

1 Zadania teoretyczne

Zadanie 1

a)

$$\text{Confidence: } \text{conf}(A \rightarrow C) = \frac{\sup(A \cup C)}{\sup(A)}$$

$$\text{Lift: } \text{lift}(A \rightarrow C) = \frac{\text{conf}(A \rightarrow C)}{\sup(C)}$$

$$\text{Laplace: } \text{lapl}(A \rightarrow C) = \frac{\sup(A \cup C) + 1}{\sup(A) + 2}$$

$$\text{Conviction: } \text{conv}(A \rightarrow C) = \frac{1 - \sup(C)}{1 - \text{conf}(A \rightarrow C)}$$

b)

Confidence: $[0, 1]$

Lift: $[0, +\infty[$

Laplace: $[0, 1[$

Conviction: $]0.5, \infty[$

c)

[hotdog \rightarrow hamburger]

$$\text{conf}(\text{hotdog} \rightarrow \text{hamburger}) = \frac{2000}{3000} = 0. (6)$$

$$\text{lift}(\text{hotdog} \rightarrow \text{hamburger}) = \frac{0. (6)}{0.5} = 1. (3)$$

$$\text{lapl}(\text{hotdog} \rightarrow \text{hamburger}) = \frac{2000 + 1}{3000 + 2} \sim 0.666555$$

$$\text{conv}(\text{hotdog} \rightarrow \text{hamburger}) = \frac{1 - 0.5}{1 - 0. (6)} = 1.5$$

[hamburger \rightarrow hotdog]

$$\text{conf}(\text{hamburger} \rightarrow \text{hotdog}) = \frac{2000}{2500} = 0.8$$

$$\text{lift}(\text{hamburger} \rightarrow \text{hotdog}) = \frac{0.8}{0,6} = 1. (3)$$

$$\text{lapl}(\text{hamburger} \rightarrow \text{hotdog}) = \frac{2000 + 1}{2500 + 2} \sim 0,79976$$

$$conv(hamburger \rightarrow hotdog) = \frac{1 - 0,6}{1 - 0,8} = 2$$

d)

Reguła $[hamburger \rightarrow hotdog]$ wydaje się być lepsza na podstawie wskaźników Confidence, Conviction i Laplace, jedynie Lift jest taki sam dla obu reguł. Większa wartość Confidence w regule $[hamburger \rightarrow hotdog]$ oznacza, że jeżeli ktoś kupił hamburgera to jest większe prawdopodobieństwo, że kupił również hot doga, niż odwrotnie.

