

STA 380, Part 2: Exercises

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```
tinytex:::install_prebuilt() tinytex:::is_tinytex()
```

Visual story telling part 1: green buildings

```
## Loading required package: dplyr
##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##   filter, lag
## The following objects are masked from 'package:base':
##   intersect, setdiff, setequal, union
## Loading required package: lattice
## Loading required package: ggformula
## Loading required package: ggplot2
## Loading required package: ggstance
##
## Attaching package: 'ggstance'
## The following objects are masked from 'package:ggplot2':
##   geom_errorbarh, GeomErrorbarh
##
## New to ggformula? Try the tutorials:
##   learnr::run_tutorial("introduction", package = "ggformula")
##   learnr::run_tutorial("refining", package = "ggformula")
## Loading required package: mosaicData
## Loading required package: Matrix
## Registered S3 method overwritten by 'mosaic':
##   method                  from
##   fortify.SpatialPolygonsDataFrame ggplot2
##
## The 'mosaic' package masks several functions from core packages in order to add
## additional features. The original behavior of these functions should not be affected by this.
##
```

```

## Note: If you use the Matrix package, be sure to load it BEFORE loading mosaic.
##
## Have you tried the ggformula package for your plots?
##
## Attaching package: 'mosaic'
##
## The following object is masked from 'package:Matrix':
##   mean
##
## The following object is masked from 'package:ggplot2':
##   stat
##
## The following objects are masked from 'package:dplyr':
##   binom.test, cor, cor.test, cov, fivenum, IQR, median, prop.test,
##   quantile, sd, t.test, var
##
## The following objects are masked from 'package:stats':
##   max, mean, min, prod, range, sample, sum
##
## -- Attaching packages -----
## v tibble  3.0.2      v purrr   0.3.4
## v tidyverse 1.1.0      v stringr 1.4.0
## v readr    1.3.1      vforcats 0.5.0
##
## -- Conflicts -----
## x mosaic::count()      masks dplyr::count()
## x purrr::cross()       masks mosaic::cross()
## x mosaic::do()         masks dplyr::do()
## x tidyverse::expand()   masks Matrix::expand()
## x dplyr::filter()      masks stats::filter()
## x ggstance::geom_errorbarh() masks ggplot2::geom_errorbarh()
## x dplyr::lag()         masks stats::lag()
## x tidyverse::pack()     masks Matrix::pack()
## x mosaic::stat()       masks ggplot2::stat()
## x mosaic::tally()      masks dplyr::tally()
## x tidyverse::unpack()   masks Matrix::unpack()
##
## corrplot 0.84 loaded
##
## 'data.frame': 7894 obs. of 23 variables:
##   $ CS_PropertyID : int 379105 122151 379839 94614 379285 94765 236739 234578 42087 233989 ...
##   $ cluster       : int 1 1 1 1 1 6 6 6 6 ...
##   $ size          : int 260300 67861 164848 93372 174307 231633 210038 225895 912011 518578 ...
##   $ empl_gr       : num 2.22 2.22 2.22 2.22 2.22 4.01 4.01 4.01 4.01 ...
##   $ Rent          : num 38.6 28.6 33.3 35 40.7 ...
##   $ leasing_rate  : num 91.4 87.1 88.9 97 96.6 ...
##   $ stories       : int 14 5 13 13 16 14 11 15 31 21 ...
##   $ age           : int 16 27 36 46 5 20 38 24 34 36 ...
##   $ renovated     : int 0 0 1 1 0 0 0 0 1 ...

```

```

## $ class_a      : int  1 0 0 0 1 1 0 1 1 1 ...
## $ class_b      : int  0 1 1 1 0 0 1 0 0 0 ...
## $ LEED         : int  0 0 0 0 0 0 0 0 0 0 ...
## $ Energystar   : int  1 0 0 0 0 0 1 0 0 0 ...
## $ green_rating  : int  1 0 0 0 0 0 1 0 0 0 ...
## $ net          : int  0 0 0 0 0 0 0 0 0 0 ...
## $ amenities    : int  1 1 1 0 1 1 1 1 1 1 ...
## $ cd_total_07   : int  4988 4988 4988 4988 4988 4988 2746 2746 2746 2746 ...
## $ hd_total07   : int  58 58 58 58 58 58 1670 1670 1670 1670 ...
## $ total_dd_07   : int  5046 5046 5046 5046 5046 5046 4416 4416 4416 4416 ...
## $ Precipitation : num  42.6 42.6 42.6 42.6 42.6 ...
## $ Gas_Costs     : num  0.0137 0.0137 0.0137 0.0137 0.0137 ...
## $ Electricity_Costs: num  0.029 0.029 0.029 0.029 0.029 ...
## $ cluster_rent   : num  36.8 36.8 36.8 36.8 36.8 ...

```

- Figure 1: Summary of Data Set

```

## CS_PropertyID      cluster      size      empl_gr
## Min.   : 1      Min.   : 1.0      Min.   : 1624      Min.   :-24.950
## 1st Qu.: 157452  1st Qu.: 272.0    1st Qu.: 50891     1st Qu.: 1.740
## Median  : 313253 Median  : 476.0    Median : 128838     Median : 1.970
## Mean    : 453003 Mean   : 588.6    Mean   : 234638     Mean   : 3.207
## 3rd Qu.: 441188  3rd Qu.: 1044.0   3rd Qu.: 294212    3rd Qu.: 2.380
## Max.    :6208103 Max.   :1230.0    Max.   :3781045    Max.   : 67.780
##                               NA's   :74
##      Rent      leasing_rate      stories      age
## Min.   : 2.98  Min.   : 0.00  Min.   : 1.00  Min.   : 0.00
## 1st Qu.: 19.50 1st Qu.: 77.85 1st Qu.: 4.00  1st Qu.: 23.00
## Median  : 25.16 Median : 89.53  Median : 10.00 Median : 34.00
## Mean    : 28.42 Mean   : 82.61  Mean   : 13.58 Mean   : 47.24
## 3rd Qu.: 34.18 3rd Qu.: 96.44  3rd Qu.: 19.00 3rd Qu.: 79.00
## Max.    :250.00 Max.   :100.00  Max.   :110.00 Max.   :187.00
##
##      renovated      class_a      class_b      LEED
## Min.   :0.00000  Min.   :0.00000  Min.   :0.00000  Min.   :0.0000000
## 1st Qu.:0.00000  1st Qu.:0.00000  1st Qu.:0.00000  1st Qu.:0.0000000
## Median :0.00000  Median :0.00000  Median :0.00000  Median :0.0000000
## Mean   :0.3795   Mean   :0.39999  Mean   :0.4595   Mean   :0.006841
## 3rd Qu.:1.00000  3rd Qu.:1.00000  3rd Qu.:1.00000  3rd Qu.:0.0000000
## Max.   :1.00000  Max.   :1.00000  Max.   :1.00000  Max.   :1.0000000
##
##      Energystar      green_rating      net      amenities
## Min.   :0.00000  Min.   :0.00000  Min.   :0.00000  Min.   :0.0000
## 1st Qu.:0.00000  1st Qu.:0.00000  1st Qu.:0.00000  1st Qu.:0.0000
## Median :0.00000  Median :0.00000  Median :0.00000  Median :1.0000
## Mean   :0.08082  Mean   :0.08677  Mean   :0.03471  Mean   :0.5266
## 3rd Qu.:0.00000  3rd Qu.:0.00000  3rd Qu.:0.00000  3rd Qu.:1.0000
## Max.   :1.00000  Max.   :1.00000  Max.   :1.00000  Max.   :1.0000
##
##      cd_total_07      hd_total07      total_dd_07      Precipitation
## Min.   : 39      Min.   : 0      Min.   :2103      Min.   :10.46
## 1st Qu.: 684     1st Qu.:1419    1st Qu.:2869      1st Qu.:22.71
## Median : 966     Median :2739    Median :4979      Median :23.16
## Mean   :1229     Mean   :3432    Mean   :4661      Mean   :31.08
## 3rd Qu.:1620     3rd Qu.:4796    3rd Qu.:6413      3rd Qu.:43.89

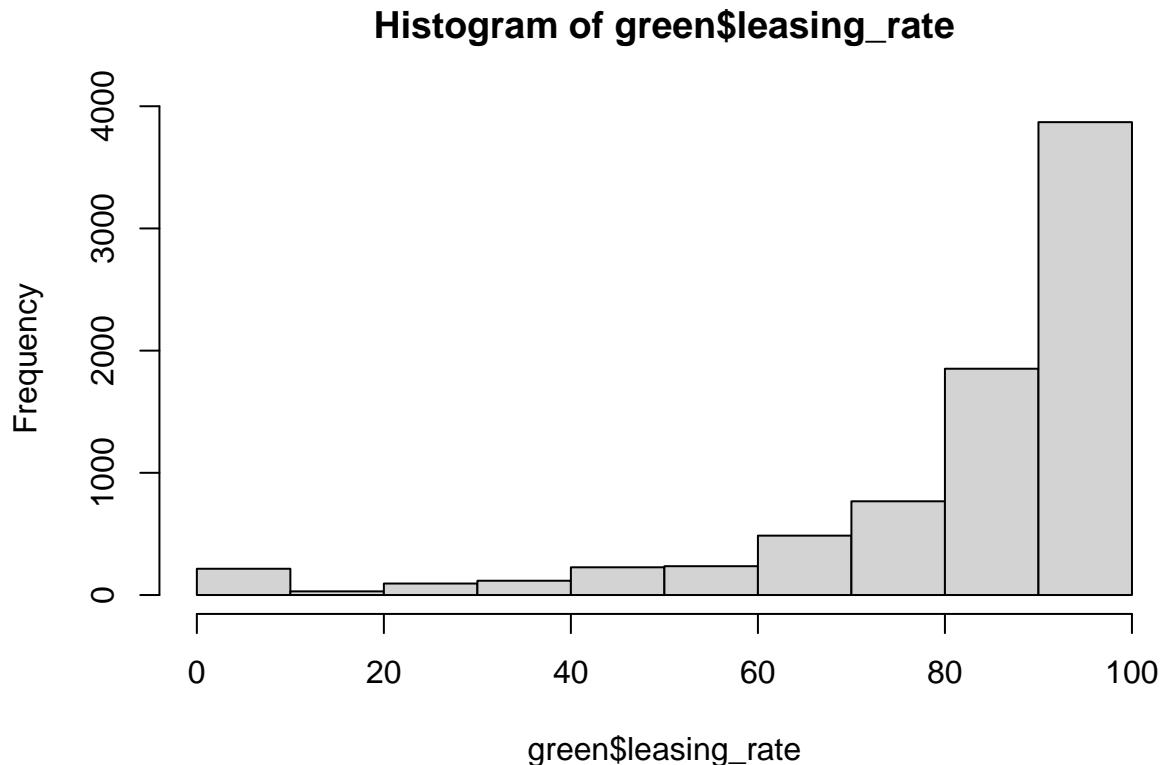
```

```

##  Max.    :5240    Max.    :7200    Max.    :8244    Max.    :58.02
##
##    Gas_Costs      Electricity_Costs  cluster_rent
##  Min.    :0.009487  Min.    :0.01780  Min.    : 9.00
##  1st Qu.:0.010296  1st Qu.:0.02330  1st Qu.:20.00
##  Median  :0.010296  Median  :0.03274  Median  :25.14
##  Mean    :0.011336  Mean    :0.03096  Mean    :27.50
##  3rd Qu.:0.011816  3rd Qu.:0.03781  3rd Qu.:34.00
##  Max.    :0.028914  Max.    :0.06280  Max.    :71.44
##

```

- Before deleting any data points from the data set, a histogram was made for some variables to see the distribution shape of the data.
- Figure 2: Histogram of Leasing_rate



- The leasing_rate histogram is skewed to the left, and there is a rise in number of leasing rates between 0% and 10%, which is located at the end of the skewed tail.

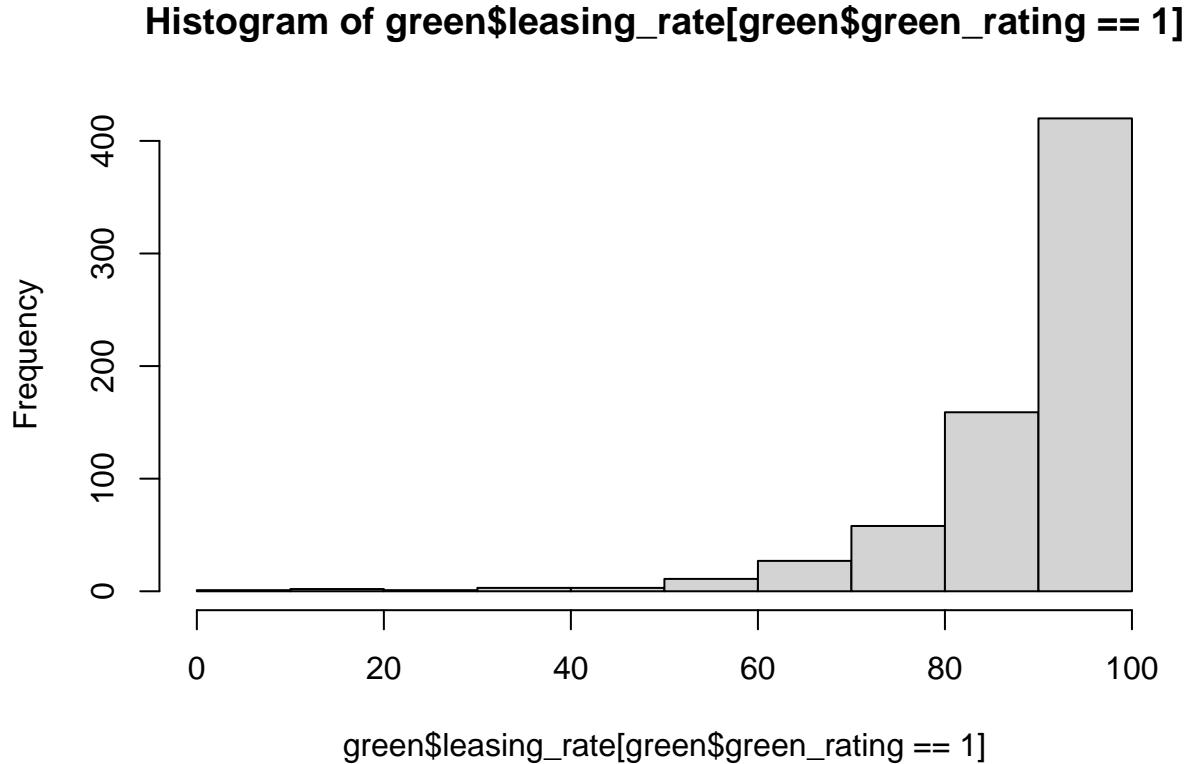
```

## [1] 23880 23881 23882 23883 23884 23885 23886 23887 23888 23889 23890 23891
## [13] 23892 23893 23894 23895 23896 23897 23898 23899 23900 23901 26268 26269
## [25] 26270 26271 26272 26273 26274 26275 26276 26277 27466 27467 27468 27469
## [37] 28502 28503 28504 28505 28506 28507 28508 28509 28510 28511 28512 28513
## [49] 28514 28515 28516 28517 28518 28519 28520 28521 28522 28523 28524 28525
## [61] 28526 28527 28528 28529 28530 28531 28532 28533 30108 30109 30110 30846
## [73] 30847 30848

```

- Observations that were not available were dropped. None of the variables are correlated with rent except for cluster_rent, which is not essential to the analysis.

- Out of 7894 locations, less than 10% of the total number of buildings are green buildings, so a histogram of green buildings' leasing_rate should be considered.
- Figure 3: Histogram of Leasing_rate Conditional on green_rate



- Comparing Figure 2 to Figure 3, the data is still skewed to the left, but there is no rise in the number of leasing rates between 0% and 10% for green buildings.
- Figure 4: Summary Statistics for Green Buildings

```
##   CS_PropertyID      cluster      size      empl_gr
##   Min.   : 2883   Min.   : 1.0   Min.   : 10560   Min.   :-24.950
##   1st Qu.: 246763  1st Qu.: 294.0  1st Qu.: 120000  1st Qu.: 1.770
##   Median  : 280498  Median : 489.0  Median : 241150  Median : 2.380
##   Mean    : 399034  Mean   : 622.9  Mean   : 325781  Mean   : 3.506
##   3rd Qu.: 409817  3rd Qu.:1047.0  3rd Qu.: 417446  3rd Qu.: 2.970
##   Max.    :6174162  Max.   :1230.0  Max.   :1721242  Max.   : 67.780
##                               NA's   :6
##      Rent      leasing_rate      stories      age
##      Min.   : 8.87   Min.   : 0.00   Min.   : 1.00   Min.   : 0.00
##      1st Qu.: 21.50  1st Qu.: 85.40  1st Qu.: 5.00  1st Qu.: 18.00
##      Median  : 27.60  Median : 92.92  Median :11.00  Median : 22.00
##      Mean    : 30.02  Mean   : 89.28  Mean   :15.33  Mean   : 23.85
##      3rd Qu.: 35.50  3rd Qu.: 97.70  3rd Qu.:21.00  3rd Qu.: 26.00
##      Max.    :138.07  Max.   :100.00  Max.   :76.00  Max.   :116.00
##      renovated      class_a      class_b      LEED
##      Min.   :0.00000  Min.   :0.00000  Min.   :0.00000  Min.   :0.000000
```

```

## 1st Qu.:0.0000 1st Qu.:1.0000 1st Qu.:0.0000 1st Qu.:0.00000
## Median :0.0000 Median :1.0000 Median :0.0000 Median :0.00000
## Mean   :0.2131 Mean   :0.7971 Mean   :0.1927 Mean   :0.07883
## 3rd Qu.:0.0000 3rd Qu.:1.0000 3rd Qu.:0.0000 3rd Qu.:0.00000
## Max.   :1.0000 Max.   :1.0000 Max.   :1.0000 Max.   :1.00000
##
##   Energystar   green_rating      net      amenities
## Min.   :0.0000 Min.   :1      Min.   :0.00000 Min.   :0.000
## 1st Qu.:1.0000 1st Qu.:1      1st Qu.:0.00000 1st Qu.:0.000
## Median :1.0000 Median :1      Median :0.00000 Median :1.000
## Mean   :0.9314 Mean   :1      Mean   :0.05693 Mean   :0.727
## 3rd Qu.:1.0000 3rd Qu.:1      3rd Qu.:0.00000 3rd Qu.:1.000
## Max.   :1.0000 Max.   :1      Max.   :1.00000 Max.   :1.000
##
##   cd_total_07   hd_total07   total_dd_07   Precipitation   Gas_Costs
## Min.   : 130   Min.   : 0   Min.   :2103   Min.   :10.46   Min.   :0.00950
## 1st Qu.: 684   1st Qu.:1419  1st Qu.:2103   1st Qu.:22.71  1st Qu.:0.01030
## Median : 921   Median :1670   Median :4416   Median :22.71  Median :0.01030
## Mean   :1426   Mean   :2794   Mean   :4219   Mean   :29.19  Mean   :0.01109
## 3rd Qu.:1813   3rd Qu.:4347  3rd Qu.:5720   3rd Qu.:40.70  3rd Qu.:0.01180
## Max.   :5240   Max.   :7200   Max.   :8244   Max.   :58.02  Max.   :0.02890
##
##   Electricity_Costs   cluster_rent
## Min.   :0.01780   Min.   : 9.00
## 1st Qu.:0.02350   1st Qu.:19.80
## Median :0.03410   Median :25.38
## Mean   :0.03158   Mean   :26.89
## 3rd Qu.:0.03780   3rd Qu.:32.30
## Max.   :0.06280   Max.   :71.44
##

```

- Figure 5: Summary Statistics for Non Green Buildings

```

##   CS_PropertyID   cluster      size      empl_gr
## Min.   : 1   Min.   : 1.0   Min.   : 1624   Min.   :-24.950
## 1st Qu.: 157087 1st Qu.: 269.0  1st Qu.: 46043  1st Qu.: 1.740
## Median : 313297 Median : 474.0   Median :118696   Median : 1.970
## Mean   : 458131 Mean   : 585.4   Mean   :225977   Mean   : 3.178
## 3rd Qu.: 455765 3rd Qu.:1044.0  3rd Qu.:279411  3rd Qu.: 2.380
## Max.   :6208103 Max.   :1230.0   Max.   :3781045  Max.   : 67.780
##
##   Rent      leasing_rate      stories      age
## Min.   : 2.98   Min.   : 0.00   Min.   : 1.00   Min.   : 0.00
## 1st Qu.: 19.18  1st Qu.: 77.05  1st Qu.: 4.00   1st Qu.: 24.00
## Median : 25.00  Median : 89.17  Median :10.00   Median : 37.00
## Mean   : 28.27  Mean   : 81.97  Mean   :13.42   Mean   : 49.47
## 3rd Qu.: 34.00  3rd Qu.: 96.28  3rd Qu.:19.00   3rd Qu.: 80.00
## Max.   :250.00  Max.   :100.00  Max.   :110.00  Max.   :187.00
##
##   renovated      class_a      class_b      LEED      Energystar
## Min.   :0.0000  Min.   :0.0000  Min.   :0.0000  Min.   :0  Min.   :0
## 1st Qu.:0.0000  1st Qu.:0.0000  1st Qu.:0.0000  1st Qu.:0  1st Qu.:0
## Median :0.0000  Median :0.0000  Median :0.0000  Median :0  Median :0
## Mean   :0.3953  Mean   :0.3622  Mean   :0.4848  Mean   :0  Mean   :0
## 3rd Qu.:1.0000  3rd Qu.:1.0000  3rd Qu.:1.0000  3rd Qu.:0  3rd Qu.:0

```

```

##  Max.    :1.0000  Max.    :1.0000  Max.    :1.0000  Max.    :0  Max.    :0
##
##  green_rating      net      amenities      cd_total_07      hd_total07
##  Min.    :0      Min.    :0.0000  Min.    :0.0000  Min.    : 39  Min.    : 0
##  1st Qu.:0      1st Qu.:0.0000  1st Qu.:0.0000  1st Qu.: 684  1st Qu.:1419
##  Median  :0      Median  :0.0000  Median  :1.0000  Median  : 966  Median  :2739
##  Mean    :0      Mean    :0.0326  Mean    :0.5076  Mean    :1211  Mean    :3493
##  3rd Qu.:0      3rd Qu.:0.0000  3rd Qu.:1.0000  3rd Qu.:1620  3rd Qu.:5042
##  Max.    :0      Max.    :1.0000  Max.    :1.0000  Max.    :5240  Max.    :7200
##
##  total_dd_07      Precipitation      Gas_Costs      Electricity_Costs
##  Min.    :2103  Min.    :10.46  Min.    :0.009487  Min.    :0.01782
##  1st Qu.:2869  1st Qu.:22.71  1st Qu.:0.010296  1st Qu.:0.02330
##  Median  :4979  Median  :23.16  Median  :0.010296  Median  :0.03274
##  Mean    :4703  Mean    :31.26  Mean    :0.011359  Mean    :0.03090
##  3rd Qu.:6558  3rd Qu.:43.89  3rd Qu.:0.011816  3rd Qu.:0.03781
##  Max.    :8244  Max.    :58.02  Max.    :0.028914  Max.    :0.06278
##
##  cluster_rent
##  Min.    : 9.00
##  1st Qu.:20.17
##  Median :25.13
##  Mean   :27.55
##  3rd Qu.:34.18
##  Max.   :71.44
##
##
##  Call:
##  lm(formula = Rent ~ LEED, data = green)
##
##  Residuals:
##      Min      1Q      Median      3Q      Max
## -25.430 -8.910 -3.315  5.770 221.590
##
##  Coefficients:
##              Estimate Std. Error t value Pr(>|t|)    
##  (Intercept) 28.4097    0.1703 166.854 <2e-16 ***
##  LEED        1.2906    2.0586  0.627   0.531    
##  ---
##  Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##  Residual standard error: 15.08 on 7892 degrees of freedom
##  Multiple R-squared:  4.98e-05,  Adjusted R-squared:  -7.69e-05
##  F-statistic: 0.393 on 1 and 7892 DF,  p-value: 0.5307


- LEED is not statistically significant, so it cannot be a reliable variable to predict premium green rent prices.


##
##  Call:
##  glm(formula = Rent ~ ., data = green[3:23])
##
##  Deviance Residuals:
##      Min      1Q      Median      3Q      Max

```

```

## -53.869 -3.596 -0.531 2.497 174.533
##
## Coefficients: (1 not defined because of singularities)
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept) -7.716e+00 9.973e-01 -7.737 1.14e-14 ***
## size          6.686e-06 6.559e-07 10.193 < 2e-16 ***
## empl_gr       6.069e-02 1.693e-02  3.585 0.000340 ***
## leasing_rate  8.877e-03 5.320e-03  1.669 0.095196 .
## stories       -3.622e-02 1.617e-02 -2.240 0.025149 *
## age           -1.272e-02 4.713e-03 -2.698 0.006987 **
## renovated     -2.201e-01 2.566e-01 -0.858 0.390920
## class_a       2.854e+00 4.379e-01  6.518 7.58e-11 ***
## class_b       1.179e+00 3.428e-01  3.439 0.000587 ***
## LEED          1.901e+00 3.584e+00  0.530 0.595837
## Energystar   -4.444e-02 3.819e+00 -0.012 0.990715
## green_rating  5.536e-01 3.840e+00  0.144 0.885375
## net           -2.537e+00 5.931e-01 -4.278 1.91e-05 ***
## amenities     6.043e-01 2.504e-01  2.414 0.015809 *
## cd_total_07  -1.266e-04 1.464e-04 -0.865 0.387164
## hd_total07   5.369e-04 8.947e-05  6.002 2.04e-09 ***
## total_dd_07   NA        NA        NA        NA
## Precipitation 4.391e-02 1.598e-02  2.748 0.006014 **
## Gas_Costs     -3.444e+02 7.614e+01 -4.523 6.18e-06 ***
## Electricity_Costs 1.938e+02 2.489e+01  7.785 7.87e-15 ***
## cluster_rent   1.008e+00 1.402e-02  71.938 < 2e-16 ***
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 88.70454)
##
## Null deviance: 1783530 on 7819 degrees of freedom
## Residual deviance: 691895 on 7800 degrees of freedom
## (74 observations deleted due to missingness)
## AIC: 57289
##
## Number of Fisher Scoring iterations: 2

```

- Statistically Significant with P-Values < .05: size, empl_gr, stories, age, class-a, class_b, net, amenities, hd_total07, Precipitation, Gas_Costs, Electricity_Costs, and cluster_rent
- Not Statistically Significant: leasing_rate, renovated, LEED, Energystar, green_rating, net, cd_total_07, total_dd_07
- Outliers can make the mean unreliable. However, the mean rent for green buildings is 30.02, and the median rent for green buildings is 27.6. The mean rent for non green buildings is 28.27, and the median rent for non green buildings is 25. Because the mean and median are not the same for green and non green buildings, the mean should be considered in the analysis, especially if the distribution of data is skewed to the left.
- The worker suggested that a 250,000 square foot green building would generate more revenue than a non green building because the median rent is higher. This assumption is problematic. Green buildings have different costs than non green buildings, which would affect profitability.
- The worker assumes rent prices won't change over time. The age and class of a building effects revenue.

Visual story telling part 2: flights at ABIA

```
## Loading required package: sp

## rgdal: version: 1.5-16, (SVN revision 1050)
## Geospatial Data Abstraction Library extensions to R successfully loaded
## Loaded GDAL runtime: GDAL 3.1.1, released 2020/06/22
## Path to GDAL shared files: /Library/Frameworks/R.framework/Versions/4.0/Resources/library/rgdal/gdal
## GDAL binary built with GEOS: TRUE
## Loaded PROJ runtime: Rel. 6.3.1, February 10th, 2020, [PJ_VERSION: 631]
## Path to PROJ shared files: /Library/Frameworks/R.framework/Versions/4.0/Resources/library/rgdal/proj
## Linking to sp version:1.4-2
## To mute warnings of possible GDAL/OSR exportToProj4() degradation,
## use options("rgdal_show_exportToProj4_warnings"="none") before loading rgdal.

##
## Attaching package: 'rgdal'

## The following object is masked from 'package:mosaic':
##
##     project

##
## Attaching package: 'lubridate'

## The following objects are masked from 'package:base':
##
##     date, intersect, setdiff, union

## randomForest 4.6-14

## Type rfNews() to see new features/changes/bug fixes.

##
## Attaching package: 'randomForest'

## The following object is masked from 'package:ggplot2':
##
##     margin

## The following object is masked from 'package:dplyr':
##
##     combine

##
## Attaching package: 'pdp'

## The following object is masked from 'package:purrr':
##
##     partial
```

- Figure 1: Summary Statistics for Each Variable

```
##      Year        Month       DayofMonth     DayOfWeek      DepTime
##  Min.  :2008  Min.   : 1.00  Min.   : 1.00  Min.   :1.000  Min.   : 1
##  1st Qu.:2008  1st Qu.: 3.00  1st Qu.: 8.00  1st Qu.:2.000  1st Qu.: 917
##  Median :2008  Median : 6.00  Median :16.00  Median :4.000  Median :1329
##  Mean   :2008  Mean   : 6.29  Mean   :15.73  Mean   :3.902  Mean   :1329
##  3rd Qu.:2008  3rd Qu.: 9.00  3rd Qu.:23.00  3rd Qu.:6.000  3rd Qu.:1728
##  Max.   :2008  Max.   :12.00  Max.   :31.00  Max.   :7.000  Max.   :2400
##                               NA's   :1413
```

```

##      CRSDepTime      ArrTime      CRSArrTime UniqueCarrier      FlightNum
##  Min.   : 55   Min.   : 1   Min.   : 5   Length:99260   Min.   : 1
##  1st Qu.: 915  1st Qu.:1107  1st Qu.:1115  Class :character  1st Qu.: 640
##  Median :1320  Median :1531  Median :1535  Mode  :character  Median :1465
##  Mean   :1320  Mean   :1487  Mean   :1505                  Mean   :1917
##  3rd Qu.:1720  3rd Qu.:1903  3rd Qu.:1902                  3rd Qu.:2653
##  Max.   :2346  Max.   :2400  Max.   :2400                  Max.   :9741
##  NA's   :1567
##      TailNum      ActualElapsedTime CRSElapsedTime      AirTime
##  Length:99260   Min.   :22.0   Min.   :17.0   Min.   : 3.00
##  Class :character  1st Qu.:57.0   1st Qu.:58.0   1st Qu.: 38.00
##  Mode  :character  Median :125.0   Median :130.0   Median :105.00
##                  Mean   :120.2   Mean   :122.1   Mean   : 99.81
##                  3rd Qu.:164.0   3rd Qu.:165.0   3rd Qu.:142.00
##                  Max.   :506.0   Max.   :320.0   Max.   :402.00
##                  NA's   :1601   NA's   :11    NA's   :1601
##      ArrDelay      DepDelay      Origin      Dest
##  Min.   :-129.000  Min.   :-42.000  Length:99260  Length:99260
##  1st Qu.: -9.000  1st Qu.: -4.000  Class :character  Class :character
##  Median : -2.000  Median :  0.000  Mode  :character  Mode  :character
##  Mean   :  7.065  Mean   :  9.171
##  3rd Qu.: 10.000  3rd Qu.:  8.000
##  Max.   : 948.000  Max.   :875.000
##  NA's   :1601    NA's   :1413
##      Distance      TaxiIn      TaxiOut      Cancelled
##  Min.   : 66   Min.   : 0.000  Min.   : 1.00  Min.   :0.00000
##  1st Qu.: 190  1st Qu.: 4.000  1st Qu.: 9.00  1st Qu.:0.00000
##  Median : 775  Median : 5.000  Median :12.00  Median :0.00000
##  Mean   : 705  Mean   : 6.413  Mean   :13.96  Mean   :0.01431
##  3rd Qu.:1085  3rd Qu.: 7.000  3rd Qu.:16.00  3rd Qu.:0.00000
##  Max.   :1770  Max.   :143.000 Max.   :305.00  Max.   :1.00000
##  NA's   :1567  NA's   :1419
##      CancellationCode      Diverted      CarrierDelay      WeatherDelay
##  Length:99260   Min.   :0.000000  Min.   : 0.00  Min.   : 0.00
##  Class :character  1st Qu.:0.000000  1st Qu.: 0.00  1st Qu.: 0.00
##  Mode  :character  Median :0.000000  Median : 0.00  Median : 0.00
##                  Mean   :0.001824  Mean   : 15.39  Mean   : 2.24
##                  3rd Qu.:0.000000  3rd Qu.: 16.00  3rd Qu.: 0.00
##                  Max.   :1.000000  Max.   :875.00  Max.   :412.00
##                  NA's   :79513   NA's   :79513  NA's   :79513
##      NASDelay      SecurityDelay      LateAircraftDelay
##  Min.   : 0.00  Min.   : 0.00  Min.   : 0.00
##  1st Qu.: 0.00  1st Qu.: 0.00  1st Qu.: 0.00
##  Median : 2.00  Median : 0.00  Median : 6.00
##  Mean   :12.47  Mean   : 0.07  Mean   :22.97
##  3rd Qu.:16.00  3rd Qu.: 0.00  3rd Qu.:30.00
##  Max.   :367.00  Max.   :199.00 Max.   :458.00
##  NA's   :79513   NA's   :79513  NA's   :79513

```

- The output above shows the minimum & maximum values, the median, and mean for each variable.
- Figure 2: Logistic Regression Dependent-DepTime & Independent-Month, DayOfWeek, ArrTime, & Distance

##

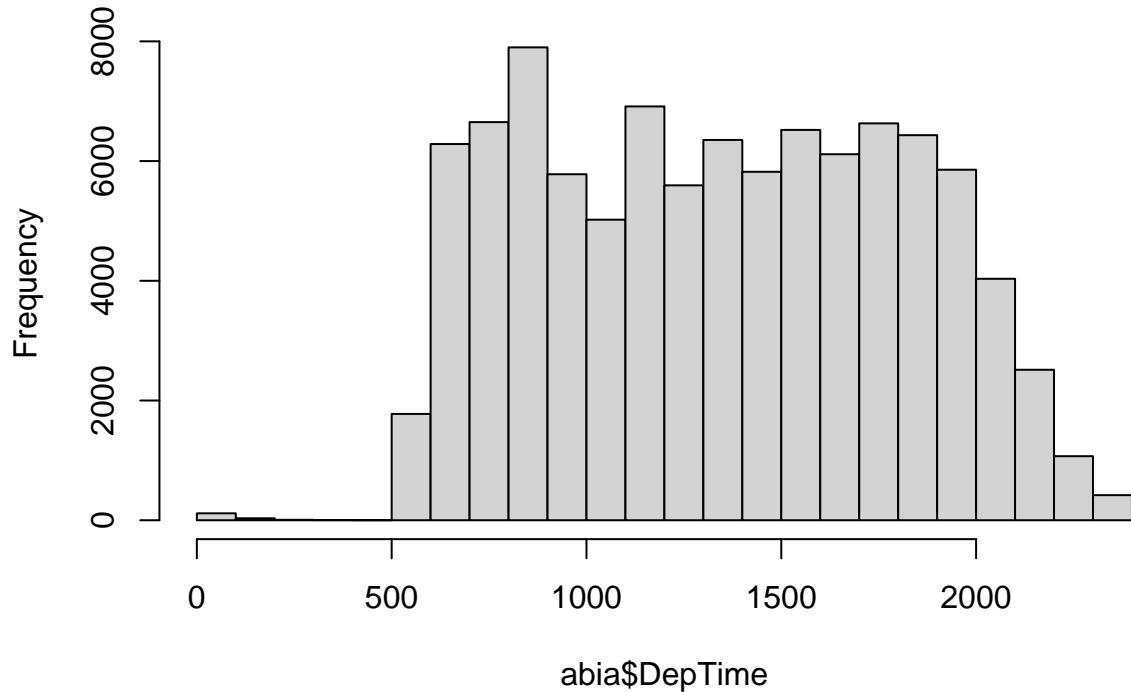
```

## Call:
## glm(formula = abia$DepTime ~ abia$Month + abia$DayOfWeek + abia$ArrTime +
##      abia$Distance)
##
## Deviance Residuals:
##      Min      1Q  Median      3Q      Max
## -550.94 -146.86 -35.55  88.78 2135.22
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 342.091006  4.013364 85.238 < 2e-16 ***
## abia$Month   -1.095293  0.275835 -3.971 7.17e-05 ***
## abia$DayOfWeek 1.203112  0.468969  2.565  0.0103 *  
## abia$ArrTime  0.726061  0.001885 385.122 < 2e-16 ***
## abia$Distance -0.128721  0.001997 -64.457 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 84775.91)
##
## Null deviance: 2.0941e+10 on 97692 degrees of freedom
## Residual deviance: 8.2816e+09 on 97688 degrees of freedom
## (1567 observations deleted due to missingness)
## AIC: 1385845
##
## Number of Fisher Scoring iterations: 2

```

- P-values less than .05 are statistically significant to the logistic regresison model. All independent variables are statistically significant to the model.
- Figure 3: Histogram of DepTime

Histogram of abia\$DepTime



- There aren't very many departures between 0 and 500. It is difficult to assume normality.
- Visualization of ArrDelay Throughout Different Locations: Consistent Throughout All Regions

```
## Warning in showSRID(uprojargs, format = "PROJ", multiline = "NO"): Discarded
## datum unknown in CRS definition

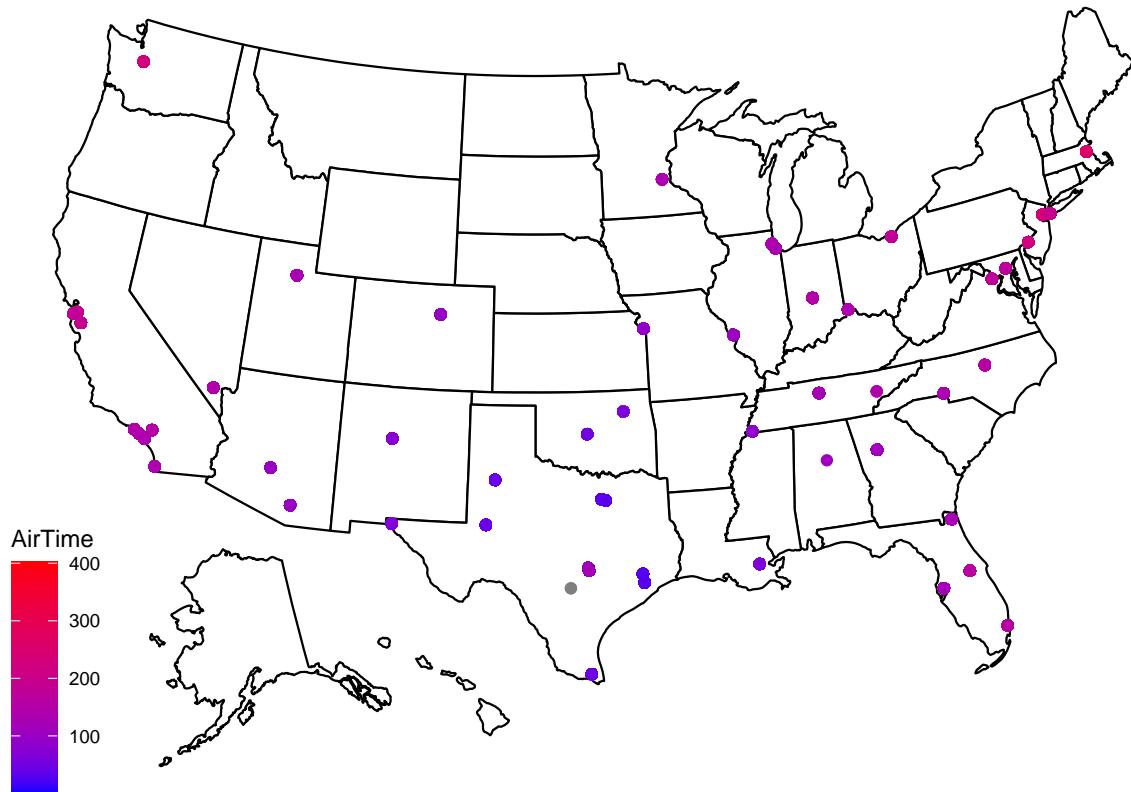
## Warning in sp::proj4string(transformed): CRS object has comment, which is lost
## in output

## Warning in showSRID(uprojargs, format = "PROJ", multiline = "NO"): Discarded
## datum Unknown based on Normal Sphere (r=6370997) ellipsoid in CRS definition

## Warning in sp::proj4string(transformed): CRS object has comment, which is lost
## in output

## Warning in showSRID(uprojargs, format = "PROJ", multiline = "NO"): Discarded
## datum Unknown based on Normal Sphere (r=6370997) ellipsoid in CRS definition

## Warning: Use of 'map_df$x' is discouraged. Use 'x' instead.
## Warning: Use of 'map_df$y' is discouraged. Use 'y' instead.
## Warning: Use of 'map_df$group' is discouraged. Use 'group' instead.
```



- Visualization of AirTimethroughout Different Locations: Central Region-Less AirTime

Portfolio Modeling

In this problem, you will construct three different portfolios of exchange-traded funds, or ETFs, and use bootstrap resampling to analyze the short-term tail risk of your portfolios.

• The exchange-traded funds (ETFs) was selected considering unique portfolios. 6 ETFs - “QQQ”, “EPV”, “AOR”, “SVXY”, “YYY” and “SPY” were selected. 5 years of ETF data starting from 01-Jan-2014 were analyzed. ETF QQQ trust is one of the largest, consisting of only non-financial stocks. EPV is a low performing ETF. AQR is a diverse ETF. SVXY is a high risk ETF because the performance is dependent on the market volatility rather than security. YYY is an amplified high income ETF. SPY is one of the safest (in terms of risk, represented as sigma (standard deviation) and largest ETFs.

```

## Loading required package: xts
## Loading required package: zoo
##
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':
##
##     as.Date, as.Date.numeric

##
```

```

## Attaching package: 'xts'

## The following objects are masked from 'package:dplyr':
##   first, last

## Loading required package: TTR

## Registered S3 method overwritten by 'quantmod':
##   method           from
##   as.zoo.data.frame zoo

## Version 0.4-0 included new data defaults. See ?getSymbols.

## Attaching package: 'foreach'

## The following objects are masked from 'package:purrr':
##   accumulate, when

## 'getSymbols' currently uses auto.assign=TRUE by default, but will
## use auto.assign=FALSE in 0.5-0. You will still be able to use
## 'loadSymbols' to automatically load data. getOption("getSymbols.env")
## and getOption("getSymbols.auto.assign") will still be checked for
## alternate defaults.

## This message is shown once per session and may be disabled by setting
## options("getSymbols.warning4.0"=FALSE). See ?getSymbols for details.

## [1] "SPY"  "SVXY" "QQQ"  "YYY"  "IWF"

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/SPY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/SPY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query1.finance.yahoo.com/v7/finance/download/SVXY?
## period1=-2208988800&period2=1597708800&interval=1d&events=div&crumb=H8XVRQ1eiut'

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/SVXY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/SVXY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/QQQ?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'

```

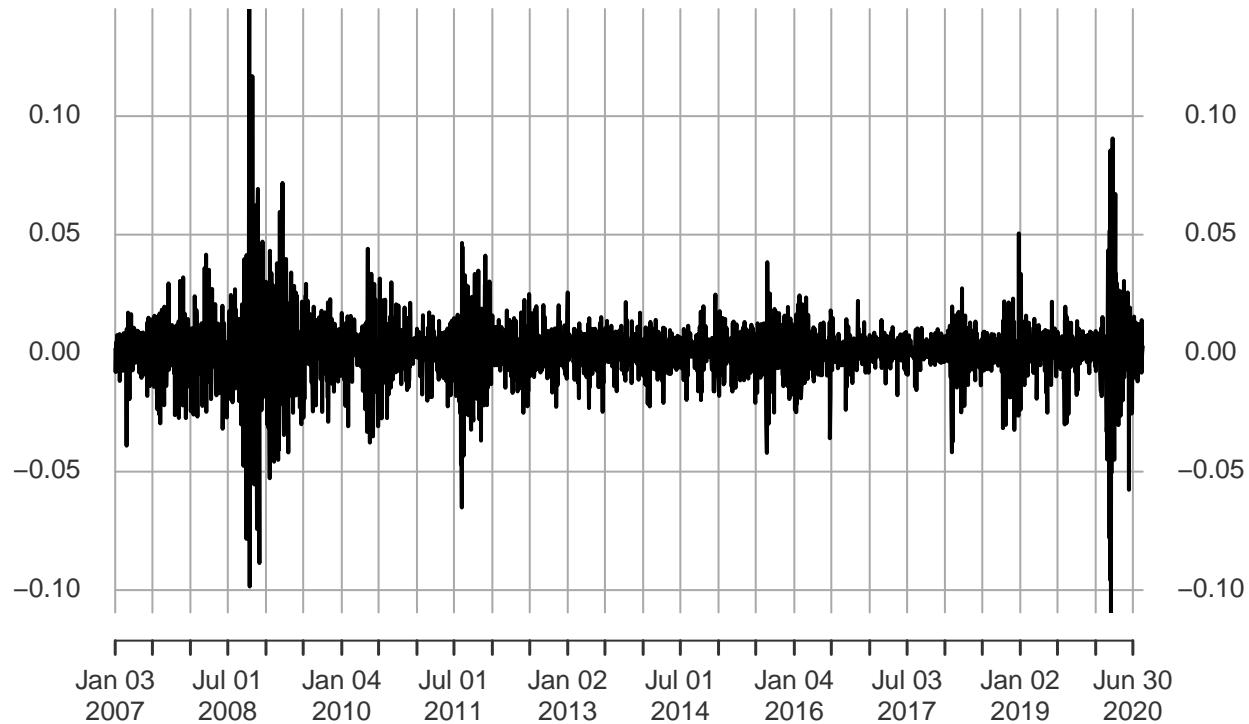
```

## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/QQQ?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/YYY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query1.finance.yahoo.com/v7/finance/download/YYY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/IWF?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query1.finance.yahoo.com/v7/finance/download/IWF?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiut'

```

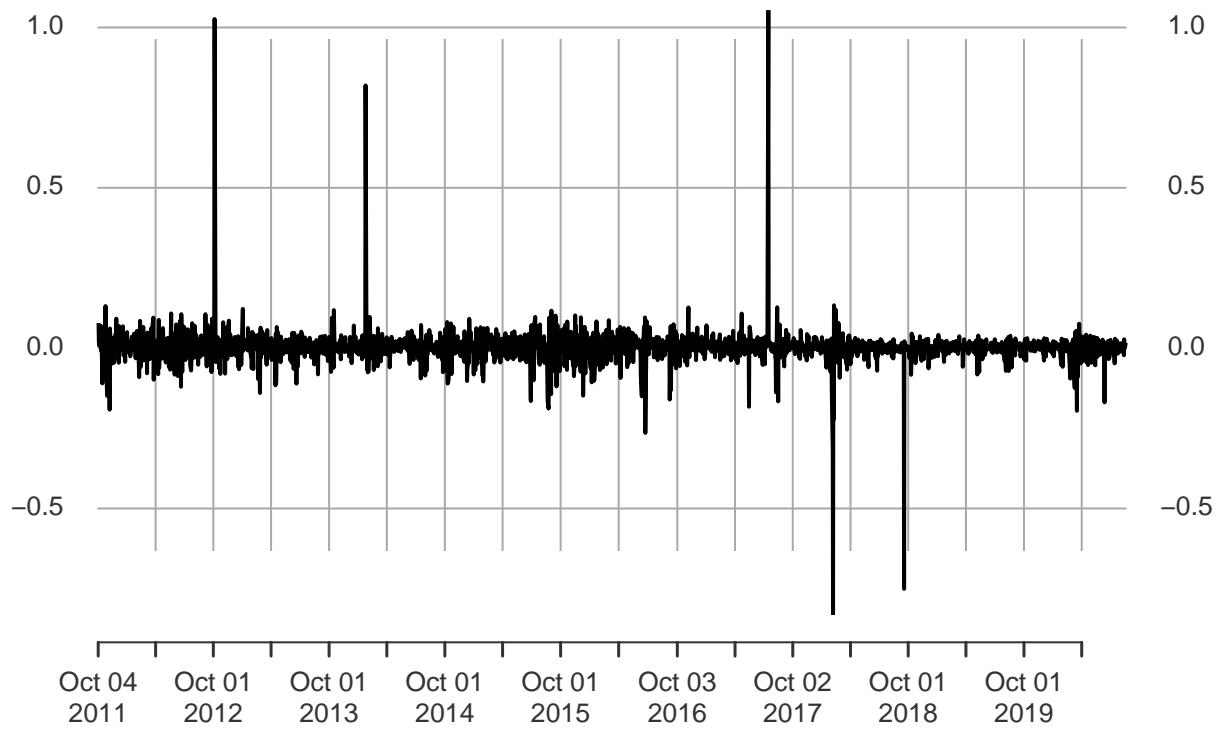
CICI(SPYa)

2007-01-03 / 2020-08-17



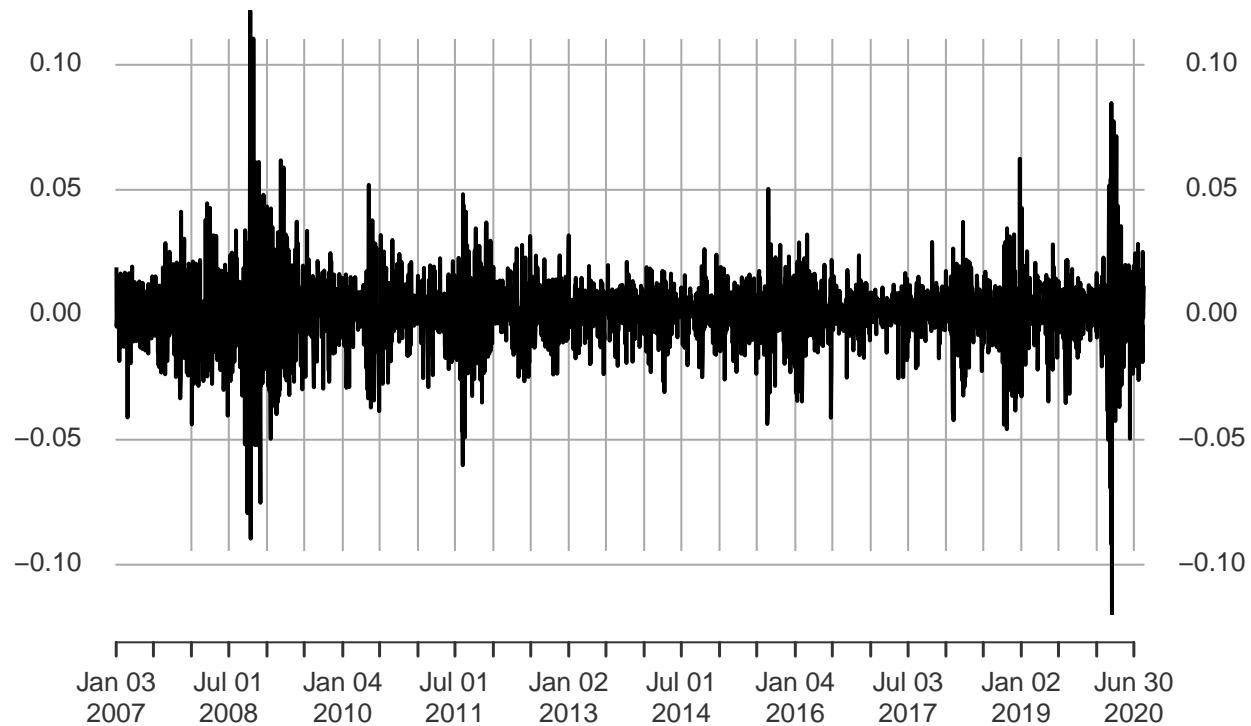
CICI(SVXYa)

2011-10-04 / 2020-08-17



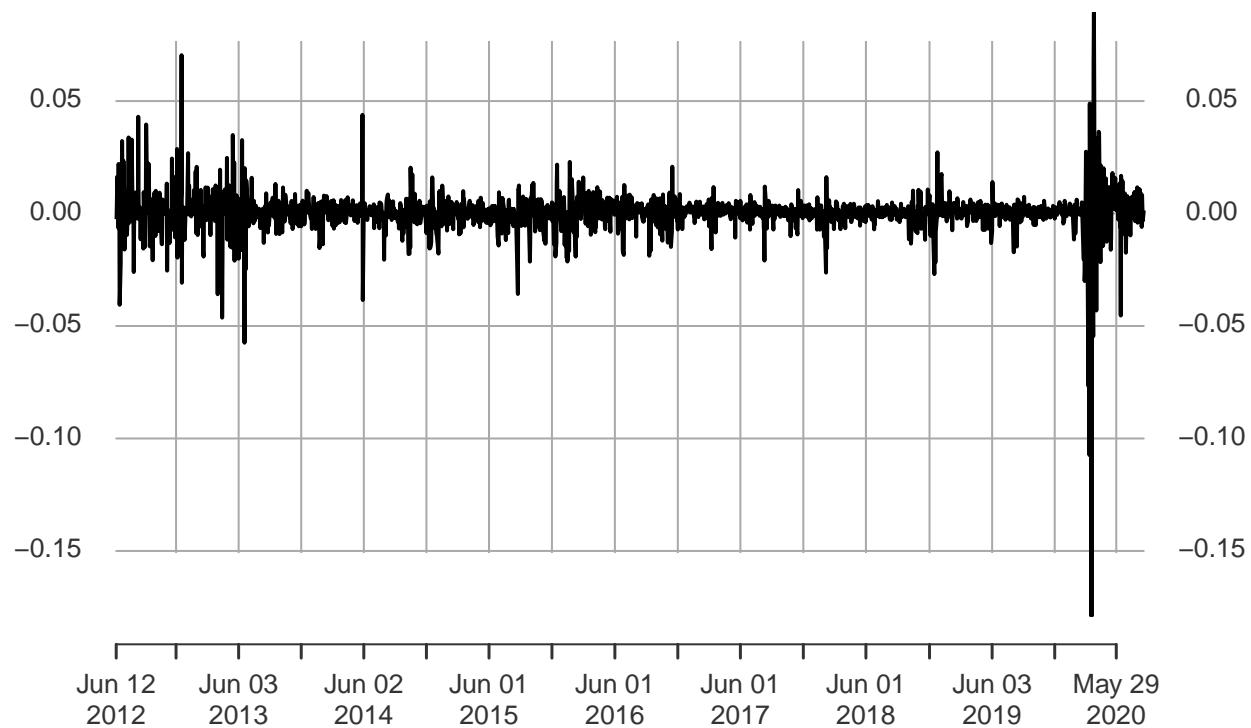
CICI(QQQa)

2007-01-03 / 2020-08-17



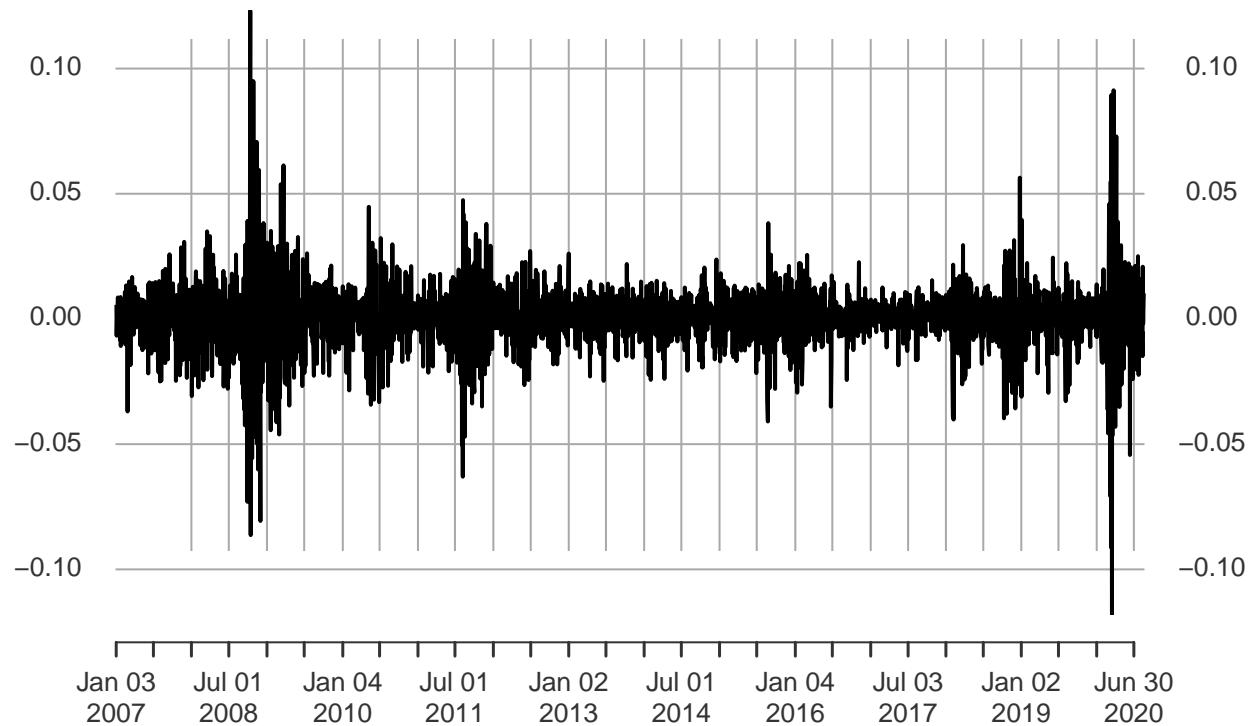
CICI(YYYYa)

2012-06-12 / 2020-08-17

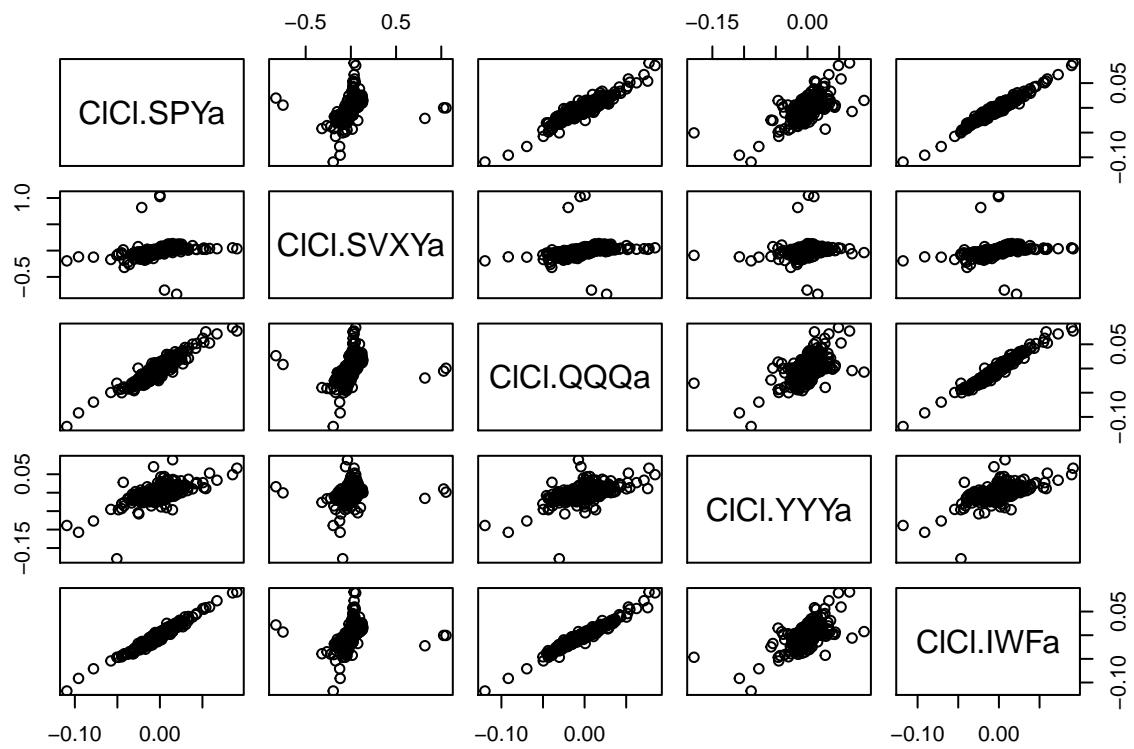


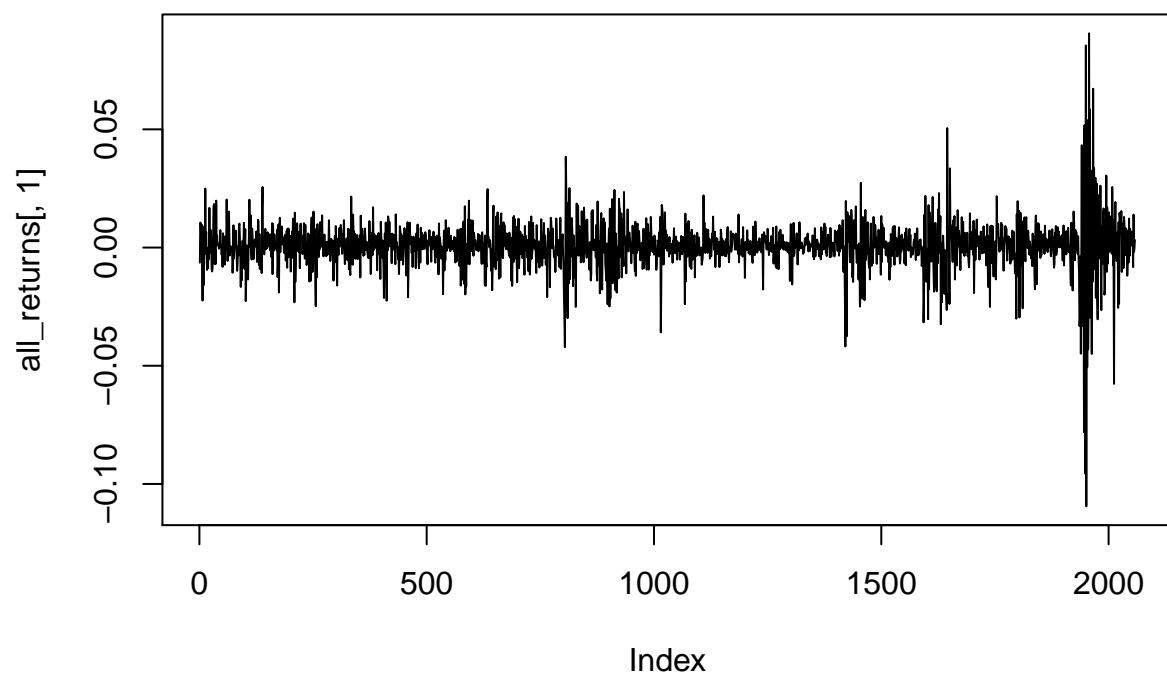
CICI(IWFa)

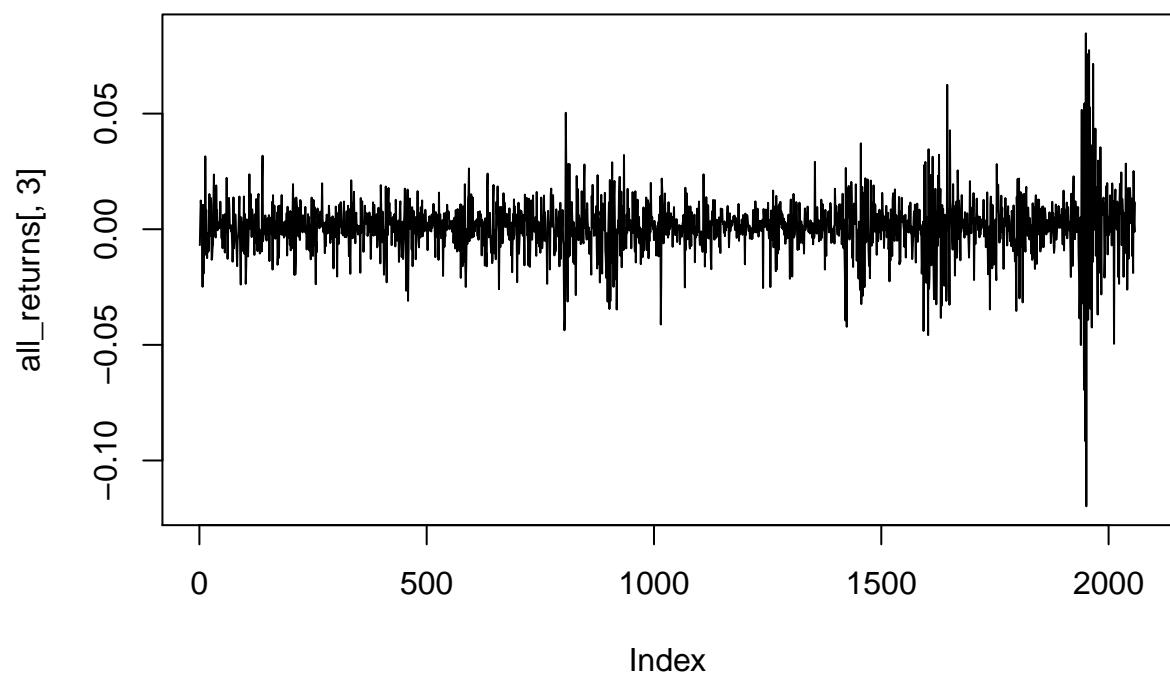
2007-01-03 / 2020-08-17

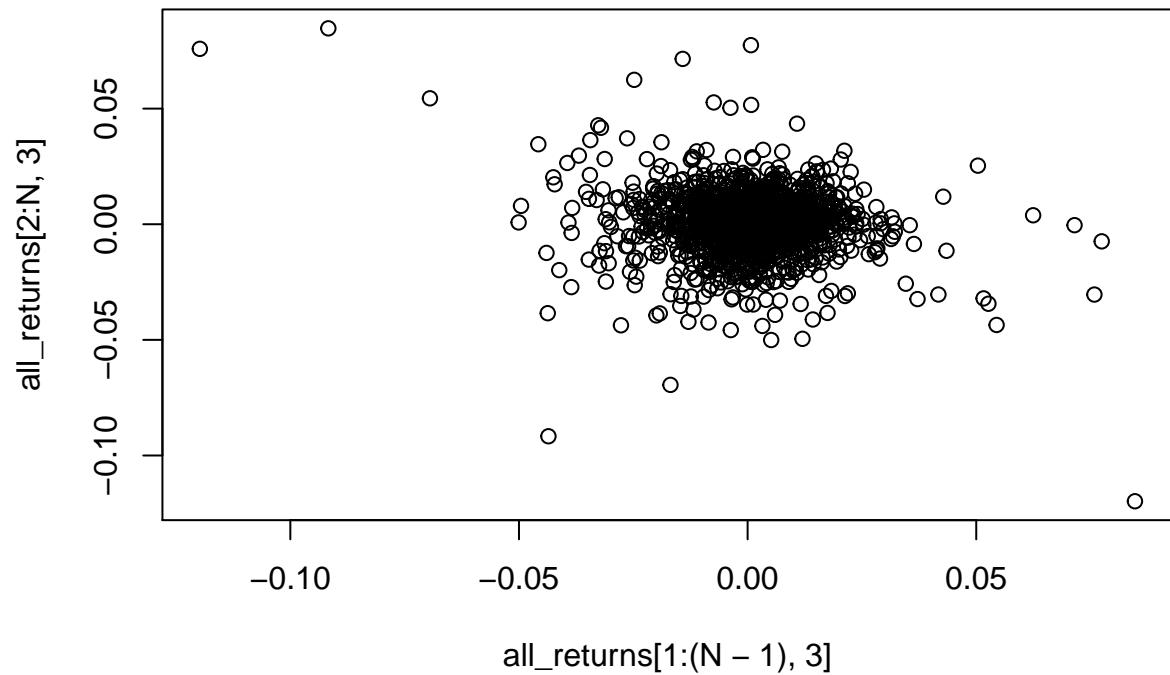


```
##          C1C1.SPYa C1C1.SVXYa      C1C1.QQQa C1C1.YYYa      C1C1.IWFa
## 2007-01-03        NA          NA        NA          NA        NA
## 2007-01-04  0.0021221123        NA  0.018963898        NA  0.005618014
## 2007-01-05 -0.0079763183        NA -0.004766296        NA -0.006667922
## 2007-01-08  0.0046250821        NA  0.000684219        NA  0.004354173
## 2007-01-09 -0.0008498831        NA  0.005013605        NA  0.001264433
## 2007-01-10  0.0033315799        NA  0.011791406        NA  0.006855511
```

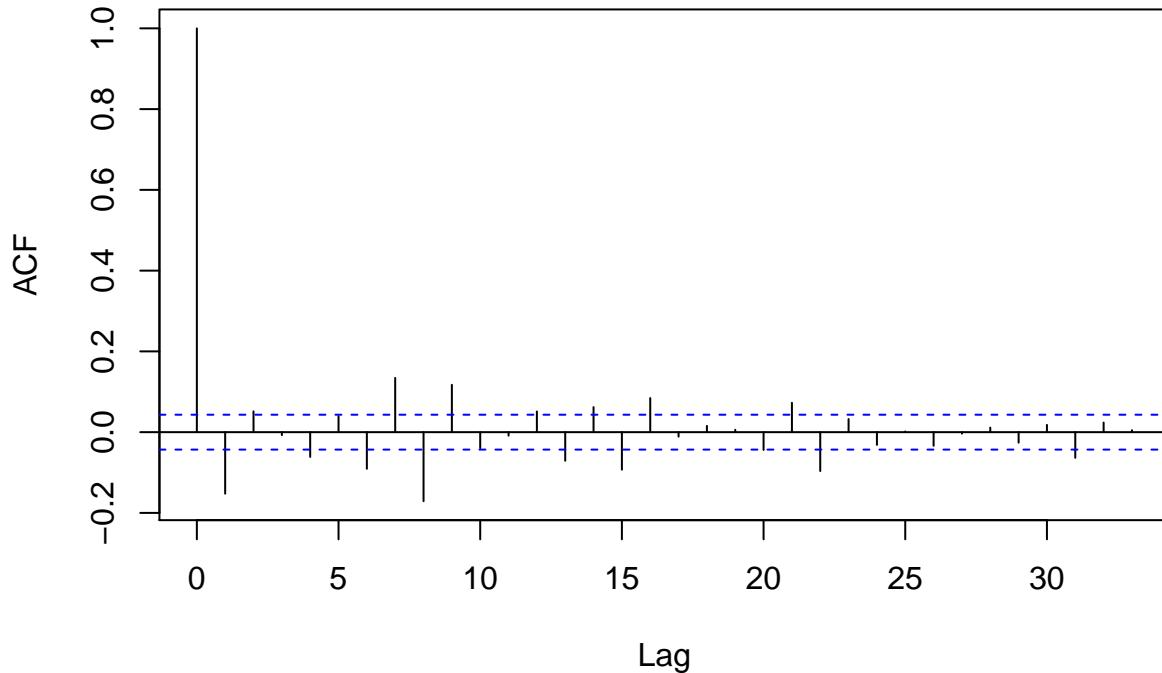








Series all_returns[, 3]



Initial capital is \$100,000

Portfolio 1: Modeling a safe portfolio

ETFs used: "SPY", "QQQ", "AOR"

```
## pausing 1 second between requests for more than 5 symbols
## pausing 1 second between requests for more than 5 symbols

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/SPY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query1.finance.yahoo.com/v7/finance/download/SPY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/SVXY?
## period1=-2208988800&period2=1597708800&interval=1d&events=div&crumb=H8XVRQ1eiuT'

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query1.finance.yahoo.com/v7/finance/download/SVXY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'

## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
```

```

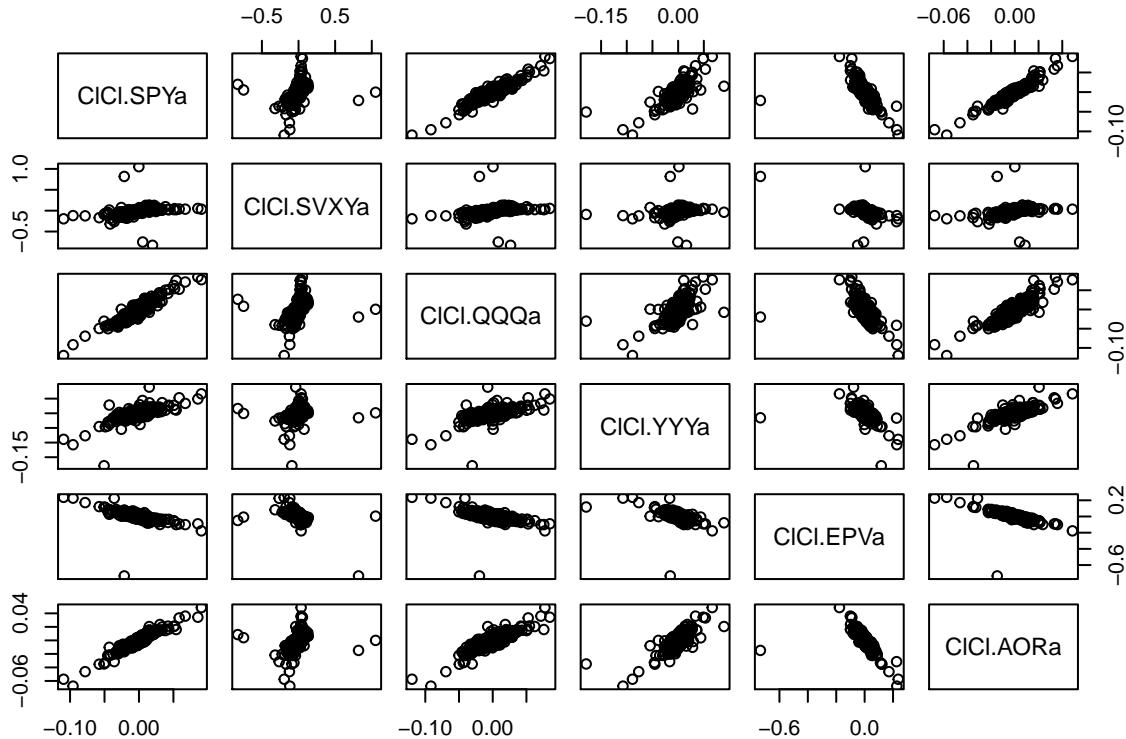
## on 'https://query2.finance.yahoo.com/v7/finance/download/SVXY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query1.finance.yahoo.com/v7/finance/download/QQQ?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/QQQ?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/YYY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/YYY?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/EPV?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/EPV?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/AOR?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'
## Warning in read.table(file = file, header = header, sep = sep,
## quote = quote, : incomplete final line found by readTableHeader
## on 'https://query2.finance.yahoo.com/v7/finance/download/AOR?
## period1=-2208988800&period2=1597708800&interval=1d&events=split&crumb=H8XVRQ1eiuT'
##          SPY.Open SPY.High  SPY.Low SPY.Close SPY.Volume SPY.Adjusted
## 2014-01-02  161.8579  161.9371  160.5383  160.9254  119636900    160.9254
## 2014-01-03  161.1981  161.5236  160.6703  160.8990  81390600    160.8990
## 2014-01-06  161.4269  161.4884  160.1864  160.4327  108028200    160.4327
## 2014-01-07  161.0749  161.6908  160.9518  161.4181  86144200    161.4181
## 2014-01-08  161.3917  161.7260  160.8990  161.4533  96582300    161.4533
## 2014-01-09  161.9723  161.9899  160.8198  161.5588  90683400    161.5588
##          C1C1.SPYa    C1C1.SVXYa    C1C1.QQQa    C1C1.YYYa    C1C1.EPVa
## 2014-01-02          NA          NA          NA          NA          NA
## 2014-01-03 -0.0001640007  0.006050087 -0.007218953  0.0017323084 -0.0006365532
## 2014-01-06 -0.0028979059  0.011952161 -0.003693433  0.0008647212 -0.0006369586
## 2014-01-07  0.0061416703  0.023399265  0.009267875  0.0073434125 -0.0146589871
## 2014-01-08  0.0002180510 -0.001669529  0.002180842 -0.0042882075  0.0025873221

```

```

## 2014-01-09 0.0006538524 -0.002617421 -0.003321510 0.0008613695 -0.0012903548
##                               C1C1.AORa
## 2014-01-02          NA
## 2014-01-03 0.0010468726
## 2014-01-06 -0.0020915556
## 2014-01-07 0.0060257797
## 2014-01-08 -0.0026042447
## 2014-01-09 -0.0007832637

```



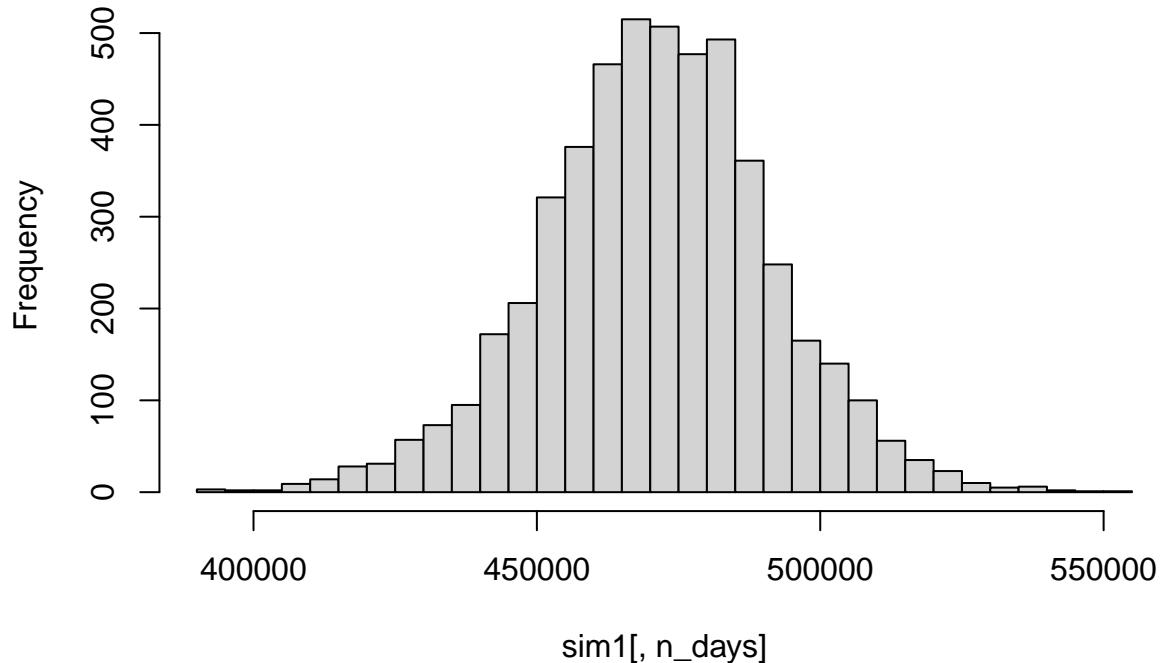
```

## [,1]      [,2]      [,3]      [,4]      [,5]      [,6]      [,7]
## result.1 106337.3 115067.9 124148.3 133782.4 143321.1 154810.5 167654.8
## result.2 104501.2 112823.3 123587.2 135058.3 148112.5 160120.0 173448.2
## result.3 107225.0 112540.3 122412.6 135950.9 147667.0 160331.5 173278.1
## result.4 109975.0 118398.2 128632.8 138883.2 150015.9 162582.4 175703.3
## result.5 108084.8 117137.7 127150.2 137188.9 147701.5 159820.9 170662.2
## result.6 106832.8 115905.1 125394.5 137459.9 147428.8 159687.4 172521.8
## [,8]      [,9]      [,10]     [,11]     [,12]     [,13]     [,14]
## result.1 180630.8 194894.1 210213.7 228058.9 246404.7 267163.2 290788.1
## result.2 188750.7 202493.6 220898.5 240438.5 259916.7 275897.1 293918.0
## result.3 186700.6 201395.8 217253.2 235346.7 252633.2 272429.5 295178.3
## result.4 188951.7 203966.3 214960.6 232553.5 250474.1 272370.5 293819.6
## result.5 185235.6 199175.2 215402.6 231269.8 250736.3 272985.0 294922.4
## result.6 187255.5 202340.9 216998.0 235138.9 254246.4 275248.2 297503.7
## [,15]     [,16]     [,17]     [,18]     [,19]     [,20]
## result.1 315126.0 339534.8 370362.0 399666.3 430120.1 462169.7
## result.2 316766.4 336242.2 363604.6 391443.9 425958.8 459787.1
## result.3 319068.9 342486.6 363201.3 394124.6 425323.2 460296.5

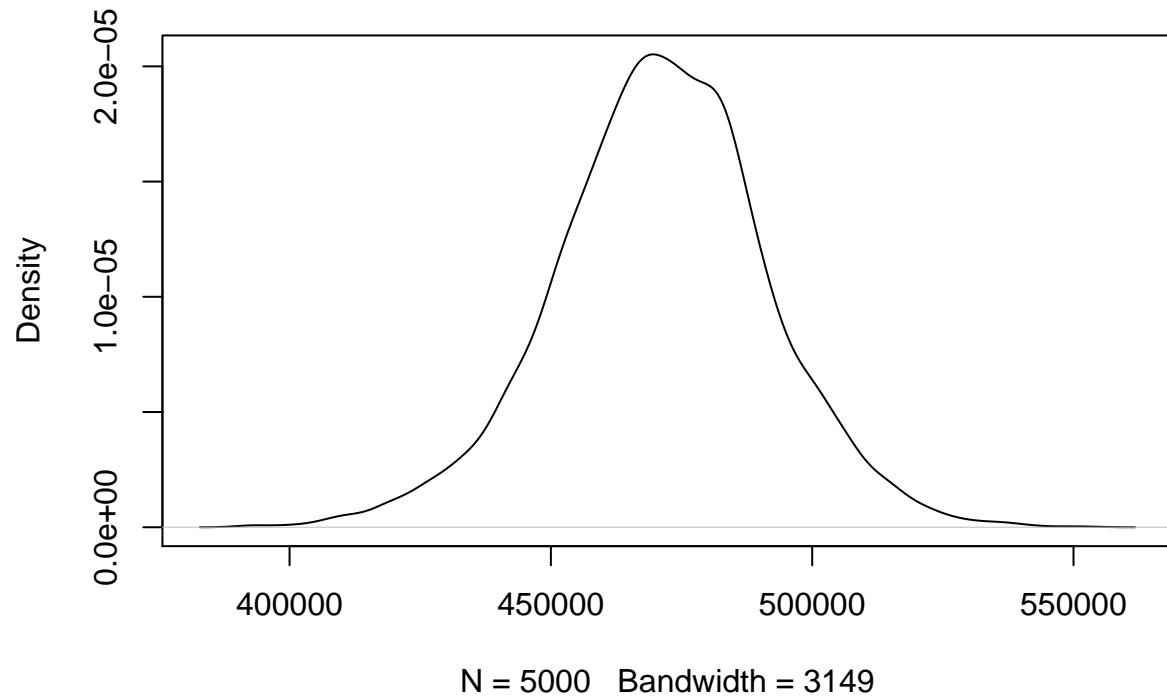
```

```
## result.4 323509.2 350350.0 381906.0 413277.9 446839.8 484561.4
## result.5 321946.3 350131.9 377240.9 408861.6 446089.9 463143.7
## result.6 321428.1 339830.3 366019.4 392531.1 428822.4 463190.8
```

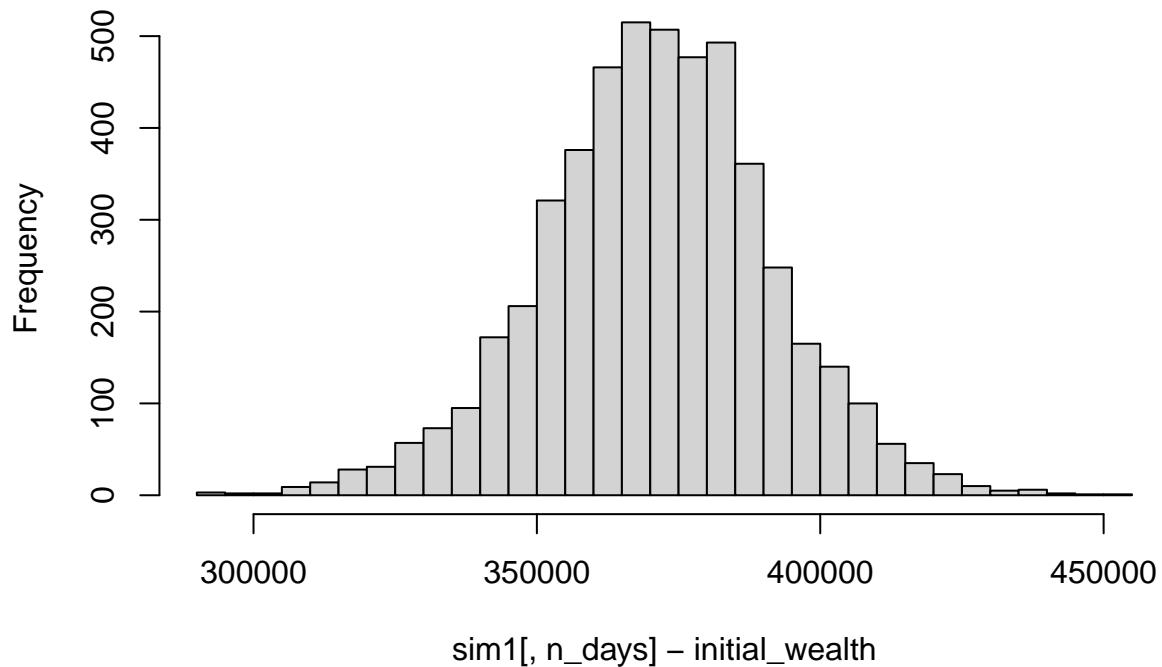
Histogram of sim1[, n_days]



density.default(x = sim1[, n_days])

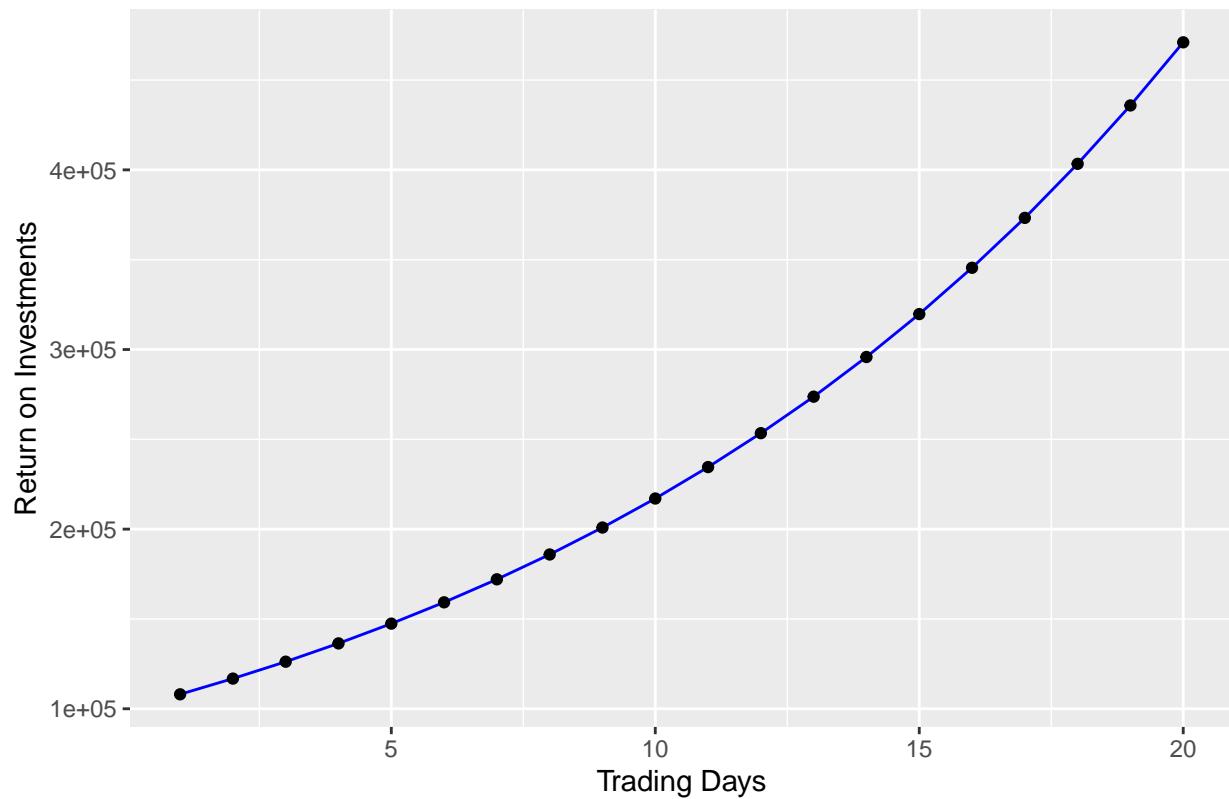


Histogram of sim1[, n_days] – initial_wealth

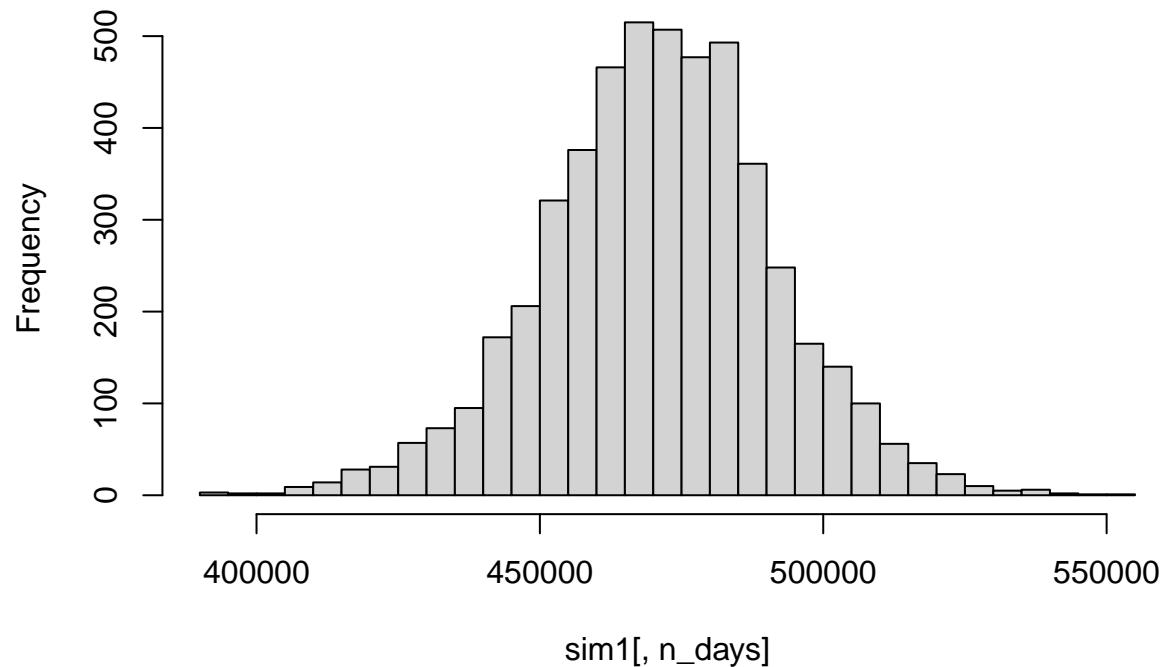


```
## Confidence Interval from Bootstrap Distribution (5000 replicates)
##
## Average return of investement after 20 days 471000.7
##
## 5% Value at Risk for safe portfolio- 336796.2
```

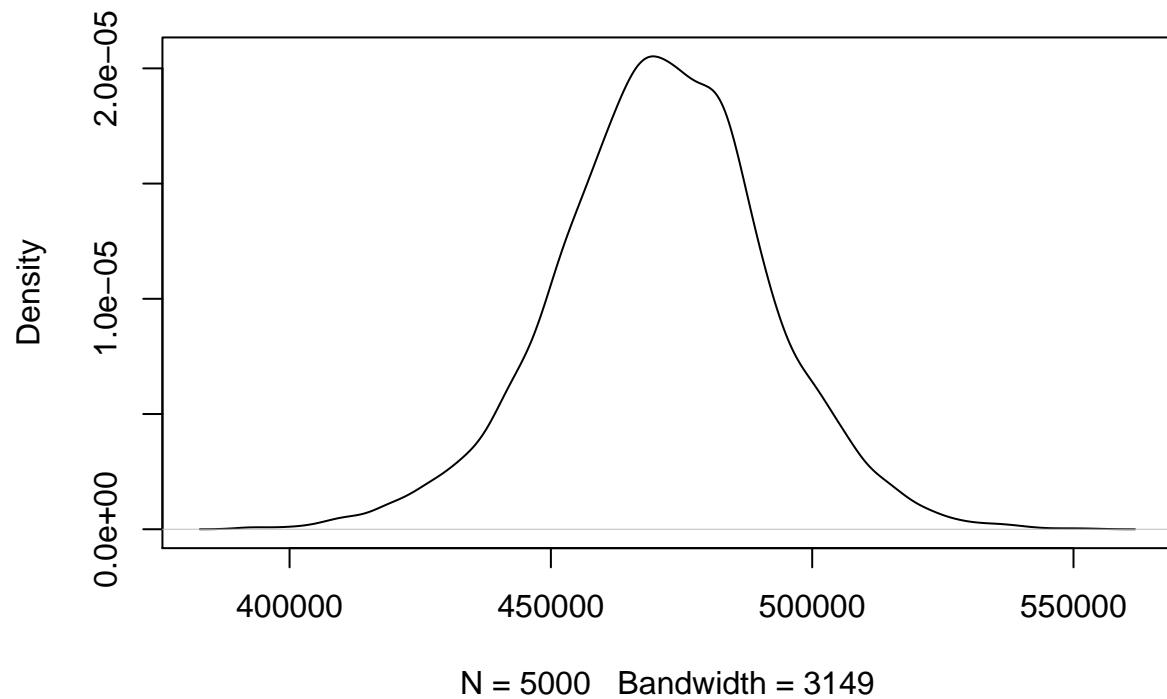
Safe Portfolio: Returns over 20 days



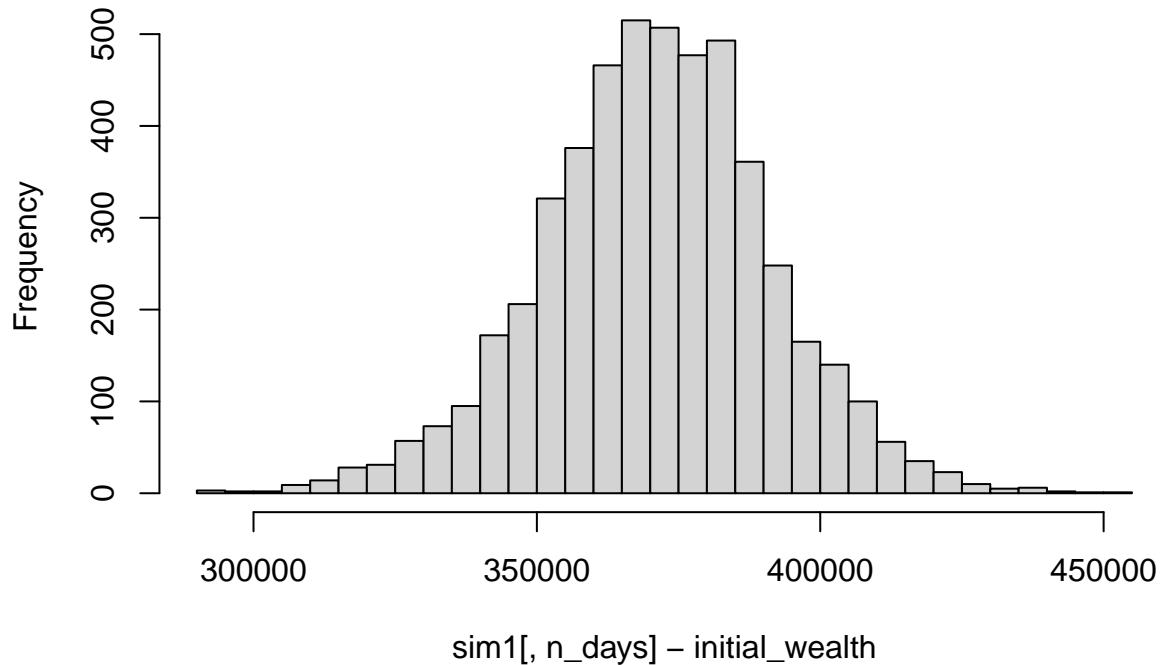
Histogram of sim1[, n_days]



density.default(x = sim1[, n_days])



Histogram of sim1[, n_days] – initial_wealth



```
## Confidence Interval from Bootstrap Distribution (5000 replicates)
```

```
##  
## Average return on investement after 20 days 471000.7  
## NULL
```

```
##  
## 5% Value at Risk for safe portfolio- 336796.2
```

- Portfolio 2: High Risk Model

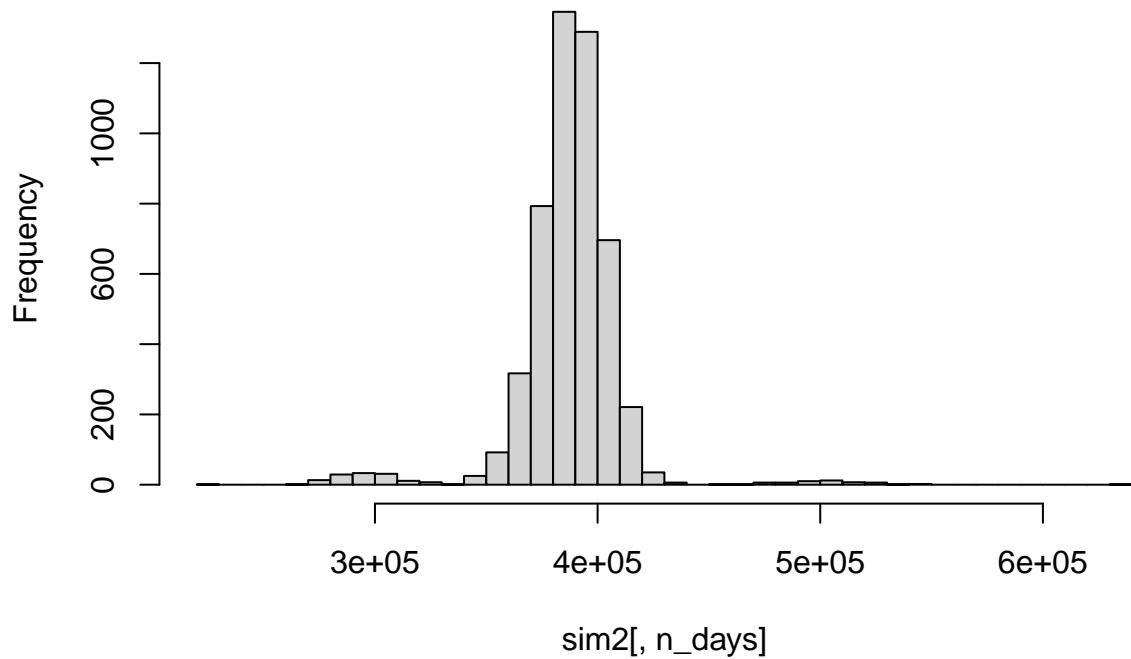
Using ETFs: SVXY, YYY, IWF

Distributed 90% of the total wealth among the low performing ETFs

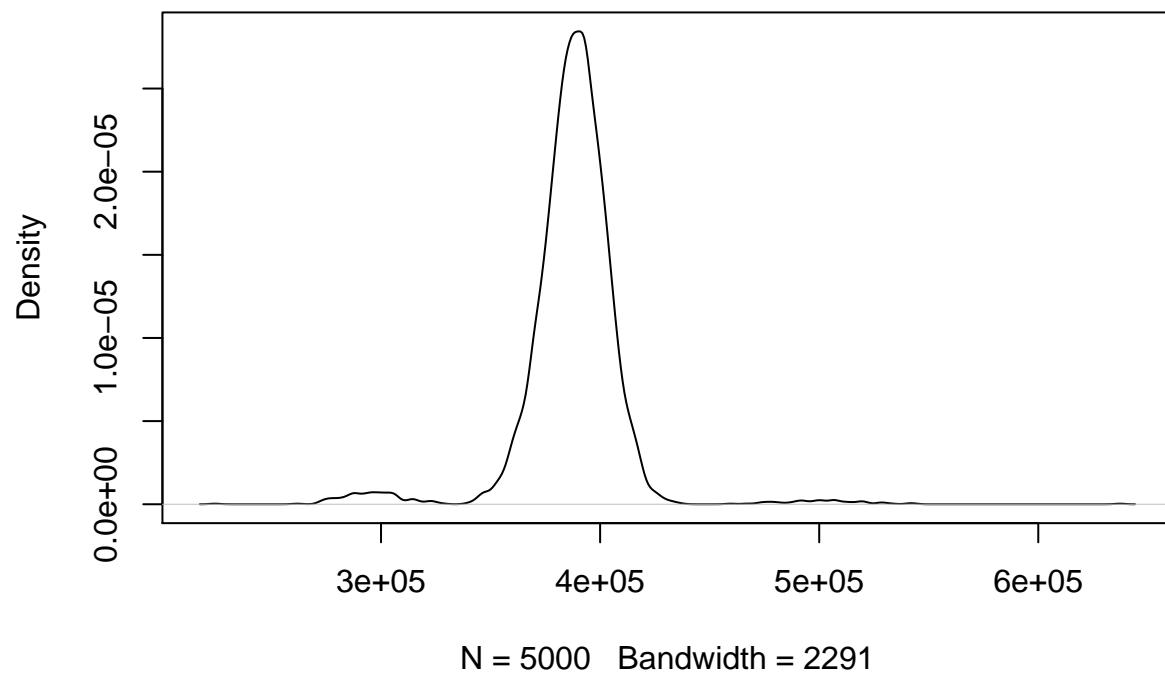
```
## [,1]      [,2]      [,3]      [,4]      [,5]      [,6]      [,7]  
## result.1 106037.1 113707.3 122003.8 127975.5 137446.7 147250.5 157801.6  
## result.2 106187.5 112736.5 120422.0 131329.4 141334.4 149509.6 159979.5  
## result.3 107636.2 115443.2 122142.6 130491.0 142310.4 152537.5 163114.9  
## result.4 107491.3 114631.8 122516.5 130862.2 138873.3 148608.4 157578.5  
## result.5 106685.3 114543.6 125243.2 133499.0 143176.7 155606.3 165560.3  
## result.6 106887.6 114669.4 122173.3 130748.4 140955.0 148984.2 160286.9  
## [,8]      [,9]      [,10]     [,11]     [,12]     [,13]     [,14]  
## result.1 168412.7 181264.2 193676.8 209310.7 223405.5 238249.7 256046.2  
## result.2 175144.1 187165.6 199138.4 212176.9 226544.4 243499.3 261565.9  
## result.3 175016.3 186658.8 200627.0 213784.8 229216.4 245904.1 260975.8  
## result.4 169234.1 181385.0 195173.2 208383.3 222105.6 236069.7 252193.1  
## result.5 177501.4 191420.6 205703.1 219125.6 234853.3 250870.1 269643.6  
## result.6 172030.1 184889.0 196923.3 210837.2 225986.0 241847.7 256947.9
```

```
## [,15]   [,16]   [,17]   [,18]   [,19]   [,20]
## result.1 271945.6 290415.1 313636.0 334926.8 359534.7 381798.9
## result.2 279121.0 300071.2 319528.8 341948.5 364883.9 391890.1
## result.3 278759.0 224519.5 236942.2 252678.6 270026.4 284761.8
## result.4 269842.2 227595.1 242946.0 256594.7 272317.6 293722.7
## result.5 286248.3 305425.3 326150.0 351235.1 375259.7 401150.0
## result.6 273240.2 291299.9 310862.9 331946.9 352449.2 375918.1
```

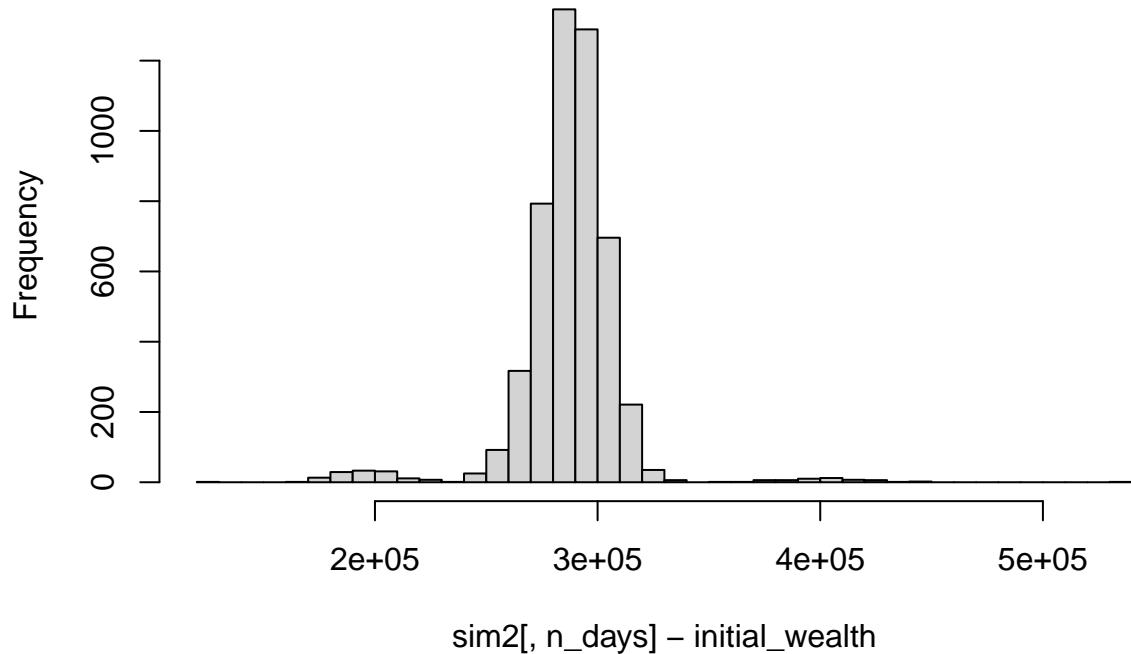
Histogram of sim2[, n_days]



density.default(x = sim2[, n_days])

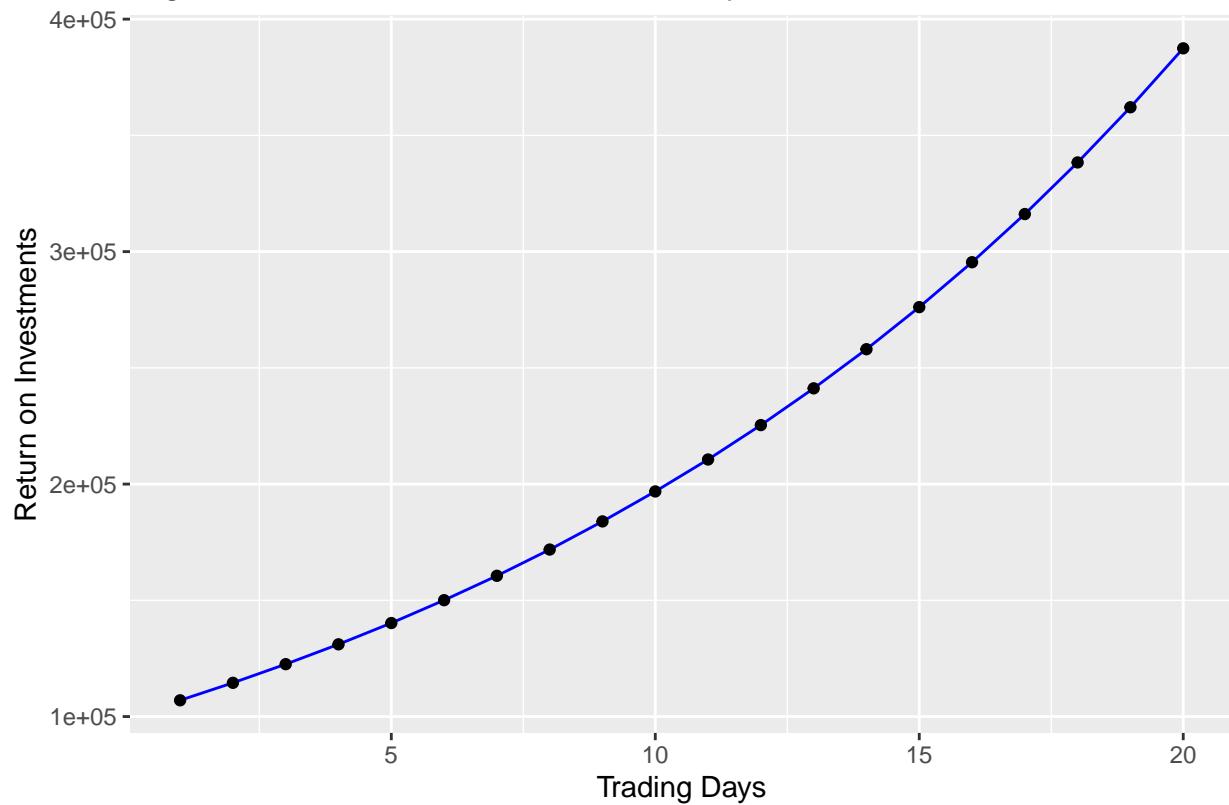


Histogram of sim2[, n_days] – initial_wealth

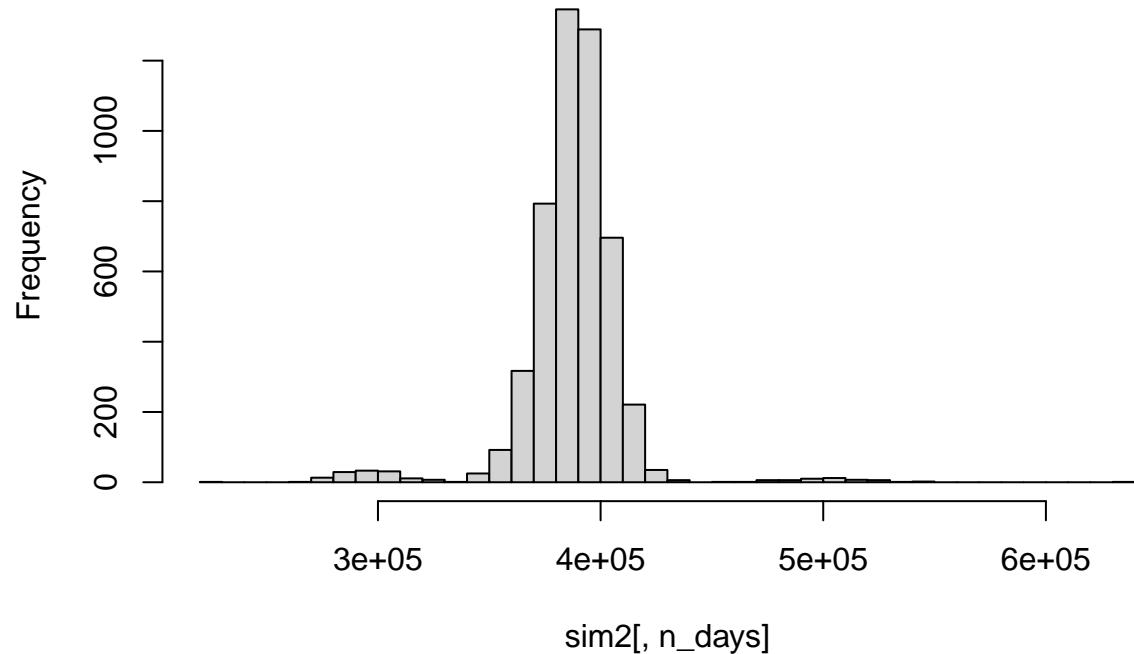


```
## Confidence Interval from Bootstrap Distribution (5000 replicates)
##
## Average return of investement after 20 days 387442.7
##
## 5% Value at Risk for High portfolio- 260250.5
```

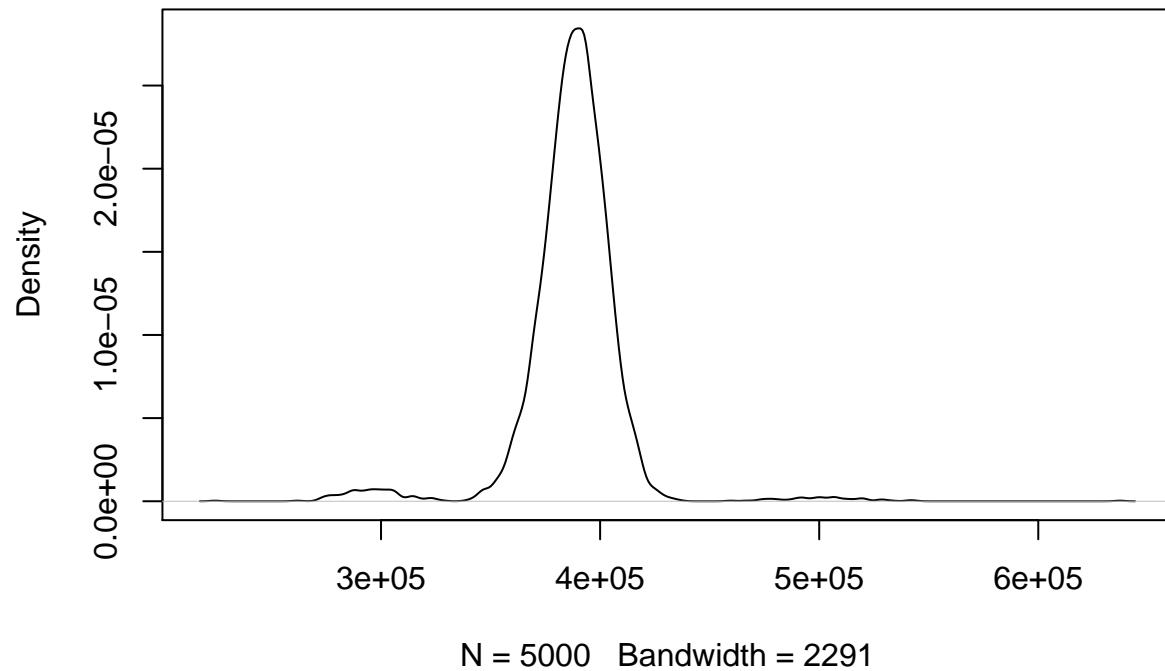
High Risk Portfolio: Returns over 20 days



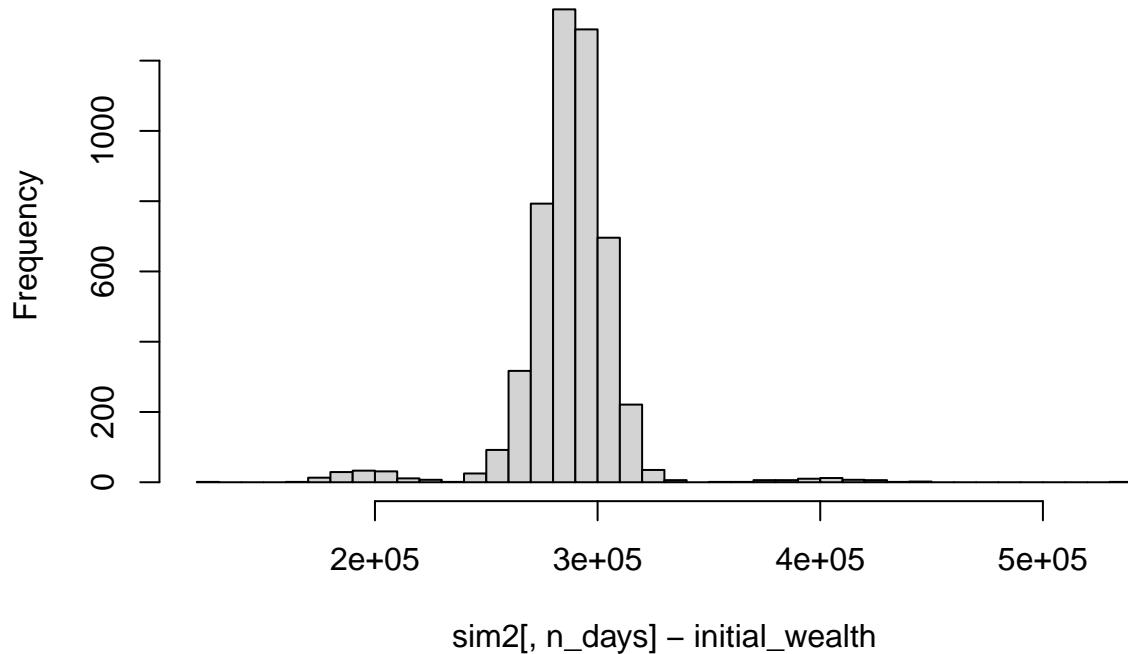
Histogram of sim2[, n_days]



density.default(x = sim2[, n_days])



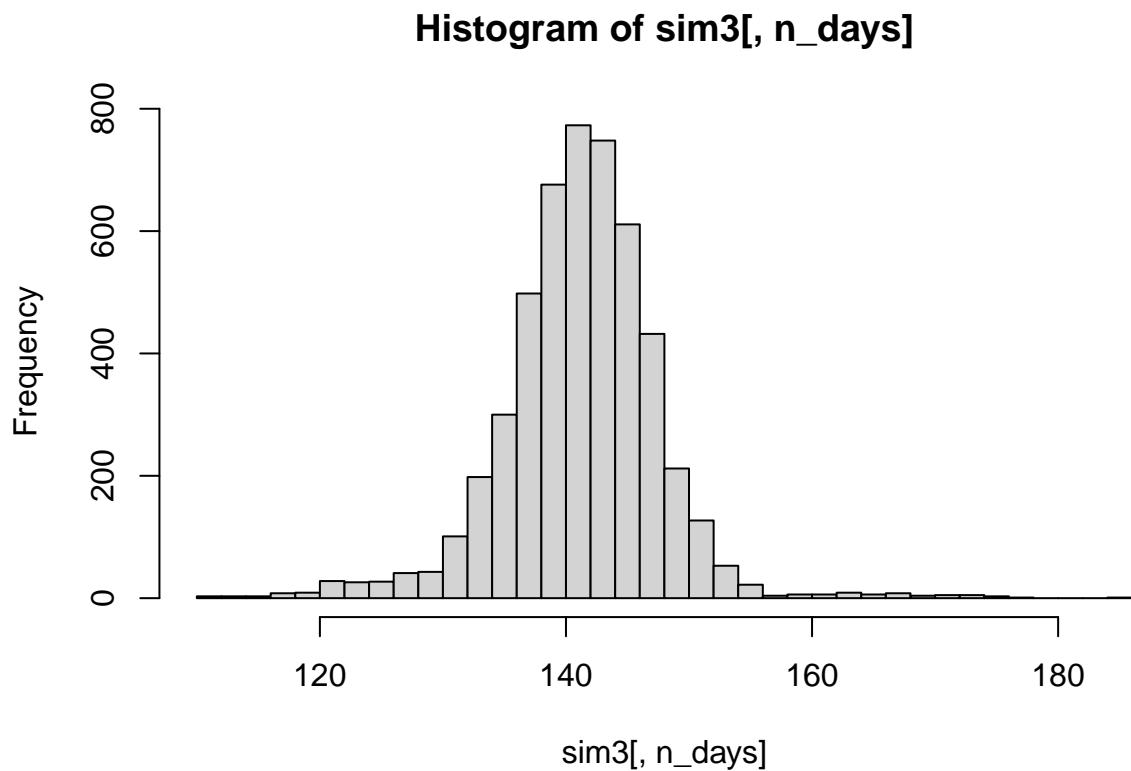
Histogram of sim2[, n_days] – initial_wealth



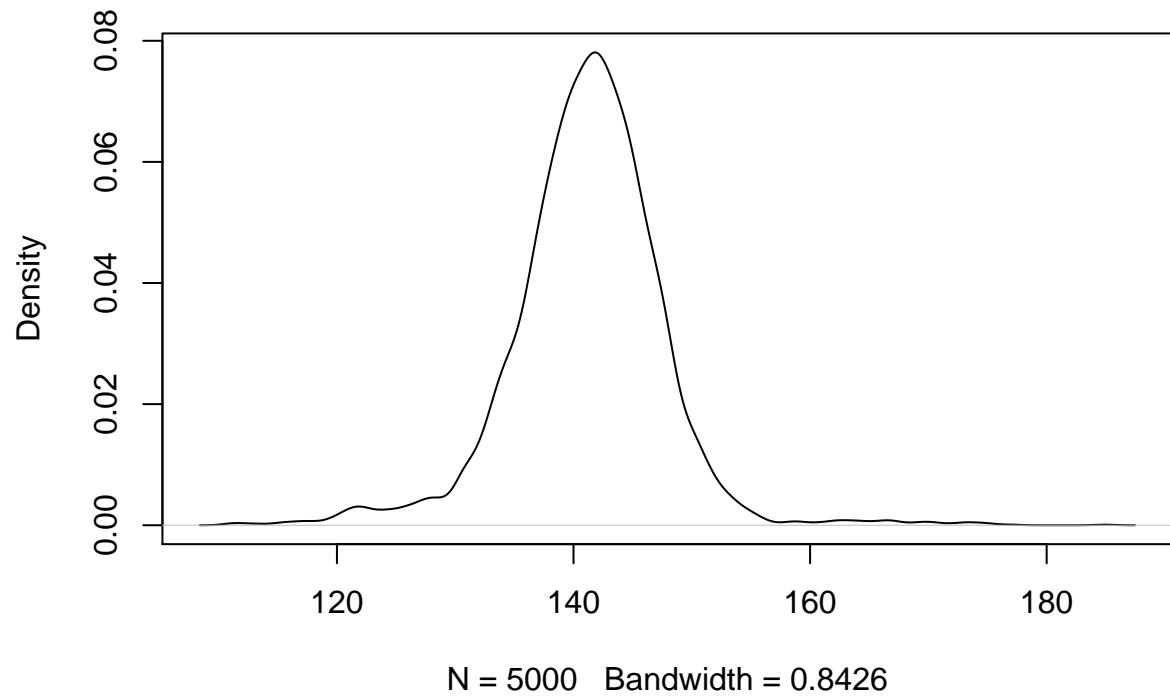
```
## Confidence Interval from Bootstrap Distribution (5000 replicates)
##
## Average return on investement after 20 days 387442.7
##
## 5% Value at Risk for High portfolio- 260250.5
*Portfolio 3: Using equal weights for all ETFs

## [,1]      [,2]      [,3]      [,4]      [,5]      [,6]      [,7]
## result.1 72178.63 52270.92 37619.74 27271.51 19638.19 14148.12 10108.591
## result.2 72339.31 52192.54 37321.68 27025.23 19215.75 13800.01 9977.443
## result.3 71621.85 51866.02 37372.68 26943.49 19468.09 13994.63 10051.864
## result.4 71950.96 51170.61 36701.95 26482.41 19329.70 13822.22 9871.513
## result.5 71205.02 51197.81 36340.09 26201.29 18844.54 13677.15 9812.992
## result.6 72038.47 52270.75 37182.20 26775.42 19348.67 13981.50 10053.324
## [,8]      [,9]      [,10]     [,11]     [,12]     [,13]     [,14]
## result.1 7237.047 5173.880 3714.766 2669.135 1936.306 1397.355 1009.2964
## result.2 7191.816 5185.402 3751.713 2677.046 1926.325 1392.892 1009.0893
## result.3 7210.958 5207.719 3764.481 2706.336 1975.374 1419.149 1013.3133
## result.4 7254.586 5226.254 3780.736 2722.754 1973.130 1404.325 1012.4398
## result.5 7065.621 5131.481 3688.450 2654.201 1909.359 1379.265 999.6658
## result.6 7302.762 5273.303 3846.580 2792.162 1994.952 1436.993 1039.0295
## [,15]     [,16]     [,17]     [,18]     [,19]     [,20]
## result.1 729.4476 528.4898 376.0760 270.5141 195.3762 140.9592
## result.2 727.4603 525.1990 375.0220 271.1192 196.8553 141.6214
## result.3 717.4812 517.1372 371.2167 266.4192 192.4455 138.7383
```

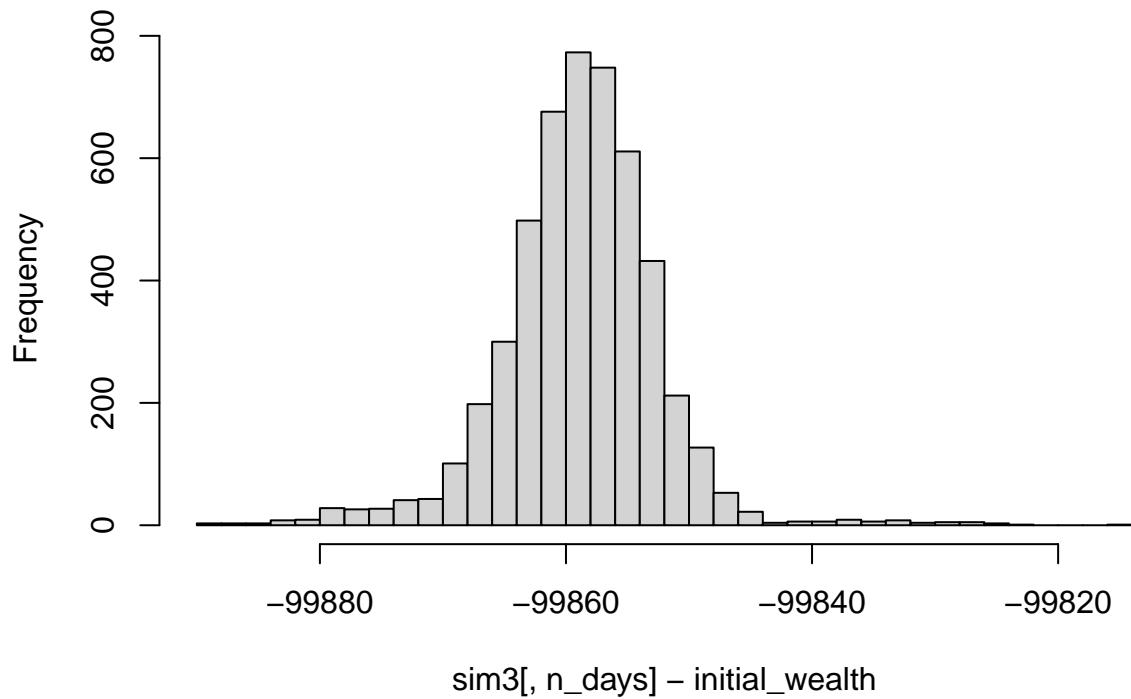
```
## result.4 729.2415 525.6624 379.3343 272.6253 197.9319 142.3386
## result.5 719.7378 518.8268 377.6678 267.4094 193.6377 137.1803
## result.6 748.0740 540.1053 389.7285 280.2679 198.2892 143.2082
```



density.default(x = sim3[, n_days])

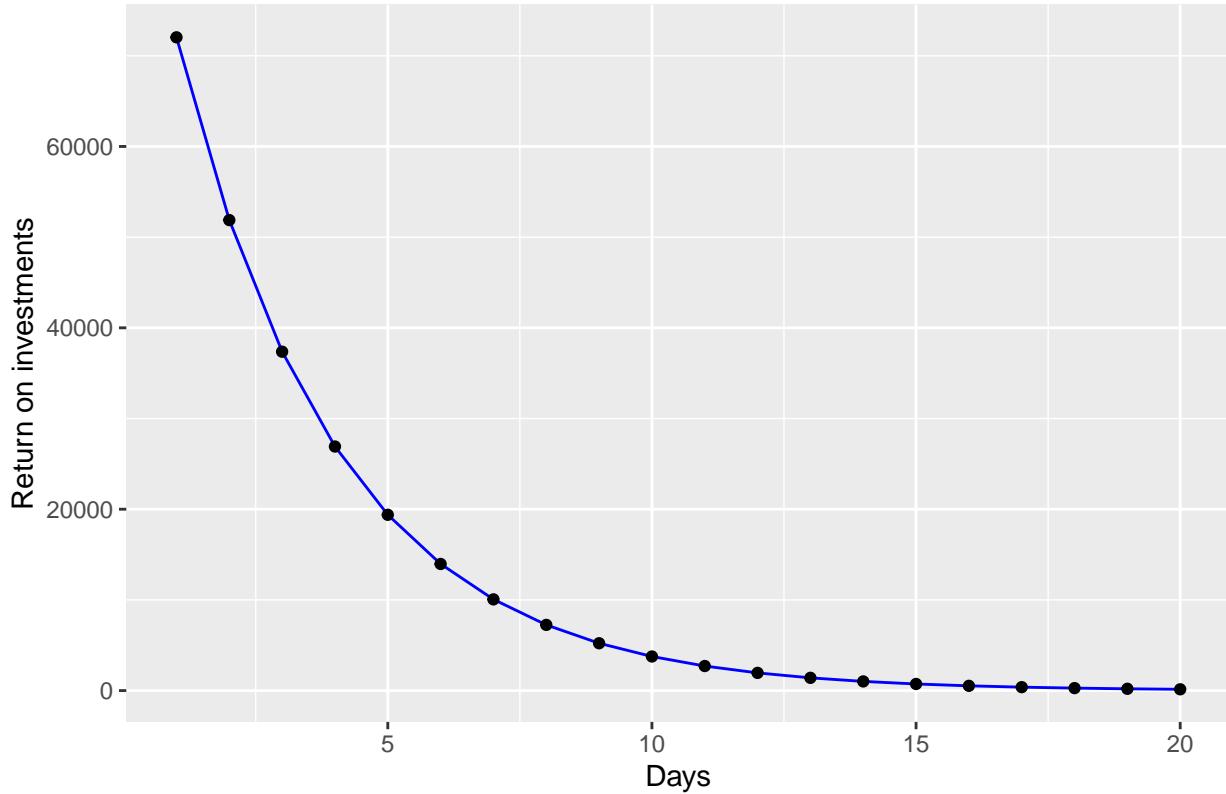


Histogram of sim3[, n_days] – initial_wealth



```
## Confidence Interval from Bootstrap Distribution (5000 replicates)
##
## Average return on investement after 20 days 141.186
##
## 5% Value at Risk for High portfolio- -99868.86
```

Diverse Portfolio: Returns over 20 days



Write a report summarizing your portfolios and your VaR findings.

Portfolio 1: Modeling a safe portfolio average return on investment: 470509.6 5% VaR value of 337695.5

Portfolio 2: High Risk portfolio average return on investment: 387633 5% VaR value of 260963.1

Portfolio 3: Diverse portfolio average return on investment: 141.0608 5% VaR value of (-99868.85)

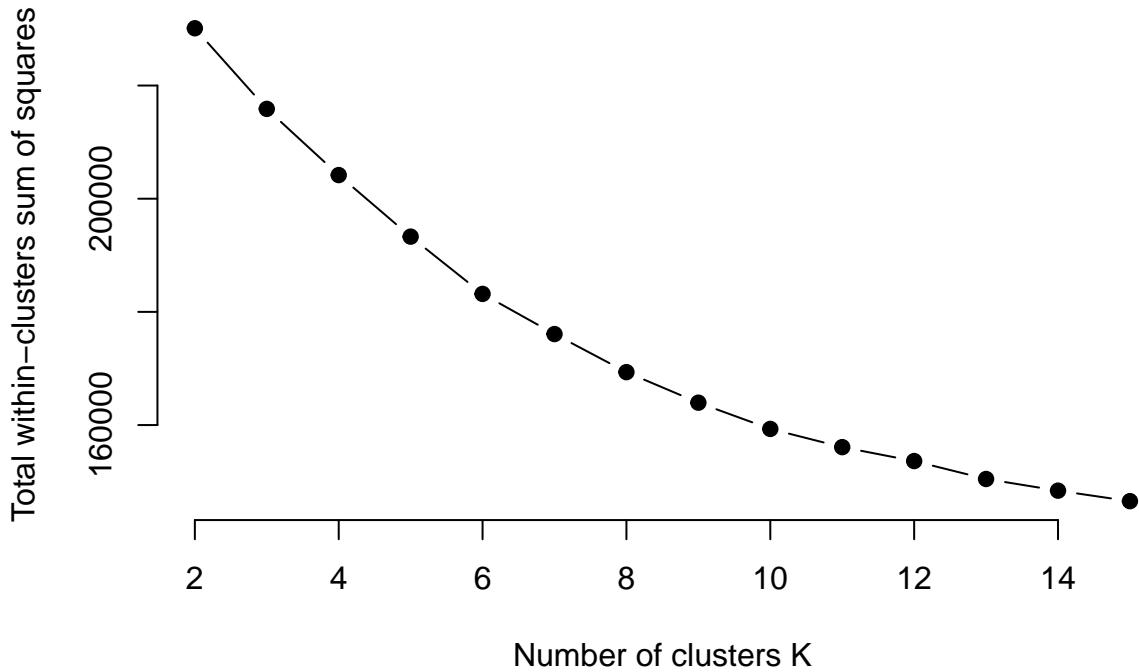
The average ROI of the safe portfolio was the highest out of the 3 portfolios at 470510. The high risk portfolio average ROI was second highest at 387633, followed by the diverse portfolio ROI of 141. Portfolio 3, the diverse portfolio was given equal weights for all EFTs to compare the returns over the time period. The bootstrap approach was used to arrive at the conclusions above. The 5% VaR value for portfolio 3 is -99868.85, implying that portfolio 3 has a 95% chance of making more than 99868.85 over the next day.

Market segmentation

Segment the market for NutrientH20 based off of the tweets of its sampled Twitter followers collected over a seven-day period in June 2014. Each tweet was categorized based on its content into any of the 36 categories (may be more than one for each tweet) by a human annotator contracted through Amazon's Mechanical Turk service.

- Number of rows = 7882, number of columns = 37
- Each row represents one use, labeled by a random, anonymous, and unique 9-character alphanumeric code

- Each column represents an interest or subject category (column 1 represents name and columns 2-37 represent variables)
- Columns “chatter”, “spam”, “adult”, and “uncategorized” were removed because these categories are either irrelevant to our analysis or contain inappropriate content by “bots” rather than actual consumers



- Number of clusters that will be used for the analysis report is 5 as it is near the “elbow” of the plot

```

##   current_events      travel   photo_sharing      tv_film
##   1.6488764      5.5617978    2.5210674    1.2162921
##   sports_fandom      politics      food      family
##   1.9957865      8.8441011    1.4438202    0.9227528
##   home_and_garden      music      news  online_gaming
##   0.6123596      0.6320225    5.2219101    1.1853933
##   shopping  health_nutrition  college_uni sports_playing
##   1.3721910      1.6615169    1.6797753    0.7064607
##   cooking      eco      computers      business
##   1.2668539      0.5969101    2.4662921    0.6741573
##   outdoors      crafts      automotive      art
##   0.9241573      0.6502809    2.3216292    0.7556180
##   religion      beauty      parenting      dating
##   1.0140449      0.4676966    0.9283708    1.0603933
##   school  personal_fitness      fashion small_business
##   0.7148876      1.0028090    0.6811798    0.4747191
##   current_events      travel   photo_sharing      tv_film
##   1.7626841      1.5024550    6.0638298    1.1734861
##   sports_fandom      politics      food      family

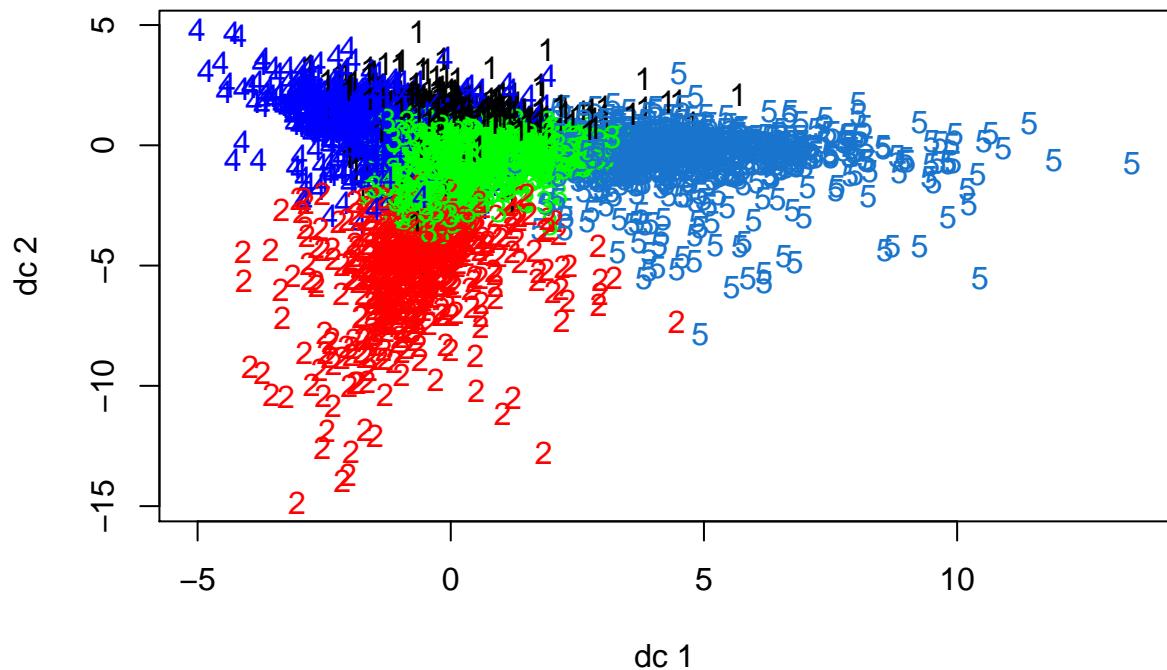
```

##	1.1505728	1.3862520	1.0851064	0.9132570
##	home_and_garden	music	news	online_gaming
##	0.6366612	1.2798691	1.0425532	1.4762684
##	shopping	health_nutrition	college_uni	sports_playing
##	2.0769231	2.2225859	2.0180033	0.9263502
##	cooking	eco	computers	business
##	10.5761047	0.5744681	0.7397709	0.6170213
##	outdoors	crafts	automotive	art
##	0.8183306	0.6448445	0.9050736	0.9738134
##	religion	beauty	parenting	dating
##	0.8494272	3.7970540	0.7872340	0.9541735
##	school	personal_fitness	fashion	small_business
##	0.9705401	1.3404255	5.4075286	0.5270049
##	current_events	travel	photo_sharing	tv_film
##	1.4500000	1.1126033	2.3068182	1.0390496
##	sports_fandom	politics	food	family
##	0.9797521	1.0068182	0.7805785	0.5991736
##	home_and_garden	music	news	online_gaming
##	0.4460744	0.5814050	0.6818182	1.1739669
##	shopping	health_nutrition	college_uni	sports_playing
##	1.2750000	1.0650826	1.5192149	0.5561983
##	cooking	eco	computers	business
##	0.8444215	0.3929752	0.3745868	0.3404959
##	outdoors	crafts	automotive	art
##	0.4010331	0.3725207	0.5958678	0.6549587
##	religion	beauty	parenting	dating
##	0.5287190	0.3421488	0.4654959	0.5568182
##	school	personal_fitness	fashion	small_business
##	0.4706612	0.6452479	0.5216942	0.2876033
##	current_events	travel	photo_sharing	tv_film
##	1.5461373	1.2414163	2.7092275	1.0214592
##	sports_fandom	politics	food	family
##	1.1534335	1.2414163	2.1169528	0.7929185
##	home_and_garden	music	news	online_gaming
##	0.6437768	0.7564378	1.0976395	1.1663090
##	shopping	health_nutrition	college_uni	sports_playing
##	1.4731760	11.8776824	1.3036481	0.6888412
##	cooking	eco	computers	business
##	3.2575107	0.9066524	0.5482833	0.4688841
##	outdoors	crafts	automotive	art
##	2.6952790	0.6019313	0.6706009	0.7564378
##	religion	beauty	parenting	dating
##	0.7564378	0.4216738	0.7521459	1.0225322
##	school	personal_fitness	fashion	small_business
##	0.5890558	6.3562232	0.7929185	0.2961373
##	current_events	travel	photo_sharing	tv_film
##	1.6772554	1.3634053	2.6251588	1.1080051
##	sports_fandom	politics	food	family
##	5.8742058	1.1740788	4.5400254	2.4841169
##	home_and_garden	music	news	online_gaming
##	0.6607370	0.7662008	1.0470140	1.2871665
##	shopping	health_nutrition	college_uni	sports_playing

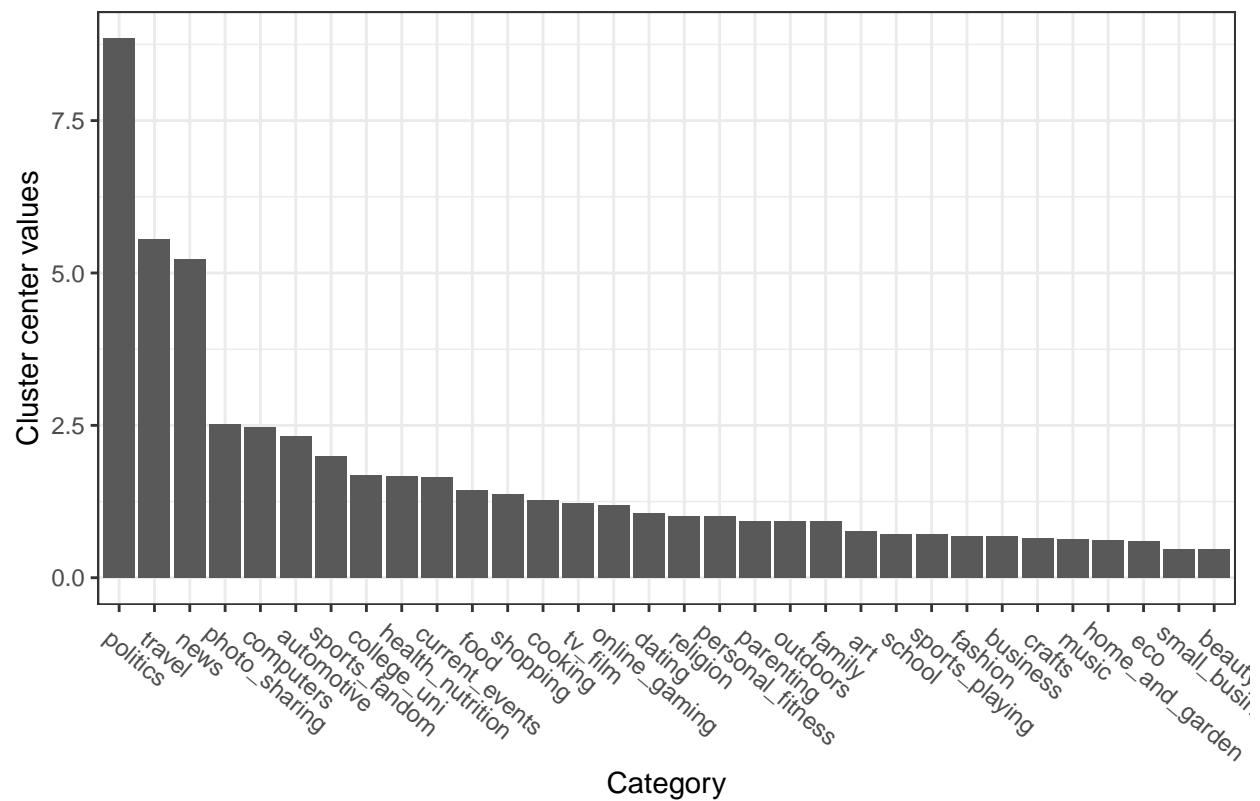
```

##      1.4752224      1.8665820      1.5451080      0.8068615
##      cooking          eco          computers      business
##      1.6048285      0.6543837      0.7420584      0.5006353
##      outdoors         crafts         automotive      art
##      0.7090216      1.0736976      1.0495553      0.8958069
##      religion         beauty        parenting      dating
##      5.2465057      1.0876747      4.0228717      0.7839898
##      school personal_fitness      fashion      small_business
##      2.6963151      1.1994917      1.0190597      0.4104193

