

## Week 9 – Apriori and Association Rules (Calculations with Tables)

### Dataset Information

Total Transactions (N) = 5

Minimum Support = 60%

Minimum Confidence = 80%

### Transactions

| Transaction ID | Items Purchased                                |
|----------------|--|
| T1             | Mango, Onion, Nintendo, Key-chain, Eggs, Yo-yo |
| T2             | Doll, Onion, Nintendo, Key-chain, Eggs, Yo-yo  |
| T3             | Mango, Apple, Key-chain, Eggs                  |
| T4             | Mango, Umbrella, Corn, Key-chain, Yo-yo        |
| T5             | Corn, Onion, Key-chain, Ice-cream, Eggs        |

### Step 1: Frequent 1-Itemsets

| Item      | Count | Support (%) |
|-----------|-------|-------------|
| Mango     | 3     | 60%         |
| Onion     | 3     | 60%         |
| Key-chain | 5     | 100%        |
| Eggs      | 4     | 80%         |
| Yo-yo     | 3     | 60%         |

Frequent 1-itemsets ( $\geq 60\%$ ): {Mango, Onion, Key-chain, Eggs, Yo-yo}

### Step 2: Frequent 2-Itemsets

| Itemset            | Count | Support (%) |
|--------------------|-------|-------------|
| {Mango, Key-chain} | 3     | 60%         |
| {Onion, Key-chain} | 3     | 60%         |

|                    |   |     |
|--------------------|---|-----|
| {Onion, Eggs}      | 3 | 60% |
| {Key-chain, Eggs}  | 4 | 80% |
| {Key-chain, Yo-yo} | 3 | 60% |

### Step 3: Frequent 3-Itemsets

| Itemset                  | Count | Support (%) |
|--------------------------|-------|-------------|
| {Onion, Key-chain, Eggs} | 3     | 60%         |

### Step 4: Association Rules

| Rule                         | Support | Confidence | Lift |
|------------------------------|---------|------------|------|
| {Onion, Key-chain}<br>→ Eggs | 60%     | 100%       | 1.25 |
| {Onion, Eggs} →<br>Key-chain | 60%     | 100%       | 1.00 |
| Onion → {Key-chain,<br>Eggs} | 60%     | 100%       | 1.25 |

### Strong Rules

All rules listed above are strong because their confidence is greater than 80%.