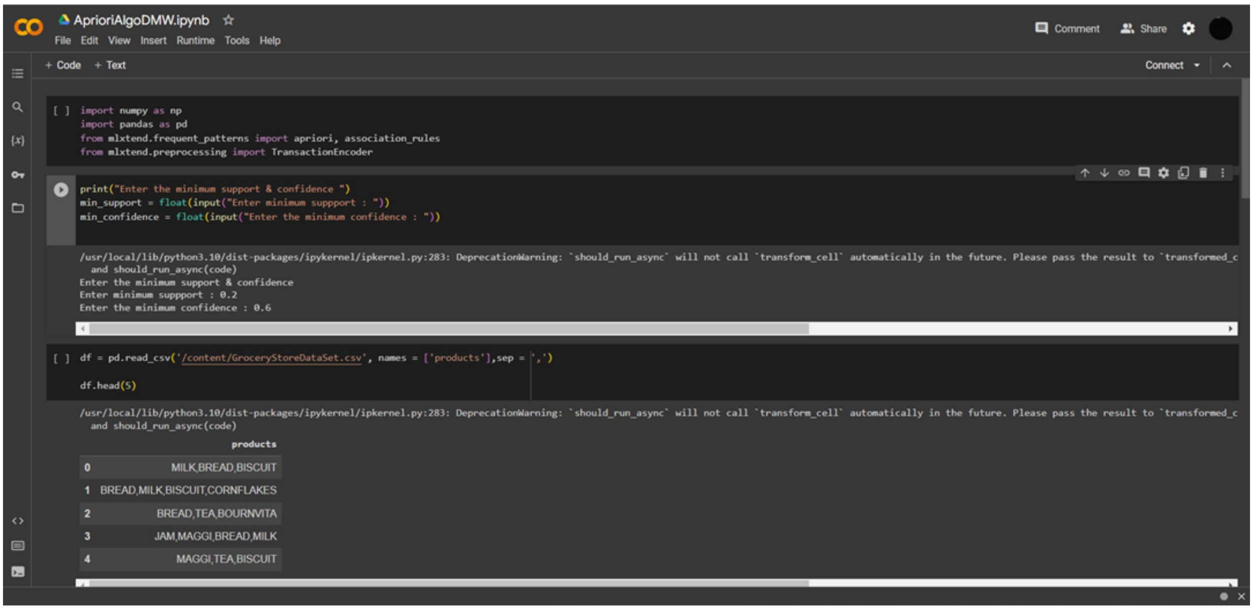
Experiment 6

Apriori Algorithm



```
[ ] import numpy as np
    import pandas as pd
    from mlxtend.frequent_patterns import apriori, association_rules
    from mlxtend.preprocessing import TransactionEncoder
```

```
print("Enter the minimum support & confidence ")
min_support = float(input("Enter minimum suppport : "))
min_confidence = float(input("Enter the minimum confidence : "))
```

