

ABC of Computing

A J ASBURY

WORD PROCESSING

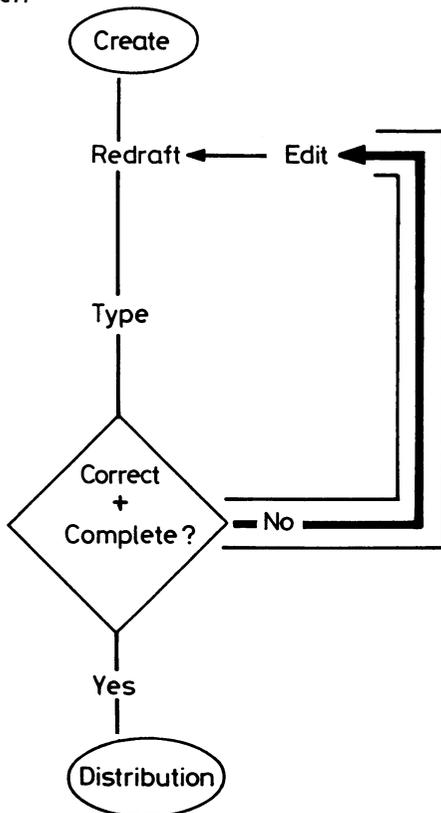
Word processing is using a computer to manipulate text with the aim of perfecting documents. This type of computing has grown since microprocessors of considerable capacity became available cheaply: it is now one of the major growth points in the computer industry.

Some years ago businessmen realised that time and therefore money could be saved if documents did not have to be continually retyped. The text could instead be held and modified in the memory of a computer and, when perfect, passed to a daisywheel printer for the final typing. Since these earlier ideas word processing has developed rapidly to include automatic indexing, spelling checking, typesetting, letter writing, and many other developments. Word processing can be of help to all types of doctor, from the general practitioner who would like to speed the production of his referral letters to the research anaesthetist writing his PhD and the professor writing textbooks.



Word processing concepts

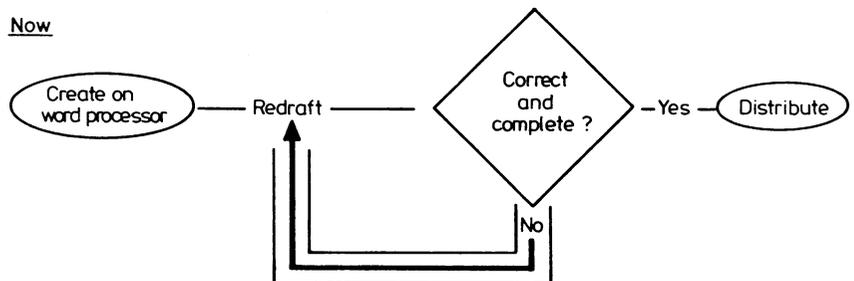
Then



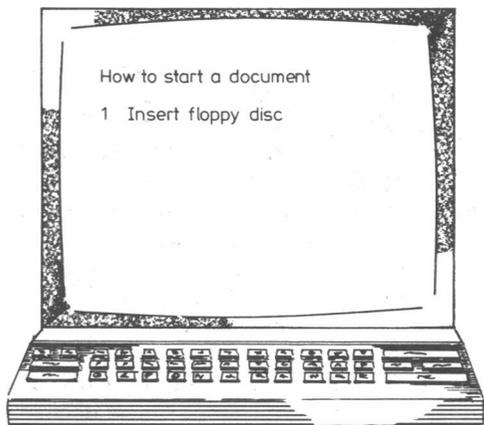
Most doctors need secretarial help to produce documents, and most word processor systems are therefore designed to be acceptable to a secretary rather than a doctor. A simple word processor system comprises a dedicated microcomputer with a television display, a keyboard, some form of computer storage medium, commonly floppy discs, and some form of printer. A new report can be produced by the secretary typing the text directly into the computer. The text appears on the screen, is automatically stored in the processor's own memory, and then as appropriate off loaded to the discs. When the typing is done, a draft copy of the report can be printed out and shown to the doctor or businessman, and any corrections can be made by modifying the text held in the computer, reading it on the screen. There is no need to retype the whole text. If the report is long the saving in time may be considerable—for example, when the author wishes to include a new paragraph at the beginning of the report, which would disrupt the previous pagination.

