

# APRIORI ALGORITHM

## CS 634

### DATA MINING

### MID TERM PROJECT

**Project By:**  
**Charanpreet Kaur Dhir**  
**([ckd22@njit.edu](mailto:ckd22@njit.edu))**

**Under Professor:**  
**Jason Wang**  
**([wangj@njit.edu](mailto:wangj@njit.edu))**

# APRIORI ALGORITHM

The Apriori algorithm principle says that if an itemset is frequent, then all of its subsets are frequent. This means that if  $\{0,1\}$  is frequent, then  $\{0\}$  and  $\{1\}$  have to be frequent.

## Association rule mining –

The Apriori Algorithm is an influential algorithm for mining frequent item sets for Boolean association rules.

Finding frequent patterns, associations, or correlations among sets of items or objects in transactional databases.

# Goal of The Project:

Using the Apriori algorithm to generate and print out all the association rules and the input transactions for each of the 5 transactional databases created. By specifying Support and Confidence as user-specified parameters.

# TRANSACTION DATABASE 1

Transaction1.txt

```
1 ToastMaker,Blender,CoffeeMaker,Charger,EggBoiler,Oven
2 Oven,ToastMaker,Blender,TissueRoll,CoffeeMaker,Charger,Vimcleaner
3 ToastMaker,Scrubber,Blender,TissueRoll,Vimcleaner
4 Microwave,Oven,Charger,Vimcleaner
5 Vimcleaner,Microwave,Scrubber,Charger,EggBoiler,Oven
6 Microwave,Scrubber,Blender,CoffeeMaker,Charger,EggBoiler,Oven
7 Vimcleaner,Microwave,Charger,EggBoiler,Oven
8 Microwave,Scrubber,Blender,ToastMaker,Vimcleaner
9 Microwave,Scrubber,TissueRoll,EggBoiler,Vimcleaner
10 Microwave,Blender,CoffeeMaker,TissueRoll,Charger,EggBoiler
11 Microwave,Scrubber,Blender,ToastMaker,TissueRoll,Charger,Oven
12 Oven,Microwave,ToastMaker,Charger,Vimcleaner
13 Scrubber,CoffeeMaker,TissueRoll,Charger
14 Oven,ToastMaker,TissueRoll,EggBoiler,Vimcleaner
15 ToastMaker,Scrubber,Charger,Vimcleaner
16 Microwave,Oven,Scrubber,ToastMaker,Vimcleaner
17 Microwave,Scrubber,EggBoiler,Vimcleaner
18 Microwave,Scrubber,TissueRoll,Charger,EggBoiler,Oven
19 Blender,CoffeeMaker,TissueRoll,Oven
20 Oven,Scrubber,EggBoiler,Vimcleaner
```

```
afsaccess1-66 datamining >: python Dhir_Charanpreet_midtermproj.py Transaction1.txt
```

## APRIORI ALGORITHM

Minimum Support taken for Algorithm : 35

Minimum Confidence taken for Algorithm : 35

Items and Total number of items in my data set :

```
{'ToastMaker': 9, 'Blender': 8, 'CoffeeMaker': 6, 'Charger': 12, 'EggBoiler': 10, 'Oven': 13, 'TissueRoll': 9, 'Vimcleaner': 13, 'Scrubber': 12, 'Microwave': 12}
```

ASSOCIATION RULE FOR THE FOLLOWING TRANSACTION WITH MIN SUPPORT 35 AND FOR MIN CONFIDENCE 35 is:

|              |            |               |                                    |
|--------------|------------|---------------|------------------------------------|
| Support 65.0 | Support 35 | Confidence 54 | ['Vimcleaner']=>['ToastMaker']     |
| Support 45.0 | Support 35 | Confidence 78 | ['ToastMaker']=>['Vimcleaner']     |
| Support 65.0 | Support 45 | Confidence 69 | ['Oven']=>['Charger']              |
| Support 60.0 | Support 45 | Confidence 75 | ['Charger']=>['Oven']              |
| Support 60.0 | Support 40 | Confidence 67 | ['Microwave']=>['Charger']         |
| Support 60.0 | Support 40 | Confidence 67 | ['Charger']=>['Microwave']         |
| Support 65.0 | Support 35 | Confidence 54 | ['Oven']=>['EggBoiler']            |
| Support 50.0 | Support 35 | Confidence 70 | ['EggBoiler']=>['Oven']            |
| Support 60.0 | Support 35 | Confidence 58 | ['Microwave']=>['EggBoiler']       |
| Support 50.0 | Support 35 | Confidence 70 | ['EggBoiler']=>['Microwave']       |
| Support 65.0 | Support 40 | Confidence 62 | ['Vimcleaner']=>['Oven']           |
| Support 65.0 | Support 40 | Confidence 62 | ['Oven']=>['Vimcleaner']           |
| Support 65.0 | Support 40 | Confidence 62 | ['Oven']=>['Microwave']            |
| Support 60.0 | Support 40 | Confidence 67 | ['Microwave']=>['Oven']            |
| Support 65.0 | Support 40 | Confidence 62 | ['Vimcleaner']=>['Scrubber']       |
| Support 60.0 | Support 40 | Confidence 67 | ['Scrubber']=>['Vimcleaner']       |
| Support 65.0 | Support 40 | Confidence 62 | ['Vimcleaner']=>['Microwave']      |
| Support 60.0 | Support 40 | Confidence 67 | ['Microwave']=>['Vimcleaner']      |
| Support 60.0 | Support 40 | Confidence 67 | ['Scrubber']=>['Microwave']        |
| Support 60.0 | Support 40 | Confidence 67 | ['Microwave']=>['Scrubber']        |
| Support 65.0 | Support 35 | Confidence 54 | ['Oven']=>['Charger', 'Microwave'] |
| Support 60.0 | Support 35 | Confidence 58 | ['Microwave']=>['Charger', 'Oven'] |
| Support 60.0 | Support 35 | Confidence 58 | ['Charger']=>['Microwave', 'Oven'] |
| Support 40.0 | Support 35 | Confidence 88 | ['Oven', 'Microwave']=>['Charger'] |
| Support 45.0 | Support 35 | Confidence 78 | ['Oven', 'Charger']=>['Microwave'] |
| Support 40.0 | Support 35 | Confidence 88 | ['Charger', 'Microwave']=>['Oven'] |

```
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```

# TRANSACTION DATABASE 2

Transaction2.txt

```
1 Blackskirt,Tie,Shoes,Shirt,Socks,HeelSandals
2 Pants,Shirt,Lipstick,Shoes,HeelSandals,EyeLiner
3 Blackskirt,Pants,Shoes,Shirt,Gloves,Socks,EyeLiner,HeelSandals
4 Blackskirt,Tie,Pants,Shoes,Lipstick,Gloves,Socks,HeelSandals
5 Blackskirt,Tie,Shoes,Lipstick,Gloves,Socks,EyeLiner,HeelSandals
6 Tie,Shoes,Shirt,HeelSandals,Socks,EyeLiner
7 Blackskirt,Shoes,Lipstick,Socks,HeelSandals
8 Blackskirt,Tie,Pants,Shoes,Shirt,Gloves,Socks,HeelSandals
9 Tie,Pants,Shoes,Lipstick,Gloves,Socks
10 Blackskirt,Shirt,Lipstick,Gloves,HeelSandals
11 Blackskirt,Tie,Pants,Lipstick,Socks,EyeLiner
12 Blackskirt,Pants,Shirt,HeelSandals,Gloves,Socks,EyeLiner
13 Blackskirt,Tie,Shirt,Gloves,Socks,EyeLiner
14 Blackskirt,Tie,Pants,Shirt,Gloves,Socks,HeelSandals
15 Blackskirt,Tie,Shoes,Lipstick,Shirt,HeelSandals
16 Blackskirt,Tie,Pants,Shoes,Shirt,HeelSandals,EyeLiner
17 Blackskirt,Shirt,Lipstick,HeelSandals,Gloves,Socks,EyeLiner
18 Blackskirt,Tie,Shoes,Lipstick,Shirt,Gloves,Socks,HeelSandals
19 Blackskirt,Pants,Shoes,Lipstick,Shirt,Gloves,EyeLiner
20 Blackskirt,Tie,Pants,Shirt,Lipstick,EyeLiner,HeelSandals
```



