Object-Oriented Programming in C++

Lab Exercise 3 (2%)

Objective

Text and file processing is fundamental to many programming tasks. The objective of this exercise is to get students up-to-speed in C++ input/output processing (*cin*, *cout, cerr* and file streams). You can work on this lab in a group of two people.

Description

First create a test file called *test.txt* containing the following:

```
this is a line
this line has 5 words
only two words
last line
```

Part I

In a file called *main.cpp* write a program that has the following functions. In your main function, test the functions one at a time by having them read from standard input and output the returned value(s) to standard output (in the main function comment out the call to the previously tested functions in when testing the next one).

a) `int countWords( istream& is )`

The function returns the number of words there are in the input stream.

```
./myprg < test.txt
14
```

b) `int countChars( istream& is )`

The function returns the number of characters there are in the input stream.

```
./myprg < test.txt
62
```

c) `int countLines( istream& is )`

The function returns the number of lines there are in the input stream.

```
./myprg < test.txt
4
```

d) `int countWordsInLongestLine( istream& in )`

The function returns the maximum number of words there are in any input line.

```
./myprg < test.txt
5
```

e) `void countCharsWordsLines( istream& is,`
`int& countChars, int& countWords, int& countLines)`

The function counts the number of lines, words, and characters there are on the input stream and updates its arguments accordingly. The counts should be outputted separated by a tab ('\t').

```
./myprg < test.txt
4       14      62
```

Part II

In the same program modify your main function to read the text in from a file, which name you pass in as a command line arguments, that is, you invoke the program as follows.

```
./myprg test.txt
```

Test the program by calling some of the functions you wrote above (without changing the functions in any way!) and ensuring the output is the same. If the file cannot be opened write an error messages out to the standard error (*cerr*) stream.

Evaluation and Hints

By the end of the lab submit your solution through MySchool.

There is a good online reference on the IO-stream library at: http://www.cplusplus.com/reference/iostream/. The lecture notes are also helpful.

Also, the following header files are of a relevance:

```
#include <iostream>
#include <fstream> //ifstream, to read from a file.
#include <sstream> //stringstream, e.g. for processing lines of text
#include <string>
#include <algorithm> //max<int>(a,b)
```