The corrected version can be typed on the daisywheel printer and the copy saved on the floppy disc. If the document was a standard type—for example, a request for a patient to attend surgery for vaccination—and another patient required the same letter then the floppy disc could be retrieved and only the name and date would have to be changed.

Now



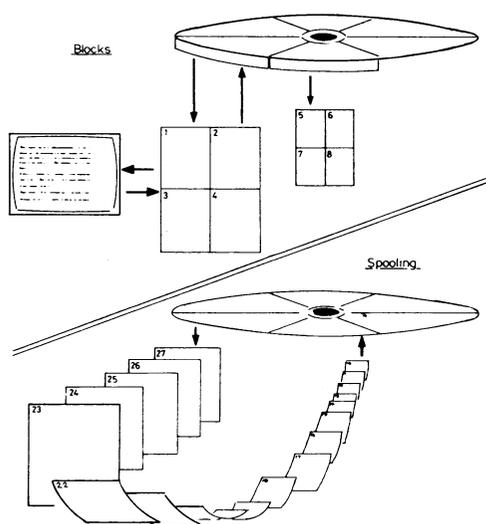
Common word processing facilities



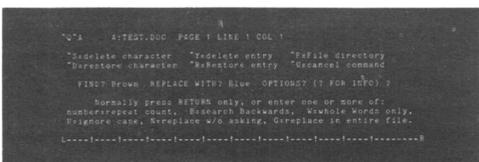
There are as many word processing systems as there are software producers, and it is therefore possible only to outline some of the commoner facilities.

Self help—Most secretaries are unfamiliar with word processing, and systems are often made to guide the operator through each operation. If the secretary wants to erase text the computer, as part of its normal operation, can remind the user to check that the text really is unwanted. If she wants to change the margins or the tabulation stops to adjust the text position on the final printed page, the computer can give full instructions. This facility increases the user's confidence and reduces, but does not remove, the need for specific training.

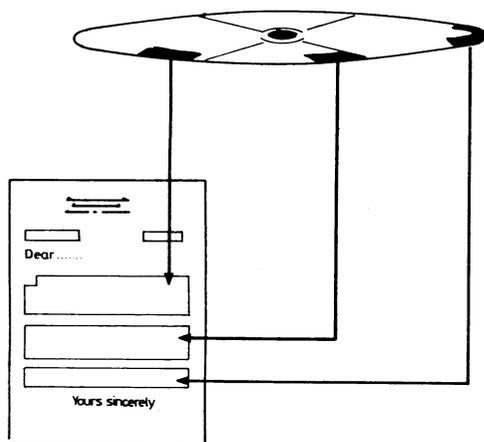
Text viewing—There are two methods of viewing text on a word processor. The first involves loading the memory full of text and viewing it in blocks; each block may range from the equivalent of only one A4 page to many such pages. The amount of text which can be held in the memory is limited by the size of the computer memory and the complexity of the text. The second method is to arrange that the document is spooled to and fro from the disc: each page is loaded from the disc to the computer's internal memory; if the memory becomes full an earlier page is displaced to make room for a new one. This means that a text of some 50 pages can be read as a single entity; the secretary can start at the top and continue correcting right through the text, the text being automatically displayed and paginated as required. The major advantage of text spooling is that the operator can modify the whole text rather than having to reload it bit by bit and repeat the modifications with each memoryful.



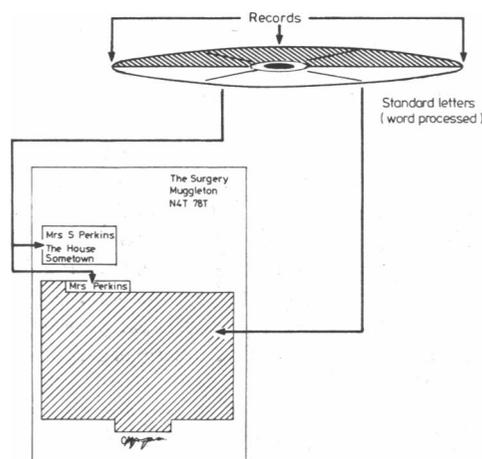
Justification and word wrapping—One of the hallmarks of word processed text is the neatly justified pages, where both left and right margins are aligned vertically. Justification is frequently used in publications to allow arrangement of text in columns but it is increasingly being requested by publishers who require text in "camera ready" form. Justification is easily undertaken on the computer; the processor measures each line length and then adds spaces between words to pad out the text to the margin. If the line cannot be elegantly spaced the word processor will automatically transfer words to the next line (word wrapping). Word wrapping helps the secretary to type quickly as resetting of the lines is unnecessary, but it is even more helpful to the non-expert typist as he or she can persist in the faulty habit of watching the keys, confident that the lines will sort themselves out.



