Association rule mining

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Association rule mining

Revisit the notes on association rule mining and the R example on music playlists: playlists.R and playlists.csv. Then use the data on grocery purchases in groceries.txt and find some interesting association rules for these shopping baskets. The data file is a list of shopping baskets: one person's basket for each row, with multiple items per row separated by commas. Pick your own thresholds for lift and confidence; just be clear what these thresholds are and say why you picked them. Do your discovered item sets make sense? Present your discoveries in an interesting and visually appealing way.

```r
# Load necessary libraries
library(tidyverse)
```

```
## ── Attaching core tidyverse packages ─────────────────────── tidyverse 2.0.0 ──
## ✔ dplyr     1.1.4     ✔ readr     2.1.5
## ✔ forcats   1.0.0     ✔ stringr   1.5.1
## ✔ ggplot2   3.5.0     ✔ tibble    3.2.1
## ✔ lubridate 1.9.3     ✔ tidyr     1.3.1
## ✔ purrr     1.0.2
## ── Conflicts ──────────────────────────────────────── tidyverse_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
## ℹ Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts
## to become errors
```

```r
library(igraph)
```

```
##
## Attaching package: 'igraph'
##
## The following objects are masked from 'package:lubridate':
##
##     %--%, union
##
## The following objects are masked from 'package:dplyr':
##
##     as_data_frame, groups, union
##
## The following objects are masked from 'package:purrr':
##
##     compose, simplify
##
## The following object is masked from 'package:tidyr':
##
##     crossing
##
## The following object is masked from 'package:tibble':
##
##     as_data_frame
##
## The following objects are masked from 'package:stats':
##
##     decompose, spectrum
##
## The following object is masked from 'package:base':
##
##     union
```

```
library(arules)
```

```
## Loading required package: Matrix
##
## Attaching package: 'Matrix'
##
## The following objects are masked from 'package:tidyr':
##
##     expand, pack, unpack
##
##
## Attaching package: 'arules'
##
## The following object is masked from 'package:dplyr':
##
##     recode
##
## The following objects are masked from 'package:base':
##
##     abbreviate, write
```

```
library(arulesViz)

# Groceries dataset file path
file_path <- "data/groceries.txt"

# Read transactions
groceries_raw <- read.transactions(file_path, format = "basket", sep = ",")

# Run the apriori algorithm on the transaction data
grocery_rules <- apriori(groceries_raw,
                         parameter=list(support=.005, confidence=.1, maxlen=4))
```

```
## Apriori
##
## Parameter specification:
##  confidence minval smax arem  aval originalSupport maxtime support minlen
##         0.1    0.1    1 none FALSE            TRUE       5   0.005      1
##  maxlen target  ext
##       4  rules TRUE
##
## 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
```

```
## Warning in apriori(groceries_raw, parameter = list(support = 0.005, confidence
## = 0.1, : Mining stopped (maxlen reached). Only patterns up to a length of 4
## returned!
```

```
##   done [0.00s].
## writing ... [1582 rule(s)] done [0.00s].
## creating S4 object  ... done [0.00s].
```

```
# arules package
arules::inspect(grocery_rules)
```

```
##          lhs                          rhs                        support confiden
ce    coverage      lift count
## [1]      {}                => {bottled water}            0.110523640  0.11052
36 1.000000000 1.0000000  1087
## [2]      {}                => {tropical fruit}            0.104931368  0.10493
14 1.000000000 1.0000000  1032
## [3]      {}                => {root vegetables}           0.108998475  0.10899
85 1.000000000 1.0000000  1072
## [4]      {}                => {soda}                      0.174377224  0.17437
72 1.000000000 1.0000000  1715
## [5]      {}                => {yogurt}                    0.139501779  0.13950
18 1.000000000 1.0000000  1372
## [6]      {}                => {rolls/buns}                0.183934926  0.18393
49 1.000000000 1.0000000  1809
## [7]      {}                => {other vegetables}          0.193492628  0.19349
26 1.000000000 1.0000000  1903
## [8]      {}                => {whole milk}                0.255516014  0.25551
60 1.000000000 1.0000000  2513
## [9]      {cake bar}        => {whole milk}                0.005592272  0.42307
69 0.013218099 1.6557746    55
## [10]    {dishes}           => {other vegetables}          0.005998983  0.34104
05 0.017590239 1.7625502    59
## [11]    {dishes}           => {whole milk}                0.005287239  0.30057
80 0.017590239 1.1763569    52
## [12]    {mustard}          => {whole milk}                0.005185562  0.43220
34 0.011997966 1.6914924    51
## [13]    {pot plants}       => {whole milk}                0.006914082  0.40000
00 0.017285206 1.5654596    68
## [14]    {chewing gum}      => {soda}                      0.005388917  0.25603
86 0.021047280 1.4683033    53
## [15]    {chewing gum}      => {whole milk}                0.005083884  0.24154
59 0.021047280 0.9453259    50
## [16]    {canned fish}      => {other vegetables}          0.005083884  0.33783
78 0.015048297 1.7459985    50
## [17]    {pasta}            => {whole milk}                0.006100661  0.40540
54 0.015048297 1.5866145    60
## [18]    {herbs}            => {root vegetables}           0.007015760  0.43125
00 0.016268429 3.9564774    69
## [19]    {herbs}            => {other vegetables}          0.007727504  0.47500
00 0.016268429 2.4548739    76
## [20]    {herbs}            => {whole milk}                0.007727504  0.47500
00 0.016268429 1.8589833    76
## [21]    {processed cheese} => {soda}                      0.005287239  0.31901
84 0.016573462 1.8294729    52
## [22]    {processed cheese} => {other vegetables}          0.005490595  0.33128
83 0.016573462 1.7121497    54
## [23]    {processed cheese} => {whole milk}                0.007015760  0.42331
29 0.016573462 1.6566981    69
## [24]    {semi-finished bread} => {other vegetables}       0.005185562  0.29310
34 0.017691917 1.5148042    51
## [25]    {semi-finished bread} => {whole milk}             0.007117438  0.40229
89 0.017691917 1.5744565    70
```

```
## [26]    {beverages}              => {yogurt}            0.005490595  0.21093
75 0.026029487 1.5120775    54
## [27]    {beverages}              => {rolls/buns}         0.005388917  0.20703
12 0.026029487 1.1255679    53
## [28]    {beverages}              => {other vegetables}   0.005185562  0.19921
88 0.026029487 1.0295935    51
## [29]    {beverages}              => {whole milk}         0.006812405  0.26171
88 0.026029487 1.0242753    67
## [30]    {ice cream}              => {soda}               0.006100661  0.24390
24 0.025012710 1.3987058    60
## [31]    {ice cream}              => {other vegetables}   0.005083884  0.20325
20 0.025012710 1.0504381    50
## [32]    {ice cream}              => {whole milk}         0.005897306  0.23577
24 0.025012710 0.9227303    58
## [33]    {detergent}              => {other vegetables}   0.006405694  0.33333
33 0.019217082 1.7227185    63
## [34]    {detergent}              => {whole milk}         0.008947636  0.46560
85 0.019217082 1.8222281    88
## [35]    {pickled vegetables}     => {other vegetables}   0.006405694  0.35795
45 0.017895272 1.8499648    63
## [36]    {pickled vegetables}     => {whole milk}         0.007117438  0.39772
73 0.017895272 1.5565650    70
## [37]    {baking powder}          => {other vegetables}   0.007320793  0.41379
31 0.017691917 2.1385471    72
## [38]    {baking powder}          => {whole milk}         0.009252669  0.52298
85 0.017691917 2.0467935    91
## [39]    {flour}                  => {other vegetables}   0.006304016  0.36257
31 0.017386884 1.8738342    62
## [40]    {flour}                  => {whole milk}         0.008439248  0.48538
01 0.017386884 1.8996074    83
## [41]    {soft cheese}            => {yogurt}             0.005998983  0.35119
05 0.017081851 2.5174623    59
## [42]    {soft cheese}            => {rolls/buns}         0.005388917  0.31547
62 0.017081851 1.7151511    53
## [43]    {soft cheese}            => {other vegetables}   0.007117438  0.41666
67 0.017081851 2.1533981    70
## [44]    {soft cheese}            => {whole milk}         0.007524148  0.44047
62 0.017081851 1.7238692    74
## [45]    {specialty bar}          => {soda}               0.007219115  0.26394
05 0.027351296 1.5136181    71
## [46]    {specialty bar}          => {rolls/buns}         0.005592272  0.20446
10 0.027351296 1.1115940    55
## [47]    {specialty bar}          => {other vegetables}   0.005592272  0.20446
10 0.027351296 1.0566861    55
## [48]    {specialty bar}          => {whole milk}         0.006507372  0.23791
82 0.027351296 0.9311284    64
## [49]    {misc. beverages}        => {bottled water}      0.005287239  0.18637
99 0.028368073 1.6863354    52
## [50]    {misc. beverages}        => {soda}               0.007320793  0.25806
45 0.028368073 1.4799210    72
## [51]    {misc. beverages}        => {other vegetables}   0.005592272  0.19713
26 0.028368073 1.0188120    55
```

```
##      lhs                    rhs                   support     confidence  coverage    lift      count
## [52] {misc. beverages}   => {whole milk}          0.007015760 0.2473118  0.028368073 0.9678917 69
## [53] {grapes}            => {tropical fruit}      0.006100661 0.2727273  0.022369090 2.5991015 60
## [54] {grapes}            => {other vegetables}    0.009049314 0.4045455  0.022369090 2.0907538 89
## [55] {grapes}            => {whole milk}          0.007320793 0.3272727  0.022369090 1.2808306 72
## [56] {cat food}          => {yogurt}              0.006202339 0.2663755  0.023284189 1.9094778 61
## [57] {cat food}          => {other vegetables}    0.006507372 0.2794760  0.023284189 1.4443753 64
## [58] {cat food}          => {whole milk}          0.008845958 0.3799127  0.023284189 1.4868448 87
## [59] {specialty chocolate} => {soda}              0.006304016 0.2073579  0.030401627 1.1891338 62
## [60] {specialty chocolate} => {rolls/buns}        0.005592272 0.1839465  0.030401627 1.0000629 55
## [61] {specialty chocolate} => {other vegetables}  0.006100661 0.2006689  0.030401627 1.0370881 60
## [62] {specialty chocolate} => {whole milk}        0.008032537 0.2642140  0.030401627 1.0340410 79
## [63] {meat}              => {sausage}             0.005287239 0.2047244  0.025826131 2.1790742 52
## [64] {meat}              => {root vegetables}     0.005083884 0.1968504  0.025826131 1.8059922 50
## [65] {meat}              => {soda}                0.005490595 0.2125984  0.025826131 1.2191869 54
## [66] {meat}              => {yogurt}              0.005287239 0.2047244  0.025826131 1.4675398 52
## [67] {meat}              => {rolls/buns}          0.006914082 0.2677165  0.025826131 1.4554959 68
## [68] {meat}              => {other vegetables}    0.009964413 0.3858268  0.025826131 1.9940128 98
## [69] {meat}              => {whole milk}          0.009964413 0.3858268  0.025826131 1.5099906 98
## [70] {frozen meals}      => {tropical fruit}      0.005490595 0.1935484  0.028368073 1.8445236 54
## [71] {frozen meals}      => {soda}                0.006202339 0.2186380  0.028368073 1.2538220 61
## [72] {frozen meals}      => {yogurt}              0.006202339 0.2186380  0.028368073 1.5672774 61
## [73] {frozen meals}      => {other vegetables}    0.007524148 0.2652330  0.028368073 1.3707653 74
## [74] {frozen meals}      => {whole milk}          0.009862735 0.3476703  0.028368073 1.3606593 97
## [75] {hard cheese}       => {sausage}             0.005185562 0.2116183  0.024504321 2.2524519 51
## [76] {hard cheese}       => {root vegetables}     0.005592272 0.2282158  0.024504321 2.0937519 55
## [77] {hard cheese}       => {yogurt}              0.006405694 0.2614108  0.024504321 1.8738886 63
```

```
## [78]    {hard cheese}      => {rolls/buns}         0.005897306 0.2406639 0.024504321 1.3084187  58
## [79]    {hard cheese}      => {other vegetables}   0.009456024 0.3858921 0.024504321 1.9943505  93
## [80]    {hard cheese}      => {whole milk}         0.010066090 0.4107884 0.024504321 1.6076815  99
## [81]    {butter milk}      => {pip fruit}          0.005083884 0.1818182 0.027961362 2.4034702  50
## [82]    {butter milk}      => {tropical fruit}     0.005490595 0.1963636 0.027961362 1.8713531  54
## [83]    {butter milk}      => {root vegetables}    0.005083884 0.1818182 0.027961362 1.6680801  50
## [84]    {butter milk}      => {yogurt}             0.008540925 0.3054545 0.027961362 2.1896104  84
## [85]    {butter milk}      => {rolls/buns}         0.007625826 0.2727273 0.027961362 1.4827378  75
## [86]    {butter milk}      => {other vegetables}   0.010371124 0.3709091 0.027961362 1.9169159 102
## [87]    {butter milk}      => {whole milk}         0.011591256 0.4145455 0.027961362 1.6223854 114
## [88]    {candy}            => {tropical fruit}     0.005388917 0.1802721 0.029893238 1.7180002  53
## [89]    {candy}            => {soda}               0.008642603 0.2891156 0.029893238 1.6579897  85
## [90]    {candy}            => {yogurt}             0.005490595 0.1836735 0.029893238 1.3166389  54
## [91]    {candy}            => {rolls/buns}         0.007117438 0.2380952 0.029893238 1.2944537  70
## [92]    {candy}            => {other vegetables}   0.006914082 0.2312925 0.029893238 1.1953557  68
## [93]    {candy}            => {whole milk}         0.008235892 0.2755102 0.029893238 1.0782502  81
## [94]    {ham}              => {white bread}        0.005083884 0.1953125 0.026029487 4.6398513  50
## [95]    {white bread}      => {ham}                0.005083884 0.1207729 0.042094560 4.6398513  50
## [96]    {ham}              => {tropical fruit}     0.005388917 0.2070312 0.026029487 1.9730158  53
## [97]    {ham}              => {yogurt}             0.006710727 0.2578125 0.026029487 1.8480947  66
## [98]    {ham}              => {rolls/buns}         0.006914082 0.2656250 0.026029487 1.4441249  68
## [99]    {ham}              => {other vegetables}   0.009150991 0.3515625 0.026029487 1.8169297  90
## [100]   {ham}              => {whole milk}         0.011489578 0.4414062 0.026029487 1.7275091 113
## [101]   {sliced cheese}    => {sausage}            0.007015760 0.2863070 0.024504321 3.0474349  69
## [102]   {sliced cheese}    => {tropical fruit}     0.005287239 0.2157676 0.024504321 2.0562739  52
## [103]   {sliced cheese}    => {root vegetables}    0.005592272 0.2282158 0.024504321 2.0937519  55
```

	lhs		rhs	support	confidence	coverage	lift	count
## [104]	{sliced cheese}	=>	{soda}	0.005083884	0.2074689	0.024504321	1.1897705	50
## [105]	{sliced cheese}	=>	{yogurt}	0.008032537	0.3278008	0.024504321	2.3497968	79
## [106]	{sliced cheese}	=>	{rolls/buns}	0.007625826	0.3112033	0.024504321	1.6919208	75
## [107]	{sliced cheese}	=>	{other vegetables}	0.009049314	0.3692946	0.024504321	1.9085720	89
## [108]	{sliced cheese}	=>	{whole milk}	0.010777834	0.4398340	0.024504321	1.7213560	106
## [109]	{UHT-milk}	=>	{bottled water}	0.007320793	0.2188450	0.033451957	1.9800740	72
## [110]	{UHT-milk}	=>	{soda}	0.007625826	0.2279635	0.033451957	1.3073010	75
## [111]	{UHT-milk}	=>	{yogurt}	0.007422471	0.2218845	0.033451957	1.5905496	73
## [112]	{UHT-milk}	=>	{rolls/buns}	0.006405694	0.1914894	0.033451957	1.0410712	63
## [113]	{UHT-milk}	=>	{other vegetables}	0.008134215	0.2431611	0.033451957	1.2566944	80
## [114]	{oil}	=>	{root vegetables}	0.007015760	0.2500000	0.028063040	2.2936101	69
## [115]	{oil}	=>	{yogurt}	0.005287239	0.1884058	0.028063040	1.3505620	52
## [116]	{oil}	=>	{rolls/buns}	0.005083884	0.1811594	0.028063040	0.9849104	50
## [117]	{oil}	=>	{other vegetables}	0.009964413	0.3550725	0.028063040	1.8350697	98
## [118]	{oil}	=>	{whole milk}	0.011286223	0.4021739	0.028063040	1.5739675	111
## [119]	{onions}	=>	{whipped/sour cream}	0.005083884	0.1639344	0.031011693	2.2869434	50
## [120]	{onions}	=>	{citrus fruit}	0.005592272	0.1803279	0.031011693	2.1787771	55
## [121]	{onions}	=>	{bottled water}	0.005897306	0.1901639	0.031011693	1.7205725	58
## [122]	{onions}	=>	{tropical fruit}	0.005693950	0.1836066	0.031011693	1.7497776	56
## [123]	{onions}	=>	{root vegetables}	0.009456024	0.3049180	0.031011693	2.7974523	93
## [124]	{onions}	=>	{soda}	0.005287239	0.1704918	0.031011693	0.9777183	52
## [125]	{onions}	=>	{yogurt}	0.007219115	0.2327869	0.031011693	1.6687019	71
## [126]	{onions}	=>	{rolls/buns}	0.006812405	0.2196721	0.031011693	1.1942927	67
## [127]	{onions}	=>	{other vegetables}	0.014234875	0.4590164	0.031011693	2.3722681	140
## [128]	{onions}	=>	{whole milk}	0.012099644	0.3901639	0.031011693	1.5269647	119
## [129]	{berries}	=>	{whipped/sour cream}	0.009049314	0.2721713	0.033248602	3.7968855	89

```
## [130]   {whipped/sour cream}  => {berries}              0.009049314  0.12624
11 0.071682766 3.7968855    89
## [131]   {berries}             => {citrus fruit}         0.005388917  0.16207
95 0.033248602 1.9582948    53
## [132]   {berries}             => {tropical fruit}       0.006710727  0.20183
49 0.033248602 1.9234941    66
## [133]   {berries}             => {root vegetables}      0.006609049  0.19877
68 0.033248602 1.8236655    65
## [134]   {berries}             => {soda}                 0.007320793  0.22018
35 0.033248602 1.2626849    72
## [135]   {berries}             => {yogurt}               0.010574479  0.31804
28 0.033248602 2.2798477   104
## [136]   {berries}             => {rolls/buns}           0.006609049  0.19877
68 0.033248602 1.0806907    65
## [137]   {berries}             => {other vegetables}     0.010269446  0.30886
85 0.033248602 1.5962805   101
## [138]   {berries}             => {whole milk}           0.011794611  0.35474
01 0.033248602 1.3883281   116
## [139]   {hamburger meat}      => {sausage}              0.005185562  0.15596
33 0.033248602 1.6600639    51
## [140]   {hamburger meat}      => {root vegetables}      0.006202339  0.18654
43 0.033248602 1.7114399    61
## [141]   {hamburger meat}      => {soda}                 0.005795628  0.17431
19 0.033248602 0.9996255    57
## [142]   {hamburger meat}      => {yogurt}               0.006507372  0.19571
87 0.033248602 1.4029832    64
## [143]   {hamburger meat}      => {rolls/buns}           0.008642603  0.25993
88 0.033248602 1.4132109    85
## [144]   {hamburger meat}      => {other vegetables}     0.013828165  0.41590
21 0.033248602 2.1494470   136
## [145]   {hamburger meat}      => {whole milk}           0.014743264  0.44342
51 0.033248602 1.7354101   145
## [146]   {hygiene articles}    => {napkins}              0.006100661  0.18518
52 0.032943569 3.5364977    60
## [147]   {napkins}             => {hygiene articles}     0.006100661  0.11650
49 0.052364006 3.5364977    60
## [148]   {hygiene articles}    => {citrus fruit}         0.005287239  0.16049
38 0.032943569 1.9391361    52
## [149]   {hygiene articles}    => {shopping bags}        0.005185562  0.15740
74 0.032943569 1.5976283    51
## [150]   {hygiene articles}    => {bottled water}        0.005693950  0.17283
95 0.032943569 1.5638239    56
## [151]   {hygiene articles}    => {tropical fruit}       0.006710727  0.20370
37 0.032943569 1.9413042    66
## [152]   {hygiene articles}    => {root vegetables}      0.005388917  0.16358
02 0.032943569 1.5007572    53
## [153]   {hygiene articles}    => {soda}                 0.007015760  0.21296
30 0.032943569 1.2212774    69
## [154]   {hygiene articles}    => {yogurt}               0.007320793  0.22222
22 0.032943569 1.5929705    72
## [155]   {hygiene articles}    => {rolls/buns}           0.005897306  0.17901
23 0.032943569 0.9732374    58
```

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## [156]  {hygiene articles}    => {other vegetables}       0.009557702  0.29012
35 0.032943569 1.4994032    94
## [157]  {hygiene articles}    => {whole milk}             0.012811388  0.38888
89 0.032943569 1.5219746   126
## [158]  {salty snack}         => {fruit/vegetable juice}  0.005998983  0.15860
22 0.037824098 2.1938849    59
## [159]  {salty snack}         => {whipped/sour cream}     0.005185562  0.13709
68 0.037824098 1.9125486    51
## [160]  {salty snack}         => {pastry}                 0.005185562  0.13709
68 0.037824098 1.5409677    51
## [161]  {salty snack}         => {shopping bags}          0.005998983  0.15860
22 0.037824098 1.6097545    59
## [162]  {salty snack}         => {sausage}                0.005287239  0.13978
49 0.037824098 1.4878625    52
## [163]  {salty snack}         => {tropical fruit}         0.005592272  0.14784
95 0.037824098 1.4090111    55
## [164]  {salty snack}         => {soda}                   0.009354347  0.24731
18 0.037824098 1.4182576    92
## [165]  {salty snack}         => {yogurt}                 0.006202339  0.16397
85 0.037824098 1.1754581    61
## [166]  {salty snack}         => {other vegetables}       0.010777834  0.28494
62 0.037824098 1.4726465   106
## [167]  {salty snack}         => {whole milk}             0.011184545  0.29569
89 0.037824098 1.1572618   110
## [168]  {sugar}               => {margarine}              0.005490595  0.16216
22 0.033858668 2.7688626    54
## [169]  {sugar}               => {pastry}                 0.005185562  0.15315
32 0.033858668 1.7214414    51
## [170]  {sugar}               => {root vegetables}        0.006405694  0.18918
92 0.033858668 1.7357049    63
## [171]  {sugar}               => {soda}                   0.007320793  0.21621
62 0.033858668 1.2399338    72
## [172]  {sugar}               => {yogurt}                 0.006914082  0.20420
42 0.033858668 1.4638107    68
## [173]  {sugar}               => {rolls/buns}             0.007015760  0.20720
72 0.033858668 1.1265245    69
## [174]  {sugar}               => {other vegetables}       0.010777834  0.31831
83 0.033858668 1.6451186   106
## [175]  {sugar}               => {whole milk}             0.015048297  0.44444
44 0.033858668 1.7393996   148
## [176]  {waffles}             => {chocolate}              0.005795628  0.15079
37 0.038434164 3.0390483    57
## [177]  {chocolate}           => {waffles}                0.005795628  0.11680
33 0.049618709 3.0390483    57
## [178]  {waffles}             => {whipped/sour cream}     0.005083884  0.13227
51 0.038434164 1.8452850    50
## [179]  {waffles}             => {pastry}                 0.007015760  0.18253
97 0.038434164 2.0517460    69
## [180]  {waffles}             => {shopping bags}          0.005490595  0.14285
71 0.038434164 1.4499484    54
## [181]  {waffles}             => {tropical fruit}         0.006100661  0.15873
02 0.038434164 1.5127046    60
```

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## [182]  {waffles}                   => {root vegetables}          0.006609049  0.17195
77 0.038434164 1.5776154     65
## [183]  {waffles}                   => {soda}                     0.009557702  0.24867
72 0.038434164 1.4260879     94
## [184]  {waffles}                   => {yogurt}                   0.007524148  0.19576
72 0.038434164 1.4033312     74
## [185]  {waffles}                   => {rolls/buns}               0.009150991  0.23809
52 0.038434164 1.2944537     90
## [186]  {waffles}                   => {other vegetables}         0.010066090  0.26190
48 0.038434164 1.3535645     99
## [187]  {waffles}                   => {whole milk}               0.012709710  0.33068
78 0.038434164 1.2941961    125
## [188]  {long life bakery product}  => {chocolate}                0.005287239  0.14130
43 0.037417387 2.8478038     52
## [189]  {chocolate}                 => {long life bakery product} 0.005287239  0.10655
74 0.049618709 2.8478038     52
## [190]  {long life bakery product}  => {fruit/vegetable juice}    0.006202339  0.16576
09 0.037417387 2.2929088     61
## [191]  {long life bakery product}  => {whipped/sour cream}       0.005795628  0.15489
13 0.037417387 2.1607886     57
## [192]  {long life bakery product}  => {pastry}                   0.005897306  0.15760
87 0.037417387 1.7715217     58
## [193]  {long life bakery product}  => {shopping bags}            0.005388917  0.14402
17 0.037417387 1.4617686     53
## [194]  {long life bakery product}  => {sausage}                  0.005388917  0.14402
17 0.037417387 1.5329587     53
## [195]  {long life bakery product}  => {tropical fruit}           0.006304016  0.16847
83 0.037417387 1.6056044     62
## [196]  {long life bakery product}  => {root vegetables}          0.005287239  0.14130
43 0.037417387 1.2963883     52
## [197]  {long life bakery product}  => {soda}                     0.007625826  0.20380
43 0.037417387 1.1687555     75
## [198]  {long life bakery product}  => {yogurt}                   0.008744281  0.23369
57 0.037417387 1.6752163     86
## [199]  {long life bakery product}  => {rolls/buns}               0.007930859  0.21195
65 0.037417387 1.1523452     78
## [200]  {long life bakery product}  => {other vegetables}         0.010676157  0.28532
61 0.037417387 1.4746096    105
## [201]  {long life bakery product}  => {whole milk}               0.013523132  0.36141
30 0.037417387 1.4144438    133
## [202]  {dessert}                   => {curd}                     0.005185562  0.13972
60 0.037112354 2.6225295     51
## [203]  {dessert}                   => {fruit/vegetable juice}    0.005998983  0.16164
38 0.037112354 2.2359594     59
## [204]  {dessert}                   => {pastry}                   0.005388917  0.14520
55 0.037112354 1.6321096     53
## [205]  {dessert}                   => {shopping bags}            0.006202339  0.16712
33 0.037112354 1.6962410     61
## [206]  {dessert}                   => {sausage}                  0.005897306  0.15890
41 0.037112354 1.6913657     58
## [207]  {dessert}                   => {bottled water}            0.005185562  0.13972
60 0.037112354 1.2642185     51
```

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## [208]  {dessert}           => {tropical fruit}         0.006304016  0.16986
30 0.037112354 1.6188011    62
## [209]  {dessert}           => {root vegetables}        0.005795628  0.15616
44 0.037112354 1.4327208    57
## [210]  {dessert}           => {soda}                   0.009862735  0.26575
34 0.037112354 1.5240145    97
## [211]  {dessert}           => {yogurt}                 0.009862735  0.26575
34 0.037112354 1.9050182    97
## [212]  {dessert}           => {rolls/buns}             0.006812405  0.18356
16 0.037112354 0.9979706    67
## [213]  {dessert}           => {other vegetables}       0.011591256  0.31232
88 0.037112354 1.6141636   114
## [214]  {dessert}           => {whole milk}             0.013726487  0.36986
30 0.037112354 1.4475140   135
## [215]  {canned beer}       => {shopping bags}          0.011387900  0.14659
69 0.077681749 1.4879052   112
## [216]  {shopping bags}     => {canned beer}            0.011387900  0.11558
31 0.098525674 1.4879052   112
## [217]  {canned beer}       => {bottled water}          0.008032537  0.10340
31 0.077681749 0.9355749    79
## [218]  {canned beer}       => {soda}                   0.013828165  0.17801
05 0.077681749 1.0208356   136
## [219]  {canned beer}       => {rolls/buns}             0.011286223  0.14528
80 0.077681749 0.7898878   111
## [220]  {canned beer}       => {other vegetables}       0.009049314  0.11649
21 0.077681749 0.6020495    89
## [221]  {canned beer}       => {whole milk}             0.008845958  0.11387
43 0.077681749 0.4456642    87
## [222]  {cream cheese}      => {curd}                   0.005083884  0.12820
51 0.039654296 2.4062928    50
## [223]  {cream cheese}      => {domestic eggs}          0.005083884  0.12820
51 0.039654296 2.0206690    50
## [224]  {cream cheese}      => {fruit/vegetable juice}  0.005693950  0.14358
97 0.039654296 1.9862238    56
## [225]  {cream cheese}      => {whipped/sour cream}     0.006405694  0.16153
85 0.039654296 2.2535188    63
## [226]  {cream cheese}      => {pip fruit}              0.006100661  0.15384
62 0.039654296 2.0337055    60
## [227]  {cream cheese}      => {citrus fruit}           0.005693950  0.14358
97 0.039654296 1.7348957    56
## [228]  {cream cheese}      => {shopping bags}          0.005592272  0.14102
56 0.039654296 1.4313593    55
## [229]  {cream cheese}      => {sausage}                0.005592272  0.14102
56 0.039654296 1.5010684    55
## [230]  {cream cheese}      => {bottled water}          0.005897306  0.14871
79 0.039654296 1.3455759    58
## [231]  {cream cheese}      => {tropical fruit}         0.007219115  0.18205
13 0.039654296 1.7349558    71
## [232]  {cream cheese}      => {root vegetables}        0.007524148  0.18974
36 0.039654296 1.7407912    74
## [233]  {cream cheese}      => {soda}                   0.006812405  0.17179
49 0.039654296 0.9851910    67
```

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## [234]  {cream cheese}          => {yogurt}               0.012404677  0.31282
05 0.039654296 2.2424123    122
## [235]  {cream cheese}          => {rolls/buns}            0.009964413  0.25128
21 0.039654296 1.3661465     98
## [236]  {cream cheese}          => {other vegetables}      0.013726487  0.34615
38 0.039654296 1.7889769    135
## [237]  {cream cheese}          => {whole milk}            0.016471784  0.41538
46 0.039654296 1.6256696    162
## [238]  {chicken}               => {frozen vegetables}     0.006710727  0.15639
81 0.042907982 3.2519564     66
## [239]  {frozen vegetables}     => {chicken}               0.006710727  0.13953
49 0.048093543 3.2519564     66
## [240]  {chicken}               => {pork}                  0.005795628  0.13507
11 0.042907982 2.3428998     57
## [241]  {pork}                  => {chicken}               0.005795628  0.10052
91 0.057651246 2.3428998     57
## [242]  {chicken}               => {butter}                0.005795628  0.13507
11 0.042907982 2.4374755     57
## [243]  {butter}                => {chicken}               0.005795628  0.10458
72 0.055414337 2.4374755     57
## [244]  {chicken}               => {newspapers}            0.005185562  0.12085
31 0.042907982 1.5141274     51
## [245]  {chicken}               => {domestic eggs}         0.006202339  0.14454
98 0.042907982 2.2782803     61
## [246]  {chicken}               => {whipped/sour cream}    0.007219115  0.16824
64 0.042907982 2.3470976     71
## [247]  {whipped/sour cream}    => {chicken}               0.007219115  0.10070
92 0.071682766 2.3470976     71
## [248]  {chicken}               => {citrus fruit}          0.006914082  0.16113
74 0.042907982 1.9469124     68
## [249]  {chicken}               => {sausage}               0.005287239  0.12322
27 0.042907982 1.3115755     52
## [250]  {chicken}               => {bottled water}         0.005287239  0.12322
27 0.042907982 1.1148995     52
## [251]  {chicken}               => {tropical fruit}        0.006405694  0.14928
91 0.042907982 1.4227309     63
## [252]  {chicken}               => {root vegetables}       0.010879512  0.25355
45 0.042907982 2.3262206    107
## [253]  {chicken}               => {soda}                  0.008337570  0.19431
28 0.042907982 1.1143244     82
## [254]  {chicken}               => {yogurt}                0.008337570  0.19431
28 0.042907982 1.3929055     82
## [255]  {chicken}               => {rolls/buns}            0.009659380  0.22511
85 0.042907982 1.2239029     95
## [256]  {chicken}               => {other vegetables}      0.017895272  0.41706
16 0.042907982 2.1554393    176
## [257]  {chicken}               => {whole milk}            0.017590239  0.40995
26 0.042907982 1.6044106    173
## [258]  {white bread}           => {frankfurter}           0.005185562  0.12318
84 0.042094560 2.0888931     51
## [259]  {white bread}           => {domestic eggs}         0.005795628  0.13768
12 0.042094560 2.1700228     57
```

```
## [260]  {white bread}            => {fruit/vegetable juice}      0.007422471  0.17632
85 0.042094560 2.4390869    73
## [261]  {fruit/vegetable juice}  => {white bread}                0.007422471  0.10267
23 0.072292832 2.4390869    73
## [262]  {white bread}            => {whipped/sour cream}         0.005490595  0.13043
48 0.042094560 1.8196115    54
## [263]  {white bread}            => {pip fruit}                  0.006609049  0.15700
48 0.042094560 2.0754604    65
## [264]  {white bread}            => {pastry}                     0.005592272  0.13285
02 0.042094560 1.4932367    55
## [265]  {white bread}            => {shopping bags}              0.007422471  0.17632
85 0.042094560 1.7896706    73
## [266]  {white bread}            => {sausage}                    0.007219115  0.17149
76 0.042094560 1.8254099    71
## [267]  {white bread}            => {tropical fruit}             0.008744281  0.20772
95 0.042094560 1.9796699    86
## [268]  {white bread}            => {root vegetables}            0.007930859  0.18840
58 0.042094560 1.7285177    78
## [269]  {white bread}            => {soda}                       0.010269446  0.24396
14 0.042094560 1.3990437    101
## [270]  {white bread}            => {yogurt}                     0.009049314  0.21497
58 0.042094560 1.5410258    89
## [271]  {white bread}            => {rolls/buns}                 0.006507372  0.15458
94 0.042094560 0.8404569    64
## [272]  {white bread}            => {other vegetables}           0.013726487  0.32608
70 0.042094560 1.6852681    135
## [273]  {white bread}            => {whole milk}                 0.017081851  0.40579
71 0.042094560 1.5881474    168
## [274]  {chocolate}              => {butter}                     0.006202339  0.12500
00 0.049618709 2.2557339    61
## [275]  {butter}                 => {chocolate}                  0.006202339  0.11192
66 0.055414337 2.2557339    61
## [276]  {chocolate}              => {newspapers}                 0.005490595  0.11065
57 0.049618709 1.3863684    54
## [277]  {chocolate}              => {fruit/vegetable juice}      0.006812405  0.13729
51 0.049618709 1.8991521    67
## [278]  {chocolate}              => {pip fruit}                  0.006100661  0.12295
08 0.049618709 1.6252975    60
## [279]  {chocolate}              => {pastry}                     0.008032537  0.16188
52 0.049618709 1.8195902    79
## [280]  {chocolate}              => {citrus fruit}               0.006405694  0.12909
84 0.049618709 1.5598064    63
## [281]  {chocolate}              => {shopping bags}              0.008134215  0.16393
44 0.049618709 1.6638752    80
## [282]  {chocolate}              => {sausage}                    0.006609049  0.13319
67 0.049618709 1.4177378    65
## [283]  {chocolate}              => {bottled water}              0.005795628  0.11680
33 0.049618709 1.0568172    57
## [284]  {chocolate}              => {tropical fruit}             0.008134215  0.16393
44 0.049618709 1.5623014    80
## [285]  {chocolate}              => {root vegetables}            0.006405694  0.12909
84 0.049618709 1.1844052    63
```

## [286] {chocolate}	=> {soda}	0.013523132	0.27254	
10 0.049618709 1.5629391 133				
## [287] {chocolate}	=> {yogurt}	0.009252669	0.18647	
54 0.049618709 1.3367242 91				
## [288] {chocolate}	=> {rolls/buns}	0.011794611	0.23770	
49 0.049618709 1.2923316 116				
## [289] {chocolate}	=> {other vegetables}	0.012709710	0.25614	
75 0.049618709 1.3238103 125				
## [290] {chocolate}	=> {whole milk}	0.016675140	0.33606	
56 0.049618709 1.3152427 164				
## [291] {coffee}	=> {fruit/vegetable juice}	0.005998983	0.10332	
75 0.058057956 1.4292910 59				
## [292] {coffee}	=> {whipped/sour cream}	0.006100661	0.10507	
88 0.058057956 1.4658866 60				
## [293] {coffee}	=> {pip fruit}	0.006914082	0.11908	
93 0.058057956 1.5742519 68				
## [294] {coffee}	=> {pastry}	0.006914082	0.11908	
93 0.058057956 1.3385639 68				
## [295] {coffee}	=> {citrus fruit}	0.006405694	0.11033	
27 0.058057956 1.3330744 63				
## [296] {coffee}	=> {shopping bags}	0.009354347	0.16112	
08 0.058057956 1.6353183 92				
## [297] {coffee}	=> {sausage}	0.006914082	0.11908	
93 0.058057956 1.2675795 68				
## [298] {coffee}	=> {bottled water}	0.007320793	0.12609	
46 0.058057956 1.1408833 72				
## [299] {coffee}	=> {tropical fruit}	0.007117438	0.12259	
19 0.058057956 1.1683060 70				
## [300] {coffee}	=> {root vegetables}	0.007320793	0.12609	
46 0.058057956 1.1568471 72				
## [301] {coffee}	=> {soda}	0.009964413	0.17162	
87 0.058057956 0.9842382 98				
## [302] {coffee}	=> {yogurt}	0.009761057	0.16812	
61 0.058057956 1.2051896 96				
## [303] {coffee}	=> {rolls/buns}	0.010981190	0.18914	
19 0.058057956 1.0283085 108				
## [304] {coffee}	=> {other vegetables}	0.013421454	0.23117	
34 0.058057956 1.1947400 132				
## [305] {coffee}	=> {whole milk}	0.018708693	0.32224	
17 0.058057956 1.2611408 184				
## [306] {frozen vegetables}	=> {pork}	0.006405694	0.13319	
24 0.048093543 2.3103124 63				
## [307] {pork}	=> {frozen vegetables}	0.006405694	0.11111	
11 0.057651246 2.3103124 63				
## [308] {frozen vegetables}	=> {frankfurter}	0.005083884	0.10570	
82 0.048093543 1.7924838 50				
## [309] {frozen vegetables}	=> {margarine}	0.005083884	0.10570	
82 0.048093543 1.8049316 50				
## [310] {frozen vegetables}	=> {butter}	0.005795628	0.12050	
74 0.048093543 2.1746611 57				
## [311] {butter}	=> {frozen vegetables}	0.005795628	0.10458	
72 0.055414337 2.1746611 57				

```
## [312]  {frozen vegetables}     => {domestic eggs}         0.005185562  0.10782
24 0.048093543 1.6994125    51
## [313]  {frozen vegetables}     => {fruit/vegetable juice}  0.007829181  0.16279
07 0.048093543 2.2518235    77
## [314]  {fruit/vegetable juice} => {frozen vegetables}      0.007829181  0.10829
82 0.072292832 2.2518235    77
## [315]  {frozen vegetables}     => {whipped/sour cream}     0.007930859  0.16490
49 0.048093543 2.3004813    78
## [316]  {whipped/sour cream}    => {frozen vegetables}      0.007930859  0.11063
83 0.071682766 2.3004813    78
## [317]  {frozen vegetables}     => {pip fruit}              0.007320793  0.15221
99 0.048093543 2.0122076    72
## [318]  {frozen vegetables}     => {citrus fruit}           0.006609049  0.13742
07 0.048093543 1.6603597    65
## [319]  {frozen vegetables}     => {sausage}                0.005998983  0.12473
57 0.048093543 1.3276795    59
## [320]  {frozen vegetables}     => {bottled water}          0.006202339  0.12896
41 0.048093543 1.1668459    61
## [321]  {frozen vegetables}     => {tropical fruit}         0.008744281  0.18181
82 0.048093543 1.7327343    86
## [322]  {frozen vegetables}     => {root vegetables}        0.011591256  0.24101
48 0.048093543 2.2111759   114
## [323]  {root vegetables}       => {frozen vegetables}      0.011591256  0.10634
33 0.108998475 2.2111759   114
## [324]  {frozen vegetables}     => {soda}                   0.008642603  0.17970
40 0.048093543 1.0305475    85
## [325]  {frozen vegetables}     => {yogurt}                 0.012404677  0.25792
81 0.048093543 1.8489235   122
## [326]  {frozen vegetables}     => {rolls/buns}             0.010167768  0.21141
65 0.048093543 1.1494092   100
## [327]  {frozen vegetables}     => {other vegetables}       0.017793594  0.36997
89 0.048093543 1.9121083   175
## [328]  {frozen vegetables}     => {whole milk}             0.020437214  0.42494
71 0.048093543 1.6630940   201
## [329]  {beef}                  => {pork}                   0.007625826  0.14534
88 0.052465684 2.5211743    75
## [330]  {pork}                  => {beef}                   0.007625826  0.13227
51 0.057651246 2.5211743    75
## [331]  {beef}                  => {margarine}              0.006202339  0.11821
71 0.052465684 2.0185152    61
## [332]  {margarine}             => {beef}                   0.006202339  0.10590
28 0.058566345 2.0185152    61
## [333]  {beef}                  => {butter}                 0.005795628  0.11046
51 0.052465684 1.9934393    57
## [334]  {butter}                => {beef}                   0.005795628  0.10458
72 0.055414337 1.9934393    57
## [335]  {beef}                  => {newspapers}             0.006405694  0.12209
30 0.052465684 1.5296623    63
## [336]  {beef}                  => {domestic eggs}          0.005998983  0.11434
11 0.052465684 1.8021548    59
## [337]  {beef}                  => {whipped/sour cream}     0.006710727  0.12790
70 0.052465684 1.7843477    66
```

```
## [338]  {beef}             => {pastry}               0.006304016  0.12015
50 0.052465684 1.3505426    62
## [339]  {beef}             => {citrus fruit}         0.008439248  0.16085
27 0.052465684 1.9434723    83
## [340]  {citrus fruit}     => {beef}                 0.008439248  0.10196
56 0.082765633 1.9434723    83
## [341]  {beef}             => {sausage}              0.005592272  0.10658
91 0.052465684 1.1345284    55
## [342]  {beef}             => {bottled water}        0.006202339  0.11821
71 0.052465684 1.0696088    61
## [343]  {beef}             => {tropical fruit}       0.007625826  0.14534
88 0.052465684 1.3851801    75
## [344]  {beef}             => {root vegetables}      0.017386884  0.33139
53 0.052465684 3.0403668   171
## [345]  {root vegetables}  => {beef}                 0.017386884  0.15951
49 0.108998475 3.0403668   171
## [346]  {beef}             => {soda}                 0.008134215  0.15503
88 0.052465684 0.8890998    80
## [347]  {beef}             => {yogurt}               0.011692933  0.22286
82 0.052465684 1.5976012   115
## [348]  {beef}             => {rolls/buns}           0.013624809  0.25968
99 0.052465684 1.4118576   134
## [349]  {beef}             => {other vegetables}     0.019725470  0.37596
90 0.052465684 1.9430662   194
## [350]  {other vegetables} => {beef}                 0.019725470  0.10194
43 0.193492628 1.9430662   194
## [351]  {beef}             => {whole milk}           0.021250635  0.40503
88 0.052465684 1.5851795   209
## [352]  {curd}             => {margarine}            0.006304016  0.11832
06 0.053279105 2.0202833    62
## [353]  {margarine}        => {curd}                 0.006304016  0.10763
89 0.058566345 2.0202833    62
## [354]  {curd}             => {butter}               0.006812405  0.12786
26 0.053279105 2.3073920    67
## [355]  {butter}           => {curd}                 0.006812405  0.12293
58 0.055414337 2.3073920    67
## [356]  {curd}             => {newspapers}           0.005693950  0.10687
02 0.053279105 1.3389410    56
## [357]  {curd}             => {domestic eggs}        0.006507372  0.12213
74 0.053279105 1.9250343    64
## [358]  {domestic eggs}    => {curd}                 0.006507372  0.10256
41 0.063446873 1.9250343    64
## [359]  {curd}             => {whipped/sour cream}   0.010472801  0.19656
49 0.053279105 2.7421499   103
## [360]  {whipped/sour cream} => {curd}               0.010472801  0.14609
93 0.071682766 2.7421499   103
## [361]  {curd}             => {pip fruit}            0.007829181  0.14694
66 0.053279105 1.9424993    77
## [362]  {pip fruit}        => {curd}                 0.007829181  0.10349
46 0.075648195 1.9424993    77
## [363]  {curd}             => {pastry}               0.007524148  0.14122
14 0.053279105 1.5873282    74
```

```
## [364]  {curd}                => {citrus fruit}           0.007117438  0.13358
78 0.053279105 1.6140490    70
## [365]  {curd}                => {shopping bags}          0.005388917  0.10114
50 0.053279105 1.0265856    53
## [366]  {curd}                => {sausage}                0.007625826  0.14312
98 0.053279105 1.5234646    75
## [367]  {curd}                => {bottled water}          0.006100661  0.11450
38 0.053279105 1.0360120    60
## [368]  {curd}                => {tropical fruit}         0.010269446  0.19274
81 0.053279105 1.8368968   101
## [369]  {curd}                => {root vegetables}        0.010879512  0.20419
85 0.053279105 1.8734067   107
## [370]  {curd}                => {soda}                   0.008134215  0.15267
18 0.053279105 0.8755258    80
## [371]  {curd}                => {yogurt}                 0.017285206  0.32442
75 0.053279105 2.3256154   170
## [372]  {yogurt}              => {curd}                   0.017285206  0.12390
67 0.139501779 2.3256154   170
## [373]  {curd}                => {rolls/buns}             0.010066090  0.18893
13 0.053279105 1.0271638    99
## [374]  {curd}                => {other vegetables}       0.017183528  0.32251
91 0.053279105 1.6668288   169
## [375]  {curd}                => {whole milk}             0.026131164  0.49045
80 0.053279105 1.9194805   257
## [376]  {whole milk}          => {curd}                   0.026131164  0.10226
82 0.255516014 1.9194805   257
## [377]  {napkins}             => {newspapers}             0.006202339  0.11844
66 0.052364006 1.4839775    61
## [378]  {napkins}             => {domestic eggs}          0.005998983  0.11456
31 0.052364006 1.8056541    59
## [379]  {napkins}             => {fruit/vegetable juice}  0.006914082  0.13203
88 0.052364006 1.8264444    68
## [380]  {napkins}             => {whipped/sour cream}     0.007219115  0.13786
41 0.052364006 1.9232528    71
## [381]  {whipped/sour cream}  => {napkins}                0.007219115  0.10070
92 0.071682766 1.9232528    71
## [382]  {napkins}             => {pip fruit}              0.006710727  0.12815
53 0.052364006 1.6940965    66
## [383]  {napkins}             => {pastry}                 0.007015760  0.13398
06 0.052364006 1.5059417    69
## [384]  {napkins}             => {citrus fruit}           0.007625826  0.14563
11 0.052364006 1.7595596    75
## [385]  {napkins}             => {shopping bags}          0.007219115  0.13786
41 0.052364006 1.3992706    71
## [386]  {napkins}             => {sausage}                0.006710727  0.12815
53 0.052364006 1.3640777    66
## [387]  {napkins}             => {bottled water}          0.008642603  0.16504
85 0.052364006 1.4933325    85
## [388]  {napkins}             => {tropical fruit}         0.010066090  0.19223
30 0.052364006 1.8319880    99
## [389]  {napkins}             => {root vegetables}        0.009964413  0.19029
13 0.052364006 1.7458158    98
```

```
## [390]  {napkins}                    => {soda}                   0.011997966  0.22912
62 0.052364006 1.3139687    118
## [391]  {napkins}                    => {yogurt}                 0.012302999  0.23495
15 0.052364006 1.6842183    121
## [392]  {napkins}                    => {rolls/buns}             0.011692933  0.22330
10 0.052364006 1.2140216    115
## [393]  {napkins}                    => {other vegetables}       0.014438231  0.27572
82 0.052364006 1.4250060    142
## [394]  {napkins}                    => {whole milk}             0.019725470  0.37669
90 0.052364006 1.4742678    194
## [395]  {pork}                       => {frankfurter}            0.005897306  0.10229
28 0.057651246 1.7345679     58
## [396]  {frankfurter}                => {pork}                   0.005897306  0.10000
00 0.058973055 1.7345679     58
## [397]  {pork}                       => {margarine}              0.006405694  0.11111
11 0.057651246 1.8971836     63
## [398]  {margarine}                  => {pork}                   0.006405694  0.10937
50 0.058566345 1.8971836     63
## [399]  {pork}                       => {newspapers}             0.006609049  0.11463
84 0.057651246 1.4362664     65
## [400]  {pork}                       => {whipped/sour cream}     0.008235892  0.14285
71 0.057651246 1.9929078     81
## [401]  {whipped/sour cream}         => {pork}                   0.008235892  0.11489
36 0.071682766 1.9929078     81
## [402]  {pork}                       => {pip fruit}              0.006100661  0.10582
01 0.057651246 1.3988451     60
## [403]  {pork}                       => {pastry}                 0.006304016  0.10934
74 0.057651246 1.2290653     62
## [404]  {pork}                       => {citrus fruit}           0.006507372  0.11287
48 0.057651246 1.3637880     64
## [405]  {pork}                       => {shopping bags}          0.006405694  0.11111
11 0.057651246 1.1277376     63
## [406]  {pork}                       => {sausage}                0.006507372  0.11287
48 0.057651246 1.2014323     64
## [407]  {pork}                       => {bottled water}          0.007422471  0.12874
78 0.057651246 1.1648892     73
## [408]  {pork}                       => {tropical fruit}         0.008540925  0.14814
81 0.057651246 1.4118576     84
## [409]  {pork}                       => {root vegetables}        0.013624809  0.23633
16 0.057651246 2.1682099    134
## [410]  {root vegetables}            => {pork}                   0.013624809  0.12500
00 0.108998475 2.1682099    134
## [411]  {pork}                       => {soda}                   0.011896289  0.20634
92 0.057651246 1.1833495    117
## [412]  {pork}                       => {yogurt}                 0.009557702  0.16578
48 0.057651246 1.1884066     94
## [413]  {pork}                       => {rolls/buns}             0.011286223  0.19576
72 0.057651246 1.0643286    111
## [414]  {pork}                       => {other vegetables}       0.021657346  0.37566
14 0.057651246 1.9414764    213
## [415]  {other vegetables}           => {pork}                   0.021657346  0.11192
85 0.193492628 1.9414764    213
```

```
## [416]  {pork}            => {whole milk}         0.022165735  0.38447
97 0.057651246 1.5047187    218
## [417]  {frankfurter}     => {brown bread}        0.007117438  0.12068
97 0.058973055 1.8604745     70
## [418]  {brown bread}     => {frankfurter}        0.007117438  0.10971
79 0.064870361 1.8604745     70
## [419]  {frankfurter}     => {margarine}          0.006405694  0.10862
07 0.058973055 1.8546606     63
## [420]  {margarine}       => {frankfurter}        0.006405694  0.10937
50 0.058566345 1.8546606     63
## [421]  {frankfurter}     => {domestic eggs}      0.007015760  0.11896
55 0.058973055 1.8750414     69
## [422]  {domestic eggs}   => {frankfurter}        0.007015760  0.11057
69 0.063446873 1.8750414     69
## [423]  {frankfurter}     => {whipped/sour cream} 0.006202339  0.10517
24 0.058973055 1.4671925     61
## [424]  {frankfurter}     => {pip fruit}          0.007219115  0.12241
38 0.058973055 1.6181985     71
## [425]  {frankfurter}     => {pastry}             0.008337570  0.14137
93 0.058973055 1.5891034     82
## [426]  {frankfurter}     => {citrus fruit}       0.006507372  0.11034
48 0.058973055 1.3332204     64
## [427]  {frankfurter}     => {shopping bags}      0.008235892  0.13965
52 0.058973055 1.4174496     81
## [428]  {frankfurter}     => {sausage}            0.010066090  0.17068
97 0.058973055 1.8168103     99
## [429]  {sausage}         => {frankfurter}        0.010066090  0.10714
29 0.093950178 1.8168103     99
## [430]  {frankfurter}     => {bottled water}      0.007320793  0.12413
79 0.058973055 1.1231799     72
## [431]  {frankfurter}     => {tropical fruit}     0.009456024  0.16034
48 0.058973055 1.5280924     93
## [432]  {frankfurter}     => {root vegetables}    0.010167768  0.17241
38 0.058973055 1.5818001    100
## [433]  {frankfurter}     => {soda}               0.011286223  0.19137
93 0.058973055 1.0975018    111
## [434]  {frankfurter}     => {yogurt}             0.011184545  0.18965
52 0.058973055 1.3595179    110
## [435]  {frankfurter}     => {rolls/buns}         0.019217082  0.32586
21 0.058973055 1.7716161    189
## [436]  {rolls/buns}      => {frankfurter}        0.019217082  0.10447
76 0.183934926 1.7716161    189
## [437]  {frankfurter}     => {other vegetables}   0.016471784  0.27931
03 0.058973055 1.4435193    162
## [438]  {frankfurter}     => {whole milk}         0.020538892  0.34827
59 0.058973055 1.3630295    202
## [439]  {margarine}       => {bottled beer}       0.006100661  0.10416
67 0.058566345 1.2935343     60
## [440]  {butter}          => {bottled beer}       0.005795628  0.10458
72 0.055414337 1.2987559     57
## [441]  {bottled beer}    => {bottled water}      0.015760041  0.19570
71 0.080528724 1.7707259    155
```