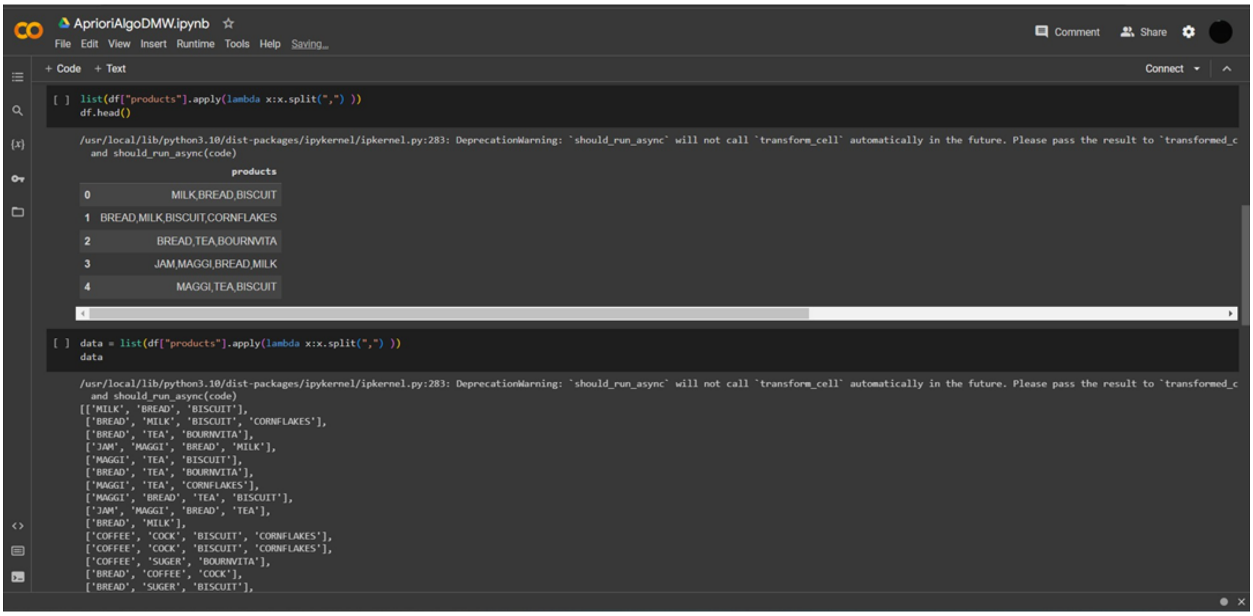
```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_cell` automatically in the future. Please pass the result to `transformed_c
  and should_run_async(code)
Enter the minimum support & confidence
Enter minimum suppport : 0.2
Enter the minimum confidence : 0.6
```

```
[ ] df = pd.read_csv('/content/GroceryStoreDataSet.csv', names = ['products'],sep = ',')

    df.head(5)
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_cell` automatically in the future. Please pass the result to `transformed_c
  and should_run_async(code)
```

	products
0	MILK,BREAD,BISCUIT
1	BREAD,MILK,BISCUIT,CORNFLAKES
2	BREAD,TEA,BOURNVITA
3	JAM,MAGGI,BREAD,MILK
4	MAGGI,TEA,BISCUIT



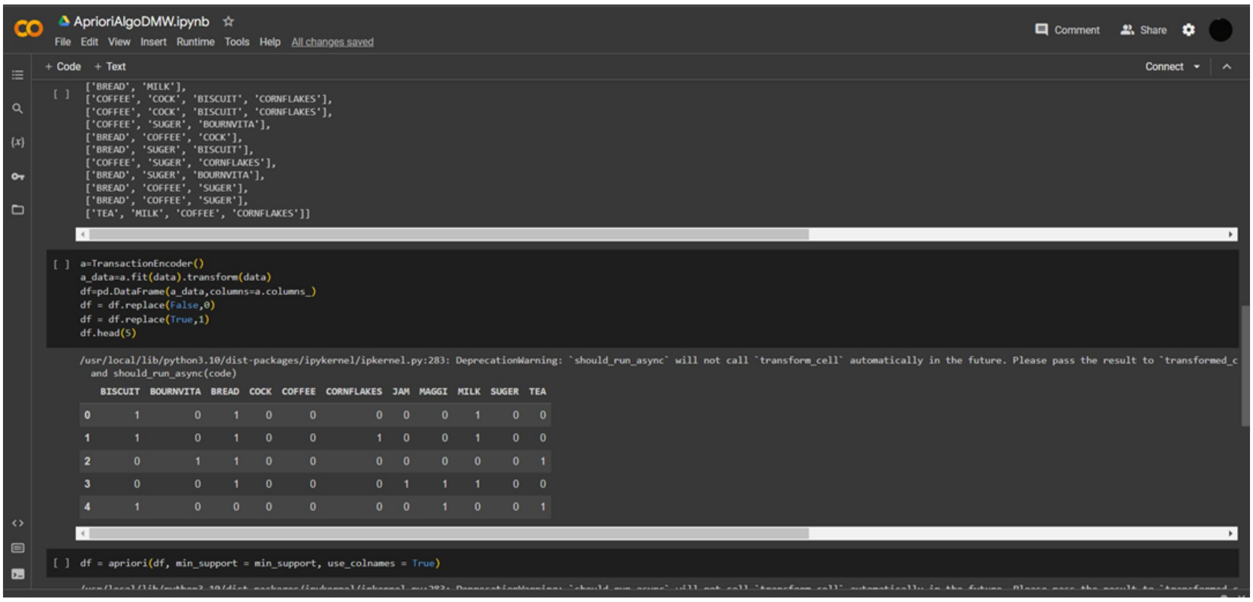
```
[ ] list(df["products"].apply(lambda x:x.split(",") ))
    df.head()
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_cell` automatically in the future. Please pass the result to `transformed_c
  and should_run_async(code)
```

