Candidate Elimination Algorithm

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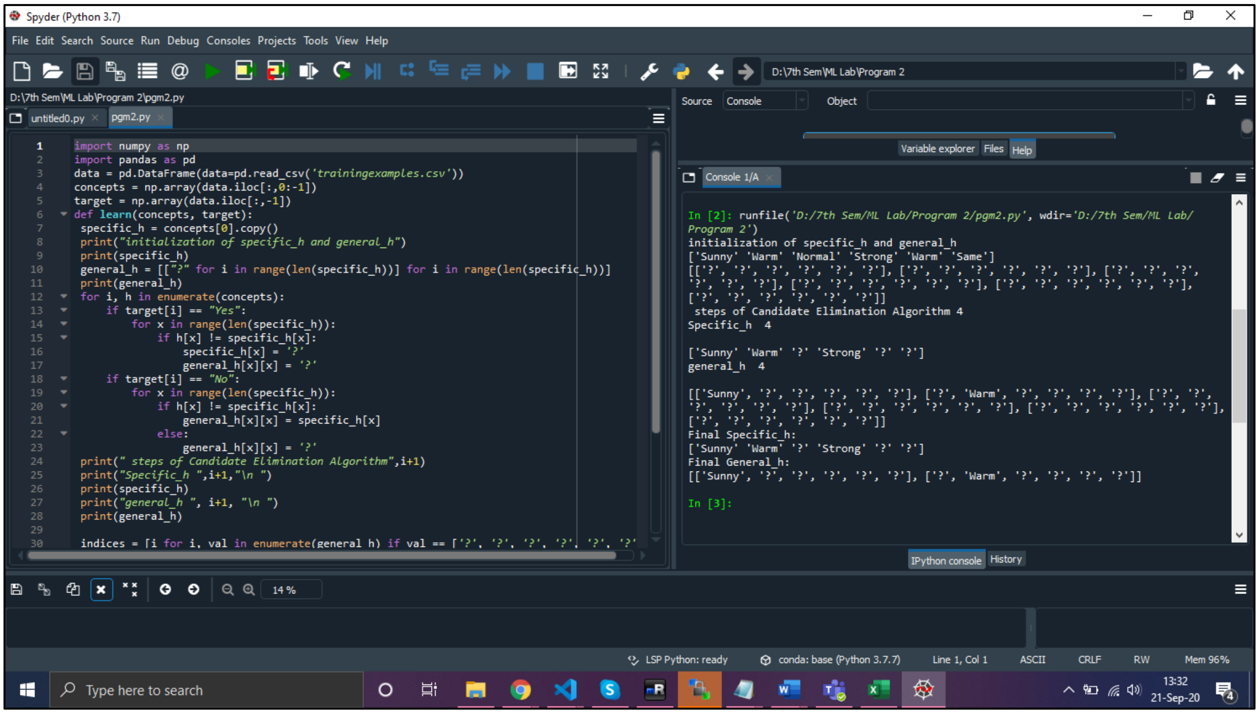
1. Program:

```
import numpy as np

import pandas as pd

data = pd.DataFrame(data=pd.read_csv('trainingexamples.csv'))

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

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

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 ",i+1,"\n ")
 print(specific_h)
 print("general_h ", i+1, "\n ")
 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("Final Specific_h:", s_final, sep="\n")
print("Final General_h:", g_final, sep="\n")
```

2. Output



```python
import numpy as np
import pandas as pd
data = pd.DataFrame(data=pd.read_csv('trainingexamples.csv'))
concepts = np.array(data.iloc[:,0:-1])
target = np.array(data.iloc[:,-1])
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 ",i+1,"\n ")
 print(specific_h)
 print("general_h ", i+1, "\n ")
 print(general_h)

 indices = [i for i, val in enumerate(general_h) if val == ['?', '?', '?', '?', '?', '?'
```

```
In [2]: runfile('D:/7th Sem/ML Lab/Program 2/pgm2.py', wdir='D:/7th Sem/ML Lab/
Program 2')
initialization of specific_h and general_h
['Sunny' 'Warm' 'Normal' 'Strong' 'Warm' 'Same']
[['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?',
'?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'],
['?', '?', '?', '?', '?', '?']]
 steps of Candidate Elimination Algorithm 4
Specific_h  4

['Sunny' 'Warm' '?' 'Strong' '?' '?']
general_h  4

[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?'], ['?', '?',
'?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'],
['?', '?', '?', '?', '?', '?']]
Final Specific_h:
['Sunny' 'Warm' '?' 'Strong' '?' '?']
Final General_h:
[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?']]

In [3]:
```