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##       lhs                        rhs                       support     confidence coverage    lift      count
## [442] {bottled water}         => {bottled beer}            0.015760041 0.1425943  0.110523640 1.7707259 155
## [443] {bottled beer}          => {tropical fruit}          0.008235892 0.1022727  0.080528724 0.9746631  81
## [444] {bottled beer}          => {root vegetables}         0.009659380 0.1199495  0.080528724 1.1004695  95
## [445] {bottled beer}          => {soda}                    0.016980173 0.2108586  0.080528724 1.2092094 167
## [446] {bottled beer}          => {yogurt}                  0.009252669 0.1148990  0.080528724 0.8236382  91
## [447] {bottled beer}          => {rolls/buns}              0.013624809 0.1691919  0.080528724 0.9198466 134
## [448] {bottled beer}          => {other vegetables}        0.016166751 0.2007576  0.080528724 1.0375464 159
## [449] {bottled beer}          => {whole milk}              0.020437214 0.2537879  0.080528724 0.9932367 201
## [450] {brown bread}           => {margarine}               0.006507372 0.1003135  0.064870361 1.7128178  64
## [451] {margarine}             => {brown bread}             0.006507372 0.1111111  0.058566345 1.7128178  64
## [452] {butter}                => {brown bread}             0.005795628 0.1045872  0.055414337 1.6122487  57
## [453] {brown bread}           => {newspapers}              0.007625826 0.1175549  0.064870361 1.4728051  75
## [454] {brown bread}           => {domestic eggs}           0.006812405 0.1050157  0.064870361 1.6551749  67
## [455] {domestic eggs}         => {brown bread}             0.006812405 0.1073718  0.063446873 1.6551749  67
## [456] {brown bread}           => {fruit/vegetable juice}   0.008337570 0.1285266  0.064870361 1.7778615  82
## [457] {fruit/vegetable juice} => {brown bread}             0.008337570 0.1153305  0.072292832 1.7778615  82
## [458] {brown bread}           => {pip fruit}               0.007625826 0.1175549  0.064870361 1.5539678  75
## [459] {pip fruit}             => {brown bread}             0.007625826 0.1008065  0.075648195 1.5539678  75
## [460] {brown bread}           => {pastry}                  0.009659380 0.1489028  0.064870361 1.6736677  95
## [461] {pastry}                => {brown bread}             0.009659380 0.1085714  0.088967972 1.6736677  95
## [462] {brown bread}           => {citrus fruit}            0.008337570 0.1285266  0.064870361 1.5528987  82
## [463] {citrus fruit}          => {brown bread}             0.008337570 0.1007371  0.082765633 1.5528987  82
## [464] {brown bread}           => {shopping bags}           0.009252669 0.1426332  0.064870361 1.4476758  91
## [465] {brown bread}           => {sausage}                 0.010676157 0.1645768  0.064870361 1.7517455 105
## [466] {sausage}               => {brown bread}             0.010676157 0.1136364  0.093950178 1.7517455 105
## [467] {brown bread}           => {bottled water}           0.008235892 0.1269592  0.064870361 1.1487067  81
```

```
## [468]  {brown bread}          => {tropical fruit}          0.010676157 0.16457
68 0.064870361 1.5684233   105
## [469]  {tropical fruit}        => {brown bread}             0.010676157 0.10174
42 0.104931368 1.5684233   105
## [470]  {brown bread}          => {root vegetables}          0.010167768 0.15673
98 0.064870361 1.4380000   100
## [471]  {brown bread}          => {soda}                     0.012608033 0.19435
74 0.064870361 1.1145800   124
## [472]  {brown bread}          => {yogurt}                   0.014539908 0.22413
79 0.064870361 1.6067030   143
## [473]  {yogurt}               => {brown bread}              0.014539908 0.10422
74 0.139501779 1.6067030   143
## [474]  {brown bread}          => {rolls/buns}               0.012608033 0.19435
74 0.064870361 1.0566637   124
## [475]  {brown bread}          => {other vegetables}         0.018708693 0.28840
13 0.064870361 1.4905025   184
## [476]  {brown bread}          => {whole milk}               0.025216065 0.38871
47 0.064870361 1.5212930   248
## [477]  {margarine}            => {butter}                   0.006710727 0.11458
33 0.058566345 2.0677561    66
## [478]  {butter}               => {margarine}                0.006710727 0.12110
09 0.055414337 2.0677561    66
## [479]  {margarine}            => {newspapers}               0.007117438 0.12152
78 0.058566345 1.5225805    70
## [480]  {margarine}            => {domestic eggs}            0.008337570 0.14236
11 0.058566345 2.2437845    82
## [481]  {domestic eggs}        => {margarine}                0.008337570 0.13141
03 0.063446873 2.2437845    82
## [482]  {margarine}            => {fruit/vegetable juice}    0.006202339 0.10590
28 0.058566345 1.4649140    61
## [483]  {margarine}            => {whipped/sour cream}       0.006812405 0.11631
94 0.058566345 1.6226975    67
## [484]  {margarine}            => {pip fruit}                0.008540925 0.14583
33 0.058566345 1.9277834    84
## [485]  {pip fruit}            => {margarine}                0.008540925 0.11290
32 0.075648195 1.9277834    84
## [486]  {margarine}            => {pastry}                   0.006812405 0.11631
94 0.058566345 1.3074306    67
## [487]  {margarine}            => {citrus fruit}             0.007930859 0.13541
67 0.058566345 1.6361461    78
## [488]  {margarine}            => {sausage}                  0.007117438 0.12152
78 0.058566345 1.2935343    70
## [489]  {margarine}            => {bottled water}            0.010269446 0.17534
72 0.058566345 1.5865133   101
## [490]  {margarine}            => {tropical fruit}           0.009354347 0.15972
22 0.058566345 1.5221590    92
## [491]  {margarine}            => {root vegetables}          0.011082867 0.18923
61 0.058566345 1.7361354   109
## [492]  {root vegetables}      => {margarine}                0.011082867 0.10167
91 0.108998475 1.7361354   109
## [493]  {margarine}            => {soda}                     0.010167768 0.17361
11 0.058566345 0.9956066   100
```

```
## [494]   {margarine}          => {yogurt}                 0.014234875 0.24305
56 0.058566345 1.7423115    140
## [495]   {yogurt}             => {margarine}              0.014234875 0.10204
08 0.139501779 1.7423115    140
## [496]   {margarine}          => {rolls/buns}             0.014743264 0.25173
61 0.058566345 1.3686151    145
## [497]   {margarine}          => {other vegetables}       0.019725470 0.33680
56 0.058566345 1.7406635    194
## [498]   {other vegetables}   => {margarine}              0.019725470 0.10194
43 0.193492628 1.7406635    194
## [499]   {margarine}          => {whole milk}             0.024199288 0.41319
44 0.058566345 1.6170980    238
## [500]   {butter}             => {newspapers}             0.005795628 0.10458
72 0.055414337 1.3103372     57
## [501]   {butter}             => {domestic eggs}          0.009659380 0.17431
19 0.055414337 2.7473683     95
## [502]   {domestic eggs}      => {butter}                 0.009659380 0.15224
36 0.063446873 2.7473683     95
## [503]   {butter}             => {fruit/vegetable juice}  0.008032537 0.14495
41 0.055414337 2.0050968     79
## [504]   {fruit/vegetable juice} => {butter}              0.008032537 0.11111
11 0.072292832 2.0050968     79
## [505]   {butter}             => {whipped/sour cream}     0.010167768 0.18348
62 0.055414337 2.5596981    100
## [506]   {whipped/sour cream} => {butter}                 0.010167768 0.14184
40 0.071682766 2.5596981    100
## [507]   {butter}             => {pip fruit}              0.007320793 0.13211
01 0.055414337 1.7463747     72
## [508]   {butter}             => {pastry}                 0.007625826 0.13761
47 0.055414337 1.5467890     75
## [509]   {butter}             => {citrus fruit}           0.009150991 0.16513
76 0.055414337 1.9952438     90
## [510]   {citrus fruit}       => {butter}                 0.009150991 0.11056
51 0.082765633 1.9952438     90
## [511]   {butter}             => {sausage}                0.008642603 0.15596
33 0.055414337 1.6600639     85
## [512]   {butter}             => {bottled water}          0.008947636 0.16146
79 0.055414337 1.4609353     88
## [513]   {butter}             => {tropical fruit}         0.009964413 0.17981
65 0.055414337 1.7136583     98
## [514]   {butter}             => {root vegetables}        0.012913066 0.23302
75 0.055414337 2.1378971    127
## [515]   {root vegetables}    => {butter}                 0.012913066 0.11847
01 0.108998475 2.1378971    127
## [516]   {butter}             => {soda}                   0.008845958 0.15963
30 0.055414337 0.9154465     87
## [517]   {butter}             => {yogurt}                 0.014641586 0.26422
02 0.055414337 1.8940273    144
## [518]   {yogurt}             => {butter}                 0.014641586 0.10495
63 0.139501779 1.8940273    144
## [519]   {butter}             => {rolls/buns}             0.013421454 0.24220
18 0.055414337 1.3167800    132
```

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## [520]  {butter}                => {other vegetables}        0.020030503 0.36146
79 0.055414337 1.8681223    197
## [521]  {other vegetables}      => {butter}                  0.020030503 0.10352
08 0.193492628 1.8681223    197
## [522]  {butter}                => {whole milk}               0.027554652 0.49724
77 0.055414337 1.9460530    271
## [523]  {whole milk}            => {butter}                  0.027554652 0.10783
92 0.255516014 1.9460530    271
## [524]  {domestic eggs}         => {newspapers}              0.006914082 0.10897
44 0.063446873 1.3653030     68
## [525]  {newspapers}            => {fruit/vegetable juice}   0.008235892 0.10318
47 0.079816980 1.4273160     81
## [526]  {fruit/vegetable juice} => {newspapers}              0.008235892 0.11392
41 0.072292832 1.4273160     81
## [527]  {whipped/sour cream}    => {newspapers}              0.007219115 0.10070
92 0.071682766 1.2617518     71
## [528]  {newspapers}            => {pastry}                  0.008439248 0.10573
25 0.079816980 1.1884331     83
## [529]  {newspapers}            => {citrus fruit}            0.008337570 0.10445
86 0.079816980 1.2621011     82
## [530]  {citrus fruit}          => {newspapers}              0.008337570 0.10073
71 0.082765633 1.2621011     82
## [531]  {newspapers}            => {sausage}                 0.008032537 0.10063
69 0.079816980 1.0711735     79
## [532]  {newspapers}            => {bottled water}           0.011286223 0.14140
13 0.079816980 1.2793758    111
## [533]  {bottled water}         => {newspapers}              0.011286223 0.10211
59 0.110523640 1.2793758    111
## [534]  {newspapers}            => {tropical fruit}          0.011794611 0.14777
07 0.079816980 1.4082605    116
## [535]  {tropical fruit}        => {newspapers}              0.011794611 0.11240
31 0.104931368 1.4082605    116
## [536]  {newspapers}            => {root vegetables}         0.011489578 0.14394
90 0.079816980 1.3206519    113
## [537]  {root vegetables}       => {newspapers}              0.011489578 0.10541
04 0.108998475 1.3206519    113
## [538]  {newspapers}            => {soda}                    0.014641586 0.18343
95 0.079816980 1.0519693    144
## [539]  {newspapers}            => {yogurt}                  0.015353330 0.19235
67 0.079816980 1.3788834    151
## [540]  {yogurt}                => {newspapers}              0.015353330 0.11005
83 0.139501779 1.3788834    151
## [541]  {newspapers}            => {rolls/buns}              0.019725470 0.24713
38 0.079816980 1.3435934    194
## [542]  {rolls/buns}            => {newspapers}              0.019725470 0.10724
16 0.183934926 1.3435934    194
## [543]  {newspapers}            => {other vegetables}        0.019318760 0.24203
82 0.079816980 1.2508912    190
## [544]  {newspapers}            => {whole milk}              0.027351296 0.34267
52 0.079816980 1.3411103    269
## [545]  {whole milk}            => {newspapers}              0.027351296 0.10704
34 0.255516014 1.3411103    269
```

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## [546]   {domestic eggs}        => {fruit/vegetable juice}    0.008032537  0.12660
26 0.063446873 1.7512464    79
## [547]   {fruit/vegetable juice}  => {domestic eggs}           0.008032537  0.11111
11 0.072292832 1.7512464    79
## [548]   {domestic eggs}        => {whipped/sour cream}       0.009964413  0.15705
13 0.063446873 2.1909211    98
## [549]   {whipped/sour cream}   => {domestic eggs}           0.009964413  0.13900
71 0.071682766 2.1909211    98
## [550]   {domestic eggs}        => {pip fruit}               0.008642603  0.13621
79 0.063446873 1.8006768    85
## [551]   {pip fruit}            => {domestic eggs}           0.008642603  0.11424
73 0.075648195 1.8006768    85
## [552]   {domestic eggs}        => {pastry}                  0.009049314  0.14262
82 0.063446873 1.6031410    89
## [553]   {pastry}               => {domestic eggs}           0.009049314  0.10171
43 0.088967972 1.6031410    89
## [554]   {domestic eggs}        => {citrus fruit}            0.010371124  0.16346
15 0.063446873 1.9749929   102
## [555]   {citrus fruit}         => {domestic eggs}           0.010371124  0.12530
71 0.082765633 1.9749929   102
## [556]   {domestic eggs}        => {shopping bags}           0.009049314  0.14262
82 0.063446873 1.4476248    89
## [557]   {domestic eggs}        => {sausage}                 0.009557702  0.15064
10 0.063446873 1.6034139    94
## [558]   {sausage}              => {domestic eggs}           0.009557702  0.10173
16 0.093950178 1.6034139    94
## [559]   {domestic eggs}        => {bottled water}           0.009150991  0.14423
08 0.063446873 1.3049766    90
## [560]   {domestic eggs}        => {tropical fruit}          0.011387900  0.17948
72 0.063446873 1.7105198   112
## [561]   {tropical fruit}       => {domestic eggs}           0.011387900  0.10852
71 0.104931368 1.7105198   112
## [562]   {domestic eggs}        => {root vegetables}         0.014336553  0.22596
15 0.063446873 2.0730706   141
## [563]   {root vegetables}      => {domestic eggs}           0.014336553  0.13152
99 0.108998475 2.0730706   141
## [564]   {domestic eggs}        => {soda}                    0.012404677  0.19551
28 0.063446873 1.1212062   122
## [565]   {domestic eggs}        => {yogurt}                  0.014336553  0.22596
15 0.063446873 1.6197753   141
## [566]   {yogurt}               => {domestic eggs}           0.014336553  0.10276
97 0.139501779 1.6197753   141
## [567]   {domestic eggs}        => {rolls/buns}              0.015658363  0.24679
49 0.063446873 1.3417510   154
## [568]   {domestic eggs}        => {other vegetables}        0.022267412  0.35096
15 0.063446873 1.8138238   219
## [569]   {other vegetables}     => {domestic eggs}           0.022267412  0.11508
15 0.193492628 1.8138238   219
## [570]   {domestic eggs}        => {whole milk}              0.029994916  0.47275
64 0.063446873 1.8502027   295
## [571]   {whole milk}           => {domestic eggs}           0.029994916  0.11738
96 0.255516014 1.8502027   295
```

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## [572]   {fruit/vegetable juice}    => {whipped/sour cream}     0.009049314   0.12517
58 0.072292832 1.7462469     89
## [573]   {whipped/sour cream}       => {fruit/vegetable juice}   0.009049314   0.12624
11 0.071682766 1.7462469     89
## [574]   {fruit/vegetable juice}    => {pip fruit}               0.009557702   0.13220
82 0.072292832 1.7476710     94
## [575]   {pip fruit}                => {fruit/vegetable juice}   0.009557702   0.12634
41 0.075648195 1.7476710     94
## [576]   {fruit/vegetable juice}    => {pastry}                  0.008540925   0.11814
35 0.072292832 1.3279325     84
## [577]   {fruit/vegetable juice}    => {citrus fruit}            0.010371124   0.14345
99 0.072292832 1.7333271    102
## [578]   {citrus fruit}             => {fruit/vegetable juice}   0.010371124   0.12530
71 0.082765633 1.7333271    102
## [579]   {fruit/vegetable juice}    => {shopping bags}           0.010676157   0.14767
93 0.072292832 1.4988918    105
## [580]   {shopping bags}            => {fruit/vegetable juice}   0.010676157   0.10835
91 0.098525674 1.4988918    105
## [581]   {fruit/vegetable juice}    => {sausage}                 0.010066090   0.13924
05 0.072292832 1.4820675     99
## [582]   {sausage}                  => {fruit/vegetable juice}   0.010066090   0.10714
29 0.093950178 1.4820675     99
## [583]   {fruit/vegetable juice}    => {bottled water}           0.014234875   0.19690
58 0.072292832 1.7815715    140
## [584]   {bottled water}            => {fruit/vegetable juice}   0.014234875   0.12879
48 0.110523640 1.7815715    140
## [585]   {fruit/vegetable juice}    => {tropical fruit}          0.013726487   0.18987
34 0.072292832 1.8095010    135
## [586]   {tropical fruit}           => {fruit/vegetable juice}   0.013726487   0.13081
40 0.104931368 1.8095010    135
## [587]   {fruit/vegetable juice}    => {root vegetables}         0.011997966   0.16596
34 0.072292832 1.5226216    118
## [588]   {root vegetables}          => {fruit/vegetable juice}   0.011997966   0.11007
46 0.108998475 1.5226216    118
## [589]   {fruit/vegetable juice}    => {soda}                    0.018403660   0.25457
10 0.072292832 1.4598869    181
## [590]   {soda}                     => {fruit/vegetable juice}   0.018403660   0.10553
94 0.174377224 1.4598869    181
## [591]   {fruit/vegetable juice}    => {yogurt}                  0.018708693   0.25879
04 0.072292832 1.8551049    184
## [592]   {yogurt}                   => {fruit/vegetable juice}   0.018708693   0.13411
08 0.139501779 1.8551049    184
## [593]   {fruit/vegetable juice}    => {rolls/buns}              0.014539908   0.20112
52 0.072292832 1.0934583    143
## [594]   {fruit/vegetable juice}    => {other vegetables}        0.021047280   0.29113
92 0.072292832 1.5046529    207
## [595]   {other vegetables}         => {fruit/vegetable juice}   0.021047280   0.10877
56 0.193492628 1.5046529    207
## [596]   {fruit/vegetable juice}    => {whole milk}              0.026639553   0.36849
51 0.072292832 1.4421604    262
## [597]   {whole milk}               => {fruit/vegetable juice}   0.026639553   0.10425
79 0.255516014 1.4421604    262
```

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## [598]   {whipped/sour cream}      => {pip fruit}                0.009252669  0.12907
80 0.071682766 1.7062934     91
## [599]   {pip fruit}               => {whipped/sour cream}       0.009252669  0.12231
18 0.075648195 1.7062934     91
## [600]   {whipped/sour cream}      => {pastry}                   0.007524148  0.10496
45 0.071682766 1.1798014     74
## [601]   {whipped/sour cream}      => {citrus fruit}             0.010879512  0.15177
30 0.071682766 1.8337690    107
## [602]   {citrus fruit}            => {whipped/sour cream}       0.010879512  0.13144
96 0.082765633 1.8337690    107
## [603]   {whipped/sour cream}      => {shopping bags}            0.007930859  0.11063
83 0.071682766 1.1229388     78
## [604]   {whipped/sour cream}      => {sausage}                  0.009049314  0.12624
11 0.071682766 1.3437030     89
## [605]   {whipped/sour cream}      => {bottled water}            0.008744281  0.12198
58 0.071682766 1.1037079     86
## [606]   {whipped/sour cream}      => {tropical fruit}           0.013828165  0.19290
78 0.071682766 1.8384188    136
## [607]   {tropical fruit}          => {whipped/sour cream}       0.013828165  0.13178
29 0.104931368 1.8384188    136
## [608]   {whipped/sour cream}      => {root vegetables}          0.017081851  0.23829
79 0.071682766 2.1862496    168
## [609]   {root vegetables}         => {whipped/sour cream}       0.017081851  0.15671
64 0.108998475 2.1862496    168
## [610]   {whipped/sour cream}      => {soda}                     0.011591256  0.16170
21 0.071682766 0.9273122    114
## [611]   {whipped/sour cream}      => {yogurt}                   0.020742247  0.28936
17 0.071682766 2.0742510    204
## [612]   {yogurt}                  => {whipped/sour cream}       0.020742247  0.14868
80 0.139501779 2.0742510    204
## [613]   {whipped/sour cream}      => {rolls/buns}               0.014641586  0.20425
53 0.071682766 1.1104760    144
## [614]   {whipped/sour cream}      => {other vegetables}         0.028876462  0.40283
69 0.071682766 2.0819237    284
## [615]   {other vegetables}        => {whipped/sour cream}       0.028876462  0.14923
80 0.193492628 2.0819237    284
## [616]   {whipped/sour cream}      => {whole milk}               0.032231825  0.44964
54 0.071682766 1.7597542    317
## [617]   {whole milk}              => {whipped/sour cream}       0.032231825  0.12614
41 0.255516014 1.7597542    317
## [618]   {pip fruit}               => {pastry}                   0.010676157  0.14112
90 0.075648195 1.5862903    105
## [619]   {pastry}                  => {pip fruit}                0.010676157  0.12000
00 0.088967972 1.5862903    105
## [620]   {pip fruit}               => {citrus fruit}             0.013828165  0.18279
57 0.075648195 2.2085942    136
## [621]   {citrus fruit}            => {pip fruit}                0.013828165  0.16707
62 0.082765633 2.2085942    136
## [622]   {pip fruit}               => {shopping bags}            0.009354347  0.12365
59 0.075648195 1.2550629     92
## [623]   {pip fruit}               => {sausage}                  0.010777834  0.14247
31 0.075648195 1.5164752    106
```

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## [624]  {sausage}          => {pip fruit}           0.010777834 0.11471
86 0.093950178 1.5164752   106
## [625]  {pip fruit}         => {bottled water}       0.010574479 0.13978
49 0.075648195 1.2647516   104
## [626]  {pip fruit}         => {tropical fruit}      0.020437214 0.27016
13 0.075648195 2.5746476   201
## [627]  {tropical fruit}    => {pip fruit}           0.020437214 0.19476
74 0.104931368 2.5746476   201
## [628]  {pip fruit}         => {root vegetables}     0.015556685 0.20564
52 0.075648195 1.8866793   153
## [629]  {root vegetables}   => {pip fruit}           0.015556685 0.14272
39 0.108998475 1.8866793   153
## [630]  {pip fruit}         => {soda}                0.013319776 0.17607
53 0.075648195 1.0097378   131
## [631]  {pip fruit}         => {yogurt}              0.017996950 0.23790
32 0.075648195 1.7053777   177
## [632]  {yogurt}            => {pip fruit}           0.017996950 0.12900
87 0.139501779 1.7053777   177
## [633]  {pip fruit}         => {rolls/buns}          0.013929842 0.18413
98 0.075648195 1.0011138   137
## [634]  {pip fruit}         => {other vegetables}    0.026131164 0.34543
01 0.075648195 1.7852365   257
## [635]  {other vegetables}  => {pip fruit}           0.026131164 0.13504
99 0.193492628 1.7852365   257
## [636]  {pip fruit}         => {whole milk}          0.030096594 0.39784
95 0.075648195 1.5570432   296
## [637]  {whole milk}        => {pip fruit}           0.030096594 0.11778
75 0.255516014 1.5570432   296
## [638]  {pastry}            => {citrus fruit}        0.009761057 0.10971
43 0.088967972 1.3256020    96
## [639]  {citrus fruit}      => {pastry}              0.009761057 0.11793
61 0.082765633 1.3256020    96
## [640]  {pastry}            => {shopping bags}       0.011896289 0.13371
43 0.088967972 1.3571517   117
## [641]  {shopping bags}     => {pastry}              0.011896289 0.12074
30 0.098525674 1.3571517   117
## [642]  {pastry}            => {sausage}             0.012506355 0.14057
14 0.088967972 1.4962338   123
## [643]  {sausage}           => {pastry}              0.012506355 0.13311
69 0.093950178 1.4962338   123
## [644]  {pastry}            => {bottled water}       0.008947636 0.10057
14 0.088967972 0.9099540    88
## [645]  {pastry}            => {tropical fruit}      0.013218099 0.14857
14 0.088967972 1.4158915   130
## [646]  {tropical fruit}    => {pastry}              0.013218099 0.12596
90 0.104931368 1.4158915   130
## [647]  {pastry}            => {root vegetables}     0.010981190 0.12342
86 0.088967972 1.1323881   108
## [648]  {root vegetables}   => {pastry}              0.010981190 0.10074
63 0.108998475 1.1323881   108
## [649]  {pastry}            => {soda}                0.021047280 0.23657
14 0.088967972 1.3566647   207
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```
## [650]  {soda}               => {pastry}            0.021047280 0.12069
97 0.174377224 1.3566647    207
## [651]  {pastry}             => {yogurt}            0.017691917 0.19885
71 0.088967972 1.4254810    174
## [652]  {yogurt}             => {pastry}            0.017691917 0.12682
22 0.139501779 1.4254810    174
## [653]  {pastry}             => {rolls/buns}         0.020945602 0.23542
86 0.088967972 1.2799558    206
## [654]  {rolls/buns}         => {pastry}            0.020945602 0.11387
51 0.183934926 1.2799558    206
## [655]  {pastry}             => {other vegetables}   0.022572445 0.25371
43 0.088967972 1.3112349    222
## [656]  {other vegetables}   => {pastry}            0.022572445 0.11665
79 0.193492628 1.3112349    222
## [657]  {pastry}             => {whole milk}         0.033248602 0.37371
43 0.088967972 1.4625865    327
## [658]  {whole milk}         => {pastry}            0.033248602 0.13012
34 0.255516014 1.4625865    327
## [659]  {citrus fruit}       => {shopping bags}      0.009761057 0.11793
61 0.082765633 1.1970090     96
## [660]  {citrus fruit}       => {sausage}           0.011286223 0.13636
36 0.082765633 1.4514463    111
## [661]  {sausage}            => {citrus fruit}       0.011286223 0.12012
99 0.093950178 1.4514463    111
## [662]  {citrus fruit}       => {bottled water}      0.013523132 0.16339
07 0.082765633 1.4783323    133
## [663]  {bottled water}      => {citrus fruit}       0.013523132 0.12235
51 0.110523640 1.4783323    133
## [664]  {citrus fruit}       => {tropical fruit}     0.019928826 0.24078
62 0.082765633 2.2947022    196
## [665]  {tropical fruit}     => {citrus fruit}       0.019928826 0.18992
25 0.104931368 2.2947022    196
## [666]  {citrus fruit}       => {root vegetables}    0.017691917 0.21375
92 0.082765633 1.9611211    174
## [667]  {root vegetables}    => {citrus fruit}       0.017691917 0.16231
34 0.108998475 1.9611211    174
## [668]  {citrus fruit}       => {soda}              0.012811388 0.15479
12 0.082765633 0.8876799    126
## [669]  {citrus fruit}       => {yogurt}            0.021657346 0.26167
08 0.082765633 1.8757521    213
## [670]  {yogurt}             => {citrus fruit}       0.021657346 0.15524
78 0.139501779 1.8757521    213
## [671]  {citrus fruit}       => {rolls/buns}         0.016776817 0.20270
27 0.082765633 1.1020349    165
## [672]  {citrus fruit}       => {other vegetables}   0.028876462 0.34889
43 0.082765633 1.8031403    284
## [673]  {other vegetables}   => {citrus fruit}       0.028876462 0.14923
80 0.193492628 1.8031403    284
## [674]  {citrus fruit}       => {whole milk}         0.030503305 0.36855
04 0.082765633 1.4423768    300
## [675]  {whole milk}         => {citrus fruit}       0.030503305 0.11937
92 0.255516014 1.4423768    300
```

```
## [676]  {shopping bags}          => {sausage}                0.015658363  0.15892
67 0.098525674 1.6916065    154
## [677]  {sausage}                 => {shopping bags}          0.015658363  0.16666
67 0.093950178 1.6916065    154
## [678]  {shopping bags}          => {bottled water}          0.010981190  0.11145
51 0.098525674 1.0084278    108
## [679]  {shopping bags}          => {tropical fruit}         0.013523132  0.13725
49 0.098525674 1.3080445    133
## [680]  {tropical fruit}         => {shopping bags}          0.013523132  0.12887
60 0.104931368 1.3080445    133
## [681]  {shopping bags}          => {root vegetables}        0.012811388  0.13003
10 0.098525674 1.1929613    126
## [682]  {root vegetables}        => {shopping bags}          0.012811388  0.11753
73 0.108998475 1.1929613    126
## [683]  {shopping bags}          => {soda}                   0.024605999  0.24974
20 0.098525674 1.4321939    242
## [684]  {soda}                    => {shopping bags}          0.024605999  0.14110
79 0.174377224 1.4321939    242
## [685]  {shopping bags}          => {yogurt}                 0.015251652  0.15479
88 0.098525674 1.1096544    150
## [686]  {yogurt}                  => {shopping bags}          0.015251652  0.10932
94 0.139501779 1.1096544    150
## [687]  {shopping bags}          => {rolls/buns}             0.019522115  0.19814
24 0.098525674 1.0772419    192
## [688]  {rolls/buns}             => {shopping bags}          0.019522115  0.10613
60 0.183934926 1.0772419    192
## [689]  {shopping bags}          => {other vegetables}       0.023182511  0.23529
41 0.098525674 1.2160366    228
## [690]  {other vegetables}       => {shopping bags}          0.023182511  0.11981
08 0.193492628 1.2160366    228
## [691]  {shopping bags}          => {whole milk}             0.024504321  0.24871
00 0.098525674 0.9733637    241
## [692]  {sausage}                 => {bottled water}          0.011997966  0.12770
56 0.093950178 1.1554598    118
## [693]  {bottled water}          => {sausage}                0.011997966  0.10855
57 0.110523640 1.1554598    118
## [694]  {sausage}                 => {tropical fruit}         0.013929842  0.14826
84 0.093950178 1.4130036    137
## [695]  {tropical fruit}         => {sausage}                0.013929842  0.13275
19 0.104931368 1.4130036    137
## [696]  {sausage}                 => {root vegetables}        0.014946619  0.15909
09 0.093950178 1.4595700    147
## [697]  {root vegetables}        => {sausage}                0.014946619  0.13712
69 0.108998475 1.4595700    147
## [698]  {sausage}                 => {soda}                   0.024300966  0.25865
80 0.093950178 1.4833245    239
## [699]  {soda}                    => {sausage}                0.024300966  0.13935
86 0.174377224 1.4833245    239
## [700]  {sausage}                 => {yogurt}                 0.019623793  0.20887
45 0.093950178 1.4972889    193
## [701]  {yogurt}                  => {sausage}                0.019623793  0.14067
06 0.139501779 1.4972889    193
```

```
## [702]  {sausage}            => {rolls/buns}         0.030604982 0.3257576 0.093950178 1.7710480 301
## [703]  {rolls/buns}         => {sausage}            0.030604982 0.1663903 0.183934926 1.7710480 301
## [704]  {sausage}            => {other vegetables}   0.026944586 0.2867965 0.093950178 1.4822091 265
## [705]  {other vegetables}   => {sausage}            0.026944586 0.1392538 0.193492628 1.4822091 265
## [706]  {sausage}            => {whole milk}         0.029893238 0.3181818 0.093950178 1.2452520 294
## [707]  {whole milk}         => {sausage}            0.029893238 0.1169916 0.255516014 1.2452520 294
## [708]  {bottled water}      => {tropical fruit}     0.018505338 0.1674333 0.110523640 1.5956459 182
## [709]  {tropical fruit}     => {bottled water}      0.018505338 0.1763566 0.104931368 1.5956459 182
## [710]  {bottled water}      => {root vegetables}    0.015658363 0.1416743 0.110523640 1.2997827 154
## [711]  {root vegetables}    => {bottled water}      0.015658363 0.1436567 0.108998475 1.2997827 154
## [712]  {bottled water}      => {soda}               0.028978139 0.2621895 0.110523640 1.5035766 285
## [713]  {soda}               => {bottled water}      0.028978139 0.1661808 0.174377224 1.5035766 285
## [714]  {bottled water}      => {yogurt}             0.022979156 0.2079117 0.110523640 1.4903873 226
## [715]  {yogurt}             => {bottled water}      0.022979156 0.1647230 0.139501779 1.4903873 226
## [716]  {bottled water}      => {rolls/buns}         0.024199288 0.2189512 0.110523640 1.1903734 238
## [717]  {rolls/buns}         => {bottled water}      0.024199288 0.1315644 0.183934926 1.1903734 238
## [718]  {bottled water}      => {other vegetables}   0.024809354 0.2244710 0.110523640 1.1601012 244
## [719]  {other vegetables}   => {bottled water}      0.024809354 0.1282186 0.193492628 1.1601012 244
## [720]  {bottled water}      => {whole milk}         0.034367056 0.3109476 0.110523640 1.2169396 338
## [721]  {whole milk}         => {bottled water}      0.034367056 0.1345006 0.255516014 1.2169396 338
## [722]  {tropical fruit}     => {root vegetables}    0.021047280 0.2005814 0.104931368 1.8402220 207
## [723]  {root vegetables}    => {tropical fruit}     0.021047280 0.1930970 0.108998475 1.8402220 207
## [724]  {tropical fruit}     => {soda}               0.020843925 0.1986434 0.104931368 1.1391592 205
## [725]  {soda}               => {tropical fruit}     0.020843925 0.1195335 0.174377224 1.1391592 205
## [726]  {tropical fruit}     => {yogurt}             0.029283172 0.2790698 0.104931368 2.0004746 288
## [727]  {yogurt}             => {tropical fruit}     0.029283172 0.2099125 0.139501779 2.0004746 288
```

```
## [728]  {tropical fruit}       => {rolls/buns}        0.024605999 0.23449
61 0.104931368 1.2748863    242
## [729]  {rolls/buns}           => {tropical fruit}     0.024605999 0.13377
56 0.183934926 1.2748863    242
## [730]  {tropical fruit}       => {other vegetables}   0.035892222 0.34205
43 0.104931368 1.7677896    353
## [731]  {other vegetables}     => {tropical fruit}     0.035892222 0.18549
66 0.193492628 1.7677896    353
## [732]  {tropical fruit}       => {whole milk}         0.042297916 0.40310
08 0.104931368 1.5775950    416
## [733]  {whole milk}           => {tropical fruit}     0.042297916 0.16553
92 0.255516014 1.5775950    416
## [734]  {root vegetables}      => {soda}               0.018607016 0.17070
90 0.108998475 0.9789636    183
## [735]  {soda}                 => {root vegetables}    0.018607016 0.10670
55 0.174377224 0.9789636    183
## [736]  {root vegetables}      => {yogurt}             0.025826131 0.23694
03 0.108998475 1.6984751    254
## [737]  {yogurt}               => {root vegetables}    0.025826131 0.18513
12 0.139501779 1.6984751    254
## [738]  {root vegetables}      => {rolls/buns}         0.024300966 0.22294
78 0.108998475 1.2121013    239
## [739]  {rolls/buns}           => {root vegetables}    0.024300966 0.13211
72 0.183934926 1.2121013    239
## [740]  {root vegetables}      => {other vegetables}   0.047381800 0.43470
15 0.108998475 2.2466049    466
## [741]  {other vegetables}     => {root vegetables}    0.047381800 0.24487
65 0.193492628 2.2466049    466
## [742]  {root vegetables}      => {whole milk}         0.048906965 0.44869
40 0.108998475 1.7560310    481
## [743]  {whole milk}           => {root vegetables}    0.048906965 0.19140
47 0.255516014 1.7560310    481
## [744]  {soda}                 => {yogurt}             0.027351296 0.15685
13 0.174377224 1.1243678    269
## [745]  {yogurt}               => {soda}               0.027351296 0.19606
41 0.139501779 1.1243678    269
## [746]  {soda}                 => {rolls/buns}         0.038332486 0.21982
51 0.174377224 1.1951242    377
## [747]  {rolls/buns}           => {soda}               0.038332486 0.20840
24 0.183934926 1.1951242    377
## [748]  {soda}                 => {other vegetables}   0.032740214 0.18775
51 0.174377224 0.9703476    322
## [749]  {other vegetables}     => {soda}               0.032740214 0.16920
65 0.193492628 0.9703476    322
## [750]  {soda}                 => {whole milk}         0.040061007 0.22973
76 0.174377224 0.8991124    394
## [751]  {whole milk}           => {soda}               0.040061007 0.15678
47 0.255516014 0.8991124    394
## [752]  {yogurt}               => {rolls/buns}         0.034367056 0.24635
57 0.139501779 1.3393633    338
## [753]  {rolls/buns}           => {yogurt}             0.034367056 0.18684
36 0.183934926 1.3393633    338
```

```
## [754]  {yogurt}                    => {other vegetables}        0.043416370 0.31122
45 0.139501779 1.6084566    427
## [755]  {other vegetables}          => {yogurt}                  0.043416370 0.22438
26 0.193492628 1.6084566    427
## [756]  {yogurt}                    => {whole milk}              0.056024403 0.40160
35 0.139501779 1.5717351    551
## [757]  {whole milk}                => {yogurt}                  0.056024403 0.21925
98 0.255516014 1.5717351    551
## [758]  {rolls/buns}                => {other vegetables}        0.042602949 0.23161
97 0.183934926 1.1970465    419
## [759]  {other vegetables}          => {rolls/buns}              0.042602949 0.22017
87 0.193492628 1.1970465    419
## [760]  {rolls/buns}                => {whole milk}              0.056634469 0.30790
49 0.183934926 1.2050318    557
## [761]  {whole milk}                => {rolls/buns}              0.056634469 0.22164
74 0.255516014 1.2050318    557
## [762]  {other vegetables}          => {whole milk}              0.074834774 0.38675
78 0.193492628 1.5136341    736
## [763]  {whole milk}                => {other vegetables}        0.074834774 0.29287
70 0.255516014 1.5136341    736
## [764]  {oil,
##         other vegetables}          => {whole milk}              0.005083884 0.51020
41 0.009964413 1.9967597     50
## [765]  {oil,
##         whole milk}                => {other vegetables}        0.005083884 0.45045
05 0.011286223 2.3279980     50
## [766]  {onions,
##         root vegetables}           => {other vegetables}        0.005693950 0.60215
05 0.009456024 3.1120076     56
## [767]  {onions,
##         other vegetables}          => {root vegetables}         0.005693950 0.40000
00 0.014234875 3.6697761     56
## [768]  {other vegetables,
##         root vegetables}           => {onions}                  0.005693950 0.12017
17 0.047381800 3.8750440     56
## [769]  {onions,
##         other vegetables}          => {whole milk}              0.006609049 0.46428
57 0.014234875 1.8170513     65
## [770]  {onions,
##         whole milk}                => {other vegetables}        0.006609049 0.54621
85 0.012099644 2.8229421     65
## [771]  {hamburger meat,
##         other vegetables}          => {whole milk}              0.006304016 0.45588
24 0.013828165 1.7841635     62
## [772]  {hamburger meat,
##         whole milk}                => {other vegetables}        0.006304016 0.42758
62 0.014743264 2.2098320     62
## [773]  {hygiene articles,
##         other vegetables}          => {whole milk}              0.005185562 0.54255
32 0.009557702 2.1233628     51
## [774]  {hygiene articles,
##         whole milk}                => {other vegetables}        0.005185562 0.40476
```

```
19 0.012811388 2.0918725       51
## [775]  {other vegetables,
##         sugar}                  => {whole milk}            0.006304016  0.58490
57 0.010777834 2.2891155       62
## [776]  {sugar,
##         whole milk}            => {other vegetables}       0.006304016  0.41891
89 0.015048297 2.1650381       62
## [777]  {long life bakery product,
##         other vegetables}      => {whole milk}             0.005693950  0.53333
33 0.010676157 2.0872795       56
## [778]  {long life bakery product,
##         whole milk}            => {other vegetables}       0.005693950  0.42105
26 0.013523132 2.1760655       56
## [779]  {cream cheese,
##         yogurt}                => {other vegetables}       0.005287239  0.42622
95 0.012404677 2.2028204       52
## [780]  {cream cheese,
##         other vegetables}      => {yogurt}                 0.005287239  0.38518
52 0.013726487 2.7611489       52
## [781]  {other vegetables,
##         yogurt}                => {cream cheese}           0.005287239  0.12177
99 0.043416370 3.0710383       52
## [782]  {cream cheese,
##         yogurt}                => {whole milk}             0.006609049  0.53278
69 0.012404677 2.0851409       65
## [783]  {cream cheese,
##         whole milk}            => {yogurt}                 0.006609049  0.40123
46 0.016471784 2.8761968       65
## [784]  {whole milk,
##         yogurt}                => {cream cheese}           0.006609049  0.11796
73 0.056024403 2.9748941       65
## [785]  {cream cheese,
##         other vegetables}      => {whole milk}             0.006710727  0.48888
89 0.013726487 1.9133395       66
## [786]  {cream cheese,
##         whole milk}            => {other vegetables}       0.006710727  0.40740
74 0.016471784 2.1055449       66
## [787]  {chicken,
##         root vegetables}       => {other vegetables}       0.005693950  0.52336
45 0.010879512 2.7048291       56
## [788]  {chicken,
##         other vegetables}      => {root vegetables}        0.005693950  0.31818
18 0.017895272 2.9191401       56
## [789]  {other vegetables,
##         root vegetables}       => {chicken}                0.005693950  0.12017
17 0.047381800 2.8006834       56
## [790]  {chicken,
##         root vegetables}       => {whole milk}             0.005998983  0.55140
19 0.010879512 2.1579934       59
## [791]  {chicken,
##         whole milk}            => {root vegetables}        0.005998983  0.34104
05 0.017590239 3.1288554       59
```

```
## [792]  {root vegetables,
##         whole milk}               => {chicken}              0.005998983  0.12266
11 0.048906965 2.8587018     59
## [793]  {chicken,
##         rolls/buns}               => {whole milk}           0.005287239  0.54736
84 0.009659380 2.1422079     52
## [794]  {chicken,
##         whole milk}               => {rolls/buns}           0.005287239  0.30057
80 0.017590239 1.6341542     52
## [795]  {chicken,
##         other vegetables}         => {whole milk}           0.008439248  0.47159
09 0.017895272 1.8456413     83
## [796]  {chicken,
##         whole milk}               => {other vegetables}     0.008439248  0.47976
88 0.017590239 2.4795197     83
## [797]  {other vegetables,
##         whole milk}               => {chicken}              0.008439248  0.11277
17 0.074834774 2.6282229     83
## [798]  {other vegetables,
##         white bread}              => {whole milk}           0.005897306  0.42962
96 0.013726487 1.6814196     58
## [799]  {white bread,
##         whole milk}               => {other vegetables}     0.005897306  0.34523
81 0.017081851 1.7842442     58
## [800]  {chocolate,
##         soda}                     => {whole milk}           0.005083884  0.37593
98 0.013523132 1.4712966     50
## [801]  {chocolate,
##         whole milk}               => {soda}                 0.005083884  0.30487
80 0.016675140 1.7483823     50
## [802]  {soda,
##         whole milk}               => {chocolate}            0.005083884  0.12690
36 0.040061007 2.5575747     50
## [803]  {chocolate,
##         other vegetables}         => {whole milk}           0.005490595  0.43200
00 0.012709710 1.6906964     54
## [804]  {chocolate,
##         whole milk}               => {other vegetables}     0.005490595  0.32926
83 0.016675140 1.7017098     54
## [805]  {coffee,
##         yogurt}                   => {whole milk}           0.005083884  0.52083
33 0.009761057 2.0383589     50
## [806]  {coffee,
##         whole milk}               => {yogurt}               0.005083884  0.27173
91 0.018708693 1.9479259     50
## [807]  {coffee,
##         other vegetables}         => {whole milk}           0.006405694  0.47727
27 0.013421454 1.8678779     63
## [808]  {coffee,
##         whole milk}               => {other vegetables}     0.006405694  0.34239
13 0.018708693 1.7695315     63
## [809]  {frozen vegetables,
```

```
##          root vegetables}        => {other vegetables}        0.006100661 0.52631
58 0.011591256 2.7200819    60
## [810]  {frozen vegetables,
##          other vegetables}       => {root vegetables}         0.006100661 0.34285
71 0.017793594 3.1455224    60
## [811]  {other vegetables,
##          root vegetables}        => {frozen vegetables}       0.006100661 0.12875
54 0.047381800 2.6771861    60
## [812]  {frozen vegetables,
##          root vegetables}        => {whole milk}              0.006202339 0.53508
77 0.011591256 2.0941455    61
## [813]  {frozen vegetables,
##          whole milk}             => {root vegetables}         0.006202339 0.30348
26 0.020437214 2.7842829    61
## [814]  {root vegetables,
##          whole milk}             => {frozen vegetables}       0.006202339 0.12681
91 0.048906965 2.6369262    61
## [815]  {frozen vegetables,
##          yogurt}                 => {other vegetables}        0.005287239 0.42622
95 0.012404677 2.2028204    52
## [816]  {frozen vegetables,
##          other vegetables}       => {yogurt}                  0.005287239 0.29714
29 0.017793594 2.1300292    52
## [817]  {other vegetables,
##          yogurt}                 => {frozen vegetables}       0.005287239 0.12177
99 0.043416370 2.5321457    52
## [818]  {frozen vegetables,
##          yogurt}                 => {whole milk}              0.006100661 0.49180
33 0.012404677 1.9247454    60
## [819]  {frozen vegetables,
##          whole milk}             => {yogurt}                  0.006100661 0.29850
75 0.020437214 2.1398111    60
## [820]  {whole milk,
##          yogurt}                 => {frozen vegetables}       0.006100661 0.10889
29 0.056024403 2.2641900    60
## [821]  {frozen vegetables,
##          rolls/buns}             => {whole milk}              0.005083884 0.50000
00 0.010167768 1.9568245    50
## [822]  {frozen vegetables,
##          whole milk}             => {rolls/buns}              0.005083884 0.24875
62 0.020437214 1.3524143    50
## [823]  {frozen vegetables,
##          other vegetables}       => {whole milk}              0.009659380 0.54285
71 0.017793594 2.1245523    95
## [824]  {frozen vegetables,
##          whole milk}             => {other vegetables}        0.009659380 0.47263
68 0.020437214 2.4426606    95
## [825]  {other vegetables,
##          whole milk}             => {frozen vegetables}       0.009659380 0.12907
61 0.074834774 2.6838548    95
## [826]  {beef,
##          root vegetables}        => {other vegetables}        0.007930859 0.45614
```

```
04 0.017386884 2.3574043     78
## [827]  {beef,
##          other vegetables}            => {root vegetables}              0.007930859  0.40206
19 0.019725470 3.6886925     78
## [828]  {other vegetables,
##          root vegetables}             => {beef}                         0.007930859  0.16738
20 0.047381800 3.1903134     78
## [829]  {beef,
##          root vegetables}             => {whole milk}                   0.008032537  0.46198
83 0.017386884 1.8080601     79
## [830]  {beef,
##          whole milk}                  => {root vegetables}              0.008032537  0.37799
04 0.021250635 3.4678506     79
## [831]  {root vegetables,
##          whole milk}                  => {beef}                         0.008032537  0.16424
12 0.048906965 3.1304493     79
## [832]  {beef,
##          yogurt}                      => {other vegetables}             0.005185562  0.44347
83 0.011692933 2.2919646     51
## [833]  {beef,
##          other vegetables}            => {yogurt}                       0.005185562  0.26288
66 0.019725470 1.8844677     51
## [834]  {other vegetables,
##          yogurt}                      => {beef}                         0.005185562  0.11943
79 0.043416370 2.2764964     51
## [835]  {beef,
##          yogurt}                      => {whole milk}                   0.006100661  0.52173
91 0.011692933 2.0419038     60
## [836]  {beef,
##          whole milk}                  => {yogurt}                       0.006100661  0.28708
13 0.021250635 2.0579045     60
## [837]  {whole milk,
##          yogurt}                      => {beef}                         0.006100661  0.10889
29 0.056024403 2.0755075     60
## [838]  {beef,
##          rolls/buns}                  => {other vegetables}             0.005795628  0.42537
31 0.013624809 2.1983945     57
## [839]  {beef,
##          other vegetables}            => {rolls/buns}                   0.005795628  0.29381
44 0.019725470 1.5973825     57
## [840]  {other vegetables,
##          rolls/buns}                  => {beef}                         0.005795628  0.13603
82 0.042602949 2.5928984     57
## [841]  {beef,
##          rolls/buns}                  => {whole milk}                   0.006812405  0.50000
00 0.013624809 1.9568245     67
## [842]  {beef,
##          whole milk}                  => {rolls/buns}                   0.006812405  0.32057
42 0.021250635 1.7428673     67
## [843]  {rolls/buns,
##          whole milk}                  => {beef}                         0.006812405  0.12028
73 0.056634469 2.2926844     67
```

```
## [844]  {beef,
##         other vegetables}           => {whole milk}              0.009252669  0.46907
22 0.019725470 1.8357838     91
## [845]  {beef,
##         whole milk}                 => {other vegetables}        0.009252669  0.43540
67 0.021250635 2.2502495     91
## [846]  {other vegetables,
##         whole milk}                 => {beef}                    0.009252669  0.12364
13 0.074834774 2.3566128     91
## [847]  {curd,
##         whipped/sour cream}         => {whole milk}              0.005897306  0.56310
68 0.010472801 2.2038024     58
## [848]  {curd,
##         whole milk}                 => {whipped/sour cream}      0.005897306  0.22568
09 0.026131164 3.1483291     58
## [849]  {whipped/sour cream,
##         whole milk}                 => {curd}                    0.005897306  0.18296
53 0.032231825 3.4340911     58
## [850]  {curd,
##         tropical fruit}             => {yogurt}                  0.005287239  0.51485
15 0.010269446 3.6906446     52
## [851]  {curd,
##         yogurt}                     => {tropical fruit}          0.005287239  0.30588
24 0.017285206 2.9150707     52
## [852]  {tropical fruit,
##         yogurt}                     => {curd}                    0.005287239  0.18055
56 0.029283172 3.3888624     52
## [853]  {curd,
##         tropical fruit}             => {other vegetables}        0.005287239  0.51485
15 0.010269446 2.6608326     52
## [854]  {curd,
##         other vegetables}           => {tropical fruit}          0.005287239  0.30769
23 0.017183528 2.9323196     52
## [855]  {other vegetables,
##         tropical fruit}             => {curd}                    0.005287239  0.14730
88 0.035892222 2.7648509     52
## [856]  {curd,
##         tropical fruit}             => {whole milk}              0.006507372  0.63366
34 0.010269446 2.4799360     64
## [857]  {curd,
##         whole milk}                 => {tropical fruit}          0.006507372  0.24902
72 0.026131164 2.3732392     64
## [858]  {tropical fruit,
##         whole milk}                 => {curd}                    0.006507372  0.15384
62 0.042297916 2.8875514     64
## [859]  {curd,
##         root vegetables}            => {other vegetables}        0.005490595  0.50467
29 0.010879512 2.6082280     54
## [860]  {curd,
##         other vegetables}           => {root vegetables}         0.005490595  0.31952
66 0.017183528 2.9314780     54
## [861]  {other vegetables,
```

```
##          root vegetables}    => {curd}                   0.005490595  0.11587
98 0.047381800 2.1749582    54
## [862]  {curd,
##          root vegetables}    => {whole milk}             0.006202339  0.57009
35 0.010879512 2.2311457    61
## [863]  {curd,
##          whole milk}         => {root vegetables}        0.006202339  0.23735
41 0.026131164 2.1775909    61
## [864]  {root vegetables,
##          whole milk}         => {curd}                   0.006202339  0.12681
91 0.048906965 2.3802788    61
## [865]  {curd,
##          yogurt}             => {other vegetables}       0.006100661  0.35294
12 0.017285206 1.8240549    60
## [866]  {curd,
##          other vegetables}   => {yogurt}                 0.006100661  0.35502
96 0.017183528 2.5449825    60
## [867]  {other vegetables,
##          yogurt}             => {curd}                   0.006100661  0.14051
52 0.043416370 2.6373420    60
## [868]  {curd,
##          yogurt}             => {whole milk}             0.010066090  0.58235
29 0.017285206 2.2791250    99
## [869]  {curd,
##          whole milk}         => {yogurt}                 0.010066090  0.38521
40 0.026131164 2.7613555    99
## [870]  {whole milk,
##          yogurt}             => {curd}                   0.010066090  0.17967
33 0.056024403 3.3723037    99
## [871]  {curd,
##          rolls/buns}         => {whole milk}             0.005897306  0.58585
86 0.010066090 2.2928449    58
## [872]  {curd,
##          whole milk}         => {rolls/buns}             0.005897306  0.22568
09 0.026131164 1.2269607    58
## [873]  {rolls/buns,
##          whole milk}         => {curd}                   0.005897306  0.10412
93 0.056634469 1.9544109    58
## [874]  {curd,
##          other vegetables}   => {whole milk}             0.009862735  0.57396
45 0.017183528 2.2462956    97
## [875]  {curd,
##          whole milk}         => {other vegetables}       0.009862735  0.37743
19 0.026131164 1.9506268    97
## [876]  {other vegetables,
##          whole milk}         => {curd}                   0.009862735  0.13179
35 0.074834774 2.4736429    97
## [877]  {napkins,
##          yogurt}             => {whole milk}             0.006100661  0.49586
78 0.012302999 1.9406524    60
## [878]  {napkins,
##          whole milk}         => {yogurt}                 0.006100661  0.30927
```

```
84 0.019725470 2.2170208    60
## [879]  {whole milk,
##         yogurt}                    => {napkins}              0.006100661  0.10889
29 0.056024403 2.0795376    60
## [880]  {napkins,
##         rolls/buns}               => {whole milk}           0.005287239  0.45217
39 0.011692933 1.7696500    52
## [881]  {napkins,
##         whole milk}               => {rolls/buns}           0.005287239  0.26804
12 0.019725470 1.4572612    52
## [882]  {napkins,
##         other vegetables}         => {whole milk}           0.006812405  0.47183
10 0.014438231 1.8465809    67
## [883]  {napkins,
##         whole milk}               => {other vegetables}     0.006812405  0.34536
08 0.019725470 1.7848785    67
## [884]  {pork,
##         root vegetables}          => {other vegetables}     0.007015760  0.51492
54 0.013624809 2.6612144    69
## [885]  {other vegetables,
##         pork}                     => {root vegetables}      0.007015760  0.32394
37 0.021657346 2.9720018    69
## [886]  {other vegetables,
##         root vegetables}          => {pork}                 0.007015760  0.14806
87 0.047381800 2.5683516    69
## [887]  {pork,
##         root vegetables}          => {whole milk}           0.006812405  0.50000
00 0.013624809 1.9568245    67
## [888]  {pork,
##         whole milk}               => {root vegetables}      0.006812405  0.30733
94 0.022165735 2.8196674    67
## [889]  {root vegetables,
##         whole milk}               => {pork}                 0.006812405  0.13929
31 0.048906965 2.4161341    67
## [890]  {pork,
##         rolls/buns}               => {other vegetables}     0.005592272  0.49549
55 0.011286223 2.5607978    55
## [891]  {other vegetables,
##         pork}                     => {rolls/buns}           0.005592272  0.25821
60 0.021657346 1.4038441    55
## [892]  {other vegetables,
##         rolls/buns}               => {pork}                 0.005592272  0.13126
49 0.042602949 2.2768791    55
## [893]  {pork,
##         rolls/buns}               => {whole milk}           0.006202339  0.54954
95 0.011286223 2.1507441    61
## [894]  {pork,
##         whole milk}               => {rolls/buns}           0.006202339  0.27981
65 0.022165735 1.5212799    61
## [895]  {rolls/buns,
##         whole milk}               => {pork}                 0.006202339  0.10951
53 0.056634469 1.8996166    61
```

```
## [896]  {other vegetables,
##          pork}                    => {whole milk}            0.010167768  0.46948
36 0.021657346 1.8373939    100
## [897]  {pork,
##          whole milk}              => {other vegetables}      0.010167768  0.45871
56 0.022165735 2.3707136    100
## [898]  {other vegetables,
##          whole milk}              => {pork}                  0.010167768  0.13586
96 0.074834774 2.3567499    100
## [899]  {frankfurter,
##          tropical fruit}          => {whole milk}            0.005185562  0.54838
71 0.009456024 2.1461946    51
## [900]  {frankfurter,
##          whole milk}              => {tropical fruit}        0.005185562  0.25247
52 0.020538892 2.4060989    51
## [901]  {tropical fruit,
##          whole milk}              => {frankfurter}           0.005185562  0.12259
62 0.042297916 2.0788503    51
## [902]  {frankfurter,
##          root vegetables}         => {whole milk}            0.005083884  0.50000
00 0.010167768 1.9568245    50
## [903]  {frankfurter,
##          whole milk}              => {root vegetables}       0.005083884  0.24752
48 0.020538892 2.2709011    50
## [904]  {root vegetables,
##          whole milk}              => {frankfurter}           0.005083884  0.10395
01 0.048906965 1.7626712    50
## [905]  {frankfurter,
##          yogurt}                  => {whole milk}            0.006202339  0.55454
55 0.011184545 2.1702963    61
## [906]  {frankfurter,
##          whole milk}              => {yogurt}                0.006202339  0.30198
02 0.020538892 2.1647050    61
## [907]  {whole milk,
##          yogurt}                  => {frankfurter}           0.006202339  0.11070
78 0.056024403 1.8772608    61
## [908]  {frankfurter,
##          rolls/buns}              => {other vegetables}      0.005592272  0.29100
53 0.019217082 1.5039606    55
## [909]  {frankfurter,
##          other vegetables}        => {rolls/buns}            0.005592272  0.33950
62 0.016471784 1.8457950    55
## [910]  {other vegetables,
##          rolls/buns}              => {frankfurter}           0.005592272  0.13126
49 0.042602949 2.2258456    55
## [911]  {frankfurter,
##          rolls/buns}              => {whole milk}            0.005998983  0.31216
93 0.019217082 1.2217211    59
## [912]  {frankfurter,
##          whole milk}              => {rolls/buns}            0.005998983  0.29207
92 0.020538892 1.5879486    59
## [913]  {rolls/buns,
```

```
##           whole milk}              => {frankfurter}              0.005998983  0.10592
46 0.056634469 1.7961524    59
## [914]   {frankfurter,
##           other vegetables}        => {whole milk}               0.007625826  0.46296
30 0.016471784 1.8118745    75
## [915]   {frankfurter,
##           whole milk}              => {other vegetables}         0.007625826  0.37128
71 0.020538892 1.9188696    75
## [916]   {other vegetables,
##           whole milk}              => {frankfurter}              0.007625826  0.10190
22 0.074834774 1.7279446    75
## [917]   {bottled beer,
##           bottled water}           => {soda}                     0.005083884  0.32258
06 0.015760041 1.8499013    50
## [918]   {bottled beer,
##           soda}                    => {bottled water}            0.005083884  0.29940
12 0.016980173 2.7089336    50
## [919]   {bottled water,
##           soda}                    => {bottled beer}             0.005083884  0.17543
86 0.028978139 2.1785841    50
## [920]   {bottled beer,
##           bottled water}           => {whole milk}               0.006100661  0.38709
68 0.015760041 1.5149609    60
## [921]   {bottled beer,
##           whole milk}              => {bottled water}            0.006100661  0.29850
75 0.020437214 2.7008472    60
## [922]   {bottled water,
##           whole milk}              => {bottled beer}             0.006100661  0.17751
48 0.034367056 2.2043661    60
## [923]   {bottled beer,
##           yogurt}                  => {whole milk}               0.005185562  0.56043
96 0.009252669 2.1933637    51
## [924]   {bottled beer,
##           whole milk}              => {yogurt}                   0.005185562  0.25373
13 0.020437214 1.8188395    51
## [925]   {bottled beer,
##           rolls/buns}              => {whole milk}               0.005388917  0.39552
24 0.013624809 1.5479358    53
## [926]   {bottled beer,
##           whole milk}              => {rolls/buns}               0.005388917  0.26368
16 0.020437214 1.4335591    53
## [927]   {bottled beer,
##           other vegetables}        => {whole milk}               0.007625826  0.47169
81 0.016166751 1.8460609    75
## [928]   {bottled beer,
##           whole milk}              => {other vegetables}         0.007625826  0.37313
43 0.020437214 1.9284162    75
## [929]   {other vegetables,
##           whole milk}              => {bottled beer}             0.007625826  0.10190
22 0.074834774 1.2654140    75
## [930]   {brown bread,
##           tropical fruit}          => {whole milk}               0.005693950  0.53333
```

```
33 0.010676157 2.0872795    56
## [931]  {brown bread,
##          whole milk}              => {tropical fruit}          0.005693950  0.22580
65 0.025216065 2.1519442    56
## [932]  {tropical fruit,
##          whole milk}              => {brown bread}             0.005693950  0.13461
54 0.042297916 2.0751447    56
## [933]  {brown bread,
##          root vegetables}         => {whole milk}              0.005693950  0.56000
00 0.010167768 2.1916435    56
## [934]  {brown bread,
##          whole milk}              => {root vegetables}         0.005693950  0.22580
65 0.025216065 2.0716478    56
## [935]  {root vegetables,
##          whole milk}              => {brown bread}             0.005693950  0.11642
41 0.048906965 1.7947197    56
## [936]  {brown bread,
##          soda}                    => {whole milk}              0.005083884  0.40322
58 0.012608033 1.5780843    50
## [937]  {brown bread,
##          whole milk}              => {soda}                    0.005083884  0.20161
29 0.025216065 1.1561883    50
## [938]  {soda,
##          whole milk}              => {brown bread}             0.005083884  0.12690
36 0.040061007 1.9562640    50
## [939]  {brown bread,
##          yogurt}                  => {other vegetables}        0.005185562  0.35664
34 0.014539908 1.8431883    51
## [940]  {brown bread,
##          other vegetables}        => {yogurt}                  0.005185562  0.27717
39 0.018708693 1.9868844    51
## [941]  {other vegetables,
##          yogurt}                  => {brown bread}             0.005185562  0.11943
79 0.043416370 1.8411789    51
## [942]  {brown bread,
##          yogurt}                  => {whole milk}              0.007117438  0.48951
05 0.014539908 1.9157723    70
## [943]  {brown bread,
##          whole milk}              => {yogurt}                  0.007117438  0.28225
81 0.025216065 2.0233295    70
## [944]  {whole milk,
##          yogurt}                  => {brown bread}             0.007117438  0.12704
17 0.056024403 1.9583943    70
## [945]  {brown bread,
##          rolls/buns}              => {whole milk}              0.005287239  0.41935
48 0.012608033 1.6412077    52
## [946]  {brown bread,
##          whole milk}              => {rolls/buns}              0.005287239  0.20967
74 0.025216065 1.1399544    52
## [947]  {brown bread,
##          other vegetables}        => {whole milk}              0.009354347  0.50000
00 0.018708693 1.9568245    92
```

```
## [948]  {brown bread,
##         whole milk}              => {other vegetables}     0.009354347  0.37096
77 0.025216065 1.9172190    92
## [949]  {other vegetables,
##         whole milk}              => {brown bread}          0.009354347  0.12500
00 0.074834774 1.9269201    92
## [950]  {domestic eggs,
##         margarine}               => {whole milk}           0.005185562  0.62195
12 0.008337570 2.4340988    51
## [951]  {margarine,
##         whole milk}              => {domestic eggs}        0.005185562  0.21428
57 0.024199288 3.3774038    51
## [952]  {domestic eggs,
##         whole milk}              => {margarine}            0.005185562  0.17288
14 0.029994916 2.9518891    51
## [953]  {margarine,
##         root vegetables}         => {other vegetables}     0.005897306  0.53211
01 0.011082867 2.7500277    58
## [954]  {margarine,
##         other vegetables}        => {root vegetables}      0.005897306  0.29896
91 0.019725470 2.7428739    58
## [955]  {other vegetables,
##         root vegetables}         => {margarine}            0.005897306  0.12446
35 0.047381800 2.1251714    58
## [956]  {margarine,
##         yogurt}                  => {other vegetables}     0.005693950  0.40000
00 0.014234875 2.0672622    56
## [957]  {margarine,
##         other vegetables}        => {yogurt}               0.005693950  0.28865
98 0.019725470 2.0692194    56
## [958]  {other vegetables,
##         yogurt}                  => {margarine}            0.005693950  0.13114
75 0.043416370 2.2392987    56
## [959]  {margarine,
##         yogurt}                  => {whole milk}           0.007015760  0.49285
71 0.014234875 1.9288699    69
## [960]  {margarine,
##         whole milk}              => {yogurt}               0.007015760  0.28991
60 0.024199288 2.0782241    69
## [961]  {whole milk,
##         yogurt}                  => {margarine}            0.007015760  0.12522
69 0.056024403 2.1382052    69
## [962]  {margarine,
##         rolls/buns}              => {other vegetables}     0.005185562  0.35172
41 0.014743264 1.8177651    51
## [963]  {margarine,
##         other vegetables}        => {rolls/buns}           0.005185562  0.26288
66 0.019725470 1.4292370    51
## [964]  {other vegetables,
##         rolls/buns}              => {margarine}            0.005185562  0.12171
84 0.042602949 2.0782990    51
## [965]  {margarine,
```

```
##          rolls/buns}            => {whole milk}           0.007930859  0.53793
10 0.014743264 2.1052733    78
## [966]  {margarine,
##          whole milk}            => {rolls/buns}           0.007930859  0.32773
11 0.024199288 1.7817774    78
## [967]  {rolls/buns,
##          whole milk}            => {margarine}            0.007930859  0.14003
59 0.056634469 2.3910645    78
## [968]  {margarine,
##          other vegetables}      => {whole milk}           0.009252669  0.46907
22 0.019725470 1.8357838    91
## [969]  {margarine,
##          whole milk}            => {other vegetables}     0.009252669  0.38235
29 0.024199288 1.9760595    91
## [970]  {other vegetables,
##          whole milk}            => {margarine}            0.009252669  0.12364
13 0.074834774 2.1111323    91
## [971]  {butter,
##          domestic eggs}         => {whole milk}           0.005998983  0.62105
26 0.009659380 2.4305820    59
## [972]  {butter,
##          whole milk}            => {domestic eggs}        0.005998983  0.21771
22 0.027554652 3.4314091    59
## [973]  {domestic eggs,
##          whole milk}            => {butter}               0.005998983  0.20000
00 0.029994916 3.6091743    59
## [974]  {butter,
##          whipped/sour cream}    => {other vegetables}     0.005795628  0.57000
00 0.010167768 2.9458487    57
## [975]  {butter,
##          other vegetables}      => {whipped/sour cream}   0.005795628  0.28934
01 0.020030503 4.0363970    57
## [976]  {other vegetables,
##          whipped/sour cream}    => {butter}               0.005795628  0.20070
42 0.028876462 3.6218827    57
## [977]  {butter,
##          whipped/sour cream}    => {whole milk}           0.006710727  0.66000
00 0.010167768 2.5830084    66
## [978]  {butter,
##          whole milk}            => {whipped/sour cream}   0.006710727  0.24354
24 0.027554652 3.3975033    66
## [979]  {whipped/sour cream,
##          whole milk}            => {butter}               0.006710727  0.20820
19 0.032231825 3.7571846    66
## [980]  {butter,
##          citrus fruit}          => {whole milk}           0.005083884  0.55555
56 0.009150991 2.1742495    50
## [981]  {butter,
##          whole milk}            => {citrus fruit}         0.005083884  0.18450
18 0.027554652 2.2292084    50
## [982]  {citrus fruit,
##          whole milk}            => {butter}               0.005083884  0.16666
```

```
67 0.030503305 3.0076453    50
## [983]  {bottled water,
##         butter}               => {whole milk}          0.005388917  0.60227
27 0.008947636 2.3570841    53
## [984]  {butter,
##         whole milk}          => {bottled water}        0.005388917  0.19557
20 0.027554652 1.7695034    53
## [985]  {bottled water,
##         whole milk}          => {butter}               0.005388917  0.15680
47 0.034367056 2.8296781    53
## [986]  {butter,
##         tropical fruit}      => {other vegetables}     0.005490595  0.55102
04 0.009964413 2.8477592    54
## [987]  {butter,
##         other vegetables}    => {tropical fruit}       0.005490595  0.27411
17 0.020030503 2.6122949    54
## [988]  {other vegetables,
##         tropical fruit}      => {butter}               0.005490595  0.15297
45 0.035892222 2.7605583    54
## [989]  {butter,
##         tropical fruit}      => {whole milk}           0.006202339  0.62244
90 0.009964413 2.4360468    61
## [990]  {butter,
##         whole milk}          => {tropical fruit}       0.006202339  0.22509
23 0.027554652 2.1451379    61
## [991]  {tropical fruit,
##         whole milk}          => {butter}               0.006202339  0.14663
46 0.042297916 2.6461494    61
## [992]  {butter,
##         root vegetables}     => {other vegetables}     0.006609049  0.51181
10 0.012913066 2.6451190    65
## [993]  {butter,
##         other vegetables}    => {root vegetables}      0.006609049  0.32994
92 0.020030503 3.0270996    65
## [994]  {other vegetables,
##         root vegetables}     => {butter}               0.006609049  0.13948
50 0.047381800 2.5171280    65
## [995]  {butter,
##         root vegetables}     => {whole milk}           0.008235892  0.63779
53 0.012913066 2.4961069    81
## [996]  {butter,
##         whole milk}          => {root vegetables}      0.008235892  0.29889
30 0.027554652 2.7421759    81
## [997]  {root vegetables,
##         whole milk}          => {butter}               0.008235892  0.16839
92 0.048906965 3.0389098    81
## [998]  {butter,
##         yogurt}              => {other vegetables}     0.006405694  0.43750
00 0.014641586 2.2610681    63
## [999]  {butter,
##         other vegetables}    => {yogurt}               0.006405694  0.31979
70 0.020030503 2.2924220    63
```

```
## [1000] {other vegetables,
##          yogurt}                => {butter}              0.006405694  0.14754
10 0.043416370 2.6625056    63
## [1001] {butter,
##          yogurt}                => {whole milk}          0.009354347  0.63888
89 0.014641586 2.5003869    92
## [1002] {butter,
##          whole milk}            => {yogurt}              0.009354347  0.33948
34 0.027554652 2.4335417    92
## [1003] {whole milk,
##          yogurt}                => {butter}              0.009354347  0.16696
91 0.056024403 3.0131038    92
## [1004] {butter,
##          rolls/buns}            => {other vegetables}    0.005693950  0.42424
24 0.013421454 2.1925508    56
## [1005] {butter,
##          other vegetables}      => {rolls/buns}          0.005693950  0.28426
40 0.020030503 1.5454594    56
## [1006] {other vegetables,
##          rolls/buns}            => {butter}              0.005693950  0.13365
16 0.042602949 2.4118587    56
## [1007] {butter,
##          rolls/buns}            => {whole milk}          0.006609049  0.49242
42 0.013421454 1.9271757    65
## [1008] {butter,
##          whole milk}            => {rolls/buns}          0.006609049  0.23985
24 0.027554652 1.3040068    65
## [1009] {rolls/buns,
##          whole milk}            => {butter}              0.006609049  0.11669
66 0.056634469 2.1058917    65
## [1010] {butter,
##          other vegetables}      => {whole milk}          0.011489578  0.57360
41 0.020030503 2.2448850   113
## [1011] {butter,
##          whole milk}            => {other vegetables}    0.011489578  0.41697
42 0.027554652 2.1549874   113
## [1012] {other vegetables,
##          whole milk}            => {butter}              0.011489578  0.15353
26 0.074834774 2.7706297   113
## [1013] {newspapers,
##          tropical fruit}        => {whole milk}          0.005083884  0.43103
45 0.011794611 1.6869177    50
## [1014] {newspapers,
##          whole milk}            => {tropical fruit}      0.005083884  0.18587
36 0.027351296 1.7713827    50
## [1015] {tropical fruit,
##          whole milk}            => {newspapers}          0.005083884  0.12019
23 0.042297916 1.5058488    50
## [1016] {newspapers,
##          root vegetables}       => {other vegetables}    0.005998983  0.52212
39 0.011489578 2.6984175    59
## [1017] {newspapers,
```

```
##          other vegetables}      => {root vegetables}        0.005998983  0.31052
63 0.019318760 2.8489051     59
## [1018] {other vegetables,
##          root vegetables}      => {newspapers}              0.005998983  0.12660
94 0.047381800 1.5862470     59
## [1019] {newspapers,
##          root vegetables}      => {whole milk}              0.005795628  0.50442
48 0.011489578 1.9741415     57
## [1020] {newspapers,
##          whole milk}           => {root vegetables}         0.005795628  0.21189
59 0.027351296 1.9440264     57
## [1021] {root vegetables,
##          whole milk}           => {newspapers}              0.005795628  0.11850
31 0.048906965 1.4846856     57
## [1022] {newspapers,
##          yogurt}               => {rolls/buns}              0.005083884  0.33112
58 0.015353330 1.8002336     50
## [1023] {newspapers,
##          rolls/buns}           => {yogurt}                  0.005083884  0.25773
20 0.019725470 1.8475174     50
## [1024] {rolls/buns,
##          yogurt}               => {newspapers}              0.005083884  0.14792
90 0.034367056 1.8533524     50
## [1025] {newspapers,
##          yogurt}               => {other vegetables}        0.005592272  0.36423
84 0.015353330 1.8824408     55
## [1026] {newspapers,
##          other vegetables}     => {yogurt}                  0.005592272  0.28947
37 0.019318760 2.0750537     55
## [1027] {other vegetables,
##          yogurt}               => {newspapers}              0.005592272  0.12880
56 0.043416370 1.6137621     55
## [1028] {newspapers,
##          yogurt}               => {whole milk}              0.006609049  0.43046
36 0.015353330 1.6846834     65
## [1029] {newspapers,
##          whole milk}           => {yogurt}                  0.006609049  0.24163
57 0.027351296 1.7321334     65
## [1030] {whole milk,
##          yogurt}               => {newspapers}              0.006609049  0.11796
73 0.056024403 1.4779729     65
## [1031] {newspapers,
##          rolls/buns}           => {other vegetables}        0.005490595  0.27835
05 0.019725470 1.4385588     54
## [1032] {newspapers,
##          other vegetables}     => {rolls/buns}              0.005490595  0.28421
05 0.019318760 1.5451689     54
## [1033] {other vegetables,
##          rolls/buns}           => {newspapers}              0.005490595  0.12887
83 0.042602949 1.6146725     54
## [1034] {newspapers,
##          rolls/buns}           => {whole milk}              0.007625826  0.38659
```

```
79 0.019725470 1.5130086    75
## [1035] {newspapers,
##         whole milk}              => {rolls/buns}          0.007625826  0.27881
04 0.027351296 1.5158100    75
## [1036] {rolls/buns,
##         whole milk}              => {newspapers}          0.007625826  0.13464
99 0.056634469 1.6869833    75
## [1037] {newspapers,
##         other vegetables}        => {whole milk}          0.008337570  0.43157
89 0.019318760 1.6890485    82
## [1038] {newspapers,
##         whole milk}              => {other vegetables}    0.008337570  0.30483
27 0.027351296 1.5754229    82
## [1039] {other vegetables,
##         whole milk}              => {newspapers}          0.008337570  0.11141
30 0.074834774 1.3958564    82
## [1040] {domestic eggs,
##         whipped/sour cream}      => {other vegetables}    0.005083884  0.51020
41 0.009964413 2.6368141    50
## [1041] {domestic eggs,
##         other vegetables}        => {whipped/sour cream}  0.005083884  0.22831
05 0.022267412 3.1850125    50
## [1042] {other vegetables,
##         whipped/sour cream}      => {domestic eggs}       0.005083884  0.17605
63 0.028876462 2.7748623    50
## [1043] {domestic eggs,
##         whipped/sour cream}      => {whole milk}          0.005693950  0.57142
86 0.009964413 2.2363709    56
## [1044] {domestic eggs,
##         whole milk}              => {whipped/sour cream}  0.005693950  0.18983
05 0.029994916 2.6482029    56
## [1045] {whipped/sour cream,
##         whole milk}              => {domestic eggs}       0.005693950  0.17665
62 0.032231825 2.7843161    56
## [1046] {domestic eggs,
##         pip fruit}               => {whole milk}          0.005388917  0.62352
94 0.008642603 2.4402753    53
## [1047] {domestic eggs,
##         whole milk}              => {pip fruit}           0.005388917  0.17966
10 0.029994916 2.3749544    53
## [1048] {pip fruit,
##         whole milk}              => {domestic eggs}       0.005388917  0.17905
41 0.030096594 2.8221100    53
## [1049] {citrus fruit,
##         domestic eggs}           => {whole milk}          0.005693950  0.54901
96 0.010371124 2.1486701    56
## [1050] {domestic eggs,
##         whole milk}              => {citrus fruit}        0.005693950  0.18983
05 0.029994916 2.2935910    56
## [1051] {citrus fruit,
##         whole milk}              => {domestic eggs}       0.005693950  0.18666
67 0.030503305 2.9420940    56
```

```
## [1052] {domestic eggs,
##          tropical fruit}          => {whole milk}         0.006914082  0.60714
29 0.011387900 2.3761441      68
## [1053] {domestic eggs,
##          whole milk}              => {tropical fruit}      0.006914082  0.23050
85 0.029994916 2.1967547      68
## [1054] {tropical fruit,
##          whole milk}              => {domestic eggs}       0.006914082  0.16346
15 0.042297916 2.5763529      68
## [1055] {domestic eggs,
##          root vegetables}         => {other vegetables}    0.007320793  0.51063
83 0.014336553 2.6390582      72
## [1056] {domestic eggs,
##          other vegetables}        => {root vegetables}     0.007320793  0.32876
71 0.022267412 3.0162543      72
## [1057] {other vegetables,
##          root vegetables}         => {domestic eggs}       0.007320793  0.15450
64 0.047381800 2.4352096      72
## [1058] {domestic eggs,
##          root vegetables}         => {whole milk}          0.008540925  0.59574
47 0.014336553 2.3315356      84
## [1059] {domestic eggs,
##          whole milk}              => {root vegetables}     0.008540925  0.28474
58 0.029994916 2.6123830      84
## [1060] {root vegetables,
##          whole milk}              => {domestic eggs}       0.008540925  0.17463
62 0.048906965 2.7524788      84
## [1061] {domestic eggs,
##          soda}                    => {other vegetables}    0.005083884  0.40983
61 0.012404677 2.1180965      50
## [1062] {domestic eggs,
##          other vegetables}        => {soda}                0.005083884  0.22831
05 0.022267412 1.3092908      50
## [1063] {other vegetables,
##          soda}                    => {domestic eggs}       0.005083884  0.15527
95 0.032740214 2.4473941      50
## [1064] {domestic eggs,
##          soda}                    => {whole milk}          0.005185562  0.41803
28 0.012404677 1.6360336      51
## [1065] {domestic eggs,
##          whole milk}              => {soda}                0.005185562  0.17288
14 0.029994916 0.9914217      51
## [1066] {soda,
##          whole milk}              => {domestic eggs}       0.005185562  0.12944
16 0.040061007 2.0401577      51
## [1067] {domestic eggs,
##          yogurt}                  => {other vegetables}    0.005795628  0.40425
53 0.014336553 2.0892544      57
## [1068] {domestic eggs,
##          other vegetables}        => {yogurt}              0.005795628  0.26027
40 0.022267412 1.8657394      57
## [1069] {other vegetables,
```

```
##            yogurt}               => {domestic eggs}              0.005795628  0.13348
95 0.043416370 2.1039565    57
## [1070] {domestic eggs,
##            yogurt}               => {whole milk}                 0.007727504  0.53900
71 0.014336553 2.1094846    76
## [1071] {domestic eggs,
##         whole milk}              => {yogurt}                     0.007727504  0.25762
71 0.029994916 1.8467658    76
## [1072] {whole milk,
##            yogurt}               => {domestic eggs}              0.007727504  0.13793
10 0.056024403 2.1739611    76
## [1073] {domestic eggs,
##          rolls/buns}             => {other vegetables}           0.005897306  0.37662
34 0.015658363 1.9464482    58
## [1074] {domestic eggs,
##         other vegetables}        => {rolls/buns}                 0.005897306  0.26484
02 0.022267412 1.4398580    58
## [1075] {other vegetables,
##          rolls/buns}             => {domestic eggs}              0.005897306  0.13842
48 0.042602949 2.1817438    58
## [1076] {domestic eggs,
##          rolls/buns}             => {whole milk}                 0.006609049  0.42207
79 0.015658363 1.6518648    65
## [1077] {domestic eggs,
##         whole milk}              => {rolls/buns}                 0.006609049  0.22033
90 0.029994916 1.1979181    65
## [1078] {rolls/buns,
##         whole milk}              => {domestic eggs}              0.006609049  0.11669
66 0.056634469 1.8392804    65
## [1079] {domestic eggs,
##         other vegetables}        => {whole milk}                 0.012302999  0.55251
14 0.022267412 2.1623358    121
## [1080] {domestic eggs,
##         whole milk}              => {other vegetables}           0.012302999  0.41016
95 0.029994916 2.1198197    121
## [1081] {other vegetables,
##         whole milk}              => {domestic eggs}              0.012302999  0.16440
22 0.074834774 2.5911785    121
## [1082] {bottled water,
##          fruit/vegetable juice}  => {soda}                       0.005185562  0.36428
57 0.014234875 2.0890671    51
## [1083] {fruit/vegetable juice,
##          soda}                   => {bottled water}              0.005185562  0.28176
80 0.018403660 2.5493908    51
## [1084] {bottled water,
##          soda}                   => {fruit/vegetable juice}      0.005185562  0.17894
74 0.028978139 2.4753128    51
## [1085] {bottled water,
##          fruit/vegetable juice}  => {whole milk}                 0.005795628  0.40714
29 0.014234875 1.5934142    57
## [1086] {fruit/vegetable juice,
##         whole milk}              => {bottled water}              0.005795628  0.21755
```

```
73 0.026639553 1.9684228     57
## [1087] {bottled water,
##         whole milk}              => {fruit/vegetable juice}   0.005795628  0.16863
91 0.034367056 2.3327216     57
## [1088] {fruit/vegetable juice,
##         tropical fruit}          => {other vegetables}        0.006609049  0.48148
15 0.013726487 2.4883712     65
## [1089] {fruit/vegetable juice,
##         other vegetables}        => {tropical fruit}          0.006609049  0.31400
97 0.021047280 2.9925242     65
## [1090] {other vegetables,
##         tropical fruit}          => {fruit/vegetable juice}   0.006609049  0.18413
60 0.035892222 2.5470849     65
## [1091] {fruit/vegetable juice,
##         tropical fruit}          => {whole milk}              0.005998983  0.43703
70 0.013726487 1.7104096     59
## [1092] {fruit/vegetable juice,
##         whole milk}              => {tropical fruit}          0.005998983  0.22519
08 0.026639553 2.1460774     59
## [1093] {tropical fruit,
##         whole milk}              => {fruit/vegetable juice}   0.005998983  0.14182
69 0.042297916 1.9618394     59
## [1094] {fruit/vegetable juice,
##         root vegetables}         => {other vegetables}        0.006609049  0.55084
75 0.011997966 2.8468653     65
## [1095] {fruit/vegetable juice,
##         other vegetables}        => {root vegetables}         0.006609049  0.31400
97 0.021047280 2.8808629     65
## [1096] {other vegetables,
##         root vegetables}         => {fruit/vegetable juice}   0.006609049  0.13948
50 0.047381800 1.9294441     65
## [1097] {fruit/vegetable juice,
##         root vegetables}         => {whole milk}              0.006507372  0.54237
29 0.011997966 2.1226571     64
## [1098] {fruit/vegetable juice,
##         whole milk}              => {root vegetables}         0.006507372  0.24427
48 0.026639553 2.2410847     64
## [1099] {root vegetables,
##         whole milk}              => {fruit/vegetable juice}   0.006507372  0.13305
61 0.048906965 1.8405163     64
## [1100] {fruit/vegetable juice,
##         soda}                    => {yogurt}                  0.005083884  0.27624
31 0.018403660 1.9802120     50
## [1101] {fruit/vegetable juice,
##         yogurt}                  => {soda}                    0.005083884  0.27173
91 0.018708693 1.5583407     50
## [1102] {soda,
##         yogurt}                  => {fruit/vegetable juice}   0.005083884  0.18587
36 0.027351296 2.5711208     50
## [1103] {fruit/vegetable juice,
##         soda}                    => {whole milk}              0.006100661  0.33149
17 0.018403660 1.2973422     60
```

```
## [1104] {fruit/vegetable juice,
##        whole milk}                => {soda}                    0.006100661  0.22900
76 0.026639553 1.3132887    60
## [1105] {soda,
##        whole milk}                => {fruit/vegetable juice}   0.006100661  0.15228
43 0.040061007 2.1064919    60
## [1106] {fruit/vegetable juice,
##        yogurt}                    => {other vegetables}        0.008235892  0.44021
74 0.018708693 2.2751120    81
## [1107] {fruit/vegetable juice,
##        other vegetables}          => {yogurt}                  0.008235892  0.39130
43 0.021047280 2.8050133    81
## [1108] {other vegetables,
##        yogurt}                    => {fruit/vegetable juice}   0.008235892  0.18969
56 0.043416370 2.6239884    81
## [1109] {fruit/vegetable juice,
##        yogurt}                    => {whole milk}              0.009456024  0.50543
48 0.018708693 1.9780943    93
## [1110] {fruit/vegetable juice,
##        whole milk}                => {yogurt}                  0.009456024  0.35496
18 0.026639553 2.5444968    93
## [1111] {whole milk,
##        yogurt}                    => {fruit/vegetable juice}   0.009456024  0.16878
40 0.056024403 2.3347270    93
## [1112] {fruit/vegetable juice,
##        rolls/buns}                => {whole milk}              0.005592272  0.38461
54 0.014539908 1.5052496    55
## [1113] {fruit/vegetable juice,
##        whole milk}                => {rolls/buns}              0.005592272  0.20992
37 0.026639553 1.1412931    55
## [1114] {fruit/vegetable juice,
##        other vegetables}          => {whole milk}              0.010472801  0.49758
45 0.021047280 1.9473713   103
## [1115] {fruit/vegetable juice,
##        whole milk}                => {other vegetables}        0.010472801  0.39312
98 0.026639553 2.0317558   103
## [1116] {other vegetables,
##        whole milk}                => {fruit/vegetable juice}   0.010472801  0.13994
57 0.074834774 1.9358164   103
## [1117] {pip fruit,
##        whipped/sour cream}        => {other vegetables}        0.005592272  0.60439
56 0.009252669 3.1236105    55
## [1118] {other vegetables,
##        whipped/sour cream}        => {pip fruit}               0.005592272  0.19366
20 0.028876462 2.5600343    55
## [1119] {other vegetables,
##        pip fruit}                 => {whipped/sour cream}      0.005592272  0.21400
78 0.026131164 2.9854844    55
## [1120] {pip fruit,
##        whipped/sour cream}        => {whole milk}              0.005998983  0.64835
16 0.009252669 2.5374208    59
## [1121] {whipped/sour cream,
```

```
##            whole milk}        => {pip fruit}             0.005998983  0.18611
99 0.032231825 2.4603346    59
## [1122] {pip fruit,
##            whole milk}        => {whipped/sour cream}    0.005998983  0.19932
43 0.030096594 2.7806450    59
## [1123] {citrus fruit,
##            whipped/sour cream} => {other vegetables}     0.005693950  0.52336
45 0.010879512 2.7048291    56
## [1124] {other vegetables,
##            whipped/sour cream} => {citrus fruit}         0.005693950  0.19718
31 0.028876462 2.3824272    56
## [1125] {citrus fruit,
##            other vegetables}  => {whipped/sour cream}    0.005693950  0.19718
31 0.028876462 2.7507741    56
## [1126] {citrus fruit,
##            whipped/sour cream} => {whole milk}           0.006304016  0.57943
93 0.010879512 2.2677219    62
## [1127] {whipped/sour cream,
##            whole milk}        => {citrus fruit}          0.006304016  0.19558
36 0.032231825 2.3631016    62
## [1128] {citrus fruit,
##            whole milk}        => {whipped/sour cream}    0.006304016  0.20666
67 0.030503305 2.8830733    62
## [1129] {sausage,
##            whipped/sour cream} => {whole milk}           0.005083884  0.56179
78 0.009049314 2.1986792    50
## [1130] {whipped/sour cream,
##            whole milk}        => {sausage}               0.005083884  0.15772
87 0.032231825 1.6788548    50
## [1131] {sausage,
##            whole milk}        => {whipped/sour cream}    0.005083884  0.17006
80 0.029893238 2.3725093    50
## [1132] {tropical fruit,
##            whipped/sour cream} => {yogurt}               0.006202339  0.44852
94 0.013828165 3.2152236    61
## [1133] {whipped/sour cream,
##            yogurt}            => {tropical fruit}        0.006202339  0.29901
96 0.020742247 2.8496685    61
## [1134] {tropical fruit,
##            yogurt}            => {whipped/sour cream}    0.006202339  0.21180
56 0.029283172 2.9547626    61
## [1135] {tropical fruit,
##            whipped/sour cream} => {other vegetables}     0.007829181  0.56617
65 0.013828165 2.9260881    77
## [1136] {other vegetables,
##            whipped/sour cream} => {tropical fruit}       0.007829181  0.27112
68 0.028876462 2.5838485    77
## [1137] {other vegetables,
##            tropical fruit}    => {whipped/sour cream}    0.007829181  0.21813
03 0.035892222 3.0429952    77
## [1138] {tropical fruit,
##            whipped/sour cream} => {whole milk}           0.007930859  0.57352
```

```
94 0.013828165 2.2445928    78
## [1139] {whipped/sour cream,
##        whole milk}              => {tropical fruit}        0.007930859 0.24605
68 0.032231825 2.3449307    78
## [1140] {tropical fruit,
##        whole milk}              => {whipped/sour cream}    0.007930859 0.18750
00 0.042297916 2.6156915    78
## [1141] {root vegetables,
##        whipped/sour cream}      => {yogurt}                0.006405694 0.37500
00 0.017081851 2.6881378    63
## [1142] {whipped/sour cream,
##        yogurt}                  => {root vegetables}       0.006405694 0.30882
35 0.020742247 2.8332830    63
## [1143] {root vegetables,
##        yogurt}                  => {whipped/sour cream}    0.006405694 0.24803
15 0.025826131 3.4601273    63
## [1144] {root vegetables,
##        whipped/sour cream}      => {other vegetables}      0.008540925 0.50000
00 0.017081851 2.5840778    84
## [1145] {other vegetables,
##        whipped/sour cream}      => {root vegetables}       0.008540925 0.29577
46 0.028876462 2.7135668    84
## [1146] {other vegetables,
##        root vegetables}         => {whipped/sour cream}    0.008540925 0.18025
75 0.047381800 2.5146562    84
## [1147] {root vegetables,
##        whipped/sour cream}      => {whole milk}            0.009456024 0.55357
14 0.017081851 2.1664843    93
## [1148] {whipped/sour cream,
##        whole milk}              => {root vegetables}       0.009456024 0.29337
54 0.032231825 2.6915550    93
## [1149] {root vegetables,
##        whole milk}              => {whipped/sour cream}    0.009456024 0.19334
72 0.048906965 2.6972619    93
## [1150] {soda,
##        whipped/sour cream}      => {whole milk}            0.005490595 0.47368
42 0.011591256 1.8538337    54
## [1151] {whipped/sour cream,
##        whole milk}              => {soda}                  0.005490595 0.17034
70 0.032231825 0.9768879    54
## [1152] {soda,
##        whole milk}              => {whipped/sour cream}    0.005490595 0.13705
58 0.040061007 1.9119775    54
## [1153] {whipped/sour cream,
##        yogurt}                  => {other vegetables}      0.010167768 0.49019
61 0.020742247 2.5334096   100
## [1154] {other vegetables,
##        whipped/sour cream}      => {yogurt}                0.010167768 0.35211
27 0.028876462 2.5240730   100
## [1155] {other vegetables,
##        yogurt}                  => {whipped/sour cream}    0.010167768 0.23419
20 0.043416370 3.2670620   100
```

```
## [1156] {whipped/sour cream,
##          yogurt}                  => {whole milk}               0.010879512 0.52450
98 0.020742247 2.0527473    107
## [1157] {whipped/sour cream,
##          whole milk}              => {yogurt}                   0.010879512 0.33753
94 0.032231825 2.4196066    107
## [1158] {whole milk,
##          yogurt}                  => {whipped/sour cream}       0.010879512 0.19419
24 0.056024403 2.7090525    107
## [1159] {rolls/buns,
##          whipped/sour cream}      => {other vegetables}         0.006710727 0.45833
33 0.014641586 2.3687380     66
## [1160] {other vegetables,
##          whipped/sour cream}      => {rolls/buns}               0.006710727 0.23239
44 0.028876462 1.2634597     66
## [1161] {other vegetables,
##          rolls/buns}              => {whipped/sour cream}       0.006710727 0.15751
79 0.042602949 2.1974306     66
## [1162] {rolls/buns,
##          whipped/sour cream}      => {whole milk}               0.007829181 0.53472
22 0.014641586 2.0927151     77
## [1163] {whipped/sour cream,
##          whole milk}              => {rolls/buns}               0.007829181 0.24290
22 0.032231825 1.3205877     77
## [1164] {rolls/buns,
##          whole milk}              => {whipped/sour cream}       0.007829181 0.13824
06 0.056634469 1.9285050     77
## [1165] {other vegetables,
##          whipped/sour cream}      => {whole milk}               0.014641586 0.50704
23 0.028876462 1.9843854    144
## [1166] {whipped/sour cream,
##          whole milk}              => {other vegetables}         0.014641586 0.45425
87 0.032231825 2.3476795    144
## [1167] {other vegetables,
##          whole milk}              => {whipped/sour cream}       0.014641586 0.19565
22 0.074834774 2.7294172    144
## [1168] {pastry,
##          pip fruit}               => {whole milk}               0.005083884 0.47619
05 0.010676157 1.8636424     50
## [1169] {pip fruit,
##          whole milk}              => {pastry}                   0.005083884 0.16891
89 0.030096594 1.8986486     50
## [1170] {pastry,
##          whole milk}              => {pip fruit}                0.005083884 0.15290
52 0.033248602 2.0212670     50
## [1171] {citrus fruit,
##          pip fruit}               => {tropical fruit}           0.005592272 0.40441
18 0.013828165 3.8540598     55
## [1172] {pip fruit,
##          tropical fruit}          => {citrus fruit}             0.005592272 0.27363
18 0.020437214 3.3061046     55
## [1173] {citrus fruit,
```

```
##           tropical fruit}        => {pip fruit}              0.005592272  0.28061
22 0.019928826 3.7094374    55
## [1174] {citrus fruit,
##           pip fruit}             => {other vegetables}       0.005897306  0.42647
06 0.013828165 2.2040663    58
## [1175] {other vegetables,
##           pip fruit}             => {citrus fruit}           0.005897306  0.22568
09 0.026131164 2.7267469    58
## [1176] {citrus fruit,
##           other vegetables}      => {pip fruit}              0.005897306  0.20422
54 0.028876462 2.6996725    58
## [1177] {citrus fruit,
##           pip fruit}             => {whole milk}             0.005185562  0.37500
00 0.013828165 1.4676184    51
## [1178] {pip fruit,
##           whole milk}            => {citrus fruit}           0.005185562  0.17229
73 0.030096594 2.0817493    51
## [1179] {citrus fruit,
##           whole milk}            => {pip fruit}              0.005185562  0.17000
00 0.030503305 2.2472446    51
## [1180] {pip fruit,
##           sausage}               => {whole milk}             0.005592272  0.51886
79 0.010777834 2.0306669    55
## [1181] {pip fruit,
##           whole milk}            => {sausage}                0.005592272  0.18581
08 0.030096594 1.9777590    55
## [1182] {sausage,
##           whole milk}            => {pip fruit}              0.005592272  0.18707
48 0.029893238 2.4729583    55
## [1183] {pip fruit,
##           tropical fruit}        => {root vegetables}        0.005287239  0.25870
65 0.020437214 2.3734870    52
## [1184] {pip fruit,
##           root vegetables}       => {tropical fruit}         0.005287239  0.33986
93 0.015556685 3.2389674    52
## [1185] {root vegetables,
##           tropical fruit}        => {pip fruit}              0.005287239  0.25120
77 0.021047280 3.3207366    52
## [1186] {pip fruit,
##           tropical fruit}        => {yogurt}                 0.006405694  0.31343
28 0.020437214 2.2468017    63
## [1187] {pip fruit,
##           yogurt}                => {tropical fruit}         0.006405694  0.35593
22 0.017996950 3.3920477    63
## [1188] {tropical fruit,
##           yogurt}                => {pip fruit}              0.006405694  0.21875
00 0.029283172 2.8916751    63
## [1189] {pip fruit,
##           tropical fruit}        => {other vegetables}       0.009456024  0.46268
66 0.020437214 2.3912361    93
## [1190] {other vegetables,
##           pip fruit}             => {tropical fruit}         0.009456024  0.36186
```

```
77 0.026131164 3.4486132    93
## [1191] {other vegetables,
##         tropical fruit}          => {pip fruit}            0.009456024 0.26345
61 0.035892222 3.4826487    93
## [1192] {pip fruit,
##         tropical fruit}          => {whole milk}           0.008439248 0.41293
53 0.020437214 1.6160839    83
## [1193] {pip fruit,
##         whole milk}              => {tropical fruit}       0.008439248 0.28040
54 0.030096594 2.6722744    83
## [1194] {tropical fruit,
##         whole milk}              => {pip fruit}            0.008439248 0.19951
92 0.042297916 2.6374619    83
## [1195] {pip fruit,
##         root vegetables}         => {yogurt}               0.005287239 0.33986
93 0.015556685 2.4363079    52
## [1196] {pip fruit,
##         yogurt}                  => {root vegetables}      0.005287239 0.29378
53 0.017996950 2.6953158    52
## [1197] {root vegetables,
##         yogurt}                  => {pip fruit}            0.005287239 0.20472
44 0.025826131 2.7062696    52
## [1198] {pip fruit,
##         root vegetables}         => {other vegetables}     0.008134215 0.52287
58 0.015556685 2.7023036    80
## [1199] {other vegetables,
##         pip fruit}               => {root vegetables}      0.008134215 0.31128
40 0.026131164 2.8558569    80
## [1200] {other vegetables,
##         root vegetables}         => {pip fruit}            0.008134215 0.17167
38 0.047381800 2.2693710    80
## [1201] {pip fruit,
##         root vegetables}         => {whole milk}           0.008947636 0.57516
34 0.015556685 2.2509877    88
## [1202] {pip fruit,
##         whole milk}              => {root vegetables}      0.008947636 0.29729
73 0.030096594 2.7275363    88
## [1203] {root vegetables,
##         whole milk}              => {pip fruit}            0.008947636 0.18295
22 0.048906965 2.4184606    88
## [1204] {pip fruit,
##         yogurt}                  => {other vegetables}     0.008134215 0.45197
74 0.017996950 2.3358895    80
## [1205] {other vegetables,
##         pip fruit}               => {yogurt}               0.008134215 0.31128
40 0.026131164 2.2313984    80
## [1206] {other vegetables,
##         yogurt}                  => {pip fruit}            0.008134215 0.18735
36 0.043416370 2.4766438    80
## [1207] {pip fruit,
##         yogurt}                  => {whole milk}           0.009557702 0.53107
34 0.017996950 2.0784351    94
```

```
## [1208] {pip fruit,
##          whole milk}              => {yogurt}                  0.009557702  0.31756
76 0.030096594 2.2764410    94
## [1209] {whole milk,
##          yogurt}                  => {pip fruit}               0.009557702  0.17059
89 0.056024403 2.2551617    94
## [1210] {pip fruit,
##          rolls/buns}              => {other vegetables}        0.005083884  0.36496
35 0.013929842 1.8861882    50
## [1211] {other vegetables,
##          pip fruit}               => {rolls/buns}              0.005083884  0.19455
25 0.026131164 1.0577248    50
## [1212] {other vegetables,
##          rolls/buns}              => {pip fruit}               0.005083884  0.11933
17 0.042602949 1.5774566    50
## [1213] {pip fruit,
##          rolls/buns}              => {whole milk}              0.006202339  0.44525
55 0.013929842 1.7425737    61
## [1214] {pip fruit,
##          whole milk}              => {rolls/buns}              0.006202339  0.20608
11 0.030096594 1.1204021    61
## [1215] {rolls/buns,
##          whole milk}              => {pip fruit}               0.006202339  0.10951
53 0.056634469 1.4476916    61
## [1216] {other vegetables,
##          pip fruit}               => {whole milk}              0.013523132  0.51750
97 0.026131164 2.0253514   133
## [1217] {pip fruit,
##          whole milk}              => {other vegetables}        0.013523132  0.44932
43 0.030096594 2.3221780   133
## [1218] {other vegetables,
##          whole milk}              => {pip fruit}               0.013523132  0.18070
65 0.074834774 2.3887751   133
## [1219] {pastry,
##          sausage}                 => {whole milk}              0.005693950  0.45528
46 0.012506355 1.7818239    56
## [1220] {pastry,
##          whole milk}              => {sausage}                 0.005693950  0.17125
38 0.033248602 1.8228153    56
## [1221] {sausage,
##          whole milk}              => {pastry}                  0.005693950  0.19047
62 0.029893238 2.1409524    56
## [1222] {pastry,
##          tropical fruit}          => {other vegetables}        0.005083884  0.38461
54 0.013218099 1.9877521    50
## [1223] {other vegetables,
##          pastry}                  => {tropical fruit}          0.005083884  0.22522
52 0.022572445 2.1464051    50
## [1224] {other vegetables,
##          tropical fruit}          => {pastry}                  0.005083884  0.14164
31 0.035892222 1.5920680    50
## [1225] {pastry,
```

```
##            tropical fruit}        => {whole milk}            0.006710727  0.50769
23 0.013218099 1.9869295    66
## [1226] {pastry,
##            whole milk}            => {tropical fruit}         0.006710727  0.20183
49 0.033248602 1.9234941    66
## [1227] {tropical fruit,
##            whole milk}            => {pastry}                 0.006710727  0.15865
38 0.042297916 1.7832692    66
## [1228] {pastry,
##            root vegetables}       => {other vegetables}       0.005897306  0.53703
70 0.010981190 2.7754909    58
## [1229] {other vegetables,
##            pastry}                => {root vegetables}        0.005897306  0.26126
13 0.022572445 2.3969258    58
## [1230] {other vegetables,
##            root vegetables}       => {pastry}                 0.005897306  0.12446
35 0.047381800 1.3989700    58
## [1231] {pastry,
##            root vegetables}       => {whole milk}             0.005693950  0.51851
85 0.010981190 2.0292995    56
## [1232] {pastry,
##            whole milk}            => {root vegetables}        0.005693950  0.17125
38 0.033248602 1.5711580    56
## [1233] {root vegetables,
##            whole milk}            => {pastry}                 0.005693950  0.11642
41 0.048906965 1.3086071    56
## [1234] {pastry,
##            soda}                  => {rolls/buns}             0.005388917  0.25603
86 0.021047280 1.3920067    53
## [1235] {pastry,
##            rolls/buns}            => {soda}                   0.005388917  0.25728
16 0.020945602 1.4754309    53
## [1236] {rolls/buns,
##            soda}                  => {pastry}                 0.005388917  0.14058
36 0.038332486 1.5801592    53
## [1237] {pastry,
##            soda}                  => {other vegetables}       0.005490595  0.26086
96 0.021047280 1.3482145    54
## [1238] {other vegetables,
##            pastry}                => {soda}                   0.005490595  0.24324
32 0.022572445 1.3949255    54
## [1239] {other vegetables,
##            soda}                  => {pastry}                 0.005490595  0.16770
19 0.032740214 1.8849689    54
## [1240] {pastry,
##            soda}                  => {whole milk}             0.008235892  0.39130
43 0.021047280 1.5314279    81
## [1241] {pastry,
##            whole milk}            => {soda}                   0.008235892  0.24770
64 0.033248602 1.4205205    81
## [1242] {soda,
##            whole milk}            => {pastry}                 0.008235892  0.20558
```

```
38 0.040061007 2.3107614    81
## [1243] {pastry,
##         yogurt}                    => {rolls/buns}            0.005795628  0.32758
62 0.017691917 1.7809897    57
## [1244] {pastry,
##         rolls/buns}                => {yogurt}                0.005795628  0.27669
90 0.020945602 1.9834803    57
## [1245] {rolls/buns,
##         yogurt}                    => {pastry}                0.005795628  0.16863
91 0.034367056 1.8955030    57
## [1246] {pastry,
##         yogurt}                    => {other vegetables}      0.006609049  0.37356
32 0.017691917 1.9306328    65
## [1247] {other vegetables,
##         pastry}                    => {yogurt}                0.006609049  0.29279
28 0.022572445 2.0988463    65
## [1248] {other vegetables,
##         yogurt}                    => {pastry}                0.006609049  0.15222
48 0.043416370 1.7110070    65
## [1249] {pastry,
##         yogurt}                    => {whole milk}            0.009150991  0.51724
14 0.017691917 2.0243012    90
## [1250] {pastry,
##         whole milk}                => {yogurt}                0.009150991  0.27522
94 0.033248602 1.9729451    90
## [1251] {whole milk,
##         yogurt}                    => {pastry}                0.009150991  0.16333
94 0.056024403 1.8359347    90
## [1252] {pastry,
##         rolls/buns}                => {other vegetables}      0.006100661  0.29126
21 0.020945602 1.5052880    60
## [1253] {other vegetables,
##         pastry}                    => {rolls/buns}            0.006100661  0.27027
03 0.022572445 1.4693798    60
## [1254] {other vegetables,
##         rolls/buns}                => {pastry}                0.006100661  0.14319
81 0.042602949 1.6095465    60
## [1255] {pastry,
##         rolls/buns}                => {whole milk}            0.008540925  0.40776
70 0.020945602 1.5958569    84
## [1256] {pastry,
##         whole milk}                => {rolls/buns}            0.008540925  0.25688
07 0.033248602 1.3965849    84
## [1257] {rolls/buns,
##         whole milk}                => {pastry}                0.008540925  0.15080
79 0.056634469 1.6950808    84
## [1258] {other vegetables,
##         pastry}                    => {whole milk}            0.010574479  0.46846
85 0.022572445 1.8334212   104
## [1259] {pastry,
##         whole milk}                => {other vegetables}      0.010574479  0.31804
28 0.033248602 1.6436947   104
```

```
## [1260] {other vegetables,
##         whole milk}              => {pastry}             0.010574479  0.14130
43 0.074834774 1.5882609    104
## [1261] {bottled water,
##         citrus fruit}            => {other vegetables}   0.005083884  0.37593
98 0.013523132 1.9429156     50
## [1262] {citrus fruit,
##         other vegetables}        => {bottled water}      0.005083884  0.17605
63 0.028876462 1.5929292     50
## [1263] {bottled water,
##         other vegetables}        => {citrus fruit}       0.005083884  0.20491
80 0.024809354 2.4758831     50
## [1264] {bottled water,
##         citrus fruit}            => {whole milk}         0.005897306  0.43609
02 0.013523132 1.7067041     58
## [1265] {citrus fruit,
##         whole milk}              => {bottled water}      0.005897306  0.19333
33 0.030503305 1.7492487     58
## [1266] {bottled water,
##         whole milk}              => {citrus fruit}       0.005897306  0.17159
76 0.034367056 2.0732957     58
## [1267] {citrus fruit,
##         tropical fruit}          => {root vegetables}    0.005693950  0.28571
43 0.019928826 2.6212687     56
## [1268] {citrus fruit,
##         root vegetables}         => {tropical fruit}     0.005693950  0.32183
91 0.017691917 3.0671389     56
## [1269] {root vegetables,
##         tropical fruit}          => {citrus fruit}       0.005693950  0.27053
14 0.021047280 3.2686441     56
## [1270] {citrus fruit,
##         tropical fruit}          => {yogurt}             0.006304016  0.31632
65 0.019928826 2.2675448     62
## [1271] {citrus fruit,
##         yogurt}                  => {tropical fruit}     0.006304016  0.29107
98 0.021657346 2.7740019     62
## [1272] {tropical fruit,
##         yogurt}                  => {citrus fruit}       0.006304016  0.21527
78 0.029283172 2.6010528     62
## [1273] {citrus fruit,
##         tropical fruit}          => {other vegetables}   0.009049314  0.45408
16 0.019928826 2.3467645     89
## [1274] {citrus fruit,
##         other vegetables}        => {tropical fruit}     0.009049314  0.31338
03 0.028876462 2.9865262     89
## [1275] {other vegetables,
##         tropical fruit}          => {citrus fruit}       0.009049314  0.25212
46 0.035892222 3.0462480     89
## [1276] {citrus fruit,
##         tropical fruit}          => {whole milk}         0.009049314  0.45408
16 0.019928826 1.7771161     89
## [1277] {citrus fruit,
```

```
##           whole milk}          => {tropical fruit}      0.009049314  0.29666
67 0.030503305 2.8272448     89
## [1278] {tropical fruit,
##           whole milk}          => {citrus fruit}        0.009049314  0.21394
23 0.042297916 2.5849172     89
## [1279] {citrus fruit,
##          root vegetables}      => {other vegetables}    0.010371124  0.58620
69 0.017691917 3.0296084    102
## [1280] {citrus fruit,
##          other vegetables}     => {root vegetables}     0.010371124  0.35915
49 0.028876462 3.2950455    102
## [1281] {other vegetables,
##          root vegetables}      => {citrus fruit}        0.010371124  0.21888
41 0.047381800 2.6446257    102
## [1282] {citrus fruit,
##          root vegetables}      => {whole milk}          0.009150991  0.51724
14 0.017691917 2.0243012     90
## [1283] {citrus fruit,
##          whole milk}           => {root vegetables}     0.009150991  0.30000
00 0.030503305 2.7523321     90
## [1284] {root vegetables,
##          whole milk}           => {citrus fruit}        0.009150991  0.18711
02 0.048906965 2.2607232     90
## [1285] {citrus fruit,
##          yogurt}               => {rolls/buns}          0.005795628  0.26760
56 0.021657346 1.4548930     57
## [1286] {citrus fruit,
##          rolls/buns}           => {yogurt}              0.005795628  0.34545
45 0.016776817 2.4763451     57
## [1287] {rolls/buns,
##          yogurt}               => {citrus fruit}        0.005795628  0.16863
91 0.034367056 2.0375492     57
## [1288] {citrus fruit,
##          yogurt}               => {other vegetables}    0.007625826  0.35211
27 0.021657346 1.8197731     75
## [1289] {citrus fruit,
##          other vegetables}     => {yogurt}              0.007625826  0.26408
45 0.028876462 1.8930548     75
## [1290] {other vegetables,
##          yogurt}               => {citrus fruit}        0.007625826  0.17564
40 0.043416370 2.1221855     75
## [1291] {citrus fruit,
##          yogurt}               => {whole milk}          0.010269446  0.47417
84 0.021657346 1.8557678    101
## [1292] {citrus fruit,
##          whole milk}           => {yogurt}              0.010269446  0.33666
67 0.030503305 2.4133503    101
## [1293] {whole milk,
##          yogurt}               => {citrus fruit}        0.010269446  0.18330
31 0.056024403 2.2147246    101
## [1294] {citrus fruit,
##          rolls/buns}           => {other vegetables}    0.005998983  0.35757
```

```
58 0.016776817 1.8480071     59
## [1295] {citrus fruit,
##         other vegetables}      => {rolls/buns}           0.005998983  0.20774
65 0.028876462 1.1294564     59
## [1296] {other vegetables,
##         rolls/buns}            => {citrus fruit}         0.005998983  0.14081
15 0.042602949 1.7013276     59
## [1297] {citrus fruit,
##         rolls/buns}            => {whole milk}           0.007219115  0.43030
30 0.016776817 1.6840550     71
## [1298] {citrus fruit,
##         whole milk}            => {rolls/buns}           0.007219115  0.23666
67 0.030503305 1.2866869     71
## [1299] {rolls/buns,
##         whole milk}            => {citrus fruit}         0.007219115  0.12746
86 0.056634469 1.5401149     71
## [1300] {citrus fruit,
##         other vegetables}      => {whole milk}           0.013014743  0.45070
42 0.028876462 1.7638982    128
## [1301] {citrus fruit,
##         whole milk}            => {other vegetables}     0.013014743  0.42666
67 0.030503305 2.2050797    128
## [1302] {other vegetables,
##         whole milk}            => {citrus fruit}         0.013014743  0.17391
30 0.074834774 2.1012712    128
## [1303] {sausage,
##         shopping bags}         => {soda}                 0.005693950  0.36363
64 0.015658363 2.0853432     56
## [1304] {shopping bags,
##         soda}                  => {sausage}              0.005693950  0.23140
50 0.024605999 2.4630604     56
## [1305] {sausage,
##         soda}                  => {shopping bags}        0.005693950  0.23430
96 0.024300966 2.3781580     56
## [1306] {sausage,
##         shopping bags}         => {rolls/buns}           0.005998983  0.38311
69 0.015658363 2.0828936     59
## [1307] {rolls/buns,
##         shopping bags}         => {sausage}              0.005998983  0.30729
17 0.019522115 3.2707939     59
## [1308] {rolls/buns,
##         sausage}               => {shopping bags}        0.005998983  0.19601
33 0.030604982 1.9894641     59
## [1309] {sausage,
##         shopping bags}         => {other vegetables}     0.005388917  0.34415
58 0.015658363 1.7786509     53
## [1310] {other vegetables,
##         shopping bags}         => {sausage}              0.005388917  0.23245
61 0.023182511 2.4742491     53
## [1311] {other vegetables,
##         sausage}               => {shopping bags}        0.005388917  0.20000
00 0.026944586 2.0299278     53
```

```
## [1312] {root vegetables,
##          shopping bags}            => {other vegetables}      0.006609049  0.51587
30 0.012811388 2.6661120     65
## [1313] {other vegetables,
##          shopping bags}            => {root vegetables}       0.006609049  0.28508
77 0.023182511 2.6155203     65
## [1314] {other vegetables,
##          root vegetables}          => {shopping bags}         0.006609049  0.13948
50 0.047381800 1.4157222     65
## [1315] {root vegetables,
##          shopping bags}            => {whole milk}            0.005287239  0.41269
84 0.012811388 1.6151567     52
## [1316] {shopping bags,
##          whole milk}               => {root vegetables}       0.005287239  0.21576
76 0.024504321 1.9795473     52
## [1317] {root vegetables,
##          whole milk}               => {shopping bags}         0.005287239  0.10810
81 0.048906965 1.0972582     52
## [1318] {shopping bags,
##          soda}                     => {rolls/buns}            0.006304016  0.25619
83 0.024605999 1.3928749     62
## [1319] {rolls/buns,
##          shopping bags}            => {soda}                  0.006304016  0.32291
67 0.019522115 1.8518282     62
## [1320] {rolls/buns,
##          soda}                     => {shopping bags}         0.006304016  0.16445
62 0.038332486 1.6691714     62
## [1321] {shopping bags,
##          soda}                     => {other vegetables}      0.005388917  0.21900
83 0.024605999 1.1318688     53
## [1322] {other vegetables,
##          shopping bags}            => {soda}                  0.005388917  0.23245
61 0.023182511 1.3330648     53
## [1323] {other vegetables,
##          soda}                     => {shopping bags}         0.005388917  0.16459
63 0.032740214 1.6705927     53
## [1324] {shopping bags,
##          soda}                     => {whole milk}            0.006812405  0.27685
95 0.024605999 1.0835309     67
## [1325] {shopping bags,
##          whole milk}               => {soda}                  0.006812405  0.27800
83 0.024504321 1.5942925     67
## [1326] {soda,
##          whole milk}               => {shopping bags}         0.006812405  0.17005
08 0.040061007 1.7259538     67
## [1327] {shopping bags,
##          yogurt}                   => {other vegetables}      0.005388917  0.35333
33 0.015251652 1.8260816     53
## [1328] {other vegetables,
##          shopping bags}            => {yogurt}                0.005388917  0.23245
61 0.023182511 1.6663310     53
## [1329] {other vegetables,
```

```
##          yogurt}                => {shopping bags}        0.005388917 0.12412
18 0.043416370 1.2597912    53
## [1330] {shopping bags,
##          yogurt}                => {whole milk}           0.005287239 0.34666
67 0.015251652 1.3567317    52
## [1331] {shopping bags,
##          whole milk}            => {yogurt}               0.005287239 0.21576
76 0.024504321 1.5467017    52
## [1332] {rolls/buns,
##          shopping bags}         => {other vegetables}     0.005287239 0.27083
33 0.019522115 1.3997088    52
## [1333] {other vegetables,
##          shopping bags}         => {rolls/buns}           0.005287239 0.22807
02 0.023182511 1.2399503    52
## [1334] {other vegetables,
##          rolls/buns}            => {shopping bags}        0.005287239 0.12410
50 0.042602949 1.2596210    52
## [1335] {rolls/buns,
##          shopping bags}         => {whole milk}           0.005287239 0.27083
33 0.019522115 1.0599466    52
## [1336] {shopping bags,
##          whole milk}            => {rolls/buns}           0.005287239 0.21576
76 0.024504321 1.1730651    52
## [1337] {other vegetables,
##          shopping bags}         => {whole milk}           0.007625826 0.32894
74 0.023182511 1.2873845    75
## [1338] {shopping bags,
##          whole milk}            => {other vegetables}     0.007625826 0.31120
33 0.024504321 1.6083472    75
## [1339] {other vegetables,
##          whole milk}            => {shopping bags}        0.007625826 0.10190
22 0.074834774 1.0342703    75
## [1340] {bottled water,
##          sausage}               => {other vegetables}     0.005083884 0.42372
88 0.011997966 2.1898964    50
## [1341] {other vegetables,
##          sausage}               => {bottled water}        0.005083884 0.18867
92 0.026944586 1.7071393    50
## [1342] {bottled water,
##          other vegetables}      => {sausage}              0.005083884 0.20491
80 0.024809354 2.1811351    50
## [1343] {sausage,
##          tropical fruit}        => {other vegetables}     0.005998983 0.43065
69 0.013929842 2.2257020    59
## [1344] {other vegetables,
##          sausage}               => {tropical fruit}       0.005998983 0.22264
15 0.026944586 2.1217822    59
## [1345] {other vegetables,
##          tropical fruit}        => {sausage}              0.005998983 0.16713
88 0.035892222 1.7790154    59
## [1346] {sausage,
##          tropical fruit}        => {whole milk}           0.007219115 0.51824
```

```
82 0.013929842 2.0282415      71
## [1347] {sausage,
##         whole milk}                => {tropical fruit}        0.007219115  0.24149
66 0.029893238 2.3014719      71
## [1348] {tropical fruit,
##         whole milk}                => {sausage}               0.007219115  0.17067
31 0.042297916 1.8166339      71
## [1349] {root vegetables,
##         sausage}                   => {yogurt}                0.005185562  0.34693
88 0.014946619 2.4869846      51
## [1350] {sausage,
##         yogurt}                    => {root vegetables}       0.005185562  0.26424
87 0.019623793 2.4243340      51
## [1351] {root vegetables,
##         yogurt}                    => {sausage}               0.005185562  0.20078
74 0.025826131 2.1371689      51
## [1352] {root vegetables,
##         sausage}                   => {other vegetables}      0.006812405  0.45578
23 0.014946619 2.3555539      67
## [1353] {other vegetables,
##         sausage}                   => {root vegetables}       0.006812405  0.25283
02 0.026944586 2.3195755      67
## [1354] {other vegetables,
##         root vegetables}           => {sausage}               0.006812405  0.14377
68 0.047381800 1.5303518      67
## [1355] {root vegetables,
##         sausage}                   => {whole milk}            0.007727504  0.51700
68 0.014946619 2.0233832      76
## [1356] {sausage,
##         whole milk}                => {root vegetables}       0.007727504  0.25850
34 0.029893238 2.3716240      76
## [1357] {root vegetables,
##         whole milk}                => {sausage}               0.007727504  0.15800
42 0.048906965 1.6817867      76
## [1358] {sausage,
##         soda}                      => {yogurt}                0.005592272  0.23012
55 0.024300966 1.6496243      55
## [1359] {sausage,
##         yogurt}                    => {soda}                  0.005592272  0.28497
41 0.019623793 1.6342392      55
## [1360] {soda,
##         yogurt}                    => {sausage}               0.005592272  0.20446
10 0.027351296 2.1762701      55
## [1361] {sausage,
##         soda}                      => {rolls/buns}            0.009659380  0.39748
95 0.024300966 2.1610335      95
## [1362] {rolls/buns,
##         sausage}                   => {soda}                  0.009659380  0.31561
46 0.030604982 1.8099532      95
## [1363] {rolls/buns,
##         soda}                      => {sausage}               0.009659380  0.25198
94 0.038332486 2.6821598      95
```

```
## [1364] {sausage,
##           soda}               => {other vegetables}          0.007219115  0.29707
11 0.024300966 1.5353098     71
## [1365] {other vegetables,
##           sausage}            => {soda}                       0.007219115  0.26792
45 0.026944586 1.5364652     71
## [1366] {other vegetables,
##           soda}               => {sausage}                    0.007219115  0.22049
69 0.032740214 2.3469556     71
## [1367] {sausage,
##           soda}               => {whole milk}                 0.006710727  0.27615
06 0.024300966 1.0807566     66
## [1368] {sausage,
##           whole milk}         => {soda}                       0.006710727  0.22448
98 0.029893238 1.2873803     66
## [1369] {soda,
##           whole milk}         => {sausage}                    0.006710727  0.16751
27 0.040061007 1.7829949     66
## [1370] {sausage,
##           yogurt}             => {rolls/buns}                 0.005998983  0.30569
95 0.019623793 1.6619980     59
## [1371] {rolls/buns,
##           sausage}            => {yogurt}                     0.005998983  0.19601
33 0.030604982 1.4050953     59
## [1372] {rolls/buns,
##           yogurt}             => {sausage}                    0.005998983  0.17455
62 0.034367056 1.8579658     59
## [1373] {sausage,
##           yogurt}             => {other vegetables}           0.008134215  0.41450
78 0.019623793 2.1422406     80
## [1374] {other vegetables,
##           sausage}            => {yogurt}                     0.008134215  0.30188
68 0.026944586 2.1640354     80
## [1375] {other vegetables,
##           yogurt}             => {sausage}                    0.008134215  0.18735
36 0.043416370 1.9941807     80
## [1376] {sausage,
##           yogurt}             => {whole milk}                 0.008744281  0.44559
59 0.019623793 1.7439058     86
## [1377] {sausage,
##           whole milk}         => {yogurt}                     0.008744281  0.29251
70 0.029893238 2.0968694     86
## [1378] {whole milk,
##           yogurt}             => {sausage}                    0.008744281  0.15607
99 0.056024403 1.6613045     86
## [1379] {rolls/buns,
##           sausage}            => {other vegetables}           0.008845958  0.28903
65 0.030604982 1.4937858     87
## [1380] {other vegetables,
##           sausage}            => {rolls/buns}                 0.008845958  0.32830
19 0.026944586 1.7848806     87
## [1381] {other vegetables,
```

