**Answer Q2-1)**

Support threshold 33.33 % → threshold is at least 2 transactions.

**By applying Apriori algorithm,**

* K=1
  + Hotdogs(4), Sandwich(2), Jam(2), Milk(3), Chips(4)
* K=2
  + {Hotdogs, Sandwich}(2), {Hotdogs, Milk}(2), {Hotdogs, Chips}(2), {Milk, Chips}(3)
* k=3
  + {Hotdogs, Milk, Chips}(3)

**All frequent item sets:**

{Hotdogs}, {Sandwich}, {Jam}, {Milk},{Chips}, {Hotdog, Sandwich}, {Hotdogs, milk}, {Hotdogs, chips}, {Milk, Chips},{Hotdogs, Milk, Chips}

**Association rules (greater than 60 % confidence)**

* {Hotdogs, Sandwich} : Sandwich → Hotdogs ( 0.33 sup, 1.00 conf)
* {Hotdogs, Milk} : Milk → Hotdogs (0.33 sup, 0.66 conf)
* {Hotdogs, Chips} : N/A
* {Milk, Chips} : Milk → chips (0.50 sup, 1.00 conf)

chips → Milk ( 0.50 sup, 0.75 conf)

* {Hotdogs, Milk, Chips} : Milk → Chips and Hotdogs (0.33 sup, 0.66 conf)

Hotdogs and Milk → Chips (0.33 sup, 1.00 conf)

Hotdogs and chips → Milk (0.33 sup, 1.00 conf)

Milk and Chips → Hotdogs (0.33 sup, 0.66 conf)

**Answer Q-2)**

The first scan of the transaction data generates the list of frequent 1-itemsets and build the table as followings.

|  |  |  |
| --- | --- | --- |
| Item | Code | Support |
| Hotdogs | H | 4=66% |
| Chips | C | 4=66% |
| Milk | M | 3=50% |
| Sandwich | S | 2=33% |
| Jam | J | 2=33% |

**FP-tree is created as follows.**



For Milk (item code M), we have two branches H-C-M and C-M resulting in a new conditional tree M(3) → C(3) →H(2). From this one, we have three patterns: (M:2, C:2, H:2), (M:3, C:3), (M:3). This patterns leads to the determination of the following item sets: {Hotdogs, Chips, Milk}(2), {Milk, Chips}(2), and {Milk}(3).