2 Zadanie praktyczne

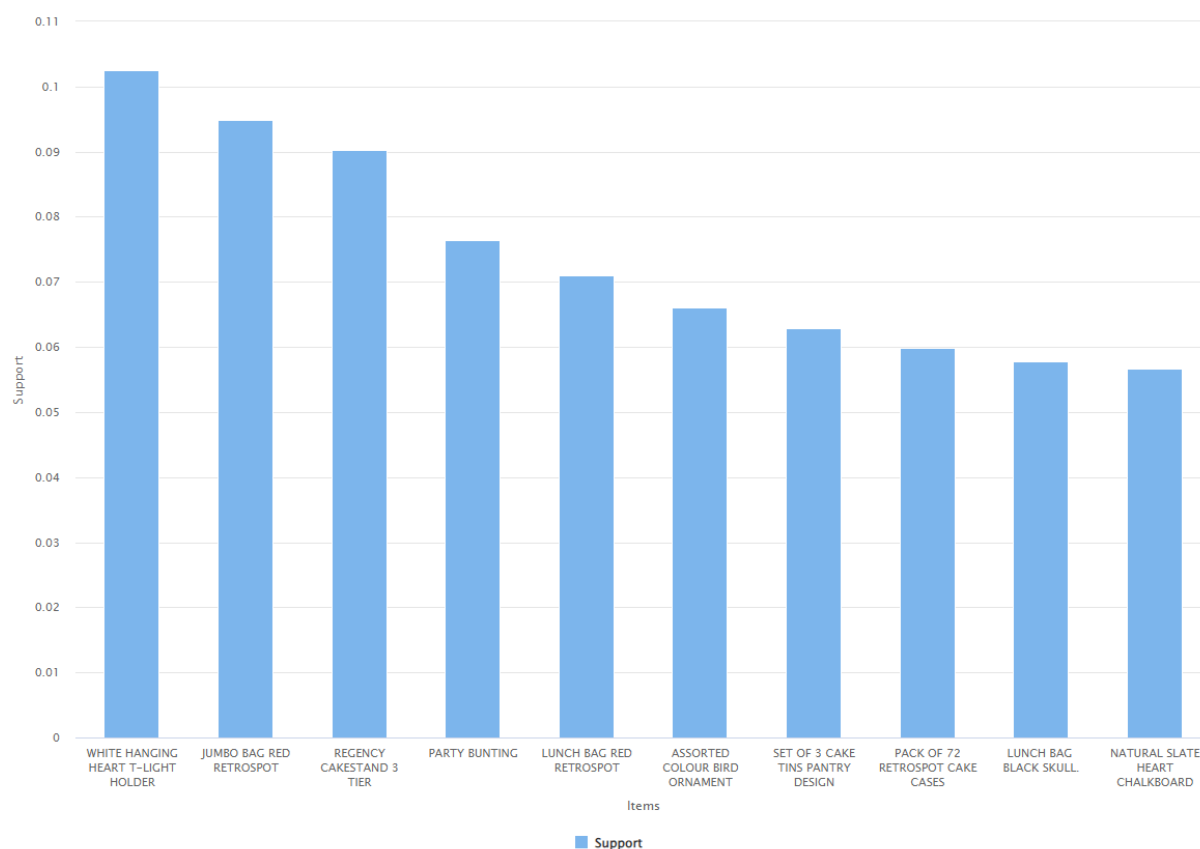
Zadanie 1

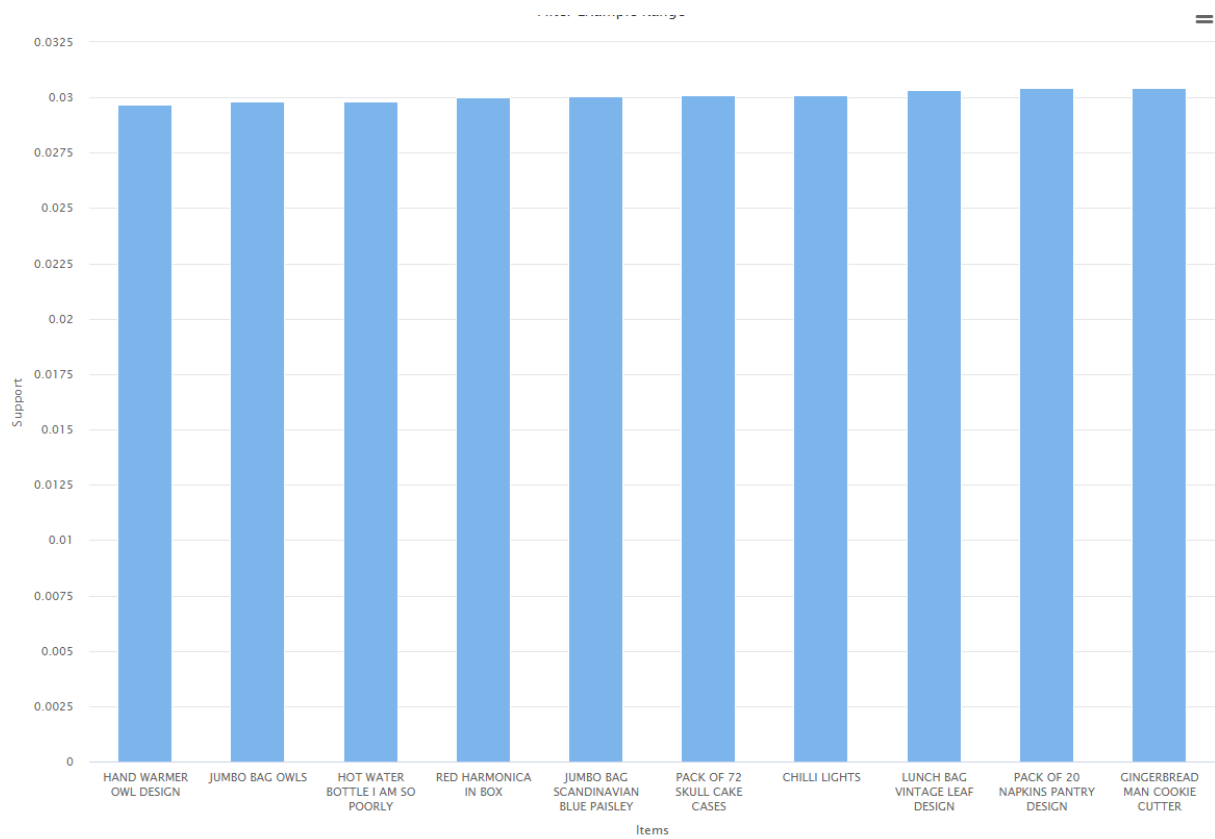
- a) od 01.12.2010 8:26 do 09.12.2011 12:50
- b) 22061
- c) 4223
- d) 38
- e) i f)

Row No.	Country	count(InvoiceNo) ↓	percentage...
37	United Kingd...	487619	91.551
15	Germany	9042	1.698
14	France	8408	1.579
11	EIRE	7894	1.482
32	Spain	2485	0.467
25	Netherlands	2363	0.444
4	Belgium	2031	0.381
34	Switzerland	1967	0.369
28	Portugal	1501	0.282
1	Australia	1185	0.222
26	Norway	1072	0.201
20	Italy	758	0.142
7	Channel Isla...	748	0.140
13	Finland	685	0.129
8	Cyprus	614	0.115
33	Sweden	451	0.085
38	Unspecified	446	0.084
2	Austria	398	0.075
10	Denmark	380	0.071
27	Poland	330	0.062
21	Japan	321	0.060
19	Israel	295	0.055
17	Hong Kong	284	0.053
31	Singapore	222	0.042
18	Iceland	182	0.034

