The instructions, or elementary steps, which must be stored in the computer's memory before a program can be executed, must be written down in a form peculiar to the computer being used. The form of these commands is chosen for easy execution by the circuitry of the computer, and not necessarily for easy understanding by the program writer. This machine-language level of programming is being replaced more and more by the use of so-called higher-level languages. Use of these languages speeds up programming and allows a program to be moved from one computer to another with less difficulty, but generally at the expense of increasing the computer time required for a particular job.

The most extensively used programming languages today are FORTRAN and COBOL. FORTRAN is an abbreviation for "FORmula TRANslation" and is commonly used for programming mathematical problems. For a business data-processing problem, such as payroll calculation, the programmer might use the COBOL language (COmmon Business Oriented Language).

Solutions are not arrived at infallibly. In the same way that a man can make an error on an adding machine if he does not enter the right numbers at the right time, a machine will produce an error if the programmer has not set down the program steps correctly.

When and How to Use a Computer

The question when to introduce computing and data processing equipment is difficult to answer briefly, except in general terms. This step should be taken when the automatic equipment can perform a task more quickly, more economically, or more efficiently than is possible by the use of manual methods.

It is helpful to compare the relative abilities of men and electronic data-processing machines to perform certain basic tasks. While man still retains a commanding lead in the use of his brain and the basic organization of its components, the machine has already surpassed his performance in:

(a)   its speed and accuracy of execution of routine arithmetic and logical operations;

(b)   its speed of assimilation of data and of producing written output after manipulation of the data;

(c)   its accurate and fast retrieval of stored information.

The ideal team for data-processing is a combination of man and machine with each taking that part of the task for which it is best suited. The computer, therefore, should be viewed as an extension of man's intellectual and clerical capability, just as power-tools are an extension of his muscles. It is important to remember always that the use of electronic data-processing

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