EE231002 Introduction to Programming

Lab 22. Word Count

No due date.

We have practiced word processing by printing out the text file in a more legible format. In this lab, we will practice more string manipulations by counting the number of lines, number of words and number of characters of a text file.

Your assignment is to write a program that reads a text file from the standard input stream, counts the number of lines, number of words and the number of characters of the file and prints out the results. Examples of the output are as following:

```
$ ./a.out < story1.txt
Number of lines: 93
Number of words: 900
Number of chars: 4705
```

```
$ ./a.out < story2.txt
Number of lines: 167
Number of words: 1196
Number of chars: 7215
```

Notes.

1. A standard text file is terminated by the end-of-file (EOF) character. This EOF macro is defined in the `stdio.h` header file. Thus, you can read all the characters from a text file by the following `while` loop:

   ```
   while ((ch = getchar()) != EOF) {
       // process each char as needed
   }
   ```

   Also, this `EOF` should not count as a character of the original file.

2. The words of a text file are separated by delimiters. A delimiter can be one of the followings:

   `' '`: space character
   `'\t'`: tab character
   `'\n'`: new-line character

   Thus, a word starts by a non-delimiter and ends when the next character is a delimiter.

3. This program can be implemented using different approaches. It is recommended that you try each of the following approaches.

3.1. The simplest and the most efficient way is to read in a character and then process this character to update line count, word count and character count immediately. The text file needs not be stored by the program, and no function needs to be implemented.

3.2. A more general way, which also practice dynamic memory allocation, is to read in the entire text file before counting lines, words and characters. Due to the size of the file is not known beforehand, dynamic memory allocation is needed. Counting of lines, words and character is then similar to the last approach.

3.3. In addition to dynamic memory allocation, we can also practice recursive function using this lab. Please try to rewrite the program to use recursive function to count the number of lines, words and characters after the entire text file is read in.

4. Again you can submit your codes by

```
$ ~ee2310/bin/submit lab22 lab22a.c
$ ~ee2310/bin/submit lab22 lab22b.c
$ ~ee2310/bin/submit lab22 lab22c.c
```

Three files for three different approaches.