10th Class Computer Science Notes
Federal Board (FBISE)
Full Book Notes

Complete chapter-wise study notes with original practice questions
and an MCQ answer key

These notes follow the chapters of the National Book Foundation (NBF)
Computer Science book for Class 10, Federal Board (FBISE), in the order given below.

Prepared for students of the Federal Board of Intermediate and Secondary Education, Islamabad.
For the current model paper and official announcements, visit fbise.edu.pk.

About These Notes

These notes cover the full Class 10 Computer Science course of the Federal Board (FBISE), following the National Book Foundation (NBF) book. Each chapter gives the key concepts, important definitions, the formulas and syntax you must know, and the key terms to revise. After the notes, every chapter has original practice questions: 10 multiple choice questions, 10 short questions and 3 long questions. An answer key for all multiple choice questions is given at the end of the book.

How to Use This Book

- Read one chapter's notes first and learn the definitions and key syntax by heart.
- Attempt the MCQs without looking at the key, then check your answers and re-read the parts you got wrong.
- Write the short and long questions in your own words; practise the programs and calculations with the formulas given.
- Revise the key terms of every chapter before the examination.

Chapters in This Book

1. **Chapter 1:** Computer Systems
2. **Chapter 2:** Computational Thinking and Algorithms
3. **Chapter 3:** Programming Fundamentals
4. **Chapter 4:** Data and Analysis
5. **Chapter 5:** Applications of Computer Science
6. **Chapter 6:** Impacts of Computing
7. **Chapter 7:** Digital Literacy
8. **Chapter 8:** Entrepreneurship in Digital Age

A Note on the Examination Paper

The FBISE Computer Science paper is SLO-based, in line with the Student Learning Outcomes of the course. The Board has introduced a restructured pattern with 50% multiple choice questions and 50% descriptive questions for this subject, and it reaches all SSC-II students in stages; most SSC-II students in the first year of the change still sit the existing pattern. The paper pattern, including any marks distribution and time allowed, is set by the Board and may change, so no marks figures or paper-pattern figures are printed in these notes. Students should check the current model paper on the official FBISE website, fbise.edu.pk, before the examination.

All practice questions in this book are original and written for these notes. They are not copied from any past paper or guide.

Chapter 1: Computer Systems

A computer system is hardware and software working together to accept data, process it, store the results and give output. This chapter explains the parts of a computer system, number systems, coding schemes, the operating system and the care of a computer.

Key Concepts

- A computer system is a combination of hardware and software. Hardware is the physical parts of the computer, such as the CPU, memory, keyboard, monitor and storage devices. Software is the set of programs that tells the hardware what to do.
- The central processing unit (CPU) is the brain of the computer. It has two main parts: the control unit (CU), which directs all operations, and the arithmetic logic unit (ALU), which performs calculations and logical comparisons.
- Memory is of two main types. Primary memory (RAM and ROM) can be reached directly by the CPU. Secondary memory (hard disk, SSD, USB drive) stores data and programs permanently, even when the computer is switched off.
- Number systems used in computing are decimal (base 10, digits 0 to 9), binary (base 2, digits 0 and 1), octal (base 8, digits 0 to 7) and hexadecimal (base 16, digits 0 to 9 and A to F). Computers store all data in binary because an electronic circuit has only two states, on and off.

- ASCII is a 7-bit code that represents 128 characters, including English letters, digits and punctuation marks. Unicode (for example UTF-8) can represent the characters of almost all the languages of the world, including Urdu and Arabic.
- An operating system (OS) manages the hardware, runs programs, manages files and provides the interface between the user and the computer. Common operating systems are Windows, Linux, macOS and Android.
- Application software helps the user do a specific task, for example a word processor, a spreadsheet or a web browser. System software, including the operating system, runs the computer itself and supports the application software.
- Computer maintenance means keeping the hardware clean and cool, updating the software, scanning for viruses and backing up important data, so that the system keeps working well and data is not lost.

Important Definitions

Term	Definition
Computer system	A combination of hardware and software that works together to accept data, process it, store results and give output.
Hardware	The physical parts of a computer, such as the CPU, memory, keyboard, monitor and storage devices.
Software	A set of programs that tells the computer hardware what to do.
CPU	The central processing unit; the brain of the computer, made up of the control unit and the arithmetic logic unit.
RAM	Random access memory; temporary primary memory that holds data and programs while the computer is on, and is lost when it is switched off.
ROM	Read only memory; permanent primary memory that holds the start-up instructions of the computer and cannot be changed easily.
Operating system	System software that manages the hardware, runs programs, manages files and provides the user interface.
Byte	A unit of data made of 8 bits; the basic unit in which computer memory is measured.

Important Formulas

> Decimal to binary: divide the number by 2 repeatedly and write the remainders in reverse order.

> Binary to decimal: multiply each bit by 2 raised to its position (starting from 0 on the right) and add the results.

> 1 byte = 8 bits; 1 KB = 1024 bytes; 1 MB = 1024 KB; 1 GB = 1024 MB; 1 nibble = 4 bits.

> ASCII code of 'A' is 65; ASCII code of 'a' is 97; ASCII code of '0' is 48.

> One hexadecimal digit represents one nibble (4 bits); two hexadecimal digits represent one byte.

