Basket Analysis

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## Basket Analysis:

### Reading and Cleaning the POS, Loyalty, Barcode and Taxonomy Data of a Retail Outlet:

library(openxlsx)  
library(tidyr)  
library(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

library(ggplot2)  
library(arules)

## Loading required package: Matrix

##   
## Attaching package: 'Matrix'

## The following objects are masked from 'package:tidyr':  
##   
## expand, pack, unpack

##   
## Attaching package: 'arules'

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

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

library(arulesViz)

## Loading required package: grid

## Registered S3 method overwritten by 'seriation':  
## method from   
## reorder.hclust gclus

# Reading base dataset on loan and returns  
POSData <- read.xlsx(xlsxFile = "D:\\Data Science and Big Data Analytics\\Assignment 2\\Data.xlsx", sheet = 1, colNames = TRUE)  
nrow(POSData) # Checking number of rows

## [1] 235474

head(POSData)

## Basket\_ID Date Barcode Sum\_Units Sum\_Value Card\_ID  
## 1 1103084867 41379 800220505783 2 1.9600000 9160003751260  
## 2 1103853519 41381 520139501183 1 5.3499928 9164001986624  
## 3 1092750793 41346 520423907421 6 1.7400147 9164012915385  
## 4 1106160983 41388 211069400000 1 0.7498166 9162005811409  
## 5 1108695491 41395 520286400380 2 0.6000000 9161003517351  
## 6 1089674734 41337 212878100000 1 3.8088040 9162006543842

LoyaltyData <- read.xlsx(xlsxFile = "D:\\Data Science and Big Data Analytics\\Assignment 2\\Data.xlsx", sheet = 2, colNames = TRUE)  
nrow(LoyaltyData) # Checking number of rows

## [1] 191129

head(LoyaltyData)

## CardholderID Age Gender MaritalStatus HouseholdSize Children  
## 1 9.162002e+12 51 Male Single (Alone) 1 0  
## 2 9.164011e+12 72 Female <NA> 2 0  
## 3 9.162001e+12 60 Female <NA> 1 0  
## 4 9.162006e+12 NULL Female Married 5 NULL  
## 5 9.163002e+12 50 Female <NA> 1 0  
## 6 9.163006e+12 35 Female <NA> 2 1

BarcodeData <- read.xlsx(xlsxFile = "D:\\Data Science and Big Data Analytics\\Assignment 2\\Data.xlsx", sheet = 3, colNames = TRUE)  
nrow(BarcodeData) # Checking number of rows

## [1] 9322

head(BarcodeData)

## Barcode CategoryA CategoryB CategoryC CategoryD  
## 1 360923242189 60 60 767 2  
## 2 501132123894 10 12 287 2  
## 3 520223414111 30 21 3 3  
## 4 400580827457 10 12 286 2  
## 5 210213800000 20 51 110 1  
## 6 520121945559 10 14 216 2

TaxonomyData <- read.xlsx(xlsxFile = "D:\\Data Science and Big Data Analytics\\Assignment 2\\Data.xlsx", sheet = 4, colNames = TRUE)  
nrow(TaxonomyData) # Checking number of rows

## [1] 703

head(TaxonomyData)

## CategoryA CategoryB CategoryBDescription CategoryC CategoryCDescription  
## 1 10 11 DRINKS 261 BEVERAGES  
## 2 10 11 DRINKS 261 BEVERAGES  
## 3 10 11 DRINKS 261 BEVERAGES  
## 4 10 11 DRINKS 261 BEVERAGES  
## 5 10 11 DRINKS 261 BEVERAGES  
## 6 10 11 DRINKS 261 BEVERAGES  
## CategoryD CategoryDDescription  
## 1 1 cola  
## 2 2 lime  
## 3 3 juice   
## 4 5 sport drinks  
## 5 6 tea  
## 6 7 milk shake

POSData <- filter(POSData, Sum\_Units >= 0)  
POSData <- filter(POSData, Sum\_Value >= 0)  
POSData$Date <- as.Date(POSData$Date, origin = "1899-12-30")

### Merging Data from POS, barcodes and Taxonomy:

Merge1<- merge(POSData, BarcodeData, by.x = "Barcode", by.y = "Barcode", all.x = TRUE)  
Merge1 <- Merge1 %>% drop\_na(CategoryA)  
head(Merge1)

## Barcode Basket\_ID Date Sum\_Units Sum\_Value Card\_ID CategoryA  
## 2 2017977 1095946999 2013-03-23 8 1.6799999 N/A 10  
## 3 2087203 1107361546 2013-04-27 1 3.1000147 9163001855077 20  
## 4 2089378 1107816609 2013-04-29 2 1.4200146 N/A 20  
## 5 2089378 1106511261 2013-04-25 2 1.2800000 9163001511928 20  
## 6 2089378 1107816575 2013-04-29 1 0.6400000 9164013170059 20  
## 7 2089378 1106189349 2013-04-24 1 0.7099926 9164001652321 20  
## CategoryB CategoryC CategoryD  
## 2 11 266 1  
## 3 54 164 2  
## 4 54 161 1  
## 5 54 161 1  
## 6 54 161 1  
## 7 54 161 1

Merge2 <- merge(Merge1, TaxonomyData, by.x = "CategoryC", by.y = "CategoryC", all.x = TRUE)  
head(Merge2)

## CategoryC Barcode Basket\_ID Date Sum\_Units Sum\_Value  
## 1 1 520223416068 1091564291 2013-03-09 1 2.580015  
## 2 1 520223416068 1091564291 2013-03-09 1 2.580015  
## 3 1 520223416068 1091564291 2013-03-09 1 2.580015  
## 4 1 520223416068 1091564291 2013-03-09 1 2.580015  
## 5 1 520103770763 1090795746 2013-03-07 1 3.100015  
## 6 1 520103770763 1090795746 2013-03-07 1 3.100015  
## Card\_ID CategoryA.x CategoryB.x CategoryD.x CategoryA.y CategoryB.y  
## 1 9164002904771 30 21 2 30 21  
## 2 9164002904771 30 21 2 30 21  
## 3 9164002904771 30 21 2 30 21  
## 4 9164002904771 30 21 2 30 21  
## 5 N/A 30 21 2 30 21  
## 6 N/A 30 21 2 30 21  
## CategoryBDescription CategoryCDescription CategoryD.y  
## 1 products thatn expire soon yoghurt 3  
## 2 products thatn expire soon yoghurt 4  
## 3 products thatn expire soon yoghurt 2  
## 4 products thatn expire soon yoghurt 1  
## 5 products thatn expire soon yoghurt 3  
## 6 products thatn expire soon yoghurt 4  
## CategoryDDescription  
## 1 mixed  
## 2 helathy  
## 3 white  
## 4 with fruits  
## 5 mixed  
## 6 helathy

names(Merge2)

## [1] "CategoryC" "Barcode" "Basket\_ID"   
## [4] "Date" "Sum\_Units" "Sum\_Value"   
## [7] "Card\_ID" "CategoryA.x" "CategoryB.x"   
## [10] "CategoryD.x" "CategoryA.y" "CategoryB.y"   
## [13] "CategoryBDescription" "CategoryCDescription" "CategoryD.y"   
## [16] "CategoryDDescription"

Merge2 <- select(Merge2, c(Basket\_ID, CategoryBDescription, CategoryCDescription))

### Frequent Item sets based on Category B

# Frequent Item sets based on Category B  
Merge2$Basket\_ID <- as.factor(Merge2$Basket\_ID)  
Merge2$CategoryBDescription <- as.factor(Merge2$CategoryBDescription)  
POSData\_by\_Cat <- split(Merge2$CategoryBDescription, Merge2$Basket\_ID)  
Basket <- as(POSData\_by\_Cat, "transactions")

## Warning in asMethod(object): removing duplicated items in transactions

itemsets <- apriori(Basket, parameter=list(minlen= 3, support=0.01, target="frequent itemsets"))

## Apriori  
##   
## Parameter specification:  
## confidence minval smax arem aval originalSupport maxtime support minlen  
## NA 0.1 1 none FALSE TRUE 5 0.01 3  
## maxlen target ext  
## 10 frequent itemsets FALSE  
##   
## Algorithmic control:  
## filter tree heap memopt load sort verbose  
## 0.1 TRUE TRUE FALSE TRUE 2 TRUE  
##   
## Absolute minimum support count: 461   
##   
## set item appearances ...[0 item(s)] done [0.00s].  
## set transactions ...[33 item(s), 46103 transaction(s)] done [0.02s].  
## sorting and recoding items ... [15 item(s)] done [0.00s].  
## creating transaction tree ... done [0.02s].  
## checking subsets of size 1 2 3 4 5 6 done [0.01s].  
## writing ... [183 set(s)] done [0.00s].  
## creating S4 object ... done [0.00s].

inspect(sort(itemsets, by ="support"))

## items support count  
## [1] {fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.10439668 4813  
## [2] {DAIRY PRODUCTS,   
## Grocery Food,   
## products thatn expire soon} 0.10387610 4789  
## [3] {Detergents,   
## Grocery Food,   
## products thatn expire soon} 0.10324708 4760  
## [4] {DAIRY PRODUCTS,   
## fruits and vegetables,   
## Grocery Food} 0.09461423 4362  
## [5] {Detergents,   
## fruits and vegetables,   
## Grocery Food} 0.09092684 4192  
## [6] {DAIRY PRODUCTS,   
## Detergents,   
## Grocery Food} 0.08797692 4056  
## [7] {DRINKS,   
## Grocery Food,   
## products thatn expire soon} 0.08040691 3707  
## [8] {Detergents,   
## DRINKS,   
## Grocery Food} 0.07619895 3513  
## [9] {DRINKS,   
## fruits and vegetables,   
## Grocery Food} 0.07448539 3434  
## [10] {DAIRY PRODUCTS,   
## DRINKS,   
## Grocery Food} 0.06721905 3099  
## [11] {DAIRY PRODUCTS,   
## fruits and vegetables,   
## products thatn expire soon} 0.06118908 2821  
## [12] {DAIRY PRODUCTS,   
## Detergents,   
## products thatn expire soon} 0.05648222 2604  
## [13] {Detergents,   
## fruits and vegetables,   
## products thatn expire soon} 0.05444331 2510  
## [14] {DAIRY PRODUCTS,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.05125480 2363  
## [15] {DAIRY PRODUCTS,   
## Detergents,   
## Grocery Food,   
## products thatn expire soon} 0.04984491 2298  
## [16] {DAIRY PRODUCTS,   
## Detergents,   
## fruits and vegetables} 0.04850010 2236  
## [17] {Detergents,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.04609245 2125  
## [18] {DAIRY PRODUCTS,   
## Deli and canned food,   
## Grocery Food} 0.04518144 2083  
## [19] {DRINKS,   
## fruits and vegetables,   
## products thatn expire soon} 0.04450903 2052  
## [20] {Detergents,   
## DRINKS,   
## products thatn expire soon} 0.04342451 2002  
## [21] {DAIRY PRODUCTS,   
## DRINKS,   
## products thatn expire soon} 0.04231829 1951  
## [22] {DAIRY PRODUCTS,   
## Detergents,   
## fruits and vegetables,   
## Grocery Food} 0.04216645 1944  
## [23] {frozen,   
## fruits and vegetables,   
## Grocery Food} 0.03982387 1836  
## [24] {Detergents,   
## Grocery Food,   
## household} 0.03906470 1801  
## [25] {DAIRY PRODUCTS,   
## DRINKS,   
## fruits and vegetables} 0.03899963 1798  
## [26] {Detergents,   
## DRINKS,   
## Grocery Food,   
## products thatn expire soon} 0.03850075 1775  
## [27] {DAIRY PRODUCTS,   
## DRINKS,   
## Grocery Food,   
## products thatn expire soon} 0.03837060 1769  
## [28] {Detergents,   
## DRINKS,   
## fruits and vegetables} 0.03832722 1767  
## [29] {DRINKS,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.03808863 1756  
## [30] {DAIRY PRODUCTS,   
## Detergents,   
## DRINKS} 0.03670043 1692  
## [31] {DAIRY PRODUCTS,   
## frozen,   
## Grocery Food} 0.03446630 1589  
## [32] {DAIRY PRODUCTS,   
## DRINKS,   
## fruits and vegetables,   
## Grocery Food} 0.03440123 1586  
## [33] {Detergents,   
## DRINKS,   
## fruits and vegetables,   
## Grocery Food} 0.03359868 1549  
## [34] {Deli and canned food,   
## Grocery Food,   
## products thatn expire soon} 0.03357699 1548  
## [35] {Detergents,   
## frozen,   
## Grocery Food} 0.03346854 1543  
## [36] {frozen,   
## Grocery Food,   
## products thatn expire soon} 0.03314318 1528  
## [37] {DAIRY PRODUCTS,   
## Detergents,   
## DRINKS,   
## Grocery Food} 0.03312149 1527  
## [38] {Deli and canned food,   
## fruits and vegetables,   
## Grocery Food} 0.03257922 1502  
## [39] {fruits and vegetables,   
## Grocery Food,   
## traditional butchery} 0.02956424 1363  
## [40] {Deli and canned food,   
## Detergents,   
## Grocery Food} 0.02858816 1318  
## [41] {DAIRY PRODUCTS,   
## Deli and canned food,   
## products thatn expire soon} 0.02832787 1306  
## [42] {Grocery Food,   
## household,   
## products thatn expire soon} 0.02793744 1288  
## [43] {fruits and vegetables,   
## Grocery Food,   
## household} 0.02787237 1285  
## [44] {DAIRY PRODUCTS,   
## Detergents,   
## fruits and vegetables,   
## products thatn expire soon} 0.02743856 1265  
## [45] {bakery,   
## fruits and vegetables,   
## Grocery Food} 0.02711320 1250  
## [46] {DAIRY PRODUCTS,   
## Deli and canned food,   
## fruits and vegetables} 0.02609375 1203  
## [47] {DAIRY PRODUCTS,   
## Grocery Food,   
## traditional butchery} 0.02594191 1196  
## [48] {DRINKS,   
## frozen,   
## Grocery Food} 0.02589853 1194  
## [49] {DAIRY PRODUCTS,   
## Grocery Food,   
## household} 0.02542134 1172  
## [50] {DAIRY PRODUCTS,   
## Deli and canned food,   
## Grocery Food,   
## products thatn expire soon} 0.02487908 1147  
## [51] {bakery,   
## Grocery Food,   
## products thatn expire soon} 0.02446695 1128  
## [52] {DAIRY PRODUCTS,   
## Detergents,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.02442357 1126  
## [53] {Grocery Food,   
## products thatn expire soon,   
## traditional butchery} 0.02422836 1117  
## [54] {bakery,   
## DAIRY PRODUCTS,   
## Grocery Food} 0.02416329 1114  
## [55] {Deli and canned food,   
## DRINKS,   
## Grocery Food} 0.02407652 1110  
## [56] {DRINKS,   
## Grocery Food,   
## household} 0.02383793 1099  
## [57] {DAIRY PRODUCTS,   
## Deli and canned food,   
## Detergents} 0.02323059 1071  
## [58] {Detergents,   
## Grocery Food,   
## traditional butchery} 0.02318721 1069  
## [59] {DAIRY PRODUCTS,   
## frozen,   
## fruits and vegetables} 0.02271002 1047  
## [60] {DAIRY PRODUCTS,   
## DRINKS,   
## fruits and vegetables,   
## products thatn expire soon} 0.02240635 1033  
## [61] {frozen,   
## fruits and vegetables,   
## products thatn expire soon} 0.02227621 1027  
## [62] {DAIRY PRODUCTS,   
## Deli and canned food,   
## fruits and vegetables,   
## Grocery Food} 0.02212437 1020  
## [63] {DAIRY PRODUCTS,   
## Detergents,   
## DRINKS,   
## products thatn expire soon} 0.02210268 1019  
## [64] {bakery,   
## Detergents,   
## Grocery Food} 0.02156042 994  
## [65] {DAIRY PRODUCTS,   
## Deli and canned food,   
## Detergents,   
## Grocery Food} 0.02088801 963  
## [66] {Detergents,   
## household,   
## products thatn expire soon} 0.02071449 955  
## [67] {Detergents,   
## DRINKS,   
## fruits and vegetables,   
## products thatn expire soon} 0.02064942 952  
## [68] {COLD CUTS,   
## DAIRY PRODUCTS,   
## Grocery Food} 0.02060603 950  
## [69] {DAIRY PRODUCTS,   
## Detergents,   
## DRINKS,   
## Grocery Food,   
## products thatn expire soon} 0.02058434 949  
## [70] {Detergents,   
## frozen,   
## fruits and vegetables} 0.02036744 939  
## [71] {Detergents,   
## fruits and vegetables,   
## household} 0.02021560 932  
## [72] {DAIRY PRODUCTS,   
## frozen,   
## products thatn expire soon} 0.02010715 927  
## [73] {DAIRY PRODUCTS,   
## DRINKS,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.02008546 926  
## [74] {DAIRY PRODUCTS,   
## frozen,   
## fruits and vegetables,   
## Grocery Food} 0.01982517 914  
## [75] {Deli and canned food,   
## fruits and vegetables,   
## products thatn expire soon} 0.01962996 905  
## [76] {bakery,   
## DRINKS,   
## Grocery Food} 0.01956489 902  
## [77] {DAIRY PRODUCTS,   
## Detergents,   
## DRINKS,   
## fruits and vegetables} 0.01893586 873  
## [78] {DRINKS,   
## Grocery Food,   
## traditional butchery} 0.01871896 863  
## [79] {DAIRY PRODUCTS,   
## Detergents,   
## household} 0.01865388 860  
## [80] {COLD CUTS,   
## Grocery Food,   
## products thatn expire soon} 0.01863219 859  
## [81] {Detergents,   
## DRINKS,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.01852374 854  
## [82] {DAIRY PRODUCTS,   
## Detergents,   
## frozen} 0.01850205 853  
## [83] {frozen,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.01837191 847  
## [84] {DAIRY PRODUCTS,   
## Deli and canned food,   
## DRINKS} 0.01826345 842  
## [85] {DAIRY PRODUCTS,   
## fruits and vegetables,   
## traditional butchery} 0.01817669 838  
## [86] {DAIRY PRODUCTS,   
## frozen,   
## Grocery Food,   
## products thatn expire soon} 0.01817669 838  
## [87] {Detergents,   
## frozen,   
## fruits and vegetables,   
## Grocery Food} 0.01780795 821  
## [88] {Detergents,   
## Grocery Food,   
## household,   
## products thatn expire soon} 0.01769950 816  
## [89] {Detergents,   
## frozen,   
## products thatn expire soon} 0.01761274 812  
## [90] {Detergents,   
## DRINKS,   
## household} 0.01756936 810  
## [91] {COLD CUTS,   
## fruits and vegetables,   
## Grocery Food} 0.01752597 808  
## [92] {Deli and canned food,   
## Detergents,   
## products thatn expire soon} 0.01733076 799  
## [93] {Detergents,   
## fruits and vegetables,   
## Grocery Food,   
## household} 0.01728738 797  
## [94] {DAIRY PRODUCTS,   
## Detergents,   
## DRINKS,   
## fruits and vegetables,   
## Grocery Food} 0.01720062 793  
## [95] {Deli and canned food,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.01685357 