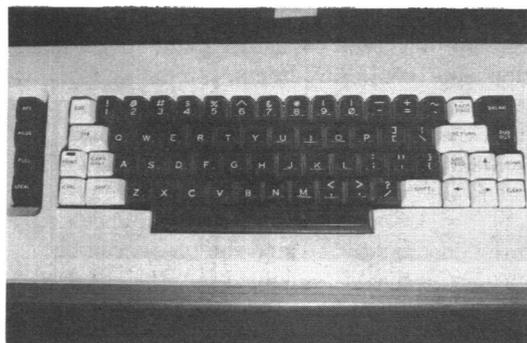
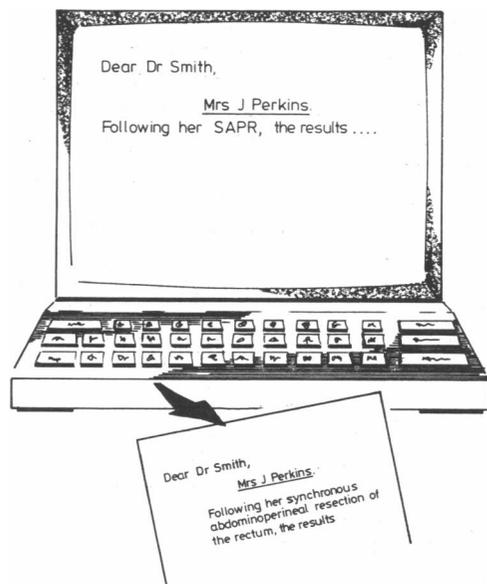
Searching operations—Many text errors are unique, being the slip of a finger on a typewriter key, but sometimes repeated errors occur—for example, misspelling names such as Stevens and Stephens. The operator could locate and correct these one by one by spooling through the text under manual control, but a good word processor can be instructed to display each occurrence of the misspelt word automatically. If the desired correction is the same in each place then the computer can be instructed to locate and correct each occurrence: Stevens could be changed to Stephens throughout the document in a few seconds. In a large document or a thesis this simple operation alone could save hours.



Merging operations—Sometimes letters need to be constructed from standard paragraphs, a requirement which is common in legal work where the wording is tested in court and the paragraphs are used unaltered thereafter. The standard text blocks can be written and checked once and stored on floppy discs. When the document is created the blocks can be passed in order to the computer memory and assembled into the required document. While the computer usually reproduces the standard text blocks correctly, errors can occur and the author must always check the final text before issue. An extension of this concept is the production of pseudo-



Word processing hardware



personalised letters, much beloved of some mail order firms. The names and addresses are held on a computer file, and a standard letter is written. Instead of filling in the names and addresses the secretary writing the letter simply inserts a symbol corresponding to the name or address. When the word processor prints the letter the text up to the symbol is printed, and when the symbol is recognised a name or address from the computer file is substituted. This process can be endlessly repeated to “personalise” thousands of letters all signed by the manager of the firm. There are also applications for this technique in general practice, the outpatient department, and many other places where standard letters are used. Another form of merging operation involves the use of a glossary system. When, for example, an author has to use complex specialist names—for example, synchronous abdominoperineal resection of the rectum—mistakes may easily occur. The word processor glossary can help by holding an abbreviation and the corresponding full name in its memory, and when the abbreviation is typed the full name can be substituted and merged into the text. This facility is particularly valuable as most doctors have their own pet abbreviations for complex words, and they can create their own glossaries.

Word processors can now be found as packages on non-dedicated computers or as dedicated devices.

