CS 280
Spring 2021
Recitation Assignment 4
September 29, 2021

Due Date: Sunday, October 3rd, 2021, 23:59
Total Points: 6

Write a C++ program that should read from a file name specified in the command line as an argument. However, if no file name is provided, the program should print on a new line "No file is found", and exit. If the file cannot be opened, print on a new line "File cannot be opened: ", followed by the file name, and exit. The program should read from the file words until the end of file. If the input file is empty, print out on a new line the message "File is empty." and then exit. A word is defined as a contiguous number of non-whitespace characters separated by whitespace. In order to avoid counting uppercase and lowercase letters, all letters of a word should be converted to lowercase. The program should keep a record of the number of occurrences of each seen preposition in the input file that is defined in a given list of prepositions. The program should create a simple directory using the <map> container that maps a string to an integer for the occurrences of each preposition word. Consider the following subset of prepositions: {in, on, to, at, after, with, over, by, between, and into} to be used to initialize the directory. The definition of the <map> container is as follows:

```
map<string,int> PrepCount =
{{"in",  0},{"on",  0},{"to",  0},{"at",  0},{"after",  0},{"with",
0},{"over", 0},{"by", 0},{"between", 0},{"into", 0},};
```

After all input has been processed, the program should

- Print each preposition word in the list and the number of times it was seen. The preposition words should be printed in order.
- Determine and printout the preposition that has been seen the largest number of times in the file.

For example, with an input file of the following contents:

one time my drama class's teacher had gone home sick so we were just put in a classroom with a movie to entertain us for the period when an alarm went off. none of us were sure if it was the fire alarm or the lockdown alarm, so we all head out into the hall to check and no one's out there, so we head back in and climb under our desks as is lockdown procedure. cut to an hour or so later when a teacher bursts in and nearly dies of relief because the school was on fire and we were the only students not accounted for and half the faculty and fire department had been searching for us for ages. literally, the whole school had filled with smoke while we'd kept super safe under our wooden desks.

Newline →

The results are as shown below:

```
List of Prepositions seen in the file and their number of occurrences:

after: 0
at: 0
between: 0
by: 0
in: 3
into: 1
on: 1
over: 0
to: 3
with: 2
The preposition with maximum occurrences is "in" found 3 times.

```

Newline →

Hints:

1. Include the <map> container.
2. Create a directory using <map> to map a string to an integer.
3. See the recitation class slides for the use of the <map> methods, or refer to the online documentation for <map> at: www.cplusplus.com/reference/map/map/
4. There are 5 test cases. These are:
    a. Case 1: Error checking of opening a file (non-existent file infile)
    b. Case 2: Empty File (infile1)
    c. Case 3: All Numeric Data File (infile2)
    d. Case 4: Textual File I (infile3)
    e. Case 5: Textual File II (infile4)

5. If you want to look at the input for one of the test cases, use the linux "cat" command. The cases are in the directory $LIB/public/RA_Fall2021/RA4. You can, for example, look at infile3 by saying "cat $LIB/public/ RA_Fall2021/ infile3 ", and you can look at the expected output by saying "cat $LIB/public/ RA_Fall2021/case4.correct".

Submission Guidelines

1. Please name your file as "RAx_firstinitial_lastname.cpp". Where, "firstinitial" and "lastname" refer to your first name initial letter and last name, respectively, and "x" refers to the recitation assignment number (e.g., 1, 2, etc). Your program Submission is to Vocareum environment. Follow the link of Recitation Assignment 2 on Canvas in the Modules or Assignments pages to connect to the current assignment on Vocareum.

2. **Submissions after the due date are accepted with a fixed penalty of 25%. No submission is accepted after Saturday 11:59 pm, October 5, 2021.**

Grading Table

Testing Cases	Points
Case 1: Error checking of opening a file	1.0
Case 2: Empty File	1.0
Case 3: All Numeric Data File	1.0
Case 4: Textual File I	1.0
Case 5: Textual File II	1.0
Compiles Successfully	1.0
Total	6