777  
## [96] {DAIRY PRODUCTS,   
## Detergents,   
## frozen,   
## Grocery Food} 0.01676680 773  
## [97] {DRINKS,   
## frozen,   
## fruits and vegetables} 0.01670173 770  
## [98] {DAIRY PRODUCTS,   
## Deli and canned food,   
## DRINKS,   
## Grocery Food} 0.01670173 770  
## [99] {DAIRY PRODUCTS,   
## Detergents,   
## Grocery Food,   
## household} 0.01622454 748  
## [100] {bakery,   
## DAIRY PRODUCTS,   
## fruits and vegetables} 0.01611609 743  
## [101] {Deli and canned food,   
## Detergents,   
## fruits and vegetables} 0.01600764 738  
## [102] {fruits and vegetables,   
## products thatn expire soon,   
## traditional butchery} 0.01596425 736  
## [103] {Detergents,   
## frozen,   
## Grocery Food,   
## products thatn expire soon} 0.01583411 730  
## [104] {Deli and canned food,   
## Detergents,   
## Grocery Food,   
## products thatn expire soon} 0.01572566 725  
## [105] {DAIRY PRODUCTS,   
## household,   
## products thatn expire soon} 0.01570397 724  
## [106] {bakery,   
## fruits and vegetables,   
## products thatn expire soon} 0.01563890 721  
## [107] {fruits and vegetables,   
## household,   
## products thatn expire soon} 0.01555213 717  
## [108] {COLD CUTS,   
## Detergents,   
## Grocery Food} 0.01553044 716  
## [109] {Detergents,   
## DRINKS,   
## Grocery Food,   
## household} 0.01507494 695  
## [110] {DAIRY PRODUCTS,   
## fruits and vegetables,   
## Grocery Food,   
## traditional butchery} 0.01496649 690  
## [111] {bakery,   
## DAIRY PRODUCTS,   
## products thatn expire soon} 0.01487973 686  
## [112] {DAIRY PRODUCTS,   
## products thatn expire soon,   
## traditional butchery} 0.01483634 684  
## [113] {DAIRY PRODUCTS,   
## fruits and vegetables,   
## household} 0.01479296 682  
## [114] {DRINKS,   
## frozen,   
## products thatn expire soon} 0.01470620 678  
## [115] {DRINKS,   
## frozen,   
## fruits and vegetables,   
## Grocery Food} 0.01457606 672  
## [116] {Detergents,   
## DRINKS,   
## frozen} 0.01448930 668  
## [117] {Deli and canned food,   
## DRINKS,   
## fruits and vegetables} 0.01422901 656  
## [118] {DAIRY PRODUCTS,   
## Grocery Food,   
## household,   
## products thatn expire soon} 0.01414225 652  
## [119] {Deli and canned food,   
## Detergents,   
## fruits and vegetables,   
## Grocery Food} 0.01414225 652  
## [120] {Detergents,   
## fruits and vegetables,   
## traditional butchery} 0.01412056 651  
## [121] {DAIRY PRODUCTS,   
## Deli and canned food,   
## fruits and vegetables,   
## products thatn expire soon} 0.01412056 651  
## [122] {Deli and canned food,   
## DRINKS,   
## products thatn expire soon} 0.01407718 649  
## [123] {DAIRY PRODUCTS,   
## DRINKS,   
## frozen} 0.01381689 637  
## [124] {fruits and vegetables,   
## Grocery Food,   
## household,   
## products thatn expire soon} 0.01379520 636  
## [125] {COLD CUTS,   
## DRINKS,   
## Grocery Food} 0.01362167 628  
## [126] {COLD CUTS,   
## DAIRY PRODUCTS,   
## products thatn expire soon} 0.01346984 621  
## [127] {DAIRY PRODUCTS,   
## fruits and vegetables,   
## Grocery Food,   
## household} 0.01342646 619  
## [128] {fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon,   
## traditional butchery} 0.01336139 616  
## [129] {bakery,   
## DAIRY PRODUCTS,   
## fruits and vegetables,   
## Grocery Food} 0.01327462 612  
## [130] {Detergents,   
## DRINKS,   
## frozen,   
## Grocery Food} 0.01320955 609  
## [131] {Deli and canned food,   
## DRINKS,   
## Grocery Food,   
## products thatn expire soon} 0.01303603 601  
## [132] {DAIRY PRODUCTS,   
## Deli and canned food,   
## Detergents,   
## products thatn expire soon} 0.01303603 601  
## [133] {DRINKS,   
## frozen,   
## Grocery Food,   
## products thatn expire soon} 0.01303603 601  
## [134] {DAIRY PRODUCTS,   
## Grocery Food,   
## products thatn expire soon,   
## traditional butchery} 0.01301434 600  
## [135] {Deli and canned food,   
## Detergents,   
## DRINKS} 0.01294927 597  
## [136] {Deli and canned food,   
## frozen,   
## Grocery Food} 0.01292758 596  
## [137] {DRINKS,   
## household,   
## products thatn expire soon} 0.01281912 591  
## [138] {Deli and canned food,   
## DRINKS,   
## fruits and vegetables,   
## Grocery Food} 0.01279743 590  
## [139] {Detergents,   
## products thatn expire soon,   
## traditional butchery} 0.01275405 588  
## [140] {DRINKS,   
## fruits and vegetables,   
## household} 0.01273236 587  
## [141] {DAIRY PRODUCTS,   
## DRINKS,   
## frozen,   
## Grocery Food} 0.01268898 585  
## [142] {bakery,   
## DAIRY PRODUCTS,   
## Grocery Food,   
## products thatn expire soon} 0.01264560 583  
## [143] {DAIRY PRODUCTS,   
## Detergents,   
## traditional butchery} 0.01262391 582  
## [144] {bakery,   
## Detergents,   
## products thatn expire soon} 0.01253715 578  
## [145] {DAIRY PRODUCTS,   
## Deli and canned food,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.01247207 575  
## [146] {bakery,   
## DRINKS,   
## fruits and vegetables} 0.01221179 563  
## [147] {bakery,   
## Detergents,   
## fruits and vegetables} 0.01219010 562  
## [148] {bakery,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.01219010 562  
## [149] {COLD CUTS,   
## DAIRY PRODUCTS,   
## fruits and vegetables} 0.01210333 558  
## [150] {COLD CUTS,   
## DAIRY PRODUCTS,   
## Grocery Food,   
## products thatn expire soon} 0.01210333 558  
## [151] {DAIRY PRODUCTS,   
## Deli and canned food,   
## Detergents,   
## Grocery Food,   
## products thatn expire soon} 0.01210333 558  
## [152] {Detergents,   
## fruits and vegetables,   
## Grocery Food,   
## traditional butchery} 0.01197319 552  
## [153] {Deli and canned food,   
## Detergents,   
## DRINKS,   
## Grocery Food} 0.01197319 552  
## [154] {DAIRY PRODUCTS,   
## frozen,   
## fruits and vegetables,   
## products thatn expire soon} 0.01182136 545  
## [155] {DRINKS,   
## fruits and vegetables,   
## traditional butchery} 0.01175628 542  
## [156] {DAIRY PRODUCTS,   
## Detergents,   
## DRINKS,   
## fruits and vegetables,   
## products thatn expire soon} 0.01147431 529  
## [157] {DAIRY PRODUCTS,   
## Deli and canned food,   
## Detergents,   
## fruits and vegetables} 0.01145262 528  
## [158] {DAIRY PRODUCTS,   
## DRINKS,   
## household} 0.01136585 524  
## [159] {DAIRY PRODUCTS,   
## Detergents,   
## Grocery Food,   
## traditional butchery} 0.01134416 523  
## [160] {DRINKS,   
## fruits and vegetables,   
## Grocery Food,   
## household} 0.01132247 522  
## [161] {DRINKS,   
## Grocery Food,   
## household,   
## products thatn expire soon} 0.01132247 522  
## [162] {bakery,   
## DAIRY PRODUCTS,   
## Detergents} 0.01127909 520  
## [163] {Detergents,   
## Grocery Food,   
## products thatn expire soon,   
## traditional butchery} 0.01117064 515  
## [164] {COLD CUTS,   
## fruits and vegetables,   
## products thatn expire soon} 0.01097542 506  
## [165] {bakery,   
## DRINKS,   
## products thatn expire soon} 0.01080190 498  
## [166] {DAIRY PRODUCTS,   
## Detergents,   
## DRINKS,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.01065007 491  
## [167] {DAIRY PRODUCTS,   
## frozen,   
## fruits and vegetables,   
## Grocery Food,   
## products thatn expire soon} 0.01062838 490  
## [168] {DRINKS,   
## products thatn expire soon,   
## traditional butchery} 0.01060669 489  
## [169] {COLD CUTS,   
## DAIRY PRODUCTS,   
## fruits and vegetables,   
## Grocery Food} 0.01051992 485  
## [170] {COLD CUTS,   
## DAIRY PRODUCTS,   
## Detergents} 0.01047654 483  
## [171] {DAIRY PRODUCTS,   
## Detergents,   
## household,   
## products thatn expire soon} 0.01047654 483  
## [172] {bakery,   
## Detergents,   
## Grocery Food,   
## products thatn expire soon} 0.01045485 482  
## [173] {DAIRY PRODUCTS,   
## DRINKS,   
## traditional butchery} 0.01034640 477  
## [174] {DAIRY PRODUCTS,   
## Deli and canned food,   
## Detergents,   
## fruits and vegetables,   
## Grocery Food} 0.01034640 477  
## [175] {DAIRY PRODUCTS,   
## Detergents,   
## frozen,   
## fruits and vegetables} 0.01032471 476  
## [176] {DAIRY PRODUCTS,   
## DRINKS,   
## Grocery Food,   
## household} 0.01028133 474  
## [177] {DAIRY PRODUCTS,   
## Deli and canned food,   
## DRINKS,   
## products thatn expire soon} 0.01028133 474  
## [178] {bakery,   
## DRINKS,   
## fruits and vegetables,   
## Grocery Food} 0.01025964 473  
## [179] {bakery,   
## Detergents,   
## fruits and vegetables,   
## Grocery Food} 0.01023795 472  
## [180] {DRINKS,   
## fruits and vegetables,   
## Grocery Food,   
## traditional butchery} 0.01021625 471  
## [181] {frozen,   
## Grocery Food,   
## household} 0.01015118 468  
## [182] {bakery,   
## frozen,   
## Grocery Food} 0.01004273 463  
## [183] {Detergents,   
## fruits and vegetables,   
## household,   
## products thatn expire soon} 0.01002104 462

