

## CATEGORIES OF COMPUTERS

Industry experts typically classify computers in seven categories:

- i. Personal computers (desktop)
- ii. mobile computers and mobile devices
- iii. game consoles
- iv. servers
- v. mainframes
- vi. supercomputers, and
- vii. embedded computers.

A computer's size, speed, processing power, and price determine the category it best fits. Due to rapidly changing technology, however, the distinction among categories is not always clear-cut. This trend of computers and devices with technologies that overlap, called convergence, leads to computer manufacturers continually releasing newer models that include similar functionality and features. For example, newer cell phones often include media player, camera, and Web browsing capabilities. As devices converge, users need fewer devices for the functionality that they require. When consumers replace outdated computers and devices, they should dispose of them properly.

### Categories of Computers

Category	Physical Size	Number of Simultaneously Connected Users	General Price Range
<b>Personal computers (desktop)</b>	Fits on a desk	Usually one (can be more if networked)	Several hundred to several thousand dollars
<b>Mobile computers and mobile devices</b>	Fits on your lap or in your hand	Usually one	Less than a hundred dollars to several thousand dollars
<b>Game consoles</b>	Small box or handheld device	One to several	Several hundred dollars or less
<b>Servers</b>	Small cabinet	Two to thousands	Several hundred to a million dollars
<b>Mainframes</b>	Partial room to a full room of equipment	Hundreds to thousands	\$300,000 to several million dollars
<b>Supercomputers</b>	Full room of equipment	Hundreds to thousands	\$500,000 to several billion dollars
<b>Embedded computers</b>	Miniature	Usually one	Embedded in the price of the product

### Personal Computers

A personal computer is a computer that can perform all of its input, processing, output, and storage activities by itself. A personal computer contains a processor, memory, and one or more input, output, and storage devices. Personal computers also often contain a communications device. Two popular architectures of personal computers are the PC and the Apple. The term, PC-compatible, refers to any personal computer based on the original IBM personal computer design. Companies such as Dell, HP, and Toshiba sell PC-compatible computers. PC and PC-compatible computers usually use a Windows

operating system. Apple computers usually use a Macintosh operating system (Mac OS). Two types of personal computers are

- i. desktop computers, and
- ii. notebook computers

**Desktop Computers:** A desktop computer is designed so that the system unit, input devices, output devices, and any other devices fit entirely on or under a desk or table. In many models, the system unit is a tall and narrow tower, which can sit on the floor vertically — if desktop space is limited.

Some desktop computers function as a server on a network. Others, such as a gaming desktop computer and home theatre PC, target a specific audience. The gaming desktop computer offers high-quality audio, video, and graphics with optimal performance for sophisticated single-user and networked or Internet multiplayer games. A home theatre PC (HTPC) combines the features of a high-definition video/audio entertainment system with a desktop computer that is designed to be connected to a television and includes a Blu-ray Disc, digital video recorder, and digital cable television connectivity. These high-end computers cost more than the basic desktop computer.

Another expensive, powerful desktop computer is the workstation, which is geared for work that requires intense calculations and graphics capabilities. An architect uses a workstation to design buildings and homes. A graphic artist uses a workstation to create computer-animated special effects for full-length motion pictures and video games.

**Notebook Computers:** A notebook computer, also called a laptop computer, is a portable, personal computer often designed to fit on your lap. Notebook computers are thin and lightweight, yet they can be as powerful as the average desktop computer. A netbook, which is a type of notebook computer, is smaller, lighter, and often not as powerful as a traditional notebook computer. Most netbooks cost less than traditional notebook computers, usually only a few hundred dollars. An ultra-thin is another type of notebook computer that is lightweight and usually less than one-inch thick. Some notebook computers have touch screens, allowing you to interact with the device by touching the screen, usually with the tip of a finger.

On a typical notebook computer, the keyboard is on top of the system unit, and the monitor attaches to the system unit with hinges. These computers weigh on average from 2.5 to more than 10 pounds (depending on configuration), which allows users to transport the computers from place to place. This is the reason why even though the Notebook is a type of Personal Computer; it is also a mobile computer. Most notebook computers can operate on batteries or a power supply or both.

### **Mobile Computers and Mobile Devices**

A mobile computer is a personal computer you can carry from place to place. Similarly, a mobile device is a computing device small enough to hold in your hand. The most popular type of mobile computer is the notebook computer, which has been discussed above.