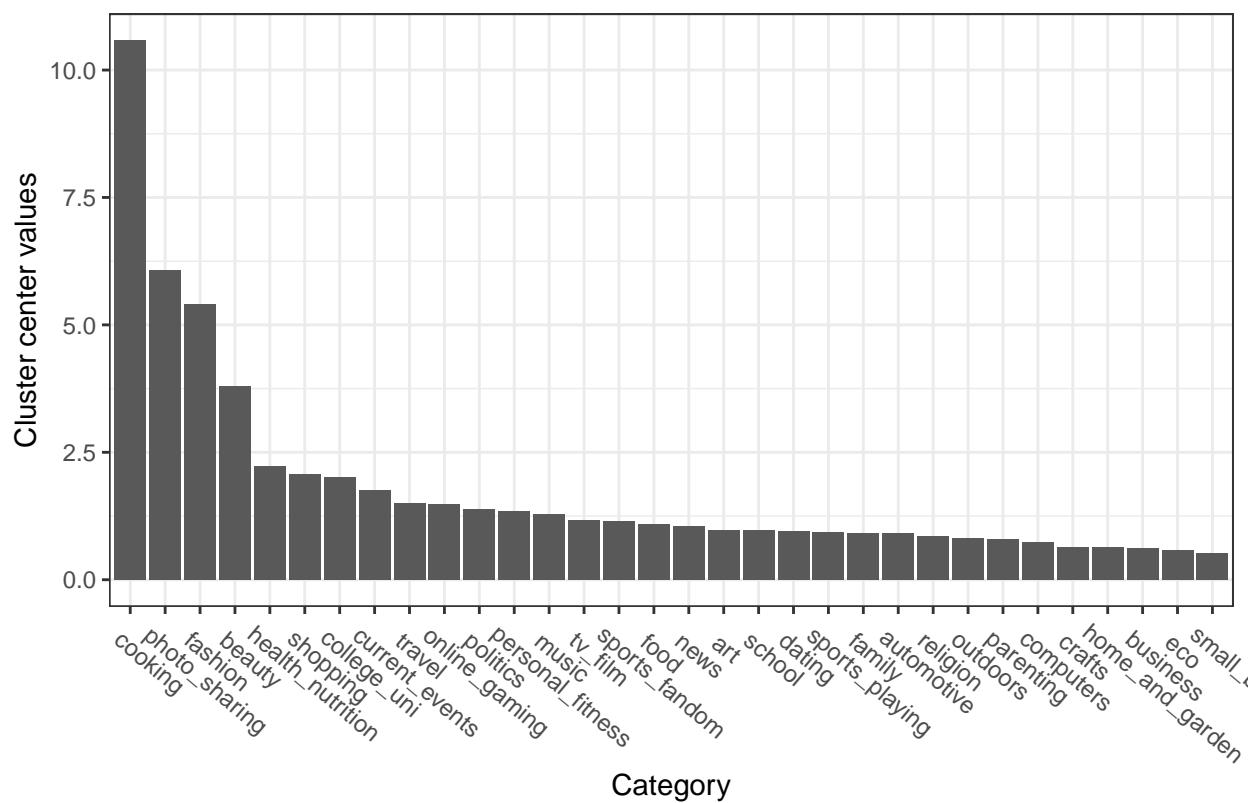
```



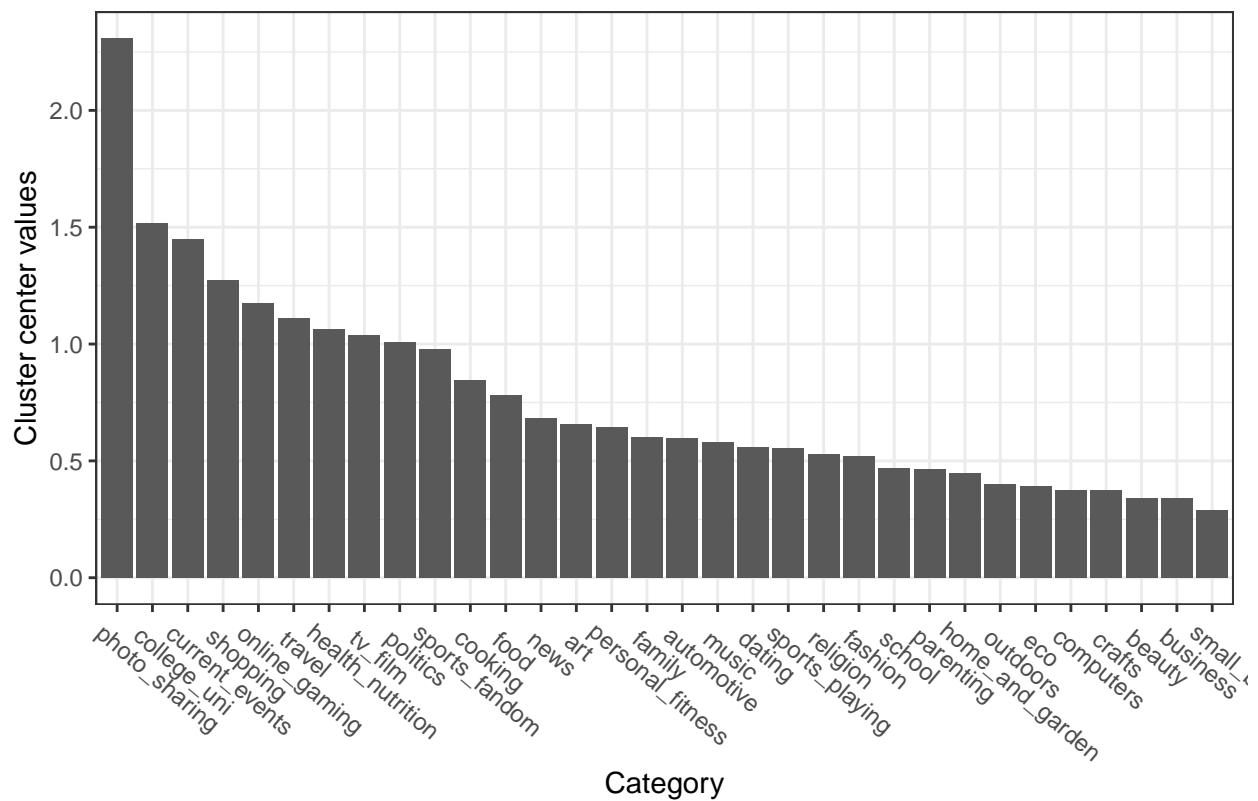
Cluster 1



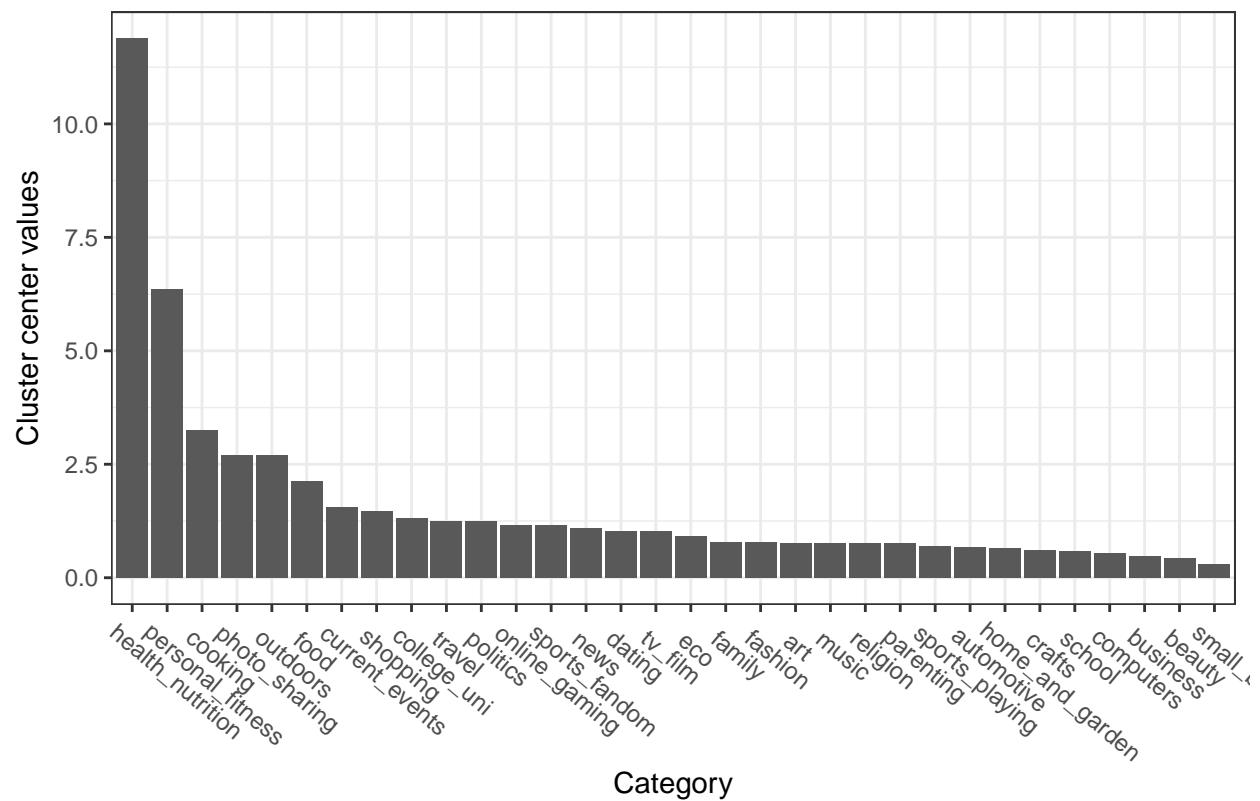
Cluster 2

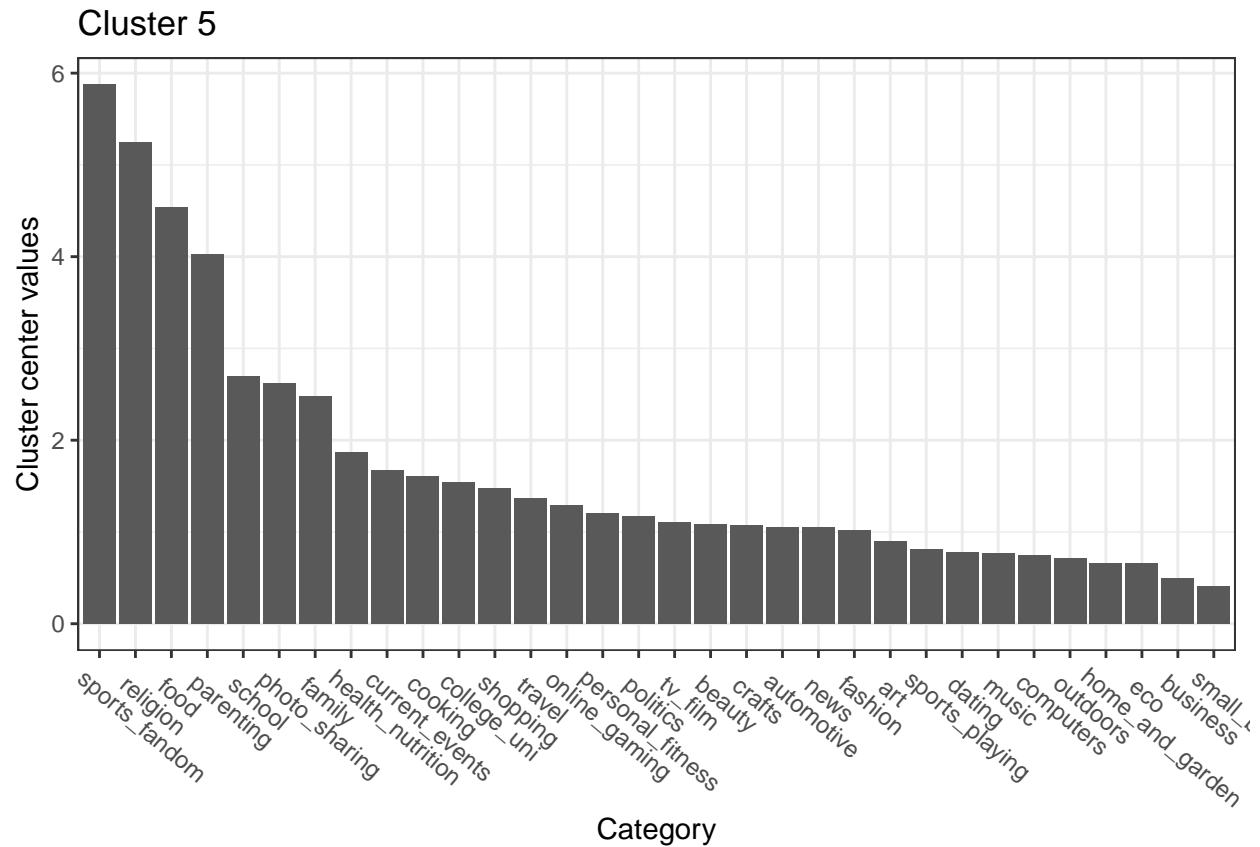


Cluster 3



Cluster 4





Dear Mr./Ms./Mrs. X, Per our commitment to identify market segments of your social media audience based on the Tweets posted by a sample of profiles from your company's followers list on Twitter, we have identified five (5) distinct market segments. In our report, we define a market segment as a cluster of consumers that share a correlated interest then group them to as a latent category. The following is a brief summary of the data that we received from Amazon's Mechanical Turk annotator: Total Twitter Users: 7882 Total Variables: 37 Each one of these user's tweets were tracked over a seven-day period in June 2014, then were assigned one or more categories based on the content of those tweets. After parsing through the data, we have decided to drop four variables from the original dataframe we deemed irrelevant to our analysis or whose content come from "bots", not real consumer profiles. These variables are "chatter", "spam", "adult", and "uncategorized." We created algorithms that works iteratively to assign each data point to one of the five clusters based feature similarity done by assigning a data point to a cluster whose nearest centroid (center point) is closest to it. With the identification of market segments, NutrientH2O will be able to leverage this information to understand their audience better and hone their social media marketing campaigns into a more targeted approach. Through K-Means partitional clustering, we identified five (5) key distinct market segments in NutrientH2O's Twitter audience that will each be given a unique name:

Cluster 1: Political Junkies

These consumers are especially vocal in matters relating to political discourse. This cluster of people are fond of traveling and exploring the world and are up-to-date in the news cycle. These consumers are likely to support and engage with a company who shares their political views, e.g. social justice. A sound marketing approach would be one that highlights the company's global initiatives e.g. sustainability in combatting climate change. It is important to highlight that this cluster may be particularly challenging to market to considering that not all "political" people share the same political opinions. Being neutral or overly one-sided in a political issue may alienate some groups of people.

Cluster 2: Master Chefs

This group of consumers are fond to talk about cooking in their tweets, along with photo-sharing, fashion, and beauty. These people are particularly interested with all things cooking and the display of that cooking through photo-sharing apps such as Instagram, Pinterest, Snapchat, or even Twitter. Aesthetics are particularly important as they discuss topics around fashion and beauty. A marketing approach suitable for this segment is to periodically post common and exotic recipes that can use NutrientH20, and post photos of NutrientH20 products in an artful and aesthetically pleasing way on the company's social media accounts

Cluster 3: Gen Z

A reasonable inference is to consider this market segment as Gen Z individuals who are currently in university or high school students researching about college. This cluster is very savvy in regards to photo-sharing apps such as Instagram, Pinterest, Snapchat, or even Twitter, and may prefer to document, convey, and receive information visually. They also enjoy topics related to shopping, online gaming, and researching about current events-dispositions a typical Gen Z might be interested in. To market this group successfully, a marketing approach that is visual, use Gen Z lingo, and that touch on school or college-related topics may prove beneficial.

Cluster 4: Health Enthusiasts

This cluster is very evident in its inkling towards health-conscious topics. They are very interested in health nutrition and personal fitness. A sound marketing strategy to this particular group of people is to cater towards their interests in health and wellness. NutrientH20 may employ marketing campaigns that highlight the products' health benefits (high in minerals, vitamins-low in calories), and suggest it to be a product that complements fitness.

Cluster 5: Fathers (age demographic) / Southerners (geographic)

Cluster 5 could be assigned to a group of consumers depending on what metric is used to determine the group. From an age demographic point of view, this cluster consists of fathers. On the other hand, from a geographic point of view, this cluster consists of southern U.S consumers. They both display a disposition to be passionate sports-enthusiastic religious people with traditional family values. A reasonable marketing approach for either metric is to convey a message that NutrientH20 is to be shared with anyone in the family or with friends on game night.

Above is our report in conducting marketing segmentation for your Twitter audience using the K-Means clustering method.

Author attribution

```
## Loading required package: NLP
##
## Attaching package: 'NLP'
## The following object is masked from 'package:ggplot2':
##   annotate
##
## Attaching package: 'tm'
## The following object is masked from 'package:mosaic':
##   inspect
##
## Attaching package: 'proxy'
## The following object is masked from 'package:Matrix':
##
```

```

##      as.matrix

## The following objects are masked from 'package:stats':
##      as.dist, dist

## The following object is masked from 'package:base':
##      as.matrix

##      as.matrix

##      lift

## Attaching package: 'caret'

## The following object is masked from 'package:purrr':
##      dotPlot

## The following object is masked from 'package:mosaic':
##      dotPlot

## Warning in tm_map.SimpleCorpus(., content_transformer(tolower)): transformation
## drops documents

## Warning in tm_map.SimpleCorpus(., content_transformer(removeNumbers)):
## transformation drops documents

## Warning in tm_map.SimpleCorpus(., content_transformer(removePunctuation)):
## transformation drops documents

## Warning in tm_map.SimpleCorpus(., content_transformer(stripWhitespace)):
## transformation drops documents

## Warning in tm_map.SimpleCorpus(., content_transformer(tolower)): transformation
## drops documents

## Warning in tm_map.SimpleCorpus(., content_transformer(removeNumbers)):
## transformation drops documents

## Warning in tm_map.SimpleCorpus(., content_transformer(removePunctuation)):
## transformation drops documents

## Warning in tm_map.SimpleCorpus(., content_transformer(stripWhitespace)):
## transformation drops documents

##      [1] "i"          "me"          "my"          "myself"       "we"
##      [6] "our"         "ours"         "ourselves"    "you"          "your"
##     [11] "yours"       "yourself"     "yourselves"   "he"           "him"
##     [16] "his"          "himself"     "she"          "her"          "hers"
##     [21] "herself"     "it"           "its"          "itself"       "they"
##     [26] "them"         "their"        "theirs"       "themselves"   "what"
##     [31] "which"        "who"          "whom"         "this"         "that"
##     [36] "these"        "those"        "am"           "is"           "are"
##     [41] "was"          "were"        "be"           "been"         "being"
##     [46] "have"         "has"          "had"          "having"       "do"
##     [51] "does"         "did"          "doing"        "would"       "should"
##     [56] "could"        "ought"        "i'm"          "you're"       "he's"
##     [61] "she's"        "it's"          "we're"        "they're"      "i've"
##     [66] "you've"       "we've"        "they've"      "i'd"          "you'd"
##     [71] "he'd"          "she'd"        "we'd"         "they'd"       "i'll"
##     [76] "you'll"       "he'll"        "she'll"       "we'll"        "they'll"

```

```

## [81] "isn't"      "aren't"      "wasn't"      "weren't"      "hasn't"
## [86] "haven't"    "hadn't"      "doesn't"     "don't"       "didn't"
## [91] "won't"       "wouldn't"    "shan't"      "shouldn't"    "can't"
## [96] "cannot"      "couldn't"    "mustn't"     "let's"        "that's"
## [101] "who's"       "what's"      "here's"      "there's"     "when's"
## [106] "where's"    "why's"       "how's"       "a"           "an"
## [111] "the"         "and"         "but"         "if"          "or"
## [116] "because"     "as"          "until"       "while"       "of"
## [121] "at"          "by"          "for"         "with"        "about"
## [126] "against"     "between"     "into"        "through"     "during"
## [131] "before"      "after"       "above"       "below"       "to"
## [136] "from"        "up"          "down"        "in"          "out"
## [141] "on"          "off"         "over"        "under"       "again"
## [146] "further"     "then"        "once"        "here"        "there"
## [151] "when"        "where"       "why"         "how"         "all"
## [156] "any"         "both"        "each"        "few"         "more"
## [161] "most"        "other"       "some"        "such"        "no"
## [166] "nor"         "not"         "only"        "own"         "same"
## [171] "so"          "than"        "too"         "very"        "very"

## Warning in tm_map.SimpleCorpus(train_documents,
## content_transformer(removeWords), : transformation drops documents

## Warning in tm_map.SimpleCorpus(test_documents,
## content_transformer(removeWords), : transformation drops documents

## <<DocumentTermMatrix (documents: 2500, terms: 32570)>>
## Non-/sparse entries: 537861/80887139
## Sparsity           : 99%
## Maximal term length: 44
## Weighting          : term frequency (tf)

## <<DocumentTermMatrix (documents: 2500, terms: 33373)>>
## Non-/sparse entries: 545286/82887214
## Sparsity           : 99%
## Maximal term length: 45
## Weighting          : term frequency (tf)

## <<DocumentTermMatrix (documents: 2500, terms: 801)>>
## Non-/sparse entries: 280686/1721814
## Sparsity           : 86%
## Maximal term length: 18
## Weighting          : term frequency (tf)

## <<DocumentTermMatrix (documents: 2500, terms: 816)>>
## Non-/sparse entries: 285048/1754952
## Sparsity           : 86%
## Maximal term length: 18
## Weighting          : term frequency (tf)

##      beijing      china      chinese      chinas      share      million
## 0.14217780  0.13599088  0.12339681  0.11729475 -0.11603417 -0.11392724
## analysts     earnings     quarter     percent     leader     analyst
## -0.11080325 -0.10911704 -0.10888264 -0.10530118  0.10442872 -0.10429956
## beijings     profits     profit      hong      political   communist
## 0.10348960 -0.10263856 -0.10177818  0.09804977  0.09701041  0.09636230
## cchina     official     officials      kong      rose      government

```

```

##  0.09431377  0.09356585  0.09334408  0.09323586 -0.09010325  0.08964346
##      human
##  0.08829769

##          corp    communications      new    companies
##  0.11789220      0.11308878  0.11183808  0.10791783
##      company        deal      will    internet
##  0.10771974      0.10020358  0.09924469  0.09775813
##      beijing    forecast      chinas    customers
##  -0.09699763      -0.09668467  -0.09578329  0.09505075
##      percent    services      profit    network
##  -0.09208300      0.09055474  -0.09035603  0.08904719
##  telecommunications      china      chinese    inc
##  0.08878670      -0.08846890  -0.08750740  0.08571191
##      industry    networks      results    rise
##  0.08488434      0.08430488  -0.08366872  -0.08344338
##      computer
##  0.08275661

##          PC1      PC2
## AaronPressman  1.170924850  4.6414998570
## AaronPressman  1.451579718  4.9641445602
## AaronPressman  2.004701421  2.3271036830
## AaronPressman  3.240530902  2.9911703325
## AaronPressman  2.639514452  3.4805377953
## AaronPressman  2.135446719  2.3839136894
## AaronPressman  3.083648677  4.3656588860
## AaronPressman  1.668248511 -0.3933455475
## AaronPressman  2.149342246 -0.9088165959
## AaronPressman  0.074605032  2.3975868281
## AaronPressman  1.179008317  4.9973957027
## AaronPressman -0.067782602  2.3317972662
## AaronPressman  0.457741438  0.5771628352
## AaronPressman  1.665908527  3.8864646884
## AaronPressman  4.029504521  3.0515329399
## AaronPressman  1.873076600  2.7127112321
## AaronPressman  2.169878653  3.1653487006
## AaronPressman  1.915396952  1.4146038552
## AaronPressman  0.388718007  1.5255189524
## AaronPressman  0.949115029  1.1645209442
## AaronPressman  3.138321181  2.0678266280
## AaronPressman  1.819489688  4.0796735663
## AaronPressman  2.348702501  3.4945907334
## AaronPressman  1.142639169  2.1796183592
## AaronPressman  0.243598095  1.1023721050
## AaronPressman  1.481548619  7.0639660523
## AaronPressman  2.679277265  6.5701968731
## AaronPressman  2.897127886  3.7675534042
## AaronPressman  1.509395404  3.1359886232
## AaronPressman  4.873212131  2.5734684968
## AaronPressman  3.432379401  2.3673938387
## AaronPressman  0.015902453  4.8410492462
## AaronPressman -0.170697115  5.4830167821
## AaronPressman  1.469521986  2.3612469929
## AaronPressman  1.858256927  1.5925272737

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## AaronPressman      1.957470426  2.5684444604
## AaronPressman      3.814460840  3.4000815076
## AaronPressman      3.922695892  3.4735912546
## AaronPressman      2.067974379  3.9880617980
## AaronPressman      2.432006889  3.6199243385
## AaronPressman      1.209470871  3.4202857805
## AaronPressman      1.718708659  4.4478540284
## AaronPressman      3.108514064  3.5708271018
## AaronPressman      1.580284778  4.2626781900
## AaronPressman      1.822201024  4.4699515491
## AaronPressman      2.806753757  1.8794666316
## AaronPressman      0.639684192  1.9745908244
## AaronPressman      3.411636482  2.7548175998
## AaronPressman      2.032099180  -0.4191257094
## AaronPressman      1.218697923  4.0428602512
## AlanCrosby         2.463273982  -0.9591537243
## AlanCrosby         -3.751978868  -6.2492016478
## AlanCrosby         1.775520889  -3.3493774997
## AlanCrosby         2.302756368  -3.0540452893
## AlanCrosby         -3.685662607  -6.3181835379
## AlanCrosby         2.110976767  -1.3792031038
## AlanCrosby         -3.997932879  -6.0973154501
## AlanCrosby         2.606440563  -0.8921921465
## AlanCrosby         1.704746080  -2.1144503043
## AlanCrosby         1.537286278  -4.4201737843
## AlanCrosby         1.766935122  -2.0737612896
## AlanCrosby         1.566588991  -3.2801160370
## AlanCrosby         2.748024886  -3.0657285714
## AlanCrosby         1.200838066  -2.4435499075
## AlanCrosby         0.283731392  -3.0007899779
## AlanCrosby         1.460850831  -2.3907804636
## AlanCrosby         1.798053924  -2.2351656012
## AlanCrosby         3.277839253  -2.0295843243
## AlanCrosby         -1.956742033  -3.9945476415
## AlanCrosby         -1.982863267  -3.7856048306
## AlanCrosby         -1.606318748  -5.5865958797
## AlanCrosby         -1.686522609  -4.9099503955
## AlanCrosby         -3.859065033  -5.8216109143
## AlanCrosby         -4.823126183  -6.4130993848
## AlanCrosby         0.552572318  -1.5803634594
## AlanCrosby         0.714661636  -1.7101627404
## AlanCrosby         -4.758571961  -3.4266908416
## AlanCrosby         -4.626460817  -1.9288940942
## AlanCrosby         0.905085934  0.1721283714
## AlanCrosby         -0.445230149  -2.9921259682
## AlanCrosby         -6.116153472  -5.4649985107
## AlanCrosby         -6.208035728  -5.5546060244
## AlanCrosby         2.887881728  -6.0679160867
## AlanCrosby         4.035243687  -6.6786139283
## AlanCrosby         -1.872481678  -6.3633194973
## AlanCrosby         1.259511999  -0.6095393673
## AlanCrosby         -0.640948715  -6.6229955388
## AlanCrosby         -0.462116052  -6.4232783393
## AlanCrosby         1.895647053  -2.8791235434

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## AlanCrosby      1.914997236 -5.4256468992
## AlanCrosby      2.744839283 -6.6181425323
## AlanCrosby      -0.313934540 -5.2835522526
## AlanCrosby      -5.135983044 -4.7895957966
## AlanCrosby      0.379080817 -5.1286912423
## AlanCrosby      0.620292941 -5.0500373740
## AlanCrosby      0.542831170 -5.1339923011
## AlanCrosby      -2.448938807 -6.5434460264
## AlanCrosby      -3.022035916 -6.3918498630
## AlanCrosby      -0.814214064 -5.0580698989
## AlanCrosby      -0.959829596 -5.0265873482
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## AlexanderSmith  -0.360656290  3.5820059580
## AlexanderSmith  0.164490719  0.9395420164
## AlexanderSmith  -2.096956246  4.2816050595
## AlexanderSmith  -2.196585999  6.6525634630
## AlexanderSmith  -1.239831285  5.0632631615
## AlexanderSmith  -1.535652845  6.0282887181
## AlexanderSmith  -2.217953987  6.7000669445
## AlexanderSmith  0.027579020  2.2045148561
## AlexanderSmith  0.670977611  1.6257846832
## AlexanderSmith  -0.333637526  2.8215668278
## AlexanderSmith  2.149657951  1.2710482606
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## AlexanderSmith  -3.027549614  0.5518844502
## AlexanderSmith  2.206313387  3.6251208249
## AlexanderSmith  -1.991441493  1.5587538436
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## AlexanderSmith  -3.411277942 -1.3683452161
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## AlexanderSmith  -3.929033975 -2.1836006264
## AlexanderSmith  -3.401608823 -1.8958891017
## AlexanderSmith  0.856775485  0.4043235748
## AlexanderSmith  -0.166780491  2.5981987801
## AlexanderSmith  -1.645770954  1.9851955373
## AlexanderSmith  -4.329753394 -2.0547575728
## AlexanderSmith  -3.792369966 -1.0985453135
## AlexanderSmith  0.893445809  1.4825986512
## AlexanderSmith  1.292359005  1.2254063890
## AlexanderSmith  1.919130180  1.6507103549
## AlexanderSmith  -2.524630527  0.9430859694
## AlexanderSmith  -1.232909161  2.3245751269
## AlexanderSmith  1.478024576  1.1381904238

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## AlexanderSmith      0.045235923  1.2879144726
## AlexanderSmith     -4.201940535 -2.6738933872
## AlexanderSmith      0.128928827  2.4573572463
## AlexanderSmith     -1.855866755 -0.7673826025
## AlexanderSmith     -0.357088571  1.7897645648
## AlexanderSmith     -2.037958292 -2.1785120825
## AlexanderSmith      1.239028656  0.5604806663
## BenjaminKangLim     7.423676535 -3.7831176859
## BenjaminKangLim     7.420558423 -4.8494631436
## BenjaminKangLim     4.065761282 -2.2679340770
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## BenjaminKangLim     7.235733943 -1.9751586494
## BenjaminKangLim     7.261532503 -1.4700667710
## BenjaminKangLim     8.162486345 -2.7026541093
## BenjaminKangLim     2.054008409 -0.7568364638
## BenjaminKangLim     7.983637937 -5.0341847022
## BenjaminKangLim     4.673783190  0.1840184493
## BenjaminKangLim     5.674895830 -3.7919812674
## BenjaminKangLim     9.215624695 -4.6213838186
## BenjaminKangLim     6.122806626 -1.8756397892
## BenjaminKangLim     8.768688809 -3.4772773382
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## BenjaminKangLim     8.775359870 -3.4255765842
## BenjaminKangLim     9.095492375 -3.9753870415
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## BenjaminKangLim     7.863128418 -3.0538310731
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## BenjaminKangLim     8.229917276 -1.6511824296
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## BenjaminKangLim     5.587169950 -3.4254421062
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## BenjaminKangLim     7.643172015 -2.8577433055
## BenjaminKangLim     -0.650910155 -5.3152029223
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## BenjaminKangLim     -1.545366036 -5.9537375565
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## BenjaminKangLim     6.931660967 -3.3793783263
## BenjaminKangLim     8.533553969 -4.1652419979
## BenjaminKangLim     8.210250583 -3.8402021557
## BenjaminKangLim     8.145145352 -5.1264117818
## BenjaminKangLim     7.689479622 -2.5229910387
## BenjaminKangLim     2.833647638 -3.7444837362
## BenjaminKangLim     7.738170832 -4.4823970474
## BenjaminKangLim     6.017620577 -2.9015719240
## BenjaminKangLim     9.011334266 -3.6212599208
## BenjaminKangLim     9.676404821 -5.2470859304
## BenjaminKangLim     4.922938080 -2.7197582223
## BenjaminKangLim     4.271414312 -2.3096902843
## BenjaminKangLim     8.151619910 -2.4307748977
## BenjaminKangLim     2.880286051 -1.6576138692

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## BenjaminKangLim    7.567508443 -1.9227758801
## BenjaminKangLim    8.131340803 -3.6275879113
## BenjaminKangLim    7.982902943 -1.9801026845
## BernardHickey     -3.302171778 -3.1785851279
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## BernardHickey     0.282194370 -0.6325412843
## BernardHickey     -0.289167580  0.2798393636
## BernardHickey     -3.786804146 -1.1456436953
## BernardHickey     -3.833082522 -0.8856608994
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## BernardHickey     -2.388916374  1.6432331415
## BernardHickey     -1.121629732  1.1584946888
## BernardHickey     -4.304429925 -2.4309678980
## BernardHickey     -5.028541965 -4.2050060860
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## BernardHickey     -1.832777106  2.4312079773
## BernardHickey     -4.666001931 -4.4118332128
## BernardHickey     -3.015959672 -2.6716221051
## BernardHickey     -6.214109328 -4.6201796878
## BernardHickey     -4.243867424 -3.2929279940
## BernardHickey     -4.970076060 -4.3567020690
## BernardHickey     -4.208814643 -4.5776349826
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## BernardHickey     0.135571669  1.8714884159
## BernardHickey     0.191208321  2.0531916814
## BernardHickey     1.003071809  0.5826350841
## BernardHickey     -1.745564308 -1.9786349541
## BernardHickey     -5.834711868 -3.2289869497
## BernardHickey     -5.473252938 -3.3553054281
## BernardHickey     -6.175147134 -3.0442766839
## BernardHickey     2.833528019 -1.0887717017
## BernardHickey     1.029665746  1.7232619363
## BernardHickey     -4.073150796 -2.0414489169
## BernardHickey     -5.963795148 -0.7206601996
## BernardHickey     -1.118963828  2.4754256815
## BernardHickey     -1.727522010  3.9620320404
## BernardHickey     -1.035651388  2.4690792541
## BernardHickey     -5.955514509 -0.5630042699
## BernardHickey     -6.581841979 -5.5734223831
## BernardHickey     -4.623204265  0.4228716676
## BernardHickey     -5.740313404 -4.6529554161
## BernardHickey     -6.175247020 -5.0662580472
## BernardHickey     -6.796131926 -5.9917025537
## BernardHickey     -6.986649074 -6.2851704782
## BernardHickey     -6.428252786 -6.3429957184
## BradDorfman      -5.839168186 -2.4770910338

```

```

## BradDorfman      -7.516953905 -5.7356121113
## BradDorfman      -0.180269090  2.5452096865
## BradDorfman      -0.018928864  2.3456606430
## BradDorfman      -3.144023982  1.6879036679
## BradDorfman      -3.596320705  3.0533696311
## BradDorfman      -0.595350671  4.2349133053
## BradDorfman      0.724730194  1.8520852406
## BradDorfman      3.233230246  1.5543891013
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## BradDorfman      -0.646968842  2.7759308869
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## BradDorfman      -9.647086110 -4.9964365634
## BradDorfman      -1.859244185  3.9752724650
## BradDorfman      -4.851511140  0.2141031478
## BradDorfman      -5.113799552 -0.7893530753
## BradDorfman      -1.678273790  3.1640042365
## BradDorfman      -1.455509268 -1.0256647857
## BradDorfman      -0.876325303 -0.2555830429
## BradDorfman      -5.826789032 -4.9047296132
## BradDorfman      -5.755546276 -4.8856555274
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## BradDorfman      -3.072791763  1.5927485537
## BradDorfman      -4.529512995 -0.0776672920
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## BradDorfman      -7.320242426 -3.5479907817
## BradDorfman      -3.830381007  2.0358284731
## BradDorfman      -3.680794993  2.8313308485
## BradDorfman      -3.073185061 -2.4256173392
## BradDorfman      -2.564729704 -2.0846636921
## BradDorfman      -2.603159321  3.3425227631
## BradDorfman      -3.197853768  0.2785530020
## BradDorfman      -3.264850851  2.7380614707
## BradDorfman      -1.337234909  3.0837635503
## BradDorfman      -2.965868774 -3.5268465086
## BradDorfman      -1.461164259  1.2476247563
## BradDorfman      -4.022229712 -2.6322996567
## BradDorfman      -7.441488660 -3.1411339731
## BradDorfman      -4.342987001  1.3099301094
## BradDorfman      -6.781273074 -3.9552074787
## BradDorfman      -3.894534485 -2.0379448196
## BradDorfman      -6.467339080 -3.6080353498
## BradDorfman      -0.073517535  4.9199983035
## BradDorfman      -8.601987561 -4.8040532235
## BradDorfman      -4.185910911 -0.6761040367
## BradDorfman      -2.626563934 -0.7661452607
## BradDorfman      -0.695793209  1.9273249077
## BradDorfman      -0.948769047  1.2616939988
## BradDorfman      -2.588220352 -0.7349360760
## BradDorfman      -2.191811283  1.9691581416
## DarrenSchuettler 2.084627761  0.4157636838
## DarrenSchuettler -7.245660040 -5.5435841143
## DarrenSchuettler -1.620543668  3.8591819287
## DarrenSchuettler -7.736243252 -5.5779595407
## DarrenSchuettler 2.756669319 -0.1210623636

```

```

## DarrenSchuettler -2.250958845 2.1705326263
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## JanLopatka 5.874698901 -1.1239581231
## JanLopatka 2.265748727 -0.7564092132
## JanLopatka 3.795021036 -4.3378463260
## JanLopatka -4.642419405 -5.9428186224
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## JanLopatka 2.527338659 -7.2766443890
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## JanLopatka 4.344233373 -3.6790018900
## JanLopatka 1.870379912 0.1984493909
## JanLopatka 2.511970854 -0.3686742015
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## JanLopatka -0.506541623 0.1371376509
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## LynnleyBrowning 0.745447055  2.1479593771
## LynnleyBrowning -0.615587036  0.3526655130
## LynnleyBrowning 0.040336354 -0.0053044105
## LynnleyBrowning 3.813647461  1.3246158114
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## LynnleyBrowning 4.662606200  1.0605993902
## LynnleyBrowning 1.170123169  0.6595622945
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## LynnleyBrowning -1.516384320 -1.9145253524

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## LynnleyBrowning    1.437324839  1.8627292134
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## MarkBendeich -5.289253116 -3.5626732386
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## MichaelConnor -4.507366360 -1.0923927478
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## NickLouth      -2.697050605  1.3109071508
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## SimonCowell      0.976837315  4.0887650856
## SimonCowell      0.761625176  0.3229272961
## SimonCowell      -1.430377990  3.6805145848
## SimonCowell      -3.517103978  -2.9940305325
## SimonCowell      -2.178622410  3.9256305916
## SimonCowell      0.228401277  3.1872321208
## SimonCowell      2.972250164  2.4271790309
## SimonCowell      2.362697794  2.6743438814
## SimonCowell      -3.141522632  -0.0799118351
## SimonCowell      0.308898729  4.9520834261
## SimonCowell      3.128281502  0.8913586517
## SimonCowell      -4.939190365  -2.4453508773
## SimonCowell      -4.699881906  -2.4739586387
## SimonCowell      -5.729204890  -3.7481647162
## SimonCowell      -4.347523364  -0.2770509534
## SimonCowell      -3.797594278  -0.4335036232
## SimonCowell      3.293057884  0.0300395260
## SimonCowell      -4.438011750  0.0846035311
## SimonCowell      -0.315583815  0.1576114365
## SimonCowell      0.208158776  2.6413307408
## SimonCowell      -5.306186486  -3.0043166829
## SimonCowell      -5.993351278  -2.2831927673
## SimonCowell      -3.746637633  -1.1350902829
## SimonCowell      -5.628655548  -1.9319665351
## SimonCowell      -5.186782051  -1.5658547030
## SimonCowell      1.194711869  0.4777012576
## SimonCowell      -6.721472067  -2.5881978602
## SimonCowell      0.511595732  2.6644569751
## SimonCowell      0.171278299  3.2221025655
## SimonCowell      0.165671180  3.0977803498
## SimonCowell      -2.583264396  0.5797600097

```

```

## SimonCowell      -1.676328586  1.8600844846
## TanEeLyn         7.283931226 -2.0109339322
## TanEeLyn         -1.008280414 -0.8177616006
## TanEeLyn          6.979227630 -3.4485414771
## TanEeLyn          7.098483076 -3.5615073118
## TanEeLyn          -0.584760143 -1.5867963473
## TanEeLyn          -0.855337462 -3.9065544441
## TanEeLyn          7.744014924 -3.6323851518
## TanEeLyn          8.485532233 -3.5290391367
## TanEeLyn          3.834474507 -2.4185280119
## TanEeLyn          3.836893864  2.4474988121
## TanEeLyn          3.020898688 -0.7714579964
## TanEeLyn          4.570159148 -1.9583351901
## TanEeLyn          6.466113449 -1.0688342060
## TanEeLyn          5.974187300 -1.3701285028
## TanEeLyn          6.148262332 -0.3904096408
## TanEeLyn          2.396718923  0.7233408892
## TanEeLyn          6.803046047 -1.7247697041
## TanEeLyn          6.684423461 -2.5928859829
## TanEeLyn          0.367910017 -0.9509358399
## TanEeLyn          6.270716587 -2.2852163914
## TanEeLyn          7.331685649 -3.9538594652
## TanEeLyn          7.877657083 -4.3218205615
## TanEeLyn          7.696890126 -2.5937666928
## TanEeLyn          6.875072101 -1.9248399059
## TanEeLyn          3.408928272 -1.6176019379
## TanEeLyn          7.738533274 -2.8869707204
## TanEeLyn          6.355272388 -3.8274438820
## TanEeLyn          10.062950110 -5.1245907547
## TanEeLyn          6.584073707 -1.7197415629
## TanEeLyn          6.814593202 -1.7602888264
## TanEeLyn          7.158713221 -1.9634249026
## TanEeLyn          6.408221827 -3.5301793626
## TanEeLyn          -0.872543392 -3.5868984049
## TanEeLyn          5.968809456 -2.5177002116
## TanEeLyn          6.394292663 -3.4432285969
## TanEeLyn          4.049520508 -0.2013579563
## TanEeLyn          7.090679369 -3.3309416782
## TanEeLyn          6.290411600 -3.5636275844
## TanEeLyn          7.031995982 -3.6862284702
## TanEeLyn          6.271012321 -3.4774984342
## TanEeLyn          5.898810709 -4.4546937446
## TanEeLyn          1.007326498 -5.1553977440
## TanEeLyn          2.266691545 -0.1051156777
## TanEeLyn          7.460656449 -1.6143688169
## TanEeLyn          7.491884912 -1.6385346627
## TanEeLyn          6.270085822 -2.3100736272
## TanEeLyn          7.696850854 -4.1470593646
## TanEeLyn          6.747547887 -3.3438154351
## TanEeLyn          5.406236562 -3.0414648057
## TanEeLyn          6.043181009 -3.0727178694
## TheresePoletti    0.452909446  4.7086925719
## TheresePoletti    0.145343065  4.4145766878
## TheresePoletti   -6.243414253 -2.1116981437

```

```

## TheresePoletti -1.590800672  6.9902500515
## TheresePoletti -0.642633872  5.8572692425
## TheresePoletti -7.982893221 -2.1715826538
## TheresePoletti -6.901657320 -1.4471573499
## TheresePoletti -5.336592464 -2.1543831891
## TheresePoletti -7.522851555 -2.8887589661
## TheresePoletti -7.675626447 -1.6804351521
## TheresePoletti -7.178672162 -0.9649291259
## TheresePoletti -0.473955268  4.3508057519
## TheresePoletti -0.391874914  4.3349763253
## TheresePoletti -1.846697846  3.5176657776
## TheresePoletti -0.661671097  6.3492969376
## TheresePoletti -1.617714589  6.0056291401
## TheresePoletti -2.135998591  3.1923640989
## TheresePoletti -1.199737824  3.3876659142
## TheresePoletti -0.940689582  3.4930354882
## TheresePoletti -6.055910156 -2.6773986185
## TheresePoletti -0.652137953  8.0126407380
## TheresePoletti -1.762569890  3.6818415357
## TheresePoletti -1.297681028  7.6608386553
## TheresePoletti -1.772032729  3.6283349519
## TheresePoletti -0.583642567  6.9380061336
## TheresePoletti -2.134712885  2.8946784216
## TheresePoletti -0.896027082  7.0959177965
## TheresePoletti -2.877040750  4.2684955887
## TheresePoletti -4.972317008 -1.5350311129
## TheresePoletti -4.183222006 -1.9036315358
## TheresePoletti -1.676517919  4.7463057225
## TheresePoletti  0.777936600  2.1587872543
## TheresePoletti -5.136630581 -1.2108509295
## TheresePoletti -4.515922703 -0.8125657674
## TheresePoletti  2.022758686  5.0500588104
## TheresePoletti -0.551532110  6.7212621017
## TheresePoletti -1.821243227  1.1487298771
## TheresePoletti -1.084459429  6.5146835193
## TheresePoletti  0.769288756  5.8045558316
## TheresePoletti  0.656782980  6.1226664574
## TheresePoletti  0.019395049  6.5953189974
## TheresePoletti -0.982413384  5.9418645545
## TheresePoletti -0.606777993  4.1907304509
## TheresePoletti -5.895768500  0.8289438816
## TheresePoletti -0.359431107  5.3195091781
## TheresePoletti -3.884352732  3.1250967860
## TheresePoletti -1.342573611  4.9476614232
## TheresePoletti -0.646886439  6.2500875864
## TheresePoletti -6.676927015 -1.5181215586
## TheresePoletti -6.697276987 -1.0572102073
## TimFarrand -2.690760744 -1.9513410398
## TimFarrand -6.215456257 -4.7070018743
## TimFarrand -1.947796112  3.7909692692
## TimFarrand -2.754257570 -2.1876834393
## TimFarrand -5.143167134 -2.7451086509
## TimFarrand -2.882327101 -2.1948163788
## TimFarrand -3.689424110 -2.3376505993

```

```

## TimFarrand      -5.594042985 -3.4895152146
## TimFarrand      1.053144755  2.1828722113
## TimFarrand      -6.099007810 -4.0839867436
## TimFarrand      -6.397397486 -4.9751390020
## TimFarrand      -4.187698798 -2.6455792912
## TimFarrand      -6.280665582 -3.7173285394
## TimFarrand      -6.270379993 -3.6929822666
## TimFarrand      -6.396859211 -5.0356188670
## TimFarrand      -5.062780725 -3.5146285824
## TimFarrand      0.977933832  2.6785304839
## TimFarrand      -4.994395089 -2.2385176703
## TimFarrand      -2.134428567 -2.3606641656
## TimFarrand      -2.613132457  0.6770121445
## TimFarrand      -4.526181148 -4.5670648249
## TimFarrand      -0.897105254  0.6447481198
## TimFarrand      -6.790111540 -3.9060530000
## TimFarrand      -5.832505101 -4.4182977308
## TimFarrand      -6.768143033 -4.1960717109
## TimFarrand      -5.531399711 -1.4630469935
## TimFarrand      -5.483021807 -2.0994141369
## TimFarrand      -5.010815675 -3.5957130238
## TimFarrand      -5.485196611 -5.3683022663
## TimFarrand      -1.572798322 -2.7254298195
## TimFarrand      -6.152269421 -3.0331194763
## TimFarrand      -4.857651614 -3.4462386828
## TimFarrand      -5.799957827 -4.3433683985
## TimFarrand      -2.158768787 -4.1535939979
## TimFarrand      -4.118331636 -2.4400599433
## TimFarrand      -6.633373033 -3.2094335813
## TimFarrand      -6.465507660 -3.4260376124
## TimFarrand      -5.787276308 -3.4504273493
## TimFarrand      -5.741072636 -3.8445876610
## TimFarrand      -4.963640282 -3.3722520352
## TimFarrand      -5.186009496 -4.2131984838
## TimFarrand      -3.640951381  0.8448743847
## TimFarrand      -1.749152930  3.8024574575
## TimFarrand      -3.486020558 -3.1719532396
## TimFarrand      -5.095072629 -2.5020288089
## TimFarrand      -3.334476801 -3.9454084269
## TimFarrand      -3.903923303 -2.1884080801
## TimFarrand      -5.525767968 -3.5399776712
## TimFarrand      -1.455809556  1.7348748062
## TimFarrand      0.015129241  2.4384148119
## ToddNissen       2.547927565  4.1838497838
## ToddNissen      -0.082525649  5.5228618494
## ToddNissen       1.435728514  3.7083802291
## ToddNissen       1.408746836  3.9347959372
## ToddNissen      -5.420419637 -2.3413573961
## ToddNissen      -7.295864698 -3.6893679891
## ToddNissen      -7.635759849 -3.6094904437
## ToddNissen       0.026834570  1.3510583071
## ToddNissen      1.121233242 -0.1430541581
## ToddNissen      0.999992081 -0.2987547300
## ToddNissen      2.301071497  3.1144507778

```

```

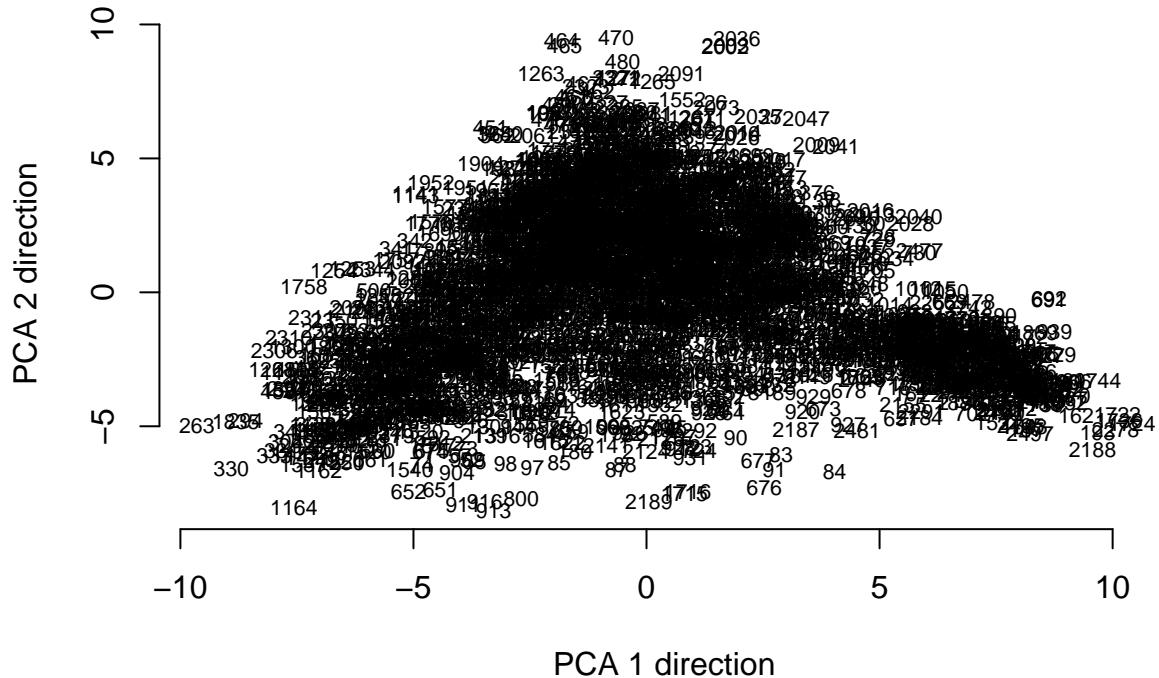
## ToddNissen      2.688118847  2.7341731902
## ToddNissen      2.899517086  2.8965921374
## ToddNissen      2.625059359  3.0235393479
## ToddNissen      -1.684477471  4.0910118514
## ToddNissen      -1.576826562  3.9043202317
## ToddNissen      -1.608412353  3.9312825133
## ToddNissen      -3.443997364  -2.9921457162
## ToddNissen      -0.537244486  3.8996020340
## ToddNissen      -0.336862258  4.1244152747
## ToddNissen      1.671745175  3.4656312236
## ToddNissen      4.253740126  0.0528434769
## ToddNissen      0.141048789  1.9699659785
## ToddNissen      -2.460069862  1.4519193603
## ToddNissen      2.893446250  -0.1000908368
## ToddNissen      3.876617721  0.9625543447
## ToddNissen      -1.057888056  4.3880213222
## ToddNissen      -0.782463670  4.0436701480
## ToddNissen      2.811699837  -0.1428232286
## ToddNissen      2.023714116  -0.7984003321
## ToddNissen      2.763830821  1.5226297202
## ToddNissen      2.235960205  -0.5440409352
## ToddNissen      3.287890956  1.8467730688
## ToddNissen      -4.775276291  -3.6113387787
## ToddNissen      -1.851853052  1.5357081051
## ToddNissen      -0.089907760  3.0079926812
## ToddNissen      1.529988115  3.0283098492
## ToddNissen      -1.924989682  0.4541532990
## ToddNissen      -1.971646556  -0.2811378516
## ToddNissen      -0.430998436  2.0581769274
## ToddNissen      3.467382524  0.3967860873
## ToddNissen      3.547213850  -0.1377012795
## ToddNissen      -1.139839608  3.0994418664
## ToddNissen      0.005148052  5.0457920824
## ToddNissen      1.215283869  1.4191937477
## ToddNissen      -4.915837396  -4.2926029364
## ToddNissen      -4.855932370  -4.2881973151
## ToddNissen      -3.930833984  -4.0927050628
## ToddNissen      -4.408227169  -4.1606202074
## ToddNissen      0.172804249  2.2849818216
## WilliamKazer    0.787412560  -0.0202607605
## WilliamKazer    5.595856046  -2.3097734412
## WilliamKazer    3.912611280  -0.6319041501
## WilliamKazer    3.542499090  -0.4881485659
## WilliamKazer    3.960516912  0.5481625505
## WilliamKazer    2.989615486  -2.3268050910
## WilliamKazer    3.270540154  0.6056951710
## WilliamKazer    2.586697234  -1.7434109937
## WilliamKazer    4.102760242  0.1192045950
## WilliamKazer    2.904562157  -2.3821949747
## WilliamKazer    2.218497073  -1.1283813992
## WilliamKazer    -0.629074450  -0.7756559521
## WilliamKazer    6.688737733  -2.2489190707
## WilliamKazer    0.939612947  -0.0225207142
## WilliamKazer    5.263080090  -1.3875114028

```

```

## WilliamKazer      0.316114761 -0.5459043783
## WilliamKazer      -1.605282354 -1.1888065494
## WilliamKazer      1.877684717 -3.5144804197
## WilliamKazer      0.711053670  0.0270156072
## WilliamKazer      8.455095596 -4.0874859962
## WilliamKazer      6.946461487 -2.9147474882
## WilliamKazer      7.091764846 -3.0865931789
## WilliamKazer      6.810970375 -3.0229535970
## WilliamKazer      6.393818888 -1.6964349760
## WilliamKazer      8.127975413 -2.8080674925
## WilliamKazer      7.570266715 -2.9258534439
## WilliamKazer      5.856986669  1.5682358820
## WilliamKazer      6.972996369 -0.3469374228
## WilliamKazer      5.488710063 -1.9957317161
## WilliamKazer      6.913673873 -2.1981357583
## WilliamKazer      4.518162950 -5.1829938977
## WilliamKazer      5.886151671 -1.4940710429
## WilliamKazer      5.929475498 -2.8416578115
## WilliamKazer      5.999808497 -2.1886544615
## WilliamKazer      1.031078345 -3.6312639206
## WilliamKazer      5.523345791 -1.4716047979
## WilliamKazer      6.274928203 -1.9009111856
## WilliamKazer      5.723391624 -2.0342552864
## WilliamKazer      1.398354023  3.0454742382
## WilliamKazer      7.517791351 -4.5116072594
## WilliamKazer      0.307530645 -2.9239984382
## WilliamKazer      -1.772130451  0.8914822816
## WilliamKazer      8.304718151 -3.8485575744
## WilliamKazer      5.339178908 -2.8488735233
## WilliamKazer      8.033795598 -4.9623081488
## WilliamKazer      2.677527272 -1.4787398292
## WilliamKazer      8.231331071 -5.2773838672
## WilliamKazer      5.488184661 -1.1948780897
## WilliamKazer      3.777686949 -2.8848576154
## WilliamKazer      6.453848085 -2.7122387510

```



```
## Accuracy      Kappa
## 0.4720000 0.4612245
```

Association rule mining

Find some interesting association rules for the shopping baskets in the dataset “groceries.”

```
## [1] "citrus fruit,semi-finished bread,margarine,ready soups"
## [2] "tropical fruit,yogurt,coffee"
## [3] "whole milk"
## [4] "pip fruit,yogurt,cream cheese ,meat spreads"
## [5] "other vegetables,whole milk,condensed milk,long life bakery product"
## [6] "whole milk,butter,yogurt,rice,abrasive cleaner"

## transactions as itemMatrix in sparse format with
## 9835 rows (elements/itemsets/transactions) and
## 169 columns (items) and a density of 0.02609146
##
## most frequent items:
##      whole milk other vegetables      rolls/buns      soda
##      2513            1903            1809            1715
##      yogurt          (Other)          34055
##      1372
##
## element (itemset/transaction) length distribution:
```

```

## sizes
##   1   2   3   4   5   6   7   8   9   10  11  12  13  14  15  16
## 2159 1643 1299 1005 855 645 545 438 350 246 182 117 78 77 55 46
##   17  18  19  20  21  22  23  24  26  27  28  29  32
##   29  14  14   9  11   4   6   1   1   1   1   3   1
##
##      Min. 1st Qu. Median     Mean 3rd Qu.    Max.
##      1.000  2.000  3.000  4.409  6.000 32.000
##
## includes extended item information - examples:
##           labels
## 1 abrasive cleaner
## 2 artif. sweetener
## 3 baby cosmetics



- There is a total of 9835 shopping baskets in the dataset, which includes various items.
- Over half of shopping baskets (5101) have 3 items or less
- The most popular item is whole milk which is listed in 2513 transactions; It is followed by other vegetables, rolls/buns, and soda.



## 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
##           2  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

## Warning in apriori(groceries_trans, parameter = list(support = 0.005, confidence
## = 0.1, : Mining stopped (maxlen reached). Only patterns up to a length of 2
## returned!

##  done [0.00s].
## writing ... [763 rule(s)] done [0.00s].
## creating S4 object ... done [0.00s].

##           lhs                      rhs                      support
## [1] {}          => {bottled water}          0.110523640
## [2] {}          => {tropical fruit}          0.104931368
## [3] {}          => {root vegetables}        0.108998475
## [4] {}          => {soda}                  0.174377224
## [5] {}          => {yogurt}                0.139501779
## [6] {}          => {rolls/buns}            0.183934926
## [7] {}          => {other vegetables}        0.193492628

```

## [8]	{}	=> {whole milk}	0.255516014
## [9]	{cake bar}	=> {whole milk}	0.005592272
## [10]	{dishes}	=> {other vegetables}	0.005998983
## [11]	{dishes}	=> {whole milk}	0.005287239
## [12]	{mustard}	=> {whole milk}	0.005185562
## [13]	{pot plants}	=> {whole milk}	0.006914082
## [14]	{chewing gum}	=> {soda}	0.005388917
## [15]	{chewing gum}	=> {whole milk}	0.005083884
## [16]	{canned fish}	=> {other vegetables}	0.005083884
## [17]	{pasta}	=> {whole milk}	0.006100661
## [18]	{herbs}	=> {root vegetables}	0.007015760
## [19]	{herbs}	=> {other vegetables}	0.007727504
## [20]	{herbs}	=> {whole milk}	0.007727504
## [21]	{processed cheese}	=> {soda}	0.005287239
## [22]	{processed cheese}	=> {other vegetables}	0.005490595
## [23]	{processed cheese}	=> {whole milk}	0.007015760
## [24]	{semi-finished bread}	=> {other vegetables}	0.005185562
## [25]	{semi-finished bread}	=> {whole milk}	0.007117438
## [26]	{beverages}	=> {yogurt}	0.005490595
## [27]	{beverages}	=> {rolls/buns}	0.005388917
## [28]	{beverages}	=> {other vegetables}	0.005185562
## [29]	{beverages}	=> {whole milk}	0.006812405
## [30]	{ice cream}	=> {soda}	0.006100661
## [31]	{ice cream}	=> {other vegetables}	0.005083884
## [32]	{ice cream}	=> {whole milk}	0.005897306
## [33]	{detergent}	=> {other vegetables}	0.006405694
## [34]	{detergent}	=> {whole milk}	0.008947636
## [35]	{pickled vegetables}	=> {other vegetables}	0.006405694
## [36]	{pickled vegetables}	=> {whole milk}	0.007117438
## [37]	{baking powder}	=> {other vegetables}	0.007320793
## [38]	{baking powder}	=> {whole milk}	0.009252669
## [39]	{flour}	=> {other vegetables}	0.006304016
## [40]	{flour}	=> {whole milk}	0.008439248
## [41]	{soft cheese}	=> {yogurt}	0.005998983
## [42]	{soft cheese}	=> {rolls/buns}	0.005388917
## [43]	{soft cheese}	=> {other vegetables}	0.007117438
## [44]	{soft cheese}	=> {whole milk}	0.007524148
## [45]	{specialty bar}	=> {soda}	0.007219115
## [46]	{specialty bar}	=> {rolls/buns}	0.005592272
## [47]	{specialty bar}	=> {other vegetables}	0.005592272
## [48]	{specialty bar}	=> {whole milk}	0.006507372
## [49]	{misc. beverages}	=> {bottled water}	0.005287239
## [50]	{misc. beverages}	=> {soda}	0.007320793
## [51]	{misc. beverages}	=> {other vegetables}	0.005592272
## [52]	{misc. beverages}	=> {whole milk}	0.007015760
## [53]	{grapes}	=> {tropical fruit}	0.006100661
## [54]	{grapes}	=> {other vegetables}	0.009049314
## [55]	{grapes}	=> {whole milk}	0.007320793
## [56]	{cat food}	=> {yogurt}	0.006202339
## [57]	{cat food}	=> {other vegetables}	0.006507372
## [58]	{cat food}	=> {whole milk}	0.008845958
## [59]	{specialty chocolate}	=> {soda}	0.006304016
## [60]	{specialty chocolate}	=> {rolls/buns}	0.005592272
## [61]	{specialty chocolate}	=> {other vegetables}	0.006100661

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## [62] {specialty chocolate}      => {whole milk}          0.008032537
## [63] {meat}                   => {sausage}            0.005287239
## [64] {meat}                   => {root vegetables}  0.005083884
## [65] {meat}                   => {soda}                0.005490595
## [66] {meat}                   => {yogurt}              0.005287239
## [67] {meat}                   => {rolls/buns}        0.006914082
## [68] {meat}                   => {other vegetables} 0.009964413
## [69] {meat}                   => {whole milk}          0.009964413
## [70] {frozen meals}          => {tropical fruit}    0.005490595
## [71] {frozen meals}          => {soda}                0.006202339
## [72] {frozen meals}          => {yogurt}              0.006202339
## [73] {frozen meals}          => {other vegetables}  0.007524148
## [74] {frozen meals}          => {whole milk}          0.009862735
## [75] {hard cheese}          => {sausage}            0.005185562
## [76] {hard cheese}          => {root vegetables}  0.005592272
## [77] {hard cheese}          => {yogurt}              0.006405694
## [78] {hard cheese}          => {rolls/buns}        0.005897306
## [79] {hard cheese}          => {other vegetables} 0.009456024
## [80] {hard cheese}          => {whole milk}          0.010066090
## [81] {butter milk}           => {pip fruit}          0.005083884
## [82] {butter milk}           => {tropical fruit}    0.005490595
## [83] {butter milk}           => {root vegetables}  0.005083884
## [84] {butter milk}           => {yogurt}              0.008540925
## [85] {butter milk}           => {rolls/buns}        0.007625826
## [86] {butter milk}           => {other vegetables} 0.010371124
## [87] {butter milk}           => {whole milk}          0.011591256
## [88] {candy}                 => {tropical fruit}    0.005388917
## [89] {candy}                 => {soda}                0.008642603
## [90] {candy}                 => {yogurt}              0.005490595
## [91] {candy}                 => {rolls/buns}        0.007117438
## [92] {candy}                 => {other vegetables} 0.006914082
## [93] {candy}                 => {whole milk}          0.008235892
## [94] {ham}                   => {white bread}        0.005083884
## [95] {white bread}          => {ham}                 0.005083884
## [96] {ham}                   => {tropical fruit}    0.005388917
## [97] {ham}                   => {yogurt}              0.006710727
## [98] {ham}                   => {rolls/buns}        0.006914082
## [99] {ham}                   => {other vegetables}  0.009150991
## [100] {ham}                  => {whole milk}          0.011489578
## [101] {sliced cheese}        => {sausage}            0.007015760
## [102] {sliced cheese}        => {tropical fruit}    0.005287239
## [103] {sliced cheese}        => {root vegetables}  0.005592272
## [104] {sliced cheese}        => {soda}                0.005083884
## [105] {sliced cheese}        => {yogurt}              0.008032537
## [106] {sliced cheese}        => {rolls/buns}        0.007625826
## [107] {sliced cheese}        => {other vegetables}  0.009049314
## [108] {sliced cheese}        => {whole milk}          0.010777834
## [109] {UHT-milk}            => {bottled water}       0.007320793
## [110] {UHT-milk}            => {soda}                0.007625826
## [111] {UHT-milk}            => {yogurt}              0.007422471
## [112] {UHT-milk}            => {rolls/buns}        0.006405694
## [113] {UHT-milk}            => {other vegetables}  0.008134215
## [114] {oil}                  => {root vegetables}  0.007015760
## [115] {oil}                  => {yogurt}              0.005287239

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## [116] {oil}                                => {rolls/buns}          0.005083884
## [117] {oil}                                => {other vegetables} 0.009964413
## [118] {oil}                                => {whole milk}          0.011286223
## [119] {onions}                             => {whipped/sour cream} 0.005083884
## [120] {onions}                             => {citrus fruit}         0.005592272
## [121] {onions}                             => {bottled water}        0.005897306
## [122] {onions}                             => {tropical fruit}      0.005693950
## [123] {onions}                             => {root vegetables}     0.009456024
## [124] {onions}                             => {soda}                 0.005287239
## [125] {onions}                             => {yogurt}               0.007219115
## [126] {onions}                             => {rolls/buns}          0.006812405
## [127] {onions}                             => {other vegetables}   0.014234875
## [128] {onions}                             => {whole milk}          0.012099644
## [129] {berries}                            => {whipped/sour cream} 0.009049314
## [130] {whipped/sour cream}                => {berries}              0.009049314
## [131] {berries}                            => {citrus fruit}         0.005388917
## [132] {berries}                            => {tropical fruit}      0.006710727
## [133] {berries}                            => {root vegetables}     0.006609049
## [134] {berries}                            => {soda}                 0.007320793
## [135] {berries}                            => {yogurt}               0.010574479
## [136] {berries}                            => {rolls/buns}          0.006609049
## [137] {berries}                            => {other vegetables}   0.010269446
## [138] {berries}                            => {whole milk}          0.011794611
## [139] {hamburger meat}                   => {sausage}              0.005185562
## [140] {hamburger meat}                   => {root vegetables}     0.006202339
## [141] {hamburger meat}                   => {soda}                 0.005795628
## [142] {hamburger meat}                   => {yogurt}               0.006507372
## [143] {hamburger meat}                   => {rolls/buns}          0.008642603
## [144] {hamburger meat}                   => {other vegetables}   0.013828165
## [145] {hamburger meat}                   => {whole milk}          0.014743264
## [146] {hygiene articles}                => {napkins}              0.006100661
## [147] {napkins}                           => {hygiene articles}   0.006100661
## [148] {hygiene articles}                => {citrus fruit}         0.005287239
## [149] {hygiene articles}                => {shopping bags}       0.005185562
## [150] {hygiene articles}                => {bottled water}        0.005693950
## [151] {hygiene articles}                => {tropical fruit}      0.006710727
## [152] {hygiene articles}                => {root vegetables}     0.005388917
## [153] {hygiene articles}                => {soda}                 0.007015760
## [154] {hygiene articles}                => {yogurt}               0.007320793
## [155] {hygiene articles}                => {rolls/buns}          0.005897306
## [156] {hygiene articles}                => {other vegetables}   0.009557702
## [157] {hygiene articles}                => {whole milk}          0.012811388
## [158] {salty snack}                    => {fruit/vegetable juice} 0.005998983
## [159] {salty snack}                    => {whipped/sour cream} 0.005185562
## [160] {salty snack}                    => {pastry}               0.005185562
## [161] {salty snack}                    => {shopping bags}       0.005998983
## [162] {salty snack}                    => {sausage}              0.005287239
## [163] {salty snack}                    => {tropical fruit}      0.005592272
## [164] {salty snack}                    => {soda}                 0.009354347
## [165] {salty snack}                    => {yogurt}               0.006202339
## [166] {salty snack}                    => {other vegetables}   0.010777834
## [167] {salty snack}                    => {whole milk}          0.011184545
## [168] {sugar}                           => {margarine}            0.005490595
## [169] {sugar}                           => {pastry}               0.005185562

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## [170] {sugar}          => {root vegetables} 0.006405694
## [171] {sugar}          => {soda}            0.007320793
## [172] {sugar}          => {yogurt}          0.006914082
## [173] {sugar}          => {rolls/buns}     0.007015760
## [174] {sugar}          => {other vegetables} 0.010777834
## [175] {sugar}          => {whole milk}      0.015048297
## [176] {waffles}        => {chocolate}       0.005795628
## [177] {chocolate}      => {waffles}         0.005795628
## [178] {waffles}        => {whipped/sour cream} 0.005083884
## [179] {waffles}        => {pastry}          0.007015760
## [180] {waffles}        => {shopping bags}   0.005490595
## [181] {waffles}        => {tropical fruit}  0.006100661
## [182] {waffles}        => {root vegetables} 0.006609049
## [183] {waffles}        => {soda}            0.009557702
## [184] {waffles}        => {yogurt}          0.007524148
## [185] {waffles}        => {rolls/buns}     0.009150991
## [186] {waffles}        => {other vegetables} 0.010066090
## [187] {waffles}        => {whole milk}      0.012709710
## [188] {long life bakery product} => {chocolate} 0.005287239
## [189] {chocolate}      => {long life bakery product} 0.005287239
## [190] {long life bakery product} => {fruit/vegetable juice} 0.006202339
## [191] {long life bakery product} => {whipped/sour cream} 0.005795628
## [192] {long life bakery product} => {pastry}          0.005897306
## [193] {long life bakery product} => {shopping bags}   0.005388917
## [194] {long life bakery product} => {sausage}         0.005388917
## [195] {long life bakery product} => {tropical fruit}  0.006304016
## [196] {long life bakery product} => {root vegetables} 0.005287239
## [197] {long life bakery product} => {soda}            0.007625826
## [198] {long life bakery product} => {yogurt}          0.008744281
## [199] {long life bakery product} => {rolls/buns}     0.007930859
## [200] {long life bakery product} => {other vegetables} 0.010676157
## [201] {long life bakery product} => {whole milk}      0.013523132
## [202] {dessert}         => {curd}            0.005185562
## [203] {dessert}         => {fruit/vegetable juice} 0.005998983
## [204] {dessert}         => {pastry}          0.005388917
## [205] {dessert}         => {shopping bags}   0.006202339
## [206] {dessert}         => {sausage}         0.005897306
## [207] {dessert}         => {bottled water}    0.005185562
## [208] {dessert}         => {tropical fruit}  0.006304016
## [209] {dessert}         => {root vegetables} 0.005795628
## [210] {dessert}         => {soda}            0.009862735
## [211] {dessert}         => {yogurt}          0.009862735
## [212] {dessert}         => {rolls/buns}     0.006812405
## [213] {dessert}         => {other vegetables} 0.011591256
## [214] {dessert}         => {whole milk}      0.013726487
## [215] {canned beer}     => {shopping bags}   0.011387900
## [216] {shopping bags}   => {canned beer}      0.011387900
## [217] {canned beer}     => {bottled water}    0.008032537
## [218] {canned beer}     => {soda}            0.013828165
## [219] {canned beer}     => {rolls/buns}     0.011286223
## [220] {canned beer}     => {other vegetables} 0.009049314
## [221] {canned beer}     => {whole milk}      0.008845958
## [222] {cream cheese }  => {curd}            0.005083884
## [223] {cream cheese }  => {domestic eggs}   0.005083884

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## [224] {cream cheese }          => {fruit/vegetable juice} 0.005693950
## [225] {cream cheese }          => {whipped/sour cream} 0.006405694
## [226] {cream cheese }          => {pip fruit} 0.006100661
## [227] {cream cheese }          => {citrus fruit} 0.005693950
## [228] {cream cheese }          => {shopping bags} 0.005592272
## [229] {cream cheese }          => {sausage} 0.005592272
## [230] {cream cheese }          => {bottled water} 0.005897306
## [231] {cream cheese }          => {tropical fruit} 0.007219115
## [232] {cream cheese }          => {root vegetables} 0.007524148
## [233] {cream cheese }          => {soda} 0.006812405
## [234] {cream cheese }          => {yogurt} 0.012404677
## [235] {cream cheese }          => {rolls/buns} 0.009964413
## [236] {cream cheese }          => {other vegetables} 0.013726487
## [237] {cream cheese }          => {whole milk} 0.016471784
## [238] {chicken}                => {frozen vegetables} 0.006710727
## [239] {frozen vegetables}      => {chicken} 0.006710727
## [240] {chicken}                => {pork} 0.005795628
## [241] {pork}                   => {chicken} 0.005795628
## [242] {chicken}                => {butter} 0.005795628
## [243] {butter}                 => {chicken} 0.005795628
## [244] {chicken}                => {newspapers} 0.005185562
## [245] {chicken}                => {domestic eggs} 0.006202339
## [246] {chicken}                => {whipped/sour cream} 0.007219115
## [247] {whipped/sour cream}     => {chicken} 0.007219115
## [248] {chicken}                => {citrus fruit} 0.006914082
## [249] {chicken}                => {sausage} 0.005287239
## [250] {chicken}                => {bottled water} 0.005287239
## [251] {chicken}                => {tropical fruit} 0.006405694
## [252] {chicken}                => {root vegetables} 0.010879512
## [253] {chicken}                => {soda} 0.008337570
## [254] {chicken}                => {yogurt} 0.008337570
## [255] {chicken}                => {rolls/buns} 0.009659380
## [256] {chicken}                => {other vegetables} 0.017895272
## [257] {chicken}                => {whole milk} 0.017590239
## [258] {white bread}             => {frankfurter} 0.005185562
## [259] {white bread}             => {domestic eggs} 0.005795628
## [260] {white bread}             => {fruit/vegetable juice} 0.007422471
## [261] {fruit/vegetable juice}   => {white bread} 0.007422471
## [262] {white bread}             => {whipped/sour cream} 0.005490595
## [263] {white bread}             => {pip fruit} 0.006609049
## [264] {white bread}             => {pastry} 0.005592272
## [265] {white bread}             => {shopping bags} 0.007422471
## [266] {white bread}             => {sausage} 0.007219115
## [267] {white bread}             => {tropical fruit} 0.008744281
## [268] {white bread}             => {root vegetables} 0.007930859
## [269] {white bread}             => {soda} 0.010269446
## [270] {white bread}             => {yogurt} 0.009049314
## [271] {white bread}             => {rolls/buns} 0.006507372
## [272] {white bread}             => {other vegetables} 0.013726487
## [273] {white bread}             => {whole milk} 0.017081851
## [274] {chocolate}               => {butter} 0.006202339
## [275] {butter}                  => {chocolate} 0.006202339
## [276] {chocolate}               => {newspapers} 0.005490595
## [277] {chocolate}               => {fruit/vegetable juice} 0.006812405

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## [278] {chocolate}	=> {pip fruit}	0.006100661
## [279] {chocolate}	=> {pastry}	0.008032537
## [280] {chocolate}	=> {citrus fruit}	0.006405694
## [281] {chocolate}	=> {shopping bags}	0.008134215
## [282] {chocolate}	=> {sausage}	0.006609049
## [283] {chocolate}	=> {bottled water}	0.005795628
## [284] {chocolate}	=> {tropical fruit}	0.008134215
## [285] {chocolate}	=> {root vegetables}	0.006405694
## [286] {chocolate}	=> {soda}	0.013523132
## [287] {chocolate}	=> {yogurt}	0.009252669
## [288] {chocolate}	=> {rolls/buns}	0.011794611
## [289] {chocolate}	=> {other vegetables}	0.012709710
## [290] {chocolate}	=> {whole milk}	0.016675140
## [291] {coffee}	=> {fruit/vegetable juice}	0.005998983
## [292] {coffee}	=> {whipped/sour cream}	0.006100661
## [293] {coffee}	=> {pip fruit}	0.006914082
## [294] {coffee}	=> {pastry}	0.006914082
## [295] {coffee}	=> {citrus fruit}	0.006405694
## [296] {coffee}	=> {shopping bags}	0.009354347
## [297] {coffee}	=> {sausage}	0.006914082
## [298] {coffee}	=> {bottled water}	0.007320793
## [299] {coffee}	=> {tropical fruit}	0.007117438
## [300] {coffee}	=> {root vegetables}	0.007320793
## [301] {coffee}	=> {soda}	0.009964413
## [302] {coffee}	=> {yogurt}	0.009761057
## [303] {coffee}	=> {rolls/buns}	0.010981190
## [304] {coffee}	=> {other vegetables}	0.013421454
## [305] {coffee}	=> {whole milk}	0.018708693
## [306] {frozen vegetables}	=> {pork}	0.006405694
## [307] {pork}	=> {frozen vegetables}	0.006405694
## [308] {frozen vegetables}	=> {frankfurter}	0.005083884
## [309] {frozen vegetables}	=> {margarine}	0.005083884
## [310] {frozen vegetables}	=> {butter}	0.005795628
## [311] {butter}	=> {frozen vegetables}	0.005795628
## [312] {frozen vegetables}	=> {domestic eggs}	0.005185562
## [313] {frozen vegetables}	=> {fruit/vegetable juice}	0.007829181
## [314] {fruit/vegetable juice}	=> {frozen vegetables}	0.007829181
## [315] {frozen vegetables}	=> {whipped/sour cream}	0.007930859
## [316] {whipped/sour cream}	=> {frozen vegetables}	0.007930859
## [317] {frozen vegetables}	=> {pip fruit}	0.007320793
## [318] {frozen vegetables}	=> {citrus fruit}	0.006609049
## [319] {frozen vegetables}	=> {sausage}	0.005998983
## [320] {frozen vegetables}	=> {bottled water}	0.006202339
## [321] {frozen vegetables}	=> {tropical fruit}	0.008744281
## [322] {frozen vegetables}	=> {root vegetables}	0.011591256
## [323] {root vegetables}	=> {frozen vegetables}	0.011591256
## [324] {frozen vegetables}	=> {soda}	0.008642603
## [325] {frozen vegetables}	=> {yogurt}	0.012404677
## [326] {frozen vegetables}	=> {rolls/buns}	0.010167768
## [327] {frozen vegetables}	=> {other vegetables}	0.017793594
## [328] {frozen vegetables}	=> {whole milk}	0.020437214
## [329] {beef}	=> {pork}	0.007625826
## [330] {pork}	=> {beef}	0.007625826
## [331] {beef}	=> {margarine}	0.006202339

