

CECS 277 HOMEWORK COLLECTION

OBJECTIVE: Get some more experience using Java Collections.

INTRODUCTION: Please remember the coding standards [here](#).

This assignment has two parts, each part should go into a separate application, although there is no reason that they cannot both belong to the same package within your Integrated Development Environment. Both of these parts deal with maps.

Remember that a map is just a data structure that manages a collection of elements. Each element has two parts: the key, and the value. Both the key and the value could be an abstract data type that you create. Either or both could be as complex as you need for them to be. Just remember that the key abstract datatype must implement the `Comparable` interface so that the collection can tell where to insert a new value (in the case of the `TreeMap`) you need to be sure that you override `hashCode` and `equals` for a `HashMap`. In **our** case, the key will be a `String`, which has a built-in `compareTo` method that does the job, as well as an override for `hashCode` and `equals`.

Part 1

You will read in a short file of words that begin with “q” but the second letter is **not** a “u”. I bet that you did not know there were any such words. For each word, you will find the Scrabble score for that word. To do that, you first read a file that has rows in it like: “4 F H V W Y”. The first field is the score for all of the letters in that record. The letters that follow each gets that score. All 26 letters are covered in this file. It is called “ScrabblePoints.txt” and you can find it [here](#). You need to read that file, and create a `Map` (use a `TreeMap` or a `HashMap`) that has the letter of the alphabet as the key, and the score that letter gets in Scrabble as the value.

Then, you have to read the records in “Q words.txt” found [here](#), and go through each word, letter by letter and compute the Scrabble score for that letter, then total them up for the word, and list out the score for the entire word when you get done reading that record in the file.

Part 2

You will read the novel *War and Peace* and count how many times each word occurs in the book. Thankfully, you now know how to write an application for that, which will save you mountains of time. *War and Peace* can be found [here](#). This time I want you to use two different types of maps: the `TreeMap` and the `HashMap`, and compare their performances.

Each time you read a word from *War and Peace*:

- Remove all non alpha characters.
- Convert all characters to lower case.
- Look in your `Map` to see whether you have an entry for that word or not:

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- If not, add an entry, and put in a count of 1
 - Else, retrieve the word count for that word, increment it by one, and update your map.
- At the end, list the words that you have found, and tell me how many times that word occurred in the entire novel.
- Report out how many words total you found in the novel.
- Report how many milliseconds it took to read the novel and do the report.
 - Use the Instant and Duration classes in java.time to do your timing.
- Be sure to write a static function to read the file in, populate the map, and report the results. You should create two maps in your main: one that is a HashMap, and the other a TreeMap.
- When you report out your statistics, **explicitly create an iterator** over your map and use the iterator to report out the statistics.

PROCEDURE:

1. Check to make sure that the various files are there.
 - a. If you put them in the same directory with your /src folder in Eclipse, you do not have to use a path name when you open the file.
 - b. **Do** check to make sure that the files are there, and tell the user if they are not before you exit.
2. **Hint:** you will want to create a Scanner object for the files that you read in, and you will also want to create a Scanner object for each line that you read in so that you can use facilities like nextInt, hasNextLine and so forth to parse the incoming data.

WHAT TO TURN IN:

- ScrabbleScores.java – the application that calculates the scores for the “q” words
- CollectionsRunner.java – the application that reads in *War and Peace*
- Your console output from each application:
 - ScrabbleScores.txt
 - CollectionsRunner.txt

SAMPLE OUTPUT:

