ITA0612 – MACHINE LEARNING FOR DECISION MAKING

LAB EXPERIMENT 2 – CANDIDATE ELIMINATION ALGORITHM

AIM:

To implement the Candidate Elimination Algorithm using training data from a .csv file and output all hypotheses consistent with the data.

ALGORITHM:

1. Initialize:
    - Specific hypothesis S as the first positive example.
    - General hypothesis G as the most general hypothesis.
2. Read training examples from the CSV file.
3. For each training instance:
    - If positive, generalize S and remove inconsistent hypotheses from G.
    - If negative, specialize G to exclude the example.
4. Continue until all examples are processed.
5. Display the final version space (S and G).

PYTHON CODE:

```
import csv

def candidate_elimination(data):
    S = data[0][:-1]
    G = [['?' for _ in S]]

    for instance in data:
        if instance[-1] == 'Yes':
            for i in range(len(S)):
                if S[i] != instance[i]:
                    S[i] = '?'
```

```
        else:
            for i in range(len(S)):
                if S[i] != '?':
                    G.append([S[j] if j == i else '?' for j in range(len(S))])
    return S, G

data = [
    ['Sunny','Warm','Normal','Strong','Warm','Same','Yes'],
    ['Sunny','Warm','High','Strong','Warm','Same','Yes'],
    ['Rainy','Cold','High','Strong','Warm','Change','No']
]

S, G = candidate_elimination(data)
print("Specific Hypothesis:", S)
print("General Hypotheses:", G)
```

SAMPLE OUTPUT:

```
Specific Hypothesis: ['Sunny', 'Warm', '?', 'Strong', 'Warm', 'Same']
General Hypotheses: [['?', '?', '?', '?', '?', '?'], ['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?'],
['?', '?', '?', 'Strong', '?', '?'], ['?', '?', '?', '?', 'Warm', '?'], ['?', '?', '?', '?', '?', 'Same']]
```

RESULT:

Thus, the Candidate Elimination algorithm was successfully implemented and the complete version space was obtained