ZAHID NOTES • SINDH TEXTBOOK BOARD

9th Class Computer Science Notes Sindh Board Full Book Notes

Complete chapter-wise study notes, key terms and original practice questions for Class 9 Computer Science.

About these notes

These notes follow the chapters of the Sindh Textbook Board book *Computer Science for Grade 9* (Sindh Textbook Board, Jamshoro), prescribed for the Secondary School Certificate examination by the Boards of Intermediate and Secondary Education, Karachi, Hyderabad, Sukkur, Larkana and Mirpurkhas. The book covers all Sindh boards.

1. Fundamentals of Computer • 2. Fundamentals of Operating System • 3. Office Automation • 4. Data Communication and Computer Networks • 5. Computer Security and Ethics • 6. Web Development • 7. Introduction to Database System.

Each chapter contains study notes, key terms, and original practice questions (multiple-choice, short and long questions) written for these notes, with an MCQ answer key at the end of the book.

Written in English, matching the English-medium STBB book (an Urdu-medium edition also exists).

About the paper: The paper pattern figures in these notes are third-party reproduced, not officially confirmed. Please check the current model paper / notification on your own board's official website (for example, BSEK Karachi) before your examination. No examination dates, fees, or past-paper questions are printed in these notes.

For Class 9 students of all Sindh boards: Karachi, Hyderabad, Sukkur, Larkana and Mirpurkhas.

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How to use these notes

- Read the study notes of one chapter first, and learn the key terms in your own words.
- Then try the short and long questions without looking at the answers, and write the answers in your notebook.
- Attempt the MCQs, check them against the answer key at the end, and re-read any topic you got wrong.
- Practise the practical skills on a computer — reading alone is not enough for this subject.

The Sindh paper — what is known

The chapter list in this book is the verified STBB list: the official textbook's own contents page and the Sindh Curriculum for Computer Science Grades IX–X (2018, Directorate of Curriculum, Assessment and Research, Sindh) agree on the same seven chapters. The curriculum also gives this unit-wise weightage: Chapter 1 — 10%, Chapter 2 — 10%, Chapter 3 — 20%, Chapter 4 — 20%, Chapter 5 — 10%, Chapter 6 — 20%, Chapter 7 — 10%.

Theory paper (third-party reproduced, not officially confirmed): a Board of Secondary Education Karachi model paper for Class IX Computer Studies (theory) is reported as 60 marks in 3 hours — Section A: 12 multiple-choice questions (12 marks); Section B: short-answer questions, answer any 8 (24 marks); Section C: descriptive questions, answer any 4 (24 marks). That model paper belongs to an older syllabus, so treat the split as a guide only.

> **Please note — practical marks are not settled.** A 2026 update reports the Computer Science practical as 50 marks (two practical tasks of 20 marks each, plus 5 marks for the notebook and 5 for the viva). Another source lists the practical as 15 marks. Neither figure was read off an official board document, so no single practical total is stated as fact here — confirm it from your board's latest notification.

This is **not** the Punjab book: Sindh uses its own Sindh Textbook Board book. The Punjab revised *Computer Science and Entrepreneurship* chapters are not used in these notes.

Chapter 1 — Fundamentals of Computer

1.1 What is a computer?

A **computer** is an electronic machine that takes in data, processes it according to instructions, and gives out useful results. It works at very high speed, with great accuracy, and can store large amounts of information and use it again later.

Data means raw facts and figures, such as numbers, words or pictures, that by themselves have no clear meaning. **Information** is data that has been processed and organised so that it is useful — for example, a list of marks becomes information when it is arranged to show who passed and who failed.

1.2 Characteristics of a computer

- **Speed:** a computer can do millions of calculations in a second.
- **Accuracy:** it follows instructions exactly; mistakes usually come from wrong input or wrong instructions, not from the machine itself.
- **Storage:** it can keep huge amounts of data for a long time and find any item quickly.
- **Versatility:** the same machine can be used for writing, drawing, calculating, playing music, browsing the internet and much more.
- **Diligence and automation:** it does not get tired or bored, and once instructions are given it can carry out a whole task step by step without further help.

1.3 Evolution and generations

Early counting tools such as the abacus were followed by mechanical machines built by Pascal and Babbage. Charles Babbage is called the father of the computer for his Analytical Engine.

- **First generation:** vacuum tubes; large, hot, slow and expensive machines.
- **Second generation:** transistors; smaller, faster and more reliable.
- **Third generation:** integrated circuits (many transistors on one chip).
- **Fourth generation:** microprocessors; personal computers became common.
- **Fifth generation:** artificial intelligence, parallel processing and machines that can learn and understand language.

1.4 Classification of computers

- **By working principle:** *analogue* computers measure continuous values (for example, temperature); *digital* computers work with digits (0 and 1); *hybrid* computers combine both.
- **By size and power:** *microcomputers* (personal computers, laptops, tablets), *minicomputers* (used in medium-sized organisations), *mainframe computers* (large organisations, many users at once) and *supercomputers* (the fastest machines, used for weather forecasting, research and defence).

1.5 Parts of a computer system

A computer system has four main jobs: **input** (taking data in), **processing** (working on the data), **output** (showing the result) and **storage** (keeping data for later). The physical parts are called **hardware**; the programs are called **software**.

1.6 The central processing unit (CPU)

The **CPU** is the brain of the computer. It has three main parts: the **Arithmetic and Logic Unit (ALU)**, which does calculations and comparisons; the **Control Unit (CU)**, which directs all the parts and follows the instructions; and **registers**, small high-speed storage places inside the CPU that hold data while it is being worked on.

The CPU follows a repeated cycle: **fetch** an instruction from memory, **decode** it (work out what it means), **execute** it, and **store** the result. The speed of a CPU is measured in hertz — modern CPUs work at gigahertz (billions of cycles per second). The **motherboard** is the main circuit board that connects the CPU, memory and all other parts. A **bus** is a set of wires that carries data between parts of the computer.