```

## [332] {margarine}          => {beef}          0.006202339
## [333] {beef}               => {butter}        0.005795628
## [334] {butter}             => {beef}          0.005795628
## [335] {beef}               => {newspapers}    0.006405694
## [336] {beef}               => {domestic eggs} 0.005998983
## [337] {beef}               => {whipped/sour cream} 0.006710727
## [338] {beef}               => {pastry}        0.006304016
## [339] {beef}               => {citrus fruit}  0.008439248
## [340] {citrus fruit}       => {beef}          0.008439248
## [341] {beef}               => {sausage}       0.005592272
## [342] {beef}               => {bottled water} 0.006202339
## [343] {beef}               => {tropical fruit} 0.007625826
## [344] {beef}               => {root vegetables} 0.017386884
## [345] {root vegetables}   => {beef}          0.017386884
## [346] {beef}               => {soda}          0.008134215
## [347] {beef}               => {yogurt}        0.011692933
## [348] {beef}               => {rolls/buns}    0.013624809
## [349] {beef}               => {other vegetables} 0.019725470
## [350] {other vegetables}  => {beef}          0.019725470
## [351] {beef}               => {whole milk}    0.021250635
## [352] {curd}               => {margarine}    0.006304016
## [353] {margarine}          => {curd}          0.006304016
## [354] {curd}               => {butter}        0.006812405
## [355] {butter}             => {curd}          0.006812405
## [356] {curd}               => {newspapers}    0.005693950
## [357] {curd}               => {domestic eggs} 0.006507372
## [358] {domestic eggs}      => {curd}          0.006507372
## [359] {curd}               => {whipped/sour cream} 0.010472801
## [360] {whipped/sour cream} => {curd}          0.010472801
## [361] {curd}               => {pip fruit}    0.007829181
## [362] {pip fruit}          => {curd}          0.007829181
## [363] {curd}               => {pastry}        0.007524148
## [364] {curd}               => {citrus fruit}  0.007117438
## [365] {curd}               => {shopping bags} 0.005388917
## [366] {curd}               => {sausage}       0.007625826
## [367] {curd}               => {bottled water} 0.006100661
## [368] {curd}               => {tropical fruit} 0.010269446
## [369] {curd}               => {root vegetables} 0.010879512
## [370] {curd}               => {soda}          0.008134215
## [371] {curd}               => {yogurt}        0.017285206
## [372] {yogurt}             => {curd}          0.017285206
## [373] {curd}               => {rolls/buns}    0.010066090
## [374] {curd}               => {other vegetables} 0.017183528
## [375] {curd}               => {whole milk}    0.026131164
## [376] {whole milk}          => {curd}          0.026131164
## [377] {napkins}            => {newspapers}    0.006202339
## [378] {napkins}            => {domestic eggs}  0.005998983
## [379] {napkins}            => {fruit/vegetable juice} 0.006914082
## [380] {napkins}            => {whipped/sour cream} 0.007219115
## [381] {whipped/sour cream} => {napkins}        0.007219115
## [382] {napkins}            => {pip fruit}    0.006710727
## [383] {napkins}            => {pastry}        0.007015760
## [384] {napkins}            => {citrus fruit}  0.007625826
## [385] {napkins}            => {shopping bags} 0.007219115

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## [386] {napkins}          => {sausage}          0.006710727
## [387] {napkins}          => {bottled water} 0.008642603
## [388] {napkins}          => {tropical fruit} 0.010066090
## [389] {napkins}          => {root vegetables} 0.009964413
## [390] {napkins}          => {soda}             0.011997966
## [391] {napkins}          => {yogurt}           0.012302999
## [392] {napkins}          => {rolls/buns}     0.011692933
## [393] {napkins}          => {other vegetables} 0.014438231
## [394] {napkins}          => {whole milk}      0.019725470
## [395] {pork}              => {frankfurter}     0.005897306
## [396] {frankfurter}       => {pork}             0.005897306
## [397] {pork}              => {margarine}       0.006405694
## [398] {margarine}        => {pork}             0.006405694
## [399] {pork}              => {newspapers}      0.006609049
## [400] {pork}              => {whipped/sour cream} 0.008235892
## [401] {whipped/sour cream} => {pork}             0.008235892
## [402] {pork}              => {pip fruit}       0.006100661
## [403] {pork}              => {pastry}           0.006304016
## [404] {pork}              => {citrus fruit}    0.006507372
## [405] {pork}              => {shopping bags} 0.006405694
## [406] {pork}              => {sausage}          0.006507372
## [407] {pork}              => {bottled water} 0.007422471
## [408] {pork}              => {tropical fruit} 0.008540925
## [409] {pork}              => {root vegetables} 0.013624809
## [410] {root vegetables}   => {pork}             0.013624809
## [411] {pork}              => {soda}             0.011896289
## [412] {pork}              => {yogurt}           0.009557702
## [413] {pork}              => {rolls/buns}     0.011286223
## [414] {pork}              => {other vegetables} 0.021657346
## [415] {other vegetables} => {pork}             0.021657346
## [416] {pork}              => {whole milk}      0.022165735
## [417] {frankfurter}       => {brown bread}     0.007117438
## [418] {brown bread}       => {frankfurter}     0.007117438
## [419] {frankfurter}       => {margarine}       0.006405694
## [420] {margarine}         => {frankfurter}     0.006405694
## [421] {frankfurter}       => {domestic eggs}   0.007015760
## [422] {domestic eggs}    => {frankfurter}     0.007015760
## [423] {frankfurter}       => {whipped/sour cream} 0.006202339
## [424] {frankfurter}       => {pip fruit}       0.007219115
## [425] {frankfurter}       => {pastry}           0.008337570
## [426] {frankfurter}       => {citrus fruit}    0.006507372
## [427] {frankfurter}       => {shopping bags} 0.008235892
## [428] {frankfurter}       => {sausage}          0.010066090
## [429] {sausage}           => {frankfurter}     0.010066090
## [430] {frankfurter}       => {bottled water} 0.007320793
## [431] {frankfurter}       => {tropical fruit} 0.009456024
## [432] {frankfurter}       => {root vegetables} 0.010167768
## [433] {frankfurter}       => {soda}             0.011286223
## [434] {frankfurter}       => {yogurt}           0.011184545
## [435] {frankfurter}       => {rolls/buns}     0.019217082
## [436] {rolls/buns}        => {frankfurter}     0.019217082
## [437] {frankfurter}       => {other vegetables} 0.016471784
## [438] {frankfurter}       => {whole milk}      0.020538892
## [439] {margarine}         => {bottled beer}    0.006100661

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## [440] {butter}          => {bottled beer}          0.005795628
## [441] {bottled beer}    => {bottled water}        0.015760041
## [442] {bottled water}   => {bottled beer}          0.015760041
## [443] {bottled beer}    => {tropical fruit}       0.008235892
## [444] {bottled beer}    => {root vegetables}     0.009659380
## [445] {bottled beer}    => {soda}                  0.016980173
## [446] {bottled beer}    => {yogurt}                0.009252669
## [447] {bottled beer}    => {rolls/buns}         0.013624809
## [448] {bottled beer}    => {other vegetables}    0.016166751
## [449] {bottled beer}    => {whole milk}          0.020437214
## [450] {brown bread}     => {margarine}            0.006507372
## [451] {margarine}       => {brown bread}          0.006507372
## [452] {butter}          => {brown bread}          0.005795628
## [453] {brown bread}     => {newspapers}           0.007625826
## [454] {brown bread}     => {domestic eggs}        0.006812405
## [455] {domestic eggs}   => {brown bread}          0.006812405
## [456] {brown bread}     => {fruit/vegetable juice} 0.008337570
## [457] {fruit/vegetable juice} => {brown bread}          0.008337570
## [458] {brown bread}     => {pip fruit}            0.007625826
## [459] {pip fruit}       => {brown bread}          0.007625826
## [460] {brown bread}     => {pastry}                0.009659380
## [461] {pastry}          => {brown bread}          0.009659380
## [462] {brown bread}     => {citrus fruit}         0.008337570
## [463] {citrus fruit}    => {brown bread}          0.008337570
## [464] {brown bread}     => {shopping bags}        0.009252669
## [465] {brown bread}     => {sausage}               0.010676157
## [466] {sausage}         => {brown bread}          0.010676157
## [467] {brown bread}     => {bottled water}         0.008235892
## [468] {brown bread}     => {tropical fruit}       0.010676157
## [469] {tropical fruit} => {brown bread}          0.010676157
## [470] {brown bread}     => {root vegetables}     0.010167768
## [471] {brown bread}     => {soda}                  0.012608033
## [472] {brown bread}     => {yogurt}                0.014539908
## [473] {yogurt}          => {brown bread}          0.014539908
## [474] {brown bread}     => {rolls/buns}          0.012608033
## [475] {brown bread}     => {other vegetables}    0.018708693
## [476] {brown bread}     => {whole milk}          0.025216065
## [477] {margarine}       => {butter}                0.006710727
## [478] {butter}          => {margarine}             0.006710727
## [479] {margarine}       => {newspapers}           0.007117438
## [480] {margarine}       => {domestic eggs}        0.008337570
## [481] {domestic eggs}   => {margarine}             0.008337570
## [482] {margarine}       => {fruit/vegetable juice} 0.006202339
## [483] {margarine}       => {whipped/sour cream}   0.006812405
## [484] {margarine}       => {pip fruit}            0.008540925
## [485] {pip fruit}       => {margarine}             0.008540925
## [486] {margarine}       => {pastry}                0.006812405
## [487] {margarine}       => {citrus fruit}         0.007930859
## [488] {margarine}       => {sausage}               0.007117438
## [489] {margarine}       => {bottled water}         0.010269446
## [490] {margarine}       => {tropical fruit}       0.009354347
## [491] {margarine}       => {root vegetables}     0.011082867
## [492] {root vegetables} => {margarine}             0.011082867
## [493] {margarine}       => {soda}                  0.010167768

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## [494] {margarine}          => {yogurt}          0.014234875
## [495] {yogurt}             => {margarine}        0.014234875
## [496] {margarine}          => {rolls/buns}       0.014743264
## [497] {margarine}          => {other vegetables} 0.019725470
## [498] {other vegetables}   => {margarine}        0.019725470
## [499] {margarine}          => {whole milk}       0.024199288
## [500] {butter}              => {newspapers}        0.005795628
## [501] {butter}              => {domestic eggs}     0.009659380
## [502] {domestic eggs}       => {butter}           0.009659380
## [503] {butter}              => {fruit/vegetable juice} 0.008032537
## [504] {fruit/vegetable juice} => {butter}           0.008032537
## [505] {butter}              => {whipped/sour cream} 0.010167768
## [506] {whipped/sour cream}  => {butter}           0.010167768
## [507] {butter}              => {pip fruit}        0.007320793
## [508] {butter}              => {pastry}           0.007625826
## [509] {butter}              => {citrus fruit}      0.009150991
## [510] {citrus fruit}        => {butter}           0.009150991
## [511] {butter}              => {sausage}          0.008642603
## [512] {butter}              => {bottled water}     0.008947636
## [513] {butter}              => {tropical fruit}    0.009964413
## [514] {butter}              => {root vegetables}   0.012913066
## [515] {root vegetables}    => {butter}           0.012913066
## [516] {butter}              => {soda}              0.008845958
## [517] {butter}              => {yogurt}            0.014641586
## [518] {yogurt}              => {butter}           0.014641586
## [519] {butter}              => {rolls/buns}       0.013421454
## [520] {butter}              => {other vegetables} 0.020030503
## [521] {other vegetables}   => {butter}           0.020030503
## [522] {butter}              => {whole milk}       0.027554652
## [523] {whole milk}          => {butter}           0.027554652
## [524] {domestic eggs}       => {newspapers}        0.006914082
## [525] {newspapers}          => {fruit/vegetable juice} 0.008235892
## [526] {fruit/vegetable juice} => {newspapers}        0.008235892
## [527] {whipped/sour cream}  => {newspapers}        0.007219115
## [528] {newspapers}          => {pastry}           0.008439248
## [529] {newspapers}          => {citrus fruit}      0.008337570
## [530] {citrus fruit}        => {newspapers}        0.008337570
## [531] {newspapers}          => {sausage}          0.008032537
## [532] {newspapers}          => {bottled water}     0.011286223
## [533] {bottled water}       => {newspapers}        0.011286223
## [534] {newspapers}          => {tropical fruit}    0.011794611
## [535] {tropical fruit}     => {newspapers}        0.011794611
## [536] {newspapers}          => {root vegetables}   0.011489578
## [537] {root vegetables}    => {newspapers}        0.011489578
## [538] {newspapers}          => {soda}              0.014641586
## [539] {newspapers}          => {yogurt}            0.015353330
## [540] {yogurt}              => {newspapers}        0.015353330
## [541] {newspapers}          => {rolls/buns}       0.019725470
## [542] {rolls/buns}          => {newspapers}        0.019725470
## [543] {newspapers}          => {other vegetables} 0.019318760
## [544] {newspapers}          => {whole milk}       0.027351296
## [545] {whole milk}          => {newspapers}        0.027351296
## [546] {domestic eggs}       => {fruit/vegetable juice} 0.008032537
## [547] {fruit/vegetable juice} => {domestic eggs}     0.008032537

```

## [548] {domestic eggs}	=> {whipped/sour cream}	0.009964413
## [549] {whipped/sour cream}	=> {domestic eggs}	0.009964413
## [550] {domestic eggs}	=> {pip fruit}	0.008642603
## [551] {pip fruit}	=> {domestic eggs}	0.008642603
## [552] {domestic eggs}	=> {pastry}	0.009049314
## [553] {pastry}	=> {domestic eggs}	0.009049314
## [554] {domestic eggs}	=> {citrus fruit}	0.010371124
## [555] {citrus fruit}	=> {domestic eggs}	0.010371124
## [556] {domestic eggs}	=> {shopping bags}	0.009049314
## [557] {domestic eggs}	=> {sausage}	0.009557702
## [558] {sausage}	=> {domestic eggs}	0.009557702
## [559] {domestic eggs}	=> {bottled water}	0.009150991
## [560] {domestic eggs}	=> {tropical fruit}	0.011387900
## [561] {tropical fruit}	=> {domestic eggs}	0.011387900
## [562] {domestic eggs}	=> {root vegetables}	0.014336553
## [563] {root vegetables}	=> {domestic eggs}	0.014336553
## [564] {domestic eggs}	=> {soda}	0.012404677
## [565] {domestic eggs}	=> {yogurt}	0.014336553
## [566] {yogurt}	=> {domestic eggs}	0.014336553
## [567] {domestic eggs}	=> {rolls/buns}	0.015658363
## [568] {domestic eggs}	=> {other vegetables}	0.022267412
## [569] {other vegetables}	=> {domestic eggs}	0.022267412
## [570] {domestic eggs}	=> {whole milk}	0.029994916
## [571] {whole milk}	=> {domestic eggs}	0.029994916
## [572] {fruit/vegetable juice}	=> {whipped/sour cream}	0.009049314
## [573] {whipped/sour cream}	=> {fruit/vegetable juice}	0.009049314
## [574] {fruit/vegetable juice}	=> {pip fruit}	0.009557702
## [575] {pip fruit}	=> {fruit/vegetable juice}	0.009557702
## [576] {fruit/vegetable juice}	=> {pastry}	0.008540925
## [577] {fruit/vegetable juice}	=> {citrus fruit}	0.010371124
## [578] {citrus fruit}	=> {fruit/vegetable juice}	0.010371124
## [579] {fruit/vegetable juice}	=> {shopping bags}	0.010676157
## [580] {shopping bags}	=> {fruit/vegetable juice}	0.010676157
## [581] {fruit/vegetable juice}	=> {sausage}	0.010066090
## [582] {sausage}	=> {fruit/vegetable juice}	0.010066090
## [583] {fruit/vegetable juice}	=> {bottled water}	0.014234875
## [584] {bottled water}	=> {fruit/vegetable juice}	0.014234875
## [585] {fruit/vegetable juice}	=> {tropical fruit}	0.013726487
## [586] {tropical fruit}	=> {fruit/vegetable juice}	0.013726487
## [587] {fruit/vegetable juice}	=> {root vegetables}	0.011997966
## [588] {root vegetables}	=> {fruit/vegetable juice}	0.011997966
## [589] {fruit/vegetable juice}	=> {soda}	0.018403660
## [590] {soda}	=> {fruit/vegetable juice}	0.018403660
## [591] {fruit/vegetable juice}	=> {yogurt}	0.018708693
## [592] {yogurt}	=> {fruit/vegetable juice}	0.018708693
## [593] {fruit/vegetable juice}	=> {rolls/buns}	0.014539908
## [594] {fruit/vegetable juice}	=> {other vegetables}	0.021047280
## [595] {other vegetables}	=> {fruit/vegetable juice}	0.021047280
## [596] {fruit/vegetable juice}	=> {whole milk}	0.026639553
## [597] {whole milk}	=> {fruit/vegetable juice}	0.026639553
## [598] {whipped/sour cream}	=> {pip fruit}	0.009252669
## [599] {pip fruit}	=> {whipped/sour cream}	0.009252669
## [600] {whipped/sour cream}	=> {pastry}	0.007524148
## [601] {whipped/sour cream}	=> {citrus fruit}	0.010879512

## [602] {citrus fruit}	=> {whipped/sour cream}	0.010879512
## [603] {whipped/sour cream}	=> {shopping bags}	0.007930859
## [604] {whipped/sour cream}	=> {sausage}	0.009049314
## [605] {whipped/sour cream}	=> {bottled water}	0.008744281
## [606] {whipped/sour cream}	=> {tropical fruit}	0.013828165
## [607] {tropical fruit}	=> {whipped/sour cream}	0.013828165
## [608] {whipped/sour cream}	=> {root vegetables}	0.017081851
## [609] {root vegetables}	=> {whipped/sour cream}	0.017081851
## [610] {whipped/sour cream}	=> {soda}	0.011591256
## [611] {whipped/sour cream}	=> {yogurt}	0.020742247
## [612] {yogurt}	=> {whipped/sour cream}	0.020742247
## [613] {whipped/sour cream}	=> {rolls/buns}	0.014641586
## [614] {whipped/sour cream}	=> {other vegetables}	0.028876462
## [615] {other vegetables}	=> {whipped/sour cream}	0.028876462
## [616] {whipped/sour cream}	=> {whole milk}	0.032231825
## [617] {whole milk}	=> {whipped/sour cream}	0.032231825
## [618] {pip fruit}	=> {pastry}	0.010676157
## [619] {pastry}	=> {pip fruit}	0.010676157
## [620] {pip fruit}	=> {citrus fruit}	0.013828165
## [621] {citrus fruit}	=> {pip fruit}	0.013828165
## [622] {pip fruit}	=> {shopping bags}	0.009354347
## [623] {pip fruit}	=> {sausage}	0.010777834
## [624] {sausage}	=> {pip fruit}	0.010777834
## [625] {pip fruit}	=> {bottled water}	0.010574479
## [626] {pip fruit}	=> {tropical fruit}	0.020437214
## [627] {tropical fruit}	=> {pip fruit}	0.020437214
## [628] {pip fruit}	=> {root vegetables}	0.015556685
## [629] {root vegetables}	=> {pip fruit}	0.015556685
## [630] {pip fruit}	=> {soda}	0.013319776
## [631] {pip fruit}	=> {yogurt}	0.017996950
## [632] {yogurt}	=> {pip fruit}	0.017996950
## [633] {pip fruit}	=> {rolls/buns}	0.013929842
## [634] {pip fruit}	=> {other vegetables}	0.026131164
## [635] {other vegetables}	=> {pip fruit}	0.026131164
## [636] {pip fruit}	=> {whole milk}	0.030096594
## [637] {whole milk}	=> {pip fruit}	0.030096594
## [638] {pastry}	=> {citrus fruit}	0.009761057
## [639] {citrus fruit}	=> {pastry}	0.009761057
## [640] {pastry}	=> {shopping bags}	0.011896289
## [641] {shopping bags}	=> {pastry}	0.011896289
## [642] {pastry}	=> {sausage}	0.012506355
## [643] {sausage}	=> {pastry}	0.012506355
## [644] {pastry}	=> {bottled water}	0.008947636
## [645] {pastry}	=> {tropical fruit}	0.013218099
## [646] {tropical fruit}	=> {pastry}	0.013218099
## [647] {pastry}	=> {root vegetables}	0.010981190
## [648] {root vegetables}	=> {pastry}	0.010981190
## [649] {pastry}	=> {soda}	0.021047280
## [650] {soda}	=> {pastry}	0.021047280
## [651] {pastry}	=> {yogurt}	0.017691917
## [652] {yogurt}	=> {pastry}	0.017691917
## [653] {pastry}	=> {rolls/buns}	0.020945602
## [654] {rolls/buns}	=> {pastry}	0.020945602
## [655] {pastry}	=> {other vegetables}	0.022572445

## [656] {other vegetables}	=> {pastry}	0.022572445
## [657] {pastry}	=> {whole milk}	0.033248602
## [658] {whole milk}	=> {pastry}	0.033248602
## [659] {citrus fruit}	=> {shopping bags}	0.009761057
## [660] {citrus fruit}	=> {sausage}	0.011286223
## [661] {sausage}	=> {citrus fruit}	0.011286223
## [662] {citrus fruit}	=> {bottled water}	0.013523132
## [663] {bottled water}	=> {citrus fruit}	0.013523132
## [664] {citrus fruit}	=> {tropical fruit}	0.019928826
## [665] {tropical fruit}	=> {citrus fruit}	0.019928826
## [666] {citrus fruit}	=> {root vegetables}	0.017691917
## [667] {root vegetables}	=> {citrus fruit}	0.017691917
## [668] {citrus fruit}	=> {soda}	0.012811388
## [669] {citrus fruit}	=> {yogurt}	0.021657346
## [670] {yogurt}	=> {citrus fruit}	0.021657346
## [671] {citrus fruit}	=> {rolls/buns}	0.016776817
## [672] {citrus fruit}	=> {other vegetables}	0.028876462
## [673] {other vegetables}	=> {citrus fruit}	0.028876462
## [674] {citrus fruit}	=> {whole milk}	0.030503305
## [675] {whole milk}	=> {citrus fruit}	0.030503305
## [676] {shopping bags}	=> {sausage}	0.015658363
## [677] {sausage}	=> {shopping bags}	0.015658363
## [678] {shopping bags}	=> {bottled water}	0.010981190
## [679] {shopping bags}	=> {tropical fruit}	0.013523132
## [680] {tropical fruit}	=> {shopping bags}	0.013523132
## [681] {shopping bags}	=> {root vegetables}	0.012811388
## [682] {root vegetables}	=> {shopping bags}	0.012811388
## [683] {shopping bags}	=> {soda}	0.024605999
## [684] {soda}	=> {shopping bags}	0.024605999
## [685] {shopping bags}	=> {yogurt}	0.015251652
## [686] {yogurt}	=> {shopping bags}	0.015251652
## [687] {shopping bags}	=> {rolls/buns}	0.019522115
## [688] {rolls/buns}	=> {shopping bags}	0.019522115
## [689] {shopping bags}	=> {other vegetables}	0.023182511
## [690] {other vegetables}	=> {shopping bags}	0.023182511
## [691] {shopping bags}	=> {whole milk}	0.024504321
## [692] {sausage}	=> {bottled water}	0.011997966
## [693] {bottled water}	=> {sausage}	0.011997966
## [694] {sausage}	=> {tropical fruit}	0.013929842
## [695] {tropical fruit}	=> {sausage}	0.013929842
## [696] {sausage}	=> {root vegetables}	0.014946619
## [697] {root vegetables}	=> {sausage}	0.014946619
## [698] {sausage}	=> {soda}	0.024300966
## [699] {soda}	=> {sausage}	0.024300966
## [700] {sausage}	=> {yogurt}	0.019623793
## [701] {yogurt}	=> {sausage}	0.019623793
## [702] {sausage}	=> {rolls/buns}	0.030604982
## [703] {rolls/buns}	=> {sausage}	0.030604982
## [704] {sausage}	=> {other vegetables}	0.026944586
## [705] {other vegetables}	=> {sausage}	0.026944586
## [706] {sausage}	=> {whole milk}	0.029893238
## [707] {whole milk}	=> {sausage}	0.029893238
## [708] {bottled water}	=> {tropical fruit}	0.018505338
## [709] {tropical fruit}	=> {bottled water}	0.018505338

## [710] {bottled water}	=> {root vegetables}	0.015658363
## [711] {root vegetables}	=> {bottled water}	0.015658363
## [712] {bottled water}	=> {soda}	0.028978139
## [713] {soda}	=> {bottled water}	0.028978139
## [714] {bottled water}	=> {yogurt}	0.022979156
## [715] {yogurt}	=> {bottled water}	0.022979156
## [716] {bottled water}	=> {rolls/buns}	0.024199288
## [717] {rolls/buns}	=> {bottled water}	0.024199288
## [718] {bottled water}	=> {other vegetables}	0.024809354
## [719] {other vegetables}	=> {bottled water}	0.024809354
## [720] {bottled water}	=> {whole milk}	0.034367056
## [721] {whole milk}	=> {bottled water}	0.034367056
## [722] {tropical fruit}	=> {root vegetables}	0.021047280
## [723] {root vegetables}	=> {tropical fruit}	0.021047280
## [724] {tropical fruit}	=> {soda}	0.020843925
## [725] {soda}	=> {tropical fruit}	0.020843925
## [726] {tropical fruit}	=> {yogurt}	0.029283172
## [727] {yogurt}	=> {tropical fruit}	0.029283172
## [728] {tropical fruit}	=> {rolls/buns}	0.024605999
## [729] {rolls/buns}	=> {tropical fruit}	0.024605999
## [730] {tropical fruit}	=> {other vegetables}	0.035892222
## [731] {other vegetables}	=> {tropical fruit}	0.035892222
## [732] {tropical fruit}	=> {whole milk}	0.042297916
## [733] {whole milk}	=> {tropical fruit}	0.042297916
## [734] {root vegetables}	=> {soda}	0.018607016
## [735] {soda}	=> {root vegetables}	0.018607016
## [736] {root vegetables}	=> {yogurt}	0.025826131
## [737] {yogurt}	=> {root vegetables}	0.025826131
## [738] {root vegetables}	=> {rolls/buns}	0.024300966
## [739] {rolls/buns}	=> {root vegetables}	0.024300966
## [740] {root vegetables}	=> {other vegetables}	0.047381800
## [741] {other vegetables}	=> {root vegetables}	0.047381800
## [742] {root vegetables}	=> {whole milk}	0.048906965
## [743] {whole milk}	=> {root vegetables}	0.048906965
## [744] {soda}	=> {yogurt}	0.027351296
## [745] {yogurt}	=> {soda}	0.027351296
## [746] {soda}	=> {rolls/buns}	0.038332486
## [747] {rolls/buns}	=> {soda}	0.038332486
## [748] {soda}	=> {other vegetables}	0.032740214
## [749] {other vegetables}	=> {soda}	0.032740214
## [750] {soda}	=> {whole milk}	0.040061007
## [751] {whole milk}	=> {soda}	0.040061007
## [752] {yogurt}	=> {rolls/buns}	0.034367056
## [753] {rolls/buns}	=> {yogurt}	0.034367056
## [754] {yogurt}	=> {other vegetables}	0.043416370
## [755] {other vegetables}	=> {yogurt}	0.043416370
## [756] {yogurt}	=> {whole milk}	0.056024403
## [757] {whole milk}	=> {yogurt}	0.056024403
## [758] {rolls/buns}	=> {other vegetables}	0.042602949
## [759] {other vegetables}	=> {rolls/buns}	0.042602949
## [760] {rolls/buns}	=> {whole milk}	0.056634469
## [761] {whole milk}	=> {rolls/buns}	0.056634469
## [762] {other vegetables}	=> {whole milk}	0.074834774
## [763] {whole milk}	=> {other vegetables}	0.074834774

```

##      confidence coverage    lift      count
## [1] 0.1105236 1.00000000 1.0000000 1087
## [2] 0.1049314 1.00000000 1.0000000 1032
## [3] 0.1089985 1.00000000 1.0000000 1072
## [4] 0.1743772 1.00000000 1.0000000 1715
## [5] 0.1395018 1.00000000 1.0000000 1372
## [6] 0.1839349 1.00000000 1.0000000 1809
## [7] 0.1934926 1.00000000 1.0000000 1903
## [8] 0.2555160 1.00000000 1.0000000 2513
## [9] 0.4230769 0.01321810 1.6557746 55
## [10] 0.3410405 0.01759024 1.7625502 59
## [11] 0.3005780 0.01759024 1.1763569 52
## [12] 0.4322034 0.01199797 1.6914924 51
## [13] 0.4000000 0.01728521 1.5654596 68
## [14] 0.2560386 0.02104728 1.4683033 53
## [15] 0.2415459 0.02104728 0.9453259 50
## [16] 0.3378378 0.01504830 1.7459985 50
## [17] 0.4054054 0.01504830 1.5866145 60
## [18] 0.4312500 0.01626843 3.9564774 69
## [19] 0.4750000 0.01626843 2.4548739 76
## [20] 0.4750000 0.01626843 1.8589833 76
## [21] 0.3190184 0.01657346 1.8294729 52
## [22] 0.3312883 0.01657346 1.7121497 54
## [23] 0.4233129 0.01657346 1.6566981 69
## [24] 0.2931034 0.01769192 1.5148042 51
## [25] 0.4022989 0.01769192 1.5744565 70
## [26] 0.2109375 0.02602949 1.5120775 54
## [27] 0.2070312 0.02602949 1.1255679 53
## [28] 0.1992188 0.02602949 1.0295935 51
## [29] 0.2617188 0.02602949 1.0242753 67
## [30] 0.2439024 0.02501271 1.3987058 60
## [31] 0.2032520 0.02501271 1.0504381 50
## [32] 0.2357724 0.02501271 0.9227303 58
## [33] 0.3333333 0.01921708 1.7227185 63
## [34] 0.4656085 0.01921708 1.8222281 88
## [35] 0.3579545 0.01789527 1.8499648 63
## [36] 0.3977273 0.01789527 1.5565650 70
## [37] 0.4137931 0.01769192 2.1385471 72
## [38] 0.5229885 0.01769192 2.0467935 91
## [39] 0.3625731 0.01738688 1.8738342 62
## [40] 0.4853801 0.01738688 1.8996074 83
## [41] 0.3511905 0.01708185 2.5174623 59
## [42] 0.3154762 0.01708185 1.7151511 53
## [43] 0.4166667 0.01708185 2.1533981 70
## [44] 0.4404762 0.01708185 1.7238692 74
## [45] 0.2639405 0.02735130 1.5136181 71
## [46] 0.2044610 0.02735130 1.1115940 55
## [47] 0.2044610 0.02735130 1.0566861 55
## [48] 0.2379182 0.02735130 0.9311284 64
## [49] 0.1863799 0.02836807 1.6863354 52
## [50] 0.2580645 0.02836807 1.4799210 72
## [51] 0.1971326 0.02836807 1.0188120 55
## [52] 0.2473118 0.02836807 0.9678917 69
## [53] 0.2727273 0.02236909 2.5991015 60

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## [54] 0.4045455 0.02236909 2.0907538 89
## [55] 0.3272727 0.02236909 1.2808306 72
## [56] 0.2663755 0.02328419 1.9094778 61
## [57] 0.2794760 0.02328419 1.4443753 64
## [58] 0.3799127 0.02328419 1.4868448 87
## [59] 0.2073579 0.03040163 1.1891338 62
## [60] 0.1839465 0.03040163 1.0000629 55
## [61] 0.2006689 0.03040163 1.0370881 60
## [62] 0.2642140 0.03040163 1.0340410 79
## [63] 0.2047244 0.02582613 2.1790742 52
## [64] 0.1968504 0.02582613 1.8059922 50
## [65] 0.2125984 0.02582613 1.2191869 54
## [66] 0.2047244 0.02582613 1.4675398 52
## [67] 0.2677165 0.02582613 1.4554959 68
## [68] 0.3858268 0.02582613 1.9940128 98
## [69] 0.3858268 0.02582613 1.5099906 98
## [70] 0.1935484 0.02836807 1.8445236 54
## [71] 0.2186380 0.02836807 1.2538220 61
## [72] 0.2186380 0.02836807 1.5672774 61
## [73] 0.2652330 0.02836807 1.3707653 74
## [74] 0.3476703 0.02836807 1.3606593 97
## [75] 0.2116183 0.02450432 2.2524519 51
## [76] 0.2282158 0.02450432 2.0937519 55
## [77] 0.2614108 0.02450432 1.8738886 63
## [78] 0.2406639 0.02450432 1.3084187 58
## [79] 0.3858921 0.02450432 1.9943505 93
## [80] 0.4107884 0.02450432 1.6076815 99
## [81] 0.1818182 0.02796136 2.4034702 50
## [82] 0.1963636 0.02796136 1.8713531 54
## [83] 0.1818182 0.02796136 1.6680801 50
## [84] 0.3054545 0.02796136 2.1896104 84
## [85] 0.2727273 0.02796136 1.4827378 75
## [86] 0.3709091 0.02796136 1.9169159 102
## [87] 0.4145455 0.02796136 1.6223854 114
## [88] 0.1802721 0.02989324 1.7180002 53
## [89] 0.2891156 0.02989324 1.6579897 85
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## [92] 0.2312925 0.02989324 1.1953557 68
## [93] 0.2755102 0.02989324 1.0782502 81
## [94] 0.1953125 0.02602949 4.6398513 50
## [95] 0.1207729 0.04209456 4.6398513 50
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## [107] 0.3692946 0.02450432 1.9085720 89

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## [108] 0.4398340 0.02450432 1.7213560 106
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## [130] 0.1262411 0.07168277 3.7968855 89
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## [134] 0.2201835 0.03324860 1.2626849 72
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## [269] 0.2439614 0.04209456 1.3990437 101

```

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## [662] 0.1633907 0.08276563 1.4783323 133
## [663] 0.1223551 0.11052364 1.4783323 133
## [664] 0.2407862 0.08276563 2.2947022 196
## [665] 0.1899225 0.10493137 2.2947022 196
## [666] 0.2137592 0.08276563 1.9611211 174
## [667] 0.1623134 0.10899847 1.9611211 174
## [668] 0.1547912 0.08276563 0.8876799 126
## [669] 0.2616708 0.08276563 1.8757521 213
## [670] 0.1552478 0.13950178 1.8757521 213
## [671] 0.2027027 0.08276563 1.1020349 165
## [672] 0.3488943 0.08276563 1.8031403 284
## [673] 0.1492380 0.19349263 1.8031403 284
## [674] 0.3685504 0.08276563 1.4423768 300
## [675] 0.1193792 0.25551601 1.4423768 300
## [676] 0.1589267 0.09852567 1.6916065 154
## [677] 0.1666667 0.09395018 1.6916065 154
## [678] 0.1114551 0.09852567 1.0084278 108
## [679] 0.1372549 0.09852567 1.3080445 133
## [680] 0.1288760 0.10493137 1.3080445 133
## [681] 0.1300310 0.09852567 1.1929613 126
## [682] 0.1175373 0.10899847 1.1929613 126
## [683] 0.2497420 0.09852567 1.4321939 242
## [684] 0.1411079 0.17437722 1.4321939 242
## [685] 0.1547988 0.09852567 1.1096544 150
## [686] 0.1093294 0.13950178 1.1096544 150
## [687] 0.1981424 0.09852567 1.0772419 192
## [688] 0.1061360 0.18393493 1.0772419 192
## [689] 0.2352941 0.09852567 1.2160366 228
## [690] 0.1198108 0.19349263 1.2160366 228
## [691] 0.2487100 0.09852567 0.9733637 241
## [692] 0.1277056 0.09395018 1.1554598 118
## [693] 0.1085557 0.11052364 1.1554598 118
## [694] 0.1482684 0.09395018 1.4130036 137
## [695] 0.1327519 0.10493137 1.4130036 137
## [696] 0.1590909 0.09395018 1.4595700 147
## [697] 0.1371269 0.10899847 1.4595700 147
## [698] 0.2586580 0.09395018 1.4833245 239
## [699] 0.1393586 0.17437722 1.4833245 239
## [700] 0.2088745 0.09395018 1.4972889 193
## [701] 0.1406706 0.13950178 1.4972889 193

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## [702] 0.3257576 0.09395018 1.7710480 301
## [703] 0.1663903 0.18393493 1.7710480 301
## [704] 0.2867965 0.09395018 1.4822091 265
## [705] 0.1392538 0.19349263 1.4822091 265
## [706] 0.3181818 0.09395018 1.2452520 294
## [707] 0.1169916 0.25551601 1.2452520 294
## [708] 0.1674333 0.11052364 1.5956459 182
## [709] 0.1763566 0.10493137 1.5956459 182
## [710] 0.1416743 0.11052364 1.2997827 154
## [711] 0.1436567 0.10899847 1.2997827 154
## [712] 0.2621895 0.11052364 1.5035766 285
## [713] 0.1661808 0.17437722 1.5035766 285
## [714] 0.2079117 0.11052364 1.4903873 226
## [715] 0.1647230 0.13950178 1.4903873 226
## [716] 0.2189512 0.11052364 1.1903734 238
## [717] 0.1315644 0.18393493 1.1903734 238
## [718] 0.2244710 0.11052364 1.1601012 244
## [719] 0.1282186 0.19349263 1.1601012 244
## [720] 0.3109476 0.11052364 1.2169396 338
## [721] 0.1345006 0.25551601 1.2169396 338
## [722] 0.2005814 0.10493137 1.8402220 207
## [723] 0.1930970 0.10899847 1.8402220 207
## [724] 0.1986434 0.10493137 1.1391592 205
## [725] 0.1195335 0.17437722 1.1391592 205
## [726] 0.2790698 0.10493137 2.0004746 288
## [727] 0.2099125 0.13950178 2.0004746 288
## [728] 0.2344961 0.10493137 1.2748863 242
## [729] 0.1337756 0.18393493 1.2748863 242
## [730] 0.3420543 0.10493137 1.7677896 353
## [731] 0.1854966 0.19349263 1.7677896 353
## [732] 0.4031008 0.10493137 1.5775950 416
## [733] 0.1655392 0.25551601 1.5775950 416
## [734] 0.1707090 0.10899847 0.9789636 183
## [735] 0.1067055 0.17437722 0.9789636 183
## [736] 0.2369403 0.10899847 1.6984751 254
## [737] 0.1851312 0.13950178 1.6984751 254
## [738] 0.2229478 0.10899847 1.2121013 239
## [739] 0.1321172 0.18393493 1.2121013 239
## [740] 0.4347015 0.10899847 2.2466049 466
## [741] 0.2448765 0.19349263 2.2466049 466
## [742] 0.4486940 0.10899847 1.7560310 481
## [743] 0.1914047 0.25551601 1.7560310 481
## [744] 0.1568513 0.17437722 1.1243678 269
## [745] 0.1960641 0.13950178 1.1243678 269
## [746] 0.2198251 0.17437722 1.1951242 377
## [747] 0.2084024 0.18393493 1.1951242 377
## [748] 0.1877551 0.17437722 0.9703476 322
## [749] 0.1692065 0.19349263 0.9703476 322
## [750] 0.2297376 0.17437722 0.8991124 394
## [751] 0.1567847 0.25551601 0.8991124 394
## [752] 0.2463557 0.13950178 1.3393633 338
## [753] 0.1868436 0.18393493 1.3393633 338
## [754] 0.3112245 0.13950178 1.6084566 427
## [755] 0.2243826 0.19349263 1.6084566 427

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## [756] 0.4016035 0.13950178 1.5717351 551
## [757] 0.2192598 0.25551601 1.5717351 551
## [758] 0.2316197 0.18393493 1.1970465 419
## [759] 0.2201787 0.19349263 1.1970465 419
## [760] 0.3079049 0.18393493 1.2050318 557
## [761] 0.2216474 0.25551601 1.2050318 557
## [762] 0.3867578 0.19349263 1.5136341 736
## [763] 0.2928770 0.25551601 1.5136341 736

• A total of 763 rules was generated with support = .005 & confidence = .1 & maximum length = 2.

## Apriori
##
## Parameter specification:
##   confidence minval smax arem  aval originalSupport maxtime support minlen
##           0.15     0.1     1 none FALSE           TRUE      5     0.05     1
##   maxlen target  ext
##           2  rules TRUE
##
## Algorithmic control:
##   filter tree heap memopt load sort verbose
##           0.1 TRUE TRUE FALSE TRUE     2     TRUE
##
## Absolute minimum support count: 491
##
## set item appearances ...[0 item(s)] done [0.00s].
## set transactions ...[169 item(s), 9835 transaction(s)] done [0.00s].
## sorting and recoding items ... [28 item(s)] done [0.00s].
## creating transaction tree ... done [0.00s].
## checking subsets of size 1 2

## Warning in apriori(groceries_trans, parameter = list(support = 0.05, confidence
## = 0.15, : Mining stopped (maxlen reached). Only patterns up to a length of 2
## returned!

## done [0.00s].
## writing ... [10 rule(s)] done [0.00s].
## creating S4 object ... done [0.00s].

##      lhs                  rhs          support  confidence coverage
## [1]  {}                  => {soda}      0.17437722 0.1743772 1.0000000
## [2]  {}                  => {rolls/buns} 0.18393493 0.1839349 1.0000000
## [3]  {}                  => {other vegetables} 0.19349263 0.1934926 1.0000000
## [4]  {}                  => {whole milk} 0.25551601 0.2555160 1.0000000
## [5]  {yogurt}            => {whole milk} 0.05602440 0.4016035 0.1395018
## [6]  {whole milk}        => {yogurt}      0.05602440 0.2192598 0.2555160
## [7]  {rolls/buns}        => {whole milk} 0.05663447 0.3079049 0.1839349
## [8]  {whole milk}        => {rolls/buns} 0.05663447 0.2216474 0.2555160
## [9]  {other vegetables} => {whole milk} 0.07483477 0.3867578 0.1934926
## [10] {whole milk}        => {other vegetables} 0.07483477 0.2928770 0.2555160

##      lift      count
## [1] 1.000000 1715
## [2] 1.000000 1809
## [3] 1.000000 1903
## [4] 1.000000 2513
## [5] 1.571735 551

```

```
## [6] 1.571735 551
## [7] 1.205032 557
## [8] 1.205032 557
## [9] 1.513634 736
## [10] 1.513634 736
```

- A total of 6 rules was generated with support = .05 & confidence = .15 & maximum length = 2.

##	lhs	rhs	support
## [1]	{}	=> {bottled water}	0.110523640
## [2]	{}	=> {tropical fruit}	0.104931368
## [3]	{}	=> {root vegetables}	0.108998475
## [4]	{}	=> {soda}	0.174377224
## [5]	{}	=> {yogurt}	0.139501779
## [6]	{}	=> {rolls/buns}	0.183934926
## [7]	{}	=> {other vegetables}	0.193492628
## [8]	{}	=> {whole milk}	0.255516014
## [9]	{cake bar}	=> {whole milk}	0.005592272
## [10]	{dishes}	=> {other vegetables}	0.005998983
## [11]	{dishes}	=> {whole milk}	0.005287239
## [12]	{mustard}	=> {whole milk}	0.005185562
## [13]	{pot plants}	=> {whole milk}	0.006914082
## [14]	{chewing gum}	=> {soda}	0.005388917
## [15]	{chewing gum}	=> {whole milk}	0.005083884
## [16]	{canned fish}	=> {other vegetables}	0.005083884
## [17]	{pasta}	=> {whole milk}	0.006100661
## [18]	{herbs}	=> {root vegetables}	0.007015760
## [19]	{herbs}	=> {other vegetables}	0.007727504
## [20]	{herbs}	=> {whole milk}	0.007727504
## [21]	{processed cheese}	=> {soda}	0.005287239
## [22]	{processed cheese}	=> {other vegetables}	0.005490595
## [23]	{processed cheese}	=> {whole milk}	0.007015760
## [24]	{semi-finished bread}	=> {other vegetables}	0.005185562
## [25]	{semi-finished bread}	=> {whole milk}	0.007117438
## [26]	{beverages}	=> {yogurt}	0.005490595
## [27]	{beverages}	=> {rolls/buns}	0.005388917
## [28]	{beverages}	=> {other vegetables}	0.005185562
## [29]	{beverages}	=> {whole milk}	0.006812405
## [30]	{ice cream}	=> {soda}	0.006100661
## [31]	{ice cream}	=> {other vegetables}	0.005083884
## [32]	{ice cream}	=> {whole milk}	0.005897306
## [33]	{detergent}	=> {other vegetables}	0.006405694
## [34]	{detergent}	=> {whole milk}	0.008947636
## [35]	{pickled vegetables}	=> {other vegetables}	0.006405694
## [36]	{pickled vegetables}	=> {whole milk}	0.007117438
## [37]	{baking powder}	=> {other vegetables}	0.007320793
## [38]	{baking powder}	=> {whole milk}	0.009252669
## [39]	{flour}	=> {other vegetables}	0.006304016
## [40]	{flour}	=> {whole milk}	0.008439248
## [41]	{soft cheese}	=> {yogurt}	0.005998983
## [42]	{soft cheese}	=> {rolls/buns}	0.005388917
## [43]	{soft cheese}	=> {other vegetables}	0.007117438
## [44]	{soft cheese}	=> {whole milk}	0.007524148
## [45]	{specialty bar}	=> {soda}	0.007219115
## [46]	{specialty bar}	=> {rolls/buns}	0.005592272

## [47] {specialty bar}	=> {other vegetables}	0.005592272
## [48] {specialty bar}	=> {whole milk}	0.006507372
## [49] {misc. beverages}	=> {bottled water}	0.005287239
## [50] {misc. beverages}	=> {soda}	0.007320793
## [51] {misc. beverages}	=> {other vegetables}	0.005592272
## [52] {misc. beverages}	=> {whole milk}	0.007015760
## [53] {grapes}	=> {tropical fruit}	0.006100661
## [54] {grapes}	=> {other vegetables}	0.009049314
## [55] {grapes}	=> {whole milk}	0.007320793
## [56] {cat food}	=> {yogurt}	0.006202339
## [57] {cat food}	=> {other vegetables}	0.006507372
## [58] {cat food}	=> {whole milk}	0.008845958
## [59] {specialty chocolate}	=> {soda}	0.006304016
## [60] {specialty chocolate}	=> {rolls/buns}	0.005592272
## [61] {specialty chocolate}	=> {other vegetables}	0.006100661
## [62] {specialty chocolate}	=> {whole milk}	0.008032537
## [63] {meat}	=> {sausage}	0.005287239
## [64] {meat}	=> {root vegetables}	0.005083884
## [65] {meat}	=> {soda}	0.005490595
## [66] {meat}	=> {yogurt}	0.005287239
## [67] {meat}	=> {rolls/buns}	0.006914082
## [68] {meat}	=> {other vegetables}	0.009964413
## [69] {meat}	=> {whole milk}	0.009964413
## [70] {frozen meals}	=> {tropical fruit}	0.005490595
## [71] {frozen meals}	=> {soda}	0.006202339
## [72] {frozen meals}	=> {yogurt}	0.006202339
## [73] {frozen meals}	=> {other vegetables}	0.007524148
## [74] {frozen meals}	=> {whole milk}	0.009862735
## [75] {hard cheese}	=> {sausage}	0.005185562
## [76] {hard cheese}	=> {root vegetables}	0.005592272
## [77] {hard cheese}	=> {yogurt}	0.006405694
## [78] {hard cheese}	=> {rolls/buns}	0.005897306
## [79] {hard cheese}	=> {other vegetables}	0.009456024
## [80] {hard cheese}	=> {whole milk}	0.010066090
## [81] {butter milk}	=> {pip fruit}	0.005083884
## [82] {butter milk}	=> {tropical fruit}	0.005490595
## [83] {butter milk}	=> {root vegetables}	0.005083884
## [84] {butter milk}	=> {yogurt}	0.008540925
## [85] {butter milk}	=> {rolls/buns}	0.007625826
## [86] {butter milk}	=> {other vegetables}	0.010371124
## [87] {butter milk}	=> {whole milk}	0.011591256
## [88] {candy}	=> {tropical fruit}	0.005388917
## [89] {candy}	=> {soda}	0.008642603
## [90] {candy}	=> {yogurt}	0.005490595
## [91] {candy}	=> {rolls/buns}	0.007117438
## [92] {candy}	=> {other vegetables}	0.006914082
## [93] {candy}	=> {whole milk}	0.008235892
## [94] {ham}	=> {white bread}	0.005083884
## [95] {white bread}	=> {ham}	0.005083884
## [96] {ham}	=> {tropical fruit}	0.005388917
## [97] {ham}	=> {yogurt}	0.006710727
## [98] {ham}	=> {rolls/buns}	0.006914082
## [99] {ham}	=> {other vegetables}	0.009150991
## [100] {ham}	=> {whole milk}	0.011489578

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## [101] {sliced cheese}          => {sausage}          0.007015760
## [102] {sliced cheese}          => {tropical fruit} 0.005287239
## [103] {sliced cheese}          => {root vegetables} 0.005592272
## [104] {sliced cheese}          => {soda}              0.005083884
## [105] {sliced cheese}          => {yogurt}            0.008032537
## [106] {sliced cheese}          => {rolls/buns}       0.007625826
## [107] {sliced cheese}          => {other vegetables} 0.009049314
## [108] {sliced cheese}          => {whole milk}        0.010777834
## [109] {UHT-milk}              => {bottled water}     0.007320793
## [110] {UHT-milk}              => {soda}              0.007625826
## [111] {UHT-milk}              => {yogurt}            0.007422471
## [112] {UHT-milk}              => {rolls/buns}       0.006405694
## [113] {UHT-milk}              => {other vegetables} 0.008134215
## [114] {oil}                  => {root vegetables} 0.007015760
## [115] {oil}                  => {yogurt}            0.005287239
## [116] {oil}                  => {rolls/buns}       0.005083884
## [117] {oil}                  => {other vegetables} 0.009964413
## [118] {oil}                  => {whole milk}        0.011286223
## [119] {onions}               => {whipped/sour cream} 0.005083884
## [120] {onions}               => {citrus fruit}      0.005592272
## [121] {onions}               => {bottled water}     0.005897306
## [122] {onions}               => {tropical fruit}    0.005693950
## [123] {onions}               => {root vegetables} 0.009456024
## [124] {onions}               => {soda}              0.005287239
## [125] {onions}               => {yogurt}            0.007219115
## [126] {onions}               => {rolls/buns}       0.006812405
## [127] {onions}               => {other vegetables} 0.014234875
## [128] {onions}               => {whole milk}        0.012099644
## [129] {berries}              => {whipped/sour cream} 0.009049314
## [130] {whipped/sour cream}   => {berries}            0.009049314
## [131] {berries}              => {citrus fruit}      0.005388917
## [132] {berries}              => {tropical fruit}    0.006710727
## [133] {berries}              => {root vegetables} 0.006609049
## [134] {berries}              => {soda}              0.007320793
## [135] {berries}              => {yogurt}            0.010574479
## [136] {berries}              => {rolls/buns}       0.006609049
## [137] {berries}              => {other vegetables} 0.010269446
## [138] {berries}              => {whole milk}        0.011794611
## [139] {hamburger meat}        => {sausage}            0.005185562
## [140] {hamburger meat}        => {root vegetables} 0.006202339
## [141] {hamburger meat}        => {soda}              0.005795628
## [142] {hamburger meat}        => {yogurt}            0.006507372
## [143] {hamburger meat}        => {rolls/buns}       0.008642603
## [144] {hamburger meat}        => {other vegetables} 0.013828165
## [145] {hamburger meat}        => {whole milk}        0.014743264
## [146] {hygiene articles}     => {napkins}            0.006100661
## [147] {napkins}              => {hygiene articles} 0.006100661
## [148] {hygiene articles}     => {citrus fruit}      0.005287239
## [149] {hygiene articles}     => {shopping bags}    0.005185562
## [150] {hygiene articles}     => {bottled water}     0.005693950
## [151] {hygiene articles}     => {tropical fruit}    0.006710727
## [152] {hygiene articles}     => {root vegetables} 0.005388917
## [153] {hygiene articles}     => {soda}              0.007015760
## [154] {hygiene articles}     => {yogurt}            0.007320793

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## [155] {hygiene articles}          => {rolls/buns}          0.005897306
## [156] {hygiene articles}          => {other vegetables} 0.009557702
## [157] {hygiene articles}          => {whole milk}          0.012811388
## [158] {salty snack}              => {fruit/vegetable juice} 0.005998983
## [159] {salty snack}              => {whipped/sour cream} 0.005185562
## [160] {salty snack}              => {pastry}              0.005185562
## [161] {salty snack}              => {shopping bags}      0.005998983
## [162] {salty snack}              => {sausage}             0.005287239
## [163] {salty snack}              => {tropical fruit}     0.005592272
## [164] {salty snack}              => {soda}                 0.009354347
## [165] {salty snack}              => {yogurt}               0.006202339
## [166] {salty snack}              => {other vegetables} 0.010777834
## [167] {salty snack}              => {whole milk}          0.011184545
## [168] {sugar}                   => {margarine}            0.005490595
## [169] {sugar}                   => {pastry}               0.005185562
## [170] {sugar}                   => {root vegetables}   0.006405694
## [171] {sugar}                   => {soda}                 0.007320793
## [172] {sugar}                   => {yogurt}               0.006914082
## [173] {sugar}                   => {rolls/buns}          0.007015760
## [174] {sugar}                   => {other vegetables} 0.010777834
## [175] {sugar}                   => {whole milk}          0.015048297
## [176] {waffles}                 => {chocolate}           0.005795628
## [177] {chocolate}               => {waffles}              0.005795628
## [178] {waffles}                 => {whipped/sour cream} 0.005083884
## [179] {waffles}                 => {pastry}               0.007015760
## [180] {waffles}                 => {shopping bags}      0.005490595
## [181] {waffles}                 => {tropical fruit}     0.006100661
## [182] {waffles}                 => {root vegetables}   0.006609049
## [183] {waffles}                 => {soda}                 0.009557702
## [184] {waffles}                 => {yogurt}               0.007524148
## [185] {waffles}                 => {rolls/buns}          0.009150991
## [186] {waffles}                 => {other vegetables} 0.010066090
## [187] {waffles}                 => {whole milk}          0.012709710
## [188] {long life bakery product}=> {chocolate}           0.005287239
## [189] {chocolate}               => {long life bakery product} 0.005287239
## [190] {long life bakery product}=> {fruit/vegetable juice} 0.006202339
## [191] {long life bakery product}=> {whipped/sour cream} 0.005795628
## [192] {long life bakery product}=> {pastry}              0.005897306
## [193] {long life bakery product}=> {shopping bags}      0.005388917
## [194] {long life bakery product}=> {sausage}              0.005388917
## [195] {long life bakery product}=> {tropical fruit}     0.006304016
## [196] {long life bakery product}=> {root vegetables}   0.005287239
## [197] {long life bakery product}=> {soda}                 0.007625826
## [198] {long life bakery product}=> {yogurt}               0.008744281
## [199] {long life bakery product}=> {rolls/buns}          0.007930859
## [200] {long life bakery product}=> {other vegetables} 0.010676157
## [201] {long life bakery product}=> {whole milk}          0.013523132
## [202] {dessert}                 => {curd}                 0.005185562
## [203] {dessert}                 => {fruit/vegetable juice} 0.005998983
## [204] {dessert}                 => {pastry}               0.005388917
## [205] {dessert}                 => {shopping bags}      0.006202339
## [206] {dessert}                 => {sausage}              0.005897306
## [207] {dessert}                 => {bottled water}        0.005185562
## [208] {dessert}                 => {tropical fruit}     0.006304016

```

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## [209] {dessert}          => {root vegetables} 0.005795628
## [210] {dessert}          => {soda}            0.009862735
## [211] {dessert}          => {yogurt}          0.009862735
## [212] {dessert}          => {rolls/buns}     0.006812405
## [213] {dessert}          => {other vegetables} 0.011591256
## [214] {dessert}          => {whole milk}      0.013726487
## [215] {canned beer}      => {shopping bags} 0.011387900
## [216] {shopping bags}    => {canned beer}     0.011387900
## [217] {canned beer}      => {bottled water}   0.008032537
## [218] {canned beer}      => {soda}            0.013828165
## [219] {canned beer}      => {rolls/buns}     0.011286223
## [220] {canned beer}      => {other vegetables} 0.009049314
## [221] {cream cheese }   => {curd}            0.005083884
## [222] {cream cheese }   => {domestic eggs}   0.005083884
## [223] {cream cheese }   => {fruit/vegetable juice} 0.005693950
## [224] {cream cheese }   => {whipped/sour cream} 0.006405694
## [225] {cream cheese }   => {pip fruit}       0.006100661
## [226] {cream cheese }   => {citrus fruit}    0.005693950
## [227] {cream cheese }   => {shopping bags}  0.005592272
## [228] {cream cheese }   => {sausage}          0.005592272
## [229] {cream cheese }   => {bottled water}   0.005897306
## [230] {cream cheese }   => {tropical fruit} 0.007219115
## [231] {cream cheese }   => {root vegetables} 0.007524148
## [232] {cream cheese }   => {soda}            0.006812405
## [233] {cream cheese }   => {yogurt}          0.012404677
## [234] {cream cheese }   => {rolls/buns}     0.009964413
## [235] {cream cheese }   => {other vegetables} 0.013726487
## [236] {cream cheese }   => {whole milk}      0.016471784
## [237] {chicken}          => {frozen vegetables} 0.006710727
## [238] {frozen vegetables}=> {chicken}          0.006710727
## [239] {chicken}          => {pork}            0.005795628
## [240] {pork}             => {chicken}          0.005795628
## [241] {chicken}          => {butter}          0.005795628
## [242] {butter}           => {chicken}          0.005795628
## [243] {chicken}          => {newspapers}      0.005185562
## [244] {chicken}          => {domestic eggs}   0.006202339
## [245] {chicken}          => {whipped/sour cream} 0.007219115
## [246] {whipped/sour cream}=> {chicken}          0.007219115
## [247] {chicken}          => {citrus fruit}    0.006914082
## [248] {chicken}          => {sausage}          0.005287239
## [249] {chicken}          => {bottled water}   0.005287239
## [250] {chicken}          => {tropical fruit} 0.006405694
## [251] {chicken}          => {root vegetables} 0.010879512
## [252] {chicken}          => {soda}            0.008337570
## [253] {chicken}          => {yogurt}          0.008337570
## [254] {chicken}          => {rolls/buns}     0.009659380
## [255] {chicken}          => {other vegetables} 0.017895272
## [256] {chicken}          => {whole milk}      0.017590239
## [257] {white bread}       => {frankfurter}     0.005185562
## [258] {white bread}       => {domestic eggs}   0.005795628
## [259] {white bread}       => {fruit/vegetable juice} 0.007422471
## [260] {fruit/vegetable juice}=> {white bread}    0.007422471
## [261] {white bread}       => {whipped/sour cream} 0.005490595
## [262] {white bread}       => {pip fruit}       0.006609049

```

```

## [263] {white bread}          => {pastry}          0.005592272
## [264] {white bread}          => {shopping bags} 0.007422471
## [265] {white bread}          => {sausage}         0.007219115
## [266] {white bread}          => {tropical fruit} 0.008744281
## [267] {white bread}          => {root vegetables} 0.007930859
## [268] {white bread}          => {soda}            0.010269446
## [269] {white bread}          => {yogurt}          0.009049314
## [270] {white bread}          => {rolls/buns}     0.006507372
## [271] {white bread}          => {other vegetables} 0.013726487
## [272] {white bread}          => {whole milk}      0.017081851
## [273] {chocolate}           => {butter}          0.006202339
## [274] {butter}               => {chocolate}       0.006202339
## [275] {chocolate}           => {newspapers}      0.005490595
## [276] {chocolate}           => {fruit/vegetable juice} 0.006812405
## [277] {chocolate}           => {pip fruit}       0.006100661
## [278] {chocolate}           => {pastry}          0.008032537
## [279] {chocolate}           => {citrus fruit}    0.006405694
## [280] {chocolate}           => {shopping bags} 0.008134215
## [281] {chocolate}           => {sausage}         0.006609049
## [282] {chocolate}           => {bottled water}   0.005795628
## [283] {chocolate}           => {tropical fruit} 0.008134215
## [284] {chocolate}           => {root vegetables} 0.006405694
## [285] {chocolate}           => {soda}            0.013523132
## [286] {chocolate}           => {yogurt}          0.009252669
## [287] {chocolate}           => {rolls/buns}     0.011794611
## [288] {chocolate}           => {other vegetables} 0.012709710
## [289] {chocolate}           => {whole milk}      0.016675140
## [290] {coffee}               => {fruit/vegetable juice} 0.005998983
## [291] {coffee}               => {whipped/sour cream} 0.006100661
## [292] {coffee}               => {pip fruit}       0.006914082
## [293] {coffee}               => {pastry}          0.006914082
## [294] {coffee}               => {citrus fruit}    0.006405694
## [295] {coffee}               => {shopping bags} 0.009354347
## [296] {coffee}               => {sausage}         0.006914082
## [297] {coffee}               => {bottled water}   0.007320793
## [298] {coffee}               => {tropical fruit} 0.007117438
## [299] {coffee}               => {root vegetables} 0.007320793
## [300] {coffee}               => {soda}            0.009964413
## [301] {coffee}               => {yogurt}          0.009761057
## [302] {coffee}               => {rolls/buns}     0.010981190
## [303] {coffee}               => {other vegetables} 0.013421454
## [304] {coffee}               => {whole milk}      0.018708693
## [305] {frozen vegetables}   => {pork}            0.006405694
## [306] {pork}                 => {frozen vegetables} 0.006405694
## [307] {frozen vegetables}   => {frankfurter}      0.005083884
## [308] {frozen vegetables}   => {margarine}        0.005083884
## [309] {frozen vegetables}   => {butter}          0.005795628
## [310] {butter}               => {frozen vegetables} 0.005795628
## [311] {frozen vegetables}   => {domestic eggs}    0.005185562
## [312] {frozen vegetables}   => {fruit/vegetable juice} 0.007829181
## [313] {fruit/vegetable juice} => {frozen vegetables} 0.007829181
## [314] {frozen vegetables}   => {whipped/sour cream} 0.007930859
## [315] {whipped/sour cream}  => {frozen vegetables} 0.007930859
## [316] {frozen vegetables}   => {pip fruit}       0.007320793

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## [317] {frozen vegetables} => {citrus fruit} 0.006609049
## [318] {frozen vegetables} => {sausage} 0.005998983
## [319] {frozen vegetables} => {bottled water} 0.006202339
## [320] {frozen vegetables} => {tropical fruit} 0.008744281
## [321] {frozen vegetables} => {root vegetables} 0.011591256
## [322] {root vegetables} => {frozen vegetables} 0.011591256
## [323] {frozen vegetables} => {soda} 0.008642603
## [324] {frozen vegetables} => {yogurt} 0.012404677
## [325] {frozen vegetables} => {rolls/buns} 0.010167768
## [326] {frozen vegetables} => {other vegetables} 0.017793594
## [327] {frozen vegetables} => {whole milk} 0.020437214
## [328] {beef} => {pork} 0.007625826
## [329] {pork} => {beef} 0.007625826
## [330] {beef} => {margarine} 0.006202339
## [331] {margarine} => {beef} 0.006202339
## [332] {beef} => {butter} 0.005795628
## [333] {butter} => {beef} 0.005795628
## [334] {beef} => {newspapers} 0.006405694
## [335] {beef} => {domestic eggs} 0.005998983
## [336] {beef} => {whipped/sour cream} 0.006710727
## [337] {beef} => {pastry} 0.006304016
## [338] {beef} => {citrus fruit} 0.008439248
## [339] {citrus fruit} => {beef} 0.008439248
## [340] {beef} => {sausage} 0.005592272
## [341] {beef} => {bottled water} 0.006202339
## [342] {beef} => {tropical fruit} 0.007625826
## [343] {beef} => {root vegetables} 0.017386884
## [344] {root vegetables} => {beef} 0.017386884
## [345] {beef} => {soda} 0.008134215
## [346] {beef} => {yogurt} 0.011692933
## [347] {beef} => {rolls/buns} 0.013624809
## [348] {beef} => {other vegetables} 0.019725470
## [349] {other vegetables} => {beef} 0.019725470
## [350] {beef} => {whole milk} 0.021250635
## [351] {curd} => {margarine} 0.006304016
## [352] {margarine} => {curd} 0.006304016
## [353] {curd} => {butter} 0.006812405
## [354] {butter} => {curd} 0.006812405
## [355] {curd} => {newspapers} 0.005693950
## [356] {curd} => {domestic eggs} 0.006507372
## [357] {domestic eggs} => {curd} 0.006507372
## [358] {curd} => {whipped/sour cream} 0.010472801
## [359] {whipped/sour cream} => {curd} 0.010472801
## [360] {curd} => {pip fruit} 0.007829181
## [361] {pip fruit} => {curd} 0.007829181
## [362] {curd} => {pastry} 0.007524148
## [363] {curd} => {citrus fruit} 0.007117438
## [364] {curd} => {shopping bags} 0.005388917
## [365] {curd} => {sausage} 0.007625826
## [366] {curd} => {bottled water} 0.006100661
## [367] {curd} => {tropical fruit} 0.010269446
## [368] {curd} => {root vegetables} 0.010879512
## [369] {curd} => {soda} 0.008134215
## [370] {curd} => {yogurt} 0.017285206

```

## [371] {yogurt}	=> {curd}	0.017285206
## [372] {curd}	=> {rolls/buns}	0.010066090
## [373] {curd}	=> {other vegetables}	0.017183528
## [374] {curd}	=> {whole milk}	0.026131164
## [375] {whole milk}	=> {curd}	0.026131164
## [376] {napkins}	=> {newspapers}	0.006202339
## [377] {napkins}	=> {domestic eggs}	0.005998983
## [378] {napkins}	=> {fruit/vegetable juice}	0.006914082
## [379] {napkins}	=> {whipped/sour cream}	0.007219115
## [380] {whipped/sour cream}	=> {napkins}	0.007219115
## [381] {napkins}	=> {pip fruit}	0.006710727
## [382] {napkins}	=> {pastry}	0.007015760
## [383] {napkins}	=> {citrus fruit}	0.007625826
## [384] {napkins}	=> {shopping bags}	0.007219115
## [385] {napkins}	=> {sausage}	0.006710727
## [386] {napkins}	=> {bottled water}	0.008642603
## [387] {napkins}	=> {tropical fruit}	0.010066090
## [388] {napkins}	=> {root vegetables}	0.009964413
## [389] {napkins}	=> {soda}	0.011997966
## [390] {napkins}	=> {yogurt}	0.012302999
## [391] {napkins}	=> {rolls/buns}	0.011692933
## [392] {napkins}	=> {other vegetables}	0.014438231
## [393] {napkins}	=> {whole milk}	0.019725470
## [394] {pork}	=> {frankfurter}	0.005897306
## [395] {frankfurter}	=> {pork}	0.005897306
## [396] {pork}	=> {margarine}	0.006405694
## [397] {margarine}	=> {pork}	0.006405694
## [398] {pork}	=> {newspapers}	0.006609049
## [399] {pork}	=> {whipped/sour cream}	0.008235892
## [400] {whipped/sour cream}	=> {pork}	0.008235892
## [401] {pork}	=> {pip fruit}	0.006100661
## [402] {pork}	=> {pastry}	0.006304016
## [403] {pork}	=> {citrus fruit}	0.006507372
## [404] {pork}	=> {shopping bags}	0.006405694
## [405] {pork}	=> {sausage}	0.006507372
## [406] {pork}	=> {bottled water}	0.007422471
## [407] {pork}	=> {tropical fruit}	0.008540925
## [408] {pork}	=> {root vegetables}	0.013624809
## [409] {root vegetables}	=> {pork}	0.013624809
## [410] {pork}	=> {soda}	0.011896289
## [411] {pork}	=> {yogurt}	0.009557702
## [412] {pork}	=> {rolls/buns}	0.011286223
## [413] {pork}	=> {other vegetables}	0.021657346
## [414] {other vegetables}	=> {pork}	0.021657346
## [415] {pork}	=> {whole milk}	0.022165735
## [416] {frankfurter}	=> {brown bread}	0.007117438
## [417] {brown bread}	=> {frankfurter}	0.007117438
## [418] {frankfurter}	=> {margarine}	0.006405694
## [419] {margarine}	=> {frankfurter}	0.006405694
## [420] {frankfurter}	=> {domestic eggs}	0.007015760
## [421] {domestic eggs}	=> {frankfurter}	0.007015760
## [422] {frankfurter}	=> {whipped/sour cream}	0.006202339
## [423] {frankfurter}	=> {pip fruit}	0.007219115
## [424] {frankfurter}	=> {pastry}	0.008337570