35	USA	179	0.034
6	Canada	151	0.028
16	Greece	145	0.027
24	Malta	112	0.021
36	United Arab E...	68	0.013
12	European Co...	60	0.011
29	RSA	58	0.011
22	Lebanon	45	0.008
23	Lithuania	35	0.007
5	Brazil	32	0.006
9	Czech Repub...	25	0.005
3	Bahrain	18	0.003
30	Saudi Arabia	9	0.002

Zadanie 2





Zadanie 3

Confidence

No.	Premises	Conclusion	Support	Confiden... ↓	LaPlace	Gain	p-s	Lift
52	REGENCY TEA PLATE ROSES, REGENCY TEA P...	REGENCY TEA PLATE GREEN	0.012	0.948	0.999	-0.013	0.011	54.759
51	HERB MARKER THYME	HERB MARKER ROSEMARY	0.010	0.933	0.999	-0.012	0.010	85.389
50	WOODEN HEART CHRISTMAS SCANDINAVIAN, ...	WOODEN STAR CHRISTMAS SCANDINAVIAN	0.011	0.928	0.999	-0.012	0.010	39.909
49	HERB MARKER ROSEMARY	HERB MARKER THYME	0.010	0.921	0.999	-0.012	0.010	85.389
48	WOODLAND CHARLOTTE BAG, CHARLOTTE BA...	RED RETROSPOT CHARLOTTE BAG	0.011	0.920	0.999	-0.013	0.010	19.620
47	REGENCY TEA PLATE GREEN, REGENCY TEA P...	REGENCY TEA PLATE ROSES	0.012	0.918	0.999	-0.014	0.011	45.388
46	REGENCY TEA PLATE PINK	REGENCY TEA PLATE GREEN	0.013	0.912	0.999	-0.015	0.012	52.658
45	REGENCY CAKESTAND 3 TIER, ROSES REGEN...	GREEN REGENCY TEACUP AND SAUCER	0.014	0.910	0.999	-0.016	0.013	19.752
44	ROSES REGENCY TEACUP AND SAUCER, PINK ...	GREEN REGENCY TEACUP AND SAUCER	0.025	0.905	0.997	-0.030	0.023	19.652
43	CHARLOTTE BAG SUKI DESIGN, CHARLOTTE BA...	RED RETROSPOT CHARLOTTE BAG	0.011	0.904	0.999	-0.014	0.011	19.278

LaPlace

No.	Premises	Conclusion	Support	Confidence	LaPl... ↓	Gain	p-s	Lift
52	REGENCY TEA PLATE ROSES, REGENCY TEA P...	REGENCY TEA PLATE GREEN	0.012	0.948	0.999	-0.013	0.011	54.759
51	HERB MARKER THYME	HERB MARKER ROSEMARY	0.010	0.933	0.999	-0.012	0.010	85.389
50	WOODEN HEART CHRISTMAS SCANDINAVIAN, ...	WOODEN STAR CHRISTMAS SCANDINAVIAN	0.011	0.928	0.999	-0.012	0.010	39.909
49	HERB MARKER ROSEMARY	HERB MARKER THYME	0.010	0.921	0.999	-0.012	0.010	85.389
48	WOODLAND CHARLOTTE BAG, CHARLOTTE BA...	RED RETROSPOT CHARLOTTE BAG	0.011	0.920	0.999	-0.013	0.010	19.620
47	REGENCY TEA PLATE GREEN, REGENCY TEA P...	REGENCY TEA PLATE ROSES	0.012	0.918	0.999	-0.014	0.011	45.388
43	CHARLOTTE BAG SUKI DESIGN, CHARLOTTE BA...	RED RETROSPOT CHARLOTTE BAG	0.011	0.904	0.999	-0.014	0.011	19.278
46	REGENCY TEA PLATE PINK	REGENCY TEA PLATE GREEN	0.013	0.912	0.999	-0.015	0.012	52.658
45	REGENCY CAKESTAND 3 TIER, ROSES REGEN...	GREEN REGENCY TEACUP AND SAUCER	0.014	0.910	0.999	-0.016	0.013	19.752
42	SET/20 RED RETROSPOT PAPER NAPKINS, SET...	SET/6 RED SPOTTY PAPER PLATES	0.012	0.895	0.999	-0.015	0.012	37.479

