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Algorithms for Data Science

Homework 5

Due 8/12/2019

1) Dutch Flag Problem (perform in place, linear sorting on array of ‘R’, ‘W’, ‘B’)

```
def DutchFlagSort(Array a):
    count[] = [0, 0, 0]
    for x in a:
        if x == ‘R’:
            count[0] ++
        elif x == ‘W’:
            count[1]++
        else:
            count[2]++
    for x in a:
        if count[0] != 0:
            x = ‘R’
            count[0] - -
        elif count[1] != 0:
            x = ‘W’
            count[1] - -
        else:
            x = ‘B’
            count[2] - -
```

2) Give an O(nlgk)-time algorithm to merge k sorted lists into one sorted list

```
def mergeWithHeap(dataFrame):   //dataframe includes all the k sorted lists
    smallestOfEachList = buildMinHeap(dataframe)   //get first value from each list/row
```

output = empty list

while smallestOfEach is not empty:

output.next = smallestOfEach.removeRoot

smallestOfEach.getNextFromRootRow(dataFrame) //insert next item from the row the root value came from into the min heap

4) (Collaborative Problem)
    a. apply neural network to iris dataset
    b. apply support vector machine to iris dataset

    Code for this problem can be found in the hw5.py file. To run this file, need to provide argument for the location of the iris data set as an arff file.