Start coding or generate with AI.

```
import pandas as pd
Dataset = pd.read_csv('/content/drive/MyDrive/market basket analysis/basket_analysis.csv', index_col=0)
Dataset
```

	Apple	Bread	Butter	Cheese	Corn	Dill	Eggs	Ice cream	Kidney Beans	Milk	Nutmeg	Onion	Sugar	Unicorn	Yogurt	chocolate
0	False	True	False	False	True	True	False	True	False	False	False	False	True	False	True	True
1	False	False	False	False	False	False	False	False	False	True	False	False	False	False	False	False
2	True	False	True	False	False	True	False	True	False	True	False	False	False	False	True	True
3	False	False	True	True	False	True	False	False	False	True	True	True	False	False	False	False
4	True	True	False	False	False	False	False	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
994	False	True	False	False	False	False	True	False	False	False	False	False	False	True	False	True
995	True	False	False	False	True	False	False	False	True	True	True	False	False	False	True	False
996	True	False	False	False	True	True	False	False	False	False	False	False	True	False	False	True
997	False	False	True	True	True	False	True	True	True	False	True	False	True	False	True	True
998	False	False	False	False	False	False	False	False	False	True	False	False	False	False	False	True

Next steps: Generate code with Dataset View recommended plots New interactive sheet

```
from mlxtend.frequent_patterns import apriori, association_rules
# Apply the apriori algorithm to find frequent itemsets
frequent_itemsets = apriori(Dataset, min_support=0.02, use_colnames=True)
# Display the frequent itemsets
frequent_itemsets
```

	support	itemsets
0	0.383383	(Apple)
1	0.384384	(Bread)
2	0.420420	(Butter)
3	0.404404	(Cheese)
4	0.407407	(Corn)
...	...	...
5540	0.020020	(Dill, Kidney Beans, Onion, Ice cream, Cheese,...
5541	0.021021	(Dill, Unicorn, chocolate, Kidney Beans, Onion...
5542	0.020020	(Sugar, chocolate, Kidney Beans, Ice cream, Ch...
5543	0.020020	(Corn, Yogurt, Unicorn, chocolate, Onion, Nutmeg)
5544	0.020020	(Milk, Dill, Unicorn, chocolate, Onion, Ice cr...

5545 rows × 2 columns

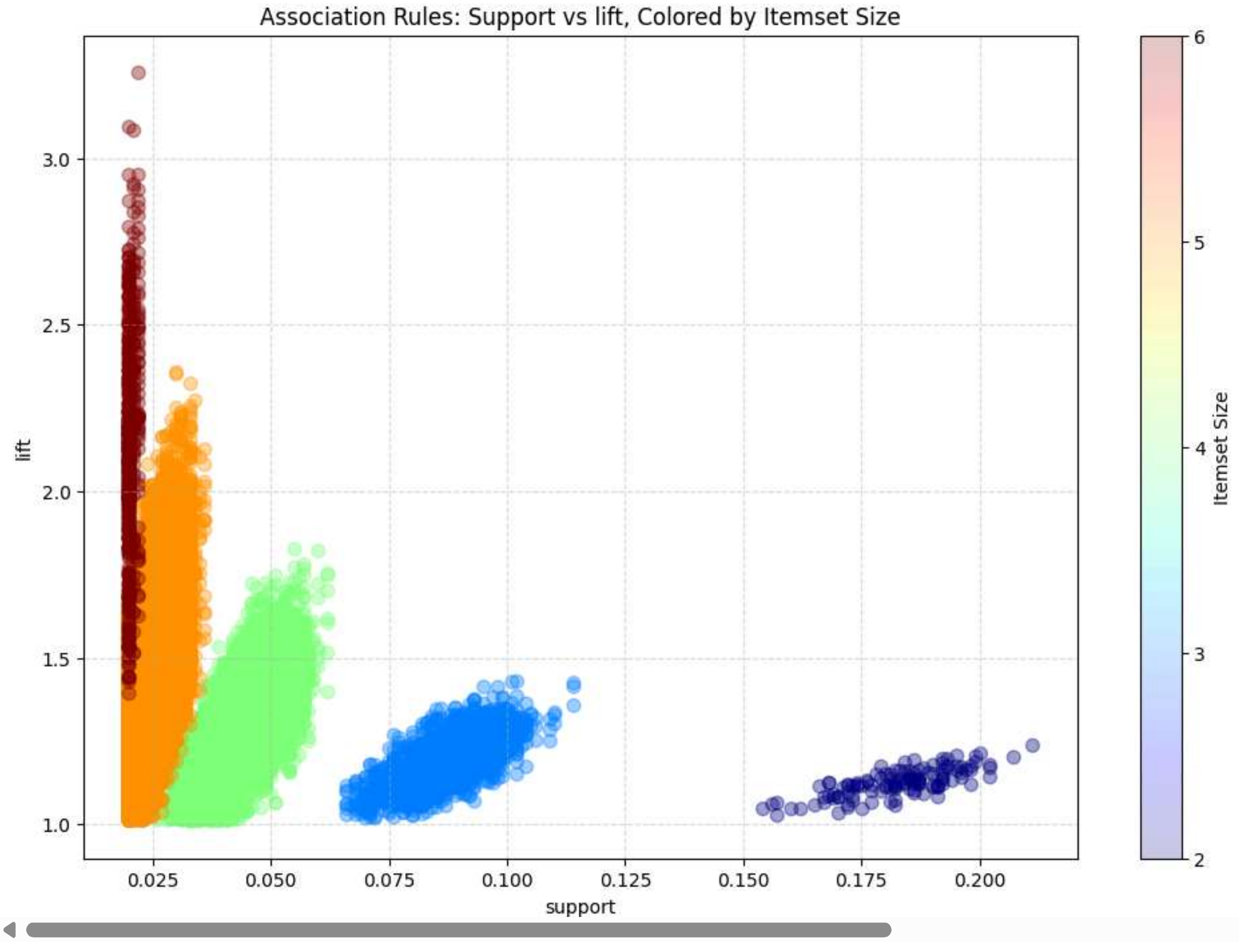
Next steps: Generate code with frequent_itemsets View recommended plots New interactive sheet

```
# Generate association rules from the frequent itemsets
rules = association_rules(frequent_itemsets, metric="lift", min_threshold=1.01, num_itemsets=len(frequent_itemsets))
# Calculate itemset size as a total number of items in both antecedents and consequents
rules['itemset_size'] = rules['antecedents'].apply(len) + rules['consequents'].apply(len)
# Display the association rules
rules.sort_values(by="lift", ascending=False)
```

	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	representativity	leverage	conviction	zhangs_r
118314	(Corn, Sugar, Kidney Beans)	(Cheese, Unicorn, Apple)	0.090090	0.075075	0.022022	0.244444	3.256000	1.0	0.015259	1.224165	0.7
118331	(Cheese, Unicorn, Apple)	(Corn, Sugar, Kidney Beans)	0.075075	0.090090	0.022022	0.293333	3.256000	1.0	0.015259	1.287608	0.7
118190	(Yogurt, Corn, Sugar)	(Unicorn, Bread, Apple)	0.085085	0.076076	0.020020	0.235294	3.092879	1.0	0.013547	1.208208	0.7
118207	(Unicorn, Bread, Apple)	(Yogurt, Corn, Sugar)	0.076076	0.085085	0.020020	0.263158	3.092879	1.0	0.013547	1.241670	0.7
118936	(Cheese, Dill, Unicorn)	(chocolate, Onion, Kidney Beans)	0.082082	0.083083	0.021021	0.256098	3.082427	1.0	0.014201	1.232577	0.7
...	...	...	...	...	...	...	...	...	...	...	
16265	(Eggs)	(Dill, Nutmeg, Butter)	0.384384	0.085085	0.033033	0.085938	1.010018	1.0	0.000328	1.000933	0.0
16258	(Dill, Nutmeg, Butter)	(Eggs)	0.085085	0.384384	0.033033	0.388235	1.010018	1.0	0.000328	1.006295	0.0
13324	(Eggs)	(chocolate, Onion, Bread)	0.384384	0.085085	0.033033	0.085938	1.010018	1.0	0.000328	1.000933	0.0
10140	(Dill, Nutmeg, Butter)	(Bread)	0.085085	0.384384	0.033033	0.388235	1.010018	1.0	0.000328	1.006295	0.0
10151	(Bread)	(Dill, Nutmeg, Butter)	0.384384	0.085085	0.033033	0.085938	1.010018	1.0	0.000328	1.000933	0.0

119160 rows × 15 columns

```
### Support vs Lift by Itemset Size
import matplotlib.pyplot as plt
import seaborn as sns

# Create a scatter plot to visualise the support against lift for the size of itemsets
plt.figure(figsize=(12, 8))
scatter = plt.scatter(
    rules['support'],
    rules['lift'],
    c=rules['itemset_size'],  # Color based on itemset size
    cmap='jet',  # Color map
    alpha=0.2,  # Slight transparency
    s=50)  # Marker size

# Add color bar (legend) with intervals of 1
cbar = plt.colorbar(scatter, label='Itemset Size')
cbar.set_ticks(list(range(2, rules['itemset_size'].max() + 1)))

# Labels and title
plt.xlabel('support')
plt.ylabel('lift')
plt.title('Association Rules: Support vs lift, Colored by Itemset Size')

# Add grid for readability
plt.grid(True, linestyle='--', alpha=0.4)

# Show the plot
plt.show()
```



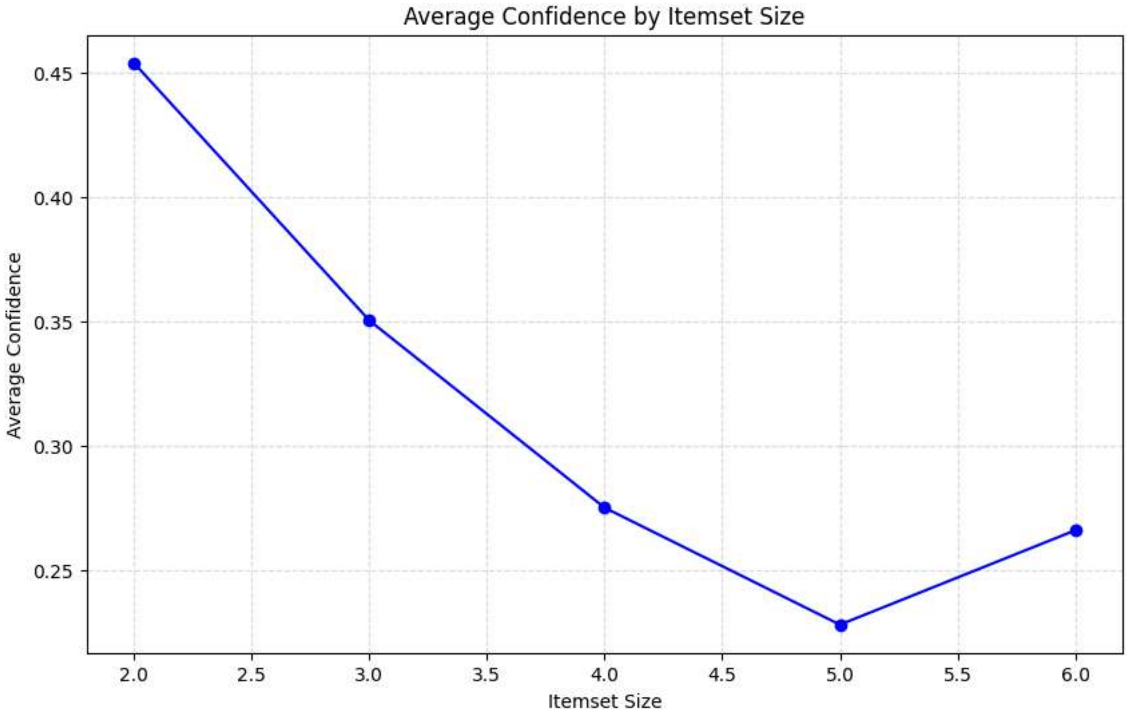
```
### Top itemset by Lift and Support

# Sort by itemset size, then by lift and support
rules_sorted = rules.sort_values(by=['itemset_size', 'lift', 'support'], ascending=[True, False, False])

# Group by itemset size and select the top itemset in each group
top_rules = rules_sorted.groupby('itemset_size').head(1).reset_index(drop=False)

# Display the filtered rules
top_rules
```

	index	antecedents	consequents	antecedent support	consequent support	support	confidence	lift	representativity	leverage	conviction	zhang
0	206	(Milk)	(chocolate)	0.405405	0.421421	0.211211	0.520988	1.236263	1.0	0.040365	1.207857	
1	1960	(Cheese, Dill)	(Onion)	0.177177	0.403403	0.102102	0.576271	1.428523	1.0	0.030628	1.407968	
2	19490	(Cheese, Dill)	(Kidney Beans, Onion)	0.177177	0.170170	0.055055	0.310734	1.826022	1.0	0.024905	1.203933	
3	45365	(Eggs, Unicorn, Apple)	(Corn, Sugar)	0.068068	0.187187	0.030030	0.441176	2.356873	1.0	0.017289	1.454507	
4	118314	(Corn, Sugar, Kidney Beans)	(Cheese, Unicorn, Apple)	0.090090	0.075075	0.022022	0.244444	3.256000	1.0	0.015259	1.224165	

Next steps: Generate code with top_rules | View recommended plots | New interactive sheet

```
### Average Confidence by Itemset Size

# Group by itemset size and calculate average confidence for each group of item size
avg_confidence = rules.groupby('itemset_size')['confidence'].mean().reset_index()
```

```
# Create a line plot for Average Confidence by Itemset Size
plt.figure(figsize=(10, 6))
plt.plot(avg_confidence['itemset_size'], avg_confidence['confidence'], marker='o', linestyle='-', color='b')

# Adding labels and title
plt.xlabel('Itemset Size')
plt.ylabel('Average Confidence')
plt.title('Average Confidence by Itemset Size')

# Add grid for readability
plt.grid(True, linestyle='--', alpha=0.4)

# Show the plot
plt.show()
```


Average Confidence by Itemset Size
Average Confidence
Itemset Size