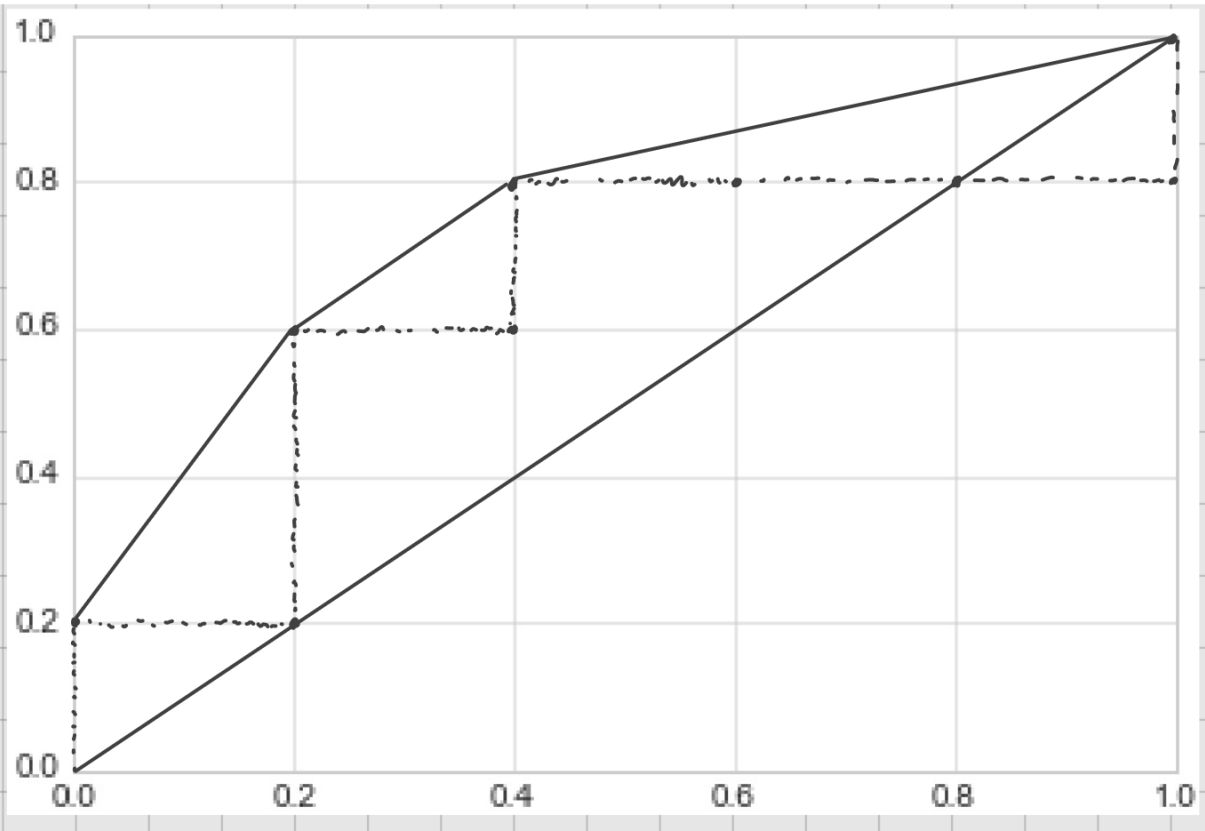
(1)

Tuple	#	Class Prob	TP	FN	FP	TN	TPR	FPR
1	p	0.95	1	4	0	5	0.2	0
2	n	0.85	1	4	1	4	0.2	0.2
3	p	0.78	2	3	1	4	0.4	0.2
4	p	0.66	3	2	1	4	0.6	0.2
5	n	0.6	3	2	2	3	0.6	0.4
6	p	0.55	4	1	2	3	0.8	0.4
7	n	0.53	4	1	3	2	0.8	0.6
8	n	0.52	4	1	4	1	0.8	0.8
9	n	0.51	4	1	5	0	0.8	1.0
10	p	0.4	5	0	5	0	1.0	1.0



(2)

TID	Basket
T1	A, B, E
T2	B, D
T3	B, C
T4	A, B, D
T5	A, C
T6	B, C
T7	A, C
T8	A, B, C, E
T9	A, B, C

a) $\{A, B\} \Rightarrow E = \frac{2}{4} = 0.5$

b) $A \Rightarrow \{B, E\} = \frac{2}{6} = 0.33$

(3)