```
afsaccess1-68 datamining >: python Dhir_Charanpreet_midtermproj.py Transaction2.txt
```

## APRIORI ALGORITHM

Minimum Support taken for Algorithm : 45

Minimum Confidence taken for Algorithm : 50

Items and Total number of items in my data set :

```
{'Blackskirt': 17, 'Tie': 13, 'Shoes': 13, 'Shirt': 15, 'Socks': 14, 'HeelSandals': 16, 'Pants': 11, 'Lipstick': 12, 'EyeLiner': 11, 'Gloves': 12}
```

ASSOCIATION RULE FOR THE FOLLOWING TRANSACTION WITH MIN SUPPORT 45 AND FOR MIN CONFIDENCE 50 is:

|              |            |               |                                 |
|--------------|------------|---------------|---------------------------------|
| Support 65.0 | Support 55 | Confidence 85 | ['Tie']=>['Blackskirt']         |
| Support 85.0 | Support 55 | Confidence 65 | ['Blackskirt']=>['Tie']         |
| Support 65.0 | Support 50 | Confidence 77 | ['Shoes']=>['Blackskirt']       |
| Support 85.0 | Support 50 | Confidence 59 | ['Blackskirt']=>['Shoes']       |
| Support 75.0 | Support 65 | Confidence 87 | ['Shirt']=>['Blackskirt']       |
| Support 85.0 | Support 65 | Confidence 76 | ['Blackskirt']=>['Shirt']       |
| Support 70.0 | Support 60 | Confidence 86 | ['Socks']=>['Blackskirt']       |
| Support 85.0 | Support 60 | Confidence 71 | ['Blackskirt']=>['Socks']       |
| Support 80.0 | Support 70 | Confidence 88 | ['HeelSandals']=>['Blackskirt'] |
| Support 85.0 | Support 70 | Confidence 82 | ['Blackskirt']=>['HeelSandals'] |
| Support 55.0 | Support 45 | Confidence 82 | ['Pants']=>['Blackskirt']       |
| Support 85.0 | Support 45 | Confidence 53 | ['Blackskirt']=>['Pants']       |
| Support 60.0 | Support 50 | Confidence 83 | ['Lipstick']=>['Blackskirt']    |
| Support 85.0 | Support 50 | Confidence 59 | ['Blackskirt']=>['Lipstick']    |
| Support 55.0 | Support 45 | Confidence 82 | ['EyeLiner']=>['Blackskirt']    |
| Support 85.0 | Support 45 | Confidence 53 | ['Blackskirt']=>['EyeLiner']    |
| Support 60.0 | Support 55 | Confidence 92 | ['Gloves']=>['Blackskirt']      |
| Support 85.0 | Support 55 | Confidence 65 | ['Blackskirt']=>['Gloves']      |
| Support 65.0 | Support 45 | Confidence 69 | ['Tie']=>['Shoes']              |
| Support 65.0 | Support 45 | Confidence 69 | ['Shoes']=>['Tie']              |
| Support 65.0 | Support 45 | Confidence 69 | ['Tie']=>['Shirt']              |
| Support 75.0 | Support 45 | Confidence 60 | ['Shirt']=>['Tie']              |
| Support 65.0 | Support 50 | Confidence 77 | ['Tie']=>['Socks']              |
| Support 70.0 | Support 50 | Confidence 71 | ['Socks']=>['Tie']              |
| Support 65.0 | Support 50 | Confidence 77 | ['Tie']=>['HeelSandals']        |
| Support 80.0 | Support 50 | Confidence 62 | ['HeelSandals']=>['Tie']        |
| Support 65.0 | Support 45 | Confidence 69 | ['Shoes']=>['Shirt']            |

|              |            |                |  |
|--------------|------------|----------------|--|
| Support 75.0 | Support 45 | Confidence 60  | ['Shirt']=>['Shoes']                     |
| Support 70.0 | Support 45 | Confidence 64  | ['Socks']=>['Shoes']                     |
| Support 65.0 | Support 45 | Confidence 69  | ['Shoes']=>['Socks']                     |
| Support 65.0 | Support 55 | Confidence 85  | ['Shoes']=>['HeelSandals']               |
| Support 80.0 | Support 55 | Confidence 69  | ['HeelSandals']=>['Shoes']               |
| Support 70.0 | Support 45 | Confidence 64  | ['Socks']=>['Shirt']                     |
| Support 75.0 | Support 45 | Confidence 60  | ['Shirt']=>['Socks']                     |
| Support 75.0 | Support 65 | Confidence 87  | ['Shirt']=>['HeelSandals']               |
| Support 80.0 | Support 65 | Confidence 81  | ['HeelSandals']=>['Shirt']               |
| Support 75.0 | Support 45 | Confidence 60  | ['Shirt']=>['EyeLiner']                  |
| Support 55.0 | Support 45 | Confidence 82  | ['EyeLiner']=>['Shirt']                  |
| Support 75.0 | Support 45 | Confidence 60  | ['Shirt']=>['Gloves']                    |
| Support 60.0 | Support 45 | Confidence 75  | ['Gloves']=>['Shirt']                    |
| Support 70.0 | Support 55 | Confidence 79  | ['Socks']=>['HeelSandals']               |
| Support 80.0 | Support 55 | Confidence 69  | ['HeelSandals']=>['Socks']               |
| Support 70.0 | Support 50 | Confidence 71  | ['Socks']=>['Gloves']                    |
| Support 60.0 | Support 50 | Confidence 83  | ['Gloves']=>['Socks']                    |
| Support 60.0 | Support 45 | Confidence 75  | ['Lipstick']=>['HeelSandals']            |
| Support 80.0 | Support 45 | Confidence 56  | ['HeelSandals']=>['Lipstick']            |
| Support 80.0 | Support 45 | Confidence 56  | ['HeelSandals']=>['Gloves']              |
| Support 60.0 | Support 45 | Confidence 75  | ['Gloves']=>['HeelSandals']              |
| Support 65.0 | Support 45 | Confidence 69  | ['Tie']=>['Blackskirt', 'HeelSandals']   |
| Support 80.0 | Support 45 | Confidence 56  | ['HeelSandals']=>['Blackskirt', 'Tie']   |
| Support 85.0 | Support 45 | Confidence 53  | ['Blackskirt']=>['HeelSandals', 'Tie']   |
| Support 50.0 | Support 45 | Confidence 90  | ['HeelSandals', 'Tie']=>['Blackskirt']   |
| Support 55.0 | Support 45 | Confidence 82  | ['Blackskirt', 'Tie']=>['HeelSandals']   |
| Support 70.0 | Support 45 | Confidence 64  | ['Blackskirt', 'HeelSandals']=>['Tie']   |
| Support 65.0 | Support 45 | Confidence 69  | ['Shoes']=>['Blackskirt', 'HeelSandals'] |
| Support 80.0 | Support 45 | Confidence 56  | ['HeelSandals']=>['Blackskirt', 'Shoes'] |
| Support 85.0 | Support 45 | Confidence 53  | ['Blackskirt']=>['HeelSandals', 'Shoes'] |
| Support 55.0 | Support 45 | Confidence 82  | ['Shoes', 'HeelSandals']=>['Blackskirt'] |
| Support 50.0 | Support 45 | Confidence 90  | ['Blackskirt', 'Shoes']=>['HeelSandals'] |
| Support 70.0 | Support 45 | Confidence 64  | ['Blackskirt', 'HeelSandals']=>['Shoes'] |
| Support 75.0 | Support 55 | Confidence 73  | ['Shirt']=>['Blackskirt', 'HeelSandals'] |
| Support 80.0 | Support 55 | Confidence 69  | ['HeelSandals']=>['Blackskirt', 'Shirt'] |
| Support 85.0 | Support 55 | Confidence 65  | ['Blackskirt']=>['HeelSandals', 'Shirt'] |
| Support 65.0 | Support 55 | Confidence 85  | ['HeelSandals', 'Shirt']=>['Blackskirt'] |
| Support 65.0 | Support 55 | Confidence 85  | ['Blackskirt', 'Shirt']=>['HeelSandals'] |
| Support 70.0 | Support 55 | Confidence 79  | ['Blackskirt', 'HeelSandals']=>['Shirt'] |
| Support 75.0 | Support 45 | Confidence 60  | ['Shirt']=>['Blackskirt', 'Gloves']      |
| Support 60.0 | Support 45 | Confidence 75  | ['Gloves']=>['Blackskirt', 'Shirt']      |
| Support 85.0 | Support 45 | Confidence 53  | ['Blackskirt']=>['Gloves', 'Shirt']      |
| Support 45.0 | Support 45 | Confidence 100 | ['Gloves', 'Shirt']=>['Blackskirt']      |



