

In [3]:

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import numpy as np
import pandas as pd

data = pd.DataFrame(pd.read_csv('pgm2-extra.csv'))
concepts = np.array(data.iloc[:, :-1])
target = np.array(data.iloc[:, -1])

def learn(concepts, target):
    specific_h = concepts[0].copy()
    general_h = [["?" for i in range(len(specific_h))] for i in range(len(specific_h))]

    for i, h in enumerate(concepts):
        if target[i] == "Positive":
            for x in range(len(specific_h)):
                if h[x] != specific_h[x]:
                    specific_h[x] = '?'
                    general_h[x][x] = '?'

            print("\n\nFor Training instance No:{0} the hypothesis is\n".format(i))
            print("Specific hypothesis: ", specific_h)
            print("General Hypothesis: ", general_h)

        if target[i] == "Negative":
            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("\n\nFor Training instance No:{0} the hypothesis is\n".format(i))
            print("Specific hypothesis: ", specific_h)
            print("General Hypothesis: ", 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

print("""*20,Candidate Elimination Algorithm,*20)
s_final, g_final = learn(concepts, target)
print("Final Specific hypothesis:", s_final)
print("General Specific hypothesis:", g_final)

```

***** Candidate Elimination Algorithm *****

For Training instance No:1 the hypothesis is

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Specific hypothesis: ['Japan' 'Honda' 'Blue' '1980' 'Economy']
General Hypothesis: [['?', '?', '?', '?', '?'], ['?', 'Honda', '?', '?', '?'],
['?', '?', 'Blue', '?', '?'], ['?', '?', '?', '1980', '?'], ['?', '?', '?', '?', 'Economy']]

```

For Training instance No:3 the hypothesis is

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Specific hypothesis: ['Japan' 'Honda' 'Blue' '1980' 'Economy']
General Hypothesis: [['Japan', '?', '?', '?', '?'], ['?', 'Honda', '?', '?', '?'],
['?', '?', 'Blue', '?', '?'], ['?', '?', '?', '?', '?'], ['?', '?', '?', '?', 'Economy']]

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'?', '?', '?', '?']]
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Final Specific hypothesis: ['Japan' 'Honda' 'Blue' '1980' 'Economy']
```

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General Specific hypothesis: [['Japan', '?', '?', '?', '?'], ['?', 'Honda', '?', '?', '?'], ['?', '?', 'Blue', '?', '?'], ['?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?']]
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