**CS1083**

**Assignment #9**

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**CharList.java:**  
  
import *java*.*util*.*Scanner*;

import *java*.*io*.*\**;

*public* *class* CharList {

*public* CharNode head;

*public* *CharList*() {

this.*head* = null;

}

*public* void *insertValue*(char valueIn, int countIn) {

// *if list is empty create a new node*

*if* (head == null) {

head = *new* *CharNode*(valueIn, countIn);

*return*;

}

*if*(head.*data* == valueIn) { // *check if valueIn matches head node*

head.*count* += countIn;

*return*;

}

// *if valueIn comes before the head alphabetically, insert at the head*

*if* (valueIn < head.*data*) {

CharNode newNode = *new* *CharNode*(valueIn, countIn);

newNode.*next* = head;

head = newNode;

*return*;

}

CharNode current = head;

*while* (current.*next* != null && current.*next*.*data* < valueIn) {

current = current.*next*;

}

// *Check if we found a match in current.next*

*if* (current.*next* != null && current.*next*.*data* == valueIn) {

current.*next*.*count* += countIn;

} *else* {

CharNode newNode = *new* *CharNode*(valueIn, countIn);

newNode.*next* = current.*next*;

current.*next* = newNode;

}

}

*public* void *readList*(String fileName) {

*try* {

File file = *new* *File*(fileName);

Scanner scan = *new* *Scanner*(file);

*while* (scan.*hasNextLine*()) {

String line = scan.*nextLine*();

String[] keyVal = line.*split*(" ");

char character = keyVal[0].*charAt*(0);

int key = Integer.*parseInt*(keyVal[1]);

*insertValue*(character, key);

}

} *catch* (FileNotFoundException fnfe) {

System.*out*.*println*(fnfe.*getMessage*());

}

}

*public* void *mergeLists*(CharList other) {

CharNode current = other.*head*;

*while* (current != null) {

*insertValue*(current.*data*, current.*count*);

current = current.*next*;

}

}

*public* void *printRec1*(CharNode front) {

*if* (front == null) {

*return*;

}

System.*out*.*println*(front.*data* + " : " + front.*count*);

*printRec1*(front.*next*);

}

*public* void *printRecBackwards1*(CharNode front) {

*if* (front == null) {

*return*;

}

*printRecBackwards1*(front.*next*);

System.*out*.*println*(front.*data* + " : " + front.*count*);

}

*public* int *charCount*() {

CharNode current = head;

int totalCount = 0;

*while*(current != null) {

totalCount += current.*count*; // *Add the count of the current node*

current = current.*next*;

}

*return* totalCount;

}

*private* *class* CharNode {

*public* char data;

*public* int count;

*public* CharNode next;

*public* *CharNode*(char dataIn, int count) {

this.*data* = dataIn;

this.*next* = null; // *does not point to anything initially*

this.*count* = count;

}

}

}

**TestCharList.java:**

*public* *class* TestCharList {

*public* *static* void *main* (String[] args) {

// *TEST 1*

CharList charList1 = *new* *CharList*();

CharList charList2 = *new* *CharList*();

// *System.out.println("List1:");*

charList1.*readList*("test1a.in");

// *charList1.printRec1(charList1.head);*

// *System.out.println("List2:");*

charList2.*readList*("test1b.in");

// *charList2.printRec1(charList2.head);*

charList1.*mergeLists*(charList2);

System.*out*.*println*("Total Character Count: " + charList1.*charCount*());

charList1.*printRec1*(charList1.*head*);

System.*out*.*println*("Merged List (Backwards):");

charList1.*printRecBackwards1*(charList1.*head*);

// *TEST 2*

System.*out*.*println*();

System.*out*.*println*("TEST2");

charList1.*readList*("test2a.in");

charList2.*readList*("test2b.in");

System.*out*.*println*("List 1: ");

charList1.*printRec1*(charList1.*head*);

System.*out*.*println*("List 2: ");

charList1.*printRec1*(charList2.*head*);

charList1.*insertValue*('z', 2); // *inserting at the end*

charList1.*insertValue*('k', 2); // *inserting at existing node*

charList2.*insertValue*('a', 3); // *inserting at the start of the list*

System.*out*.*println*("List 1: (After)");

charList1.*printRec1*(charList1.*head*);

System.*out*.*println*("List 2: (After)");

charList1.*printRec1*(charList2.*head*);

}

}