```

Support 65.0 Support 45 Confidence 69 ['Tie']=>['Blackskirt', 'HeelSandals']
Support 80.0 Support 45 Confidence 56 ['HeelSandals']=>['Blackskirt', 'Tie']
Support 85.0 Support 45 Confidence 53 ['Blackskirt']=>['HeelSandals', 'Tie']
Support 50.0 Support 45 Confidence 90 ['HeelSandals', 'Tie']=>['Blackskirt']
Support 55.0 Support 45 Confidence 82 ['Blackskirt', 'Tie']=>['HeelSandals']
Support 70.0 Support 45 Confidence 64 ['Blackskirt', 'HeelSandals']=>['Tie']
Support 65.0 Support 45 Confidence 69 ['Shoes']=>['Blackskirt', 'HeelSandals']
Support 80.0 Support 45 Confidence 56 ['HeelSandals']=>['Blackskirt', 'Shoes']
Support 85.0 Support 45 Confidence 53 ['Blackskirt']=>['HeelSandals', 'Shoes']
Support 55.0 Support 45 Confidence 82 ['Shoes', 'HeelSandals']=>['Blackskirt']
Support 50.0 Support 45 Confidence 90 ['Blackskirt', 'Shoes']=>['HeelSandals']
Support 70.0 Support 45 Confidence 64 ['Blackskirt', 'HeelSandals']=>['Shoes']
Support 75.0 Support 55 Confidence 73 ['Shirt']=>['Blackskirt', 'HeelSandals']
Support 80.0 Support 55 Confidence 69 ['HeelSandals']=>['Blackskirt', 'Shirt']
Support 85.0 Support 55 Confidence 65 ['Blackskirt']=>['HeelSandals', 'Shirt']
Support 65.0 Support 55 Confidence 85 ['HeelSandals', 'Shirt']=>['Blackskirt']
Support 65.0 Support 55 Confidence 85 ['Blackskirt', 'Shirt']=>['HeelSandals']
Support 70.0 Support 55 Confidence 79 ['Blackskirt', 'HeelSandals']=>['Shirt']
Support 75.0 Support 45 Confidence 60 ['Shirt']=>['Blackskirt', 'Gloves']
Support 60.0 Support 45 Confidence 75 ['Gloves']=>['Blackskirt', 'Shirt']
Support 85.0 Support 45 Confidence 53 ['Blackskirt']=>['Gloves', 'Shirt']
Support 45.0 Support 45 Confidence 100 ['Gloves', 'Shirt']=>['Blackskirt']
Support 65.0 Support 45 Confidence 69 ['Blackskirt', 'Shirt']=>['Gloves']
Support 55.0 Support 45 Confidence 82 ['Gloves', 'Blackskirt']=>['Shirt']
Support 70.0 Support 50 Confidence 71 ['Socks']=>['Blackskirt', 'HeelSandals']
Support 80.0 Support 50 Confidence 62 ['HeelSandals']=>['Blackskirt', 'Socks']
Support 85.0 Support 50 Confidence 59 ['Blackskirt']=>['HeelSandals', 'Socks']
Support 55.0 Support 50 Confidence 91 ['Socks', 'HeelSandals']=>['Blackskirt']
Support 60.0 Support 50 Confidence 83 ['Socks', 'Blackskirt']=>['HeelSandals']
Support 70.0 Support 50 Confidence 71 ['Blackskirt', 'HeelSandals']=>['Socks']
Support 70.0 Support 45 Confidence 64 ['Socks']=>['Blackskirt', 'Gloves']
Support 60.0 Support 45 Confidence 75 ['Gloves']=>['Blackskirt', 'Socks']
Support 85.0 Support 45 Confidence 53 ['Blackskirt']=>['Gloves', 'Socks']
Support 50.0 Support 45 Confidence 90 ['Gloves', 'Socks']=>['Blackskirt']
Support 60.0 Support 45 Confidence 75 ['Socks', 'Blackskirt']=>['Gloves']
Support 55.0 Support 45 Confidence 82 ['Gloves', 'Blackskirt']=>['Socks']
Support 80.0 Support 45 Confidence 56 ['HeelSandals']=>['Blackskirt', 'Gloves']
Support 60.0 Support 45 Confidence 75 ['Gloves']=>['Blackskirt', 'HeelSandals']
Support 85.0 Support 45 Confidence 53 ['Blackskirt']=>['Gloves', 'HeelSandals']
Support 45.0 Support 45 Confidence 100 ['Gloves', 'HeelSandals']=>['Blackskirt']
Support 70.0 Support 45 Confidence 64 ['Blackskirt', 'HeelSandals']=>['Gloves']
Support 55.0 Support 45 Confidence 82 ['Gloves', 'Blackskirt']=>['HeelSandals']
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```

# TRANSACTION DATABASE 3

|    |  |
|----|--|
| 1  | Raspberrypi,Memorycard,Charger,Powerbank,Motherboard,HDMICable,Canakit         |
| 2  | Raspberrypi,CardReader,Memorycard,Powerbank,Charger,Laptop                     |
| 3  | Keyboard,Powerbank,Charger,Motherboard,HDMICable                               |
| 4  | Canakit,Charger,Powerbank,HDMICable  |
| 5  | Raspberrypi,CardReader,Memorycard,Powerbank,Charger,HDMICable,Laptop           |
| 6  | Keyboard,Raspberrypi,Memorycard,Powerbank,Motherboard,HDMICable,Canakit        |
| 7  | Memorycard,Powerbank,Charger,Motherboard,HDMICable,Canakit,Laptop              |
| 8  | Raspberrypi,CardReader,Laptop,Memorycard,Charger,Motherboard,HDMICable,Canakit |
| 9  | Raspberrypi,CardReader,Memorycard,Motherboard,HDMICable                        |
| 10 | Keyboard,Raspberrypi,CardReader,Laptop,Memorycard,Charger,Motherboard,Canakit  |
| 11 | Raspberrypi,CardReader,Memorycard,Charger,HDMICable,Laptop                     |
| 12 | Keyboard,Raspberrypi,CardReader,Powerbank,Charger,Canakit,Laptop               |
| 13 | Keyboard,Raspberrypi,CardReader,Memorycard,Motherboard,HDMICable,Canakit       |
| 14 | Keyboard,CardReader,Memorycard,Charger,Motherboard,Canakit,Laptop              |
| 15 | Memorycard,Powerbank,Charger,Motherboard,Laptop                                |
| 16 | Raspberrypi,CardReader,Memorycard,Powerbank,Charger,HDMICable,Canakit,Laptop   |
| 17 | Keyboard,Raspberrypi,Memorycard,Charger,Powerbank,HDMICable,Canakit,Laptop     |
| 18 | Keyboard,CardReader,Memorycard,Powerbank,Charger,HDMICable                     |
| 19 | Keyboard,Raspberrypi,CardReader,Motherboard,HDMICable,Canakit                  |
| 20 | Keyboard,Raspberrypi,CardReader,Memorycard                                     |

```
afsaccess1-73 datamining >: python Dhir_Charanpreet_midtermproj.py Transaction3.txt
```

