|  |  |
| --- | --- |
| **Frequent 1-itemSet** | **Frequency** |
| Barley | 7 |
| Corn | 7 |
| Gram | 7 |
| Millet | 8 |
| Rice | 11 |
| Wheat | 10 |

**Table-1: Frequent** 1-item Set

Total transaction =12, minimum support level =33%, confidence=66%

**Table-2 : Frequent** 2-item Set

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Frequent 2-item Set** | **Frequency** | **Frequent 2-item Set** | **Frequency** | **Frequent 2-item Set** | **Frequency** |
| Barley, Corn | 4 | Corn, Millet | 5 | Millet, Rice | 7 |
| Barley, Gram | 5 | Corn, Rice | 6 | Millet, Wheat | 6 |
| Barley, Millet | 5 | Corn, Wheat | 6 | Rice, Wheat | 10 |
| Barley, Rice | 6 |  |  |  |  |
| Barley, Wheat | 5 | Gram, Rice | 6 |  |  |
| Corn, Gram | 4 | Gram, Wheat | 5 |  |  |

Since, (Gram, Millet) occurred 3 times out of 12 transaction. So (Gram, Millet) item Set is not the part of frequent item as it is less than minimum support level (33%). Same procedure followed for (3,4,5 )-item Set **.**

**Table-3: Frequent** 3-itemSet

|  |  |
| --- | --- |
| **Frequent 3-itemSet** | **Frequency** |
| Barley, Gram, Rice | 4 |
| Barley, Millet, Rice | 4 |
| Corn, Millet, Rice | 4 |
| Corn, Millet, Wheat | 4 |
| Corn, Rice, Wheat | 6 |
| Gram, Rice, Wheat | 5 |
| Millet, Rice, Wheat | 6 |
| Barley, Rice, Wheat | 5 |

**Table-4: Frequent** **4-itemset**

|  |  |
| --- | --- |
| **Frequent 4 -itemset** | **Frequency** |
| Barley, Gram, Rice, Wheat | 4 |
| Corn, Millet, Rice, Wheat | 4 |

**Table-5: 5-itemset**

|  |  |  |
| --- | --- | --- |
| **5 -itemset** | **Frequency** |  |
| Barley, Corn, Gram, Millet, Rice | 1 |  |
| Corn, Gram, Millet, Rice, Wheat | 1 |  |

Table-5 illustrates **5-itemset. But,** No frequent item set for **5-itemset. So, I will set Association rule based frequent 4-itemset of Table-4**

I = {Barley, Gram, Rice, Wheat} and {Corn, Millet, Rice, Wheat}

Non empty subset={Barley},{ Gram},{ Rice},{ Wheat} { Barley, Gram},{ Barley ,Rice},{ Barley , Wheat },

{ Gram, Rice },{ Gram , Wheat},{ Rice, Wheat },{ Barley, Gram, Rice},{ Barley, Rice, Wheat },{ Gram, Rice, Wheat }

Rule-1 : {Barley}🡪{ Gram, Rice, Wheat} , (s=33%,c= 57.14% )

Rule-2:{ Gram }🡪{Barley, Rice, Wheat}(s=33%, c= 57.14%)

Rule-3: { Rice }🡪{Barley, Gram, Wheat}(s=33%, c=36.36)

Rule-4: { Wheat }🡪{Barley, Gram, Rice}(s=33%, c= 40)

Rule-5: {Barley, Gram} 🡪{Rice, Wheat} (s=33%, c=80%)

Rule-6: { Barley ,Rice } 🡪{Gram, Wheat} (s=33%, c= 66.66 %)

Rule-6: { Barley , Wheat } 🡪{ Gram, Rice } (s=33%, c=80%)

Rule-7: { Gram, Rice } 🡪{ Barley , Wheat } (s=33%, c= 66.66 %)

Rule-8: { Gram , Wheat } 🡪{ Barley , Rice } (s=33%, c= 80%)

Rule-8: { Rice , Wheat } 🡪{ Barley, Gram } (s=33%, c= 40%)

Rule-9: { Barley, Gram, Rice } 🡪{ Wheat } (s=33%, c= 100%)

Rule-10: { Barley, Rice, Wheat } 🡪{ Gram } (s=33%, c= 80%)

Rule-11: { Gram, Rice, Wheat } 🡪{ Barley } (s=33%, c= 80%)

Based on problem, we can find many find out many Association rule from frequent item set, here I just calculated total 11 rules. Among of them, Red marked rule are invalid as their confidence <66%. On the other hand, Green marked rules are valid as confidence>=66%