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##         rolls/buns}           => {sausage}            0.008845958 0.20763
72 0.042602949 2.2100781    87
## [1382] {rolls/buns,
##         sausage}              => {whole milk}          0.009354347 0.30564
78 0.030604982 1.1961984    92
## [1383] {sausage,
##         whole milk}           => {rolls/buns}          0.009354347 0.31292
52 0.029893238 1.7012820    92
## [1384] {rolls/buns,
##         whole milk}           => {sausage}             0.009354347 0.16517
06 0.056634469 1.7580654    92
## [1385] {other vegetables,
##         sausage}              => {whole milk}          0.010167768 0.37735
85 0.026944586 1.4768487   100
## [1386] {sausage,
##         whole milk}           => {other vegetables}    0.010167768 0.34013
61 0.029893238 1.7578760   100
## [1387] {other vegetables,
##         whole milk}           => {sausage}             0.010167768 0.13586
96 0.074834774 1.4461874   100
## [1388] {bottled water,
##         tropical fruit}       => {soda}                0.005185562 0.28021
98 0.018505338 1.6069747    51
## [1389] {bottled water,
##         soda}                 => {tropical fruit}      0.005185562 0.17894
74 0.028978139 1.7053754    51
## [1390] {soda,
##         tropical fruit}       => {bottled water}       0.005185562 0.24878
05 0.020843925 2.2509256    51
## [1391] {bottled water,
##         tropical fruit}       => {yogurt}              0.007117438 0.38461
54 0.018505338 2.7570644    70
## [1392] {bottled water,
##         yogurt}               => {tropical fruit}      0.007117438 0.30973
45 0.022979156 2.9517819    70
## [1393] {tropical fruit,
##         yogurt}               => {bottled water}       0.007117438 0.24305
56 0.029283172 2.1991273    70
## [1394] {bottled water,
##         tropical fruit}       => {rolls/buns}          0.005388917 0.29120
88 0.018505338 1.5832164    53
## [1395] {bottled water,
##         rolls/buns}           => {tropical fruit}      0.005388917 0.22268
91 0.024199288 2.1222355    53
## [1396] {rolls/buns,
##         tropical fruit}       => {bottled water}       0.005388917 0.21900
83 0.024605999 1.9815513    53
## [1397] {bottled water,
##         tropical fruit}       => {other vegetables}    0.006202339 0.33516
48 0.018505338 1.7321840    61
## [1398] {bottled water,
##         other vegetables}     => {tropical fruit}      0.006202339 0.25000
```

