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THE COMPUTER ROLE TOWARDS DISCOVERING NEW ASPECTS IN MULTIDISIPLINARY RESEARCH

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ABSTRACT

Research in common parlance refers to a search for knowledge. Once can also define research as a scientific and systematic search for pertinent information on a specific topic.In fact, research is an art of scientific investigation. The Advanced Learner's Dictionary of Current English lays down the meaning of research as " a careful investigation or inquiry specially through search for new facts in any branch of knowledge.''

The purpose of research is to discover answer to questions through the application of scientific procedures. The main aim of research to find out the truth which is hidden and which is hidden and which has not been discovered as yet. Though each research study has its own specific purpose.

Definition of Research :

1. Redman and Mory define research as a " Systematized effort to gain new knowledge."
2. Clifford woody says " Research comprises defining and redefining problems, formulating hypothesis or suggested solutions: collecting,organizing, and evaluating data."
3. D.Slesinger and M.Stephenson in the Encyclopedia of Social Sciences define research as " The manipulation of things, concepts or symbols for the purpose of generalising to extend, correct or verify knowledge, whether that knowledge aids in construction of theory or in the practice of an art."

OBJECTIVES OF RESEARCH

To gain familiarity with a phenomenon or to achieve new insights into it (studies with this object in view are termed as exploratory or formulative research studies);

1. To portray accurately the characteristics of a particular individual,situation or a group (studies with this object in view are known as descriptive research studies);
2. To determine the frequency with which something occurs or with it is associated with something else (studies with this object in view are known as diagnostic research studies);
3. To test a hypothesis of a casual relationship between variables (such studies are known as hypothesis-testing research studies).

THE COMPUTER AND COMPUTER TECHNOLOGY

A computer, as the name indicates, is nothing but a device that computes. In this sense, any device, however crude or sophisticated, that enables one to carry out mathematical manipulations becomes a computer. But what has made this term conspicuous today and, what we normally imply when we speak of computers, are electronically operating machines which are used to carry out computations.

In brief, computer is a machine capable of receiving, storing, manipulating and yielding information such as numbers, words, pictures. The computer can be a digital computer or it can be a analogue computer. A digital computer is one which operates essentially by counting (using information,

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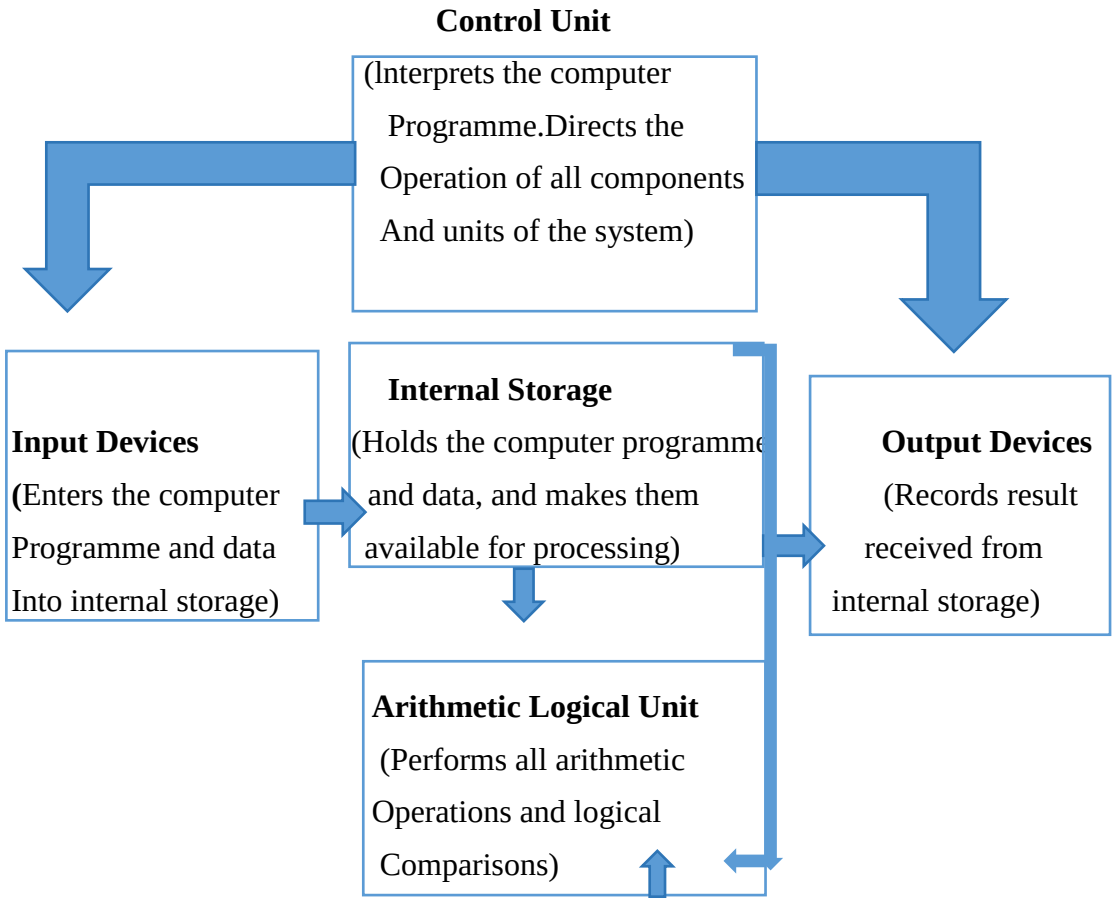
including letters and symbols, in coded form) where as the analogue computer operates by measuring rather than counting. Digital computer handles information as strings of binary numbers I.e., zeros and ones, with the help of counting process but analogue computer converts varying quantities such as temperature and pressure into corresponding electrical voltages and then performs specified functions on the given signals. Thus analogue computers are used for certain specialized engineering and scientific applications. Most computers are digital, so much so that the word computer is generally accepted as being synonymous with the term 'Digital Computer'.

