

# store-data

November 13, 2024

```
[1]: import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
from apyori import apriori
```

```
[10]: df = pd.read_csv('C:\\Users\\ANUSHA\\Downloads\\store_data.csv')
df.head()
```

```
[10]:      shrimp  almonds  avocado  vegetables mix green grapes \
0      burgers  meatballs      eggs      NaN      NaN
1      chutney      NaN      NaN      NaN      NaN
2      turkey  avocado      NaN      NaN      NaN
3  mineral water      milk  energy bar  whole wheat rice  green tea
4  low fat yogurt      NaN      NaN      NaN      NaN

      whole weat flour yams cottage cheese energy drink tomato juice \
0      NaN  NaN      NaN      NaN      NaN      NaN
1      NaN  NaN      NaN      NaN      NaN      NaN
2      NaN  NaN      NaN      NaN      NaN      NaN
3      NaN  NaN      NaN      NaN      NaN      NaN
4      NaN  NaN      NaN      NaN      NaN      NaN

      low fat yogurt green tea honey salad mineral water salmon antioxydant juice \
0      NaN      NaN  NaN  NaN      NaN      NaN      NaN
1      NaN      NaN  NaN  NaN      NaN      NaN      NaN
2      NaN      NaN  NaN  NaN      NaN      NaN      NaN
3      NaN      NaN  NaN  NaN      NaN      NaN      NaN
4      NaN      NaN  NaN  NaN      NaN      NaN      NaN

      frozen smoothie spinach  olive oil
0      NaN      NaN      NaN
1      NaN      NaN      NaN
2      NaN      NaN      NaN
3      NaN      NaN      NaN
4      NaN      NaN      NaN
```

```
[11]: df = pd.read_csv('C:\\Users\\ANUSHA\\Downloads\\store_data.csv',header=None)
df.head()
```

```
[11]:
```

	0	1	2	3	4	\
0	shrimp	almonds	avocado	vegetables mix	green grapes	
1	burgers	meatballs	eggs	NaN	NaN	
2	chutney	NaN	NaN	NaN	NaN	
3	turkey	avocado	NaN	NaN	NaN	
4	mineral water	milk	energy bar	whole wheat rice	green tea	

  

	5	6	7	8	9	\
0	whole weat flour	yams	cottage cheese	energy drink	tomato juice	
1	NaN	NaN	NaN	NaN	NaN	
2	NaN	NaN	NaN	NaN	NaN	
3	NaN	NaN	NaN	NaN	NaN	
4	NaN	NaN	NaN	NaN	NaN	

  

	10	11	12	13	14	15	\
0	low fat yogurt	green tea	honey	salad	mineral water	salmon	
1	NaN	NaN	NaN	NaN	NaN	NaN	
2	NaN	NaN	NaN	NaN	NaN	NaN	
3	NaN	NaN	NaN	NaN	NaN	NaN	
4	NaN	NaN	NaN	NaN	NaN	NaN	

  

	16	17	18	19
0	antioxydant juice	frozen smoothie	spinach	olive oil
1	NaN	NaN	NaN	NaN
2	NaN	NaN	NaN	NaN
3	NaN	NaN	NaN	NaN
4	NaN	NaN	NaN	NaN

```
[12]: df.fillna(0,inplace=True)
df.head()
```

```
[12]:
```

	0	1	2	3	4	\
0	shrimp	almonds	avocado	vegetables mix	green grapes	
1	burgers	meatballs	eggs	0	0	
2	chutney	0	0	0	0	
3	turkey	avocado	0	0	0	
4	mineral water	milk	energy bar	whole wheat rice	green tea	

  

	5	6	7	8	9	\
0	whole weat flour	yams	cottage cheese	energy drink	tomato juice	
1	0	0	0	0	0	
2	0	0	0	0	0	
3	0	0	0	0	0	
4	0	0	0	0	0	

	10	11	12	13	14	15 \
0 low fat yogurt	green tea	honey	salad	mineral water	salmon	
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0

  

	16	17	18	19
0 antioxydant juice	frozen smoothie	spinach	olive oil	
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0

```
[13]: transactions = []
      for i in range(0,len(df)):
          transactions.append([str(df.values[i,j]) for j in range(0,20) if str(df.
          ↪values[i,j])!='0']])
```

```
[30]: transactions[0]
```

```
[30]: ['shrimp',
      'almonds',
      'avocado',
      'vegetables mix',
      'green grapes',
      'whole weat flour',
      'yams',
      'cottage cheese',
      'energy drink',
      'tomato juice',
      'low fat yogurt',
      'green tea',
      'honey',
      'salad',
      'mineral water',
      'salmon',
      'antioxydant juice',
      'frozen smoothie',
      'spinach',
      'olive oil']
```

```
[43]: rules = apriori(transactions,min_support=0.003,min_confidance=0.
      ↪2,min_lift=3,min_length=2)
      rules
```

[43]: <generator object apriori at 0x00000144574AB4A0>

```
[44]: Results = list(rules)
Results
```

```
[44]: [RelationRecord(items=frozenset({'cottage cheese', 'brownies'}),
support=0.0034662045060658577,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'brownies'}),
items_add=frozenset({'cottage cheese'}), confidence=0.10276679841897232,
lift=3.225329518580382), OrderedStatistic(items_base=frozenset({'cottage
cheese'}), items_add=frozenset({'brownies'}), confidence=0.10878661087866107,
lift=3.2253295185803816)]),
RelationRecord(items=frozenset({'light cream', 'chicken'}),
support=0.004532728969470737,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'chicken'}),
items_add=frozenset({'light cream'}), confidence=0.07555555555555556,
lift=4.843950617283951), OrderedStatistic(items_base=frozenset({'light cream'}),
items_add=frozenset({'chicken'}), confidence=0.29059829059829057,
lift=4.84395061728395)]),
RelationRecord(items=frozenset({'mushroom cream sauce', 'escalope'}),
support=0.005732568990801226,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'escalope'}),
items_add=frozenset({'mushroom cream sauce'}), confidence=0.0722689075630252,
lift=3.7908326967150496), OrderedStatistic(items_base=frozenset({'mushroom cream
sauce'}), items_add=frozenset({'escalope'}), confidence=0.3006993006993007,
lift=3.790832696715049)]),
RelationRecord(items=frozenset({'pasta', 'escalope'}),
support=0.005865884548726837,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'escalope'}),
items_add=frozenset({'pasta'}), confidence=0.07394957983193277,
lift=4.700811850163794), OrderedStatistic(items_base=frozenset({'pasta'}),
items_add=frozenset({'escalope'}), confidence=0.3728813559322034,
lift=4.700811850163794)]),
RelationRecord(items=frozenset({'fresh bread', 'tomato juice'}),
support=0.004266097853619517,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'fresh bread'}),
items_add=frozenset({'tomato juice'}), confidence=0.09907120743034055,
lift=3.2593558198902826), OrderedStatistic(items_base=frozenset({'tomato
juice'}), items_add=frozenset({'fresh bread'}), confidence=0.14035087719298245,
lift=3.2593558198902826)]),
RelationRecord(items=frozenset({'honey', 'fresh tuna'}),
support=0.003999466737768298,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'fresh tuna'}),
items_add=frozenset({'honey'}), confidence=0.17964071856287428,
lift=3.7850703088205613), OrderedStatistic(items_base=frozenset({'honey'}),
items_add=frozenset({'fresh tuna'}), confidence=0.08426966292134831,
lift=3.7850703088205613)]),
```

```

RelationRecord(items=frozenset({'fromage blanc', 'honey'}),
support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'fromage blanc'}),
items_add=frozenset({'honey'}), confidence=0.2450980392156863,
lift=5.164270764485569), OrderedStatistic(items_base=frozenset({'honey'}),
items_add=frozenset({'fromage blanc'}), confidence=0.0702247191011236,
lift=5.16427076448557)]),
RelationRecord(items=frozenset({'ground beef', 'herb & pepper'}),
support=0.015997866951073192,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'herb & pepper'}), confidence=0.1628222523744912,
lift=3.291993841134928), OrderedStatistic(items_base=frozenset({'herb &
pepper'}), items_add=frozenset({'ground beef'}), confidence=0.3234501347708895,
lift=3.2919938411349285)]),
RelationRecord(items=frozenset({'tomato sauce', 'ground beef'}),
support=0.005332622317024397,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'tomato sauce'}), confidence=0.054274084124830396,
lift=3.840659481324083), OrderedStatistic(items_base=frozenset({'tomato
sauce'}), items_add=frozenset({'ground beef'}), confidence=0.3773584905660377,
lift=3.840659481324083)]),
RelationRecord(items=frozenset({'light cream', 'olive oil'}),
support=0.003199573390214638,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'light cream'}),
items_add=frozenset({'olive oil'}), confidence=0.20512820512820515,
lift=3.1147098515519573), OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'light cream'}), confidence=0.048582995951417005,
lift=3.114709851551957)]),
RelationRecord(items=frozenset({'whole wheat pasta', 'olive oil'}),
support=0.007998933475536596,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'whole wheat pasta'}), confidence=0.12145748987854252,
lift=4.1224100976422955), OrderedStatistic(items_base=frozenset({'whole wheat
pasta'}), items_add=frozenset({'olive oil'}), confidence=0.2714932126696833,
lift=4.122410097642296)]),
RelationRecord(items=frozenset({'pasta', 'shrimp'}),
support=0.005065991201173177,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'pasta'}),
items_add=frozenset({'shrimp'}), confidence=0.3220338983050847,
lift=4.506672147735896), OrderedStatistic(items_base=frozenset({'shrimp'}),
items_add=frozenset({'pasta'}), confidence=0.0708955223880597,
lift=4.506672147735896)]),
RelationRecord(items=frozenset({'avocado', 'milk', 'spaghetti'}),
support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'avocado', 'spaghetti'}), confidence=0.025720164609053502,
lift=3.2154492455418384), OrderedStatistic(items_base=frozenset({'avocado',

