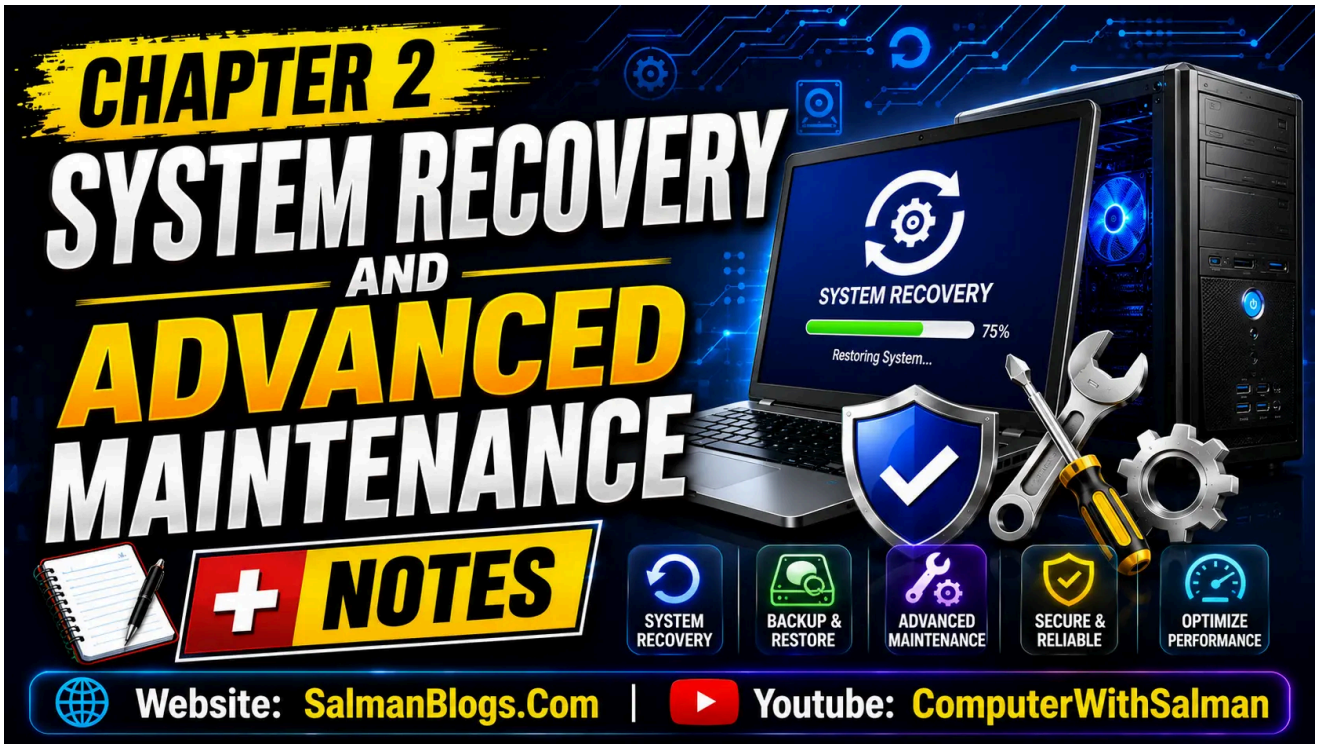
Control Structures in Python

Posted in **10 Computer Science**



These lecture notes are prepared by **Salman Ahmad**, who is both a **teacher** and a **web developer**. The purpose of this material is to make the topic clear and useful for students of Class 10 Computer Science.

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System Recovery

System recovery means **bringing a computer or other system back to a working condition after something goes wrong**.

Example: Windows Not Starting

Windows suddenly stops starting properly. The user uses **System Restore** or **Startup Repair** to make the computer work again.

Advanced Maintenance

Advanced maintenance means doing **detailed and technical work to fix difficult problems in a computer or system**.

It is needed when **normal or basic maintenance cannot solve the problem**.
Example: If a computer keeps crashing, a technician may check the hardware, repair system files, update drivers, or replace a damaged part.

Post-Troubleshooting

Post-troubleshooting means the **steps taken after fixing a problem** to make sure the system is working properly and the same problem does not happen again.

Post-Troubleshooting — Examples

1. **Internet problem:** Check the internet after fixing the connection.
2. **Computer crash:** Restart the computer to make sure it works properly.
3. **Printer problem:** Print a test page after repairing the printer.
4. **Software error:** Open the software to confirm the error is gone.
5. **Virus problem:** Scan the computer again after removing the virus.

> **Note:** Dear Students, you can write **1 to 2 examples** in the exam paper. The extra examples are provided only for **better understanding and extra learning**.

Importance of Continuous Maintenance

Continuous maintenance means **regularly checking, updating, and taking care of a system to keep it working properly**.

Importance

1. **Prevents problems:** Finds issues before they become serious.
2. **Improves performance:** Keeps the system running smoothly and quickly.
3. **Increases security:** Helps protect the system from viruses and attacks.
4. **Saves money:** Prevents expensive repairs and replacements.
5. **Increases system life:** Helps hardware and software last longer.
6. **Reduces downtime:** Keeps the system available and working.
7. **Keeps data safe:** Regular backups help prevent data loss.

> **Note:** Dear Students, you can mention **only the name** in the exam paper of Importance. The detailed explanation is provided only for **better understanding and extra learning**.

Poor Maintenance

Poor maintenance means **not properly checking, updating, or taking care of a system**.

Its Impacts

1. **Slow Performance:** The system becomes slow and takes more time to perform tasks.
2. **System Failure:** The system may stop working or crash unexpectedly.
3. **Security Risks:** Viruses, malware, and hackers can easily attack an unmaintained system.
4. **Data Loss:** Important files and information may be lost or damaged.
5. **Hardware Damage:** Poor maintenance can cause hardware parts to overheat, wear out, or become damaged.

Introduction to System Health Monitoring

System health monitoring means regularly checking a computer to make sure that all its hardware and software are working properly.
It helps us **find problems early**, keep the computer running smoothly, and prevent serious damage or data loss.

1. **Check Memory and Processing Usage:** See how much **RAM and CPU power** the computer is using.
2. **Monitor Background Applications and Services:** Check which programs and services are running in the background.
3. **View Warnings and Error Messages:** Find warnings and errors that may indicate a problem with the system.
4. **Identify Slow Programs:** Find programs that are using too many system resources and may be making the computer slow.

Importance of System Health Monitoring

System health monitoring is like a **regular check-up of a computer**. It helps us know whether the computer is working properly and allows us to solve problems before they become bigger.

Built-in Diagnostic Tools

Operating systems like Windows provide several built-in tools that help users check the computer's performance and find problems.

1. Task Manager

Shortcut Key: `Ctrl + Shift + Esc`
Other Way: Type **Task Manager** in the Windows Search box or search for it from the **Start button**.
Task Manager shows the programs and processes currently running on the computer. It also shows how much **CPU, RAM, Disk, and Network** each program is using.
It can be used to:

- Check which programs are running.
- Find programs using too many resources.
- Close a program that has stopped responding.
- Check overall system performance.

Example: If a program is using too much RAM and making the computer slow, Task Manager can help identify it.

2. Resource Monitor

Shortcut: Press `Windows + R`, type `resmon`, and press `Enter`.
Other Way: Type **Resource Monitor** in the Windows Search box or search for it from the **Start button**.
Resource Monitor provides more detailed information about how computer resources are being used. It gives information about **CPU, memory, disk, and network activity**.
It helps users:

- Find which programs are using system resources.
- Check detailed CPU and memory usage.
- See which programs are accessing the disk.
- Monitor network activity.

> **Note:** Resource Monitor gives a **more detailed view** of the computer's resource usage.

3. Event Viewer

Shortcut: Press `Windows + R`, type `eventvwr`, and press `Enter`.
Other Way: Type **Event Viewer** in the Windows Search box or search for it from the **Start button**.
Event Viewer records important events that happen in Windows, such as **errors, warnings, and system activities**.
It helps users:

- Find the cause of system problems.
- Check error and warning messages.

- View information about system and application problems.
- Troubleshoot repeated errors.

Example: If a program keeps crashing, Event Viewer may contain an error record that helps identify what went wrong.

System Recovery Options

System recovery options are tools provided by the operating system to **repair, restore, or recover a computer when it is not working properly**. They are especially useful when Windows has startup problems, crashes, or becomes unstable.

Common System Recovery Options

1. **Safe Mode** – Starts Windows with only **basic drivers and essential services** to help identify and fix problems.
2. **System Restore** – Returns system settings and files to an **earlier working state** using a restore point.
3. **Bootable Recovery Media** – A USB or other device that can **start the computer and provide tools to repair or recover Windows**.

