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COMPUTERS AND ICT **8** Workbook



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COMPUTERS AND ICT Workbook

8

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This book belongs to:

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Preface



Welcome to the Computer and ICT (Information and Communication Technology) book for students of Class 8. As technology transforms every aspect of our lives, understanding computers and ICT has become essential for young learners. This book is designed to introduce foundational concepts, spark curiosity, and empower students with the skills needed to succeed in a rapidly evolving digital world.

Aligned with the National Education Policy (NEP) 2020 and the National Curriculum Framework (NCF) 2023, this book introduces students to foundational concepts in computers and ICT, emphasizing early exposure to technology through coding fundamentals, computational thinking, and safe technology practices.

The book begins by introducing operating systems, followed by essential skills in spreadsheets, including formulas and charts in Excel. Students will learn to develop algorithms and flowcharts, laying the groundwork for understanding Python, which covers decision-making and loops. App development basics guide students through creating their own quiz apps, fostering creativity and problem-solving. Networking concepts, including cloud computing, data storage, and online platforms like OneDrive and YouTube, provide a comprehensive understanding of modern digital communication.

Designed to be inclusive, this book ensures accessibility for learners from diverse backgrounds while fostering values of empathy, collaboration, and responsibility. By addressing real-world challenges and promoting innovation, it equips students to contribute meaningfully to society and adapt confidently to technological advancements.

We hope this book becomes a valuable guide, inspiring students to explore, innovate, and embrace the exciting possibilities of technology.

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Publisher

Edition: First

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Trivia!

In 1956, the IBM Model 350 became the world's first hard disk drive and changed the way we store data. It was part of the IBM 305 RAMAC, a big computer used for business tasks. The Model 350 could hold only 5 megabytes of data, which is very small compared to today's hard drives that can store terabytes (1,000,000 megabytes) of data! Even though the IBM 350 had limited storage, it was an important invention that helped create the powerful storage systems we use today.



Operating Systems



Key Points

➔ Introduction to Operating Systems

➔ User Interface and Its Types

INTRODUCTION TO OPERATING SYSTEMS

A modern computer consists of one or more processors, main memory, disks, printers, and various input/output devices. A computer is a device that cannot perform any task on its own. It requires a set of commands from the user to perform a specific task. These commands have to be converted into a language which is understood by the computer.

All computer systems require an interface between the computer and the user. This interface is provided by an operating system. An operating system (OS) is the most important program required to turn on and run the computer. It also helps to manage and organise different applications.

A basic input–output system (BIOS) is used to start the OS. The BIOS enables a computer to perform certain operations as soon as you turn it on. Every computer must have a basic platform to run other applications or programs. When you turn on a computer, the microprocessor tries to process its first instruction. These instructions are provided by BIOS. It acts as an interface between the hardware components and the OS.

The main objectives of using an OS are as follows:

- ✎ To control applications
- ✎ To use the computer hardware efficiently
- ✎ To easily solve user problems

Let us learn about the OS in detail.



Did you know !

The devices that we use in our day-to-day life, such as graphical calculators, smartphones, and desktop computers, require an operating system to function.

Definition of Operating System

An Operating System or OS, is a program or a set of programs that manages computer hardware and software resources. A computer consists of both hardware and software components.

- ✎ **Hardware Components:** The physical machine and its components form a part of hardware components. For example, keyboard, mouse, printer, disk drive, monitor and central processing unit (CPU).
- ✎ **Software Components:** The programs or applications on the computer system are the software components. For example, the OS and MS Office applications.

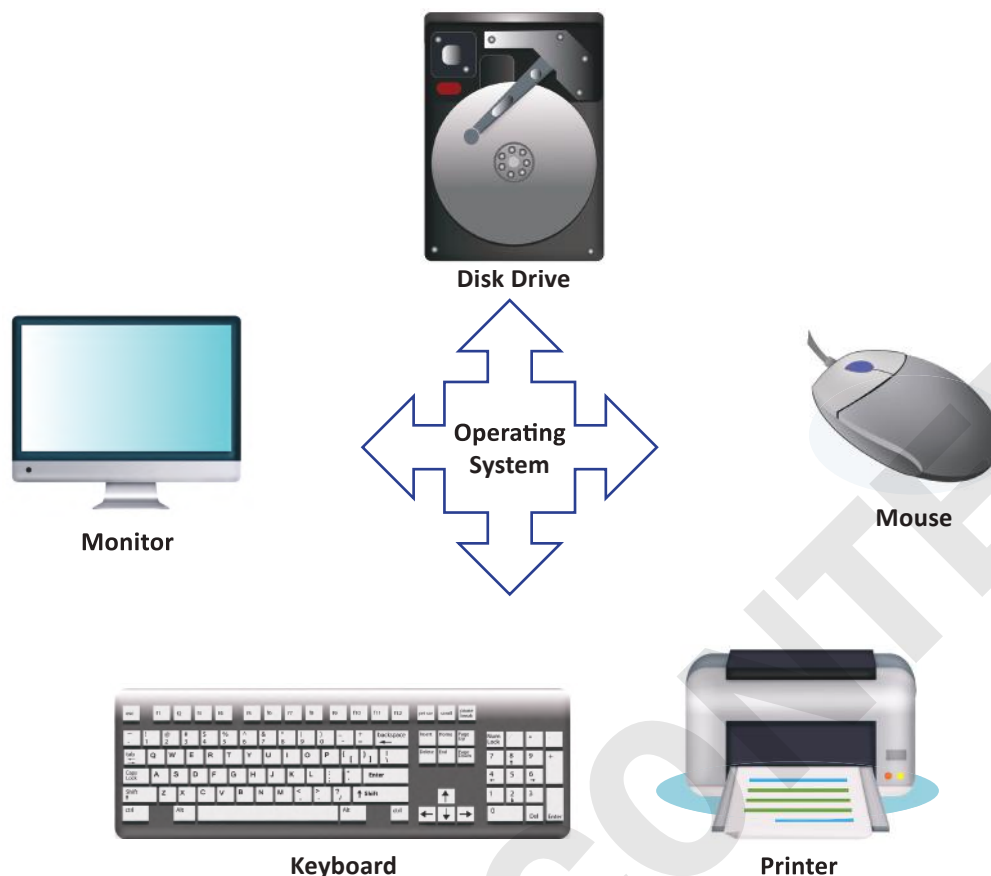


Figure 1: Operating System - Interface between Software and Hardware

Hardware and software components are dependent on each other. This means hardware requires software to run and, similarly, software cannot run without a supporting hardware component. The main function of an operating system is to provide a platform to run programs. These programs are required to operate the computer. All software programs are broadly classified into two categories:

- 📌 **System software:** A system software has programs that manage the computer.
- 📌 **Application software:** An application software enables the user to complete tasks using different applications.

An OS provides security to the users to make sure that the illegal users are prohibited from accessing the system. Hence, the OS combines hardware, application and data in the computer. This helps the user to use the OS easily and efficiently.

The OS is responsible for the functioning of hardware. In addition to this, a programming interface is required to run the applications on a computer. The command processor or command line interpreter forms a part of the OS. All commands are accepted and executed on a command processor.

For example, when a user enters a command in a computer application, it acts as an input to the OS. The command is processed by the OS and instructions are sent to the hardware. On receiving the instructions, the hardware provides the required results to the OS. This output is converted into simple language by the OS, which is then displayed through an application to the user.

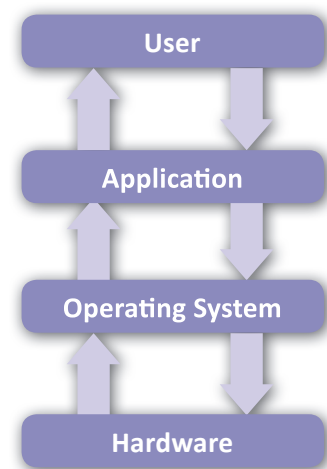


Figure 2: Connection between the User, Hardware and Operating System



The OS provides a base on which other applications can run. These programs allow the users to easily perform a specific task. Computer resources, such as memory, monitor, keyboard and printer, are controlled by the OS. It allows multiple programs to operate and communicate with each other.

The following table shows the commonly used desktop and mobile operating systems.

Table 1: Commonly used Desktop and Mobile Operating Systems

Operating Systems	Examples
Desktop operating systems	- Windows by Microsoft - Mac for Apple's Macintosh - Linux, which is a Unix-based system
Mobile operating systems	- Google Android - Apple iOS - Windows 10 Mobile - BlackBerry OS

Each OS has distinct features. They provide a unique graphical user interface (GUI) to manage files and folders.