Itemset	Sup
{A}	6
{B}	7
{C}	6
{D}	2
{E}	2

→

Itemset	Sup
A, B	4
A, C	4
~~A, D~~	~~1~~
A, E	2
B, C	3
B, D	2
B, E	2
~~C, D~~	~~0~~
~~C, E~~	~~1~~
~~D, E~~	~~0~~

→

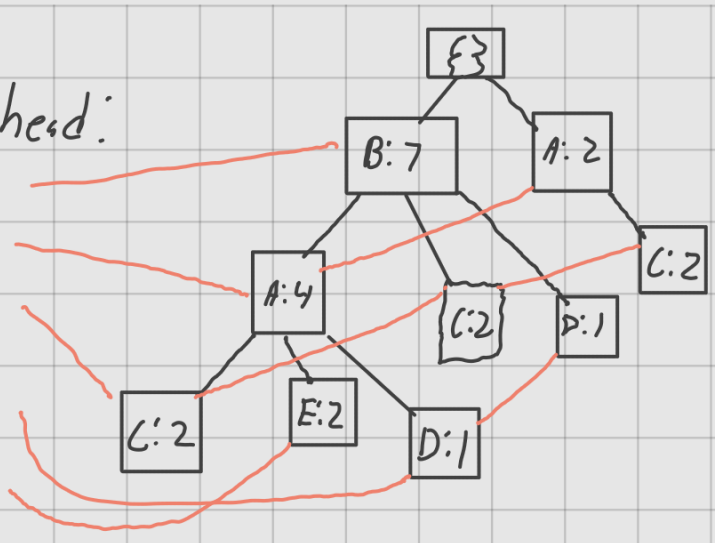
Itemset	Sup
{A, B}	4
{A, C}	4
{A, E}	2
{B, C}	3
{B, D}	2
{B, E}	2

Itemset	Sup
{A, B, C}	2
{A, B, E}	2
{B, C, E}	1
{A, B, D}	1

Itemset	Sup
{A, B C}	2
{A, B, E}	2

(4)

Item:	Freq:	head:
B	7	
A	6	
C	6	
D	2	
E	2	



(5)

```
Apriori
=======

Minimum support: 0.2 (1 instances)
Minimum metric <confidence>: 0.9
Number of cycles performed: 16

Generated sets of large itemsets:

Size of set of large itemsets L(1): 5

Size of set of large itemsets L(2): 8

Size of set of large itemsets L(3): 3

Best rules found:

 1. A=t 2 ==> D=t 2    <conf:(1)> lift:(1.67) lev:(0.16) [0] conv:(0.8)
 2. E=t 1 ==> B=t 1    <conf:(1)> lift:(1.25) lev:(0.04) [0] conv:(0.2)
 3. E=t 1 ==> C=t 1    <conf:(1)> lift:(1.67) lev:(0.08) [0] conv:(0.4)
 4. A=t B=t 1 ==> D=t 1    <conf:(1)> lift:(1.67) lev:(0.08) [0] conv:(0.4)
 5. C=t D=t 1 ==> A=t 1    <conf:(1)> lift:(2.5) lev:(0.12) [0] conv:(0.6)
 6. A=t C=t 1 ==> D=t 1    <conf:(1)> lift:(1.67) lev:(0.08) [0] conv:(0.4)
 7. C=t E=t 1 ==> B=t 1    <conf:(1)> lift:(1.25) lev:(0.04) [0] conv:(0.2)
 8. B=t E=t 1 ==> C=t 1    <conf:(1)> lift:(1.67) lev:(0.08) [0] conv:(0.4)
 9. E=t 1 ==> B=t C=t 1    <conf:(1)> lift:(2.5) lev:(0.12) [0] conv:(0.6)
```