```

```

'spaghetti'}), items_add=frozenset({'milk'}), confidence=0.41666666666666663,
lift=3.215449245541838)]),
  RelationRecord(items=frozenset({'cake', 'burgers', 'milk'}),
support=0.0037328356219170776,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'burgers'}),
items_add=frozenset({'cake', 'milk'}), confidence=0.04281345565749235,
lift=3.211437308868501), OrderedStatistic(items_base=frozenset({'cake',
'milk'}), items_add=frozenset({'burgers'}), confidence=0.27999999999999997,
lift=3.211437308868501)]),
  RelationRecord(items=frozenset({'chocolate', 'burgers', 'turkey'}),
support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'burgers'}),
items_add=frozenset({'chocolate', 'turkey'}), confidence=0.035168195718654434,
lift=3.1034898363014927), OrderedStatistic(items_base=frozenset({'chocolate',
'turkey'}), items_add=frozenset({'burgers'}), confidence=0.27058823529411763,
lift=3.1034898363014927)]),
  RelationRecord(items=frozenset({'burgers', 'turkey', 'milk'}),
support=0.003199573390214638,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'burgers'}),
items_add=frozenset({'turkey', 'milk'}), confidence=0.03669724770642202,
lift=3.2384241770102538), OrderedStatistic(items_base=frozenset({'turkey',
'milk'}), items_add=frozenset({'burgers'}), confidence=0.2823529411764706,
lift=3.2384241770102533)]),
  RelationRecord(items=frozenset({'tomatoes', 'cake', 'frozen vegetables'}),
support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'cake', 'tomatoes'}),
confidence=0.03216783216783217, lift=3.83001443001443),
OrderedStatistic(items_base=frozenset({'tomatoes'}),
items_add=frozenset({'cake', 'frozen vegetables'}),
confidence=0.04483430799220273, lift=4.367560314928736),
OrderedStatistic(items_base=frozenset({'cake', 'frozen vegetables'}),
items_add=frozenset({'tomatoes'}), confidence=0.2987012987012987,
lift=4.367560314928736), OrderedStatistic(items_base=frozenset({'cake',
'tomatoes'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.36507936507936506, lift=3.8300144300144296)]),
  RelationRecord(items=frozenset({'ground beef', 'cereals', 'spaghetti'}),
support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'cereals'}),
items_add=frozenset({'ground beef', 'spaghetti'}),
confidence=0.11917098445595856, lift=3.040481477565119),
OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'cereals', 'spaghetti'}), confidence=0.03120759837177748,
lift=4.681763907734057), OrderedStatistic(items_base=frozenset({'spaghetti'}),
items_add=frozenset({'ground beef', 'cereals'}), confidence=0.01761102603369066,
lift=3.885303125844519), OrderedStatistic(items_base=frozenset({'ground beef',
'cereals'}), items_add=frozenset({'spaghetti'}), confidence=0.6764705882352942,

```

```

lift=3.8853031258445188), OrderedStatistic(items_base=frozenset({'cereals',
'spaghetti'}), items_add=frozenset({'ground beef'}),
confidence=0.45999999999999996, lift=4.681763907734057),
OrderedStatistic(items_base=frozenset({'ground beef', 'spaghetti'}),
items_add=frozenset({'cereals'}), confidence=0.0782312925170068,
lift=3.0404814775651197)]),
RelationRecord(items=frozenset({'ground beef', 'milk', 'chicken'}),
support=0.0038661511798426876,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'ground beef', 'chicken'}), confidence=0.02983539094650206,
lift=3.1520460209818584), OrderedStatistic(items_base=frozenset({'ground beef',
'chicken'}), items_add=frozenset({'milk'}), confidence=0.40845070422535207,
lift=3.152046020981858)]),
RelationRecord(items=frozenset({'olive oil', 'milk', 'chicken'}),
support=0.0035995200639914677,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'chicken'}),
items_add=frozenset({'milk', 'olive oil'}), confidence=0.06, lift=3.51609375),
OrderedStatistic(items_base=frozenset({'milk'}), items_add=frozenset({'chicken',
'olive oil'}), confidence=0.027777777777777778, lift=3.8585390946502063),
OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'milk', 'chicken'}), confidence=0.054655870445344125,
lift=3.6934566145092456), OrderedStatistic(items_base=frozenset({'milk',
'chicken'}), items_add=frozenset({'olive oil'}), confidence=0.24324324324324323,
lift=3.693456614509246), OrderedStatistic(items_base=frozenset({'olive oil',
'chicken'}), items_add=frozenset({'milk'}), confidence=0.5,
lift=3.858539094650206), OrderedStatistic(items_base=frozenset({'milk', 'olive
oil'}), items_add=frozenset({'chicken'}), confidence=0.2109375,
lift=3.51609375)]),
RelationRecord(items=frozenset({'pancakes', 'milk', 'chicken'}),
support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'chicken'}),
items_add=frozenset({'milk', 'pancakes'}), confidence=0.051111111111111114,
lift=3.091810035842294), OrderedStatistic(items_base=frozenset({'pancakes',
'milk'}), items_add=frozenset({'chicken'}), confidence=0.18548387096774194,
lift=3.091810035842294)]),
RelationRecord(items=frozenset({'olive oil', 'chicken', 'spaghetti'}),
support=0.0034662045060658577,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'chicken', 'spaghetti'}), confidence=0.05263157894736842,
lift=3.0603835169318647), OrderedStatistic(items_base=frozenset({'chicken',
'spaghetti'}), items_add=frozenset({'olive oil'}),
confidence=0.20155038759689922, lift=3.0603835169318647)]),
RelationRecord(items=frozenset({'chocolate', 'frozen vegetables', 'shrimp'}),
support=0.005332622317024397,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'chocolate', 'shrimp'}),
confidence=0.055944055944055944, lift=3.1084175084175087),

```

```

OrderedStatistic(items_base=frozenset({'shrimp'}),
items_add=frozenset({'chocolate', 'frozen vegetables'}),
confidence=0.07462686567164178, lift=3.2545123221103784),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables'}),
items_add=frozenset({'shrimp'}), confidence=0.23255813953488375,
lift=3.2545123221103784), OrderedStatistic(items_base=frozenset({'chocolate',
'shrimp'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.29629629629629634, lift=3.1084175084175087))],
RelationRecord(items=frozenset({'chocolate', 'ground beef', 'herb & pepper'}),
support=0.003999466737768298,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'chocolate', 'herb & pepper'}),
confidence=0.0407055630936228, lift=4.490182775959774),
OrderedStatistic(items_base=frozenset({'herb & pepper'}),
items_add=frozenset({'chocolate', 'ground beef'}),
confidence=0.08086253369272238, lift=3.5060685851393676),
OrderedStatistic(items_base=frozenset({'chocolate', 'ground beef'}),
items_add=frozenset({'herb & pepper'}), confidence=0.17341040462427748,
lift=3.5060685851393676), OrderedStatistic(items_base=frozenset({'chocolate',
'herb & pepper'}), items_add=frozenset({'ground beef'}),
confidence=0.4411764705882354, lift=4.4901827759597746))],
RelationRecord(items=frozenset({'soup', 'chocolate', 'milk'}),
support=0.003999466737768298,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'soup', 'chocolate'}), confidence=0.030864197530864203,
lift=3.0462150747238472), OrderedStatistic(items_base=frozenset({'soup',
'chocolate'}), items_add=frozenset({'milk'}), confidence=0.3947368421052632,
lift=3.0462150747238472))],
RelationRecord(items=frozenset({'ground beef', 'cooking oil', 'spaghetti'}),
support=0.004799360085321957,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'cooking oil', 'spaghetti'}),
confidence=0.048846675712347354, lift=3.078982474943844),
OrderedStatistic(items_base=frozenset({'spaghetti'}),
items_add=frozenset({'ground beef', 'cooking oil'}),
confidence=0.027565084226646247, lift=3.2819951870487856),
OrderedStatistic(items_base=frozenset({'ground beef', 'cooking oil'}),
items_add=frozenset({'spaghetti'}), confidence=0.5714285714285714,
lift=3.2819951870487856), OrderedStatistic(items_base=frozenset({'cooking oil',
'spaghetti'}), items_add=frozenset({'ground beef'}),
confidence=0.3025210084033613, lift=3.0789824749438446))],
RelationRecord(items=frozenset({'ground beef', 'herb & pepper', 'eggs'}),
support=0.0041327822956939075,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'herb & pepper', 'eggs'}), confidence=0.04206241519674356,
lift=3.3564912381997174), OrderedStatistic(items_base=frozenset({'herb &
pepper'}), items_add=frozenset({'ground beef', 'eggs'}),

```



```

confidence=0.08355795148247978, lift=4.178454627133872),
OrderedStatistic(items_base=frozenset({'ground beef', 'eggs'}),
items_add=frozenset({'herb & pepper'}), confidence=0.2066666666666667,
lift=4.178454627133872), OrderedStatistic(items_base=frozenset({'herb & pepper',
'eggs'}), items_add=frozenset({'ground beef'}), confidence=0.3297872340425532,
lift=3.3564912381997174))),
RelationRecord(items=frozenset({'spaghetti', 'eggs', 'red wine'}),
support=0.0037328356219170776,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'red wine'}),
items_add=frozenset({'eggs', 'spaghetti'}), confidence=0.13270142180094788,
lift=3.6328224997405476), OrderedStatistic(items_base=frozenset({'spaghetti'}),
items_add=frozenset({'eggs', 'red wine'}), confidence=0.021439509954058193,
lift=3.0342974370828397), OrderedStatistic(items_base=frozenset({'eggs', 'red
wine'}), items_add=frozenset({'spaghetti'}), confidence=0.5283018867924528,
lift=3.0342974370828397), OrderedStatistic(items_base=frozenset({'eggs',
'spaghetti'}), items_add=frozenset({'red wine'}),
confidence=0.10218978102189781, lift=3.632822499740547)]),
RelationRecord(items=frozenset({'ground beef', 'herb & pepper', 'french
fries'}), support=0.003199573390214638,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'herb & pepper', 'french fries'}),
confidence=0.03256445047489824, lift=4.697421981004071),
OrderedStatistic(items_base=frozenset({'herb & pepper'}),
items_add=frozenset({'ground beef', 'french fries'}),
confidence=0.0646900269541779, lift=4.665768194070082),
OrderedStatistic(items_base=frozenset({'ground beef', 'french fries'}),
items_add=frozenset({'herb & pepper'}), confidence=0.23076923076923078,
lift=4.665768194070081), OrderedStatistic(items_base=frozenset({'herb & pepper',
'french fries'}), items_add=frozenset({'ground beef'}),
confidence=0.46153846153846156, lift=4.697421981004071)]),
RelationRecord(items=frozenset({'tomatoes', 'frozen vegetables', 'green tea'}),
support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'tomatoes'}),
items_add=frozenset({'frozen vegetables', 'green tea'}),
confidence=0.04873294346978558, lift=3.38468341635983),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'green tea'}),
items_add=frozenset({'tomatoes'}), confidence=0.2314814814814815,
lift=3.38468341635983)]),
RelationRecord(items=frozenset({'ground beef', 'frozen vegetables',
'spaghetti'}), support=0.008665511265164644,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.08819538670284939, lift=3.165328208890303),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'spaghetti'}),
items_add=frozenset({'ground beef'}), confidence=0.31100478468899523,
lift=3.165328208890303)]),
RelationRecord(items=frozenset({'frozen vegetables', 'milk', 'olive oil'}),