Key Terms to Remember

computer system, **hardware**, **software**, **CPU**, **control unit**, **ALU**, **RAM**, **ROM**, **primary memory**, **secondary memory**, **binary**, **decimal**, **octal**, **hexadecimal**, **ASCII**, **Unicode**, **operating system**, **application software**, **system software**, **maintenance**

Chapter 1: Computer Systems — Practice Questions

Multiple Choice Questions

1. Which of the following is the brain of the computer?

(a) Monitor (b) CPU (c) Keyboard (d) Printer

2. How many bits are there in one byte?

(a) 4 (b) 8 (c) 16 (d) 32

3. Which number system uses only the digits 0 and 1?

(a) Binary (b) Decimal (c) Octal (d) Hexadecimal

4. Which memory is lost when the computer is switched off?

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

5. Which of the following is system software?

(a) MS Word (b) Operating system (c) Web browser (d) Spreadsheet

6. The ASCII code of the letter 'A' is:

(a) 60 (b) 65 (c) 70 (d) 97

7. Which part of the CPU performs calculations and comparisons?

(a) Control unit (b) ALU (c) RAM (d) ROM

8. 1 KB is equal to:

(a) 100 bytes (b) 1024 bytes (c) 1000 bits (d) 8 bytes

9. Which of the following is secondary memory?

(a) RAM (b) ROM (c) Hard disk (d) Cache

10. Unicode is used to represent:

(a) Only English letters (b) Only numbers (c) Only images (d) Characters of almost all the languages of the world

Short Questions

1. Define a computer system and name its two main parts.
2. Distinguish between hardware and software with one example of each.
3. What is the CPU? Name its two main parts and state the job of each.
4. Define RAM and ROM and state one difference between them.
5. What is an operating system? Give two examples of operating systems.
6. Convert the binary number 1011 to decimal.
7. Convert the decimal number 13 to binary.
8. What is ASCII? How many characters does 7-bit ASCII represent?
9. Define a byte, a kilobyte and a megabyte.

10. State two tasks of computer maintenance.

Long Questions

1. Describe the main parts of a computer system: the CPU, primary memory, secondary memory, input devices and output devices. Give one example of each and explain how they work together to process data.
2. Explain the decimal, binary, octal and hexadecimal number systems. Convert decimal 25 to binary and binary 11010 to decimal, showing every step, and explain why computers use the binary system.
3. Explain the functions of an operating system. Distinguish between system software and application software with examples, and describe the care and maintenance a computer needs to keep working well.

Chapter 2: Computational Thinking and Algorithms

Computational thinking is a way of solving problems step by step, the way a computer would. This chapter explains decomposition, pattern recognition, abstraction and algorithms, and shows how algorithms are written as flowcharts and pseudocode and how their efficiency is judged.

Key Concepts

- Computational thinking has four parts: decomposition (breaking a big problem into small parts), pattern recognition (finding what is common), abstraction (keeping only the important details) and algorithm design (writing the steps to solve the problem).
- An algorithm is a finite, step-by-step set of instructions for solving a problem. A good algorithm is definite (each step is clear), finite (it ends), has input, gives output and is effective (each step can be carried out).
- A flowchart is a diagram of an algorithm using standard symbols: oval for start and stop, parallelogram for input and output, rectangle for a process, diamond for a decision, and arrows to show the flow of control.
- Pseudocode is an algorithm written in simple English-like statements, without the strict rules of a programming language. It is easier to write than code and easier to check than a flowchart for a long algorithm.
- Sequence means steps carried out one after another. Selection means choosing a step according to a condition (if-else). Iteration means repeating steps (loops) until a condition is met.
- Algorithm analysis judges how good an algorithm is. Time complexity is how the running time grows as the input grows; space complexity is how much memory it needs. A simple, clear and efficient algorithm is better than a long and wasteful one.
- Tracing (a dry run) means following an algorithm by hand with a small set of values, writing down the value of each variable at every step. It is the best way to find mistakes before the program is written.
- Common mistakes in algorithms are missing steps, unclear conditions, infinite loops (a loop that never ends) and wrong order of steps. Testing an algorithm with different inputs, including the largest and smallest values, catches most of these mistakes.

Important Definitions

Term	Definition
Computational thinking	A way of solving problems by breaking them into parts, finding patterns, removing unimportant detail and writing clear steps.
Decomposition	Breaking a large problem into smaller, easier parts.
Abstraction	Keeping only the important details of a problem and ignoring the rest.
Algorithm	A finite, step-by-step set of clear instructions for solving a problem.
Flowchart	A diagram that shows the steps of an algorithm using standard symbols joined by arrows.
Pseudocode	An algorithm written in simple English-like statements without the strict rules of a programming language.
Selection	Choosing which step to carry out according to a condition, as in if-else.
Iteration	Repeating a set of steps until a condition is met; a loop.

Important Formulas

> Sum of the first n natural numbers = n x (n + 1) / 2.

> Average of numbers = sum of the numbers / count of the numbers.

> Area of a rectangle = length x width.

> Largest of three numbers: compare the first two, keep the larger, then compare it with the third.

> Factorial of n = 1 x 2 x 3 x ... x n.

Key Terms to Remember

computational thinking, **decomposition**, **pattern recognition**, **abstraction**, **algorithm**, **flowchart**, **pseudocode**, **sequence**, **selection**, **iteration**, **dry run**, **time complexity**, **space complexity**, **infinite loop**, **debugging**

Chapter 2: Computational Thinking and Algorithms — Practice Questions

Multiple Choice Questions

1. Which of the following is the first step of computational thinking?

(a) Writing code (b) Decomposition (c) Testing (d) Debugging

2. An algorithm must be:

(a) Infinite (b) Finite (c) Unclear (d) Without input

3. In a flowchart, a diamond shape is used for:

(a) Start (b) Input (c) Decision (d) Process

4. In a flowchart, a parallelogram is used for:

(a) Start and stop (b) Input and output (c) Decision (d) Process

5. Pseudocode is written in:

(a) Machine code (b) Simple English-like statements (c) Binary (d) Only symbols

6. Which control structure repeats a set of steps?

(a) Sequence (b) Selection (c) Iteration (d) Abstraction

7. A dry run of an algorithm means:

(a) Running it on a computer (b) Following it by hand with small values (c) Deleting it (d) Printing it

8. A loop that never ends is called:

(a) A finite loop (b) An infinite loop (c) A selection (d) A sequence

9. Which of the following is a property of a good algorithm?

(a) It is unclear (b) It never ends (c) Each step is definite (d) It has no output

10. Finding what is common in different problems is called:

(a) Decomposition (b) Abstraction (c) Pattern recognition (d) Testing

Short Questions

1. Define computational thinking and name its four parts.
2. What is decomposition? Give one example.
3. Define an algorithm and state three properties of a good algorithm.
4. Draw and name the four main flowchart symbols and state the use of each.
5. What is pseudocode? How is it different from a flowchart?
6. Distinguish between selection and iteration with one example of each.
7. What is a dry run? Why is it useful before writing a program?
8. What is an infinite loop? Give one example.
9. Write an algorithm to find the sum of the first 10 natural numbers.
10. Write pseudocode to find the largest of three numbers.

Long Questions

1. Explain the four parts of computational thinking (decomposition, pattern recognition, abstraction and algorithm design) with the example of planning a school timetable.
2. Draw a flowchart and write pseudocode for an algorithm that reads three numbers and prints the largest one. Explain each symbol and each step of the flowchart.
3. Explain how the efficiency of an algorithm is judged (time and space). Compare two different algorithms for finding the sum of the first n natural numbers and explain which one is better and why.

Chapter 3: Programming Fundamentals

Programming is writing instructions that a computer can follow. This chapter explains programming languages, the structure of a C program, variables, data types, operators, input and output, selection and loops, and the roles of HTML, CSS and JavaScript in web development.

Key Concepts

- A programming language is a set of rules for writing instructions for a computer. Low-level languages (machine code and assembly) are close to the hardware; high-level languages (C, Python, Java) are close to human language and easier to write.
- A compiler translates a whole high-level program into machine code before it runs. An interpreter translates and runs the program line by line. A compiled program runs fast; an interpreted program is easier to test step by step.
- A C program has a header (for example #include <stdio.h>), the main function int main(), and statements inside curly braces. Every statement ends with a semicolon, and return 0 ends the program.
- A variable is a named place in memory that stores a value which can change. A constant is a value that does not change while the program runs. Every variable must be declared with a data type before it is used.
- Common data types in C are int (whole numbers), float (numbers with a decimal point), double (larger decimal numbers) and char (a single character). The type decides how much memory the variable uses and what values it can hold.
- Operators are symbols that act on values. Arithmetic operators are + - * / and % (remainder). Relational operators (< > == !=) compare values. Logical operators (AND, OR, NOT) combine conditions. The assignment operator = stores a value in a variable.
- Input and output in C use printf() to show output on the screen and scanf() to read input from the keyboard. The format specifier %d is for integers, %f for float values and %c for characters; the & sign is used with scanf() to give the address of the variable.
- Selection in C uses if, if-else and switch. A condition is tested; if it is true one block of statements runs, otherwise another block runs. Selection lets a program take decisions.
- Loops in C are for, while and do-while. A for loop is best when the number of repetitions is known; a while loop repeats while a condition is true; a do-while loop always runs at least once because the condition is tested at the end.
- In web development, HTML gives the structure of a web page (headings, paragraphs, tables, forms), CSS gives the style (colours, fonts, layout) and JavaScript gives the behaviour (responding to clicks, checking a form, changing the page). The three work together in one page.

Important Definitions

Term	Definition
Program	A set of instructions written in a programming language that tells a computer what to do.
Programming language	A set of rules and symbols for writing instructions for a computer.
Compiler	A translator that converts a whole high-level program into machine code before it runs.
Interpreter	A translator that converts and runs a high-level program line by line.
Variable	A named place in memory that stores a value which can change while the

	program runs.
Constant	A value that does not change while the program runs.
Data type	The kind of value a variable can hold, such as int, float or char.
Operator	A symbol that performs an operation on one or more values, such as + or <.
Function	A named block of code that does one task and can be used again, such as main() or printf().
Syntax error	A mistake in the grammar of a program, such as a missing semicolon, which stops the program from running.

Important Formulas

> Header for input and output in C: #include <stdio.h>

> Main function: int main() { statements; return 0; }

> Output: printf("Result = %d", result); Input: scanf("%d", &number);

> Declaration: int age; float price; char grade; Assignment: age = 15;

> if statement: if (marks >= 40) { printf("Pass"); } else { printf("Fail"); }

> for loop: for (i = 1; i <= 10; i++) { sum = sum + i; }

> Remainder operator: 10 % 3 gives 1; 10 / 3 gives 3 for integers.

Key Terms to Remember

program, **programming language**, **low-level language**, **high-level language**, **compiler**, **interpreter**, **variable**, **constant**, **data type**, **int**, **float**, **char**, **operator**, **printf**, **scanf**, **selection**, **loop**, **HTML**, **CSS**, **JavaScript**, **syntax error**, **logical error**, **runtime error**

Chapter 3: Programming Fundamentals — Practice Questions

Multiple Choice Questions

1. Which of the following is a high-level language?

(a) Machine code (b) Assembly (c) C (d) Binary

2. A compiler translates:

(a) One line at a time (b) The whole program before it runs (c) Only the errors (d) Only the output

