
UNIT 20 PRINTERS

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20.0 OBJECTIVES

In this unit our aim is to give you practice in reading comprehension by (a) setting a passage on types of computer printers,(b) giving a glossary of difficult words, and (c) asking questions relating to comprehension of the passage. In the vocabulary section, we have set exercises asking you to (a) find synonyms and antonyms from the passage for the words listed and (b) match different kinds of printers with their features. The section on grammar and usage deals with sequence words such as already, now, in the meantime, soon etc. In the section on writing we have asked you to write a paragraph. Types of printers', using the information given in the passage and an outline provided.

20.1 READING COMPREHENSION

20.1.1 Study Guide

The passage states that printed paper remains an essential communication medium. The computer printers can be classified either in terms of the printed output they make or in terms of printing techniques. The passage mentions different types of computers and how they are distinguished from one another. It also mentions how each one functions. After you have read the passage once, read it again with the help of the glossary we have provided at the end of the passage. Answer all the questions and check your answers with the answers given at the end of the unit.

20.1.2 Comprehension passage

PRINTERS

Cathode Ray Tubes are very useful for displaying the results of processing. Their images, however, are temporary. Sooner or later, printed versions, or hard copies, are needed. Statements must be sent to customers, check prepared for employees and vendors, reports prepared for management and so on. Although electronic means of transmitting and displaying information are growing in popularity, printed paper remains an essential communication medium.

Printers fall into three basic categories defined by the amount of printed output the device produces during one operation. Page printers print an entire page at once, line printers produce one line at a time and character printers produce one character at a time.

Page printers produce complete page images as a single operation. They produce the images by laser or electrostatic methods. Image quality is sufficiently high for business correspondence.

Line printers produce a line of characters all at once. The length of the line varies with the requirements of the application. Most line printers produce 120 to 144 characters per line, requiring a paper width of fourteen inches. The most common width is 132 characters. Printing is accomplished by passing the paper through the printer, which uses a moving belt or chain containing the complete character set. A set of hammers, one for each of the printing positions on the line, strikes the paper from behind. This presses the paper against an inked ribbon behind which is the character to be printed. Line printers sacrifice quality of print for speed. One of most common line printers is the chain printer.

Character printers form one letter at a time on the paper. Typically, they do this in one of the two ways. Letter quality printers create fully formed letters, much like a typewriter. Dot matrix printers create characters as a series of dots in a rectangular matrix. Letter quality is suitable for business correspondence. Dot-matrix output is faster, usually than letter quality output, is not of high enough quality to be used for business correspondence, although design improvements may change this in the near future.

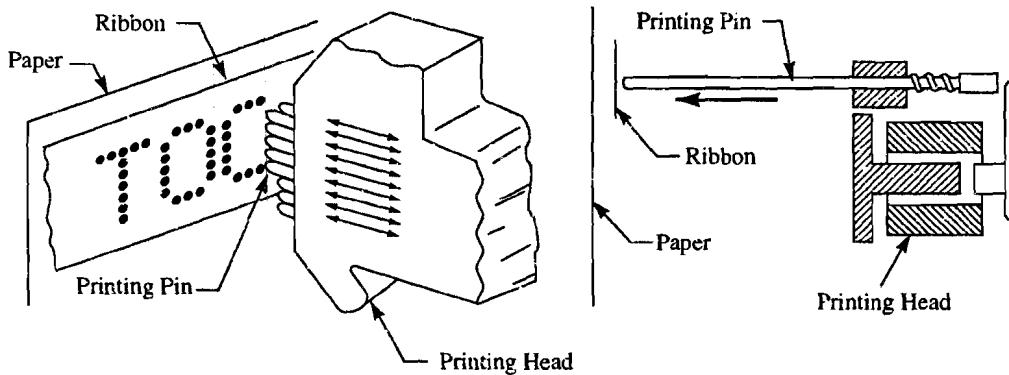
Printers can also be categorized by whether or not the print head strikes the paper. If it does, the printer is known as an impact printer; if it doesn't, it is a non-impact printer.