> **Note:** System recovery options help us **bring a computer back to a working condition** when normal methods cannot solve the problem.

Safe Mode

Safe Mode is a special way of starting Windows with only the **basic drivers, services, and essential programs** needed to run the computer.
It is mainly used for **troubleshooting problems**. When Windows works normally but starts causing problems such as crashes, freezing, or errors, Safe Mode can help us find out whether a recently installed program, driver, or setting is causing the problem.

When to Use Safe Mode

Safe Mode can be useful when:

- Windows is **freezing or crashing frequently**.
- A newly installed **program or driver** is causing problems.
- The computer becomes very slow or unstable.
- Windows cannot work properly in normal mode.
- We need to **remove a problematic program or driver**.
- We want to check whether a problem is caused by third-party software.

How to Open Safe Mode

The method can be different depending on the version of Windows.

On Most Modern Windows Systems

In Windows 10 and Windows 11:

1. Open **Settings**.
2. Go to **System → Recovery**.
3. Under **Advanced startup**, select **Restart now**.
4. After the computer restarts, select **Troubleshoot**.
5. Select **Advanced options → Startup Settings**.
6. Click **Restart**.
7. When the options appear, press **4** or **F4** to start **Safe Mode**.

You can also press **5** or **F5** to start **Safe Mode with Networking**.

On Some Older Systems

On some older versions of Windows, pressing the **F8 key repeatedly while the computer is starting** can open the **Advanced Boot Options** menu.

From this menu, you can select **Safe Mode**.

> **Note:** The **F8** method is mainly associated with older Windows versions. On many modern systems, Windows starts too quickly for F8 to open the Safe Mode menu.

Safe Mode with Networking

Safe Mode with Networking is similar to normal Safe Mode, but it also loads the basic **network drivers and services** needed for an internet or network connection.

It can be useful when you need to:

- Access the internet to find troubleshooting information.
- Download a required driver or tool.
- Connect to another computer on the network.
- Troubleshoot a problem related to networking.

System Restore

System Restore is a Windows feature that allows us to return the computer's system settings to an **earlier working state**. It is useful when a problem occurs after installing a program, driver, or update.

System Restore mainly changes **system files, drivers, settings, and installed programs**. It normally does not affect personal files such as documents, pictures, and videos.

What Are System Restore Points?

A **restore point** is a saved record of important system settings and files at a particular time.

Windows may create restore points automatically before certain major changes, such as installing software or drivers. Users can also **create a restore point manually**.

For example, if the computer is working properly today and we create a restore point, we can use that point later to return the system to today's settings if a problem occurs.

> **Note:** A restore point is like a **saved checkpoint for the computer's system**.

Steps to Create a Restore Point

1. Open the **Start menu**.
2. Search for **Create a restore point** and open it.
3. In the **System Properties** window, select the **System Protection** tab.
4. Select the drive where Windows is installed, usually **C:**.
5. Click **Create**.
6. Enter a name for the restore point, such as **Before Installing New Software**.
7. Click **Create**.
8. Wait until Windows finishes creating the restore point.
9. Click **Close** when it is completed.

Steps to Use a Restore Point

1. Open the **Start menu**.
2. Search for **Create a restore point** and open it.
3. Go to the **System Protection** tab.
4. Click **System Restore**.
5. Click **Next**.
6. Select the restore point you want to use.
7. Check the affected programs if the option is available.
8. Click **Next** and then **Finish**.
9. Confirm the action when Windows asks.
10. Windows will restart the computer and restore the system to the selected point.

> **Note:** Before using System Restore, carefully select the correct restore point. System Restore is mainly designed to restore **system settings and software-related changes**, not to recover deleted personal files.

Bootable Recovery Media

Bootable recovery media is a USB drive, DVD, or another storage device that contains the necessary files to **start a computer and repair or recover the operating system**. It is especially useful when Windows cannot start normally or when the system has serious problems.

Understanding Bootable Media and Its Uses

Bootable media is a storage device that a computer can use to **start the operating system or recovery environment**.

A bootable USB can be used to:

- Install or reinstall Windows.
- Repair Windows startup problems.
- Access recovery and troubleshooting tools.
- Recover or back up important data when Windows cannot start.
- Troubleshoot serious system problems.
- Perform a clean installation of the operating system.

