Zed-King
GROUP OF INSTITUTIONS
ISO 9001: 2015 Certified

COURSE ON COMPUTER CONCEPTS

INTRODUCTION TO COMPUTER

Topics Covered:

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1.0 Introduction

> *A computer is an electronic device that accepts data as input, processes it according to a set of instructions (program), stores it, and produces meaningful output called information.*

The word "computer" comes from the word *compute*, which means to calculate. Today computers are used everywhere — in offices, banks, schools, hospitals, railways, shops and even in our pockets as smartphones. **Information Technology (IT)** is the use of computers, networks, storage devices and software to create, process, store, secure and exchange information of all kinds. Knowing computer basics is the first step towards digital literacy.

Basic Functions of a Computer

Function	Description	Example
Input	Accepting data and instructions from the user through input devices	Typing marks using a keyboard
Processing	CPU performs calculations and logical operations on the data	Calculating total and percentage
Output	Showing the processed result (information) to the user	Displaying or printing a result sheet
Storage	Saving data and results for future use	Saving the file on hard disk / cloud

Characteristics of a Computer

Characteristic	Description	Example
Speed	Performs millions to billions of operations per second (measured in MHz/GHz)	Modern CPUs run at 3–5 GHz
Accuracy	Gives correct results if the input data and program are correct	No calculation errors in banking software
Automation	Once programmed, works automatically without human intervention	Payroll processing, batch jobs
Storage	Can store huge amounts of data permanently and temporarily	Terabytes of data on a hard disk
Versatility	Can perform many different types of tasks	Typing, gaming, designing, research
Diligence	Works for long hours without tiredness or loss of accuracy	Servers running 24x7
No IQ	Cannot think on its own; follows only the given instructions	Cannot decide without a program

> **Exam Tip:** Computer has SPEED, ACCURACY, DILIGENCE, STORAGE, VERSATILITY — but NO intelligence or emotions. GIGO = Garbage In, Garbage Out (wrong input gives wrong output).

Data vs Information

Basis	Data	Information
Definition	Raw, unprocessed facts and figures	Processed, organized and meaningful data

Basis	Data	Information
Example	85, 70, 90 (marks of students)	Average marks = 81.67
Use	Input to the computer system	Output of data processing; useful in decision making

1.1 Objectives

After studying this chapter, you will be able to:

- Define a computer and explain its characteristics and basic functions
- Trace the evolution of computers through the five generations and name important milestones
- Classify computers on the basis of size and working principle
- Identify the latest IT gadgets and explain their applications in daily life
- Differentiate between hardware and software
- Describe the CPU, input devices, output devices, computer memory and storage devices
- Classify software into application, system and utility software with examples
- Differentiate between open source and proprietary software
- Understand mobile apps and use them safely

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1.2 Computer and Latest IT Gadgets

> *An IT gadget is a small electronic device with a computing capability that makes a task easier — for example a smartphone, tablet, smartwatch or smart speaker. Most modern gadgets contain a tiny computer (processor, memory and software) inside them.*

1.2.1 Evolution of Computers & its Applications

A. Early Calculating Devices

Device	Year	Inventor / Details
Abacus	c. 2500 BC	First calculating tool; beads on rods
Napier's Bones	1617	John Napier; multiplication using numbered rods
Pascaline	1642	Blaise Pascal; mechanical adding and subtracting machine
Stepped Reckoner	1673	Gottfried Leibniz; could also multiply and divide
Jacquard Loom	1801	Joseph Jacquard; used punched cards to control weaving
Difference Engine	1822	Charles Babbage; machine to calculate mathematical tables
Analytical Engine	1837	Charles Babbage; design had input, memory, ALU and control — he is the **Father of the Computer**. Ada Lovelace is called the first programmer.
Tabulating Machine	1890	Herman Hollerith; punched cards used for the US census; led to the birth of IBM
Mark I	1944	Howard Aiken; first large electromechanical computer
ENIAC	1946	Eckert & Mauchly; first general-purpose electronic digital computer
EDVAC	1945–51	John von Neumann's stored-program concept
UNIVAC I	1951	First commercially produced computer

B. Generations of Computers

Generation	Period	Technology	Main Features	Examples
First	1940–1956	Vacuum tubes	Huge size, costly, produced much heat, machine language, slow	ENIAC, EDVAC, UNIVAC I
Second	1956–1963	Transistors	Smaller, faster, more reliable; assembly language and early high-level languages (FORTRAN, COBOL)	IBM 1401, IBM 7094
Third	1964–1971	Integrated Circuits (IC)	Still smaller, keyboard and monitor, operating systems, high-level languages	IBM 360, PDP-8
Fourth	1971–present	Microprocessor (VLSI)	Personal computers, GUI, networking, Internet, laptops	IBM PC, Apple Macintosh, modern laptops
Fifth	Present & beyond	ULSI, Artificial Intelligence	AI, voice recognition, robotics, parallel processing, quantum computing research	AI assistants, expert systems

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Memory Trick: Vacuum Tube → Transistor → IC → Microprocessor → AI. Remember: 1st = Vacuum tube, 2nd = Transistor, 3rd = IC, 4th = Microprocessor (Intel 4004, 1971).

