UNIT 4

Peripherals

STARTER **1** Identify the peripherals in this computer application. Divide them into input and output devices.

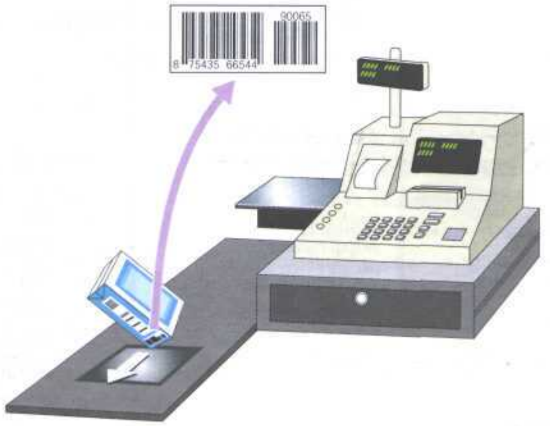

Fig 1
EPOS till

2 Link the inputs on the left and the outputs on the right with the appropriate peripherals in the centre.

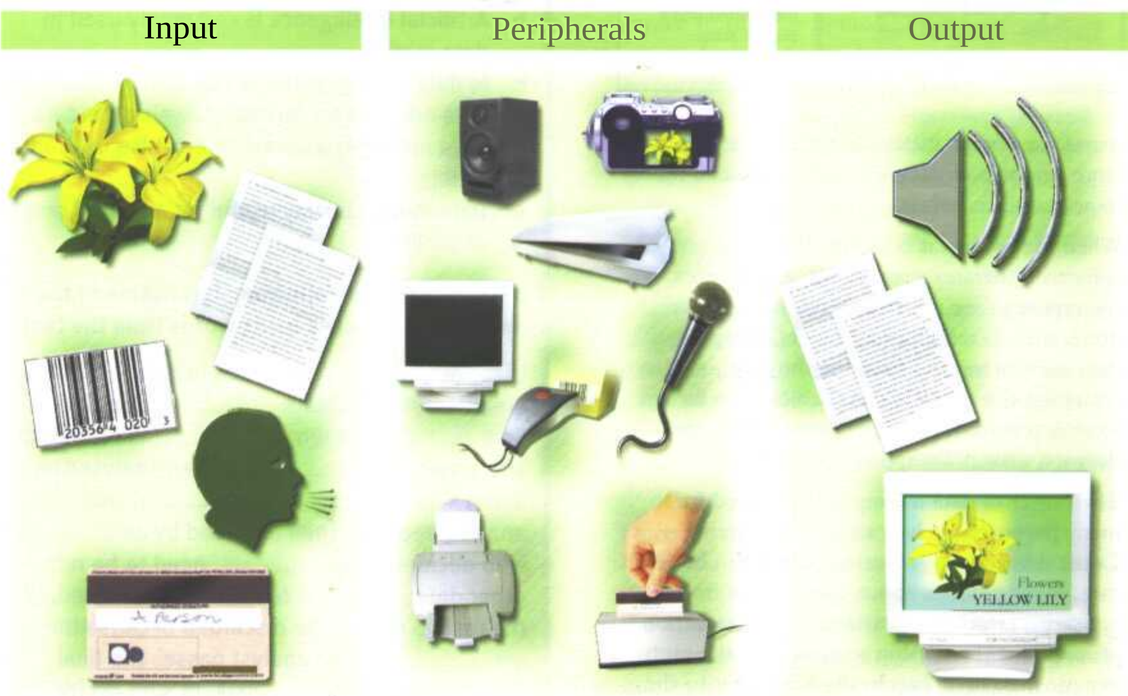

Fig 2
Input and output devices

LISTENING **3** Study this description and answer these questions.

1 How do digital cameras differ from conventional cameras?
2 How do they work?
3 What are their advantages and disadvantages compared to conventional cameras?

HOW a digital camera works

Digital cameras store images on memory cards so pictures can be transferred easily to a computer.

A lens focuses the image on to a CCD unit or Charge-Coupled Device where the film would normally be.

So you can aim the camera accurately, there is an optical viewfinder.

So you can play back the images and decide which to keep and which to re-shoot, the image is passed to a small LCD screen on the back of the camera.

Fig 3
Canon PowerShot, G1

4 Listen to Part 1 of this discussion between A and B and complete this table of similarities and differences between conventional and digital cameras. Tick (✓) or cross (✗) the boxes.

Feature	Digital	Conventional
lens		
viewfinder		
requires chemical processing		
film		
transfer images directly to PC		
can delete unsatisfactory images		

5 Listen to Part 2 of the dialogue to list the disadvantages of digital cameras.

6 Now listen to both parts again to find the answers to these questions:

1 What does a CCD contain?
2 What is a pixel?
3 How can you view pictures before they are downloaded to a PC?
4 When you have downloaded the images, what can you do with them?
5 Is special software required?
6 Why is the resolution important?
7 What does the capacity of a digital camera depend on?
8 Why is it worth getting a rechargeable battery?

LANGUAGE **WORK** Revision: Comparison and contrast

Study this comparison of digital and conventional cameras.

FEATURE	DIGITAL	CONVENTIONAL
lens	✓	✓
viewfinder	✓	✓
requires chemical processing	✗	✓
film	✗	✓
transfer images directly to PC	✓	✗
can delete unsatisfactory images	✓	✗

Note how we can compare and contrast these types of cameras.

Comparing features which are similar:

1 *Both* cameras have lenses.
2 *Like* the conventional camera, the digital camera has a viewfinder.

Contrasting features which are different:

3 The conventional camera requires chemical processing *whereas* the digital camera does not.
4 The conventional camera uses film *unlike* the digital camera.
5 With a digital camera you can transfer images directly to a PC *but* with a conventional camera you need to use a scanner.
6 With digital cameras you can delete unsatisfactory images; *however* with conventional cameras you cannot.

7 Study this data about storage devices. Then complete the blanks in the following sentences comparing and contrasting the different types.

Device	Read/Write	Speed	Media Capacity	Media Removable	Cost
Floppy disk	Read and write	Slow	Very low	Yes	Low
Fixed hard disk	Read and write	Fast	Very high	No	Medium
Removable hard disk	Read and write	Medium to fast	High	Yes	Medium
CD-ROM	Read only	Medium	High	Yes	Low
CD-R	Recordable	Slow	High	Yes	Medium
CD-RW	Read and write	Medium	High	Yes	Medium
CD-MO	Read and write	Medium	High	Yes	High
DVD-ROM	Read only	Medium	High	Yes	Medium
DVD-RAM	Read and write	Medium	Very high	Yes	High
Magnetic Tape	Read and write	Very slow	High	Yes	Medium

1 You can write to hard disks .... optical disks.

2 Floppy disks have a .... capacity .... other devices.

3 CD-ROMs and floppy disks are .... low priced.

4 DVD-RAM has a .... capacity .... other optical disks.

5 CD-ROMs cannot be re-recorded .... some other optical disks can be.

6 .... hard disks, you can read from and write to CD-MO drives.

7 .... CD-ROMs, CD-Rs are recordable.

8 Magnetic tape is much .... other devices.

9 .... DVD-RAM and fixed hard disks have very high media capacity.

10 Floppy disks are cheap .... DVD-RAM is expensive.

8 Write your own comparison of printer types.

Type	Speed	Text Quality	Graphics Capability	Colour Quality	Cost
Dot-matrix	Slow to medium	Fair to good	Limited	Fair if you add a colour option	Low
Ink-Jet	Medium to fast	Good to excellent	Good to excellent	Good to Very Good	Low to high
Laser	Medium to very fast	Excellent	Good to excellent	Good in colour laser printers	Medium to high
Thermal Transfer	Medium to fast	Excellent	Good to excellent	Good to superior	Medium to high
Solid Ink	Medium to fast	Excellent	Good to excellent	Good	Medium to high
Electro-static	Slow to fast	Fair to good	Fair to good	Fair to good	Low to high

PROBLEM-SOLVING 9 Study this list of needs. Which type of peripheral would you advise in each case?

1. inputting printed graphics
2. building cars
3. controlling the screen cursor in a fast action game
4. making choices on a screen in a public information terminal
5. recording moving images
6. recording a book loan in a library
7. printing very high quality text and graphics
8. creating drawings
9. printing building plan drawings
10. recording sound
11. listening to music without disturbing others
12. storing programs and data
13. inputting a lot of text
14. backing up large quantities of data

WRITING **10** Describe the EPOS **till** shown in Fig 1. Explain the function of each peripheral using the structures studied in Unit 2.

11 Check these websites for the latest digital cameras. Compare the newest cameras with the one described in Fig 3. You will find its specifications on www.canon.com.

MINOLTA

www.minolta.com

FUJIFILM

www.fujifilm.com

PENTAX

www.pentax.com

OLYMPUS

www.olympus.com

SAMSUNG

www.samsungcamera.com

RICOH
Image Communication

www.ricohcamera.com

SONY

www.sony.com

Canon
Imaging across networks

www.canon.com

SPECIALIST READING

A **Find** the answers **to these questions in the following text.**

1. What is Currie Munce's main aim?
2. How quickly did the possible areal density of hard disks increase in the 1990s?
3. How long does Munce think magnetic recording technology will continue to make rapid advances in capacity?
4. What problem does he predict for magnetic storage?
5. What is the predicted limit for discrete bit magnetic storage capacity?
6. What storage technologies might replace current magnetic systems?
7. What is the advantage of holographic storage being three-dimensional?
8. What improvements are predicted due to the fast access rates and transfer times of holographic storage?
9. What is predicted to be the most important high capacity removable storage media in the next 10 years?
10. What method of software distribution is likely to replace optical disks?

Ready for the Bazillion-Byte Drive?

Thinking about writing your memoirs - putting your life story down on paper for all eternity? Why not skip the repetitive strain injury and just capture your whole life on full-motion video, putting it all in a device the size of a sugar cube? It might not be as far off as you think.

Currie Munce, director of IBM's Advanced HDD Technology Storage Systems Division, has one avowed goal: Build bigger storage. Recently Munce and his fellow Ph.Ds restored Big Blue's lead in the disk space race with a new world record for areal (bit) density: 35.3 gigabits per square inch - roughly three times as dense as any drive shipping at press time.

During the 1990s, areal density doubled every 18 months, keeping pace with the transistor density gains predicted by Moore's Law. But increasingly daunting technical challenges face those who would push the storage envelope further. 'I think magnetic recording technology has another good 5 to 10 years,' says Munce. 'After that, we'll see substantial difficulties with further advances at the pace people are accustomed to.'

From here on, a phenomenon called superparamagnetism threatens to make densely-packed bits unstable. Provided that new developments continue to thwart superparamagnetic corruption, scientists speculate that the theoretical limit for discrete bit recording is 10 terabits per square inch (1 terabit = 1,000 gigabits).

Approaching this limit will require new technologies. Two possible contenders are atomic force microscopy (AFM) and holographic storage.

AFM would use a spinning plastic disk, perhaps inside a wristwatch, and a tiny, 10-micron cantilever with a 40-angstrom tip (an angstrom represents the approximate radius of an atom) to write data. In theory, AFM will allow densities of 300 to 400 gigabits per square inch.

While AFM is still in the lab, holographic storage is closer to reality. According to Rusty Rosenberger, optical program manager for Imation, 'We are targeting a 5 $^{1}/_{4}$ -inch disk with 125GB of storage and a 40MB-per-second transfer rate.' Future iterations of holographic systems should improve substantially.

The three-dimensional nature of holography makes it an appealing storage medium because 'pages' of data can be superimposed on a single volume - imagine transferring a whole page of text at once as opposed to reading each letter in sequence. Hans Coufal, manager of IBM's New Directions in Science and Technology Research division, predicts that the fast access rates and transfer times of holographic storage will lead to improved network searches, video on demand, high-end servers, enterprise computing, and supercomputing.

Meanwhile, also-ran technologies are thriving. Tape, first used for data storage in 1951 with the Univac I, has been revitalized by the corporate hunger for affordable archiving solutions. In the consumer arena, says Dataquest analyst Mary Craig, recordable CD-ROMs and DVDs will remain the dominant high-capacity removable storage media for the next decade. Despite their failure to match the areal density gains of hard disks, optical disks are cheap to produce, making them ideal for software distribution (until a mature digital rights management system facilitates online delivery). Finally, solid state options such as flash cards can't yet match the pricing of hard disks at high capacities.

Further out, scientists salivate over the prospect of data manipulation and storage on an atomic level. Because consumer demand for capacity is lagging behind what technology can deliver, bringing new storage options to the masses will depend on seeing the need for more space.

[Adapted from 'Ready for the Bazillion-Byte Drive?' by Thomas Claburn, PC Magazine, March 2000]

B Re-read the text to find the answers to these questions.

1 Match the terms in Table A with the statements in Table B.

Table A	
a	Big Blue
b	Areal density
c	Moore's Law
d	Superparamagnetism
e	Terabit
f	AFM
g	Angstrom

Table B	
i	Atomic force microscopy
ii	The approximate radius of an atom
iii	IBM
iv	The data capacity of a storage device measured in bits per square inch
v	Prediction that the number of transistors that can be incorporated into a processor chip will double every 18 months
vi	A phenomenon that threatens to make densely packed bits unstable in magnetic storage devices
vii	One thousand gigabits

2 Mark the following statements as True or False:

a The development of AFM is more advanced than holographic storage.

b The predicted maximum storage density of AFM is 400 gigabits per square inch.

c Holography works in 3D.

d Univac I was the first computer to use tape storage devices.

e Users want higher capacity storage devices than technology can provide.