Introduction to Computer Science
Tutorial 6: printf() formatting, ASCII, Standard Input/Output

1. printf() formatting

1.1 Temperatures can be expressed in various different scales. Two of the most commonly used are Celsius degrees and Fahrenheit degrees. The relationship between these two scales is summarized by the formula F = C * (9/5) + 32, where C is a temperature in Celsius degrees, and F is the corresponding temperature in Fahrenheit degrees. Write a program `celsius2fahr.c` that:

- Receives from standard input three floats `x`, `y`, and `i`
- Prints out a table of degrees Celsius/Fahrenheit, showing all the Celsius temperatures from `x` to `y` in steps of `i`, and their corresponding Fahrenheit degrees.
- The table should have headings “Celsius” and “Fahrenheit” for each of its two columns
- Values printed out should be right aligned, with 2 digits for the decimal part

1.2 Write a program similar to the above, but to produce a table converting from Fahrenheit to Celsius degrees.

2. Character input/output with getchar() and putchar()

2.1 Write a program that processes a stream of characters from standard input, and outputs it to standard output in such a way that no line exceeds 80 characters in width. That is, when a line of more than 80 characters is produced, a line break is forced at 80 characters, continuing the string at the next line.

2.2 Write a program that processes a stream of characters from standard input, and outputs it to standard output in such a way that:

- multiple blank space characters are replaced by single spaces (e.g., “hi my” would be turned into “hi my”.
- After each period (‘.’), a blank space should be inserted between the period and the next word.

3. A Text Statistics Program

3.1 Write a program that processes a stream of characters from standard input, and outputs three different statistics of the input:

- total number of characters
- total number of words
- total number of lines

4. Linux commands and redirection

The command `ls` has many options, to list files and directories, files only, directories only, etc. Also, the command `wc` has different options, to compute different statistics. Use a combination of commands `ls` and `wc`, using redirection and/or pipes, to count the number of directories present in the current directory.