Lift

No.	Premises	Conclusion	Support	Confidence	LaPlace	Lift ↓	Convicti...	Gain
49	HERB MARKER ROSEMARY	HERB MARKER THYME	0.010	0.921	0.999	85.389	12.547	-0.012
51	HERB MARKER THYME	HERB MARKER ROSEMARY	0.010	0.933	0.999	85.389	14.713	-0.012
24	REGENCY TEA PLATE PINK	REGENCY TEA PLATE ROSES, REGENCY TEA P...	0.012	0.837	0.998	57.678	6.031	-0.016
52	REGENCY TEA PLATE ROSES, REGENCY TEA P...	REGENCY TEA PLATE GREEN	0.012	0.948	0.999	54.759	18.952	-0.013
46	REGENCY TEA PLATE PINK	REGENCY TEA PLATE GREEN	0.013	0.912	0.999	52.658	11.137	-0.015
47	REGENCY TEA PLATE GREEN, REGENCY TEA P...	REGENCY TEA PLATE ROSES	0.012	0.918	0.999	45.388	11.885	-0.014
31	POPPY'S PLAYHOUSE KITCHEN, POPPY'S PLAY...	POPPY'S PLAYHOUSE BEDROOM	0.010	0.856	0.998	44.515	6.788	-0.014
40	REGENCY TEA PLATE PINK	REGENCY TEA PLATE ROSES	0.012	0.882	0.998	43.647	8.328	-0.016
36	POPPY'S PLAYHOUSE BEDROOM, POPPY'S PLA...	POPPY'S PLAYHOUSE KITCHEN	0.010	0.862	0.998	43.522	7.106	-0.013
25	REGENCY TEA PLATE GREEN	REGENCY TEA PLATE ROSES	0.015	0.838	0.997	41.438	6.037	-0.020

