

CS 6301.004
Association Rule Analysis

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Data Description

The dataset for this competition is a relational set of files describing customers' orders over time. The dataset is anonymized and contains a sample of over 3 million grocery orders from more than 200,000 Instacart users. For each user, we provide between 4 and 100 of their orders, with the sequence of products purchased in each order.

File descriptions

Each entity (customer, product, order, aisle, etc.) has an associated unique id. Most of the files and variable names should be self-explanatory.

order_products__prior.csv

These files specify which products were purchased in each order. order_products__prior.csv contains previous order contents for all customers. 'reordered' indicates that the customer has a previous order that contains the product. Note that some orders will have no reordered items. You may predict an explicit 'None' value for orders with no reordered items. See the evaluation page for full details.

```
order_id,product_id,add_to_cart_order,reordered
1,49302,1,1
1,11109,2,1
1,10246,3,0
...
```

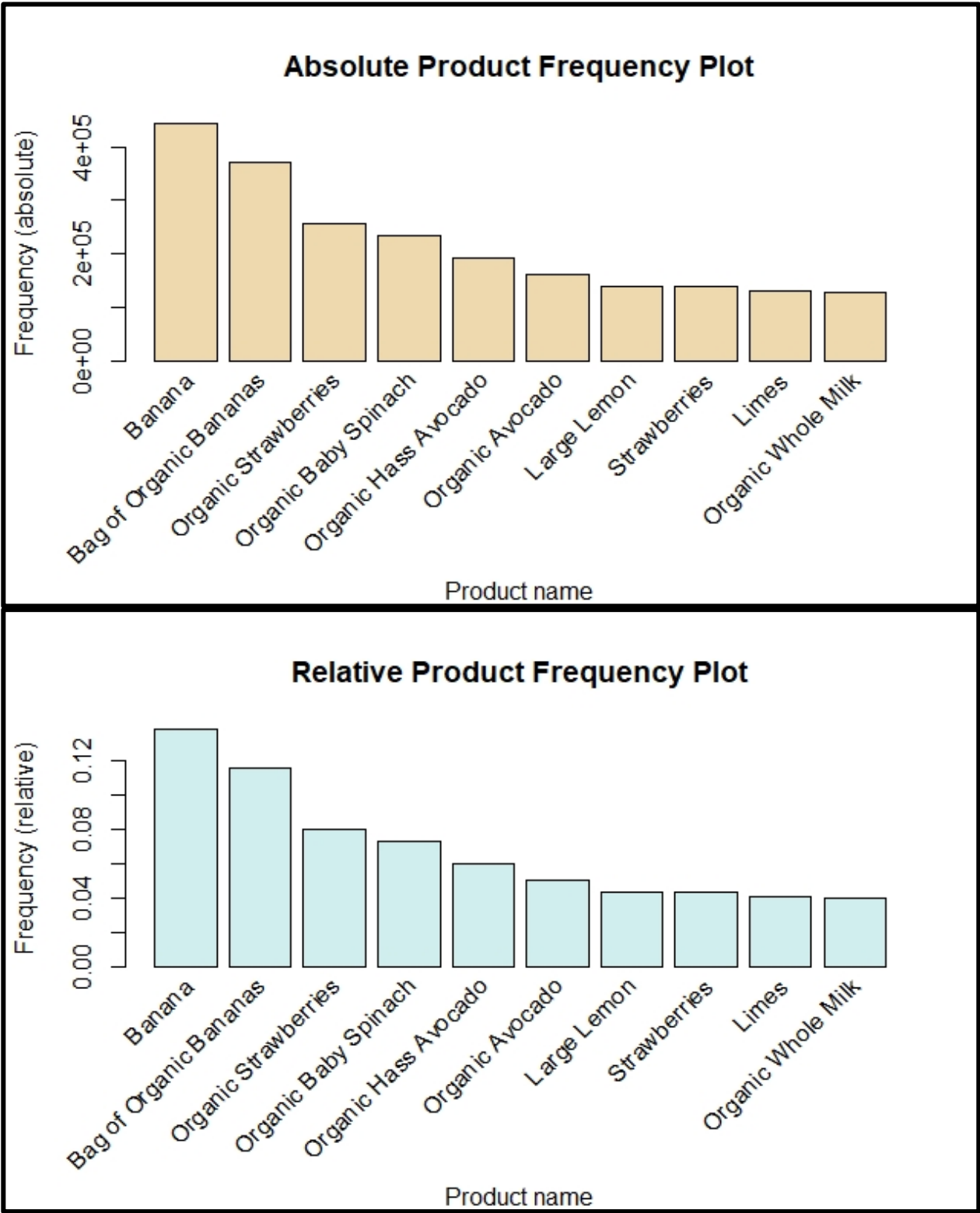
departments.csv

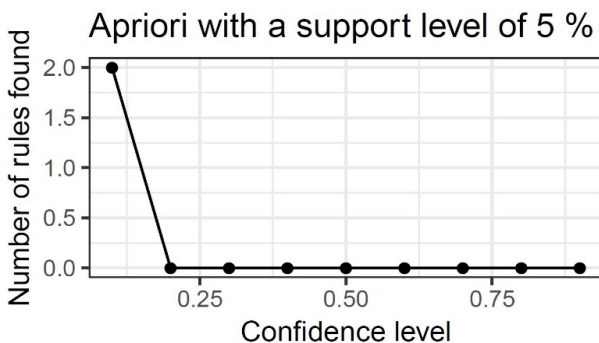
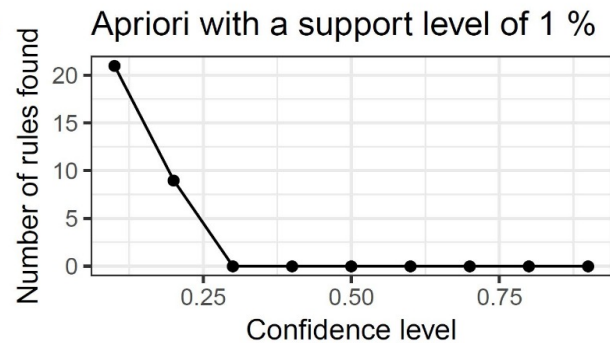
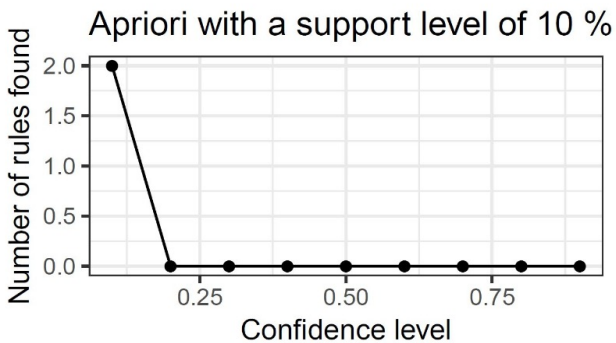
```
department_id,department
1,frozen
2,other
3,bakery
...
```

products.csv

```
product_id,product_name,aisle_id,department_id
1,Chocolate Sandwich Cookies,61,19
2,All-Seasons Salt,104,13
3,Robust Golden Unsweetened Oolong Tea,94,7
...
```

Results- Products





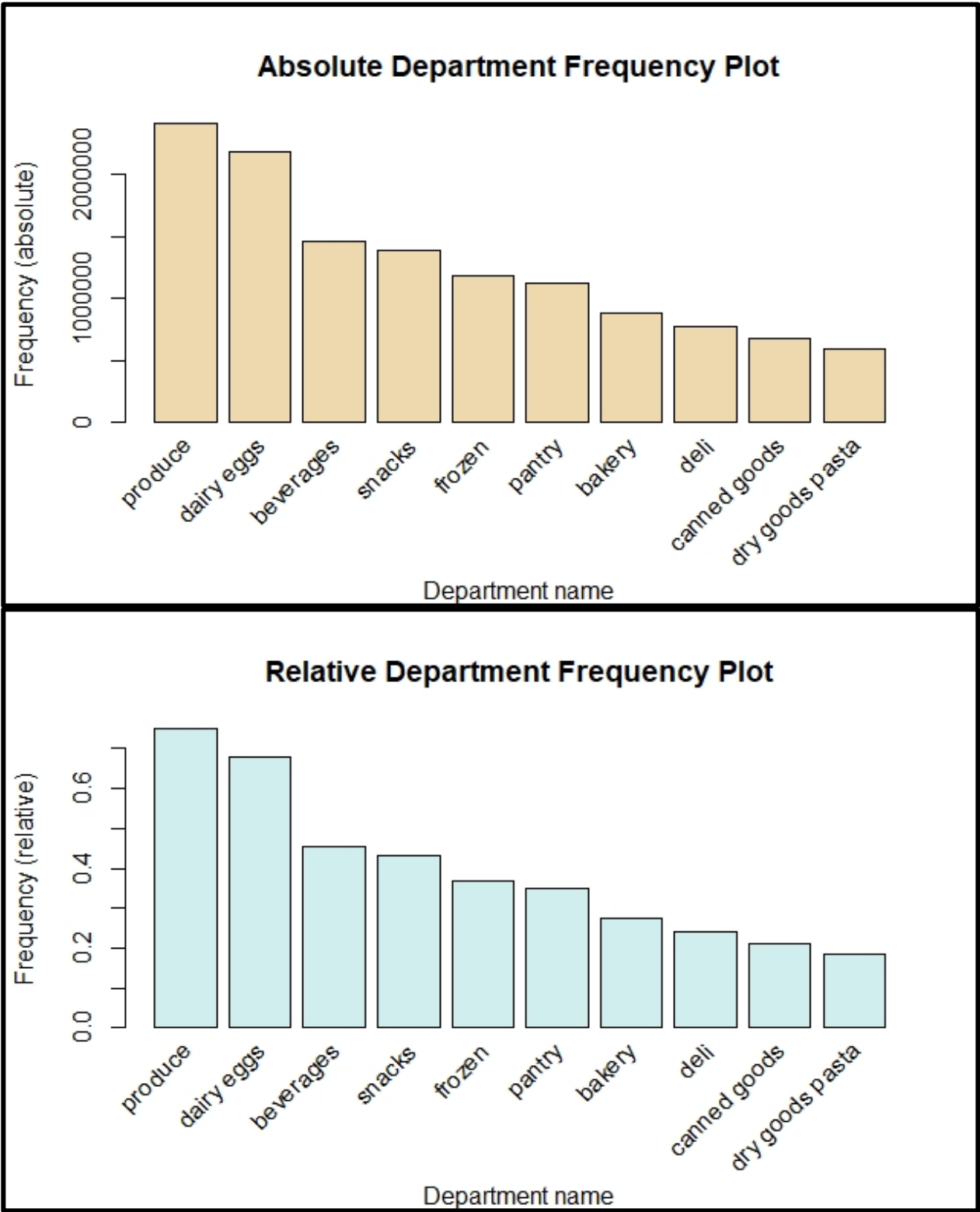
```
> inspect(frequent_products)
```

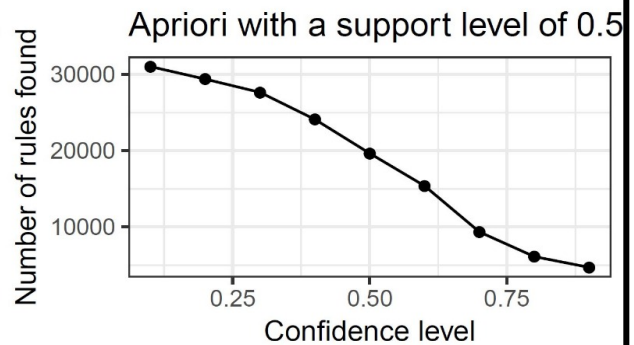
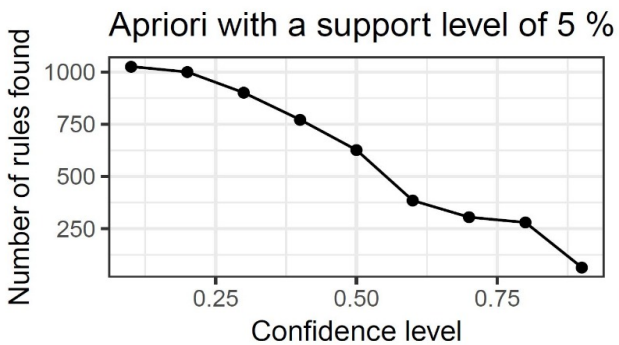
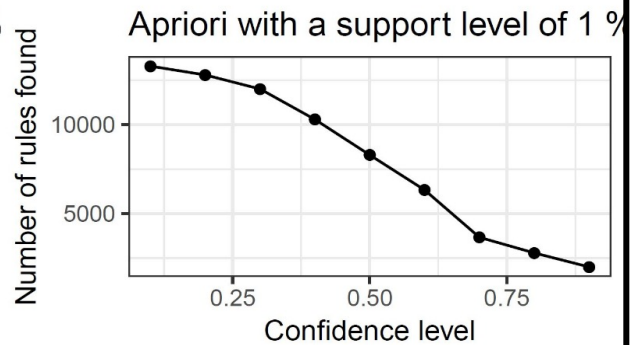
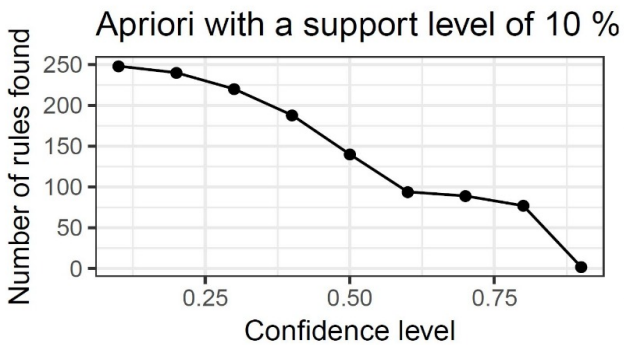
	items	support	count
[1]	{Banana}	0.13767787	442617
[2]	{Bag of Organic Bananas}	0.11575228	372129
[3]	{Organic Strawberries}	0.07970141	256230
[4]	{Organic Baby Spinach}	0.07324984	235489
[5]	{Organic Hass Avocado}	0.05970467	191943
[6]	{Organic Avocado}	0.05021845	161446
[7]	{Large Lemon}	0.04311211	138600
[8]	{Limes}	0.04095526	131666
[9]	{Strawberries}	0.04294227	138054

```
> inspect(product_association_rules)
```

	lhs	rhs	support	confidence	lift	count
[1]	{Strawberries}	=> {Banana}	0.01172425	0.2730236	1.983061	37692
[2]	{Organic Raspberries}	=> {Bag of Organic Bananas}	0.01107944	0.2856032	2.467365	35619
[3]	{Large Lemon}	=> {Banana}	0.01126856	0.2613781	1.898476	36227
