

Experiment-II

For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

In [1]:

```
import csv
# Open the csv file "candidate_elimination.csv"
with open("candidate_elimination.csv") as f:
    # Read the contents of the file using the csv reader
    csv_file = csv.reader(f)
    # Convert the contents to a list of lists
    data = list(csv_file)
```

In [2]:

data

Out[2]:

```
[['Sunny', 'Warm', 'Normal', 'Strong', 'Warm', 'Same', 'Yes'],
 ['Sunny', 'Warm', 'High', 'Strong', 'Warm', 'Same', 'Yes'],
 ['Rainy', 'Cold', 'High', 'Strong', 'Warm', 'Change', 'No'],
 ['Sunny', 'Warm', 'High', 'Strong', 'Cool', 'Change', 'Yes']]
```

In [3]:

```
# Initialize the specific hypothesis with the first row of the data, excluding the last column
specific = data[0][:-1]
# Initialize the general hypothesis with a list of "?" of the same length as the specific hypothesis
general = [['?' for i in range(len(specific)) for j in range(len(specific))]
```

In [4]:

specific

Out[4]:

```
['Sunny', 'Warm', 'Normal', 'Strong', 'Warm', 'Same']
```

In [5]:

general

Out[5]:

```
[['?', '?', '?', '?', '?', '?'],
 ['?', '?', '?', '?', '?', '?'],
 ['?', '?', '?', '?', '?', '?'],
 ['?', '?', '?', '?', '?', '?'],
 ['?', '?', '?', '?', '?', '?'],
 ['?', '?', '?', '?', '?', '?']]
```

In [11]:

```

# Iterate over each row in the data
for i in data:
    # If the last column of the current row is "Yes"
    if i[-1] == "Yes":
        # Iterate over each column in the current row
        for j in range(len(specific)):
            # If the current column value is not equal to the corresponding value in the specific hypothesis
            if i[j] != specific[j]:
                # Update the corresponding value in the specific hypothesis to "?"
                specific[j] = "?"
                # Update the corresponding value in the general hypothesis to "?"
                general[j][j] = "?"

    # If the last column of the current row is "No"
    elif i[-1] == "No":
        # Iterate over each column in the current row
        for j in range(len(specific)):
            # If the current column value is not equal to the corresponding value in the specific hypothesis
            if i[j] != specific[j]:
                # Update the corresponding value in the general hypothesis to the corresponding value in the specific hypothesis
                general[j][j] = specific[j]
            else:
                # If the current column value is equal to the corresponding value in the specific hypothesis, update the corresponding value in the general hypothesis to "?"
                general[j][j] = "?"
        # Print the current step of the algorithm and the values of the specific and general hypotheses
        print("\nStep " + str(data.index(i)+1) + " of Candidate Elimination Algorithm")
        print(specific)
        print(general)

```

Step 1 of Candidate Elimination Algorithm

```

['Sunny', 'Warm', '?', 'Strong', '?', '?']
[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?']]

```

Step 2 of Candidate Elimination Algorithm

```

['Sunny', 'Warm', '?', 'Strong', '?', '?']
[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?']]

```

Step 3 of Candidate Elimination Algorithm

```

['Sunny', 'Warm', '?', 'Strong', '?', '?']
[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?']]

```

Step 4 of Candidate Elimination Algorithm

```

['Sunny', 'Warm', '?', 'Strong', '?', '?']
[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?'], ['?', '?', '?', '?', '?', '?']]

```

In [12]:

```

# Initialize the final general hypothesis List
gh = []
# Iterate over each List in the general hypothesis
for i in general:
    # Iterate over each value in the current List
    for j in i:
        # If the current value is not "?"
        if j != '?':
            # Add the current List to the final general hypothesis List
            gh.append(i)
            break
# Print the final specific and general hypotheses
print("\nFinal Specific hypothesis:\n", specific)
print("\nFinal General hypothesis:\n", gh)

```

Final Specific hypothesis:

```

['Sunny', 'Warm', '?', 'Strong', '?', '?']

```

Final General hypothesis:

```

[['Sunny', '?', '?', '?', '?', '?'], ['?', 'Warm', '?', '?', '?', '?']]

```