In [1]:
```
import numpy as np
import pandas as pd
```

In [2]:
```
df = pd.read_csv('EnjoySport.csv')
df.head()
```

Out[2]:

	Example	Sky	AirTemp	Humidity	Wind	Water	Forecast	EnjoySport
0	1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
1	2	Sunny	Warm	High	Strong	Warm	Same	Yes
2	3	Rainy	Cold	High	Strong	Warm	Change	No
3	4	Sunny	Warm	High	Strong	Cool	Change	Yes

Find S algorithm

In [3]:
```
h = [None,None,None,None,None,None]
```

In [12]:
```
for i in range(len(df)):
    if df.iloc[i,-1] == 'Yes':
        h = list(df.iloc[i,1:-1])
        break
print(h)
for i in range(len(df)):
    if df.iloc[i,-1] == 'Yes':
        for j in range(len(h)):
            if h[j] != df.iloc[i,j+1]:
                h[j] = '?'
        print(h)
```

```
['Sunny', 'Warm', 'Normal', 'Strong', 'Warm', 'Same']
['Sunny', 'Warm', 'Normal', 'Strong', 'Warm', 'Same']
['Sunny', 'Warm', '?', 'Strong', 'Warm', 'Same']
['Sunny', 'Warm', '?', 'Strong', '?', '?']
```

Candidate Elimination Algorithm

In [13]:
```
def generalize(s,i):
    if s[0] == None:
        s = list(df.iloc[0,1:-1])
        return s
    if df.iloc[i,-1] == 'Yes':
        for j in range(len(s)):
            if s[j] != df.iloc[i,j+1]:
                s[j] = '?'
    return s
```

In [17]:
```
def specialize(s,gen,index):
    print(s)
    for i in range(len(s)):
        if s[i] != df.iloc[index,i+1] and s[i] != '?':
            g = ['?']*6
            g[i] = s[i]
            gen.append(g)
    return gen
```

In [21]:
```
s = [None]*6
gen = []
all_gen = []
for i in range(len(df)):
    if df.iloc[i,-1] == 'Yes':
        s = generalize(s,i)
    else:
        gen = specialize(s,gen,i)
        all_gen.append(gen)
```

```
['Sunny', 'Warm', '?', 'Strong', 'Warm', 'Same']
```

In [23]:
```
gen = all_gen[0]
final_gen = []
for i in gen:
    for j,k in zip(range(len(i)),range(len(s))):
        if i[j] != '?':
            if s[k] == i[j]:
                final_gen.append(i)
print(final_gen)
print(s)
```

```
[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?']]
['Sunny', 'Warm', '?', 'Strong', '?', '?']
```