**Tablet PCs:** Resembling a letter-sized slate, the Tablet PC, or tablet computer, is a special type of notebook computer that you can interact with by touching the screen with your finger or a digital pen. A digital pen looks like a small ink pen but uses pressure instead of ink. Users write or draw on a Tablet PC by pressing a finger or digital pen on the screen, and issue instructions by tapping on the screen. One design of Tablet PC, called a convertible tablet, has an attached keyboard. Another design, which does

not include a keyboard, is called a slate tablet (for example iPad) and provides other means for typing. Some Tablet PCs also support voice input so that users can speak into the computer.

Tablet PCs are useful especially for taking notes in lectures, at meetings, conferences, and other forums where the standard notebook computer is not practical.

### **Mobile Devices**

Mobile devices, which are small enough to carry in a pocket, usually do not have disk drives. Instead, these devices store programs and data permanently on special memory inside the system unit or on small storage media such as memory cards. You often can connect a mobile device to a personal computer to exchange information between the computer and the mobile device.

Some mobile devices are Internet-enabled, meaning they can connect to the Internet wirelessly. With an Internet-enabled device, users can chat, send e-mail and instant messages, and access the Web. Because of their reduced size, the screens on mobile devices are small, but usually are in colour. Popular types of mobile devices are smart phones and PDAs, e-book readers, handheld computers, portable media players, and digital cameras.

**Smart Phones and PDAs:** Offering the convenience of one-handed operation, a smart phone is an Internet-enabled phone that usually also provides personal information management functions such as a calendar, an appointment book, an address book, a calculator, and a notepad. In addition to basic phone capabilities, a smart phone allows you to send and receive e-mail messages and access the Web — usually for an additional fee. Some smart phones communicate wirelessly with other devices or computers. Many also function as a portable media player and include built-in digital cameras so that you can share photos or videos with others as soon as you capture the image. Many smart phones also offer a variety of application software such as word processing, spreadsheet, and games, and the capability of conducting live video conferences.

Many smart phones have keypads that contain both numbers and letters so that you can use the same keypad to dial phone numbers and enter messages. Others have a built-in mini keyboard on the front of the phone or a keyboard that slides in and out from behind the phone. Some have touch screens, where you press objects on the screen to make selections and enter text through an on-screen keyboard. Others include a stylus, which is similar to a digital pen but smaller and has less functionality.

Instead of calling someone's smart phone or cell phone, users often send messages to others by pressing buttons on their phone's keypad, keys on the mini keyboard, or images on an onscreen keyboard. Types of messages users send with smart phones include text messages, instant messages, picture messages, and video messages.

- A text message is a short note, typically fewer than 300 characters, sent to or from a smart phone or other mobile device.
- An instant message is a real-time Internet communication, where you exchange messages with other connected users.
- A picture message is a photo or other image, sometimes along with sound and text, sent to or from a smart phone or other mobile device. A phone that can send picture messages often is called a camera phone.

- A video message is a short video clip, usually about 30 seconds, sent to or from a smart phone or other mobile device. A phone that can send video messages often is called a video phone.

A **PDA** (personal digital assistant), which often looks like a smart phone, provides personal information management functions such as a calendar, an appointment book, an address book, a calculator, and a notepad. A PDA differs from a smart phone in that it usually does not provide phone capabilities and may not be Internet-enabled, support voice input, have a built-in camera, or function as a portable media player.

As smart phones and PDAs continue a trend of convergence, it is becoming increasingly difficult to differentiate between the two devices. This has led some manufacturers to refer to PDAs and smart phones simply as *handhelds*.

**E-Book Readers:** An e-book reader (short for electronic book reader), or e-reader, is a handheld device that is used primarily for reading e-books. An e-book, or digital book, is an electronic version of a printed book, readable on computers and other digital devices. In addition to books, users typically can purchase and read other forms of digital media such as newspapers and magazines. Most e-book readers have a touch screen and are Internet-enabled. These devices usually are smaller than tablet computers but larger than smart phones.

**Handheld Computers:** A handheld computer, sometimes referred to as an Ultra-Mobile PC (UMPC), is a computer small enough to fit in one hand. Many handheld computers communicate wirelessly with other devices or computers and also include a digital pen or stylus for input. Some handheld computers have miniature or specialized keyboards. Many handheld computers are industry-specific and serve the needs of mobile employees, such as meter readers and parcel delivery people, whose jobs require them to move from place to place.

**Portable Media Players:** A portable media player is a mobile device on which you can store, organize, and play digital media. For example, you can listen to music; watch videos, movies, and television shows; and view photos on the device's screen. With most, you download the digital media from a computer to the portable media player or to media that you insert in the device. An example is the iPod.

Some portable media players are Internet-enabled so that you can access Web sites and send e-mail messages directly from the device. Many offer personal information management functions such as a calendar and address book, and include a variety of games and other application software. Portable media players usually include a set of earbuds, which are small speakers that rest inside each ear canal. Some portable media players have a touch screen, while others have a touch-sensitive pad that you operate with a thumb or finger, to navigate through digital media, adjust volume, and customize settings.

**Digital Cameras:** A digital camera is a device that allows users to take pictures and store the photographed images digitally, instead of on traditional film. While many digital cameras look like a traditional camera, some are built into smart phones and other mobile devices.

Although digital cameras usually have some amount of internal storage to hold images, most users store images on small storage media such as memory cards. Digital cameras typically allow users to review,

and sometimes modify, images while they are in the camera. Some digital cameras connect to or communicate wirelessly with a computer or printer, allowing users to print or view images directly from the printer. Some memory cards can connect to a network wirelessly, so that you can transfer photos directly from the memory card in the camera to the Internet without requiring a computer. Often users prefer to download images from the digital camera to the computer. Or, you can remove the storage media such as a memory card from the digital camera and insert it in a card reader in or attached to the computer.

### **Game Consoles**

A game console is a mobile computing device designed for single-player or multiplayer video games. Standard game consoles use a handheld controller(s) as an input device(s); a television screen as an output device; and hard disks, optical discs, and/or memory cards for storage. Weighing on average between two and nine pounds, the compact size of game consoles makes them easy to use at home, in the car, in a hotel, or any location that has an electrical outlet. Three popular models are Microsoft's Xbox 360, Nintendo's Wii (pronounced wee), and Sony's PlayStation 3.

A handheld game console is small enough to fit in one hand, making it more portable than the standard game console. With the handheld game console, the controls, screen, and speakers are built into the device. Because of their reduced size, the screens are small — three to four inches. Some models use cartridges to store games; others use a memory card or a miniature optical disc. Many handheld game consoles can communicate wirelessly with other similar consoles for multiplayer gaming. Two popular models are Nintendo DS Lite and Sony's PlayStation Portable (PSP). In addition to gaming, many game console models allow users to listen to music, watch movies, keep fit, and connect to the Internet. Game consoles can cost from a couple hundred dollars to more than \$500.

### **Servers**

A server controls access to the hardware, software, and other resources on a network and provides a centralized storage area for programs, data, and information. Servers can support from two to several thousand connected computers at the same time. In many cases, one server accesses data, information, and programs on another server. In other cases, people use personal computers or terminals to access data, information, and programs on a server. A terminal is a device with a monitor, keyboard, and memory.

### **Mainframes**

A mainframe is a large, expensive, powerful computer that can handle hundreds or thousands of connected users simultaneously. Mainframes store tremendous amounts of data, instructions, and information. Most major corporations use mainframes for business activities. With mainframes, enterprises are able to bill millions of customers, prepare payroll for thousands of employees, and manage thousands of items in inventory. One study reported that mainframes process more than 83 per cent of transactions around the world. Mainframes also can act as servers in a network environment. Servers and other mainframes can access data and information from a mainframe. People also can access programs on the mainframe using terminals or personal computers.

### **Supercomputers**

A supercomputer is the fastest, most powerful computer — and the most expensive. The fastest supercomputers are capable of processing more than one quadrillion instructions in a single second. With weights that exceed 100 tons, these computers can store more than 20,000 times the data and

information of an average desktop computer. Applications requiring complex, sophisticated mathematical calculations use supercomputers. Large-scale simulations and applications in medicine, aerospace, automotive design, online banking, weather forecasting, nuclear energy research, and petroleum exploration use a supercomputer.

### **Embedded Computers**

An embedded computer is a special-purpose computer that functions as a component in a larger product. Embedded computers are everywhere — at home, in your car, and at work. The following list identifies a variety of everyday products that contain embedded computers.

- Consumer Electronics: mobile and digital telephones, digital televisions, cameras, video recorders, DVD players and recorders, answering machines
- Home Automation Devices: thermostats, sprinkling systems, security monitoring systems, appliances, lights
- Automobiles: antilock brakes, engine control modules, airbag controller, cruise control
- Process Controllers and Robotics: remote monitoring systems, power monitors, machine controllers, medical devices
- Computer Devices and Office Machines: keyboards, printers, fax and copy machines

Because embedded computers are components in larger products, they usually are small and have limited hardware. These computers perform various functions, depending on the requirements of the product in which they reside. Embedded computers in printers, for example, monitor the amount of paper in the tray, check the ink or toner level, signal if a paper jam has occurred, and so on.