```

```

support=0.004799360085321957,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'frozen vegetables', 'olive oil'}),
confidence=0.037037037037037035, lift=3.2684095860566447),
OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'frozen vegetables', 'milk'}),
confidence=0.0728744939271255, lift=3.0883140053523634),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'milk'}),
items_add=frozenset({'olive oil'}), confidence=0.20338983050847456,
lift=3.088314005352364), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'olive oil'}), items_add=frozenset({'milk'}),
confidence=0.4235294117647058, lift=3.2684095860566447)]]),
RelationRecord(items=frozenset({'soup', 'frozen vegetables', 'milk'}),
support=0.003999466737768298,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'soup', 'frozen vegetables'}),
confidence=0.030864197530864203, lift=3.858539094650206),
OrderedStatistic(items_base=frozenset({'soup'}), items_add=frozenset({'frozen
vegetables', 'milk'}), confidence=0.079155672823219, lift=3.3545011403783374),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'milk'}),
items_add=frozenset({'soup'}), confidence=0.16949152542372883,
lift=3.354501140378338), OrderedStatistic(items_base=frozenset({'soup', 'frozen
vegetables'}), items_add=frozenset({'milk'}), confidence=0.5,
lift=3.858539094650206)]]),
RelationRecord(items=frozenset({'tomatoes', 'frozen vegetables', 'milk'}),
support=0.0041327822956939075,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'tomatoes', 'milk'}),
confidence=0.043356643356643354, lift=3.0973160173160172),
OrderedStatistic(items_base=frozenset({'tomatoes', 'milk'}),
items_add=frozenset({'frozen vegetables'}), confidence=0.29523809523809524,
lift=3.0973160173160172)]]),
RelationRecord(items=frozenset({'frozen vegetables', 'mineral water',
'shrimp'}), support=0.007199040127982935,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'mineral water', 'shrimp'}),
confidence=0.07552447552447553, lift=3.2006163328197226),
OrderedStatistic(items_base=frozenset({'mineral water', 'shrimp'}),
items_add=frozenset({'frozen vegetables'}), confidence=0.30508474576271183,
lift=3.200616332819722)]]),
RelationRecord(items=frozenset({'frozen vegetables', 'olive oil',
'spaghetti'}), support=0.005732568990801226,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.08704453441295547, lift=3.124024175270713),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'spaghetti'}),
items_add=frozenset({'olive oil'}), confidence=0.20574162679425836,

```

```

lift=3.1240241752707125))),
  RelationRecord(items=frozenset({'frozen vegetables', 'shrimp', 'spaghetti'}),
support=0.005999200106652446,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'shrimp'}),
items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.08395522388059701, lift=3.013148968078269),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'spaghetti'}),
items_add=frozenset({'shrimp'}), confidence=0.21531100478468898,
lift=3.0131489680782684)]),
  RelationRecord(items=frozenset({'tomatoes', 'frozen vegetables', 'shrimp'}),
support=0.003999466737768298,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'tomatoes', 'shrimp'}),
confidence=0.04195804195804196, lift=3.7467532467532467),
OrderedStatistic(items_base=frozenset({'shrimp'}),
items_add=frozenset({'tomatoes', 'frozen vegetables'}),
confidence=0.055970149253731345, lift=3.469686690514371),
OrderedStatistic(items_base=frozenset({'tomatoes'}),
items_add=frozenset({'frozen vegetables', 'shrimp'}),
confidence=0.058479532163742694, lift=3.5092397660818713),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'shrimp'}),
items_add=frozenset({'tomatoes'}), confidence=0.24000000000000002,
lift=3.5092397660818717), OrderedStatistic(items_base=frozenset({'tomatoes',
'frozen vegetables'}), items_add=frozenset({'shrimp'}),
confidence=0.2479338842975207, lift=3.4696866905143704),
OrderedStatistic(items_base=frozenset({'tomatoes', 'shrimp'}),
items_add=frozenset({'frozen vegetables'}), confidence=0.35714285714285715,
lift=3.7467532467532467)]),
  RelationRecord(items=frozenset({'tomatoes', 'frozen vegetables', 'spaghetti'}),
support=0.006665777896280496,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'tomatoes', 'spaghetti'}),
confidence=0.06993006993006994, lift=3.341053850607991),
OrderedStatistic(items_base=frozenset({'tomatoes'}),
items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.09746588693957116, lift=3.4980460188216425),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'spaghetti'}),
items_add=frozenset({'tomatoes'}), confidence=0.23923444976076558,
lift=3.4980460188216425), OrderedStatistic(items_base=frozenset({'tomatoes',
'spaghetti'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.3184713375796179, lift=3.341053850607991)]),
  RelationRecord(items=frozenset({'ground beef', 'grated cheese', 'spaghetti'}),
support=0.005332622317024397,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'grated cheese', 'spaghetti'}),
confidence=0.054274084124830396, lift=3.283144395325426),
OrderedStatistic(items_base=frozenset({'grated cheese', 'spaghetti'}),

```

```

items_add=frozenset({'ground beef'}), confidence=0.3225806451612903,
lift=3.283144395325426)),
  RelationRecord(items=frozenset({'herb & pepper', 'grated cheese',
'spaghetti'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'grated cheese'}),
items_add=frozenset({'herb & pepper', 'spaghetti'}),
confidence=0.058524173027989825, lift=3.5982772285487843),
OrderedStatistic(items_base=frozenset({'herb & pepper'}),
items_add=frozenset({'grated cheese', 'spaghetti'}),
confidence=0.06199460916442048, lift=3.7501738979219197),
OrderedStatistic(items_base=frozenset({'grated cheese', 'spaghetti'}),
items_add=frozenset({'herb & pepper'}), confidence=0.18548387096774194,
lift=3.7501738979219197), OrderedStatistic(items_base=frozenset({'herb &
pepper', 'spaghetti'}), items_add=frozenset({'grated cheese'}),
confidence=0.18852459016393444, lift=3.5982772285487843)]),
  RelationRecord(items=frozenset({'ground beef', 'tomatoes', 'green tea'}),
support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'tomatoes'}),
items_add=frozenset({'ground beef', 'green tea'}),
confidence=0.04483430799220273, lift=3.0297490472929067),
OrderedStatistic(items_base=frozenset({'ground beef', 'green tea'}),
items_add=frozenset({'tomatoes'}), confidence=0.2072072072072072,
lift=3.0297490472929067)]),
  RelationRecord(items=frozenset({'ground beef', 'herb & pepper', 'milk'}),
support=0.0035995200639914677,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'herb & pepper', 'milk'}), confidence=0.036635006784260515,
lift=3.982596896938234), OrderedStatistic(items_base=frozenset({'herb &
pepper'}), items_add=frozenset({'ground beef', 'milk'}),
confidence=0.07277628032345013, lift=3.3084538103406027),
OrderedStatistic(items_base=frozenset({'ground beef', 'milk'}),
items_add=frozenset({'herb & pepper'}), confidence=0.16363636363636364,
lift=3.3084538103406027), OrderedStatistic(items_base=frozenset({'herb &
pepper', 'milk'}), items_add=frozenset({'ground beef'}),
confidence=0.3913043478260869, lift=3.9825968969382335)]),
  RelationRecord(items=frozenset({'ground beef', 'mineral water', 'herb &
pepper'}), support=0.006665777896280496,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'herb & pepper', 'mineral water'}),
confidence=0.067842605156038, lift=3.9756826662143836),
OrderedStatistic(items_base=frozenset({'herb & pepper'}),
items_add=frozenset({'ground beef', 'mineral water'}),
confidence=0.1347708894878706, lift=3.292887433382793),
OrderedStatistic(items_base=frozenset({'ground beef', 'mineral water'}),
items_add=frozenset({'herb & pepper'}), confidence=0.16286644951140067,
lift=3.2928874333827935), OrderedStatistic(items_base=frozenset({'mineral
water', 'herb & pepper'}), items_add=frozenset({'ground beef'}),

```

```

confidence=0.39062500000000006, lift=3.975682666214383]]),
  RelationRecord(items=frozenset({'ground beef', 'herb & pepper', 'spaghetti'}),
support=0.006399146780429276,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'herb & pepper', 'spaghetti'}),
confidence=0.06512890094979648, lift=4.004359721511667),
OrderedStatistic(items_base=frozenset({'herb & pepper'}),
items_add=frozenset({'ground beef', 'spaghetti'}),
confidence=0.1293800539083558, lift=3.3009516475053635),
OrderedStatistic(items_base=frozenset({'ground beef', 'spaghetti'}),
items_add=frozenset({'herb & pepper'}), confidence=0.163265306122449,
lift=3.3009516475053635), OrderedStatistic(items_base=frozenset({'herb &
pepper', 'spaghetti'}), items_add=frozenset({'ground beef'}),
confidence=0.3934426229508197, lift=4.004359721511667)]),
  RelationRecord(items=frozenset({'ground beef', 'milk', 'olive oil'}),
support=0.004932675643247567,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'ground beef', 'milk'}), confidence=0.07489878542510121,
lift=3.4049441786283894), OrderedStatistic(items_base=frozenset({'ground beef',
'milk'}), items_add=frozenset({'olive oil'}), confidence=0.22424242424242427,
lift=3.40494417862839)]),
  RelationRecord(items=frozenset({'soup', 'ground beef', 'milk'}),
support=0.003999466737768298,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'soup', 'ground beef'}), confidence=0.030864197530864203,
lift=3.1714019956029094), OrderedStatistic(items_base=frozenset({'soup'}),
items_add=frozenset({'ground beef', 'milk'}), confidence=0.079155672823219,
lift=3.5984648596785807), OrderedStatistic(items_base=frozenset({'ground beef',
'milk'}), items_add=frozenset({'soup'}), confidence=0.18181818181818185,
lift=3.5984648596785807), OrderedStatistic(items_base=frozenset({'soup', 'ground
beef'}), items_add=frozenset({'milk'}), confidence=0.4109589041095891,
lift=3.1714019956029094)]),
  RelationRecord(items=frozenset({'ground beef', 'pepper', 'spaghetti'}),
support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'pepper', 'spaghetti'}), confidence=0.033921302578019,
lift=3.438428251861088), OrderedStatistic(items_base=frozenset({'pepper'}),
items_add=frozenset({'ground beef', 'spaghetti'}),
confidence=0.12562814070351758, lift=3.2052268143438276),
OrderedStatistic(items_base=frozenset({'ground beef', 'spaghetti'}),
items_add=frozenset({'pepper'}), confidence=0.08503401360544217,
lift=3.2052268143438276), OrderedStatistic(items_base=frozenset({'pepper',
'spaghetti'}), items_add=frozenset({'ground beef'}),
confidence=0.33783783783783783, lift=3.4384282518610876)]),
  RelationRecord(items=frozenset({'ground beef', 'shrimp', 'spaghetti'}),
support=0.005999200106652446,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'spaghetti'}),

