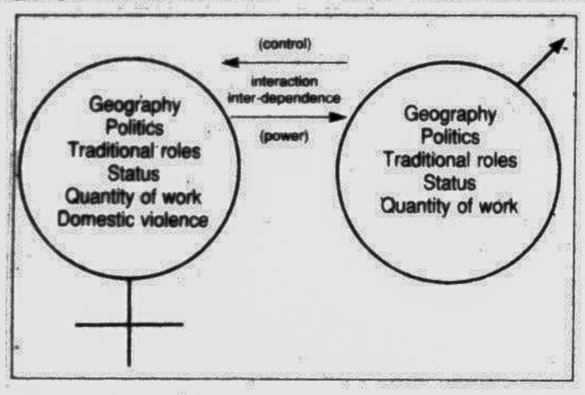
Gender, technology and innovation

BOTH women's and men's use and adaptation of technology are shaped by the economic, social, cul-tural, political, and geogra-phical contexts in which both sexes live, but which each sex experi-ences in a different way. Men and women usually have differ-ent, culturally determined sets of technical knowledge and skills. Conflicts, famine, and water resources, for exam-ple, will affect both men and women, but have different implications for each in rela-tion to use of time and tech-nology. Living in urban ar-eas, where there may be variable access to jobs and no land, poor infrastructure, and few public services, will also affect each sex differ-ently.

Technology is not used or developed in a vacuum; it is influenced and shaped by a number of external factors, and these will affect men and women quite differently.

structural adjustment measures have also been shown to place quite different pressures on women and men. Thus for both sexes the circumstances in which they live in any society will impact quite differently on their respective priorities with relation to the use and innova-tion of technology. An examination of these circumstances is essential to identifying key aspects of the relationship be-tween women and technology, and men and technology. Relationships also exist between these two sets of users, how-ever, which support hierarchies of access, use, ownership and control, and which also influ-ence the ways in which technol-ogy is perceived by both women and men.



Both women's and men's use of technology is shaped by the contexts in which they live, but each sex is affected differently.

0 *Geography* Where people live fundamentally affects the technologies to which they have access or which they are able to use. Men and women may live in the same place, but within households the environment affects their use of technology differently. Living in a dry area with few water resources, for example, will affect both men and women, but have different implications for each in relation to use of time and technology. Living in urban areas, where there may be variable access to jobs and no land, poor infrastructure, and few public services, will also affect each sex differently.

0 *Political/socio-economic environment* People's access to and control over technology at grassroots level is modified by the environment created by political and economic decisions taken at national level. For example, decisions over imports, exports, and subsidies all affect the climate in which people work. Agricultural policies may particularly affect women's technology use in relation to men's, as many of women's agricultural contributions are less visible and may be overlooked. Structural adjustment programmes often reduce spending on health and education: where these are the responsibility of women, women have to seek alternative ways of maintaining the welfare of their families, which has implications for their use of time. If national policies affect household incomes or survival strategies, women's and men's technology use will be affected differently. Wars and conflict also impact differently on women and men, and women may be left alone to assume all household tasks and responsibilities.

0 *Traditional roles and status* People's use of technology is firmly embedded in the roles and status which a society traditionally allocates to them. These roles will reflect their position in relation to social gatherings, freedom of movement, and family responsibilities. In many cases women are responsible for the preperation of foodstuffs and for the health, welfare and survival of the family ; these tasks tie women to the home, making it difficult for them to travel, meet with other technology users, see different techniques and equipment in use, and share information. In many countries the status of women prevents them from travelling away from their communities or from driving or having access to transport, whereas men can and do move around more freely. Status may also affect access to education if schooling is regarded as more important for one sex (usually males) than the other. Less schooling affects people's self-confidence, and their ability both to read and to understand technical information in the future, and to think numerically. Lower status often means that women in particular have little say in or influence over local decision-making, and local development plans involving key technical decisions (such as the choice, location, and management of wells, grinding mills or tree planting schemes) may go ahead without taking into account women's technical priorities or knowledge.

Where people live will affect their choice of technologies; transportation to and from markets is often a problem.

It is thus possible to begin to analyse women's and men's relationships with technology by constructing separate models incorporating each sex's technical knowledge and skills, usage, constraints and priorities. A further feature of the models, however, is that in daily life they are not separate. They are altered and adapted, and to some extent defined, by interactions and relationships of interdependence between them. These may be interdependences strictly relating to process, such as supply of materials or labour, where one sex gross something which the other processes, or where one sex provides labour to the cultivation of a crop by the other. There may also be relationships prescribed by the wider environment in which people live and work, such as rights over land or natural resources.