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## [425] {frankfurter}          => {citrus fruit}          0.006507372
## [426] {frankfurter}          => {shopping bags}        0.008235892
## [427] {frankfurter}          => {sausage}              0.010066090
## [428] {sausage}              => {frankfurter}           0.010066090
## [429] {frankfurter}          => {bottled water}         0.007320793
## [430] {frankfurter}          => {tropical fruit}        0.009456024
## [431] {frankfurter}          => {root vegetables}       0.010167768
## [432] {frankfurter}          => {soda}                  0.011286223
## [433] {frankfurter}          => {yogurt}                0.011184545
## [434] {frankfurter}          => {rolls/buns}            0.019217082
## [435] {rolls/buns}           => {frankfurter}           0.019217082
## [436] {frankfurter}          => {other vegetables}      0.016471784
## [437] {frankfurter}          => {whole milk}             0.020538892
## [438] {margarine}            => {bottled beer}           0.006100661
## [439] {butter}                => {bottled beer}           0.005795628
## [440] {bottled beer}          => {bottled water}          0.015760041
## [441] {bottled water}         => {bottled beer}           0.015760041
## [442] {bottled beer}          => {tropical fruit}         0.008235892
## [443] {bottled beer}          => {root vegetables}        0.009659380
## [444] {bottled beer}          => {soda}                  0.016980173
## [445] {bottled beer}          => {yogurt}                0.009252669
## [446] {bottled beer}          => {rolls/buns}            0.013624809
## [447] {bottled beer}          => {other vegetables}      0.016166751
## [448] {bottled beer}          => {whole milk}             0.020437214
## [449] {brown bread}           => {margarine}              0.006507372
## [450] {margarine}             => {brown bread}            0.006507372
## [451] {butter}                 => {brown bread}            0.005795628
## [452] {brown bread}           => {newspapers}             0.007625826
## [453] {brown bread}           => {domestic eggs}          0.006812405
## [454] {domestic eggs}          => {brown bread}            0.006812405
## [455] {brown bread}           => {fruit/vegetable juice} 0.008337570
## [456] {fruit/vegetable juice} => {brown bread}            0.008337570
## [457] {brown bread}           => {pip fruit}              0.007625826
## [458] {pip fruit}              => {brown bread}            0.007625826
## [459] {brown bread}           => {pastry}                 0.009659380
## [460] {pastry}                 => {brown bread}            0.009659380
## [461] {brown bread}           => {citrus fruit}            0.008337570
## [462] {citrus fruit}          => {brown bread}            0.008337570
## [463] {brown bread}           => {shopping bags}          0.009252669
## [464] {brown bread}           => {sausage}                0.010676157
## [465] {sausage}                => {brown bread}            0.010676157
## [466] {brown bread}           => {bottled water}          0.008235892
## [467] {brown bread}           => {tropical fruit}         0.010676157
## [468] {tropical fruit}         => {brown bread}            0.010676157
## [469] {brown bread}           => {root vegetables}        0.010167768
## [470] {brown bread}           => {soda}                  0.012608033
## [471] {brown bread}           => {yogurt}                0.014539908
## [472] {yogurt}                 => {brown bread}            0.014539908
## [473] {brown bread}           => {rolls/buns}            0.012608033
## [474] {brown bread}           => {other vegetables}      0.018708693
## [475] {brown bread}           => {whole milk}             0.025216065
## [476] {margarine}              => {butter}                 0.006710727
## [477] {butter}                 => {margarine}              0.006710727
## [478] {margarine}              => {newspapers}             0.007117438

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## [479] {margarine}          => {domestic eggs}          0.008337570
## [480] {domestic eggs}      => {margarine}             0.008337570
## [481] {margarine}          => {fruit/vegetable juice} 0.006202339
## [482] {margarine}          => {whipped/sour cream} 0.006812405
## [483] {margarine}          => {pip fruit}            0.008540925
## [484] {pip fruit}          => {margarine}             0.008540925
## [485] {margarine}          => {pastry}               0.006812405
## [486] {margarine}          => {citrus fruit}         0.007930859
## [487] {margarine}          => {sausage}              0.007117438
## [488] {margarine}          => {bottled water}         0.010269446
## [489] {margarine}          => {tropical fruit}        0.009354347
## [490] {margarine}          => {root vegetables}       0.011082867
## [491] {root vegetables}     => {margarine}             0.011082867
## [492] {margarine}          => {soda}                  0.010167768
## [493] {margarine}          => {yogurt}                0.014234875
## [494] {yogurt}              => {margarine}             0.014234875
## [495] {margarine}          => {rolls/buns}            0.014743264
## [496] {margarine}          => {other vegetables}      0.019725470
## [497] {other vegetables}    => {margarine}             0.019725470
## [498] {margarine}          => {whole milk}            0.024199288
## [499] {butter}              => {newspapers}            0.005795628
## [500] {butter}              => {domestic eggs}          0.009659380
## [501] {domestic eggs}       => {butter}                 0.009659380
## [502] {butter}              => {fruit/vegetable juice} 0.008032537
## [503] {fruit/vegetable juice} => {butter}                 0.008032537
## [504] {butter}              => {whipped/sour cream} 0.010167768
## [505] {whipped/sour cream}  => {butter}                 0.010167768
## [506] {butter}              => {pip fruit}             0.007320793
## [507] {butter}              => {pastry}                0.007625826
## [508] {butter}              => {citrus fruit}          0.009150991
## [509] {citrus fruit}        => {butter}                 0.009150991
## [510] {butter}              => {sausage}               0.008642603
## [511] {butter}              => {bottled water}          0.008947636
## [512] {butter}              => {tropical fruit}        0.009964413
## [513] {butter}              => {root vegetables}       0.012913066
## [514] {root vegetables}     => {butter}                 0.012913066
## [515] {butter}              => {soda}                  0.008845958
## [516] {butter}              => {yogurt}                0.014641586
## [517] {yogurt}              => {butter}                 0.014641586
## [518] {butter}              => {rolls/buns}            0.013421454
## [519] {butter}              => {other vegetables}      0.020030503
## [520] {other vegetables}    => {butter}                 0.020030503
## [521] {butter}              => {whole milk}            0.027554652
## [522] {whole milk}          => {butter}                 0.027554652
## [523] {domestic eggs}       => {newspapers}            0.006914082
## [524] {newspapers}          => {fruit/vegetable juice} 0.008235892
## [525] {fruit/vegetable juice} => {newspapers}            0.008235892
## [526] {whipped/sour cream}  => {newspapers}            0.007219115
## [527] {newspapers}          => {pastry}                0.008439248
## [528] {newspapers}          => {citrus fruit}          0.008337570
## [529] {citrus fruit}        => {newspapers}            0.008337570
## [530] {newspapers}          => {sausage}               0.008032537
## [531] {newspapers}          => {bottled water}          0.011286223
## [532] {bottled water}        => {newspapers}            0.011286223

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```

## [533] {newspapers}          => {tropical fruit}          0.011794611
## [534] {tropical fruit}     => {newspapers}           0.011794611
## [535] {newspapers}          => {root vegetables}       0.011489578
## [536] {root vegetables}     => {newspapers}           0.011489578
## [537] {newspapers}          => {soda}                 0.014641586
## [538] {newspapers}          => {yogurt}               0.015353330
## [539] {yogurt}              => {newspapers}           0.015353330
## [540] {newspapers}          => {rolls/buns}          0.019725470
## [541] {rolls/buns}          => {newspapers}           0.019725470
## [542] {newspapers}          => {other vegetables}    0.019318760
## [543] {newspapers}          => {whole milk}          0.027351296
## [544] {whole milk}          => {newspapers}           0.027351296
## [545] {domestic eggs}       => {fruit/vegetable juice} 0.008032537
## [546] {fruit/vegetable juice} => {domestic eggs}        0.008032537
## [547] {domestic eggs}       => {whipped/sour cream}  0.009964413
## [548] {whipped/sour cream}  => {domestic eggs}        0.009964413
## [549] {domestic eggs}       => {pip fruit}            0.008642603
## [550] {pip fruit}           => {domestic eggs}        0.008642603
## [551] {domestic eggs}       => {pastry}               0.009049314
## [552] {pastry}              => {domestic eggs}        0.009049314
## [553] {domestic eggs}       => {citrus fruit}          0.010371124
## [554] {citrus fruit}         => {domestic eggs}        0.010371124
## [555] {domestic eggs}       => {shopping bags}         0.009049314
## [556] {domestic eggs}       => {sausage}              0.009557702
## [557] {sausage}              => {domestic eggs}        0.009557702
## [558] {domestic eggs}       => {bottled water}          0.009150991
## [559] {domestic eggs}       => {tropical fruit}        0.011387900
## [560] {tropical fruit}      => {domestic eggs}        0.011387900
## [561] {domestic eggs}       => {root vegetables}       0.014336553
## [562] {root vegetables}     => {domestic eggs}        0.014336553
## [563] {domestic eggs}       => {soda}                 0.012404677
## [564] {domestic eggs}       => {yogurt}               0.014336553
## [565] {yogurt}              => {domestic eggs}        0.014336553
## [566] {domestic eggs}       => {rolls/buns}          0.015658363
## [567] {domestic eggs}       => {other vegetables}    0.022267412
## [568] {other vegetables}    => {domestic eggs}        0.022267412
## [569] {domestic eggs}       => {whole milk}          0.029994916
## [570] {whole milk}          => {domestic eggs}        0.029994916
## [571] {fruit/vegetable juice} => {whipped/sour cream}  0.009049314
## [572] {whipped/sour cream}  => {fruit/vegetable juice} 0.009049314
## [573] {fruit/vegetable juice} => {pip fruit}            0.009557702
## [574] {pip fruit}           => {fruit/vegetable juice} 0.009557702
## [575] {fruit/vegetable juice} => {pastry}               0.008540925
## [576] {fruit/vegetable juice} => {citrus fruit}          0.010371124
## [577] {citrus fruit}         => {fruit/vegetable juice} 0.010371124
## [578] {fruit/vegetable juice} => {shopping bags}         0.010676157
## [579] {shopping bags}        => {fruit/vegetable juice} 0.010676157
## [580] {fruit/vegetable juice} => {sausage}              0.010066090
## [581] {sausage}              => {fruit/vegetable juice} 0.010066090
## [582] {fruit/vegetable juice} => {bottled water}          0.014234875
## [583] {bottled water}         => {fruit/vegetable juice} 0.014234875
## [584] {fruit/vegetable juice} => {tropical fruit}        0.013726487
## [585] {tropical fruit}       => {fruit/vegetable juice} 0.013726487
## [586] {fruit/vegetable juice} => {root vegetables}       0.011997966

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## [587] {root vegetables} => {fruit/vegetable juice} 0.011997966
## [588] {fruit/vegetable juice} => {soda} 0.018403660
## [589] {soda} => {fruit/vegetable juice} 0.018403660
## [590] {fruit/vegetable juice} => {yogurt} 0.018708693
## [591] {yogurt} => {fruit/vegetable juice} 0.018708693
## [592] {fruit/vegetable juice} => {rolls/buns} 0.014539908
## [593] {fruit/vegetable juice} => {other vegetables} 0.021047280
## [594] {other vegetables} => {fruit/vegetable juice} 0.021047280
## [595] {fruit/vegetable juice} => {whole milk} 0.026639553
## [596] {whole milk} => {fruit/vegetable juice} 0.026639553
## [597] {whipped/sour cream} => {pip fruit} 0.009252669
## [598] {pip fruit} => {whipped/sour cream} 0.009252669
## [599] {whipped/sour cream} => {pastry} 0.007524148
## [600] {whipped/sour cream} => {citrus fruit} 0.010879512
## [601] {citrus fruit} => {whipped/sour cream} 0.010879512
## [602] {whipped/sour cream} => {shopping bags} 0.007930859
## [603] {whipped/sour cream} => {sausage} 0.009049314
## [604] {whipped/sour cream} => {bottled water} 0.008744281
## [605] {whipped/sour cream} => {tropical fruit} 0.013828165
## [606] {tropical fruit} => {whipped/sour cream} 0.013828165
## [607] {whipped/sour cream} => {root vegetables} 0.017081851
## [608] {root vegetables} => {whipped/sour cream} 0.017081851
## [609] {whipped/sour cream} => {soda} 0.011591256
## [610] {whipped/sour cream} => {yogurt} 0.020742247
## [611] {yogurt} => {whipped/sour cream} 0.020742247
## [612] {whipped/sour cream} => {rolls/buns} 0.014641586
## [613] {whipped/sour cream} => {other vegetables} 0.028876462
## [614] {other vegetables} => {whipped/sour cream} 0.028876462
## [615] {whipped/sour cream} => {whole milk} 0.032231825
## [616] {whole milk} => {whipped/sour cream} 0.032231825
## [617] {pip fruit} => {pastry} 0.010676157
## [618] {pastry} => {pip fruit} 0.010676157
## [619] {pip fruit} => {citrus fruit} 0.013828165
## [620] {citrus fruit} => {pip fruit} 0.013828165
## [621] {pip fruit} => {shopping bags} 0.009354347
## [622] {pip fruit} => {sausage} 0.010777834
## [623] {sausage} => {pip fruit} 0.010777834
## [624] {pip fruit} => {bottled water} 0.010574479
## [625] {pip fruit} => {tropical fruit} 0.020437214
## [626] {tropical fruit} => {pip fruit} 0.020437214
## [627] {pip fruit} => {root vegetables} 0.015556685
## [628] {root vegetables} => {pip fruit} 0.015556685
## [629] {pip fruit} => {soda} 0.013319776
## [630] {pip fruit} => {yogurt} 0.017996950
## [631] {yogurt} => {pip fruit} 0.017996950
## [632] {pip fruit} => {rolls/buns} 0.013929842
## [633] {pip fruit} => {other vegetables} 0.026131164
## [634] {other vegetables} => {pip fruit} 0.026131164
## [635] {pip fruit} => {whole milk} 0.030096594
## [636] {whole milk} => {pip fruit} 0.030096594
## [637] {pastry} => {citrus fruit} 0.009761057
## [638] {citrus fruit} => {pastry} 0.009761057
## [639] {pastry} => {shopping bags} 0.011896289
## [640] {shopping bags} => {pastry} 0.011896289

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## [641] {pastry}          => {sausage}          0.012506355
## [642] {sausage}         => {pastry}           0.012506355
## [643] {pastry}          => {bottled water}    0.008947636
## [644] {pastry}          => {tropical fruit}  0.013218099
## [645] {tropical fruit} => {pastry}           0.013218099
## [646] {pastry}          => {root vegetables} 0.010981190
## [647] {root vegetables} => {pastry}           0.010981190
## [648] {pastry}          => {soda}              0.021047280
## [649] {soda}             => {pastry}           0.021047280
## [650] {pastry}          => {yogurt}            0.017691917
## [651] {yogurt}           => {pastry}           0.017691917
## [652] {pastry}          => {rolls/buns}      0.020945602
## [653] {rolls/buns}      => {pastry}           0.020945602
## [654] {pastry}          => {other vegetables} 0.022572445
## [655] {other vegetables}=> {pastry}           0.022572445
## [656] {pastry}          => {whole milk}       0.033248602
## [657] {whole milk}       => {pastry}           0.033248602
## [658] {citrus fruit}    => {shopping bags}   0.009761057
## [659] {citrus fruit}    => {sausage}          0.011286223
## [660] {sausage}          => {citrus fruit}     0.011286223
## [661] {citrus fruit}    => {bottled water}    0.013523132
## [662] {bottled water}   => {citrus fruit}     0.013523132
## [663] {citrus fruit}    => {tropical fruit}   0.019928826
## [664] {tropical fruit}  => {citrus fruit}     0.019928826
## [665] {citrus fruit}    => {root vegetables} 0.017691917
## [666] {root vegetables} => {citrus fruit}     0.017691917
## [667] {citrus fruit}    => {soda}              0.012811388
## [668] {citrus fruit}    => {yogurt}            0.021657346
## [669] {yogurt}           => {citrus fruit}     0.021657346
## [670] {citrus fruit}    => {rolls/buns}      0.016776817
## [671] {citrus fruit}    => {other vegetables} 0.028876462
## [672] {other vegetables}=> {citrus fruit}     0.028876462
## [673] {citrus fruit}    => {whole milk}       0.030503305
## [674] {whole milk}       => {citrus fruit}     0.030503305
## [675] {shopping bags}   => {sausage}          0.015658363
## [676] {sausage}          => {shopping bags}   0.015658363
## [677] {shopping bags}   => {bottled water}    0.010981190
## [678] {shopping bags}   => {tropical fruit}   0.013523132
## [679] {tropical fruit}  => {shopping bags}   0.013523132
## [680] {shopping bags}   => {root vegetables} 0.012811388
## [681] {root vegetables} => {shopping bags}   0.012811388
## [682] {shopping bags}   => {soda}              0.024605999
## [683] {soda}              => {shopping bags}   0.024605999
## [684] {shopping bags}   => {yogurt}            0.015251652
## [685] {yogurt}            => {shopping bags}   0.015251652
## [686] {shopping bags}   => {rolls/buns}      0.019522115
## [687] {rolls/buns}       => {shopping bags}   0.019522115
## [688] {shopping bags}   => {other vegetables} 0.023182511
## [689] {other vegetables}=> {shopping bags}   0.023182511
## [690] {shopping bags}   => {whole milk}       0.024504321
## [691] {sausage}          => {bottled water}    0.011997966
## [692] {bottled water}   => {sausage}          0.011997966
## [693] {sausage}          => {tropical fruit}  0.013929842
## [694] {tropical fruit}  => {sausage}          0.013929842

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## [695] {sausage}                                     => {root vegetables} 0.014946619
## [696] {root vegetables}                         => {sausage} 0.014946619
## [697] {sausage}                                     => {soda} 0.024300966
## [698] {soda}                                         => {sausage} 0.024300966
## [699] {sausage}                                     => {yogurt} 0.019623793
## [700] {yogurt}                                       => {sausage} 0.019623793
## [701] {sausage}                                     => {rolls/buns} 0.030604982
## [702] {rolls/buns}                                 => {sausage} 0.030604982
## [703] {sausage}                                     => {other vegetables} 0.026944586
## [704] {other vegetables}                         => {sausage} 0.026944586
## [705] {sausage}                                     => {whole milk} 0.029893238
## [706] {whole milk}                                 => {sausage} 0.029893238
## [707] {bottled water}                            => {tropical fruit} 0.018505338
## [708] {tropical fruit}                           => {bottled water} 0.018505338
## [709] {bottled water}                            => {root vegetables} 0.015658363
## [710] {root vegetables}                         => {bottled water} 0.015658363
## [711] {bottled water}                            => {soda} 0.028978139
## [712] {soda}                                         => {bottled water} 0.028978139
## [713] {bottled water}                            => {yogurt} 0.022979156
## [714] {yogurt}                                       => {bottled water} 0.022979156
## [715] {bottled water}                            => {rolls/buns} 0.024199288
## [716] {rolls/buns}                                => {bottled water} 0.024199288
## [717] {bottled water}                            => {other vegetables} 0.024809354
## [718] {other vegetables}                         => {bottled water} 0.024809354
## [719] {bottled water}                            => {whole milk} 0.034367056
## [720] {whole milk}                                 => {bottled water} 0.034367056
## [721] {tropical fruit}                           => {root vegetables} 0.021047280
## [722] {root vegetables}                          => {tropical fruit} 0.021047280
## [723] {tropical fruit}                           => {soda} 0.020843925
## [724] {soda}                                         => {tropical fruit} 0.020843925
## [725] {tropical fruit}                           => {yogurt} 0.029283172
## [726] {yogurt}                                       => {tropical fruit} 0.029283172
## [727] {tropical fruit}                           => {rolls/buns} 0.024605999
## [728] {rolls/buns}                                => {tropical fruit} 0.024605999
## [729] {tropical fruit}                           => {other vegetables} 0.035892222
## [730] {other vegetables}                         => {tropical fruit} 0.035892222
## [731] {tropical fruit}                           => {whole milk} 0.042297916
## [732] {whole milk}                                 => {tropical fruit} 0.042297916
## [733] {root vegetables}                         => {soda} 0.018607016
## [734] {soda}                                         => {root vegetables} 0.018607016
## [735] {root vegetables}                         => {yogurt} 0.025826131
## [736] {yogurt}                                       => {root vegetables} 0.025826131
## [737] {root vegetables}                         => {rolls/buns} 0.024300966
## [738] {rolls/buns}                                => {root vegetables} 0.024300966
## [739] {root vegetables}                         => {other vegetables} 0.047381800
## [740] {other vegetables}                         => {root vegetables} 0.047381800
## [741] {root vegetables}                         => {whole milk} 0.048906965
## [742] {whole milk}                                 => {root vegetables} 0.048906965
## [743] {soda}                                         => {yogurt} 0.027351296
## [744] {yogurt}                                       => {soda} 0.027351296
## [745] {soda}                                         => {rolls/buns} 0.038332486
## [746] {rolls/buns}                                => {soda} 0.038332486
## [747] {soda}                                         => {other vegetables} 0.032740214
## [748] {other vegetables}                         => {soda} 0.032740214

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## [749] {soda}                      => {whole milk}          0.040061007
## [750] {whole milk}                => {soda}                 0.040061007
## [751] {yogurt}                   => {rolls/buns}          0.034367056
## [752] {rolls/buns}                => {yogurt}               0.034367056
## [753] {yogurt}                   => {other vegetables}  0.043416370
## [754] {other vegetables}        => {yogurt}               0.043416370
## [755] {yogurt}                   => {whole milk}          0.056024403
## [756] {whole milk}                => {yogurt}               0.056024403
## [757] {rolls/buns}                => {other vegetables}  0.042602949
## [758] {other vegetables}        => {rolls/buns}          0.042602949
## [759] {rolls/buns}                => {whole milk}          0.056634469
## [760] {whole milk}                => {rolls/buns}          0.056634469
## [761] {other vegetables}        => {whole milk}          0.074834774
## [762] {whole milk}                => {other vegetables}  0.074834774

##      confidence coverage   lift      count
## [1]  0.1105236 1.00000000 1.0000000 1087
## [2]  0.1049314 1.00000000 1.0000000 1032
## [3]  0.1089985 1.00000000 1.0000000 1072
## [4]  0.1743772 1.00000000 1.0000000 1715
## [5]  0.1395018 1.00000000 1.0000000 1372
## [6]  0.1839349 1.00000000 1.0000000 1809
## [7]  0.1934926 1.00000000 1.0000000 1903
## [8]  0.2555160 1.00000000 1.0000000 2513
## [9]  0.4230769 0.01321810 1.6557746 55
## [10] 0.3410405 0.01759024 1.7625502 59
## [11] 0.3005780 0.01759024 1.1763569 52
## [12] 0.4322034 0.01199797 1.6914924 51
## [13] 0.4000000 0.01728521 1.5654596 68
## [14] 0.2560386 0.02104728 1.4683033 53
## [15] 0.2415459 0.02104728 0.9453259 50
## [16] 0.3378378 0.01504830 1.7459985 50
## [17] 0.4054054 0.01504830 1.5866145 60
## [18] 0.4312500 0.01626843 3.9564774 69
## [19] 0.4750000 0.01626843 2.4548739 76
## [20] 0.4750000 0.01626843 1.8589833 76
## [21] 0.3190184 0.01657346 1.8294729 52
## [22] 0.3312883 0.01657346 1.7121497 54
## [23] 0.4233129 0.01657346 1.6566981 69
## [24] 0.2931034 0.01769192 1.5148042 51
## [25] 0.4022989 0.01769192 1.5744565 70
## [26] 0.2109375 0.02602949 1.5120775 54
## [27] 0.2070312 0.02602949 1.1255679 53
## [28] 0.1992188 0.02602949 1.0295935 51
## [29] 0.2617188 0.02602949 1.0242753 67
## [30] 0.2439024 0.02501271 1.3987058 60
## [31] 0.2032520 0.02501271 1.0504381 50
## [32] 0.2357724 0.02501271 0.9227303 58
## [33] 0.3333333 0.01921708 1.7227185 63
## [34] 0.4656085 0.01921708 1.8222281 88
## [35] 0.3579545 0.01789527 1.8499648 63
## [36] 0.3977273 0.01789527 1.5565650 70
## [37] 0.4137931 0.01769192 2.1385471 72
## [38] 0.5229885 0.01769192 2.0467935 91
## [39] 0.3625731 0.01738688 1.8738342 62

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## [40] 0.4853801 0.01738688 1.8996074 83
## [41] 0.3511905 0.01708185 2.5174623 59
## [42] 0.3154762 0.01708185 1.7151511 53
## [43] 0.4166667 0.01708185 2.1533981 70
## [44] 0.4404762 0.01708185 1.7238692 74
## [45] 0.2639405 0.02735130 1.5136181 71
## [46] 0.2044610 0.02735130 1.1115940 55
## [47] 0.2044610 0.02735130 1.0566861 55
## [48] 0.2379182 0.02735130 0.9311284 64
## [49] 0.1863799 0.02836807 1.6863354 52
## [50] 0.2580645 0.02836807 1.4799210 72
## [51] 0.1971326 0.02836807 1.0188120 55
## [52] 0.2473118 0.02836807 0.9678917 69
## [53] 0.2727273 0.02236909 2.5991015 60
## [54] 0.4045455 0.02236909 2.0907538 89
## [55] 0.3272727 0.02236909 1.2808306 72
## [56] 0.2663755 0.02328419 1.9094778 61
## [57] 0.2794760 0.02328419 1.4443753 64
## [58] 0.3799127 0.02328419 1.4868448 87
## [59] 0.2073579 0.03040163 1.1891338 62
## [60] 0.1839465 0.03040163 1.0000629 55
## [61] 0.2006689 0.03040163 1.0370881 60
## [62] 0.2642140 0.03040163 1.0340410 79
## [63] 0.2047244 0.02582613 2.1790742 52
## [64] 0.1968504 0.02582613 1.8059922 50
## [65] 0.2125984 0.02582613 1.2191869 54
## [66] 0.2047244 0.02582613 1.4675398 52
## [67] 0.2677165 0.02582613 1.4554959 68
## [68] 0.3858268 0.02582613 1.9940128 98
## [69] 0.3858268 0.02582613 1.5099906 98
## [70] 0.1935484 0.02836807 1.8445236 54
## [71] 0.2186380 0.02836807 1.2538220 61
## [72] 0.2186380 0.02836807 1.5672774 61
## [73] 0.2652330 0.02836807 1.3707653 74
## [74] 0.3476703 0.02836807 1.3606593 97
## [75] 0.2116183 0.02450432 2.2524519 51
## [76] 0.2282158 0.02450432 2.0937519 55
## [77] 0.2614108 0.02450432 1.8738886 63
## [78] 0.2406639 0.02450432 1.3084187 58
## [79] 0.3858921 0.02450432 1.9943505 93
## [80] 0.4107884 0.02450432 1.6076815 99
## [81] 0.1818182 0.02796136 2.4034702 50
## [82] 0.1963636 0.02796136 1.8713531 54
## [83] 0.1818182 0.02796136 1.6680801 50
## [84] 0.3054545 0.02796136 2.1896104 84
## [85] 0.2727273 0.02796136 1.4827378 75
## [86] 0.3709091 0.02796136 1.9169159 102
## [87] 0.4145455 0.02796136 1.6223854 114
## [88] 0.1802721 0.02989324 1.7180002 53
## [89] 0.2891156 0.02989324 1.6579897 85
## [90] 0.1836735 0.02989324 1.3166389 54
## [91] 0.2380952 0.02989324 1.2944537 70
## [92] 0.2312925 0.02989324 1.1953557 68
## [93] 0.2755102 0.02989324 1.0782502 81

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## [94] 0.1953125 0.02602949 4.6398513 50
## [95] 0.1207729 0.04209456 4.6398513 50
## [96] 0.2070312 0.02602949 1.9730158 53
## [97] 0.2578125 0.02602949 1.8480947 66
## [98] 0.2656250 0.02602949 1.4441249 68
## [99] 0.3515625 0.02602949 1.8169297 90
## [100] 0.4414062 0.02602949 1.7275091 113
## [101] 0.2863071 0.02450432 3.0474349 69
## [102] 0.2157676 0.02450432 2.0562739 52
## [103] 0.2282158 0.02450432 2.0937519 55
## [104] 0.2074689 0.02450432 1.1897705 50
## [105] 0.3278008 0.02450432 2.3497968 79
## [106] 0.3112033 0.02450432 1.6919208 75
## [107] 0.3692946 0.02450432 1.9085720 89
## [108] 0.4398340 0.02450432 1.7213560 106
## [109] 0.2188450 0.03345196 1.9800740 72
## [110] 0.2279635 0.03345196 1.3073010 75
## [111] 0.2218845 0.03345196 1.5905496 73
## [112] 0.1914894 0.03345196 1.0410712 63
## [113] 0.2431611 0.03345196 1.2566944 80
## [114] 0.2500000 0.02806304 2.2936101 69
## [115] 0.1884058 0.02806304 1.3505620 52
## [116] 0.1811594 0.02806304 0.9849104 50
## [117] 0.3550725 0.02806304 1.8350697 98
## [118] 0.4021739 0.02806304 1.5739675 111
## [119] 0.1639344 0.03101169 2.2869434 50
## [120] 0.1803279 0.03101169 2.1787771 55
## [121] 0.1901639 0.03101169 1.7205725 58
## [122] 0.1836066 0.03101169 1.7497776 56
## [123] 0.3049180 0.03101169 2.7974523 93
## [124] 0.1704918 0.03101169 0.9777183 52
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##      lhs                      rhs          support
## [1] {}          => {bottled water} 0.110523640
## [2] {}          => {tropical fruit} 0.104931368
## [3] {}          => {root vegetables} 0.108998475
## [4] {}          => {soda}          0.174377224
## [5] {}          => {yogurt}        0.139501779
## [6] {}          => {rolls/buns}   0.183934926
## [7] {}          => {other vegetables} 0.193492628
## [8] {}          => {whole milk}    0.255516014
## [9] {cake bar}  => {whole milk}    0.005592272
## [10] {dishes}   => {other vegetables} 0.005998983
## [11] {dishes}   => {whole milk}    0.005287239
## [12] {mustard}  => {whole milk}    0.005185562
## [13] {pot plants}=> {whole milk}    0.006914082
## [14] {chewing gum}=> {soda}          0.005388917
## [15] {chewing gum}=> {whole milk}    0.005083884
## [16] {canned fish}=> {other vegetables} 0.005083884
## [17] {pasta}     => {whole milk}    0.006100661
## [18] {herbs}     => {root vegetables} 0.007015760
## [19] {herbs}     => {other vegetables} 0.007727504
## [20] {herbs}     => {whole milk}    0.007727504
## [21] {processed cheese}=> {soda}          0.005287239
## [22] {processed cheese}=> {other vegetables} 0.005490595
## [23] {processed cheese}=> {whole milk}    0.007015760
## [24] {semi-finished bread}=> {other vegetables} 0.005185562
## [25] {semi-finished bread}=> {whole milk}    0.007117438
## [26] {beverages}  => {yogurt}        0.005490595
## [27] {beverages}  => {rolls/buns}   0.005388917
## [28] {beverages}  => {other vegetables} 0.005185562
## [29] {beverages}  => {whole milk}    0.006812405
## [30] {ice cream}  => {soda}          0.006100661
## [31] {ice cream}  => {other vegetables} 0.005083884

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## [32] {ice cream}          => {whole milk}          0.005897306
## [33] {detergent}         => {other vegetables} 0.006405694
## [34] {detergent}         => {whole milk}          0.008947636
## [35] {pickled vegetables} => {other vegetables} 0.006405694
## [36] {pickled vegetables} => {whole milk}          0.007117438
## [37] {baking powder}      => {other vegetables} 0.007320793
## [38] {baking powder}      => {whole milk}          0.009252669
## [39] {flour}              => {other vegetables} 0.006304016
## [40] {flour}              => {whole milk}          0.008439248
## [41] {soft cheese}        => {yogurt}              0.005998983
## [42] {soft cheese}        => {rolls/buns}         0.005388917
## [43] {soft cheese}        => {other vegetables} 0.007117438
## [44] {soft cheese}        => {whole milk}          0.007524148
## [45] {specialty bar}      => {soda}                0.007219115
## [46] {specialty bar}      => {rolls/buns}         0.005592272
## [47] {specialty bar}      => {other vegetables} 0.005592272
## [48] {specialty bar}      => {whole milk}          0.006507372
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## [50] {misc. beverages}    => {soda}                0.007320793
## [51] {misc. beverages}    => {other vegetables} 0.005592272
## [52] {misc. beverages}    => {whole milk}          0.007015760
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## [54] {grapes}              => {other vegetables} 0.009049314
## [55] {grapes}              => {whole milk}          0.007320793
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## [58] {cat food}            => {whole milk}          0.008845958
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## [60] {specialty chocolate} => {rolls/buns}         0.005592272
## [61] {specialty chocolate} => {other vegetables} 0.006100661
## [62] {specialty chocolate} => {whole milk}          0.008032537
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## [64] {meat}                => {root vegetables} 0.005083884
## [65] {meat}                => {soda}                0.005490595
## [66] {meat}                => {yogurt}              0.005287239
## [67] {meat}                => {rolls/buns}         0.006914082
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## [69] {meat}                => {whole milk}          0.009964413
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## [72] {frozen meals}         => {yogurt}              0.006202339
## [73] {frozen meals}         => {other vegetables} 0.007524148
## [74] {frozen meals}         => {whole milk}          0.009862735
## [75] {hard cheese}          => {sausage}             0.005185562
## [76] {hard cheese}          => {root vegetables} 0.005592272
## [77] {hard cheese}          => {yogurt}              0.006405694
## [78] {hard cheese}          => {rolls/buns}         0.005897306
## [79] {hard cheese}          => {other vegetables} 0.009456024
## [80] {hard cheese}          => {whole milk}          0.010066090
## [81] {butter milk}           => {pip fruit}           0.005083884
## [82] {butter milk}           => {tropical fruit}     0.005490595
## [83] {butter milk}           => {root vegetables} 0.005083884
## [84] {butter milk}           => {yogurt}              0.008540925
## [85] {butter milk}           => {rolls/buns}         0.007625826

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## [86] {butter milk}          => {other vegetables} 0.010371124
## [87] {butter milk}          => {whole milk}        0.011591256
## [88] {candy}                => {tropical fruit}  0.005388917
## [89] {candy}                => {soda}              0.008642603
## [90] {candy}                => {yogurt}            0.005490595
## [91] {candy}                => {rolls/buns}       0.007117438
## [92] {candy}                => {other vegetables} 0.006914082
## [93] {candy}                => {whole milk}        0.008235892
## [94] {ham}                  => {white bread}      0.005083884
## [95] {white bread}          => {ham}               0.005083884
## [96] {ham}                  => {tropical fruit}  0.005388917
## [97] {ham}                  => {yogurt}            0.006710727
## [98] {ham}                  => {rolls/buns}       0.006914082
## [99] {ham}                  => {other vegetables} 0.009150991
## [100] {ham}                 => {whole milk}        0.011489578
## [101] {sliced cheese}       => {sausage}           0.007015760
## [102] {sliced cheese}       => {tropical fruit}  0.005287239
## [103] {sliced cheese}       => {root vegetables} 0.005592272
## [104] {sliced cheese}       => {soda}              0.005083884
## [105] {sliced cheese}       => {yogurt}            0.008032537
## [106] {sliced cheese}       => {rolls/buns}       0.007625826
## [107] {sliced cheese}       => {other vegetables} 0.009049314
## [108] {sliced cheese}       => {whole milk}        0.010777834
## [109] {UHT-milk}           => {bottled water}     0.007320793
## [110] {UHT-milk}           => {soda}              0.007625826
## [111] {UHT-milk}           => {yogurt}            0.007422471
## [112] {UHT-milk}           => {rolls/buns}       0.006405694
## [113] {UHT-milk}           => {other vegetables} 0.008134215
## [114] {oil}                 => {root vegetables} 0.007015760
## [115] {oil}                 => {yogurt}            0.005287239
## [116] {oil}                 => {rolls/buns}       0.005083884
## [117] {oil}                 => {other vegetables} 0.009964413
## [118] {oil}                 => {whole milk}        0.011286223
## [119] {onions}              => {whipped/sour cream} 0.005083884
## [120] {onions}              => {citrus fruit}     0.005592272
## [121] {onions}              => {bottled water}     0.005897306
## [122] {onions}              => {tropical fruit}  0.005693950
## [123] {onions}              => {root vegetables} 0.009456024
## [124] {onions}              => {soda}              0.005287239
## [125] {onions}              => {yogurt}            0.007219115
## [126] {onions}              => {rolls/buns}       0.006812405
## [127] {onions}              => {other vegetables} 0.014234875
## [128] {onions}              => {whole milk}        0.012099644
## [129] {berries}             => {whipped/sour cream} 0.009049314
## [130] {whipped/sour cream} => {berries}            0.009049314
## [131] {berries}             => {citrus fruit}     0.005388917
## [132] {berries}             => {tropical fruit}  0.006710727
## [133] {berries}             => {root vegetables} 0.006609049
## [134] {berries}             => {soda}              0.007320793
## [135] {berries}             => {yogurt}            0.010574479
## [136] {berries}             => {rolls/buns}       0.006609049
## [137] {berries}             => {other vegetables} 0.010269446
## [138] {berries}             => {whole milk}        0.011794611
## [139] {hamburger meat}      => {sausage}           0.005185562

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## [140] {hamburger meat}          => {root vegetables} 0.006202339
## [141] {hamburger meat}          => {soda}            0.005795628
## [142] {hamburger meat}          => {yogurt}          0.006507372
## [143] {hamburger meat}          => {rolls/buns}     0.008642603
## [144] {hamburger meat}          => {other vegetables} 0.013828165
## [145] {hamburger meat}          => {whole milk}      0.014743264
## [146] {hygiene articles}        => {napkins}         0.006100661
## [147] {napkins}                => {hygiene articles} 0.006100661
## [148] {hygiene articles}        => {citrus fruit}    0.005287239
## [149] {hygiene articles}        => {shopping bags}  0.005185562
## [150] {hygiene articles}        => {bottled water}   0.005693950
## [151] {hygiene articles}        => {tropical fruit} 0.006710727
## [152] {hygiene articles}        => {root vegetables} 0.005388917
## [153] {hygiene articles}        => {soda}            0.007015760
## [154] {hygiene articles}        => {yogurt}          0.007320793
## [155] {hygiene articles}        => {rolls/buns}     0.005897306
## [156] {hygiene articles}        => {other vegetables} 0.009557702
## [157] {hygiene articles}        => {whole milk}      0.012811388
## [158] {salty snack}            => {fruit/vegetable juice} 0.005998983
## [159] {salty snack}            => {whipped/sour cream} 0.005185562
## [160] {salty snack}            => {pastry}          0.005185562
## [161] {salty snack}            => {shopping bags}  0.005998983
## [162] {salty snack}            => {sausage}         0.005287239
## [163] {salty snack}            => {tropical fruit} 0.005592272
## [164] {salty snack}            => {soda}            0.009354347
## [165] {salty snack}            => {yogurt}          0.006202339
## [166] {salty snack}            => {other vegetables} 0.010777834
## [167] {salty snack}            => {whole milk}      0.011184545
## [168] {sugar}                  => {margarine}       0.005490595
## [169] {sugar}                  => {pastry}          0.005185562
## [170] {sugar}                  => {root vegetables} 0.006405694
## [171] {sugar}                  => {soda}            0.007320793
## [172] {sugar}                  => {yogurt}          0.006914082
## [173] {sugar}                  => {rolls/buns}     0.007015760
## [174] {sugar}                  => {other vegetables} 0.010777834
## [175] {sugar}                  => {whole milk}      0.015048297
## [176] {waffles}                => {chocolate}       0.005795628
## [177] {waffles}                => {waffles}         0.005795628
## [178] {waffles}                => {whipped/sour cream} 0.005083884
## [179] {waffles}                => {pastry}          0.007015760
## [180] {waffles}                => {shopping bags}  0.005490595
## [181] {waffles}                => {tropical fruit} 0.006100661
## [182] {waffles}                => {root vegetables} 0.006609049
## [183] {waffles}                => {soda}            0.009557702
## [184] {waffles}                => {yogurt}          0.007524148
## [185] {waffles}                => {rolls/buns}     0.009150991
## [186] {waffles}                => {other vegetables} 0.010066090
## [187] {waffles}                => {whole milk}      0.012709710
## [188] {long life bakery product} => {chocolate}       0.005287239
## [189] {chocolate}              => {long life bakery product} 0.005287239
## [190] {long life bakery product} => {fruit/vegetable juice} 0.006202339
## [191] {long life bakery product} => {whipped/sour cream} 0.005795628
## [192] {long life bakery product} => {pastry}          0.005897306
## [193] {long life bakery product} => {shopping bags}  0.005388917

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## [194] {long life bakery product} => {sausage} 0.005388917
## [195] {long life bakery product} => {tropical fruit} 0.006304016
## [196] {long life bakery product} => {root vegetables} 0.005287239
## [197] {long life bakery product} => {soda} 0.007625826
## [198] {long life bakery product} => {yogurt} 0.008744281
## [199] {long life bakery product} => {rolls/buns} 0.007930859
## [200] {long life bakery product} => {other vegetables} 0.010676157
## [201] {long life bakery product} => {whole milk} 0.013523132
## [202] {dessert} => {curd} 0.005185562
## [203] {dessert} => {fruit/vegetable juice} 0.005998983
## [204] {dessert} => {pastry} 0.005388917
## [205] {dessert} => {shopping bags} 0.006202339
## [206] {dessert} => {sausage} 0.005897306
## [207] {dessert} => {bottled water} 0.005185562
## [208] {dessert} => {tropical fruit} 0.006304016
## [209] {dessert} => {root vegetables} 0.005795628
## [210] {dessert} => {soda} 0.009862735
## [211] {dessert} => {yogurt} 0.009862735
## [212] {dessert} => {rolls/buns} 0.006812405
## [213] {dessert} => {other vegetables} 0.011591256
## [214] {dessert} => {whole milk} 0.013726487
## [215] {canned beer} => {shopping bags} 0.011387900
## [216] {shopping bags} => {canned beer} 0.011387900
## [217] {canned beer} => {bottled water} 0.008032537
## [218] {canned beer} => {soda} 0.013828165
## [219] {canned beer} => {rolls/buns} 0.011286223
## [220] {canned beer} => {other vegetables} 0.009049314
## [221] {canned beer} => {whole milk} 0.008845958
## [222] {cream cheese } => {curd} 0.005083884
## [223] {cream cheese } => {domestic eggs} 0.005083884
## [224] {cream cheese } => {fruit/vegetable juice} 0.005693950
## [225] {cream cheese } => {whipped/sour cream} 0.006405694
## [226] {cream cheese } => {pip fruit} 0.006100661
## [227] {cream cheese } => {citrus fruit} 0.005693950
## [228] {cream cheese } => {shopping bags} 0.005592272
## [229] {cream cheese } => {sausage} 0.005592272
## [230] {cream cheese } => {bottled water} 0.005897306
## [231] {cream cheese } => {tropical fruit} 0.007219115
## [232] {cream cheese } => {root vegetables} 0.007524148
## [233] {cream cheese } => {soda} 0.006812405
## [234] {cream cheese } => {yogurt} 0.012404677
## [235] {cream cheese } => {rolls/buns} 0.009964413
## [236] {cream cheese } => {other vegetables} 0.013726487
## [237] {cream cheese } => {whole milk} 0.016471784
## [238] {chicken} => {frozen vegetables} 0.006710727
## [239] {frozen vegetables} => {chicken} 0.006710727
## [240] {chicken} => {pork} 0.005795628
## [241] {pork} => {chicken} 0.005795628
## [242] {chicken} => {butter} 0.005795628
## [243] {butter} => {chicken} 0.005795628
## [244] {chicken} => {newspapers} 0.005185562
## [245] {chicken} => {domestic eggs} 0.006202339
## [246] {chicken} => {whipped/sour cream} 0.007219115
## [247] {whipped/sour cream} => {chicken} 0.007219115

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## [248] {chicken}          => {citrus fruit}          0.006914082
## [249] {chicken}          => {sausage}              0.005287239
## [250] {chicken}          => {bottled water}        0.005287239
## [251] {chicken}          => {tropical fruit}       0.006405694
## [252] {chicken}          => {root vegetables}     0.010879512
## [253] {chicken}          => {soda}                  0.008337570
## [254] {chicken}          => {yogurt}                0.008337570
## [255] {chicken}          => {rolls/buns}          0.009659380
## [256] {chicken}          => {other vegetables}    0.017895272
## [257] {chicken}          => {whole milk}           0.017590239
## [258] {white bread}       => {frankfurter}          0.005185562
## [259] {white bread}       => {domestic eggs}         0.005795628
## [260] {white bread}       => {fruit/vegetable juice} 0.007422471
## [261] {fruit/vegetable juice} => {white bread}          0.007422471
## [262] {white bread}       => {whipped/sour cream}    0.005490595
## [263] {white bread}       => {pip fruit}             0.006609049
## [264] {white bread}       => {pastry}                0.005592272
## [265] {white bread}       => {shopping bags}        0.007422471
## [266] {white bread}       => {sausage}               0.007219115
## [267] {white bread}       => {tropical fruit}        0.008744281
## [268] {white bread}       => {root vegetables}      0.007930859
## [269] {white bread}       => {soda}                  0.010269446
## [270] {white bread}       => {yogurt}                0.009049314
## [271] {white bread}       => {rolls/buns}           0.006507372
## [272] {white bread}       => {other vegetables}     0.013726487
## [273] {white bread}       => {whole milk}            0.017081851
## [274] {chocolate}         => {butter}                0.006202339
## [275] {butter}            => {chocolate}            0.006202339
## [276] {chocolate}         => {newspapers}           0.005490595
## [277] {chocolate}         => {fruit/vegetable juice} 0.006812405
## [278] {chocolate}         => {pip fruit}             0.006100661
## [279] {chocolate}         => {pastry}                0.008032537
## [280] {chocolate}         => {citrus fruit}          0.006405694
## [281] {chocolate}         => {shopping bags}        0.008134215
## [282] {chocolate}         => {sausage}               0.006609049
## [283] {chocolate}         => {bottled water}         0.005795628
## [284] {chocolate}         => {tropical fruit}        0.008134215
## [285] {chocolate}         => {root vegetables}      0.006405694
## [286] {chocolate}         => {soda}                  0.013523132
## [287] {chocolate}         => {yogurt}                0.009252669
## [288] {chocolate}         => {rolls/buns}           0.011794611
## [289] {chocolate}         => {other vegetables}     0.012709710
## [290] {chocolate}         => {whole milk}            0.016675140
## [291] {coffee}             => {fruit/vegetable juice} 0.005998983
## [292] {coffee}             => {whipped/sour cream}    0.006100661
## [293] {coffee}             => {pip fruit}             0.006914082
## [294] {coffee}             => {pastry}                0.006914082
## [295] {coffee}             => {citrus fruit}          0.006405694
## [296] {coffee}             => {shopping bags}        0.009354347
## [297] {coffee}             => {sausage}               0.006914082
## [298] {coffee}             => {bottled water}         0.007320793
## [299] {coffee}             => {tropical fruit}        0.007117438
## [300] {coffee}             => {root vegetables}      0.007320793
## [301] {coffee}             => {soda}                  0.009964413

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## [302] {coffee}          => {yogurt}          0.009761057
## [303] {coffee}          => {rolls/buns}      0.010981190
## [304] {coffee}          => {other vegetables} 0.013421454
## [305] {coffee}          => {whole milk}       0.018708693
## [306] {frozen vegetables} => {pork}            0.006405694
## [307] {pork}            => {frozen vegetables} 0.006405694
## [308] {frozen vegetables} => {frankfurter}      0.005083884
## [309] {frozen vegetables} => {margarine}        0.005083884
## [310] {frozen vegetables} => {butter}           0.005795628
## [311] {butter}          => {frozen vegetables} 0.005795628
## [312] {frozen vegetables} => {domestic eggs}     0.005185562
## [313] {frozen vegetables} => {fruit/vegetable juice} 0.007829181
## [314] {fruit/vegetable juice} => {frozen vegetables} 0.007829181
## [315] {frozen vegetables} => {whipped/sour cream} 0.007930859
## [316] {whipped/sour cream} => {frozen vegetables} 0.007930859
## [317] {frozen vegetables} => {pip fruit}        0.007320793
## [318] {frozen vegetables} => {citrus fruit}      0.006609049
## [319] {frozen vegetables} => {sausage}          0.005998983
## [320] {frozen vegetables} => {bottled water}      0.006202339
## [321] {frozen vegetables} => {tropical fruit}    0.008744281
## [322] {frozen vegetables} => {root vegetables}   0.011591256
## [323] {root vegetables}  => {frozen vegetables} 0.011591256
## [324] {frozen vegetables} => {soda}             0.008642603
## [325] {frozen vegetables} => {yogurt}           0.012404677
## [326] {frozen vegetables} => {rolls/buns}       0.010167768
## [327] {frozen vegetables} => {other vegetables} 0.017793594
## [328] {frozen vegetables} => {whole milk}        0.020437214
## [329] {beef}              => {pork}            0.007625826
## [330] {pork}              => {beef}             0.007625826
## [331] {beef}              => {margarine}        0.006202339
## [332] {margarine}         => {beef}             0.006202339
## [333] {beef}              => {butter}           0.005795628
## [334] {butter}            => {beef}             0.005795628
## [335] {beef}              => {newspapers}       0.006405694
## [336] {beef}              => {domestic eggs}     0.005998983
## [337] {beef}              => {whipped/sour cream} 0.006710727
## [338] {beef}              => {pastry}           0.006304016
## [339] {beef}              => {citrus fruit}     0.008439248
## [340] {citrus fruit}      => {beef}             0.008439248
## [341] {beef}              => {sausage}          0.005592272
## [342] {beef}              => {bottled water}     0.006202339
## [343] {beef}              => {tropical fruit}   0.007625826
## [344] {beef}              => {root vegetables} 0.017386884
## [345] {root vegetables}  => {beef}             0.017386884
## [346] {beef}              => {soda}             0.008134215
## [347] {beef}              => {yogurt}           0.011692933
## [348] {beef}              => {rolls/buns}       0.013624809
## [349] {beef}              => {other vegetables} 0.019725470
## [350] {other vegetables} => {beef}             0.019725470
## [351] {beef}              => {whole milk}        0.021250635
## [352] {curd}              => {margarine}        0.006304016
## [353] {margarine}         => {curd}            0.006304016
## [354] {curd}              => {butter}           0.006812405
## [355] {butter}            => {curd}            0.006812405

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```

## [356] {curd}          => {newspapers}          0.005693950
## [357] {curd}          => {domestic eggs}       0.006507372
## [358] {domestic eggs} => {curd}                 0.006507372
## [359] {curd}          => {whipped/sour cream}  0.010472801
## [360] {whipped/sour cream} => {curd}               0.010472801
## [361] {curd}          => {pip fruit}           0.007829181
## [362] {pip fruit}      => {curd}                 0.007829181
## [363] {curd}          => {pastry}               0.007524148
## [364] {curd}          => {citrus fruit}         0.007117438
## [365] {curd}          => {shopping bags}        0.005388917
## [366] {curd}          => {sausage}              0.007625826
## [367] {curd}          => {bottled water}        0.006100661
## [368] {curd}          => {tropical fruit}       0.010269446
## [369] {curd}          => {root vegetables}      0.010879512
## [370] {curd}          => {soda}                 0.008134215
## [371] {curd}          => {yogurt}               0.017285206
## [372] {yogurt}         => {curd}                 0.017285206
## [373] {curd}          => {rolls/buns}           0.010066090
## [374] {curd}          => {other vegetables}     0.017183528
## [375] {curd}          => {whole milk}            0.026131164
## [376] {whole milk}     => {curd}                 0.026131164
## [377] {napkins}        => {newspapers}           0.006202339
## [378] {napkins}        => {domestic eggs}        0.005998983
## [379] {napkins}        => {fruit/vegetable juice} 0.006914082
## [380] {napkins}        => {whipped/sour cream}   0.007219115
## [381] {whipped/sour cream} => {napkins}            0.007219115
## [382] {napkins}        => {pip fruit}            0.006710727
## [383] {napkins}        => {pastry}               0.007015760
## [384] {napkins}        => {citrus fruit}          0.007625826
## [385] {napkins}        => {shopping bags}         0.007219115
## [386] {napkins}        => {sausage}              0.006710727
## [387] {napkins}        => {bottled water}         0.008642603
## [388] {napkins}        => {tropical fruit}        0.010066090
## [389] {napkins}        => {root vegetables}      0.009964413
## [390] {napkins}        => {soda}                 0.011997966
## [391] {napkins}        => {yogurt}               0.012302999
## [392] {napkins}        => {rolls/buns}           0.011692933
## [393] {napkins}        => {other vegetables}     0.014438231
## [394] {napkins}        => {whole milk}            0.019725470
## [395] {pork}           => {frankfurter}          0.005897306
## [396] {pork}           => {margarine}            0.006405694
## [397] {margarine}      => {pork}                 0.006405694
## [398] {pork}           => {newspapers}           0.006609049
## [399] {pork}           => {whipped/sour cream}   0.008235892
## [400] {whipped/sour cream} => {pork}               0.008235892
## [401] {pork}           => {pip fruit}            0.006100661
## [402] {pork}           => {pastry}               0.006304016
## [403] {pork}           => {citrus fruit}          0.006507372
## [404] {pork}           => {shopping bags}        0.006405694
## [405] {pork}           => {sausage}              0.006507372
## [406] {pork}           => {bottled water}         0.007422471
## [407] {pork}           => {tropical fruit}       0.008540925
## [408] {pork}           => {root vegetables}      0.013624809
## [409] {root vegetables} => {pork}                0.013624809

```

## [410] {pork}	=> {soda}	0.011896289
## [411] {pork}	=> {yogurt}	0.009557702
## [412] {pork}	=> {rolls/buns}	0.011286223
## [413] {pork}	=> {other vegetables}	0.021657346
## [414] {other vegetables}	=> {pork}	0.021657346
## [415] {pork}	=> {whole milk}	0.022165735
## [416] {frankfurter}	=> {brown bread}	0.007117438
## [417] {brown bread}	=> {frankfurter}	0.007117438
## [418] {frankfurter}	=> {margarine}	0.006405694
## [419] {margarine}	=> {frankfurter}	0.006405694
## [420] {frankfurter}	=> {domestic eggs}	0.007015760
## [421] {domestic eggs}	=> {frankfurter}	0.007015760
## [422] {frankfurter}	=> {whipped/sour cream}	0.006202339
## [423] {frankfurter}	=> {pip fruit}	0.007219115
## [424] {frankfurter}	=> {pastry}	0.008337570
## [425] {frankfurter}	=> {citrus fruit}	0.006507372
## [426] {frankfurter}	=> {shopping bags}	0.008235892
## [427] {frankfurter}	=> {sausage}	0.010066090
## [428] {sausage}	=> {frankfurter}	0.010066090
## [429] {frankfurter}	=> {bottled water}	0.007320793
## [430] {frankfurter}	=> {tropical fruit}	0.009456024
## [431] {frankfurter}	=> {root vegetables}	0.010167768
## [432] {frankfurter}	=> {soda}	0.011286223
## [433] {frankfurter}	=> {yogurt}	0.011184545
## [434] {frankfurter}	=> {rolls/buns}	0.019217082
## [435] {rolls/buns}	=> {frankfurter}	0.019217082
## [436] {frankfurter}	=> {other vegetables}	0.016471784
## [437] {frankfurter}	=> {whole milk}	0.020538892
## [438] {margarine}	=> {bottled beer}	0.006100661
## [439] {butter}	=> {bottled beer}	0.005795628
## [440] {bottled beer}	=> {bottled water}	0.015760041
## [441] {bottled water}	=> {bottled beer}	0.015760041
## [442] {bottled beer}	=> {tropical fruit}	0.008235892
## [443] {bottled beer}	=> {root vegetables}	0.009659380
## [444] {bottled beer}	=> {soda}	0.016980173
## [445] {bottled beer}	=> {yogurt}	0.009252669
## [446] {bottled beer}	=> {rolls/buns}	0.013624809
## [447] {bottled beer}	=> {other vegetables}	0.016166751
## [448] {bottled beer}	=> {whole milk}	0.020437214
## [449] {brown bread}	=> {margarine}	0.006507372
## [450] {margarine}	=> {brown bread}	0.006507372
## [451] {butter}	=> {brown bread}	0.005795628
## [452] {brown bread}	=> {newspapers}	0.007625826
## [453] {brown bread}	=> {domestic eggs}	0.006812405
## [454] {domestic eggs}	=> {brown bread}	0.006812405
## [455] {brown bread}	=> {fruit/vegetable juice}	0.008337570
## [456] {fruit/vegetable juice}	=> {brown bread}	0.008337570
## [457] {brown bread}	=> {pip fruit}	0.007625826
## [458] {pip fruit}	=> {brown bread}	0.007625826
## [459] {brown bread}	=> {pastry}	0.009659380
## [460] {pastry}	=> {brown bread}	0.009659380
## [461] {brown bread}	=> {citrus fruit}	0.008337570
## [462] {citrus fruit}	=> {brown bread}	0.008337570
## [463] {brown bread}	=> {shopping bags}	0.009252669

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## [464] {brown bread}          => {sausage}          0.010676157
## [465] {sausage}             => {brown bread}        0.010676157
## [466] {brown bread}          => {bottled water}       0.008235892
## [467] {brown bread}          => {tropical fruit}      0.010676157
## [468] {tropical fruit}       => {brown bread}        0.010676157
## [469] {brown bread}          => {root vegetables}     0.010167768
## [470] {brown bread}          => {soda}               0.012608033
## [471] {brown bread}          => {yogurt}              0.014539908
## [472] {yogurt}               => {brown bread}        0.014539908
## [473] {brown bread}          => {rolls/buns}         0.012608033
## [474] {brown bread}          => {other vegetables}   0.018708693
## [475] {brown bread}          => {whole milk}          0.025216065
## [476] {margarine}            => {butter}              0.006710727
## [477] {butter}               => {margarine}           0.006710727
## [478] {margarine}            => {newspapers}          0.007117438
## [479] {margarine}            => {domestic eggs}        0.008337570
## [480] {domestic eggs}         => {margarine}           0.008337570
## [481] {margarine}            => {fruit/vegetable juice} 0.006202339
## [482] {margarine}            => {whipped/sour cream}   0.006812405
## [483] {margarine}            => {pip fruit}           0.008540925
## [484] {pip fruit}             => {margarine}           0.008540925
## [485] {margarine}            => {pastry}              0.006812405
## [486] {margarine}            => {citrus fruit}         0.007930859
## [487] {margarine}            => {sausage}              0.007117438
## [488] {margarine}            => {bottled water}         0.010269446
## [489] {margarine}            => {tropical fruit}       0.009354347
## [490] {margarine}            => {root vegetables}     0.011082867
## [491] {root vegetables}       => {margarine}           0.011082867
## [492] {margarine}            => {soda}               0.010167768
## [493] {margarine}            => {yogurt}              0.014234875
## [494] {yogurt}               => {margarine}           0.014234875
## [495] {margarine}            => {rolls/buns}         0.014743264
## [496] {margarine}            => {other vegetables}   0.019725470
## [497] {other vegetables}     => {margarine}           0.019725470
## [498] {margarine}            => {whole milk}          0.024199288
## [499] {butter}               => {newspapers}          0.005795628
## [500] {butter}               => {domestic eggs}        0.009659380
## [501] {domestic eggs}         => {butter}              0.009659380
## [502] {butter}               => {fruit/vegetable juice} 0.008032537
## [503] {fruit/vegetable juice} => {butter}              0.008032537
## [504] {butter}               => {whipped/sour cream}   0.010167768
## [505] {whipped/sour cream}   => {butter}              0.010167768
## [506] {butter}               => {pip fruit}           0.007320793
## [507] {butter}               => {pastry}              0.007625826
## [508] {butter}               => {citrus fruit}         0.009150991
## [509] {citrus fruit}          => {butter}              0.009150991
## [510] {butter}               => {sausage}             0.008642603
## [511] {butter}               => {bottled water}        0.008947636
## [512] {butter}               => {tropical fruit}       0.009964413
## [513] {butter}               => {root vegetables}     0.012913066
## [514] {root vegetables}       => {butter}              0.012913066
## [515] {butter}               => {soda}               0.008845958
## [516] {butter}               => {yogurt}              0.014641586
## [517] {yogurt}               => {butter}              0.014641586

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## [518] {butter}          => {rolls/buns}          0.013421454
## [519] {butter}          => {other vegetables} 0.020030503
## [520] {other vegetables} => {butter}          0.020030503
## [521] {butter}          => {whole milk}         0.027554652
## [522] {whole milk}       => {butter}          0.027554652
## [523] {domestic eggs}   => {newspapers}        0.006914082
## [524] {newspapers}       => {fruit/vegetable juice} 0.008235892
## [525] {fruit/vegetable juice} => {newspapers}        0.008235892
## [526] {whipped/sour cream} => {newspapers}        0.007219115
## [527] {newspapers}       => {pastry}          0.008439248
## [528] {newspapers}       => {citrus fruit}       0.008337570
## [529] {citrus fruit}    => {newspapers}        0.008337570
## [530] {newspapers}       => {sausage}          0.008032537
## [531] {newspapers}       => {bottled water}      0.011286223
## [532] {bottled water}   => {newspapers}        0.011286223
## [533] {newspapers}       => {tropical fruit}    0.011794611
## [534] {tropical fruit}  => {newspapers}        0.011794611
## [535] {newspapers}       => {root vegetables}   0.011489578
## [536] {root vegetables} => {newspapers}        0.011489578
## [537] {newspapers}       => {soda}             0.014641586
## [538] {newspapers}       => {yogurt}           0.015353330
## [539] {yogurt}          => {newspapers}        0.015353330
## [540] {newspapers}       => {rolls/buns}        0.019725470
## [541] {rolls/buns}       => {newspapers}        0.019725470
## [542] {newspapers}       => {other vegetables} 0.019318760
## [543] {newspapers}       => {whole milk}         0.027351296
## [544] {whole milk}        => {newspapers}        0.027351296
## [545] {domestic eggs}   => {fruit/vegetable juice} 0.008032537
## [546] {fruit/vegetable juice} => {domestic eggs} 0.008032537
## [547] {domestic eggs}   => {whipped/sour cream} 0.009964413
## [548] {whipped/sour cream} => {domestic eggs} 0.009964413
## [549] {domestic eggs}   => {pip fruit}         0.008642603
## [550] {pip fruit}        => {domestic eggs} 0.008642603
## [551] {domestic eggs}   => {pastry}           0.009049314
## [552] {pastry}          => {domestic eggs} 0.009049314
## [553] {domestic eggs}   => {citrus fruit}       0.010371124
## [554] {citrus fruit}    => {domestic eggs} 0.010371124
## [555] {domestic eggs}   => {shopping bags}     0.009049314
## [556] {domestic eggs}   => {sausage}          0.009557702
## [557] {sausage}          => {domestic eggs} 0.009557702
## [558] {domestic eggs}   => {bottled water}      0.009150991
## [559] {domestic eggs}   => {tropical fruit}    0.011387900
## [560] {tropical fruit}  => {domestic eggs} 0.011387900
## [561] {domestic eggs}   => {root vegetables}   0.014336553
## [562] {root vegetables} => {domestic eggs} 0.014336553
## [563] {domestic eggs}   => {soda}             0.012404677
## [564] {domestic eggs}   => {yogurt}           0.014336553
## [565] {yogurt}          => {domestic eggs} 0.014336553
## [566] {domestic eggs}   => {rolls/buns}        0.015658363
## [567] {domestic eggs}   => {other vegetables} 0.022267412
## [568] {other vegetables} => {domestic eggs} 0.022267412
## [569] {domestic eggs}   => {whole milk}         0.029994916
## [570] {whole milk}        => {domestic eggs} 0.029994916
## [571] {fruit/vegetable juice} => {whipped/sour cream} 0.009049314

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## [572] {whipped/sour cream} => {fruit/vegetable juice} 0.009049314
## [573] {fruit/vegetable juice} => {pip fruit} 0.009557702
## [574] {pip fruit} => {fruit/vegetable juice} 0.009557702
## [575] {fruit/vegetable juice} => {pastry} 0.008540925
## [576] {fruit/vegetable juice} => {citrus fruit} 0.010371124
## [577] {citrus fruit} => {fruit/vegetable juice} 0.010371124
## [578] {fruit/vegetable juice} => {shopping bags} 0.010676157
## [579] {shopping bags} => {fruit/vegetable juice} 0.010676157
## [580] {fruit/vegetable juice} => {sausage} 0.010066090
## [581] {sausage} => {fruit/vegetable juice} 0.010066090
## [582] {fruit/vegetable juice} => {bottled water} 0.014234875
## [583] {bottled water} => {fruit/vegetable juice} 0.014234875
## [584] {fruit/vegetable juice} => {tropical fruit} 0.013726487
## [585] {tropical fruit} => {fruit/vegetable juice} 0.013726487
## [586] {fruit/vegetable juice} => {root vegetables} 0.011997966
## [587] {root vegetables} => {fruit/vegetable juice} 0.011997966
## [588] {fruit/vegetable juice} => {soda} 0.018403660
## [589] {soda} => {fruit/vegetable juice} 0.018403660
## [590] {fruit/vegetable juice} => {yogurt} 0.018708693
## [591] {yogurt} => {fruit/vegetable juice} 0.018708693
## [592] {fruit/vegetable juice} => {rolls/buns} 0.014539908
## [593] {fruit/vegetable juice} => {other vegetables} 0.021047280
## [594] {other vegetables} => {fruit/vegetable juice} 0.021047280
## [595] {fruit/vegetable juice} => {whole milk} 0.026639553
## [596] {whole milk} => {fruit/vegetable juice} 0.026639553
## [597] {whipped/sour cream} => {pip fruit} 0.009252669
## [598] {pip fruit} => {whipped/sour cream} 0.009252669
## [599] {whipped/sour cream} => {pastry} 0.007524148
## [600] {whipped/sour cream} => {citrus fruit} 0.010879512
## [601] {citrus fruit} => {whipped/sour cream} 0.010879512
## [602] {whipped/sour cream} => {shopping bags} 0.007930859
## [603] {whipped/sour cream} => {sausage} 0.009049314
## [604] {whipped/sour cream} => {bottled water} 0.008744281
## [605] {whipped/sour cream} => {tropical fruit} 0.013828165
## [606] {tropical fruit} => {whipped/sour cream} 0.013828165
## [607] {whipped/sour cream} => {root vegetables} 0.017081851
## [608] {root vegetables} => {whipped/sour cream} 0.017081851
## [609] {whipped/sour cream} => {soda} 0.011591256
## [610] {whipped/sour cream} => {yogurt} 0.020742247
## [611] {yogurt} => {whipped/sour cream} 0.020742247
## [612] {whipped/sour cream} => {rolls/buns} 0.014641586
## [613] {whipped/sour cream} => {other vegetables} 0.028876462
## [614] {other vegetables} => {whipped/sour cream} 0.028876462
## [615] {whipped/sour cream} => {whole milk} 0.032231825
## [616] {whole milk} => {whipped/sour cream} 0.032231825
## [617] {pip fruit} => {pastry} 0.010676157
## [618] {pastry} => {pip fruit} 0.010676157
## [619] {pip fruit} => {citrus fruit} 0.013828165
## [620] {citrus fruit} => {pip fruit} 0.013828165
## [621] {pip fruit} => {shopping bags} 0.009354347
## [622] {pip fruit} => {sausage} 0.010777834
## [623] {sausage} => {pip fruit} 0.010777834
## [624] {pip fruit} => {bottled water} 0.010574479
## [625] {pip fruit} => {tropical fruit} 0.020437214

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## [626] {tropical fruit}          => {pip fruit}          0.020437214
## [627] {pip fruit}              => {root vegetables} 0.015556685
## [628] {root vegetables}        => {pip fruit}          0.015556685
## [629] {pip fruit}              => {soda}               0.013319776
## [630] {pip fruit}              => {yogurt}             0.017996950
## [631] {yogurt}                => {pip fruit}          0.017996950
## [632] {pip fruit}              => {rolls/buns}        0.013929842
## [633] {pip fruit}              => {other vegetables} 0.026131164
## [634] {other vegetables}       => {pip fruit}          0.026131164
## [635] {pip fruit}              => {whole milk}         0.030096594
## [636] {whole milk}             => {pip fruit}          0.030096594
## [637] {pastry}                => {citrus fruit}       0.009761057
## [638] {citrus fruit}           => {pastry}             0.009761057
## [639] {pastry}                => {shopping bags}     0.011896289
## [640] {shopping bags}          => {pastry}             0.011896289
## [641] {pastry}                => {sausage}            0.012506355
## [642] {sausage}               => {pastry}             0.012506355
## [643] {pastry}                => {bottled water}      0.008947636
## [644] {pastry}                => {tropical fruit}    0.013218099
## [645] {tropical fruit}         => {pastry}             0.013218099
## [646] {pastry}                => {root vegetables}  0.010981190
## [647] {root vegetables}        => {pastry}             0.010981190
## [648] {pastry}                => {soda}               0.021047280
## [649] {soda}                  => {pastry}             0.021047280
## [650] {pastry}                => {yogurt}             0.017691917
## [651] {yogurt}                => {pastry}             0.017691917
## [652] {pastry}                => {rolls/buns}        0.020945602
## [653] {rolls/buns}            => {pastry}             0.020945602
## [654] {pastry}                => {other vegetables} 0.022572445
## [655] {other vegetables}       => {pastry}             0.022572445
## [656] {pastry}                => {whole milk}         0.033248602
## [657] {whole milk}             => {pastry}             0.033248602
## [658] {citrus fruit}           => {shopping bags}     0.009761057
## [659] {citrus fruit}           => {sausage}            0.011286223
## [660] {sausage}               => {citrus fruit}       0.011286223
## [661] {citrus fruit}           => {bottled water}      0.013523132
## [662] {bottled water}          => {citrus fruit}       0.013523132
## [663] {citrus fruit}           => {tropical fruit}    0.019928826
## [664] {tropical fruit}         => {citrus fruit}       0.019928826
## [665] {citrus fruit}           => {root vegetables}  0.017691917
## [666] {root vegetables}        => {citrus fruit}       0.017691917
## [667] {citrus fruit}           => {soda}               0.012811388
## [668] {citrus fruit}           => {yogurt}             0.021657346
## [669] {yogurt}                => {citrus fruit}       0.021657346
## [670] {citrus fruit}           => {rolls/buns}        0.016776817
## [671] {citrus fruit}           => {other vegetables} 0.028876462
## [672] {other vegetables}       => {citrus fruit}       0.028876462
## [673] {citrus fruit}           => {whole milk}         0.030503305
## [674] {whole milk}             => {citrus fruit}       0.030503305
## [675] {shopping bags}          => {sausage}            0.015658363
## [676] {sausage}               => {shopping bags}     0.015658363
## [677] {shopping bags}          => {bottled water}      0.010981190
## [678] {shopping bags}          => {tropical fruit}    0.013523132
## [679] {tropical fruit}         => {shopping bags}     0.013523132