```

```

items_add=frozenset({'ground beef', 'shrimp'}), confidence=0.03445635528330781,
lift=3.0053153602336264), OrderedStatistic(items_base=frozenset({'ground beef',
'shrimp'}), items_add=frozenset({'spaghetti'}), confidence=0.5232558139534884,
lift=3.005315360233627))),
RelationRecord(items=frozenset({'tomato sauce', 'ground beef', 'spaghetti'}),
support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'tomato sauce', 'spaghetti'}),
confidence=0.03120759837177748, lift=4.980599901844742),
OrderedStatistic(items_base=frozenset({'spaghetti'}),
items_add=frozenset({'tomato sauce', 'ground beef'}),
confidence=0.01761102603369066, lift=3.302507656967841),
OrderedStatistic(items_base=frozenset({'tomato sauce'}),
items_add=frozenset({'ground beef', 'spaghetti'}),
confidence=0.2169811320754717, lift=5.535970992170453),
OrderedStatistic(items_base=frozenset({'ground beef', 'spaghetti'}),
items_add=frozenset({'tomato sauce'}), confidence=0.0782312925170068,
lift=5.535970992170453), OrderedStatistic(items_base=frozenset({'tomato sauce',
'ground beef'}), items_add=frozenset({'spaghetti'}),
confidence=0.5750000000000001, lift=3.3025076569678413),
OrderedStatistic(items_base=frozenset({'tomato sauce', 'spaghetti'}),
items_add=frozenset({'ground beef'}), confidence=0.4893617021276596,
lift=4.980599901844742)]),
RelationRecord(items=frozenset({'mineral water', 'light cream', 'spaghetti'}),
support=0.003199573390214638,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'light cream'}),
items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.20512820512820515, lift=3.4345238095238098),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'light cream'}), confidence=0.053571428571428575,
lift=3.4345238095238098)]),
RelationRecord(items=frozenset({'soup', 'mineral water', 'milk'}),
support=0.008532195707239034,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'soup'}),
items_add=frozenset({'mineral water', 'milk'}), confidence=0.16886543535620052,
lift=3.518498973907945), OrderedStatistic(items_base=frozenset({'mineral water',
'milk'}), items_add=frozenset({'soup'}), confidence=0.17777777777777776,
lift=3.5184989739079446)]),
RelationRecord(items=frozenset({'shrimp', 'milk', 'olive oil'}),
support=0.003199573390214638,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'shrimp', 'olive oil'}), confidence=0.02469135802469136,
lift=3.0362274843149164), OrderedStatistic(items_base=frozenset({'shrimp',
'olive oil'}), items_add=frozenset({'milk'}), confidence=0.3934426229508197,
lift=3.0362274843149164)]),
RelationRecord(items=frozenset({'soup', 'milk', 'olive oil'}),
support=0.0035995200639914677,

```

```

ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'soup', 'olive oil'}), confidence=0.02777777777777778,
lift=3.1098673300165838), OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'soup', 'milk'}), confidence=0.054655870445344125,
lift=3.596260387811634), OrderedStatistic(items_base=frozenset({'soup'}),
items_add=frozenset({'milk', 'olive oil'}), confidence=0.07124010554089709,
lift=4.174781497361478), OrderedStatistic(items_base=frozenset({'milk', 'olive
oil'}), items_add=frozenset({'soup'}), confidence=0.2109375,
lift=4.174781497361478), OrderedStatistic(items_base=frozenset({'soup',
'milk'}), items_add=frozenset({'olive oil'}), confidence=0.23684210526315788,
lift=3.5962603878116344), OrderedStatistic(items_base=frozenset({'soup', 'olive
oil'}), items_add=frozenset({'milk'}), confidence=0.4029850746268656,
lift=3.1098673300165833)]),
RelationRecord(items=frozenset({'milk', 'olive oil', 'spaghetti'}),
support=0.007199040127982935,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'milk', 'spaghetti'}), confidence=0.10931174089068825,
lift=3.0825089038385434), OrderedStatistic(items_base=frozenset({'milk',
'spaghetti'}), items_add=frozenset({'olive oil'}),
confidence=0.20300751879699247, lift=3.0825089038385434)]),
RelationRecord(items=frozenset({'soup', 'tomatoes', 'milk'}),
support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'soup', 'tomatoes'}), confidence=0.02366255144032922,
lift=3.4133230452674903), OrderedStatistic(items_base=frozenset({'soup'}),
items_add=frozenset({'tomatoes', 'milk'}), confidence=0.06068601583113457,
lift=4.335293378565146), OrderedStatistic(items_base=frozenset({'tomatoes',
'milk'}), items_add=frozenset({'soup'}), confidence=0.21904761904761905,
lift=4.335293378565146), OrderedStatistic(items_base=frozenset({'soup',
'tomatoes'}), items_add=frozenset({'milk'}), confidence=0.44230769230769235,
lift=3.4133230452674903)]),
RelationRecord(items=frozenset({'whole wheat pasta', 'milk', 'spaghetti'}),
support=0.003999466737768298,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'whole wheat pasta', 'spaghetti'}),
confidence=0.030864197530864203, lift=3.5077628133183696),
OrderedStatistic(items_base=frozenset({'whole wheat pasta'}),
items_add=frozenset({'milk', 'spaghetti'}), confidence=0.13574660633484165,
lift=3.8279522335249894), OrderedStatistic(items_base=frozenset({'milk',
'spaghetti'}), items_add=frozenset({'whole wheat pasta'}),
confidence=0.11278195488721805, lift=3.827952233524989),
OrderedStatistic(items_base=frozenset({'whole wheat pasta', 'spaghetti'}),
items_add=frozenset({'milk'}), confidence=0.4545454545454546,
lift=3.5077628133183696)]),
RelationRecord(items=frozenset({'soup', 'mineral water', 'olive oil'}),
support=0.005199306759098787,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),

```

```

items_add=frozenset({'soup', 'mineral water'}), confidence=0.07894736842105264,
lift=3.423030118649225), OrderedStatistic(items_base=frozenset({'soup'}),
items_add=frozenset({'mineral water', 'olive oil'}),
confidence=0.1029023746701847, lift=3.7288440212611373),
OrderedStatistic(items_base=frozenset({'mineral water', 'olive oil'}),
items_add=frozenset({'soup'}), confidence=0.18840579710144928,
lift=3.7288440212611373), OrderedStatistic(items_base=frozenset({'soup',
'mineral water'}), items_add=frozenset({'olive oil'}),
confidence=0.22543352601156072, lift=3.4230301186492245)]),
RelationRecord(items=frozenset({'whole wheat pasta', 'mineral water', 'olive
oil'}), support=0.0038661511798426876,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'whole wheat pasta', 'mineral water'}),
confidence=0.058704453441295545, lift=6.115862573099415),
OrderedStatistic(items_base=frozenset({'whole wheat pasta'}),
items_add=frozenset({'mineral water', 'olive oil'}),
confidence=0.13122171945701358, lift=4.755044046604149),
OrderedStatistic(items_base=frozenset({'mineral water', 'olive oil'}),
items_add=frozenset({'whole wheat pasta'}), confidence=0.1400966183574879,
lift=4.755044046604148), OrderedStatistic(items_base=frozenset({'whole wheat
pasta', 'mineral water'}), items_add=frozenset({'olive oil'}),
confidence=0.4027777777777778, lift=6.115862573099416)]),
RelationRecord(items=frozenset({'soup', 'tomatoes', 'mineral water'}),
support=0.0037328356219170776,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'soup'}),
items_add=frozenset({'tomatoes', 'mineral water'}),
confidence=0.07387862796833773, lift=3.0282163300027394),
OrderedStatistic(items_base=frozenset({'tomatoes', 'mineral water'}),
items_add=frozenset({'soup'}), confidence=0.15300546448087432,
lift=3.0282163300027394)]),
RelationRecord(items=frozenset({'pancakes', 'olive oil', 'spaghetti'}),
support=0.005065991201173177,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'pancakes', 'spaghetti'}), confidence=0.07692307692307693,
lift=3.052910052910053), OrderedStatistic(items_base=frozenset({'pancakes',
'spaghetti'}), items_add=frozenset({'olive oil'}),
confidence=0.20105820105820105, lift=3.0529100529100526)]),
RelationRecord(items=frozenset({'tomatoes', 'olive oil', 'spaghetti'}),
support=0.004399413411545127,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'tomatoes', 'spaghetti'}), confidence=0.06680161943319839,
lift=3.1915856520281602), OrderedStatistic(items_base=frozenset({'spaghetti'}),
items_add=frozenset({'tomatoes', 'olive oil'}), confidence=0.02526799387442573,
lift=3.5099115194827295), OrderedStatistic(items_base=frozenset({'tomatoes',
'olive oil'}), items_add=frozenset({'spaghetti'}),
confidence=0.6111111111111112, lift=3.5099115194827295),
OrderedStatistic(items_base=frozenset({'tomatoes', 'spaghetti'}),

```



```

items_add=frozenset({'olive oil'}), confidence=0.21019108280254778,
lift=3.19158565202816))],
RelationRecord(items=frozenset({'tomatoes', 'whole wheat rice', 'spaghetti'}),
support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'tomatoes'}),
items_add=frozenset({'whole wheat rice', 'spaghetti'}),
confidence=0.04483430799220273, lift=3.1726617382029496),
OrderedStatistic(items_base=frozenset({'whole wheat rice', 'spaghetti'}),
items_add=frozenset({'tomatoes'}), confidence=0.2169811320754717,
lift=3.1726617382029496)]),
RelationRecord(items=frozenset({'chocolate', 'ground beef', 'mineral water',
'eggs'}), support=0.003999466737768298,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'chocolate', 'mineral water', 'eggs'}),
confidence=0.0407055630936228, lift=3.023093354111531),
OrderedStatistic(items_base=frozenset({'chocolate', 'ground beef'}),
items_add=frozenset({'mineral water', 'eggs'}), confidence=0.17341040462427748,
lift=3.4051084949913752), OrderedStatistic(items_base=frozenset({'chocolate',
'mineral water'}), items_add=frozenset({'ground beef', 'eggs'}),
confidence=0.0759493670886076, lift=3.7979746835443042),
OrderedStatistic(items_base=frozenset({'ground beef', 'eggs'}),
items_add=frozenset({'chocolate', 'mineral water'}),
confidence=0.20000000000000004, lift=3.7979746835443047),
OrderedStatistic(items_base=frozenset({'mineral water', 'eggs'}),
items_add=frozenset({'chocolate', 'ground beef'}),
confidence=0.07853403141361257, lift=3.405108494991375),
OrderedStatistic(items_base=frozenset({'chocolate', 'mineral water', 'eggs'}),
items_add=frozenset({'ground beef'}), confidence=0.29702970297029707,
lift=3.023093354111531)]),
RelationRecord(items=frozenset({'chocolate', 'ground beef', 'eggs',
'spaghetti'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'chocolate', 'ground
beef'}), items_add=frozenset({'eggs', 'spaghetti'}),
confidence=0.13294797687861273, lift=3.6395721699506356),
OrderedStatistic(items_base=frozenset({'chocolate', 'spaghetti'}),
items_add=frozenset({'ground beef', 'eggs'}), confidence=0.0782312925170068,
lift=3.912086167800454), OrderedStatistic(items_base=frozenset({'ground beef',
'eggs'}), items_add=frozenset({'chocolate', 'spaghetti'}),
confidence=0.15333333333333335, lift=3.912086167800454),
OrderedStatistic(items_base=frozenset({'eggs', 'spaghetti'}),
items_add=frozenset({'chocolate', 'ground beef'}),
confidence=0.08394160583941607, lift=3.6395721699506356)]),
RelationRecord(items=frozenset({'chocolate', 'frozen vegetables', 'mineral
water', 'ground beef'}), support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'chocolate', 'ground beef', 'mineral
water'}), confidence=0.03496503496503497, lift=3.1984478935698455),