## APRIORI ALGORITHM

Minimum Support taken for Algorithm : 50

Minimum Confidence taken for Algorithm : 50

Items and Total number of items in my data set :

```
{'Raspberrypi': 14, 'Memorycard': 16, 'Charger': 15, 'Powerbank': 12, 'Motherboard': 11, 'HDMICable': 14, 'Canakit': 12, 'CardReader': 13, 'Laptop': 11, 'Keyboard': 10}
```

ASSOCIATION RULE FOR THE FOLLOWING TRANSACTION WITH MIN SUPPORT 50 AND FOR MIN CONFIDENCE 50 is:

```
Support 70.0 Support 60 Confidence 86 ['Raspberrypi']=>['Memorycard']
Support 80.0 Support 60 Confidence 75 ['Memorycard']=>['Raspberrypi']
Support 70.0 Support 50 Confidence 71 ['Raspberrypi']=>['HDMICable']
Support 70.0 Support 50 Confidence 71 ['HDMICable']=>['Raspberrypi']
Support 70.0 Support 55 Confidence 79 ['Raspberrypi']=>['CardReader']
Support 65.0 Support 55 Confidence 85 ['CardReader']=>['Raspberrypi']
Support 80.0 Support 60 Confidence 75 ['Memorycard']=>['Charger']
Support 75.0 Support 60 Confidence 80 ['Charger']=>['Memorycard']
Support 80.0 Support 55 Confidence 69 ['Memorycard']=>['HDMICable']
Support 70.0 Support 55 Confidence 79 ['HDMICable']=>['Memorycard']
Support 80.0 Support 55 Confidence 69 ['Memorycard']=>['CardReader']
Support 65.0 Support 55 Confidence 85 ['CardReader']=>['Memorycard']
Support 80.0 Support 50 Confidence 62 ['Memorycard']=>['Laptop']
Support 55.0 Support 50 Confidence 91 ['Laptop']=>['Memorycard']
Support 60.0 Support 55 Confidence 92 ['Powerbank']=>['Charger']
Support 75.0 Support 55 Confidence 73 ['Charger']=>['Powerbank']
Support 70.0 Support 50 Confidence 71 ['HDMICable']=>['Charger']
Support 75.0 Support 50 Confidence 67 ['Charger']=>['HDMICable']
Support 55.0 Support 55 Confidence 100 ['Laptop']=>['Charger']
Support 75.0 Support 55 Confidence 73 ['Charger']=>['Laptop']
Support 80.0 Support 50 Confidence 62 ['Memorycard']=>['Charger', 'Laptop']
Support 55.0 Support 50 Confidence 91 ['Laptop']=>['Charger', 'Memorycard']
Support 75.0 Support 50 Confidence 67 ['Charger']=>['Laptop', 'Memorycard']
Support 50.0 Support 50 Confidence 100 ['Laptop', 'Memorycard']=>['Charger']
Support 60.0 Support 50 Confidence 83 ['Charger', 'Memorycard']=>['Laptop']
Support 55.0 Support 50 Confidence 91 ['Charger', 'Laptop']=>['Memorycard']
```

# TRANSACTION DATABASE 4

Transaction4.txt x

```
1 Tide,Bounce,Diapers,Thrashbag,Batteries
2 Razor,Tide,Bounce,Powder,Diapers,Syrup,Batteries
3 Powder,Diapers,Lumify,Syrup,Thrashbag,Batteries
4 Powder,Lumify,Syrup,Thrashbag,Bandage
5 Razor,Powder,Bounce,Diapers,Syrup,Bandage,Batteries
6 Razor,Powder,Bounce,Diapers,Thrashbag,Bandage
7 Razor,Powder,Diapers,Bounce,Lumify,Thrashbag,Batteries
8 Razor,Tide,Bounce,Diapers,Lumify,Syrup,Batteries
9 Tide,Bounce,Lumify,Syrup,Thrashbag,Bandage,Batteries
10 Razor,Bounce,Diapers,Lumify,Syrup,Thrashbag,Bandage,Batteries
11 Powder,Bounce,Lumify,Syrup,Thrashbag
12 Razor,Tide,Bounce,Powder,Thrashbag,Bandage,Batteries
13 Razor,Powder,Bounce,Diapers,Lumify,Tide,Syrup
14 Razor,Powder,Bounce,Diapers,Syrup,Thrashbag,Bandage
15 Razor,Powder,Diapers,Lumify,Tide,Bounce,Thrashbag,Bandage
16 Razor,Tide,Bounce,Diapers,Bandage,Batteries
17 Razor,Tide,Diapers,Lumify,Powder,Syrup,Bandage,Batteries
18 Razor,Tide,Bounce,Diapers,Bandage,Batteries
19 Razor,Diapers,Bounce,Syrup,Bandage
20 Razor,Tide,Diapers,Lumify,Bounce,Bandage,Batteries
```

afsaccess1-78 datamining >: python Dhir\_Charanpreet\_midtermproj.py Transaction4.txt

### APRIORI ALGORITHM

Minimum Support taken for Algorithm : 40  
Minimum Confidence taken for Algorithm : 40

Items and Total number of items in my data set :

{'Tide': 11, 'Bounce': 17, 'Diapers': 16, 'Thrashbag': 11, 'Batteries': 13, 'Razor': 15, 'Powder': 12, 'Syrup': 12, 'Lumify': 11, 'Bandage': 13}

ASSOCIATION RULE FOR THE FOLLOWING TRANSACTION WITH MIN SUPPORT 40 AND FOR MIN CONFIDENCE 40 is:

|              |            |               |                            |
|--------------|------------|---------------|----------------------------|
| Support 55.0 | Support 50 | Confidence 91 | ['Tide']=>['Bounce']       |
| Support 85.0 | Support 50 | Confidence 59 | ['Bounce']=>['Tide']       |
| Support 55.0 | Support 45 | Confidence 82 | ['Tide']=>['Diapers']      |
| Support 80.0 | Support 45 | Confidence 56 | ['Diapers']=>['Tide']      |
| Support 55.0 | Support 45 | Confidence 82 | ['Tide']=>['Batteries']    |
| Support 65.0 | Support 45 | Confidence 69 | ['Batteries']=>['Tide']    |
| Support 55.0 | Support 45 | Confidence 82 | ['Tide']=>['Razor']        |
| Support 75.0 | Support 45 | Confidence 60 | ['Razor']=>['Tide']        |
| Support 80.0 | Support 70 | Confidence 88 | ['Diapers']=>['Bounce']    |
| Support 85.0 | Support 70 | Confidence 82 | ['Bounce']=>['Diapers']    |
| Support 55.0 | Support 45 | Confidence 82 | ['Thrashbag']=>['Bounce']  |
| Support 85.0 | Support 45 | Confidence 53 | ['Bounce']=>['Thrashbag']  |
| Support 85.0 | Support 55 | Confidence 65 | ['Bounce']=>['Batteries']  |
| Support 65.0 | Support 55 | Confidence 85 | ['Batteries']=>['Bounce']  |
| Support 75.0 | Support 70 | Confidence 93 | ['Razor']=>['Bounce']      |
| Support 85.0 | Support 70 | Confidence 82 | ['Bounce']=>['Razor']      |
| Support 60.0 | Support 45 | Confidence 75 | ['Powder']=>['Bounce']     |
| Support 85.0 | Support 45 | Confidence 53 | ['Bounce']=>['Powder']     |
| Support 60.0 | Support 45 | Confidence 75 | ['Syrup']=>['Bounce']      |
| Support 85.0 | Support 45 | Confidence 53 | ['Bounce']=>['Syrup']      |
| Support 55.0 | Support 40 | Confidence 73 | ['Lumify']=>['Bounce']     |
| Support 85.0 | Support 40 | Confidence 47 | ['Bounce']=>['Lumify']     |
| Support 85.0 | Support 55 | Confidence 65 | ['Bounce']=>['Bandage']    |
| Support 65.0 | Support 55 | Confidence 85 | ['Bandage']=>['Bounce']    |
| Support 80.0 | Support 55 | Confidence 69 | ['Diapers']=>['Batteries'] |
| Support 65.0 | Support 55 | Confidence 85 | ['Batteries']=>['Diapers'] |
| Support 75.0 | Support 70 | Confidence 93 | ['Razor']=>['Diapers']     |



|              |            |               |                                   |
|--------------|------------|---------------|-----------------------------------|
| Support 80.0 | Support 70 | Confidence 88 | ['Diapers']=>['Razor']            |
| Support 60.0 | Support 45 | Confidence 75 | ['Powder']=>['Diapers']           |
| Support 80.0 | Support 45 | Confidence 56 | ['Diapers']=>['Powder']           |
| Support 60.0 | Support 45 | Confidence 75 | ['Syrup']=>['Diapers']            |
| Support 80.0 | Support 45 | Confidence 56 | ['Diapers']=>['Syrup']            |
| Support 55.0 | Support 40 | Confidence 73 | ['Lumify']=>['Diapers']           |
| Support 80.0 | Support 40 | Confidence 50 | ['Diapers']=>['Lumify']           |
| Support 80.0 | Support 50 | Confidence 62 | ['Diapers']=>['Bandage']          |
| Support 65.0 | Support 50 | Confidence 77 | ['Bandage']=>['Diapers']          |
| Support 55.0 | Support 40 | Confidence 73 | ['Thrashbag']=>['Powder']         |
| Support 60.0 | Support 40 | Confidence 67 | ['Powder']=>['Thrashbag']         |
| Support 75.0 | Support 50 | Confidence 67 | ['Razor']=>['Batteries']          |
| Support 65.0 | Support 50 | Confidence 77 | ['Batteries']=>['Razor']          |
| Support 65.0 | Support 40 | Confidence 62 | ['Batteries']=>['Bandage']        |
| Support 65.0 | Support 40 | Confidence 62 | ['Bandage']=>['Batteries']        |
| Support 75.0 | Support 45 | Confidence 60 | ['Razor']=>['Powder']             |
| Support 60.0 | Support 45 | Confidence 75 | ['Powder']=>['Razor']             |
| Support 60.0 | Support 40 | Confidence 67 | ['Syrup']=>['Razor']              |
| Support 75.0 | Support 40 | Confidence 53 | ['Razor']=>['Syrup']              |
| Support 75.0 | Support 55 | Confidence 73 | ['Razor']=>['Bandage']            |
| Support 65.0 | Support 55 | Confidence 85 | ['Bandage']=>['Razor']            |
| Support 60.0 | Support 40 | Confidence 67 | ['Syrup']=>['Powder']             |
| Support 60.0 | Support 40 | Confidence 67 | ['Powder']=>['Syrup']             |
| Support 60.0 | Support 40 | Confidence 67 | ['Syrup']=>['Lumify']             |
| Support 55.0 | Support 40 | Confidence 73 | ['Lumify']=>['Syrup']             |
| Support 55.0 | Support 40 | Confidence 73 | ['Tide']=>['Bounce', 'Diapers']   |
| Support 80.0 | Support 40 | Confidence 50 | ['Diapers']=>['Bounce', 'Tide']   |
| Support 85.0 | Support 40 | Confidence 47 | ['Bounce']=>['Diapers', 'Tide']   |
| Support 45.0 | Support 40 | Confidence 89 | ['Diapers', 'Tide']=>['Bounce']   |
| Support 50.0 | Support 40 | Confidence 80 | ['Tide', 'Bounce']=>['Diapers']   |
| Support 70.0 | Support 40 | Confidence 57 | ['Diapers', 'Bounce']=>['Tide']   |
| Support 55.0 | Support 40 | Confidence 73 | ['Tide']=>['Batteries', 'Bounce'] |
| Support 85.0 | Support 40 | Confidence 47 | ['Bounce']=>['Batteries', 'Tide'] |
| Support 65.0 | Support 40 | Confidence 62 | ['Batteries']=>['Bounce', 'Tide'] |
| Support 50.0 | Support 40 | Confidence 80 | ['Tide', 'Bounce']=>['Batteries'] |
| Support 45.0 | Support 40 | Confidence 89 | ['Batteries', 'Tide']=>['Bounce'] |
| Support 55.0 | Support 40 | Confidence 73 | ['Batteries', 'Bounce']=>['Tide'] |
| Support 55.0 | Support 40 | Confidence 73 | ['Tide']=>['Bounce', 'Razor']     |
| Support 75.0 | Support 40 | Confidence 53 | ['Razor']=>['Bounce', 'Tide']     |
| Support 85.0 | Support 40 | Confidence 47 | ['Bounce']=>['Razor', 'Tide']     |
| Support 45.0 | Support 40 | Confidence 89 | ['Tide', 'Razor']=>['Bounce']     |
| Support 50.0 | Support 40 | Confidence 80 | ['Tide', 'Bounce']=>['Razor']     |
| Support 70.0 | Support 40 | Confidence 57 | ['Razor', 'Bounce']=>['Tide']     |



|              |            |               |   |
|--------------|------------|---------------|---|
| Support 85.0 | Support 40 | Confidence 47 | ['Bounce']=>['Razor', 'Tide']                 |
| Support 45.0 | Support 40 | Confidence 89 | ['Tide', 'Razor']=>['Bounce']                 |
| Support 50.0 | Support 40 | Confidence 80 | ['Tide', 'Bounce']=>['Razor']                 |
| Support 70.0 | Support 40 | Confidence 57 | ['Razor', 'Bounce']=>['Tide']                 |
| Support 55.0 | Support 40 | Confidence 73 | ['Tide']=>['Diapers', 'Razor']                |
| Support 75.0 | Support 40 | Confidence 53 | ['Razor']=>['Diapers', 'Tide']                |
| Support 80.0 | Support 40 | Confidence 50 | ['Diapers']=>['Razor', 'Tide']                |
| Support 45.0 | Support 40 | Confidence 89 | ['Tide', 'Razor']=>['Diapers']                |
| Support 45.0 | Support 40 | Confidence 89 | ['Diapers', 'Tide']=>['Razor']                |
| Support 70.0 | Support 40 | Confidence 57 | ['Diapers', 'Razor']=>['Tide']                |
| Support 80.0 | Support 45 | Confidence 56 | ['Diapers']=>['Batteries', 'Bounce']          |
| Support 85.0 | Support 45 | Confidence 53 | ['Bounce']=>['Batteries', 'Diapers']          |
| Support 65.0 | Support 45 | Confidence 69 | ['Batteries']=>['Bounce', 'Diapers']          |
| Support 70.0 | Support 45 | Confidence 64 | ['Diapers', 'Bounce']=>['Batteries']          |
| Support 55.0 | Support 45 | Confidence 82 | ['Batteries', 'Diapers']=>['Bounce']          |
| Support 55.0 | Support 45 | Confidence 82 | ['Batteries', 'Bounce']=>['Diapers']          |
| Support 75.0 | Support 65 | Confidence 87 | ['Razor']=>['Bounce', 'Diapers']              |
| Support 80.0 | Support 65 | Confidence 81 | ['Diapers']=>['Bounce', 'Razor']              |
| Support 85.0 | Support 65 | Confidence 76 | ['Bounce']=>['Diapers', 'Razor']              |
| Support 70.0 | Support 65 | Confidence 93 | ['Diapers', 'Razor']=>['Bounce']              |
| Support 70.0 | Support 65 | Confidence 93 | ['Razor', 'Bounce']=>['Diapers']              |
| Support 70.0 | Support 65 | Confidence 93 | ['Diapers', 'Bounce']=>['Razor']              |
| Support 80.0 | Support 45 | Confidence 56 | ['Diapers']=>['Bandage', 'Bounce']            |
| Support 85.0 | Support 45 | Confidence 53 | ['Bounce']=>['Bandage', 'Diapers']            |
| Support 65.0 | Support 45 | Confidence 69 | ['Bandage']=>['Bounce', 'Diapers']            |
| Support 70.0 | Support 45 | Confidence 64 | ['Diapers', 'Bounce']=>['Bandage']            |
| Support 50.0 | Support 45 | Confidence 90 | ['Diapers', 'Bandage']=>['Bounce']            |
| Support 55.0 | Support 45 | Confidence 82 | ['Bandage', 'Bounce']=>['Diapers']            |
| Support 75.0 | Support 40 | Confidence 53 | ['Razor']=>['Batteries', 'Bounce', 'Diapers'] |
| Support 80.0 | Support 40 | Confidence 50 | ['Diapers']=>['Batteries', 'Bounce', 'Razor'] |
| Support 85.0 | Support 40 | Confidence 47 | ['Bounce']=>['Batteries', 'Diapers', 'Razor'] |
| Support 65.0 | Support 40 | Confidence 62 | ['Batteries']=>['Bounce', 'Diapers', 'Razor'] |
| Support 70.0 | Support 40 | Confidence 57 | ['Diapers', 'Razor']=>['Batteries', 'Bounce'] |
| Support 70.0 | Support 40 | Confidence 57 | ['Razor', 'Bounce']=>['Batteries', 'Diapers'] |
| Support 70.0 | Support 40 | Confidence 57 | ['Diapers', 'Bounce']=>['Batteries', 'Razor'] |
| Support 50.0 | Support 40 | Confidence 80 | ['Batteries', 'Razor']=>['Bounce', 'Diapers'] |
| Support 55.0 | Support 40 | Confidence 73 | ['Batteries', 'Diapers']=>['Bounce', 'Razor'] |
| Support 55.0 | Support 40 | Confidence 73 | ['Batteries', 'Bounce']=>['Diapers', 'Razor'] |
| Support 65.0 | Support 40 | Confidence 62 | ['Diapers', 'Razor', 'Bounce']=>['Batteries'] |
| Support 45.0 | Support 40 | Confidence 89 | ['Batteries', 'Razor', 'Diapers']=>['Bounce'] |
| Support 45.0 | Support 40 | Confidence 89 | ['Batteries', 'Razor', 'Bounce']=>['Diapers'] |
| Support 45.0 | Support 40 | Confidence 89 | ['Batteries', 'Bounce', 'Diapers']=>['Razor'] |
| Support 75.0 | Support 45 | Confidence 60 | ['Razor']=>['Bandage', 'Bounce', 'Diapers']   |

