In [1]:

```
import numpy as np
import pandas as pd
data=pd.DataFrame(data=pd.read_csv("enjoysportss.csv"))
print(data)
concepts=np.array(data.iloc[:,0:-1])

print(concepts)
target=np.array(data.iloc[:,-1])
print(target)
def learn(concepts,target):
    specific_h=concepts[0].copy()
    print("\nIntialisation of specific_h and general_h")
    print(specific_h)
    general_h=[["?" for i in range(len(specific_h))] for i in range(len(specific_h))]
    print(general_h)
    for i,h in enumerate(concepts):
        if target[i]=="Yes":
            for x in range(len(specific_h)):
                if h[x]!=specific_h[x]:
                    specific_h[x]='?'
                    general_h[x][x]='?'
        if target[i]=="No":
            for x in range(len(specific_h)):
                if h[x]!=specific_h[x]:
                    general_h[x][x]=specific_h[x]
                else:
                    general_h[x][x]='?'
        print("\nSteps of Candidate Elimination Algorithm",i+1)
        print(specific_h)
        print(general_h)
    indices=[i for i,val in enumerate(general_h) if val ==['?','?','?','?','?','?']]
    for i in indices:
        general_h.remove(['?','?','?','?','?','?'])
    return specific_h,general_h
s_final,g_final = learn(concepts,target)
print("\nFinal Specific_h:",s_final,sep="\n")
print("\nFinal General_h:",g_final,sep="\n")
```

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

```
   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
[[1 'Sunny' 'Warm' 'Normal' 'Strong' 'Warm' 'Same']
 [2 'Sunny' 'Warm' 'High' 'Strong' 'Warm' 'Same']
 [3 'Rainy' 'Cold' 'High' 'Strong' 'Warm' 'Change']
 [4 'Sunny' 'Warm' 'High' 'Strong' 'Cool' 'Change']]
['Yes' 'Yes' 'No' 'Yes']

Intialisation of specific_h and general_h
[1 'Sunny' 'Warm' 'Normal' 'Strong' 'Warm' 'Same']
[['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'],
['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'],
['?', '?', '?', '?', '?', '?', '?']]

Steps of Candidate Elimination Algorithm 1
[1 'Sunny' 'Warm' 'Normal' 'Strong' 'Warm' 'Same']
[['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'],
['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'],
['?', '?', '?', '?', '?', '?', '?']]

Steps of Candidate Elimination Algorithm 2
['?' 'Sunny' 'Warm' '?' 'Strong' 'Warm' 'Same']
[['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'],
['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'],
['?', '?', '?', '?', '?', '?', '?']]

Steps of Candidate Elimination Algorithm 3
['?' 'Sunny' 'Warm' '?' 'Strong' 'Warm' 'Same']
[['?', '?', '?', '?', '?', '?', '?'], ['?', 'Sunny', '?', '?', '?', '?', '?'], ['?', '?', 'Warm', '?', '?', '?',
'?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?',
'?'], ['?', '?', '?', '?', '?', '?', 'Same']]

Steps of Candidate Elimination Algorithm 4
['?' 'Sunny' 'Warm' '?' 'Strong' '?' '?']
[['?', '?', '?', '?', '?', '?', '?'], ['?', 'Sunny', '?', '?', '?', '?', '?'], ['?', '?', 'Warm', '?', '?', '?',
'?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?',
'?'], ['?', '?', '?', '?', '?', '?', '?']]
```

```
Final Specific_h:
['?' 'Sunny' 'Warm' '?' 'Strong' '?' '?']

Final General_h:
[['?', '?', '?', '?', '?', '?', '?'], ['?', 'Sunny', '?', '?', '?', '?', '?'], ['?', '?', 'Warm', '?', '?', '?',
'?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?',
'?'], ['?', '?', '?', '?', '?', '?', '?']]
```

In [ ]: