Association Rules

Assignment 1

BP: Prepare rules for the all the data sets

1) Try different values of support and confidence. Observe the change in number of rules for different support,confidence values

2) Change the minimum length in apriori algorithm

3) Visulize the obtained rules using different plots

PROCEDURE:

STEP 1: First we have to Exploratory Data Analysis which can be done by plotting scattered plot, box plots and summary.

summary(book\_1\_)

ChildBks YouthBks CookBks DoItYBks RefBks

Min. :0.000 Min. :0.0000 Min. :0.000 Min. :0.000 Min. :0.0000

1st Qu.:0.000 1st Qu.:0.0000 1st Qu.:0.000 1st Qu.:0.000 1st Qu.:0.0000

Median :0.000 Median :0.0000 Median :0.000 Median :0.000 Median :0.0000

Mean :0.423 Mean :0.2475 Mean :0.431 Mean :0.282 Mean :0.2145

3rd Qu.:1.000 3rd Qu.:0.0000 3rd Qu.:1.000 3rd Qu.:1.000 3rd Qu.:0.0000

Max. :1.000 Max. :1.0000 Max. :1.000 Max. :1.000 Max. :1.0000

ArtBks GeogBks ItalCook ItalAtlas ItalArt

Min. :0.000 Min. :0.000 Min. :0.0000 Min. :0.000 Min. :0.0000

1st Qu.:0.000 1st Qu.:0.000 1st Qu.:0.0000 1st Qu.:0.000 1st Qu.:0.0000

Median :0.000 Median :0.000 Median :0.0000 Median :0.000 Median :0.0000

Mean :0.241 Mean :0.276 Mean :0.1135 Mean :0.037 Mean :0.0485

3rd Qu.:0.000 3rd Qu.:1.000 3rd Qu.:0.0000 3rd Qu.:0.000 3rd Qu.:0.0000

Max. :1.000 Max. :1.000 Max. :1.0000 Max. :1.000 Max. :1.0000

Florence

Min. :0.0000

1st Qu.:0.0000

Median :0.0000

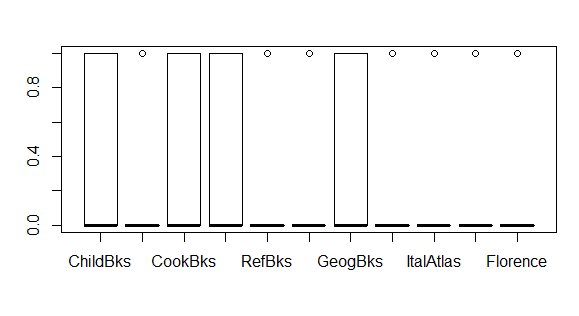
Mean :0.1085

3rd Qu.:0.0000

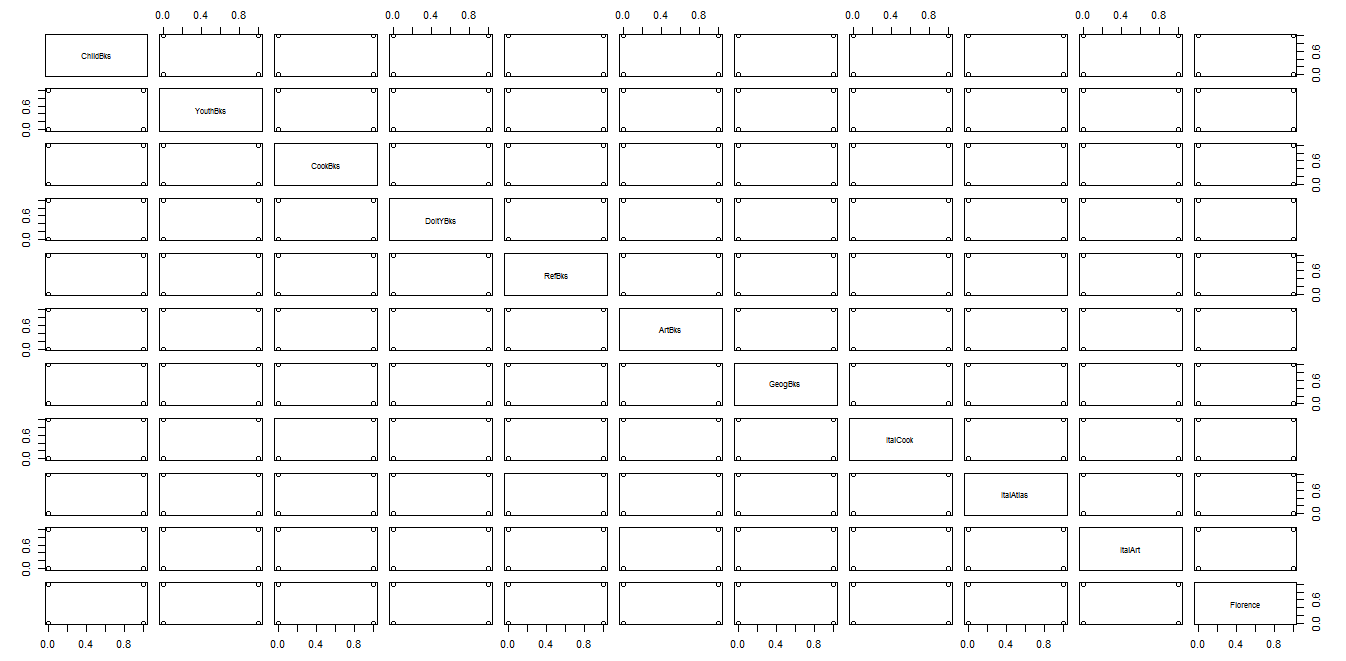
Max. :1.0000

From the summary we can see that all are lying in the same level , it can my confirmed by using Box Plot .

