In [20]:

```
import pandas as pd
import numpy as mp
import pyfpgrowth
from mlxtend.frequent_patterns import apriori
from mlxtend.frequent_patterns import association_rules
from sklearn.model_selection import train_test_split
```

In [21]:

```
data = pd.read_csv(r"I:\Last Semester\477\Chess\chess1.csv")
from mlxtend.preprocessing import TransactionEncoder
te = TransactionEncoder()
te_ary = te.fit(data).transform(data)
df= pd.DataFrame(te_ary, columns=te.columns_)
df
```

Out[21]:

	0	1	2	3	4	5	6	7	8	9
0	False	True	False	False	False	False	False	False	False	False
1	False	False	False	True	False	False	False	False	False	False
2	False	False	False	False	False	True	False	False	False	False
3	False	False	False	False	False	False	False	True	False	False
4	False	False	False	False	False	False	False	False	False	True
...	...	...	...	...	...	...	...	...	...	...
3190	False	False	False	False	False	False	False	False	False	False
3191	False	False	False	False	False	False	False	False	False	False
3192	False	False	False	False	False	False	False	False	False	False
3193	False	False	False	False	False	False	False	False	False	False
3194	False	False	False	False	False	False	False	False	False	False

3195 rows × 10 columns

In [22]:

```
data.head(100)
```

Out[22]:

	1	3	5	7	9	11	13	15	17	19	...	56	58	60	62	64	66	68	70	72	74
0	1	3	5	7	9	12	13	15	17	19	...	56	58	60	62	64	66	68	70	72	74
1	1	3	5	7	9	12	13	16	17	19	...	56	58	60	62	64	66	68	70	72	74
2	1	3	5	7	9	11	13	15	17	20	...	56	58	60	62	64	66	68	70	72	74
3	1	3	5	7	9	11	13	15	17	19	...	56	58	60	62	64	66	68	70	72	74
4	1	3	5	7	9	11	13	15	17	19	...	56	58	60	63	64	66	68	70	72	74
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
95	1	3	5	7	9	12	13	16	17	19	...	56	58	60	62	64	66	68	71	73	74
96	1	3	5	7	9	11	13	15	17	20	...	56	58	60	62	64	66	68	70	73	74
97	1	3	5	7	9	11	13	15	17	19	...	56	58	60	62	64	66	68	70	73	74
98	1	3	5	7	9	12	13	16	18	20	...	56	58	60	62	64	66	68	70	72	74
99	1	3	5	7	9	12	13	16	18	20	...	56	58	60	62	64	66	68	70	72	74

100 rows × 37 columns

In [23]:

```
df
```

Out[23]:

	0	1	2	3	4	5	6	7	8	9
0	False	True	False	False	False	False	False	False	False	False
1	False	False	False	True	False	False	False	False	False	False
2	False	False	False	False	False	True	False	False	False	False
3	False	False	False	False	False	False	False	True	False	False
4	False	False	False	False	False	False	False	False	False	True
...	...	...	...	...	...	...	...	...	...	...
3190	False	False	False	False	False	False	False	False	False	False
3191	False	False	False	False	False	False	False	False	False	False
3192	False	False	False	False	False	False	False	False	False	False
3193	False	False	False	False	False	False	False	False	False	False
3194	False	False	False	False	False	False	False	False	False	False

3195 rows × 10 columns

In [24]:

```
from mlxtend.frequent_patterns import apriori
apriori(df, min_support=0.0006)
```

Out[24]:

	support	itemsets
0	0.001252	(0)
1	0.002504	(1)
2	0.002817	(2)
3	0.002191	(3)
4	0.002817	(4)
5	0.002504	(5)
6	0.002504	(6)
7	0.001878	(7)
8	0.001252	(8)
9	0.000939	(9)
10	0.000626	(1, 3)
11	0.000626	(2, 5)
12	0.000626	(2, 7)
13	0.000626	(4, 6)

In [25]:

```
from mlxtend.frequent_patterns import apriori
%timeit apriori(df, min_support=0.0005)
```

```
3.28 ms ± 143 µs per loop (mean ± std. dev. of 7 runs, 100 loops each)
```

In [26]:

```
 from mlxtend.frequent_patterns import apriori
%timeit apriori(df, min_support=0.0006)
```

```
3.4 ms ± 286 µs per loop (mean ± std. dev. of 7 runs, 100 loops each)
```

In [27]:

```
from mlxtend.frequent_patterns import apriori
%timeit apriori(df, min_support=0.0007)
```

```
2.02 ms ± 34.5 µs per loop (mean ± std. dev. of 7 runs, 100 loops each)
```

In [ ]:

```

```