```

## [680] {shopping bags}	=> {root vegetables}	0.012811388
## [681] {root vegetables}	=> {shopping bags}	0.012811388
## [682] {shopping bags}	=> {soda}	0.024605999
## [683] {soda}	=> {shopping bags}	0.024605999
## [684] {shopping bags}	=> {yogurt}	0.015251652
## [685] {yogurt}	=> {shopping bags}	0.015251652
## [686] {shopping bags}	=> {rolls/buns}	0.019522115
## [687] {rolls/buns}	=> {shopping bags}	0.019522115
## [688] {shopping bags}	=> {other vegetables}	0.023182511
## [689] {other vegetables}	=> {shopping bags}	0.023182511
## [690] {shopping bags}	=> {whole milk}	0.024504321
## [691] {sausage}	=> {bottled water}	0.011997966
## [692] {bottled water}	=> {sausage}	0.011997966
## [693] {sausage}	=> {tropical fruit}	0.013929842
## [694] {tropical fruit}	=> {sausage}	0.013929842
## [695] {sausage}	=> {root vegetables}	0.014946619
## [696] {root vegetables}	=> {sausage}	0.014946619
## [697] {sausage}	=> {soda}	0.024300966
## [698] {soda}	=> {sausage}	0.024300966
## [699] {sausage}	=> {yogurt}	0.019623793
## [700] {yogurt}	=> {sausage}	0.019623793
## [701] {sausage}	=> {rolls/buns}	0.030604982
## [702] {rolls/buns}	=> {sausage}	0.030604982
## [703] {sausage}	=> {other vegetables}	0.026944586
## [704] {other vegetables}	=> {sausage}	0.026944586
## [705] {sausage}	=> {whole milk}	0.029893238
## [706] {whole milk}	=> {sausage}	0.029893238
## [707] {bottled water}	=> {tropical fruit}	0.018505338
## [708] {tropical fruit}	=> {bottled water}	0.018505338
## [709] {bottled water}	=> {root vegetables}	0.015658363
## [710] {root vegetables}	=> {bottled water}	0.015658363
## [711] {bottled water}	=> {soda}	0.028978139
## [712] {soda}	=> {bottled water}	0.028978139
## [713] {bottled water}	=> {yogurt}	0.022979156
## [714] {yogurt}	=> {bottled water}	0.022979156
## [715] {bottled water}	=> {rolls/buns}	0.024199288
## [716] {rolls/buns}	=> {bottled water}	0.024199288
## [717] {bottled water}	=> {other vegetables}	0.024809354
## [718] {other vegetables}	=> {bottled water}	0.024809354
## [719] {bottled water}	=> {whole milk}	0.034367056
## [720] {whole milk}	=> {bottled water}	0.034367056
## [721] {tropical fruit}	=> {root vegetables}	0.021047280
## [722] {root vegetables}	=> {tropical fruit}	0.021047280
## [723] {tropical fruit}	=> {soda}	0.020843925
## [724] {soda}	=> {tropical fruit}	0.020843925
## [725] {tropical fruit}	=> {yogurt}	0.029283172
## [726] {yogurt}	=> {tropical fruit}	0.029283172
## [727] {tropical fruit}	=> {rolls/buns}	0.024605999
## [728] {rolls/buns}	=> {tropical fruit}	0.024605999
## [729] {tropical fruit}	=> {other vegetables}	0.035892222
## [730] {other vegetables}	=> {tropical fruit}	0.035892222
## [731] {tropical fruit}	=> {whole milk}	0.042297916
## [732] {whole milk}	=> {tropical fruit}	0.042297916
## [733] {root vegetables}	=> {soda}	0.018607016

```

## [734] {soda}                                => {root vegetables} 0.018607016
## [735] {root vegetables}                    => {yogurt}          0.025826131
## [736] {yogurt}                             => {root vegetables} 0.025826131
## [737] {root vegetables}                    => {rolls/buns}      0.024300966
## [738] {rolls/buns}                         => {root vegetables} 0.024300966
## [739] {root vegetables}                    => {other vegetables} 0.047381800
## [740] {other vegetables}                  => {root vegetables} 0.047381800
## [741] {root vegetables}                    => {whole milk}      0.048906965
## [742] {whole milk}                         => {root vegetables} 0.048906965
## [743] {soda}                               => {yogurt}          0.027351296
## [744] {yogurt}                            => {soda}            0.027351296
## [745] {soda}                               => {rolls/buns}      0.038332486
## [746] {rolls/buns}                        => {soda}            0.038332486
## [747] {soda}                               => {other vegetables} 0.032740214
## [748] {other vegetables}                 => {soda}            0.032740214
## [749] {soda}                               => {whole milk}      0.040061007
## [750] {whole milk}                        => {soda}            0.040061007
## [751] {yogurt}                            => {rolls/buns}      0.034367056
## [752] {rolls/buns}                        => {yogurt}          0.034367056
## [753] {yogurt}                            => {other vegetables} 0.043416370
## [754] {other vegetables}                 => {yogurt}          0.043416370
## [755] {yogurt}                            => {whole milk}      0.056024403
## [756] {whole milk}                        => {yogurt}          0.056024403
## [757] {rolls/buns}                        => {other vegetables} 0.042602949
## [758] {other vegetables}                 => {rolls/buns}      0.042602949
## [759] {rolls/buns}                        => {whole milk}      0.056634469
## [760] {whole milk}                        => {rolls/buns}      0.056634469
## [761] {other vegetables}                 => {whole milk}      0.074834774
## [762] {whole milk}                        => {other vegetables} 0.074834774

##      confidence coverage   lift   count
## [1]  0.1105236 1.00000000 1.0000000 1087
## [2]  0.1049314 1.00000000 1.0000000 1032
## [3]  0.1089985 1.00000000 1.0000000 1072
## [4]  0.1743772 1.00000000 1.0000000 1715
## [5]  0.1395018 1.00000000 1.0000000 1372
## [6]  0.1839349 1.00000000 1.0000000 1809
## [7]  0.1934926 1.00000000 1.0000000 1903
## [8]  0.2555160 1.00000000 1.0000000 2513
## [9]  0.4230769 0.01321810 1.6557746  55
## [10] 0.3410405 0.01759024 1.7625502  59
## [11] 0.3005780 0.01759024 1.1763569  52
## [12] 0.4322034 0.01199797 1.6914924  51
## [13] 0.4000000 0.01728521 1.5654596  68
## [14] 0.2560386 0.02104728 1.4683033  53
## [15] 0.2415459 0.02104728 0.9453259  50
## [16] 0.3378378 0.01504830 1.7459985  50
## [17] 0.4054054 0.01504830 1.5866145  60
## [18] 0.4312500 0.01626843 3.9564774  69
## [19] 0.4750000 0.01626843 2.4548739  76
## [20] 0.4750000 0.01626843 1.8589833  76
## [21] 0.3190184 0.01657346 1.8294729  52
## [22] 0.3312883 0.01657346 1.7121497  54
## [23] 0.4233129 0.01657346 1.6566981  69
## [24] 0.2931034 0.01769192 1.5148042  51

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## [25] 0.4022989 0.01769192 1.5744565 70
## [26] 0.2109375 0.02602949 1.5120775 54
## [27] 0.2070312 0.02602949 1.1255679 53
## [28] 0.1992188 0.02602949 1.0295935 51
## [29] 0.2617188 0.02602949 1.0242753 67
## [30] 0.2439024 0.02501271 1.3987058 60
## [31] 0.2032520 0.02501271 1.0504381 50
## [32] 0.2357724 0.02501271 0.9227303 58
## [33] 0.3333333 0.01921708 1.7227185 63
## [34] 0.4656085 0.01921708 1.8222281 88
## [35] 0.3579545 0.01789527 1.8499648 63
## [36] 0.3977273 0.01789527 1.5565650 70
## [37] 0.4137931 0.01769192 2.1385471 72
## [38] 0.5229885 0.01769192 2.0467935 91
## [39] 0.3625731 0.01738688 1.8738342 62
## [40] 0.4853801 0.01738688 1.8996074 83
## [41] 0.3511905 0.01708185 2.5174623 59
## [42] 0.3154762 0.01708185 1.7151511 53
## [43] 0.4166667 0.01708185 2.1533981 70
## [44] 0.4404762 0.01708185 1.7238692 74
## [45] 0.2639405 0.02735130 1.5136181 71
## [46] 0.2044610 0.02735130 1.1115940 55
## [47] 0.2044610 0.02735130 1.0566861 55
## [48] 0.2379182 0.02735130 0.9311284 64
## [49] 0.1863799 0.02836807 1.6863354 52
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## [51] 0.1971326 0.02836807 1.0188120 55
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## [53] 0.2727273 0.02236909 2.5991015 60
## [54] 0.4045455 0.02236909 2.0907538 89
## [55] 0.3272727 0.02236909 1.2808306 72
## [56] 0.2663755 0.02328419 1.9094778 61
## [57] 0.2794760 0.02328419 1.4443753 64
## [58] 0.3799127 0.02328419 1.4868448 87
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## [60] 0.1839465 0.03040163 1.0000629 55
## [61] 0.2006689 0.03040163 1.0370881 60
## [62] 0.2642140 0.03040163 1.0340410 79
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## [65] 0.2125984 0.02582613 1.2191869 54
## [66] 0.2047244 0.02582613 1.4675398 52
## [67] 0.2677165 0.02582613 1.4554959 68
## [68] 0.3858268 0.02582613 1.9940128 98
## [69] 0.3858268 0.02582613 1.5099906 98
## [70] 0.1935484 0.02836807 1.8445236 54
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## [72] 0.2186380 0.02836807 1.5672774 61
## [73] 0.2652330 0.02836807 1.3707653 74
## [74] 0.3476703 0.02836807 1.3606593 97
## [75] 0.2116183 0.02450432 2.2524519 51
## [76] 0.2282158 0.02450432 2.0937519 55
## [77] 0.2614108 0.02450432 1.8738886 63
## [78] 0.2406639 0.02450432 1.3084187 58

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## [79] 0.3858921 0.02450432 1.9943505 93
## [80] 0.4107884 0.02450432 1.6076815 99
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## [82] 0.1963636 0.02796136 1.8713531 54
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## [84] 0.3054545 0.02796136 2.1896104 84
## [85] 0.2727273 0.02796136 1.4827378 75
## [86] 0.3709091 0.02796136 1.9169159 102
## [87] 0.4145455 0.02796136 1.6223854 114
## [88] 0.1802721 0.02989324 1.7180002 53
## [89] 0.2891156 0.02989324 1.6579897 85
## [90] 0.1836735 0.02989324 1.3166389 54
## [91] 0.2380952 0.02989324 1.2944537 70
## [92] 0.2312925 0.02989324 1.1953557 68
## [93] 0.2755102 0.02989324 1.0782502 81
## [94] 0.1953125 0.02602949 4.6398513 50
## [95] 0.1207729 0.04209456 4.6398513 50
## [96] 0.2070312 0.02602949 1.9730158 53
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## [99] 0.3515625 0.02602949 1.8169297 90
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## [118] 0.4021739 0.02806304 1.5739675 111
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## [132] 0.2018349 0.03324860 1.9234941 66

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## [240] 0.1350711 0.04290798 2.3428998 57

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## [711] 0.2621895 0.11052364 1.5035766 285
## [712] 0.1661808 0.17437722 1.5035766 285
## [713] 0.2079117 0.11052364 1.4903873 226
## [714] 0.1647230 0.13950178 1.4903873 226
## [715] 0.2189512 0.11052364 1.1903734 238
## [716] 0.1315644 0.18393493 1.1903734 238
## [717] 0.2244710 0.11052364 1.1601012 244
## [718] 0.1282186 0.19349263 1.1601012 244
## [719] 0.3109476 0.11052364 1.2169396 338
## [720] 0.1345006 0.25551601 1.2169396 338
## [721] 0.2005814 0.10493137 1.8402220 207
## [722] 0.1930970 0.10899847 1.8402220 207
## [723] 0.1986434 0.10493137 1.1391592 205
## [724] 0.1195335 0.17437722 1.1391592 205
## [725] 0.2790698 0.10493137 2.0004746 288
## [726] 0.2099125 0.13950178 2.0004746 288

```

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## [727] 0.2344961 0.10493137 1.2748863 242
## [728] 0.1337756 0.18393493 1.2748863 242
## [729] 0.3420543 0.10493137 1.7677896 353
## [730] 0.1854966 0.19349263 1.7677896 353
## [731] 0.4031008 0.10493137 1.5775950 416
## [732] 0.1655392 0.25551601 1.5775950 416
## [733] 0.1707090 0.10899847 0.9789636 183
## [734] 0.1067055 0.17437722 0.9789636 183
## [735] 0.2369403 0.10899847 1.6984751 254
## [736] 0.1851312 0.13950178 1.6984751 254
## [737] 0.2229478 0.10899847 1.2121013 239
## [738] 0.1321172 0.18393493 1.2121013 239
## [739] 0.4347015 0.10899847 2.2466049 466
## [740] 0.2448765 0.19349263 2.2466049 466
## [741] 0.4486940 0.10899847 1.7560310 481
## [742] 0.1914047 0.25551601 1.7560310 481
## [743] 0.1568513 0.17437722 1.1243678 269
## [744] 0.1960641 0.13950178 1.1243678 269
## [745] 0.2198251 0.17437722 1.1951242 377
## [746] 0.2084024 0.18393493 1.1951242 377
## [747] 0.1877551 0.17437722 0.9703476 322
## [748] 0.1692065 0.19349263 0.9703476 322
## [749] 0.2297376 0.17437722 0.8991124 394
## [750] 0.1567847 0.25551601 0.8991124 394
## [751] 0.2463557 0.13950178 1.3393633 338
## [752] 0.1868436 0.18393493 1.3393633 338
## [753] 0.3112245 0.13950178 1.6084566 427
## [754] 0.2243826 0.19349263 1.6084566 427
## [755] 0.4016035 0.13950178 1.5717351 551
## [756] 0.2192598 0.25551601 1.5717351 551
## [757] 0.2316197 0.18393493 1.1970465 419
## [758] 0.2201787 0.19349263 1.1970465 419
## [759] 0.3079049 0.18393493 1.2050318 557
## [760] 0.2216474 0.25551601 1.2050318 557
## [761] 0.3867578 0.19349263 1.5136341 736
## [762] 0.2928770 0.25551601 1.5136341 736

##      lhs                      rhs          support
## [1]  {}          => {bottled water} 0.110523640
## [2]  {}          => {tropical fruit} 0.104931368
## [3]  {}          => {root vegetables} 0.108998475
## [4]  {}          => {soda}          0.174377224
## [5]  {}          => {yogurt}        0.139501779
## [6]  {}          => {rolls/buns}   0.183934926
## [7]  {}          => {other vegetables} 0.193492628
## [8]  {}          => {whole milk}    0.255516014
## [9]  {cake bar}  => {whole milk}    0.005592272
## [10] {dishes}    => {other vegetables} 0.005998983
## [11] {dishes}    => {whole milk}    0.005287239
## [12] {mustard}   => {whole milk}    0.005185562
## [13] {pot plants}=> {whole milk}    0.006914082
## [14] {chewing gum}=> {soda}          0.005388917
## [15] {chewing gum}=> {whole milk}    0.005083884
## [16] {canned fish}=> {other vegetables} 0.005083884

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## [17] {pasta}          => {whole milk}          0.006100661
## [18] {herbs}          => {root vegetables} 0.007015760
## [19] {herbs}          => {other vegetables} 0.007727504
## [20] {herbs}          => {whole milk}          0.007727504
## [21] {processed cheese} => {soda}              0.005287239
## [22] {processed cheese} => {other vegetables} 0.005490595
## [23] {processed cheese} => {whole milk}          0.007015760
## [24] {semi-finished bread} => {other vegetables} 0.005185562
## [25] {semi-finished bread} => {whole milk}          0.007117438
## [26] {beverages}        => {yogurt}             0.005490595
## [27] {beverages}        => {rolls/buns}        0.005388917
## [28] {beverages}        => {other vegetables} 0.005185562
## [29] {beverages}        => {whole milk}          0.006812405
## [30] {ice cream}        => {soda}              0.006100661
## [31] {ice cream}        => {other vegetables} 0.005083884
## [32] {ice cream}        => {whole milk}          0.005897306
## [33] {detergent}        => {other vegetables} 0.006405694
## [34] {detergent}        => {whole milk}          0.008947636
## [35] {pickled vegetables} => {other vegetables} 0.006405694
## [36] {pickled vegetables} => {whole milk}          0.007117438
## [37] {baking powder}     => {other vegetables} 0.007320793
## [38] {baking powder}     => {whole milk}          0.009252669
## [39] {flour}             => {other vegetables} 0.006304016
## [40] {flour}             => {whole milk}          0.008439248
## [41] {soft cheese}       => {yogurt}             0.005998983
## [42] {soft cheese}       => {rolls/buns}        0.005388917
## [43] {soft cheese}       => {other vegetables} 0.007117438
## [44] {soft cheese}       => {whole milk}          0.007524148
## [45] {specialty bar}     => {soda}              0.007219115
## [46] {specialty bar}     => {rolls/buns}        0.005592272
## [47] {specialty bar}     => {other vegetables} 0.005592272
## [48] {specialty bar}     => {whole milk}          0.006507372
## [49] {misc. beverages}   => {bottled water}      0.005287239
## [50] {misc. beverages}   => {soda}              0.007320793
## [51] {misc. beverages}   => {other vegetables} 0.005592272
## [52] {misc. beverages}   => {whole milk}          0.007015760
## [53] {grapes}             => {tropical fruit}    0.006100661
## [54] {grapes}             => {other vegetables} 0.009049314
## [55] {grapes}             => {whole milk}          0.007320793
## [56] {cat food}           => {yogurt}             0.006202339
## [57] {cat food}           => {other vegetables} 0.006507372
## [58] {cat food}           => {whole milk}          0.008845958
## [59] {specialty chocolate} => {soda}              0.006304016
## [60] {specialty chocolate} => {rolls/buns}        0.005592272
## [61] {specialty chocolate} => {other vegetables} 0.006100661
## [62] {specialty chocolate} => {whole milk}          0.008032537
## [63] {meat}                => {sausage}           0.005287239
## [64] {meat}                => {root vegetables} 0.005083884
## [65] {meat}                => {soda}              0.005490595
## [66] {meat}                => {yogurt}             0.005287239
## [67] {meat}                => {rolls/buns}        0.006914082
## [68] {meat}                => {other vegetables} 0.009964413
## [69] {meat}                => {whole milk}          0.009964413
## [70] {frozen meals}        => {tropical fruit}    0.005490595

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## [71] {frozen meals}          => {soda}           0.006202339
## [72] {frozen meals}          => {yogurt}          0.006202339
## [73] {frozen meals}          => {other vegetables} 0.007524148
## [74] {frozen meals}          => {whole milk}       0.009862735
## [75] {hard cheese}          => {sausage}         0.005185562
## [76] {hard cheese}          => {root vegetables} 0.005592272
## [77] {hard cheese}          => {yogurt}          0.006405694
## [78] {hard cheese}          => {rolls/buns}       0.005897306
## [79] {hard cheese}          => {other vegetables} 0.009456024
## [80] {hard cheese}          => {whole milk}       0.010066090
## [81] {butter milk}          => {pip fruit}        0.005083884
## [82] {butter milk}          => {tropical fruit}   0.005490595
## [83] {butter milk}          => {root vegetables} 0.005083884
## [84] {butter milk}          => {yogurt}          0.008540925
## [85] {butter milk}          => {rolls/buns}       0.007625826
## [86] {butter milk}          => {other vegetables} 0.010371124
## [87] {butter milk}          => {whole milk}       0.011591256
## [88] {candy}                => {tropical fruit}   0.005388917
## [89] {candy}                => {soda}           0.008642603
## [90] {candy}                => {yogurt}          0.005490595
## [91] {candy}                => {rolls/buns}       0.007117438
## [92] {candy}                => {other vegetables} 0.006914082
## [93] {candy}                => {whole milk}       0.008235892
## [94] {ham}                  => {white bread}      0.005083884
## [95] {white bread}          => {ham}             0.005083884
## [96] {ham}                  => {tropical fruit}   0.005388917
## [97] {ham}                  => {yogurt}          0.006710727
## [98] {ham}                  => {rolls/buns}       0.006914082
## [99] {ham}                  => {other vegetables} 0.009150991
## [100] {ham}                 => {whole milk}       0.011489578
## [101] {sliced cheese}       => {sausage}         0.007015760
## [102] {sliced cheese}       => {tropical fruit}   0.005287239
## [103] {sliced cheese}       => {root vegetables} 0.005592272
## [104] {sliced cheese}       => {soda}           0.005083884
## [105] {sliced cheese}       => {yogurt}          0.008032537
## [106] {sliced cheese}       => {rolls/buns}       0.007625826
## [107] {sliced cheese}       => {other vegetables} 0.009049314
## [108] {sliced cheese}       => {whole milk}       0.010777834
## [109] {UHT-milk}           => {bottled water}     0.007320793
## [110] {UHT-milk}           => {soda}           0.007625826
## [111] {UHT-milk}           => {yogurt}          0.007422471
## [112] {UHT-milk}           => {rolls/buns}       0.006405694
## [113] {UHT-milk}           => {other vegetables} 0.008134215
## [114] {oil}                 => {root vegetables} 0.007015760
## [115] {oil}                 => {yogurt}          0.005287239
## [116] {oil}                 => {rolls/buns}       0.005083884
## [117] {oil}                 => {other vegetables} 0.009964413
## [118] {oil}                 => {whole milk}       0.011286223
## [119] {onions}              => {whipped/sour cream} 0.005083884
## [120] {onions}              => {citrus fruit}      0.005592272
## [121] {onions}              => {bottled water}     0.005897306
## [122] {onions}              => {tropical fruit}   0.005693950
## [123] {onions}              => {root vegetables} 0.009456024
## [124] {onions}              => {soda}           0.005287239

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## [125] {onions}          => {yogurt}          0.007219115
## [126] {onions}          => {rolls/buns}      0.006812405
## [127] {onions}          => {other vegetables} 0.014234875
## [128] {onions}          => {whole milk}       0.012099644
## [129] {berries}         => {whipped/sour cream} 0.009049314
## [130] {whipped/sour cream} => {berries}         0.009049314
## [131] {berries}         => {citrus fruit}      0.005388917
## [132] {berries}         => {tropical fruit}    0.006710727
## [133] {berries}         => {root vegetables}   0.006609049
## [134] {berries}         => {soda}             0.007320793
## [135] {berries}         => {yogurt}           0.010574479
## [136] {berries}         => {rolls/buns}       0.006609049
## [137] {berries}         => {other vegetables} 0.010269446
## [138] {berries}         => {whole milk}       0.011794611
## [139] {hamburger meat}  => {sausage}          0.005185562
## [140] {hamburger meat}  => {root vegetables}   0.006202339
## [141] {hamburger meat}  => {soda}             0.005795628
## [142] {hamburger meat}  => {yogurt}           0.006507372
## [143] {hamburger meat}  => {rolls/buns}       0.008642603
## [144] {hamburger meat}  => {other vegetables} 0.013828165
## [145] {hamburger meat}  => {whole milk}       0.014743264
## [146] {hygiene articles} => {napkins}          0.006100661
## [147] {napkins}         => {hygiene articles} 0.006100661
## [148] {hygiene articles} => {citrus fruit}      0.005287239
## [149] {hygiene articles} => {shopping bags}     0.005185562
## [150] {hygiene articles} => {bottled water}     0.005693950
## [151] {hygiene articles} => {tropical fruit}    0.006710727
## [152] {hygiene articles} => {root vegetables}   0.005388917
## [153] {hygiene articles} => {soda}             0.007015760
## [154] {hygiene articles} => {yogurt}           0.007320793
## [155] {hygiene articles} => {rolls/buns}       0.005897306
## [156] {hygiene articles} => {other vegetables} 0.009557702
## [157] {hygiene articles} => {whole milk}       0.012811388
## [158] {salty snack}      => {fruit/vegetable juice} 0.005998983
## [159] {salty snack}      => {whipped/sour cream} 0.005185562
## [160] {salty snack}      => {pastry}          0.005185562
## [161] {salty snack}      => {shopping bags}     0.005998983
## [162] {salty snack}      => {sausage}          0.005287239
## [163] {salty snack}      => {tropical fruit}    0.005592272
## [164] {salty snack}      => {soda}             0.009354347
## [165] {salty snack}      => {yogurt}           0.006202339
## [166] {salty snack}      => {other vegetables} 0.010777834
## [167] {salty snack}      => {whole milk}       0.011184545
## [168] {sugar}             => {margarine}        0.005490595
## [169] {sugar}             => {pastry}          0.005185562
## [170] {sugar}             => {root vegetables}   0.006405694
## [171] {sugar}             => {soda}             0.007320793
## [172] {sugar}             => {yogurt}           0.006914082
## [173] {sugar}             => {rolls/buns}       0.007015760
## [174] {sugar}             => {other vegetables} 0.010777834
## [175] {sugar}             => {whole milk}       0.015048297
## [176] {waffles}           => {chocolate}        0.005795628
## [177] {chocolate}         => {waffles}          0.005795628
## [178] {waffles}           => {whipped/sour cream} 0.005083884

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## [179] {waffles}          => {pastry}          0.007015760
## [180] {waffles}          => {shopping bags} 0.005490595
## [181] {waffles}          => {tropical fruit} 0.006100661
## [182] {waffles}          => {root vegetables} 0.006609049
## [183] {waffles}          => {soda}            0.009557702
## [184] {waffles}          => {yogurt}          0.007524148
## [185] {waffles}          => {rolls/buns}    0.009150991
## [186] {waffles}          => {other vegetables} 0.010066090
## [187] {waffles}          => {whole milk}     0.012709710
## [188] {long life bakery product} => {chocolate} 0.005287239
## [189] {chocolate}         => {long life bakery product} 0.005287239
## [190] {long life bakery product} => {fruit/vegetable juice} 0.006202339
## [191] {long life bakery product} => {whipped/sour cream} 0.005795628
## [192] {long life bakery product} => {pastry}          0.005897306
## [193] {long life bakery product} => {shopping bags} 0.005388917
## [194] {long life bakery product} => {sausage}         0.005388917
## [195] {long life bakery product} => {tropical fruit} 0.006304016
## [196] {long life bakery product} => {root vegetables} 0.005287239
## [197] {long life bakery product} => {soda}            0.007625826
## [198] {long life bakery product} => {yogurt}          0.008744281
## [199] {long life bakery product} => {rolls/buns}    0.007930859
## [200] {long life bakery product} => {other vegetables} 0.010676157
## [201] {long life bakery product} => {whole milk}     0.013523132
## [202] {dessert}          => {curd}            0.005185562
## [203] {dessert}          => {fruit/vegetable juice} 0.005998983
## [204] {dessert}          => {pastry}          0.005388917
## [205] {dessert}          => {shopping bags} 0.006202339
## [206] {dessert}          => {sausage}         0.005897306
## [207] {dessert}          => {bottled water}   0.005185562
## [208] {dessert}          => {tropical fruit} 0.006304016
## [209] {dessert}          => {root vegetables} 0.005795628
## [210] {dessert}          => {soda}            0.009862735
## [211] {dessert}          => {yogurt}          0.009862735
## [212] {dessert}          => {rolls/buns}    0.006812405
## [213] {dessert}          => {other vegetables} 0.011591256
## [214] {dessert}          => {whole milk}     0.013726487
## [215] {canned beer}      => {shopping bags} 0.011387900
## [216] {shopping bags}    => {canned beer}    0.011387900
## [217] {canned beer}      => {bottled water}   0.008032537
## [218] {canned beer}      => {soda}            0.013828165
## [219] {canned beer}      => {rolls/buns}    0.011286223
## [220] {canned beer}      => {other vegetables} 0.009049314
## [221] {cream cheese }    => {curd}            0.005083884
## [222] {cream cheese }    => {domestic eggs}   0.005083884
## [223] {cream cheese }    => {fruit/vegetable juice} 0.005693950
## [224] {cream cheese }    => {whipped/sour cream} 0.006405694
## [225] {cream cheese }    => {pip fruit}      0.006100661
## [226] {cream cheese }    => {citrus fruit}    0.005693950
## [227] {cream cheese }    => {shopping bags} 0.005592272
## [228] {cream cheese }    => {sausage}         0.005592272
## [229] {cream cheese }    => {bottled water}   0.005897306
## [230] {cream cheese }    => {tropical fruit} 0.007219115
## [231] {cream cheese }    => {root vegetables} 0.007524148
## [232] {cream cheese }    => {soda}            0.006812405

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## [233] {cream cheese }          => {yogurt}          0.012404677
## [234] {cream cheese }          => {rolls/buns}      0.009964413
## [235] {cream cheese }          => {other vegetables} 0.013726487
## [236] {cream cheese }          => {whole milk}       0.016471784
## [237] {chicken}                => {frozen vegetables} 0.006710727
## [238] {frozen vegetables}      => {chicken}          0.006710727
## [239] {chicken}                => {pork}             0.005795628
## [240] {pork}                   => {chicken}          0.005795628
## [241] {chicken}                => {butter}            0.005795628
## [242] {butter}                 => {chicken}          0.005795628
## [243] {chicken}                => {newspapers}        0.005185562
## [244] {chicken}                => {domestic eggs}     0.006202339
## [245] {chicken}                => {whipped/sour cream} 0.007219115
## [246] {whipped/sour cream}     => {chicken}          0.007219115
## [247] {chicken}                => {citrus fruit}      0.006914082
## [248] {chicken}                => {sausage}           0.005287239
## [249] {chicken}                => {bottled water}      0.005287239
## [250] {chicken}                => {tropical fruit}     0.006405694
## [251] {chicken}                => {root vegetables}    0.010879512
## [252] {chicken}                => {soda}              0.008337570
## [253] {chicken}                => {yogurt}            0.008337570
## [254] {chicken}                => {rolls/buns}        0.009659380
## [255] {chicken}                => {other vegetables} 0.017895272
## [256] {chicken}                => {whole milk}         0.017590239
## [257] {white bread}            => {frankfurter}        0.005185562
## [258] {white bread}            => {domestic eggs}      0.005795628
## [259] {white bread}            => {fruit/vegetable juice} 0.007422471
## [260] {fruit/vegetable juice}  => {white bread}        0.007422471
## [261] {white bread}            => {whipped/sour cream} 0.005490595
## [262] {white bread}            => {pip fruit}          0.006609049
## [263] {white bread}            => {pastry}             0.005592272
## [264] {white bread}            => {shopping bags}       0.007422471
## [265] {white bread}            => {sausage}            0.007219115
## [266] {white bread}            => {tropical fruit}      0.008744281
## [267] {white bread}            => {root vegetables}    0.007930859
## [268] {white bread}            => {soda}                0.010269446
## [269] {white bread}            => {yogurt}              0.009049314
## [270] {white bread}            => {rolls/buns}          0.006507372
## [271] {white bread}            => {other vegetables} 0.013726487
## [272] {white bread}            => {whole milk}          0.017081851
## [273] {chocolate}              => {butter}             0.006202339
## [274] {butter}                 => {chocolate}          0.006202339
## [275] {chocolate}              => {newspapers}          0.005490595
## [276] {chocolate}              => {fruit/vegetable juice} 0.006812405
## [277] {chocolate}              => {pip fruit}           0.006100661
## [278] {chocolate}              => {pastry}              0.008032537
## [279] {chocolate}              => {citrus fruit}         0.006405694
## [280] {chocolate}              => {shopping bags}        0.008134215
## [281] {chocolate}              => {sausage}             0.006609049
## [282] {chocolate}              => {bottled water}        0.005795628
## [283] {chocolate}              => {tropical fruit}       0.008134215
## [284] {chocolate}              => {root vegetables}    0.006405694
## [285] {chocolate}              => {soda}                0.013523132
## [286] {chocolate}              => {yogurt}              0.009252669

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```

## [287] {chocolate}          => {rolls/buns}          0.011794611
## [288] {chocolate}          => {other vegetables} 0.012709710
## [289] {chocolate}          => {whole milk}          0.016675140
## [290] {coffee}             => {fruit/vegetable juice} 0.005998983
## [291] {coffee}             => {whipped/sour cream} 0.006100661
## [292] {coffee}             => {pip fruit}          0.006914082
## [293] {coffee}             => {pastry}             0.006914082
## [294] {coffee}             => {citrus fruit}        0.006405694
## [295] {coffee}             => {shopping bags}       0.009354347
## [296] {coffee}             => {sausage}            0.006914082
## [297] {coffee}             => {bottled water}        0.007320793
## [298] {coffee}             => {tropical fruit}      0.007117438
## [299] {coffee}             => {root vegetables}     0.007320793
## [300] {coffee}             => {soda}                0.009964413
## [301] {coffee}             => {yogurt}              0.009761057
## [302] {coffee}             => {rolls/buns}          0.010981190
## [303] {coffee}             => {other vegetables} 0.013421454
## [304] {coffee}             => {whole milk}          0.018708693
## [305] {frozen vegetables} => {pork}                0.006405694
## [306] {pork}               => {frozen vegetables} 0.006405694
## [307] {frozen vegetables} => {frankfurter}          0.005083884
## [308] {frozen vegetables} => {margarine}            0.005083884
## [309] {frozen vegetables} => {butter}               0.005795628
## [310] {butter}             => {frozen vegetables} 0.005795628
## [311] {frozen vegetables} => {domestic eggs}        0.005185562
## [312] {frozen vegetables} => {fruit/vegetable juice} 0.007829181
## [313] {fruit/vegetable juice} => {frozen vegetables} 0.007829181
## [314] {frozen vegetables} => {whipped/sour cream} 0.007930859
## [315] {whipped/sour cream} => {frozen vegetables} 0.007930859
## [316] {frozen vegetables} => {pip fruit}            0.007320793
## [317] {frozen vegetables} => {citrus fruit}          0.006609049
## [318] {frozen vegetables} => {sausage}              0.005998983
## [319] {frozen vegetables} => {bottled water}         0.006202339
## [320] {frozen vegetables} => {tropical fruit}       0.008744281
## [321] {frozen vegetables} => {root vegetables}      0.011591256
## [322] {root vegetables}   => {frozen vegetables} 0.011591256
## [323] {frozen vegetables} => {soda}                 0.008642603
## [324] {frozen vegetables} => {yogurt}               0.012404677
## [325] {frozen vegetables} => {rolls/buns}          0.010167768
## [326] {frozen vegetables} => {other vegetables} 0.017793594
## [327] {frozen vegetables} => {whole milk}           0.020437214
## [328] {beef}               => {pork}                0.007625826
## [329] {pork}               => {beef}                0.007625826
## [330] {beef}               => {margarine}           0.006202339
## [331] {margarine}          => {beef}                0.006202339
## [332] {beef}               => {butter}              0.005795628
## [333] {butter}             => {beef}                0.005795628
## [334] {beef}               => {newspapers}          0.006405694
## [335] {beef}               => {domestic eggs}        0.005998983
## [336] {beef}               => {whipped/sour cream} 0.006710727
## [337] {beef}               => {pastry}              0.006304016
## [338] {beef}               => {citrus fruit}         0.008439248
## [339] {citrus fruit}        => {beef}                0.008439248
## [340] {beef}               => {sausage}             0.005592272

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## [341] {beef}                                => {bottled water}          0.006202339
## [342] {beef}                                => {tropical fruit}        0.007625826
## [343] {beef}                                => {root vegetables}       0.017386884
## [344] {root vegetables}                      => {beef}                  0.017386884
## [345] {beef}                                => {soda}                  0.008134215
## [346] {beef}                                => {yogurt}                0.011692933
## [347] {beef}                                => {rolls/buns}            0.013624809
## [348] {beef}                                => {other vegetables}      0.019725470
## [349] {other vegetables}                     => {beef}                  0.019725470
## [350] {beef}                                => {whole milk}            0.021250635
## [351] {curd}                                => {margarine}             0.006304016
## [352] {margarine}                           => {curd}                  0.006304016
## [353] {curd}                                => {butter}                0.006812405
## [354] {butter}                             => {curd}                  0.006812405
## [355] {curd}                                => {newspapers}            0.005693950
## [356] {curd}                                => {domestic eggs}          0.006507372
## [357] {domestic eggs}                      => {curd}                  0.006507372
## [358] {curd}                                => {whipped/sour cream}     0.010472801
## [359] {whipped/sour cream}                   => {curd}                  0.010472801
## [360] {curd}                                => {pip fruit}             0.007829181
## [361] {pip fruit}                           => {curd}                  0.007829181
## [362] {curd}                                => {pastry}                0.007524148
## [363] {curd}                                => {citrus fruit}           0.007117438
## [364] {curd}                                => {shopping bags}          0.005388917
## [365] {curd}                                => {sausage}                0.007625826
## [366] {curd}                                => {bottled water}           0.006100661
## [367] {curd}                                => {tropical fruit}          0.010269446
## [368] {curd}                                => {root vegetables}        0.010879512
## [369] {curd}                                => {soda}                  0.008134215
## [370] {curd}                                => {yogurt}                0.017285206
## [371] {yogurt}                             => {curd}                  0.017285206
## [372] {curd}                                => {rolls/buns}             0.010066090
## [373] {curd}                                => {other vegetables}       0.017183528
## [374] {curd}                                => {whole milk}             0.026131164
## [375] {whole milk}                           => {curd}                  0.026131164
## [376] {napkins}                            => {newspapers}             0.006202339
## [377] {napkins}                           => {domestic eggs}           0.005998983
## [378] {napkins}                           => {fruit/vegetable juice}  0.006914082
## [379] {napkins}                           => {whipped/sour cream}     0.007219115
## [380] {whipped/sour cream}                   => {napkins}                0.007219115
## [381] {napkins}                           => {pip fruit}              0.006710727
## [382] {napkins}                           => {pastry}                 0.007015760
## [383] {napkins}                           => {citrus fruit}            0.007625826
## [384] {napkins}                           => {shopping bags}          0.007219115
## [385] {napkins}                           => {sausage}                 0.006710727
## [386] {napkins}                           => {bottled water}            0.008642603
## [387] {napkins}                           => {tropical fruit}          0.010066090
## [388] {napkins}                           => {root vegetables}         0.009964413
## [389] {napkins}                           => {soda}                  0.011997966
## [390] {napkins}                           => {yogurt}                0.012302999
## [391] {napkins}                           => {rolls/buns}             0.011692933
## [392] {napkins}                           => {other vegetables}       0.014438231
## [393] {napkins}                           => {whole milk}              0.019725470
## [394] {pork}                                => {frankfurter}            0.005897306

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## [395] {pork}                                => {margarine}          0.006405694
## [396] {margarine}                           => {pork}              0.006405694
## [397] {pork}                                => {newspapers}         0.006609049
## [398] {pork}                                => {whipped/sour cream} 0.008235892
## [399] {whipped/sour cream}                  => {pork}              0.008235892
## [400] {pork}                                => {pip fruit}         0.006100661
## [401] {pork}                                => {pastry}             0.006304016
## [402] {pork}                                => {citrus fruit}       0.006507372
## [403] {pork}                                => {shopping bags}     0.006405694
## [404] {pork}                                => {sausage}            0.006507372
## [405] {pork}                                => {bottled water}      0.007422471
## [406] {pork}                                => {tropical fruit}    0.008540925
## [407] {pork}                                => {root vegetables}   0.013624809
## [408] {root vegetables}                     => {pork}              0.013624809
## [409] {pork}                                => {soda}               0.011896289
## [410] {pork}                                => {yogurt}             0.009557702
## [411] {pork}                                => {rolls/buns}         0.011286223
## [412] {pork}                                => {other vegetables}  0.021657346
## [413] {other vegetables}                   => {pork}              0.021657346
## [414] {pork}                                => {whole milk}         0.022165735
## [415] {frankfurter}                          => {brown bread}        0.007117438
## [416] {brown bread}                          => {frankfurter}        0.007117438
## [417] {frankfurter}                          => {margarine}          0.006405694
## [418] {margarine}                           => {frankfurter}        0.006405694
## [419] {frankfurter}                          => {domestic eggs}      0.007015760
## [420] {domestic eggs}                       => {frankfurter}        0.007015760
## [421] {frankfurter}                          => {whipped/sour cream} 0.006202339
## [422] {frankfurter}                          => {pip fruit}          0.007219115
## [423] {frankfurter}                          => {pastry}             0.008337570
## [424] {frankfurter}                          => {citrus fruit}       0.006507372
## [425] {frankfurter}                          => {shopping bags}     0.008235892
## [426] {frankfurter}                          => {sausage}            0.010066090
## [427] {sausage}                            => {frankfurter}        0.010066090
## [428] {frankfurter}                          => {bottled water}      0.007320793
## [429] {frankfurter}                          => {tropical fruit}    0.009456024
## [430] {frankfurter}                          => {root vegetables}   0.010167768
## [431] {frankfurter}                          => {soda}               0.011286223
## [432] {frankfurter}                          => {yogurt}             0.011184545
## [433] {frankfurter}                          => {rolls/buns}         0.019217082
## [434] {rolls/buns}                          => {frankfurter}        0.019217082
## [435] {frankfurter}                          => {other vegetables}  0.016471784
## [436] {frankfurter}                          => {whole milk}         0.020538892
## [437] {margarine}                           => {bottled beer}        0.006100661
## [438] {butter}                             => {bottled beer}        0.005795628
## [439] {bottled beer}                         => {bottled water}       0.015760041
## [440] {bottled water}                        => {bottled beer}        0.015760041
## [441] {bottled beer}                        => {tropical fruit}    0.008235892
## [442] {bottled beer}                        => {root vegetables}   0.009659380
## [443] {bottled beer}                        => {soda}               0.016980173
## [444] {bottled beer}                        => {yogurt}             0.009252669
## [445] {bottled beer}                        => {rolls/buns}         0.013624809
## [446] {bottled beer}                        => {other vegetables}  0.016166751
## [447] {bottled beer}                        => {whole milk}         0.020437214
## [448] {brown bread}                         => {margarine}          0.006507372

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## [449] {margarine}          => {brown bread}          0.006507372
## [450] {butter}             => {brown bread}          0.005795628
## [451] {brown bread}        => {newspapers}           0.007625826
## [452] {brown bread}        => {domestic eggs}        0.006812405
## [453] {domestic eggs}      => {brown bread}          0.006812405
## [454] {brown bread}        => {fruit/vegetable juice} 0.008337570
## [455] {fruit/vegetable juice} => {brown bread}          0.008337570
## [456] {brown bread}        => {pip fruit}           0.007625826
## [457] {pip fruit}          => {brown bread}          0.007625826
## [458] {brown bread}        => {pastry}              0.009659380
## [459] {pastry}              => {brown bread}          0.009659380
## [460] {brown bread}        => {citrus fruit}         0.008337570
## [461] {citrus fruit}       => {brown bread}          0.008337570
## [462] {brown bread}        => {shopping bags}        0.009252669
## [463] {brown bread}        => {sausage}             0.010676157
## [464] {sausage}             => {brown bread}          0.010676157
## [465] {brown bread}        => {bottled water}         0.008235892
## [466] {brown bread}        => {tropical fruit}        0.010676157
## [467] {tropical fruit}     => {brown bread}          0.010676157
## [468] {brown bread}        => {root vegetables}       0.010167768
## [469] {brown bread}        => {soda}                 0.012608033
## [470] {brown bread}        => {yogurt}               0.014539908
## [471] {yogurt}              => {brown bread}          0.014539908
## [472] {brown bread}        => {rolls/buns}           0.012608033
## [473] {brown bread}        => {other vegetables}      0.018708693
## [474] {brown bread}        => {whole milk}            0.025216065
## [475] {margarine}           => {butter}               0.006710727
## [476] {butter}              => {margarine}            0.006710727
## [477] {margarine}           => {newspapers}           0.007117438
## [478] {margarine}           => {domestic eggs}         0.008337570
## [479] {domestic eggs}       => {margarine}            0.008337570
## [480] {margarine}           => {fruit/vegetable juice} 0.006202339
## [481] {margarine}           => {whipped/sour cream}     0.006812405
## [482] {margarine}           => {pip fruit}            0.008540925
## [483] {pip fruit}          => {margarine}            0.008540925
## [484] {margarine}           => {pastry}              0.006812405
## [485] {margarine}           => {citrus fruit}          0.007930859
## [486] {margarine}           => {sausage}              0.007117438
## [487] {margarine}           => {bottled water}          0.010269446
## [488] {margarine}           => {tropical fruit}        0.009354347
## [489] {margarine}           => {root vegetables}       0.011082867
## [490] {root vegetables}     => {margarine}            0.011082867
## [491] {margarine}           => {soda}                 0.010167768
## [492] {margarine}           => {yogurt}               0.014234875
## [493] {yogurt}              => {margarine}            0.014234875
## [494] {margarine}           => {rolls/buns}           0.014743264
## [495] {margarine}           => {other vegetables}      0.019725470
## [496] {other vegetables}    => {margarine}            0.019725470
## [497] {margarine}           => {whole milk}            0.024199288
## [498] {butter}              => {newspapers}           0.005795628
## [499] {butter}              => {domestic eggs}         0.009659380
## [500] {domestic eggs}       => {butter}               0.009659380
## [501] {butter}              => {fruit/vegetable juice} 0.008032537
## [502] {fruit/vegetable juice} => {butter}               0.008032537

```

```

## [503] {butter} => {whipped/sour cream} 0.010167768
## [504] {whipped/sour cream} => {butter} 0.010167768
## [505] {butter} => {pip fruit} 0.007320793
## [506] {butter} => {pastry} 0.007625826
## [507] {butter} => {citrus fruit} 0.009150991
## [508] {citrus fruit} => {butter} 0.009150991
## [509] {butter} => {sausage} 0.008642603
## [510] {butter} => {bottled water} 0.008947636
## [511] {butter} => {tropical fruit} 0.009964413
## [512] {butter} => {root vegetables} 0.012913066
## [513] {root vegetables} => {butter} 0.012913066
## [514] {butter} => {soda} 0.008845958
## [515] {butter} => {yogurt} 0.014641586
## [516] {yogurt} => {butter} 0.014641586
## [517] {butter} => {rolls/buns} 0.013421454
## [518] {butter} => {other vegetables} 0.020030503
## [519] {other vegetables} => {butter} 0.020030503
## [520] {butter} => {whole milk} 0.027554652
## [521] {whole milk} => {butter} 0.027554652
## [522] {domestic eggs} => {newspapers} 0.006914082
## [523] {newspapers} => {fruit/vegetable juice} 0.008235892
## [524] {fruit/vegetable juice} => {newspapers} 0.008235892
## [525] {whipped/sour cream} => {newspapers} 0.007219115
## [526] {newspapers} => {pastry} 0.008439248
## [527] {newspapers} => {citrus fruit} 0.008337570
## [528] {citrus fruit} => {newspapers} 0.008337570
## [529] {newspapers} => {sausage} 0.008032537
## [530] {newspapers} => {bottled water} 0.011286223
## [531] {bottled water} => {newspapers} 0.011286223
## [532] {newspapers} => {tropical fruit} 0.011794611
## [533] {tropical fruit} => {newspapers} 0.011794611
## [534] {newspapers} => {root vegetables} 0.011489578
## [535] {root vegetables} => {newspapers} 0.011489578
## [536] {newspapers} => {soda} 0.014641586
## [537] {newspapers} => {yogurt} 0.015353330
## [538] {yogurt} => {newspapers} 0.015353330
## [539] {newspapers} => {rolls/buns} 0.019725470
## [540] {rolls/buns} => {newspapers} 0.019725470
## [541] {newspapers} => {other vegetables} 0.019318760
## [542] {newspapers} => {whole milk} 0.027351296
## [543] {whole milk} => {newspapers} 0.027351296
## [544] {domestic eggs} => {fruit/vegetable juice} 0.008032537
## [545] {fruit/vegetable juice} => {domestic eggs} 0.008032537
## [546] {domestic eggs} => {whipped/sour cream} 0.009964413
## [547] {whipped/sour cream} => {domestic eggs} 0.009964413
## [548] {domestic eggs} => {pip fruit} 0.008642603
## [549] {pip fruit} => {domestic eggs} 0.008642603
## [550] {domestic eggs} => {pastry} 0.009049314
## [551] {pastry} => {domestic eggs} 0.009049314
## [552] {domestic eggs} => {citrus fruit} 0.010371124
## [553] {citrus fruit} => {domestic eggs} 0.010371124
## [554] {domestic eggs} => {shopping bags} 0.009049314
## [555] {domestic eggs} => {sausage} 0.009557702
## [556] {sausage} => {domestic eggs} 0.009557702

```

## [557] {domestic eggs}	=> {bottled water}	0.009150991
## [558] {domestic eggs}	=> {tropical fruit}	0.011387900
## [559] {tropical fruit}	=> {domestic eggs}	0.011387900
## [560] {domestic eggs}	=> {root vegetables}	0.014336553
## [561] {root vegetables}	=> {domestic eggs}	0.014336553
## [562] {domestic eggs}	=> {soda}	0.012404677
## [563] {domestic eggs}	=> {yogurt}	0.014336553
## [564] {yogurt}	=> {domestic eggs}	0.014336553
## [565] {domestic eggs}	=> {rolls/buns}	0.015658363
## [566] {domestic eggs}	=> {other vegetables}	0.022267412
## [567] {other vegetables}	=> {domestic eggs}	0.022267412
## [568] {domestic eggs}	=> {whole milk}	0.029994916
## [569] {whole milk}	=> {domestic eggs}	0.029994916
## [570] {fruit/vegetable juice}	=> {whipped/sour cream}	0.009049314
## [571] {whipped/sour cream}	=> {fruit/vegetable juice}	0.009049314
## [572] {fruit/vegetable juice}	=> {pip fruit}	0.009557702
## [573] {pip fruit}	=> {fruit/vegetable juice}	0.009557702
## [574] {fruit/vegetable juice}	=> {pastry}	0.008540925
## [575] {fruit/vegetable juice}	=> {citrus fruit}	0.010371124
## [576] {citrus fruit}	=> {fruit/vegetable juice}	0.010371124
## [577] {fruit/vegetable juice}	=> {shopping bags}	0.010676157
## [578] {shopping bags}	=> {fruit/vegetable juice}	0.010676157
## [579] {fruit/vegetable juice}	=> {sausage}	0.010066090
## [580] {sausage}	=> {fruit/vegetable juice}	0.010066090
## [581] {fruit/vegetable juice}	=> {bottled water}	0.014234875
## [582] {bottled water}	=> {fruit/vegetable juice}	0.014234875
## [583] {fruit/vegetable juice}	=> {tropical fruit}	0.013726487
## [584] {tropical fruit}	=> {fruit/vegetable juice}	0.013726487
## [585] {fruit/vegetable juice}	=> {root vegetables}	0.011997966
## [586] {root vegetables}	=> {fruit/vegetable juice}	0.011997966
## [587] {fruit/vegetable juice}	=> {soda}	0.018403660
## [588] {soda}	=> {fruit/vegetable juice}	0.018403660
## [589] {fruit/vegetable juice}	=> {yogurt}	0.018708693
## [590] {yogurt}	=> {fruit/vegetable juice}	0.018708693
## [591] {fruit/vegetable juice}	=> {rolls/buns}	0.014539908
## [592] {fruit/vegetable juice}	=> {other vegetables}	0.021047280
## [593] {other vegetables}	=> {fruit/vegetable juice}	0.021047280
## [594] {fruit/vegetable juice}	=> {whole milk}	0.026639553
## [595] {whole milk}	=> {fruit/vegetable juice}	0.026639553
## [596] {whipped/sour cream}	=> {pip fruit}	0.009252669
## [597] {pip fruit}	=> {whipped/sour cream}	0.009252669
## [598] {whipped/sour cream}	=> {pastry}	0.007524148
## [599] {whipped/sour cream}	=> {citrus fruit}	0.010879512
## [600] {citrus fruit}	=> {whipped/sour cream}	0.010879512
## [601] {whipped/sour cream}	=> {shopping bags}	0.007930859
## [602] {whipped/sour cream}	=> {sausage}	0.009049314
## [603] {whipped/sour cream}	=> {bottled water}	0.008744281
## [604] {whipped/sour cream}	=> {tropical fruit}	0.013828165
## [605] {tropical fruit}	=> {whipped/sour cream}	0.013828165
## [606] {whipped/sour cream}	=> {root vegetables}	0.017081851
## [607] {root vegetables}	=> {whipped/sour cream}	0.017081851
## [608] {whipped/sour cream}	=> {soda}	0.011591256
## [609] {whipped/sour cream}	=> {yogurt}	0.020742247
## [610] {yogurt}	=> {whipped/sour cream}	0.020742247

## [611] {whipped/sour cream}	=> {rolls/buns}	0.014641586
## [612] {whipped/sour cream}	=> {other vegetables}	0.028876462
## [613] {other vegetables}	=> {whipped/sour cream}	0.028876462
## [614] {whipped/sour cream}	=> {whole milk}	0.032231825
## [615] {whole milk}	=> {whipped/sour cream}	0.032231825
## [616] {pip fruit}	=> {pastry}	0.010676157
## [617] {pastry}	=> {pip fruit}	0.010676157
## [618] {pip fruit}	=> {citrus fruit}	0.013828165
## [619] {citrus fruit}	=> {pip fruit}	0.013828165
## [620] {pip fruit}	=> {shopping bags}	0.009354347
## [621] {pip fruit}	=> {sausage}	0.010777834
## [622] {sausage}	=> {pip fruit}	0.010777834
## [623] {pip fruit}	=> {bottled water}	0.010574479
## [624] {pip fruit}	=> {tropical fruit}	0.020437214
## [625] {tropical fruit}	=> {pip fruit}	0.020437214
## [626] {pip fruit}	=> {root vegetables}	0.015556685
## [627] {root vegetables}	=> {pip fruit}	0.015556685
## [628] {pip fruit}	=> {soda}	0.013319776
## [629] {pip fruit}	=> {yogurt}	0.017996950
## [630] {yogurt}	=> {pip fruit}	0.017996950
## [631] {pip fruit}	=> {rolls/buns}	0.013929842
## [632] {pip fruit}	=> {other vegetables}	0.026131164
## [633] {other vegetables}	=> {pip fruit}	0.026131164
## [634] {pip fruit}	=> {whole milk}	0.030096594
## [635] {whole milk}	=> {pip fruit}	0.030096594
## [636] {pastry}	=> {citrus fruit}	0.009761057
## [637] {citrus fruit}	=> {pastry}	0.009761057
## [638] {pastry}	=> {shopping bags}	0.011896289
## [639] {shopping bags}	=> {pastry}	0.011896289
## [640] {pastry}	=> {sausage}	0.012506355
## [641] {sausage}	=> {pastry}	0.012506355
## [642] {pastry}	=> {bottled water}	0.008947636
## [643] {pastry}	=> {tropical fruit}	0.013218099
## [644] {tropical fruit}	=> {pastry}	0.013218099
## [645] {pastry}	=> {root vegetables}	0.010981190
## [646] {root vegetables}	=> {pastry}	0.010981190
## [647] {pastry}	=> {soda}	0.021047280
## [648] {soda}	=> {pastry}	0.021047280
## [649] {pastry}	=> {yogurt}	0.017691917
## [650] {yogurt}	=> {pastry}	0.017691917
## [651] {pastry}	=> {rolls/buns}	0.020945602
## [652] {rolls/buns}	=> {pastry}	0.020945602
## [653] {pastry}	=> {other vegetables}	0.022572445
## [654] {other vegetables}	=> {pastry}	0.022572445
## [655] {pastry}	=> {whole milk}	0.033248602
## [656] {whole milk}	=> {pastry}	0.033248602
## [657] {citrus fruit}	=> {shopping bags}	0.009761057
## [658] {citrus fruit}	=> {sausage}	0.011286223
## [659] {sausage}	=> {citrus fruit}	0.011286223
## [660] {citrus fruit}	=> {bottled water}	0.013523132
## [661] {bottled water}	=> {citrus fruit}	0.013523132
## [662] {citrus fruit}	=> {tropical fruit}	0.019928826
## [663] {tropical fruit}	=> {citrus fruit}	0.019928826
## [664] {citrus fruit}	=> {root vegetables}	0.017691917

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## [665] {root vegetables}          => {citrus fruit}          0.017691917
## [666] {citrus fruit}           => {soda}                  0.012811388
## [667] {citrus fruit}           => {yogurt}                0.021657346
## [668] {yogurt}                 => {citrus fruit}          0.021657346
## [669] {citrus fruit}           => {rolls/buns}           0.016776817
## [670] {citrus fruit}           => {other vegetables}    0.028876462
## [671] {other vegetables}      => {citrus fruit}          0.028876462
## [672] {citrus fruit}           => {whole milk}           0.030503305
## [673] {whole milk}             => {citrus fruit}          0.030503305
## [674] {shopping bags}          => {sausage}               0.015658363
## [675] {sausage}                => {shopping bags}        0.015658363
## [676] {shopping bags}          => {bottled water}         0.010981190
## [677] {shopping bags}          => {tropical fruit}        0.013523132
## [678] {tropical fruit}         => {shopping bags}        0.013523132
## [679] {shopping bags}          => {root vegetables}      0.012811388
## [680] {root vegetables}        => {shopping bags}        0.012811388
## [681] {shopping bags}          => {soda}                  0.024605999
## [682] {soda}                   => {shopping bags}        0.024605999
## [683] {shopping bags}          => {yogurt}                0.015251652
## [684] {yogurt}                 => {shopping bags}        0.015251652
## [685] {shopping bags}          => {rolls/buns}           0.019522115
## [686] {rolls/buns}             => {shopping bags}        0.019522115
## [687] {shopping bags}          => {other vegetables}    0.023182511
## [688] {other vegetables}      => {shopping bags}        0.023182511
## [689] {shopping bags}          => {whole milk}           0.024504321
## [690] {sausage}                => {bottled water}         0.011997966
## [691] {bottled water}          => {sausage}               0.011997966
## [692] {sausage}                => {tropical fruit}        0.013929842
## [693] {tropical fruit}         => {sausage}               0.013929842
## [694] {sausage}                => {root vegetables}      0.014946619
## [695] {root vegetables}        => {sausage}               0.014946619
## [696] {sausage}                => {soda}                  0.024300966
## [697] {soda}                   => {sausage}               0.024300966
## [698] {sausage}                => {yogurt}                0.019623793
## [699] {yogurt}                 => {sausage}               0.019623793
## [700] {sausage}                => {rolls/buns}           0.030604982
## [701] {rolls/buns}             => {sausage}               0.030604982
## [702] {sausage}                => {other vegetables}    0.026944586
## [703] {other vegetables}      => {sausage}               0.026944586
## [704] {sausage}                => {whole milk}           0.029893238
## [705] {whole milk}             => {sausage}               0.029893238
## [706] {bottled water}          => {tropical fruit}        0.018505338
## [707] {tropical fruit}         => {bottled water}          0.018505338
## [708] {bottled water}          => {root vegetables}      0.015658363
## [709] {root vegetables}        => {bottled water}          0.015658363
## [710] {bottled water}          => {soda}                  0.028978139
## [711] {soda}                   => {bottled water}          0.028978139
## [712] {bottled water}          => {yogurt}                0.022979156
## [713] {yogurt}                 => {bottled water}          0.022979156
## [714] {bottled water}          => {rolls/buns}           0.024199288
## [715] {rolls/buns}             => {bottled water}          0.024199288
## [716] {bottled water}          => {other vegetables}    0.024809354
## [717] {other vegetables}      => {bottled water}          0.024809354
## [718] {bottled water}          => {whole milk}           0.034367056

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## [719] {whole milk}          => {bottled water}          0.034367056
## [720] {tropical fruit}     => {root vegetables}      0.021047280
## [721] {root vegetables}     => {tropical fruit}        0.021047280
## [722] {tropical fruit}     => {soda}                  0.020843925
## [723] {soda}                => {tropical fruit}        0.020843925
## [724] {tropical fruit}     => {yogurt}                0.029283172
## [725] {yogurt}              => {tropical fruit}        0.029283172
## [726] {tropical fruit}     => {rolls/buns}           0.024605999
## [727] {rolls/buns}          => {tropical fruit}        0.024605999
## [728] {tropical fruit}     => {other vegetables}     0.035892222
## [729] {other vegetables}    => {tropical fruit}        0.035892222
## [730] {tropical fruit}     => {whole milk}            0.042297916
## [731] {whole milk}          => {tropical fruit}        0.042297916
## [732] {root vegetables}     => {soda}                  0.018607016
## [733] {soda}                => {root vegetables}      0.018607016
## [734] {root vegetables}     => {yogurt}                0.025826131
## [735] {yogurt}              => {root vegetables}      0.025826131
## [736] {root vegetables}     => {rolls/buns}           0.024300966
## [737] {rolls/buns}          => {root vegetables}      0.024300966
## [738] {root vegetables}     => {other vegetables}     0.047381800
## [739] {other vegetables}    => {root vegetables}      0.047381800
## [740] {root vegetables}     => {whole milk}            0.048906965
## [741] {whole milk}          => {root vegetables}      0.048906965
## [742] {soda}                => {yogurt}                0.027351296
## [743] {yogurt}              => {soda}                  0.027351296
## [744] {soda}                => {rolls/buns}           0.038332486
## [745] {rolls/buns}          => {soda}                  0.038332486
## [746] {soda}                => {other vegetables}     0.032740214
## [747] {other vegetables}    => {soda}                  0.032740214
## [748] {soda}                => {whole milk}            0.040061007
## [749] {whole milk}          => {soda}                  0.040061007
## [750] {yogurt}              => {rolls/buns}           0.034367056
## [751] {rolls/buns}          => {yogurt}                0.034367056
## [752] {yogurt}              => {other vegetables}     0.043416370
## [753] {other vegetables}    => {yogurt}                0.043416370
## [754] {yogurt}              => {whole milk}            0.056024403
## [755] {whole milk}          => {yogurt}                0.056024403
## [756] {rolls/buns}          => {other vegetables}     0.042602949
## [757] {other vegetables}    => {rolls/buns}           0.042602949
## [758] {rolls/buns}          => {whole milk}            0.056634469
## [759] {whole milk}          => {rolls/buns}           0.056634469
## [760] {other vegetables}    => {whole milk}            0.074834774
## [761] {whole milk}          => {other vegetables}     0.074834774

##      confidence coverage    lift      count
## [1]  0.1105236 1.00000000 1.0000000 1087
## [2]  0.1049314 1.00000000 1.0000000 1032
## [3]  0.1089985 1.00000000 1.0000000 1072
## [4]  0.1743772 1.00000000 1.0000000 1715
## [5]  0.1395018 1.00000000 1.0000000 1372
## [6]  0.1839349 1.00000000 1.0000000 1809
## [7]  0.1934926 1.00000000 1.0000000 1903
## [8]  0.2555160 1.00000000 1.0000000 2513
## [9]  0.4230769 0.01321810 1.6557746   55
## [10] 0.3410405 0.01759024 1.7625502   59

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## [11] 0.3005780 0.01759024 1.1763569 52
## [12] 0.4322034 0.01199797 1.6914924 51
## [13] 0.4000000 0.01728521 1.5654596 68
## [14] 0.2560386 0.02104728 1.4683033 53
## [15] 0.2415459 0.02104728 0.9453259 50
## [16] 0.3378378 0.01504830 1.7459985 50
## [17] 0.4054054 0.01504830 1.5866145 60
## [18] 0.4312500 0.01626843 3.9564774 69
## [19] 0.4750000 0.01626843 2.4548739 76
## [20] 0.4750000 0.01626843 1.8589833 76
## [21] 0.3190184 0.01657346 1.8294729 52
## [22] 0.3312883 0.01657346 1.7121497 54
## [23] 0.4233129 0.01657346 1.6566981 69
## [24] 0.2931034 0.01769192 1.5148042 51
## [25] 0.4022989 0.01769192 1.5744565 70
## [26] 0.2109375 0.02602949 1.5120775 54
## [27] 0.2070312 0.02602949 1.1255679 53
## [28] 0.1992188 0.02602949 1.0295935 51
## [29] 0.2617188 0.02602949 1.0242753 67
## [30] 0.2439024 0.02501271 1.3987058 60
## [31] 0.2032520 0.02501271 1.0504381 50
## [32] 0.2357724 0.02501271 0.9227303 58
## [33] 0.3333333 0.01921708 1.7227185 63
## [34] 0.4656085 0.01921708 1.8222281 88
## [35] 0.3579545 0.01789527 1.8499648 63
## [36] 0.3977273 0.01789527 1.5565650 70
## [37] 0.4137931 0.01769192 2.1385471 72
## [38] 0.5229885 0.01769192 2.0467935 91
## [39] 0.3625731 0.01738688 1.8738342 62
## [40] 0.4853801 0.01738688 1.8996074 83
## [41] 0.3511905 0.01708185 2.5174623 59
## [42] 0.3154762 0.01708185 1.7151511 53
## [43] 0.4166667 0.01708185 2.1533981 70
## [44] 0.4404762 0.01708185 1.7238692 74
## [45] 0.2639405 0.02735130 1.5136181 71
## [46] 0.2044610 0.02735130 1.1115940 55
## [47] 0.2044610 0.02735130 1.0566861 55
## [48] 0.2379182 0.02735130 0.9311284 64
## [49] 0.1863799 0.02836807 1.6863354 52
## [50] 0.2580645 0.02836807 1.4799210 72
## [51] 0.1971326 0.02836807 1.0188120 55
## [52] 0.2473118 0.02836807 0.9678917 69
## [53] 0.2727273 0.02236909 2.5991015 60
## [54] 0.4045455 0.02236909 2.0907538 89
## [55] 0.3272727 0.02236909 1.2808306 72
## [56] 0.2663755 0.02328419 1.9094778 61
## [57] 0.2794760 0.02328419 1.4443753 64
## [58] 0.3799127 0.02328419 1.4868448 87
## [59] 0.2073579 0.03040163 1.1891338 62
## [60] 0.1839465 0.03040163 1.0000629 55
## [61] 0.2006689 0.03040163 1.0370881 60
## [62] 0.2642140 0.03040163 1.0340410 79
## [63] 0.2047244 0.02582613 2.1790742 52
## [64] 0.1968504 0.02582613 1.8059922 50

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## [65] 0.2125984 0.02582613 1.2191869 54
## [66] 0.2047244 0.02582613 1.4675398 52
## [67] 0.2677165 0.02582613 1.4554959 68
## [68] 0.3858268 0.02582613 1.9940128 98
## [69] 0.3858268 0.02582613 1.5099906 98
## [70] 0.1935484 0.02836807 1.8445236 54
## [71] 0.2186380 0.02836807 1.2538220 61
## [72] 0.2186380 0.02836807 1.5672774 61
## [73] 0.2652330 0.02836807 1.3707653 74
## [74] 0.3476703 0.02836807 1.3606593 97
## [75] 0.2116183 0.02450432 2.2524519 51
## [76] 0.2282158 0.02450432 2.0937519 55
## [77] 0.2614108 0.02450432 1.8738886 63
## [78] 0.2406639 0.02450432 1.3084187 58
## [79] 0.3858921 0.02450432 1.9943505 93
## [80] 0.4107884 0.02450432 1.6076815 99
## [81] 0.1818182 0.02796136 2.4034702 50
## [82] 0.1963636 0.02796136 1.8713531 54
## [83] 0.1818182 0.02796136 1.6680801 50
## [84] 0.3054545 0.02796136 2.1896104 84
## [85] 0.2727273 0.02796136 1.4827378 75
## [86] 0.3709091 0.02796136 1.9169159 102
## [87] 0.4145455 0.02796136 1.6223854 114
## [88] 0.1802721 0.02989324 1.7180002 53
## [89] 0.2891156 0.02989324 1.6579897 85
## [90] 0.1836735 0.02989324 1.3166389 54
## [91] 0.2380952 0.02989324 1.2944537 70
## [92] 0.2312925 0.02989324 1.1953557 68
## [93] 0.2755102 0.02989324 1.0782502 81
## [94] 0.1953125 0.02602949 4.6398513 50
## [95] 0.1207729 0.04209456 4.6398513 50
## [96] 0.2070312 0.02602949 1.9730158 53
## [97] 0.2578125 0.02602949 1.8480947 66
## [98] 0.2656250 0.02602949 1.4441249 68
## [99] 0.3515625 0.02602949 1.8169297 90
## [100] 0.4414062 0.02602949 1.7275091 113
## [101] 0.2863071 0.02450432 3.0474349 69
## [102] 0.2157676 0.02450432 2.0562739 52
## [103] 0.2282158 0.02450432 2.0937519 55
## [104] 0.2074689 0.02450432 1.1897705 50
## [105] 0.3278008 0.02450432 2.3497968 79
## [106] 0.3112033 0.02450432 1.6919208 75
## [107] 0.3692946 0.02450432 1.9085720 89
## [108] 0.4398340 0.02450432 1.7213560 106
## [109] 0.2188450 0.03345196 1.9800740 72
## [110] 0.2279635 0.03345196 1.3073010 75
## [111] 0.2218845 0.03345196 1.5905496 73
## [112] 0.1914894 0.03345196 1.0410712 63
## [113] 0.2431611 0.03345196 1.2566944 80
## [114] 0.2500000 0.02806304 2.2936101 69
## [115] 0.1884058 0.02806304 1.3505620 52
## [116] 0.1811594 0.02806304 0.9849104 50
## [117] 0.3550725 0.02806304 1.8350697 98
## [118] 0.4021739 0.02806304 1.5739675 111

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## [119] 0.1639344 0.03101169 2.2869434 50
## [120] 0.1803279 0.03101169 2.1787771 55
## [121] 0.1901639 0.03101169 1.7205725 58
## [122] 0.1836066 0.03101169 1.7497776 56
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## [127] 0.4590164 0.03101169 2.3722681 140
## [128] 0.3901639 0.03101169 1.5269647 119
## [129] 0.2721713 0.03324860 3.7968855 89
## [130] 0.1262411 0.07168277 3.7968855 89
## [131] 0.1620795 0.03324860 1.9582948 53
## [132] 0.2018349 0.03324860 1.9234941 66
## [133] 0.1987768 0.03324860 1.8236655 65
## [134] 0.2201835 0.03324860 1.2626849 72
## [135] 0.3180428 0.03324860 2.2798477 104
## [136] 0.1987768 0.03324860 1.0806907 65
## [137] 0.3088685 0.03324860 1.5962805 101
## [138] 0.3547401 0.03324860 1.3883281 116
## [139] 0.1559633 0.03324860 1.6600639 51
## [140] 0.1865443 0.03324860 1.7114399 61
## [141] 0.1743119 0.03324860 0.9996255 57
## [142] 0.1957187 0.03324860 1.4029832 64
## [143] 0.2599388 0.03324860 1.4132109 85
## [144] 0.4159021 0.03324860 2.1494470 136
## [145] 0.4434251 0.03324860 1.7354101 145
## [146] 0.1851852 0.03294357 3.5364977 60
## [147] 0.1165049 0.05236401 3.5364977 60
## [148] 0.1604938 0.03294357 1.9391361 52
## [149] 0.1574074 0.03294357 1.5976283 51
## [150] 0.1728395 0.03294357 1.5638239 56
## [151] 0.2037037 0.03294357 1.9413042 66
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## [155] 0.1790123 0.03294357 0.9732374 58
## [156] 0.2901235 0.03294357 1.4994032 94
## [157] 0.3888889 0.03294357 1.5219746 126
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## [161] 0.1586022 0.03782410 1.6097545 59
## [162] 0.1397849 0.03782410 1.4878625 52
## [163] 0.1478495 0.03782410 1.4090111 55
## [164] 0.2473118 0.03782410 1.4182576 92
## [165] 0.1639785 0.03782410 1.1754581 61
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## [167] 0.2956989 0.03782410 1.1572618 110
## [168] 0.1621622 0.03385867 2.7688626 54
## [169] 0.1531532 0.03385867 1.7214414 51
## [170] 0.1891892 0.03385867 1.7357049 63
## [171] 0.2162162 0.03385867 1.2399338 72
## [172] 0.2042042 0.03385867 1.4638107 68

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## [173] 0.2072072 0.03385867 1.1265245 69
## [174] 0.3183183 0.03385867 1.6451186 106
## [175] 0.4444444 0.03385867 1.7393996 148
## [176] 0.1507937 0.03843416 3.0390483 57
## [177] 0.1168033 0.04961871 3.0390483 57
## [178] 0.1322751 0.03843416 1.8452850 50
## [179] 0.1825397 0.03843416 2.0517460 69
## [180] 0.1428571 0.03843416 1.4499484 54
## [181] 0.1587302 0.03843416 1.5127046 60
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## [186] 0.2619048 0.03843416 1.3535645 99
## [187] 0.3306878 0.03843416 1.2941961 125
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## [189] 0.1065574 0.04961871 2.8478038 52
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## [199] 0.2119565 0.03741739 1.1523452 78
## [200] 0.2853261 0.03741739 1.4746096 105
## [201] 0.3614130 0.03741739 1.4144438 133
## [202] 0.1397260 0.03711235 2.6225295 51
## [203] 0.1616438 0.03711235 2.2359594 59
## [204] 0.1452055 0.03711235 1.6321096 53
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## [567] 0.1150815 0.19349263 1.8138238 219
## [568] 0.4727564 0.06344687 1.8502027 295
## [569] 0.1173896 0.25551601 1.8502027 295
## [570] 0.1251758 0.07229283 1.7462469 89
## [571] 0.1262411 0.07168277 1.7462469 89
## [572] 0.1322082 0.07229283 1.7476710 94
## [573] 0.1263441 0.07564820 1.7476710 94
## [574] 0.1181435 0.07229283 1.3279325 84
## [575] 0.1434599 0.07229283 1.7333271 102
## [576] 0.1253071 0.08276563 1.7333271 102
## [577] 0.1476793 0.07229283 1.4988918 105
## [578] 0.1083591 0.09852567 1.4988918 105
## [579] 0.1392405 0.07229283 1.4820675 99
## [580] 0.1071429 0.09395018 1.4820675 99
## [581] 0.1969058 0.07229283 1.7815715 140
## [582] 0.1287948 0.11052364 1.7815715 140
## [583] 0.1898734 0.07229283 1.8095010 135
## [584] 0.1308140 0.10493137 1.8095010 135
## [585] 0.1659634 0.07229283 1.5226216 118
## [586] 0.1100746 0.10899847 1.5226216 118
## [587] 0.2545710 0.07229283 1.4598869 181
## [588] 0.1055394 0.17437722 1.4598869 181
## [589] 0.2587904 0.07229283 1.8551049 184
## [590] 0.1341108 0.13950178 1.8551049 184
## [591] 0.2011252 0.07229283 1.0934583 143
## [592] 0.2911392 0.07229283 1.5046529 207
## [593] 0.1087756 0.19349263 1.5046529 207
## [594] 0.3684951 0.07229283 1.4421604 262
## [595] 0.1042579 0.25551601 1.4421604 262
## [596] 0.1290780 0.07168277 1.7062934 91
## [597] 0.1223118 0.07564820 1.7062934 91
## [598] 0.1049645 0.07168277 1.1798014 74
## [599] 0.1517730 0.07168277 1.8337690 107
## [600] 0.1314496 0.08276563 1.8337690 107
## [601] 0.1106383 0.07168277 1.1229388 78
## [602] 0.1262411 0.07168277 1.3437030 89
## [603] 0.1219858 0.07168277 1.1037079 86
## [604] 0.1929078 0.07168277 1.8384188 136

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## [605] 0.1317829 0.10493137 1.8384188 136
## [606] 0.2382979 0.07168277 2.1862496 168
## [607] 0.1567164 0.10899847 2.1862496 168
## [608] 0.1617021 0.07168277 0.9273122 114
## [609] 0.2893617 0.07168277 2.0742510 204
## [610] 0.1486880 0.13950178 2.0742510 204
## [611] 0.2042553 0.07168277 1.1104760 144
## [612] 0.4028369 0.07168277 2.0819237 284
## [613] 0.1492380 0.19349263 2.0819237 284
## [614] 0.4496454 0.07168277 1.7597542 317
## [615] 0.1261441 0.25551601 1.7597542 317
## [616] 0.1411290 0.07564820 1.5862903 105
## [617] 0.1200000 0.08896797 1.5862903 105
## [618] 0.1827957 0.07564820 2.2085942 136
## [619] 0.1670762 0.08276563 2.2085942 136
## [620] 0.1236559 0.07564820 1.2550629 92
## [621] 0.1424731 0.07564820 1.5164752 106
## [622] 0.1147186 0.09395018 1.5164752 106
## [623] 0.1397849 0.07564820 1.2647516 104
## [624] 0.2701613 0.07564820 2.5746476 201
## [625] 0.1947674 0.10493137 2.5746476 201
## [626] 0.2056452 0.07564820 1.8866793 153
## [627] 0.1427239 0.10899847 1.8866793 153
## [628] 0.1760753 0.07564820 1.0097378 131
## [629] 0.2379032 0.07564820 1.7053777 177
## [630] 0.1290087 0.13950178 1.7053777 177
## [631] 0.1841398 0.07564820 1.0011138 137
## [632] 0.3454301 0.07564820 1.7852365 257
## [633] 0.1350499 0.19349263 1.7852365 257
## [634] 0.3978495 0.07564820 1.5570432 296
## [635] 0.1177875 0.25551601 1.5570432 296
## [636] 0.1097143 0.08896797 1.3256020 96
## [637] 0.1179361 0.08276563 1.3256020 96
## [638] 0.1337143 0.08896797 1.3571517 117
## [639] 0.1207430 0.09852567 1.3571517 117
## [640] 0.1405714 0.08896797 1.4962338 123
## [641] 0.1331169 0.09395018 1.4962338 123
## [642] 0.1005714 0.08896797 0.9099540 88
## [643] 0.1485714 0.08896797 1.4158915 130
## [644] 0.1259690 0.10493137 1.4158915 130
## [645] 0.1234286 0.08896797 1.1323881 108
## [646] 0.1007463 0.10899847 1.1323881 108
## [647] 0.2365714 0.08896797 1.3566647 207
## [648] 0.1206997 0.17437722 1.3566647 207
## [649] 0.1988571 0.08896797 1.4254810 174
## [650] 0.1268222 0.13950178 1.4254810 174
## [651] 0.2354286 0.08896797 1.2799558 206
## [652] 0.1138751 0.18393493 1.2799558 206
## [653] 0.2537143 0.08896797 1.3112349 222
## [654] 0.1166579 0.19349263 1.3112349 222
## [655] 0.3737143 0.08896797 1.4625865 327
## [656] 0.1301234 0.25551601 1.4625865 327
## [657] 0.1179361 0.08276563 1.1970090 96
## [658] 0.1363636 0.08276563 1.4514463 111

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## [659] 0.1201299 0.09395018 1.4514463 111
## [660] 0.1633907 0.08276563 1.4783323 133
## [661] 0.1223551 0.11052364 1.4783323 133
## [662] 0.2407862 0.08276563 2.2947022 196
## [663] 0.1899225 0.10493137 2.2947022 196
## [664] 0.2137592 0.08276563 1.9611211 174
## [665] 0.1623134 0.10899847 1.9611211 174
## [666] 0.1547912 0.08276563 0.8876799 126
## [667] 0.2616708 0.08276563 1.8757521 213
## [668] 0.1552478 0.13950178 1.8757521 213
## [669] 0.2027027 0.08276563 1.1020349 165
## [670] 0.3488943 0.08276563 1.8031403 284
## [671] 0.1492380 0.19349263 1.8031403 284
## [672] 0.3685504 0.08276563 1.4423768 300
## [673] 0.1193792 0.25551601 1.4423768 300
## [674] 0.1589267 0.09852567 1.6916065 154
## [675] 0.1666667 0.09395018 1.6916065 154
## [676] 0.1114551 0.09852567 1.0084278 108
## [677] 0.1372549 0.09852567 1.3080445 133
## [678] 0.1288760 0.10493137 1.3080445 133
## [679] 0.1300310 0.09852567 1.1929613 126
## [680] 0.1175373 0.10899847 1.1929613 126
## [681] 0.2497420 0.09852567 1.4321939 242
## [682] 0.1411079 0.17437722 1.4321939 242
## [683] 0.1547988 0.09852567 1.1096544 150
## [684] 0.1093294 0.13950178 1.1096544 150
## [685] 0.1981424 0.09852567 1.0772419 192
## [686] 0.1061360 0.18393493 1.0772419 192
## [687] 0.2352941 0.09852567 1.2160366 228
## [688] 0.1198108 0.19349263 1.2160366 228
## [689] 0.2487100 0.09852567 0.9733637 241
## [690] 0.1277056 0.09395018 1.1554598 118
## [691] 0.1085557 0.11052364 1.1554598 118
## [692] 0.1482684 0.09395018 1.4130036 137
## [693] 0.1327519 0.10493137 1.4130036 137
## [694] 0.1590909 0.09395018 1.4595700 147
## [695] 0.1371269 0.10899847 1.4595700 147
## [696] 0.2586580 0.09395018 1.4833245 239
## [697] 0.1393586 0.17437722 1.4833245 239
## [698] 0.2088745 0.09395018 1.4972889 193
## [699] 0.1406706 0.13950178 1.4972889 193
## [700] 0.3257576 0.09395018 1.7710480 301
## [701] 0.1663903 0.18393493 1.7710480 301
## [702] 0.2867965 0.09395018 1.4822091 265
## [703] 0.1392538 0.19349263 1.4822091 265
## [704] 0.3181818 0.09395018 1.2452520 294
## [705] 0.1169916 0.25551601 1.2452520 294
## [706] 0.1674333 0.11052364 1.5956459 182
## [707] 0.1763566 0.10493137 1.5956459 182
## [708] 0.1416743 0.11052364 1.2997827 154
## [709] 0.1436567 0.10899847 1.2997827 154
## [710] 0.2621895 0.11052364 1.5035766 285
## [711] 0.1661808 0.17437722 1.5035766 285
## [712] 0.2079117 0.11052364 1.4903873 226

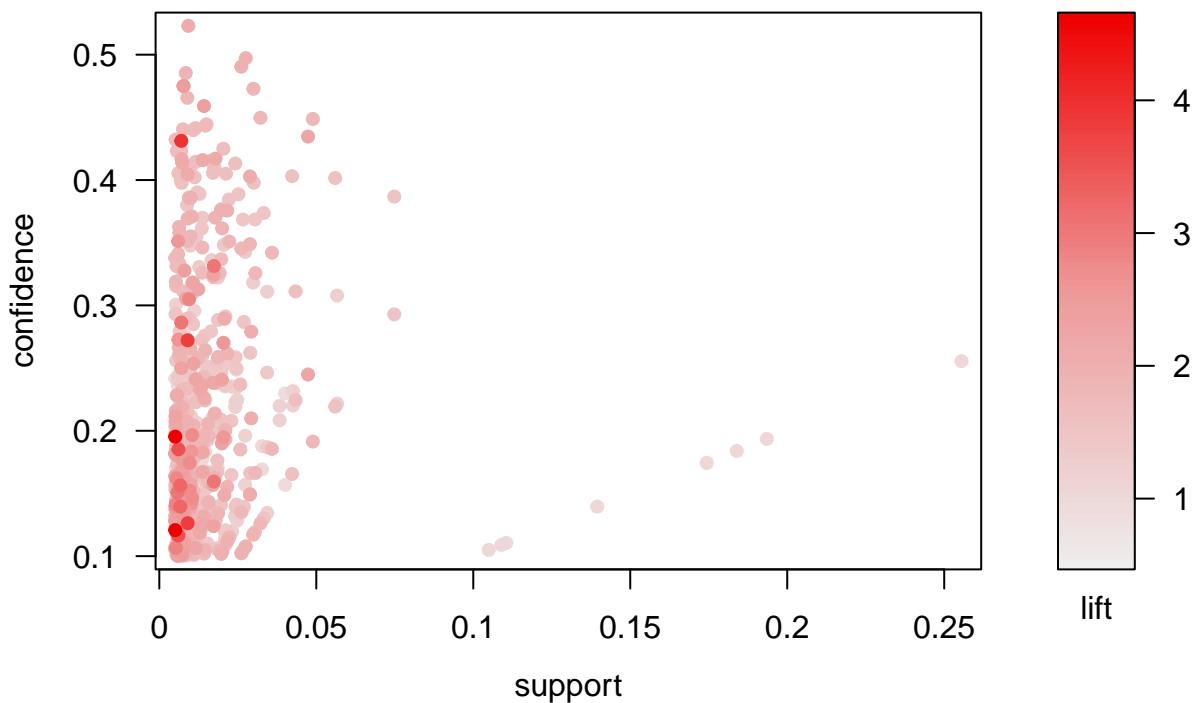
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## [713] 0.1647230 0.13950178 1.4903873 226
## [714] 0.2189512 0.11052364 1.1903734 238
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## [717] 0.1282186 0.19349263 1.1601012 244
## [718] 0.3109476 0.11052364 1.2169396 338
## [719] 0.1345006 0.25551601 1.2169396 338
## [720] 0.2005814 0.10493137 1.8402220 207
## [721] 0.1930970 0.10899847 1.8402220 207
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## [723] 0.1195335 0.17437722 1.1391592 205
## [724] 0.2790698 0.10493137 2.0004746 288
## [725] 0.2099125 0.13950178 2.0004746 288
## [726] 0.2344961 0.10493137 1.2748863 242
## [727] 0.1337756 0.18393493 1.2748863 242
## [728] 0.3420543 0.10493137 1.7677896 353
## [729] 0.1854966 0.19349263 1.7677896 353
## [730] 0.4031008 0.10493137 1.5775950 416
## [731] 0.1655392 0.25551601 1.5775950 416
## [732] 0.1707090 0.10899847 0.9789636 183
## [733] 0.1067055 0.17437722 0.9789636 183
## [734] 0.2369403 0.10899847 1.6984751 254
## [735] 0.1851312 0.13950178 1.6984751 254
## [736] 0.2229478 0.10899847 1.2121013 239
## [737] 0.1321172 0.18393493 1.2121013 239
## [738] 0.4347015 0.10899847 2.2466049 466
## [739] 0.2448765 0.19349263 2.2466049 466
## [740] 0.4486940 0.10899847 1.7560310 481
## [741] 0.1914047 0.25551601 1.7560310 481
## [742] 0.1568513 0.17437722 1.1243678 269
## [743] 0.1960641 0.13950178 1.1243678 269
## [744] 0.2198251 0.17437722 1.1951242 377
## [745] 0.2084024 0.18393493 1.1951242 377
## [746] 0.1877551 0.17437722 0.9703476 322
## [747] 0.1692065 0.19349263 0.9703476 322
## [748] 0.2297376 0.17437722 0.8991124 394
## [749] 0.1567847 0.25551601 0.8991124 394
## [750] 0.2463557 0.13950178 1.3393633 338
## [751] 0.1868436 0.18393493 1.3393633 338
## [752] 0.3112245 0.13950178 1.6084566 427
## [753] 0.2243826 0.19349263 1.6084566 427
## [754] 0.4016035 0.13950178 1.5717351 551
## [755] 0.2192598 0.25551601 1.5717351 551
## [756] 0.2316197 0.18393493 1.1970465 419
## [757] 0.2201787 0.19349263 1.1970465 419
## [758] 0.3079049 0.18393493 1.2050318 557
## [759] 0.2216474 0.25551601 1.2050318 557
## [760] 0.3867578 0.19349263 1.5136341 736
## [761] 0.2928770 0.25551601 1.5136341 736

```

Scatter plot for 763 rules



##	lhs	rhs	support
## [1]	{}	=> {bottled water}	0.110523640
## [2]	{}	=> {tropical fruit}	0.104931368
## [3]	{}	=> {root vegetables}	0.108998475
## [4]	{}	=> {soda}	0.174377224
## [5]	{}	=> {yogurt}	0.139501779
## [6]	{}	=> {rolls/buns}	0.183934926
## [7]	{}	=> {other vegetables}	0.193492628
## [8]	{}	=> {whole milk}	0.255516014
## [9]	{cake bar}	=> {whole milk}	0.005592272
## [10]	{dishes}	=> {other vegetables}	0.005998983
## [11]	{dishes}	=> {whole milk}	0.005287239
## [12]	{mustard}	=> {whole milk}	0.005185562
## [13]	{pot plants}	=> {whole milk}	0.006914082
## [14]	{chewing gum}	=> {soda}	0.005388917
## [15]	{chewing gum}	=> {whole milk}	0.005083884
## [16]	{canned fish}	=> {other vegetables}	0.005083884
## [17]	{pasta}	=> {whole milk}	0.006100661
## [18]	{herbs}	=> {root vegetables}	0.007015760
## [19]	{herbs}	=> {other vegetables}	0.007727504
## [20]	{herbs}	=> {whole milk}	0.007727504
## [21]	{processed cheese}	=> {soda}	0.005287239
## [22]	{processed cheese}	=> {other vegetables}	0.005490595
## [23]	{processed cheese}	=> {whole milk}	0.007015760
## [24]	{semi-finished bread}	=> {other vegetables}	0.005185562
## [25]	{semi-finished bread}	=> {whole milk}	0.007117438

## [26]	{beverages}	=> {yogurt}	0.005490595
## [27]	{beverages}	=> {rolls/buns}	0.005388917
## [28]	{beverages}	=> {other vegetables}	0.005185562
## [29]	{beverages}	=> {whole milk}	0.006812405
## [30]	{ice cream}	=> {soda}	0.006100661
## [31]	{ice cream}	=> {other vegetables}	0.005083884
## [32]	{ice cream}	=> {whole milk}	0.005897306
## [33]	{detergent}	=> {other vegetables}	0.006405694
## [34]	{detergent}	=> {whole milk}	0.008947636
## [35]	{pickled vegetables}	=> {other vegetables}	0.006405694
## [36]	{pickled vegetables}	=> {whole milk}	0.007117438
## [37]	{baking powder}	=> {other vegetables}	0.007320793
## [38]	{baking powder}	=> {whole milk}	0.009252669
## [39]	{flour}	=> {other vegetables}	0.006304016
## [40]	{flour}	=> {whole milk}	0.008439248
## [41]	{soft cheese}	=> {yogurt}	0.005998983
## [42]	{soft cheese}	=> {rolls/buns}	0.005388917
## [43]	{soft cheese}	=> {other vegetables}	0.007117438
## [44]	{soft cheese}	=> {whole milk}	0.007524148
## [45]	{specialty bar}	=> {soda}	0.007219115
## [46]	{specialty bar}	=> {rolls/buns}	0.005592272
## [47]	{specialty bar}	=> {other vegetables}	0.005592272
## [48]	{specialty bar}	=> {whole milk}	0.006507372
## [49]	{misc. beverages}	=> {bottled water}	0.005287239
## [50]	{misc. beverages}	=> {soda}	0.007320793
## [51]	{misc. beverages}	=> {other vegetables}	0.005592272
## [52]	{misc. beverages}	=> {whole milk}	0.007015760
## [53]	{grapes}	=> {tropical fruit}	0.006100661
## [54]	{grapes}	=> {other vegetables}	0.009049314
## [55]	{grapes}	=> {whole milk}	0.007320793
## [56]	{cat food}	=> {yogurt}	0.006202339
## [57]	{cat food}	=> {other vegetables}	0.006507372
## [58]	{cat food}	=> {whole milk}	0.008845958
## [59]	{specialty chocolate}	=> {soda}	0.006304016
## [60]	{specialty chocolate}	=> {rolls/buns}	0.005592272
## [61]	{specialty chocolate}	=> {other vegetables}	0.006100661
## [62]	{specialty chocolate}	=> {whole milk}	0.008032537
## [63]	{meat}	=> {sausage}	0.005287239
## [64]	{meat}	=> {root vegetables}	0.005083884
## [65]	{meat}	=> {soda}	0.005490595
## [66]	{meat}	=> {yogurt}	0.005287239
## [67]	{meat}	=> {rolls/buns}	0.006914082
## [68]	{meat}	=> {other vegetables}	0.009964413
## [69]	{meat}	=> {whole milk}	0.009964413
## [70]	{frozen meals}	=> {tropical fruit}	0.005490595
## [71]	{frozen meals}	=> {soda}	0.006202339
## [72]	{frozen meals}	=> {yogurt}	0.006202339
## [73]	{frozen meals}	=> {other vegetables}	0.007524148
## [74]	{frozen meals}	=> {whole milk}	0.009862735
## [75]	{hard cheese}	=> {sausage}	0.005185562
## [76]	{hard cheese}	=> {root vegetables}	0.005592272
## [77]	{hard cheese}	=> {yogurt}	0.006405694
## [78]	{hard cheese}	=> {rolls/buns}	0.005897306
## [79]	{hard cheese}	=> {other vegetables}	0.009456024

## [80] {hard cheese}	=> {whole milk}	0.010066090
## [81] {butter milk}	=> {pip fruit}	0.005083884
## [82] {butter milk}	=> {tropical fruit}	0.005490595
## [83] {butter milk}	=> {root vegetables}	0.005083884
## [84] {butter milk}	=> {yogurt}	0.008540925
## [85] {butter milk}	=> {rolls/buns}	0.007625826
## [86] {butter milk}	=> {other vegetables}	0.010371124
## [87] {butter milk}	=> {whole milk}	0.011591256
## [88] {candy}	=> {tropical fruit}	0.005388917
## [89] {candy}	=> {soda}	0.008642603
## [90] {candy}	=> {yogurt}	0.005490595
## [91] {candy}	=> {rolls/buns}	0.007117438
## [92] {candy}	=> {other vegetables}	0.006914082
## [93] {candy}	=> {whole milk}	0.008235892
## [94] {ham}	=> {white bread}	0.005083884
## [95] {white bread}	=> {ham}	0.005083884
## [96] {ham}	=> {tropical fruit}	0.005388917
## [97] {ham}	=> {yogurt}	0.006710727
## [98] {ham}	=> {rolls/buns}	0.006914082
## [99] {ham}	=> {other vegetables}	0.009150991
## [100] {ham}	=> {whole milk}	0.011489578
## [101] {sliced cheese}	=> {sausage}	0.007015760
## [102] {sliced cheese}	=> {tropical fruit}	0.005287239
## [103] {sliced cheese}	=> {root vegetables}	0.005592272
## [104] {sliced cheese}	=> {soda}	0.005083884
## [105] {sliced cheese}	=> {yogurt}	0.008032537
## [106] {sliced cheese}	=> {rolls/buns}	0.007625826
## [107] {sliced cheese}	=> {other vegetables}	0.009049314
## [108] {sliced cheese}	=> {whole milk}	0.010777834
## [109] {UHT-milk}	=> {bottled water}	0.007320793
## [110] {UHT-milk}	=> {soda}	0.007625826
## [111] {UHT-milk}	=> {yogurt}	0.007422471
## [112] {UHT-milk}	=> {rolls/buns}	0.006405694
## [113] {UHT-milk}	=> {other vegetables}	0.008134215
## [114] {oil}	=> {root vegetables}	0.007015760
## [115] {oil}	=> {yogurt}	0.005287239
## [116] {oil}	=> {rolls/buns}	0.005083884
## [117] {oil}	=> {other vegetables}	0.009964413
## [118] {oil}	=> {whole milk}	0.011286223
## [119] {onions}	=> {whipped/sour cream}	0.005083884
## [120] {onions}	=> {citrus fruit}	0.005592272
## [121] {onions}	=> {bottled water}	0.005897306
## [122] {onions}	=> {tropical fruit}	0.005693950
## [123] {onions}	=> {root vegetables}	0.009456024
## [124] {onions}	=> {soda}	0.005287239
## [125] {onions}	=> {yogurt}	0.007219115
## [126] {onions}	=> {rolls/buns}	0.006812405
## [127] {onions}	=> {other vegetables}	0.014234875
## [128] {onions}	=> {whole milk}	0.012099644
## [129] {berries}	=> {whipped/sour cream}	0.009049314
## [130] {whipped/sour cream}	=> {berries}	0.009049314
## [131] {berries}	=> {citrus fruit}	0.005388917
## [132] {berries}	=> {tropical fruit}	0.006710727
## [133] {berries}	=> {root vegetables}	0.006609049

```

## [134] {berries}          => {soda}          0.007320793
## [135] {berries}          => {yogurt}         0.010574479
## [136] {berries}          => {rolls/buns}    0.006609049
## [137] {berries}          => {other vegetables} 0.010269446
## [138] {berries}          => {whole milk}     0.011794611
## [139] {hamburger meat}   => {sausage}        0.005185562
## [140] {hamburger meat}   => {root vegetables} 0.006202339
## [141] {hamburger meat}   => {soda}           0.005795628
## [142] {hamburger meat}   => {yogurt}          0.006507372
## [143] {hamburger meat}   => {rolls/buns}     0.008642603
## [144] {hamburger meat}   => {other vegetables} 0.013828165
## [145] {hamburger meat}   => {whole milk}      0.014743264
## [146] {hygiene articles} => {napkins}         0.006100661
## [147] {napkins}          => {hygiene articles} 0.006100661
## [148] {hygiene articles} => {citrus fruit}    0.005287239
## [149] {hygiene articles} => {shopping bags}   0.005185562
## [150] {hygiene articles} => {bottled water}    0.005693950
## [151] {hygiene articles} => {tropical fruit}   0.006710727
## [152] {hygiene articles} => {root vegetables} 0.005388917
## [153] {hygiene articles} => {soda}            0.007015760
## [154] {hygiene articles} => {yogurt}          0.007320793
## [155] {hygiene articles} => {rolls/buns}     0.005897306
## [156] {hygiene articles} => {other vegetables} 0.009557702
## [157] {hygiene articles} => {whole milk}      0.012811388
## [158] {salty snack}       => {fruit/vegetable juice} 0.005998983
## [159] {salty snack}       => {whipped/sour cream} 0.005185562
## [160] {salty snack}       => {pastry}          0.005185562
## [161] {salty snack}       => {shopping bags}   0.005998983
## [162] {salty snack}       => {sausage}         0.005287239
## [163] {salty snack}       => {tropical fruit}   0.005592272
## [164] {salty snack}       => {soda}            0.009354347
## [165] {salty snack}       => {yogurt}          0.006202339
## [166] {salty snack}       => {other vegetables} 0.010777834
## [167] {salty snack}       => {whole milk}      0.011184545
## [168] {sugar}             => {margarine}       0.005490595
## [169] {sugar}             => {pastry}          0.005185562
## [170] {sugar}             => {root vegetables} 0.006405694
## [171] {sugar}             => {soda}            0.007320793
## [172] {sugar}             => {yogurt}          0.006914082
## [173] {sugar}             => {rolls/buns}     0.007015760
## [174] {sugar}             => {other vegetables} 0.010777834
## [175] {sugar}             => {whole milk}      0.015048297
## [176] {waffles}           => {chocolate}       0.005795628
## [177] {waffles}           => {waffles}          0.005795628
## [178] {waffles}           => {whipped/sour cream} 0.005083884
## [179] {waffles}           => {pastry}          0.007015760
## [180] {waffles}           => {shopping bags}   0.005490595
## [181] {waffles}           => {tropical fruit}   0.006100661
## [182] {waffles}           => {root vegetables} 0.006609049
## [183] {waffles}           => {soda}            0.009557702
## [184] {waffles}           => {yogurt}          0.007524148
## [185] {waffles}           => {rolls/buns}     0.009150991
## [186] {waffles}           => {other vegetables} 0.010066090
## [187] {waffles}           => {whole milk}      0.012709710

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```

## [188] {long life bakery product} => {chocolate} 0.005287239
## [189] {chocolate} => {long life bakery product} 0.005287239
## [190] {long life bakery product} => {fruit/vegetable juice} 0.006202339
## [191] {long life bakery product} => {whipped/sour cream} 0.005795628
## [192] {long life bakery product} => {pastry} 0.005897306
## [193] {long life bakery product} => {shopping bags} 0.005388917
## [194] {long life bakery product} => {sausage} 0.005388917
## [195] {long life bakery product} => {tropical fruit} 0.006304016
## [196] {long life bakery product} => {root vegetables} 0.005287239
## [197] {long life bakery product} => {soda} 0.007625826
## [198] {long life bakery product} => {yogurt} 0.008744281
## [199] {long life bakery product} => {rolls/buns} 0.007930859
## [200] {long life bakery product} => {other vegetables} 0.010676157
## [201] {long life bakery product} => {whole milk} 0.013523132
## [202] {dessert} => {curd} 0.005185562
## [203] {dessert} => {fruit/vegetable juice} 0.005998983
## [204] {dessert} => {pastry} 0.005388917
## [205] {dessert} => {shopping bags} 0.006202339
## [206] {dessert} => {sausage} 0.005897306
## [207] {dessert} => {bottled water} 0.005185562
## [208] {dessert} => {tropical fruit} 0.006304016
## [209] {dessert} => {root vegetables} 0.005795628
## [210] {dessert} => {soda} 0.009862735
## [211] {dessert} => {yogurt} 0.009862735
## [212] {dessert} => {rolls/buns} 0.006812405
## [213] {dessert} => {other vegetables} 0.011591256
## [214] {dessert} => {whole milk} 0.013726487
## [215] {canned beer} => {shopping bags} 0.011387900
## [216] {shopping bags} => {canned beer} 0.011387900
## [217] {canned beer} => {bottled water} 0.008032537
## [218] {canned beer} => {soda} 0.013828165
## [219] {canned beer} => {rolls/buns} 0.011286223
## [220] {canned beer} => {other vegetables} 0.009049314
## [221] {canned beer} => {whole milk} 0.008845958
## [222] {cream cheese } => {curd} 0.005083884
## [223] {cream cheese } => {domestic eggs} 0.005083884
## [224] {cream cheese } => {fruit/vegetable juice} 0.005693950
## [225] {cream cheese } => {whipped/sour cream} 0.006405694
## [226] {cream cheese } => {pip fruit} 0.006100661
## [227] {cream cheese } => {citrus fruit} 0.005693950
## [228] {cream cheese } => {shopping bags} 0.005592272
## [229] {cream cheese } => {sausage} 0.005592272
## [230] {cream cheese } => {bottled water} 0.005897306
## [231] {cream cheese } => {tropical fruit} 0.007219115
## [232] {cream cheese } => {root vegetables} 0.007524148
## [233] {cream cheese } => {soda} 0.006812405
## [234] {cream cheese } => {yogurt} 0.012404677
## [235] {cream cheese } => {rolls/buns} 0.009964413
## [236] {cream cheese } => {other vegetables} 0.013726487
## [237] {cream cheese } => {whole milk} 0.016471784
## [238] {chicken} => {frozen vegetables} 0.006710727
## [239] {frozen vegetables} => {chicken} 0.006710727
## [240] {chicken} => {pork} 0.005795628
## [241] {pork} => {chicken} 0.005795628

```

```

## [242] {chicken}          => {butter}          0.005795628
## [243] {butter}           => {chicken}          0.005795628
## [244] {chicken}          => {newspapers}        0.005185562
## [245] {chicken}          => {domestic eggs}    0.006202339
## [246] {chicken}          => {whipped/sour cream} 0.007219115
## [247] {whipped/sour cream} => {chicken}          0.007219115
## [248] {chicken}          => {citrus fruit}     0.006914082
## [249] {chicken}          => {sausage}          0.005287239
## [250] {chicken}          => {bottled water}    0.005287239
## [251] {chicken}          => {tropical fruit}   0.006405694
## [252] {chicken}          => {root vegetables} 0.010879512
## [253] {chicken}          => {soda}              0.008337570
## [254] {chicken}          => {yogurt}            0.008337570
## [255] {chicken}          => {rolls/buns}       0.009659380
## [256] {chicken}          => {other vegetables} 0.017895272
## [257] {chicken}          => {whole milk}        0.017590239
## [258] {white bread}       => {frankfurter}      0.005185562
## [259] {white bread}       => {domestic eggs}    0.005795628
## [260] {white bread}       => {fruit/vegetable juice} 0.007422471
## [261] {fruit/vegetable juice} => {white bread}    0.007422471
## [262] {white bread}       => {whipped/sour cream} 0.005490595
## [263] {white bread}       => {pip fruit}        0.006609049
## [264] {white bread}       => {pastry}            0.005592272
## [265] {white bread}       => {shopping bags}    0.007422471
## [266] {white bread}       => {sausage}          0.007219115
## [267] {white bread}       => {tropical fruit}   0.008744281
## [268] {white bread}       => {root vegetables} 0.007930859
## [269] {white bread}       => {soda}              0.010269446
## [270] {white bread}       => {yogurt}            0.009049314
## [271] {white bread}       => {rolls/buns}       0.006507372
## [272] {white bread}       => {other vegetables} 0.013726487
## [273] {white bread}       => {whole milk}        0.017081851
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## [275] {butter}           => {chocolate}        0.006202339
## [276] {chocolate}         => {newspapers}        0.005490595
## [277] {chocolate}         => {fruit/vegetable juice} 0.006812405
## [278] {chocolate}         => {pip fruit}        0.006100661
## [279] {chocolate}         => {pastry}            0.008032537
## [280] {chocolate}         => {citrus fruit}     0.006405694
## [281] {chocolate}         => {shopping bags}    0.008134215
## [282] {chocolate}         => {sausage}          0.006609049
## [283] {chocolate}         => {bottled water}    0.005795628
## [284] {chocolate}         => {tropical fruit}   0.008134215
## [285] {chocolate}         => {root vegetables} 0.006405694
## [286] {chocolate}         => {soda}              0.013523132
## [287] {chocolate}         => {yogurt}            0.009252669
## [288] {chocolate}         => {rolls/buns}       0.011794611
## [289] {chocolate}         => {other vegetables} 0.012709710
## [290] {chocolate}         => {whole milk}        0.016675140
## [291] {coffee}            => {fruit/vegetable juice} 0.005998983
## [292] {coffee}            => {whipped/sour cream} 0.006100661
## [293] {coffee}            => {pip fruit}        0.006914082
## [294] {coffee}            => {pastry}            0.006914082
## [295] {coffee}            => {citrus fruit}     0.006405694

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## [296] {coffee}	=> {shopping bags}	0.009354347
## [297] {coffee}	=> {sausage}	0.006914082
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## [299] {coffee}	=> {tropical fruit}	0.007117438
## [300] {coffee}	=> {root vegetables}	0.007320793
## [301] {coffee}	=> {soda}	0.009964413
## [302] {coffee}	=> {yogurt}	0.009761057
## [303] {coffee}	=> {rolls/buns}	0.010981190
## [304] {coffee}	=> {other vegetables}	0.013421454
## [305] {coffee}	=> {whole milk}	0.018708693
## [306] {frozen vegetables}	=> {pork}	0.006405694
## [307] {pork}	=> {frozen vegetables}	0.006405694
## [308] {frozen vegetables}	=> {frankfurter}	0.005083884
## [309] {frozen vegetables}	=> {margarine}	0.005083884
## [310] {frozen vegetables}	=> {butter}	0.005795628
## [311] {butter}	=> {frozen vegetables}	0.005795628
## [312] {frozen vegetables}	=> {domestic eggs}	0.005185562
## [313] {frozen vegetables}	=> {fruit/vegetable juice}	0.007829181
## [314] {fruit/vegetable juice}	=> {frozen vegetables}	0.007829181
## [315] {frozen vegetables}	=> {whipped/sour cream}	0.007930859
## [316] {whipped/sour cream}	=> {frozen vegetables}	0.007930859
## [317] {frozen vegetables}	=> {pip fruit}	0.007320793
## [318] {frozen vegetables}	=> {citrus fruit}	0.006609049
## [319] {frozen vegetables}	=> {sausage}	0.005998983
## [320] {frozen vegetables}	=> {bottled water}	0.006202339
## [321] {frozen vegetables}	=> {tropical fruit}	0.008744281
## [322] {frozen vegetables}	=> {root vegetables}	0.011591256
## [323] {root vegetables}	=> {frozen vegetables}	0.011591256
## [324] {frozen vegetables}	=> {soda}	0.008642603
## [325] {frozen vegetables}	=> {yogurt}	0.012404677
## [326] {frozen vegetables}	=> {rolls/buns}	0.010167768
## [327] {frozen vegetables}	=> {other vegetables}	0.017793594
## [328] {frozen vegetables}	=> {whole milk}	0.020437214
## [329] {beef}	=> {pork}	0.007625826
## [330] {pork}	=> {beef}	0.007625826
## [331] {beef}	=> {margarine}	0.006202339
## [332] {margarine}	=> {beef}	0.006202339
## [333] {beef}	=> {butter}	0.005795628
## [334] {butter}	=> {beef}	0.005795628
## [335] {beef}	=> {newspapers}	0.006405694
## [336] {beef}	=> {domestic eggs}	0.005998983
## [337] {beef}	=> {whipped/sour cream}	0.006710727
## [338] {beef}	=> {pastry}	0.006304016
## [339] {beef}	=> {citrus fruit}	0.008439248
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## [341] {beef}	=> {sausage}	0.005592272
## [342] {beef}	=> {bottled water}	0.006202339
## [343] {beef}	=> {tropical fruit}	0.007625826
## [344] {beef}	=> {root vegetables}	0.017386884
## [345] {root vegetables}	=> {beef}	0.017386884
## [346] {beef}	=> {soda}	0.008134215
## [347] {beef}	=> {yogurt}	0.011692933
## [348] {beef}	=> {rolls/buns}	0.013624809
## [349] {beef}	=> {other vegetables}	0.019725470

```

## [350] {other vegetables}          => {beef}          0.019725470
## [351] {beef}                     => {whole milk}  0.021250635
## [352] {curd}                     => {margarine}    0.006304016
## [353] {margarine}                => {curd}         0.006304016
## [354] {curd}                     => {butter}       0.006812405
## [355] {butter}                   => {curd}         0.006812405
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## [359] {curd}                     => {whipped/sour cream} 0.010472801
## [360] {whipped/sour cream}      => {curd}         0.010472801
## [361] {curd}                     => {pip fruit}   0.007829181
## [362] {pip fruit}                => {curd}         0.007829181
## [363] {curd}                     => {pastry}       0.007524148
## [364] {curd}                     => {citrus fruit} 0.007117438
## [365] {curd}                     => {shopping bags} 0.005388917
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## [367] {curd}                     => {bottled water} 0.006100661
## [368] {curd}                     => {tropical fruit} 0.010269446
## [369] {curd}                     => {root vegetables} 0.010879512
## [370] {curd}                     => {soda}         0.008134215
## [371] {curd}                     => {yogurt}       0.017285206
## [372] {yogurt}                   => {curd}         0.017285206
## [373] {curd}                     => {rolls/buns}   0.010066090
## [374] {curd}                     => {other vegetables} 0.017183528
## [375] {curd}                     => {whole milk}   0.026131164
## [376] {whole milk}               => {curd}         0.026131164
## [377] {napkins}                  => {newspapers}   0.006202339
## [378] {napkins}                  => {domestic eggs} 0.005998983
## [379] {napkins}                  => {fruit/vegetable juice} 0.006914082
## [380] {napkins}                  => {whipped/sour cream} 0.007219115
## [381] {whipped/sour cream}      => {napkins}       0.007219115
## [382] {napkins}                  => {pip fruit}   0.006710727
## [383] {napkins}                  => {pastry}       0.007015760
## [384] {napkins}                  => {citrus fruit} 0.007625826
## [385] {napkins}                  => {shopping bags} 0.007219115
## [386] {napkins}                  => {sausage}      0.006710727
## [387] {napkins}                  => {bottled water} 0.008642603
## [388] {napkins}                  => {tropical fruit} 0.010066090
## [389] {napkins}                  => {root vegetables} 0.009964413
## [390] {napkins}                  => {soda}         0.011997966
## [391] {napkins}                  => {yogurt}       0.012302999
## [392] {napkins}                  => {rolls/buns}   0.011692933
## [393] {napkins}                  => {other vegetables} 0.014438231
## [394] {napkins}                  => {whole milk}   0.019725470
## [395] {pork}                     => {frankfurter}  0.005897306
## [396] {frankfurter}              => {pork}         0.005897306
## [397] {pork}                     => {margarine}    0.006405694
## [398] {margarine}                => {pork}         0.006405694
## [399] {pork}                     => {newspapers}   0.006609049
## [400] {pork}                     => {whipped/sour cream} 0.008235892
## [401] {whipped/sour cream}      => {pork}         0.008235892
## [402] {pork}                     => {pip fruit}   0.006100661
## [403] {pork}                     => {pastry}       0.006304016

```

```

## [404] {pork}          => {citrus fruit}          0.006507372
## [405] {pork}          => {shopping bags}        0.006405694
## [406] {pork}          => {sausage}              0.006507372
## [407] {pork}          => {bottled water}         0.007422471
## [408] {pork}          => {tropical fruit}        0.008540925
## [409] {pork}          => {root vegetables}       0.013624809
## [410] {root vegetables} => {pork}                  0.013624809
## [411] {pork}          => {soda}                  0.011896289
## [412] {pork}          => {yogurt}                0.009557702
## [413] {pork}          => {rolls/buns}            0.011286223
## [414] {pork}          => {other vegetables}      0.021657346
## [415] {other vegetables} => {pork}                  0.021657346
## [416] {pork}          => {whole milk}             0.022165735
## [417] {frankfurter}    => {brown bread}            0.007117438
## [418] {brown bread}    => {frankfurter}            0.007117438
## [419] {frankfurter}    => {margarine}              0.006405694
## [420] {margarine}      => {frankfurter}            0.006405694
## [421] {frankfurter}    => {domestic eggs}          0.007015760
## [422] {domestic eggs}  => {frankfurter}            0.007015760
## [423] {frankfurter}    => {whipped/sour cream}    0.006202339
## [424] {frankfurter}    => {pip fruit}              0.007219115
## [425] {frankfurter}    => {pastry}                 0.008337570
## [426] {frankfurter}    => {citrus fruit}            0.006507372
## [427] {frankfurter}    => {shopping bags}          0.008235892
## [428] {frankfurter}    => {sausage}                0.010066090
## [429] {sausage}         => {frankfurter}            0.010066090
## [430] {frankfurter}    => {bottled water}           0.007320793
## [431] {frankfurter}    => {tropical fruit}         0.009456024
## [432] {frankfurter}    => {root vegetables}        0.010167768
## [433] {frankfurter}    => {soda}                  0.011286223
## [434] {frankfurter}    => {yogurt}                0.011184545
## [435] {frankfurter}    => {rolls/buns}            0.019217082
## [436] {rolls/buns}     => {frankfurter}            0.019217082
## [437] {frankfurter}    => {other vegetables}       0.016471784
## [438] {frankfurter}    => {whole milk}             0.020538892
## [439] {margarine}       => {bottled beer}             0.006100661
## [440] {butter}          => {bottled beer}             0.005795628
## [441] {bottled beer}    => {bottled water}            0.015760041
## [442] {bottled water}   => {bottled beer}             0.015760041
## [443] {bottled beer}    => {tropical fruit}          0.008235892
## [444] {bottled beer}    => {root vegetables}        0.009659380
## [445] {bottled beer}    => {soda}                  0.016980173
## [446] {bottled beer}    => {yogurt}                0.009252669
## [447] {bottled beer}    => {rolls/buns}            0.013624809
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## [449] {bottled beer}    => {whole milk}              0.020437214
## [450] {brown bread}     => {margarine}              0.006507372
## [451] {margarine}        => {brown bread}             0.006507372
## [452] {butter}          => {brown bread}             0.005795628
## [453] {brown bread}     => {newspapers}             0.007625826
## [454] {brown bread}     => {domestic eggs}           0.006812405
## [455] {domestic eggs}   => {brown bread}             0.006812405
## [456] {brown bread}     => {fruit/vegetable juice}  0.008337570
## [457] {fruit/vegetable juice} => {brown bread}           0.008337570

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```

## [458] {brown bread}          => {pip fruit}          0.007625826
## [459] {pip fruit}           => {brown bread}        0.007625826
## [460] {brown bread}          => {pastry}             0.009659380
## [461] {pastry}               => {brown bread}        0.009659380
## [462] {brown bread}          => {citrus fruit}        0.008337570
## [463] {citrus fruit}         => {brown bread}        0.008337570
## [464] {brown bread}          => {shopping bags}      0.009252669
## [465] {brown bread}          => {sausage}            0.010676157
## [466] {sausage}              => {brown bread}        0.010676157
## [467] {brown bread}          => {bottled water}       0.008235892
## [468] {brown bread}          => {tropical fruit}     0.010676157
## [469] {tropical fruit}       => {brown bread}        0.010676157
## [470] {brown bread}          => {root vegetables}    0.010167768
## [471] {brown bread}          => {soda}                0.012608033
## [472] {brown bread}          => {yogurt}              0.014539908
## [473] {yogurt}               => {brown bread}        0.014539908
## [474] {brown bread}          => {rolls/buns}         0.012608033
## [475] {brown bread}          => {other vegetables}   0.018708693
## [476] {brown bread}          => {whole milk}          0.025216065
## [477] {margarine}            => {butter}              0.006710727
## [478] {butter}               => {margarine}           0.006710727
## [479] {margarine}            => {newspapers}          0.007117438
## [480] {margarine}            => {domestic eggs}       0.008337570
## [481] {domestic eggs}         => {margarine}           0.008337570
## [482] {margarine}            => {fruit/vegetable juice} 0.006202339
## [483] {margarine}            => {whipped/sour cream} 0.006812405
## [484] {margarine}            => {pip fruit}           0.008540925
## [485] {pip fruit}             => {margarine}           0.008540925
## [486] {margarine}            => {pastry}              0.006812405
## [487] {margarine}            => {citrus fruit}         0.007930859
## [488] {margarine}            => {sausage}             0.007117438
## [489] {margarine}            => {bottled water}        0.010269446
## [490] {margarine}            => {tropical fruit}      0.009354347
## [491] {margarine}            => {root vegetables}     0.011082867
## [492] {root vegetables}       => {margarine}           0.011082867
## [493] {margarine}            => {soda}                0.010167768
## [494] {margarine}            => {yogurt}              0.014234875
## [495] {yogurt}               => {margarine}           0.014234875
## [496] {margarine}            => {rolls/buns}          0.014743264
## [497] {margarine}            => {other vegetables}    0.019725470
## [498] {other vegetables}     => {margarine}           0.019725470
## [499] {margarine}            => {whole milk}          0.024199288
## [500] {butter}               => {newspapers}          0.005795628
## [501] {butter}               => {domestic eggs}       0.009659380
## [502] {domestic eggs}         => {butter}              0.009659380
## [503] {butter}               => {fruit/vegetable juice} 0.008032537
## [504] {fruit/vegetable juice} => {butter}              0.008032537
## [505] {butter}               => {whipped/sour cream} 0.010167768
## [506] {whipped/sour cream}    => {butter}              0.010167768
## [507] {butter}               => {pip fruit}           0.007320793
## [508] {butter}               => {pastry}              0.007625826
## [509] {butter}               => {citrus fruit}         0.009150991
## [510] {citrus fruit}          => {butter}              0.009150991
## [511] {butter}               => {sausage}             0.008642603

```

## [512] {butter}	=> {bottled water}	0.008947636
## [513] {butter}	=> {tropical fruit}	0.009964413
## [514] {butter}	=> {root vegetables}	0.012913066
## [515] {root vegetables}	=> {butter}	0.012913066
## [516] {butter}	=> {soda}	0.008845958
## [517] {butter}	=> {yogurt}	0.014641586
## [518] {yogurt}	=> {butter}	0.014641586
## [519] {butter}	=> {rolls/buns}	0.013421454
## [520] {butter}	=> {other vegetables}	0.020030503
## [521] {other vegetables}	=> {butter}	0.020030503
## [522] {butter}	=> {whole milk}	0.027554652
## [523] {whole milk}	=> {butter}	0.027554652
## [524] {domestic eggs}	=> {newspapers}	0.006914082
## [525] {newspapers}	=> {fruit/vegetable juice}	0.008235892
## [526] {fruit/vegetable juice}	=> {newspapers}	0.008235892
## [527] {whipped/sour cream}	=> {newspapers}	0.007219115
## [528] {newspapers}	=> {pastry}	0.008439248
## [529] {newspapers}	=> {citrus fruit}	0.008337570
## [530] {citrus fruit}	=> {newspapers}	0.008337570
## [531] {newspapers}	=> {sausage}	0.008032537
## [532] {newspapers}	=> {bottled water}	0.011286223
## [533] {bottled water}	=> {newspapers}	0.011286223
## [534] {newspapers}	=> {tropical fruit}	0.011794611
## [535] {tropical fruit}	=> {newspapers}	0.011794611
## [536] {newspapers}	=> {root vegetables}	0.011489578
## [537] {root vegetables}	=> {newspapers}	0.011489578
## [538] {newspapers}	=> {soda}	0.014641586
## [539] {newspapers}	=> {yogurt}	0.015353330
## [540] {yogurt}	=> {newspapers}	0.015353330
## [541] {newspapers}	=> {rolls/buns}	0.019725470
## [542] {rolls/buns}	=> {newspapers}	0.019725470
## [543] {newspapers}	=> {other vegetables}	0.019318760
## [544] {newspapers}	=> {whole milk}	0.027351296
## [545] {whole milk}	=> {newspapers}	0.027351296
## [546] {domestic eggs}	=> {fruit/vegetable juice}	0.008032537
## [547] {fruit/vegetable juice}	=> {domestic eggs}	0.008032537
## [548] {domestic eggs}	=> {whipped/sour cream}	0.009964413
## [549] {whipped/sour cream}	=> {domestic eggs}	0.009964413
## [550] {domestic eggs}	=> {pip fruit}	0.008642603
## [551] {pip fruit}	=> {domestic eggs}	0.008642603
## [552] {domestic eggs}	=> {pastry}	0.009049314
## [553] {pastry}	=> {domestic eggs}	0.009049314
## [554] {domestic eggs}	=> {citrus fruit}	0.010371124
## [555] {citrus fruit}	=> {domestic eggs}	0.010371124
## [556] {domestic eggs}	=> {shopping bags}	0.009049314
## [557] {domestic eggs}	=> {sausage}	0.009557702
## [558] {sausage}	=> {domestic eggs}	0.009557702
## [559] {domestic eggs}	=> {bottled water}	0.009150991
## [560] {domestic eggs}	=> {tropical fruit}	0.011387900
## [561] {tropical fruit}	=> {domestic eggs}	0.011387900
## [562] {domestic eggs}	=> {root vegetables}	0.014336553
## [563] {root vegetables}	=> {domestic eggs}	0.014336553
## [564] {domestic eggs}	=> {soda}	0.012404677
## [565] {domestic eggs}	=> {yogurt}	0.014336553

```

## [566] {yogurt}          => {domestic eggs}          0.014336553
## [567] {domestic eggs}  => {rolls/buns}           0.015658363
## [568] {domestic eggs}  => {other vegetables}      0.022267412
## [569] {other vegetables} => {domestic eggs}          0.022267412
## [570] {domestic eggs}  => {whole milk}            0.029994916
## [571] {whole milk}      => {domestic eggs}          0.029994916
## [572] {fruit/vegetable juice} => {whipped/sour cream} 0.009049314
## [573] {whipped/sour cream} => {fruit/vegetable juice} 0.009049314
## [574] {fruit/vegetable juice} => {pip fruit}           0.009557702
## [575] {pip fruit}        => {fruit/vegetable juice} 0.009557702
## [576] {fruit/vegetable juice} => {pastry}              0.008540925
## [577] {fruit/vegetable juice} => {citrus fruit}         0.010371124
## [578] {citrus fruit}      => {fruit/vegetable juice} 0.010371124
## [579] {fruit/vegetable juice} => {shopping bags}        0.010676157
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## [581] {fruit/vegetable juice} => {sausage}             0.010066090
## [582] {sausage}          => {fruit/vegetable juice} 0.010066090
## [583] {fruit/vegetable juice} => {bottled water}        0.014234875
## [584] {bottled water}     => {fruit/vegetable juice} 0.014234875
## [585] {fruit/vegetable juice} => {tropical fruit}       0.013726487
## [586] {tropical fruit}    => {fruit/vegetable juice} 0.013726487
## [587] {fruit/vegetable juice} => {root vegetables}      0.011997966
## [588] {root vegetables}   => {fruit/vegetable juice} 0.011997966
## [589] {fruit/vegetable juice} => {soda}                0.018403660
## [590] {soda}              => {fruit/vegetable juice} 0.018403660
## [591] {fruit/vegetable juice} => {yogurt}              0.018708693
## [592] {yogurt}            => {fruit/vegetable juice} 0.018708693
## [593] {fruit/vegetable juice} => {rolls/buns}          0.014539908
## [594] {fruit/vegetable juice} => {other vegetables}     0.021047280
## [595] {other vegetables}  => {fruit/vegetable juice} 0.021047280
## [596] {fruit/vegetable juice} => {whole milk}           0.026639553
## [597] {whole milk}        => {fruit/vegetable juice} 0.026639553
## [598] {whipped/sour cream} => {pip fruit}            0.009252669
## [599] {pip fruit}         => {whipped/sour cream}    0.009252669
## [600] {whipped/sour cream} => {pastry}              0.007524148
## [601] {whipped/sour cream} => {citrus fruit}          0.010879512
## [602] {citrus fruit}      => {whipped/sour cream}    0.010879512
## [603] {whipped/sour cream} => {shopping bags}        0.007930859
## [604] {whipped/sour cream} => {sausage}             0.009049314
## [605] {whipped/sour cream} => {bottled water}         0.008744281
## [606] {whipped/sour cream} => {tropical fruit}       0.013828165
## [607] {tropical fruit}    => {whipped/sour cream}    0.013828165
## [608] {whipped/sour cream} => {root vegetables}      0.017081851
## [609] {root vegetables}   => {whipped/sour cream}    0.017081851
## [610] {whipped/sour cream} => {soda}                0.011591256
## [611] {whipped/sour cream} => {yogurt}              0.020742247
## [612] {yogurt}            => {whipped/sour cream}    0.020742247
## [613] {whipped/sour cream} => {rolls/buns}          0.014641586
## [614] {whipped/sour cream} => {other vegetables}     0.028876462
## [615] {other vegetables}  => {whipped/sour cream}    0.028876462
## [616] {whipped/sour cream} => {whole milk}           0.032231825
## [617] {whole milk}        => {whipped/sour cream}    0.032231825
## [618] {pip fruit}         => {pastry}              0.010676157
## [619] {pastry}            => {pip fruit}           0.010676157

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## [620] {pip fruit}	=> {citrus fruit}	0.013828165
## [621] {citrus fruit}	=> {pip fruit}	0.013828165
## [622] {pip fruit}	=> {shopping bags}	0.009354347
## [623] {pip fruit}	=> {sausage}	0.010777834
## [624] {sausage}	=> {pip fruit}	0.010777834
## [625] {pip fruit}	=> {bottled water}	0.010574479
## [626] {pip fruit}	=> {tropical fruit}	0.020437214
## [627] {tropical fruit}	=> {pip fruit}	0.020437214
## [628] {pip fruit}	=> {root vegetables}	0.015556685
## [629] {root vegetables}	=> {pip fruit}	0.015556685
## [630] {pip fruit}	=> {soda}	0.013319776
## [631] {pip fruit}	=> {yogurt}	0.017996950
## [632] {yogurt}	=> {pip fruit}	0.017996950
## [633] {pip fruit}	=> {rolls/buns}	0.013929842
## [634] {pip fruit}	=> {other vegetables}	0.026131164
## [635] {other vegetables}	=> {pip fruit}	0.026131164
## [636] {pip fruit}	=> {whole milk}	0.030096594
## [637] {whole milk}	=> {pip fruit}	0.030096594
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## [640] {pastry}	=> {shopping bags}	0.011896289
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## [642] {pastry}	=> {sausage}	0.012506355
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## [644] {pastry}	=> {bottled water}	0.008947636
## [645] {pastry}	=> {tropical fruit}	0.013218099
## [646] {tropical fruit}	=> {pastry}	0.013218099
## [647] {pastry}	=> {root vegetables}	0.010981190
## [648] {root vegetables}	=> {pastry}	0.010981190
## [649] {pastry}	=> {soda}	0.021047280
## [650] {soda}	=> {pastry}	0.021047280
## [651] {pastry}	=> {yogurt}	0.017691917
## [652] {yogurt}	=> {pastry}	0.017691917
## [653] {pastry}	=> {rolls/buns}	0.020945602
## [654] {rolls/buns}	=> {pastry}	0.020945602
## [655] {pastry}	=> {other vegetables}	0.022572445
## [656] {other vegetables}	=> {pastry}	0.022572445
## [657] {pastry}	=> {whole milk}	0.033248602
## [658] {whole milk}	=> {pastry}	0.033248602
## [659] {citrus fruit}	=> {shopping bags}	0.009761057
## [660] {citrus fruit}	=> {sausage}	0.011286223
## [661] {sausage}	=> {citrus fruit}	0.011286223
## [662] {citrus fruit}	=> {bottled water}	0.013523132
## [663] {bottled water}	=> {citrus fruit}	0.013523132
## [664] {citrus fruit}	=> {tropical fruit}	0.019928826
## [665] {tropical fruit}	=> {citrus fruit}	0.019928826
## [666] {citrus fruit}	=> {root vegetables}	0.017691917
## [667] {root vegetables}	=> {citrus fruit}	0.017691917
## [668] {citrus fruit}	=> {soda}	0.012811388
## [669] {citrus fruit}	=> {yogurt}	0.021657346
## [670] {yogurt}	=> {citrus fruit}	0.021657346
## [671] {citrus fruit}	=> {rolls/buns}	0.016776817
## [672] {citrus fruit}	=> {other vegetables}	0.028876462
## [673] {other vegetables}	=> {citrus fruit}	0.028876462

## [674] {citrus fruit}	=> {whole milk}	0.030503305
## [675] {whole milk}	=> {citrus fruit}	0.030503305
## [676] {shopping bags}	=> {sausage}	0.015658363
## [677] {sausage}	=> {shopping bags}	0.015658363
## [678] {shopping bags}	=> {bottled water}	0.010981190
## [679] {shopping bags}	=> {tropical fruit}	0.013523132
## [680] {tropical fruit}	=> {shopping bags}	0.013523132
## [681] {shopping bags}	=> {root vegetables}	0.012811388
## [682] {root vegetables}	=> {shopping bags}	0.012811388
## [683] {shopping bags}	=> {soda}	0.024605999
## [684] {soda}	=> {shopping bags}	0.024605999
## [685] {shopping bags}	=> {yogurt}	0.015251652
## [686] {yogurt}	=> {shopping bags}	0.015251652
## [687] {shopping bags}	=> {rolls/buns}	0.019522115
## [688] {rolls/buns}	=> {shopping bags}	0.019522115
## [689] {shopping bags}	=> {other vegetables}	0.023182511
## [690] {other vegetables}	=> {shopping bags}	0.023182511
## [691] {shopping bags}	=> {whole milk}	0.024504321
## [692] {sausage}	=> {bottled water}	0.011997966
## [693] {bottled water}	=> {sausage}	0.011997966
## [694] {sausage}	=> {tropical fruit}	0.013929842
## [695] {tropical fruit}	=> {sausage}	0.013929842
## [696] {sausage}	=> {root vegetables}	0.014946619
## [697] {root vegetables}	=> {sausage}	0.014946619
## [698] {sausage}	=> {soda}	0.024300966
## [699] {soda}	=> {sausage}	0.024300966
## [700] {sausage}	=> {yogurt}	0.019623793
## [701] {yogurt}	=> {sausage}	0.019623793
## [702] {sausage}	=> {rolls/buns}	0.030604982
## [703] {rolls/buns}	=> {sausage}	0.030604982
## [704] {sausage}	=> {other vegetables}	0.026944586
## [705] {other vegetables}	=> {sausage}	0.026944586
## [706] {sausage}	=> {whole milk}	0.029893238
## [707] {whole milk}	=> {sausage}	0.029893238
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## [710] {bottled water}	=> {root vegetables}	0.015658363
## [711] {root vegetables}	=> {bottled water}	0.015658363
## [712] {bottled water}	=> {soda}	0.028978139
## [713] {soda}	=> {bottled water}	0.028978139
## [714] {bottled water}	=> {yogurt}	0.022979156
## [715] {yogurt}	=> {bottled water}	0.022979156
## [716] {bottled water}	=> {rolls/buns}	0.024199288
## [717] {rolls/buns}	=> {bottled water}	0.024199288
## [718] {bottled water}	=> {other vegetables}	0.024809354
## [719] {other vegetables}	=> {bottled water}	0.024809354
## [720] {bottled water}	=> {whole milk}	0.034367056
## [721] {whole milk}	=> {bottled water}	0.034367056
## [722] {tropical fruit}	=> {root vegetables}	0.021047280
## [723] {root vegetables}	=> {tropical fruit}	0.021047280
## [724] {tropical fruit}	=> {soda}	0.020843925
## [725] {soda}	=> {tropical fruit}	0.020843925
## [726] {tropical fruit}	=> {yogurt}	0.029283172
## [727] {yogurt}	=> {tropical fruit}	0.029283172

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## [728] {tropical fruit}          => {rolls/buns}          0.024605999
## [729] {rolls/buns}             => {tropical fruit} 0.024605999
## [730] {tropical fruit}          => {other vegetables} 0.035892222
## [731] {other vegetables}        => {tropical fruit} 0.035892222
## [732] {tropical fruit}          => {whole milk}        0.042297916
## [733] {whole milk}              => {tropical fruit} 0.042297916
## [734] {root vegetables}         => {soda}              0.018607016
## [735] {soda}                   => {root vegetables} 0.018607016
## [736] {root vegetables}         => {yogurt}            0.025826131
## [737] {yogurt}                 => {root vegetables} 0.025826131
## [738] {root vegetables}         => {rolls/buns}        0.024300966
## [739] {rolls/buns}             => {root vegetables} 0.024300966
## [740] {root vegetables}         => {other vegetables} 0.047381800
## [741] {other vegetables}        => {root vegetables} 0.047381800
## [742] {root vegetables}         => {whole milk}        0.048906965
## [743] {whole milk}              => {root vegetables} 0.048906965
## [744] {soda}                   => {yogurt}            0.027351296
## [745] {yogurt}                 => {soda}              0.027351296
## [746] {soda}                   => {rolls/buns}        0.038332486
## [747] {rolls/buns}             => {soda}              0.038332486
## [748] {soda}                   => {other vegetables} 0.032740214
## [749] {other vegetables}        => {soda}              0.032740214
## [750] {soda}                   => {whole milk}        0.040061007
## [751] {whole milk}              => {soda}              0.040061007
## [752] {yogurt}                 => {rolls/buns}        0.034367056
## [753] {rolls/buns}             => {yogurt}            0.034367056
## [754] {yogurt}                 => {other vegetables} 0.043416370
## [755] {other vegetables}        => {yogurt}            0.043416370
## [756] {yogurt}                 => {whole milk}        0.056024403
## [757] {whole milk}              => {yogurt}            0.056024403
## [758] {rolls/buns}             => {other vegetables} 0.042602949
## [759] {other vegetables}        => {rolls/buns}        0.042602949
## [760] {rolls/buns}             => {whole milk}        0.056634469
## [761] {whole milk}              => {rolls/buns}        0.056634469
## [762] {other vegetables}        => {whole milk}        0.074834774
## [763] {whole milk}              => {other vegetables} 0.074834774

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## [5]  0.1395018 1.00000000 1.0000000 1372
## [6]  0.1839349 1.00000000 1.0000000 1809
## [7]  0.1934926 1.00000000 1.0000000 1903
## [8]  0.2555160 1.00000000 1.0000000 2513
## [9]  0.4230769 0.01321810 1.6557746  55
## [10] 0.3410405 0.01759024 1.7625502  59
## [11] 0.3005780 0.01759024 1.1763569  52
## [12] 0.4322034 0.01199797 1.6914924  51
## [13] 0.4000000 0.01728521 1.5654596  68
## [14] 0.2560386 0.02104728 1.4683033  53
## [15] 0.2415459 0.02104728 0.9453259  50
## [16] 0.3378378 0.01504830 1.7459985  50
## [17] 0.4054054 0.01504830 1.5866145  60

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## [19] 0.4750000 0.01626843 2.4548739 76
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## [26] 0.2109375 0.02602949 1.5120775 54
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## [28] 0.1992188 0.02602949 1.0295935 51
## [29] 0.2617188 0.02602949 1.0242753 67
## [30] 0.2439024 0.02501271 1.3987058 60
## [31] 0.2032520 0.02501271 1.0504381 50
## [32] 0.2357724 0.02501271 0.9227303 58
## [33] 0.3333333 0.01921708 1.7227185 63
## [34] 0.4656085 0.01921708 1.8222281 88
## [35] 0.3579545 0.01789527 1.8499648 63
## [36] 0.3977273 0.01789527 1.5565650 70
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## [38] 0.5229885 0.01769192 2.0467935 91
## [39] 0.3625731 0.01738688 1.8738342 62
## [40] 0.4853801 0.01738688 1.8996074 83
## [41] 0.3511905 0.01708185 2.5174623 59
## [42] 0.3154762 0.01708185 1.7151511 53
## [43] 0.4166667 0.01708185 2.1533981 70
## [44] 0.4404762 0.01708185 1.7238692 74
## [45] 0.2639405 0.02735130 1.5136181 71
## [46] 0.2044610 0.02735130 1.1115940 55
## [47] 0.2044610 0.02735130 1.0566861 55
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## [50] 0.2580645 0.02836807 1.4799210 72
## [51] 0.1971326 0.02836807 1.0188120 55
## [52] 0.2473118 0.02836807 0.9678917 69
## [53] 0.2727273 0.02236909 2.5991015 60
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## [763] 0.2928770 0.25551601 1.5136341 736

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## [2] {}  => {tropical fruit} 0.104931368
## [3] {}  => {root vegetables} 0.108998475
## [4] {}  => {soda} 0.174377224
## [5] {}  => {yogurt} 0.139501779
## [6] {}  => {rolls/buns} 0.183934926
## [7] {}  => {other vegetables} 0.193492628
## [8] {}  => {whole milk} 0.255516014

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## [9]  {cake bar}          => {whole milk}          0.005592272
## [10] {dishes}           => {other vegetables} 0.005998983
## [11] {dishes}           => {whole milk}          0.005287239
## [12] {mustard}          => {whole milk}          0.005185562
## [13] {pot plants}        => {whole milk}          0.006914082
## [14] {chewing gum}       => {soda}                0.005388917
## [15] {chewing gum}       => {whole milk}          0.005083884
## [16] {canned fish}        => {other vegetables} 0.005083884
## [17] {pasta}             => {whole milk}          0.006100661
## [18] {herbs}             => {root vegetables} 0.007015760
## [19] {herbs}             => {other vegetables} 0.007727504
## [20] {herbs}             => {whole milk}          0.007727504
## [21] {processed cheese}  => {soda}                0.005287239
## [22] {processed cheese}  => {other vegetables} 0.005490595
## [23] {processed cheese}  => {whole milk}          0.007015760
## [24] {semi-finished bread} => {other vegetables} 0.005185562
## [25] {semi-finished bread} => {whole milk}          0.007117438
## [26] {beverages}          => {yogurt}              0.005490595
## [27] {beverages}          => {rolls/buns}         0.005388917
## [28] {beverages}          => {other vegetables} 0.005185562
## [29] {beverages}          => {whole milk}          0.006812405
## [30] {ice cream}          => {soda}                0.006100661
## [31] {ice cream}          => {other vegetables} 0.005083884
## [32] {ice cream}          => {whole milk}          0.005897306
## [33] {detergent}          => {other vegetables} 0.006405694
## [34] {detergent}          => {whole milk}          0.008947636
## [35] {pickled vegetables} => {other vegetables} 0.006405694
## [36] {pickled vegetables} => {whole milk}          0.007117438
## [37] {baking powder}       => {other vegetables} 0.007320793
## [38] {baking powder}       => {whole milk}          0.009252669
## [39] {flour}              => {other vegetables} 0.006304016
## [40] {flour}              => {whole milk}          0.008439248
## [41] {soft cheese}         => {yogurt}              0.005998983
## [42] {soft cheese}         => {rolls/buns}         0.005388917
## [43] {soft cheese}         => {other vegetables} 0.007117438
## [44] {soft cheese}         => {whole milk}          0.007524148
## [45] {specialty bar}        => {soda}                0.007219115
## [46] {specialty bar}        => {rolls/buns}         0.005592272
## [47] {specialty bar}        => {other vegetables} 0.005592272
## [48] {specialty bar}        => {whole milk}          0.006507372
## [49] {misc. beverages}      => {bottled water}        0.005287239
## [50] {misc. beverages}      => {soda}                0.007320793
## [51] {misc. beverages}      => {other vegetables} 0.005592272
## [52] {misc. beverages}      => {whole milk}          0.007015760
## [53] {grapes}              => {tropical fruit}       0.006100661
## [54] {grapes}              => {other vegetables} 0.009049314
## [55] {grapes}              => {whole milk}          0.007320793
## [56] {cat food}             => {yogurt}              0.006202339
## [57] {cat food}             => {other vegetables} 0.006507372
## [58] {cat food}             => {whole milk}          0.008845958
## [59] {specialty chocolate}  => {soda}                0.006304016
## [60] {specialty chocolate}  => {rolls/buns}         0.005592272
## [61] {specialty chocolate}  => {other vegetables} 0.006100661
## [62] {specialty chocolate}  => {whole milk}          0.008032537

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## [63] {meat}          => {sausage}          0.005287239
## [64] {meat}          => {root vegetables} 0.005083884
## [65] {meat}          => {soda}              0.005490595
## [66] {meat}          => {yogurt}             0.005287239
## [67] {meat}          => {rolls/buns}        0.006914082
## [68] {meat}          => {other vegetables} 0.009964413
## [69] {meat}          => {whole milk}         0.009964413
## [70] {frozen meals}  => {tropical fruit}    0.005490595
## [71] {frozen meals}  => {soda}              0.006202339
## [72] {frozen meals}  => {yogurt}             0.006202339
## [73] {frozen meals}  => {other vegetables} 0.007524148
## [74] {frozen meals}  => {whole milk}         0.009862735
## [75] {hard cheese}  => {sausage}            0.005185562
## [76] {hard cheese}  => {root vegetables} 0.005592272
## [77] {hard cheese}  => {yogurt}              0.006405694
## [78] {hard cheese}  => {rolls/buns}        0.005897306
## [79] {hard cheese}  => {other vegetables} 0.009456024
## [80] {hard cheese}  => {whole milk}          0.010066090
## [81] {butter milk}   => {pip fruit}          0.005083884
## [82] {butter milk}   => {tropical fruit}    0.005490595
## [83] {butter milk}   => {root vegetables} 0.005083884
## [84] {butter milk}   => {yogurt}              0.008540925
## [85] {butter milk}   => {rolls/buns}        0.007625826
## [86] {butter milk}   => {other vegetables} 0.010371124
## [87] {butter milk}   => {whole milk}          0.011591256
## [88] {candy}          => {tropical fruit}    0.005388917
## [89] {candy}          => {soda}              0.008642603
## [90] {candy}          => {yogurt}             0.005490595
## [91] {candy}          => {rolls/buns}        0.007117438
## [92] {candy}          => {other vegetables} 0.006914082
## [93] {candy}          => {whole milk}          0.008235892
## [94] {ham}             => {white bread}        0.005083884
## [95] {white bread}   => {ham}                0.005083884
## [96] {ham}             => {tropical fruit}    0.005388917
## [97] {ham}             => {yogurt}             0.006710727
## [98] {ham}             => {rolls/buns}        0.006914082
## [99] {ham}             => {other vegetables} 0.009150991
## [100] {ham}            => {whole milk}          0.011489578
## [101] {sliced cheese} => {sausage}            0.007015760
## [102] {sliced cheese} => {tropical fruit}    0.005287239
## [103] {sliced cheese} => {root vegetables} 0.005592272
## [104] {sliced cheese} => {soda}              0.005083884
## [105] {sliced cheese} => {yogurt}              0.008032537
## [106] {sliced cheese} => {rolls/buns}        0.007625826
## [107] {sliced cheese} => {other vegetables} 0.009049314
## [108] {sliced cheese} => {whole milk}          0.010777834
## [109] {UHT-milk}       => {bottled water}       0.007320793
## [110] {UHT-milk}       => {soda}              0.007625826
## [111] {UHT-milk}       => {yogurt}             0.007422471
## [112] {UHT-milk}       => {rolls/buns}        0.006405694
## [113] {UHT-milk}       => {other vegetables} 0.008134215
## [114] {oil}             => {root vegetables} 0.007015760
## [115] {oil}             => {yogurt}              0.005287239
## [116] {oil}             => {rolls/buns}        0.005083884

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## [117] {oil}                                => {other vegetables} 0.009964413
## [118] {oil}                                => {whole milk}      0.011286223
## [119] {onions}                             => {whipped/sour cream} 0.005083884
## [120] {onions}                             => {citrus fruit}    0.005592272
## [121] {onions}                             => {bottled water}   0.005897306
## [122] {onions}                             => {tropical fruit} 0.005693950
## [123] {onions}                             => {root vegetables} 0.009456024
## [124] {onions}                             => {soda}            0.005287239
## [125] {onions}                             => {yogurt}          0.007219115
## [126] {onions}                             => {rolls/buns}     0.006812405
## [127] {onions}                             => {other vegetables} 0.014234875
## [128] {onions}                             => {whole milk}      0.012099644
## [129] {berries}                            => {whipped/sour cream} 0.009049314
## [130] {whipped/sour cream}                => {berries}         0.009049314
## [131] {berries}                            => {citrus fruit}    0.005388917
## [132] {berries}                            => {tropical fruit} 0.006710727
## [133] {berries}                            => {root vegetables} 0.006609049
## [134] {berries}                            => {soda}            0.007320793
## [135] {berries}                            => {yogurt}          0.010574479
## [136] {berries}                            => {rolls/buns}     0.006609049
## [137] {berries}                            => {other vegetables} 0.010269446
## [138] {berries}                            => {whole milk}      0.011794611
## [139] {hamburger meat}                   => {sausage}         0.005185562
## [140] {hamburger meat}                   => {root vegetables} 0.006202339
## [141] {hamburger meat}                   => {soda}            0.005795628
## [142] {hamburger meat}                   => {yogurt}          0.006507372
## [143] {hamburger meat}                   => {rolls/buns}     0.008642603
## [144] {hamburger meat}                   => {other vegetables} 0.013828165
## [145] {hamburger meat}                   => {whole milk}      0.014743264
## [146] {hygiene articles}                => {napkins}         0.006100661
## [147] {napkins}                           => {hygiene articles} 0.006100661
## [148] {hygiene articles}                => {citrus fruit}    0.005287239
## [149] {hygiene articles}                => {shopping bags} 0.005185562
## [150] {hygiene articles}                => {bottled water}   0.005693950
## [151] {hygiene articles}                => {tropical fruit} 0.006710727
## [152] {hygiene articles}                => {root vegetables} 0.005388917
## [153] {hygiene articles}                => {soda}            0.007015760
## [154] {hygiene articles}                => {yogurt}          0.007320793
## [155] {hygiene articles}                => {rolls/buns}     0.005897306
## [156] {hygiene articles}                => {other vegetables} 0.009557702
## [157] {hygiene articles}                => {whole milk}      0.012811388
## [158] {salty snack}                    => {fruit/vegetable juice} 0.005998983
## [159] {salty snack}                    => {whipped/sour cream} 0.005185562
## [160] {salty snack}                    => {pastry}          0.005185562
## [161] {salty snack}                    => {shopping bags} 0.005998983
## [162] {salty snack}                    => {sausage}         0.005287239
## [163] {salty snack}                    => {tropical fruit} 0.005592272
## [164] {salty snack}                    => {soda}            0.009354347
## [165] {salty snack}                    => {yogurt}          0.006202339
## [166] {salty snack}                    => {other vegetables} 0.010777834
## [167] {salty snack}                    => {whole milk}      0.011184545
## [168] {sugar}                           => {margarine}       0.005490595
## [169] {sugar}                           => {pastry}          0.005185562
## [170] {sugar}                           => {root vegetables} 0.006405694

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## [171] {sugar}          => {soda}          0.007320793
## [172] {sugar}          => {yogurt}        0.006914082
## [173] {sugar}          => {rolls/buns}   0.007015760
## [174] {sugar}          => {other vegetables} 0.010777834
## [175] {sugar}          => {whole milk}    0.015048297
## [176] {waffles}        => {chocolate}    0.005795628
## [177] {chocolate}      => {waffles}       0.005795628
## [178] {waffles}        => {whipped/sour cream} 0.005083884
## [179] {waffles}        => {pastry}        0.007015760
## [180] {waffles}        => {shopping bags} 0.005490595
## [181] {waffles}        => {tropical fruit} 0.006100661
## [182] {waffles}        => {root vegetables} 0.006609049
## [183] {waffles}        => {soda}          0.009557702
## [184] {waffles}        => {yogurt}        0.007524148
## [185] {waffles}        => {rolls/buns}   0.009150991
## [186] {waffles}        => {other vegetables} 0.010066090
## [187] {waffles}        => {whole milk}    0.012709710
## [188] {long life bakery product} => {chocolate} 0.005287239
## [189] {chocolate}      => {long life bakery product} 0.005287239
## [190] {long life bakery product} => {fruit/vegetable juice} 0.006202339
## [191] {long life bakery product} => {whipped/sour cream} 0.005795628
## [192] {long life bakery product} => {pastry}        0.005897306
## [193] {long life bakery product} => {shopping bags} 0.005388917
## [194] {long life bakery product} => {sausage}       0.005388917
## [195] {long life bakery product} => {tropical fruit} 0.006304016
## [196] {long life bakery product} => {root vegetables} 0.005287239
## [197] {long life bakery product} => {soda}          0.007625826
## [198] {long life bakery product} => {yogurt}        0.008744281
## [199] {long life bakery product} => {rolls/buns}   0.007930859
## [200] {long life bakery product} => {other vegetables} 0.010676157
## [201] {long life bakery product} => {whole milk}    0.013523132
## [202] {dessert}         => {curd}          0.005185562
## [203] {dessert}         => {fruit/vegetable juice} 0.005998983
## [204] {dessert}         => {pastry}        0.005388917
## [205] {dessert}         => {shopping bags} 0.006202339
## [206] {dessert}         => {sausage}       0.005897306
## [207] {dessert}         => {bottled water}   0.005185562
## [208] {dessert}         => {tropical fruit} 0.006304016
## [209] {dessert}         => {root vegetables} 0.005795628
## [210] {dessert}         => {soda}          0.009862735
## [211] {dessert}         => {yogurt}        0.009862735
## [212] {dessert}         => {rolls/buns}   0.006812405
## [213] {dessert}         => {other vegetables} 0.011591256
## [214] {dessert}         => {whole milk}    0.013726487
## [215] {canned beer}     => {shopping bags} 0.011387900
## [216] {shopping bags}   => {canned beer}    0.011387900
## [217] {canned beer}     => {bottled water}   0.008032537
## [218] {canned beer}     => {soda}          0.013828165
## [219] {canned beer}     => {rolls/buns}   0.011286223
## [220] {canned beer}     => {other vegetables} 0.009049314
## [221] {canned beer}     => {whole milk}    0.008845958
## [222] {cream cheese }   => {curd}          0.005083884
## [223] {cream cheese }   => {domestic eggs}  0.005083884
## [224] {cream cheese }   => {fruit/vegetable juice} 0.005693950