3. Every statement in C ends with a:

(a) Full stop (b) Comma (c) Semicolon (d) Colon

4. Which data type is used for whole numbers in C?

(a) float (b) char (c) int (d) double

5. Which function is used to show output in C?

(a) scanf (b) printf (c) main (d) get

6. The format specifier for an integer in C is:

(a) %f (b) %c (c) %d (d) %s

7. Which operator gives the remainder of a division?

(a) + (b) / (c) % (d) *

8. Which loop always runs at least once?

(a) for (b) while (c) do-while (d) if

9. In web development, CSS is used for:

(a) Structure (b) Style (c) Behaviour (d) Storage

10. A missing semicolon in a C program causes a:

(a) Logical error (b) Runtime error (c) Syntax error (d) No error

Short Questions

1. Define a program and a programming language.
2. Distinguish between a compiler and an interpreter.
3. Write the basic structure of a C program and label its parts.
4. What is a variable? How is it different from a constant?
5. Name the four common data types in C and give one example value for each.
6. What is the use of printf() and scanf()? Write one example of each.
7. What is the difference between the operators = and == in C?
8. Write a C statement to add two integers a and b and store the result in sum.
9. Distinguish between selection and loops in C with one example of each.
10. What are the roles of HTML, CSS and JavaScript in a web page?

Long Questions

1. Explain the structure of a C program with an example program that reads two numbers and prints their sum. Explain the header, the main function, the statements and the semicolon.
2. Explain variables, constants and data types in C. Write a program that reads the marks of a student and prints Pass if the marks are 40 or more and Fail otherwise, and explain how selection works in it.
3. Explain the three loops in C (for, while and do-while) with one example of each. Describe how HTML, CSS and JavaScript work together to make a web page, giving one example for each.

Chapter 4: Data and Analysis

Data is the raw material of computing, and analysis turns it into useful information. This chapter explains data collection, data types, spreadsheets, data visualisation with charts, and the basic statistics (mean, median, mode and range) used to describe data.

Key Concepts

- Data are raw facts and figures, such as a list of marks or temperatures. Information is data that has been processed and organised so that it has meaning, such as the average marks of a class.
- Data is collected by surveys and questionnaires, observation, interviews, sensors and automatic

devices, and online forms. The method chosen depends on what is being measured and how many people or things are involved.

- Data has types: numeric data (numbers, such as age or marks), text data (names and words), date and time data, and Boolean data (true or false). The type decides what operations can be done on the data.
- Data must be cleaned before analysis: wrong entries are corrected, duplicate entries are removed and missing values are handled. Dirty data gives wrong results, however good the analysis is.
- A spreadsheet organises data in a grid of cells, arranged in rows and columns. A cell is named by its column letter and row number, for example B3. A formula starts with = and calculates a value; a function is a ready-made formula, such as SUM or AVERAGE.
- Data visualisation means showing data as a chart or graph so that patterns are easy to see. A bar chart compares categories, a pie chart shows parts of a whole, and a line graph shows change over time.
- The mean is the average: the sum of the values divided by how many values there are. The median is the middle value when the values are in order. The mode is the value that occurs most often. The range is the difference between the largest and the smallest value.
- A good chart has a title, labelled axes, a correct scale and a source. A chart with a broken scale or missing labels can mislead the reader, even if the numbers are correct.

Important Definitions

Term	Definition
Data	Raw facts and figures that have not yet been processed, such as a list of marks.
Information	Data that has been processed and organised so that it has meaning and can be used for a decision.
Data collection	Gathering facts by surveys, observation, interviews, sensors or forms.
Spreadsheet	A program that organises data in a grid of rows and columns and can calculate with formulas.
Cell	One box of a spreadsheet, named by its column letter and row number, for example B3.
Formula	An instruction in a spreadsheet, starting with =, that calculates a value from other cells.
Function	A ready-made formula in a spreadsheet, such as SUM or AVERAGE.
Mean	The average of a set of values: the sum of the values divided by how many values there are.
Median	The middle value of a set of values arranged in order.
Mode	The value that occurs most often in a set of values.

Important Formulas

> Mean = sum of the values / number of values.

> Range = largest value - smallest value.

> Percentage = (part / whole) x 100.

> Spreadsheet sum: =SUM(A1:A10) adds the values in cells A1 to A10.

> Spreadsheet average: =AVERAGE(A1:A10) finds the mean of cells A1 to A10.

> Median of 5, 8, 12: the values in order are 5, 8, 12, so the median is 8.

Key Terms to Remember

data, **information**, **data collection**, **survey**, **data cleaning**, **spreadsheet**, **cell**, **row**, **column**, **formula**, **function**, **bar chart**, **pie chart**, **line graph**, **mean**, **median**, **mode**, **range**

Chapter 4: Data and Analysis — Practice Questions

Multiple Choice Questions

1. Processed data that has meaning is called:

(a) Data (b) Information (c) A file (d) A chart

2. Which of the following is a data collection method?

(a) Survey (b) Printing (c) Deleting (d) Saving

3. In a spreadsheet, a cell is named by its:

(a) Row only (b) Column letter and row number (c) Colour (d) Font

4. Which function adds a range of cells in a spreadsheet?

(a) AVERAGE (b) SUM (c) MAX (d) COUNT

5. A pie chart is best for showing:

(a) Change over time (b) Parts of a whole (c) Two variables (d) Raw data

6. A line graph is best for showing:

(a) Parts of a whole (b) Change over time (c) Categories (d) Text

7. The mean of 10, 20 and 30 is:

(a) 10 (b) 20 (c) 30 (d) 60

8. The range of 5, 9, 14 and 20 is:

(a) 5 (b) 15 (c) 20 (d) 9

9. The value that occurs most often in a set of data is the:

(a) Mean (b) Median (c) Mode (d) Range

10. Which of the following makes a chart misleading?

(a) A title (b) Labelled axes (c) A broken scale (d) A source note

Short Questions

1. Distinguish between data and information with one example.
2. Name three methods of collecting data.

3. Define a spreadsheet and a cell. Give the name of the cell in column C, row 5.
4. What is a formula in a spreadsheet? Write one example.
5. What is the difference between a formula and a function in a spreadsheet?
6. Which chart would you use to show the favourite games of a class, and why?
7. Find the mean of 4, 8, 15, 16 and 17.
8. Find the median of 3, 7, 9, 12 and 15.
9. Define mode and range, and find both for 2, 5, 5, 7, 9.
10. State three features of a good chart.

