0.005795628	0.5588235	2.187039	57
## [104]	{citrus fruit, root vegetables, whole milk}	=> {other vegetables}	0.005795628	0.6333333	3.273165	57
## [105]	{root vegetables, tropical fruit, yogurt}	=> {whole milk}	0.005693950	0.7000000	2.739554	56
## [106]	{other vegetables, root vegetables, tropical fruit}	=> {whole milk}	0.007015760	0.5702479	2.231750	69
## [107]	{root vegetables, tropical fruit, whole milk}	=> {other vegetables}	0.007015760	0.5847458	3.022057	69
## [108]	{other vegetables, tropical fruit, yogurt}	=> {whole milk}	0.007625826	0.6198347	2.425816	75
## [109]	{tropical fruit, whole milk, yogurt}	=> {other vegetables}	0.007625826	0.5033557	2.601421	75
## [110]	{other vegetables, root vegetables, yogurt}	=> {whole milk}	0.007829181	0.6062992	2.372842	77
## [111]	{root vegetables, whole milk, yogurt}	=> {other vegetables}	0.007829181	0.5384615	2.782853	77
## [112]	{other vegetables, rolls/buns, root vegetables}	=> {whole milk}	0.006202339	0.5083333	1.989438	61
## [113]	{other vegetables, rolls/buns, yogurt}	=> {whole milk}	0.005998983	0.5221239	2.043410	59

From the inspect, we can see that other vegetables and whole milk are the items mostly purchased and they are the items with highest support values. We can also find the two kinds of item are most frequently purchased in the plot of the Top 20 frequency of item purchased. We can see that there are associations between people who buy a certain kind of items and also buy some of the more frequently purchased items. For instance, people who buy onion or root vegetables also tend to purchase other vegetables. And customers who buy dairy products will also be more likely to buy whole milk.