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## [225] {cream cheese } => {whipped/sour cream} 0.006405694
## [226] {cream cheese } => {pip fruit} 0.006100661
## [227] {cream cheese } => {citrus fruit} 0.005693950
## [228] {cream cheese } => {shopping bags} 0.005592272
## [229] {cream cheese } => {sausage} 0.005592272
## [230] {cream cheese } => {bottled water} 0.005897306
## [231] {cream cheese } => {tropical fruit} 0.007219115
## [232] {cream cheese } => {root vegetables} 0.007524148
## [233] {cream cheese } => {soda} 0.006812405
## [234] {cream cheese } => {yogurt} 0.012404677
## [235] {cream cheese } => {rolls/buns} 0.009964413
## [236] {cream cheese } => {other vegetables} 0.013726487
## [237] {cream cheese } => {whole milk} 0.016471784
## [238] {chicken} => {frozen vegetables} 0.006710727
## [239] {frozen vegetables} => {chicken} 0.006710727
## [240] {chicken} => {pork} 0.005795628
## [241] {pork} => {chicken} 0.005795628
## [242] {chicken} => {butter} 0.005795628
## [243] {butter} => {chicken} 0.005795628
## [244] {chicken} => {newspapers} 0.005185562
## [245] {chicken} => {domestic eggs} 0.006202339
## [246] {chicken} => {whipped/sour cream} 0.007219115
## [247] {whipped/sour cream} => {chicken} 0.007219115
## [248] {chicken} => {citrus fruit} 0.006914082
## [249] {chicken} => {sausage} 0.005287239
## [250] {chicken} => {bottled water} 0.005287239
## [251] {chicken} => {tropical fruit} 0.006405694
## [252] {chicken} => {root vegetables} 0.010879512
## [253] {chicken} => {soda} 0.008337570
## [254] {chicken} => {yogurt} 0.008337570
## [255] {chicken} => {rolls/buns} 0.009659380
## [256] {chicken} => {other vegetables} 0.017895272
## [257] {chicken} => {whole milk} 0.017590239
## [258] {white bread} => {frankfurter} 0.005185562
## [259] {white bread} => {domestic eggs} 0.005795628
## [260] {white bread} => {fruit/vegetable juice} 0.007422471
## [261] {fruit/vegetable juice} => {white bread} 0.007422471
## [262] {white bread} => {whipped/sour cream} 0.005490595
## [263] {white bread} => {pip fruit} 0.006609049
## [264] {white bread} => {pastry} 0.005592272
## [265] {white bread} => {shopping bags} 0.007422471
## [266] {white bread} => {sausage} 0.007219115
## [267] {white bread} => {tropical fruit} 0.008744281
## [268] {white bread} => {root vegetables} 0.007930859
## [269] {white bread} => {soda} 0.010269446
## [270] {white bread} => {yogurt} 0.009049314
## [271] {white bread} => {rolls/buns} 0.006507372
## [272] {white bread} => {other vegetables} 0.013726487
## [273] {white bread} => {whole milk} 0.017081851
## [274] {chocolate} => {butter} 0.006202339
## [275] {butter} => {chocolate} 0.006202339
## [276] {chocolate} => {newspapers} 0.005490595
## [277] {chocolate} => {fruit/vegetable juice} 0.006812405
## [278] {chocolate} => {pip fruit} 0.006100661

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## [279] {chocolate}	=> {pastry}	0.008032537
## [280] {chocolate}	=> {citrus fruit}	0.006405694
## [281] {chocolate}	=> {shopping bags}	0.008134215
## [282] {chocolate}	=> {sausage}	0.006609049
## [283] {chocolate}	=> {bottled water}	0.005795628
## [284] {chocolate}	=> {tropical fruit}	0.008134215
## [285] {chocolate}	=> {root vegetables}	0.006405694
## [286] {chocolate}	=> {soda}	0.013523132
## [287] {chocolate}	=> {yogurt}	0.009252669
## [288] {chocolate}	=> {rolls/buns}	0.011794611
## [289] {chocolate}	=> {other vegetables}	0.012709710
## [290] {chocolate}	=> {whole milk}	0.016675140
## [291] {coffee}	=> {fruit/vegetable juice}	0.005998983
## [292] {coffee}	=> {whipped/sour cream}	0.006100661
## [293] {coffee}	=> {pip fruit}	0.006914082
## [294] {coffee}	=> {pastry}	0.006914082
## [295] {coffee}	=> {citrus fruit}	0.006405694
## [296] {coffee}	=> {shopping bags}	0.009354347
## [297] {coffee}	=> {sausage}	0.006914082
## [298] {coffee}	=> {bottled water}	0.007320793
## [299] {coffee}	=> {tropical fruit}	0.007117438
## [300] {coffee}	=> {root vegetables}	0.007320793
## [301] {coffee}	=> {soda}	0.009964413
## [302] {coffee}	=> {yogurt}	0.009761057
## [303] {coffee}	=> {rolls/buns}	0.010981190
## [304] {coffee}	=> {other vegetables}	0.013421454
## [305] {coffee}	=> {whole milk}	0.018708693
## [306] {frozen vegetables}	=> {pork}	0.006405694
## [307] {pork}	=> {frozen vegetables}	0.006405694
## [308] {frozen vegetables}	=> {frankfurter}	0.005083884
## [309] {frozen vegetables}	=> {margarine}	0.005083884
## [310] {frozen vegetables}	=> {butter}	0.005795628
## [311] {butter}	=> {frozen vegetables}	0.005795628
## [312] {frozen vegetables}	=> {domestic eggs}	0.005185562
## [313] {frozen vegetables}	=> {fruit/vegetable juice}	0.007829181
## [314] {fruit/vegetable juice}	=> {frozen vegetables}	0.007829181
## [315] {frozen vegetables}	=> {whipped/sour cream}	0.007930859
## [316] {whipped/sour cream}	=> {frozen vegetables}	0.007930859
## [317] {frozen vegetables}	=> {pip fruit}	0.007320793
## [318] {frozen vegetables}	=> {citrus fruit}	0.006609049
## [319] {frozen vegetables}	=> {sausage}	0.005998983
## [320] {frozen vegetables}	=> {bottled water}	0.006202339
## [321] {frozen vegetables}	=> {tropical fruit}	0.008744281
## [322] {frozen vegetables}	=> {root vegetables}	0.011591256
## [323] {root vegetables}	=> {frozen vegetables}	0.011591256
## [324] {frozen vegetables}	=> {soda}	0.008642603
## [325] {frozen vegetables}	=> {yogurt}	0.012404677
## [326] {frozen vegetables}	=> {rolls/buns}	0.010167768
## [327] {frozen vegetables}	=> {other vegetables}	0.017793594
## [328] {frozen vegetables}	=> {whole milk}	0.020437214
## [329] {beef}	=> {pork}	0.007625826
## [330] {pork}	=> {beef}	0.007625826
## [331] {beef}	=> {margarine}	0.006202339
## [332] {margarine}	=> {beef}	0.006202339

## [333] {beef}	=> {butter}	0.005795628
## [334] {butter}	=> {beef}	0.005795628
## [335] {beef}	=> {newspapers}	0.006405694
## [336] {beef}	=> {domestic eggs}	0.005998983
## [337] {beef}	=> {whipped/sour cream}	0.006710727
## [338] {beef}	=> {pastry}	0.006304016
## [339] {beef}	=> {citrus fruit}	0.008439248
## [340] {citrus fruit}	=> {beef}	0.008439248
## [341] {beef}	=> {sausage}	0.005592272
## [342] {beef}	=> {bottled water}	0.006202339
## [343] {beef}	=> {tropical fruit}	0.007625826
## [344] {beef}	=> {root vegetables}	0.017386884
## [345] {root vegetables}	=> {beef}	0.017386884
## [346] {beef}	=> {soda}	0.008134215
## [347] {beef}	=> {yogurt}	0.011692933
## [348] {beef}	=> {rolls/buns}	0.013624809
## [349] {beef}	=> {other vegetables}	0.019725470
## [350] {other vegetables}	=> {beef}	0.019725470
## [351] {beef}	=> {whole milk}	0.021250635
## [352] {curd}	=> {margarine}	0.006304016
## [353] {margarine}	=> {curd}	0.006304016
## [354] {curd}	=> {butter}	0.006812405
## [355] {butter}	=> {curd}	0.006812405
## [356] {curd}	=> {newspapers}	0.005693950
## [357] {curd}	=> {domestic eggs}	0.006507372
## [358] {domestic eggs}	=> {curd}	0.006507372
## [359] {curd}	=> {whipped/sour cream}	0.010472801
## [360] {whipped/sour cream}	=> {curd}	0.010472801
## [361] {curd}	=> {pip fruit}	0.007829181
## [362] {pip fruit}	=> {curd}	0.007829181
## [363] {curd}	=> {pastry}	0.007524148
## [364] {curd}	=> {citrus fruit}	0.007117438
## [365] {curd}	=> {shopping bags}	0.005388917
## [366] {curd}	=> {sausage}	0.007625826
## [367] {curd}	=> {bottled water}	0.006100661
## [368] {curd}	=> {tropical fruit}	0.010269446
## [369] {curd}	=> {root vegetables}	0.010879512
## [370] {curd}	=> {soda}	0.008134215
## [371] {curd}	=> {yogurt}	0.017285206
## [372] {yogurt}	=> {curd}	0.017285206
## [373] {curd}	=> {rolls/buns}	0.010066090
## [374] {curd}	=> {other vegetables}	0.017183528
## [375] {curd}	=> {whole milk}	0.026131164
## [376] {whole milk}	=> {curd}	0.026131164
## [377] {napkins}	=> {newspapers}	0.006202339
## [378] {napkins}	=> {domestic eggs}	0.005998983
## [379] {napkins}	=> {fruit/vegetable juice}	0.006914082
## [380] {napkins}	=> {whipped/sour cream}	0.007219115
## [381] {whipped/sour cream}	=> {napkins}	0.007219115
## [382] {napkins}	=> {pip fruit}	0.006710727
## [383] {napkins}	=> {pastry}	0.007015760
## [384] {napkins}	=> {citrus fruit}	0.007625826
## [385] {napkins}	=> {shopping bags}	0.007219115
## [386] {napkins}	=> {sausage}	0.006710727

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## [387] {napkins}          => {bottled water}          0.008642603
## [388] {napkins}          => {tropical fruit}        0.010066090
## [389] {napkins}          => {root vegetables}       0.009964413
## [390] {napkins}          => {soda}                  0.011997966
## [391] {napkins}          => {yogurt}                0.012302999
## [392] {napkins}          => {rolls/buns}           0.011692933
## [393] {napkins}          => {other vegetables}     0.014438231
## [394] {napkins}          => {whole milk}            0.019725470
## [395] {pork}              => {frankfurter}           0.005897306
## [396] {pork}              => {margarine}             0.006405694
## [397] {margarine}         => {pork}                  0.006405694
## [398] {pork}              => {newspapers}            0.006609049
## [399] {pork}              => {whipped/sour cream}  0.008235892
## [400] {whipped/sour cream}=> {pork}                  0.008235892
## [401] {pork}              => {pip fruit}             0.006100661
## [402] {pork}              => {pastry}                0.006304016
## [403] {pork}              => {citrus fruit}           0.006507372
## [404] {pork}              => {shopping bags}          0.006405694
## [405] {pork}              => {sausage}                0.006507372
## [406] {pork}              => {bottled water}           0.007422471
## [407] {pork}              => {tropical fruit}         0.008540925
## [408] {pork}              => {root vegetables}        0.013624809
## [409] {root vegetables}   => {pork}                  0.013624809
## [410] {pork}              => {soda}                  0.011896289
## [411] {pork}              => {yogurt}                0.009557702
## [412] {pork}              => {rolls/buns}            0.011286223
## [413] {pork}              => {other vegetables}      0.021657346
## [414] {other vegetables} => {pork}                  0.021657346
## [415] {pork}              => {whole milk}             0.022165735
## [416] {frankfurter}        => {brown bread}            0.007117438
## [417] {brown bread}        => {frankfurter}           0.007117438
## [418] {frankfurter}        => {margarine}              0.006405694
## [419] {margarine}          => {frankfurter}           0.006405694
## [420] {frankfurter}        => {domestic eggs}          0.007015760
## [421] {domestic eggs}      => {frankfurter}           0.007015760
## [422] {frankfurter}        => {whipped/sour cream}  0.006202339
## [423] {frankfurter}        => {pip fruit}              0.007219115
## [424] {frankfurter}        => {pastry}                0.008337570
## [425] {frankfurter}        => {citrus fruit}            0.006507372
## [426] {frankfurter}        => {shopping bags}          0.008235892
## [427] {frankfurter}        => {sausage}                0.010066090
## [428] {sausage}            => {frankfurter}           0.010066090
## [429] {frankfurter}        => {bottled water}           0.007320793
## [430] {frankfurter}        => {tropical fruit}         0.009456024
## [431] {frankfurter}        => {root vegetables}        0.010167768
## [432] {frankfurter}        => {soda}                  0.011286223
## [433] {frankfurter}        => {yogurt}                0.011184545
## [434] {frankfurter}        => {rolls/buns}             0.019217082
## [435] {rolls/buns}         => {frankfurter}           0.019217082
## [436] {frankfurter}        => {other vegetables}      0.016471784
## [437] {frankfurter}        => {whole milk}             0.020538892
## [438] {margarine}          => {bottled beer}            0.006100661
## [439] {butter}              => {bottled beer}            0.005795628
## [440] {bottled beer}        => {bottled water}           0.015760041

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## [441] {bottled water}          => {bottled beer}          0.015760041
## [442] {bottled beer}          => {tropical fruit}        0.008235892
## [443] {bottled beer}          => {root vegetables}       0.009659380
## [444] {bottled beer}          => {soda}                  0.016980173
## [445] {bottled beer}          => {yogurt}                0.009252669
## [446] {bottled beer}          => {rolls/buns}           0.013624809
## [447] {bottled beer}          => {other vegetables}     0.016166751
## [448] {bottled beer}          => {whole milk}            0.020437214
## [449] {brown bread}           => {margarine}             0.006507372
## [450] {margarine}             => {brown bread}           0.006507372
## [451] {butter}                => {brown bread}           0.005795628
## [452] {brown bread}           => {newspapers}            0.007625826
## [453] {brown bread}           => {domestic eggs}          0.006812405
## [454] {domestic eggs}          => {brown bread}           0.006812405
## [455] {brown bread}           => {fruit/vegetable juice} 0.008337570
## [456] {fruit/vegetable juice} => {brown bread}           0.008337570
## [457] {brown bread}           => {pip fruit}             0.007625826
## [458] {pip fruit}             => {brown bread}           0.007625826
## [459] {brown bread}           => {pastry}                0.009659380
## [460] {pastry}                => {brown bread}           0.009659380
## [461] {brown bread}           => {citrus fruit}           0.008337570
## [462] {citrus fruit}          => {brown bread}           0.008337570
## [463] {brown bread}           => {shopping bags}          0.009252669
## [464] {brown bread}           => {sausage}                0.010676157
## [465] {sausage}                => {brown bread}           0.010676157
## [466] {brown bread}           => {bottled water}           0.008235892
## [467] {brown bread}           => {tropical fruit}         0.010676157
## [468] {tropical fruit}         => {brown bread}           0.010676157
## [469] {brown bread}           => {root vegetables}        0.010167768
## [470] {brown bread}           => {soda}                  0.012608033
## [471] {brown bread}           => {yogurt}                0.014539908
## [472] {yogurt}                 => {brown bread}           0.014539908
## [473] {brown bread}           => {rolls/buns}            0.012608033
## [474] {brown bread}           => {other vegetables}       0.018708693
## [475] {brown bread}           => {whole milk}             0.025216065
## [476] {margarine}              => {butter}                 0.006710727
## [477] {butter}                 => {margarine}              0.006710727
## [478] {margarine}              => {newspapers}             0.007117438
## [479] {margarine}              => {domestic eggs}          0.008337570
## [480] {domestic eggs}          => {margarine}              0.008337570
## [481] {margarine}              => {fruit/vegetable juice} 0.006202339
## [482] {margarine}              => {whipped/sour cream}     0.006812405
## [483] {margarine}              => {pip fruit}              0.008540925
## [484] {pip fruit}              => {margarine}              0.008540925
## [485] {margarine}              => {pastry}                 0.006812405
## [486] {margarine}              => {citrus fruit}            0.007930859
## [487] {margarine}              => {sausage}                0.007117438
## [488] {margarine}              => {bottled water}           0.010269446
## [489] {margarine}              => {tropical fruit}         0.009354347
## [490] {margarine}              => {root vegetables}        0.011082867
## [491] {root vegetables}        => {margarine}              0.011082867
## [492] {margarine}              => {soda}                  0.010167768
## [493] {margarine}              => {yogurt}                0.014234875
## [494] {yogurt}                 => {margarine}              0.014234875

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## [495] {margarine}          => {rolls/buns}          0.014743264
## [496] {margarine}          => {other vegetables} 0.019725470
## [497] {other vegetables}  => {margarine}          0.019725470
## [498] {margarine}          => {whole milk}          0.024199288
## [499] {butter}             => {newspapers}          0.005795628
## [500] {butter}             => {domestic eggs}        0.009659380
## [501] {domestic eggs}       => {butter}             0.009659380
## [502] {butter}             => {fruit/vegetable juice} 0.008032537
## [503] {fruit/vegetable juice} => {butter}             0.008032537
## [504] {butter}             => {whipped/sour cream} 0.010167768
## [505] {whipped/sour cream} => {butter}             0.010167768
## [506] {butter}             => {pip fruit}          0.007320793
## [507] {butter}             => {pastry}             0.007625826
## [508] {butter}             => {citrus fruit}        0.009150991
## [509] {citrus fruit}        => {butter}             0.009150991
## [510] {butter}             => {sausage}            0.008642603
## [511] {butter}             => {bottled water}        0.008947636
## [512] {butter}             => {tropical fruit}      0.009964413
## [513] {butter}             => {root vegetables}     0.012913066
## [514] {root vegetables}    => {butter}             0.012913066
## [515] {butter}             => {soda}                0.008845958
## [516] {butter}             => {yogurt}              0.014641586
## [517] {yogurt}              => {butter}             0.014641586
## [518] {butter}             => {rolls/buns}          0.013421454
## [519] {butter}             => {other vegetables}   0.020030503
## [520] {other vegetables}   => {butter}             0.020030503
## [521] {butter}             => {whole milk}          0.027554652
## [522] {whole milk}          => {butter}             0.027554652
## [523] {domestic eggs}       => {newspapers}          0.006914082
## [524] {newspapers}          => {fruit/vegetable juice} 0.008235892
## [525] {fruit/vegetable juice} => {newspapers}          0.008235892
## [526] {whipped/sour cream}  => {newspapers}          0.007219115
## [527] {newspapers}          => {pastry}              0.008439248
## [528] {newspapers}          => {citrus fruit}         0.008337570
## [529] {citrus fruit}        => {newspapers}          0.008337570
## [530] {newspapers}          => {sausage}             0.008032537
## [531] {newspapers}          => {bottled water}        0.011286223
## [532] {bottled water}        => {newspapers}          0.011286223
## [533] {newspapers}          => {tropical fruit}      0.011794611
## [534] {tropical fruit}      => {newspapers}          0.011794611
## [535] {newspapers}          => {root vegetables}     0.011489578
## [536] {root vegetables}    => {newspapers}          0.011489578
## [537] {newspapers}          => {soda}                0.014641586
## [538] {newspapers}          => {yogurt}              0.015353330
## [539] {yogurt}              => {newspapers}          0.015353330
## [540] {newspapers}          => {rolls/buns}          0.019725470
## [541] {rolls/buns}          => {newspapers}          0.019725470
## [542] {newspapers}          => {other vegetables}   0.019318760
## [543] {newspapers}          => {whole milk}          0.027351296
## [544] {whole milk}          => {newspapers}          0.027351296
## [545] {domestic eggs}        => {fruit/vegetable juice} 0.008032537
## [546] {fruit/vegetable juice} => {domestic eggs}        0.008032537
## [547] {domestic eggs}        => {whipped/sour cream} 0.009964413
## [548] {whipped/sour cream}  => {domestic eggs}        0.009964413

```

```

## [549] {domestic eggs}          => {pip fruit}          0.008642603
## [550] {pip fruit}             => {domestic eggs} 0.008642603
## [551] {domestic eggs}          => {pastry}           0.009049314
## [552] {pastry}                => {domestic eggs} 0.009049314
## [553] {domestic eggs}          => {citrus fruit}      0.010371124
## [554] {citrus fruit}           => {domestic eggs} 0.010371124
## [555] {domestic eggs}          => {shopping bags} 0.009049314
## [556] {domestic eggs}          => {sausage}          0.009557702
## [557] {sausage}                => {domestic eggs} 0.009557702
## [558] {domestic eggs}           => {bottled water} 0.009150991
## [559] {domestic eggs}           => {tropical fruit} 0.011387900
## [560] {tropical fruit}          => {domestic eggs} 0.011387900
## [561] {domestic eggs}           => {root vegetables} 0.014336553
## [562] {root vegetables}          => {domestic eggs} 0.014336553
## [563] {domestic eggs}           => {soda}             0.012404677
## [564] {domestic eggs}           => {yogurt}           0.014336553
## [565] {yogurt}                 => {domestic eggs} 0.014336553
## [566] {domestic eggs}           => {rolls/buns}      0.015658363
## [567] {domestic eggs}           => {other vegetables} 0.022267412
## [568] {other vegetables}        => {domestic eggs} 0.022267412
## [569] {domestic eggs}           => {whole milk}      0.029994916
## [570] {whole milk}              => {domestic eggs} 0.029994916
## [571] {fruit/vegetable juice}   => {whipped/sour cream} 0.009049314
## [572] {whipped/sour cream}      => {fruit/vegetable juice} 0.009049314
## [573] {fruit/vegetable juice}   => {pip fruit}          0.009557702
## [574] {pip fruit}                => {fruit/vegetable juice} 0.009557702
## [575] {fruit/vegetable juice}   => {pastry}           0.008540925
## [576] {fruit/vegetable juice}   => {citrus fruit}      0.010371124
## [577] {citrus fruit}             => {fruit/vegetable juice} 0.010371124
## [578] {fruit/vegetable juice}   => {shopping bags} 0.010676157
## [579] {shopping bags}            => {fruit/vegetable juice} 0.010676157
## [580] {fruit/vegetable juice}   => {sausage}          0.010066090
## [581] {sausage}                 => {fruit/vegetable juice} 0.010066090
## [582] {fruit/vegetable juice}   => {bottled water} 0.014234875
## [583] {bottled water}            => {fruit/vegetable juice} 0.014234875
## [584] {fruit/vegetable juice}   => {tropical fruit} 0.013726487
## [585] {tropical fruit}           => {fruit/vegetable juice} 0.013726487
## [586] {fruit/vegetable juice}   => {root vegetables} 0.011997966
## [587] {root vegetables}          => {fruit/vegetable juice} 0.011997966
## [588] {fruit/vegetable juice}   => {soda}             0.018403660
## [589] {soda}                     => {fruit/vegetable juice} 0.018403660
## [590] {fruit/vegetable juice}   => {yogurt}           0.018708693
## [591] {yogurt}                  => {fruit/vegetable juice} 0.018708693
## [592] {fruit/vegetable juice}   => {rolls/buns}      0.014539908
## [593] {fruit/vegetable juice}   => {other vegetables} 0.021047280
## [594] {other vegetables}        => {fruit/vegetable juice} 0.021047280
## [595] {fruit/vegetable juice}   => {whole milk}      0.026639553
## [596] {whole milk}               => {fruit/vegetable juice} 0.026639553
## [597] {whipped/sour cream}      => {pip fruit}          0.009252669
## [598] {pip fruit}                => {whipped/sour cream} 0.009252669
## [599] {whipped/sour cream}      => {pastry}           0.007524148
## [600] {whipped/sour cream}      => {citrus fruit}      0.010879512
## [601] {citrus fruit}              => {whipped/sour cream} 0.010879512
## [602] {whipped/sour cream}      => {shopping bags} 0.007930859

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## [603] {whipped/sour cream}	=> {sausage}	0.009049314
## [604] {whipped/sour cream}	=> {bottled water}	0.008744281
## [605] {whipped/sour cream}	=> {tropical fruit}	0.013828165
## [606] {tropical fruit}	=> {whipped/sour cream}	0.013828165
## [607] {whipped/sour cream}	=> {root vegetables}	0.017081851
## [608] {root vegetables}	=> {whipped/sour cream}	0.017081851
## [609] {whipped/sour cream}	=> {soda}	0.011591256
## [610] {whipped/sour cream}	=> {yogurt}	0.020742247
## [611] {yogurt}	=> {whipped/sour cream}	0.020742247
## [612] {whipped/sour cream}	=> {rolls/buns}	0.014641586
## [613] {whipped/sour cream}	=> {other vegetables}	0.028876462
## [614] {other vegetables}	=> {whipped/sour cream}	0.028876462
## [615] {whipped/sour cream}	=> {whole milk}	0.032231825
## [616] {whole milk}	=> {whipped/sour cream}	0.032231825
## [617] {pip fruit}	=> {pastry}	0.010676157
## [618] {pastry}	=> {pip fruit}	0.010676157
## [619] {pip fruit}	=> {citrus fruit}	0.013828165
## [620] {citrus fruit}	=> {pip fruit}	0.013828165
## [621] {pip fruit}	=> {shopping bags}	0.009354347
## [622] {pip fruit}	=> {sausage}	0.010777834
## [623] {sausage}	=> {pip fruit}	0.010777834
## [624] {pip fruit}	=> {bottled water}	0.010574479
## [625] {pip fruit}	=> {tropical fruit}	0.020437214
## [626] {tropical fruit}	=> {pip fruit}	0.020437214
## [627] {pip fruit}	=> {root vegetables}	0.015556685
## [628] {root vegetables}	=> {pip fruit}	0.015556685
## [629] {pip fruit}	=> {soda}	0.013319776
## [630] {pip fruit}	=> {yogurt}	0.017996950
## [631] {yogurt}	=> {pip fruit}	0.017996950
## [632] {pip fruit}	=> {rolls/buns}	0.013929842
## [633] {pip fruit}	=> {other vegetables}	0.026131164
## [634] {other vegetables}	=> {pip fruit}	0.026131164
## [635] {pip fruit}	=> {whole milk}	0.030096594
## [636] {whole milk}	=> {pip fruit}	0.030096594
## [637] {pastry}	=> {citrus fruit}	0.009761057
## [638] {citrus fruit}	=> {pastry}	0.009761057
## [639] {pastry}	=> {shopping bags}	0.011896289
## [640] {shopping bags}	=> {pastry}	0.011896289
## [641] {pastry}	=> {sausage}	0.012506355
## [642] {sausage}	=> {pastry}	0.012506355
## [643] {pastry}	=> {bottled water}	0.008947636
## [644] {pastry}	=> {tropical fruit}	0.013218099
## [645] {tropical fruit}	=> {pastry}	0.013218099
## [646] {pastry}	=> {root vegetables}	0.010981190
## [647] {root vegetables}	=> {pastry}	0.010981190
## [648] {pastry}	=> {soda}	0.021047280
## [649] {soda}	=> {pastry}	0.021047280
## [650] {pastry}	=> {yogurt}	0.017691917
## [651] {yogurt}	=> {pastry}	0.017691917
## [652] {pastry}	=> {rolls/buns}	0.020945602
## [653] {rolls/buns}	=> {pastry}	0.020945602
## [654] {pastry}	=> {other vegetables}	0.022572445
## [655] {other vegetables}	=> {pastry}	0.022572445
## [656] {pastry}	=> {whole milk}	0.033248602

## [657] {whole milk}	=> {pastry}	0.033248602
## [658] {citrus fruit}	=> {shopping bags}	0.009761057
## [659] {citrus fruit}	=> {sausage}	0.011286223
## [660] {sausage}	=> {citrus fruit}	0.011286223
## [661] {citrus fruit}	=> {bottled water}	0.013523132
## [662] {bottled water}	=> {citrus fruit}	0.013523132
## [663] {citrus fruit}	=> {tropical fruit}	0.019928826
## [664] {tropical fruit}	=> {citrus fruit}	0.019928826
## [665] {citrus fruit}	=> {root vegetables}	0.017691917
## [666] {root vegetables}	=> {citrus fruit}	0.017691917
## [667] {citrus fruit}	=> {soda}	0.012811388
## [668] {citrus fruit}	=> {yogurt}	0.021657346
## [669] {yogurt}	=> {citrus fruit}	0.021657346
## [670] {citrus fruit}	=> {rolls/buns}	0.016776817
## [671] {citrus fruit}	=> {other vegetables}	0.028876462
## [672] {other vegetables}	=> {citrus fruit}	0.028876462
## [673] {citrus fruit}	=> {whole milk}	0.030503305
## [674] {whole milk}	=> {citrus fruit}	0.030503305
## [675] {shopping bags}	=> {sausage}	0.015658363
## [676] {sausage}	=> {shopping bags}	0.015658363
## [677] {shopping bags}	=> {bottled water}	0.010981190
## [678] {shopping bags}	=> {tropical fruit}	0.013523132
## [679] {tropical fruit}	=> {shopping bags}	0.013523132
## [680] {shopping bags}	=> {root vegetables}	0.012811388
## [681] {root vegetables}	=> {shopping bags}	0.012811388
## [682] {shopping bags}	=> {soda}	0.024605999
## [683] {soda}	=> {shopping bags}	0.024605999
## [684] {shopping bags}	=> {yogurt}	0.015251652
## [685] {yogurt}	=> {shopping bags}	0.015251652
## [686] {shopping bags}	=> {rolls/buns}	0.019522115
## [687] {rolls/buns}	=> {shopping bags}	0.019522115
## [688] {shopping bags}	=> {other vegetables}	0.023182511
## [689] {other vegetables}	=> {shopping bags}	0.023182511
## [690] {shopping bags}	=> {whole milk}	0.024504321
## [691] {sausage}	=> {bottled water}	0.011997966
## [692] {bottled water}	=> {sausage}	0.011997966
## [693] {sausage}	=> {tropical fruit}	0.013929842
## [694] {tropical fruit}	=> {sausage}	0.013929842
## [695] {sausage}	=> {root vegetables}	0.014946619
## [696] {root vegetables}	=> {sausage}	0.014946619
## [697] {sausage}	=> {soda}	0.024300966
## [698] {soda}	=> {sausage}	0.024300966
## [699] {sausage}	=> {yogurt}	0.019623793
## [700] {yogurt}	=> {sausage}	0.019623793
## [701] {sausage}	=> {rolls/buns}	0.030604982
## [702] {rolls/buns}	=> {sausage}	0.030604982
## [703] {sausage}	=> {other vegetables}	0.026944586
## [704] {other vegetables}	=> {sausage}	0.026944586
## [705] {sausage}	=> {whole milk}	0.029893238
## [706] {whole milk}	=> {sausage}	0.029893238
## [707] {bottled water}	=> {tropical fruit}	0.018505338
## [708] {tropical fruit}	=> {bottled water}	0.018505338
## [709] {bottled water}	=> {root vegetables}	0.015658363
## [710] {root vegetables}	=> {bottled water}	0.015658363

```

## [711] {bottled water}          => {soda}          0.028978139
## [712] {soda}                  => {bottled water} 0.028978139
## [713] {bottled water}          => {yogurt}        0.022979156
## [714] {yogurt}                => {bottled water} 0.022979156
## [715] {bottled water}          => {rolls/buns}   0.024199288
## [716] {rolls/buns}            => {bottled water} 0.024199288
## [717] {bottled water}          => {other vegetables} 0.024809354
## [718] {other vegetables}      => {bottled water} 0.024809354
## [719] {bottled water}          => {whole milk}   0.034367056
## [720] {whole milk}            => {bottled water} 0.034367056
## [721] {tropical fruit}        => {root vegetables} 0.021047280
## [722] {root vegetables}       => {tropical fruit} 0.021047280
## [723] {tropical fruit}        => {soda}          0.020843925
## [724] {soda}                  => {tropical fruit} 0.020843925
## [725] {tropical fruit}        => {yogurt}        0.029283172
## [726] {yogurt}                => {tropical fruit} 0.029283172
## [727] {tropical fruit}        => {rolls/buns}   0.024605999
## [728] {rolls/buns}            => {tropical fruit} 0.024605999
## [729] {tropical fruit}        => {other vegetables} 0.035892222
## [730] {other vegetables}      => {tropical fruit} 0.035892222
## [731] {tropical fruit}        => {whole milk}   0.042297916
## [732] {whole milk}            => {tropical fruit} 0.042297916
## [733] {root vegetables}       => {soda}          0.018607016
## [734] {soda}                  => {root vegetables} 0.018607016
## [735] {root vegetables}       => {yogurt}        0.025826131
## [736] {yogurt}                => {root vegetables} 0.025826131
## [737] {root vegetables}       => {rolls/buns}   0.024300966
## [738] {rolls/buns}            => {root vegetables} 0.024300966
## [739] {root vegetables}       => {other vegetables} 0.047381800
## [740] {other vegetables}      => {root vegetables} 0.047381800
## [741] {root vegetables}       => {whole milk}   0.048906965
## [742] {whole milk}            => {root vegetables} 0.048906965
## [743] {soda}                  => {yogurt}        0.027351296
## [744] {yogurt}                => {soda}          0.027351296
## [745] {soda}                  => {rolls/buns}   0.038332486
## [746] {rolls/buns}            => {soda}          0.038332486
## [747] {soda}                  => {other vegetables} 0.032740214
## [748] {other vegetables}      => {soda}          0.032740214
## [749] {soda}                  => {whole milk}   0.040061007
## [750] {whole milk}            => {soda}          0.040061007
## [751] {yogurt}                => {rolls/buns}   0.034367056
## [752] {rolls/buns}            => {yogurt}        0.034367056
## [753] {yogurt}                => {other vegetables} 0.043416370
## [754] {other vegetables}      => {yogurt}        0.043416370
## [755] {yogurt}                => {whole milk}   0.056024403
## [756] {whole milk}            => {yogurt}        0.056024403
## [757] {rolls/buns}            => {other vegetables} 0.042602949
## [758] {other vegetables}      => {rolls/buns}   0.042602949
## [759] {rolls/buns}            => {whole milk}   0.056634469
## [760] {whole milk}            => {rolls/buns}   0.056634469
## [761] {other vegetables}      => {whole milk}   0.074834774
## [762] {whole milk}            => {other vegetables} 0.074834774

##      confidence coverage    lift      count
## [1] 0.1105236 1.00000000 1.0000000 1087

```

```

## [2] 0.1049314 1.00000000 1.00000000 1032
## [3] 0.1089985 1.00000000 1.00000000 1072
## [4] 0.1743772 1.00000000 1.00000000 1715
## [5] 0.1395018 1.00000000 1.00000000 1372
## [6] 0.1839349 1.00000000 1.00000000 1809
## [7] 0.1934926 1.00000000 1.00000000 1903
## [8] 0.2555160 1.00000000 1.00000000 2513
## [9] 0.4230769 0.01321810 1.6557746 55
## [10] 0.3410405 0.01759024 1.7625502 59
## [11] 0.3005780 0.01759024 1.1763569 52
## [12] 0.4322034 0.01199797 1.6914924 51
## [13] 0.4000000 0.01728521 1.5654596 68
## [14] 0.2560386 0.02104728 1.4683033 53
## [15] 0.2415459 0.02104728 0.9453259 50
## [16] 0.3378378 0.01504830 1.7459985 50
## [17] 0.4054054 0.01504830 1.5866145 60
## [18] 0.4312500 0.01626843 3.9564774 69
## [19] 0.4750000 0.01626843 2.4548739 76
## [20] 0.4750000 0.01626843 1.8589833 76
## [21] 0.3190184 0.01657346 1.8294729 52
## [22] 0.3312883 0.01657346 1.7121497 54
## [23] 0.4233129 0.01657346 1.6566981 69
## [24] 0.2931034 0.01769192 1.5148042 51
## [25] 0.4022989 0.01769192 1.5744565 70
## [26] 0.2109375 0.02602949 1.5120775 54
## [27] 0.2070312 0.02602949 1.1255679 53
## [28] 0.1992188 0.02602949 1.0295935 51
## [29] 0.2617188 0.02602949 1.0242753 67
## [30] 0.2439024 0.02501271 1.3987058 60
## [31] 0.2032520 0.02501271 1.0504381 50
## [32] 0.2357724 0.02501271 0.9227303 58
## [33] 0.3333333 0.01921708 1.7227185 63
## [34] 0.4656085 0.01921708 1.8222281 88
## [35] 0.3579545 0.01789527 1.8499648 63
## [36] 0.3977273 0.01789527 1.5565650 70
## [37] 0.4137931 0.01769192 2.1385471 72
## [38] 0.5229885 0.01769192 2.0467935 91
## [39] 0.3625731 0.01738688 1.8738342 62
## [40] 0.4853801 0.01738688 1.8996074 83
## [41] 0.3511905 0.01708185 2.5174623 59
## [42] 0.3154762 0.01708185 1.7151511 53
## [43] 0.4166667 0.01708185 2.1533981 70
## [44] 0.4404762 0.01708185 1.7238692 74
## [45] 0.2639405 0.02735130 1.5136181 71
## [46] 0.2044610 0.02735130 1.1115940 55
## [47] 0.2044610 0.02735130 1.0566861 55
## [48] 0.2379182 0.02735130 0.9311284 64
## [49] 0.1863799 0.02836807 1.6863354 52
## [50] 0.2580645 0.02836807 1.4799210 72
## [51] 0.1971326 0.02836807 1.0188120 55
## [52] 0.2473118 0.02836807 0.9678917 69
## [53] 0.2727273 0.02236909 2.5991015 60
## [54] 0.4045455 0.02236909 2.0907538 89
## [55] 0.3272727 0.02236909 1.2808306 72

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## [56] 0.2663755 0.02328419 1.9094778 61
## [57] 0.2794760 0.02328419 1.4443753 64
## [58] 0.3799127 0.02328419 1.4868448 87
## [59] 0.2073579 0.03040163 1.1891338 62
## [60] 0.1839465 0.03040163 1.0000629 55
## [61] 0.2006689 0.03040163 1.0370881 60
## [62] 0.2642140 0.03040163 1.0340410 79
## [63] 0.2047244 0.02582613 2.1790742 52
## [64] 0.1968504 0.02582613 1.8059922 50
## [65] 0.2125984 0.02582613 1.2191869 54
## [66] 0.2047244 0.02582613 1.4675398 52
## [67] 0.2677165 0.02582613 1.4554959 68
## [68] 0.3858268 0.02582613 1.9940128 98
## [69] 0.3858268 0.02582613 1.5099906 98
## [70] 0.1935484 0.02836807 1.8445236 54
## [71] 0.2186380 0.02836807 1.2538220 61
## [72] 0.2186380 0.02836807 1.5672774 61
## [73] 0.2652330 0.02836807 1.3707653 74
## [74] 0.3476703 0.02836807 1.3606593 97
## [75] 0.2116183 0.02450432 2.2524519 51
## [76] 0.2282158 0.02450432 2.0937519 55
## [77] 0.2614108 0.02450432 1.8738886 63
## [78] 0.2406639 0.02450432 1.3084187 58
## [79] 0.3858921 0.02450432 1.9943505 93
## [80] 0.4107884 0.02450432 1.6076815 99
## [81] 0.1818182 0.02796136 2.4034702 50
## [82] 0.1963636 0.02796136 1.8713531 54
## [83] 0.1818182 0.02796136 1.6680801 50
## [84] 0.3054545 0.02796136 2.1896104 84
## [85] 0.2727273 0.02796136 1.4827378 75
## [86] 0.3709091 0.02796136 1.9169159 102
## [87] 0.4145455 0.02796136 1.6223854 114
## [88] 0.1802721 0.02989324 1.7180002 53
## [89] 0.2891156 0.02989324 1.6579897 85
## [90] 0.1836735 0.02989324 1.3166389 54
## [91] 0.2380952 0.02989324 1.2944537 70
## [92] 0.2312925 0.02989324 1.1953557 68
## [93] 0.2755102 0.02989324 1.0782502 81
## [94] 0.1953125 0.02602949 4.6398513 50
## [95] 0.1207729 0.04209456 4.6398513 50
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## [97] 0.2578125 0.02602949 1.8480947 66
## [98] 0.2656250 0.02602949 1.4441249 68
## [99] 0.3515625 0.02602949 1.8169297 90
## [100] 0.4414062 0.02602949 1.7275091 113
## [101] 0.2863071 0.02450432 3.0474349 69
## [102] 0.2157676 0.02450432 2.0562739 52
## [103] 0.2282158 0.02450432 2.0937519 55
## [104] 0.2074689 0.02450432 1.1897705 50
## [105] 0.3278008 0.02450432 2.3497968 79
## [106] 0.3112033 0.02450432 1.6919208 75
## [107] 0.3692946 0.02450432 1.9085720 89
## [108] 0.4398340 0.02450432 1.7213560 106
## [109] 0.2188450 0.03345196 1.9800740 72

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## [110] 0.2279635 0.03345196 1.3073010 75
## [111] 0.2218845 0.03345196 1.5905496 73
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## [114] 0.2500000 0.02806304 2.2936101 69
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## [116] 0.1811594 0.02806304 0.9849104 50
## [117] 0.3550725 0.02806304 1.8350697 98
## [118] 0.4021739 0.02806304 1.5739675 111
## [119] 0.1639344 0.03101169 2.2869434 50
## [120] 0.1803279 0.03101169 2.1787771 55
## [121] 0.1901639 0.03101169 1.7205725 58
## [122] 0.1836066 0.03101169 1.7497776 56
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## [126] 0.2196721 0.03101169 1.1942927 67
## [127] 0.4590164 0.03101169 2.3722681 140
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## [129] 0.2721713 0.03324860 3.7968855 89
## [130] 0.1262411 0.07168277 3.7968855 89
## [131] 0.1620795 0.03324860 1.9582948 53
## [132] 0.2018349 0.03324860 1.9234941 66
## [133] 0.1987768 0.03324860 1.8236655 65
## [134] 0.2201835 0.03324860 1.2626849 72
## [135] 0.3180428 0.03324860 2.2798477 104
## [136] 0.1987768 0.03324860 1.0806907 65
## [137] 0.3088685 0.03324860 1.5962805 101
## [138] 0.3547401 0.03324860 1.3883281 116
## [139] 0.1559633 0.03324860 1.6600639 51
## [140] 0.1865443 0.03324860 1.7114399 61
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## [145] 0.4434251 0.03324860 1.7354101 145
## [146] 0.1851852 0.03294357 3.5364977 60
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## [156] 0.2901235 0.03294357 1.4994032 94
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## [161] 0.1586022 0.03782410 1.6097545 59
## [162] 0.1397849 0.03782410 1.4878625 52
## [163] 0.1478495 0.03782410 1.4090111 55

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## [164] 0.2473118 0.03782410 1.4182576 92
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## [169] 0.1531532 0.03385867 1.7214414 51
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## [171] 0.2162162 0.03385867 1.2399338 72
## [172] 0.2042042 0.03385867 1.4638107 68
## [173] 0.2072072 0.03385867 1.1265245 69
## [174] 0.3183183 0.03385867 1.6451186 106
## [175] 0.4444444 0.03385867 1.7393996 148
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## [177] 0.1168033 0.04961871 3.0390483 57
## [178] 0.1322751 0.03843416 1.8452850 50
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## [187] 0.3306878 0.03843416 1.2941961 125
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## [189] 0.1065574 0.04961871 2.8478038 52
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## [200] 0.2853261 0.03741739 1.4746096 105
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## [214] 0.3698630 0.03711235 1.4475140 135
## [215] 0.1465969 0.07768175 1.4879052 112
## [216] 0.1155831 0.09852567 1.4879052 112
## [217] 0.1034031 0.07768175 0.9355749 79

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## [218] 0.1780105 0.07768175 1.0208356 136
## [219] 0.1452880 0.07768175 0.7898878 111
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## [226] 0.1538462 0.03965430 2.0337055 60
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## [228] 0.1410256 0.03965430 1.4313593 55
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## [236] 0.3461538 0.03965430 1.7889769 135
## [237] 0.4153846 0.03965430 1.6256696 162
## [238] 0.1563981 0.04290798 3.2519564 66
## [239] 0.1395349 0.04809354 3.2519564 66
## [240] 0.1350711 0.04290798 2.3428998 57
## [241] 0.1005291 0.05765125 2.3428998 57
## [242] 0.1350711 0.04290798 2.4374755 57
## [243] 0.1045872 0.05541434 2.4374755 57
## [244] 0.1208531 0.04290798 1.5141274 51
## [245] 0.1445498 0.04290798 2.2782803 61
## [246] 0.1682464 0.04290798 2.3470976 71
## [247] 0.1007092 0.07168277 2.3470976 71
## [248] 0.1611374 0.04290798 1.9469124 68
## [249] 0.1232227 0.04290798 1.3115755 52
## [250] 0.1232227 0.04290798 1.1148995 52
## [251] 0.1492891 0.04290798 1.4227309 63
## [252] 0.2535545 0.04290798 2.3262206 107
## [253] 0.1943128 0.04290798 1.1143244 82
## [254] 0.1943128 0.04290798 1.3929055 82
## [255] 0.2251185 0.04290798 1.2239029 95
## [256] 0.4170616 0.04290798 2.1554393 176
## [257] 0.4099526 0.04290798 1.6044106 173
## [258] 0.1231884 0.04209456 2.0888931 51
## [259] 0.1376812 0.04209456 2.1700228 57
## [260] 0.1763285 0.04209456 2.4390869 73
## [261] 0.1026723 0.07229283 2.4390869 73
## [262] 0.1304348 0.04209456 1.8196115 54
## [263] 0.1570048 0.04209456 2.0754604 65
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## [265] 0.1763285 0.04209456 1.7896706 73
## [266] 0.1714976 0.04209456 1.8254099 71
## [267] 0.2077295 0.04209456 1.9796699 86
## [268] 0.1884058 0.04209456 1.7285177 78
## [269] 0.2439614 0.04209456 1.3990437 101
## [270] 0.2149758 0.04209456 1.5410258 89
## [271] 0.1545894 0.04209456 0.8404569 64

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## [272] 0.3260870 0.04209456 1.6852681 135
## [273] 0.4057971 0.04209456 1.5881474 168
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## [635] 0.3978495 0.07564820 1.5570432 296
## [636] 0.1177875 0.25551601 1.5570432 296
## [637] 0.1097143 0.08896797 1.3256020 96
## [638] 0.1179361 0.08276563 1.3256020 96
## [639] 0.1337143 0.08896797 1.3571517 117
## [640] 0.1207430 0.09852567 1.3571517 117
## [641] 0.1405714 0.08896797 1.4962338 123
## [642] 0.1331169 0.09395018 1.4962338 123
## [643] 0.1005714 0.08896797 0.9099540 88
## [644] 0.1485714 0.08896797 1.4158915 130
## [645] 0.1259690 0.10493137 1.4158915 130
## [646] 0.1234286 0.08896797 1.1323881 108
## [647] 0.1007463 0.10899847 1.1323881 108
## [648] 0.2365714 0.08896797 1.3566647 207
## [649] 0.1206997 0.17437722 1.3566647 207

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## [650] 0.1988571 0.08896797 1.4254810 174
## [651] 0.1268222 0.13950178 1.4254810 174
## [652] 0.2354286 0.08896797 1.2799558 206
## [653] 0.1138751 0.18393493 1.2799558 206
## [654] 0.2537143 0.08896797 1.3112349 222
## [655] 0.1166579 0.19349263 1.3112349 222
## [656] 0.3737143 0.08896797 1.4625865 327
## [657] 0.1301234 0.25551601 1.4625865 327
## [658] 0.1179361 0.08276563 1.1970090 96
## [659] 0.1363636 0.08276563 1.4514463 111
## [660] 0.1201299 0.09395018 1.4514463 111
## [661] 0.1633907 0.08276563 1.4783323 133
## [662] 0.1223551 0.11052364 1.4783323 133
## [663] 0.2407862 0.08276563 2.2947022 196
## [664] 0.1899225 0.10493137 2.2947022 196
## [665] 0.2137592 0.08276563 1.9611211 174
## [666] 0.1623134 0.10899847 1.9611211 174
## [667] 0.1547912 0.08276563 0.8876799 126
## [668] 0.2616708 0.08276563 1.8757521 213
## [669] 0.1552478 0.13950178 1.8757521 213
## [670] 0.2027027 0.08276563 1.1020349 165
## [671] 0.3488943 0.08276563 1.8031403 284
## [672] 0.1492380 0.19349263 1.8031403 284
## [673] 0.3685504 0.08276563 1.4423768 300
## [674] 0.1193792 0.25551601 1.4423768 300
## [675] 0.1589267 0.09852567 1.6916065 154
## [676] 0.1666667 0.09395018 1.6916065 154
## [677] 0.1114551 0.09852567 1.0084278 108
## [678] 0.1372549 0.09852567 1.3080445 133
## [679] 0.1288760 0.10493137 1.3080445 133
## [680] 0.1300310 0.09852567 1.1929613 126
## [681] 0.1175373 0.10899847 1.1929613 126
## [682] 0.2497420 0.09852567 1.4321939 242
## [683] 0.1411079 0.17437722 1.4321939 242
## [684] 0.1547988 0.09852567 1.1096544 150
## [685] 0.1093294 0.13950178 1.1096544 150
## [686] 0.1981424 0.09852567 1.0772419 192
## [687] 0.1061360 0.18393493 1.0772419 192
## [688] 0.2352941 0.09852567 1.2160366 228
## [689] 0.1198108 0.19349263 1.2160366 228
## [690] 0.2487100 0.09852567 0.9733637 241
## [691] 0.1277056 0.09395018 1.1554598 118
## [692] 0.1085557 0.11052364 1.1554598 118
## [693] 0.1482684 0.09395018 1.4130036 137
## [694] 0.1327519 0.10493137 1.4130036 137
## [695] 0.1590909 0.09395018 1.4595700 147
## [696] 0.1371269 0.10899847 1.4595700 147
## [697] 0.2586580 0.09395018 1.4833245 239
## [698] 0.1393586 0.17437722 1.4833245 239
## [699] 0.2088745 0.09395018 1.4972889 193
## [700] 0.1406706 0.13950178 1.4972889 193
## [701] 0.3257576 0.09395018 1.7710480 301
## [702] 0.1663903 0.18393493 1.7710480 301
## [703] 0.2867965 0.09395018 1.4822091 265

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## [704] 0.1392538 0.19349263 1.4822091 265
## [705] 0.3181818 0.09395018 1.2452520 294
## [706] 0.1169916 0.25551601 1.2452520 294
## [707] 0.1674333 0.11052364 1.5956459 182
## [708] 0.1763566 0.10493137 1.5956459 182
## [709] 0.1416743 0.11052364 1.2997827 154
## [710] 0.1436567 0.10899847 1.2997827 154
## [711] 0.2621895 0.11052364 1.5035766 285
## [712] 0.1661808 0.17437722 1.5035766 285
## [713] 0.2079117 0.11052364 1.4903873 226
## [714] 0.1647230 0.13950178 1.4903873 226
## [715] 0.2189512 0.11052364 1.1903734 238
## [716] 0.1315644 0.18393493 1.1903734 238
## [717] 0.2244710 0.11052364 1.1601012 244
## [718] 0.1282186 0.19349263 1.1601012 244
## [719] 0.3109476 0.11052364 1.2169396 338
## [720] 0.1345006 0.25551601 1.2169396 338
## [721] 0.2005814 0.10493137 1.8402220 207
## [722] 0.1930970 0.10899847 1.8402220 207
## [723] 0.1986434 0.10493137 1.1391592 205
## [724] 0.1195335 0.17437722 1.1391592 205
## [725] 0.2790698 0.10493137 2.0004746 288
## [726] 0.2099125 0.13950178 2.0004746 288
## [727] 0.2344961 0.10493137 1.2748863 242
## [728] 0.1337756 0.18393493 1.2748863 242
## [729] 0.3420543 0.10493137 1.7677896 353
## [730] 0.1854966 0.19349263 1.7677896 353
## [731] 0.4031008 0.10493137 1.5775950 416
## [732] 0.1655392 0.25551601 1.5775950 416
## [733] 0.1707090 0.10899847 0.9789636 183
## [734] 0.1067055 0.17437722 0.9789636 183
## [735] 0.2369403 0.10899847 1.6984751 254
## [736] 0.1851312 0.13950178 1.6984751 254
## [737] 0.2229478 0.10899847 1.2121013 239
## [738] 0.1321172 0.18393493 1.2121013 239
## [739] 0.4347015 0.10899847 2.2466049 466
## [740] 0.2448765 0.19349263 2.2466049 466
## [741] 0.4486940 0.10899847 1.7560310 481
## [742] 0.1914047 0.25551601 1.7560310 481
## [743] 0.1568513 0.17437722 1.1243678 269
## [744] 0.1960641 0.13950178 1.1243678 269
## [745] 0.2198251 0.17437722 1.1951242 377
## [746] 0.2084024 0.18393493 1.1951242 377
## [747] 0.1877551 0.17437722 0.9703476 322
## [748] 0.1692065 0.19349263 0.9703476 322
## [749] 0.2297376 0.17437722 0.8991124 394
## [750] 0.1567847 0.25551601 0.8991124 394
## [751] 0.2463557 0.13950178 1.3393633 338
## [752] 0.1868436 0.18393493 1.3393633 338
## [753] 0.3112245 0.13950178 1.6084566 427
## [754] 0.2243826 0.19349263 1.6084566 427
## [755] 0.4016035 0.13950178 1.5717351 551
## [756] 0.2192598 0.25551601 1.5717351 551
## [757] 0.2316197 0.18393493 1.1970465 419

```

```

## [758] 0.2201787 0.19349263 1.1970465 419
## [759] 0.3079049 0.18393493 1.2050318 557
## [760] 0.2216474 0.25551601 1.2050318 557
## [761] 0.3867578 0.19349263 1.5136341 736
## [762] 0.2928770 0.25551601 1.5136341 736

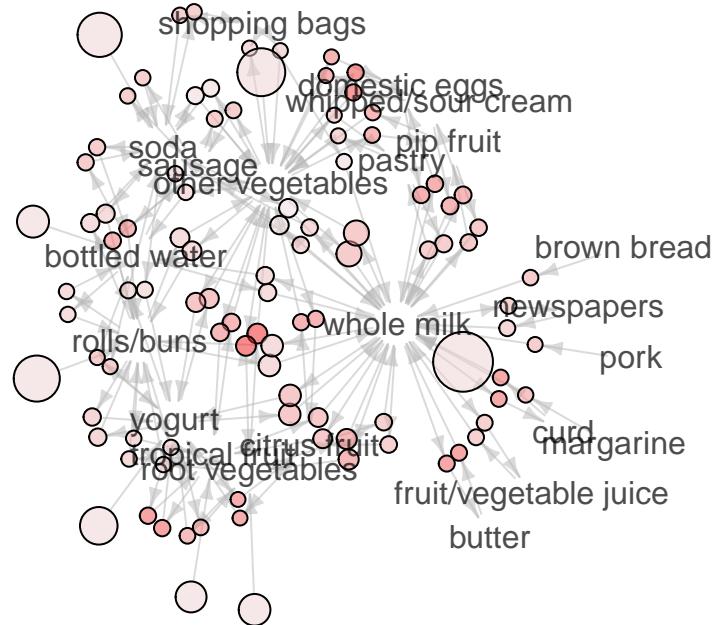
## set of 762 rules
##
## rule length distribution (lhs + rhs):sizes
##   1   2
##   8 754
##
##   Min. 1st Qu. Median   Mean 3rd Qu.   Max.
##   1.00   2.00   2.00   1.99   2.00   2.00
##
## summary of quality measures:
##      support      confidence      coverage      lift
##   Min. :0.005084  Min. :0.1003  Min. :0.01200  Min. :0.4457
##   1st Qu.:0.006609  1st Qu.:0.1261  1st Qu.:0.03843  1st Qu.:1.3156
##   Median :0.009202  Median :0.1643  Median :0.05765  Median :1.5744
##   Mean   :0.013992  Mean   :0.1949  Mean   :0.08014  Mean   :1.6329
##   3rd Qu.:0.014642  3rd Qu.:0.2357  3rd Qu.:0.08277  3rd Qu.:1.8550
##   Max.   :0.255516  Max.   :0.5230  Max.   :1.00000  Max.   :4.6399
##
##      count
##   Min.   : 50.0
##   1st Qu.: 65.0
##   Median : 90.5
##   Mean   :137.6
##   3rd Qu.:144.0
##   Max.   :2513.0
##
## mining info:
##      data ntransactions support confidence
## groceries_trans      9835     0.005       0.1

## Warning: plot: Too many rules supplied. Only plotting the best 100 rules using
## 'support' (change control parameter max if needed)

```

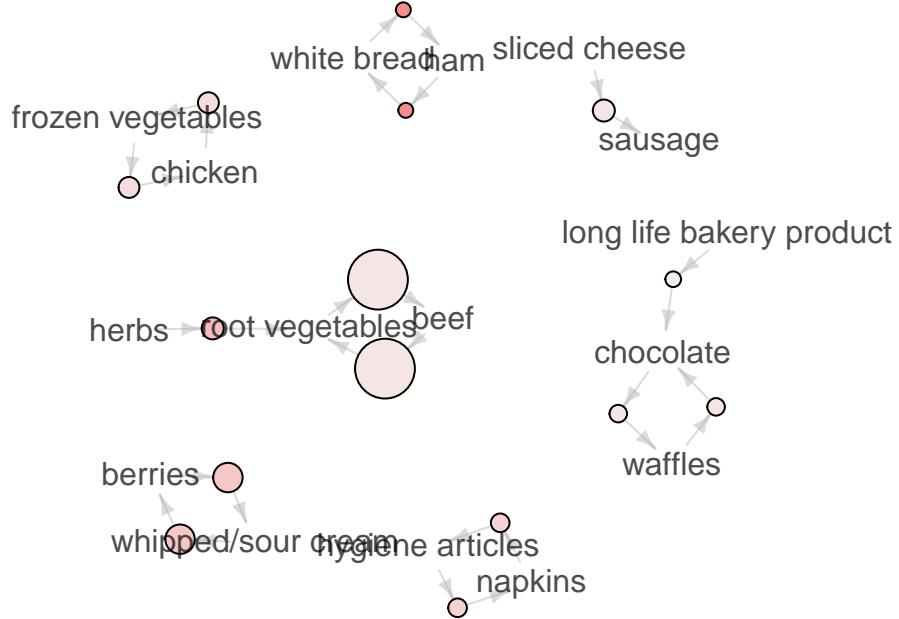
Graph for 100 rules

size: support (0.022 – 0.256)
color: lift (0.899 – 2.247)



Graph for 15 rules

size: support (0.005 – 0.017)
color: lift (2.848 – 4.64)



```
##      lhs                  rhs          support  confidence coverage
## [1] {}                  => {soda}      0.17437722 0.1743772 1.0000000
## [2] {}                  => {rolls/buns} 0.18393493 0.1839349 1.0000000
## [3] {}                  => {other vegetables} 0.19349263 0.1934926 1.0000000
## [4] {}                  => {whole milk} 0.25551601 0.2555160 1.0000000
## [5] {yogurt}             => {whole milk} 0.05602440 0.4016035 0.1395018
## [6] {whole milk}          => {yogurt}     0.05602440 0.2192598 0.2555160
## [7] {rolls/buns}          => {whole milk} 0.05663447 0.3079049 0.1839349
## [8] {whole milk}          => {rolls/buns} 0.05663447 0.2216474 0.2555160
## [9] {other vegetables} => {whole milk} 0.07483477 0.3867578 0.1934926
## [10] {whole milk}          => {other vegetables} 0.07483477 0.2928770 0.2555160
##      lift      count
## [1] 1.000000 1715
## [2] 1.000000 1809
## [3] 1.000000 1903
## [4] 1.000000 2513
## [5] 1.571735 551
## [6] 1.571735 551
## [7] 1.205032 557
## [8] 1.205032 557
## [9] 1.513634 736
## [10] 1.513634 736

##      lhs                  rhs          support  confidence coverage
## [1] {}                  => {soda}      0.17437722 0.1743772 1.0000000
## [2] {}                  => {rolls/buns} 0.18393493 0.1839349 1.0000000
## [3] {}                  => {other vegetables} 0.19349263 0.1934926 1.0000000
```

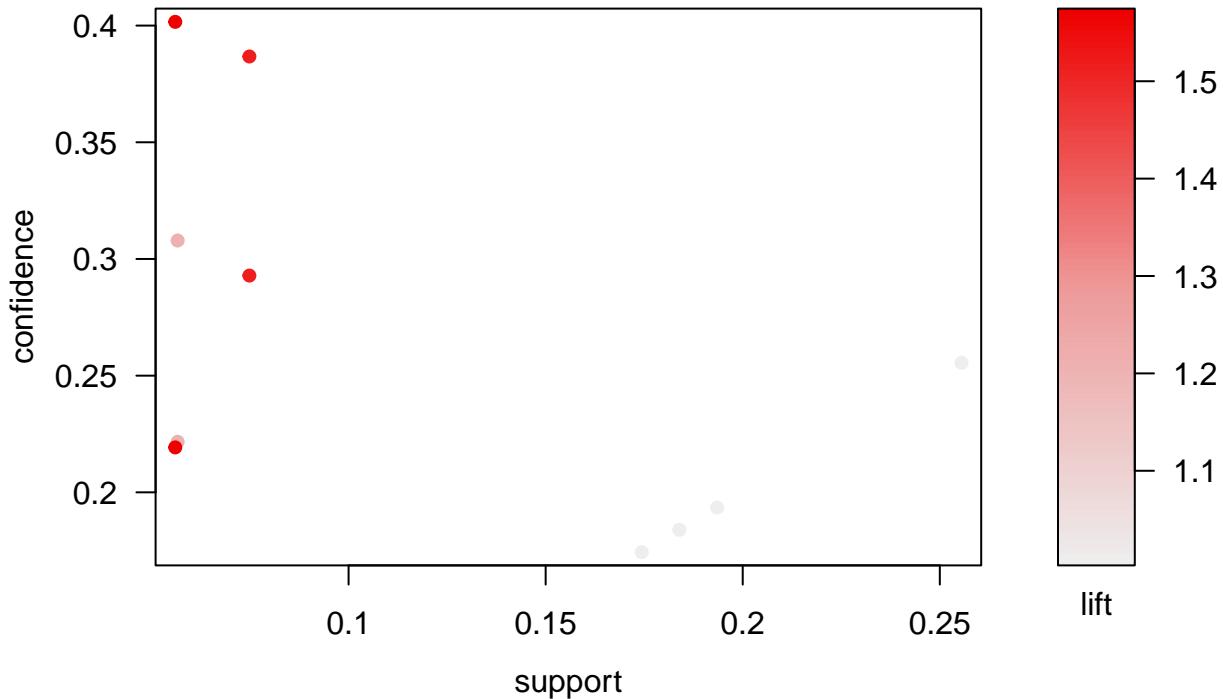
```

## [4] {}          => {whole milk}      0.25551601 0.2555160 1.0000000
## [5] {yogurt}    => {whole milk}      0.05602440 0.4016035 0.1395018
## [6] {whole milk} => {yogurt}        0.05602440 0.2192598 0.2555160
## [7] {rolls/buns} => {whole milk}      0.05663447 0.3079049 0.1839349
## [8] {whole milk}  => {rolls/buns}      0.05663447 0.2216474 0.2555160
## [9] {other vegetables} => {whole milk}  0.07483477 0.3867578 0.1934926
## [10] {whole milk}  => {other vegetables} 0.07483477 0.2928770 0.2555160
##      lift      count
## [1] 1.000000 1715
## [2] 1.000000 1809
## [3] 1.000000 1903
## [4] 1.000000 2513
## [5] 1.571735 551
## [6] 1.571735 551
## [7] 1.205032 557
## [8] 1.205032 557
## [9] 1.513634 736
## [10] 1.513634 736

##      lhs          rhs          support  confidence  coverage
## [1] {}          => {soda}        0.17437722 0.1743772 1.0000000
## [2] {}          => {rolls/buns}  0.18393493 0.1839349 1.0000000
## [3] {}          => {other vegetables} 0.19349263 0.1934926 1.0000000
## [4] {}          => {whole milk}    0.25551601 0.2555160 1.0000000
## [5] {yogurt}    => {whole milk}    0.05602440 0.4016035 0.1395018
## [6] {whole milk} => {yogurt}        0.05602440 0.2192598 0.2555160
## [7] {rolls/buns} => {whole milk}    0.05663447 0.3079049 0.1839349
## [8] {whole milk}  => {rolls/buns}    0.05663447 0.2216474 0.2555160
## [9] {other vegetables} => {whole milk}  0.07483477 0.3867578 0.1934926
## [10] {whole milk}  => {other vegetables} 0.07483477 0.2928770 0.2555160
##      lift      count
## [1] 1.000000 1715
## [2] 1.000000 1809
## [3] 1.000000 1903
## [4] 1.000000 2513
## [5] 1.571735 551
## [6] 1.571735 551
## [7] 1.205032 557
## [8] 1.205032 557
## [9] 1.513634 736
## [10] 1.513634 736

```

Scatter plot for 10 rules



```
##      lhs                  rhs          support  confidence coverage
## [1]  {}      => {soda}      0.17437722 0.1743772 1.0000000
## [2]  {}      => {rolls/buns} 0.18393493 0.1839349 1.0000000
## [3]  {}      => {other vegetables} 0.19349263 0.1934926 1.0000000
## [4]  {}      => {whole milk} 0.25551601 0.2555160 1.0000000
## [5]  {yogurt} => {whole milk} 0.05602440 0.4016035 0.1395018
## [6]  {whole milk} => {yogurt} 0.05602440 0.2192598 0.2555160
## [7]  {rolls/buns} => {whole milk} 0.05663447 0.3079049 0.1839349
## [8]  {whole milk} => {rolls/buns} 0.05663447 0.2216474 0.2555160
## [9]  {other vegetables} => {whole milk} 0.07483477 0.3867578 0.1934926
## [10] {whole milk} => {other vegetables} 0.07483477 0.2928770 0.2555160
##      lift      count
## [1] 1.000000 1715
## [2] 1.000000 1809
## [3] 1.000000 1903
## [4] 1.000000 2513
## [5] 1.571735 551
## [6] 1.571735 551
## [7] 1.205032 557
## [8] 1.205032 557
## [9] 1.513634 736
## [10] 1.513634 736
##      lhs                  rhs          support  confidence coverage
## [1]  {}      => {soda}      0.17437722 0.1743772 1.0000000
## [2]  {}      => {rolls/buns} 0.18393493 0.1839349 1.0000000
## [3]  {}      => {other vegetables} 0.19349263 0.1934926 1.0000000
```

```

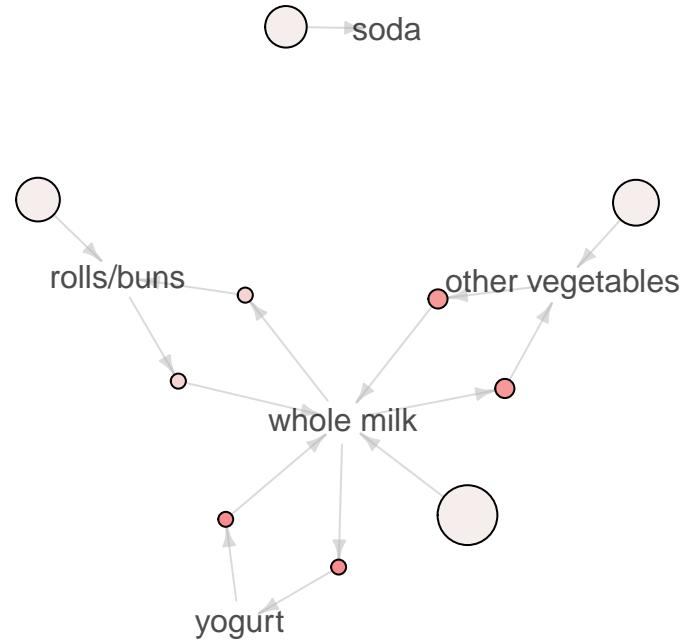
## [4]  {}          => {whole milk}      0.25551601 0.2555160 1.0000000
## [5]  {yogurt}    => {whole milk}      0.05602440 0.4016035 0.1395018
## [6]  {whole milk} => {yogurt}        0.05602440 0.2192598 0.2555160
## [7]  {rolls/buns}=> {whole milk}      0.05663447 0.3079049 0.1839349
## [8]  {whole milk} => {rolls/buns}     0.05663447 0.2216474 0.2555160
## [9]  {other vegetables}=> {whole milk} 0.07483477 0.3867578 0.1934926
## [10] {whole milk}  => {other vegetables} 0.07483477 0.2928770 0.2555160
##      lift      count
## [1] 1.000000 1715
## [2] 1.000000 1809
## [3] 1.000000 1903
## [4] 1.000000 2513
## [5] 1.571735 551
## [6] 1.571735 551
## [7] 1.205032 557
## [8] 1.205032 557
## [9] 1.513634 736
## [10] 1.513634 736

## set of 10 rules
##
## rule length distribution (lhs + rhs):sizes
## 1 2
## 4 6
##
##      Min. 1st Qu. Median   Mean 3rd Qu.   Max.
##      1.0    1.0    2.0    1.6    2.0    2.0
##
## summary of quality measures:
##      support      confidence      coverage      lift
##      Min. :0.05602  Min. :0.1744  Min. :0.1395  Min. :1.000
##      1st Qu.:0.05663 1st Qu.:0.1999 1st Qu.:0.2090 1st Qu.:1.000
##      Median :0.07483 Median :0.2386 Median :0.2555 Median :1.205
##      Mean   :0.11823 Mean   :0.2637 Mean   :0.5283 Mean   :1.258
##      3rd Qu.:0.18155 3rd Qu.:0.3041 3rd Qu.:1.0000 3rd Qu.:1.514
##      Max.   :0.25552 Max.   :0.4016  Max.   :1.0000 Max.   :1.572
##      count
##      Min.   : 551
##      1st Qu.: 557
##      Median : 736
##      Mean   :1163
##      3rd Qu.:1786
##      Max.   :2513
##
## mining info:
##      data ntransactions support confidence
##  groceries_trans      9835      0.05      0.15

```

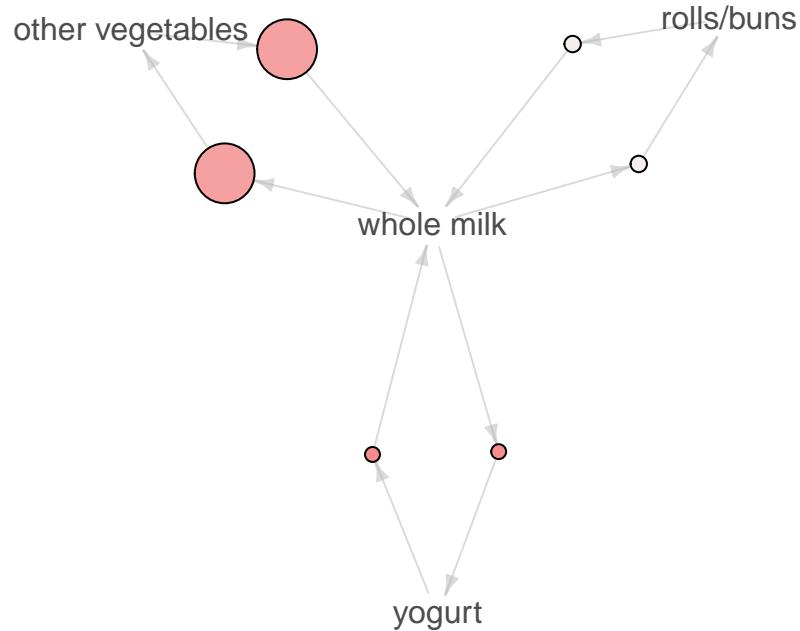
Graph for 10 rules

size: support (0.056 – 0.256)
color: lift (1 – 1.572)



Graph for 6 rules

size: support (0.056 – 0.075)
color: lift (1.205 – 1.572)



Using association rules, the findings are sensible in explaining associations between items in a grocery transaction. Two associate rule algorithms were created to generate rules associated with particular values of support, confidence, and lift levels that were chosen to be fit for the dataset. Interesting key findings from both obvservations are as below:

People are more likely to buy napkins if they purchased hygiene articles; sausage if they buy sliced cheese; waffles if they buy chocolate, and bakery products if they buy chocolate; ham if they buy white bread; and whole milk if they buy yogurt.