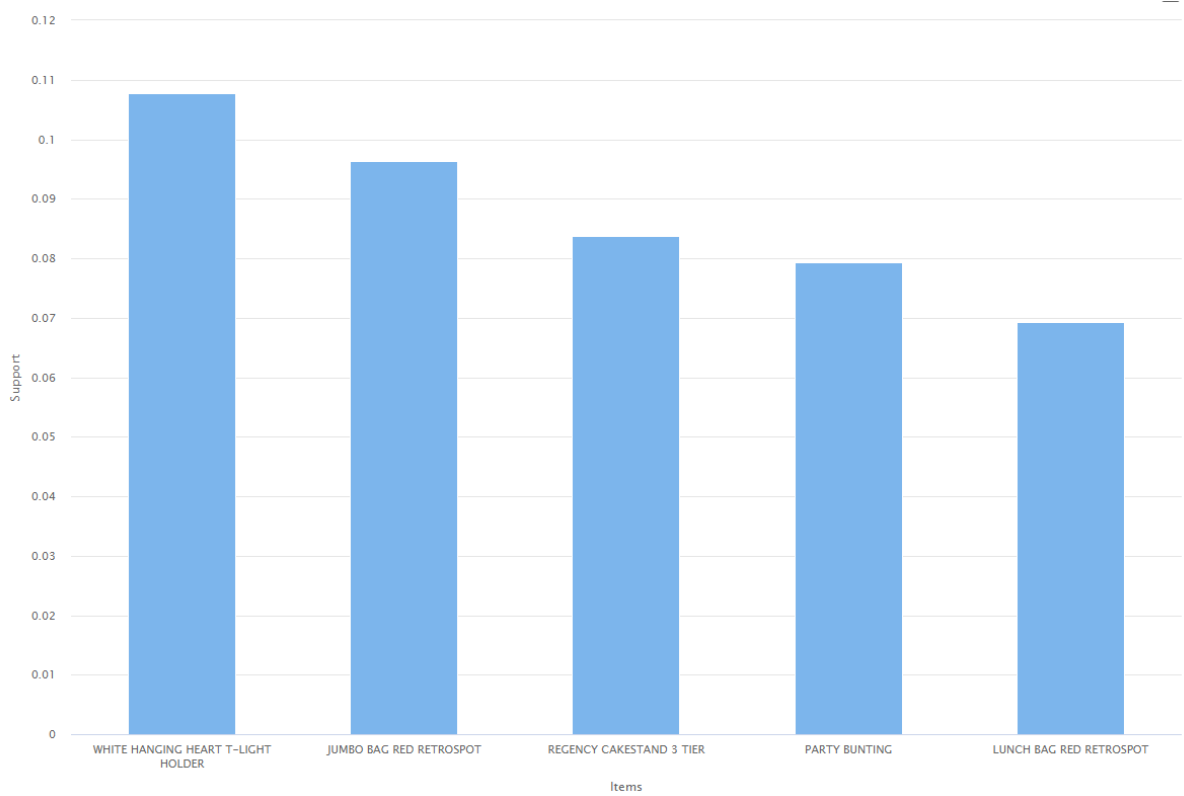
Conviction

No.	Premises	Conclusion	Support	Confidence	LaPlace	Lift	Con... ↓	Gain
52	REGENCY TEA PLATE ROSES, REGENCY TEA P...	REGENCY TEA PLATE GREEN	0.012	0.948	0.999	54.759	18.952	-0.013
51	HERB MARKER THYME	HERB MARKER ROSEMARY	0.010	0.933	0.999	85.389	14.713	-0.012
50	WOODEN HEART CHRISTMAS SCANDINAVIAN, ...	WOODEN STAR CHRISTMAS SCANDINAVIAN	0.011	0.928	0.999	39.909	13.566	-0.012
49	HERB MARKER ROSEMARY	HERB MARKER THYME	0.010	0.921	0.999	85.389	12.547	-0.012
48	WOODLAND CHARLOTTE BAG, CHARLOTTE BA...	RED RETROSPOT CHARLOTTE BAG	0.011	0.920	0.999	19.620	11.982	-0.013
47	REGENCY TEA PLATE GREEN, REGENCY TEA P...	REGENCY TEA PLATE ROSES	0.012	0.918	0.999	45.388	11.885	-0.014
46	REGENCY TEA PLATE PINK	REGENCY TEA PLATE GREEN	0.013	0.912	0.999	52.658	11.137	-0.015
45	REGENCY CAKESTAND 3 TIER, ROSES REGEN...	GREEN REGENCY TEACUP AND SAUCER	0.014	0.910	0.999	19.752	10.557	-0.016
44	ROSES REGENCY TEACUP AND SAUCER, PINK ...	GREEN REGENCY TEACUP AND SAUCER	0.025	0.905	0.997	19.652	10.042	-0.030
43	CHARLOTTE BAG SUKI DESIGN, CHARLOTTE BA...	RED RETROSPOT CHARLOTTE BAG	0.011	0.904	0.999	19.278	9.971	-0.014

