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1 Experiment 2 - Find-S Algorithm

Import the necessary libraries.

[ ]:
```
import pandas as pd
import numpy as np
```

Declare a function to calculate the final specific hypothesis given a vector of concepts (tuples) and a vector of targets.

[ ]:
```
def train(concepts, targets, specificHypothesis):
    for i, val in enumerate(targets):
        if val == 'Yes':
            specificHypothesis = concepts[i]
            break

    for i, val in enumerate(concepts):
        if targets[i] == 'Yes':
            for i in range (len(specificHypothesis)):
                if val[i] != specificHypothesis[i]:
                    specificHypothesis[i] = '?'

    return specificHypothesis
```

Read the imported data set.

[ ]:
```
data = pd.read_csv('data.csv',␣
 ↪names=['Sky','Temperature','Humidity','Wind','Water','Forecast','Enjoy Sport?
 ↪'])
```

Here's what the data looks like in a data frame.

[ ]:
```
data
```

[ ]:
```
     Sky Temperature Humidity    Wind Water Forecast Enjoy Sport?
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
```

Retrieving the data points as the vector of concepts (tuples) of the data set.

```
[ ]: dataPoints = np.array(data)[:, :-1]
     phiLength = dataPoints.shape[0] + 1
```

Retrieving the target vector.

```
[ ]: dataTarget = np.array(data)[:, -1]
     dataTarget
```

```
[ ]: array(['Yes', 'Yes', 'No', 'Yes'], dtype=object)
```

Defining the specific hypothesis to be all zeros initially.

```
[ ]: specificHypothesis = np.zeros(phiLength)
     specificHypothesis
```

```
[ ]: array([0., 0., 0., 0., 0.])
```

Calling the function defined above and obtaining our final hypothesis.

```
[ ]: print(f'The final hypothesis is: {train(dataPoints, dataTarget, specificHypothesis)}')
```

```
The final hypothesis is: ['Sunny' 'Warm' '?' 'Strong' '?' '?']
```