Courtesy
Appropriate Technology

Utilizing the Neem Tree

For Pest Control and Rural Development in Bangladesh: Some Socio Economic and Policy Considerations

by Saleem Ahmed

DECISION-makers pondering agricultural production strategies are often confronted with a dilemma. On the one hand, there cannot be adequate production without pest control; and, on the other, the environment may be harmed by injudicious use of synthetic pesticides. Even at current pesticide use levels, annual agricultural losses worldwide caused by more than 20,000 species of field and storage pests run into several billion dollars — at a cost of 400,000 cases of pesticide poisoning (1-5 per cent of which prove fatal), instances of contaminated ground water and polluted atmosphere, and, as yet, undetermined long-term effect on humans, wildlife, and the environment. Additionally, the increasing development of pesticide resistance in target pests is necessitating the use of progressively larger pesticide doses — such as 15-16 sprayings on cotton in South Asia today as opposed to 5-6 sprayings 10-15 years back.

These unanticipated adverse environmental consequences of growth-oriented strategies have increased the quest for alternative approaches to development. A desire for quick economic return in being replaced by one for sustainability: to meet present needs without compromising those of the future, and to interweave social and environmental concerned with "economics" in decision-making. Alternative and low-cost pest-control strategies are thus needed. Extracts of selected plants may play an important role here; and a closer look at cultural practices of some traditional societies may provide an answer to this 20th century challenge.

Neem's Current Pest Control Uses

In terms of the extent, diversity, and safety, neem appears to be in a class by itself. Its traditional use for pest control has continued in south Asia over many generations; indeed, scientists learnt of neem's pest-control properties by observing such farmer practices.

Traditionally, for stored grain pest control, south Asia's poorer farmers either simply mix a "handful" of neem leaves with the grains stored in sacks, or apply a neem leaf paste on the inside of the earthen container used for such storage. These practices, however, are not followed by the more affluent farmers — due in part to the stigma of "backwardness" associated with the use of traditional materials, and practices in agriculture. This highlights how well-intentioned government efforts to increase agricultural production by promoting the use of "modern" materials and practices has, unwittingly, backfired. In south India, however, many commercial cardamom growers annually incorporate 100-250 kg/ha of neem "Cake" (residue after oil is extracted from the seed) into the soil for nematode control. This is based on the local experience that no synthetic nematocide works as effectively as neem cake in controlling these soil-borne micro-organisms. More recently, diluted neem seed oil and aqueous neem leaf extracts are being used by tobacco growers in Andhra Pradesh and by vegetable growers in south India for controlling many foliage pests.

Looking Ahead

Neem provides a good example of science learning from culture. By responding concurrently to the interest of farming, forestry, and industrial sectors, neem offers considerable potential for utilization in sustainable agriculture. When considered together, the various economic uses of neem suggest that the utilization of this tree can be a highly attractive proposition. In countries such as Bangladesh, the utilization of this nature's bounty should be a "natural" strategy to pursue.

We need to change from being neem gathers to become scientific neem farmers. Our marginal semiarid regions offer considerable potential for neem plantations, adding, in the process, to rural development. We must make research on, and use of, traditional materials "fashionable" again. The recent approval of a SAARC (South Asian Association for Regional Co-operation) neem project involving all member-countries, and the passage of a resolution in the Senate, State of Hawaii supporting neem research are heartening. Indeed, neem could help brook the degraded environment-poverty cycle.

And, in view of the potential environmental problems associated with global warming, international foundations and donor agencies may consider establishing mega neem plantations straddling international boundaries in the under-utilized semi-arid regions of the tropics to act as "sinks" for drawing out Co_2 from the atmosphere. Any neem-based industries that may be established in these areas will then promote rural development and help improve the quality of life of the inhabitants living in these marginal lands; people who currently barely eke out an existence.

Saw is tough on bricks, tender on hands

IN the best traditions of products that are tough but tender comes a hand-held electric saw that can slice through brick or timber, but not put a nick in a finger.

Named the Allsaw, the strange looking tool employs a revolutionary cutting technology developed by Perth inventor Kevin Inkster. He believes that while it is more economical and versatile than anything available on the international market, the Allsaw's greatest appeal will lie in its absolute safety.