Part 1:

```
Score for word: qabala is: 17
Score for word: qabalah is: 21
Score for word: qabalahs is: 22
Score for word: qabalas is: 18
Score for word: qadi is: 14
Score for word: qadis is: 15
Score for word: qaid is: 14
Score for word: qaidis is: 15
Score for word: qanat is: 14
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Score for word: qanats is: 15
Score for word: qat is: 12
Score for word: qats is: 13
Score for word: qi is: 11
Score for word: qindar is: 16
Score for word: qindarka is: 22
Score for word: qindars is: 17
Score for word: qintar is: 15
Score for word: qintars is: 16
Score for word: qis is: 12
Score for word: qiviut is: 18
Score for word: qiviuts is: 19
Score for word: qoph is: 18
Score for word: qophs is: 19
Score for word: qwerty is: 21
Score for word: qwertys is: 22
Completed satisfactorily.

Part 2:

Tree map
Total words in War and Peace: 566316
Total time (sec) to read and hash War and Peace: 1.023 seconds
a occurred: 10522 times
aah occurred: 1 times
ab occurred: 1 times
aback occurred: 3 times
abacus occurred: 1 times
abandon occurred: 25 times
abandoned occurred: 54 times
abandoning occurred: 26 times
abandonment occurred: 14 times
abandons occurred: 1 times
abasement occurred: 1 times
abashed occurred: 12 times
abate occurred: 2 times
abbe occurred: 18 times
abbes occurred: 1 times
abbreviations occurred: 1 times
abc occurred: 1 times
abdicate occurred: 1 times
abdomen occurred: 2 times
abdomens occurred: 2 times
abduction occurred: 3 times
abductors occurred: 1 times
abhorrence occurred: 1 times
abide occurred: 1 times
ability occurred: 4 times
ablaze occurred: 2 times
able occurred: 107 times
abnormal occurred: 1 times
abnormally occurred: 1 times
abodes occurred: 1 times

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yielding occurred: 7 times
yields occurred: 1 times
yonder occurred: 1 times
york occurred: 1 times
you occurred: 3644 times
youas occurred: 1 times
youd occurred: 17 times
youeven occurred: 1 times
yougive occurred: 1 times
youi occurred: 4 times
youis occurred: 1 times
youll occurred: 66 times
young occurred: 441 times
younger occurred: 32 times
youngest occurred: 11 times
younglooking occurred: 2 times
youngster occurred: 1 times
youngsters occurred: 1 times
youngyield occurred: 1 times
youpeter occurred: 1 times
your occurred: 816 times
youre occurred: 71 times
yours occurred: 25 times
yourself occurred: 117 times
yourselves occurred: 5 times
yourshe occurred: 1 times
yousit occurred: 1 times
yousonya occurred: 1 times
youth occurred: 44 times
youth occurred: 1 times
youthful occurred: 14 times
youthfully occurred: 1 times
youthfulness occurred: 3 times
youthfulnessand occurred: 1 times
youths occurred: 3 times
youturn occurred: 1 times
youve occurred: 41 times
youvodka occurred: 1 times
yukhnov occurred: 1 times
yukhnovna occurred: 1 times
yukhnovo occurred: 1 times
yuri occurred: 1 times
yusupova occurred: 1 times
yusupovs occurred: 1 times
z occurred: 2 times
zakhar occurred: 9 times
zakharchenko occurred: 1 times
zakharino occurred: 1 times
zakharych occurred: 2 times
zakret occurred: 1 times
zakuska occurred: 1 times
zaletaev occurred: 2 times
zat occurred: 6 times

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zavarzinsk occurred: 1 times
zaymishcheas occurred: 1 times
zdrzhinski occurred: 4 times
zdrzhinskis occurred: 3 times
ze occurred: 9 times
zeal occurred: 9 times
zealous occurred: 4 times
zealously occurred: 2 times
zen occurred: 1 times
zenith occurred: 1 times
zeres occurred: 1 times
zero occurred: 2 times
zest occurred: 2 times
zharov occurred: 1 times
zherkov occurred: 37 times
zherkovs occurred: 3 times
zhilinski occurred: 6 times
zhilinskile occurred: 1 times
zhilinskis occurred: 1 times
zides occurred: 1 times
zigzag occurred: 1 times
zikin occurred: 1 times
zinaida occurred: 1 times
zip occurred: 1 times
zis occurred: 1 times
znaim occurred: 12 times
znamenska occurred: 1 times
zone occurred: 1 times
zoology occurred: 3 times
zu occurred: 2 times
zubov occurred: 2 times
zubova occurred: 3 times
zubovski occurred: 2 times
zum occurred: 1 times
zweck occurred: 1 times

Hash map
Total words in War and Peace: 566316
Total time (sec) to read and hash War and Peace: 0.564 seconds
frowning occurred: 48 times
undermining occurred: 3 times
nicely occurred: 1 times
acutely occurred: 3 times
costing occurred: 4 times
abrupt occurred: 6 times
ecossaise occurred: 8 times
salary occurred: 4 times
spontaneous occurred: 2 times
childs occurred: 8 times
pretend occurred: 5 times
guards occurred: 94 times
sprouting occurred: 3 times
nizhni occurred: 6 times
blameworthy occurred: 3 times

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pick occurred: 9 times
gloomy occurred: 33 times
stonily occurred: 1 times
manylimbed occurred: 1 times
exhaled occurred: 1 times
energy occurred: 23 times
deference occurred: 5 times
perspired occurred: 3 times
counters occurred: 1 times
carabineers occurred: 1 times
spreading occurred: 17 times
everquickening occurred: 1 times
mozhaysk occurred: 25 times
alphonse occurred: 1 times
forestalled occurred: 2 times
avoidance occurred: 2 times
exhales occurred: 1 times
elsethen occurred: 1 times
borisshe occurred: 1 times
tallow occurred: 4 times
compassionate occurred: 2 times
incited occurred: 3 times
snaffle occurred: 1 times
dismayed occurred: 3 times
protective occurred: 1 times
amusing occurred: 21 times
grandiloquent occurred: 1 times
moscowdespite occurred: 1 times
squatting occurred: 5 times
role occurred: 23 times
glade occurred: 3 times
turf occurred: 1 times
fearless occurred: 3 times
professedly occurred: 1 times
napoleonic occurred: 8 times
roll occurred: 14 times
turn occurred: 103 times
turk occurred: 2 times
gold occurred: 41 times
reticule occurred: 9 times
result occurred: 73 times
ces occurred: 1 times
pier occurred: 1 times
cet occurred: 1 times
pies occurred: 1 times
selfish occurred: 3 times
causesto occurred: 1 times
crunching occurred: 2 times
after occurred: 834 times
redoubt occurred: 31 times
staircase occurred: 11 times
kinswoman occurred: 1 times
resume occurred: 2 times
a occurred: 10522 times

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b occurred: 11 times
friedland occurred: 4 times
c occurred: 9 times
overtaking occurred: 7 times
d occurred: 6 times
collisions occurred: 1 times
e occurred: 26 times
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carried occurred: 96 times
cleaning occurred: 5 times
bulges occurred: 1 times
overcoat occurred: 21 times
motion occurred: 45 times
homelike occurred: 1 times
welli occurred: 1 times
vesenya occurred: 3 times
hurrying occurred: 18 times
distracted occurred: 7 times
incoherent occurred: 7 times
clothes occurred: 31 times
efficacy occurred: 2 times
caleches occurred: 3 times
deseccration occurred: 1 times
unsuited occurred: 1 times
carries occurred: 5 times
bulged occurred: 2 times
stoutness occurred: 2 times
witchery occurred: 1 times
response occurred: 2 times
soandso occurred: 10 times
oblivious occurred: 4 times
responsive occurred: 1 times
etait occurred: 1 times
independently occurred: 16 times
arguments occurred: 22 times
delegation occurred: 1 times
rival occurred: 5 times
Completed satisfactorily.