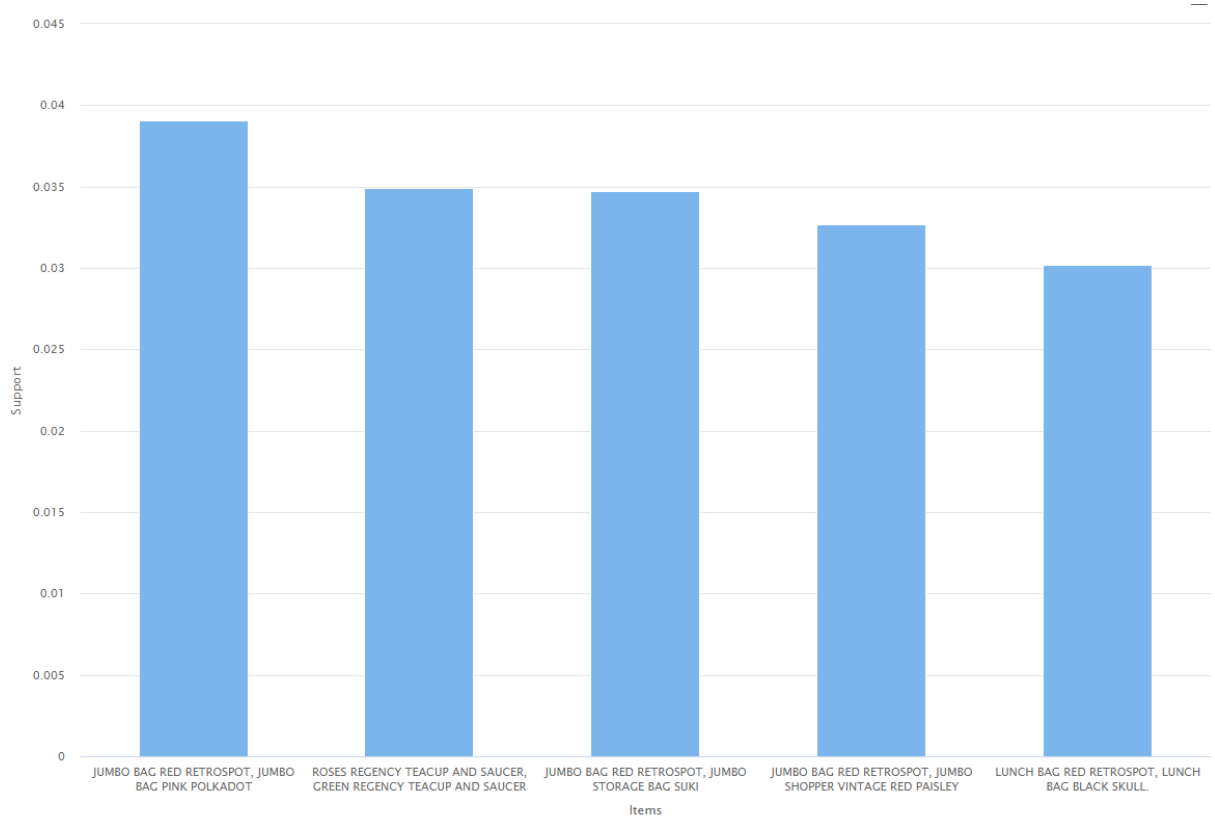
Zadanie 4

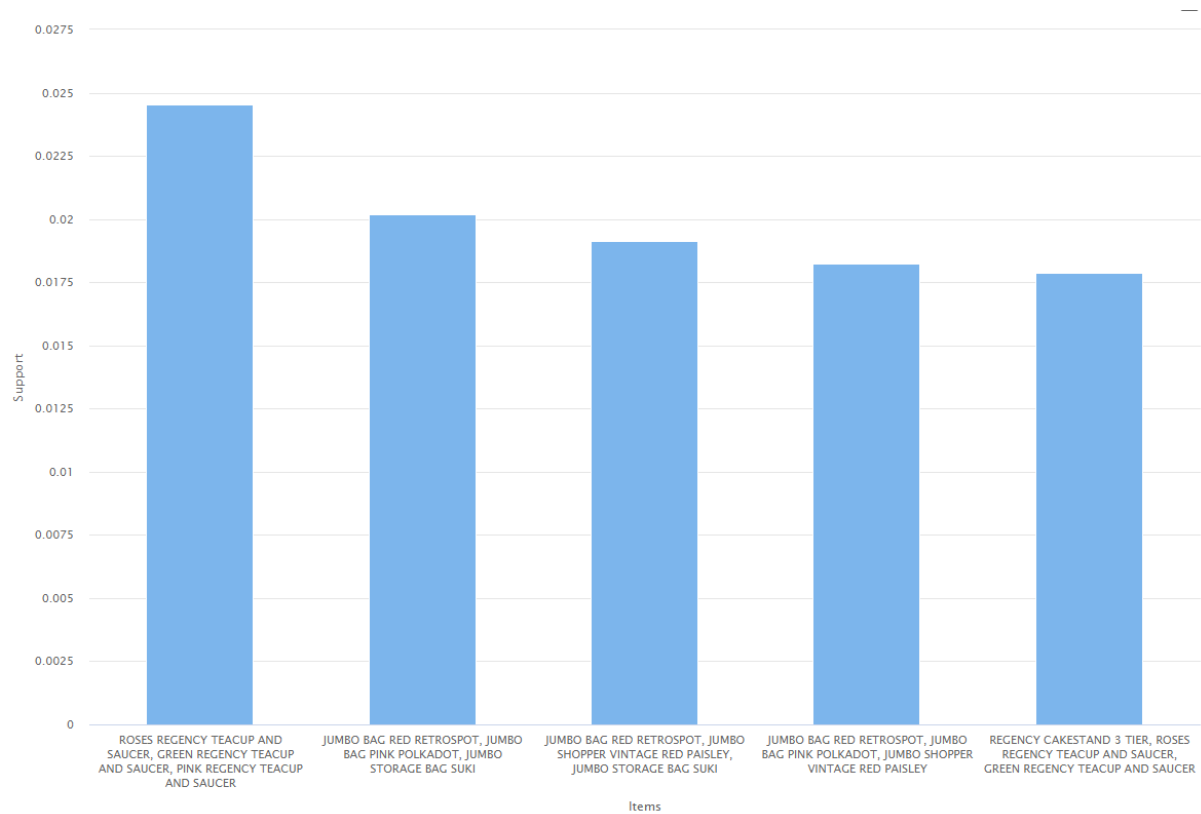
Wielka Brytania

a)



b)



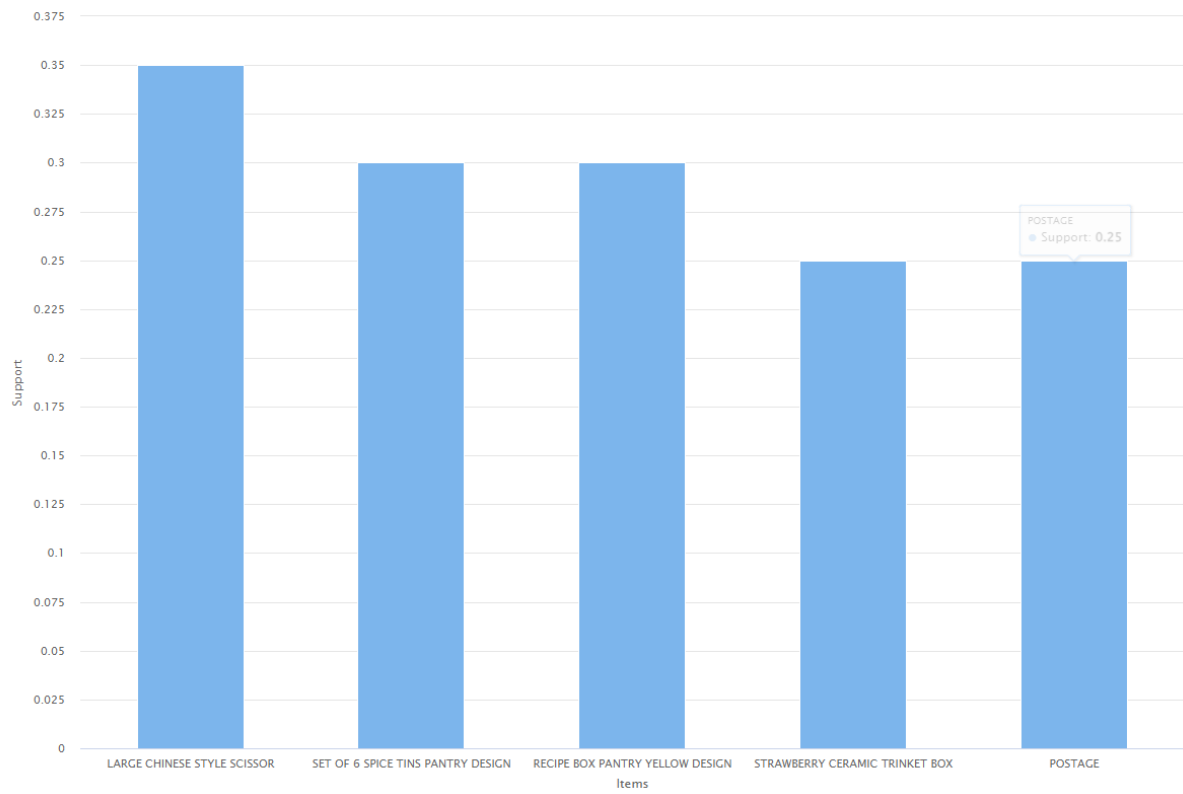


c)