### Frequent Item sets based on Category C

# Frequent Item sets based on Category C  
Merge2$Basket\_ID <- as.factor(Merge2$Basket\_ID)  
Merge2$CategoryCDescription <- as.factor(Merge2$CategoryCDescription)  
POSData\_by\_Cat <- split(Merge2$CategoryCDescription, Merge2$Basket\_ID)  
Basket <- as(POSData\_by\_Cat, "transactions")

## Warning in asMethod(object): removing duplicated items in transactions

itemsets <- apriori(Basket, parameter=list(minlen= 2, support=0.01, target="frequent itemsets"))

## Apriori  
##   
## Parameter specification:  
## confidence minval smax arem aval originalSupport maxtime support minlen  
## NA 0.1 1 none FALSE TRUE 5 0.01 2  
## maxlen target ext  
## 10 frequent itemsets FALSE  
##   
## Algorithmic control:  
## filter tree heap memopt load sort verbose  
## 0.1 TRUE TRUE FALSE TRUE 2 TRUE  
##   
## Absolute minimum support count: 461   
##   
## set item appearances ...[0 item(s)] done [0.00s].  
## set transactions ...[187 item(s), 46103 transaction(s)] done [0.03s].  
## sorting and recoding items ... [72 item(s)] done [0.00s].  
## creating transaction tree ... done [0.03s].  
## checking subsets of size 1 2 3 4 done [0.01s].  
## writing ... [239 set(s)] done [0.00s].  
## creating S4 object ... done [0.01s].