Dedicated word processing equipment—In the same way as a cash register contains a microprocessor dedicated to managing the till, a microprocessor can be dedicated to text management. Dedicated word processors are commonly built round several microprocessors, and can, because they are designed for only one task, be very user friendly. The dedicated word processor may, for example, use secretarial terms like “memorise” when text is to be stored rather than “save,” which is more conventional in computer circles. The dedicated word processor can also be made much more convenient to start up; a turn of the on-off switch (turnkey facility) will bring the system into operation, whereas with a word processing package on a non-dedicated microcomputer, several brief operations may be necessary before the text can be typed. Some bigger word processor systems are designed so that there is a central computer and memory unit, with several peripheral VDU terminals to the computer. The same document can then be developed in different departments and printed only when complete. Dedicated word processors have several major disadvantages. Firstly, they are inflexible in that if the user wanted to run a statistical program he would not be able to on that microprocessor. Furthermore, the user may be restricted to the software manufactured by that company, and if he wants special software features he is restricted to those provided through the original company, usually at considerable expense. Finally, dedicated word processors are expensive, because all the effort and expense of dedication has to be recovered by the manufacturers.

Word processing packages used on non-dedicated computers—Word processing packages are available on most types of non-dedicated computer, from the massive mainframes to the smallest micros, but obviously the power and facilities will vary enormously. The major advantage of implementing a word processing package on a non-dedicated system is flexibility. In a mainframe with many users and many terminals one user may be typing a report using a word processing package while another may be using the same computer to undertake statistical analyses. Obviously the bigger the computer the more text can be held in memory for immediate operations.

A smaller computer bought for a general practice may be unable to manage simultaneous operations, but there is no reason why, when the computer has finished with the morning’s consultations, it could not be loaded with a word processor package and the referral letters typed while the general practitioner is on his rounds. A further powerful advantage of

Dedicated	Non dedicated
Very user friendly	Flexible
Easy to start	Access to records / database
Expensive	Cheap package
Inflexible	More cumbersome to use

such a system is that the word processing program can access the database of patients' records—for example, to find the previous hospital number and admission date when making up a referral letter.

The disadvantage of using a non-dedicated computer as a word processor is that the word processing package has to be loaded into the empty computer memory before typing can begin. The non-dedicated computer becomes a word processor only when it is given the processing package. There are, nevertheless, many excellent packages available for all types and sizes of computer.

Special facilities

On some computers word processing has developed even further.

Automatic spelling checking—The text is presented to the computer usually via a word processing program, and then the processor dissects each word, removing the recognisable prefixes and suffixes until the root is defined. The root is then compared with a dictionary held by the computer. Any suspect words are then displayed on the screen to give the author the chance to correct the error. If the word is correct and is not in the dictionary it can be included. Automatic spelling checking is infinitely faster than proofreading by eye, but in computer terms it is slow and expensive. It is probably only worth while for textbook writers and publishers. Spelling checkers for micro computers are now available but they often have American dictionaries.

Automatic indexing—If the indexer marks the items to be indexed on the computer text there are packages that will read through the whole text and collect the index together. The index can then be automatically assembled and presented to the author in standard form. This technique removes the drudgery of manually transferring each item to a card and then compiling the index, but skill is still required in deciding which terms are worth indexing. One major advantage of this technique for the publisher is that so long as the items are marked initially the index can still be produced quickly and correctly no matter how often and how extensively the pagination is changed.

Automatic sorting—Sometimes references to papers need to be sorted into some specified order: so long as the references have been typed into the word processor in a specified format the tedious operation of sorting can be reduced to minutes.

Automatic typesetting—Word processors are increasingly used in journalism. The reporter can type his article into a word processor and then send the completed disk to the editor, who will read and amend the text on his own word processor. When the text is satisfactory the editor can transmit the text to a central computer which will adjust the margin and length to fit it into the newspaper. The type for the newspaper can then be set automatically by computer. This is very much faster than conventional methods because it removes the need for the copy to be rekeyboarded at the typesetting stage and has considerable implications for jobs in the printing and publishing industry.

Word processors are increasingly being used in offices, and they will increase efficiency if used correctly, but unfortunately they have to work against human nature. A document is frequently developed by a process of draft, type, edit, and retype. If the author with a word processor in his office, realising how quickly errors can be corrected on the processor, does not correct the text with the same care as before more secretarial time will be wasted and the overall efficiency will not be improved.

Dr A J Asbury, FFARCS, PHD, is lecturer in anaesthetics, University of Sheffield.

