SECTION 1. COMPUTERS TODAY

LEARNING OBJECTIVES

- To know computer applications in everyday life
- Study the basic structure of a computer system.
- Study the differences between certain types of computer.
- Learn how to classify computer devices.
- Learn and use relative pronouns.

INDEX

1. LIVING IN A DIGITAL AGE

Nowadays, computers are essential in our lives. They are used in nearly every daily activity.
Here, you can find a few examples of vocabulary for different contexts.

Vocabulary

Student tasks	Entertainment
Perform operations	Download
Access the Internet	Burn CDs/DVDs
Do research	Play games
Give presentations	Edit photos
Complete exercises online	Make video clips
Enrol online	Watch movies
Search the web	Listen to music

Administrative tasks	Mobiles
Write letters	Make calls/video calls
Keep records	Built-in camera
Type out a document	Send texts
Print out a document	Face-to-face
Word processor	PDA
Store information	GPS
Speeds up	Smartphone

Banking	Pick up a telephone
Access databases	Take photos

Carry out transactions	**Factories and industrial processes**
Pay bills	Design products
Transfer money	Do calculations
PIN (Personal identification number)	Control industrial robots
Enter a PIN	Control assembly lines
Dispense money	Keep record of stocks

ATMs	Formula 1 cars
Cashpoints	Design the car
Chip and pin card	Control electronic components

Airlines	Monitor engine speed
	Display data
Display data	
Aeroplane control	
Regulate air traffic	

1. LIVING IN A DIGITAL AGE

2. COMPUTER ESSENTIALS

A **computer** is an electronic device that manipulates information, or data. It has the ability to **store**, **retrieve**, and **process** data. You may already know that you can use a computer to **type documents**, **send email**, **play games**, and **browse the Web**. You can also use it to edit or create **spreadsheets**, **presentations**, and even **videos**.

Before we talk about different types of computers, let's talk about two things all computers have in common: **hardware** and **software**.

- **Hardware** is any part of your computer that has a **physical structure**, such as the keyboard or mouse. It also includes all of the computer's internal parts.

- **Software** is any **set of instructions** that tells the hardware **what to do** and **how to do it**. Examples of software include web browsers, games, and word processors.
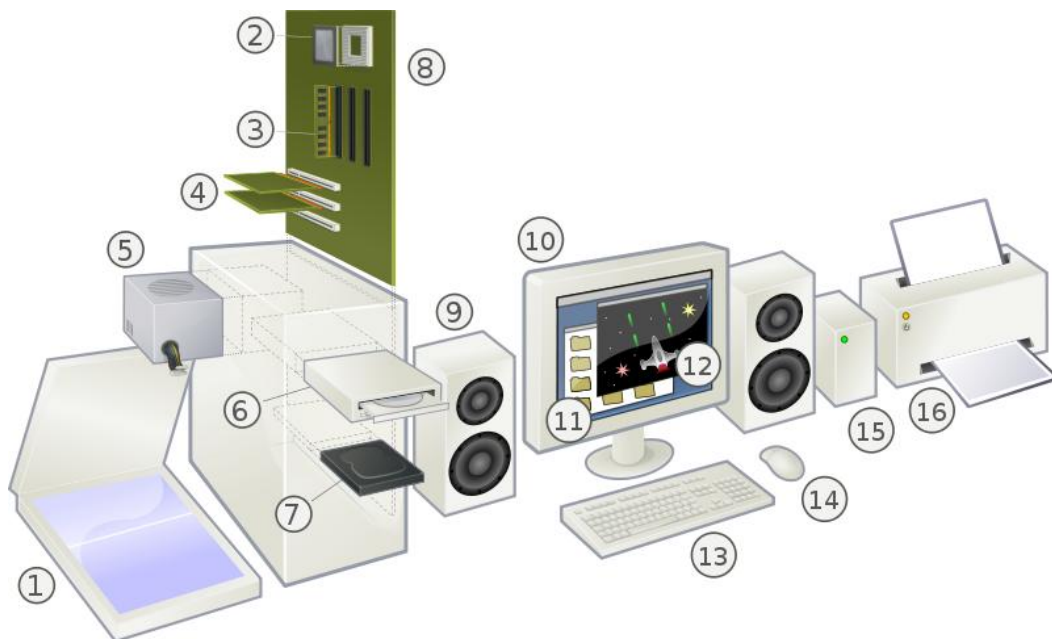
1 Scanner	9 Speaker
2 CPU (Microprocessor)	10 Monitor
3 Main memory (RAM)	11 System software
4 Expansion cards	12 Application software
5 Power supply unit	13 Keyboard
6 Optical disc drive	14 Mouse
7 Hard disk drive (HDD)	15 External hard disk
8 Motherboard	16 Printer

Different types of computer

There are a lot of terms used to describe computers. Most of these words imply the size, expected use or capability of the computer. The term computer can apply to virtually any device that has a microprocessor in it.

You probably already own at least one of these types of PCs:

- **Laptop**, a portable computer with a built-in screen, integrated keyboard, and battery power.

- **Desktop computers,** Many people use **desktop computers** at work, home, and school. Desktop computers are designed to be placed on a desk, and they're typically made up of a few different parts, including the **computer case**, **monitor**, **keyboard**, and **mouse**.

- **Tablet computers**—or tablets—are handheld computers that are even more portable than laptops. Instead of a keyboard and mouse, tablets use a touch-sensitive screen for typing and navigation. The iPad is an example of a tablet.

- **Workstation**, a high quality computer, typically with lots of RAM, plenty of CPU power, and a high quality video card.

- A **server** is a computer that serves up information to other computers on a network. For example, whenever you use the Internet, you're looking at something that's stored on a server. Many businesses also use local **file servers** to store and share files internally.

Many of today's electronics are basically **specialized computers**, though we don't always think of them that way. Here are a few common examples.

- **Smartphones**: Many cell phones can do a lot of things computers can do, including browsing the Internet and playing games.

- **Wearables**: Wearable technology is a general term for a group of devices—including **fitness trackers** and **smartwatches**—that are designed to be worn throughout the day. These devices are often called **wearables** for short.

- **Game consoles**: A **game console** is a specialized type of computer that is used for playing **video games** on your TV.

- **TVs**: Many TVs now include **applications**—or **apps**—that let you access various types of online content. For example, you can stream video from the Internet directly onto your TV.

- **Embedded systems**, are other kinds of computers that fit inside of other devices and control them. These computers are known as, a computer using a relatively slow and specialized processor and ROM chip, normally used to control a particular device such as a washing machine or an MP3 player

  Embedded systems can be found in traffic lights, TV sets, refrigerators, coffee machines and many more devices. Embedded systems are typically controlled by inexpensive, specialized processors which can only handle very specific tasks.

Watch this video to learn more: https://youtu.be/7cXEOWAStq4

3. INSIDE THE SYSTEM

Have you ever looked **inside a computer case**, or seen pictures of the inside of one? The small parts may look complicated, but the inside of a computer case isn't really all that mysterious.

At the most exterior of the computer we see the **computer case**. This is meant to look good, protect the components, and provide an easy interface to plug in peripherals. If you are buying or building your own computer, make sure it has a good case.

At the heart of the computer lies several key components sitting on the **motherboard** including the microprocessor, the chipset, RAM and a ROM firmware instruction set called the BIOS. These core components are connected by several "buses" made to carry information around the system and eventually out to display devices and other peripherals.

The **motherboard** is the computer's **main circuit board**. It's a thin plate that holds the CPU, memory, connectors for the hard drive and optical drives, expansion cards to control the video and audio, and connections to your computer's ports (such as USB ports). The motherboard connects directly or indirectly to every part of the computer.

The **central processing unit (CPU)**, also called a **processor**, is located inside the computer case on the motherboard. It is sometimes called the brain of the computer, and its job is to carry out commands. Whenever you press a key, click the mouse, or start an application, you're sending instructions to the CPU.
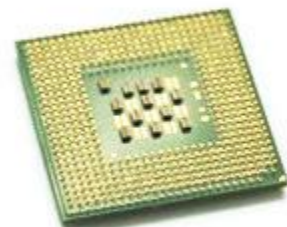
The CPU is usually a two-inch ceramic square with a silicon chip located inside. The chip is usually about the size of a thumbnail. The CPU fits into the motherboard's **CPU socket**, which is covered by the **heat sink**, an object that absorbs heat from the CPU.

A processor's **speed** is measured in **megahertz (MHz)**, or millions of instructions per second; and **gigahertz (GHz)**, or billions of instructions per second. A faster processor can execute instructions more quickly. However, the actual speed of the computer depends on the speed of many different components—not just the processor.

RAM (random access memory), is your system's **short-term memory**. Whenever your computer performs calculations, it temporarily stores the data in the RAM until it is needed.

This **short-term memory disappears** when the computer is turned off. If you're working on a document, spreadsheet, or other type of file, you'll need to **save** it to avoid losing it. When you save a file, the data is written to the **hard drive**, which acts as **long-term storage**.

RAM is measured in **megabytes (MB) or gigabytes (GB)**. The **more RAM** you have, the more things your computer can do at the same time. If you don't have enough RAM, you may notice that your computer is sluggish when you have several programs open. Because of this, many people add **extra RAM** to their computers to improve performance.

ROM, Read Only Memory, is a kind of permanent memory which is still intact even when the computer is off.

The **BIOS** is a good example of an application using ROM. The BIOS controls very low-level access to the hardware.

Busses and ports are general terms for connectivity components which connect the different parts of the PC together. These include the serial port, parallel port, PCI and PCIe busses, and the Universal Serial Bus (USB) controller. These devices allow communication between different parts of the system. Also network interface cards are now standard on most motherboards, although USB and PCI versions of the devices are also available.

The **hard drive** is where your software, documents, and other files are stored. The hard drive is long-term storage, which means the data is still saved even if you turn the computer off or unplug it.

When you run a program or open a file, the computer copies some of the data from the hard drive onto the RAM. When you save a file, the data is copied back to the hard drive. The faster the hard drive, the faster your computer can start up and load programs.

Your optical drives and hard disk drives are also components in your computer. To allow data interchange between your CPU and drives, SATA, ATA, and SCSI **controllers** are still widely used.

Most computers have **expansion slots** on the motherboard that allow you to add various types of **expansion cards**. These are sometimes called **PCI (peripheral component interconnect) cards**. You may never need to add any PCI cards because most motherboards have built-in video, sound, network, and other capabilities.

However, if you want to boost the performance of your computer or update the capabilities of an older computer, you can always add one or more cards. Below are some of the most common types of expansion cards.

- The **video card** is responsible for what you see on the monitor. Most computers have a **GPU (graphics processing unit)** built into the motherboard instead of having a separate video card. If you like playing graphics-intensive games, you can add a faster video card to one of the **expansion slots** to get better performance.

- The **sound card**—also called an audio card—is responsible for **what you hear** in the speakers or headphones. Most motherboards have integrated sound, but you can upgrade to a dedicated sound card for higher-quality sound.

- The **network card** allows your computer to communicate over a network and access the Internet. It can either connect with an **Ethernet** cable or through a **wireless** connection (often called **Wi-Fi**). Many motherboards have built-in network connections, and a network card can also be added to an expansion slot.

Feeding all these components with a steady supply of energy is another component called the power supply.

The **power supply unit** in a computer converts the power from the wall outlet to the type of power needed by the computer. It sends power through cables to the motherboard and other components.

If you decide to open the computer case and take a look, make sure to **unplug** the computer first. Before touching the inside of the computer, you should touch a grounded metal object—or a metal part of the computer casing—to discharge any static buildup. Static electricity can be transmitted through the computer circuits, which can seriously damage your machine.

Watch this video to learn more: ***https://youtu.be/K00dKueUDuI***

4. BUYING A COMPUTER

Buying a computer can feel overwhelming. With so many options to choose from, it's tough to know if you're getting the right computer at the best price. There are many questions to answer. Let's answer some of them.

What kind of computer should I get?

There are many different types of computers you may have heard of, such as desktops, laptops, and tablets. But before you start shopping, you'll need to think carefully about the kinds of things you want to do with your computer.

For example, if you only need something for email and light web browsing, you'll probably buy a very different computer from someone who does a lot of video editing or PC gaming. You should also think about where you want to use your computer because it will have a big impact on the type you buy.

In this link you can find help to take this decision: https://infogram.com/computer-buying-guide-1gl94pkv0063m3v

How much should I spend?

Once you've decided on the type of computer you want, you'll need to start thinking about how much money you want to spend. This is probably one of the more confusing things about buying a computer, and that's because you'll find options across a wide range of prices—from as low as $250 to well over $1,000. These prices are based mostly on the internal components of the computer, such as the amount of hard-drive space, memory, processing power, and so on, which are called the specifications (or specs for short). These internal components are also a big part of the reason computers can become outdated or obsolete after only a few years. As manufacturers continue to create faster processors and larger hard drives, a computer that costs $1,000 today might only cost $500 in a few years.

So, very generally, we recommend spending between $300-$800 on a new computer, depending on your needs and budget. And if you really don't have much to spend, we'd still suggest buying a machine with even slightly higher specs than the absolute cheapest model. A computer with more hard drive space, more memory, and faster processors will be a much better deal in the long run.

Common PC brands computers from a well-known manufacturer, such as Dell, HP, Lenovo, Acer, Asus, Toshiba, or Samsung. While store brands will be less

expensive, they're also much less reliable and will likely become obsolete much sooner than a name-brand computer.

Where should I buy my computer?

Once you've chosen a computer, you'll have to decide where to purchase it. As with most things these days, you can choose to buy a computer at a larger retail store—like Media Mark or PC BOX—or online. If you're buying online, you'll be able to choose from big online retailers like Amazon or NewEgg, or through a computer manufacturer's website, such as Dell, HP, or ASUS.

Technical specs

Looking for more detailed information about current models and technical specifications? Check out the sites below:

- [Consumer Reports Best Computer Buying Guide](#)
- [Amazon's Computer Buying Guide](#)
- [Best Buy Computer Buying Guide](#)

5. VOCABULARY COMPUTER HARDWARE

Application software	Laptop
Arithmetic Logic Unit (ALU)	Long-term
Basic Input/output System (BIOS)	Main memory
Bus width	Memory card readers
Buses	Monitor
Central processing unit (CPU)	Motherboard
Chip	Mouse
Client-server	Network
Clock speed	Optical disc drive
Computer case	Output devices
Connector	Peer-to-peer
Control Unit	Pen drive
Controller	Peripherals
CPU (Microprocessor)	Ports
Desktop PC	Power supply unit
Disk drive	Printer
Dual in-line memory modules (DIMMs)	Processor
Embedded System	Random Access Memory (RAM)
Expansion cards	Registers
Expansion cards	Scanner
Expansion slots	Server
External hard disk	Smartphone
Front panel	Socket
Gigahertz (GHz)	Software
GPU (graphics processing unit)	Speaker
Hard disk drive (HDD)	Specs
Hard drive	Storage devices
Hardware	System clock
heat sink	System software
Input devices	Unplug
Integrated circuit	Wearables
Keyboard	Wireless
Lanes	Workstation

6. USEFUL LANGUAGE

Expressions for classifying

Are classified into X types/categories
Are classified by
Can be divided into X types/categories
Consists of
There are X types /classes of
X is a type of

Language functions useful to a PC specs

The PC has a processor running at GHz
The PC has 2 GB of RAM
They feature a camera built into the display
The MacBook has one gigabyte, expandable to two gigabyte

7. GRAMMAR

The relative pronouns are:

relative pronoun	use	example
who	subject or object pronoun for people	I told you about the woman *who* lives next door.
which	subject or object pronoun for animals and things	Do you see the cat *which* is lying on the roof?
which	referring to a whole sentence	He couldn't read, *which* surprised me.
whose	possession for people animals and things	Do you know the boy *whose* mother is a nurse?
whom	object pronoun for people, especially in non-defining relative clauses (in defining relative clauses we colloquially prefer *who*)	I was invited by the professor *whom* I met at the conference.
that	subject or object pronoun for people, animals and things in defining relative clauses (*who* or *which* are also possible)	I don't like the table *that* stands in the kitchen.

We use relative pronouns to introduce **relative clauses**. Relative clauses tell us more about people and things:

- *Lord Thompson,* who is 76*, has just retired.*
- *This is the house* which Jack built*.*
- *Marie Curie is the woman* that discovered radium*.*

We use:

- *who and whom for **people***
- *which for **things***
- *that for **people or things***.

There are two kinds of relative clause:

1. Defining relative clauses

We use defining relative clauses to give essential information about someone or something – information that we need in order to understand what or who is being referred to. A defining relative clause usually comes immediately after the noun it describes.

We usually use a relative pronoun (e.g. *who, that, which, whose* and *whom*) to introduce a defining relative clause

- *Marie Curie is the woman **who discovered radium**. This is the house **which Jack built**.*

In this kind of relative clause, **we can use *that*** instead of *who* or *which*:

- *Marie Curie is the woman **that discovered radium**. This is the house **that Jack built**.*

We can **leave out** the pronoun **if it is the object** of the relative clause:

- *This is the house ~~that~~ Jack built. (that* is the object of *built*)

2. Non-defining relative clauses

We use non-defining relative clauses to give extra information about the person or thing. It is not necessary information. We don't need it to understand who or what is being referred to.

We always use a relative pronoun (*who, which, whose* or *whom*) to introduce a non-defining relative clause (In the examples, the relative clause is in bold, and the person or thing being referred to is <u>underlined</u>.)

- <u>*Clare,*</u> who *I work with, is doing the London marathon this year.*
- *Lord Thompson,* **who is 76***, has just retired.*
- *We had fish and chips,* **which I always enjoy***.*
- *I met Rebecca in town yesterday,* **which was a nice surprise***.*

With this kind of relative clause, we use commas (,) to separate it from the rest of the sentence.

Be careful!

In this kind of relative clause, we **cannot** use *that*:
- *Lord   Thompson,*   **who   is   76***,   has   just   retired.*
  (NOT ~~*Lord Thompson, that is 76, has just retired.*~~)

and we **cannot** leave out the pronoun:
- *We   had   fish   and   chips,*   **which   I   always   enjoy***.*
  (NOT ~~*We had fish and chips, I always enjoy.*~~)

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when *and* where

We can use *when* with times and *where* with places to **make it clear which time or place** we are talking about:

- *England won the World Cup in 1966. It was the year* **when we got married***.*
  I remember my twentieth birthday. It was the day **when the tsunami happened***.*

- *Do you remember the place* **where we caught the train***?*
  Stratford-upon-Avon is the town **where Shakespeare was born***.*

We can **leave out *when***:

- *England won the World Cup in 1966.*

- *It was the year* **we got married***.*

- *I remember my twentieth birthday. It was the day* **the tsunami happened***.*

8. SELF-ASSESSMENT

Select the best definition of the word.

1. spec or specification

a) The main printed circuit board in a computer that carries the system buses, sockets for processors, memory modules, etc
b) A separate unit or part of a circuit that supplies the correct amount of electrical current to a computer system.
c) a clear set of technical or quantitative requirements

2. microprocessor

a) a clear set of technical or quantitative requirements
b) an electronic device constructed from microscopic transistors and other circuit elements on a single integrated circuit; popular manufactures of these devices include Intel, AMD, and IBM
c) a wired or increasingly wireless PCI or USB device that connects a computer to a network

3. desktop computer

a) a personal computer typically in the shape of a tower or box with a connected keyboard, mouse, and monitor
b) computers which are sold incomplete or in kits that require extra components to be functional
c) a computer using a relatively slow and specialized processor and ROM chip, normally used to control a particular device such as a washing machine or an MP3 player

4. server

a) the evolution of devices towards common functionality
b) a type of computer intended primarily for central distribution of data to other computers on the same network
c) a computer using a relatively slow and specialized processor and ROM chip, normally used to control a particular device such as a washing machine or an MP3 player

5. motherboard

a) Any computer processor or portion of the CPU which assists the main processor by performing a highly specialized task
b) The main printed circuit board in a computer that carries the system buses, sockets for processors, memory modules, etc
c) A widely used bus for connecting hard disk drives and similar devices to the motherboard and running at speeds up to 6 Gbit/s

ANSWERS: 1. c)   2. b)   3. a)   4. b)   5. b)

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