```
## 00 0.024809354 2.3825097   61
## [1399] {other vegetables,
##         tropical fruit}         => {bottled water}     0.006202339 0.17280
## 45 0.035892222 1.5635074   61
## [1400] {bottled water,
##         tropical fruit}         => {whole milk}        0.008032537 0.43406
## 59 0.018505338 1.6987817   79
## [1401] {bottled water,
##         whole milk}             => {tropical fruit}    0.008032537 0.23372
## 78 0.034367056 2.2274351   79
## [1402] {tropical fruit,
##         whole milk}             => {bottled water}     0.008032537 0.18990
## 38 0.042297916 1.7182193   79
## [1403] {bottled water,
##         root vegetables}        => {other vegetables}  0.007015760 0.44805
## 19 0.015658363 2.3156022   69
## [1404] {bottled water,
##         other vegetables}       => {root vegetables}   0.007015760 0.28278
## 69 0.024809354 2.5944114   69
## [1405] {other vegetables,
##         root vegetables}        => {bottled water}     0.007015760 0.14806
## 87 0.047381800 1.3397013   69
## [1406] {bottled water,
##         root vegetables}        => {whole milk}        0.007320793 0.46753
## 25 0.015658363 1.8297580   72
## [1407] {bottled water,
##         whole milk}             => {root vegetables}   0.007320793 0.21301
## 78 0.034367056 1.9543186   72
## [1408] {root vegetables,
##         whole milk}             => {bottled water}     0.007320793 0.14968
## 81 0.048906965 1.3543541   72
## [1409] {bottled water,
##         soda}                   => {yogurt}            0.007422471 0.25614
## 04 0.028978139 1.8361081   73
## [1410] {bottled water,
##         yogurt}                 => {soda}              0.007422471 0.32300
## 88 0.022979156 1.8523569   73
## [1411] {soda,
##         yogurt}                 => {bottled water}     0.007422471 0.27137
## 55 0.027351296 2.4553613   73
## [1412] {bottled water,
##         soda}                   => {rolls/buns}        0.006812405 0.23508
## 77 0.028978139 1.2781027   67
## [1413] {bottled water,
##         rolls/buns}             => {soda}              0.006812405 0.28151
## 26 0.024199288 1.6143886   67
## [1414] {rolls/buns,
##         soda}                   => {bottled water}     0.006812405 0.17771
## 88 0.038332486 1.6079712   67
## [1415] {bottled water,
##         soda}                   => {other vegetables}  0.005693950 0.19649
## 12 0.028978139 1.0154972   56
```