Scatter Plot for the Following data frame is:



Scatter plot is given by :



STEP 2:

Building Rules using Apriori algorithm which is given by :

Rules <-apriori(as.matrix(book\_1\_[,1:11]),parameter=list(support=0.002,confidence=0.7))

Apriori

Parameter specification:

confidence minval smax arem aval originalSupport maxtime support minlen maxlen

0.7 0.1 1 none FALSE TRUE 5 0.02 1 10

target ext

rules FALSE

Algorithmic control:

filter tree heap memopt load sort verbose

0.1 TRUE TRUE FALSE TRUE 2 TRUE

Absolute minimum support count: 40

set item appearances ...[0 item(s)] done [0.00s].

set transactions ...[11 item(s), 2000 transaction(s)] done [0.00s].

sorting and recoding items ... [11 item(s)] done [0.00s].

creating transaction tree ... done [0.00s].

checking subsets of size 1 2 3 4 5 6 done [0.00s].

writing ... [299 rule(s)] done [0.00s].

creating S4 object ... done [0.00s].

inspect(rules)

lhs rhs support confidence lift count

[1] {} => {Gladiator=1} 0.7 0.7000000 1.0000000 7

[2] {} => {Green Mile=0} 0.8 0.8000000 1.0000000 8

[3] {} => {LOTR2=0} 0.8 0.8000000 1.0000000 8

[4] {} => {Harry Potter1=0} 0.8 0.8000000 1.0000000 8

[5] {} => {LOTR1=0} 0.8 0.8000000 1.0000000 8

[6] {} => {LOTR=0} 0.9 0.9000000 1.0000000 9

[7] {} => {Braveheart=0} 0.9 0.9000000 1.0000000 9

[8] {} => {Harry Potter2=0} 0.9 0.9000000 1.0000000 9

[9] {Harry Potter2=1} => {V2=Harry Potter2} 0.1 1.0000000 10.0000000 1

[10] {V2=Harry Potter2} => {Harry Potter2=1} 0.1 1.0000000 10.0000000 1

[11] {Harry Potter2=1} => {V1=Harry Potter1} 0.1 1.0000000 10.0000000 1

[12] {V1=Harry Potter1} => {Harry Potter2=1} 0.1 1.0000000 10.0000000 1

[13] {Harry Potter2=1} => {Harry Potter1=1} 0.1 1.0000000 5.0000000 1

[14] {Harry Potter2=1} => {Gladiator=0} 0.1 1.0000000 3.3333333 1

[15] {Harry Potter2=1} => {Sixth Sense=0} 0.1 1.0000000 2.5000000 1

[16] {Harry Potter2=1} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[17] {Harry Potter2=1} => {Green Mile=0} 0.1 1.0000000 1.2500000 1

[18] {Harry Potter2=1} => {LOTR2=0} 0.1 1.0000000 1.2500000 1

[19] {Harry Potter2=1} => {LOTR1=0} 0.1 1.0000000 1.2500000 1

[20] {Harry Potter2=1} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[21] {Harry Potter2=1} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[22] {V2=Harry Potter2} => {V1=Harry Potter1} 0.1 1.0000000 10.0000000 1

[23] {V1=Harry Potter1} => {V2=Harry Potter2} 0.1 1.0000000 10.0000000 1

[24] {V2=Harry Potter2} => {Harry Potter1=1} 0.1 1.0000000 5.0000000 1

[25] {V2=Harry Potter2} => {Gladiator=0} 0.1 1.0000000 3.3333333 1

[26] {V2=Harry Potter2} => {Sixth Sense=0} 0.1 1.0000000 2.5000000 1

[27] {V2=Harry Potter2} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[28] {V2=Harry Potter2} => {Green Mile=0} 0.1 1.0000000 1.2500000 1

[29] {V2=Harry Potter2} => {LOTR2=0} 0.1 1.0000000 1.2500000 1

[30] {V2=Harry Potter2} => {LOTR1=0} 0.1 1.0000000 1.2500000 1

[31] {V2=Harry Potter2} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[32] {V2=Harry Potter2} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[33] {V1=Harry Potter1} => {Harry Potter1=1} 0.1 1.0000000 5.0000000 1

[34] {V1=Harry Potter1} => {Gladiator=0} 0.1 1.0000000 3.3333333 1

[35] {V1=Harry Potter1} => {Sixth Sense=0} 0.1 1.0000000 2.5000000 1

[36] {V1=Harry Potter1} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[37] {V1=Harry Potter1} => {Green Mile=0} 0.1 1.0000000 1.2500000 1

[38] {V1=Harry Potter1} => {LOTR2=0} 0.1 1.0000000 1.2500000 1

[39] {V1=Harry Potter1} => {LOTR1=0} 0.1 1.0000000 1.2500000 1

[40] {V1=Harry Potter1} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[41] {V1=Harry Potter1} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[42] {V2=LOTR2} => {V1=LOTR1} 0.1 1.0000000 10.0000000 1

[43] {V1=LOTR1} => {V2=LOTR2} 0.1 1.0000000 10.0000000 1

[44] {V2=LOTR2} => {LOTR2=1} 0.1 1.0000000 5.0000000 1

[45] {V2=LOTR2} => {LOTR1=1} 0.1 1.0000000 5.0000000 1

[46] {V2=LOTR2} => {Gladiator=0} 0.1 1.0000000 3.3333333 1

[47] {V2=LOTR2} => {Sixth Sense=0} 0.1 1.0000000 2.5000000 1

[48] {V2=LOTR2} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[49] {V2=LOTR2} => {Green Mile=0} 0.1 1.0000000 1.2500000 1

[50] {V2=LOTR2} => {Harry Potter1=0} 0.1 1.0000000 1.2500000 1

[51] {V2=LOTR2} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[52] {V2=LOTR2} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[53] {V2=LOTR2} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[54] {V1=LOTR1} => {LOTR2=1} 0.1 1.0000000 5.0000000 1

[55] {V1=LOTR1} => {LOTR1=1} 0.1 1.0000000 5.0000000 1

[56] {V1=LOTR1} => {Gladiator=0} 0.1 1.0000000 3.3333333 1

[57] {V1=LOTR1} => {Sixth Sense=0} 0.1 1.0000000 2.5000000 1

[58] {V1=LOTR1} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[59] {V1=LOTR1} => {Green Mile=0} 0.1 1.0000000 1.2500000 1

[60] {V1=LOTR1} => {Harry Potter1=0} 0.1 1.0000000 1.2500000 1

[61] {V1=LOTR1} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[62] {V1=LOTR1} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[63] {V1=LOTR1} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[64] {Braveheart=1} => {V3=Braveheart} 0.1 1.0000000 10.0000000 1