> **Note:** A bootable USB works like an **emergency tool** that allows us to start and repair a computer when the normal Windows system cannot start.

When Do We Use Bootable Media?

Bootable media is useful when:

- Windows **does not start**.
- The computer repeatedly shows **startup errors**.
- Important system files are damaged or missing.
- The operating system needs to be **reinstalled**.
- Normal recovery methods are not working.
- We need to access files or recovery tools without starting Windows normally.

How to Create and Use a Bootable USB

To create a bootable USB, we need a **USB flash drive** and the installation or recovery files for the operating system.

Steps to Create a Bootable USB

1. Get a suitable **USB flash drive**. A USB of at least **8 GB** is commonly used for Windows installation media.
2. Download the **ISO image** of the operating system you want to install or use. It can be a **Windows ISO, Linux ISO, macOS ISO**, or an ISO of another operating system.

ISO stands for **International Organization for Standardization**. An ISO file is a **complete image of a CD, DVD, or operating system installation media** stored as a single file.

3. Use a suitable tool to write the ISO image to the USB drive.
4. Select the correct **USB drive** in the tool.
5. Select the appropriate settings, such as the **partition style (MBR or GPT)**, if required.
6. Start the process and wait for it to complete.
7. Once the process is finished, the USB drive will be ready to use as **bootable media**.

> **Note:** Use a bootable USB creation tool, such as **Rufus, balenaEtcher, Ventoy, or UNetbootin**, to write the ISO image to the USB drive.

Steps to Use a Bootable USB

1. Insert the bootable USB into the computer.
2. Restart the computer.
3. Open the **Boot Menu** by pressing the appropriate key during startup. The key varies by computer manufacturer and may be **F12, F9, Esc, or another key**.
4. Select the USB drive from the boot options.
5. The computer will start from the USB instead of the internal drive.
6. Choose the required option, such as **installing Windows, repairing the system, or accessing recovery tools**.

How to Check the Partition Style: MBR or GPT

MBR (Master Boot Record) and **GPT (GUID Partition Table)** are two different partition styles used to organize data on a storage drive.
Knowing the partition style can be important when creating bootable media because the boot mode and partition style should be compatible.

Method 1: Using Disk Management

1. Right-click the **Start** button.
2. Select **Disk Management**.
3. Find the disk you want to check, such as **Disk 0**.
4. Right-click the **Disk** section on the left side, not one of its partitions.
5. Select **Properties**.
6. Open the **Volumes** tab.
7. Look at **Partition style**.
8. It will show either:

- **Master Boot Record (MBR)**
- **GUID Partition Table (GPT)**

Method 2: Using Command Prompt

1. Open **Command Prompt** as administrator.
2. Type `diskpart` and press **Enter**.
3. Type `list disk` and press **Enter**.
4. Look at the **GPT** column:
    - A **star (*)** under GPT means the disk uses **GPT**.
    - No star means the disk uses **MBR**.

> **Note: MBR** is an older partition style commonly used with **Legacy BIOS**, while **GPT** is a newer partition style commonly used with **UEFI** and modern computers.

BIOS/UEFI and Boot Process Awareness

When a computer is turned on, it goes through a **startup process** before the operating system, such as Windows, begins to load. **BIOS and UEFI** are firmware interfaces that help the computer perform this startup process.

Firmware

Firmware is a type of software stored on a computer's hardware. It provides basic instructions that help the hardware work and allows the computer to start before the operating system loads.

BIOS

BIOS stands for **Basic Input/Output System**. It is an older type of firmware used to start the computer.

When the computer is turned on, BIOS:

- Checks the basic hardware components.
- Performs the **Power-On Self-Test (POST)**.
- Identifies available boot devices.
- Finds a bootable device and starts the operating system.

BIOS commonly works with the **MBR (Master Boot Record)** partition style.

UEFI

UEFI stands for **Unified Extensible Firmware Interface**. It is the modern replacement for traditional BIOS and is found on most modern computers.

UEFI:

- Checks and initializes hardware during startup.
- Performs startup checks.
- Identifies available boot devices.
- Finds and loads the operating system's boot manager.
- Supports modern features such as **GPT (GUID Partition Table)** and Secure Boot.
- Generally provides a faster and more flexible boot process than traditional BIOS.

Role of BIOS/UEFI in Computer Startup

When a computer is turned on, **BIOS or UEFI** controls the initial startup process. It prepares the hardware and finds the device from which the operating system should start.

1. Power On

The computer is switched on.

↓

2. BIOS/UEFI Starts

The firmware starts and initializes the basic hardware components.

↓

3. Hardware Check (POST)

BIOS/UEFI checks important hardware such as the **RAM, keyboard, processor, and storage devices** to make sure they are working properly.

↓

4. Boot Device is Selected

BIOS/UEFI checks the available devices, such as the **SSD, hard drive, or bootable USB**, and selects the appropriate boot device.

↓

5. Bootloader Starts

BIOS/UEFI loads the **bootloader**, which is a small program responsible for starting the operating system.

↓

6. Operating System Loads

The bootloader starts loading the operating system, such as **Windows or Linux**.

> **Note:** BIOS/UEFI **checks the computer's hardware, finds the bootable device, and starts the operating system**.

> **Note:** BIOS or UEFI acts as a **bridge between the computer's hardware and the operating system during startup**. It prepares the computer and tells it where to

find the operating system so that it can start.

POST (Power-On Self-Test)

POST stands for **Power-On Self-Test**. It is a test performed by the computer's **BIOS or UEFI** when the computer is turned on.
The purpose of POST is to check whether the **basic hardware components** are working properly before the operating system starts.

What Does POST Check?

POST may check components such as:

- **RAM (Memory)**
- **Processor (CPU)**
- **Keyboard**
- **Storage devices**
- **Display/Graphics hardware**
- Other essential hardware components

Example of POST

Suppose you turn on your computer and the **RAM is not properly installed**. During POST, the computer may detect the problem and:

- Display an **error message** on the screen.
- Produce **beep sounds**.
- Stop the startup process until the problem is fixed.

Another example is when the computer starts normally and displays the manufacturer's logo. This usually means that the initial hardware checks have completed successfully and the computer can continue with the boot process.

Shortcut Keys to Access BIOS/UEFI Settings

During startup, a specific key can be pressed to open the **BIOS/UEFI setup**. The key depends on the computer manufacturer.

Key	Common Use
F2	BIOS/UEFI Setup
Delete (Del)	BIOS/UEFI Setup

Key	Common Use
F10	BIOS/UEFI Setup on some HP computers
Esc	Startup Menu on some computers
F12	Boot Menu on many computers
F9	Boot Menu on some HP computers

> **Note:** The exact key varies by **manufacturer and computer model**. The correct key is usually shown briefly on the screen when the computer starts.

Boot Order

Boot order is the sequence in which **BIOS/UEFI checks different devices to find a bootable operating system**.

For example, a computer may have the following boot order:

1. USB Drive → 2. SSD → 3. Network

This means the computer first checks the USB drive for a bootable system. If no bootable USB is found, it checks the SSD. If necessary, it then checks the network.

Why Change the Boot Order?

We may need to change the boot order when we want to:

- Start the computer from a **bootable USB**.
- Install or reinstall an operating system.
- Use **recovery or repair media**.
- Troubleshoot startup problems.

Example: If Windows is not starting and you have a Windows recovery USB, you can set the USB as the first boot device so the computer starts from the recovery USB.

Steps to Change the Boot Order

1. **Turn on or restart the computer.**
2. As soon as the computer starts, repeatedly press the **BIOS/UEFI setup key**. Common keys include **F2, Delete, F10, or Esc**, depending on the computer manufacturer.

3. Once the BIOS/UEFI screen opens, find the **Boot**, **Boot Order**, or **Boot Priority** section.
4. You will see a list of available boot devices, such as:
    - SSD/HDD
    - USB drive
    - CD/DVD
    - Network
5. Select the device you want to boot from.
6. Move it to the **top of the boot order** using the keys shown on the screen, such as **F5/F6, +/−, or arrow keys**.
7. Save the changes using **Save & Exit**. On many systems, **F10** is used to save and exit.
8. The computer will restart and check the selected device first.

> **Note:** The BIOS/UEFI menu and shortcut keys can be different depending on the **computer manufacturer and model**.

Boot Repair

Boot repair means fixing problems that prevent the operating system from **starting normally**.

A computer may fail to boot because of:

- Damaged or missing boot files.
- Problems with the boot configuration.
- A failed system update.
- A damaged operating system.
- Problems with the storage drive.