```
## [1416] {bottled water,
##         other vegetables}        => {soda}                 0.005693950  0.22950
82 0.024809354 1.3161593    56
## [1417] {other vegetables,
##         soda}                    => {bottled water}        0.005693950  0.17391
30 0.032740214 1.5735371    56
## [1418] {bottled water,
##         soda}                    => {whole milk}           0.007524148  0.25964
91 0.028978139 1.0161755    74
## [1419] {bottled water,
##         whole milk}              => {soda}                 0.007524148  0.21893
49 0.034367056 1.2555247    74
## [1420] {soda,
##         whole milk}              => {bottled water}        0.007524148  0.18781
73 0.040061007 1.6993401    74
## [1421] {bottled water,
##         yogurt}                  => {rolls/buns}           0.007117438  0.30973
45 0.022979156 1.6839353    70
## [1422] {bottled water,
##         rolls/buns}              => {yogurt}               0.007117438  0.29411
76 0.024199288 2.1083433    70
## [1423] {rolls/buns,
##         yogurt}                  => {bottled water}        0.007117438  0.20710
06 0.034367056 1.8738126    70
## [1424] {bottled water,
##         yogurt}                  => {other vegetables}     0.008134215  0.35398
23 0.022979156 1.8294356    80
## [1425] {bottled water,
##         other vegetables}        => {yogurt}               0.008134215  0.32786
89 0.024809354 2.3502844    80
## [1426] {other vegetables,
##         yogurt}                  => {bottled water}        0.008134215  0.18735
36 0.043416370 1.6951453    80
## [1427] {bottled water,
##         yogurt}                  => {whole milk}           0.009659380  0.42035
40 0.022979156 1.6451180    95
## [1428] {bottled water,
##         whole milk}              => {yogurt}               0.009659380  0.28106
51 0.034367056 2.0147778    95
## [1429] {whole milk,
##         yogurt}                  => {bottled water}        0.009659380  0.17241
38 0.056024403 1.5599721    95
## [1430] {bottled water,
##         rolls/buns}              => {other vegetables}     0.007320793  0.30252
10 0.024199288 1.5634756    72
## [1431] {bottled water,
##         other vegetables}        => {rolls/buns}           0.007320793  0.29508
20 0.024809354 1.6042737    72
## [1432] {other vegetables,
##         rolls/buns}              => {bottled water}        0.007320793  0.17183
77 0.042602949 1.5547598    72
## [1433] {bottled water,
```

```
##           rolls/buns}                => {whole milk}           0.008744281  0.36134
45 0.024199288 1.4141757    86
## [1434] {bottled water,
##          whole milk}                 => {rolls/buns}           0.008744281  0.25443
79 0.034367056 1.3833037    86
## [1435] {rolls/buns,
##          whole milk}                 => {bottled water}        0.008744281  0.15439
86 0.056634469 1.3969732    86
## [1436] {bottled water,
##          other vegetables}           => {whole milk}           0.010777834  0.43442
62 0.024809354 1.7001918    106
## [1437] {bottled water,
##          whole milk}                 => {other vegetables}     0.010777834  0.31360
95 0.034367056 1.6207825    106
## [1438] {other vegetables,
##          whole milk}                 => {bottled water}        0.010777834  0.14402
17 0.074834774 1.3030854    106
## [1439] {root vegetables,
##          tropical fruit}             => {yogurt}               0.008134215  0.38647
34 0.021047280 2.7703835    80
## [1440] {tropical fruit,
##          yogurt}                     => {root vegetables}      0.008134215  0.27777
78 0.029283172 2.5484556    80
## [1441] {root vegetables,
##          yogurt}                     => {tropical fruit}       0.008134215  0.31496
06 0.025826131 3.0015870    80
## [1442] {root vegetables,
##          tropical fruit}             => {rolls/buns}           0.005897306  0.28019
32 0.021047280 1.5233281    58
## [1443] {rolls/buns,
##          tropical fruit}             => {root vegetables}      0.005897306  0.23966
94 0.024605999 2.1988328    58
## [1444] {rolls/buns,
##          root vegetables}            => {tropical fruit}       0.005897306  0.24267
78 0.024300966 2.3127291    58
## [1445] {root vegetables,
##          tropical fruit}             => {other vegetables}     0.012302999  0.58454
11 0.021047280 3.0209991    121
## [1446] {other vegetables,
##          tropical fruit}             => {root vegetables}      0.012302999  0.34277
62 0.035892222 3.1447798    121
## [1447] {other vegetables,
##          root vegetables}            => {tropical fruit}       0.012302999  0.25965
67 0.047381800 2.4745380    121
## [1448] {root vegetables,
##          tropical fruit}             => {whole milk}           0.011997966  0.57004
83 0.021047280 2.2309690    118
## [1449] {tropical fruit,
##          whole milk}                 => {root vegetables}      0.011997966  0.28365
38 0.042297916 2.6023653    118
## [1450] {root vegetables,
##          whole milk}                 => {tropical fruit}       0.011997966  0.24532
```

```
22 0.048906965 2.3379305   118
## [1451] {soda,
##         tropical fruit}        => {yogurt}              0.006609049  0.31707
32 0.020843925 2.2728970    65
## [1452] {tropical fruit,
##         yogurt}                 => {soda}               0.006609049  0.22569
44 0.029283172 1.2942885    65
## [1453] {soda,
##         yogurt}                 => {tropical fruit}     0.006609049  0.24163
57 0.027351296 2.3027975    65
## [1454] {soda,
##         tropical fruit}        => {rolls/buns}          0.005388917  0.25853
66 0.020843925 1.4055872    53
## [1455] {rolls/buns,
##         tropical fruit}        => {soda}               0.005388917  0.21900
83 0.024605999 1.2559454    53
## [1456] {rolls/buns,
##         soda}                   => {tropical fruit}     0.005388917  0.14058
36 0.038332486 1.3397667    53
## [1457] {soda,
##         tropical fruit}        => {other vegetables}   0.007219115  0.34634
15 0.020843925 1.7899466    71
## [1458] {other vegetables,
##         tropical fruit}        => {soda}               0.007219115  0.20113
31 0.035892222 1.1534370    71
## [1459] {other vegetables,
##         soda}                   => {tropical fruit}     0.007219115  0.22049
69 0.032740214 2.1013440    71
## [1460] {soda,
##         tropical fruit}        => {whole milk}          0.007829181  0.37560
98 0.020843925 1.4700048    77
## [1461] {tropical fruit,
##         whole milk}             => {soda}               0.007829181  0.18509
62 0.042297916 1.0614698    77
## [1462] {soda,
##         whole milk}             => {tropical fruit}     0.007829181  0.19543
15 0.040061007 1.8624695    77
## [1463] {tropical fruit,
##         yogurt}                 => {rolls/buns}          0.008744281  0.29861
11 0.029283172 1.6234606    86
## [1464] {rolls/buns,
##         tropical fruit}        => {yogurt}              0.008744281  0.35537
19 0.024605999 2.5474363    86
## [1465] {rolls/buns,
##         yogurt}                 => {tropical fruit}     0.008744281  0.25443
79 0.034367056 2.4248028    86
## [1466] {tropical fruit,
##         yogurt}                 => {other vegetables}   0.012302999  0.42013
89 0.029283172 2.1713431   121
## [1467] {other vegetables,
##         tropical fruit}        => {yogurt}              0.012302999  0.34277
62 0.035892222 2.4571457   121
```

```
## [1468] {other vegetables,
##          yogurt}              => {tropical fruit}        0.012302999  0.28337
24 0.043416370 2.7005496    121
## [1469] {tropical fruit,
##          yogurt}              => {whole milk}            0.015149975  0.51736
11 0.029283172 2.0247698    149
## [1470] {tropical fruit,
##          whole milk}          => {yogurt}                0.015149975  0.35817
31 0.042297916 2.5675162    149
## [1471] {whole milk,
##          yogurt}              => {tropical fruit}        0.015149975  0.27041
74 0.056024403 2.5770885    149
## [1472] {rolls/buns,
##          tropical fruit}      => {other vegetables}      0.007829181  0.31818
18 0.024605999 1.6444131     77
## [1473] {other vegetables,
##          tropical fruit}      => {rolls/buns}            0.007829181  0.21813
03 0.035892222 1.1859102     77
## [1474] {other vegetables,
##          rolls/buns}          => {tropical fruit}        0.007829181  0.18377
09 0.042602949 1.7513436     77
## [1475] {rolls/buns,
##          tropical fruit}      => {whole milk}            0.010981190  0.44628
10 0.024605999 1.7465872    108
## [1476] {tropical fruit,
##          whole milk}          => {rolls/buns}            0.010981190  0.25961
54 0.042297916 1.4114524    108
## [1477] {rolls/buns,
##          whole milk}          => {tropical fruit}        0.010981190  0.19389
59 0.056634469 1.8478352    108
## [1478] {other vegetables,
##          tropical fruit}      => {whole milk}            0.017081851  0.47592
07 0.035892222 1.8625865    168
## [1479] {tropical fruit,
##          whole milk}          => {other vegetables}      0.017081851  0.40384
62 0.042297916 2.0871397    168
## [1480] {other vegetables,
##          whole milk}          => {tropical fruit}        0.017081851  0.22826
09 0.074834774 2.1753349    168
## [1481] {root vegetables,
##          soda}                => {other vegetables}      0.008235892  0.44262
30 0.018607016 2.2875443     81
## [1482] {other vegetables,
##          root vegetables}     => {soda}                  0.008235892  0.17381
97 0.047381800 0.9968030     81
## [1483] {other vegetables,
##          soda}                => {root vegetables}       0.008235892  0.25155
28 0.032740214 2.3078561     81
## [1484] {root vegetables,
##          soda}                => {whole milk}            0.008134215  0.43715
85 0.018607016 1.7108848     80
## [1485] {root vegetables,
```

```
##            whole milk}        => {soda}                  0.008134215  0.16632
02 0.048906965 0.9537952    80
## [1486] {soda,
##            whole milk}        => {root vegetables}       0.008134215  0.20304
57 0.040061007 1.8628305    80
## [1487] {root vegetables,
##            yogurt}            => {rolls/buns}            0.007219115  0.27952
76 0.025826131 1.5197090    71
## [1488] {rolls/buns,
##            root vegetables}   => {yogurt}                0.007219115  0.29707
11 0.024300966 2.1295150    71
## [1489] {rolls/buns,
##            yogurt}            => {root vegetables}       0.007219115  0.21005
92 0.034367056 1.9271753    71
## [1490] {root vegetables,
##            yogurt}            => {other vegetables}      0.012913066  0.50000
00 0.025826131 2.5840778   127
## [1491] {other vegetables,
##            root vegetables}   => {yogurt}                0.012913066  0.27253
22 0.047381800 1.9536108   127
## [1492] {other vegetables,
##            yogurt}            => {root vegetables}       0.012913066  0.29742
39 0.043416370 2.7286977   127
## [1493] {root vegetables,
##            yogurt}            => {whole milk}            0.014539908  0.56299
21 0.025826131 2.2033536   143
## [1494] {root vegetables,
##            whole milk}        => {yogurt}                0.014539908  0.29729
73 0.048906965 2.1311362   143
## [1495] {whole milk,
##            yogurt}            => {root vegetables}       0.014539908  0.25952
81 0.056024403 2.3810253   143
## [1496] {rolls/buns,
##            root vegetables}   => {other vegetables}      0.012201322  0.50209
21 0.024300966 2.5948898   120
## [1497] {other vegetables,
##            root vegetables}   => {rolls/buns}            0.012201322  0.25751
07 0.047381800 1.4000100   120
## [1498] {other vegetables,
##            rolls/buns}        => {root vegetables}       0.012201322  0.28639
62 0.042602949 2.6275247   120
## [1499] {rolls/buns,
##            root vegetables}   => {whole milk}            0.012709710  0.52301
26 0.024300966 2.0468876   125
## [1500] {root vegetables,
##            whole milk}        => {rolls/buns}            0.012709710  0.25987
53 0.048906965 1.4128652   125
## [1501] {rolls/buns,
##            whole milk}        => {root vegetables}       0.012709710  0.22441
65 0.056634469 2.0588959   125
## [1502] {other vegetables,
##            root vegetables}   => {whole milk}            0.023182511  0.48927
```

```
04 0.047381800 1.9148326    228
## [1503] {root vegetables,
##          whole milk}                => {other vegetables}      0.023182511  0.47401
25 0.048906965 2.4497702    228
## [1504] {other vegetables,
##          whole milk}                => {root vegetables}       0.023182511  0.30978
26 0.074834774 2.8420820    228
## [1505] {soda,
##          yogurt}                    => {rolls/buns}            0.008642603  0.31598
51 0.027351296 1.7179181     85
## [1506] {rolls/buns,
##          soda}                      => {yogurt}                0.008642603  0.22546
42 0.038332486 1.6162101     85
## [1507] {rolls/buns,
##          yogurt}                    => {soda}                  0.008642603  0.25147
93 0.034367056 1.4421567     85
## [1508] {soda,
##          yogurt}                    => {other vegetables}      0.008337570  0.30483
27 0.027351296 1.5754229     82
## [1509] {other vegetables,
##          soda}                      => {yogurt}                0.008337570  0.25465
84 0.032740214 1.8254849     82
## [1510] {other vegetables,
##          yogurt}                    => {soda}                  0.008337570  0.19203
75 0.043416370 1.1012761     82
## [1511] {soda,
##          yogurt}                    => {whole milk}            0.010472801  0.38289
96 0.027351296 1.4985348    103
## [1512] {soda,
##          whole milk}                => {yogurt}                0.010472801  0.26142
13 0.040061007 1.8739641    103
## [1513] {whole milk,
##          yogurt}                    => {soda}                  0.010472801  0.18693
28 0.056024403 1.0720027    103
## [1514] {rolls/buns,
##          soda}                      => {other vegetables}      0.009862735  0.25729
44 0.038332486 1.3297376     97
## [1515] {other vegetables,
##          soda}                      => {rolls/buns}            0.009862735  0.30124
22 0.032740214 1.6377653     97
## [1516] {other vegetables,
##          rolls/buns}                => {soda}                  0.009862735  0.23150
36 0.042602949 1.3276022     97
## [1517] {rolls/buns,
##          soda}                      => {whole milk}            0.008845958  0.23076
92 0.038332486 0.9031498     87
## [1518] {soda,
##          whole milk}                => {rolls/buns}            0.008845958  0.22081
22 0.040061007 1.2004908     87
## [1519] {rolls/buns,
##          whole milk}                => {soda}                  0.008845958  0.15619
39 0.056634469 0.8957242     87
```

```
## [1520] {other vegetables,
##          soda}                    => {whole milk}           0.013929842 0.42546
58 0.032740214 1.6651240    137
## [1521] {soda,
##          whole milk}              => {other vegetables}      0.013929842 0.34771
57 0.040061007 1.7970490    137
## [1522] {other vegetables,
##          whole milk}              => {soda}                  0.013929842 0.18614
13 0.074834774 1.0674634    137
## [1523] {rolls/buns,
##          yogurt}                  => {other vegetables}      0.011489578 0.33431
95 0.034367056 1.7278153    113
## [1524] {other vegetables,
##          yogurt}                  => {rolls/buns}            0.011489578 0.26463
70 0.043416370 1.4387534    113
## [1525] {other vegetables,
##          rolls/buns}              => {yogurt}                0.011489578 0.26968
97 0.042602949 1.9332351    113
## [1526] {rolls/buns,
##          yogurt}                  => {whole milk}            0.015556685 0.45266
27 0.034367056 1.7715630    153
## [1527] {whole milk,
##          yogurt}                  => {rolls/buns}            0.015556685 0.27767
70 0.056024403 1.5096478    153
## [1528] {rolls/buns,
##          whole milk}              => {yogurt}                0.015556685 0.27468
58 0.056634469 1.9690488    153
## [1529] {other vegetables,
##          yogurt}                  => {whole milk}            0.022267412 0.51288
06 0.043416370 2.0072345    219
## [1530] {whole milk,
##          yogurt}                  => {other vegetables}      0.022267412 0.39745
92 0.056024403 2.0541308    219
## [1531] {other vegetables,
##          whole milk}              => {yogurt}                0.022267412 0.29755
43 0.074834774 2.1329789    219
## [1532] {other vegetables,
##          rolls/buns}              => {whole milk}            0.017895272 0.42004
77 0.042602949 1.6439194    176
## [1533] {rolls/buns,
##          whole milk}              => {other vegetables}      0.017895272 0.31597
85 0.056634469 1.6330258    176
## [1534] {other vegetables,
##          whole milk}              => {rolls/buns}            0.017895272 0.23913
04 0.074834774 1.3000817    176
## [1535] {fruit/vegetable juice,
##          other vegetables,
##          yogurt}                  => {whole milk}            0.005083884 0.61728
40 0.008235892 2.4158327     50
## [1536] {fruit/vegetable juice,
##          whole milk,
##          yogurt}                  => {other vegetables}      0.005083884 0.53763
```

```
   44 0.009456024 2.7785782     50
## [1537] {fruit/vegetable juice,
##          other vegetables,
##          whole milk}                  => {yogurt}                0.005083884 0.48543
   69 0.010472801 3.4797900     50
## [1538] {other vegetables,
##          whole milk,
##          yogurt}                      => {fruit/vegetable juice}  0.005083884 0.22831
   05 0.022267412 3.1581347     50
## [1539] {other vegetables,
##          root vegetables,
##          whipped/sour cream}          => {whole milk}             0.005185562 0.60714
   29 0.008540925 2.3761441     51
## [1540] {root vegetables,
##          whipped/sour cream,
##          whole milk}                  => {other vegetables}       0.005185562 0.54838
   71 0.009456024 2.8341498     51
## [1541] {other vegetables,
##          whipped/sour cream,
##          whole milk}                  => {root vegetables}        0.005185562 0.35416
   67 0.014641586 3.2492809     51
## [1542] {other vegetables,
##          root vegetables,
##          whole milk}                  => {whipped/sour cream}     0.005185562 0.22368
   42 0.023182511 3.1204741     51
## [1543] {other vegetables,
##          whipped/sour cream,
##          yogurt}                      => {whole milk}             0.005592272 0.55000
   00 0.010167768 2.1525070     55
## [1544] {whipped/sour cream,
##          whole milk,
##          yogurt}                      => {other vegetables}       0.005592272 0.51401
   87 0.010879512 2.6565286     55
## [1545] {other vegetables,
##          whipped/sour cream,
##          whole milk}                  => {yogurt}                 0.005592272 0.38194
   44 0.014641586 2.7379181     55
## [1546] {other vegetables,
##          whole milk,
##          yogurt}                      => {whipped/sour cream}     0.005592272 0.25114
   16 0.022267412 3.5035137     55
## [1547] {other vegetables,
##          pip fruit,
##          root vegetables}             => {whole milk}             0.005490595 0.67500
   00 0.008134215 2.6417131     54
## [1548] {pip fruit,
##          root vegetables,
##          whole milk}                  => {other vegetables}       0.005490595 0.61363
   64 0.008947636 3.1713682     54
## [1549] {other vegetables,
##          pip fruit,
##          whole milk}                  => {root vegetables}        0.005490595 0.40601
```

```
50 0.013523132 3.7249607      54
## [1550] {other vegetables,
##         root vegetables,
##         whole milk}               => {pip fruit}              0.005490595 0.23684
21 0.023182511 3.1308362      54
## [1551] {other vegetables,
##         pip fruit,
##         yogurt}                   => {whole milk}             0.005083884 0.62500
00 0.008134215 2.4460306      50
## [1552] {pip fruit,
##         whole milk,
##         yogurt}                   => {other vegetables}       0.005083884 0.53191
49 0.009557702 2.7490189      50
## [1553] {other vegetables,
##         pip fruit,
##         whole milk}               => {yogurt}                 0.005083884 0.37593
98 0.013523132 2.6948749      50
## [1554] {other vegetables,
##         whole milk,
##         yogurt}                   => {pip fruit}              0.005083884 0.22831
05 0.022267412 3.0180562      50
## [1555] {citrus fruit,
##         other vegetables,
##         root vegetables}          => {whole milk}             0.005795628 0.55882
35 0.010371124 2.1870392      57
## [1556] {citrus fruit,
##         root vegetables,
##         whole milk}               => {other vegetables}       0.005795628 0.63333
33 0.009150991 3.2731652      57
## [1557] {citrus fruit,
##         other vegetables,
##         whole milk}               => {root vegetables}        0.005795628 0.44531
25 0.013014743 4.0854929      57
## [1558] {other vegetables,
##         root vegetables,
##         whole milk}               => {citrus fruit}           0.005795628 0.25000
00 0.023182511 3.0205774      57
## [1559] {root vegetables,
##         tropical fruit,
##         yogurt}                   => {whole milk}             0.005693950 0.70000
00 0.008134215 2.7395543      56
## [1560] {root vegetables,
##         tropical fruit,
##         whole milk}               => {yogurt}                 0.005693950 0.47457
63 0.011997966 3.4019370      56
## [1561] {tropical fruit,
##         whole milk,
##         yogurt}                   => {root vegetables}        0.005693950 0.37583
89 0.015149975 3.4481118      56
## [1562] {root vegetables,
##         whole milk,
##         yogurt}                   => {tropical fruit}         0.005693950 0.39160
```

```
84 0.014539908 3.7320432      56
## [1563] {other vegetables,
##          root vegetables,
##          tropical fruit}          => {whole milk}             0.007015760   0.57024
79 0.012302999 2.2317503      69
## [1564] {root vegetables,
##          tropical fruit,
##          whole milk}             => {other vegetables}        0.007015760   0.58474
58 0.011997966 3.0220571      69
## [1565] {other vegetables,
##          tropical fruit,
##          whole milk}             => {root vegetables}         0.007015760   0.41071
43 0.017081851 3.7680737      69
## [1566] {other vegetables,
##          root vegetables,
##          whole milk}             => {tropical fruit}          0.007015760   0.30263
16 0.023182511 2.8840907      69
## [1567] {other vegetables,
##          tropical fruit,
##          yogurt}                 => {whole milk}              0.007625826   0.61983
47 0.012302999 2.4258155      75
## [1568] {tropical fruit,
##          whole milk,
##          yogurt}                 => {other vegetables}        0.007625826   0.50335
57 0.015149975 2.6014206      75
## [1569] {other vegetables,
##          tropical fruit,
##          whole milk}             => {yogurt}                  0.007625826   0.44642
86 0.017081851 3.2001640      75
## [1570] {other vegetables,
##          whole milk,
##          yogurt}                 => {tropical fruit}          0.007625826   0.34246
58 0.022267412 3.2637119      75
## [1571] {other vegetables,
##          root vegetables,
##          yogurt}                 => {whole milk}              0.007829181   0.60629
92 0.012913066 2.3728423      77
## [1572] {root vegetables,
##          whole milk,
##          yogurt}                 => {other vegetables}        0.007829181   0.53846
15 0.014539908 2.7828530      77
## [1573] {other vegetables,
##          root vegetables,
##          whole milk}             => {yogurt}                  0.007829181   0.33771
93 0.023182511 2.4208960      77
## [1574] {other vegetables,
##          whole milk,
##          yogurt}                 => {root vegetables}         0.007829181   0.35159
82 0.022267412 3.2257165      77
## [1575] {other vegetables,
##          rolls/buns,
##          root vegetables}        => {whole milk}              0.006202339   0.50833
```

```
33 0.012201322 1.9894383    61
## [1576] {rolls/buns,
##         root vegetables,
##         whole milk}              => {other vegetables}         0.006202339  0.48800
00 0.012709710 2.5220599    61
## [1577] {other vegetables,
##         root vegetables,
##         whole milk}              => {rolls/buns}               0.006202339  0.26754
39 0.023182511 1.4545571    61
## [1578] {other vegetables,
##         rolls/buns,
##         whole milk}              => {root vegetables}          0.006202339  0.34659
09 0.017895272 3.1797776    61
## [1579] {other vegetables,
##         rolls/buns,
##         yogurt}                  => {whole milk}               0.005998983  0.52212
39 0.011489578 2.0434097    59
## [1580] {rolls/buns,
##         whole milk,
##         yogurt}                  => {other vegetables}         0.005998983  0.38562
09 0.015556685 1.9929489    59
## [1581] {other vegetables,
##         whole milk,
##         yogurt}                  => {rolls/buns}               0.005998983  0.26940
64 0.022267412 1.4646832    59
## [1582] {other vegetables,
##         rolls/buns,
##         whole milk}              => {yogurt}                   0.005998983  0.33522
73 0.017895272 2.4030322    59
```

```
# Convert rules to data frame
grocery_rules_df <- as(grocery_rules, "data.frame")

# Inspect the first few rules
head(grocery_rules_df)
```

```
##                    rules   support confidence coverage lift count
## 1   {} => {bottled water} 0.1105236  0.1105236        1    1  1087
## 2   {} => {tropical fruit} 0.1049314  0.1049314        1    1  1032
## 3 {} => {root vegetables} 0.1089985  0.1089985        1    1  1072
## 4           {} => {soda} 0.1743772  0.1743772        1    1  1715
## 5          {} => {yogurt} 0.1395018  0.1395018        1    1  1372
## 6      {} => {rolls/buns} 0.1839349  0.1839349        1    1  1809
```

```
# Subset rules based on lift
high_lift_rules <- subset(grocery_rules_df, lift > 5)
high_confidence_rules <- subset(grocery_rules_df, confidence > 0.6)
high_lift_confidence_rules <- subset(grocery_rules_df, lift > 10 & confidence > 0.5)

# Inspect the subsets
head(high_lift_rules)
```

```
## [1] rules       support   confidence coverage   lift       count
## <0 rows> (or 0-length row.names)
```

```
head(high_confidence_rules)
```

```
##                                             rules      support confidence
## 766 {onions,root vegetables} => {other vegetables} 0.005693950  0.6021505
## 856            {curd,tropical fruit} => {whole milk} 0.006507372  0.6336634
## 950        {domestic eggs,margarine} => {whole milk} 0.005185562  0.6219512
## 971            {butter,domestic eggs} => {whole milk} 0.005998983  0.6210526
## 977     {butter,whipped/sour cream} => {whole milk} 0.006710727  0.6600000
## 983            {bottled water,butter} => {whole milk} 0.005388917  0.6022727
##        coverage     lift count
## 766 0.009456024 3.112008    56
## 856 0.010269446 2.479936    64
## 950 0.008337570 2.434099    51
## 971 0.009659380 2.430582    59
## 977 0.010167768 2.583008    66
## 983 0.008947636 2.357084    53
```
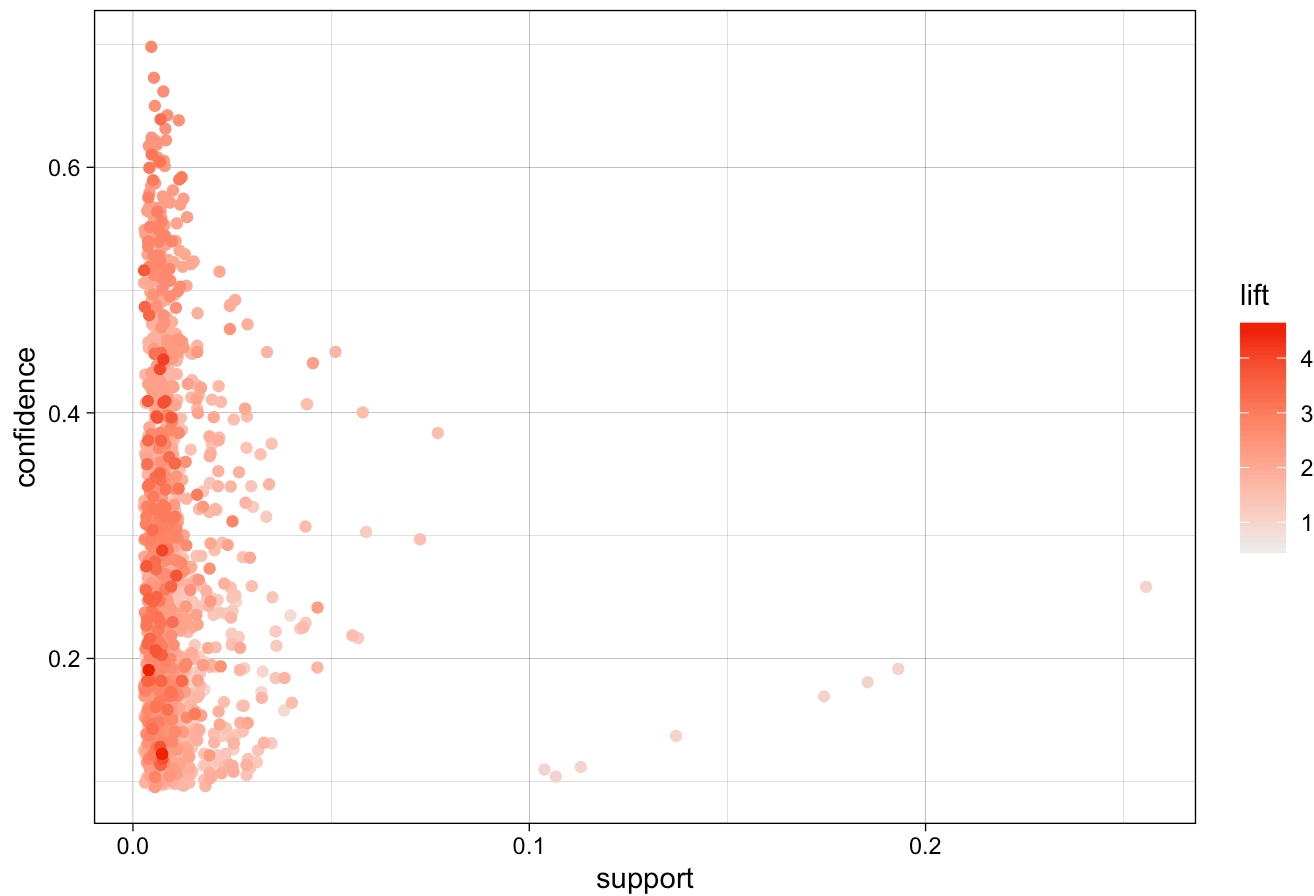
```
head(high_lift_confidence_rules)
```

```
## [1] rules       support   confidence coverage   lift       count
## <0 rows> (or 0-length row.names)
```

```
# Plot the rules in (support, confidence) space
plot(grocery_rules)
```

```
## To reduce overplotting, jitter is added! Use jitter = 0 to prevent jitter.
```
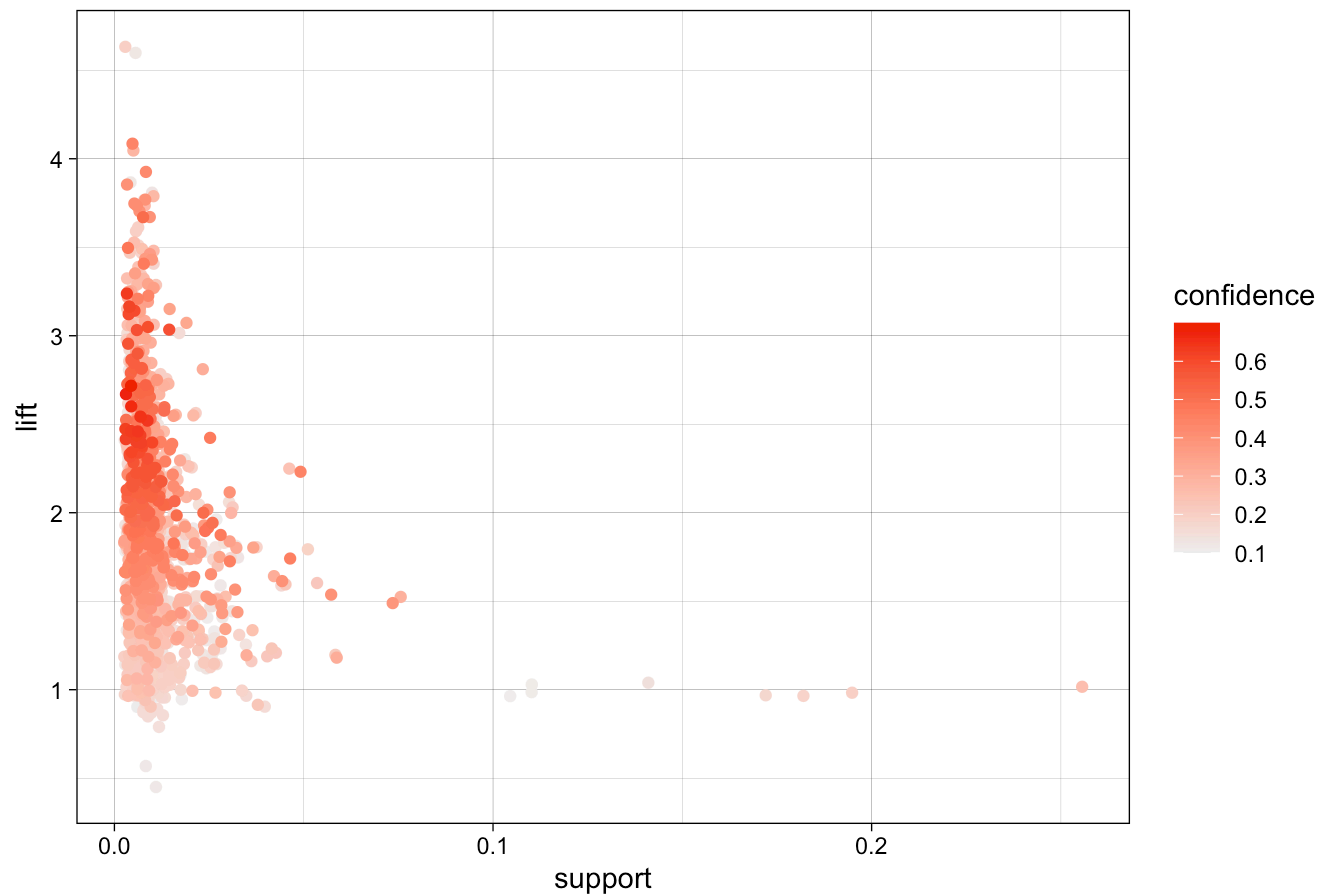
Scatter plot for 1582 rules


```
# Alternative plots
plot(grocery_rules, measure = c("support", "lift"), shading = "confidence")
```

```
## To reduce overplotting, jitter is added! Use jitter = 0 to prevent jitter.
```
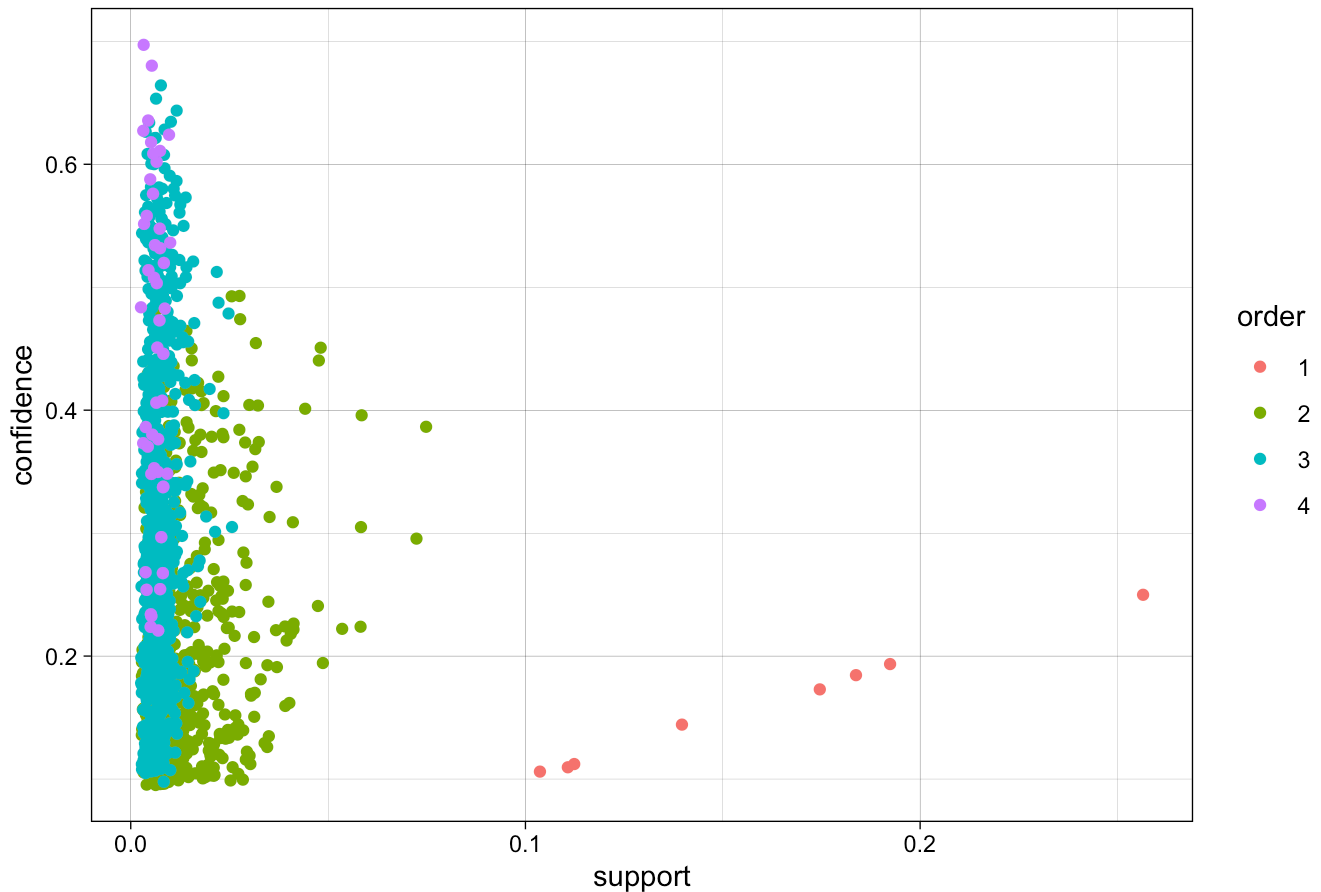
Scatter plot for 1582 rules


```
plot(grocery_rules, method='two-key plot')
```

```
## To reduce overplotting, jitter is added! Use jitter = 0 to prevent jitter.
```

Scatter plot for 1582 rules


```
# Graph-based visualization
grocery_graph <- associations2igraph(subset(grocery_rules, lift > 4), associationsAsNode
s = FALSE)
igraph::write_graph(grocery_graph, file='grocery_rules.graphml', format = "graphml")
```

The analysis of grocery shopping patterns revealed strong connections between certain items, particularly those involving root vegetables, fruits, and whole milk. For example, when shoppers buy root vegetables along with citrus or tropical fruits, there is a significantly higher likelihood that they will also purchase other vegetables, with a lift exceeding 3. Additionally, for lifts above 2, products like butter, whipped/sour cream, and eggs are bought together with whole milk. Therefore, it's recommended to implement cross promotions and store layouts that place vegetables with fruits or dairy products close to each other to encourage sales. This approach will help increase overall sales.