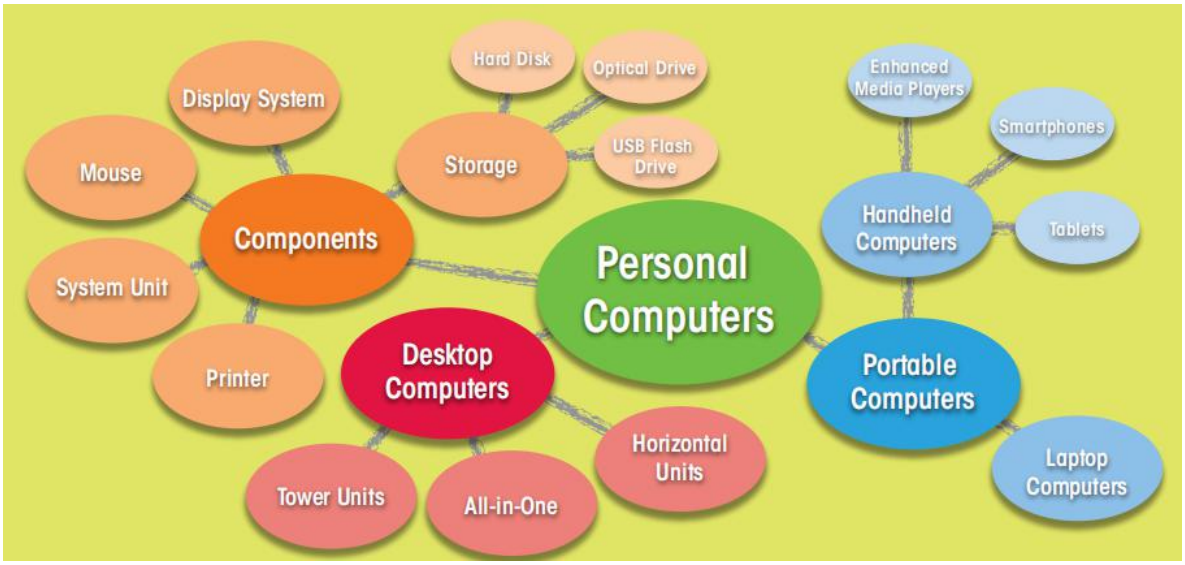
# HARDWARE BASICS




***Exercise 1: Translate into Russian***

desktop computer
peripheral devices
system unit
keyboard
hard disk drive
removable storage
compatible
input device
output device
device driver
headphones
speakers
circuit
data center
system board (motherboard)
core
RAM
ROM
volatile, non-volatile memory
firmware
to back up files
utility
update
solid state storage
optical storage
magnetic storage

## PERSONAL COMPUTER SYSTEMS

Whether you are shopping for a new computer, using your trusty laptop, or troubleshooting a system glitch, it is useful to have some background about computer system components and how they work.

**A stationary desktop computer** is placed on a desk and runs on power from an electrical wall outlet. It contains **the internal nodes** of the personal computer and **peripheral devices** (input, output, and storage equipment that might be added to a computer system to enhance its functionality): system unit; keyboard; mouse; display system; hard disk drive; optical drive; removable storage; sound system; network and Internet access; printer.

**A portable computer** is a small, lightweight personal computer with input, output, storage, and processing components integrated into a single unit that runs on power supplied by an electrical outlet or a battery.

**Types of portable personal computers**: smartphone; a tablet computer; laptops or notebooks; netbooks.

Computers that operate in essentially the same way and use the same software are said to be **compatible** or having the same platform.

**Basic input devices** include: a keyboard; a mechanical or optical mouse; a scanner; a digital camera; a microphone; a trackpad (touchpad/touchscreen). Some devices require software called a **device driver** to set up communication between your computer and the device. An **output device** is any piece of computer hardware equipment which converts information into human readable form (monitor, headphones, speakers, printer…).

A **microprocessor** (processor, CPU - central processing unit) is an integrated circuit where most processing in the computer takes place. It is the largest chip on the system board. The CPU is often referred to as the "brain" of the computer. A microprocessor's performance is affected by several factors, including **clock speed**, **bus speed**, **word size**, **cache size**, **instruction set**, **number of cores** and **processing techniques**.