Long Questions

1. Explain data and information, and describe four methods of collecting data. Explain why data must be cleaned before it is analysed, giving two examples of dirty data.
2. Explain the use of a spreadsheet for data analysis: cells, rows, columns, formulas and functions. Use the example of a class marks sheet to show how SUM, AVERAGE and a percentage formula are used.
3. Explain the mean, median, mode and range with a worked example for each. Describe three types of charts (bar chart, pie chart and line graph), when each is used, and how a chart can mislead a reader.

Chapter 5: Applications of Computer Science

Computer science is used in almost every part of modern life. This chapter explains artificial intelligence, machine learning, robotics, the Internet of Things and cloud computing, and how they are used in health, education, farming and daily life.

Key Concepts

- Artificial intelligence (AI) is the ability of a machine to do tasks that normally need human intelligence, such as understanding language, recognising pictures, taking decisions and learning from experience.
- Machine learning is a part of AI in which a computer learns from data instead of being given fixed rules. The computer is trained on examples (training data), builds a model, and then uses the model to predict or decide on new data.
- Supervised learning trains a model on labelled examples, such as pictures labelled cat or dog. Unsupervised learning finds patterns in data that has no labels, such as grouping customers by what they buy.
- A robot is a machine that can sense its surroundings, decide and act. It has sensors to gather information, a controller (a small computer) to decide, and actuators such as motors to move or act.
- The Internet of Things (IoT) is a network of everyday objects connected to the internet, such as a smart watch, a smart bulb or a soil sensor in a field. These devices collect data and can be controlled from far away.
- Cloud computing means using computing services over the internet instead of on your own computer: storage (saving files online), software (using an application in a browser) and computing power rented when it is needed.
- AI is used in health (reading X-ray images), education (personalised lessons), farming (checking

crops with drones), transport (route planning) and business (chatbots that answer customer questions at any time).

- AI has limits: it can be wrong, it can learn unfair patterns from unfair data, and it cannot replace human judgement, care and responsibility. A human must always check important decisions made by AI.

Important Definitions

Term	Definition
Artificial intelligence (AI)	The ability of a machine to do tasks that normally need human intelligence, such as learning, deciding and understanding language.
Machine learning	A part of AI in which a computer learns patterns from data and improves its performance without being given fixed rules.
Training data	The set of examples used to teach a machine learning model.
Robot	A machine that senses its surroundings, decides with a controller and acts with motors or other actuators.
Sensor	A device that measures something in the surroundings, such as light, temperature or distance.
Actuator	A device that acts or moves, such as a motor or a switch, on the orders of a controller.
Internet of Things (IoT)	A network of everyday objects connected to the internet that collect data and can be controlled from far away.
Cloud computing	Using storage, software and computing power over the internet instead of on your own computer.
Chatbot	A program that talks with users in written language, often to answer questions or give help.
Automation	Doing a task with machines or programs instead of by hand, so that it is faster and more regular.

Important Formulas

> Machine learning: training data -> model -> prediction on new data.

> Robot: sensors -> controller -> actuators (sense, decide, act).

> Supervised learning needs labelled examples; unsupervised learning finds patterns without labels.

> Cloud storage: files are saved on computers on the internet and reached from any device.

> An AI answer must be checked by a human before it is used for an important decision.

Key Terms to Remember

artificial intelligence, **machine learning**, **supervised learning**, **unsupervised learning**, **training data**, **model**, **robot**, **sensor**, **actuator**, **Internet of Things**, **cloud computing**, **chatbot**, **automation**, **drone**, **smart device**

Chapter 5: Applications of Computer Science — Practice Questions

Multiple Choice Questions

1. AI stands for:

(a) Automatic Internet (b) Artificial Intelligence (c) Advanced Information (d) Applied Internet

2. In machine learning, a model learns from:

(a) Fixed rules only (b) Training data (c) A printer (d) A keyboard

3. Which of the following is an example of supervised learning?

(a) Grouping customers without labels (b) Teaching a model with labelled pictures of cats and dogs (c) Charging a battery (d) Printing a document

4. Which part of a robot gathers information about its surroundings?

(a) Actuator (b) Sensor (c) Motor (d) Battery

5. Which part of a robot does the moving?

(a) Sensor (b) Controller (c) Actuator (d) Camera

6. A smart watch connected to the internet is an example of:

(a) Cloud computing (b) The Internet of Things (c) A printer (d) A database

7. Cloud computing means using services:

(a) Only on your own computer (b) Over the internet (c) Without electricity (d) On paper

8. A chatbot is used to:

(a) Print documents (b) Talk with users and answer questions (c) Charge a phone (d) Store files

9. Which of the following is a use of AI in farming?

(a) Reading X-ray images (b) Checking crops with drones (c) Writing novels (d) Playing music

10. Why must a human check important AI decisions?

(a) AI is always right (b) AI can be wrong and cannot replace human judgement (c) AI is too slow (d) AI needs no data

Short Questions

1. Define artificial intelligence and give two examples of what it can do.
2. What is machine learning? How is it different from a program with fixed rules?
3. What is training data? What is a model in machine learning?
4. Distinguish between supervised and unsupervised learning with one example of each.
5. Name the three main parts of a robot and state the job of each.
6. What is the Internet of Things? Give two examples of IoT devices.
7. Define cloud computing and give two examples of cloud services.
8. What is a chatbot? Give one example of where chatbots are used.