	products
0	MILK,BREAD,BISCUIT
1	BREAD,MILK,BISCUIT,CORNFLAKES
2	BREAD,TEA,BOURNVITA
3	JAM,MAGGI,BREAD,MILK
4	MAGGI,TEA,BISCUIT

```
[ ] data = list(df["products"].apply(lambda x:x.split(",") ))
    data
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_cell` automatically in the future. Please pass the result to `transformed_c
  and should_run_async(code)
[['MILK', 'BREAD', 'BISCUIT'],
 ['BREAD', 'MILK', 'BISCUIT', 'CORNFLAKES'],
 ['BREAD', 'TEA', 'BOURNVITA'],
 ['JAM', 'MAGGI', 'BREAD', 'MILK'],
 ['MAGGI', 'TEA', 'BISCUIT'],
 ['BREAD', 'TEA', 'BOURNVITA'],
 ['MAGGI', 'TEA', 'CORNFLAKES'],
 ['MAGGI', 'BREAD', 'TEA', 'BISCUIT'],
 ['JAM', 'MAGGI', 'BREAD', 'TEA'],
 ['BREAD', 'MILK'],
 ['COFFEE', 'COCK', 'BISCUIT', 'CORNFLAKES'],
 ['COFFEE', 'COCK', 'BISCUIT', 'CORNFLAKES'],
 ['COFFEE', 'SUGER', 'BOURNVITA'],
 ['BREAD', 'COFFEE', 'COCK'],
 ['BREAD', 'SUGER', 'BISCUIT'],
```



```
[ ] ['BREAD', 'MILK'],
 ['COFFEE', 'COCK', 'BISCUIT', 'CORNFLAKES'],
 ['COFFEE', 'COCK', 'BISCUIT', 'CORNFLAKES'],
 ['COFFEE', 'SUGER', 'BOURNVITA'],
 ['BREAD', 'COFFEE', 'COCK'],
 ['BREAD', 'SUGER', 'BISCUIT'],
 ['COFFEE', 'SUGER', 'CORNFLAKES'],
 ['BREAD', 'SUGER', 'BOURNVITA'],
 ['BREAD', 'COFFEE', 'SUGER'],
 ['BREAD', 'COFFEE', 'SUGER'],
 ['TEA', 'MILK', 'COFFEE', 'CORNFLAKES']]
```