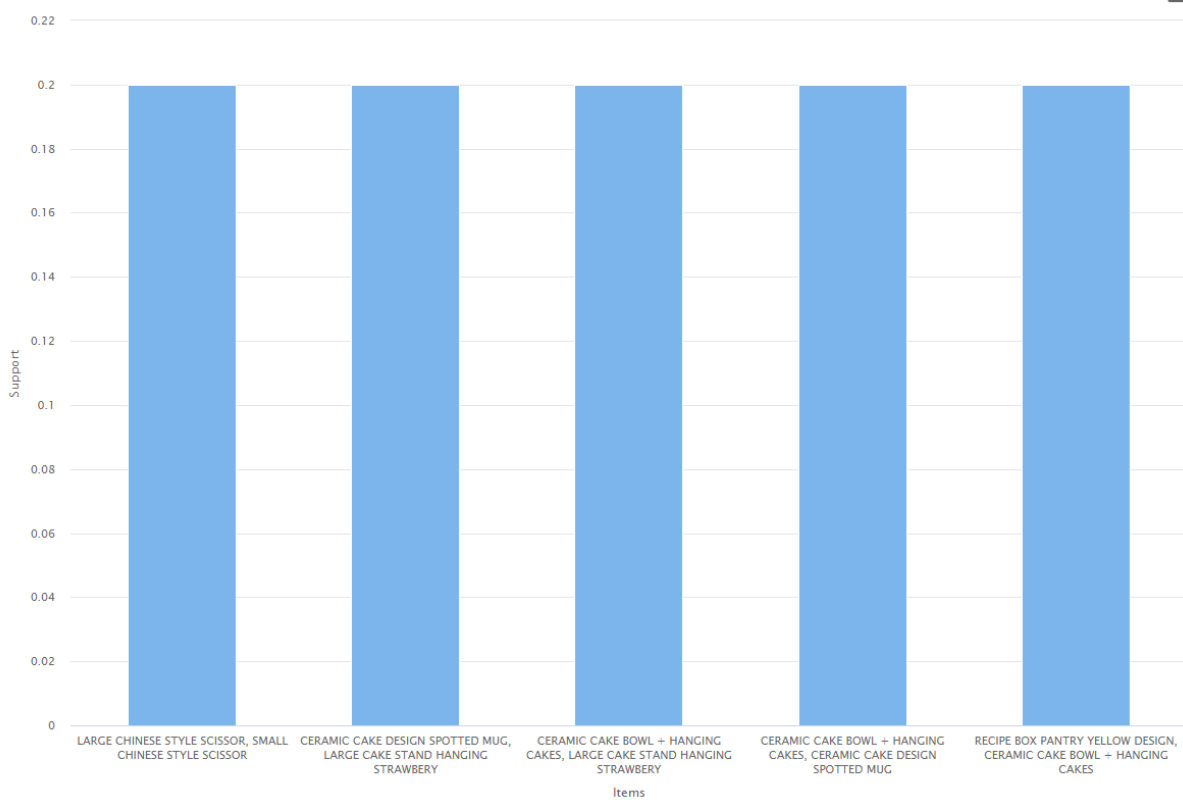
No.	Premises	Conclusion	Support	Confiden... ↓	LaPlace	Gain	p-s	Lift
2577	JAM MAKING SET PRINTED, SUKI SHOULDER B...	DOTCOM POSTAGE	0.010	0.963	1.000	-0.011	0.010	27.337
2576	REGENCY TEA PLATE ROSES, REGENCY TEA P...	REGENCY TEA PLATE GREEN	0.011	0.945	0.999	-0.012	0.011	56.428
2575	WOODEN HEART CHRISTMAS SCANDINAVIAN, ...	WOODEN STAR CHRISTMAS SCANDINAVIAN	0.011	0.944	0.999	-0.012	0.011	39.578
2574	HERB MARKER THYME	HERB MARKER ROSEMARY	0.011	0.931	0.999	-0.012	0.011	80.717
2573	WOODLAND CHARLOTTE BAG, CHARLOTTE BA...	RED RETROSPOT CHARLOTTE BAG	0.012	0.928	0.999	-0.013	0.011	20.615