## COMPUTER MEMORY

**RAM (random access memory)** is a temporary holding area for data, application program instructions, and the operating system. RAM is volatile memory, which means that the information temporarily stored in the module is erased when you restart or shut down your computer.

**ROM (read-only memory)** is non-volatile, which means the information is permanently stored on the chip. It stores crucial information essential to operate the system, like the program essential to boot the computer and firmware instructions.

Newer **EEPROM** (electrically erasable programmable read-only memory) is a type of ROM that is non- volatile but user-modifiable. A ROM or EEPROM chip along with its instructions is commonly referred to as **firmware**.

## STORAGE DEVICES

There are 3 main storage technologies: **magnetic** (HDD, hard disk drive), **solid state storage** or flash memory (SSD, USB flash drive) and **optical storage** technology (CD, DVD…).

**Hard disk drive** is a device for storing information on the principle of magnetic recording. CD and DVD technologies are classified as **optical storage**. The disk is quite durable and data less **susceptible** to environmental damage than data recorded on magnetic media. **Solid state storage** or flash memory is a technology that stores data in erasable, rewritable circuitry, rather than on spinning disks. Solid state storage is **durable**, **removable** and provides fairy fast access to data because it includes no moving parts. Solid state devices include USB flash drives, SD cards, micro SD cards, newer types of hard drive, SIM card that goes in your mobile phone and smart cards such as chip and pin credit and debit cards.

## HARDWARE SECURITY

To prevent hardware problems you can undertake some **preventive maintenance**:

- Back up your files regularly, particularly those that are most important to you.
- Run utilities that ensure peak performance for your hard disk drive.
- Apply the latest operating system, driver, and security updates.

- Scan your computer for viruses and spyware once a week and keep your antivirus and spyware definitions updated.

To help minimize risks the hardware and software for most corporate information systems are housed in data centers. A **data center** is a specialized facility designed to hold and protect computer systems and data.

**COMPREHENSION.** *Choose a word from the variants provided.*

1. Monitor, printer, speakers, headphone are examples of ***input/output*** devices.
2. A ROM or EEPROM chip along with its instructions is commonly referred to as ***hardware/firmware***.
3. ***System unit/CPU*** is an integrated circuit where most processing in the computer takes place.
4. The instructions are loaded into ***RAM/ROM*** every time you start your computer.
5. A ***stationary/portable*** computer is a small, lightweight computer with input, output, storage, and processing components integrated into a single unit.
6. ***Magnetic/ solid state*** storage is durable, removable and provides fairy fast access to data because it includes no moving parts.
7. A computer ***power supply/system unit*** houses the main circuit board, microprocessor, storage devices, and network card.

**QUICK CHECK.** *Complete the sentences with the words from the text.*

1) The term … device designates the equipment that might be added to a computer system to enhance its functionality.
2) The computer's main board is called a (an) …, "motherboard", or "main board".
3) To protect hardware, software and data, corporative systems are located in a protective facility called a(an) ... center.
4) … is a temporary holding area for data, application program instructions, and the operating system.
5) … storage technologies, such as hard disks, store data as magnetized particles.
6) Computers that operate in essentially the same way and use the same software are said to be … or having the same platform.
7) The … is often referred to as the "brain" of the computer.
8) CD and DVD storage technologies can be classified as … storage, which stores data as microscopic light and dark spots on the disk surface.
9) The design of most computer … is based on the typewriter's QWERTY layout.

**VOCABULARY**

***1.*** *Choose the necessary word from the given variants.*

How Can I Tell if Something is Wrong With my Computer?

There are several **indistinct/clear** signs that your computer is in trouble. The most **obscure/obvious** sign is failure to power up. A loud beep at startup time can also **indicate/disguise** a problem. If your computer's screen remains blank or error messages **appear/disappear**, you might have a hardware problem. Hardware problems can also show up as unexpected restarts at **regular/random** intervals, or as a peripheral device that stops working. Windows users might **face/overlook** the blue screen of death (also called BSoD). The blue screen of death indicates that the operating system has **missed out/encountered** an error from which it cannot recover. And in this case the computer no longer **ignores/accepts** any commands.

**DISCUSSION**

1. What are the components of a typical desktop computer system?
2. How do portable computers differ from desktops?
3. What are the basic input and output devices?
4. What are the main types of computer memory? Briefly describe them.
5. What are the main types of storage technologies?
6. What is preventive maintenance? How can you prevent hardware problems?
7. What is data center?