|              |            |                |   |
|--------------|------------|----------------|---|
| Support 75.0 | Support 45 | Confidence 60  | ['Razor']=>['Bandage', 'Bounce', 'Diapers'] |
| Support 80.0 | Support 45 | Confidence 56  | ['Diapers']=>['Bandage', 'Bounce', 'Razor'] |
| Support 85.0 | Support 45 | Confidence 53  | ['Bounce']=>['Bandage', 'Diapers', 'Razor'] |
| Support 65.0 | Support 45 | Confidence 69  | ['Bandage']=>['Bounce', 'Diapers', 'Razor'] |
| Support 70.0 | Support 45 | Confidence 64  | ['Diapers', 'Razor']=>['Bandage', 'Bounce'] |
| Support 70.0 | Support 45 | Confidence 64  | ['Razor', 'Bounce']=>['Bandage', 'Diapers'] |
| Support 70.0 | Support 45 | Confidence 64  | ['Diapers', 'Bounce']=>['Bandage', 'Razor'] |
| Support 55.0 | Support 45 | Confidence 82  | ['Bandage', 'Razor']=>['Bounce', 'Diapers'] |
| Support 50.0 | Support 45 | Confidence 90  | ['Diapers', 'Bandage']=>['Bounce', 'Razor'] |
| Support 55.0 | Support 45 | Confidence 82  | ['Bandage', 'Bounce']=>['Diapers', 'Razor'] |
| Support 65.0 | Support 45 | Confidence 69  | ['Diapers', 'Razor', 'Bounce']=>['Bandage'] |
| Support 50.0 | Support 45 | Confidence 90  | ['Diapers', 'Bandage', 'Razor']=>['Bounce'] |
| Support 50.0 | Support 45 | Confidence 90  | ['Bandage', 'Razor', 'Bounce']=>['Diapers'] |
| Support 45.0 | Support 45 | Confidence 100 | ['Diapers', 'Bandage', 'Bounce']=>['Razor'] |
| Support 75.0 | Support 45 | Confidence 60  | ['Razor']=>['Batteries', 'Bounce']          |
| Support 85.0 | Support 45 | Confidence 53  | ['Bounce']=>['Batteries', 'Razor']          |
| Support 65.0 | Support 45 | Confidence 69  | ['Batteries']=>['Bounce', 'Razor']          |
| Support 70.0 | Support 45 | Confidence 64  | ['Razor', 'Bounce']=>['Batteries']          |
| Support 50.0 | Support 45 | Confidence 90  | ['Batteries', 'Razor']=>['Bounce']          |
| Support 55.0 | Support 45 | Confidence 82  | ['Batteries', 'Bounce']=>['Razor']          |
| Support 75.0 | Support 40 | Confidence 53  | ['Razor']=>['Bounce', 'Powder']             |
| Support 60.0 | Support 40 | Confidence 67  | ['Powder']=>['Bounce', 'Razor']             |
| Support 85.0 | Support 40 | Confidence 47  | ['Bounce']=>['Powder', 'Razor']             |
| Support 45.0 | Support 40 | Confidence 89  | ['Razor', 'Powder']=>['Bounce']             |
| Support 70.0 | Support 40 | Confidence 57  | ['Razor', 'Bounce']=>['Powder']             |
| Support 45.0 | Support 40 | Confidence 89  | ['Bounce', 'Powder']=>['Razor']             |
| Support 75.0 | Support 50 | Confidence 67  | ['Razor']=>['Bandage', 'Bounce']            |
| Support 85.0 | Support 50 | Confidence 59  | ['Bounce']=>['Bandage', 'Razor']            |
| Support 65.0 | Support 50 | Confidence 77  | ['Bandage']=>['Bounce', 'Razor']            |
| Support 70.0 | Support 50 | Confidence 71  | ['Razor', 'Bounce']=>['Bandage']            |
| Support 55.0 | Support 50 | Confidence 91  | ['Bandage', 'Razor']=>['Bounce']            |
| Support 55.0 | Support 50 | Confidence 91  | ['Bandage', 'Bounce']=>['Razor']            |
| Support 75.0 | Support 45 | Confidence 60  | ['Razor']=>['Batteries', 'Diapers']         |
| Support 80.0 | Support 45 | Confidence 56  | ['Diapers']=>['Batteries', 'Razor']         |
| Support 65.0 | Support 45 | Confidence 69  | ['Batteries']=>['Diapers', 'Razor']         |
| Support 70.0 | Support 45 | Confidence 64  | ['Diapers', 'Razor']=>['Batteries']         |
| Support 50.0 | Support 45 | Confidence 90  | ['Batteries', 'Razor']=>['Diapers']         |
| Support 55.0 | Support 45 | Confidence 82  | ['Batteries', 'Diapers']=>['Razor']         |
| Support 75.0 | Support 40 | Confidence 53  | ['Razor']=>['Diapers', 'Powder']            |
| Support 60.0 | Support 40 | Confidence 67  | ['Powder']=>['Diapers', 'Razor']            |
| Support 80.0 | Support 40 | Confidence 50  | ['Diapers']=>['Powder', 'Razor']            |
| Support 45.0 | Support 40 | Confidence 89  | ['Razor', 'Powder']=>['Diapers']            |
| Support 70.0 | Support 40 | Confidence 57  | ['Diapers', 'Razor']=>['Powder']            |

```

2. afsaccess1.njit.edu (On Campus)
Support 70.0 Support 40 Confidence 57 ['Diapers', 'Razor']=>['Powder']
Support 45.0 Support 40 Confidence 89 ['Diapers', 'Powder']=>['Razor']
Support 60.0 Support 40 Confidence 67 ['Syrup']=>['Diapers', 'Razor']
Support 75.0 Support 40 Confidence 53 ['Razor']=>['Diapers', 'Syrup']
Support 80.0 Support 40 Confidence 50 ['Diapers']=>['Razor', 'Syrup']
Support 40.0 Support 40 Confidence 100 ['Razor', 'Syrup']=>['Diapers']
Support 45.0 Support 40 Confidence 89 ['Diapers', 'Syrup']=>['Razor']
Support 70.0 Support 40 Confidence 57 ['Diapers', 'Razor']=>['Syrup']
Support 75.0 Support 50 Confidence 67 ['Razor']=>['Bandage', 'Diapers']
Support 80.0 Support 50 Confidence 62 ['Diapers']=>['Bandage', 'Razor']
Support 65.0 Support 50 Confidence 77 ['Bandage']=>['Diapers', 'Razor']
Support 70.0 Support 50 Confidence 71 ['Diapers', 'Razor']=>['Bandage']
Support 55.0 Support 50 Confidence 91 ['Bandage', 'Razor']=>['Diapers']
Support 50.0 Support 50 Confidence 100 ['Diapers', 'Bandage']=>['Razor']
Support 75.0 Support 40 Confidence 53 ['Razor']=>['Batteries', 'Bounce', 'Diapers']
Support 80.0 Support 40 Confidence 50 ['Diapers']=>['Batteries', 'Bounce', 'Razor']
Support 85.0 Support 40 Confidence 47 ['Bounce']=>['Batteries', 'Diapers', 'Razor']
Support 65.0 Support 40 Confidence 62 ['Batteries']=>['Bounce', 'Diapers', 'Razor']
Support 70.0 Support 40 Confidence 57 ['Diapers', 'Razor']=>['Batteries', 'Bounce']
Support 70.0 Support 40 Confidence 57 ['Razor', 'Bounce']=>['Batteries', 'Diapers']
Support 70.0 Support 40 Confidence 57 ['Diapers', 'Bounce']=>['Batteries', 'Razor']
Support 50.0 Support 40 Confidence 80 ['Batteries', 'Razor']=>['Bounce', 'Diapers']
Support 55.0 Support 40 Confidence 73 ['Batteries', 'Diapers']=>['Bounce', 'Razor']
Support 55.0 Support 40 Confidence 73 ['Batteries', 'Bounce']=>['Diapers', 'Razor']
Support 65.0 Support 40 Confidence 62 ['Diapers', 'Razor', 'Bounce']=>['Batteries']
Support 45.0 Support 40 Confidence 89 ['Batteries', 'Razor', 'Diapers']=>['Bounce']
Support 45.0 Support 40 Confidence 89 ['Batteries', 'Razor', 'Bounce']=>['Diapers']
Support 45.0 Support 40 Confidence 89 ['Batteries', 'Bounce', 'Diapers']=>['Razor']
Support 75.0 Support 45 Confidence 60 ['Razor']=>['Bandage', 'Bounce', 'Diapers']
Support 80.0 Support 45 Confidence 56 ['Diapers']=>['Bandage', 'Bounce', 'Razor']
Support 85.0 Support 45 Confidence 53 ['Bounce']=>['Bandage', 'Diapers', 'Razor']
Support 65.0 Support 45 Confidence 69 ['Bandage']=>['Bounce', 'Diapers', 'Razor']
Support 70.0 Support 45 Confidence 64 ['Diapers', 'Razor']=>['Bandage', 'Bounce']
Support 70.0 Support 45 Confidence 64 ['Razor', 'Bounce']=>['Bandage', 'Diapers']
Support 70.0 Support 45 Confidence 64 ['Diapers', 'Bounce']=>['Bandage', 'Razor']
Support 55.0 Support 45 Confidence 82 ['Bandage', 'Razor']=>['Bounce', 'Diapers']
Support 50.0 Support 45 Confidence 90 ['Diapers', 'Bandage']=>['Bounce', 'Razor']
Support 55.0 Support 45 Confidence 82 ['Bandage', 'Bounce']=>['Diapers', 'Razor']
Support 65.0 Support 45 Confidence 69 ['Diapers', 'Razor', 'Bounce']=>['Bandage']
Support 50.0 Support 45 Confidence 90 ['Diapers', 'Bandage', 'Razor']=>['Bounce']
Support 50.0 Support 45 Confidence 90 ['Bandage', 'Razor', 'Bounce']=>['Diapers']
Support 45.0 Support 45 Confidence 100 ['Diapers', 'Bandage', 'Bounce']=>['Razor']
afsaccess1-78 datamining >:

```

# TRANSACTION DATABASE 5

Transaction5.txt

```
1 Laptop, Projector, Desktop, TV, Headphone, Remotes, Printer
2 Routers, Laptop, Projector, Desktop, VideoGame, TV, Headphone, Remotes, Printer
3 Laptop, Projector, Desktop, Speaker, TV, Remotes, Routers
4 Laptop, Projector, Desktop, TV, VideoGame, Remotes, Routers
5 Laptop, Desktop, TV, VideoGame, Headphone, Remotes
6 Laptop, Projector, Desktop, Speaker, VideoGame, Headphone, Printer
7 Printer, Laptop, Speaker, Desktop, TV, VideoGame, Headphone, Routers
8 Projector, TV, VideoGame, Headphone
9 Printer, Speaker, VideoGame, Remotes, Routers
10 Speaker, Projector, Desktop, VideoGame, Headphone, Routers
11 Laptop, Printer, Projector, Speaker, Routers
12 Laptop, Projector, TV, Headphone, Remotes, Routers
13 Laptop, Projector, VideoGame, Headphone, Remotes, Printer
14 Desktop, TV, VideoGame, Headphone, Remotes, Printer
15 Printer, Projector, Speaker, Headphone, Remotes, Routers
16 Speaker, Desktop, VideoGame, TV, Headphone, Remotes
17 Routers, Laptop, TV, VideoGame, Headphone, Remotes, Printer
18 Laptop, Projector, Speaker, Desktop, Remotes, Routers
19 Projector, VideoGame, TV, Headphone, Remotes
20 Projector, Desktop, Speaker, VideoGame, TV, Routers
```



## APRIORI ALGORITHM

Minimum Support taken for Algorithm : 45  
Minimum Confidence taken for Algorithm : 45

Items and Total number of items in my data set :

{'Laptop': 12, 'Projector': 14, 'Desktop': 12, 'TV': 13, 'Headphone': 14, 'Remotes': 14, 'Printer': 10, 'Routers': 12, 'VideoGame': 14, 'Speaker': 10}

ASSOCIATION RULE FOR THE FOLLOWING TRANSACTION WITH MIN SUPPORT 45 AND FOR MIN CONFIDENCE 45 is:

|              |            |               |                              |
|--------------|------------|---------------|------------------------------|
| Support 70.0 | Support 45 | Confidence 64 | ['Projector']=>['Laptop']    |
| Support 60.0 | Support 45 | Confidence 75 | ['Laptop']=>['Projector']    |
| Support 70.0 | Support 45 | Confidence 64 | ['Remotes']=>['Laptop']      |
| Support 60.0 | Support 45 | Confidence 75 | ['Laptop']=>['Remotes']      |
| Support 70.0 | Support 45 | Confidence 64 | ['Projector']=>['Headphone'] |
| Support 70.0 | Support 45 | Confidence 64 | ['Headphone']=>['Projector'] |
| Support 70.0 | Support 45 | Confidence 64 | ['Remotes']=>['Projector']   |
| Support 70.0 | Support 45 | Confidence 64 | ['Projector']=>['Remotes']   |
| Support 60.0 | Support 45 | Confidence 75 | ['Routers']=>['Projector']   |
| Support 70.0 | Support 45 | Confidence 64 | ['Projector']=>['Routers']   |
| Support 65.0 | Support 45 | Confidence 69 | ['TV']=>['Desktop']          |
| Support 60.0 | Support 45 | Confidence 75 | ['Desktop']=>['TV']          |
| Support 70.0 | Support 45 | Confidence 64 | ['VideoGame']=>['Desktop']   |
| Support 60.0 | Support 45 | Confidence 75 | ['Desktop']=>['VideoGame']   |
| Support 65.0 | Support 50 | Confidence 77 | ['TV']=>['Headphone']        |
| Support 70.0 | Support 50 | Confidence 71 | ['Headphone']=>['TV']        |
| Support 65.0 | Support 50 | Confidence 77 | ['TV']=>['Remotes']          |
| Support 70.0 | Support 50 | Confidence 71 | ['Remotes']=>['TV']          |
| Support 70.0 | Support 50 | Confidence 71 | ['VideoGame']=>['TV']        |
| Support 65.0 | Support 50 | Confidence 77 | ['TV']=>['VideoGame']        |
| Support 70.0 | Support 50 | Confidence 71 | ['Remotes']=>['Headphone']   |
| Support 70.0 | Support 50 | Confidence 71 | ['Headphone']=>['Remotes']   |
| Support 70.0 | Support 55 | Confidence 79 | ['VideoGame']=>['Headphone'] |
| Support 70.0 | Support 55 | Confidence 79 | ['Headphone']=>['VideoGame'] |
| Support 70.0 | Support 45 | Confidence 64 | ['VideoGame']=>['Remotes']   |
| Support 70.0 | Support 45 | Confidence 64 | ['Remotes']=>['VideoGame']   |