[4]	{Organic Avocado}	=> {Banana}	0.01497695	0.2982359	2.166187	48149
[5]	{Organic Hass Avocado}	=> {Bag of Organic Bananas}	0.01679350	0.2812762	2.429984	53989
[6]	{Organic Baby Spinach}	=> {Bag of Organic Bananas}	0.01514243	0.2067230	1.785909	48681
[7]	{Organic Baby Spinach}	=> {Banana}	0.01489421	0.2033343	1.476885	47883
[8]	{Organic Strawberries}	=> {Bag of Organic Bananas}	0.01842685	0.2311985	1.997356	59240
[9]	{Organic Strawberries}	=> {Banana}	0.01608461	0.2018109	1.465819	51710

Results- Departments





```
> inspect(frequent_departments)
```

	items	support	count
[1]	{beverages,produce}	0.3335636	1072365
[2]	{beverages,dairy eggs}	0.3207379	1031132
[3]	{produce,snacks}	0.3372617	1084254
[4]	{dairy eggs,snacks}	0.3225479	1036951
[5]	{dairy eggs,produce}	0.5504835	1769735
[6]	{produce}	0.7494291	2409320
[7]	{dairy eggs}	0.6772701	2177338
[8]	{snacks}	0.4328154	1391447
[9]	{beverages}	0.4533151	1457351
[10]	{frozen}	0.3673606	1181018
[11]	{pantry}	0.3477250	1117892