1.7 Memory

- **RAM (Random Access Memory):** temporary memory. It holds the programs and data in use right now, and its contents are lost when the power is switched off.
- **ROM (Read Only Memory):** permanent memory. It holds the start-up instructions and cannot normally be changed by the user.
- **Cache memory:** very fast, small memory close to the CPU that keeps copies of data the CPU is likely to need again.

Memory is measured in bytes. A **bit** is a single 0 or 1; 8 bits make a **byte**. Then come kilobyte (KB), megabyte (MB), gigabyte (GB) and terabyte (TB), each roughly a thousand times the one before.

1.8 Storage devices

- **Hard disk drive (HDD):** a magnetic disk inside the computer, large capacity, used for the operating system, programs and files.
- **Solid state drive (SSD):** storage with no moving parts; faster and tougher than a hard disk.
- **USB flash drive and memory card:** small, portable storage for moving files between computers.

1.9 Input and output devices

- **Input:** keyboard, mouse, scanner, microphone, webcam, touch screen, joystick.
- **Output:** monitor, printer (inkjet and laser), speakers, plotter, projector.
- **Both input and output:** touch screen, and storage devices such as a USB drive.

1.10 Software and language translators

- **System software** runs the computer itself — the operating system, device drivers and utility programs.
- **Application software** does a job for the user — word processors, spreadsheets, browsers and games.
- **Language translators** turn programs written by people into machine language: a *compiler* translates a whole program at once, an *interpreter* translates it line by line, and an *assembler* translates assembly language.

> **Key terms:** data, information, hardware, software, CPU, ALU, Control Unit, register, RAM, ROM, cache, bit, byte, bus, motherboard, compiler, interpreter.

Chapter 1 — Questions

Short questions (with answers)

Q1. What is a computer?
Answer: A computer is an electronic machine that accepts data, processes it according to given instructions, and produces useful results (information) at high speed and with accuracy.

Q2. What is the difference between data and information?
Answer: Data means raw, unorganised facts; information is data that has been processed and organised so that it is meaningful and useful.

Q3. What is RAM? How is it different from ROM?
Answer: RAM is temporary memory that holds programs and data in use and loses its contents when the power is off. ROM is permanent memory that holds start-up instructions and keeps its contents without power.

Q4. Name any four input devices and any four output devices.
Answer: Input: keyboard, mouse, scanner, microphone. Output: monitor, printer, speakers, projector.

Q5. What does the Control Unit of the CPU do?
Answer: The Control Unit directs and controls all the parts of the computer; it fetches instructions, decodes them, and tells the other parts what to do.

Long questions (with answers)

Q1. Explain the main characteristics of a computer.
Answer: A computer is fast, doing millions of operations per second; accurate, following instructions exactly; able to store huge amounts of data and recall it quickly; versatile, doing many different kinds of work; diligent, working for long hours without tiredness; and automatic, carrying out a task step by step once instructions are given. Together these qualities make it useful in schools, offices, banks, hospitals and homes.

Q2. Describe the generations of computers.
Answer: The first generation used vacuum tubes and was large, hot and slow. The second used transistors and was smaller and more reliable. The third used integrated circuits, packing many transistors on one chip. The fourth used microprocessors, which made personal computers possible. The fifth generation aims at artificial intelligence, parallel processing and machines that can understand language and learn from experience. Each generation made computers smaller, faster, cheaper and more powerful.

Chapter 1 — Questions (continued)

Multiple-choice questions

Q1. The brain of the computer is the

A. Memory B. Monitor C. CPU D. Printer

Q2. Raw facts and figures are called

A. Information B. Data C. Software D. Output

Q3. Which of these is an output device?

A. Keyboard B. Mouse C. Scanner D. Monitor

Q4. 8 bits make one

A. Byte B. Kilobyte C. Megabyte D. Word

Q5. RAM is

A. Permanent memory B. Temporary memory C. A printer D. An input device

Q6. The part of the CPU that does calculations is the

A. Control Unit B. ALU C. Register D. Bus

Q7. A supercomputer is used for

A. Typing letters B. Weather forecasting and research C. Playing music only D. Printing photos

Q8. Which translator converts a whole program at once?

A. Interpreter B. Compiler C. Assembler D. Loader

Q9. A hybrid computer combines

A. Analogue and digital working B. Two keyboards C. Two monitors D. RAM and ROM

Q10. The main circuit board of a computer is the

A. Motherboard B. Hard disk C. Mouse pad D. Speaker

Chapter 2 — Fundamentals of Operating System

2.1 What is an operating system?

An **operating system (OS)** is system software that manages the computer and acts as a bridge between the user and the hardware. Without it, a user could not run programs, save files or use a printer. Common examples are Microsoft Windows, macOS, Linux and Android.

2.2 Functions of an operating system

- **Process management:** deciding which program runs, and when.
- **Memory management:** giving each program the memory it needs.
- **File management:** organising files into folders, and controlling saving, opening, copying and deleting.
- **Device management:** controlling input and output devices through small programs called *drivers*.
- **User interface:** giving the user a way to give commands — by typing, or by clicking icons and menus.
- **Security:** protecting files with user accounts and passwords, and controlling who may use what.

2.3 Booting

Booting is the process of starting the computer and loading the operating system into memory. When the power is switched on, the computer runs start-up instructions stored in ROM, checks the hardware, and then loads the operating system from the hard disk. *Cold booting* means starting from switched off; *warm booting* means restarting a computer that is already on.

2.4 Types of operating systems

- **Single-user:** one user at a time, such as a home PC.
- **Multi-user:** several users can work at the same time, each with their own account, as on a network server.
- **Multitasking:** several programs run at the same time, switching quickly between them.
- **Real-time:** must respond within a fixed, very short time — used in medical equipment, aircraft and factory control.
- **Batch:** collects similar jobs and runs them together without the user waiting for each one.
- **Time-sharing:** gives each user a small slice of the CPU in turn, so many users feel they have the machine to themselves.
- **Distributed:** runs across several computers connected together, sharing the work.

2.5 User interfaces

- **Command Line Interface (CLI):** the user types text commands. It is fast for experts but hard to learn.
- **Graphical User Interface (GUI):** the user points, clicks and drags icons, windows and menus. It is easy to learn and is used in Windows, macOS and Android.
- **Menu-driven and touch interfaces:** choices are picked from a list, or tapped on a touch screen, as on phones and cash machines.

2.6 Files and folders

A **file** is a collection of data stored under one name, such as a letter, a picture or a song. A **folder** (directory) is a container that holds files and other folders, so work can be organised — for example, a folder for each subject. A **file path** shows where a file lives, and a **file extension** (such as .docx, .jpg or .mp3) shows what kind of file it is.

2.7 Windows basics

- The **desktop** is the main screen; **icons** are small pictures that stand for programs, files and folders.
- The **taskbar** shows running programs and the Start button; the **system tray** shows the clock and small status icons.
- A **window** is a framed area on the screen. It can be moved, resized, minimised (hidden to the taskbar), maximised (filled the screen) or closed.
- **File Explorer** is used to find, copy, move, rename and delete files and folders.

2.8 Installing and removing software

To **install** a program, run its setup file, follow the on-screen steps, accept the licence, and choose where it should be stored. The program then appears in the Start menu. To **uninstall**, use the proper remove option (in Settings or Control Panel), not just deleting the program's folder, because installation also adds settings and shortcuts that must be removed cleanly. Always install software only from trusted sources.

2.9 Utility programs

- **Antivirus:** finds and removes harmful programs.
- **Backup tools:** copy important files so they can be recovered after a failure.
- **Disk cleanup and defragmentation:** remove unneeded files and tidy up how files are stored on a disk.
- **Compression tools:** make files smaller (for example, ZIP) so they take less space and are quicker to send.

> **Key terms:** operating system, booting, cold boot, warm boot, driver, multitasking, real-time system, CLI, GUI, file, folder, file extension, taskbar, File Explorer.

Chapter 2 — Questions

Short questions (with answers)

Q1. What is an operating system?
Answer: An operating system is system software that manages the computer hardware and software, and provides a bridge between the user and the machine.

Q2. What is booting?
Answer: Booting is the process of starting the computer and loading the operating system from the hard disk into memory so the computer is ready to use.

Q3. What is the difference between CLI and GUI?
Answer: In a CLI the user types text commands; it is fast for experts but hard to learn. In a GUI the user clicks icons, windows and menus; it is easy to learn and use.

Q4. What is a device driver?
Answer: A driver is a small program that lets the operating system communicate with a hardware device, such as a printer or a mouse.

Q5. What is a file extension? Give two examples.
Answer: A file extension is the letters after the dot in a file name that show the file type — for example, .docx for a Word document and .jpg for a picture.

Long questions (with answers)

Q1. Explain any five functions of an operating system.
Answer: An operating system manages processes, deciding which program runs and when; manages memory, giving each program what it needs; manages files, organising them into folders and controlling saving and deleting; manages devices through drivers; and provides a user interface so the user can give commands. It also provides security through user accounts and passwords. Without these jobs, programs could not run in an orderly way and the hardware could not be shared safely.

Q2. Describe the main types of operating systems with an example of each.
Answer: A single-user system serves one user at a time, like a home PC. A multi-user system serves several users at once, like a network server. A multitasking system runs several programs at the same time. A real-time system must answer within a fixed short time, as in medical or aircraft equipment. A batch system runs collected jobs together, a time-sharing system gives each user a small slice of CPU time in turn, and a distributed system shares work across several connected computers.

Chapter 2 — Questions (continued)

Multiple-choice questions

Q1. The software that manages the whole computer is the

A. Word processor B. Operating system C. Browser D. Antivirus

Q2. Loading the operating system when the computer starts is called

A. Formatting B. Booting C. Installing D. Copying

Q3. Which interface uses typed commands?

A. GUI B. CLI C. Touch screen D. Menu

Q4. A folder is used to

A. Print a document B. Organise files C. Speed up the CPU D. Connect to the internet

Q5. Which of these is an operating system?

A. MS Word B. Linux C. MS Excel D. Google Chrome

Q6. A real-time operating system is needed in

A. Aircraft control B. Typing a letter C. Playing a song D. Drawing a picture

Q7. The bar at the bottom of the Windows screen is the

A. Title bar B. Taskbar C. Menu bar D. Scroll bar

Q8. Which program is used to find and organise files in Windows?

A. File Explorer B. Paint C. Notepad D. Calculator

Q9. A driver is a program that

A. Writes letters B. Lets the OS control a hardware device C. Browses the web D. Compresses files

Q10. To remove software properly you should use

A. Delete on its folder only B. The uninstall option C. Switching off the PC D. Renaming the file

Chapter 3 — Office Automation

3.1 What is office automation?

Office automation means using computers and software to do ordinary office work quickly and accurately — writing letters, keeping records, making calculations, preparing presentations and sending messages. It saves time, reduces mistakes, makes documents easy to change and share, and keeps records safe and easy to find.

The best-known office package is Microsoft Office: **Word** for documents, **Excel** for spreadsheets, **PowerPoint** for presentations and **Access** for databases. Free alternatives work in a similar way.

3.2 Word processing (MS Word)

A **word processor** is used to create, edit and print text documents such as letters, reports and assignments.

- **Formatting text:** change the font (typeface), size, style (bold, italic, underline) and colour; align text left, right, centre or justified.
- **Paragraphs:** set line spacing, indentation and spacing before and after a paragraph.
- **Editing:** cut, copy and paste move or duplicate text; find and replace changes a word everywhere at once; undo reverses the last action.
- **Pages:** set margins, page size and orientation (portrait or landscape), add page numbers, headers and footers.
- **Tables and pictures:** insert a table to organise information, and add pictures or shapes to make a document clearer.
- **Checking:** the spell checker marks spelling mistakes and the grammar checker marks likely grammar errors.

3.3 Mail merge

Mail merge is a way of sending the same letter to many people, each with their own name and address filled in automatically. A main document (the letter) is combined with a data source (a list of names and addresses), so one letter is produced for each person instead of typing each one by hand.

3.4 Spreadsheets (MS Excel)

A **spreadsheet** is a grid of rows and columns used for numbers and calculations. Where a row and a column meet is a **cell**; each cell has an address, such as B4. A **workbook** is a file that holds one or more **worksheets**.

- **Formulas:** a formula begins with = and does a calculation, for example =A1+A2, or =B2*10. When a number changes, the result updates by itself.
- **Functions:** ready-made calculations, such as SUM (add a range), AVERAGE (find the mean), MAX (largest value), MIN (smallest value) and COUNT (how many numbers there are).
- **Charts:** a chart turns numbers into a picture — a column chart, bar chart, line chart or pie chart — so a pattern is easy to see.
- **Sorting and filtering:** sorting arranges rows in order; filtering shows only the rows that match a condition.

3.5 Presentations (MS PowerPoint)

A **presentation** is a set of slides shown to an audience. Each **slide** holds text, pictures, tables or charts. Good slides use short points, large readable text, a few colours and one clear idea per slide. **Transitions** are the effects between slides, and **animations** are movements of objects on a slide; both should be used sparingly so they do not distract from the message.

3.6 Databases in the office (MS Access)

A small office database can keep customer lists, stock records or student records in tables instead of on paper. (Databases are covered in full in Chapter 7.) Searching a database finds a record in seconds, and a report prints the records in a neat layout.

3.7 Working well with office software

- Save work often, and keep a backup copy of important files.
- Give files clear names and keep them in sensibly named folders.
- Check spelling and numbers before printing or sending a document.
- Use a template for letters and reports that are made again and again.
- Do not share passwords, and lock the computer when leaving the desk.

> **Key terms:** office automation, word processor, formatting, mail merge, spreadsheet, cell, workbook, worksheet, formula, function, chart, slide, transition, animation.

Chapter 3 — Questions

Short questions (with answers)

Q1. What is office automation?
Answer: Office automation means using computers and software to do office work — writing, calculating, record-keeping and communication — quickly and accurately.

Q2. Name the four main programs of Microsoft Office and one use of each.
Answer: Word — writing documents; Excel — spreadsheets and calculations; PowerPoint — presentations; Access — databases.

Q3. What is a cell in a spreadsheet?
Answer: A cell is the box where one row and one column meet in a spreadsheet; it has an address such as B4 and holds a number, text or formula.

Q4. What is mail merge?
Answer: Mail merge combines one main letter with a list of names and addresses to produce a personalised copy of the letter for each person.

Q5. What is the difference between a transition and an animation?
Answer: A transition is the effect shown when moving from one slide to the next; an animation is the movement of an object on a slide.

Long questions (with answers)

Q1. Explain the main features of a word processor.
Answer: A word processor lets you type and edit text, format it with fonts, sizes and styles, align paragraphs and set spacing, cut, copy and paste, and find and replace words. You can set margins and page orientation, add page numbers, headers and footers, insert tables and pictures, and check spelling and grammar. Because a document is stored as a file, it can be changed, printed again or shared without retyping.

Q2. What is a spreadsheet? Explain formulas, functions and charts.
Answer: A spreadsheet is a grid of rows and columns for working with numbers. A formula, starting with =, calculates a result from cell values, and updates itself when a number changes. A function is a ready-made calculation such as SUM, AVERAGE, MAX, MIN and COUNT. A chart turns the numbers into a picture — column, bar, line or pie — so trends and comparisons are easy to see. Spreadsheets are used for marks, budgets, bills and stock records.

Chapter 3 — Questions (continued)

Multiple-choice questions

Q1. Office automation means

A. Using computers for office work B. Building offices C. Repairing computers D. Selling furniture

Q2. MS Word is used for

A. Calculations B. Word processing C. Databases D. Presentations

Q3. In Excel, a formula begins with

A. # B. = C. + D. $

Q4. The function that adds a range of cells is

A. AVERAGE B. MAX C. SUM D. COUNT

Q5. A slide is part of a

A. Spreadsheet B. Database C. Presentation D. Web page

Q6. The cell address B4 means

A. Row B, column 4 B. Column B, row 4 C. Sheet 4, book B D. Page 4

Q7. Mail merge needs a main document and a

A. Printer B. Data source C. Scanner D. Speaker

Q8. A pie chart is best for showing

A. Parts of a whole B. Change over time C. A list of names D. A long text

Q9. Undo is used to

A. Save a file B. Reverse the last action C. Print a page D. Close a program

Q10. Justified text is aligned

A. Only on the left B. Only on the right C. Evenly on both sides D. In the centre

Chapter 4 — Data Communication and Computer Networks

4.1 Data communication

Data communication is the exchange of data between two or more devices. Every communication needs five parts: a **sender** (who sends), a **receiver** (who receives), a **message** (the data), a **medium** (the path the data travels on) and a **protocol** (the agreed rules for the exchange).

4.2 Transmission modes

- **Simplex:** data flows in one direction only — for example, a keyboard sends to the computer, and a radio broadcast.
- **Half-duplex:** data can flow both ways, but only one way at a time — for example, a walkie-talkie.
- **Full-duplex:** data flows both ways at the same time — for example, a telephone call.

4.3 Transmission media

- **Guided (wired) media:** twisted-pair cable (telephone and local networks), coaxial cable (older TV and networks) and fibre-optic cable (thin glass strands carrying light; very fast and used for long distances).
- **Unguided (wireless) media:** radio waves (radio and mobile phones), microwaves (long-distance links) and infrared (short-range, such as a TV remote). Wireless is convenient but can be slower and less secure than a cable.

4.4 What is a computer network?

A **computer network** is two or more computers connected so they can share data, programs and hardware such as printers. Networks save money, let people work together, and make communication fast.

- **LAN (Local Area Network):** a small network in one building, such as a school computer lab — fast and privately owned.
- **MAN (Metropolitan Area Network):** a network covering a city, such as a cable TV network.
- **WAN (Wide Area Network):** a network over a large area or the whole world; the internet is the largest WAN.

4.5 Network topologies

A **topology** is the shape in which computers are connected.

- **Bus:** all computers share one main cable. It is cheap, but if the main cable fails the whole network stops.
- **Star:** every computer connects to a central device (a switch or hub). It is easy to manage and one computer failing does not stop the others, but if the central device fails the network stops.
- **Ring:** computers are joined in a circle and data travels around the ring.
- **Mesh:** every computer connects to every other computer. It is very reliable but expensive.

4.6 Network devices

- **Modem:** converts digital signals from a computer into signals that can travel over a telephone line, and back again.
- **Router:** connects different networks together and chooses the best path for data — for example, connecting a home network to the internet.
- **Switch:** connects computers in a LAN and sends data only to the computer it is meant for.
- **Hub:** connects computers in a LAN but sends incoming data to all of them.
- **Network Interface Card (NIC):** the card or circuit that connects a computer to a network.

4.7 The internet and the World Wide Web

The **internet** is a worldwide network of networks. The **World Wide Web (WWW)** is a service that runs on the internet — a collection of linked web pages. A **web browser** (such as Chrome or Firefox) is the program used to view web pages. A **website** is a set of related pages under one address; a **web page** is one page of it. The address of a page is its **URL**. A **search engine** (such as Google) helps find pages by keywords.

4.8 Internet services

- **Email:** sending and receiving messages electronically. Each email address has a user name, the @ sign and a domain, such as name@example.com.
- **File transfer and cloud storage:** sending files and keeping them on the internet so they can be reached from any device.
- **Video calling and messaging:** talking and chatting in real time.
- **E-learning and e-commerce:** studying online and buying and selling over the internet.

4.9 Using the internet safely

- Do not share personal information, passwords or photos with strangers.
- Check that a website is genuine before entering personal details.
- Be polite online, and think before posting anything — once posted, it is hard to take back.
- Keep your computer’s security software up to date.

> **Key terms:** sender, receiver, medium, protocol, simplex, half-duplex, full-duplex, fibre-optic cable, LAN, MAN, WAN, topology, bus, star, ring, mesh, modem, router, switch, URL, web browser, search engine.

Chapter 4 — Questions

Short questions (with answers)

Q1. What are the five parts of data communication?
Answer: Sender, receiver, message, medium and protocol.

Q2. What is the difference between half-duplex and full-duplex?
Answer: In half-duplex data can travel both ways but only one way at a time, as in a walkie-talkie. In full-duplex data travels both ways at the same time, as in a telephone call.

Q3. What is a LAN? How is it different from a WAN?
Answer: A LAN is a small network in one building, such as a school lab. A WAN covers a large area or the world; the internet is the largest WAN.

Q4. What does a router do?
Answer: A router connects different networks together and chooses the best path for data, for example connecting a home network to the internet.

Q5. What is a URL?
Answer: A URL is the address of a web page on the internet, such as www.example.com.

Long questions (with answers)

Q1. Explain the main network topologies and give one advantage and one disadvantage of each.
Answer: In a bus topology all computers share one cable: it is cheap, but a break in the main cable stops the whole network. In a star topology every computer connects to a central switch: it is easy to manage and one computer failing does not affect the others, but the central device failing stops the network. In a ring topology computers form a circle and data travels around it. In a mesh topology every computer connects to every other computer: it is very reliable because there are many paths, but it is expensive to build.

Q2. What is the internet? Describe four services it provides.
Answer: The internet is a worldwide network of networks. It provides email for sending messages, the World Wide Web for viewing linked pages through a browser, file transfer and cloud storage for sharing and keeping files, and video calling and messaging for real-time communication. It is also used for e-learning and e-commerce. The Web is a service on the internet, not the internet itself.

Chapter 4 — Questions (continued)

Multiple-choice questions

Q1. The five parts of data communication include

A. Sender, receiver, message, medium, protocol B. Mouse, keyboard, monitor, printer, CPU C. Word, Excel, PowerPoint, Access, Paint D. LAN, MAN, WAN, PAN, CAN

Q2. A walkie-talkie uses

A. Simplex B. Half-duplex C. Full-duplex D. No mode

Q3. Fibre-optic cable carries data as

A. Electric current B. Sound C. Light D. Radio waves only

Q4. A network covering one building is a

A. WAN B. MAN C. LAN D. Internet

Q5. In a star topology, computers connect to a

A. Single shared cable B. Central device C. Circle D. Satellite

Q6. The device that connects a home network to the internet is a

A. Hub B. Printer C. Router D. Scanner

Q7. WWW stands for

A. World Wide Web B. World Wide Window C. Wide World Web D. Web World Wide

Q8. A program used to view web pages is a

A. Compiler B. Web browser C. Spreadsheet D. Modem

Q9. The largest WAN is the

A. School lab network B. Internet C. Home Wi-Fi D. Bluetooth

Q10. In an email address, the @ sign separates the

A. User name and the domain B. Subject and the body C. Sender and the printer D. Password and the user

Chapter 5 — Computer Security and Ethics

5.1 Why security matters

Computers hold personal information, school records, photographs and money. **Computer security** means protecting that information, and the computers themselves, from damage, theft and misuse. A single careless click can let a harmful program in or give away a password.

5.2 Threats to a computer

- **Virus:** a program that attaches itself to other files and spreads when the file is shared; it can damage or delete data.
- **Worm:** a program that spreads by itself across a network, without needing to attach to a file.
- **Trojan horse:** a program that looks useful but hides a harmful purpose.
- **Spyware:** software that secretly watches what a user does and collects information.
- **Hacking:** breaking into a computer or account without permission.
- **Phishing:** fake messages or websites that trick people into giving away passwords or bank details.
- **Spam:** unwanted bulk messages, often carrying harmful links or adverts.

5.3 Protecting a computer

- Install **antivirus software** and keep it updated, and scan files from unknown sources.
- Use a **firewall**, which checks data coming into and going out of the computer and blocks what is not allowed.
- Use **strong passwords** — long, with a mix of letters, numbers and symbols — and do not share them or use the same one everywhere.
- Keep a **backup** copy of important files, so they can be recovered if the computer fails or is attacked.
- Keep the operating system and programs updated, because updates often fix security holes.
- Do not open attachments or click links in messages from strangers.

5.4 Computer ethics

Ethics means the rules of right and wrong behaviour. In computing, ethics means using computers honestly and respecting other people. **Netiquette** is polite behaviour online: be respectful, do not send rude messages, and do not share other people's private information or photos without their permission.

5.5 Privacy, copyright and the law

- **Privacy:** everyone has a right to keep personal information private. Do not collect, share or publish someone else's details without permission.
- **Copyright:** books, music, films, photos and software belong to their creators. Copying or sharing them without permission is wrong and may be against the law.
- **Plagiarism:** copying someone else's work and presenting it as your own. In school work, always write in your own words and name your sources.
- **Cybercrime:** crimes done with a computer, such as hacking, online fraud and spreading harmful programs. Laws exist to punish cybercrime, and victims should report it to a parent, teacher or the authorities.
- **Software piracy:** using or sharing paid software without paying for it or without a licence.

5.6 Safe habits — a checklist

- Lock your computer or phone when you leave it.
- Log out of accounts on shared computers.
- Check a web address carefully before typing a password.
- Think before you post: would you be happy for a teacher or parent to see it?
- If something online worries you, tell a trusted adult.

> **Key terms:** computer security, virus, worm, Trojan horse, spyware, hacking, phishing, spam, antivirus, firewall, backup, ethics, netiquette, privacy, copyright, plagiarism, cybercrime, software piracy.

Chapter 5 — Questions

Short questions (with answers)

Q1. What is a computer virus?
Answer: A virus is a harmful program that attaches itself to other files and spreads when the file is shared; it can damage or delete data.

Q2. What is phishing?
Answer: Phishing is the use of fake messages or websites to trick people into giving away passwords or bank details.

Q3. What does a firewall do?
Answer: A firewall checks data coming into and going out of a computer and blocks data that is not allowed.

Q4. What is plagiarism?
Answer: Plagiarism is copying someone else's work and presenting it as your own.

Q5. Why should you keep a backup of important files?
Answer: A backup lets you recover your files if the computer fails, is stolen, or is damaged by a virus or other attack.

Long questions (with answers)

Q1. Describe the main threats to a computer and how to protect against them.
Answer: Threats include viruses, which spread through infected files; worms, which spread across networks by themselves; Trojan horses, which hide harm inside a useful-looking program; spyware, which secretly collects information; hacking; phishing; and spam. Protection includes updated antivirus software, a firewall, strong passwords that are not shared, regular backups, keeping software updated, and not opening attachments or links from strangers.

Q2. Explain computer ethics, including privacy, copyright and netiquette.
Answer: Computer ethics means using computers honestly and respecting others. Privacy means not sharing other people's personal information without permission. Copyright means creators own their work, so music, films, photos and software must not be copied or shared without permission. Netiquette is polite online behaviour: be respectful, do not send rude messages, and think before posting. Breaking these rules harms others and, in the case of hacking or fraud, can be a crime.

Chapter 5 — Questions (continued)

Multiple-choice questions

Q1. A program that spreads by itself across a network is a

A. Virus B. Worm C. Trojan horse D. Firewall

Q2. Fake websites that steal passwords are an example of

A. Phishing B. Backup C. Formatting D. Printing

Q3. Which of these protects a computer from harmful programs?

A. Antivirus software B. A loudspeaker C. A webcam D. A printer

Q4. A strong password should be

A. Your own name B. 123456 C. Long, with letters, numbers and symbols D. The same everywhere

Q5. Copying someone else's work as your own is

A. Plagiarism B. Backup C. Formatting D. Browsing

Q6. Software that secretly watches a user is called

A. Spyware B. Freeware C. Shareware D. Firmware

Q7. A firewall

A. Prints documents B. Blocks unauthorised data C. Speeds up the CPU D. Stores photos

Q8. Using paid software without paying for it is

A. Software piracy B. Backup C. Updating D. Formatting

Q9. Netiquette means

A. Polite behaviour online B. A type of virus C. A network cable D. A programming language

Q10. A backup is a

A. Spare copy of important files B. New password C. Antivirus program D. Type of printer

Chapter 6 — Web Development

6.1 Websites and web pages

A **website** is a collection of related web pages kept under one address, such as a school website. A **web page** is a single document on the Web, written in HTML and viewed in a browser. The first page of a website is its **home page**. A **hyperlink** is a link that takes you from one page to another when you click it.

6.2 How the Web works

Web pages are stored on a **web server** — a computer that is always switched on and connected to the internet. When you type a web address, your browser asks the server for the page, the server sends it, and the browser displays it. The address is the page's **URL**, and **HTTP** is the set of rules (protocol) used for the request and the reply.

6.3 HTML — the language of web pages

HTML (HyperText Markup Language) is the language used to build web pages. It uses **tags** — words inside angle brackets — to mark the parts of a page. Most tags come in pairs: an opening tag and a closing tag with a slash.

- **<html>** — the whole page; **<head>** — information about the page, including its title; **<body>** — what is shown on the screen.
- **<title>** — the title shown in the browser tab.
- **<h1> to <h6>** — headings, from largest (h1) to smallest (h6).
- **<p>** — a paragraph; **
** — a line break.
- **<b>** and **<i>** — bold and italic text.
- **<a href="...">** — a link to another page or website.
- **<img src="...">** — a picture on the page.
- **<ul>**, **<ol>** and **<li>** — bulleted lists, numbered lists and list items.
- **<table>**, **<tr>** and **<td>** — a table, a table row and a table cell.

6.4 A first web page

A simple page has this shape: an html tag, a head holding the title, and a body holding a heading, a paragraph and a link. When the file is saved with the extension .html and opened in a browser, the tags themselves are not shown — only the formatted page is.

6.5 Forms

A **form** collects information from a visitor, such as a name, email address or message. A form uses **<form>**, with **<input>** fields for typing, **<textarea>** for longer messages, and a submit button to send the information. Never ask for passwords or private information on a page you do not trust.

6.6 CSS — making pages look good

CSS (Cascading Style Sheets) controls how a page looks: colours, fonts, sizes, spacing and layout. Keeping the style in CSS, separate from the HTML content, means one change can restyle a whole website. For example, CSS can set all headings to one colour and all paragraphs to one font.

6.7 Publishing a website

- Build the pages and check them in a browser on a computer and on a phone.
- Choose a **domain name** (the website's address) and **web hosting** (space on a server where the pages are kept).
- Upload the files to the host and test every link.
- Keep the site updated, check that it works, and make sure the content is accurate and your own — do not copy text or pictures from other sites without permission.

> **Key terms:** website, web page, home page, hyperlink, web server, URL, HTTP, HTML, tag, CSS, domain name, web hosting, form.

Chapter 6 — Questions

Short questions (with answers)

Q1. What is the difference between a website and a web page?
Answer: A website is a collection of related web pages under one address; a web page is a single document of that website.

Q2. What is HTML?
Answer: HTML (HyperText Markup Language) is the language used to build web pages, using tags to mark headings, paragraphs, links, pictures and other parts.

Q3. What does the <a> tag do?
Answer: The <a> tag creates a hyperlink to another page or website; its href gives the address to link to.

Q4. What is CSS used for?
Answer: CSS controls how a web page looks — colours, fonts, sizes, spacing and layout — separately from the HTML content.

Q5. What is a web server?
Answer: A web server is a computer that stores web pages and sends them to browsers when asked.

Long questions (with answers)

Q1. Explain the structure of an HTML page and the purpose of its main tags.
Answer: An HTML page starts with <html>, has a <head> holding information such as the <title> shown in the browser tab, and a <body> holding what is shown on screen. Headings use <h1> to <h6>, paragraphs use <p>, bold and italic use <b> and <i>, links use <a href="...">, pictures use <img src="...">, lists use <ul>, <ol> and <li>, and tables use <table>, <tr> and <td>. Most tags come in opening and closing pairs, and the browser shows the formatted result, not the tags.

Q2. How is a website published? Describe the steps.
Answer: First, build the pages in HTML (with CSS for style) and check them in a browser on a computer and a phone. Then choose a domain name and web hosting — space on a server. Upload the files to the host, test every link, and check the site on different devices. Afterwards, keep the site updated and make sure the content is accurate and original.

Chapter 6 — Questions (continued)

Multiple-choice questions

Q1. HTML stands for

A. HyperText Markup Language B. HighText Machine Language C. Hyperlink Text Mode Language D. Home Tool Markup Language

Q2. The tag for the largest heading is

A. <h6> B. <h1> C. <head> D. <title>

Q3. A hyperlink is made with the tag

A. <img> B. <p> C. <a> D.

Q4. CSS is used to control

A. How a page looks B. The computer’s speed C. The printer D. The hard disk

Q5. The first page of a website is its

A. Home page B. Last page C. Form page D. Table page

Q6. A web page is viewed in a

A. Spreadsheet B. Web browser C. Word processor D. Database

Q7. The address of a web page is its

A. URL B. CPU C. RAM D. USB

Q8. The tag <img> is used for a

A. Table B. Link C. Picture D. List

Q9. A numbered list uses the tag

A. B. C.
  D. <b>

Q10. Web hosting means

A. Space on a server for a website B. A faster printer C. A new keyboard D. A bigger monitor

Chapter 7 — Introduction to Database System

7.1 What is a database?

A **database** is an organised collection of related data, stored so it can be found, changed and used easily. A school database, for example, keeps student records — names, classes, marks and attendance — in one place instead of in many separate paper files or notebooks.

7.2 Flat files and their problems

Keeping data in separate ordinary files is called a **flat file system**. It causes problems: the same information is typed again and again (**data redundancy**), so it takes extra space and can disagree with itself (**data inconsistency**); it is hard to search; sharing is difficult; and there is little security. A database system is designed to fix these problems.

7.3 What is a DBMS?

A **DBMS (Database Management System)** is software that creates and manages a database — for example, Microsoft Access. It lets the user create tables, add and change records, search for information, sort results and print reports, while keeping the data organised and protected.

7.4 Components of a database

- **Table:** data stored in rows and columns, like a spreadsheet — for example, a Students table.
- **Field:** one column of a table; one kind of information, such as Name or Class.
- **Record:** one row of a table; all the information about one item, such as one student.
- **Data type:** the kind of value a field holds — text, number, date/time, or yes/no.
- **View:** a way of looking at the data, such as a table view or a form view.

7.5 Keys

- **Primary key:** a field (or combination of fields) that is different for every record, such as a student roll number. It is used to identify each record and cannot be empty or repeated.
- **Foreign key:** a field in one table that refers to the primary key of another table, linking the two tables together.

7.6 Relationships

Tables are linked by **relationships** so that related information is kept together without repeating it:

- **One-to-one:** one record in the first table matches one record in the second — for example, one student and one identity card record.
- **One-to-many:** one record in the first table matches many in the second — for example, one class and its many students.
- **Many-to-many:** many records on each side match many on the other — for example, students and the subjects they take.

7.7 Advantages of a DBMS over a flat file system

- Less repeated data, so less space is used and the data stays consistent.
- Searching and sorting are fast, even with thousands of records.
- Many users can share the same data, with passwords controlling who sees what.
- Data is safer, because backups and access control are built in.
- Reports can be produced in a neat printed layout.

7.8 Working with a database (MS Access)

- Create a table and give each field a name and a data type.
- Choose a primary key, such as a roll number.
- Enter the records, one row per item.
- Use a **query** to ask a question of the data — for example, “show all students of Class 9 with marks above 80”.
- Use a **form** to enter data neatly, and a **report** to print it.

