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The Basic Principles of Computers

Computers for office work are automatic electronic machines which take in information and subject it to a variety of arithmetical and logical processes to produce wanted results. Much of the input information, or data, is numerical; inside the machines numbers are represented by groups of electrical signals, and the machines are called digital computers because a separate signal is used for each digit.

Electronic machines use radio valves, transistors, resistors, capacitors and similar components of the sort that are to be found inside a television set. Electronic computers are fast and accurate; thus, the LEAPS computer can add two 10 - digit numbers together in 1/6000th of a second.

The automatic nature of a computer enables it to undertake, without any human intervention, long sequences of connected operations, by passing the results of earlier operations on to subsequent operations, and by using the intermediate results to select which of alternative sets of operations shall follow.

For their arithmetic most computers use binary numbers as these have only two different digits, 0 and 1, to be represented by electrical signals instead of the ten of decimal numbers. Binary numbers look strange at first, but are built up on a similar plan to decimal numbers thus, 11010 is the binary representation of 26 as, no units, one two, no fours (2 x 2), one eight(2 x 2 x 2) and one sixteen (2 x 2 x 2 x 2). Binary arithmetic is identical with decimal arithmetic, and the computer is arranged to convert automatically between the binary and decimal scales.

The computer performs its arithmetic by combining and selecting the groups of signals that represent the input numbers in ways that produce another group of signals that represent the required answer.

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