Computer technology has undergone a significant change over a period of four decades. The present day microcomputer is far more powerful and costs very little, compared to the world's first electronic computer viz. Electronic Numerical Integrator and Calculator (ENICA) completed in 1946. The microcomputer works many times faster, is thousands of times more reliable and has a large memory.

The advances in computer technology are usually talked in terms of 'Generations'. Today we have the fourth generation computer in service and efforts are being made to develop the fifth generation computer, which is expected by 1990.

THE COMPUTER SYSTEM

In general, all computer systems can be described as containing some kind of input devices, the CPU ans some kind of output devices.



The function of the input-output devices is to get information into,and out of, the CPU. The input devices translate them back into the familiar character I.e., in a human readable form. In other words, the purpose of the input-output devices is to act as translating devices our external world and the

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internal world of the CPU I.e., they act as an interface between man and machine. So far as CPU is concerned,it has three segments viz.(1) internal storage, (2) control unit (3) arithmetic logical unit. When a computer program or data is input into the CPU,it is in fact into the internal storage of the CPU. The control unit serves to direct the sequence of computer system operation. Its function extends to the input and output devices as well and does not just remain confined to the sequence of operation within the CPU. The arithmetic logical unit is concerned with performing the arithmetic operations and logical comparisons designed in the computer program.

In terms of overall sequence of events, a computer program is input into the internal storage and then transmitted to the control unit, where it becomes the basis for overall sequencing and control of computer system operations. Data that is input the internal storage of the CPU is available for processing by the arithmetic logical unit, which conveys the result of the calculations and comparisons back to the internal storage. After the designated calculations and comparisons have been completed, output is obtained from the internal storage of the CPU.

It would be appropriate to become familiar with the following terms as well in context of computers:

1. Hardware : All the physical components (such as CPU,Input-output devices,storage devices,etc.) of the computer are collectively called hardware.
2. Software : It consists of computer programs written by the user which allow the computer to execute of computer.
3. Firmware : It is that software which is incorporated by the manufacturer into the electronic circuitry of computer.
4. System software : It is that program which tells the computer how to function. It is also known as operating software and is normally supplied by the computer manufacturer.
5. Application software : It is that program which tells the computer how to perform specific tasks such as preparation of company pay roll or inventory management. This software is either written by the user himself or supplied by ‘ software houses’, the companies whose business is to produce and sell software.
6. Integrated circuit (IC): It is a complete electronic circuit fabricated on a single piece of pure silicon. Silicon is the most commonly used semiconductor---a material which is neither a good conductor of electricity nor a bad one. An IC may be small-scale, medium-scale or a large -scale depending upon the number of electronic components fabricated on the chip.
7. Memory chips : these ICs form the secondary or storage of the computer. They hold data and instructions not needed immediately by the main memory contained in the CPU.
8. Two-state devices : The transistors on an IC Chip take only two states-----they are either on or off, conducting or non-conducting. The on --state is represented by 1 and the off-state by zero. These two binary digits are called bits. A string of eight bits termed byte and a group of bits constitute a word. A chip is called 8-bit, 32- bit and so on ,depending on the number of bits contained its standard word.

