**Solution 3a**

|  |  |
| --- | --- |
| Trans | Items |
| T1 | I1, I2, I3, I4, I5, I6, I7, I8, I9, I10 |
| T2 | I1, I2, I3, I4, I5, I6, I7, I8 |
| T3 | I1, I2, I3, I4, I5 |
| T4 | I6, I7, I8 |
| T5 | I100, I101, I102, I103 |

|  |  |
| --- | --- |
| Items | frequency |
| I1 | 3 |
| I2 | 3 |
| I3 | 3 |
| I4 | 3 |
| I5 | 3 |
| I6 | 3 |
| I7 | 3 |
| I8 | 3 |
| I9 | 1 |
| I10 | 1 |
| I100 | 1 |
| I101 | 1 |
| I102 | 1 |
| I103 | 1 |

Frequent Items with min\_support=2

|  |  |
| --- | --- |
| Items | frequency |
| I1 | 3 |
| I2 | 3 |
| I3 | 3 |
| I4 | 3 |
| I5 | 3 |
| I6 | 3 |
| I7 | 3 |
| I8 | 3 |

**Number of frequent patterns: 2^8-1 = 255**

**Solution 3b**

Definition of closed-pattern

An itemset X is closed if X is frequent and there exists no super itemset , Y SUPERSET X with the same support as X.

{I1,I2,I3,I4,I5,I6,I7,I8:2}

//SETS WITH 3 FREQUENCY

{I1,I2,I3,I4,I5:3}

{I6,I7,I8:3}

**Solution 3c**

Definiton of Max-Pattern

An itemset X is a max-­itemset if X is frequent and there exists no frequent super itemset Y SUPERSET X such that and Y is frequent.

{I1,I2,I3,I4,I5,I6,I7,I8:2}

**Solution 3d**

min-support = 2 and min-conf = 70

(I1,I2,I3,I4, IX ->IY )

* X=I6,Y=I7

I1,I2,I3,I4, I6 ->I7

Support count =2

Support = 2/5 =0.4

Confidence =2/2=100%

* X=I6,Y=I8

I1,I2,I3,I4, I6 ->I8

Support count =2

Support = 2/5 =0.4

Confidence =2/2=100%

* X=I7,Y=I6

I1,I2,I3,I4, I7 ->I6

Support count =2

Support = 2/5 =0.4

Confidence =2/2=100%

* X=I7,Y=I8

I1,I2,I3,I4, I7 ->I8

Support count =2

Support = 2/5 =0.4

Confidence =2/2=100%

* X=I8,Y=I6

I1,I2,I3,I4, I8 ->I6

Support count =2

Support = 2/5 =0.4

Confidence =2/2=100%

* X=I8,Y=I7

I1,I2,I3,I4, I8 ->I7

Support count =2

Support = 2/5 =0.4

Confidence =2/2=100%

**Solution 3e**

I1->I6.

SUPPORT COUNT=2

SUPPORT of {I1,I6}=2/5 = 0.4

Confidence=2/3=0.67

Lift = 1.11

INTEREST=

**Solution 4a**

|  |  |
| --- | --- |
| ***TID*** | ***Items\_bought*** |
| T100 | {M,O,N,K,E,Y} |
| T200 | {D,O,N,K,E,Y} |
| T300 | {M,A,K,E} |
| T400 | {M,U,C,K,Y} |
| T500 | {C,O,O,K,I,E} |

**APRIORI ALGORITHM**

Given *min\_sup*=60% and we have 5 transactions. Therefore minimum support count will be 0.6\*5 =3

Sup\_count

**C1**

|  |  |
| --- | --- |
| ITEM SET | SUPPORT COUNT |
| {M} | 3 |
| {O} | 3 |
| {N} | 2 |
| {K} | 5 |
| {E} | 4 |
| {Y} | 3 |
| {D} | 1 |
| {A} | 1 |
| {U} | 1 |
| {C} | 2 |
| {I} | 1 |

**L1**

|  |  |
| --- | --- |
| ITEM SET | SUPPORT COUNT |
| {M} | 3 |
| {O} | 3 |
| {K} | 5 |
| {E} | 4 |
| {Y} | 3 |

**C2**

|  |  |
| --- | --- |
| ITEM SET | SUPPORT COUNT |
| {M,O} | 1 |
| {M,K} | 3 |
| {M,E} | 2 |
| {M,Y} | 2 |
| {O,K} | 3 |
| {O,E} | 3 |
| {O,Y} | 2 |
| {K,E} | 4 |
| {K,Y} | 3 |

**L2**

|  |  |
| --- | --- |
| ITEM SET | SUPPORT COUNT |
| {M,K} | 3 |
| {O,K} | 3 |
| {O,E} | 3 |
| {K,E} | 4 |
| {K,Y} | 3 |

**C3**

|  |  |
| --- | --- |
| ITEM SET | SUPPORT COUNT |
| {M,K,O} | 1 |
| {M,K,E} | 2 |
| {M,K,Y} | 2 |
| {O,K,E} | 3 |
| {O,K,Y} | 2 |

**L3**

|  |  |
| --- | --- |
| ITEM SET | SUPPORT COUNT |
| {O,K,E} | 3 |

Frequent Item set will be {O,K,E} with support count =3 and support =0.6

**Solution 4b**

**FP-GROWTH**

**L order of items (descending order of item according to their frequency)**

|  |  |
| --- | --- |
| K | 5 |
| E | 4 |
| M | 3 |
| O | 3 |
| Y | 3 |
| N | 2 |
| C | 2 |
| D | 1 |
| A | 1 |
| U | 1 |
| I | 1 |

NULL

|  |  |  |
| --- | --- | --- |
| K | 5 |  |
| E | 4 |  |
| M | 3 |  |
| O | 3 |  |
| Y | 3 |  |
| N | 2 |  |
| C | 2 |  |
| D | 1 |  |
| A | 1 |  |
| U | 1 |  |
| I | 1 |  |

K:5

M:1

E:4

N:1

O:1

Y:1

A:1

M:2

I:1

C:1

D:1

Y:1

N:1

O:2

C:1

Y:1

U:1

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Conditional Pattern Base | Conditional FP-tree | Frequent Patterns Generated |
| I | {K,E,O,C:1} | <K:1,E:1,O:1,C:1> |  |
| U | {K,M,Y,C} | <K:1,M:1,Y:1,C:1> |  |
| A | {K,E,M:1} | <K:1,M:1,E:1> |  |
| D | {K,E,O,Y,N:1} | <K:1,E:1,O:1,Y:1,N:1> |  |
| C | {K,E,O:1},{K,M,Y:1} | <K=2,E=1,O=1,M=1,Y=1> |  |
| N | {K,E,M,O,Y:1},{K,E,O,Y:1} | <K:2,E:2,O:2,Y:2,M:1> |  |
| Y | {K,E,M,O:1},{K,E,O:1},{K,M:1} | <K:3,E:2,O:2,M:2> | {K,Y:3} |
| O | {K,E,M:1},{K,E:2} | <K:3,E:3,M=1> | {K,O:3},{K,E:3},{K,O,E:3} |
| M | {K,E:2},{K:1} | <K:3,E:2> | {K,M:3} |
| E | {K:4} | <K:4> | {E,K:4} |

Frequent Item set will be {O,K,E} with support count =3 and support =0.6