9. Give two uses of AI in health and two uses of AI in education.
10. State two limits of artificial intelligence.

Long Questions

1. Explain artificial intelligence and machine learning. Describe supervised and unsupervised learning with examples, and explain how training data and a model are used to make a prediction.
2. Explain the parts of a robot (sensors, controller and actuators) and the Internet of Things, with examples. Describe how a smart home and a farm soil sensor use these ideas.
3. Describe the uses of AI in health, education, farming and business, and the limits of AI. Explain cloud computing and why a human must check important decisions made by AI.

Chapter 6: Impacts of Computing

Computers bring great benefits, but they also bring risks. This chapter explains cybersecurity, common threats such as viruses and phishing, the digital footprint, privacy, ethical computing and the safe and responsible use of social media.

Key Concepts

- Cybersecurity is the protection of computers, networks and data from attack, damage or unauthorised use. It matters because personal, school and business data are stored on computers.
- Malware is harmful software. A virus spreads by attaching itself to files; a worm spreads on its own through a network; ransomware locks your files and demands money; spyware secretly watches what you do.
- Phishing is a fake message or website that pretends to be from a trusted place (such as a bank) to trick you into giving your password or bank details. The message often creates fear or urgency so that you act without thinking.
- Hacking is getting into a computer or account without permission. A strong password, two-step checks and updated software make hacking much harder.
- A digital footprint is the trail of data you leave online: posts, photos, comments, searches and likes. It is hard to delete, and schools, employers and strangers can see parts of it, so you should post with care.
- Privacy means controlling who can see your personal information. Share as little as possible, use privacy settings, and never share passwords, your address or your location with strangers.
- Ethical computing means using computers honestly and fairly. Copyright protects the work of others; copying software, music or films without permission is piracy. Using another person's work as your own is plagiarism.
- Cyberbullying is using the internet to hurt, threaten or embarrass someone. It is wrong and harmful. If you are bullied online, tell a trusted adult, save the evidence and block the bully; never answer back with abuse.
- Social media should be used responsibly: be polite, check facts before sharing, respect other people's photos and privacy, and take breaks from the screen for your health.

Important Definitions

Term	Definition
Cybersecurity	The protection of computers, networks and data from attack, damage or unauthorised use.
Malware	Harmful software made to damage a computer or steal information.
Virus	Malware that spreads by attaching itself to files and programs.
Ransomware	Malware that locks your files and demands money to unlock them.
Phishing	A fake message or website that tricks you into giving passwords or bank details.
Hacking	Getting into a computer or account without permission.
Digital footprint	The trail of data you leave online through posts, photos, comments and searches.
Privacy	Control over who can see your personal information.
Piracy	Copying software, music or films without permission, against copyright law.
Cyberbullying	Using the internet to hurt, threaten or embarrass someone.

Important Formulas

> A strong password has at least 8 characters, with capital and small letters, numbers and symbols.

> Never share your password with anyone, and use a different password for each important account.

> Before clicking a link, check the sender and the web address; a bank never asks for a password by email.

> Think before you post: once something is online, it is hard to delete.

> If you are bullied online, save the evidence, block the bully and tell a trusted adult.

Key Terms to Remember

cybersecurity, **malware**, **virus**, **worm**, **ransomware**, **spyware**, **phishing**, **hacking**, **digital footprint**, **privacy**, **copyright**, **piracy**, **plagiarism**, **cyberbullying**, **strong password**

Chapter 6: Impacts of Computing — Practice Questions

Multiple Choice Questions

1. Cybersecurity is the protection of:

(a) Only printers (b) Computers, networks and data (c) Only games (d) Only paper files

2. Which of the following is malware?

(a) A virus (b) A printer (c) A monitor (d) A keyboard

3. Ransomware is malware that:

(a) Speeds up a computer (b) Locks your files and demands money (c) Cleans viruses (d) Saves your work

4. Phishing tries to trick you into giving:

(a) Your homework (b) Your passwords or bank details (c) Your books (d) Your lunch

5. A digital footprint is:

(a) A mark on the floor (b) The trail of data you leave online (c) A shoe size (d) A password

6. Which of the following is a strong password?

(a) 12345 (b) password (c) Ali#2026_Star (d) abc

7. Copying software without permission is called:

(a) Sharing (b) Piracy (c) Saving (d) Printing

8. Using another person's work as your own is:

(a) Plagiarism (b) Research (c) Quoting (d) Typing

9. If you are bullied online, you should:

(a) Answer back with abuse (b) Save the evidence and tell a trusted adult (c) Share your password (d) Delete your account at once

10. Which of these is a safe habit?

(a) Clicking every link (b) Sharing your password (c) Updating your software (d) Posting your address

Short Questions

1. Define cybersecurity and state why it matters.
2. What is malware? Name three types of malware.
3. Define phishing and state one sign of a phishing message.
4. What is a digital footprint? Why is it hard to delete?
5. State three rules for a strong password.
6. What is piracy? How is it different from plagiarism?
7. Define cyberbullying and state what a student should do if it happens to them.
8. State two ways to protect your privacy online.
9. Why should software be updated regularly?
10. State two rules for responsible use of social media.

Long Questions

1. Explain malware (virus, worm, ransomware and spyware) and phishing. Describe how each one harms a user and what habits protect a computer and its data from them.
2. Explain the digital footprint and privacy. Describe what a student should and should not share online, and how privacy settings and strong passwords protect personal information.
3. Explain ethical computing: copyright, piracy and plagiarism. Describe cyberbullying, why it is harmful, and the correct steps to take if you are bullied or see someone else being bullied online.