> **Note:** Boot repair is mainly used when the computer **cannot start the operating system normally**.

Data Recovery Techniques

Data recovery means recovering files that have been **accidentally deleted, lost, or become inaccessible** because of problems with the computer or storage device.

There are two common approaches to data recovery:

1. Built-in Data Recovery Tools

Windows provides several built-in features that can help recover lost or deleted files.

Recycle Bin

The **Recycle Bin** temporarily stores files that are deleted from the computer.
If a file was deleted accidentally:

1. Open **Recycle Bin**.
2. Find the deleted file.
3. Right-click the file.
4. Select **Restore**.
5. The file will be returned to its original location.

> **Note:** Files permanently deleted using **Shift + Delete**, or files removed from an emptied Recycle Bin, cannot normally be recovered through the Recycle Bin.

File History

File History is a Windows backup feature that regularly saves copies of files from selected folders.
If a file is lost or an older version is needed, File History can be used to restore it from a previous backup.

How to Enable File History

1. Connect an **external USB drive** to the computer.
2. Open **Control Panel**.
3. Select **System and Security**.
4. Select **File History**.
5. Click **Turn on**.
6. Windows will start saving copies of your files to the selected drive.

Previous Versions

Previous Versions is a Windows feature that allows users to view and restore an **older version of a file or folder**. It works when Windows has a suitable restore point, File History backup, or another supported backup available.

How to Check Previous Versions

1. Find the **file or folder** you want to restore.
2. Right-click on it.
3. Select **Properties**.
4. Open the **Previous Versions** tab.

5. If previous versions are available, they will be displayed in the list.
6. Select the version you want to check.
7. Click **Open** to view it before restoring.
8. If it is the required version, click **Restore** to restore it.

> **Note:** The **Previous Versions** tab may be empty if Windows has not created or saved any previous versions for that file or folder.

2. Third-Party Data Recovery Tools

If built-in Windows tools cannot recover a file, **third-party data recovery software** may sometimes help.

Some commonly used data recovery tools include:

- **Tenorshare 4DDiG**
- **Recuva**
- **EaseUS Data Recovery Wizard**
- **Disk Drill**
- **Stellar Data Recovery**

These programs scan storage devices for data that is no longer visible through the normal file system.

How to Use Tenorshare 4DDiG

Tenorshare 4DDiG is a third-party data recovery program that can scan storage devices and attempt to recover deleted or lost files.

Basic steps are:

1. **Install Tenorshare 4DDiG** on the computer.
2. Open the program.
3. Select the **drive or location** where the file was lost.
4. Start the **Scan**.
5. Allow the program to search for recoverable files.
6. Use the available filters or search options to find the required file.
7. **Preview the file** when possible to check whether it is recoverable.
8. Select the required files and click **Recover**.
9. Save the recovered files to a **different drive or storage device**.

> **Important:** If files have been accidentally deleted, avoid saving new files to the **same drive**. New data may overwrite the deleted data and make recovery more difficult.

Note: First, check Windows' **built-in recovery options** such as Recycle Bin and File History. If they cannot recover the required data, a **third-party recovery tool** such as Tenorshare 4DDiG may be used to scan the storage device for recoverable files.

Limitations of Recovery and Best Practices

While **data recovery tools** can be helpful, they have some limitations.

Limitations of Data Recovery

1. **Deleted for a Long Time** – If a file was **deleted a long time ago**, it may no longer be possible to recover it.
2. **Damaged or Formatted Drive** – Recovery may not be possible if the **hard drive is damaged or has been formatted**.
3. **No Backup** – Files may be **permanently lost** if the Recycle Bin has been emptied and **no backup was created**.

Best Practices

1. **Do Not Install Recovery Software on the Same Drive** – Never install recovery software on the same drive where the lost file was stored. This may overwrite the deleted data and reduce the chance of successful recovery.
2. **Check the Recycle Bin First** – Always check the **Recycle Bin** before using advanced recovery tools. It is the easiest and safest way to restore deleted files.

Note: If you accidentally delete an important file, avoid saving new data to the same drive and check the Recycle Bin first. This can improve the chances of successful recovery.

Best Practices for Preventive Maintenance

Preventive maintenance means regularly taking care of a computer to **prevent problems before they happen**. It helps keep the system secure, reliable, and running smoothly.