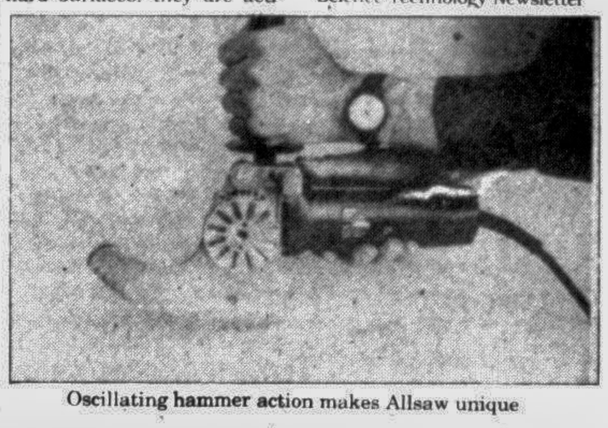
In a recent nationally televised demonstration, Mr Inkster used the orbital, twin-blade saw to slice through masonry and wool blocks simultaneously. He then held the vibrating blades against his hand without causing the slightest damage.

"The technology combines an oscillating and hammer action in the blades," he explained. "When the blades contact very hard surfaces, they are activated to cut cleanly and quickly. All you feel when you put your hand against them is a slight vibration. They simply will not operate on contacting skin or flesh. Also, grabbing and kicking, common faults with most saws, do not occur with the Allsaw, and it is so safe that a hand guard is not necessary."

Mr Inkster's company Arbortech plans to develop different versions of the tool, including a chainsaw, ceramic tile cutter and a medical surgery saw.

The Allsaw is not Mr Inkster's first successful and novel creation. Three years ago he won several Australian awards for his Arbortech Woodcarver, a mechanical carving and shaping tool which has registered sales of more than 250 000 units.

Courtesy — Australian Science Technology Newsletter



Oscillating hammer action makes Allsaw unique

Computing Bytes

The Daily Star Computer Awareness Course

by Yousuf M Islam

(Continued from last session)

Permanent Storage Devices (Fig 1.5)

While instructions are being READ, the tape has to be moved forward mechanically. So, although instructions are stored electronically, the necessity of mechanical movement makes the device slow.

In addition, when many programs are stored on the same tape, finding for instance, the fifth program will take a long time. This is also the case if we want to listen to the fifth song on an audio cassette. This makes the tape a considerably slow device compared to the electronic speed of a calculator.

To improve the speed of ACCESS (getting to) to programmes, the material which forms the tape is rolled out in the form of a record better known as FLOPPY DISC. Just as the arm of a record player can move quickly across the surface of a record, the programmes on a floppy disc can be accessed by moving the HEAD radially. The head is similar to a record/playback head of and audio cassette player.

Common floppy discs come in two sizes 5.25" and 3.5" diameters. The amount of storage space available is quoted in the maximum number of bytes each disc can hold. The 5.25" disc has a capacity of 1.2 MEGAbytes (or 1.2 million characters) and the 3.5" disc has a capacity of 1.44 megabytes. This is abbreviated as 1.2 MB and 1.44 MB respectively. Due to its finer construction, the smaller sized disc holds a greater number of characters.

In an effort to further increase speed of access and capacity, HARDS DISCS are robust discs stacked with individual READ/WRITE heads as shown in Fig 1.5. As the discs rotate very fast programme and instruction access is very fast.

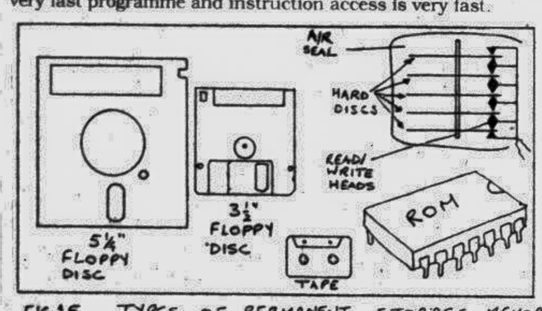


FIG 1.5. TYPES OF PERMANENT STORAGE MEMORIES

Q.1.5.1 If the capacity of each surface is 20 MB, what is the total capacity of the hard disc shown in Fig 1.5.?

Although a hard disc is fast, access still involves mechanical movement. A ROM (Read Only Memory) is a permanent memory device which has built-in programmes and access involves no mechanical movement. The use of a ROM is limited by the fact that results, new instructions or programmes cannot be added to it.

Q.1.5.2 Once programmes have been stored in a particular memory device, how can the instructions be transferred to the electronic calculating device?