Chapter 7: Digital Literacy

Digital literacy is the ability to use digital tools well, find good information, judge what is true and behave responsibly online. This chapter explains digital communication, online collaboration, information literacy

and responsible digital citizenship.

Key Concepts

- Digital literacy means being able to find, use, understand and create information with digital tools, and to do so safely and honestly.
- Digital communication tools include email, messaging apps and video calls. Email is best for formal messages and records; messaging is quick and informal; video calls are best when face and voice both matter.
- Online collaboration means working together on the internet: shared documents that several people can edit, cloud drives that store files online, and video meetings. Changes are saved with version history, so earlier work is not lost.
- Information literacy is the ability to find the information you need and to judge whether it is good. A good search uses clear keywords; a good source is checked before it is trusted.
- To judge online content, ask five questions: who wrote it (authority), when was it written (currency), is it backed by evidence (accuracy), why was it written (purpose) and does it fit your need (relevance).
- Fake news is false information shared as if it were true. Misinformation is false information shared by mistake; disinformation is false information shared on purpose to mislead. Check a surprising claim in a second source before sharing it.
- Critical thinking means not accepting everything you read at once. Compare sources, look for evidence, notice one-sided writing and ask what the writer wants you to believe.
- Responsible digital citizenship means behaving well online: being polite (netiquette), respecting other people's work and photos, following the rules of a website, and standing up against wrong behaviour online.
- Your digital identity is how you appear online: your profiles, posts and comments. Keep it honest and respectful, because it stays visible for a long time and shapes what others think of you.

Important Definitions

Term	Definition
Digital literacy	The ability to find, use, understand and create information with digital tools, safely and honestly.
Digital citizenship	Behaving responsibly, honestly and kindly as a member of the online world.
Information literacy	The ability to find information and judge whether it is true, useful and trustworthy.
Netiquette	Good manners on the internet: being polite, clear and respectful in online messages.
Fake news	False information presented as if it were true news.
Misinformation	False information shared by mistake, without the intention to mislead.
Disinformation	False information shared on purpose to mislead people.
Cloud storage	Saving files on computers on the internet so they can be reached from any device.
Digital identity	How a person appears online through profiles, posts and comments.

Credible source	A source that can be trusted because its author, evidence and date can be checked.

Important Formulas

> Judge a source with five questions: who wrote it, when was it written, is it backed by evidence, why was it written, does it fit your need?

> Email is best for formal messages and records; messaging is best for quick, informal talk.

> Shared documents save every change with version history, so earlier work is not lost.

> Before sharing a surprising claim, check it in a second, independent source.

> A good search uses clear keywords; a good source can be checked.

Key Terms to Remember

digital literacy, **digital citizenship**, **information literacy**, **netiquette**, **fake news**, **misinformation**, **disinformation**, **cloud storage**, **collaboration**, **version history**, **digital identity**, **credible source**, **critical thinking**, **email**, **video call**

Chapter 7: Digital Literacy — Practice Questions

Multiple Choice Questions

1. Digital literacy means being able to:

(a) Use a computer only (b) Find, use, understand and create information with digital tools (c) Play games (d) Type fast

2. Which tool is best for a formal message with a record?

(a) Email (b) A game chat (c) A meme (d) A phone wallpaper

3. In a shared document, version history lets you:

(a) Delete everything (b) See and restore earlier work (c) Hide the file (d) Print only

4. Which question checks the authority of a source?

(a) Who wrote it? (b) What colour is it? (c) How long is it? (d) Is it funny?

5. False information shared by mistake is called:

(a) Disinformation (b) Misinformation (c) Netiquette (d) Copyright

6. False information shared on purpose to mislead is called:

(a) Misinformation (b) Disinformation (c) A fact (d) A review

7. Before sharing a surprising claim, you should:

(a) Share it at once (b) Check it in a second source (c) Add your own guess (d) Delete it

8. Netiquette means:

(a) Good manners online (b) Fast typing (c) A kind of software (d) A password rule

9. Your digital identity is:

(a) Your password (b) How you appear online through profiles and posts (c) Your phone number (d) Your school ID

10. A credible source is one that:

(a) Is the longest (b) Can be checked for author, evidence and date (c) Has the most pictures (d) Is the newest

Short Questions

1. Define digital literacy.
2. Name three digital communication tools and state one good use of each.
3. What is online collaboration? Give two examples of collaboration tools.
4. Define information literacy.
5. List the five questions used to judge an online source.
6. Distinguish between misinformation and disinformation.
7. What is netiquette? Give two examples of good netiquette.
8. What is a digital identity? Why should you keep it respectful?
9. How can version history help when several students edit one document?
10. State two ways to check whether an online claim is true.

Long Questions

1. Explain digital communication and online collaboration. Compare email, messaging and video calls, and describe how shared documents and cloud storage help a group of students finish a project together.
2. Explain information literacy and the five questions used to judge an online source (who, when, evidence, purpose, relevance). Use the example of a health claim on social media to show how to check it.
3. Explain fake news, misinformation and disinformation. Describe responsible digital citizenship and the digital identity, and explain why critical thinking matters every time you read or share something online.

Chapter 8: Entrepreneurship in Digital Age

The internet has made it possible for anyone to start a business from a small room. This chapter explains entrepreneurship, digital business, e-commerce, online marketing, startup planning and the habits that make an online business succeed.

