Association Rule Learning
Apriori Intuition

ARL - What is it all about ?

191. Apriori Intuition

ARL - What is it all about ?

People who bought also bought ...

Playback Rate
1.5 x
4:07 / 18:13

ARL - Movie Recommendation

User ID	Movies liked
46578	Movie1, Movie2, Movie3, Movie4
98989	Movie1, Movie2
71527	Movie1, Movie2, Movie4
78981	Movie1, Movie2
89192	Movie2, Movie4
61557	Movie1, Movie3

Potential Rules:

Movie1 → Movie2

Movie2 → Movie4

Movie1 → Movie3

ARL - Market Basket Optimisation

Transaction ID	Products purchased
46578	Burgers, French Fries, Vegetables
98989	Burgers, French Fries, Ketchup
71527	Vegetables, Fruits
78981	Pasta, Fruits, Butter, Vegetables
89192	Burgers, Pasta, French Fries
61557	Fruits, Orange Juice, Vegetables
87923	Burgers, French Fries, Ketchup, Mayo

Potential Rules:

Burgers → French Fries

Vegetables → Fruits

Burgers, French Fries → Ketchup

Apriori - Support

Here M : sets of two or more than two movies

Movie Recommendation:

$$\text{support}(\boldsymbol{M}) = \frac{\#\ \text{user watchlists containing } \boldsymbol{M}}{\#\ \text{user watchlists}}$$

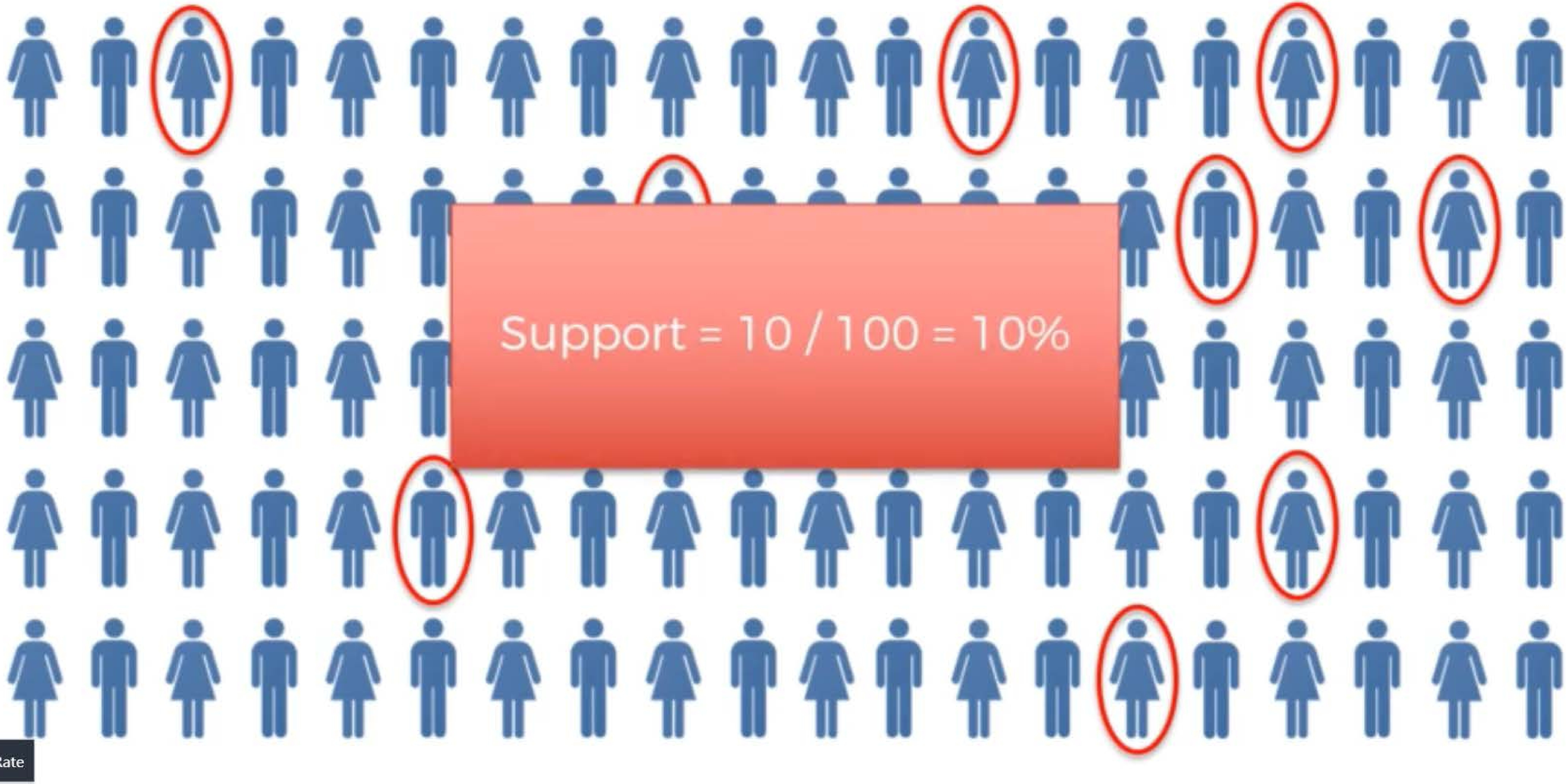
Here P : sets of two or more than two Transactions

Market Basket Optimisation:

$$\text{support}(\boldsymbol{I}) = \frac{\#\ \text{transactions containing } \boldsymbol{I}}{\#\ \text{transactions}}$$

191. Apriori Intuition

Apriori - Support



Support = 10 / 100 = 10%

Playback Rate

1.5 × 8:11 / 18:13

Apriori - Confidence

Movie Recommendation: $\mathrm{confidence}(\boldsymbol{M_1} \rightarrow \boldsymbol{M_2}) = \dfrac{\#\text{ user watchlists containing } \boldsymbol{M_1} \text{ and } \boldsymbol{M_2}}{\#\text{ user watchlists containing } \boldsymbol{M_1}}$

Market Basket Optimisation: $\mathrm{confidence}(\boldsymbol{I_1} \rightarrow \boldsymbol{I_2}) = \dfrac{\#\text{ transactions containing } \boldsymbol{I_1} \text{ and } \boldsymbol{I_2}}{\#\text{ transactions containing } \boldsymbol{I_1}}$

Apriori - Confidence

Confidence = 7 / 40 = 17.5%

Apriori - Lift

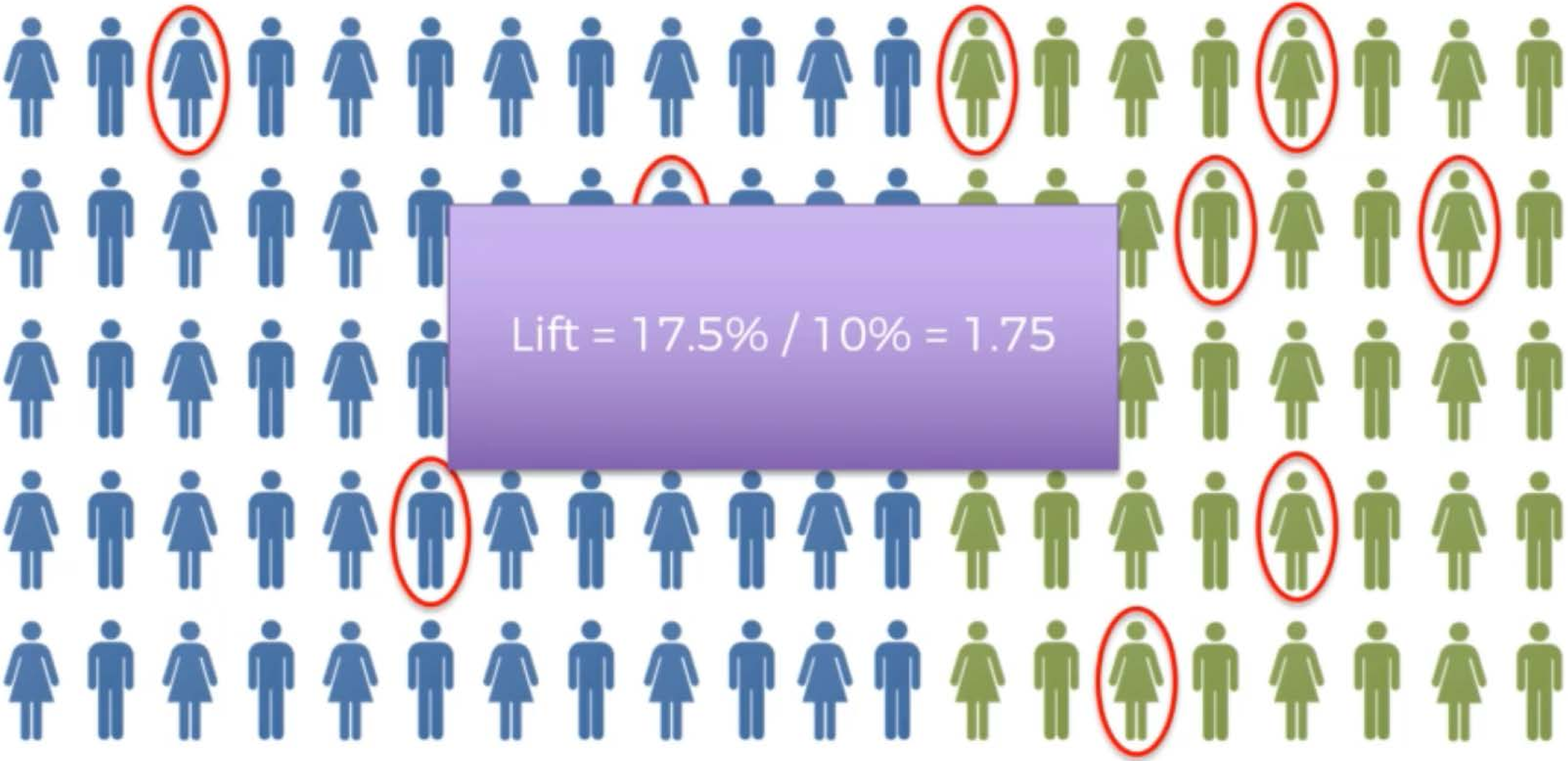
Movie Recommendation:

$$\text{lift}(\boldsymbol{M_1} \rightarrow \boldsymbol{M_2}) = \frac{\text{confidence}(\boldsymbol{M_1} \rightarrow \boldsymbol{M_2})}{\text{support}(\boldsymbol{M_2})}$$

Market Basket Optimisation:

$$\text{lift}(\boldsymbol{I_1} \rightarrow \boldsymbol{I_2}) = \frac{\text{confidence}(\boldsymbol{I_1} \rightarrow \boldsymbol{I_2})}{\text{support}(\boldsymbol{I_2})}$$

Apriori - Lift



Lift = 17.5% / 10% = 1.75

Apriori - Algorithm

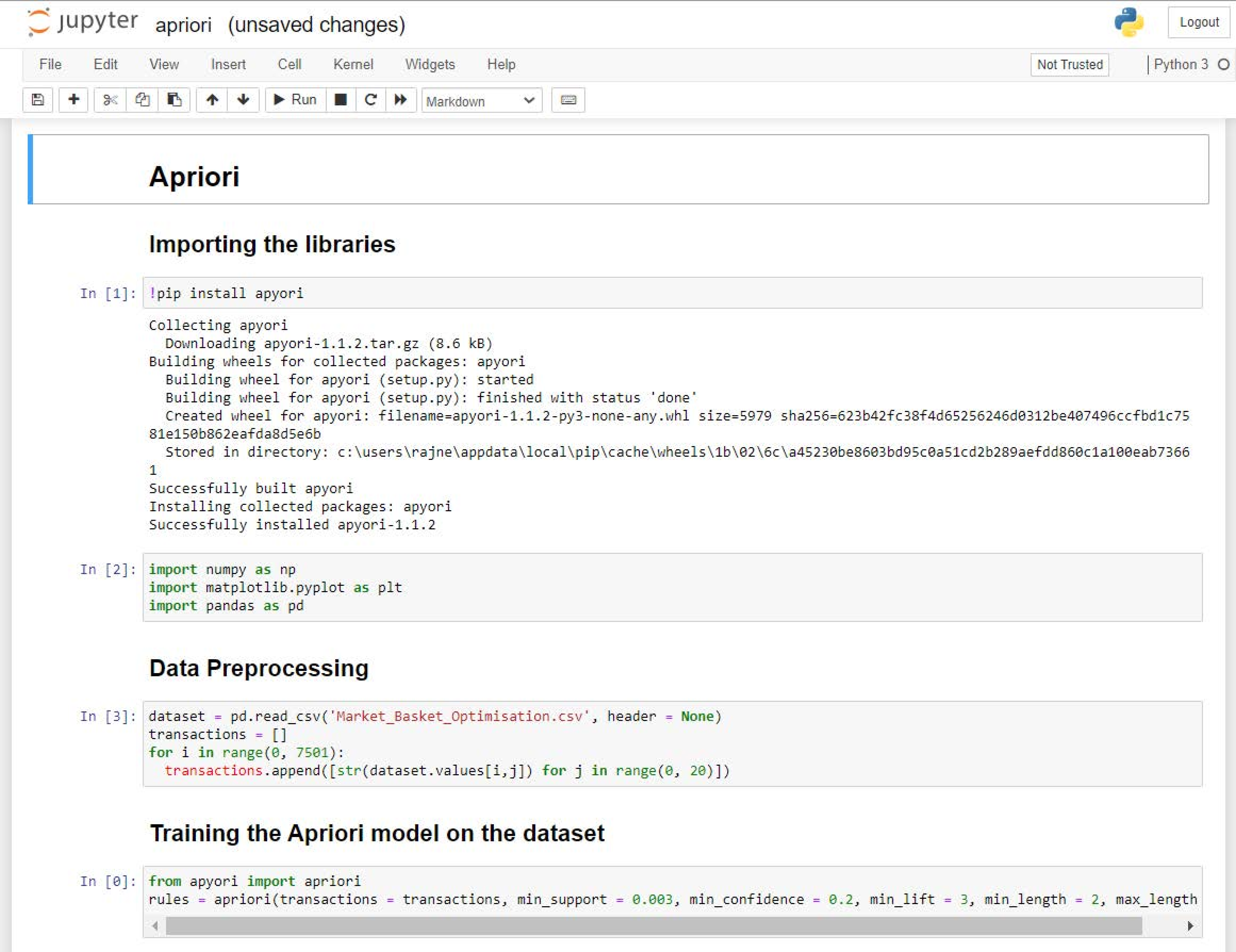
Step 1: Set a minimum support and confidence

Step 2: Take all the subsets in transactions having higher support than minimum support

Step 3: Take all the rules of these subsets having higher confidence than minimum confidence

Step 4: Sort the rules by decreasing lift

Playback Rate



Apriori

Importing the libraries

In [1]:
```
!pip install apyori
```

```
Collecting apyori
  Downloading apyori-1.1.2.tar.gz (8.6 kB)
Building wheels for collected packages: apyori
  Building wheel for apyori (setup.py): started
  Building wheel for apyori (setup.py): finished with status 'done'
  Created wheel for apyori: filename=apyori-1.1.2-py3-none-any.whl size=5979 sha256=623b42fc38f4d65256246d0312be407496ccfbd1c75
81e150b862eafda8d5e6b
  Stored in directory: c:\users\rajne\appdata\local\pip\cache\wheels\1b\02\6c\a45230be8603bd95c0a51cd2b289aefdd860c1a100eab7366
1
Successfully built apyori
Installing collected packages: apyori
Successfully installed apyori-1.1.2
```

In [2]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
```

Data Preprocessing

In [3]:
```
dataset = pd.read_csv('Market_Basket_Optimisation.csv', header = None)
transactions = []
for i in range(0, 7501):
  transactions.append([str(dataset.values[i,j]) for j in range(0, 20)])
```

Training the Apriori model on the dataset

In [0]:
```
from apyori import apriori
rules = apriori(transactions = transactions, min_support = 0.003, min_confidence = 0.2, min_lift = 3, min_length = 2, max_length
```

Association Rule Learning
Eclat Intuition

Eclat - Support

Movie Recommendation: $$\text{support}(\boldsymbol{M}) = \frac{\#\ \text{user watchlists containing } \boldsymbol{M}}{\#\ \text{user watchlists}}$$

Market Basket Optimisation: $$\text{support}(\boldsymbol{I}) = \frac{\#\ \text{transactions containing } \boldsymbol{I}}{\#\ \text{transactions}}$$

Eclat - Algorithm

Step 1: Set a minimum support

Step 2: Take all the subsets in transactions having higher support than minimum support

Step 3: Sort these subsets by decreasing support