

# EE231002 Introduction to Programming

## Lab09. Word Processing

Due: Dec. 11, 2021

Word processing has been one of the major applications for computers. In this assignment you will try to write a program to perform simple word processing with a fixed character width, such as the workstation terminal display. Today's powerful word processors use a similar concept but with more complicated fonts and more flexible font positioning.

Let's assume the output has  $N$  characters per line. Thus, any line which has more than  $N$  characters will take more than one output line. It is very likely that line-change happens within a word. This would make the output less legible. Thus, a reasonable word processor would break a line only on word boundaries.

Your assignment is to write a **C** program to process a text file and print it out in a pseudo-legal format. An example of the program output is attached at the end of this file. The input file has the following characteristics:

1. The first 6 lines are document title information, which should be printed with the text at the center of the line.
2. The remaining document consist of paragraphs separated by a blank line. Each paragraph is a single string ended by new-line character (`\n`), and the maximum number of characters in a paragraph is no more than 1500.
3. The document is terminated by a EOF character, which is a macro defined in `stdio.h` header file.

The output need to satisfy the following:

1. To facilitate reference to any paragraph in the document, line number of the printed text should be kept, and it should be printed out on the left edge of the document every 5th line.
2. The document title, the first 6 lines, should printed at the center. The spaces taken by the line numbers are excluded when centering the text.
3. The remaining paragraphs should be printed with each line no more than a specified number, `LW`, of characters.

To make your program more general, the output line width (`LW`) should be defined as a global variable and can be modified through command line argument. This `LW` includes 3 spaces for the line number and an additional space to separate the line number and the main document. And you should assume that  $68 \leq LW \leq 80$ .

To facilitate your programming, three global variables can be declared:

```
char PARA[1500];    // an input paragraph
int LN = 0;         // line number of printed text
int LW;            // line width of output lines
```

In addition, you are free to declare necessary functions to facilitate your coding. As usual, your program should be efficient, concise and legible.

### Notes.

1. Create a directory **lab09** and use it as the working directory.
2. Name your program source file as **lab09.c**.
3. The first few lines of your program should be comments as the following.

```
// EE231002 Lab09. Word Processing
// ID, Name
// Date:
```

4. After you finish verifying your program, you can submit your source code by

```
$ ~ee2310/bin/submit lab09 lab09.c
```

If you see a "submitted successfully" message, then you are done. In case you want to check which file and at what time you submitted your labs, you can type in the following command:

```
$ ~ee2310/bin/subrec lab09
```

It will show youe submission records for lab09.

5. You should try to write the program as efficient as possible. The format of your program should be compact and easy to understand. These are part of the grading criteria.

Example output is shown below.

\$ ./a.out 76 < US2981877.tex

Patent Number: 2,981,877

SEMICONDUCTOR DEVICE-AND-LEAD STRUCTURE

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5 Filed July 30, 1959, Serial Number 830,507

10 Claims. (Cl. 317-235)

This invention relates to electrical circuit structures incorporating semiconductor devices. Its principal objects are these: to provide  
10 improved device-and-lead structures for making electrical connections to the various semiconductor regions; to make unitary circuit structures more compact and more easily fabricated in small sizes than has heretofore been feasible; and to facilitate the inclusion of numerous semiconductor devices within a single body of material.

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In brief, the present invention utilizes dished junctions extending to the surface of a body of extrinsic semiconductor, an insulating surface layer consisting essentially of oxide of the same semiconductor extending across the junctions, and leads in the form of  
20 vacuum-deposited or otherwise formed metal strips extending over and adherent to the insulating oxide layer for making electrical connections to and between various regions of the semiconductor body without shorting the junctions.

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...

10. A semiconductor device comprising a body of extrinsic semiconductor having a surface, said body containing adjacent P-type and N-type regions with a dished junction therebetween, said junction having an  
545 edge that extends to said surface and there forms an elongated, closed figure, first and second contacts in the form of parallel metal strips adherent to said surface, said first contact being wholly within and said second contact wholly without said edge of the junction, an insulating layer consisting of oxide of said semiconductor on said  
550 surface and extending across said junction, and a metal strip adherent to said insulating layer and extending thereover across said junction to connect physically and electrically with said first contact.

References Cited in the file of this patent UNITED STATES PATENTS

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