```

```

OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'chocolate', 'frozen vegetables', 'mineral water'}),
confidence=0.033921302578019, lift=3.4855300087358976),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables'}),
items_add=frozenset({'ground beef', 'mineral water'}),
confidence=0.14534883720930233, lift=3.5513408075145825),
OrderedStatistic(items_base=frozenset({'chocolate', 'ground beef'}),
items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.14450867052023122, lift=4.044625140194979),
OrderedStatistic(items_base=frozenset({'chocolate', 'mineral water'}),
items_add=frozenset({'ground beef', 'frozen vegetables'}),
confidence=0.06329113924050633, lift=3.738164058606598),
OrderedStatistic(items_base=frozenset({'ground beef', 'frozen vegetables'}),
items_add=frozenset({'chocolate', 'mineral water'}),
confidence=0.19685039370078738, lift=3.738164058606598),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water'}),
items_add=frozenset({'chocolate', 'ground beef'}),
confidence=0.09328358208955223, lift=4.044625140194979),
OrderedStatistic(items_base=frozenset({'ground beef', 'mineral water'}),
items_add=frozenset({'chocolate', 'frozen vegetables'}),
confidence=0.08143322475570033, lift=3.551340807514583),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables',
'mineral water'}), items_add=frozenset({'ground beef'}),
confidence=0.34246575342465757, lift=3.4855300087358976),
OrderedStatistic(items_base=frozenset({'chocolate', 'ground beef', 'mineral
water'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.30487804878048785, lift=3.1984478935698455)]),
RelationRecord(items=frozenset({'chocolate', 'frozen vegetables', 'spaghetti',
'ground beef'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'chocolate', 'ground beef', 'spaghetti'}),
confidence=0.03216783216783217, lift=3.4969696969696975),
OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'chocolate', 'frozen vegetables', 'spaghetti'}),
confidence=0.03120759837177748, lift=3.967596531978015),
OrderedStatistic(items_base=frozenset({'spaghetti'}),
items_add=frozenset({'chocolate', 'frozen vegetables', 'ground beef'}),
confidence=0.01761102603369066, lift=3.0721001460165964),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables'}),
items_add=frozenset({'ground beef', 'spaghetti'}),
confidence=0.13372093023255816, lift=3.411703053314349),
OrderedStatistic(items_base=frozenset({'chocolate', 'ground beef'}),
items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.13294797687861273, lift=4.771496529026192),
OrderedStatistic(items_base=frozenset({'chocolate', 'spaghetti'}),
items_add=frozenset({'ground beef', 'frozen vegetables'}),
confidence=0.0782312925170068, lift=4.620574213937544),

```

```

OrderedStatistic(items_base=frozenset({'ground beef', 'frozen vegetables'}),
items_add=frozenset({'chocolate', 'spaghetti'}), confidence=0.1811023622047244,
lift=4.620574213937543), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'spaghetti'}), items_add=frozenset({'chocolate', 'ground beef'}),
confidence=0.11004784688995216, lift=4.771496529026192),
OrderedStatistic(items_base=frozenset({'ground beef', 'spaghetti'}),
items_add=frozenset({'chocolate', 'frozen vegetables'}),
confidence=0.0782312925170068, lift=3.4117030533143495),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables', 'ground
beef'}), items_add=frozenset({'spaghetti'}), confidence=0.5348837209302326,
lift=3.0721001460165964), OrderedStatistic(items_base=frozenset({'chocolate',
'frozen vegetables', 'spaghetti'}), items_add=frozenset({'ground beef'}),
confidence=0.3898305084745763, lift=3.967596531978015),
OrderedStatistic(items_base=frozenset({'chocolate', 'ground beef',
'spaghetti'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.3333333333333337, lift=3.4969696969696975)]),
RelationRecord(items=frozenset({'chocolate', 'frozen vegetables', 'mineral
water', 'milk'}), support=0.003999466737768298,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'chocolate', 'frozen vegetables', 'mineral water'}),
confidence=0.030864197530864203, lift=3.1714019956029094),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables'}),
items_add=frozenset({'mineral water', 'milk'}), confidence=0.17441860465116282,
lift=3.63420542635659), OrderedStatistic(items_base=frozenset({'chocolate',
'milk'}), items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.1244813278008299, lift=3.4840837307239743),
OrderedStatistic(items_base=frozenset({'chocolate', 'mineral water'}),
items_add=frozenset({'frozen vegetables', 'milk'}),
confidence=0.0759493670886076, lift=3.218622613173139),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'milk'}),
items_add=frozenset({'chocolate', 'mineral water'}),
confidence=0.16949152542372883, lift=3.2186226131731392),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water'}),
items_add=frozenset({'chocolate', 'milk'}), confidence=0.11194029850746269,
lift=3.484083730723974), OrderedStatistic(items_base=frozenset({'mineral water',
'milk'}), items_add=frozenset({'chocolate', 'frozen vegetables'}),
confidence=0.08333333333333334, lift=3.6342054263565897),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables',
'mineral water'}), items_add=frozenset({'milk'}), confidence=0.4109589041095891,
lift=3.1714019956029094)]),
RelationRecord(items=frozenset({'chocolate', 'frozen vegetables', 'milk',
'spaghetti'}), support=0.0034662045060658577,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'chocolate', 'milk', 'spaghetti'}),
confidence=0.03636363636363636, lift=3.326385809312639),
OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'chocolate', 'frozen vegetables', 'spaghetti'}),

```

```

confidence=0.026748971193415638, lift=3.400746320708656),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables'}),
items_add=frozenset({'milk', 'spaghetti'}), confidence=0.1511627906976744,
lift=4.262677041440811), OrderedStatistic(items_base=frozenset({'chocolate',
'milk'}), items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.1078838174273859, lift=3.87194504556374),
OrderedStatistic(items_base=frozenset({'chocolate', 'spaghetti'}),
items_add=frozenset({'frozen vegetables', 'milk'}),
confidence=0.08843537414965985, lift=3.747761251393212),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'milk'}),
items_add=frozenset({'chocolate', 'spaghetti'}), confidence=0.14689265536723162,
lift=3.747761251393212), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'spaghetti'}), items_add=frozenset({'chocolate', 'milk'}),
confidence=0.12440191387559808, lift=3.87194504556374),
OrderedStatistic(items_base=frozenset({'milk', 'spaghetti'}),
items_add=frozenset({'chocolate', 'frozen vegetables'}),
confidence=0.09774436090225563, lift=4.262677041440812),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables',
'spaghetti'}), items_add=frozenset({'milk'}), confidence=0.44067796610169485,
lift=3.4007463207086555), OrderedStatistic(items_base=frozenset({'chocolate',
'milk', 'spaghetti'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.3170731707317073, lift=3.3263858093126384)]),
RelationRecord(items=frozenset({'chocolate', 'frozen vegetables', 'mineral
water', 'shrimp'}), support=0.003199573390214638,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'chocolate', 'mineral water', 'shrimp'}),
confidence=0.033566433566433566, lift=4.417224880382775),
OrderedStatistic(items_base=frozenset({'shrimp'}),
items_add=frozenset({'chocolate', 'frozen vegetables', 'mineral water'}),
confidence=0.04477611940298507, lift=4.600899611531384),
OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables'}),
items_add=frozenset({'mineral water', 'shrimp'}),
confidence=0.13953488372093026, lift=5.913283405597163),
OrderedStatistic(items_base=frozenset({'chocolate', 'mineral water'}),
items_add=frozenset({'frozen vegetables', 'shrimp'}),
confidence=0.06075949367088608, lift=3.6460556962025317),
OrderedStatistic(items_base=frozenset({'chocolate', 'shrimp'}),
items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.17777777777777778, lift=4.975787728026535),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water'}),
items_add=frozenset({'chocolate', 'shrimp'}), confidence=0.08955223880597014,
lift=4.975787728026535), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'shrimp'}), items_add=frozenset({'chocolate', 'mineral water'}),
confidence=0.192, lift=3.6460556962025317),
OrderedStatistic(items_base=frozenset({'mineral water', 'shrimp'}),
items_add=frozenset({'chocolate', 'frozen vegetables'}),
confidence=0.13559322033898305, lift=5.913283405597162),

```

```

OrderedStatistic(items_base=frozenset({'chocolate', 'frozen vegetables',
'mineral water'}), items_add=frozenset({'shrimp'}),
confidence=0.32876712328767127, lift=4.600899611531385),
OrderedStatistic(items_base=frozenset({'chocolate', 'mineral water', 'shrimp'}),
items_add=frozenset({'frozen vegetables'}), confidence=0.4210526315789474,
lift=4.417224880382776))),
RelationRecord(items=frozenset({'chocolate', 'frozen vegetables', 'mineral
water', 'spaghetti'}), support=0.0041327822956939075,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'chocolate', 'frozen
vegetables'}), items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.1802325581395349, lift=3.0176884343853825),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'chocolate', 'frozen vegetables'}),
confidence=0.06919642857142858, lift=3.0176884343853825)]),
RelationRecord(items=frozenset({'chocolate', 'ground beef', 'mineral water',
'milk'}), support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'chocolate', 'ground
beef'}), items_add=frozenset({'mineral water', 'milk'}),
confidence=0.14450867052023122, lift=3.0109987154784847),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'chocolate', 'ground beef'}),
confidence=0.06944444444444445, lift=3.0109987154784843)]),
RelationRecord(items=frozenset({'chocolate', 'mineral water', 'olive oil',
'spaghetti'}), support=0.0038661511798426876,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'chocolate', 'mineral water', 'spaghetti'}),
confidence=0.058704453441295545, lift=3.700353825740822),
OrderedStatistic(items_base=frozenset({'chocolate', 'mineral water'}),
items_add=frozenset({'olive oil', 'spaghetti'}), confidence=0.07341772151898734,
lift=3.201780983220489), OrderedStatistic(items_base=frozenset({'chocolate',
'olive oil'}), items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.23577235772357724, lift=3.947608159117306),
OrderedStatistic(items_base=frozenset({'chocolate', 'spaghetti'}),
items_add=frozenset({'mineral water', 'olive oil'}),
confidence=0.09863945578231292, lift=3.5743698445561796),
OrderedStatistic(items_base=frozenset({'mineral water', 'olive oil'}),
items_add=frozenset({'chocolate', 'spaghetti'}), confidence=0.1400966183574879,
lift=3.5743698445561796), OrderedStatistic(items_base=frozenset({'mineral
water', 'spaghetti'}), items_add=frozenset({'chocolate', 'olive oil'}),
confidence=0.06473214285714286, lift=3.947608159117306),
OrderedStatistic(items_base=frozenset({'olive oil', 'spaghetti'}),
items_add=frozenset({'chocolate', 'mineral water'}),
confidence=0.1686046511627907, lift=3.2017809832204884),
OrderedStatistic(items_base=frozenset({'chocolate', 'mineral water',
'spaghetti'}), items_add=frozenset({'olive oil'}),
confidence=0.2436974789915966, lift=3.700353825740822)]),
RelationRecord(items=frozenset({'chocolate', 'mineral water', 'pancakes',

