CSC 412 Machine Learning and Knowledge Discovery
Exercise I

1. Summarize the Iris Data Set

The Iris Data Set is perhaps the best known database. The data set contains 3 classes of 50 instances each, where each class refers to a type of iris plant.


You can use any text editor to open it.

Attribute Information:
1. sepal length in cm
2. sepal width in cm
3. petal length in cm
4. petal width in cm
5. class:
   - Iris Setosa
   - Iris Versicolour
   - Iris Virginica

Write a Python program that reads the input file. And print the summary statistics as follows:

<table>
<thead>
<tr>
<th></th>
<th>Summary Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>--------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>Min</td>
</tr>
<tr>
<td>Sepal length</td>
<td>4.3 (Setosa)</td>
</tr>
<tr>
<td>Sepal width</td>
<td>2.0 (Versicolor)</td>
</tr>
<tr>
<td>Petal length</td>
<td>1.0 (Setosa)</td>
</tr>
<tr>
<td>Petal width</td>
<td>0.1 (Setosa)</td>
</tr>
</tbody>
</table>
2. **Sort Characters by Frequency**

Given a string \( s \), sort it in deceasing order based on the frequency of the characters. The frequency of a character is the number of times it appears in the string.

--- Example ---

Input: \( s = \text{"tree"} \)

Output: \( \text{"eert"} \)

Explanation: ‘e’ appears twice while ‘r’ and ‘t’ both appear once. So ‘e’ must appear before both ‘r’ and ‘t’.

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3. (5 points) **Palindrome**

Given an Array \( \text{arr} \) of letters, return \text{true} if \( \text{arr} \) is a palindrome. An array is a palindrome when it reads the same backward as forward.

For example, \( \text{abcba} \) is a palindrome while \( \text{abcd} \) is not.

--- Example 1 ---

Input: \( \text{arr} = [\text{a'}, \text{b'}, \text{c'}, \text{b'}, \text{a'}] \)

Output: \text{true}

--- Example 2 ---

Input: \( \text{arr} = [\text{2'}, \text{0'}, \text{2'}, \text{2'}] \)

Output: \text{false}