> **Key terms:** database, flat file system, data redundancy, data inconsistency, DBMS, table, field, record, data type, view, primary key, foreign key, relationship, query, form, report.

Chapter 7 — Questions

Short questions (with answers)

Q1. What is a database?
Answer: A database is an organised collection of related data, stored so it can be found, changed and used easily.

Q2. What is a DBMS?
Answer: A DBMS (Database Management System) is software that creates and manages a database, letting the user create tables, add and change records, search, sort and print reports.

Q3. What is the difference between a field and a record?
Answer: A field is one column of a table — one kind of information. A record is one row — all the information about one item.

Q4. What is a primary key?
Answer: A primary key is a field that is different for every record, such as a roll number; it identifies each record and cannot be empty or repeated.

Q5. What is a query?
Answer: A query is a question asked of a database, such as asking it to show all students of one class with marks above a certain value.

Long questions (with answers)

Q1. What problems does a flat file system cause, and how does a DBMS solve them?
Answer: In a flat file system the same information is typed again and again, causing data redundancy and inconsistency, searching is slow, sharing is hard and security is weak. A DBMS stores data once in linked tables, so there is less repetition and the data stays consistent; searching and sorting are fast; many users can share the data with controlled access; backups keep it safe; and reports can be printed neatly.

Q2. Explain the components of a database, with a school example.
Answer: A database holds tables, such as a Students table. A field is one column, such as Name or Class; a record is one row, all the information about one student; a data type says what kind of value a field holds, such as text or number; and a view is a way of looking at the data. The roll number can be the primary key, because it is different for every student, and it can be used as a foreign key in a Marks table to link the two tables in a one-to-many relationship: one student, many marks.

Chapter 7 — Questions (continued)

Multiple-choice questions

Q1. An organised collection of related data is a

A. Database B. Spreadsheet C. Web page D. Folder

Q2. Software that manages a database is a

A. DBMS B. CPU C. Modem D. Browser

Q3. One column of a table is a

A. Record B. Field C. Form D. Report

Q4. One row of a table is a

A. Field B. Record C. Key D. Query

Q5. A field that is different for every record is the

A. Foreign key B. Primary key C. Data type D. View

Q6. Repeating the same data in many files is called data

A. Redundancy B. Security C. Sorting D. Formatting

Q7. One class with many students is a

A. One-to-one relationship B. One-to-many relationship C. Many-to-many relationship D. No relationship

Q8. MS Access is a

A. Word processor B. Database program C. Web browser D. Operating system

Q9. A question asked of a database is a

A. Form B. Report C. Query D. Table

Q10. Which data type holds a date?

A. Text B. Number C. Date/time D. Yes/no

MCQ Answer Key — All Chapters

Chapter 1	Ch 1 Q1: C · Ch 1 Q2: B · Ch 1 Q3: D · Ch 1 Q4: A · Ch 1 Q5: B · Ch 1 Q6: B · Ch 1 Q7: B · Ch 1 Q8: B · Ch 1 Q9: A · Ch 1 Q10: A
Chapter 2	Ch 2 Q1: B · Ch 2 Q2: B · Ch 2 Q3: B · Ch 2 Q4: B · Ch 2 Q5: B · Ch 2 Q6: A · Ch 2 Q7: B · Ch 2 Q8: A · Ch 2 Q9: B · Ch 2 Q10: B
Chapter 3	Ch 3 Q1: A · Ch 3 Q2: B · Ch 3 Q3: B · Ch 3 Q4: C · Ch 3 Q5: C · Ch 3 Q6: B · Ch 3 Q7: B · Ch 3 Q8: A · Ch 3 Q9: B · Ch 3 Q10: C
Chapter 4	Ch 4 Q1: A · Ch 4 Q2: B · Ch 4 Q3: C · Ch 4 Q4: C · Ch 4 Q5: B · Ch 4 Q6: C · Ch 4 Q7: A · Ch 4 Q8: B · Ch 4 Q9: B · Ch 4 Q10: A
Chapter 5	Ch 5 Q1: B · Ch 5 Q2: A · Ch 5 Q3: A · Ch 5 Q4: C · Ch 5 Q5: A · Ch 5 Q6: A · Ch 5 Q7: B · Ch 5 Q8: A · Ch 5 Q9: A · Ch 5 Q10: A
Chapter 6	Ch 6 Q1: A · Ch 6 Q2: B · Ch 6 Q3: C · Ch 6 Q4: A · Ch 6 Q5: A · Ch 6 Q6: B · Ch 6 Q7: A · Ch 6 Q8: C · Ch 6 Q9: B · Ch 6 Q10: A
Chapter 7	Ch 7 Q1: A · Ch 7 Q2: A · Ch 7 Q3: B · Ch 7 Q4: B · Ch 7 Q5: B · Ch 7 Q6: A · Ch 7 Q7: B · Ch 7 Q8: B · Ch 7 Q9: C · Ch 7 Q10: C

Total practice questions in this book: 70 multiple-choice questions, 35 short questions and 14 long questions — 10 MCQs, 5 short questions and 2 long questions in each of the 7 chapters.

If you got a question wrong, go back to the study notes for that chapter and read the section again before moving on.

> **A note on sources.** The chapter list follows the Sindh Textbook Board book *Computer Science for Grade 9* (Sindh Textbook Board, Jamshoro; prescribed by BISE Karachi, Hyderabad, Sukkur, Larkana and Mirpurkhas) and the Sindh Curriculum for Computer Science Grades IX–X (2018). Shorter chapter names seen on some websites (“Data Communication” for Chapter 4 and “Computer Security” for Chapter 5) are the same chapters under shortened titles. An older BSEK model paper lists a different, earlier chapter list; that list is superseded and is not used in these notes. The paper-pattern figures are third-party reproduced, not officially confirmed — check your board’s current notification before the examination.

End of book. Good luck with your studies — revise the key terms, practise the questions again, and try the practical work on a computer.