```

```

'spaghetti'}), support=0.0037328356219170776,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'chocolate',
'pancakes'}), items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.1879194630872483, lift=3.1463926174496644),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'chocolate', 'pancakes'}), confidence=0.0625,
lift=3.1463926174496644)]),
RelationRecord(items=frozenset({'chocolate', 'mineral water', 'shrimp',
'spaghetti'}), support=0.0034662045060658577,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'shrimp'}),
items_add=frozenset({'chocolate', 'mineral water', 'spaghetti'}),
confidence=0.04850746268656716, lift=3.0576006522011783),
OrderedStatistic(items_base=frozenset({'chocolate', 'mineral water'}),
items_add=frozenset({'shrimp', 'spaghetti'}), confidence=0.06582278481012657,
lift=3.10526231987899), OrderedStatistic(items_base=frozenset({'chocolate',
'shrimp'}), items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.1925925925925926, lift=3.2246362433862434),
OrderedStatistic(items_base=frozenset({'chocolate', 'spaghetti'}),
items_add=frozenset({'mineral water', 'shrimp'}),
confidence=0.08843537414965985, lift=3.747761251393212),
OrderedStatistic(items_base=frozenset({'mineral water', 'shrimp'}),
items_add=frozenset({'chocolate', 'spaghetti'}), confidence=0.14689265536723162,
lift=3.747761251393212), OrderedStatistic(items_base=frozenset({'mineral water',
'spaghetti'}), items_add=frozenset({'chocolate', 'shrimp'}),
confidence=0.05803571428571428, lift=3.2246362433862434),
OrderedStatistic(items_base=frozenset({'shrimp', 'spaghetti'}),
items_add=frozenset({'chocolate', 'mineral water'}),
confidence=0.16352201257861634, lift=3.10526231987899),
OrderedStatistic(items_base=frozenset({'chocolate', 'mineral water',
'spaghetti'}), items_add=frozenset({'shrimp'}), confidence=0.21848739495798317,
lift=3.0576006522011783)]),
RelationRecord(items=frozenset({'milk', 'frozen vegetables', 'mineral water',
'eggs'}), support=0.0037328356219170776,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'milk'}),
items_add=frozenset({'frozen vegetables', 'mineral water', 'eggs'}),
confidence=0.02880658436213992, lift=3.177620430888405),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'eggs'}),
items_add=frozenset({'mineral water', 'milk'}), confidence=0.17177914110429446,
lift=3.5792092706203134), OrderedStatistic(items_base=frozenset({'milk',
'eggs'}), items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.12121212121212122, lift=3.392582541836273),
OrderedStatistic(items_base=frozenset({'mineral water', 'eggs'}),
items_add=frozenset({'frozen vegetables', 'milk'}),
confidence=0.07329842931937172, lift=3.106279764545804),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'milk'}),
items_add=frozenset({'mineral water', 'eggs'}), confidence=0.1581920903954802,
lift=3.106279764545804), OrderedStatistic(items_base=frozenset({'frozen

```

```

vegetables', 'mineral water'})), items_add=frozenset({'eggs', 'milk'}),
confidence=0.10447761194029849, lift=3.3925825418362727),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'frozen vegetables', 'eggs'}),
confidence=0.07777777777777778, lift=3.5792092706203134),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water',
'eggs'}), items_add=frozenset({'milk'}), confidence=0.411764705882353,
lift=3.177620430888405))),
RelationRecord(items=frozenset({'milk', 'ground beef', 'mineral water',
'eggs'}), support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef',
'eggs'}), items_add=frozenset({'mineral water', 'milk'}),
confidence=0.16666666666666669, lift=3.4726851851851857),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'ground beef', 'eggs'}), confidence=0.06944444444444445,
lift=3.4726851851851857)]),
RelationRecord(items=frozenset({'ground beef', 'mineral water', 'eggs',
'spaghetti'}), support=0.0038661511798426876,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef',
'eggs'}), items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.19333333333333336, lift=3.237038690476191),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'ground beef', 'eggs'}), confidence=0.06473214285714286,
lift=3.237038690476191)]),
RelationRecord(items=frozenset({'frozen smoothie', 'mineral water', 'milk',
'spaghetti'}), support=0.003199573390214638,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen smoothie'}),
items_add=frozenset({'mineral water', 'milk', 'spaghetti'}),
confidence=0.05052631578947369, lift=3.2118465655664585),
OrderedStatistic(items_base=frozenset({'milk'}), items_add=frozenset({'frozen
smoothie', 'mineral water', 'spaghetti'}), confidence=0.02469135802469136,
lift=3.6315662067296057), OrderedStatistic(items_base=frozenset({'frozen
smoothie', 'milk'}), items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.22429906542056074, lift=3.7555073431241657),
OrderedStatistic(items_base=frozenset({'frozen smoothie', 'mineral water'}),
items_add=frozenset({'milk', 'spaghetti'}), confidence=0.15789473684210528,
lift=4.452512861100119), OrderedStatistic(items_base=frozenset({'frozen
smoothie', 'spaghetti'}), items_add=frozenset({'mineral water', 'milk'}),
confidence=0.20512820512820515, lift=4.274074074074075),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'frozen smoothie', 'spaghetti'}),
confidence=0.06666666666666668, lift=4.274074074074075),
OrderedStatistic(items_base=frozenset({'milk', 'spaghetti'}),
items_add=frozenset({'frozen smoothie', 'mineral water'}),
confidence=0.09022556390977443, lift=4.452512861100119),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'frozen smoothie', 'milk'}),

```

```

confidence=0.053571428571428575, lift=3.7555073431241657),
OrderedStatistic(items_base=frozenset({'frozen smoothie', 'mineral water',
'spaghetti'}), items_add=frozenset({'milk'}), confidence=0.4705882352941177,
lift=3.631566206729606), OrderedStatistic(items_base=frozenset({'mineral water',
'milk', 'spaghetti'}), items_add=frozenset({'frozen smoothie'}),
confidence=0.2033898305084746, lift=3.211846565566459)]),
RelationRecord(items=frozenset({'ground beef', 'frozen vegetables', 'mineral
water', 'milk'}), support=0.0037328356219170776,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'ground beef', 'mineral water', 'milk'}),
confidence=0.03916083916083916, lift=3.5391018619934282),
OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'frozen vegetables', 'mineral water', 'milk'}),
confidence=0.037991858887381276, lift=3.433457030292132),
OrderedStatistic(items_base=frozenset({'milk'}), items_add=frozenset({'ground
beef', 'frozen vegetables', 'mineral water'}), confidence=0.02880658436213992,
lift=3.1315679608755294), OrderedStatistic(items_base=frozenset({'ground beef',
'frozen vegetables'}), items_add=frozenset({'mineral water', 'milk'}),
confidence=0.22047244094488186, lift=4.593788276465442),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'milk'}),
items_add=frozenset({'ground beef', 'mineral water'}),
confidence=0.1581920903954802, lift=3.865142899206831),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water'}),
items_add=frozenset({'ground beef', 'milk'}), confidence=0.10447761194029849,
lift=4.749615558570782), OrderedStatistic(items_base=frozenset({'ground beef',
'milk'}), items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.1696969696969697, lift=4.749615558570782),
OrderedStatistic(items_base=frozenset({'ground beef', 'mineral water'}),
items_add=frozenset({'frozen vegetables', 'milk'}),
confidence=0.09120521172638436, lift=3.865142899206831),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'ground beef', 'frozen vegetables'}),
confidence=0.07777777777777778, lift=4.593788276465442),
OrderedStatistic(items_base=frozenset({'ground beef', 'frozen vegetables',
'mineral water'}), items_add=frozenset({'milk'}),
confidence=0.40579710144927533, lift=3.1315679608755294),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water',
'milk'}), items_add=frozenset({'ground beef'}), confidence=0.3373493975903614,
lift=3.4334570302921317), OrderedStatistic(items_base=frozenset({'ground beef',
'mineral water', 'milk'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.3373493975903614, lift=3.539101861993428)]),
RelationRecord(items=frozenset({'ground beef', 'frozen vegetables', 'milk',
'spaghetti'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'ground beef', 'milk', 'spaghetti'}),
confidence=0.03216783216783217, lift=3.3053549190535496),
OrderedStatistic(items_base=frozenset({'ground beef'}),

```



```

items_add=frozenset({'frozen vegetables', 'milk', 'spaghetti'}),
confidence=0.03120759837177748, lift=3.77561605462424),
OrderedStatistic(items_base=frozenset({'spaghetti'}),
items_add=frozenset({'ground beef', 'frozen vegetables', 'milk'}),
confidence=0.01761102603369066, lift=3.0721001460165964),
OrderedStatistic(items_base=frozenset({'ground beef', 'frozen vegetables'}),
items_add=frozenset({'milk', 'spaghetti'}), confidence=0.1811023622047244,
lift=5.1069504469836), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'milk'}), items_add=frozenset({'ground beef', 'spaghetti'}),
confidence=0.12994350282485875, lift=3.315327260847842),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'spaghetti'}),
items_add=frozenset({'ground beef', 'milk'}), confidence=0.11004784688995216,
lift=5.002841815282007), OrderedStatistic(items_base=frozenset({'ground beef',
'milk'}), items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.1393939393939394, lift=5.002841815282007),
OrderedStatistic(items_base=frozenset({'ground beef', 'spaghetti'}),
items_add=frozenset({'frozen vegetables', 'milk'}),
confidence=0.0782312925170068, lift=3.315327260847842),
OrderedStatistic(items_base=frozenset({'milk', 'spaghetti'}),
items_add=frozenset({'ground beef', 'frozen vegetables'}),
confidence=0.08646616541353383, lift=5.1069504469836),
OrderedStatistic(items_base=frozenset({'ground beef', 'frozen vegetables',
'milk'}), items_add=frozenset({'spaghetti'}), confidence=0.5348837209302326,
lift=3.0721001460165964), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'milk', 'spaghetti'}), items_add=frozenset({'ground beef'}),
confidence=0.3709677419354839, lift=3.7756160546242397),
OrderedStatistic(items_base=frozenset({'ground beef', 'milk', 'spaghetti'}),
items_add=frozenset({'frozen vegetables'}), confidence=0.3150684931506849,
lift=3.305354919053549)]),
RelationRecord(items=frozenset({'ground beef', 'frozen vegetables', 'mineral
water', 'spaghetti'}), support=0.004399413411545127,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'frozen vegetables', 'mineral water', 'spaghetti'}),
confidence=0.04477611940298508, lift=3.731840796019901),
OrderedStatistic(items_base=frozenset({'ground beef', 'frozen vegetables'}),
items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.25984251968503935, lift=4.350622187851519),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water'}),
items_add=frozenset({'ground beef', 'spaghetti'}),
confidence=0.12313432835820895, lift=3.1416006701187937),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'spaghetti'}),
items_add=frozenset({'ground beef', 'mineral water'}),
confidence=0.15789473684210528, lift=3.857877593005315),
OrderedStatistic(items_base=frozenset({'ground beef', 'mineral water'}),
items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.10749185667752444, lift=3.857877593005315),
OrderedStatistic(items_base=frozenset({'ground beef', 'spaghetti'}),