Electronic Transfer Device (Fig 1.6)

Each instruction would need to be transferred to the calculator by an electronic transfer device. The results would also need to be transferred from the calculator to the memory device as and when required. Inside the computer, such a device is called a CONTROL UNIT abbreviated as CU.

Data Input & Output System in Computer

by Zakaria Swapan

Input

Input is the process of transferring readable data into the computer system. In some instances, this is a two-stage process. First, the human readable data is converted into a machine readable form. This is data preparation or **data entry**. The second stage is to transfer the machine readable data into the system. This is **data input**.

Key-to-tape and disc

A keyboard that transfers human readable data directly to magnetic tape or discs is a popular method of performing data preparation or entry. Data is entered through a keyboard onto a magnetic tape, a cassette, or a disc. In addition, some of these devices can have a buffer storage area or a microcomputer to assist in entering the data. Some of the newer data entry devices allow the data to be checked for errors before it is entered on tape or discs.

Terminal devices

Terminals are very attractive for data input and output. These devices perform data entry and data input at the same time. Data is keyed into the terminal which converts the data into machine readable form and transfers the data to the computer system. Terminals, normally connected directly to the computer by telephone lines, can be placed in offices, warehouses, and homes — anywhere telephone lines can be placed. Today terminals are used for *online data entry*. With online data entry, the computer displays menus and tells the data entry operator exactly what is required.

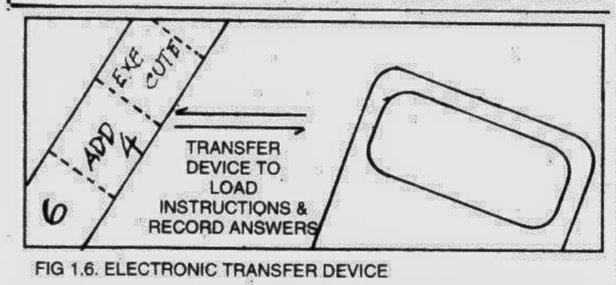


FIG 1.6. ELECTRONIC TRANSFER DEVICE

Q. 1.6 We now have a permanent memory device, a CU and a calculator. If we wanted to process instructions very fast, which device would limit the speed of the entire process?

A Computer (Fig. 1.7)

In the computer, the calculator (without its keys and screen) is known as the ARITHMETIC LOGIC UNIT or ALU for short. The CU transfers instructions to the ALU for processing inside the computer.

To take full advantage of the electronic speed of the ALU and CU we need a purely electronic memory device in which results may also be recorded. Such a device is called a RANDOM ACCESS MEMORY or RAM. A RAM needs electricity to store instructions, thus is a TEMPORARY memory device. The contents of the RAM are lost when power is switched off.

Unlike accessing instructions on a tape, any instruction in the RAM can be directly or randomly accessed. This makes the RAM particularly fast.

We now have all the parts required by the CENTRAL PROCESSING UNIT or CPU of the computer. It consists of an electronic RAM, electronic ALU and electronic CU. The CPU can thus process instructions very fast.

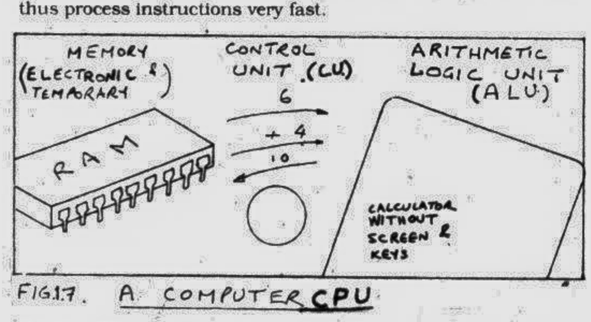


FIG 1.7. A COMPUTER CPU

Q.1.7.1 What, then is the role of slow mechanical memories?

Q.1.7.2 How many instructions can the CPU execute quickly?

Ans 1.5.1 *5 discs x 2 surfaces each x 20 MB = 200 MB*

Ans 1.5.2 *We need an electronic device which can transfer instructions from the permanent memory device to the calculator.*

Ans. 1.6 *The permanent memory device.*

Ans.1.7.1 *To record programmes so that they can used later, RAM is only a temporary memory device.*

Ans.1.7.2 *As many as can be stored in the RAM.*

The author is the systems director of Rafi Computer Systems Limited.