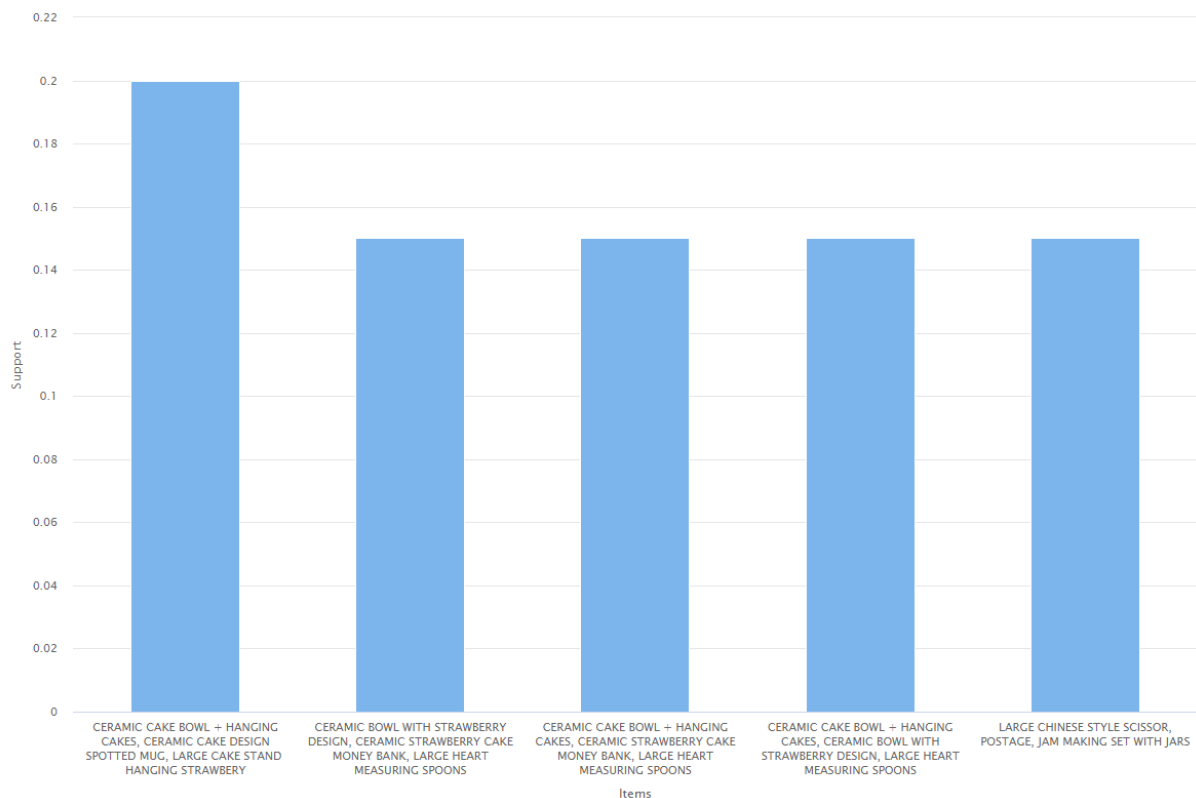
Polska

a)



b)





c)

No.	Premises	Conclusion	Support	Confidence	LaPlace	Lift	Convicti...
1	S/6 WOODEN SKITTLES IN COTTON BAG	LARGE CHINESE STYLE SCISSOR	0.050	1	1	2.857	∞
2	SET 3 RETROSPOT TEA,COFFEE,SUGAR	LARGE CHINESE STYLE SCISSOR	0.050	1	1	2.857	∞
3	SET OF 16 VINTAGE PISTACHIO CUTLERY	LARGE CHINESE STYLE SCISSOR	0.050	1	1	2.857	∞
4	SET OF 16 VINTAGE ROSE CUTLERY	LARGE CHINESE STYLE SCISSOR	0.050	1	1	2.857	∞
5	SET OF 3 WOODEN HEART DECORATIONS	LARGE CHINESE STYLE SCISSOR	0.050	1	1	2.857	∞

5.

a)

Najbardziej popularnym produktem w całym zbiorze jest WHITE HANGING HEART T-LIGHT LOADER, którego wsparcie wynosi 0,102. Oznacza to, że występuje w nieco ponad 10% wszystkich transakcji. Najrzadziej kupowanym produktem jest HAND WARMER OWL DESIGN, którego wsparcie wynosi niecałe 0,03.

b)

Najczęściej kupowanym produktem w Wielkiej Brytanii jest WHITE HANGING HEART T-LIGHT LOADER, którego wsparcie wynosi niecałe 0.11, czyli występuje w prawie 11% transakcji.

c)

Najpopularniejszym produktem w Polsce jest LARGE CHINESE STYLE SCISSOR, którego wsparcie wynosi 0,35.

d)

W Wielkiej Brytanii istnieje niemal pełna pewność (0.963), że jeśli ktoś kupił JAM MAKING SET PRINTED oraz SUKI SHOULDER BAG to kupił również DOTCOM POSTAGE.

W Polsce często kupowanym produktem z innymi jest LARGE CHINESE STYLE SCISSOR (na podstawie confidence i laplace).

e)

Największa różnica w między segmentach jest zdecydowanie większa ilość transakcji w segmencie angielskim. Podobieństwem jest to, że w obu segmentach istnieją grupy produktów (dwóch, trzech), które są często kupowane razem oraz przypadki w których jest duża pewność, że kupienie jednego produktu X powoduje kupienie drugiego produktu Y.