**Unit 1.**

***The digital age***

We are now living in what some people call the digital age, meaning that computers have become an essential part of our lives. Young people who have grown up with PCs and mobile phones are 5 often called the digital generation. Computers help students to perform mathematical operations and improve their maths skills.

They are used to access the Internet, to do basic research and to communicate with other students around the world. 10 Teachers use projectors and interactive whiteboards to give presentations and teach sciences, history or language courses. PCs are also used for administrative purposes - schools use word processors to write letters, and databases to keep records of students 15 and teachers. A school website allows teachers to publish exercises for students to complete online.

Students can also enrol for courses via the website and parents can download official reports.

Mobiles let you make voice calls, send texts 20 email people and download logos, ringtones or games. With a built-in camera you can send pictures and make video calls in face-to-face mode. New smartphones combine a telephone with web access, video, a games console, an MP3 player, a personal 25 digital assistant (PDA) and a GPS navigation system, all in one.

In banks, computers store information about the money held by each customer and enable staff to access large databases and to carry out financial 30 transactions at high speed. They also control the cashpoints, or ATMs (automatic teller machines), which dispense money to customers by the use of a PIN-protected card. People use a Chip and PIN card to pay for goods and services. Instead of using a 35 signature to verify payments, customers are asked to enter a four-digit personal identification number (PIN), the same number used at cashpoints; this system makes transactions more secure. With online ' banking, clients can easily pay bills and transfer money from the comfort of their homes.

Airline pilots use computers to help them control the plane. For example, monitors display data about fuel consumption and weather conditions.

In airport control towers, computers are used to 45 manage radar systems and regulate air traffic. On the ground, airlines are connected to travel agencies by computer. Travel agents use computers to find out about the availability of flights, prices, times, stopovers and many other details.

Unit 2.

*What is a computer?*

A computer is an electronic machine which can accept data in a certain form, process the data, and give the results of the processing in a specified format as information.

First, data is fed into the computer's memory. Then, when the program is run, the computer performs a set of instructions and processes the data. Finally, we can see the results (the output) on the screen or in printed form (see Fig. 1 below).

A computer system consists of two parts: hardware and software. Hardware is any electronic or mechanical part you can see or touch. Software is a set of instructions, called a program, which tells the computer what to do. There are three basic hardware sections: the central processing unit (CPU), main memory and peripherals

Perhaps the most influential component is the central processing unit. Its function is to execute program instructions and coordinate the activities of all the other units. In a way, it is the 'brain' of the computer.

The main memory (a collection of RAM chips) holds the instructions and data which are being processed by the CPU. Peripherals are the physical units attached to the computer. They include storage devices and input/ output devices.

Storage devices (hard drives, DVD drives or flash drives) provide a permanent storage of both data and programs. Disk drives are used to read and write data on disks. Input devices enable data to go into the computer's memory. The most common input devices are the mouse and the keyboard. Output devices enable us to extract the finished product from the system.

For example, the computer shows the output on the monitor or prints the results onto paper by means of a printer

On the rear panel of the computer there are several ports into which we can plug a wide range of peripherals - a modem, a digital camera, a scanner, etc. They allow communication between the computer and the devices. Modern desktop PCs have USB ports and memory card readers on the front panel.

Software programs which can be used on a particular computer system

hardware physical parts that make up a computer system

central processing unit (CPU) the brain of the computer

Storage - Files and programs are held on disk

hard drive (also known as hard disk) magnetic device used to store information

main memory section that holds programs and data while they are executed or processed

peripherals input devices attached to the CPU

ports sockets into which an external device may be connected

input the information which is presented to the computer (Data is collected and entered)

output results produced by a computer (The results are shown on the monitor or in print form)

Processing - Data is manipulated

**Unit 3**

***What is inside a PC system?***

**Processing**

The nerve centre of a PC is the **processor,** also called the **CPU,** or **central processing unit.** This is built into a single **chip** which executes program instructions and coordinates the activities that take place within 5 the computer system. The chip itself is a small piece of silicon with a complex electrical circuit called an **integrated circuit**

The processor consists of three main parts:

* The **control unit** examines the instructions in 10 the user's program, interprets each instruction and causes the circuits and the rest of the components - monitor, disk drives, etc. - to execute the functions specified.
* The **arithmetic logic unit (ALU)** performs **15 mathematical calculations (+, etc.) and logical operations (AND, OR, NOT).**
* The **registers** are high-speed units of memory used to store and control data. One of the registers (the program counter, or PC) keeps track of the next instruction to be performed in the main memory. The other (the instruction register, or IR) holds the instruction that is being executed (see Fig. 1 on page 13).

The power and performance of a computer is partly determined by the speed of its processor. A **system clock** sends out signals at fixed intervals to measure and synchronize the flow of data. **Clock speed** is measured in **gigahertz (GHz).** For example, a CPU running at 4GHz (four thousand million hertz, or cycles, per second) will enable your PC to handle the most demanding applications.

**RAM and ROM**

The programs and data which pass through the processor must be loaded into the main memory in order to be processed. Therefore, when the user runs a program, the CPU looks for it on the hard disk and transfers a copy into the **RAM** chips. RAM **(random access memory)** is volatile - that is, its information is lost when the computer is turned off. However,

**ROM (read only memory)** is non-volatile, containing instructions and routines for the basic operations of the CPU. The **BIOS (basic input/output system)** uses ROM to control communication with peripherals.

RAM capacity can be expanded by adding extra chips, usually contained in small circuit boards called **dual in-line memory modules** **(DIMMs).**

**Buses and cards**

The main circuit board inside your system is called the **motherboard** and contains the processor, the memory chips, expansions slots, and controllers for peripherals, connected by **buses** - electrical channels which allow devices inside the computer to communicate with each other. For example, the front side bus carries all data that passes from the CPU to other devices.

The size of a bus, called **bus width,** determines how much data can be transmitted. It can be compared to the number of lanes on a motorway - the larger the width, the more data can travel along the bus. For example, a 64-bit bus can transmit 64 bits of data.

**Expansion slots** allow users to install **expansion cards,** adding features like sound, memory and network capabilities.

***Bits and bytes***

Computers do all calculations using a code made of just two numbers - 0 and 1. This system is called **binary code.** The electronic circuits in a digital computer detect the difference between two states: ON (the current passes through) or OFF (the current doesn't pass through) and represent these states as 1 or 0. Each 1 or 0 is called a **binary digit,** or **bit**

Bits are grouped into eight-digit codes that typically represent characters (letters, numbers and symbols).

Eight bits together are called a **byte.** Thus, each character on a keyboard has its own arrangement of eight bits. For example, 01000001 for the letter A, 01000010 for B, and 01000011 for C.

Computers use a standard code for the binary representation of characters. This is the **American Standard Code for Information Interchange**, or **ASCII** - pronounced /'æski/. In order to avoid complex calculations of bytes, we use bigger units such as kilobytes, megabytes and gigabytes.

We use these units to describe the RAM memory, the storage capacity of disks and the size of a program or document.

**Unit 5**

**Input devices** are the pieces of hardware which allow interact with a computer by using one of these: a **light** us to enter information into the computer. The most **pen,**  **scanner,** a **trackball,** a **graphics tablet,** a **game** common are the **keyboard** and the **mouse** We can also **controller** or a **microphone.**

1. **Cursor control keys** include arrow keys that move the insertion point up, down, right and left, and keys such as *End, Home, Page Up* and *Page Down,* which are used in word processing to move around a long document.
2. **Alphanumeric keys** represent letters and numbers, as arranged on a typewriter.
3. **Function keys** appear at the top of the keyboard and can be programmed to do special tasks.
4. **Dedicated keys** are used to issue commands or to produce alternative characters, e.g. the *Ctrl* key or the *Alt* key.
5. A **numeric keypad** appears to the right of the main keyboard. The *Num Lock* key is used to switch from numbers to editing keys.

***Mouse actions***

A mouse allows you to control the cursor and move around the screen very quickly. Making the same movements with the arrow keys on the keyboard would take much longer. As you move the mouse on your desk, the pointer on the screen moves in the same direction. The pointer usually looks like an l-bar, an arrow, or a pointing hand, depending on what you are doing.

A mouse has one or more buttons to communicate with the computer. For example, if you want to place the insertion point or choose a menu option, you just click (press and release) on the mouse button, and the option is chosen.

The mouse is also used to select text and items on the screen. You can highlight text to be deleted, copied or edited in some way.

The mouse is widely used in graphics and design. When you want to move an image, you position the pointer on the object you want to move, press the mouse button, and drag the image to a new location on the screen. Similarly, the mouse is used to change the shape of a graphic object. For example, if you want to convert a square into a rectangle, you grab one corner of the square and stretch it into a rectangle.

The *mouse is also used to start a program or open a* document: you put the pointer on the file name and double-click on the name - that is, you rapidly press and release the mouse button twice.

**Unit 6**

***The eyes of your computer***

**What does a scanner do?**

A scanner 'sees' images and converts the printed text or pictures into electronic codes that can be understood by the computer. With a flatbed colour scanner, the paper with the image is placed face down on a glass screen, as with a photocopier. Beneath the glass are the lighting and measurement devices. Once the scanner is activated, it reads the image as a series of dots and then generates the digitized image that is sent to the computer and stored as a file.

The scanner operates by using three rotating lamps, each of which has a different coloured filter: red, green and blue. The resulting three separate images are combined into one by appropriate software.

**What does a digital camera do?**

A digital camera takes photos electronically and converts them into digital data (binary codes made up of 1 s and Os). It doesn't use the film found in a traditional camera; instead it has a special light-sensitive silicon chip.

Photographs are stored in the camera's memory card before being sent to the computer. Some cameras can also be connected to a printer or a TV set to make viewing images easier. This is usually the case with camera phones - mobile phones with a built-in camera.

**What does a camcorder do?**

A camcorder, or digital video camera, records moving pictures and converts them into digital data that can be stored and edited by a computer with special video editing software.

Digital video cameras are used by home users to create their own movies, or by professionals in computer art and video conferencing

They are also used to send live video images via the Internet. In this case they are called web cameras, or webcams.

To avoid red eyes, use the camera's red eye **reduction** feature.

**Cropping** a photograph means cutting out the parts of an image you don't need.

The **sharpness** of a photograph is a combination of resolution and acutance - the ability to represent clear edges.

**Unit 7**

***How screen displays work?***

**Displays,** often called **monitors** or **screens,** are themost-used output device on a computer. They provide instant feedback by showing you text and graphic images as you work or play.

Most desktop displays use **Liquid Crystal Display (LCD)** or **Cathode Ray Tube (CRT)** technology, while nearly all portable computing devices, such as laptops, incorporate LCDs. Because of their slimmer design and lower energy consumption, LCD monitors (also called **flat panel** or **flat screen** displays) are replacing CRTs.

**Basic features**

**Resolution** refers to the number of dots of colour, known as **pixels** (picture elements), contained in a display. It is expressed by identifying the number of pixels on the horizontal and vertical axes. A typical resolution is 1024x768.

Two measurements describe the size of your display: the **aspect ratio** and the **screen size.** Historically, computer displays, like most televisions, have had an aspect ratio of 4:3 - the width of the screen to the height is four to three. For widescreen LCD displays, the aspect ratio is 16:9, very useful for viewing DVD movies, playing games and displaying multiple windows side by side. High- definition TV also uses this format. The viewable screen size is measured diagonally, so a 19" screen measures 19" from the top left to the bottom right.

Inside the computer there is a **video adapter,** or graphics card, which processes images and sends signals to the monitor. CRT monitors use a **VGA (video graphics adapter)** cable, which converts digital signals into analogue signals. LCD monitors use a **DVI (digital video interface)** connection.

**Colour depth** refers to the number of colours a monitor can display. This depends on the number of bits used to describe the colour of a single pixel. For example, an old VGA monitor with an 8-bit depth can generate 256 colours and a SuperVGA with a 24-bit depth can generate 16.7 million colours. Monitors with a 32-bit depth are used in digital video, animation and video games to get certain effects.

**Display technologies**

An **LCD** is made of two glass plates with a liquid crystal material between them. The crystals block the light in different quantities to create the image. **Active-matrix LCDs** use **TFT (thin film transistor)** technology, in which each pixel has its own switch. The amount of light the LCD monitor produces is called brightness or luminance, measured in cd/m2 (candela per square metre).

A **CRT** monitor is similar to a traditional TV set. It contains millions of tiny red, green and blue phosphor dots that glow when struck by an electron beam that travels across the screen and create a visible image.

PCs can be connected to **video projectors,** which project the image onto a large screen. They are used for presentations and home theatre applications.

In a **plasma screen,** images are created by a plasma discharge which contains noble (non-harmful) gases. Plasma TVs allow for larger screens and wide viewing angles, making them ideal for movies.

**Organic Light-Emitting Diodes (OLEDs)** are thin-film LED displays that don't require a backlight to function. The material emits light when stimulated by an electrical current, which is known as electroluminescence. They consume less energy, produce brighter colours and are flexible - i.e. they can be bent and rolled up when they're not being used.

* **Pixel** - the smallest unit on a display screen or bitmapped image (usually a coloured dot)
* **Video adapter** - an expansion card that generates the video signal sent to a computer display
* **Aspect ration** - the width of the screen in proportion to its height
* **Plasma screen** - also called *gas discharge display*
* **Resolution** - the number of pixels contained in a display, horizontally and vertically
* **Colour depth** - the number of bits used to hold a colour pixel; this determines the maximum number of colours that can be displayed

... are classified into X types/categories

... are classified by ...

... can be divided into X types/categories

... include(s)...

... consist(s) of...

There are X types/classes of...

X is a type of...