

Introduction to Computer Fundamentals

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Designed as a quick-reference guide for beginners

1. What Is a Computer?

Aspect	Description
Definition	An electronic device that receives data (input), processes it according to stored instructions (software), and produces results (output).
Purpose	Automate calculations, store and retrieve information, enable communication, and control other devices.
Key Characteristics	Speed, accuracy, repeatability, versatility, and storage capacity.

2. Basic Components

2.1 Hardware (Physical Parts)

Component	Function	Typical Examples
CPU (Central Processing Unit)	Executes instructions; the “brain” of the computer.	Intel Core i7, AMD Ryzen 5
Memory (RAM)	Temporary storage for data and programs in use.	8GB DDR4, 16GB DDR5
Storage	Permanent data retention.	HDD, SSD, NVMe, USB flash drive
Motherboard	Connects all components and provides communication pathways.	
Power Supply (PSU)	Converts AC mains to DC voltages required by components.	
Input Devices	Capture user data.	Keyboard, mouse, scanner, microphone
Output Devices	Present results to the user.	Monitor, printer, speakers, headphones

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Component	Function	Typical Examples
Peripheral Devices	Extend functionality.	External hard drive, webcam, game controller

2.2 Software (Intangible Parts)

Layer	Description
System Software	Manages hardware resources and provides a platform for applications. <i>Examples: Operating Systems (Windows, macOS, Linux), device drivers.</i>
Application Software	Performs specific tasks for the user. <i>Examples: Word processors, web browsers, games, database systems.</i>
Utility Software	Helps maintain, analyze, or optimize the system. <i>Examples: antivirus, disk cleanup, backup tools.</i>

3. How a Computer Works – The Basic Cycle

1. **Input** – Data entered via input devices (e.g., typing a document).
2. **Processing** – CPU fetches instructions from RAM, executes them, and manipulates data.
3. **Storage** – Results are saved to permanent storage if needed.
4. **Output** – Processed information displayed or transmitted (e.g., on a screen).

The cycle repeats continuously while the computer is powered on.

4. Number Systems Used in Computing

System	Base	Digits	Common Use
Binary	2	0,1	Machine language, low-level hardware design
Octal	8	0-7	Historical convenience for grouping binary digits
Decimal	10	0-9	Human-friendly representation
Hexadecimal	16	0-9, A-F	Memory addresses, debugging, color codes

Conversion tip: 1 hex digit = 4 binary bits; 1 octal digit = 3 binary bits.

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5. Data Representation

Data Type	Typical Size	Representation
Integer	8, 16, 32, 64 bits	Two's complement (signed) or unsigned binary
Floating Point	32 bits (single), 64 bits (double)	IEEE 754 standard