C. Types of Computers

Basis	Type	Description	Example
By Size	Supercomputer	Fastest and most powerful; thousands of processors; used for weather forecasting, space and scientific simulation	PARAM series (C-DAC, India)
	Mainframe	Large, powerful; serves hundreds of users at once; banks, airlines, insurance	IBM Z series
	Mini / Server	Mid-sized multi-user computer; provides services to other computers	Web, file and database servers
	Microcomputer	Small computer for personal use	Desktop, laptop, tablet, smartphone
By Working	Analog	Works on continuous physical quantities	Speedometer, thermometer
	Digital	Works on binary data (0 and 1)	PC, laptop, smartphone
	Hybrid	Combination of analog and digital	ICU monitors, petrol pump machine

D. Applications of Computers

Education E-learning, online exams, digital libraries, smart classes	**Communication** Email, video calls, social media, messaging apps
Banking & Finance ATM, net banking, UPI payments, stock markets	**Science & Research** Data analysis, weather forecasting, simulations
Healthcare Patient records, MRI/CT scan, telemedicine, robotic surgery	**Defence & Space** Radar, missile guidance, satellites, surveillance
Business & Commerce Accounting, GST billing, payroll, inventory, e-commerce	**Transportation** Air traffic control, GPS navigation, railway reservation (IRCTC)
Entertainment Movies, video games, OTT platforms, animation, music	**Government** E-governance, Aadhaar, DigiLocker, census, online tax filing
Industry Robotics, CAD/CAM, automated production lines	**Agriculture** Weather alerts, drones for spraying, mandi price apps

1.2.2 IT Gadgets and their Applications

Gadget	Description	Applications
Smartphone	Pocket computer with touchscreen, camera, Internet and apps; runs Android or iOS	Calls, UPI payments, social media, photography, online learning
Tablet	Larger touchscreen device, lighter than a laptop	Reading, digital notes, presentations, drawing
Laptop	Portable personal computer with built-in screen, keyboard and battery	Office work, programming, studies

Gadget	Description	Applications
Smartwatch / Fitness Band	Wearable device connected to a phone; has sensors	Heart rate, steps, sleep tracking, notifications, calls
Smart Speaker	Voice-controlled speaker with a virtual assistant (Alexa, Google Assistant)	Music, reminders, controlling smart-home devices
E-Reader	Device with e-ink display for reading digital books (Kindle)	Reading e-books and documents without eye strain
Wireless Earbuds / Headset	Bluetooth audio devices with microphone	Music, calls, online classes, gaming
Smart TV	TV with Internet connectivity and apps	OTT streaming, screen mirroring, YouTube
Digital / Action Camera	Captures photos and video in digital form	Photography, vlogging, adventure sports
VR / AR Headset	Gives a virtual (VR) or augmented (AR) 3D experience	Gaming, training, virtual tours, medical education
Drone	Unmanned flying device with camera and sensors	Photography, agriculture spraying, mapping, delivery
Smart Home Devices (IoT)	Bulbs, plugs, cameras, locks connected to the Internet	Remote control and home security
Wi-Fi Router / Hotspot	Device that shares an Internet connection wirelessly	Home/office networks, mobile hotspot
Power Bank	Portable battery for charging devices	Charging phones and gadgets on the go
POS & QR Scanner	Point-of-Sale machine / QR code reader	Shop billing, UPI and card payments
3D Printer	Builds three-dimensional objects layer by layer	Prototypes, spare parts, medical models
Robots	Programmable machines that perform physical tasks	Factories, warehouses, cleaning, surgery

Latest Technologies behind Modern Gadgets

Technology	Meaning	Use
Artificial Intelligence (AI)	Machines that can learn, understand language and make decisions	Chatbots, voice assistants, face recognition, translation
Internet of Things (IoT)	Everyday objects connected to the Internet to collect and share data	Smart homes, smart meters, smart farming
Cloud Computing	Using remote servers on the Internet to store and process data	Google Drive, OneDrive, online software
5G	Fifth-generation mobile network with very high speed and low delay	HD streaming, online gaming, smart cities
Blockchain	Secure, shared digital record of transactions	Cryptocurrency, secure records
AR / VR	Mixing digital objects with the real world / fully virtual world	Education, gaming, shopping, training

