

DIGITAL LITERACY I

(ICT 1)

level 200 (Week 4)

Plan of the day

- ✓ **COMPUTER HARDWARE**
- **Output devices**
 - **Hard Copy Devices**
 - **Soft Copy Devices**

Output devices

Output

Output is data That has been processed into a useful form. That is, information that comes out of the computer after processing is referred to as output. Examples of output include; text, graphics, audio and video.

Softcopy and Hardcopy output

Softcopy output:

It is temporary output and it refers to information that is displayed on the computer screen or in audio, video or voice form through speakers. This kind of output disappears when the computer is switch off.

1. Hardcopy output

It is a permanent output and it refers to information that is typed or printed on paper i.e printed computer output.

Output devices: Output devices provide output to the user, which is generated after processing the input data. The processed data, presented to the user via the output devices could be text, graphics, audio or video. The output could be on a paper or on a film in a tangible form, or, in an intangible form as audio, video and electronic form.

Printers

A printer prints the output information from the computer onto a paper. Printers are generally used to print textual information, but nowadays printers also print graphical information. The print quality (sharpness and clarity of print) of the printer is determined by the resolution of the printer. Resolution is measured in dots per inch (dpi). Printers with a high resolution (more dpi) provide better quality output. Different kinds of printers are available for different types of applications. Printers are classified into two categories i.e impact printer and non-impact printer.

A. IMPACT PRINTERS

Impact printers use the typewriter approach of physically striking a typeface against the paper and inked ribbon. Impact printers can print a character or an entire line at a time. Impact printers are low-cost printers useful for bulk printing. Dot matrix printers, daisy wheel printers and drum printers are examples of impact printers.

TYPES OF IMPACT PRINTERS

1. Dot Matrix Printers Print one character at a time. The speed of dot matrix printer lies between 200 and 600 characters per second (cps) and their resolution ranges from 72 to 360 dpi. Dot matrix printers normally come in two sizes i.e 80 column printer and 132 column printer. Dot matrix printers can print alphanumeric characters, special characters, charts and graphs. They can print only in black and white. Some dot matrix printers can print in both directions - left to right and right to left. Dot matrix printers are commonly used for printing in applications like payroll and accounting.

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TYPES OF IMPACT PRINTERS

Daisy Wheel Printers: print one character at a time. They produce letter quality document which is better than a document printed by a dot matrix printer. The speed of daisy wheel printers is about 100 cps. The print head of the printer is like a daisy flower, hence the name. These printers are slow, can only print text (not graphics), and are costly in comparison to dot matrix printers. Daisy wheel printers are used where high quality printing is needed and no graphics is needed.

TYPES OF IMPACT PRINTERS

Drum Printers are line printers. They are expensive and faster than character printers but produce a low quality output. They can print 200–2500 lines per minute. Drum printers are generally used for voluminous print outputs.

B. NON-IMPACT

Non-Impact Printers do not hit or impact a ribbon to print. They use electro-static chemicals and ink-jet technologies. Non-impact printers are faster and quieter than impact printers. They produce high quality output and can be used for printing text and graphics both in black and white, and color. Ink-jet printers and laser printers are non-impact printers.

Types of non-impact printers

Ink-jet Printers spray ink drops directly on the paper like a jet . Their resolution is more than 500 dpi. They produce high quality graphics and text. Ink-jet printers are commonly found in homes and offices.

Types of Non-impact Printers

Laser Printers provide highest quality of text and graphics printing. Laser printers process and store the entire page before printing and are also known as page printers. The laser printer can print 5–24 pages of text per minute and their resolution ranges from 400 to 1200 dpi. They are faster and expensive than impact printers. Laser printers are used in applications requiring high quality voluminous printing.

Softcopy output

The output obtained in an intangible form on a visual display, audio unit or video unit is called soft copy output. The soft copy allows corrections to be made, can be stored, and, can be sent via E– to other users. The soft copy output requires a computer to be read or used. The devices that generate soft copy output are called soft copy devices. Visual output devices like computer monitor, visual display terminal, video system and audio response system are common soft copy output devices.

MONITOR

Monitor is a common output device. The monitor is provided along with the computer, to view the displayed output. A monitor is of two kinds - monochrome display monitor and color display monitor. A monochrome display monitor uses only one color to display text and color display monitor can display 256 colors at one time. The number of colors displayed by a color monitor varies with the kind of color adapter attached to it—CGA, EGA, VGA, XGA and SVGA. The CGA monitor supports four colors and SVGA supports around 16,000,000 colors. Monitors are available in various sizes like 14, 15, 17, 19 and 21 inches.

Monitor

An image on the monitor is created by a configuration of dots, also known as pixels. The clarity of image on the computer screen depends on three factors:

1. **Resolution of Screen:** The number of pixels in horizontal and vertical direction. More the number of pixels, the sharper is the image. The common resolution of computer screen is 800x600 and 1024x768,
2. **Dot Pitch:** The diagonal distance between two colored pixels on a display screen, and
3. **Refresh Rate:** The number of times per second the pixels are recharged so that their glow remains bright.