IT Nugget

Some other important operating systems used are UNIX, OS/2 Warp and MS DOS.

The main features of an OS are as follows:

Multi-Tasking: A process where two or more programs are controlled at the same time by a single user is called multi-tasking. In general, a CPU can perform only one task at a time. However, the programs are executed so fast that two or more tasks seem to be executed at the same time.

Multi-Programming: A process where two or more programs are stored in the main memory at the same time is called multi-programming. In this feature, the CPU switches to execute another task when the first task is on hold.

Parallel Processing: The use of two or more CPUs to handle a single task is called parallel processing. It is widely used for computer networking.

Device Management: The input/output devices of a computer are controlled by the OS. An OS receives an input through the input device. A computer performs a specific task based on the input data. The processed output is sent to the output device. In this way, an OS manages the input/output operations of a computer.



Figure 3: Popular Operating Systems



Based on the features, the main functions of an operating system are as follows:

- ✎ **Booting:** The process in which the computer is turned on and the OS starts is called booting. The OS checks all the hardware and software components installed in the computer and loads all the files required to run the computer.
- ✎ **Managing Memory:** One of the main functions OS is memory management. The OS is required to manage different programs. The OS defines the amount of memory needed by each program. It keeps aside enough memory for these processes to function smoothly.
- ✎ **Loading and Execution:** Applications can be executed only after loading it in the system's memory. An OS has the ability to load programs in the memory and run them whenever required.
- ✎ **Managing Data Security:** The data is stored on a computer hard disk in the form of files and folders. The OS maintains a record of this data. It records the creation, modification, deletion and renaming of all the files and folders. This data might contain sensitive information which needs to be protected from unauthorised access. One of the main functions of the OS is to protect the data stored on the computer from illegal use, modification or deletion.
- ✎ **Managing Disk:** The OS processes the disk space to store files and folders. It also provides a system back-up for all the files and folders, so that they can be recovered in case the computer system crashes.
- ✎ **Managing Process:** A process is an important function of an OS. It forms a part of all applications and programs. An OS allots the CPU, memory and time to conduct all the processes required to start the applications. This helps the computer to run smoothly without allowing any process to overlap with another.
- ✎ **Managing Peripheral Devices:** The OS acts as a controller between the peripheral devices (such as the printer, mouse, keyboard, speakers and monitor) and the CPU. It accepts commands from the user, processes it and sends the output to a peripheral device. This output is then displayed to the user.
- ✎ **Managing Print Function:** The print function is also controlled by the OS. When a user executes two print commands at a time, the OS prints them separately.
- ✎ **Managing Interface:** The different interfaces, such as GUI and Command Line Interface, allow you to control how the information that the user has sent as input can be displayed on the screen.

Types of Operating System

The different types of operating system are given in **Table 2**.

Table 2: Types of Operating System

Type	Description
Single-User System	✎ As the name suggests, a single-user system provides a platform for only one user at a time. ✎ Commonly used OS are desktop operating systems, which run on a standalone system, where no user accounts are required. ✎ For example, DOS, WINDOWS 3X and WINDOWS 95/97/98.
Multi-User System	✎ In a multi-user system, two or more users can simultaneously access the same computer system. ✎ The user details are stored and maintained in the system. This makes it easier to provide access to multiple users at the same time. ✎ For example, UNIX OS, such as Solaris and Linux; non-UNIX OS, such as Amiga OS, VMS and mainframe OS; and WINDOWS VISTA.



Type	Description
Batch Processing	✎ In batch processing, several tasks are grouped together before they are processed. ✎ It automatically executes the tasks without any human interference. ✎ The execution of tasks takes place one after another and no new task can be started until the previous task is completed. ✎ For example, Payroll System, Bank Statements, and IBM's MVS OS.
Real-Time Processing	✎ Real-time processing is a type of OS which processes data from multiple users at the same time. ✎ It requires a continuous flow of input in order to deliver uninterrupted output. ✎ The processing time for the input data is very low. It means that the output response is very quick (in tenths of seconds). ✎ For example, Airplane landing control system, anti-missile defence system, medical imaging systems, industrial control systems, robots, and many more.
Time Share Processing	✎ In time share processing, each user is allotted a time slot to interact with the CPU. ✎ Each user has to follow a sequence, and the duration of time slot depends on the system. ✎ For example, Multics, UNIX, TOPS-10 and TOPS-20.
Distributed	✎ Distributed operating system refers to a set of computers (in different locations) that can communicate with each other. ✎ It is the latest advancement in the world of computer technology. ✎ The set of computers are interconnected by a network. ✎ A user can access data and processes of different computers through the network. ✎ For example, LOCUS and MICROS

**IT Nugget**

The Task Manager window displays the details of current tasks running on the computer. It also includes details of background tasks. A user can view the details of the task or end a currently running task.