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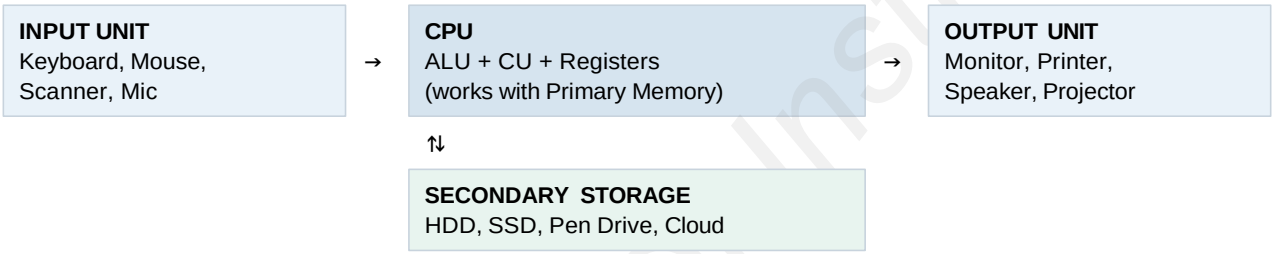
1.3 Basics of Hardware and Software

Basis	Hardware	Software
Definition	Physical, tangible parts of a computer that you can touch	Set of programs/instructions that tell the hardware what to do
Examples	CPU, RAM, keyboard, monitor, hard disk, printer	Windows, MS Word, Chrome browser, Python
Can be touched?	Yes — physical components	No — logical / virtual
Failure type	Wear and tear, physical damage	Bugs, viruses, corruption
Relationship	Hardware cannot work without software	Software needs hardware to run

Block Diagram of a Computer System



1.3.1 Hardware

> *Hardware means all the physical components of a computer system that can be seen and touched — the CPU, memory, input devices, output devices and storage devices.*

1.3.1.1 Central Processing Unit (CPU)

> *The CPU is the "brain" of the computer. It fetches instructions from memory, decodes them and executes them. All arithmetic, logic and control operations happen in the CPU. A CPU built on a single chip is called a **microprocessor**.*

Component	Full Form	Function
ALU	Arithmetic Logic Unit	Performs arithmetic operations (+, −, ×, ÷) and logical operations (AND, OR, NOT, comparisons)
CU	Control Unit	Directs and coordinates all operations; fetches, decodes and controls execution of instructions
Registers	—	Small, ultra-fast storage inside the CPU (e.g., Accumulator, Program Counter, Instruction Register)
Clock	—	Generates pulses that synchronize CPU operations; speed measured in GHz
Cache	—	Small, very fast memory inside/near the CPU that holds frequently used data

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Instruction Cycle: The CPU repeats four steps for every instruction:

1. FETCH	→	2. DECODE	→	3. EXECUTE	→	4. STORE
Get instruction from memory		Understand the instruction		Perform the operation		Write the result

- **Clock speed:** measured in GHz — higher GHz generally means a faster CPU.
- **Cores:** a multi-core CPU has several processing units on one chip (dual-core, quad-core, octa-core) and can do many tasks at once.
- **Popular CPU makers:** Intel, AMD (laptops/PCs); Apple, Qualcomm, MediaTek (mobile phones).

Other Important Internal Parts

Part	Function
Motherboard	Main circuit board that connects the CPU, RAM, storage and all other components
SMPS (Power Supply)	Converts AC mains supply into low-voltage DC for the computer parts
GPU (Graphics Card)	Processor that handles graphics, video and gaming; also used in AI work
Ports	Sockets for connecting devices — USB, HDMI, audio jack, LAN (Ethernet), Type-C

> **Memory Trick:** ALU = Arithmetic Logic Unit (does the math), CU = Control Unit (does the managing), Registers = CPU's notepad.

1.3.1.2 Input Devices

> *An input device is a hardware device used to enter data and instructions into the computer. It converts human-readable data into a form the computer can understand.*

Device	Description	Use
Keyboard	Primary input device; standard keyboard has about 104 keys — alphanumeric, function (F1–F12), control (Ctrl, Alt, Shift), numeric keypad and navigation keys. Common layout: QWERTY	Typing text, numbers and commands
Mouse	Pointing device with left button, right button and scroll wheel. Types: optical, laser, wireless, trackball	Moving the cursor, selecting items in GUI
Touchpad	Touch-sensitive pad on a laptop that works like a mouse	Laptop cursor control
Scanner	Converts physical documents/photos into digital format	Digitizing documents, photocopying
Microphone	Captures voice/sound as input	Voice commands, calls, recording
Webcam	Captures video and images	Video conferencing, online classes
Joystick	Pointing device to control movement	Games, flight simulators
Light Pen	Pen-shaped device to point or draw on screen (now rarely used)	Older CAD systems
Barcode / QR Reader	Reads barcodes or QR codes using light/laser	Shops, inventory, UPI payments
OMR	Optical Mark Recognition — detects pencil/pen marks on sheets	Exam answer sheets, surveys
OCR	Optical Character Recognition — reads printed text and converts it to editable text	Digitizing books and documents

