CS262, Lab Assignment 5:
File I/O and Formatting

Due: Sunday, March 13 at 11:59 pm ET

Description:

The purpose of this assignment is to review file processing. In this assignment, you will read in different types of data from input files, process the data, and then write the data to output to files.

Preparation:

In preparation for this assignment, you should review: **File I/O and formatting**, it is important to have the basics of the `fopen()`, `fclose()` functions, and knowledge of the conversion characters needed for the different datatypes.

→ **NOTE**: Review the textbook sections: 7.1 Standard Input and Output and 7.5 File Access

If you use the `fgets()` function to read the input file, instead of `stdin`, the third parameter is a pointer to FILE (the return value of the `fopen()` function)

Instructions:

The source file for this assignment will be named `lab5_<username>_<labsection>.c`

When running your program, you will enter the name of the *input* and *output* files *on the command line*. These filenames must be given, otherwise show an Error Msg! and exit the program.
Here is the command you should run when executing your program:

```
lab5_<username>_<labsection> <input_file> <output_file>
```

Where:
`<input_file>` and `<output_file>` are the file names for reading and writing respectively.

Your program will open the input file for reading, and open the output file for writing. The first row in the input file has an `int` value specifying the *remaining number of rows to be read*. Your program will use this `int` value to process the rest of the file.

The remaining rows have *7 columns of data* that *will be read into 6 variables*. Your program will read in each line using `fgets()` then parse it using `sscanf()`. There is a name field that uses a *comma* (,) as a delimiter. You will need to *scan the first and last name into one string using the comma delimiter*. Then write the output with the fields in a different order to the output file.

The order of the data fields and their data type in the input file is:

Gnum	***name***	***semester***	***course***	***credits***	***grade***
int	*string*	*int*	*string*	*int*	*float*

The order of the data fields in your output file should be:

name	***Gnum***	***grade***	***course***	***credits***	***semester***

The data in the output file should be **formatted** as follows:

- The *name* is left justified, min. width 25
- The *Gnum* is left justified, min. width 10
- The *grade* should print 2 decimal places, left justified, min. width 8
- The *course* is left justified, min. width 10
- The *credits* are left justified, min. width 3
- The *semester* is right justified, min. width 3

You must use the input file called `lab5_input.txt` provided with this assignment. Do not modify it in any way. A similar input file will be used to test your program.

Be sure to include comments within your code that explain in high-level terms what the various parts of your code are doing.

Makefile:

Modify the Makefile you used for `lab4` so that it works for this assignment. Add the following compiler option in `CFLAGS`:

```
-Os
```

With `-O` the compiler tries to reduce code size and execution time, '`O`' stands by optimization. Then, specify which optimization you want, for size is `s`.

Note there is difference between `-o` *(for* ***output <file>****) and* `-O` *(for* ***optimization****).*

Submission:

You will submit a typescript file similar to the one of previous Labs:

1. Create a typescript file named `lab5_typescript_<username>_<labsection>`
2. Show that you are logged onto Zeus
3. Compile the code using your `Makefile`
4. Run the code given these options each in a separate run:
   ```
   lab5_<username>_<labsection>
   lab5_<username>_<labsection> input.txt
   lab5_<username>_<labsection> lab5_input.txt lab5_output.txt
   ```
5. Remove the executable using your `Makefile`
6. End the typescript
7. Be sure your directory ONLY contains the *source file*, *script* and `Makefile`
8. Verify your typescript file is correct, then change (`cd`) to the directory above
9. Create a `tarfile` of your `lab5_<username>_<labsection>` directory
10. Submit the `tarfile` to Blackboard
11. Verify that your submitted `tarfile` can be extracted and it's the right `tarfile`.

Congratulations! You have completed your assignment