**Exercise 1**

Exercise 3.1 in Mitchell’s book.

**Exercise 2**

Given the following training examples for the target concept \( \text{EnjoySport} \).

<table>
<thead>
<tr>
<th>Example</th>
<th>Sky</th>
<th>AirTemp</th>
<th>Humidity</th>
<th>Wind</th>
<th>Water</th>
<th>Forecast</th>
<th>EnjoySport</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sunny</td>
<td>Warm</td>
<td>Normal</td>
<td>Strong</td>
<td>Warm</td>
<td>Same</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Sunny</td>
<td>Warm</td>
<td>High</td>
<td>Strong</td>
<td>Warm</td>
<td>Same</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Rainy</td>
<td>Cold</td>
<td>High</td>
<td>Strong</td>
<td>Cool</td>
<td>Change</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Sunny</td>
<td>Warm</td>
<td>High</td>
<td>Strong</td>
<td>Cool</td>
<td>Change</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>Sunny</td>
<td>Warm</td>
<td>Normal</td>
<td>Weak</td>
<td>Warm</td>
<td>Same</td>
<td>No</td>
</tr>
</tbody>
</table>

Draw the decision tree that will be learnt by ID3 based on the training examples. Show the value for information gain for each of the candidate attributes for each step in the growing tree.

**Exercise 3**

Exercise 3.4 in Mitchell’s book.

**Exercise 4**

Discuss the merits and drawbacks of each of the following two schemes for handling multi-class data sets:

(a) Form a single decision tree for all classes.

(b) Form one decision tree for each class. To train a decision tree for class \( C_i \) convert the data into a two-class problem using the following rule to relabel each instance: if the class is equal to \( C_i \) then set label to \(+\), else set label to \( - \). To classify an instance using this scheme you use each class’s tree to classify it and then output all class names whose corresponding tree predicted a \( + \).