Device	Description	Use
MICR	Magnetic Ink Character Recognition — reads magnetic ink characters	Bank cheque processing
Biometric Sensor	Captures fingerprint, face or iris data	Attendance, Aadhaar, phone unlock
Touchscreen	Works as both input and output — operated by finger touch	Smartphones, ATMs, kiosks
Digitizer / Stylus	Converts hand-drawn lines into digital form	Graphic tablets, digital drawing

1.3.1.3 Output Devices

> *An output device receives processed data (information) from the computer and presents it to the user in a human-readable form — as text, image, video, sound or print.*

Basis	Softcopy Output	Hardcopy Output
Meaning	Temporary output seen or heard on a device	Permanent output printed on paper or other material
Devices	Monitor, speaker, projector, headphones	Printer, plotter, Braille printer
Example	Watching a document on screen	Printed result sheet

Monitor / VDU (Visual Display Unit) is the main output device. Its sharpness depends on **resolution** (number of pixels, e.g., 1920 × 1080).

Type	Full Form	Description
CRT	Cathode Ray Tube	Old, bulky monitors using electron beam; heavy, high power consumption
LCD	Liquid Crystal Display	Flat, thin screen with low power use; uses a TFT panel for better quality
LED	Light Emitting Diode	LCD with LED backlight; brighter and more energy efficient
OLED	Organic LED	Each pixel produces its own light; deep black, thin and flexible; used in premium phones and TVs

Other Output Devices

Device	Description	Output Type
Printer	Prints text/images onto paper	Hardcopy
Plotter	Draws large diagrams, maps and blueprints using pens	Hardcopy
Speaker / Headphones	Convert digital audio signals into sound	Softcopy (audio)
Projector	Displays computer output on a large screen or wall	Softcopy (projected)
Braille Printer	Prints text in Braille for visually impaired people	Hardcopy

Types of Printers

Category	Type	Working	Example Use
Impact	Dot Matrix	Pins strike an inked ribbon against paper to form characters from dots; can print carbon copies	Bills, railway/bank slips
Non-Impact	Inkjet	Sprays tiny ink droplets onto paper	Home/office use, photos

Category	Type	Working	Example Use
Non-Impact	Laser	Uses laser beam and toner powder; fast, high quality	Offices, schools
Non-Impact	Thermal	Uses heat on special heat-sensitive paper	Receipts, ATM slips
Special	3D Printer	Builds three-dimensional objects layer by layer	Prototypes, manufacturing

Exam Tip: Printer speed: PPM (pages per minute) for laser/inkjet and CPS (characters per second) for dot matrix. Print quality: DPI (dots per inch).

Exam Tip: Touchscreen is both an input and an output device. Monitor/VDU = Softcopy; Printer = Hardcopy.

1.3.1.4 Computer Memory & Storage

*Memory is the part of a computer that stores data and instructions — temporarily during processing or permanently for later use. Memory is of two main types: **Primary** and **Secondary**.*

A. Primary Memory (Main Memory) — directly accessed by the CPU; fast but limited in size.

Type	Full Form	Description	Volatile?
RAM	Random Access Memory	Temporary working memory used while the computer is ON; data is lost when power is off. Types: SRAM (fast, used in cache) and DRAM (main RAM; DDR4/DDR5)	Yes
ROM	Read Only Memory	Permanent memory written by the manufacturer; stores BIOS/firmware that starts the computer	No
PROM	Programmable ROM	Can be programmed once by the user; cannot be erased	No
EPROM	Erasable Programmable ROM	Can be erased with UV light and reprogrammed	No
EEPROM	Electrically Erasable PROM	Can be erased and rewritten electrically without removing the chip; flash memory is a development of it	No
Cache	—	Very fast memory between CPU and RAM; holds frequently used data (L1, L2, L3)	Yes
Registers	—	Fastest memory, inside the CPU; holds data being processed right now	Yes

B. Secondary Memory (Storage) — permanent, large-capacity storage; data must be loaded into RAM before the CPU can use it.

Storage Device	Type	Description	Typical Capacity
Hard Disk (HDD)	Magnetic	Spinning platters; large capacity, affordable, slower	500 GB – 20 TB
SSD	Flash (electronic)	No moving parts; much faster, silent and more durable than HDD	128 GB – 8 TB
Pen Drive (USB)	Flash	Portable plug-and-play storage	8 GB – 1 TB
SD / Memory Card	Flash	Used in cameras, phones and drones	2 GB – 1 TB
CD	Optical	Disc read by laser	700 MB
DVD	Optical	Higher capacity; movies and software	4.7 GB – 8.5 GB
Blu-ray Disc	Optical	High-definition video and large data	25 GB – 100 GB

Storage Device	Type	Description	Typical Capacity
Cloud Storage	Network-based	Remote servers accessed via Internet (Google Drive, OneDrive, iCloud)	Free limit; paid plans for more

C. Primary vs Secondary Memory

Basis	Primary Memory	Secondary Memory
Access	Directly by CPU	Through RAM (not directly)
Speed	Very fast	Slower
Capacity	Small (GB)	Large (GB – TB)
Cost per GB	High	Low
Data	RAM is volatile; ROM is permanent	Permanent
Examples	RAM, ROM, Cache, Registers	HDD, SSD, Pen drive, DVD

D. Memory Hierarchy — faster memory is costlier and smaller in size.

Level	Memory Type	Speed	Size	Cost
1 (Fastest)	CPU Registers	Extremely fast	Bytes	Very high
2	Cache (L1, L2, L3)	Very fast	KB – MB	High
3	RAM (Main Memory)	Fast	4 GB – 64 GB	Medium
4 (Slowest)	Secondary storage (HDD/SSD)	Slow to medium	500 GB – TB	Low

E. Memory Units

Unit	Symbol	Equivalent Value
Bit	b	Smallest unit — 0 or 1
Nibble	—	4 bits
Byte	B	8 bits (1 character = 1 byte)
Kilobyte	KB	1024 bytes
Megabyte	MB	1024 KB
Gigabyte	GB	1024 MB
Terabyte	TB	1024 GB
Petabyte	PB	1024 TB

> **Exam Tip:** 1 KB = 1024 bytes (NOT 1000) because computers use binary (base 2) and $2^{10} = 1024$. Note: storage makers often sell capacity using 1 GB = 1000 MB, so a "500 GB" disk shows less in Windows.

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SECTION 4: SOFTWARE

1.3.2 Software

> *Software is a set of programs and instructions that tells the computer hardware what to do and how to do it. Without software, hardware is only a lifeless machine.*

Main Type	Sub-types / Examples
System Software	Operating System, Device Drivers, Utility Software, Language Translators, Firmware
Application Software	General-purpose (MS Office, browsers) and Specific-purpose (Tally, railway reservation, hospital software)

1.3.2.1 Application Software

> *Application software is designed to perform specific tasks for the end user. It runs on top of the operating system.*

Category	Description	Examples
Word Processor	Creating and editing text documents	MS Word, LibreOffice Writer, Google Docs
Spreadsheet	Calculations, data analysis and charts	MS Excel, LibreOffice Calc, Google Sheets
Presentation	Creating slide shows	MS PowerPoint, Google Slides, Canva
Database (DBMS)	Storing and managing structured data	MS Access, MySQL, Oracle
Web Browser	Browsing websites on the Internet	Chrome, Firefox, Edge, Safari
Communication	Email, chat and video meetings	Gmail, WhatsApp, Zoom, Google Meet
Accounting	Financial management, GST and billing	Tally Prime, QuickBooks, Busy
Graphics & Design	Image editing and designing	Photoshop, CorelDRAW, GIMP
Media Player	Playing audio and video files	VLC, Windows Media Player

Types of application software:

- **General-purpose (packaged) software** — ready-made software used by many people, e.g., MS Office.
- **Customized (tailor-made) software** — developed for a particular organization, e.g., a bank's core banking system.
- **Web-based software** — runs in a browser without installation, e.g., Google Docs.

1.3.2.2 Systems Software

> *System software manages and controls the computer hardware and provides a platform on which application software can run.*

Operating System (OS) is the most important system software. Its main functions are:

- **Process management** — decides which program uses the CPU and when
- **Memory management** — allocates and frees RAM for programs
- **File management** — creates, stores, searches and deletes files and folders
- **Device management** — controls input/output devices through drivers
- **Security** — passwords, user accounts, permissions
- **User interface** — CLI (command line) or GUI (icons, windows, menus)

Type of OS	Meaning	Example
Single-user	One user works at a time	MS-DOS, early Windows
Multi-tasking	Runs several programs at the same time	Windows, macOS, Android
Multi-user	Many users share one computer at the same time	Linux, UNIX servers
Real-time (RTOS)	Gives result within a fixed time; used in critical systems	Air traffic control, medical devices
Mobile OS	Designed for phones and tablets	Android, iOS

System Software	Description	Examples
Operating System	Manages hardware resources, runs programs, provides user interface	Windows, Linux, macOS, Android, iOS
Device Drivers	Allow the OS to communicate with hardware devices	Printer driver, graphics driver, USB driver
Firmware	Permanent software stored in ROM/flash of a device	BIOS/UEFI, router firmware
Language Translators	Convert program code into machine language	Compiler, Interpreter, Assembler

Translator	Function	Languages
Compiler	Translates the entire program at once into machine code; shows all errors together; faster execution	C, C++, Pascal
Interpreter	Translates and runs the program line by line; easier to debug; stops at first error	Python, JavaScript, BASIC
Assembler	Converts assembly language (mnemonics) into machine language	Assembly programs

> **Exam Tip:** Compiler = whole program at once (C, C++). Interpreter = line by line (Python). Assembler = Assembly → Machine code. Java is first compiled to bytecode and then run by the JVM.

1.3.2.3 Utility Software

> *Utility software helps to maintain, protect, analyse and optimize the computer. It is a part of system software that performs supporting tasks.*

Utility	Purpose	Examples
Antivirus	Detects and removes viruses, malware and spyware	Windows Defender, Quick Heal, Kaspersky
Firewall	Blocks unauthorized access from the network	Windows Firewall
Disk Cleanup	Deletes temporary and unwanted files to free space	Disk Cleanup, CCleaner
Disk Defragmenter	Rearranges scattered file parts on an HDD for faster access (not needed for SSD)	Windows Optimize Drives
Backup & Restore	Makes a copy of data to recover after loss	Windows Backup, File History
File Compression	Reduces file size / makes ZIP archives	WinRAR, 7-Zip, WinZip
File Manager	Browse, copy, move and organize files and folders	File Explorer, Files app
Task Manager	Shows running programs and resource usage; closes hung programs	Windows Task Manager

1.3.2.4 Open Source and Proprietary Software

Basis	Open Source Software	Proprietary Software
Source code	Publicly available	Kept secret by the owner
Cost	Usually free	Paid licence (or free with limits)
Modification	Anyone can study, change and share	Not allowed; only owner can modify
Support	Community forums; paid support optional	Official company support
Examples	Linux, LibreOffice, Mozilla Firefox, VLC, Android (AOSP), Python	Windows, MS Office, Adobe Photoshop, Tally Prime

Licence Type	Meaning	Example
Freeware	Free to use but source code is not open	Adobe Acrobat Reader, Google Chrome
Shareware	Free trial for limited time/features; payment needed afterwards	WinRAR (trial), trial antivirus
Freemium	Basic features free; advanced features paid	Canva, Spotify
Commercial	Must buy a licence before use	MS Office, Windows

1.3.2.5 Mobile Apps

> *A mobile app is an application program designed to run on smartphones and tablets. Apps are downloaded and installed from an app store.*

App Type	Description	Example
Native App	Built for one OS (Android or iOS); best speed and access to phone features	Camera app, Google Pay
Web App	Runs in the browser; no installation	Web version of Gmail
Hybrid / PWA	Built once and used on many platforms; behaves like an app	Many shopping and news apps

App stores: Google Play Store (Android) and Apple App Store (iOS).

Common app categories:

Communication WhatsApp, Telegram, Gmail, Zoom	**Payments** PhonePe, Google Pay, Paytm, BHIM (UPI)
Government DigiLocker, UMANG, mAadhaar	**Travel** IRCTC Rail Connect, Google Maps
Education DIKSHA, YouTube, Khan Academy	**Shopping** Amazon, Flipkart

Safe use of mobile apps:

- Install apps only from the official store; avoid APK files from unknown websites.
- Check the app permissions (camera, contacts, location) before allowing them.
- Keep apps and the phone software updated.
- Never share your OTP, UPI PIN, CVV or password with anyone.
- Use a screen lock and enable two-step verification where available.

1.4 Summary

Computer & Evolution

- Computer = electronic device that takes input, processes, stores and gives output (IPO cycle).
- Characteristics: speed, accuracy, diligence, versatility, storage — but NO intelligence (GIGO).
- Father of Computer = Charles Babbage; first general-purpose electronic computer = ENIAC (1946).
- Generations: Vacuum tube → Transistor → IC → Microprocessor → AI.
- By size: Super, Mainframe, Mini, Micro. By working: Analog, Digital, Hybrid.

IT Gadgets

- Smartphone, tablet, smartwatch, smart speaker, e-reader, VR/AR headset, drone, smart TV and IoT devices are modern IT gadgets.
- AI, IoT, cloud, 5G and AR/VR are the technologies behind them.

Hardware

- CPU = ALU + CU + Registers; clock speed measured in GHz.
- Input devices: keyboard, mouse, scanner, mic, OMR, OCR, MICR, barcode reader. Output devices: monitor, printer, plotter, speaker, projector.
- Touchscreen is both input and output. Softcopy = screen; Hardcopy = paper.
- RAM = volatile; ROM = non-volatile; Registers are the fastest memory, then Cache, then RAM.
- Secondary storage: HDD, SSD, pen drive, DVD, cloud. 1 Byte = 8 bits; 1 KB = 1024 bytes; 1 MB = 1024 KB; 1 GB = 1024 MB.