afsaccess1-80 datamining >: █

# Code for Apriori Algorithm

Dhir\_Charanpreet\_midtermproj.py

```
1 import itertools
2 import sys
3
4 def scanningmyitems(Hashed_values, min_Sup, T_items, new_val): #creating frequent item set by checking minimum support
5     appearedlist = []
6     removed = []
7     Total_transaction= len(T_items)
8     for val in range(len(Hashed_values)):
9         if val%2 !=0:
10             support = (Hashed_values[val] / Total_transaction)*100
11             if support >= min_Sup:
12                 appearedlist.append(Hashed_values[val-1])
13                 appearedlist.append(Hashed_values[val])
14             else :
15                 removed.append(Hashed_values[val-1]) #storing values that do not satisfy the function
16     for i in appearedlist:
17         new_val.append(i)
18     # print("new_val:", new_val)
19     # print("appearedlist:", appearedlist)
20     # print("removed",removed)
21     if len(appearedlist) == 2 or len(appearedlist) == 0:
22         ret_val = new_val
23         return ret_val
24
25     else:
26         newsetofvalues(T_items, removed, appearedlist, min_Sup)#sending the frequent itemsets, removedsets and all the items
27
28 def newsetofvalues(T_items, removed, appearedlist, min_Sup): #Generate candidate set for the new generated appeared items in the database
29     newfromold = []
30     combine = []
31     candidate_array = []
32     Total_transaction= len(T_items)
33     for val in range(len(appearedlist)):
```



```

34     if val%2 == 0:
35         newfromold.append(appearedlist[val])
36 for new_item in newfromold:
37     tempArray = []
38     k = newfromold.index(new_item)
39     for val in range(k + 1, len(newfromold)):
40         for j in new_item:
41             if j not in tempArray:
42                 tempArray.append(j)
43         for m in newfromold[val]:
44             if m not in tempArray:
45                 tempArray.append(m)
46         combine.append(tempArray)
47         tempArray = []
48 sortedArray = []
49 uniqueArray = []
50 for val in combine:
51     sortedArray.append(sorted(val))
52 for i in sortedArray:
53     if i not in uniqueArray:
54         uniqueArray.append(i)
55 combine = uniqueArray
56 for new_item in combine:
57     count = 0
58     for transaction in T_items:
59         if set(new_item).issubset(set(transaction)):
60             count = count + 1
61     if count != 0:
62         candidate_array.append(new_item)
63         candidate_array.append(count)
64 scanningmyitems(candidate_array, min_Sup, T_items, new_val)
65
66

```

```

67 def Set_association(new_val):# This generates Association Rules for all the appeared frequent item sets
68     Association_Rule = []
69     for items in new_val:
70         if isinstance(items, list):
71             if len(items) != 0:
72                 term = len(items) - 1
73                 while term > 0:
74                     combinations = list(itertools.combinations(items, term))
75                     temporary = []
76                     valuesinone = []
77                     for otherval in combinations:
78                         valuesinone = set(items) - set(otherval)
79                         temporary.append(list(valuesinone))
80                         temporary.append(list(otherval))
81                         Association_Rule.append(temporary)
82                         temporary = []
83                     term = term - 1
84     # print("here i print",Association_Rule)
85     return Association_Rule
86
87 def Output(set_for_association, T_items, min_Sup, min_Conf): #creates output for the association rule
88     Total_transaction= len(T_items)
89     returnOutput = []
90     for association in set_for_association:
91         Numeratorofsingle = 0
92         Percentage_Numeratorofsingle = 0
93         Numeratorofdouple = 0
94         Percentage_Numeratorofdouple = 0
95         for item in T_items:
96             if set(association[0]).issubset(set(item)):
97                 Numeratorofsingle = Numeratorofsingle + 1
98             if set(association[0] + association[1]).issubset(set(item)):
99                 Numeratorofdouple = Numeratorofdouple + 1

```

```

100 Percentage_Numeratorofsingle = (Numeratorofsingle / Total_transaction) * 100
101 Percentage_Numeratorofdoubble = (Numeratorofdoubble / Total_transaction) * 100
102 conf = (Percentage_Numeratorofdoubble / Percentage_Numeratorofsingle) * 100
103 if conf >= min_Conf:
104     Numeratorofsingle_join = "Support " + str(round(Percentage_Numeratorofsingle, 2))
105     Numeratorofdoubble_join = "Support " + str(round(Percentage_Numeratorofdoubble))
106     Confidence_join = "Confidence " + str(round(conf))
107
108     returnOutput.append(Numeratorofsingle_join)
109     returnOutput.append(Numeratorofdoubble_join)
110     returnOutput.append(Confidence_join)
111     returnOutput.append(association)
112
113 return returnOutput
114
115 def printreport(AprioriOutput): #prints the output
116     count = 1
117     if len(AprioriOutput) == 0:
118         print("For given value of Confidence and support no Association_Rule")
119     else:
120         print("\n \t ASSOCIATION RULE FOR THE FOLLOWING TRANSACTION WITH MIN SUPPORT",min_Sup," AND FOR MIN CONFIDENCE",min_Conf,"is: \n\n ")
121         for val in AprioriOutput:
122             if count == 4:
123                 print(str(val[0]) + "=>" + str(val[1]))
124                 count = 0
125             else:
126                 print(val, end=' ')
127             count = count + 1
128 Database=sys.argv[1];
129
130 with open(Database,'r') as DB: #fileobject to open file
131     values = DB.readlines() #readlines method to read line in file until end of file
132

```

```

132 print("\n \t \t \t \t \t APRIORI ALGORITHM \n")
133 min_Sup = int(input('Minimum Support taken for Algorithm : '))
134 min_Conf = int(input('Minimum Confidence taken for Algorithm : '))
135
136 T_items = [];
137 for item in values: #for every item in the database
138     item = item.strip() #removes characters from starting and the end
139     T_items.append(item.split(",")) #stores item by removing the separations character (,)
140
141 #count_transac= len(open(Database).readlines( ))
142 Hash_Item = {}
143 Hashed_values = []
144 for items in T_items: #finding all items in database and how many times they appear
145     for Hash_key in items:
146         if Hash_key not in Hash_Item:
147             Hash_Item[Hash_key] = 1
148         else:
149             Hash_Item[Hash_key] = Hash_Item[Hash_key] + 1
150 for key in Hash_Item:
151     Store_val = []
152     Store_val.append(key)
153     Hashed_values.append(Store_val)
154     Hashed_values.append(Hash_Item[key])
155     Store_val = []
156 print (" \n Items and Total number of items in my data set : \n ")
157 print (Hash_Item)
158 print (" \n")
159 new_val=[]
160 num_items=float(len(T_items))
161 frequentItemSet = scanningmyitems(Hashed_values, min_Sup, T_items, new_val)
162 set_for_association = Set_association(new_val)
163 AprioriOutput = Output(set_for_association, T_items, min_Sup, min_Conf)
164 print_report=printreport(AprioriOutput)

```

# THANKYOU