

### **Input-Output Environment**

Data and instructions must enter the data processing system, and information must leave it. These operations are performed by input and output (I/O) units that link the computer to its external environment.

The I/O environment may be human-related or human-independent. A remote banking terminal is an example of a human-related input environment, and printer is an example of a device that produces output in a human-readable format. An example of a human-independent input environment is a device that measures traffic flow. A reel of magnetic tape upon which the collected data are stored in binary format is an example of a human-independent output.

*Input-Output Interfaces.* Data enter input units in forms that depend upon the particular device used. For example, data are entered from a keyboard in a manner similar to typing, and this differs from the way that data are entered by a bar-code scanner. However, regardless of the forms in which they receive their inputs, all input devices must provide a computer with data that are transformed into the binary codes that the primary memory of the computer is designed to accept. This transformation is accomplished by units called I/O interfaces. Input interfaces are designed to match the unique physical or electrical characteristics of input devices to the requirements of the computer system. Similarly, when output is available, output interfaces must be designed to reverse the process and to adapt the output to the external environment. These I/O interfaces are also called channels or input-output processors\*(IOP).

The major differences between devices are the media that they use and the speed with which they are able to transfer data to or from primary storage.

*Input-Output Device Speed.* Input-output devices can be classified as high-speed, medium-speed, and low-speed. The devices are grouped according to their speed. It should be noted that the high-speed devices are entirely electronic in their operation or magnetic media that can be moved at high speed. Those highspeed devices are both input and output devices and are used as secondary storage. The low-speed devices are those with complex mechanical motion or operate at the speed of a human operator. The medium-speed devices are those that fall between — they tend to have mechanical moving parts which are more complex than the high-speed devices but not as complex as the low-speed.

*High-speed devices:* magnetic disk; magnetic tape.

*Medium-speed devices:* card readers; line printers; page printers; computer output microfilms; magnetic diskette; optical character readers; optical mark readers; visual displays.

*Low-speed devices:* bar-code readers; character printers; digitizers; keyboard input devices; plotters; voice recognition and response units.

**Exercise 1.** Find in the text the English equivalents.

*Среда, устройств ввода-вывода; система обработки информации; внешняя среда; связан с человеком; независим от человека; удаленный банковский терминал; измерять поток данных; бобина с магнитной лентой; хранить собранную информацию; двоичный формат; интерфейс ввода-вывода; вводить с клавиатуры; устройство считывания штрих-кода; не смотря на; преобразовать в двоичный код; сопоставлять параметры; подобным образом; интерфейс вывода; изменить процесс в обратном направлении; настроить устройство ввода-вывода к внешней среде; главное отличие; основная память; вторичная память; низкоскоростные устройства; в соответствии.*

**Exercise 2.** Translate the following word combinations.

*Environment:* application environment; communication environment; execution environment; external environment; hardware environment; interface environment; management environment; multimedia environment; network environment; processing environment; security environment; software environment; user environment.

*Interface:* channel interface; common interface; data interface; database interface; display interface; external interface; flexible interface; floppy-disk interface; general-purpose interface; hardware interface; low-level interface.

*Scanner:* bar code scanner; black-and-white scanner; color scanner; desktop scanner; hand scanner; laser scanner; manual scanner; optical scanner; visual scanner.

*Terminal:* batch terminal; desktop terminal; display terminal; printer terminal; remote terminal; security terminal; logical terminal; text terminal.

**Exercise 3.** Answer the questions on the text.

1. What is the purpose of input and output devices?
2. What types of input-output devices do you know?
3. Why are data transformed into a binary code while entering the input device?
4. Give an example of a human independent output.
5. What is an I/O interface?
6. What are the major differences between the various I/O devices?
7. What types of I/O devices tend to be high-speed devices?
8. What types of devices tend to be low- speed devices?

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