Software

- Software = System software (OS, drivers, utilities, translators) + Application software (MS Office, Tally, browsers).
- Utility software maintains the computer — antivirus, backup, disk cleanup, file compression.
- Open source: source code is public (Linux, LibreOffice). Proprietary: owned and licensed by a company (Windows, Photoshop).
- Mobile apps are installed from the Google Play Store / Apple App Store; use only trusted apps and never share OTP/PIN.

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1.5 Model Questions and Answers

> *These questions are commonly asked in exams. Correct answers are marked with ✓ and an explanation is provided.*

Part A: Multiple Choice Questions (MCQs)

Q1. Who is known as the Father of the Computer?

(a) Blaise Pascal
(b) Charles Babbage ✓
(c) Alan Turing
(d) Howard Aiken

Explanation: *Charles Babbage designed the Analytical Engine (1837), which had the basic ideas of a modern computer — input, memory, processing and output.*

Q2. First generation computers used which technology?

(a) Transistors
(b) Integrated Circuits
(c) Vacuum tubes ✓
(d) Microprocessors

Explanation: *First generation (1940–56) computers like ENIAC used vacuum tubes.*

Q3. Which technology was used in Third Generation computers?

(a) Vacuum tubes
(b) Transistors
(c) Integrated Circuits (IC) ✓
(d) Quantum chips

Explanation: *Third generation (1964–71) used Integrated Circuits, which placed many transistors on one chip.*

Q4. Fourth generation computers are based on:

(a) Vacuum tubes
(b) Transistors
(c) Punched cards
(d) Microprocessors (VLSI) ✓

Explanation: *The microprocessor (Intel 4004, 1971) started the fourth generation and made personal computers possible.*

Q5. Which is the fastest and most powerful type of computer?

(a) Mainframe
(b) Minicomputer
(c) Supercomputer ✓
(d) Microcomputer

Explanation: *Supercomputers (e.g., PARAM) are used for weather forecasting and scientific simulations.*

Q6. Which of the following is a wearable IT gadget?

(a) Router
(b) Smartwatch ✓
(c) Projector
(d) Scanner

Explanation: *A smartwatch is worn on the wrist and tracks health data and notifications.*

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Q7. IoT stands for:

(a) Input of Things
(b) Internet of Things ✓
(c) Integration of Technology
(d) Internal Operating Tool

Explanation: *Internet of Things means everyday objects connected to the Internet, such as smart bulbs and cameras.*

Q8. Which of the following is NOT a part of the CPU?

(a) ALU
(b) Control Unit
(c) Registers
(d) Hard Disk ✓

Explanation: *CPU contains ALU, CU and registers. Hard disk is secondary storage outside the CPU.*

Q9. CPU clock speed is measured in:

(a) Bytes
(b) Pixels
(c) Gigahertz (GHz) ✓
(d) DPI

Explanation: *Clock speed tells how many cycles the CPU performs per second; 1 GHz = one billion cycles per second.*

Q10. Which of the following is an input device?

(a) Monitor
(b) Plotter
(c) Scanner ✓
(d) Speaker

Explanation: *A scanner feeds documents/images into the computer. The others are output devices.*

Q11. Which device is used for both input and output?

(a) Keyboard
(b) Printer
(c) Touchscreen ✓
(d) Mouse

Explanation: *A touchscreen takes touch as input and displays information as output.*

Q12. Bank cheques are processed using which technology?

(a) OMR
(b) OCR
(c) MICR ✓
(d) Barcode

Explanation: *MICR reads the magnetic ink characters printed on cheques.*

Q13. Which printer works by striking a ribbon against paper?

(a) Laser
(b) Inkjet
(c) Dot Matrix ✓
(d) Thermal

Explanation: *Dot matrix is an impact printer; the others are non-impact printers.*

Q14. Which memory loses its data when power is switched off?

(a) ROM
(b) RAM ✓
(c) Hard disk
(d) SSD

Explanation: *RAM is volatile; ROM, HDD and SSD keep data without power.*

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Q15. BIOS/firmware that starts the computer is stored in:

(a) RAM
(b) Cache
(c) ROM ✓
(d) Pen drive

Explanation: *ROM is non-volatile, so start-up instructions remain even when power is off.*

Q16. Which is the fastest memory in a computer?

(a) RAM
(b) Cache
(c) Register ✓
(d) SSD

Explanation: *Registers are inside the CPU and are the fastest; then cache, RAM and secondary storage.*

Q17. 1 GB is equal to:

(a) 1000 KB
(b) 1024 MB ✓
(c) 1024 KB
(d) 100 MB

Explanation: *1 GB = 1024 MB in binary measurement.*

Q18. Which storage device has no moving parts?