[65] {V3=Braveheart} => {Braveheart=1} 0.1 1.0000000 10.0000000 1

[66] {Braveheart=1} => {Sixth Sense=0} 0.1 1.0000000 2.5000000 1

[67] {Braveheart=1} => {Patriot=1} 0.1 1.0000000 1.6666667 1

[68] {Braveheart=1} => {V2=Patriot} 0.1 1.0000000 1.6666667 1

[69] {Braveheart=1} => {V1=Gladiator} 0.1 1.0000000 1.6666667 1

[70] {Braveheart=1} => {Gladiator=1} 0.1 1.0000000 1.4285714 1

[71] {Braveheart=1} => {Green Mile=0} 0.1 1.0000000 1.2500000 1

[72] {Braveheart=1} => {LOTR2=0} 0.1 1.0000000 1.2500000 1

[73] {Braveheart=1} => {Harry Potter1=0} 0.1 1.0000000 1.2500000 1

[74] {Braveheart=1} => {LOTR1=0} 0.1 1.0000000 1.2500000 1

[75] {Braveheart=1} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[76] {Braveheart=1} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[77] {V3=Braveheart} => {Sixth Sense=0} 0.1 1.0000000 2.5000000 1

[78] {V3=Braveheart} => {Patriot=1} 0.1 1.0000000 1.6666667 1

[79] {V3=Braveheart} => {V2=Patriot} 0.1 1.0000000 1.6666667 1

[80] {V3=Braveheart} => {V1=Gladiator} 0.1 1.0000000 1.6666667 1

[81] {V3=Braveheart} => {Gladiator=1} 0.1 1.0000000 1.4285714 1

[82] {V3=Braveheart} => {Green Mile=0} 0.1 1.0000000 1.2500000 1

[83] {V3=Braveheart} => {LOTR2=0} 0.1 1.0000000 1.2500000 1

[84] {V3=Braveheart} => {Harry Potter1=0} 0.1 1.0000000 1.2500000 1

[85] {V3=Braveheart} => {LOTR1=0} 0.1 1.0000000 1.2500000 1

[86] {V3=Braveheart} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[87] {V3=Braveheart} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[88] {V3=Gladiator} => {V2=LOTR} 0.1 1.0000000 10.0000000 1

[89] {V2=LOTR} => {V3=Gladiator} 0.1 1.0000000 10.0000000 1

[90] {V3=Gladiator} => {LOTR=1} 0.1 1.0000000 10.0000000 1

[91] {LOTR=1} => {V3=Gladiator} 0.1 1.0000000 10.0000000 1

[92] {V3=Gladiator} => {V4=Green Mile} 0.1 1.0000000 5.0000000 1

[93] {V3=Gladiator} => {V1=Sixth Sense} 0.1 1.0000000 5.0000000 1

[94] {V3=Gladiator} => {Green Mile=1} 0.1 1.0000000 5.0000000 1

[95] {V3=Gladiator} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[96] {V3=Gladiator} => {Sixth Sense=1} 0.1 1.0000000 1.6666667 1

[97] {V3=Gladiator} => {Gladiator=1} 0.1 1.0000000 1.4285714 1

[98] {V3=Gladiator} => {LOTR2=0} 0.1 1.0000000 1.2500000 1

[99] {V3=Gladiator} => {Harry Potter1=0} 0.1 1.0000000 1.2500000 1

[100] {V3=Gladiator} => {LOTR1=0} 0.1 1.0000000 1.2500000 1

[101] {V3=Gladiator} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[102] {V3=Gladiator} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[103] {V2=LOTR} => {LOTR=1} 0.1 1.0000000 10.0000000 1

[104] {LOTR=1} => {V2=LOTR} 0.1 1.0000000 10.0000000 1

[105] {V2=LOTR} => {V4=Green Mile} 0.1 1.0000000 5.0000000 1

[106] {V2=LOTR} => {V1=Sixth Sense} 0.1 1.0000000 5.0000000 1

[107] {V2=LOTR} => {Green Mile=1} 0.1 1.0000000 5.0000000 1

[108] {V2=LOTR} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[109] {V2=LOTR} => {Sixth Sense=1} 0.1 1.0000000 1.6666667 1

[110] {V2=LOTR} => {Gladiator=1} 0.1 1.0000000 1.4285714 1

[111] {V2=LOTR} => {LOTR2=0} 0.1 1.0000000 1.2500000 1

[112] {V2=LOTR} => {Harry Potter1=0} 0.1 1.0000000 1.2500000 1

[113] {V2=LOTR} => {LOTR1=0} 0.1 1.0000000 1.2500000 1

[114] {V2=LOTR} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[115] {V2=LOTR} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[116] {LOTR=1} => {V4=Green Mile} 0.1 1.0000000 5.0000000 1

[117] {LOTR=1} => {V1=Sixth Sense} 0.1 1.0000000 5.0000000 1

[118] {LOTR=1} => {Green Mile=1} 0.1 1.0000000 5.0000000 1

[119] {LOTR=1} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[120] {LOTR=1} => {Sixth Sense=1} 0.1 1.0000000 1.6666667 1

[121] {LOTR=1} => {Gladiator=1} 0.1 1.0000000 1.4285714 1

[122] {LOTR=1} => {LOTR2=0} 0.1 1.0000000 1.2500000 1

[123] {LOTR=1} => {Harry Potter1=0} 0.1 1.0000000 1.2500000 1

[124] {LOTR=1} => {LOTR1=0} 0.1 1.0000000 1.2500000 1

[125] {LOTR=1} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[126] {LOTR=1} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[127] {V2=LOTR1} => {V3=Harry Potter1} 0.1 1.0000000 10.0000000 1

[128] {V3=Harry Potter1} => {V2=LOTR1} 0.1 1.0000000 10.0000000 1

[129] {V2=LOTR1} => {V5=LOTR2} 0.1 1.0000000 10.0000000 1

[130] {V5=LOTR2} => {V2=LOTR1} 0.1 1.0000000 10.0000000 1

[131] {V2=LOTR1} => {LOTR2=1} 0.1 1.0000000 5.0000000 1

[132] {V2=LOTR1} => {LOTR1=1} 0.1 1.0000000 5.0000000 1

[133] {V2=LOTR1} => {Harry Potter1=1} 0.1 1.0000000 5.0000000 1

[134] {V2=LOTR1} => {V4=Green Mile} 0.1 1.0000000 5.0000000 1

[135] {V2=LOTR1} => {V1=Sixth Sense} 0.1 1.0000000 5.0000000 1

[136] {V2=LOTR1} => {Green Mile=1} 0.1 1.0000000 5.0000000 1

[137] {V2=LOTR1} => {Gladiator=0} 0.1 1.0000000 3.3333333 1

[138] {V2=LOTR1} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[139] {V2=LOTR1} => {Sixth Sense=1} 0.1 1.0000000 1.6666667 1