USER INTERFACE AND ITS TYPES

A user interface is a system, with both software and hardware components, that allows a user to interact with the computer.

Some of the main elements of the user interface are the look and feel of your computer or mobile, the design, layout, interactivity, icons, buttons, keypad, and touch screen.

Types of User Interface

A user can communicate with the OS using the user interface. It provides a means of

- ✎ **Input** that allows the users to control the system and



Output that allows the system to indicate the effects of the user's input data.

A user can easily communicate with a computer by giving commands and receiving messages using the different elements of the user interface. The different types of user interface are Character User Interface (CUI) and Graphical User Interface (GUI).

Character User Interface (CUI)

A CUI allows the user to enter commands to perform a specific task. A user can interact with a computer OS or software using a CUI. Since this method requires a user to enter instructions to a computer, it is also known as entering command method. The commands can be typed using a keyboard.

As there are many commands to be remembered in order to use CUI, it is not recommended for beginners. Previously, MS DOS and UNIX provided the user with Command Line Prompt to enter the commands in the form of sequential lines of text. These lines of text are also called as command lines. The scripting of the computer programs was done mainly using CUI.

A CUI can be made concise by assigning unique names to different commands.

A few examples of commands for Command Line Interface are as follows :

Table 3: Commands for Command Line Interface

Command	Description
DIR	To display list of files or folders
COPY	To copy files or folders
MD	To make a new folder
CLS	To clear the screen
Quit	To quit

The CUI is a text-based interface, thus, it is easier to use the commands mentioned in **Table 3**.

Graphical User Interface (GUI)

A GUI allows the user to interact with the computer with images rather than text commands. Several peripheral devices, such as mouse, keyboard, keypad, stylus pens, joy sticks and remote controls, are used to input data into the computer or mobile devices. This interface is menu-driven, graphics-based, user-friendly and extremely interactive in nature.

A user can interact with the computer system by using the icons, menus, options, dialog boxes and text boxes to run the desired application. Compared to CUI, the GUI is expensive and consumes more memory on the computer. **Figure 5** shows the GUI of MS Windows 10.

```

PS C:\Documents and Settings\Administrator\Desktop> ls
Directory: C:\Documents and Settings\Administrator\Desktop

Mode                LastWriteTime         Length Name
----                -
-a----- 5/3/2018 3:08 PM          54204 Anno1Hindi.ttf
-a----- 5/21/2018 12:17 PM             74 Hello.txt
-a----- 4/30/2018 10:00 AM          2459 Microsoft Excel 2010.lnk
-a----- 5/2/2018 10:01 AM          2507 Microsoft Outlook 2010.lnk
-a----- 4/30/2018 9:59 AM          2040 Microsoft Word 2010.lnk
-a----- 5/11/2018 4:49 PM          2379 Snagit 10.lnk

PS C:\Documents and Settings\Administrator\Desktop> cat Hello.txt

Hello!

This is a sample document to test the cat command!

PS C:\Documents and Settings\Administrator\Desktop>

```

Figure 4: Character User Interface (CUI)



Did you know !

The Character User Interface is also commonly known as Command Line Interface (CLI).



IT Nugget

In MS Windows OS, Command Prompt is a command-line interpreter that is used to enter command lines.



Figure 5: Windows 10 GUI

Other unique GUIs have been developed for different operating systems, such as OS/2, Windows, Macintosh, Linux, and Symbian OS.

Advantages and Disadvantages of Graphical User Interface

A typical GUI offers the following advantages over CUI:

- It provides the users with fast, visual feedback about the effect of each action.
- It allows multiple programs or instances to be displayed simultaneously.
- It allows you to use a computer without learning any programming languages.
- It provides an easy-to-use interface to the users.
- It supports peripheral devices, such as keyboard and mouse, to access files and folders on the system.



Did you know !

The first GUI was developed by researchers at Xerox Palo Alto Research Center (PARC) in the 1970s.

The following are the disadvantages of GUI over CUI:

- It needs to be designed by a software developer.
- It is costly as compared to CUI.
- It takes more time to complete a task as compared to CUI.
- It requires more memory (RAM) as compared to other user interfaces.
- GUI system works slow as compared to CUI as it uses a lot of memory resources.
- Additional software and time is required for testing and implementation of GUI.

Differences between CUI and GUI

The following table displays the various differences between a CUI and GUI.

Table 4: Difference between CUI and GUI

Feature	Character User Interface (CUI)	Graphical User Interface (GUI)
Usage	A user can issue commands in the form of successive lines of text or command lines to perform task.	A user can use the graphical icons and visual indicators to interact with the electronic devices.



Feature	Character User Interface (CUI)	Graphical User Interface (GUI)
Ease	It is not easy for beginners since the users have to learn the commands.	It is easy for a beginner.
Memory	It requires less memory as compared to GUI.	It requires more memory as it contains a lot of graphical components.
Speed	It is faster as compared to GUI.	It is slower as compared to CUI.
Appearance	It is not possible to change the appearance.	It is possible to change the appearance.
Flexibility	It is not very flexible.	It is more flexible as compared to CUI.



Summarise

- ⏏ A computer consists of both hardware and software components.
- ⏏ An operating system is a program or a set of programs that manages computer hardware and software resources.
- ⏏ A basic input-output system (BIOS) is used to start the operating system.
- ⏏ The OS defines the amount of memory needed by each program and sets aside enough memory for these processes to function smoothly.
- ⏏ A user interface is a system that allows a user to interact with the computer.
- ⏏ The different types of user interface are Character User Interface (CUI) and Graphical User Interface (GUI).
- ⏏ A GUI allows the user to interact with computer with images rather than text commands.



Exercise Section

A. Select the appropriate option from the choices given below each question.

- Which program or set of programs manages computer hardware and software resources?
 - Operating System
 - Application
 - Computer Program
 - Central Processing Unit
- The desktop operating system most commonly used by Microsoft is:
 - Windows
 - Android
 - Symbian
 - Blackberry
- Which feature of the OS uses two or more CPUs to handle tasks?
 - Multi-Tasking
 - Parallel Processing
 - Multi-Programming
 - Buffering
- Google Android, Apple iOS, and BlackBerry OS are some commonly used:
 - Desktop operating systems
 - Command Line Interface
 - Graphical User Interface (GUI)
 - Mobile operating systems
- It allows the user to enter commands to perform a specific task.
 - Graphical User Interface
 - Peripheral Device Interface
 - Character User Interface
 - Symbian OS Interface

**B. Fill in the blanks.**

1. An operating system is a _____ software, which consists of a group of software with instructions to operate the computer.
2. A user can communicate with the operating system using a _____.
3. _____ refers to set of computers (in different locations) that can communicate with each other.
4. _____ is a type of operating system which processes data from multiple users at the same time.
5. As compared to CUI, the _____ is more expensive and consumes more memory.

C. Write (T) for true and (F) for false statements.

1. A modern computer is made up of one or more processors, main memory, disks, printers and various input/output devices. ☐
2. A system software enables the user to complete tasks using different applications. ☐
3. The physical machine and its components form a part of hardware components. ☐
4. In batch processing, each user is allotted a time slot to interact with the CPU. ☐
5. The data is stored on a computer hard disk in the form of files and folders. ☐

D. Match the following.

Features of OS		Description	
1.	Parallel Processing	a.	Executes print commands
2.	Booting	b.	Printer, mouse, keyboard and monitor
3.	Peripheral Devices	c.	Helps interact with the computer
4.	Print Function	d.	Computer turns on and operating system starts
5.	User Interface	e.	Use two or more CPUs to handle tasks

E. Answer in one word or a sentence.

1. Any one example of CUI operating system.

2. Any one UNIX based operating system.

3. A feature of OS where two or more programs are stored in the main memory, at the same time.

4. The process in which a computer is turned on and the operating system starts.



- The hardware in a computer where the files and folders are stored.

F. Answer the following.

- Define operating system.

- Which are the commonly used desktop and mobile operating systems?