6

Associator output

```
=== Run information ===

Scheme:       weka.associations.FPGrowth -P 2 -I -1 -N 10 -T 0 -C 0.9 -D 0.05 -U 1.0 -M 0.1
Relation:     supermarket
Instances:    4627
Attributes:   217
              [list of attributes omitted]
=== Associator model (full training set) ===

FPGrowth found 16 rules (displaying top 10)

 1. [fruit=t, frozen foods=t, biscuits=t, total=high]: 788 ==> [bread and cake=t]: 723   <conf:(0.92)> lift:(1.27) lev:(0.03) conv:(3.35)
 2. [fruit=t, baking needs=t, biscuits=t, total=high]: 760 ==> [bread and cake=t]: 696   <conf:(0.92)> lift:(1.27) lev:(0.03) conv:(3.28)
 3. [fruit=t, baking needs=t, frozen foods=t, total=high]: 770 ==> [bread and cake=t]: 705   <conf:(0.92)> lift:(1.27) lev:(0.03) conv:(3.27)
 4. [fruit=t, vegetables=t, biscuits=t, total=high]: 815 ==> [bread and cake=t]: 746   <conf:(0.92)> lift:(1.27) lev:(0.03) conv:(3.26)
 5. [fruit=t, party snack foods=t, total=high]: 854 ==> [bread and cake=t]: 779   <conf:(0.91)> lift:(1.27) lev:(0.04) conv:(3.15)
 6. [vegetables=t, frozen foods=t, biscuits=t, total=high]: 797 ==> [bread and cake=t]: 725   <conf:(0.91)> lift:(1.26) lev:(0.03) conv:(3.06)
 7. [vegetables=t, baking needs=t, biscuits=t, total=high]: 772 ==> [bread and cake=t]: 701   <conf:(0.91)> lift:(1.26) lev:(0.03) conv:(3.01)
 8. [fruit=t, biscuits=t, total=high]: 954 ==> [bread and cake=t]: 866   <conf:(0.91)> lift:(1.26) lev:(0.04) conv:(3)
 9. [fruit=t, vegetables=t, frozen foods=t, total=high]: 834 ==> [bread and cake=t]: 757   <conf:(0.91)> lift:(1.26) lev:(0.03) conv:(3)
10. [fruit=t, frozen foods=t, total=high]: 969 ==> [bread and cake=t]: 877   <conf:(0.91)> lift:(1.26) lev:(0.04) conv:(2.92)
```

Associator output

```
=== Run information ===

Scheme:       weka.associations.Apriori -N 10 -T 0 -C 0.9 -D 0.05 -U 1.0 -M 0.1 -S -1.0 -c -1
Relation:     supermarket
Instances:    4627
Attributes:   217
              [list of attributes omitted]
=== Associator model (full training set) ===


Apriori
=======

Minimum support: 0.15 (694 instances)
Minimum metric <confidence>: 0.9
Number of cycles performed: 17

Generated sets of large itemsets:

Size of set of large itemsets L(1): 44

Size of set of large itemsets L(2): 380

Size of set of large itemsets L(3): 910

Size of set of large itemsets L(4): 633

Size of set of large itemsets L(5): 105

Size of set of large itemsets L(6): 1

Best rules found:

 1. biscuits=t frozen foods=t fruit=t total=high 788 ==> bread and cake=t 723    <conf:(0.92)> lift:(1.27) lev:(0.03) [155] conv:(3.35)
 2. baking needs=t biscuits=t fruit=t total=high 760 ==> bread and cake=t 696    <conf:(0.92)> lift:(1.27) lev:(0.03) [149] conv:(3.28)
 3. baking needs=t frozen foods=t fruit=t total=high 770 ==> bread and cake=t 705    <conf:(0.92)> lift:(1.27) lev:(0.03) [150] conv:(3.27)
 4. biscuits=t fruit=t vegetables=t total=high 815 ==> bread and cake=t 746    <conf:(0.92)> lift:(1.27) lev:(0.03) [159] conv:(3.26)
 5. party snack foods=t fruit=t total=high 854 ==> bread and cake=t 779    <conf:(0.91)> lift:(1.27) lev:(0.04) [164] conv:(3.15)
 6. biscuits=t frozen foods=t vegetables=t total=high 797 ==> bread and cake=t 725    <conf:(0.91)> lift:(1.26) lev:(0.03) [151] conv:(3.06)
 7. baking needs=t biscuits=t vegetables=t total=high 772 ==> bread and cake=t 701    <conf:(0.91)> lift:(1.26) lev:(0.03) [145] conv:(3.01)
 8. biscuits=t fruit=t total=high 954 ==> bread and cake=t 866    <conf:(0.91)> lift:(1.26) lev:(0.04) [179] conv:(3)
 9. frozen foods=t fruit=t vegetables=t total=high 834 ==> bread and cake=t 757    <conf:(0.91)> lift:(1.26) lev:(0.03) [156] conv:(3)
10. frozen foods=t fruit=t total=high 969 ==> bread and cake=t 877    <conf:(0.91)> lift:(1.26) lev:(0.04) [179] conv:(2.92)
```