MODULE 1 – INTRODUCTION AND CONCEPT LEARNING

1. Define Machine Learning. Explain with examples why machine learning is important.
2. Discuss some applications of machine learning with examples.
3. Explain how some disciplines have influenced the machine learning.
4. What is well-posed learning problems.
5. Describe the following problems with respect to Tasks, Performance and Experience:
   a. A Checkers learning problem
   b. A Handwritten recognition learning problem
   c. A Robot driving learning problem
6. Explain the steps in designing a learning systems in detail.
7. Explain different perspective and issues in machine learning.
8. Define concept learning and discuss with example.
9. Explain the General-to-Specific Ordering of Hypotheses
10. Write FIND-S algorithm and explain with example given below

<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>Warm</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>
</tbody>
</table>

11. What are the key properties and complaints of FIND-S algorithm?
12. Define Consistent Hypothesis and Version Space.
13. Write LIST-THEN-ELIMINATE algorithm.
14. Write the candidate elimination algorithm and illustrate with example
15. Write the final version space for the below mentioned training examples using candidate elimination algorithm.
Example – 1:

<table>
<thead>
<tr>
<th>Origin</th>
<th>Manufacturer</th>
<th>Color</th>
<th>Decade</th>
<th>Type</th>
<th>Example Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>Honda</td>
<td>Blue</td>
<td>1980</td>
<td>Economy</td>
<td>Positive</td>
</tr>
<tr>
<td>Japan</td>
<td>Toyota</td>
<td>Green</td>
<td>1970</td>
<td>Sports</td>
<td>Negative</td>
</tr>
<tr>
<td>Japan</td>
<td>Toyota</td>
<td>Blue</td>
<td>1990</td>
<td>Economy</td>
<td>Positive</td>
</tr>
<tr>
<td>USA</td>
<td>Chrysler</td>
<td>Red</td>
<td>1980</td>
<td>Economy</td>
<td>Negative</td>
</tr>
<tr>
<td>Japan</td>
<td>Honda</td>
<td>White</td>
<td>1980</td>
<td>Economy</td>
<td>Positive</td>
</tr>
<tr>
<td>Japan</td>
<td>Toyota</td>
<td>Green</td>
<td>1980</td>
<td>Economy</td>
<td>Positive</td>
</tr>
<tr>
<td>Japan</td>
<td>Honda</td>
<td>Red</td>
<td>1990</td>
<td>Economy</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Example – 2:

<table>
<thead>
<tr>
<th>Size</th>
<th>Color</th>
<th>Shape</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Big</td>
<td>Red</td>
<td>Circle</td>
<td>No</td>
</tr>
<tr>
<td>Small</td>
<td>Red</td>
<td>Triangle</td>
<td>No</td>
</tr>
<tr>
<td>Small</td>
<td>Red</td>
<td>Circle</td>
<td>Yes</td>
</tr>
<tr>
<td>Big</td>
<td>Blue</td>
<td>Circle</td>
<td>No</td>
</tr>
<tr>
<td>Small</td>
<td>Blue</td>
<td>Circle</td>
<td>Yes</td>
</tr>
</tbody>
</table>

16. Explain in detail the Inductive Bias of Candidate Elimination algorithm.