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.

   Get the data set from: https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data

   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:

```
+-------------------------------------------------+
|                 Summary Statistics              |
+--------------+------------------+-----------------+
|              |       Min        |       Max       |
+--------------+------------------+-----------------+
| Sepal length | 4.3 (Setosa)     | 7.9 (Virginica) |
+--------------+------------------+-----------------+
|  Sepal width | 2.0 (Versicolor) | 4.4 (Setosa)    |
+--------------+------------------+-----------------+
| Petal length | 1.0 (Setosa)     | 6.9 (Virginica) |
+--------------+------------------+-----------------+
|  Petal width | 0.1 (Setosa)     | 2.5 (Virginica) |
+--------------+------------------+-----------------+
```

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 = "tree"
       Output: "eert"
  Explanation: 'e' appears twice while 'r' and 't' both appear once.
               So 'e' must appear before both 'r' and 't'.
```

3. (5 points) **Palindrome**

Given an Array `arr` of letters, return `true` if `arr` is a **palindrome**.

An array is a **palindrome** when it reads the same backward as forward.

For example, `abcba` is a palindrome while `abcda` is not.

```
-- Example 1 --
        Input: arr = ['a', 'b', 'c', 'b', 'a']
       Output: true

-- Example 2 --
        Input: arr = ['2', '0', '2', '2']
       Output: false
```