CS5001 – Object Oriented Modelling Design and Programming

Practical 1 – Aligning Text

Due Thursday, week 3 – weighting 10%

Now that you are familiar with your programming environment from having completed the introductory exercise, you are going to write a small program in your first practical that reads in a number of paragraphs of text from a file and aligns the text with a line wrapping at a specified line length.

For this practical, you may develop your code in any IDE or editor of your choice, however, you must ensure you're your source code is in a folder named **CS5001-p1-aligntext/src** and your main method is in a file called **AlignText.java** (see Exercise 0 – Using MMS and the Automated Checker for Hello World for instructions).

Basic requirements

- Accept two arguments from the command line:
  - First argument is the name (and path) of the file containing the text
  - Second argument is the desired length of the line for wrapping the text
  - If either argument is missing or invalid, you should output the following message:
    ```
    usage: java AlignText file_name line_length
    ```

- Right-align text from the file:
  - Ensure each line contains the maximum number of words possible within the specified limit
  - Ensure no word is split across lines
  - Output the right-aligned text to the standard output

Enhancements

- Use a third command line argument to support one or more of the additional options detailed below:
  - Left-align text from the file
    - Third command line argument = L
  - Centre-align text from the file
    - Third command line argument = C
    - If there are an odd number of spaces, place the extra space at the start of the line
  - Fully justify text from the file
    - Third command line argument = J
    - Distribute spaces as evenly as possible between words on the line
  - If any argument is missing or invalid, you should output the following message:
    ```
    usage: java AlignText file_name line_length <align_mode>
    ```

Implementation

You are going to read from a file in this task. Since we have not covered this yet we have provided you with a *FileUtil.java* class to deal with reading from a file. We have also provided you with two pieces of example text. The files are available at:

https://studres.cs.st-andrews.ac.uk/CS5001/Practicals/p1-aligntext/Resources/

You should save the java file to your **src** directory, i.e. in the same directory that contains your *AlignText.java* file, and you should save the text files to your **CS5001-p1-aligntext** directory.

In order to read in the file specified as the first command line argument into your Java program you should use the following line of code:

```
String[] paragraphs = FileUtil.readFile(args[0]);
```

Each String in the array called 'paragraphs' will then contain <u>a complete paragraph of text from the file.</u>

When running your program on files in different directories remember to <u>use the absolute or relative path</u> to the file. For instance, if you are running your program from `CS5001-p1-aligntext/src` but your test files are in `CS5001-p1-aligntext`, you could use the following command, <u>specifying the relative path to</u> "test_pratchett.txt" (assuming a column length of 80):

```
java AlignText "../test_pratchett.txt" 80
```

Note: you must include the quote marks around the file name if there are spaces in the file name/path.

The result of right-aligning the provided text with a line length of 80 characters is shown in <u>Appendix A – Sample Alignment</u>. You can find further examples of output by examining the tests provided (see <u>Automated Checking</u> below).

As with any programming practical you will probably need to look at the Java API, and in fact I will not mention this again. The API can be found at

http://docs.oracle.com/javase/8/docs/api/

For this practical you may find the documentation of the *Array* and *String* class particularly useful in showing you how to find out the *length* of an *Array* and of a *String*, how to extract substrings from a string, how to find the occurrence of certain characters in a string, split a string, remove leading and trailing white space, etc.

Automated Checking

You are provided with some basic unit test to check your code provides the required functionality. The tests can be found at `/cs/studres/CS5001/Practicals/p1-aligntext/Tests.`
In order to run the automated checker on your program, open a terminal window connected to the Linux lab clients/servers and **change directory** to your **CS5001-p1-aligntext** directory and execute the following command:

```
stacscheck /cs/studres/CS5001/Practicals/p1-aligntext/Tests
```

Similarly to the instructions in Section <u>Exercise 0 - Running the Automated Checker</u>, if the automated checker doesn't run, or the build fails, or all tests fail, you may have mis-typed a command or not have followed the instructions above.

You should open the provided test files and make sure you understand what the tests are doing and try to come up with some interesting tests of your own. You can run your own via the command line, or via the automated checker. You can create new tests in a local sub-directory in your assignment directory and run `stacscheck` with your own directory as the argument e.g.

```
stacscheck ~/CS5001-p1-aligntext/MyTests
```

You should also look at the documentation for the automated checker at:

https://studres.cs.st-andrews.ac.uk/Library/stacscheck/

Deliverables – Software (and ReadMe)

If you have attempted any enhancements beyond those mentioned in the handout, you should include a short ReadMe file in your assignment folder (CS5001-p1-aligntext). You should describe what you have done, including any instructions for compiling, running and using your program. Hand in a .zip archive of your entire assignment folder, which includes your src directory, the ReadMe file (if applicable), and any local test sub-directories, via MMS.

Marking

A very good attempt at satisfying the basic requirement above can achieve a mark of 14 - 16. This means you should produce very good, re-usable code demonstrating a very good decomposition of the problem into sensible methods with sensible parameters. To achieve a 17 or above, your code must in addition make a very good attempt at one or more enhancements. See the standard mark descriptors in the School Student Handbook:

http://info.cs.st-andrews.ac.uk/student-handbook/learning-teaching/feedback.html#Mark_Descriptors

Lateness

The standard penalty for late submission applies (Scheme B: 1 mark per 8 hour period, or part thereof):

http://info.cs.st-andrews.ac.uk/student-handbook/learning-teaching/assessment.html#lateness-penalties

Good Academic Practice

The University policy on Good Academic Practice applies:

https://www.st-andrews.ac.uk/students/rules/academicpractice/

Appendix A – Sample Alignment

Reproduced from "Interesting Times", Terry Pratchett

Many things went on at the Unseen University and, regrettably teaching had to be one of them. The faculty had long ago confronted this fact and had perfected various devices for avoiding it. But this was perfectly all right because to be fair, so had the students.

The system had worked quite well and, as happens in such cases, had taken on the status of a tradition. Lectures clearly took place, because they were down there on the timetable in black and white. The fact that no-one attended was an irrelevant detail. It was occasionally maintained that this meant that the lectures did not in fact happen at all, but no-one ever attended them to find out if this was true.

Anyway, it was argued (by the Reader in Woolly Thinking, which is like Fuzzy Logic, only less so) that lectures had taken place in essence, so that was all right, too.

And, therefore education at the University mostly worked by the age-old method of putting a lot of young people in the vicinity of a lot of books and hoping that something would pass from one to the other, while the actual young people put themselves in the vicinity of inns and taverns for exactly the same reason.

Right-Aligned with 80 column width

```
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    one of them. The faculty had long ago confronted this fact and had perfected
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          irrelevant detail. It was occasionally maintained that this meant that the
        lectures did not in fact happen at all, but no-one ever attended them to find
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   And, therefore education at the University mostly worked by the age-old method
    of putting a lot of young people in the vicinity of a lot of books and hoping
    that something would pass from one to the other, while the actual young people
  put themselves in the vicinity of inns and taverns for exactly the same reason.
```

Reproduced from "Supercalifragilisticexpialidocious", the Sherman Brothers

It's... supercalifragilisticexpialidocious! Even though the sound of it is something quite atrocious. If you say it loud enough you'll always sound precocious. Supercalifragilisticexpialidocious!

Right-Aligned with 80 column width

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    It's... supercalifragilisticexpialidocious! Even though the sound of it is
      something quite atrocious. If you say it loud enough you'll always sound
                         precocious. Supercalifragilisticexpialidocious!
```