	lhs		rhs	support	confidence	lift	count
[1]	{breakfast}	=>	{dairy eggs}	0.1350771	0.8268582	1.220869	434256
[2]	{breakfast}	=>	{produce}	0.1318472	0.8070862	1.076935	423872
[3]	{meat seafood}	=>	{dairy eggs}	0.1432821	0.8014776	1.183394	460634
[4]	{meat seafood}	=>	{produce}	0.1564752	0.8752756	1.167923	503048
[5]	{dry goods pasta}	=>	{dairy eggs}	0.1540110	0.8281610	1.222793	495126
[6]	{dry goods pasta}	=>	{produce}	0.1617429	0.8697375	1.160533	519983
[7]	{canned goods}	=>	{dairy eggs}	0.1699849	0.8021077	1.184325	546480
[8]	{canned goods}	=>	{produce}	0.1863062	0.8791232	1.173057	598951
[9]	{deli}	=>	{dairy eggs}	0.1930604	0.8057445	1.189695	620665
[10]	{deli}	=>	{produce}	0.2060591	0.8599948	1.147533	662454
[11]	{bakery}	=>	{dairy eggs}	0.2249973	0.8205242	1.211517	723338
[12]	{bakery}	=>	{produce}	0.2289679	0.8350042	1.114187	736103
[13]	{pantry}	=>	{produce}	0.2869403	0.8251933	1.101096	922477
[14]	{frozen}	=>	{produce}	0.2981184	0.8115143	1.082843	958413
[15]	{dairy eggs}	=>	{produce}	0.5504835	0.8127976	1.084556	1769735
[16]	{breakfast,dairy eggs}	=>	{produce}	0.1140661	0.8444512	1.126793	366708
[17]	{breakfast,produce}	=>	{dairy eggs}	0.1140661	0.8651385	1.277391	366708
[18]	{dairy eggs,meat seafood}	=>	{produce}	0.1291578	0.9014228	1.202813	415226
[19]	{meat seafood,produce}	=>	{dairy eggs}	0.1291578	0.8254202	1.218746	415226
[20]	{dairy eggs,dry goods pasta}	=>	{produce}	0.1377208	0.8942269	1.193211	442755
[21]	{dry goods pasta,produce}	=>	{dairy eggs}	0.1377208	0.8514798	1.257223	442755
[22]	{canned goods,dairy eggs}	=>	{produce}	0.1536741	0.9040459	1.206313	494043
[23]	{canned goods,produce}	=>	{dairy eggs}	0.1536741	0.8248471	1.217900	494043
[24]	{deli,frozen}	=>	{produce}	0.1034722	0.8867569	1.183243	332650
[25]	{beverages,deli}	=>	{dairy eggs}	0.1019866	0.8379609	1.237263	327874
[26]	{beverages,deli}	=>	{produce}	0.1053755	0.8658057	1.155287	338769
[27]	{deli,snacks}	=>	{dairy eggs}	0.1158842	0.8419638	1.243173	372553
[28]	{deli,snacks}	=>	{produce}	0.1203721	0.8745709	1.166983	386981
[29]	{dairy eggs,deli}	=>	{produce}	0.1717775	0.8897602	1.187251	552243
[30]	{deli,produce}	=>	{dairy eggs}	0.1717775	0.8336322	1.230871	552243
[31]	{bakery,pantry}	=>	{dairy eggs}	0.1073034	0.8668384	1.279901	344967
[32]	{bakery,pantry}	=>	{produce}	0.1082727	0.8746683	1.167113	348083
[33]	{bakery,frozen}	=>	{dairy eggs}	0.1147759	0.8658668	1.278466	368990
[34]	{bakery,frozen}	=>	{produce}	0.1143784	0.8628679	1.151367	367712
[35]	{bakery,beverages}	=>	{dairy eggs}	0.1194672	0.8513385	1.257015	384072
[36]	{bakery,beverages}	=>	{produce}	0.1178587	0.8398764	1.120688	378901
[37]	{bakery,snacks}	=>	{dairy eggs}	0.1280374	0.8611705	1.271532	411624
[38]	{bakery,snacks}	=>	{produce}	0.1274607	0.8572917	1.143926	409770
[39]	{bakery,dairy eggs}	=>	{produce}	0.1945964	0.8648834	1.154056	625603
[40]	{bakery,produce}	=>	{dairy eggs}	0.1945964	0.8498851	1.254869	625603