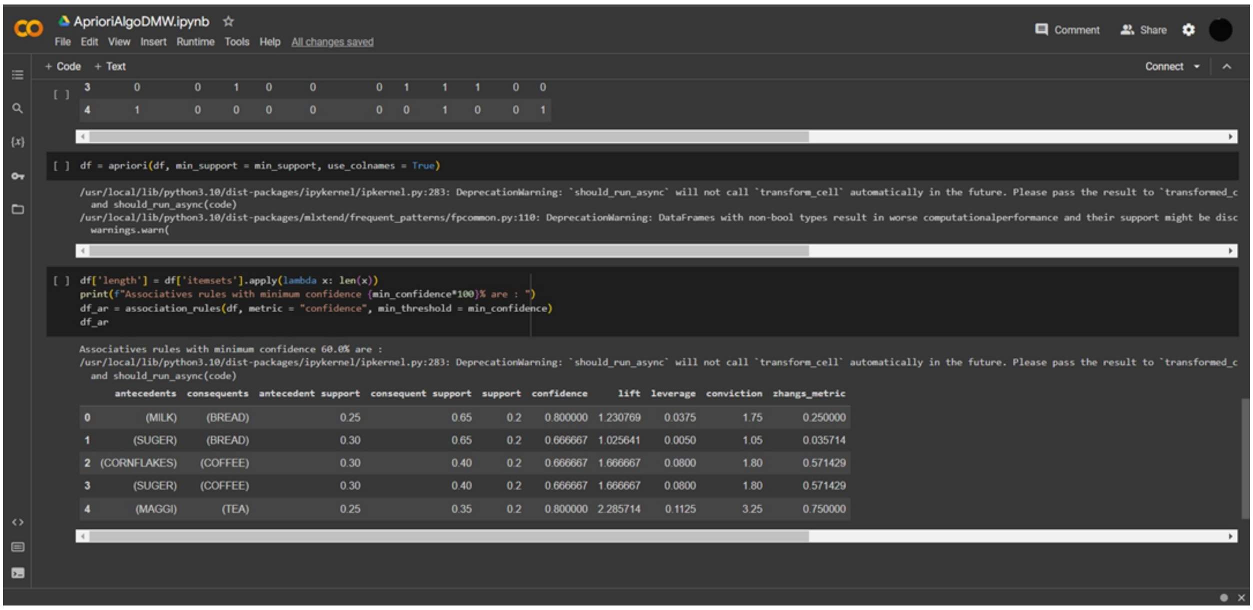
```
[ ] a=TransactionEncoder()
    a_data=a.fit(data).transform(data)
    df=pd.DataFrame(a_data,columns=a.columns_)
    df = df.replace(False,0)
    df = df.replace(True,1)
    df.head(5)
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_cell` automatically in the future. Please pass the result to `transformed_c
  and should_run_async(code)
```

	BISCUIT	BOURNVITA	BREAD	COCK	COFFEE	CORNFLAKES	JAM	MAGGI	MILK	SUGER	TEA
0	1	0	1	0	0	0	0	0	1	0	0
1	1	0	1	0	0	1	0	0	1	0	0
2	0	1	1	0	0	0	0	0	0	0	1
3	0	0	1	0	0	0	1	1	1	0	0
4	1	0	0	0	0	0	0	1	0	0	1

```
[ ] df = apriori(df, min_support = min_support, use_colnames = True)
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_cell` automatically in the future. Please pass the result to `transformed_c
```



```
3   0   0   1   0   0   0   1   1   1   0   0
4   1   0   0   0   0   0   0   1   0   0   1
```