Non-impact printers are the fastest because they minimize the amount of physical movement required during the printing process. The Xerox 9700 Electronic Printing System, for example, uses laser beams to form character images on paper. It produces 120 pages per minute.

Other non-impact printers use a variety of technologies. Thermal printers, the slowest of the non-impacts, form characters by burning them on specially treated paper. Operating at about thirty characters per second, they are sometimes built into microcomputers, especially portable and lapsized versions.

Electrostatic printers operate in a manner similar to thermal printers. They form the characters by charging the paper electrically. The paper then passes through a toner solution. Particles of ink adhere to the charged areas of the paper. When the paper is heated, the particles melt, thus producing the characters. Electro-graphic printers can be quite fast. A Honeywell model, for example, prints up to 18,000 lines(about 300 pages) per minute.

Ink-jet printers squirt streams of ink to the surface of the paper. The ink dries almost immediately. These printers are fairly slow, producing from 50 to 100 characters per second, but offer the advantages of low cost and multiple colour printing.

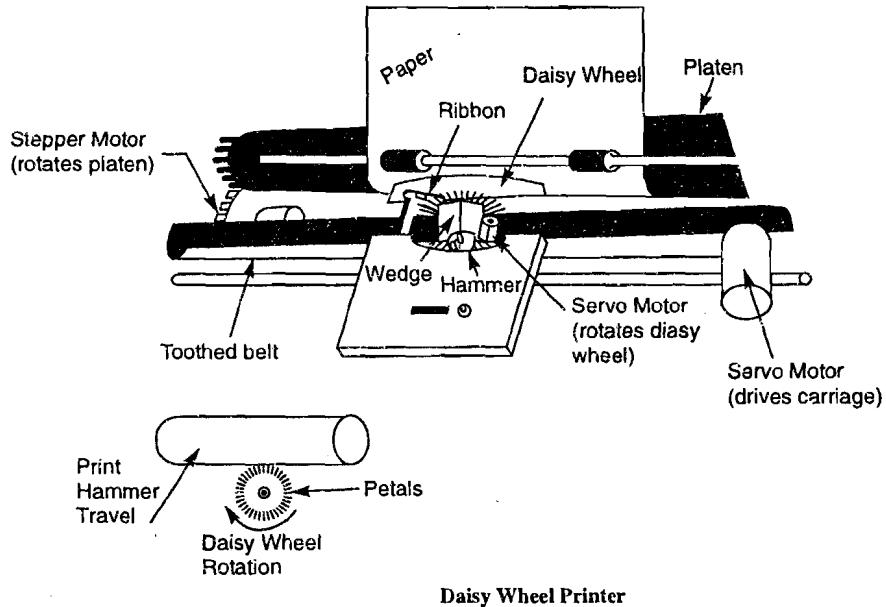


The Dot-Matrix Printer

Impact printers involve more physical motion and, because the paper is struck by the printing device, are quite noisy. They also can produce multi-part reports, meaning that through the use of carbon paper interleaves or chemical transfer methods, multiple copies can be printed at once.

Dot matrix impact printers use a print head consisting of a column of vertical wires or pins, which passes along the length of the line being printed. Letters are formed by striking various of these wires against a ribbon which then strikes the paper. The characters appear as selected dots from among those

in a rectangle or matrix. Initially, the most common dimensions for the matrix were seven by nine, 63 dots, although some manufacturers have substantially increased the number of pins and the number of dots per matrix. Increasing the density of the matrix, in this manner, improves the appearance of the document and increases the cost of the equipment. Non-impact printers such as ink-jet, thermal and electrostatic units also use the dot-matrix technique. Dot-matrix speeds range from fifty to 3200 characters per second. Because of their flexibility, dot-matrix printers can produce a wide variety of type and graphic effects.



Daisy Wheel Printer

Letter-quality impact printers operate in a manner very similar to the printing operation in an electric typewriter. The print head, equipped with a hammer, moves across the paper. In front of the head spins a daisy wheel thimble, or similar element containing the character set. As the character to be printed comes into position, the hammer strikes it against the ribbon and the paper. The print head then moves on to the next character. Letter quality printers produce faultless copies, but they are slow, ranging in speed from twelve to fifty characters per second.