Key Concepts

- An entrepreneur is a person who starts a new business, takes the risk and works to make it grow. Entrepreneurship is the process of finding a problem, making a product or service that solves it, and selling it to customers.
- A digital business sells products or services mainly through the internet: an online shop, a food delivery app, a tutoring website or a freelancing service. It needs less money to start than a shop in a market, and it can reach customers far away.
- E-commerce is buying and selling over the internet. In business-to-customer (B2C) a shop sells to people; in business-to-business (B2B) one business sells to another; in customer-to-customer

(C2C) people sell to each other on a marketplace.

- Online marketing means finding customers on the internet: social media pages, search engines, email and online adverts. Good marketing shows the product clearly, answers questions quickly and asks happy customers to tell others.
- Digital payments (mobile wallets, bank cards, online transfer) let customers pay without cash. A business must keep payment records safe and give the customer a receipt for every payment.
- Startup planning has steps: find an idea and check that people need it, study the market and the competitors, write a simple business plan (what you sell, to whom, at what price, at what cost), arrange the money, start small and improve from customer feedback.
- Freelancing means working for different clients on the internet (writing, design, programming, teaching) instead of one employer. It needs a skill, a portfolio of work, honest dealing and regular delivery on time.
- A digital business faces risks: strong competition, fake orders, late delivery, online fraud and unhappy customers. Good service, honest prices, quality products and quick replies to complaints reduce these risks.

Important Definitions

Term	Definition
Entrepreneur	A person who starts a new business, takes the risk and works to make it grow.
Entrepreneurship	The process of finding a problem, making a product or service that solves it, and selling it to customers.
E-commerce	Buying and selling products or services over the internet.
Startup	A new, small business that is just beginning and hopes to grow fast.
Business plan	A written plan of what a business sells, to whom, at what price and at what cost.
Online marketing	Finding and keeping customers through the internet, such as social media, search engines and email.
Freelancing	Working for different clients on the internet, instead of for one employer.
Innovation	Making something new or much better, such as a new product, service or way of working.
Digital payment	Paying for something with a mobile wallet, bank card or online transfer instead of cash.
Customer	A person who buys a product or service from a business.

Important Formulas

> Profit = selling price - cost price.

> Profit percentage = (profit / cost price) x 100.

> Total cost = cost of one item x number of items.

> Price must cover the cost and leave a profit, or the business will close.

> A business plan lists what you sell, to whom, at what price and at what cost.

Key Terms to Remember

entrepreneur, **entrepreneurship**, **digital business**, **e-commerce**, **B2C**, **B2B**, **C2C**, **online marketing**, **digital payment**, **startup**, **business plan**, **freelancing**, **innovation**, **customer**, **market research**

Chapter 8: Entrepreneurship in Digital Age — Practice Questions

Multiple Choice Questions

1. An entrepreneur is a person who:

(a) Works in a bank only (b) Starts a new business and takes the risk (c) Never takes a risk (d) Buys only

2. A digital business sells mainly through:

(a) The market only (b) The internet (c) Newspapers (d) The radio

3. In B2C e-commerce, a shop sells to:

(a) Another business (b) People (customers) (c) The government only (d) Itself

4. Which of the following is online marketing?

(a) A shop signboard (b) A social media page for the shop (c) A printed poster (d) A spoken announcement

5. A business plan includes:

(a) What you sell, to whom, at what price and cost (b) Only the shop name (c) Only the logo (d) Only the address

6. Freelancing means:

(a) Working for one employer for life (b) Working for different clients on the internet (c) Never working (d) Working without a skill

7. If the selling price is 500 and the cost price is 400, the profit is:

(a) 100 (b) 900 (c) 400 (d) 50

8. Which of the following reduces business risk?

(a) Dishonest prices (b) Good service and quick replies (c) Ignoring customers (d) Late delivery

9. Digital payment includes:

(a) Cash only (b) Mobile wallets and bank cards (c) Barter (d) Cheques only

10. Innovation means:

(a) Copying others (b) Making something new or much better (c) Closing a business (d) Raising prices

Short Questions

1. Define an entrepreneur and entrepreneurship.
2. What is a digital business? Give two examples.
3. Explain B2C, B2B and C2C e-commerce with one example of each.
4. Name three methods of online marketing.

5. What is a business plan? List four things it contains.
6. Define freelancing and name two skills a freelancer can sell online.
7. If a shop buys a pen for 50 rupees and sells it for 70 rupees, find the profit and the profit percentage.
8. State two risks of a digital business.
9. Why should a business answer customer complaints quickly?
10. Give two examples of digital payments.

Long Questions

1. Explain entrepreneurship and digital business. Describe e-commerce (B2C, B2B and C2C) with examples, and explain online marketing and digital payments.
2. Describe the steps of startup planning: finding an idea, studying the market, writing a business plan, arranging money, starting small and improving from feedback. Use the example of a student starting an online shop for school stationery.
3. Explain freelancing as a way of earning online. Describe the skills, portfolio and habits a freelancer needs, and the risks of a digital business and how good service and honest dealing reduce them.

MCQ Answer Key

Check your answers below. Each chapter has 10 MCQs, numbered 1 to 10.

Chapter	1	2	3	4	5	6	7	8	9	10
Ch. 1	B	B	A	A	B	B	B	B	C	D
Ch. 2	B	B	C	B	B	C	B	B	C	C
Ch. 3	C	B	C	C	B	C	C	C	B	C
Ch. 4	B	A	B	B	B	B	B	B	C	C
Ch. 5	B	B	B	B	C	B	B	B	B	B
Ch. 6	B	A	B	B	B	C	B	A	B	C
Ch. 7	B	A	B	A	B	B	B	A	B	B
Ch. 8	B	B	B	B	A	B	A	B	B	B

Score guide: count your correct answers out of 80. Re-read the notes for every chapter in which you scored less than 7 out of 10.

End of notes. Good luck with your studies — revise regularly, practise the programs, and check fbise.edu.pk for the current model paper.