Special Purpose Equipment

In addition to central processing units, permanent storage devices, and input and output devices, computers can accommodate special purpose equipment. This equipment can process the checks that you write using **magnetic ink character recognition (MICR)**. Special purpose equipment can place data on microfilm. It can help us check out items at the grocery store or at a department store using **point of sale (POS)** equipment. And it can read data directly from a standard sheet of paper using a special **optical character recognition (OCR) reader**. The computer can also recognize human speech to some extent, and some computers have been programmed to respond with a human voice. With this system, the computer will talk to you in a number of different voices, even with sexy voices. Even so, you can still tell it is a computer generated voice.

For the last few years, special purpose **robots** have been used on the factory floor to paint, weld, and perform other manufacturing operations. Both Japan and the United States are in a race to produce sophisticated robots. Robots can even be used in prison. Costing approximately dollars 30,000 each, 200-pound and 4-foot-high mobile robots will be used in the future to supplement human guards in a prison setting. Police departments are now using robots in dangerous situations. For example, the New York City police department used a robot, called RM13, in the shoot-out in Elmira, NY. The robot can be used to take pictures inside buildings and other facilities instead of endangering a human police officer. The Los Angeles police department uses a similar robot to locate and handle bombs. Called Felix, this robot has the ability to pick up terrorists' bombs and other dangerous objects and place them in special tanks or areas where they can be exploded, investigated, or disarmed.

Output : Printer

Although there are many different types of output devices, the most commonly used is the **printer**. Printers are available with different speeds, features, and capabilities. Some print one character at a time (serial), others print a complete line of characters at a time (**line printers**) or an entire page at one time. Printers are set up to accommodate different paper forms — blank check forms, blank invoice forms, and so forth. Forms may be in different colours with several copies that are routed to various departments. Other output devices include **computer output microfilm (COM)**, **plotters**, and **voice response**.

Overview of Software

by Ismat Ara

A *computer programme* is a set of instructions given to the computer system to perform a task or activity. *Software* consists of one or more computer programmes and other documents (flowcharts, decision tables, and manuals) that describe the programmes and how they are to be used.

Types of Software

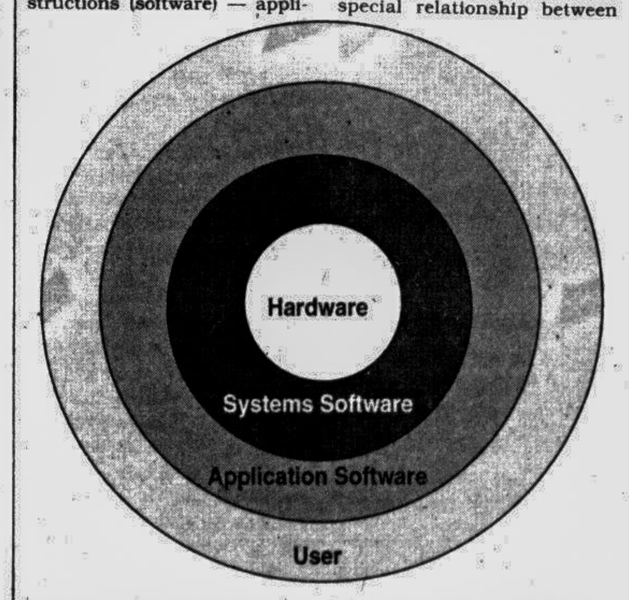
With a manual system, two types of instructions are needed. One type performs useful applications, such as payroll, word processing, scientific research, oil exploration, computer aided instruction, and so on. The other type tells the clerk how to operate the manual system — how to get data from the filing cabinets, what jobs to do first, and other office procedures to follow. Likewise, a computer system needs two types of instructions (software) — application software and system software.

Application software (also called an **application package**) is one or more programmes designed to produce information, solve a problem, or support the decision-making process for one or more individuals or organisations.

System software (also called a system package) is one or more programmes that make the operation of the computer system more effective and efficient. System packages include **assemblers** and **compilers**, **operating systems**, **data base management systems**, and **utility programmes**.

The relationship between hardware and software

In order for the computer to produce useful output, the hardware and software must work together. Thus there is a special relationship between hardware and software. At the centre of any computer system is hardware. Surrounding the hardware is system software. Finally, the user interacts with application software. This process is shown in Figure above.



The relation between hardware and software

Acquiring software

At one time, application and system software were included (bundled) in the purchase price of the computer.

You can either buy an existing package, or you can develop your own package.