(Adapted from **Using Microcomputers** by Richard W. Brightman and Jeffrey M. Dimsdale, second edition, 1987)

20.1.3 Glossary

- Cathode Ray Tube** : the picture tube of a video monitor also known as CRT.
- display** : physical/visual representation of data, as on a screen or display.
- processing** : computer manipulation of data in solving a problem.
- images** : exact logical duplicate stored in a different medium. If the computer user displays the contents of memory on a display screen, he or she will see an image of memory.
- versions** : rendering or copies.
- hard copies** : printed copies of machine output in readable form, such as reports, listing documents, or summaries. A hard copy is contrasted with a soft copy, which is data presented as a video image, in audio format, or in any other form that is not a hard copy.
- vendors** : seller
- electronic** : pertaining to the flow of electricity through semiconductors, valves, and filters in contrast with the free flow of current through simple conductors.
- transmitting** : sending data from one location to receive the data at another location

operation	: action specified by a single computer instruction or high-level-language statement; any specified action.
page printer	: this can print more than 20,000 lines per minute
laser	: acronym for Light Amplification by Stimulated Emission of Radiation, the technology that uses the principle of amplification of electromagnetic waves by stimulated emission of radiation and operates in the infrared, visible, or ultraviolet region.
electrostatic	: electronic methods
accomplished	: successfully completed/done
character set	: all of the numbers, letters, and symbols associated with a given device or a coding system. All of the characters recognised by a computer system.
hammers	: tool with a heavy metal head used for striking something.
sacrifice	: give up.
typically	: normally.
latter quality	: pertaining to printed copy of the highest quality.
matrix	: orderly array of symbols by rows and columns. Matrices provide a way in which complicated mathematical statements can be expressed simply.
categorized	: classified
print head	: also called print element. That part of a printer that actually puts the image on paper.
impact printer	: data print out device that imprints by momentary pressure or raised type against paper, using ink or ribbon as a colour medium. See daisy wheel printer, line printer, thimble printer
non-impact printer	: Printer that uses electricity, heat laser technology, or photographic techniques to print, e.g. electrostatic printer, laser printer, thermal printer
beam	: ray or stream of light
technologies	: knowledge and methods
thermal printer	: uses heat to melt wax particles that contain ink, which are then transferred to paper. Has mediocre quality reproduction, and uses expensive paper. The device, however is inexpensive quiet and reliable
specially treated paper	: in his case specially prepared heat-sensitive paper.
portable	: that can be carried about, not fixed
lap-sized versions	: note book - or briefcase - size portable computer, usually weighing less than 10 pounds
burning	: melting
particles	: very small bits
toner solution	: in computer graphics, the solution which decides the degree of tint and shade in colour.
Honeywell model	: a model produced by Honeywell - a large manufacturer of computer.

Ink-Jet printers	: printers which spray ink electrostatically.
squirts	: sprays
multiple	: many
struck	: pressed or hammered
carbon paper interleaves	: layers of paper separated by carbon sheets.
column	: vertical members of one line of an array.
density	: number of characters that can be stored in a given physical space. Measures how close together data are recorded on a magnetic medium, usually in bytes per inch. As recording density increases, the capacity of a storage device increases.
type	: letters, numbers and symbols.
graphic	: visual symbols
daisy wheel thimble	: a wheel (in the shape of thimble) with up to 100 characters, each being on an individual arm, so that only rotation is needed for the hammer to hit each letter. It resembles a flower in shape with the 'petals' containing the individuals characters, hence, its name. It can be changed, like the golf ball on a typewriter to allow the use of various character sizes and different type faces or fonts.

20.1.4 Answer the Following Questions

Exercise 1

1. Mention some of the people who would like to have printed copies of the result of computer processing.
2. How do page printers print an entire page in one operation?
3. How can printers be classified ?
4. How many characters per inch does a line printer print?
5. Arrange the following in the right sequence for the purposes of line printing:
ink ribbon, paper, hammer, characters.
6. Which printers are found more useful for business correspondence? And why ?
7. Why are non-impact printers very fast and quiet?
8. Why is paper heated in the printing by electrostatic printers?
9. What similarity do you notice between the thermal printer and the electrostatic printer?
10. Name the slowest and the fastest non-impact printer
11. What is Dot-matrix printing ?
12. Which word in the passage indicates that daisy wheel makes a rotating movement?
13. In what ways are dot matrix printers flexible?