- Explain the main features of an operating system.

- List the types of operating systems.

- Distinguish between CUI and GUI.



Activity Section



Try IT

Perform the following steps to learn more about the edition of the operating system and details of RAM.

Solution:

- Click the **Start**  button.
- In the left corner, click the **Settings**  icon. (The **Settings** screen will appear.)
- Click **System**.
- In the left pane, click **About**. (The **Device specifications** will appear on the screen.) ((Refer Figure 7))
- From the **Windows specifications** section, note down the **Edition** of the operating system you are working on (Here, Windows 10 Pro).
- From the **Device specifications** section, note the **Installed RAM** of the operating system (Here, it is 4.00 GB).

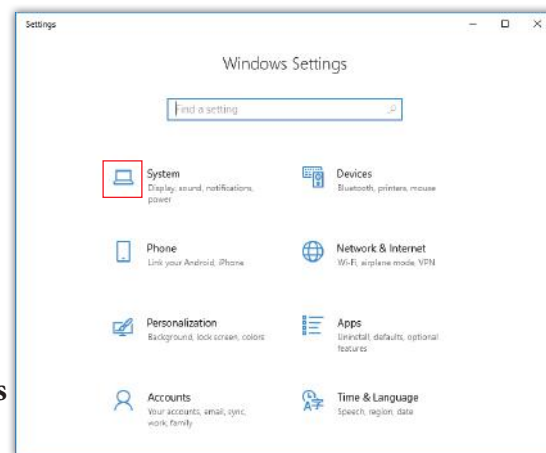


Figure 6: Settings screen

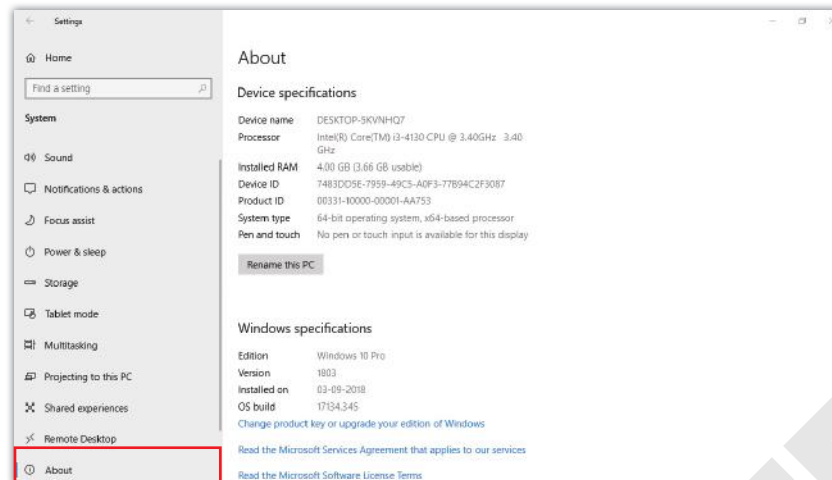


Figure 7: Device Specifications screen



Apply IT

- Shutting down the OS closes all files, programs and exits the OS and shuts down the system. Define the Shut Down options, as shown in Figure 3, in your own words and perform the steps to **Shut down** your system.
- Prepare a PowerPoint presentation for at least two operating systems (OS) used by smartphones, laptops and tablets. Also mention which operating system is freely available and widely used in schools and colleges for research and activities.

Sleep
Shut down
Restart

Figure 8: Shut Down options



Discuss IT

Conduct a group discussion on the topics:

- Windows Operating System
- iOS Operating System
- Android Operating System
- Macintosh Operating System
- Linux Operating System

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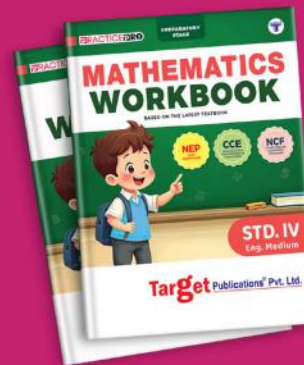
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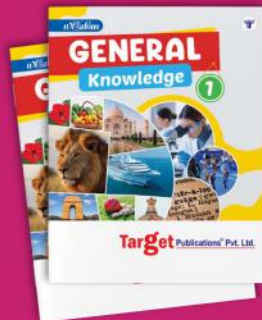
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