inspect(sort(itemsets, by ="support"))

## items support count  
## [1] {FRESH MILK,   
## fresh vegetables} 0.07802095 3597  
## [2] {fresh fruits,   
## fresh vegetables} 0.05826085 2686  
## [3] {BEVERAGES,   
## FRESH MILK} 0.05693773 2625  
## [4] {BEVERAGES,   
## fresh vegetables} 0.05353231 2468  
## [5] {cheese (counter),   
## fresh vegetables} 0.04917251 2267  
## [6] {cheese (counter),   
## FRESH MILK} 0.04568032 2106  
## [7] {FRESH MILK,   
## tisues/sanitary etc} 0.04448734 2051  
## [8] {fresh fruits,   
## FRESH MILK} 0.04377155 2018  
## [9] {FRESH MILK,   
## yoghurt} 0.04034445 1860  
## [10] {fresh vegetables,   
## tisues/sanitary etc} 0.03791510 1748  
## [11] {BEVERAGES,   
## tisues/sanitary etc} 0.03362037 1550  
## [12] {FRESH MILK,   
## special packed bread} 0.03301304 1522  
## [13] {fresh vegetables,   
## yoghurt} 0.03283951 1514  
## [14] {cheese (counter),   
## cold cuts} 0.03249246 1498  
## [15] {fresh vegetables,   
## tin food - vegetables} 0.03244908 1496  
## [16] {BEVERAGES,   
## crisps} 0.02958593 1364  
## [17] {BEVERAGES,   
## cheese (counter)} 0.02904366 1339  
## [18] {coffee,   
## FRESH MILK} 0.02880507 1328  
## [19] {coffee,   
## fresh vegetables} 0.02871830 1324  
## [20] {FRESH MILK,   
## pastry making} 0.02867492 1322  
## [21] {fresh vegetables,   
## pasta} 0.02765547 1275  
## [22] {cheese (counter),   
## special packed bread} 0.02709151 1249  
## [23] {FRESH MILK,   
## pasta} 0.02641911 1218  
## [24] {FRESH MILK,   
## sugar} 0.02620220 1208  
## [25] {biscuits,   
## FRESH MILK} 0.02615882 1206  
## [26] {fresh vegetables,   
## sugar} 0.02557317 1179  
## [27] {BEVERAGES,   
## fresh fruits} 0.02544303 1173  
## [28] {BEVERAGES,   
## pastry making} 0.02535627 1169  
## [29] {cold cuts,   
## FRESH MILK} 0.02531289 1167  
## [30] {HYGIENE - COSMETICS,   
## tisues/sanitary etc} 0.02526951 1165  
## [31] {FRESH MILK,   
## HYGIENE - COSMETICS} 0.02522612 1163  
## [32] {fresh vegetables,   
## special packed bread} 0.02470555 1139  
## [33] {FRESH MILK,   
## tin food - vegetables} 0.02418498 1115  
## [34] {cleaners,   
## fresh vegetables} 0.02375117 1095  
## [35] {cheese (counter),   
## tisues/sanitary etc} 0.02349088 1083  
## [36] {cheese (counter),   
## fresh fruits} 0.02342581 1080  
## [37] {cold cuts,   
## fresh vegetables} 0.02340412 1079  
## [38] {cleaners,   
## tisues/sanitary etc} 0.02333905 1076  
## [39] {fresh vegetables,   
## HYGIENE - COSMETICS} 0.02327397 1073  
## [40] {bakeries,   
## FRESH MILK} 0.02320890 1070  
## [41] {desserts,   
## FRESH MILK} 0.02240635 1033  
## [42] {cleaners,   
## FRESH MILK} 0.02214606 1021  
## [43] {crisps,   
## FRESH MILK} 0.02210268 1019  
## [44] {cold cuts,   
## special packed bread} 0.02208099 1018  
## [45] {BEVERAGES,   
## coffee} 0.02188578 1009  
## [46] {condensed milk,   
## fresh vegetables} 0.02184240 1007  
## [47] {coffee,   
## tisues/sanitary etc} 0.02169056 1000  
## [48] {BEVERAGES,   
## biscuits} 0.02145197 989  
## [49] {FRESH MILK,   
## MARGARINS} 0.02138689 986  
## [50] {BEVERAGES,   
## special packed bread} 0.02132182 983  
## [51] {pasta,   
## tin food - vegetables} 0.02127844 981  
## [52] {bakeries,   
## fresh vegetables} 0.02119168 977  
## [53] {fresh fruits,   
## FRESH MILK,   
## fresh vegetables} 0.02116999 976  
## [54] {cheese (counter),   
## yoghurt} 0.02101816 969  
## [55] {fresh vegetables,   
## pastry making} 0.02084463 961  
## [56] {cereals,   
## FRESH MILK} 0.02060603 950  
## [57] {FRESH MILK,   
## sweets} 0.02051927 946  
## [58] {fresh vegetables,   
## oil} 0.02047589 944  
## [59] {FRESH MILK,   
## laundry} 0.02047589 944  
## [60] {BEVERAGES,   
## yoghurt} 0.02030237 936  
## [61] {BEVERAGES,   
## water} 0.01995532 920  
## [62] {fresh fruits,   
## tisues/sanitary etc} 0.01976010 911  
## [63] {desserts,   
## fresh vegetables} 0.01973841 910  
## [64] {condensed milk,   
## FRESH MILK} 0.01967334 907  
## [65] {BEVERAGES,   
## pasta} 0.01945643 897  
## [66] {BEVERAGES,   
## tin food - vegetables} 0.01941305 895  
## [67] {BEVERAGES,   
## FRESH MILK,   
## fresh vegetables} 0.01939136 894  
## [68] {flour,   
## FRESH MILK} 0.01934798 892  
## [69] {EGGS,   
## fresh vegetables} 0.01928291 889  
## [70] {fresh vegetables,   
## laundry} 0.01917446 884  
## [71] {biscuits,   
## fresh vegetables} 0.01908769 880  
## [72] {FRESH MILK,   
## packed cheese} 0.01906600 879  
## [73] {flour,   
## fresh vegetables} 0.01900093 876  
## [74] {BEVERAGES,   
## HYGIENE - COSMETICS} 0.01889248 871  
## [75] {crisps,   
## fresh vegetables} 0.01882741 868  
## [76] {BEVERAGES,   
## cleaners} 0.01882741 868  
## [77] {laundry,   
## tisues/sanitary etc} 0.01863219 859  
## [78] {cheese (counter),   
## pasta} 0.01854543 855  
## [79] {fresh fruits,   
## yoghurt} 0.01850205 853  
## [80] {coffee,   
## sugar} 0.01839360 848  
## [81] {cheese (counter),   
## coffee} 0.01808993 834  
## [82] {FRESH MILK,   
## water} 0.01785133 823  
## [83] {coffee,   
## condensed milk} 0.01785133 823  
## [84] {chocholate related sweets,   
## FRESH MILK} 0.01774288 818  
## [85] {cheese (counter),   
## FRESH MILK,   
## fresh vegetables} 0.01769950 816  
## [86] {BEVERAGES,   
## sugar} 0.01767781 815  
## [87] {pasta,   
## tisues/sanitary etc} 0.01756936 810  
## [88] {fresh vegetables,   
## poultry} 0.01750428 807  
## [89] {tisues/sanitary etc,   
## yoghurt} 0.01748259 806  
## [90] {cleaning tools, gloves and fragrance,   
## tisues/sanitary etc} 0.01746090 805  
## [91] {fresh vegetables,   
## MARGARINS} 0.01743921 804  
## [92] {cheese (counter),   
## tin food - vegetables} 0.01728738 797  
## [93] {fresh vegetables,   
## packed cheese} 0.01698371 783  
## [94] {tin food - vegetables,   
## tisues/sanitary etc} 0.01698371 783  
## [95] {BEVERAGES,   
## cold cuts} 0.01689695 779  
## [96] {flour,   
## sugar} 0.01663666 767  
## [97] {special packed bread,   
## tisues/sanitary etc} 0.01657159 764  
## [98] {cleaners,   
## laundry} 0.01654990 763  
## [99] {fresh vegetables,   
## water} 0.01650652 761  
## [100] {BEVERAGES,   
## chocholate related sweets} 0.01648483 760  
## [101] {BEVERAGES,   
## condensed milk} 0.01639807 756  
## [102] {BEVERAGES,   
## desserts} 0.01615947 745  
## [103] {fresh vegetables,   
## sweets} 0.01592087 734  
## [104] {EGGS,   
## FRESH MILK} 0.01587749 732  
## [105] {cleaning tools, gloves and fragrance,   
## fresh vegetables} 0.01587749 732  
## [106] {sugar,   
## tisues/sanitary etc} 0.01579073 728  
## [107] {bread,   
## fresh vegetables} 0.01570397 724  
## [108] {bakeries,   
## BEVERAGES} 0.01563890 721  
## [109] {cleaning tools, gloves and fragrance,   
## FRESH MILK} 0.01557382 718  
## [110] {bakeries,   
## tisues/sanitary etc} 0.01529185 705  
## [111] {condensed milk,   
## tisues/sanitary etc} 0.01509663 696  
## [112] {BEVERAGES,   
## laundry} 0.01500987 692  
## [113] {biscuits,   
## pastry making} 0.01487973 686  
## [114] {FRESH MILK,   
## fresh vegetables,   
## yoghurt} 0.01481465 683  
## [115] {cheese (counter),   
## cleaners} 0.01477127 681  
## [116] {BEVERAGES,   
## sweets} 0.01470620 678  
## [117] {BEVERAGES,   
## cleaning tools, gloves and fragrance} 0.01457606 672  
## [118] {bakeries,   
## cheese (counter)} 0.01442422 665  
## [119] {crisps,   
## tisues/sanitary etc} 0.01429408 659  
## [120] {biscuits,   
## tisues/sanitary etc} 0.01425070 657  
## [121] {cheese (counter),   
## condensed milk} 0.01420732 655  
## [122] {coffee,   
## special packed bread} 0.01414225 652  
## [123] {chocholate related sweets,   
## fresh vegetables} 0.01407718 649  
## [124] {cheese (counter),   
## HYGIENE - COSMETICS} 0.01407718 649  
## [125] {cleaners,   
## coffee} 0.01401210 646  
## [126] {fish, seafood,   
## fresh vegetables} 0.01396872 644  
## [127] {fresh vegetables,   
## salt - peper - spicies} 0.01396872 644  
## [128] {FRESH MILK,   
## oil} 0.01396872 644  
## [129] {pastry making,   
## tisues/sanitary etc} 0.01390365 641  
## [130] {crisps,   
## pastry making} 0.01386027 639  
## [131] {cheese (counter),   
## fresh fruits,   
## fresh vegetables} 0.01386027 639  
## [132] {fresh vegetables,   
## vegetables} 0.01383858 638  
## [133] {beer nuts,   
## BEVERAGES} 0.01370844 632  
## [134] {fresh fruits,   
## special packed bread} 0.01362167 628  
## [135] {Disinfectant,   
## FRESH MILK} 0.01353491 624  
## [136] {cheese (counter),   
## cold cuts,   
## FRESH MILK} 0.01351322 623  
## [137] {cheese (counter),   
## sugar} 0.01349153 622  
## [138] {cleaners,   
## HYGIENE - COSMETICS} 0.01349153 622  
## [139] {biscuits,   
## crisps} 0.01336139 616  
## [140] {Disinfectant,   
## fresh vegetables} 0.01329631 613  
## [141] {BEVERAGES,   
## fresh fruits,   
## fresh vegetables} 0.01323124 610  
## [142] {cheese (counter),   
## cold cuts,   
## special packed bread} 0.01320955 609  
## [143] {FRESH MILK,   
## fresh vegetables,   
## tisues/sanitary etc} 0.01320955 609  
## [144] {pasta,   
## sugar} 0.01318786 608  
## [145] {condensed milk,   
## sugar} 0.01316617 607  
## [146] {cheese (counter),   
## pastry making} 0.01316617 607  
## [147] {coffee,   
## pasta} 0.01310110 604  
## [148] {coffee,   
## fresh fruits} 0.01305772 602  
## [149] {pastry making,   
## sugar} 0.01301434 600  
## [150] {coffee,   
## tin food - vegetables} 0.01301434 600  
## [151] {flour,   
## pastry making} 0.01299265 599  
## [152] {BEVERAGES,   
## packed cheese} 0.01297096 598  
## [153] {desserts,   
## tisues/sanitary etc} 0.01297096 598  
## [154] {cheese (counter),   
## cold cuts,   
## fresh vegetables} 0.01290588 595  
## [155] {cleaners,   
## Disinfectant} 0.01284081 592  
## [156] {Disinfectant,   
## tisues/sanitary etc} 0.01271067 586  
## [157] {CHILDREN'S PRODUCTS,   
## FRESH MILK} 0.01264560 583  
## [158] {BEVERAGES,   
## oil} 0.01255884 579  
## [159] {hair care,   
## HYGIENE - COSMETICS} 0.01253715 578  
## [160] {cheese (counter),   
## FRESH MILK,   
## special packed bread} 0.01251545 577  
## [161] {bakeries,   
## coffee} 0.01236362 570  
## [162] {fresh vegetables,   
## rice} 0.01234193 569  
## [163] {oil,   
## tin food - vegetables} 0.01229855 567  
## [164] {BEVERAGES,   
## cheese (counter),   
## fresh vegetables} 0.01227686 566  
## [165] {sugar,   
## tin food - vegetables} 0.01221179 563  
## [166] {fresh fruits,   
## HYGIENE - COSMETICS} 0.01219010 562  
## [167] {sweets,   
## tisues/sanitary etc} 0.01214671 560  
## [168] {bakeries,   
## fresh fruits} 0.01214671 560  
## [169] {tisues/sanitary etc,   
## water} 0.01212502 559  
## [170] {FRESH MILK,   
## poultry} 0.01210333 558  
## [171] {beer nuts,   
## FRESH MILK} 0.01205995 556  
## [172] {cheese (counter),   
## MARGARINS} 0.01205995 556  
## [173] {cheese (counter),   
## desserts} 0.01205995 556  
## [174] {bread,   
## FRESH MILK} 0.01203826 555  
## [175] {biscuits,   
## cheese (counter)} 0.01192981 550  
## [176] {fresh fruits,   
## pasta} 0.01186474 547  
## [177] {fresh fruits,   
## pastry making} 0.01184305 546  
## [178] {cold cuts,   
## tisues/sanitary etc} 0.01182136 545  
## [179] {BEVERAGES,   
## flour} 0.01177798 543  
## [180] {BEVERAGES,   
## FRESH MILK,   
## tisues/sanitary etc} 0.01175628 542  
## [181] {beer nuts,   
## fresh vegetables} 0.01166952 538  
## [182] {coffee,   
## HYGIENE - COSMETICS} 0.01164783 537  
## [183] {bakeries,   
## yoghurt} 0.01162614 536  
## [184] {BEVERAGES,   
## cheese (counter),   
## FRESH MILK} 0.01162614 536  
## [185] {cereals,   
## fresh vegetables} 0.01160445 535  
## [186] {cleaners,   
## sugar} 0.01160445 535  
## [187] {cleaners,   
## pasta} 0.01153938 532  
## [188] {coffee,   
## yoghurt} 0.01149600 530  
## [189] {cheese (counter),   
## flour} 0.01147431 529  
## [190] {fresh vegetables,   
## Peas, Beans, Sweetcorn etc} 0.01145262 528  
## [191] {cleaners,   
## tin food - vegetables} 0.01140924 526  
## [192] {cleaners,   
## fresh fruits} 0.01140924 526  
## [193] {BEVERAGES,   
## fresh fruits,   
## FRESH MILK} 0.01140924 526  
## [194] {hair care,   
## tisues/sanitary etc} 0.01136585 524  
## [195] {special packed bread,   
## yoghurt} 0.01136585 524  
## [196] {chocholate related sweets,   
## crisps} 0.01134416 523  
## [197] {desserts,   
## fresh fruits} 0.01134416 523  
## [198] {chocholates,   
## FRESH MILK} 0.01130078 521  
## [199] {FRESH MILK,   
## fresh vegetables,   
## special packed bread} 0.01123571 518  
## [200] {biscuits,   
## chocholate related sweets} 0.01108388 511  
## [201] {HYGIENE - COSMETICS,   
## yoghurt} 0.01106219 510  
## [202] {FRESH MILK,   
## hair care} 0.01104050 509  
## [203] {condensed milk,   
## special packed bread} 0.01099712 507  
## [204] {chocholate related sweets,   
## tisues/sanitary etc} 0.01091035 503  
## [205] {Condiments & Table Sauces,   
## fresh vegetables} 0.01088866 502  
## [206] {cheese (counter),   
## laundry} 0.01088866 502  
## [207] {cold cuts,   
## FRESH MILK,   
## special packed bread} 0.01088866 502  
## [208] {desserts,   
## yoghurt} 0.01086697 501  
## [209] {cheese (counter),   
## crisps} 0.01084528 500  
## [210] {bakeries,   
## biscuits} 0.01080190 498  
## [211] {fresh fruits,   
## sugar} 0.01080190 498  
## [212] {fresh fruits,   
## tin food - vegetables} 0.01075852 496  
## [213] {fresh vegetables,   
## pork} 0.01071514 494  
## [214] {packed cheese,   
## special packed bread} 0.01067176 492  
## [215] {cold cuts,   
## fresh fruits} 0.01067176 492  
## [216] {coffee,   
## pastry making} 0.01060669 489  
## [217] {FRESH MILK,   
## fresh vegetables,   
## tin food - vegetables} 0.01060669 489  
## [218] {BEVERAGES,   
## MARGARINS} 0.01058499 488  
## [219] {condensed milk,   
## tin food - vegetables} 0.01054161 486  
## [220] {BEVERAGES,   
## Disinfectant} 0.01049823 484  
## [221] {pasta,   
## special packed bread} 0.01045485 482  
## [222] {BEVERAGES,   
## fresh vegetables,   
## tisues/sanitary etc} 0.01045485 482  
## [223] {cleaners,   
## yoghurt} 0.01034640 477  
## [224] {HYGIENE - COSMETICS,   
## laundry} 0.01032471 476  
## [225] {MARGARINS,   
## tisues/sanitary etc} 0.01030302 475  
## [226] {coffee,   
## cold cuts} 0.01028133 474  
## [227] {cheese (counter),   
## FRESH MILK,   
## yoghurt} 0.01028133 474  
## [228] {biscuits,   
## fresh fruits} 0.01019456 470  
## [229] {chocholate related sweets,   
## pastry making} 0.01017287 469  
## [230] {bakeries,   
## special packed bread} 0.01017287 469  
## [231] {condensed milk,   
## pasta} 0.01017287 469  
## [232] {BEVERAGES,   
## chocholates} 0.01015118 468  
## [233] {packed cheese,   
## yoghurt} 0.01012949 467  
## [234] {fresh vegetables,   
## hair care} 0.01010780 466  
## [235] {oil,   
## tisues/sanitary etc} 0.01010780 466  
## [236] {BEVERAGES,   
## EGGS} 0.01008611 465  
## [237] {BEVERAGES,   
## FRESH MILK,   
## special packed bread} 0.01008611 465  
## [238] {biscuits,   
## coffee} 0.01002104 462  
## [239] {cheese (counter),   
## fresh vegetables,   
## special packed bread} 0.01002104 462

### Rules based on Category C

# Rules based on Category C  
rules <- apriori(Basket, parameter=list(minlen= 2, support=0.01, confidence = 0.2, target="rules"))

## Apriori  
##   
## Parameter specification:  
## confidence minval smax arem aval originalSupport maxtime support minlen  
## 0.2 0.1 1 none FALSE TRUE 5 0.01 2  
## maxlen target ext  
## 10 rules FALSE  
##   
## Algorithmic control:  
## filter tree heap memopt load sort verbose  
## 0.1 TRUE TRUE FALSE TRUE 2 TRUE  
##   
## Absolute minimum support count: 461   
##   
## set item appearances ...[0 item(s)] done [0.00s].  
## set transactions ...[187 item(s), 46103 transaction(s)] done [0.04s].  
## sorting and recoding items ... [72 item(s)] done [0.00s].  
## creating transaction tree ... done [0.03s].  
## checking subsets of size 1 2 3 4 done [0.01s].  
## writing ... [217 rule(s)] done [0.00s].  
## creating S4 object ... done [0.01s].

inspect(sort(rules, by ="lift"))

## lhs rhs support confidence lift count  
## [1] {cheese (counter),   
## special packed bread} => {cold cuts} 0.01320955 0.4875901 7.6304702 609  
## [2] {cold cuts,   
## FRESH MILK} => {special packed bread} 0.01088866 0.4301628 5.5566814 502  
## [3] {cheese (counter),   
## cold cuts} => {special packed bread} 0.01320955 0.4065421 5.2515574 609  
## [4] {FRESH MILK,   
## special packed bread} => {cold cuts} 0.01088866 0.3298292 5.1616138 502  
## [5] {cheese (counter),   
## FRESH MILK} => {cold cuts} 0.01351322 0.2958215 4.6294151 623  
## [6] {cold cuts,   
## special packed bread} => {cheese (counter)} 0.01320955 0.5982318 4.5860130 609  
## [7] {cold cuts} => {special packed bread} 0.02208099 0.3455533 4.4637275 1018  
## [8] {special packed bread} => {cold cuts} 0.02208099 0.2852340 4.4637275 1018  
## [9] {cold cuts,   
## fresh vegetables} => {cheese (counter)} 0.01290588 0.5514365 4.2272826 595  
## [10] {flour} => {sugar} 0.01663666 0.3117886 4.1520481 767  
## [11] {sugar} => {flour} 0.01663666 0.2215482 4.1520481 767  
## [12] {cheese (counter),   
## fresh vegetables} => {cold cuts} 0.01290588 0.2624614 4.1073517 595  
## [13] {cold cuts,   
## FRESH MILK} => {cheese (counter)} 0.01351322 0.5338475 4.0924460 623  
## [14] {cold cuts} => {cheese (counter)} 0.03249246 0.5084861 3.8980269 1498  
## [15] {cheese (counter)} => {cold cuts} 0.03249246 0.2490855 3.8980269 1498  
## [16] {hair care} => {HYGIENE - COSMETICS} 0.01253715 0.3220056 3.8459645 578  
## [17] {cheese (counter),   
## FRESH MILK} => {special packed bread} 0.01251545 0.2739791 3.5391591 577  
## [18] {tin food - vegetables} => {pasta} 0.02127844 0.2763380 3.4846860 981  
## [19] {pasta} => {tin food - vegetables} 0.02127844 0.2683260 3.4846860 981  
## [20] {Disinfectant} => {cleaners} 0.01284081 0.2780648 3.4535621 592  
## [21] {fresh vegetables,   
## special packed bread} => {cheese (counter)} 0.01002104 0.4056190 3.1094531 462  
## [22] {laundry} => {cleaners} 0.01654990 0.2424531 3.0112653 763  
## [23] {cleaners} => {laundry} 0.01654990 0.2055496 3.0112653 763  
## [24] {oil} => {tin food - vegetables} 0.01229855 0.2314286 3.0055074 567  
## [25] {FRESH MILK,   
## special packed bread} => {cheese (counter)} 0.01251545 0.3791064 2.9062095 577  
## [26] {flour} => {pastry making} 0.01299265 0.2434959 2.8542825 599  
## [27] {packed cheese} => {special packed bread} 0.01067176 0.2140061 2.7644502 492  
## [28] {special packed bread} => {cheese (counter)} 0.02709151 0.3499580 2.6827590 1249  
## [29] {cheese (counter)} => {special packed bread} 0.02709151 0.2076821 2.6827590 1249  
## [30] {condensed milk} => {coffee} 0.01785133 0.2553522 2.6419436 823  
## [31] {cheese (counter),   
## fresh vegetables} => {special packed bread} 0.01002104 0.2037936 2.6325286 462  
## [32] {sugar} => {coffee} 0.01839360 0.2449451 2.5342695 848  
## [33] {biscuits} => {pastry making} 0.01487973 0.2062538 2.4177262 686  
## [34] {cheese (counter),   
## FRESH MILK} => {yoghurt} 0.01028133 0.2250712 2.3826541 474  
## [35] {cheese (counter),   
## fresh vegetables} => {fresh fruits} 0.01386027 0.2818703 2.3159984 639  
## [36] {cleaning tools, gloves and fragrance} => {tisues/sanitary etc} 0.01746090 0.3490893 2.2948903 805  
## [37] {cheese (counter),   
## fresh fruits} => {fresh vegetables} 0.01386027 0.5916667 2.2899268 639  
## [38] {FRESH MILK,   
## fresh vegetables} => {fresh fruits} 0.02116999 0.2713372 2.2294529 976  
## [39] {packed cheese} => {yoghurt} 0.01012949 0.2031318 2.1503984 467  
## [40] {BEVERAGES,   
## fresh vegetables} => {fresh fruits} 0.01323124 0.2471637 2.0308301 610  
## [41] {BEVERAGES,   
## fresh fruits} => {fresh vegetables} 0.01323124 0.5200341 2.0126874 610  
## [42] {HYGIENE - COSMETICS} => {tisues/sanitary etc} 0.02526951 0.3018135 1.9841019 1165  
## [43] {vegetables} => {fresh vegetables} 0.01383858 0.5067514 1.9612793 638  
## [44] {FRESH MILK,   
## yoghurt} => {cheese (counter)} 0.01028133 0.2548387 1.9535798 474  
## [45] {hair care} => {tisues/sanitary etc} 0.01136585 0.2919220 1.9190760 524  
## [46] {cleaners} => {tisues/sanitary etc} 0.02333905 0.2898707 1.9055908 1076  
## [47] {crisps} => {BEVERAGES} 0.02958593 0.3580992 1.9055228 1364  
## [48] {MARGARINS} => {cheese (counter)} 0.01205995 0.2471111 1.8943405 556  
## [49] {fresh fruits,   
## FRESH MILK} => {fresh vegetables} 0.02116999 0.4836472 1.8718591 976  
## [50] {fresh fruits} => {fresh vegetables} 0.05826085 0.4787025 1.8527219 2686  
## [51] {fresh vegetables} => {fresh fruits} 0.05826085 0.2254869 1.8527219 2686  
## [52] {fresh fruits,   
## fresh vegetables} => {cheese (counter)} 0.01386027 0.2379002 1.8237303 639  
## [53] {Disinfectant} => {tisues/sanitary etc} 0.01271067 0.2752466 1.8094530 586  
## [54] {cold cuts,   
## special packed bread} => {FRESH MILK} 0.01088866 0.4931238 1.8069055 502  
## [55] {laundry} => {tisues/sanitary etc} 0.01863219 0.2729584 1.7944104 859  
## [56] {pasta} => {cheese (counter)} 0.01854543 0.2338621 1.7927746 855  
## [57] {cheese (counter),   
## yoghurt} => {FRESH MILK} 0.01028133 0.4891641 1.7923964 474  
## [58] {cereals} => {FRESH MILK} 0.02060603 0.4849413 1.7769233 950  
## [59] {beer nuts} => {BEVERAGES} 0.01370844 0.3324566 1.7690728 632  
## [60] {BEVERAGES,   
## fresh vegetables} => {cheese (counter)} 0.01227686 0.2293355 1.7580735 566  
## [61] {FRESH MILK,   
## fresh vegetables} => {cheese (counter)} 0.01769950 0.2268557 1.7390637 816  
## [62] {BEVERAGES,   
## special packed bread} => {FRESH MILK} 0.01008611 0.4730417 1.7333208 465  
## [63] {EGGS} => {fresh vegetables} 0.01928291 0.4474082 1.7316033 889  
## [64] {tin food - vegetables} => {cheese (counter)} 0.01728738 0.2245070 1.7210589 797  
## [65] {yoghurt} => {cheese (counter)} 0.02101816 0.2225029 1.7056950 969  
## [66] {FRESH MILK,   
## tin food - vegetables} => {fresh vegetables} 0.01060669 0.4385650 1.6973777 489  
## [67] {cheese (counter),   
## special packed bread} => {FRESH MILK} 0.01251545 0.4619696 1.6927502 577  
## [68] {fresh vegetables,   
## special packed bread} => {FRESH MILK} 0.01123571 0.4547849 1.6664241 518  
## [69] {water} => {BEVERAGES} 0.01995532 0.3129252 1.6651419 920  
## [70] {CHILDREN'S PRODUCTS} => {FRESH MILK} 0.01264560 0.4515879 1.6547097 583  
## [71] {fresh vegetables,   
## yoghurt} => {FRESH MILK} 0.01481465 0.4511229 1.6530056 683  
## [72] {flour} => {cheese (counter)} 0.01147431 0.2150407 1.6484900 529  
## [73] {BEVERAGES,   
## FRESH MILK} => {fresh fruits} 0.01140924 0.2003810 1.6464379 526  
## [74] {BEVERAGES,   
## fresh fruits} => {FRESH MILK} 0.01140924 0.4484228 1.6431123 526  
## [75] {Peas, Beans, Sweetcorn etc} => {fresh vegetables} 0.01145262 0.4230769 1.6374341 528  
## [76] {BEVERAGES,   
## cheese (counter)} => {fresh vegetables} 0.01227686 0.4227035 1.6359889 566  
## [77] {rice} => {fresh vegetables} 0.01234193 0.4224202 1.6348924 569  
## [78] {tin food - vegetables} => {fresh vegetables} 0.03244908 0.4214085 1.6309766 1496  
## [79] {FRESH MILK,   
## special packed bread} => {BEVERAGES} 0.01008611 0.3055191 1.6257323 465  
## [80] {pork} => {fresh vegetables} 0.01071514 0.4154752 1.6080132 494  
## [81] {bakeries} => {cheese (counter)} 0.01442422 0.2096469 1.6071419 665  
## [82] {MARGARINS} => {FRESH MILK} 0.02138689 0.4382222 1.6057351 986  
## [83] {salt - peper - spicies} => {fresh vegetables} 0.01396872 0.4099300 1.5865515 644  
## [84] {biscuits} => {BEVERAGES} 0.02145197 0.2973542 1.5822853 989  
## [85] {pastry making} => {BEVERAGES} 0.02535627 0.2972286 1.5816169 1169  
## [86] {poultry} => {fresh vegetables} 0.01750428 0.4061399 1.5718828 807  
## [87] {BEVERAGES,   
## FRESH MILK} => {cheese (counter)} 0.01162614 0.2041905 1.5653132 536  
## [88] {yoghurt} => {FRESH MILK} 0.04034445 0.4270953 1.5649638 1860  
## [89] {special packed bread} => {FRESH MILK} 0.03301304 0.4264500 1.5625992 1522  
## [90] {condensed milk} => {cheese (counter)} 0.01420732 0.2032268 1.5579258 655  
## [91] {cleaning tools, gloves and fragrance} => {BEVERAGES} 0.01457606 0.2914137 1.5506747 672  
## [92] {cheese (counter),   
## cold cuts} => {fresh vegetables} 0.01290588 0.3971963 1.5372682 595  
## [93] {fish, seafood} => {fresh vegetables} 0.01396872 0.3960640 1.5328859 644  
## [94] {chocholate related sweets} => {BEVERAGES} 0.01648483 0.2878788 1.5318647 760  
## [95] {cheese (counter),   
## cold cuts} => {FRESH MILK} 0.01351322 0.4158879 1.5238974 623  
## [96] {Condiments & Table Sauces} => {fresh vegetables} 0.01088866 0.3934169 1.5226411 502  
## [97] {cheese (counter),   
## FRESH MILK} => {fresh vegetables} 0.01769950 0.3874644 1.4996030 816  
## [98] {oil} => {fresh vegetables} 0.02047589 0.3853061 1.4912498 944  
## [99] {coffee} => {tisues/sanitary etc} 0.02169056 0.2244165 1.4752994 1000  
## [100] {fresh vegetables,   
## tisues/sanitary etc} => {BEVERAGES} 0.01045485 0.2757437 1.4672913 482  
## [101] {BEVERAGES,   
## cheese (counter)} => {FRESH MILK} 0.01162614 0.4002987 1.4667757 536  
## [102] {special packed bread} => {BEVERAGES} 0.02132182 0.2754273 1.4656076 983  
## [103] {bakeries} => {tisues/sanitary etc} 0.01529185 0.2222573 1.4611045 705  
## [104] {cheese (counter)} => {fresh vegetables} 0.04917251 0.3769538 1.4589238 2267  
## [105] {pasta} => {tisues/sanitary etc} 0.01756936 0.2215536 1.4564788 810  
## [106] {cold cuts} => {FRESH MILK} 0.02531289 0.3961303 1.4515019 1167  
## [107] {tin food - vegetables} => {tisues/sanitary etc} 0.01698371 0.2205634 1.4499691 783  
## [108] {cheese (counter),   
## special packed bread} => {fresh vegetables} 0.01002104 0.3698959 1.4316077 462  
## [109] {FRESH MILK,   
## yoghurt} => {fresh vegetables} 0.01481465 0.3672043 1.4211904 683  
## [110] {bread} => {fresh vegetables} 0.01570397 0.3671400 1.4209414 724  
## [111] {condensed milk} => {tisues/sanitary etc} 0.01509663 0.2159479 1.4196271 696  
## [112] {cold cuts} => {fresh vegetables} 0.02340412 0.3662593 1.4175331 1079  
## [113] {special packed bread} => {tisues/sanitary etc} 0.01657159 0.2140656 1.4072529 764  
## [114] {cold cuts} => {BEVERAGES} 0.01689695 0.2644263 1.4070692 779  
## [115] {FRESH MILK,   
## tisues/sanitary etc} => {BEVERAGES} 0.01175628 0.2642613 1.4061912 542  
## [116] {packed cheese} => {FRESH MILK} 0.01906600 0.3823401 1.4009719 879  
## [117] {chocholates} => {BEVERAGES} 0.01015118 0.2623318 1.3959239 468  
## [118] {MARGARINS} => {tisues/sanitary etc} 0.01030302 0.2111111 1.3878305 475  
## [119] {fresh fruits,   
## FRESH MILK} => {BEVERAGES} 0.01140924 0.2606541 1.3869964 526  
## [120] {packed cheese} => {BEVERAGES} 0.01297096 0.2601131 1.3841175 598  
## [121] {MARGARINS} => {fresh vegetables} 0.01743921 0.3573333 1.3829868 804  
## [122] {sugar} => {tisues/sanitary etc} 0.01579073 0.2102831 1.3823871 728  
## [123] {flour} => {fresh vegetables} 0.01900093 0.3560976 1.3782040 876  
## [124] {BEVERAGES,   
## FRESH MILK} => {tisues/sanitary etc} 0.01175628 0.2064762 1.3573609 542  
## [125] {cheese (counter),   
## FRESH MILK} => {BEVERAGES} 0.01162614 0.2545109 1.3543071 536  
## [126] {EGGS} => {FRESH MILK} 0.01587749 0.3683946 1.3498724 732  
## [127] {pasta} => {fresh vegetables} 0.02765547 0.3487418 1.3497350 1275  
## [128] {yoghurt} => {fresh vegetables} 0.03283951 0.3476464 1.3454954 1514  
## [129] {tin food - vegetables} => {BEVERAGES} 0.01941305 0.2521127 1.3415456 895  
## [130] {fresh fruits,   
## fresh vegetables} => {FRESH MILK} 0.02116999 0.3633656 1.3314453 976  
## [131] {flour} => {FRESH MILK} 0.01934798 0.3626016 1.3286459 892  
## [132] {biscuits} => {FRESH MILK} 0.02615882 0.3625977 1.3286316 1206  
## [133] {cheese (counter),   
## fresh vegetables} => {BEVERAGES} 0.01227686 0.2496692 1.3285431 566  
## [134] {BEVERAGES,   
## fresh vegetables} => {FRESH MILK} 0.01939136 0.3622366 1.3273085 894  
## [135] {FRESH MILK,   
## fresh vegetables} => {BEVERAGES} 0.01939136 0.2485405 1.3225370 894  
## [136] {cheese (counter),   
## fresh vegetables} => {FRESH MILK} 0.01769950 0.3599471 1.3189191 816  
## [137] {packed cheese} => {fresh vegetables} 0.01698371 0.3405829 1.3181575 783  
## [138] {BEVERAGES,   
## FRESH MILK} => {fresh vegetables} 0.01939136 0.3405714 1.3181132 894  
## [139] {sugar} => {fresh vegetables} 0.02557317 0.3405546 1.3180481 1179  
## [140] {fresh fruits} => {FRESH MILK} 0.04377155 0.3596507 1.3178331 2018  
## [141] {FRESH MILK,   
## special packed bread} => {fresh vegetables} 0.01123571 0.3403417 1.3172239 518  
## [142] {pasta} => {BEVERAGES} 0.01945643 0.2453501 1.3055605 897  
## [143] {desserts} => {BEVERAGES} 0.01615947 0.2429876 1.2929891 745  
## [144] {cheese (counter)} => {FRESH MILK} 0.04568032 0.3501829 1.2831412 2106  
## [145] {BEVERAGES,   
## tisues/sanitary etc} => {FRESH MILK} 0.01175628 0.3496774 1.2812890 542  
## [146] {sugar} => {FRESH MILK} 0.02620220 0.3489313 1.2785549 1208  
## [147] {fresh vegetables,   
## tisues/sanitary etc} => {FRESH MILK} 0.01320955 0.3483982 1.2766016 609  
## [148] {sweets} => {BEVERAGES} 0.01470620 0.2378113 1.2654448 678  
## [149] {oil} => {BEVERAGES} 0.01255884 0.2363265 1.2575441 579  
## [150] {sugar} => {BEVERAGES} 0.01767781 0.2354131 1.2526833 815  
## [151] {condensed milk} => {BEVERAGES} 0.01639807 0.2345641 1.2481657 756  
## [152] {EGGS} => {BEVERAGES} 0.01008611 0.2340211 1.2452766 465  
## [153] {cleaners} => {BEVERAGES} 0.01882741 0.2338362 1.2442925 868  
## [154] {bakeries} => {FRESH MILK} 0.02320890 0.3373266 1.2360331 1070  
## [155] {special packed bread} => {fresh vegetables} 0.02470555 0.3191370 1.2351556 1139  
## [156] {desserts} => {FRESH MILK} 0.02240635 0.3369211 1.2345471 1033  
## [157] {pastry making} => {FRESH MILK} 0.02867492 0.3361302 1.2316492 1322  
## [158] {cleaning tools, gloves and fragrance} => {fresh vegetables} 0.01587749 0.3174328 1.2285597 732  
## [159] {pasta} => {FRESH MILK} 0.02641911 0.3331510 1.2207328 1218  
## [160] {sweets} => {FRESH MILK} 0.02051927 0.3318134 1.2158316 946  
## [161] {Disinfectant} => {BEVERAGES} 0.01049823 0.2273368 1.2097077 484  
## [162] {bakeries} => {BEVERAGES} 0.01563890 0.2273014 1.2095194 721  
## [163] {condensed milk} => {fresh vegetables} 0.02184240 0.3124418 1.2092432 1007  
## [164] {fresh fruits,   
## fresh vegetables} => {BEVERAGES} 0.01323124 0.2271035 1.2084664 610  
## [165] {coffee} => {BEVERAGES} 0.02188578 0.2264363 1.2049159 1009  
## [166] {BEVERAGES,   
## tisues/sanitary etc} => {fresh vegetables} 0.01045485 0.3109677 1.2035381 482  
## [167] {HYGIENE - COSMETICS} => {BEVERAGES} 0.01889248 0.2256477 1.2007196 871  
## [168] {fresh vegetables,   
## tin food - vegetables} => {FRESH MILK} 0.01060669 0.3268717 1.1977241 489  
## [169] {bakeries} => {fresh vegetables} 0.02119168 0.3080076 1.1920813 977  
## [170] {cheese (counter)} => {BEVERAGES} 0.02904366 0.2226472 1.1847532 1339  
## [171] {tisues/sanitary etc} => {BEVERAGES} 0.03362037 0.2210181 1.1760847 1550  
## [172] {flour} => {BEVERAGES} 0.01177798 0.2207317 1.1745607 543  
## [173] {laundry} => {BEVERAGES} 0.01500987 0.2198920 1.1700922 692  
## [174] {MARGARINS} => {BEVERAGES} 0.01058499 0.2168889 1.1541122 488  
## [175] {tin food - vegetables} => {FRESH MILK} 0.02418498 0.3140845 1.1508693 1115  
## [176] {coffee} => {fresh vegetables} 0.02871830 0.2971275 1.1499721 1324  
## [177] {FRESH MILK,   
## tisues/sanitary etc} => {fresh vegetables} 0.01320955 0.2969283 1.1492014 609  
## [178] {desserts} => {fresh vegetables} 0.01973841 0.2968037 1.1487188 910  
## [179] {yoghurt} => {BEVERAGES} 0.02030237 0.2149254 1.1436640 936  
## [180] {cleaners} => {fresh vegetables} 0.02375117 0.2949892 1.1416965 1095  
## [181] {cleaning tools, gloves and fragrance} => {FRESH MILK} 0.01557382 0.3113617 1.1408923 718  
## [182] {chocholate related sweets} => {FRESH MILK} 0.01774288 0.3098485 1.1353477 818  
## [183] {Disinfectant} => {fresh vegetables} 0.01329631 0.2879286 1.1143698 613  
## [184] {fresh fruits} => {BEVERAGES} 0.02544303 0.2090536 1.1124192 1173  
## [185] {BEVERAGES} => {FRESH MILK} 0.05693773 0.3029778 1.1101723 2625  
## [186] {FRESH MILK} => {BEVERAGES} 0.05693773 0.2086314 1.1101723 2625  
## [187] {FRESH MILK} => {fresh vegetables} 0.07802095 0.2858846 1.1064588 3597  
## [188] {fresh vegetables} => {FRESH MILK} 0.07802095 0.3019644 1.1064588 3597  
## [189] {HYGIENE - COSMETICS} => {FRESH MILK} 0.02522612 0.3012953 1.1040072 1163  
## [190] {BEVERAGES} => {fresh vegetables} 0.05353231 0.2848569 1.1024813 2468  
## [191] {fresh vegetables} => {BEVERAGES} 0.05353231 0.2071860 1.1024813 2468  
## [192] {laundry} => {FRESH MILK} 0.02047589 0.2999682 1.0991444 944  
## [193] {beer nuts} => {fresh vegetables} 0.01166952 0.2830089 1.0953292 538  
## [194] {coffee} => {FRESH MILK} 0.02880507 0.2980251 1.0920245 1328  
## [195] {laundry} => {fresh vegetables} 0.01917446 0.2809024 1.0871764 884  
## [196] {HYGIENE - COSMETICS} => {fresh vegetables} 0.02327397 0.2779793 1.0758629 1073  
## [197] {Disinfectant} => {FRESH MILK} 0.01353491 0.2930953 1.0739608 624  
## [198] {beer nuts} => {FRESH MILK} 0.01205995 0.2924776 1.0716974 556  
## [199] {tisues/sanitary etc} => {FRESH MILK} 0.04448734 0.2924569 1.0716213 2051  
## [200] {chocholates} => {FRESH MILK} 0.01130078 0.2920404 1.0700951 521  
## [201] {cereals} => {fresh vegetables} 0.01160445 0.2730985 1.0569729 535  
## [202] {hair care} => {FRESH MILK} 0.01104050 0.2835655 1.0390414 509  
## [203] {bread} => {FRESH MILK} 0.01203826 0.2814402 1.0312538 555  
## [204] {condensed milk} => {FRESH MILK} 0.01967334 0.2814148 1.0311610 907  
## [205] {poultry} => {FRESH MILK} 0.01210333 0.2808254 1.0290011 558  
## [206] {water} => {FRESH MILK} 0.01785133 0.2799320 1.0257275 823  
## [207] {biscuits} => {fresh vegetables} 0.01908769 0.2645821 1.0240117 880  
## [208] {cleaners} => {FRESH MILK} 0.02214606 0.2750539 1.0078532 1021  
## [209] {hair care} => {fresh vegetables} 0.01010780 0.2596100 1.0047684 466  
## [210] {water} => {fresh vegetables} 0.01650652 0.2588435 1.0018018 761  
## [211] {sweets} => {fresh vegetables} 0.01592087 0.2574535 0.9964221 734  
## [212] {crisps} => {FRESH MILK} 0.02210268 0.2675243 0.9802632 1019  
## [213] {tisues/sanitary etc} => {fresh vegetables} 0.03791510 0.2492514 0.9646774 1748  
## [214] {oil} => {FRESH MILK} 0.01396872 0.2628571 0.9631619 644  
## [215] {chocholate related sweets} => {fresh vegetables} 0.01407718 0.2458333 0.9514485 649  
## [216] {pastry making} => {fresh vegetables} 0.02084463 0.2443427 0.9456794 961  
## [217] {crisps} => {fresh vegetables} 0.01882741 0.2278813 0.8819689 868

highLiftRules <- head(sort(rules, by ="lift"), 5)  
plot(highLiftRules, method = "graph", control = list(type="items"))

## Warning: Unknown control parameters: type

## Available control parameters (with default values):  
## main = Graph for 5 rules  
## nodeColors = c("#66CC6680", "#9999CC80")  
## nodeCol = c("#EE0000FF", "#EE0303FF", "#EE0606FF", "#EE0909FF", "#EE0C0CFF", "#EE0F0FFF", "#EE1212FF", "#EE1515FF", "#EE1818FF", "#EE1B1BFF", "#EE1E1EFF", "#EE2222FF", "#EE2525FF", "#EE2828FF", "#EE2B2BFF", "#EE2E2EFF", "#EE3131FF", "#EE3434FF", "#EE3737FF", "#EE3A3AFF", "#EE3D3DFF", "#EE4040FF", "#EE4444FF", "#EE4747FF", "#EE4A4AFF", "#EE4D4DFF", "#EE5050FF", "#EE5353FF", "#EE5656FF", "#EE5959FF", "#EE5C5CFF", "#EE5F5FFF", "#EE6262FF", "#EE6666FF", "#EE6969FF", "#EE6C6CFF", "#EE6F6FFF", "#EE7272FF", "#EE7575FF", "#EE7878FF", "#EE7B7BFF", "#EE7E7EFF", "#EE8181FF", "#EE8484FF", "#EE8888FF", "#EE8B8BFF", "#EE8E8EFF", "#EE9191FF", "#EE9494FF", "#EE9797FF", "#EE9999FF", "#EE9B9BFF", "#EE9D9DFF", "#EE9F9FFF", "#EEA0A0FF", "#EEA2A2FF", "#EEA4A4FF", "#EEA5A5FF", "#EEA7A7FF", "#EEA9A9FF", "#EEABABFF", "#EEACACFF", "#EEAEAEFF", "#EEB0B0FF", "#EEB1B1FF", "#EEB3B3FF", "#EEB5B5FF", "#EEB7B7FF", "#EEB8B8FF", "#EEBABAFF", "#EEBCBCFF", "#EEBDBDFF", "#EEBFBFFF", "#EEC1C1FF", "#EEC3C3FF", "#EEC4C4FF", "#EEC6C6FF", "#EEC8C8FF", "#EEC9C9FF", "#EECBCBFF", "#EECDCDFF", "#EECFCFFF", "#EED0D0FF", "#EED2D2FF", "#EED4D4FF", "#EED5D5FF", "#EED7D7FF", "#EED9D9FF", "#EEDBDBFF", "#EEDCDCFF", "#EEDEDEFF", "#EEE0E0FF", "#EEE1E1FF", "#EEE3E3FF", "#EEE5E5FF", "#EEE7E7FF", "#EEE8E8FF", "#EEEAEAFF", "#EEECECFF", "#EEEEEEFF")  
## edgeCol = c("#474747FF", "#494949FF", "#4B4B4BFF", "#4D4D4DFF", "#4F4F4FFF", "#515151FF", "#535353FF", "#555555FF", "#575757FF", "#595959FF", "#5B5B5BFF", "#5E5E5EFF", "#606060FF", "#626262FF", "#646464FF", "#666666FF", "#686868FF", "#6A6A6AFF", "#6C6C6CFF", "#6E6E6EFF", "#707070FF", "#727272FF", "#747474FF", "#767676FF", "#787878FF", "#7A7A7AFF", "#7C7C7CFF", "#7E7E7EFF", "#808080FF", "#828282FF", "#848484FF", "#868686FF", "#888888FF", "#8A8A8AFF", "#8C8C8CFF", "#8D8D8DFF", "#8F8F8FFF", "#919191FF", "#939393FF", "#959595FF", "#979797FF", "#999999FF", "#9A9A9AFF", "#9C9C9CFF", "#9E9E9EFF", "#A0A0A0FF", "#A2A2A2FF", "#A3A3A3FF", "#A5A5A5FF", "#A7A7A7FF", "#A9A9A9FF", "#AAAAAAFF", "#ACACACFF", "#AEAEAEFF", "#AFAFAFFF", "#B1B1B1FF", "#B3B3B3FF", "#B4B4B4FF", "#B6B6B6FF", "#B7B7B7FF", "#B9B9B9FF", "#BBBBBBFF", "#BCBCBCFF", "#BEBEBEFF", "#BFBFBFFF", "#C1C1C1FF", "#C2C2C2FF", "#C3C3C4FF", "#C5C5C5FF", "#C6C6C6FF", "#C8C8C8FF", "#C9C9C9FF", "#CACACAFF", "#CCCCCCFF", "#CDCDCDFF", "#CECECEFF", "#CFCFCFFF", "#D1D1D1FF", "#D2D2D2FF", "#D3D3D3FF", "#D4D4D4FF", "#D5D5D5FF", "#D6D6D6FF", "#D7D7D7FF", "#D8D8D8FF", "#D9D9D9FF", "#DADADAFF", "#DBDBDBFF", "#DCDCDCFF", "#DDDDDDFF", "#DEDEDEFF", "#DEDEDEFF", "#DFDFDFFF", "#E0E0E0FF", "#E0E0E0FF", "#E1E1E1FF", "#E1E1E1FF", "#E2E2E2FF", "#E2E2E2FF", "#E2E2E2FF")  
## alpha = 0.5  
## cex = 1  
## itemLabels = TRUE  
## labelCol = #000000B3  
## measureLabels = FALSE  
## precision = 3  
## layout = NULL  
## layoutParams = list()  
## arrowSize = 0.5  
## engine = igraph  
## plot = TRUE  
## plot\_options = list()  
## max = 100  
## verbose = FALSE

