CHAPTER 1

# INTRODUCING PERSONAL COMPUTERS

INFOCUS

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Since the first serious business personal computer was released by IBM in August 1981 they have become a standard feature in most work places, schools, and even homes.

The computer landscape has changed dramatically since those early days. Personal computers now come in many shapes, sizes, and types, but they all have some aspects in common. For example, they all comprise of hardware items and are operated using software.

This session explores personal computers and the technology behind them.

**In this session you will:**

- ✓ gain an overview of some of the more basic concepts of computers
- ✓ gain an overview of the differences between hardware and software
- ✓ gain an overview of the history of personal computers
- ✓ gain an overview of the different types of personal computers
- ✓ gain an overview of the main components of a personal computer
- ✓ gain an understanding of a range of input devices
- ✓ gain an understanding of output devices
- ✓ gain an understanding of how external devices are connected
- ✓ gain an understanding of communications technology in the office.

# WHAT IS A COMPUTER?

A ***computer*** is nothing more than a box of wires and electronic components. These components interact together so that by using special suites of instructions, known as ***programs*** or ***applications***, the computer allows you to type letters, draw pictures and communicate with other people, enhance your family photos, and much, much more.

## What Is A Computer?

In simple terms a modern computer is an electronic device that allows you to ***process*** and ***store*** data.

Data is entered into a computer using a variety of ***input devices*** – the keyboard, a scanner, a bar code reader, a writing tablet. The most common input device is still the keyboard.

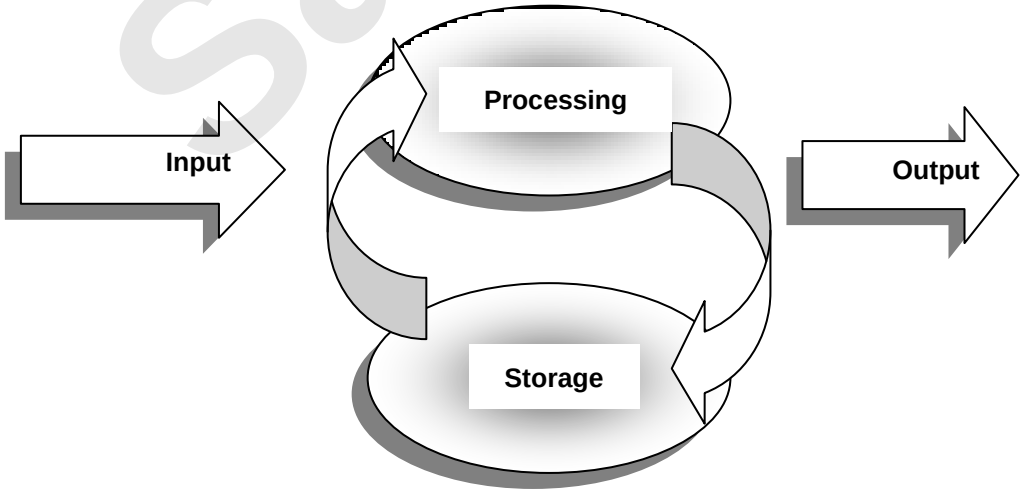
Once the data has been entered into the computer it can be ***processed*** to provide relevant, timely, and quality information.

The information can be made available on a variety of ***output devices*** – the screen or the printer being the most common.

In this sense a computer is similar to a hand-held calculator. With the calculator you enter numbers using the keyboard and perform a mathematical operation. The result of the operation is displayed on the calculator's screen.

A computer differs from a calculator, however, in that it can process words as well as numbers. A computer also differs from a calculator because it allows you to ***store*** the raw data, the processed information, and even the processing instructions, for future use.

As soon as you switch a calculator off all of the data that you have entered and the information that it has processed is lost. A computer allows you to ***save*** the data and the processes so that they can be used again later.

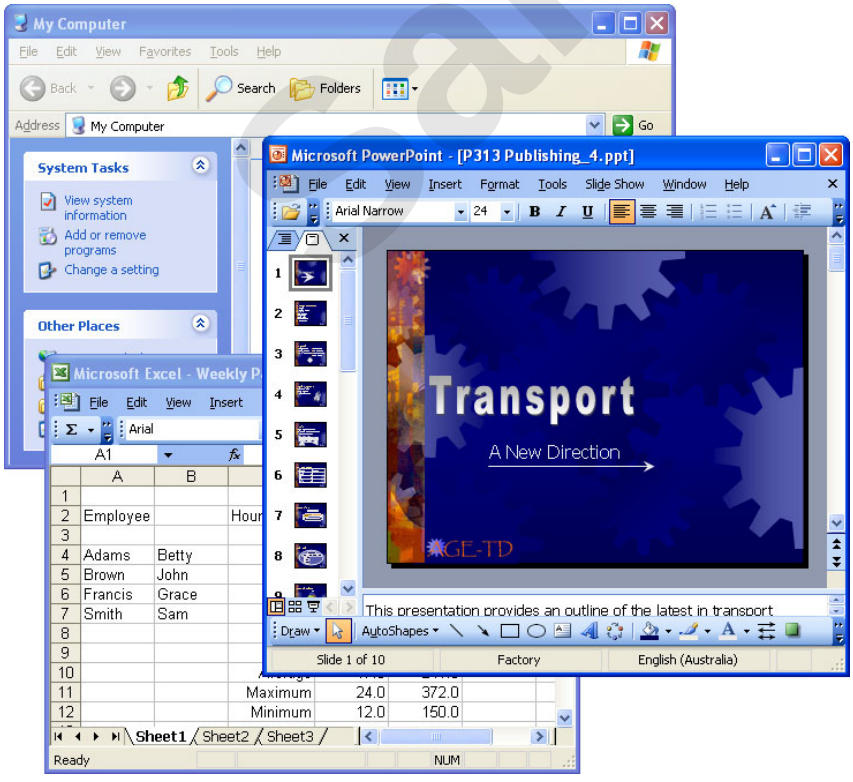


# HARDWARE AND SOFTWARE

A computer is an electronic device. In very general terms, ***hardware*** refers to the tangible aspects of the computer (the case, the mouse, the keyboard, and so on), while ***software*** refers to the intangible elements of the computer such as the processing instructions.

## Hardware

The ***hardware*** refers to the physical components of the computer including the monitor (the screen), the computer cabinet, the various peripheral devices connected to the cabinet, and even the printer used to print information. In general terms hardware means all of the electrical and electronic components of the computer together with the cabinets, boxes, or shells, in which they are housed.


## Software

The ***software*** refers to the instructions (sometimes known as programs) that make the computer work. Basically it is the software that tells the computer what to do and how to do it.

Software is categorised as either an ***operating system*** or an ***application***.

***Operating system*** software is what makes the computer start up and is what you see when you first start your computer. It handles the boring jobs such as allowing you to connect devices, print data, and the like.

***Application software*** gets the job done for you if you want to write a letter, create an email, play with digital photos, and so on.

# PERSONAL COMPUTERS

Personal computers took off in the business world in the early 1980s when IBM released the first IBM PC (*PC* is an acronym for *personal computer*). Personal computers became popular largely as a reaction to the high costs associated with mainframe and mini-computers. Personal computers have permeated virtually all aspects of business, education, and even the home.

## The Development Of The Personal Computer

In the late1970s the interest in computing by the general business community started to increase. In those days computers were large, specialised items of equipment. But while the computers themselves remained the domain of the engineers and technicians, the software used on those computers because easier for non-computing people to use. This was especially the case in finance and engineering.

As a consequence these *mainframes* and *mini-computers* started to become overloaded and overworked. The only alternative lay in developing smaller, more ***personal computers*** that users could have on their desktop and that would alleviate the pressures being placed on the bigger computers.

In 1981 IBM released the ***IBM Personal Computer*** (***PC***), the first of a new breed of specialised computers developed originally for the business community. The IBM PC differed from mainframe and mini-computers in the fact that it had its own ***central processing unit***. Unlike mainframe and mini-computers where dumb terminals (screens) are connected to a remote central processing unit, with a personal computer the terminal and the central processing unit are combined in the one installation – hence the name, *personal* computer. Instead of having many users at screens trying to access one (albeit very large) central processing unit, each personal computer has its own central processing unit handling data requests from only one user.

The IBM PC was so successful that it spawned an entirely new computer industry. Today personal computers are in every workplace you could imagine. In a modern office they are used for budgeting, accounting, letter writing, developing marketing materials, keeping contact with customers and suppliers, doing small-scale inventories, and much more.

The pace of change with personal computers is frenetic. Personal computers don't really deteriorate or wear out – they just become out-dated. The first IBM PC retailed in Australia at many thousands of dollars. Today the technology in it is so out-dated that you would be lucky to get the scrap metal price for the equipment. If you could find one of these computers chances are it would still do what it used to back in 1981 – the problem is that our expectations of what we want out of a computer have changed.

Indeed, personal computers are now used for things that even the IBM technicians couldn't have imagined back in 1981. Moreover, computers (note that the word *personal* has largely been dropped from their name) have become part of the furniture in most homes.

It is also interesting that while the original purpose of the personal computer was to free up the large, networked computers, today most personal computers are connected to the biggest computer network of all – the ***Internet***.

# TYPES OF PERSONAL COMPUTERS

There are many different types of personal computers on the market today, but they generally fall into several categories (not necessarily mutually exclusive): ***desktop***, ***laptop*** and ***netbook***. There are also ***smart*** devices such as *phones*, *cameras*, *global positioning systems*, and even *pens* that have computer technology built into them.

## Desktop Personal Computers

As the name suggests the ***desktop*** personal computer is designed to sit on a desk at home or in an office. The desktop computer normally has three physical components: a screen (sometimes known as a monitor), a keyboard, and the systems unit (a squarish box which houses the processing and storage components of the computer).

The systems unit can be found either laid flat on the desk, usually with the monitor sitting on top, or in a vertical (or tower) configuration where it sites on the floor. Another recent trend is for the systems unit and the monitor to be encased as one unit. Apple Mac computers carry this type of configuration.

*An example of a desktop personal computer with a tower systems unit (note: the keyboard is not shown here)*

*An example of a desktop computer with the systems unit and the monitor in one case.*

## Laptop Personal Computers

***Laptop*** computers are a form of portable computing. The systems unit, monitor, and keyboard are combined into one unit for ease of transport and the laptop computer can be powered by battery or plugged into mains power.

Since most laptop computers can be connected to networks and modems they have the reach of a desktop computer and a greater versatility by virtue of their portability.

## Netbook Computers

***Netbook computers*** are an alternative to a laptop computer. They are usually smaller than a laptop and carry less hardware and software. Their main purpose is to make it easy to access the Internet and emails while travelling.

## Tablet Computers

***Tablet computers*** are a relatively new innovation made popular by the introduction of the Apple iPad. They are simply a hand-held device (roughly the size of a small magazine) which have the systems unit and monitor built into the same case. The keyboard is displayed on the touch-screen.

# MAIN COMPONENTS OF A PERSONAL COMPUTER

A personal computer is normally made up of three main components: the ***monitor*** (or screen), the ***keyboard***, and the ***systems unit***. In desktop computers these components are quite separate and distinct. In laptop or smaller personal computers however, the components are still all there but tend to be integrated into one neat package.

## Main Components of a Personal Computer

| Component | Function |
|---|---|
| **Keyboard** | As the name suggests a keyboard is made up if keys – usually alphanumeric with some additional special function keys. A keyboard is an input device in that it allows you to input data or instructions to the computer. |
| **Monitor** | Where the keyboard is an input device, a monitor is an output device where data and information that has been processed by the computer is displayed for you to see. |
| **Systems Unit** | The systems unit is the *brain* of the computer. Here data and instructions received from input devices are processed and then sent to output devices for display. Whenever you type on the keyboard or move the mouse things rattle around inside the systems unit (sometimes you can even hear them!) and magic happens! |

## Main Components of the Systems Unit

| Component | Category | Function |
|---|---|---|
| **CPU** | Processing | The ***Central Processing Unit*** is an integrated circuit that is plugged into the main electronic board inside the systems unit. Its job is to direct all of the activities within the computer (more about this later) and is where the processing of data takes place. Personal computers are often classified according to the type and speed of the processor they have fitted. |
| **Hard disk** | Storage | The hard disk is used to store data and information so that it can be used again at a later time. |
| **Memory** | Storage | Memory is a temporary storage area for data awaiting processing – it is like the waiting room of a doctor's surgery for your data. Memory and storage are measured in bytes. A byte is roughly equivalent to one typed character. I Mb (megabyte) = 1,024,000 bytes while 1Gb is 1,024,000 by 1,024,000 bytes. Today new computers typically have a memory of around 4Gb (gigabytes). |
| **DVD Drive** | Storage | The DVD drive on the computer is much the same as the DVD you use at home for playing movies. Large programs (especially games) also are available on DVD and the drive is normally used to load those programs onto the computer. The DVD drive can also be used to play your audio CDs on the computer and play movies – providing you have the right software and sound card. Most of the DVD drives can also create (or *write* as it is known) DVD discs – this is known as *burning* a disc. |
| **USB port** | Storage or device connection | Another important part of a computer are the USB (Universal Serial Bus) ports. In computer jargon a port means a socket or an input. Most computers will have several of these ports because they can be used to do a number of different jobs, sometimes simultaneously.<br><br>USB ports for example can be used to connect a mouse to your computer. They can also be used to easily connect a temporary storage device known as a *USB Stick* or *Memory Stick* to the computer so that you can copy data from the computer to it for safe keeping. |

# OFFICE TECHNOLOGY – INPUT DEVICES

Getting the most out of computers is an on-going project. Constant changes in technology are making it easier and easier to communicate with our computers. While the keyboard was originally the main means by which we would ***input data*** today there are a number of devices that can be used to input data.

## Keyboard

The most traditional and probably the most widely used input device is the ***keyboard***. Virtually every personal computer will have a keyboard. To enter data via a keyboard you press a button on the keyboard. Keyboard buttons (*keys*) correspond with letters of the alphabet and numbers.

## Mouse

The second most widely used input device is a ***mouse***. A mouse is used to point at something on the screen and then click with the mouse button to select it – hence, this is often referred to as a *point and click* device.

## Joystick

A ***joystick*** is often used to send instructions to computer simulation games. For example, in the game you might be simulating flying an airplane, driving a race car, or even running through a field. As you move the joystick provides movement simulation that would not be easily achieved on a keyboard.

## Scanner

A ***scanner*** is like a mini-photocopy machine that connects to your computer and allows you to scan in images and even text without the need for typing. There is more than one type of scanner. For example you would most likely be familiar with bar code scanners such as are used to add prices in supermarket check outs.

Office scanners come in different shapes and sizes. From the standard A4 document scanner seen in many offices to large industrial scanners used in the printing industry.


## Digital Camera

***Digital cameras*** can be used to input photos and images directly to the computer. Uses for digital camera technology vary. You could for example input photo snaps via a memory chip in the camera or perhaps connect directly to the computer to conduct video conferencing or send video via e-mail.

## Microphone

***Microphones*** are used to input voice and sounds which can be stored in the computer and played back as required. Increasingly they can also be used to issue voice instructions to a computer instead of typing at a keyboard. Microphones are also important when communicating to other people over the Internet. These days many computers have microphones built into them.

# OFFICE TECHNOLOGY – OUTPUT DEVICES

***Output devices*** are used by the computer to display information that has been processed by the CPU. Output devices vary enormously, perhaps even more so than input devices.

The most common output devices are the ***screen*** (known as the *monitor*) and the ***printer***.

## Monitors

Monitors were available on the first personal computer and have undergone significant change since 1981. This change has primarily centred on two aspects: the introduction of ***colour***, improvements in the ***resolution*** of images, and even the technology used to get the display up and running. Images are displayed on monitors as thousands of tiny coloured dots.

## Inkjet printers

***Inkjet*** printers are commonly used with home computers because they are relatively cheap to purchase – they are also great for photo printing. They actually squirt ink onto the paper through tiny nozzles in the print head. They are extremely quiet and reasonably fast. There is also a misconception that these printers are the cheapest of all – because of their purchase price. While they are relatively cheap units to purchase the need to constantly replace the print cartridge means that they are expensive to operate. Any parent who has kids and an inkjet printer will appreciate this fact! Inkjets are best used as local, single user printers in small business or at home. They are too expensive for heavy use.

## Laser Printers

***Laser*** printers are the real workhorses of computer printing. They are fast, extremely quiet, and relatively affordable to operate. However, laser printers can be the most expensive to purchase (though some inkjets come close). Often they are heavy units and will also emit heat, gases and fumes when used extensively.

## Multi-Function Printers

As the name suggests ***multi-function printers*** can do several different jobs – usually *photocopy*, *print*, *fax*, and *scan* documents into the computer. If you have a small office where all of these things are required then this type of printer will be ideal. Multifunction printers can be purchased either as inkjet printers or laser printers – watch out for the inkjets as they can cost a small fortune in consumables such as ink!