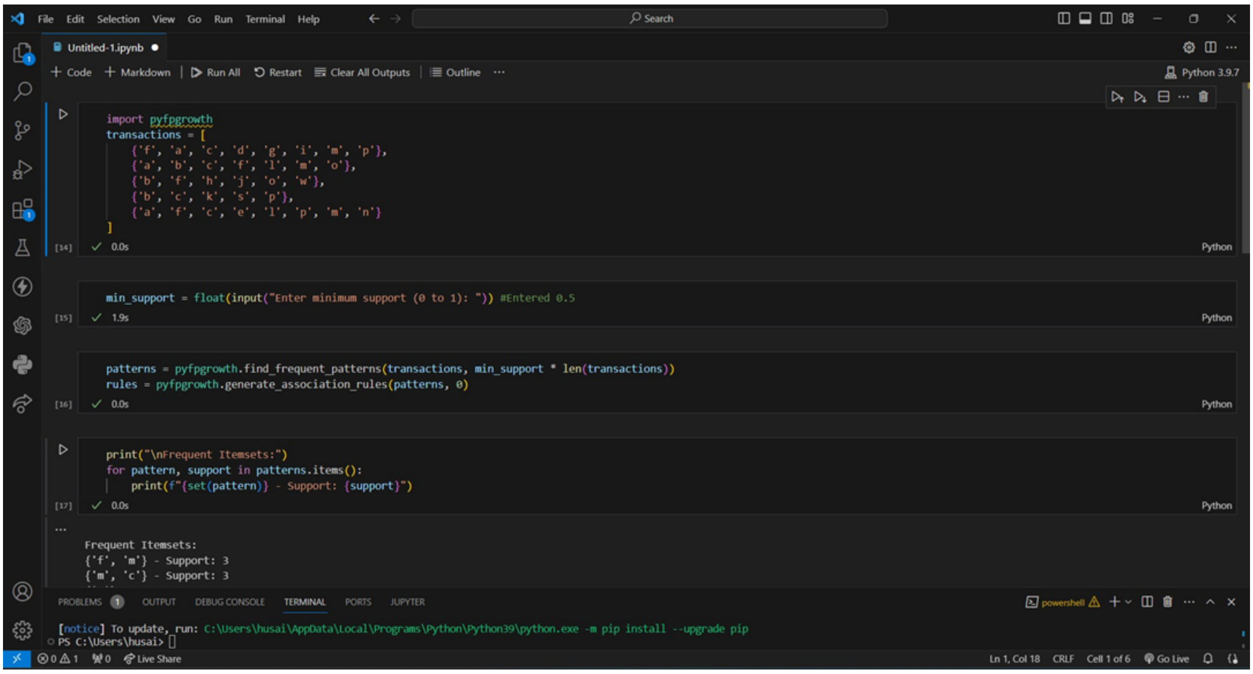
```
df = apriori(df, min_support = min_support, use_colnames = True)
```

```
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_cell` automatically in the future. Please pass the result to `transformed_c
  and should_run_async(code)
/usr/local/lib/python3.10/dist-packages/mlxtend/frequent_patterns/fpcommon.py:110: DeprecationWarning: DataFrames with non-bool types result in worse computationalperformance and their support might be disc
  warnings.warn(
```

```
df['length'] = df['itemsets'].apply(lambda x: len(x))
print(f"Associatives rules with minimum confidence {min_confidence*100}% are : ")
df_ar = association_rules(df, metric = "confidence", min_threshold = min_confidence)
df_ar
```

```
Associatives rules with minimum confidence 60.0% are :
/usr/local/lib/python3.10/dist-packages/ipykernel/ipkernel.py:283: DeprecationWarning: `should_run_async` will not call `transform_cell` automatically in the future. Please pass the result to `transformed_c
  and should_run_async(code)
     antecedents  consequents  antecedent support  consequent support  support  confidence      lift  leverage  conviction  zhangs_metric
0         (MILK)      (BREAD)                0.25                0.65      0.2    0.800000  1.230769    0.0375        1.75       0.250000
1        (SUGER)      (BREAD)                0.30                0.65      0.2    0.666667  1.025641    0.0050        1.05       0.035714
2   (CORNFLAKES)     (COFFEE)                0.30                0.40      0.2    0.666667  1.666667    0.0800        1.80       0.571429
3        (SUGER)     (COFFEE)                0.30                0.40      0.2    0.666667  1.666667    0.0800        1.80       0.571429
4        (MAGGI)        (TEA)                0.25                0.35      0.2    0.800000  2.285714    0.1125        3.25       0.750000
```

FP Tree Algorithm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Python 3.9.7
Python
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0 1 0 Live Share
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```
import pyfpgrowth
transactions = [
    {'f', 'a', 'c', 'd', 'g', 'i', 'm', 'p'},
    {'a', 'b', 'c', 'f', 'l', 'm', 'o'},
    {'b', 'f', 'h', 'j', 'o', 'w'},
    {'b', 'c', 'k', 's', 'p'},
    {'a', 'f', 'c', 'e', 'l', 'p', 'm', 'n'}
]
```

[14] ✓ 0.0s

```
min_support = float(input("Enter minimum support (0 to 1): ")) #Entered 0.5
```

[15] ✓ 1.9s

```
patterns = pyfpgrowth.find_frequent_patterns(transactions, min_support * len(transactions))
rules = pyfpgrowth.generate_association_rules(patterns, 0)
```

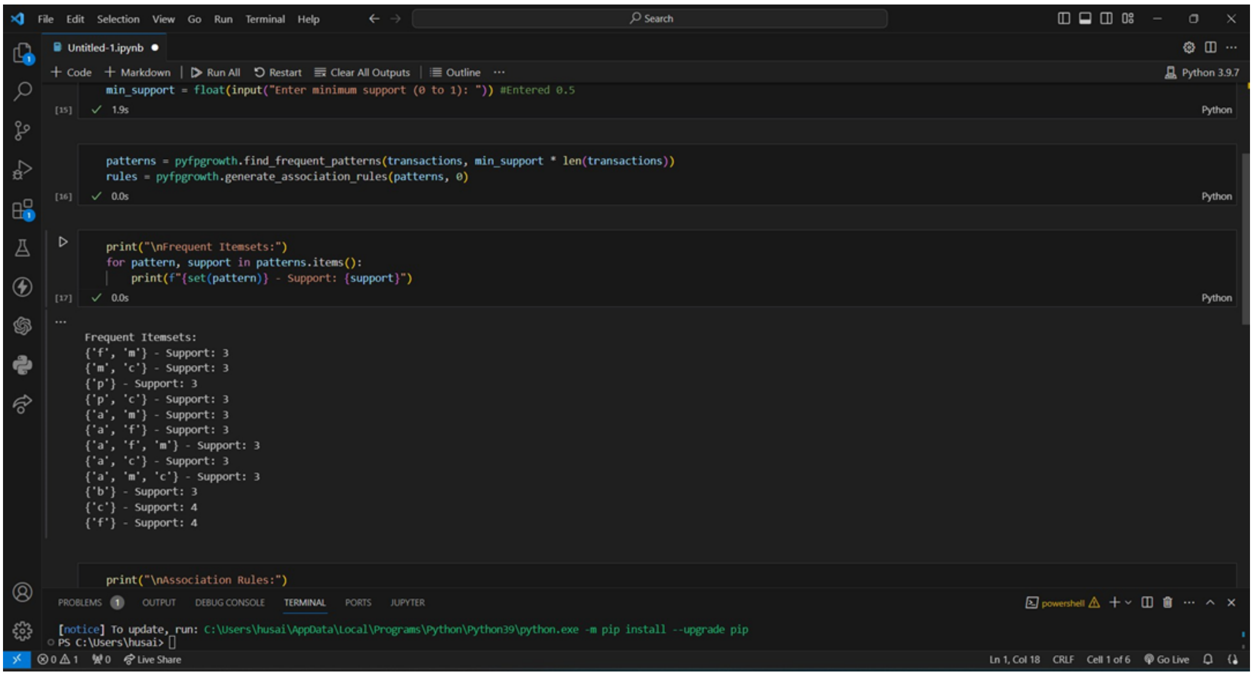
[16] ✓ 0.0s

```
print("\nFrequent Itemsets:")
for pattern, support in patterns.items():
    print(f"{set(pattern)} - Support: {support}")
```

[17] ✓ 0.0s

```
Frequent Itemsets:
{'f', 'm'} - Support: 3
{'m', 'c'} - Support: 3
```

```
[notice] To update, run: C:\Users\husai\AppData\Local\Programs\Python\Python39\python.exe -m pip install --upgrade pip
PS C:\Users\husai> 
```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Live Share

```
min_support = float(input("Enter minimum support (0 to 1): ")) #Entered 0.5
```

[15] ✓ 1.9s

```
patterns = pyfpgrowth.find_frequent_patterns(transactions, min_support * len(transactions))
rules = pyfpgrowth.generate_association_rules(patterns, 0)
```

[16] ✓ 0.0s

```
print("\nFrequent Itemsets:")
for pattern, support in patterns.items():
    print(f"{set(pattern)} - Support: {support}")
```

[17] ✓ 0.0s

```
Frequent Itemsets:
{'f', 'm'} - Support: 3
{'m', 'c'} - Support: 3
{'p'} - Support: 3
{'p', 'c'} - Support: 3
{'a', 'm'} - Support: 3
{'a', 'f'} - Support: 3
{'a', 'f', 'm'} - Support: 3
{'a', 'c'} - Support: 3
{'a', 'm', 'c'} - Support: 3
{'b'} - Support: 3
{'c'} - Support: 4
{'f'} - Support: 4
```

```
print("\nAssociation Rules:")
```

```
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```

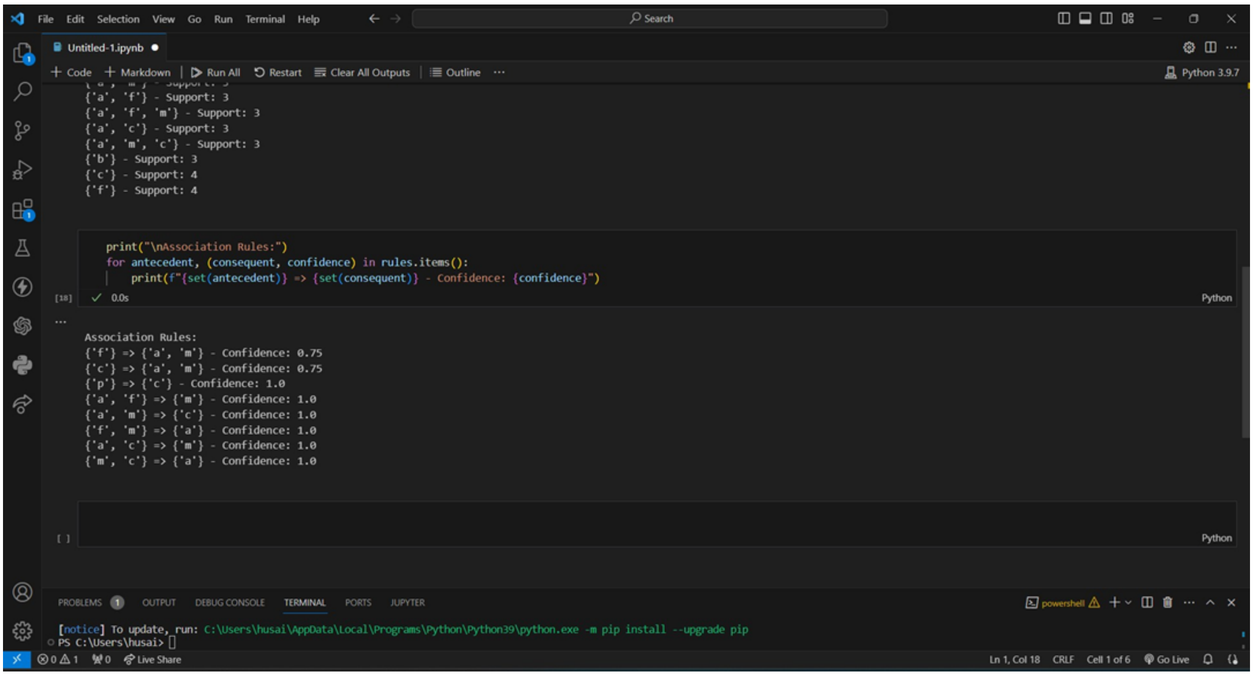
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```
{'a', 'f'} - Support: 3
{'a', 'f', 'm'} - Support: 3
{'a', 'c'} - Support: 3
{'a', 'm', 'c'} - Support: 3
{'b'} - Support: 3
{'c'} - Support: 4
{'f'} - Support: 4
```

```
print("\nAssociation Rules:")
for antecedent, (consequent, confidence) in rules.items():
    print(f"{set(antecedent)} => {set(consequent)} - Confidence: {confidence}")
```

[18] ✓ 0.0s

```
Association Rules:
{'f'} => {'a', 'm'} - Confidence: 0.75
{'c'} => {'a', 'm'} - Confidence: 0.75
{'p'} => {'c'} - Confidence: 1.0
{'a', 'f'} => {'m'} - Confidence: 1.0
{'a', 'm'} => {'c'} - Confidence: 1.0
{'f', 'm'} => {'a'} - Confidence: 1.0
{'a', 'c'} => {'m'} - Confidence: 1.0
{'m', 'c'} => {'a'} - Confidence: 1.0
```

[ ]

```
[notice] To update, run: C:\Users\husai\AppData\Local\Programs\Python\Python39\python.exe -m pip install --upgrade pip
PS C:\Users\husai> 
```