[140] {V2=LOTR1} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[141] {V2=LOTR1} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[142] {V2=LOTR1} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[143] {V3=Harry Potter1} => {V5=LOTR2} 0.1 1.0000000 10.0000000 1

[144] {V5=LOTR2} => {V3=Harry Potter1} 0.1 1.0000000 10.0000000 1

[145] {V3=Harry Potter1} => {LOTR2=1} 0.1 1.0000000 5.0000000 1

[146] {V3=Harry Potter1} => {LOTR1=1} 0.1 1.0000000 5.0000000 1

[147] {V3=Harry Potter1} => {Harry Potter1=1} 0.1 1.0000000 5.0000000 1

[148] {V3=Harry Potter1} => {V4=Green Mile} 0.1 1.0000000 5.0000000 1

[149] {V3=Harry Potter1} => {V1=Sixth Sense} 0.1 1.0000000 5.0000000 1

[150] {V3=Harry Potter1} => {Green Mile=1} 0.1 1.0000000 5.0000000 1

[151] {V3=Harry Potter1} => {Gladiator=0} 0.1 1.0000000 3.3333333 1

[152] {V3=Harry Potter1} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[153] {V3=Harry Potter1} => {Sixth Sense=1} 0.1 1.0000000 1.6666667 1

[154] {V3=Harry Potter1} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[155] {V3=Harry Potter1} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[156] {V3=Harry Potter1} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[157] {V5=LOTR2} => {LOTR2=1} 0.1 1.0000000 5.0000000 1

[158] {V5=LOTR2} => {LOTR1=1} 0.1 1.0000000 5.0000000 1

[159] {V5=LOTR2} => {Harry Potter1=1} 0.1 1.0000000 5.0000000 1

[160] {V5=LOTR2} => {V4=Green Mile} 0.1 1.0000000 5.0000000 1

[161] {V5=LOTR2} => {V1=Sixth Sense} 0.1 1.0000000 5.0000000 1

[162] {V5=LOTR2} => {Green Mile=1} 0.1 1.0000000 5.0000000 1

[163] {V5=LOTR2} => {Gladiator=0} 0.1 1.0000000 3.3333333 1

[164] {V5=LOTR2} => {Patriot=0} 0.1 1.0000000 2.5000000 1

[165] {V5=LOTR2} => {Sixth Sense=1} 0.1 1.0000000 1.6666667 1

[166] {V5=LOTR2} => {LOTR=0} 0.1 1.0000000 1.1111111 1

[167] {V5=LOTR2} => {Braveheart=0} 0.1 1.0000000 1.1111111 1

[168] {V5=LOTR2} => {Harry Potter2=0} 0.1 1.0000000 1.1111111 1

[169] {LOTR2=1} => {LOTR1=1} 0.2 1.0000000 5.0000000 2

[170] {LOTR1=1} => {LOTR2=1} 0.2 1.0000000 5.0000000 2

[171] {LOTR2=1} => {Gladiator=0} 0.2 1.0000000 3.3333333 2

[172] {LOTR2=1} => {Patriot=0} 0.2 1.0000000 2.5000000 2

[173] {LOTR2=1} => {LOTR=0} 0.2 1.0000000 1.1111111 2

[174] {LOTR2=1} => {Braveheart=0} 0.2 1.0000000 1.1111111 2

[175] {LOTR2=1} => {Harry Potter2=0} 0.2 1.0000000 1.1111111 2

[176] {LOTR1=1} => {Gladiator=0} 0.2 1.0000000 3.3333333 2

[177] {LOTR1=1} => {Patriot=0} 0.2 1.0000000 2.5000000 2

[178] {LOTR1=1} => {LOTR=0} 0.2 1.0000000 1.1111111 2

[179] {LOTR1=1} => {Braveheart=0} 0.2 1.0000000 1.1111111 2

[180] {LOTR1=1} => {Harry Potter2=0} 0.2 1.0000000 1.1111111 2

[181] {Harry Potter1=1} => {Gladiator=0} 0.2 1.0000000 3.3333333 2

[182] {Harry Potter1=1} => {Patriot=0} 0.2 1.0000000 2.5000000 2

[183] {Harry Potter1=1} => {LOTR=0} 0.2 1.0000000 1.1111111 2

[184] {Harry Potter1=1} => {Braveheart=0} 0.2 1.0000000 1.1111111 2

[185] {V4=Green Mile} => {V1=Sixth Sense} 0.2 1.0000000 5.0000000 2

[186] {V1=Sixth Sense} => {V4=Green Mile} 0.2 1.0000000 5.0000000 2

[187] {V4=Green Mile} => {Green Mile=1} 0.2 1.0000000 5.0000000 2

[188] {Green Mile=1} => {V4=Green Mile} 0.2 1.0000000 5.0000000 2

[189] {V4=Green Mile} => {Patriot=0} 0.2 1.0000000 2.5000000 2

[190] {V4=Green Mile} => {Sixth Sense=1} 0.2 1.0000000 1.6666667 2

[191] {V4=Green Mile} => {Braveheart=0} 0.2 1.0000000 1.1111111 2

[192] {V4=Green Mile} => {Harry Potter2=0} 0.2 1.0000000 1.1111111 2

[193] {V1=Sixth Sense} => {Green Mile=1} 0.2 1.0000000 5.0000000 2

[194] {Green Mile=1} => {V1=Sixth Sense} 0.2 1.0000000 5.0000000 2

[195] {V1=Sixth Sense} => {Patriot=0} 0.2 1.0000000 2.5000000 2

[196] {V1=Sixth Sense} => {Sixth Sense=1} 0.2 1.0000000 1.6666667 2

[197] {V1=Sixth Sense} => {Braveheart=0} 0.2 1.0000000 1.1111111 2

[198] {V1=Sixth Sense} => {Harry Potter2=0} 0.2 1.0000000 1.1111111 2

[199] {Green Mile=1} => {Patriot=0} 0.2 1.0000000 2.5000000 2

[200] {Green Mile=1} => {Sixth Sense=1} 0.2 1.0000000 1.6666667 2

[201] {Green Mile=1} => {Braveheart=0} 0.2 1.0000000 1.1111111 2

[202] {Green Mile=1} => {Harry Potter2=0} 0.2 1.0000000 1.1111111 2

[203] {Gladiator=0} => {Patriot=0} 0.3 1.0000000 2.5000000 3

[204] {Patriot=0} => {Gladiator=0} 0.3 0.7500000 2.5000000 3

[205] {Gladiator=0} => {LOTR=0} 0.3 1.0000000 1.1111111 3

[206] {Gladiator=0} => {Braveheart=0} 0.3 1.0000000 1.1111111 3

[207] {Sixth Sense=0} => {Green Mile=0} 0.4 1.0000000 1.2500000 4

[208] {Sixth Sense=0} => {LOTR2=0} 0.3 0.7500000 0.9375000 3

[209] {Sixth Sense=0} => {Harry Potter1=0} 0.3 0.7500000 0.9375000 3

[210] {Sixth Sense=0} => {LOTR1=0} 0.3 0.7500000 0.9375000 3

[211] {Sixth Sense=0} => {LOTR=0} 0.4 1.0000000 1.1111111 4

[212] {Sixth Sense=0} => {Braveheart=0} 0.3 0.7500000 0.8333333 3

[213] {Sixth Sense=0} => {Harry Potter2=0} 0.3 0.7500000 0.8333333 3

[214] {V3=Sixth Sense} => {Patriot=1} 0.4 1.0000000 1.6666667 4

[215] {V3=Sixth Sense} => {V2=Patriot} 0.4 1.0000000 1.6666667 4

[216] {V3=Sixth Sense} => {V1=Gladiator} 0.4 1.0000000 1.6666667 4

[217] {V3=Sixth Sense} => {Sixth Sense=1} 0.4 1.0000000 1.6666667 4

[218] {V3=Sixth Sense} => {Gladiator=1} 0.4 1.0000000 1.4285714 4

[219] {V3=Sixth Sense} => {Green Mile=0} 0.4 1.0000000 1.2500000 4

[220] {V3=Sixth Sense} => {LOTR2=0} 0.4 1.0000000 1.2500000 4

[221] {V3=Sixth Sense} => {Harry Potter1=0} 0.4 1.0000000 1.2500000 4

[222] {V3=Sixth Sense} => {LOTR1=0} 0.4 1.0000000 1.2500000 4

[223] {V3=Sixth Sense} => {LOTR=0} 0.4 1.0000000 1.1111111 4

[224] {V3=Sixth Sense} => {Braveheart=0} 0.4 1.0000000 1.1111111 4

[225] {V3=Sixth Sense} => {Harry Potter2=0} 0.4 1.0000000 1.1111111 4

[226] {Patriot=0} => {LOTR=0} 0.3 0.7500000 0.8333333 3

[227] {Patriot=0} => {Braveheart=0} 0.4 1.0000000 1.1111111 4

[228] {Patriot=0} => {Harry Potter2=0} 0.3 0.7500000 0.8333333 3

[229] {Patriot=1} => {V2=Patriot} 0.6 1.0000000 1.6666667 6

[230] {V2=Patriot} => {Patriot=1} 0.6 1.0000000 1.6666667 6

[231] {Patriot=1} => {V1=Gladiator} 0.6 1.0000000 1.6666667 6

[232] {V1=Gladiator} => {Patriot=1} 0.6 1.0000000 1.6666667 6

[233] {Patriot=1} => {Gladiator=1} 0.6 1.0000000 1.4285714 6

[234] {Gladiator=1} => {Patriot=1} 0.6 0.8571429 1.4285714 6

[235] {Patriot=1} => {Green Mile=0} 0.6 1.0000000 1.2500000 6

[236] {Green Mile=0} => {Patriot=1} 0.6 0.7500000 1.2500000 6

[237] {Patriot=1} => {LOTR2=0} 0.6 1.0000000 1.2500000 6

[238] {LOTR2=0} => {Patriot=1} 0.6 0.7500000 1.2500000 6

[239] {Patriot=1} => {Harry Potter1=0} 0.6 1.0000000 1.2500000 6

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[243] {Patriot=1} => {LOTR=0} 0.6 1.0000000 1.1111111 6

[244] {Patriot=1} => {Braveheart=0} 0.5 0.8333333 0.9259259 5

[245] {Patriot=1} => {Harry Potter2=0} 0.6 1.0000000 1.1111111 6

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[248] {V2=Patriot} => {Gladiator=1} 0.6 1.0000000 1.4285714 6

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[254] {V2=Patriot} => {Harry Potter1=0} 0.6 1.0000000 1.2500000 6

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[258] {V2=Patriot} => {LOTR=0} 0.6 1.0000000 1.1111111 6

[259] {V2=Patriot} => {Braveheart=0} 0.5 0.8333333 0.9259259 5

[260] {V2=Patriot} => {Harry Potter2=0} 0.6 1.0000000 1.1111111 6

[261] {V1=Gladiator} => {Gladiator=1} 0.6 1.0000000 1.4285714 6

[262] {Gladiator=1} => {V1=Gladiator} 0.6 0.8571429 1.4285714 6

[263] {V1=Gladiator} => {Green Mile=0} 0.6 1.0000000 1.2500000 6

[264] {Green Mile=0} => {V1=Gladiator} 0.6 0.7500000 1.2500000 6

[265] {V1=Gladiator} => {LOTR2=0} 0.6 1.0000000 1.2500000 6

[266] {LOTR2=0} => {V1=Gladiator} 0.6 0.7500000 1.2500000 6

[267] {V1=Gladiator} => {Harry Potter1=0} 0.6 1.0000000 1.2500000 6

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[271] {V1=Gladiator} => {LOTR=0} 0.6 1.0000000 1.1111111 6

[272] {V1=Gladiator} => {Braveheart=0} 0.5 0.8333333 0.9259259 5

[273] {V1=Gladiator} => {Harry Potter2=0} 0.6 1.0000000 1.1111111 6

[274] {Sixth Sense=1} => {Gladiator=1} 0.5 0.8333333 1.1904762 5

[275] {Gladiator=1} => {Sixth Sense=1} 0.5 0.7142857 1.1904762 5

[276] {Sixth Sense=1} => {LOTR2=0} 0.5 0.8333333 1.0416667 5

[277] {Sixth Sense=1} => {Harry Potter1=0} 0.5 0.8333333 1.0416667 5

[278] {Sixth Sense=1} => {LOTR1=0} 0.5 0.8333333 1.0416667 5

[279] {Sixth Sense=1} => {LOTR=0} 0.5 0.8333333 0.9259259 5

[280] {Sixth Sense=1} => {Braveheart=0} 0.6 1.0000000 1.1111111 6

[281] {Sixth Sense=1} => {Harry Potter2=0} 0.6 1.0000000 1.1111111 6

[282] {Gladiator=1} => {Green Mile=0} 0.6 0.8571429 1.0714286 6

[283] {Green Mile=0} => {Gladiator=1} 0.6 0.7500000 1.0714286 6

[284] {Gladiator=1} => {LOTR2=0} 0.7 1.0000000 1.2500000 7

[285] {LOTR2=0} => {Gladiator=1} 0.7 0.8750000 1.2500000 7

[286] {Gladiator=1} => {Harry Potter1=0} 0.7

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lhs rhs support confidence

[1] {CookBks,GeogBks,ItalArt} => {ItalCook} 0.0240 0.9600000

[2] {CookBks,ArtBks,GeogBks,ItalArt} => {ItalCook} 0.0240 0.9600000

[3] {ChildBks,CookBks,ItalArt} => {ItalCook} 0.0285 0.9500000

[4] {ChildBks,CookBks,ArtBks,ItalArt} => {ItalCook} 0.0285 0.9500000

[5] {CookBks,DoItYBks,ItalArt} => {ItalCook} 0.0250 0.9259259

[6] {CookBks,DoItYBks,ArtBks,ItalArt} => {ItalCook} 0.0250 0.9259259

[7] {CookBks,ItalArt} => {ItalCook} 0.0375 0.9146341

[8] {CookBks,ArtBks,ItalArt} => {ItalCook} 0.0375 0.9146341

[9] {ChildBks,CookBks,ItalAtlas} => {ItalCook} 0.0200 0.8888889

[10] {ChildBks,CookBks,RefBks,ItalAtlas} => {ItalCook} 0.0200 0.8888889

[11] {DoItYBks,ItalArt} => {ItalCook} 0.0250 0.8333333

[12] {DoItYBks,ArtBks,ItalArt} => {ItalCook} 0.0250 0.8333333

[13] {GeogBks,ItalArt} => {ItalCook} 0.0240 0.8135593

[14] {ArtBks,GeogBks,ItalArt} => {ItalCook} 0.0240 0.8135593

[15] {CookBks,ItalAtlas} => {ItalCook} 0.0230 0.8070175

[16] {CookBks,RefBks,ItalAtlas} => {ItalCook} 0.0230 0.8070175

[17] {ChildBks,ItalArt} => {ItalCook} 0.0285 0.7916667

[18] {ChildBks,ArtBks,ItalArt} => {ItalCook} 0.0285 0.7916667

[19] {ItalArt} => {ItalCook} 0.0375 0.7731959

[20] {ArtBks,ItalArt} => {ItalCook} 0.0375 0.7731959

[21] {ChildBks,ItalAtlas} => {ItalCook} 0.0200 0.7017544

[22] {ChildBks,RefBks,ItalAtlas} => {ItalCook} 0.0200 0.7017544

[23] {ItalAtlas} => {RefBks} 0.0370 1.0000000

[24] {ItalCook,ItalAtlas} => {RefBks} 0.0230 1.0000000

[25] {GeogBks,ItalAtlas} => {RefBks} 0.0205 1.0000000

[26] {ChildBks,ItalAtlas} => {RefBks} 0.0285 1.0000000

[27] {CookBks,ItalAtlas} => {RefBks} 0.0285 1.0000000

[28] {ChildBks,ItalCook,ItalAtlas} => {RefBks} 0.0200 1.0000000

[29] {CookBks,ItalCook,ItalAtlas} => {RefBks} 0.0230 1.0000000

[30] {ChildBks,CookBks,ItalAtlas} => {RefBks} 0.0225 1.0000000

[31] {ChildBks,CookBks,ItalCook,ItalAtlas} => {RefBks} 0.0200 1.0000000

[32] {ItalArt} => {ArtBks} 0.0485 1.0000000

[33] {ItalCook,ItalArt} => {ArtBks} 0.0375 1.0000000

[34] {RefBks,ItalArt} => {ArtBks} 0.0200 1.0000000

[35] {YouthBks,ItalArt} => {ArtBks} 0.0230 1.0000000

[36] {DoItYBks,ItalArt} => {ArtBks} 0.0300 1.0000000

[37] {GeogBks,ItalArt} => {ArtBks} 0.0295 1.0000000

[38] {ChildBks,ItalArt} => {ArtBks} 0.0360 1.0000000

[39] {CookBks,ItalArt} => {ArtBks} 0.0410 1.0000000

[40] {DoItYBks,ItalCook,ItalArt} => {ArtBks} 0.0250 1.0000000

[41] {GeogBks,ItalCook,ItalArt} => {ArtBks} 0.0240 1.0000000

[42] {ChildBks,ItalCook,ItalArt} => {ArtBks} 0.0285 1.0000000

[43] {CookBks,ItalCook,ItalArt} => {ArtBks} 0.0375 1.0000000

[44] {ChildBks,DoItYBks,ItalArt} => {ArtBks} 0.0220 1.0000000

[45] {CookBks,DoItYBks,ItalArt} => {ArtBks} 0.0270 1.0000000

[46] {ChildBks,GeogBks,ItalArt} => {ArtBks} 0.0230 1.0000000

[47] {CookBks,GeogBks,ItalArt} => {ArtBks} 0.0250 1.0000000

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[53] {DoItYBks,Florence} => {ArtBks} 0.0245 0.7777778

[54] {ChildBks,GeogBks,Florence} => {ArtBks} 0.0230 0.7540984

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[57] {GeogBks,Florence} => {ArtBks} 0.0300 0.7058824

[58] {ChildBks,CookBks,Florence} => {GeogBks} 0.0245 0.7313433

[59] {CookBks,ArtBks,Florence} => {GeogBks} 0.0230 0.7301587

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[61] {ItalCook} => {CookBks} 0.1135 1.0000000

[62] {ItalCook,ItalAtlas} => {CookBks} 0.0230 1.0000000

[63] {ItalCook,ItalArt} => {CookBks} 0.0375 1.0000000

[64] {RefBks,ItalCook} => {CookBks} 0.0465 1.0000000

[65] {YouthBks,ItalCook} => {CookBks} 0.0590 1.0000000

[66] {ArtBks,ItalCook} => {CookBks} 0.0565 1.0000000

[67] {DoItYBks,ItalCook} => {CookBks} 0.0585 1.0000000

[68] {GeogBks,ItalCook} => {CookBks} 0.0640 1.0000000

[69] {ChildBks,ItalCook} => {CookBks} 0.0850 1.0000000

[70] {RefBks,ItalCook,ItalAtlas} => {CookBks} 0.0230 1.0000000

[71] {ChildBks,ItalCook,ItalAtlas} => {CookBks} 0.0200 1.0000000

[72] {ArtBks,ItalCook,ItalArt} => {CookBks} 0.0375 1.0000000

[73] {DoItYBks,ItalCook,ItalArt} => {CookBks} 0.0250 1.0000000

[74] {GeogBks,ItalCook,ItalArt} => {CookBks} 0.0240 1.0000000

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[76] {YouthBks,RefBks,ItalCook} => {CookBks} 0.0265 1.0000000

[77] {RefBks,ArtBks,ItalCook} => {CookBks} 0.0235 1.0000000

[78] {DoItYBks,RefBks,ItalCook} => {CookBks} 0.0250 1.0000000

[79] {RefBks,GeogBks,ItalCook} => {CookBks} 0.0290 1.0000000

[80] {ChildBks,RefBks,ItalCook} => {CookBks} 0.0415 1.0000000

[81] {YouthBks,ArtBks,ItalCook} => {CookBks} 0.0305 1.0000000

[82] {YouthBks,DoItYBks,ItalCook} => {CookBks} 0.0310 1.0000000

[83] {YouthBks,GeogBks,ItalCook} => {CookBks} 0.0345 1.0000000

[84] {ChildBks,YouthBks,ItalCook} => {CookBks} 0.0460 1.0000000

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[93] {ArtBks,GeogBks,ItalCook,ItalArt} => {CookBks} 0.0240 1.0000000

[94] {ChildBks,ArtBks,ItalCook,ItalArt} => {CookBks} 0.0285 1.0000000

[95] {ChildBks,YouthBks,RefBks,ItalCook} => {CookBks} 0.0245 1.0000000

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[97] {ChildBks,DoItYBks,RefBks,ItalCook} => {CookBks} 0.0225 1.0000000

[98] {ChildBks,RefBks,GeogBks,ItalCook} => {CookBks} 0.0270 1.0000000

[99] {YouthBks,ArtBks,GeogBks,ItalCook} => {CookBks} 0.0200 1.0000000

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[112] {YouthBks,RefBks,ItalCook} => {ChildBks} 0.0245 0.9245283

[113] {YouthBks,CookBks,RefBks,ItalCook} => {ChildBks} 0.0245 0.9245283

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[116] {YouthBks,CookBks,RefBks,GeogBks} => {ChildBks} 0.0440 0.9166667

[117] {YouthBks,DoItYBks,RefBks} => {ChildBks} 0.0530 0.9137931

[118] {CookBks,DoItYBks,RefBks,GeogBks} => {ChildBks} 0.0450 0.9090909

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[126] {CookBks,RefBks,ItalCook} => {ChildBks} 0.0415 0.8924731

[127] {ChildBks,DoItYBks,ItalArt} => {CookBks} 0.0200 0.9090909

[128] {ChildBks,DoItYBks,ArtBks,ItalArt} => {CookBks} 0.0200 0.9090909

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[132] {DoItYBks,ItalArt} => {CookBks} 0.0270 0.9000000

[133] {DoItYBks,ArtBks,ItalArt} => {CookBks} 0.0270 0.9000000

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[139] {CookBks,RefBks,ArtBks,GeogBks} => {ChildBks} 0.0405 0.8804348

[140] {YouthBks,CookBks,RefBks} => {ChildBks} 0.0680 0.8774194

[141] {RefBks,ArtBks,GeogBks} => {ChildBks} 0.0495 0.8761062

[142] {YouthBks,DoItYBks,RefBks,GeogBks} => {CookBks} 0.0290 0.8923077

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[125] 2.109866 83

[126] 2.109866 83

[127] 2.109260 40

[128] 2.109260 40

[129] 2.094327 102

[130] 2.092780 54

[131] 2.088258 53

[132] 2.088167 54

[133] 2.088167 54

[134] 2.088167 54

[135] 2.086217 107

[136] 2.085941 45

[137] 2.085160 157

[138] 2.084295 149

[139] 2.081406 81

[140] 2.074277 136

[141] 2.071173 99

[142] 2.070319 58

head(quality(rules))

