```
import numpy as np
import pandas as pd


data=pd.DataFrame(data=pd.read_csv('p3.csv'))
print(data)
```

```
          sky airtemp humidity    wind water forcast enjoysport
      0  sunny    warm   normal  strong  warm    same        yes
      1  sunny    warm     high  strong  warm    same        yes
      2  rainy    cold     high  strong  warm  change         no
      3  sunny    warm     high  strong  cool  change        yes
```

```
concepts=np.array(data.iloc[:,0:-1])
print(concepts)
```

```
      [['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
       ['sunny' 'warm' 'high' 'strong' 'warm' 'same']
       ['rainy' 'cold' 'high' 'strong' 'warm' 'change']
       ['sunny' 'warm' 'high' 'strong' 'cool' 'change']]
```

```
target=np.array(data.iloc[:,-1])
print(target)
```

```
      ['yes' 'yes' 'no' 'yes']
```

```
def learn(concepts,target):
    specific_h=concepts[0].copy()
    print("initialization 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("steps 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)
```

```
initialization of specific_h and general_h
['sunny' 'warm' 'normal' 'strong' 'warm' 'same']
[['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?'
steps of candidate Elimination Algorithm 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', '?', '?', '?', '?'], ['?', '
steps of candidate Elimination Algorithm 4
['sunny' 'warm' '?' 'strong' '?' '?']
[['sunny', '?', '?', '?', '?', '?'], ['?', 'warm', '?', '?', '?', '?'], ['?', '
```

```
print("\nFinal Specific_h:", s_final, sep="\n")
print("\nFinal General_h:", g_final, sep="\n")
```

```
Final Specific_h:
['sunny' 'warm' '?' 'strong' '?' '?']

Final General_h:
[['sunny', '?', '?', '?', '?', '?'], ['?', 'warm', '?', '?', '?', '?']]
```