```

```

items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.11224489795918367, lift=3.1416006701187937),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'ground beef', 'frozen vegetables'}),
confidence=0.07366071428571429, lift=4.350622187851518),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water',
'spaghetti'}), items_add=frozenset({'ground beef'}),
confidence=0.3666666666666667, lift=3.7318407960199007)]),
RelationRecord(items=frozenset({'frozen vegetables', 'mineral water', 'milk',
'olive oil'}), support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'mineral water', 'milk', 'olive oil'}),
confidence=0.03496503496503497, lift=4.098011363636364),
OrderedStatistic(items_base=frozenset({'milk'}), items_add=frozenset({'frozen
vegetables', 'mineral water', 'olive oil'}), confidence=0.025720164609053502,
lift=3.9372847904593944), OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'frozen vegetables', 'mineral water', 'milk'}),
confidence=0.05060728744939272, lift=4.573557387444516),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'milk'}),
items_add=frozenset({'mineral water', 'olive oil'}),
confidence=0.14124293785310735, lift=5.118180081334097),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water'}),
items_add=frozenset({'milk', 'olive oil'}), confidence=0.09328358208955223,
lift=5.4665636660447765), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'olive oil'}), items_add=frozenset({'mineral water', 'milk'}),
confidence=0.29411764705882354, lift=6.12826797385621),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'frozen vegetables', 'olive oil'}),
confidence=0.06944444444444445, lift=6.128267973856209),
OrderedStatistic(items_base=frozenset({'milk', 'olive oil'}),
items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.19531250000000003, lift=5.4665636660447765),
OrderedStatistic(items_base=frozenset({'mineral water', 'olive oil'}),
items_add=frozenset({'frozen vegetables', 'milk'}),
confidence=0.12077294685990338, lift=5.118180081334097),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water',
'milk'}), items_add=frozenset({'olive oil'}), confidence=0.30120481927710846,
lift=4.573557387444516), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'mineral water', 'olive oil'}), items_add=frozenset({'milk'}),
confidence=0.5102040816326531, lift=3.937284790459394),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk', 'olive oil'}),
items_add=frozenset({'frozen vegetables'}), confidence=0.39062500000000006,
lift=4.098011363636364)]),
RelationRecord(items=frozenset({'soup', 'frozen vegetables', 'mineral water',
'milk'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'soup', 'mineral water', 'milk'}),

```

```

confidence=0.03216783216783217, lift=3.7701704545454553),
OrderedStatistic(items_base=frozenset({'milk'}), items_add=frozenset({'soup',
'frozen vegetables', 'mineral water'}), confidence=0.02366255144032922,
lift=4.670863114576566), OrderedStatistic(items_base=frozenset({'mineral
water'}), items_add=frozenset({'soup', 'frozen vegetables', 'milk'}),
confidence=0.012863534675615214, lift=3.2163124533929905),
OrderedStatistic(items_base=frozenset({'soup'}), items_add=frozenset({'frozen
vegetables', 'mineral water', 'milk'}), confidence=0.06068601583113457,
lift=5.484407286136632), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'milk'}), items_add=frozenset({'soup', 'mineral water'}),
confidence=0.12994350282485875, lift=5.634139969302113),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water'}),
items_add=frozenset({'soup', 'milk'}), confidence=0.08582089552238806,
lift=5.646864362398533), OrderedStatistic(items_base=frozenset({'soup', 'frozen
vegetables'}), items_add=frozenset({'mineral water', 'milk'}),
confidence=0.3833333333333333, lift=7.987175925925926),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'soup', 'frozen vegetables'}),
confidence=0.06388888888888889, lift=7.987175925925926),
OrderedStatistic(items_base=frozenset({'soup', 'milk'}),
items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.20175438596491227, lift=5.646864362398533),
OrderedStatistic(items_base=frozenset({'soup', 'mineral water'}),
items_add=frozenset({'frozen vegetables', 'milk'}),
confidence=0.13294797687861273, lift=5.6341399693021135),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water',
'milk'}), items_add=frozenset({'soup'}), confidence=0.27710843373493976,
lift=5.484407286136631), OrderedStatistic(items_base=frozenset({'soup', 'frozen
vegetables', 'milk'}), items_add=frozenset({'mineral water'}),
confidence=0.7666666666666666, lift=3.21631245339299),
OrderedStatistic(items_base=frozenset({'soup', 'frozen vegetables', 'mineral
water'}), items_add=frozenset({'milk'}), confidence=0.6052631578947368,
lift=4.670863114576565), OrderedStatistic(items_base=frozenset({'soup', 'mineral
water', 'milk'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.35937500000000006, lift=3.7701704545454553)]),
RelationRecord(items=frozenset({'frozen vegetables', 'mineral water', 'milk',
'spaghetti'}), support=0.004532728969470737,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'mineral water', 'milk', 'spaghetti'}),
confidence=0.04755244755244755, lift=3.0228043143297376),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'milk'}),
items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.19209039548022597, lift=3.216227804681194),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water'}),
items_add=frozenset({'milk', 'spaghetti'}), confidence=0.12686567164179102,
lift=3.5775165525754677), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'spaghetti'}), items_add=frozenset({'mineral water', 'milk'}),

```

```

confidence=0.16267942583732056, lift=3.389606592238171),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.09444444444444444, lift=3.389606592238171),
OrderedStatistic(items_base=frozenset({'milk', 'spaghetti'}),
items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.12781954887218044, lift=3.577516552575468),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'frozen vegetables', 'milk'}),
confidence=0.07589285714285714, lift=3.216227804681194),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk', 'spaghetti'}),
items_add=frozenset({'frozen vegetables'}), confidence=0.28813559322033894,
lift=3.0228043143297376)]),
RelationRecord(items=frozenset({'frozen vegetables', 'mineral water', 'shrimp',
'spaghetti'}), support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'mineral water', 'shrimp', 'spaghetti'}),
confidence=0.03496503496503497, lift=4.098011363636364),
OrderedStatistic(items_base=frozenset({'shrimp'}), items_add=frozenset({'frozen
vegetables', 'mineral water', 'spaghetti'}), confidence=0.046641791044776115,
lift=3.8873341625207294), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'mineral water'}), items_add=frozenset({'shrimp', 'spaghetti'}),
confidence=0.09328358208955223, lift=4.400755655683844),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'shrimp'}),
items_add=frozenset({'mineral water', 'spaghetti'}), confidence=0.2,
lift=3.3486607142857148), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'spaghetti'}), items_add=frozenset({'mineral water', 'shrimp'}),
confidence=0.11961722488038279, lift=5.069202281512719),
OrderedStatistic(items_base=frozenset({'mineral water', 'shrimp'}),
items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.14124293785310735, lift=5.069202281512719),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'frozen vegetables', 'shrimp'}),
confidence=0.05580357142857143, lift=3.3486607142857143),
OrderedStatistic(items_base=frozenset({'shrimp', 'spaghetti'}),
items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.15723270440251574, lift=4.400755655683845),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water',
'spaghetti'}), items_add=frozenset({'shrimp'}), confidence=0.2777777777777778,
lift=3.8873341625207294), OrderedStatistic(items_base=frozenset({'mineral
water', 'shrimp', 'spaghetti'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.39062500000000006, lift=4.098011363636364)]),
RelationRecord(items=frozenset({'tomatoes', 'frozen vegetables', 'mineral
water', 'spaghetti'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'frozen
vegetables'}), items_add=frozenset({'tomatoes', 'mineral water', 'spaghetti'}),
confidence=0.03216783216783217, lift=3.4470129870129873),

```

```

OrderedStatistic(items_base=frozenset({'spaghetti'}),
items_add=frozenset({'tomatoes', 'mineral water', 'frozen vegetables'}),
confidence=0.01761102603369066, lift=3.0022796881525826),
OrderedStatistic(items_base=frozenset({'tomatoes'}),
items_add=frozenset({'frozen vegetables', 'mineral water', 'spaghetti'}),
confidence=0.04483430799220273, lift=3.736690491661252),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water'}),
items_add=frozenset({'tomatoes', 'spaghetti'}), confidence=0.08582089552238806,
lift=4.1002709383021205), OrderedStatistic(items_base=frozenset({'frozen
vegetables', 'spaghetti'}), items_add=frozenset({'tomatoes', 'mineral water'}),
confidence=0.11004784688995216, lift=4.510759013778858),
OrderedStatistic(items_base=frozenset({'tomatoes', 'frozen vegetables'}),
items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.1900826446280992, lift=3.1826114226682414),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'tomatoes', 'frozen vegetables'}),
confidence=0.05133928571428572, lift=3.1826114226682414),
OrderedStatistic(items_base=frozenset({'tomatoes', 'mineral water'}),
items_add=frozenset({'frozen vegetables', 'spaghetti'}),
confidence=0.12568306010928962, lift=4.510759013778858),
OrderedStatistic(items_base=frozenset({'tomatoes', 'spaghetti'}),
items_add=frozenset({'frozen vegetables', 'mineral water'}),
confidence=0.14649681528662423, lift=4.1002709383021205),
OrderedStatistic(items_base=frozenset({'frozen vegetables', 'mineral water',
'spaghetti'}), items_add=frozenset({'tomatoes'}), confidence=0.2555555555555556,
lift=3.7366904916612524), OrderedStatistic(items_base=frozenset({'tomatoes',
'frozen vegetables', 'mineral water'}), items_add=frozenset({'spaghetti'}),
confidence=0.5227272727272727, lift=3.0022796881525826),
OrderedStatistic(items_base=frozenset({'tomatoes', 'mineral water',
'spaghetti'}), items_add=frozenset({'frozen vegetables'}),
confidence=0.32857142857142857, lift=3.447012987012987)]],
RelationRecord(items=frozenset({'ground beef', 'mineral water', 'milk',
'spaghetti'}), support=0.004399413411545127,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef',
'milk'}), items_add=frozenset({'mineral water', 'spaghetti'}), confidence=0.2,
lift=3.3486607142857148), OrderedStatistic(items_base=frozenset({'ground beef',
'mineral water'}), items_add=frozenset({'milk', 'spaghetti'}),
confidence=0.10749185667752444, lift=3.0311895373613185),
OrderedStatistic(items_base=frozenset({'milk', 'spaghetti'}),
items_add=frozenset({'ground beef', 'mineral water'}),
confidence=0.12406015037593984, lift=3.0311895373613185),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'ground beef', 'milk'}), confidence=0.07366071428571429,
lift=3.3486607142857148)]],
RelationRecord(items=frozenset({'ground beef', 'mineral water', 'olive oil',
'spaghetti'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),

```

```

items_add=frozenset({'mineral water', 'olive oil', 'spaghetti'}),
confidence=0.03120759837177748, lift=3.040106433593544),
OrderedStatistic(items_base=frozenset({'ground beef', 'mineral water'}),
items_add=frozenset({'olive oil', 'spaghetti'}), confidence=0.0749185667752443,
lift=3.267233542913416), OrderedStatistic(items_base=frozenset({'ground beef',
'olive oil'}), items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.2169811320754717, lift=3.63298096361186),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'ground beef', 'olive oil'}),
confidence=0.05133928571428572, lift=3.63298096361186),
OrderedStatistic(items_base=frozenset({'olive oil', 'spaghetti'}),
items_add=frozenset({'ground beef', 'mineral water'}),
confidence=0.13372093023255816, lift=3.267233542913416),
OrderedStatistic(items_base=frozenset({'mineral water', 'olive oil',
'spaghetti'}), items_add=frozenset({'ground beef'}),
confidence=0.2987012987012987, lift=3.0401064335935435)]),
RelationRecord(items=frozenset({'ground beef', 'mineral water', 'pancakes',
'spaghetti'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef',
'pancakes'}), items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.21100917431192662, lift=3.532990661861075),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'ground beef', 'pancakes'}),
confidence=0.05133928571428572, lift=3.532990661861075)]),
RelationRecord(items=frozenset({'ground beef', 'tomatoes', 'mineral water',
'spaghetti'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'ground beef'}),
items_add=frozenset({'tomatoes', 'mineral water', 'spaghetti'}),
confidence=0.03120759837177748, lift=3.344117076952898),
OrderedStatistic(items_base=frozenset({'spaghetti'}),
items_add=frozenset({'ground beef', 'tomatoes', 'mineral water'}),
confidence=0.01761102603369066, lift=3.221958689724723),
OrderedStatistic(items_base=frozenset({'ground beef', 'mineral water'}),
items_add=frozenset({'tomatoes', 'spaghetti'}), confidence=0.0749185667752443,
lift=3.579389613892405), OrderedStatistic(items_base=frozenset({'ground beef',
'spaghetti'}), items_add=frozenset({'tomatoes', 'mineral water'}),
confidence=0.0782312925170068, lift=3.2066280063938146),
OrderedStatistic(items_base=frozenset({'ground beef', 'tomatoes'}),
items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.26136363636363635, lift=4.3760907061688314),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'ground beef', 'tomatoes'}),
confidence=0.05133928571428572, lift=4.3760907061688314),
OrderedStatistic(items_base=frozenset({'tomatoes', 'mineral water'}),
items_add=frozenset({'ground beef', 'spaghetti'}),
confidence=0.12568306010928962, lift=3.206628006393814),
OrderedStatistic(items_base=frozenset({'tomatoes', 'spaghetti'}),

```

```

items_add=frozenset({'ground beef', 'mineral water'}),
confidence=0.14649681528662423, lift=3.579389613892405),
OrderedStatistic(items_base=frozenset({'ground beef', 'tomatoes', 'mineral
water'}), items_add=frozenset({'spaghetti'}), confidence=0.5609756097560976,
lift=3.221958689724723), OrderedStatistic(items_base=frozenset({'tomatoes',
'mineral water', 'spaghetti'}), items_add=frozenset({'ground beef'}),
confidence=0.32857142857142857, lift=3.344117076952898)]),
RelationRecord(items=frozenset({'mineral water', 'milk', 'olive oil',
'spaghetti'}), support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'olive oil'}),
items_add=frozenset({'mineral water', 'milk', 'spaghetti'}),
confidence=0.05060728744939272, lift=3.216993755575379),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'olive oil', 'spaghetti'}), confidence=0.06944444444444445,
lift=3.0285045219638245), OrderedStatistic(items_base=frozenset({'milk', 'olive
oil'}), items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.19531250000000003, lift=3.2701764787946432),
OrderedStatistic(items_base=frozenset({'milk', 'spaghetti'}),
items_add=frozenset({'mineral water', 'olive oil'}),
confidence=0.09398496240601503, lift=3.4057062947223127),
OrderedStatistic(items_base=frozenset({'mineral water', 'olive oil'}),
items_add=frozenset({'milk', 'spaghetti'}), confidence=0.12077294685990338,
lift=3.4057062947223127), OrderedStatistic(items_base=frozenset({'mineral
water', 'spaghetti'}), items_add=frozenset({'milk', 'olive oil'}),
confidence=0.05580357142857143, lift=3.2701764787946432),
OrderedStatistic(items_base=frozenset({'olive oil', 'spaghetti'}),
items_add=frozenset({'mineral water', 'milk'}), confidence=0.14534883720930233,
lift=3.0285045219638245), OrderedStatistic(items_base=frozenset({'mineral
water', 'milk', 'spaghetti'}), items_add=frozenset({'olive oil'}),
confidence=0.211864406779661, lift=3.216993755575379)]),
RelationRecord(items=frozenset({'mineral water', 'shrimp', 'milk',
'spaghetti'}), support=0.0030662578322890282,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'mineral water',
'milk'}), items_add=frozenset({'shrimp', 'spaghetti'}),
confidence=0.06388888888888889, lift=3.014028651292803),
OrderedStatistic(items_base=frozenset({'milk', 'spaghetti'}),
items_add=frozenset({'mineral water', 'shrimp'}),
confidence=0.08646616541353383, lift=3.6643090777791936),
OrderedStatistic(items_base=frozenset({'mineral water', 'shrimp'}),
items_add=frozenset({'milk', 'spaghetti'}), confidence=0.12994350282485875,
lift=3.6643090777791936), OrderedStatistic(items_base=frozenset({'shrimp',
'spaghetti'}), items_add=frozenset({'mineral water', 'milk'}),
confidence=0.14465408805031446, lift=3.014028651292802)]),
RelationRecord(items=frozenset({'tomatoes', 'mineral water', 'milk',
'spaghetti'}), support=0.003332888948140248,
ordered_statistics=[OrderedStatistic(items_base=frozenset({'tomatoes'}),
items_add=frozenset({'mineral water', 'milk', 'spaghetti'}),

```

```

confidence=0.04873294346978558, lift=3.097845838702217),
OrderedStatistic(items_base=frozenset({'mineral water', 'milk'}),
items_add=frozenset({'tomatoes', 'spaghetti'}), confidence=0.06944444444444445,
lift=3.3178520877565467), OrderedStatistic(items_base=frozenset({'milk',
'spaghetti'}), items_add=frozenset({'tomatoes', 'mineral water'}),
confidence=0.09398496240601503, lift=3.8523563005875343),
OrderedStatistic(items_base=frozenset({'tomatoes', 'milk'}),
items_add=frozenset({'mineral water', 'spaghetti'}),
confidence=0.2380952380952381, lift=3.9865008503401365),
OrderedStatistic(items_base=frozenset({'mineral water', 'spaghetti'}),
items_add=frozenset({'tomatoes', 'milk'}), confidence=0.05580357142857143,
lift=3.9865008503401365), OrderedStatistic(items_base=frozenset({'tomatoes',
'mineral water'}), items_add=frozenset({'milk', 'spaghetti'}),
confidence=0.1366120218579235, lift=3.8523563005875348),
OrderedStatistic(items_base=frozenset({'tomatoes', 'spaghetti'}),
items_add=frozenset({'mineral water', 'milk'}), confidence=0.15923566878980894,
lift=3.3178520877565467), OrderedStatistic(items_base=frozenset({'mineral
water', 'milk', 'spaghetti'}), items_add=frozenset({'tomatoes'}),
confidence=0.211864406779661, lift=3.0978458387022165))]]]

```

```

[45]: df_results = pd.DataFrame(Results)
      df_results.head()

```

```

[45]:
      items      support \
0  (cottage cheese, brownies)  0.003466
1      (light cream, chicken)  0.004533
2  (mushroom cream sauce, escalope)  0.005733
3      (pasta, escalope)  0.005866
4  (fresh bread, tomato juice)  0.004266

      ordered_statistics
0  [((brownies), (cottage cheese), 0.102766798418...
1  [((chicken), (light cream), 0.0755555555555555...
2  [((escalope), (mushroom cream sauce), 0.072268...
3  [((escalope), (pasta), 0.07394957983193277, 4...
4  [((fresh bread), (tomato juice), 0.09907120743...

```

```

[46]: support = df_results.support

```

```

[47]: first_values = []
      second_values = []
      third_values = []
      fourth_value = []
      for i in range(df_results.shape[0]):
          single_list = df_results['ordered_statistics'][i][0]
          first_values.append(list(single_list[0]))
          second_values.append(list(single_list[1]))

```



```
third_values.append(single_list[2])
fourth_value.append(single_list[3])
```

```
[48]: lhs = pd.DataFrame(first_values)
      rhs= pd.DataFrame(second_values)
      confidance=pd.DataFrame(third_values,columns=['Confidance'])
      lift=pd.DataFrame(fourth_value,columns=['lift'])
```

```
[49]: df_final = pd.concat([lhs,rhs,support,confidance,lift], axis=1)
      df_final
```

```
[49]:
```

	0	1	0	1	2 \
0	brownies	None	cottage cheese	None	None
1	chicken	None	light cream	None	None
2	escalope	None	mushroom cream sauce	None	None
3	escalope	None	pasta	None	None
4	fresh bread	None	tomato juice	None	None
..	...	...	...	...	...
89	ground beef	pancakes	mineral water	spaghetti	None
90	ground beef	None	tomatoes	mineral water	spaghetti
91	olive oil	None	mineral water	milk	spaghetti
92	mineral water	milk	shrimp	spaghetti	None
93	tomatoes	None	mineral water	milk	spaghetti

  

	support	Confidance	lift
0	0.003466	0.102767	3.225330
1	0.004533	0.075556	4.843951
2	0.005733	0.072269	3.790833
3	0.005866	0.073950	4.700812
4	0.004266	0.099071	3.259356
..	...	...	...
89	0.003066	0.211009	3.532991
90	0.003066	0.031208	3.344117
91	0.003333	0.050607	3.216994
92	0.003066	0.063889	3.014029
93	0.003333	0.048733	3.097846

[94 rows x 8 columns]

```
[50]: df_final.fillna(value=' ', inplace=True)
```

```
[53]: df_final.drop(columns=[1,2],inplace=True)
```

```
[54]: df_final.head()
```

```
[54]:
```

	0	0	support	Confidance	lift
0	brownies	cottage cheese	0.003466	0.102767	3.225330

1	chicken	light cream	0.004533	0.075556	4.843951
2	escalope	mushroom cream sauce	0.005733	0.072269	3.790833
3	escalope	pasta	0.005866	0.073950	4.700812
4	fresh bread	tomato juice	0.004266	0.099071	3.259356

[ ]: