In [2]:
```
import pandas as pd
import numpy as np
```

In [10]:
```
data = pd.read_csv('lab1.csv')
```

In [35]:
```
data
```

Out[35]:

	citations	size	inLibrary	price	editions	buy
0	some	small	no	affordable	many	no
1	many	big	no	expensive	one	yes
2	some	big	always	expensive	few	no
3	many	medium	no	expensive	many	yes
4	many	small	no	affordable	many	yes

In [39]:
```
instance_space=3*2*2*2*2*2
instance_space
```

Out[39]:
```
96
```

In [40]:
```
Hypothesis_space=5*4*4*4*4*4
Hypothesis_space
```

Out[40]:
```
5120
```

In [46]:
```
semantically_distinct_hypothesis=(4*3*3*3*3*3)+1
semantically_distinct_hypothesis
```

Out[46]:
```
973
```

In [13]:
```
concepts = np.array(data)
```

In [14]:
```
concepts = np.array(data)[:,:-1]
```

In [15]:
```
concepts
```

Out[15]:
```
array([['sunny', 'warm', 'noraml', 'strong', 'warm', 'same'],
       ['sunny', 'warm', 'high', 'strong', 'warm', 'same'],
       ['rainy', 'cold', 'high', 'strong', 'warm', 'change'],
       ['sunny', 'warm', 'high', 'strong', 'cool', 'change']],
      dtype=object)
```

In [16]:
```
target = np.array(data)[:,-1]
```

In [17]:
```
target
```

Out[17]:
```
array(['yes', 'yes', 'no', 'yes'], dtype=object)
```

In [21]:
```
def train(con,tar):
    for i,val in enumerate(tar):
        if val=='yes':
            specific_h = con[i].copy()
            break
    for i,val in enumerate(con):
        if tar[i]=='yes':
            for x in range(len(specific_h)):
                if val[x]!= specific_h[x]:
                    specific_h[x] = '?'
                else:
                        pass
    return specific_h
```

In [22]:
```
print(train(concepts,target))
```

```
['sunny' 'warm' '?' 'strong' '?' '?']
```

In [ ]:

In [ ]:

In [23]:
```
import pandas as pd
import numpy as np
```

In [24]:
```
data = pd.read_csv('lab3.csv')
```

In [25]:
```
data
```

Out[25]:

	citations	size	inLibrary	price	editions	buy
0	some	small	no	affordable	many	no
1	many	big	no	expensive	one	yes
2	some	big	always	expensive	few	no
3	many	medium	no	expensive	many	yes
4	many	small	no	affordable	many	yes

In [38]:
```
instance_space=2*3*2*2*3
instance_space
```

Out[38]: 72

In [41]:
```
Hypothesis_space=4*5*4*4*5
Hypothesis_space
```

Out[41]: 1600

In [43]:
```
semantically_distinct_hypothesis=(3*4*3*3*4)+1
semantically_distinct_hypothesis
```

Out[43]:
```
433
```

In [26]:
```
concepts = np.array(data)
```

In [27]:
```
concepts = np.array(data)[:,:-1]
```

In [28]:
```
concepts
```

Out[28]:
```
array([['some', 'small', 'no', 'affordable', 'many'],
       ['many', 'big', 'no', 'expensive', 'one'],
       ['some', 'big', 'always', 'expensive', 'few'],
       ['many', 'medium', 'no', 'expensive', 'many'],
       ['many', 'small', 'no', 'affordable', 'many']], dtype=object)
```

In [29]:
```
target = np.array(data)[:,-1]
```

In [30]:
```
target
```

Out[30]:
```
array(['no', 'yes', 'no', 'yes', 'yes'], dtype=object)
```

In [31]:
```
def train(con,tar):
    for i,val in enumerate(tar):
        if val=='yes':
            specific_h = con[i].copy()
            break
    for i,val in enumerate(con):
        if tar[i]=='yes':
            for x in range(len(specific_h)):
                if val[x]!= specific_h[x]:
                    specific_h[x] = '?'
                else:
                        pass
    return specific_h
```

In [32]:
```
print(train(concepts,target))
```

```
['many' '?' 'no' '?' '?']
```

In [33]:
```

```

In [ ]:
```

```

In [ ]:
```

```