support confidence lift count

1 0.0370 1.0000000 4.662005 74

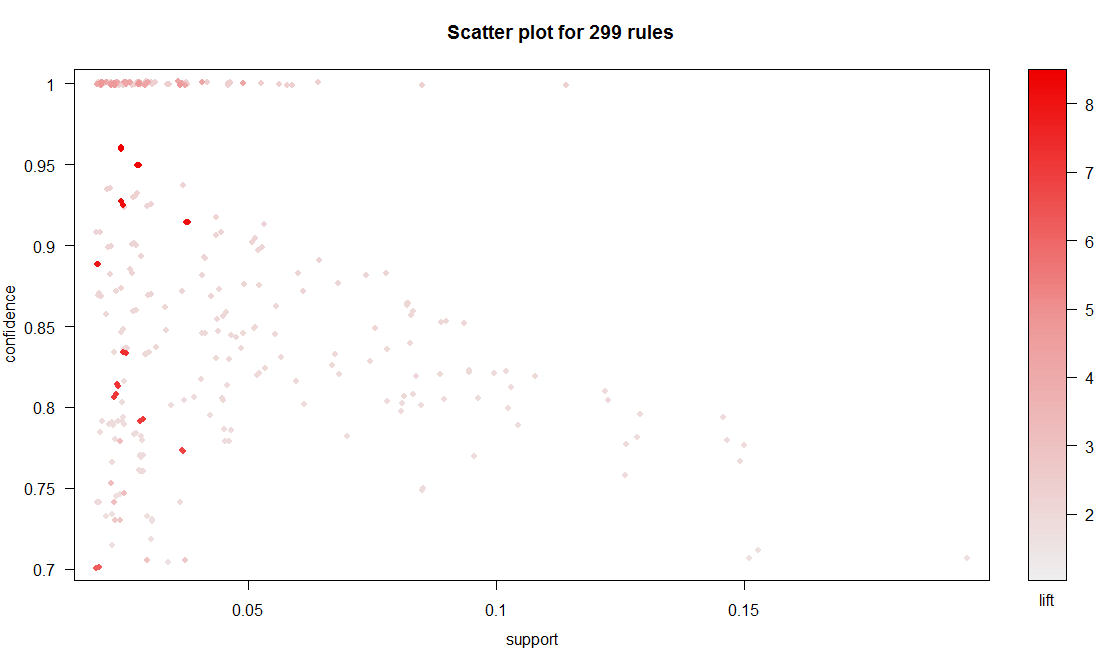
2 0.0285 0.7702703 1.820970 57

3 0.0285 0.7702703 1.787170 57

4 0.0375 0.7731959 6.812298 75

5 0.0485 1.0000000 4.149378 97

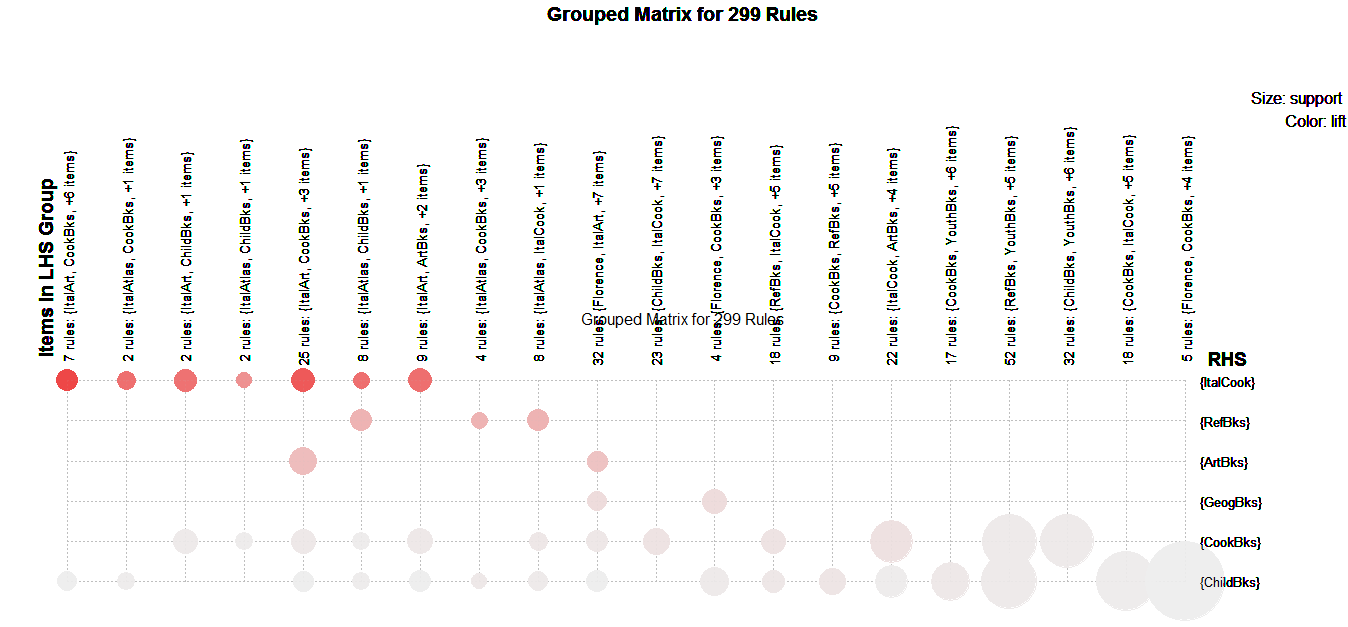
6 0.0360 0.7422680 1.754771 72

plot(rules)  


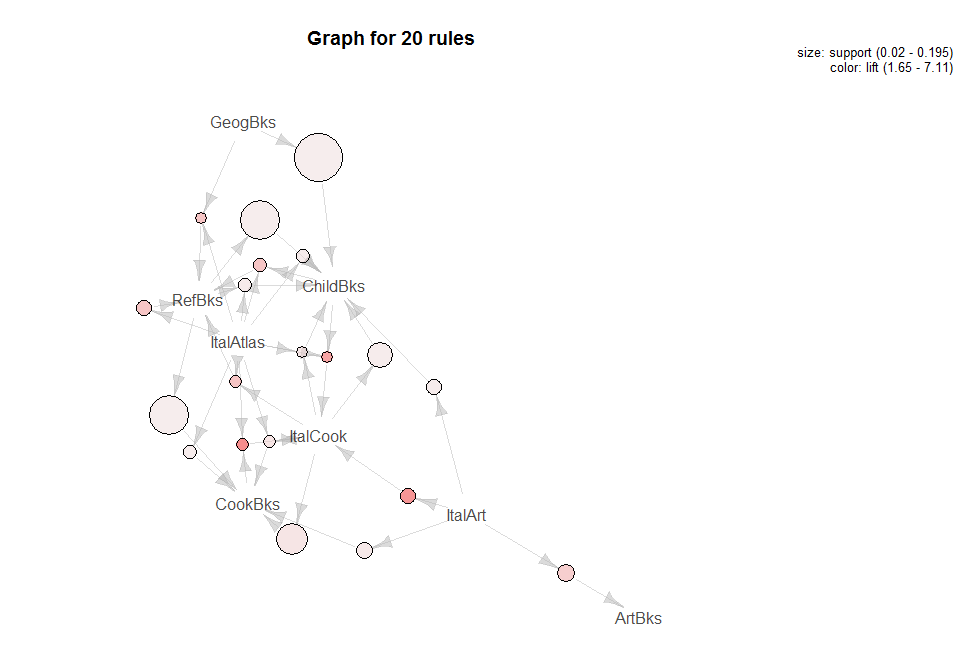
For better visualizations we can use other methods to plot and we can do   
that in a new window

windows()

plot(rules,method = "grouped")



plot(rules[1:20] , method = "graph")

  
  
Thus , we can Association rules are formed , we can by :

write(rules , file = " arulessol.csv" , sep="," )