**Chapter 6**

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| **Num** | **Multiple Choice Answers** | **Matching Answers** |
| 1 | B | D |
| 2 | A | F |
| 3 | C | G |
| 4 | A | A |
| 5 | B | I |
| 6 | B | J |
| 7 | C | B |
| 8 | D | C |
| 9 | A | H |
| 10 | C | E |

**Open Ended Questions:**

**3、Define output and output devices.**Output is processed data or information. Output typically takes the form of text, graphics, photos, audio, and/or video.

* Output devices are hardware used to provide or to create output. They translate information that has been processed by the system unit into a form that people can understand. There are a wide range of output devices. The most widely used are monitors, printers, and audio-output devices.
* 输出：数字化数据转换为人类能够理解的信息，如文字、图片、音频和视频等。
* 输出设备：用于将计算机系统处理的数字化数据转换为人类可理解信息的物理设备，如显示器、打印机、音箱和耳机等。

**4、Describe the features and different types of monitors and printers.**

Monitors are also known as display screens. They present visual images of text and graphics. The output is often referred to as soft copy. Monitors vary in size, shape, and cost. The most important characteristic is clarity which is a function of the following features:

* **Resolution –** one of the most important features of a monitor. Images for formed on a monitor by a series of dots or pixels. Resolution is expressed as a grid of those dots or pixels.
* **Dot (pixel) pitch –** is the distance between each pixel. Most newer desktop monitors have a dot pitch below 0.30 mm (30/100th of a millimeter). Cell phones, which are designed to be viewed more closely than desktop monitors, can have dot pitches below 0.05 mm (5/1000th of a millimeter). The lower the dot pitch (the shorter the distance between pixels), the clearer the images produced.
* **Contrast ratios –** indicate a monitor’s ability to display colors. It compares the light intensity of the brightest white to the darkest black. The higher the ratio, the better the monitor.
* **Active display area (size)** – is measured by the diagonal length of a monitor’s viewing area. Common sizes are 15, 17, 19, 21, and 24 inches. **Aspect ratio** – is determined by the width of a monitor divided by its height. Common aspect ratios for monitors are 4:3 (standard, like traditional television pictures) and 16:10 (wide screen)
* Different types of monitors include:
* **Flat-panel monitors** – are the most widely used type of monitor today. They are thin, more portable, and require less power to operate.
  + Most of today's flat-panel monitors are **LCD** (**liquid crystal display**). One characteristic of LCD technology is that the monitors are back-lit meaning that a common source of light is dispersed over all the pixels on the screen. **LED**, light-emitting diode, advanced technology, slimmer, better picture quality and environmentally friendly, and **OLED** (organic light-emitting diode) replace the LED monitor’s back lighting technology with a thin layer or organic compound that produces light.
* **E-book Readers** – are dedicated mobile devices for storing and displaying e-books and other electronic media including electronic newspapers and magazines.
* **Other** **Monitors** – These monitors are used for more specialized applications, such as making presentations and watching television. Some of these specialized devices are digital whiteboards, flexible screens, and digital projectors.
* **Printers**: translate information that has been processed by the system unit and present the information on paper.

**Features** – Basic distinguishing features include:

* + **Resolution -** the clarity of images produced and measured in dpi (dots per inch). The higher the dpi, the better the quality of images produced.
  + **Color capability –** provided by most printers today. Users typically have the option to print either with just black ink or with color.
  + **Speed** - measured in the number of pages printed per minute.
  + **Memory** – printer memory is used to store printing instructions and documents waiting to be printed. The more memory in a printer, the faster it will be able to create large documents.
  + **Duplex printing** – allows automatic printing on both sides of a sheet of paper.
  + **Connectivity** – the ability of the printer to connect to a network, eliminating the need for a computer to be attached by a cable to the printer and making it easier for multiple computers to share one printer. Many printers include the ability to connect to a network over Wi-Fi or Ethernet.
  + **Ink-jet printers** 
    - Spray ink at high speed onto the surface of paper
    - Most widely used printers
    - Available in black and white or color
    - Relatively inexpensive
    - Most costly aspect is replacing ink cartridges
  + **Laser printers**
    - Use a laser light beam to produce images with excellent letter and graphics quality.
    - Available in black and white or color
    - More expensive than inkjets
    - Faster than inkjets and are used in applications requiring high-quality output
    - Two categories
      * Personal – used by single users
      * Shared – used by a group of users, typically support color, and are more expensive
  + **3D printers**,also known as additive manufacturing, create three-dimensional shapes by adding very thin layer after layer of material until the final shape is fully formed. There are a variety of different processes and materials that can be used to create each layer. 3D printers are controlled by data, usually a file, describing the shape of the object to be created.
  + **Other Printers**
    - **Cloud printers** are printers connected to the Internet that provide printing services to others on the Internet.
    - **Thermal printers** use heat elements to produce images on heat-sensitive paper.
    - **Plotters** are special-purpose printers for producing maps, images, and architectural and engineering drawings.
* 监视器又称显示器，将输出呈现在屏幕上，是最常见的输出设备之一，所产生的输出被称为软拷贝。
* 显示器的主要性能是清晰度，由以下指标确定：

分辨率：屏幕图像的精密度，指显示器像素数量，用dpi（dots per inch,每英寸点数）度量，dpi值越高清晰度越高。

点距：像素点间的距离，距离越小清晰度越高。

对比度：显示器显示颜色的能力。屏幕上同一点最亮时（白色）与最暗时（黑色）的亮度的比值，高的对比度意味着相对较高的亮度和呈现颜色的艳丽程度。

显示区尺寸：显示器显示区的大小。

纵横比：显示器宽度与高度的比率。

* 显示器的种类包括：

平板式显示器：分为液晶显示器（LCD）、发光二极管显示器（LED）和有机发光二极管显示器（OLED）

电子书阅读器：用于存储和阅读电子版图书、报纸等。

其它显示器：用于其它特殊用途的显示器，如电子白板、柔性屏幕和数字投影仪。

* 打印机将输出呈现在纸上，所产生的输出被称为硬拷贝，是最常见的输出设备之一。
* 打印机的主要性能指标包括：

分辨率：用dpi（dots per inch,每英寸点数）度量，dpi值越高打印效果越清晰。

单色/彩色：打印机分为单色打印机和彩色打印机，单色打印机输出黑白两色，彩色打印机可输出彩色效果图。

打印速度：单位时间打印的页数。

打印内存：存放打印指令和文档的存储区。

单/双页打印：打印机是否具有自动双面打印的功能。

联网能力：打印机是否支持联网共享。

* 打印机分类：喷墨式打印机、激光打印机、3D打印机、热感式打印机、绘图仪等。