## Speakers

As the name suggests, ***speakers*** play sounds. Your computer can be used like a juke box storing and playing your favourite songs, or it can be used as a communication device allowing you to have real-time conversations with people. To do these the computer will need to have speakers. Many computers come with a simple pair of left and right speakers, but you can also attach a full surround-sound system to your computer so you can watch that re-run of *Jurassic Park* in full ground-thumping realism!

# DEVICE CONNECTIONS

The devices used by your computer all have connections that must be functioning for the devices to work. These days connectivity is made either through cables (a ***physical*** connection) or ***wirelessly***. With physical connections where cables are involved you can easily check to ensure that the device is properly connected by examining the cable and the plug at either end.

## Understanding Cable Connections

In the bad old days of computing, connecting external devices such as keyboards, printers, monitors, and the like could sometimes become a nightmare. Each device, and sometimes each manufacturer, had their own special type of plug which required a compatible socket somewhere on the computer.

Not only that but each device had to have special software (known as a ***device driver***) installed on the computer to make sure that the computer would communicate properly with the device.

Today most external devices use a ***Universal Serial Bus*** (*USB*) style of plug for connecting to the computer. Printers, mice (mouses?), keyboards, digital cameras, writing tablets, external hard disk drives, etc, all now basically use a standard *USB* cable with a *USB* plug for connecting to a computer. Indeed, so prolific is this style of connection that most modern computers have several *USB* sockets allowing you to connect many different devices at the same time. You can even purchase special ***hubs*** which add even more *USB* sockets to your computer.

All of the devices still require software to be installed for the device to work properly. However, USB sockets in a computer are "*hot wired*" meaning that the computer will automatically detect that you've plugged a new device in and will attempt to find and install the required software without any assistance from you – all you need to do is to be a little patient while this is going on.

*USB plugs have a special trident symbol which indicates the top of the plug. The plug is flat and is a little over 1 centimetre wide. The socket on a computer usually has a similar symbol to indicate it is a USB socket – although the symbol may be a little hard to see.*

The only common device today that defies this rule is an external monitor. If you have a desktop computer with a separate monitor, or if you decide to connect an external monitor to a laptop, you'll find that the monitor has a larger and different plug to the USB plug. There will be a corresponding socket for this plug somewhere on the computer.

## Troubleshooting Cabled Connections

If your external device is not working check first to see whether the cable is properly inserted into the correct socket on the computer. When you pull the plug out of the computer the computer (if it is currently switched on) will make a sound – conversely a sound will also be made when the plug is inserted into the computer. To check whether a device is properly inserted simply pull the plug out, wait a few moments, and then re-insert it.

## Wireless Devices

Wireless devices, such as some of the newer printers, are a little trickier to set up and therefore also to troubleshoot. There is no cable as such and a bit of fiddly work is involved to get these devices setup the first time around. If you have a wireless device that is not working properly it may be wise to lean on a geeky friend to lend a hand (if at home) or the company IT department or expert if at work.

# OFFICE TECHNOLOGY – COMMUNICATIONS

The effective use of our computers is inextricably tied to being able to communicate with others using them. The ***Internet***, e-mail, the ability to move files between different personal computers within a building or country are all examples of how we employ communications technology in ways that make our computers more useful and our communications easier and more effective.

## Computer Network

A ***computer network*** is simply several computers that are joined together so that communication in the form of emails, data transfers, and even text messaging can be performed between them.

A network can be simply a group of computers within an office or a building. But networks can also be connected to other networks forming what has become known as the ***World Wide Web***.

## Router

A ***router*** is the device that connects computers on a network. The job of the router is to intercept data from the sender computer and then route it to the computer that it is addressed for. It's a bit like a post-office – data comes in and is then sent to the correct location.

In the past a router was wired into a computer network, but nowadays there are more wireless routers available where no cabling is required.

## Modem

A ***Modem*** is the break-out device that allows one computer to connect to another, or one network to connect to another using the telephone line. The telephone line at the present time is the easiest form of cabling to use simply because it is there. However, many governments in many countries are setting up more high-tech cabling and infrastructure to make this interconnectivity much faster and more reliable.

Modems translate your computer data into a format so that it can be transmitted via the telephone communications network. Modems are a necessary piece of equipment if you wish to connect to the ***Internet***.

Modems are also used at home where several computers may be connected via a router to form a network. In this scenario the modem is plugged into the router so that any computer on the network can have access to the Internet from the one place.

## Dial Up, BroadBand, ADSL, Satellite

Everybody nowadays wants to be connected to the internet because the internet is simply the most radical and prolific tool available today for communicating with other people – you can visit their websites, send them emails, argue, associate or otherwise engage with them in forums, and see what they are doing on social networking sites such as ***Facebook*** and ***Twitter***.

In the early days of computing the only way to connect to the Internet was by using existing phone lines in a process known as dial-up. Dial-up is still available today but only for emergency use and where no alternative is available. Dial-up is very slow and costly.

Broadband caters for very fast internet access because it is effectively a separate and dedicated line developed exclusively for the internet. Most of the telecommunication companies in a country have jumped on this bandwagon and offer special broadband plans.

**Asymmetric digital subscriber line** (**ADSL**) is a sneaky way of making the older copper telephone lines carry more data and do it faster. It has spelt the death of dial-up because it effectively uses the same telephone lines but employs different router technology to get the job done.

Satellite technology uses dishes and satellite to allow communication to take place. It is generally used only in very isolated or rural locations and can be both slow and expensive to operate.

CHAPTER 2

# STARTING OFF WITH WINDOWS 7

In Focus

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***Windows 7*** is the latest operating system produced by Microsoft. It was officially released around the world in October 2009.

An operating system such as Windows 7 provides a range of tools, programs and resources that help you and your computer to work together. It provides the ***interface*** between what your computer can do and your data.



**In this session you will:**

- ✓ gain an overview of the features new to ***Windows*** 7
- ✓ learn how to turn on the computer
- ✓ learn how to log on to a computer
- ✓ gain an understanding of the main elements of the ***Windows*** 7 screen
- ✓ learn how to open folders and start programs from the ***Start Menu***
- ✓ gain an understanding of the common components of a window
- ✓ learn how to minimise, maximise and restore a window
- ✓ learn how to minimise, maximise, and restore a window
- ✓ learn how to move a window on the desktop
- ✓ learn how to scroll in a window
- ✓ gain an overview of how to work with menus
- ✓ learn how to display menus in a window
- ✓ learn how to close a window
- ✓ learn how to put your computer to sleep
- ✓ learn how to shut down your computer.

# WHAT IS WINDOWS 7

Windows 7 is an ***operating system*** that provides an intuitive, secure interface for you and your computer. If you purchase a new personal computer, it will have Windows 7 installed.

Compared to earlier versions, Windows 7 provides a new range of tools to help you easily manage your files, computer devices and information sharing with other users or via the Internet.

Some of the features new to ***Windows 7*** are:

## Better backup facilities

The new automated ***Backup and Restore Centre*** makes it easier for you to backup your files, programs and settings every night. You can back up to a CD, DVD, external hard drive, USB flash drive or hard drive on your computer or network.

## Search facilities

Searching for files has never been easier. If you can't remember where you've stored that important file, simply click on the ***Start*** menu and type the file name or a phrase from its contents into the search field. Improved indexing means that files are located quicker than in earlier versions of Windows.

## Streamlined controls

Less keystrokes and clicks means that you can complete tasks faster, such as the single-click ***Shut Down*** option.

## Internet Explorer 8

Windows 7 provides ***Internet Explorer 8*** to help you surf the web more easily and securely.

## Improved Taskbar

Right-click on the ***Taskbar*** icons to quickly locate and open recently-used files.

## Library

A brand new feature, the ***Library*** enables you to store your frequently-used documents, pictures, music, files, etc. This provides quick and convenient access to your files.

## Touch-screen technology

***Windows 7*** supports dual-finger touch screen technology, but supporting hardware is required to use this feature.

## Media enhancements

With the improved ***Media Centre***, you can now more easily play DVDs, CDs, and video clips. You can also watch TV on your PC and listen to radio shows. A feature new to Windows 7 is ***Play To***, which enables you to play music and video on other networked PCs, TVs, or your stereo. When you're away, remote media streaming (available only on some editions of Windows 7) allows you to listen to the music on your computer via the Internet.

## Snap

A quick way to view your windows side-by-side, drag your windows to the edge of the screen to snap windows into position.

## HomeGroup

Allows you to more easily and securely share files and printers on a home network.