(a) HDD
(b) CD
(c) DVD
(d) SSD ✓

Explanation: *An SSD uses flash memory chips, so it is faster, silent and more durable than an HDD.*

Q19. Which software manages the hardware and runs other programs?

(a) Application software
(b) Operating System ✓
(c) Utility program
(d) Compiler

Explanation: *The Operating System (Windows, Linux, macOS, Android) manages all hardware and software resources.*

Q20. Which of the following is application software?

(a) Windows 11
(b) Device driver
(c) MS Excel ✓
(d) BIOS

Explanation: *MS Excel is a spreadsheet application used by end users for a specific task.*

Q21. Which of the following is utility software?

(a) Antivirus ✓
(b) MS Word
(c) Google Chrome
(d) VLC Player

Explanation: *Utility software performs maintenance tasks — antivirus, backup, disk cleanup, file compression.*

Q22. Which of the following is open source software?

(a) Linux ✓
(b) Windows
(c) Adobe Photoshop
(d) MS Office

Explanation: *Linux has publicly available source code that anyone can study, modify and share.*

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Q23. Which of these is proprietary software?

(a) Linux
(b) LibreOffice
(c) Mozilla Firefox
(d) Adobe Photoshop ✓

Explanation: *Proprietary software is owned by a company; its source code is not shared and a licence is required.*

Q24. Android mobile apps are officially downloaded from:

(a) App Store
(b) Google Play Store ✓
(c) Windows Store only
(d) Any unknown website

Explanation: *Google Play Store is the official store for Android apps; the Apple App Store is for iOS.*

Q25. A translator that converts a program line by line is called:

(a) Compiler
(b) Assembler
(c) Interpreter ✓
(d) Linker

Explanation: *An interpreter translates and executes one line at a time (e.g., Python). A compiler translates the whole program at once.*

Part B: True or False

#	Statement	Answer
1	A computer has its own intelligence and can think like a human.	False — it has no IQ and follows instructions only.
2	ROM is a non-volatile memory.	True
3	1 KB is equal to 1000 bytes in computer memory measurement.	False — 1 KB = 1024 bytes.
4	Antivirus is an example of utility software.	True
5	Proprietary software gives access to its source code to everyone.	False — that is open source software.
6	A touchscreen can work as both input and output device.	True

Part C: Short Answer Questions

Q1. What is a computer? Write its main characteristics.

Ans: A computer is an electronic device that accepts data, processes it as per instructions, stores it and gives output. Main characteristics: speed, accuracy, diligence, versatility, storage capacity and automation; it has no intelligence of its own.

Q2. Differentiate between data and information.

Ans: Data is raw, unprocessed facts (e.g., 85, 70, 90). Information is processed and meaningful data (e.g., average marks = 81.67) that helps in decision making.

Q3. Write a short note on the five generations of computers.

Ans: 1st: vacuum tubes; 2nd: transistors; 3rd: integrated circuits; 4th: microprocessors/VLSI; 5th: AI and ULSI. Each generation became smaller, faster, cheaper and more reliable.

Q4. What is a CPU? Name its components.

Ans: CPU is the brain of the computer which fetches, decodes and executes instructions. Its components are ALU (arithmetic and logic operations), CU (control and coordination) and Registers (fast temporary storage).

Q5. Differentiate between RAM and ROM.

Ans: RAM is volatile, temporary read/write memory that holds running programs. ROM is non-volatile, permanent memory that stores start-up instructions such as BIOS.

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Q6. What is the difference between hardware and software?

Ans: Hardware is the physical part of a computer that can be touched (CPU, monitor). Software is the set of programs that instruct the hardware (Windows, MS Word).

Q7. Differentiate between system software and application software.

Ans: System software manages the hardware and provides a platform for other software (OS, drivers, utilities). Application software performs specific user tasks (MS Word, Tally, Chrome).

Q8. What is utility software? Give examples.

Ans: Utility software performs maintenance and protection tasks for the computer, such as antivirus, disk cleanup, backup, file compression and file manager.

Q9. Differentiate between open source and proprietary software.

Ans: Open source software has publicly available source code that can be modified and shared (Linux, LibreOffice). Proprietary software is owned by a company, source code is secret and a licence is needed (Windows, Photoshop).

Q10. What are mobile apps? How can they be used safely?

Ans: Mobile apps are programs designed for smartphones/tablets, downloaded from Play Store or App Store. For safe use: install from official stores, check permissions, update regularly and never share OTP/PIN.

Part D: Long Answer Questions (Practice)

- Explain the evolution of computers with the help of a generation-wise table.
- Describe the block diagram of a computer system and explain the functions of each unit.
- Explain different types of input and output devices with examples.
- Explain the memory hierarchy and the difference between primary and secondary memory.
- What are IT gadgets? Explain any five latest gadgets and their applications.
- Explain the types of software with suitable examples.

Best of Luck for Your Exam!

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