

THE PRINTER

Characteristics of Printer

Printers are also classified by the following characteristics:

1. Quality of Type

The output produced by printers is said to be either letter-quality (as good as a typewriter), near letter quality, or draft quality. Only daisy-wheel, ink-jet and laser printers produce letter-quality type. Some dot-matrix printers also claim letter-quality print.

2. Speed

Speed is measured in characters per second or pages per minute. The speed of printers varies widely. Daisy-wheel printers tend to be the slowest, printing about 30 Cps. Line printers are fastest (up to 3,000 lines per minute). Dot-matrix printers can print up to 500 Cps, and laser printers range from about 4 to 20 text pages per minute.

3. Impact or Non-impact

Impact printers include all printers that work by striking an ink ribbon. Daisy-wheel, dot-matrix and line printers are impact printers. Non-impact printers include laser printers and ink-jet printers. Impact printers are noisier.

4. Graphics

Some printers (daisy-wheel and line printers) can print only text. Other printers can print both text and graphics.

5. Fonts

Some printers, like dot-matrix printers, are limited to one or a few fonts. In contrast, laser and ink-jet printers are capable of printing an almost unlimited variety of fonts. Daisy-wheel printers can also print different fonts, but you need to change the daisy wheel.

While buying a printer, the four main aspects to look out for:

1. Resolution

It is the sharpness at which the graphics or text appear on the paper when the print is removed. This resolution is generally measured in dots per inch. General printers will give you a resolution of about six hundred dots per inch. This resolution is adequate enough for normal everyday print jobs.

2. Speed

If a person requires many print-outs, the speed at which the printer functions becomes a crucial aspect. The normal everyday printers are capable of printing about three to six printed sheets of paper every sixty seconds. However, this number reduces if you are printing colour print-outs. The printer that costs more is capable of printing print-outs, both colour and black and white, at a faster rate.

3. Colour

You will need a colour printer if your work demands that coloured images be part of the printouts. With colour printers, you have the best of both worlds, because they can also be programmed to give print-outs in black-and-white and colour. Depending on the manufacturer and model of the printer, ink cartridge comes in various combinations, such as separate black

and colour cartridges, Colour and black in a single cartridges or even a cartridge for each ink colour.

4. Memory

Printers have a small quantity of memory storage space. However, the user can increase the memory, which is beneficial and also makes the printer quicker when it has to give print-outs of a large number of graphics.

Principles of Operation of Inkjet Printer

In the inkjet printing mechanism, the print head has several tiny nozzles, also called jets. As the paper moves past the print head, the nozzles spray ink onto it, forming the characters and images. An inkjet printer can produce from 100 to several hundred pages, depending on the nature of the hard copy, before the ink cartridges must be replaced. There is usually one black ink cartridge and one so-called colour cartridge containing ink in primary pigments (cyan, magenta and yellow). Some inkjet printers use a single cartridge with cyan, magenta, yellow and black ink. A few models require separate cartridges for each primary pigment, along with a black ink cartridge.

An inkjet printer works in the following manner:

1. An ink-filled print cartridge attached to the print head moves sideways across the width of a sheet of paper. This sheet of paper is fed through the printer below the print head.
2. The print head is made up of small ink-filled chambers, each attached to a nozzle thinner than a human hair.
3. An electrical pulse flows through a heating element, i.e., a thin resistor located at the back of the ink chambers.
4. When electric current flows through the resistor, the resistor heats a thin, layer of ink at the bottom of the chamber to more than 900° Fahrenheit for a short duration. This makes the ink to boil and forms a small bubble of vapor.
5. At this vapor bubble expands, it pushes ink through the nozzle to form a droplet at the tip of the nozzle.
6. When the bubble further expands, the ink droplet overcomes the surface tension and the pressure of the bubble forces the droplet onto the paper forming a small dot.
7. A typical character is formed by a number of these tiny dots.
8. As the resistor cools, the bubble collapses and pulls fresh ink from the attached reservoir into the ink chamber.
9. For color printing, multiple cartridges of three basic colors cyan, magenta and yellow are used. The color output of Inkjet printers are of very high quality because there is no ribbon to fade the color and ink is directly deposited on the paper. In addition, by mixing different colors on the paper, Inkjet printers can provide millions of colors.
10. Most of the good quality Inkjet printers provide one additional black cartridge other than the three basic color cartridges. This black cartridge is used to print black text or other black color images. Mixing of the three basic colors to produce black gives a faded black color.
11. In Piezo-electric technology, pressure, not heat, is used to eject ink on the paper. Now, most of the ink-jet printers use this technology.

Various Components of the Inkjet Printer

An inkjet printer is made up of several parts that accept, support and move the paper during the process of printing. All these parts work in co- ordination so that the printer works properly. If any of these components gets spoilt, the printing process will get held up.

These inkjet parts are categorized into two main groups: These are:

- (a) The Print Head Assembly
- (b) The Paper Feed Assembly.

a) The Print Head Assembly

- **Print Head**

The first and most obvious part is the print head itself. The print head is the soul of any! ink jet printer. It is made up of several nozzles whose purpose is to spray small droplets of ink on to the paper. Without this component, the inkjet printer would be completely useless.

- **Cartridge**

The second most important part in this category is the ink cartridge. A cartridge contains ink for printing. The type of ink cartridge will differ depending on which manufacturer you buy from. Different manufacturers make ink cartridges with a variety of different combinations. For example, you can purchase ink cartridges that come with individual cartridges for black ink and coloured inks or with a single cartridge for both kinds of ink. You can even purchase an individual ink cartridge for every different colour. There is some ink cartridges available for inkjet printers that come built in with the print head. Cover of cartridge provides a cover for the ink cartridge. Thus, the cover is removed only when a cartridge has to be replaced.

- **Printer Head Stepper Motor**

An inkjet printer comes built in with a stepper motor. The function of the stepper motor is to move the print head assembly, which consists of the ink cartridges and print head, forward and backward from corner to corner of the page.

- **Belt**

The belt is another part of the print head assembly. It is used to attach the print head assembly to the stepper motor.

- **Stabilizer Bar**

The print head assembly also makes use of a stabilizer bar. The function of the stabilizer bar is to make sure that the printing process goes through with precision, control and accuracy.

b) The Paper Feed Assembly Paper Tray/Feeder

The main part in this category is the paper tray/feeder. Almost all models of inkjet printer consist of a tray into which you can load the paper. Others make use of a feeder in place of a tray. The feeder accepts the paper and forwards individual sheets as printing progresses. It pulls open at an angle and is placed at the back of the printer. However, there is a disadvantage with paper feeders. They cannot hold as much paper as a normal paper tray.

- **Roller**

A roller/pulls the page from the paper tray or paper feeder and sends it into the printer once the print head system is all set to print.

- **Power supply**

While earlier printers often had an external trans-former, most new printers use standard power supply that is incorporated into the printer itself.

- **Control circuitry**

It is a tiny, but significant, piece of circuitry that is built into the printer. The main function of this circuitry is to oversee and manage the mechanical phases of the printing process. The other function it has is to decode all information given by the computer to the printer for any print jobs.

- **Interface port**

The last component is actually a group of devices combined and put under one category, which are called the Interface Ports. The parallel port is still used by many printers. The newest range in Interface Ports amongst printer owners is the USB ports.

Exercise:

- 1: Write the Characteristics of Printer.**
- 2: List Various Components of the Inkjet Printer.**
- 3: Explain the Operation of Inkjet Printer.**