Types of monitors

- Monitors may be Cathode Ray Tube (CRT) monitors that look like a television or
- Liquid Crystal Display (LCD) monitors that have a high resolution,
- Flat screen, flat panel display. Nowadays, LCD monitors are generally used.

Assignment

Make notes on the types of monitors stated above

COMPUTER MEMORY

☐ PRIMARY MEMORY

✓ RAM, ROM, CACHE MEMORY

☐ SECONDARY MEMORY

✓ FLOPPY DISK, HARDDISK, etc.

COMPUTER MEMORY

The computer's memory stores data, instructions required during the processing of data, and output results. Storage may be required for a limited period of time, instantly, or, for an extended period of time.

PRIMARY STORAGE

Primary memory is the main memory of computer. It is a chip mounted on the motherboard of computer. Primary memory is categorized into two main types:

- ❑ Random Access Memory (RAM), and
- ❑ Read Only Memory (ROM)

Random Access Memory (RAM)

- ❑ RAM provides random access to the stored bytes, words, or larger data units. This means that it requires same amount of time to access information from RAM, irrespective of where it is located in it.
- ❑ RAM can be read from and written to with the same speed.
- ❑ The size of RAM is limited due to its high cost. The size of RAM is measured in MB or GB.
- ❑ The performance of RAM is affected by:
Access speed (how quickly information can be retrieved).

Random Access Memory (RAM)

- ❑ The speed of RAM is expressed in nanoseconds.
- ❑ Data transfer unit size (how much information can be retrieved in one request).
- ❑ RAM affects the speed and power of a computer. The More the RAM, the better it is.
- ❑ Nowadays, computers generally have 512 MB to 4 GB of RAM.
- ❑ RAM is a microchip implemented using semiconductors.

There are two categories of RAM

DRAM is the most common type of memory chip. DRAM is mostly used as main memory since it is small and cheap.

- ❑ It uses transistors and capacitors. The transistors are arranged in a matrix of rows and columns. The capacitor holds the bit of information 0 and 1. The transistor and capacitor are paired to make a memory cell. The transistor acts as a switch that lets the control circuitry on the memory chip read the capacitor or change its state.
- ❑ DRAM must be refreshed continually to store information. For this, a memory controller is used. The memory controller recharges all the capacitors holding a 1 before they discharge. To do this, the memory controller reads the memory and then writes it right back.

There are two categories of RAM

SRAM chip is usually used in cache memory due to its high speed.

- ✓ SRAM uses multiple transistors (four to six), for each memory cell. It does not have a capacitor in each cell.
- ✓ A SRAM memory cell has more parts so it takes more space on a chip than DRAM cell.
- ✓ It does not need constant refreshing and therefore is faster than DRAM.
- ✓ SRAM is more expensive than DRAM, and it takes up more space.
- ✓ It stores information as long as it is supplied with power.
- ✓ SRAM are easier to use and very fast. The access speed of SRAM ranges from 2–10 nanosecond.

Read Only Memory

ROM is a non-volatile primary memory. It does not lose its content when the power is switched off. The features of ROM are described as follows:

ROM, as the name implies, has only read capability and no write capability. After the information is stored in ROM, it is permanent and cannot be corrected.

ROM comes programmed by the manufacturer. It stores standard processing programs that permanently reside in the computer. ROM stores the data needed for the start up of the computer. The instructions that are required for initializing the devices attached to a computer are stored in ROM.

Read Only Memory

The **ROM** memory chip stores the Basic Input Output System (BIOS). BIOS provides the processor with the information required to boot the system. It provides the system with the settings and resources that are available on the system. BIOS is a permanent part of the computer. It does not load from disk but instead is stored in a ROM memory chip. The program code in the BIOS differs from ordinary software since it acts as an integral part of the computer.

When the computer is turned on, the BIOS does the following things

Power On Self Test (POST) is a program that runs automatically when the system is booted. BIOS performs the power-on self-test. It checks that the major hardware components are working properly.

❑ BIOS setup program, which is a built-in utility in BIOS, lets the user set the many functions that control how the computer works. BIOS displays the system settings and finds the bootable devices. It loads the interrupt handlers and device drivers.

When the computer is turned on, the BIOS does the following things

❑ Bootstrap Loader is a program whose purpose is to start the computer software for operation when the power is turned on. It loads the operating system into RAM and launches it. It generally seeks the operating system on the hard disk. The bootstrap loader resides in the ROM. The BIOS initiates the bootstrap sequence.

Types of ROM

❑ **PROM** can be programmed with a special tool, but after it has been programmed the contents cannot be changed. PROM memories have thousands of fuses (or diodes). High voltage (12 V) is applied to the fuses to be burnt. The burnt fuses correspond to 0 and the others to 1.

❑ **EPROM** can be programmed in a similar way as PROM, but it can be erased by exposing it to ultra violet light and re-programmed. EPROM chips have to be removed from the computer for re-writing.

Types of ROM

□ **EEPROM** memories can be erased by electric charge and re-programmed. EEPROM chips do not have to be removed from the computer for re-writing.

Flash Memory

Flash Memory is a kind of semiconductor-based non-volatile, rewritable computer memory that can be electrically erased and reprogrammed. It is a specific type of EEPROM.

SECONDARY STORAGE

Assignment 2

make short notes on secondary memory