题目：文本格式化

班级：19184115

姓名：

学号：19063140

日期：2020.10.28

### 需求分析：

输入文件中含有待格式化(或称为待排版)的文本,它由多行的文字组成,例如一篇英文文章。每一行由一系列被一个或多个空格符所隔开的字组成,任何完整的字都没有被分割在两行(每行最后一个字与下一行的第一个字之间在逻辑上应该由空格分开),每行字符数不超过80。除了上述文本类字符之外,还存在着起控制作用的字符:符号“@”指示它后面的正文在格式化时应另起一段排放,即空一行,并在段首缩入8个字符位置。“@”自成一个字。

一个文本格式化程序可以处理上述输入文件,按照用户指定的版面规格重排版面:实现页内调整、分段、分页等文本处理功能,排版结果存入输出文本文件中。

(1)输出文件中字与字之间只留一个空格符,即实现多余空格符的压缩。

(2)在输出文件中,任何完整的字仍不能分割在两行,行尾不齐没关系,但行首要对齐(即左对齐)。

(3）如果所要求的每页页底所空行数不少于3,则将页号印在页底空行中第2行的中间位置上,否则不印。

(4)版面要求的参数要包含:

- 页长(Page Length)——每页内文字(不计页号)的行数。

- 页宽(Page Wedth)——每行内文字所占最大字符数。

- 左空白(Left Margin)—-每行文字前的固定空格数。

- 头长(Heading Length)——每页页顶所空行数。

- 脚长(Footing Length)——每页页底所空行数(含页号行)。

- 起始页号(Starting Page Number)——首页的页号。

### 概要设计：

struct Formator 格式化机,存储格式化当前的状态包括行数页数当前行长度

void FormatorInit(Formator \*formator) 按照所给参数初始化

void FormatorNewPage(Formator \*formator) 另起一页,即完成页底

void FormatorPrint(Formator \*formator) 输出一行,同时处理页顶,页底

void FormatorAdd(Formator \*formator, char \*word) 加入一个单词,若超出页宽则输出

### 调试分析：

1. 没有遇到问题,一遍过
2. 时空分析

设文章总字符数为N

时间复杂度为 O(N)

空间复杂度为 O(1) 因为缓冲区大小确定

### 用户使用说明：

输入文本，注意在标点之后加上空格符。

### 测试结果：

输入

10

50

2

1

3

1

testdata.txt

ans.txt

输出

-见附录

### 附录：

testdata.txt

Studies serve for delight, for ornament, and for ability. Their chief use for delight, is in privateness and retiring; for ornament, is in discourse; and for ability, is in the judgment and disposition of business. For expert men can execute, and perhaps judge of particulars, one by one; but the general counsels, and the plots and marshalling of affairs come best from those that are learned.

　　To spend too much time in studies is sloth; to use them too much for ornament is affection; to make judgment wholly by their rules is the humor of a scholar. They perfect nature and are perfected by experience: for natural abilities are like natural plants, that need pruning by study, and studies themselves do give forth directions too much at large, except they be bounded in by experience.

　　Crafty men contemn studies, simple men admire them, and wise men use them, for they teach not their own use; but that is a wisdom without them and above them, won by observation. Read not to contradict and confuse; nor to believe and take for granted; nor to find talk and discourse; but to weigh and consider.

　　Some books are to be tasted, others to be swallowed, and some few to be chewed and digested; that is some books are to be read only in parts; others to be read, but not curiously; and some few to be ready wholly, and with diligence and attention. Some books also may be read by deputy and extracts made of them by others; but that would be only in the less important arguments, and the meaner sort of books; else distilled books are, like common distilled waters, flashy things.

　　Reading makes a full man; conference a ready man; and writing an exact man. And therefore, if a man write little, he had need have a great memory; if he confer little, he had need have a present wit; and if he read little, he had need have much cunning to seem to know that he doth not.

　　Histories make men wise; poets witty; the mathematics subtle; natural philosophy deep; moral grave; logic and rhetoric able to contend.

Abeunt studia in mores. Nay there is no stond or impediment in the wit, but may be wrought out by fit studies: like as diseases of the body may have appropriate exercises. Bowling is good for the stone and reins; shooting for the lungs and breast; gentle walking for the stomach; riding for the head; and the like. So if a man’s wit be wandering, let him study the mathematics; for in demonstrations, if his wit be called away never so little, he must begin again. If his wit be not apt to distinguish or find differences, let him study the schoolmen; for they are cymini sectores. If he be not apt to beat over matters, and to call up one thing to prove and illustrate another, let him study the lawyers’ cases. So every defect of the mind may have a special receipt.

ans.txt

Studies serve for delight, for ornament, and for

ability. Their chief use for delight, is in privateness

and retiring; for ornament, is in discourse; and for

ability, is in the judgment and disposition of

business. For expert men can execute, and perhaps judge

of particulars, one by one; but the general counsels,

1

and the plots and marshalling of affairs come best from

those that are learned. 　　To spend too much time in

studies is sloth; to use them too much for ornament is

affection; to make judgment wholly by their rules is the

humor of a scholar. They perfect nature and are

perfected by experience: for natural abilities are

2

like natural plants, that need pruning by study, and

studies themselves do give forth directions too much at

large, except they be bounded in by experience.