IMPORTANT CHARACTERISTICS

The following characteristics of computers are note worthy:

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1. Speed: Computers can perform calculations in just a few seconds that human beings would need weeks to do by hand. This has led to many scientific projects which were previously impossible.
2. Diligence : Being a machine , a computer does not suffer from the human traits of tireness and lack of concentration. If two million calculations have to be performed, it will perform the two millionth with exactly the same accuracy and speed s the first.
3. Storage : Although the storage capacity of the present day computer is much more than its earlier counterpart but then the internal memory of the CPU is only large enough to retain a certain amount of information just as the human brain selects and retain what it feels to be important and relegates unimportant details to the back of the mind or just forgets them.hence , it is impossible to store all types of information inside the computer records. If need be, all unimportant information/data can be stored in auxiliary storage devices and the same may be brought into the main internal memory of the computer, as and when required for processing.
4. Accuracy :The computer's accuracy is consistently high.Errors in the machinery can occur but,due to increased efficiency in error-detecting techniques,these seldom lead to false results. Almost without exception , the errors in computing are due to human rather than to technological weaknesses,I.e., due to imprecise thinking by the programmer or due to inaccurate data or due to poorly designed systems.
5. Automation : Once a program is in the computer's memory,all that needed is the individual instructions to it which are transferred one after the other, to the control unit for execution. The CPU follows these instructions until it meets a last instruction which says ' stop program execution'.
6. Binary digits : Computers use only the binary number system (a system in which all the numbers are represented by a combination of two digits---one and zero) and thus operates to the base of two, compared to the ordinary decimal arithmetic which operates on a base of ten.

COMPUTER AND RESEARCHERS

Performing calculations almost at the speed of light,the computer has one of the most useful research tools in modern times. Computers are ideally suited for data analysis concerning large research projects. Researchers are essentially concerned with huge storage of data, their faster retrieval when required and processing of data with the aid of various techniques. In all these operations, computers are of great help. Their use,apart expediting the research work, has reduces human drudgery and added to the quality of research activity.

Researchers in economics and other social sciences have found,by now, electronic computers to constitute an indispensable part of their research equipment. The computers con perform many statistical 't' tests, analysis of variance,analysis of covariance,multiple regression, factor analysis and various non parametric analyses are just a few of the programs and subprograms that are available at almost all computer centers. Similarly , canned programs for linear programming, multivariate analysis, monte carlo simulation etc. Are also available in the market. In brief, software packages are readily available for the various simple and complicated analytical and quantitative techniques of which researcher has to do is to feed in the data he/she gathered after loading the operating system and particular software package on the computer. The output, or to say the result, will be ready within seconds or minutes depending upon the quantum of work.

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Techniques involving trial and error process are quite frequently employed in research methodology. This involves lot of calculations and work of repetitive nature. Computer is best suited for such techniques, thus reducing the drudgery of researchers on the one hand and producing the final result rapidly on the other. Thus different scenarios are made available to researchers by computers in no time which otherwise might have taken days or even months.

The storage facility which the computers provide is of immense help to a researcher for he can make use of stored up data whenever he requires to do so.

Thus, computers do faclitate the research work. Innumerable data can be processed and analyzed with greater ease and speed. Moreover, the results obtained are generally correct and reliable. Not only this, even the design, pictorial graphing and report are being developed with the help of computers. Hence, researchers should be given computer education and be trained in the line so that they can use computers for their research work.

CONCLUSION

In spite of all this sophistication we should not forget that basically computers are machines that only compute,they do not think. But researchers using computers,can carry on their task at faster speed and with greater reliability. The developments now taking place in computer technology will further enhance and facilitate the use of computers for researchers.

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