20.1.5 Identify the False Statements and Correct them

Exercise 2

1. Printed output of data processing is no longer considered important.

2. Page printers are good for business correspondence because they are very fast.
3. The line printers has as many hammers as there are printing positions on the line.
4. Non-impact printers are the only printers used for multiple colour printing.
5. Ink-jet printers are the only printers used for multiple colour printing.
6. There is no difference between thermal printers and electrostatic printers.
7. Dot-matrix printers are not as fast as letter quality printers.
8. Multiple part reports are the multiple copies of a document printed several times.

20.1.6 Complete the Table

Exercise 3

Complete the following table in the light of the facts stated or suggested in the reading passage.

		Impact printers	Non-impact printed
1.	Speed		
2.	Noise produced		
3.	Printed output in one stroke		
4.	No. of copies printed at once		
5.	Name of the printers		

20.1.7 Contextual reference

Exercise 4

Find out from the reading passage what the underlined words refer to.

1. Their images (para 1) _____
2. A set of hammers, one for each (para 4) _____
3. This presses the paper (para 4) _____
4. Although design improvements may change this (para 20) _____
5. It produces 120 pages (para 7) _____
6. From characters by burning them (para 8) _____
7. They are sometimes built (para 12) _____
8. Which passes along the length (para 12) _____
9. From those in a rectangle or matrix (para 12) _____
10. The hammer strikes it (para 14) _____

20.2 VOCABULARY

20.2.1 Synonyms

Exercise 5

Read the passage again and find synonyms for the following words :

- | | | |
|---------------|-----------|-------|
| 1. Copies | (para 1) | _____ |
| 2. Important | (para 1) | _____ |
| 3. Adequately | (para 3) | _____ |
| 4. Completed | (para 4) | _____ |
| 5. Rays | (para 7) | _____ |
| 6. Instantly | (para 10) | _____ |

20.2.2 Antonyms

Exercise 6

Read the passage and find antonyms for the following words:

- | | | |
|---------------|----------|-------|
| 1. Buyers | (para 1) | _____ |
| 2. Gain | (para 1) | _____ |
| 3. Uniformity | (para 1) | _____ |
| 4. Single | (para 1) | _____ |
| 5. Rigidity | (para 1) | _____ |

20.2.3 Matching

Exercise 7

Match different kinds of printers listed in column 'A' with their salient features in column 'B'.

Column 'A'		Column 'B'	
1.	Impact printers	a.	uses a special chemically treated paper
2.	Non-impact printers	b.	prints an entire line in one action
3.	Thermal printers	c.	form characters by chemical or electronic means.
4.	Ink jet printers	e.	rotation is needed for hammer to hit each character.
5.	Daisy wheel printers	f.	patterns of dots are used.
		g.	hammer each character against an ink-ribbon and on to the paper.
		h.	Operate by projecting small ink droplets.

20.3 GRAMMAR AND USAGE

Sequencing

Exercise 8

Events occur either before, during or often other events. This sequence may be chronological, logical or

causal. In order that the events may be arranged sequentially it is important to establish a time-reference. All other events can be arranged in relation to this reference point. Thus, all other events could be before or simultaneous with or after this reference point. If an event relates to a time before this reference point, adverbs such as those underlined in the following sentences are used:

1. Microcomputers are already used in automobiles emission control systems and are the basis of many T.V. game attachments.
2. The slide was invented hundreds of years ago.
3. Computers may have a short history, but prior to their development, there were many other ways of doing calculations.

If an event occurs simultaneous with the reference point, adverbs such as at present, now, today are used:

1. Today, weather forecasts for the entire globe can be predicted by one monster computer.
2. Now some microcomputers sell for as cheaply as \$ 10.
3. At present, it is industrialised societies which possess the capital to invest in technology.