[41]	{frozen,pantry}	=>	{dairy eggs}	0.1321103	0.8369751	1.235807	424718
[42]	{frozen,pantry}	=>	{produce}	0.1366579	0.8657862	1.155261	439338
[43]	{beverages,pantry}	=>	{dairy eggs}	0.1376511	0.8107295	1.197055	442531
[44]	{beverages,pantry}	=>	{produce}	0.1413468	0.8324958	1.110840	454412
[45]	{pantry,snacks}	=>	{dairy eggs}	0.1471218	0.8267068	1.220646	472978
[46]	{pantry,snacks}	=>	{produce}	0.1510482	0.8487703	1.132556	485601
[47]	{dairy eggs,pantry}	=>	{produce}	0.2324586	0.8633188	1.151969	747325
[48]	{pantry,produce}	=>	{dairy eggs}	0.2324586	0.8101286	1.196168	747325
[49]	{beverages,frozen}	=>	{dairy eggs}	0.1498706	0.8035902	1.186514	481815
[50]	{beverages,frozen}	=>	{produce}	0.1520959	0.8155219	1.088191	488969
[51]	{frozen,snacks}	=>	{dairy eggs}	0.1607562	0.8233959	1.215757	516811
[52]	{frozen,snacks}	=>	{produce}	0.1634985	0.8374417	1.117440	525627
[53]	{dairy eggs,frozen}	=>	{produce}	0.2425800	0.8560245	1.142236	779864
[54]	{frozen,produce}	=>	{dairy eggs}	0.2425800	0.8137035	1.201446	779864
[55]	{beverages,dairy eggs}	=>	{produce}	0.2611630	0.8142566	1.086503	839606
[56]	{dairy eggs,snacks}	=>	{produce}	0.2704660	0.8385295	1.118891	869514
[57]	{produce,snacks}	=>	{dairy eggs}	0.2704660	0.8019468	1.184087	869514
[58]	{dairy eggs,deli,snacks}	=>	{produce}	0.1042573	0.8996680	1.200471	335174
[59]	{deli,produce,snacks}	=>	{dairy eggs}	0.1042573	0.8661252	1.278848	335174
[60]	{bakery,dairy eggs,frozen}	=>	{produce}	0.1014345	0.8837611	1.179246	326099
[61]	{bakery,frozen,produce}	=>	{dairy eggs}	0.1014345	0.8868326	1.309422	326099
[62]	{bakery,beverages,dairy eggs}	=>	{produce}	0.1034009	0.8655174	1.154902	332421
[63]	{bakery,beverages,produce}	=>	{dairy eggs}	0.1034009	0.8773294	1.295391	332421
[64]	{bakery,dairy eggs,snacks}	=>	{produce}	0.1126784	0.8800434	1.174285	362247
[65]	{bakery,produce,snacks}	=>	{dairy eggs}	0.1126784	0.8840252	1.305277	362247
[66]	{dairy eggs,frozen,pantry}	=>	{produce}	0.1175595	0.8898587	1.187382	377939
[67]	{frozen,pantry,produce}	=>	{dairy eggs}	0.1175595	0.8602466	1.270168	377939
[68]	{beverages,dairy eggs,pantry}	=>	{produce}	0.1192137	0.8660568	1.155622	383257
[69]	{beverages,pantry,produce}	=>	{dairy eggs}	0.1192137	0.8434130	1.245313	383257
[70]	{dairy eggs,pantry,snacks}	=>	{produce}	0.1293192	0.8789944	1.172885	415745
[71]	{pantry,produce,snacks}	=>	{dairy eggs}	0.1293192	0.8561453	1.264112	415745
[72]	{beverages,dairy eggs,frozen}	=>	{produce}	0.1282284	0.8555940	1.141661	412238
[73]	{beverages,frozen,produce}	=>	{dairy eggs}	0.1282284	0.8430759	1.244815	412238
[74]	{dairy eggs,frozen,snacks}	=>	{produce}	0.1400503	0.8711966	1.162480	450244
[75]	{frozen,produce,snacks}	=>	{dairy eggs}	0.1400503	0.8565846	1.264761	450244
[76]	{beverages,dairy eggs,snacks}	=>	{produce}	0.1492936	0.8378912	1.118039	479960
[77]	{beverages,produce,snacks}	=>	{dairy eggs}	0.1492936	0.8311917	1.227268	479960