　　Crafty men contemn studies, simple men admire

them, and wise men use them, for they teach not their own

use; but that is a wisdom without them and above them, won

3

by observation. Read not to contradict and confuse; nor

to believe and take for granted; nor to find talk and

discourse; but to weigh and consider. 　　Some books

are to be tasted, others to be swallowed, and some few to

be chewed and digested; that is some books are to be read

only in parts; others to be read, but not curiously; and

4

some few to be ready wholly, and with diligence and

attention. Some books also may be read by deputy and

extracts made of them by others; but that would be only in

the less important arguments, and the meaner sort of

books; else distilled books are, like common distilled

waters, flashy things. 　　Reading makes a full man;

5

conference a ready man; and writing an exact man. And

therefore, if a man write little, he had need have a great

memory; if he confer little, he had need have a present

wit; and if he read little, he had need have much cunning

to seem to know that he doth not. 　　Histories make

men wise; poets witty; the mathematics subtle; natural

6

philosophy deep; moral grave; logic and rhetoric able

to contend. 　　Abeunt studia in mores. Nay there is

no stond or impediment in the wit, but may be wrought out

by fit studies: like as diseases of the body may have

appropriate exercises. Bowling is good for the stone

and reins; shooting for the lungs and breast; gentle

7

walking for the stomach; riding for the head; and the

like. So if a man’s wit be wandering, let him study the

mathematics; for in demonstrations, if his wit be

called away never so little, he must begin again. If his

wit be not apt to distinguish or find differences, let

him study the schoolmen; for they are cymini sectores.

8

If he be not apt to beat over matters, and to call up one

thing to prove and illustrate another, let him study the

lawyers’ cases. So every defect of the mind may have a

special receipt.

9

Code

1. #include <stdio.h>
2. #include <stdlib.h>
3. #include <string.h>
5. **int** page\_length,
6. page\_wedth,
7. left\_margin,
8. heading\_length,
9. footing\_length,
10. starting\_page\_number;
11. **char** in\_file\_name[20], out\_file\_name[20];
13. **typedef** **struct** Formator {
14. **char** buf[200];
15. **int** len, line, page;
16. } Formator;
18. /\* 初始化 \*/
19. **void** FormatorInit(Formator \*formator) {
20. memset(formator->buf, ' ', left\_margin);
21. formator->buf[left\_margin] = '\0';
22. formator->len = left\_margin;
23. formator->line = 1;
24. formator->page = starting\_page\_number;
25. }
27. /\* 另起一页 \*/
28. **void** FormatorNewPage(Formator \*formator) {
29. // 如果所要求页底空行数不少于3,则将页号印在页底空行中第二行的中间位置
30. **if** (page\_length-formator->line+1 >= 3) {
31. puts("");
32. **for** (**int** i = 0; i < (page\_wedth-3)/2; ++i) putchar(' ');
33. printf("%3d\n", formator->page);
34. }
35. **for** ( ; formator->line <= page\_length; ++formator->line) puts("");
36. formator->line = 1;
37. formator->page++;
38. }
40. /\* 输出一行 \*/
41. **void** FormatorPrint(Formator \*formator) {
42. // 每页页底空行
43. **if** (formator->line+footing\_length > page\_length) FormatorNewPage(formator);
44. // 每页页顶空行
45. **for** ( ; formator->line <= heading\_length; ++formator->line) puts("");
46. puts(formator->buf);
47. memset(formator->buf, ' ', left\_margin);
48. formator->buf[left\_margin] = '\0';
49. formator->len = left\_margin;
50. formator->line++;
51. }
53. /\* 输入一个单词 \*/
54. **void** FormatorAdd(Formator \*formator, **char** \*word) {
55. **static** **const** **char** \*space = " ";
56. **int** word\_len = strlen(word);
57. // 另起一行
58. **if** (formator->len+1+word\_len > page\_wedth) FormatorPrint(formator);
59. **if** (formator->len) strcat(formator->buf, space); // 加上空格
60. strcat(formator->buf, word);                   // 加上单词
61. formator->len += word\_len;                     // 更新长度
62. }
64. **int** main() {
65. Formator formator;
66. **static** **char** word[200];
68. printf("请输入页长："); scanf("%d", &page\_length);
69. printf("请输入页宽："); scanf("%d", &page\_wedth);
70. printf("请输入左空白："); scanf("%d", &left\_margin);
71. printf("请输入头长："); scanf("%d", &heading\_length);
72. printf("请输入脚长："); scanf("%d", &footing\_length);
73. printf("请输入起始页号："); scanf("%d", &starting\_page\_number);
74. printf("请输入输入文件名："); scanf("%s", in\_file\_name);
75. printf("请输入输出文件名："); scanf("%s", out\_file\_name);
76. freopen(in\_file\_name, "r", stdin);
77. freopen(out\_file\_name, "w", stdout);
79. FormatorInit(&formator);
80. **while** (~scanf("%s", word)) FormatorAdd(&formator, word);
81. FormatorPrint(&formator);
82. FormatorNewPage(&formator);
83. **return** 0;
84. }