If an event occurs after the reference point, adverbs such as those underlined in the following sentences are used :

1. Soon microprocessors will be cheaper, and their capacity and performance will be greater.
2. By the end of this century microcomputers will be cheaper, better and probably used in every aspect of life.
3. After being mounted on a disc drive, discs are kept spinning at a very high and constant speed.

Underline in the following sentences adverbs indicating sequence of events and mention which of the following categories they refer to:

- a) events before the reference point
 - b) events simultaneous with the reference point
 - c) events after the reference point.
1. Some of the micro computers now used can do multitasking.
 2. Most people are very surprised to find that punched cards were used as long ago as 1780 on textile machinery.
 3. Already many experimental computers can tackle problems as complicated as a game of chess.
 4. Today's computer circuits can be put on a chip.
 5. When power is removed, information in the memory is lost.
 6. By the time you have a usable microcomputer system, the price will be somewhere between \$ 200 and 20000 depending on the display unit.
 7. It is just forty years ago that the first computer was built.
 8. Before such a change can take place, many technical hardware and software problems will have to be solved.
 9. Soon nations will be linked to each other via satellites.
 10. It was not until the mid-1940s that the first digital computer was built.

20.4 LET US SUM UP

In this unit we have given practice in

- a) Understanding a passage dealing with different types of computer printers.
- b) Identifying false statements and correcting them.
- c) Completing a table based on the information given in the passage.
- d) Finding out objects or persons who have been referred to by certain pronouns and demonstratives used in the passage.
- e) Finding out synonyms and antonyms.
- f) Sequence words.
- g) Writing a paragraph based on the information given in the passage and an outline provided.

Answers to Exercises

Exercise 1

1. Customers, employees, vendors, management etc.
2. By using laser or electrostatic methods.
3. They can be classified on the following basis :
 - i) the amount of printed output a printer produces in one operation.
 - ii) whether the print head strikes the paper or not. (i.e. the printing techniques)
4. About 8-10 characters.
5. Hammer, characters, ink ribbon, paper.
6. Page printers and letter quality printers. They are preferred because of the quality of their printing.
7. They are fast because they involve minimum amount of Physical movement and are quiet because the paper is not struck by the printing device.
8. The paper is heated to melt the ink particles to form characters.
9. Both of them are non-impact printers and involve heating to form characters.
10. Slowest : thermal printer.
Fastest : electrostatic printer.
11. The printing that creates characters out of individual dots.
12. Spins.
13. They are flexible in the variety of type and graphic effects

Exercise 2

1. False. A printed output of data processing is still considered important.
2. False. Page printers are good for business correspondence because they have good quality of print.
3. True.
4. False. Non-impact printers use different methods of printing.

5. True.
6. False. Thermal printers and electrostatic printers operate in a similar manner, but in thermal printers the characters are burnt onto the paper and in the electrostatic inkjet is sprayed to form characters.
7. True.
8. False. Multiple part reports are the multiple copies of a document printed at once.

Exercise 3

	Impact printers	Non-impact Printers
1. speed	slow	Fast
2. Noise produced	Noisy	Quiet
3. Printed output	Character/line	Page
4. No. copies printed out once	Multiple	Single
5. Name of the printers	Character printers a) Dot-matrix b) Letter quality	1. Thermal printers 2. Ink jet printers 3. Electrostatic printers.

Exercise 4

1. Cathode Ray Tube,
2. a hammer,
3. a set of hammers,
4. quality,
5. The Xerox 9700 electronic printing system,
6. Characters,
7. Thermal printers.
8. a print head,
9. dots,
10. character.

Exercise 5

1. images/versions,
2. essential,
3. sufficiently,
4. accomplished,
5. squirts,
6. immediately.

Exercise 6

1. Vendors,
2. sacrifice,
3. variety,
4. multiple,
5. flexibility.

Exercise 7

1. f,
2. c,
3. a,
4. g,
5. d.

Exercise 8

1. now (ii),
2. long ago (i),
3. already (i),
4. Today (ii),
5. When (ii),
6. by the time (iii),
7. ago (i),
8. Before (i),
9. soon (iii),
10. until (i).