1. Disk Cleanup

Disk Cleanup is a built-in Windows tool that removes **unnecessary files** from the computer. It can free up storage space and help keep the system organized.

Steps to Perform Disk Cleanup

1. Open the **Start menu**.
2. Search for **Disk Cleanup** and open it.
3. Select the drive you want to clean, usually **C:**.
4. Windows will calculate how much space can be freed.
5. Select the types of unnecessary files you want to remove.
6. Click **OK**.
7. Click **Delete Files** to confirm.

> **Note:** Check the selected file categories carefully before deleting them, especially if you are not sure what they contain.

2. Patch Management and System Updates

Patch management means regularly installing **updates and security fixes** provided by the operating system or software developers.

Updates can:

- Fix security weaknesses.
- Repair software problems.
- Improve system performance.
- Add new features.
- Protect the computer from newly discovered threats.

Users should regularly check for and install **Windows Updates** and keep important software up to date.

In simple words: Keeping the system updated helps **fix problems and protect the computer from security threats**.

3. Staying Protected with Windows Defender

Windows Defender, now known as **Microsoft Defender Antivirus**, is a built-in security feature in Windows that helps protect the computer from **viruses, malware, spyware, and other threats**.

For better protection:

- Keep Microsoft Defender **enabled**.
- Keep its **security intelligence updates** up to date.
- Run regular **virus scans**.

- Pay attention to security warnings and take appropriate action.

In simple words: Microsoft Defender helps **detect and protect the computer from harmful software**.

4. Keeping a Maintenance Calendar

A **maintenance calendar** helps users remember when important computer maintenance tasks need to be performed.
For example:

Task	Suggested Schedule
Check for Windows Updates	Regularly
Run a security scan	Regularly
Check storage space	Monthly
Perform Disk Cleanup	Monthly or when needed
Check backups	Regularly
Review installed programs	Every few months

Keeping a maintenance calendar ensures that important tasks are **not forgotten**.

System Documentation and Logs

System documentation and logs are important for **understanding, maintaining, monitoring, and troubleshooting a computer system**.
They help users and system administrators keep a **clear and organized record** of system settings, changes, errors, warnings, and other important activities.
This information can be useful when **checking system performance, finding problems, and maintaining the computer over time**.

Exercise Short Questions – Answers

1. Write one key function of the Resource Monitor.

Resource Monitor provides **detailed information about the use of CPU, memory, disk, and network resources**.

2. Define the use of Safe Mode in system recovery.

Safe Mode starts Windows with only **basic drivers and essential services**. It is used to **find and fix problems** caused by programs, drivers, or settings.

3. List the steps to create a bootable USB using Rufus.

1. Connect a USB drive to the computer.
2. Open **Rufus**.
3. Select the USB drive.
4. Select the required **ISO image**.
5. Choose the appropriate settings, such as **MBR or GPT**.
6. Click **Start** and wait for the process to complete.

4. What happens during the Power-On Self-Test (POST)?

POST checks the computer's **basic hardware components**, such as RAM, processor, keyboard, and storage devices, to make sure they are working properly before the operating system starts.

5. Why is the boot order setting important when using recovery tools from a USB drive?

Boot order is important because it tells the computer **which device to check first for a bootable system**. Setting the USB first allows the computer to start from the **recovery USB** instead of the internal drive.

6. List the two benefits of running regular disk cleanup.

- It **removes unnecessary files**.
- It **frees up storage space**.

7. How does Windows Defender help in maintaining system health?

Windows Defender helps maintain system health by **detecting, blocking, and removing harmful software such as viruses and malware**. It also provides **real-time protection** to help keep the computer safe from security threats.

Multiple Choice Questions (MCQs) on System Recovery and Advanced Maintenance

1. What is system recovery?

a. Installing a new printer
b. Bringing a computer or system back to a working condition
c. Deleting all personal files
d. Changing the desktop wallpaper

> **Answer: b. Bringing a computer or system back to a working condition**

2. Which Windows feature can help return a computer to an earlier working state?

a. Disk Cleanup
b. Task Manager
c. System Restore
d. Resource Monitor

> **Answer: c. System Restore**

3. What does advanced maintenance involve?

a. Simple file organization
b. Changing the desktop theme
c. Printing documents
d. Detailed and technical work to fix difficult problems

> **Answer: d. Detailed and technical work to fix difficult problems**

4. What is post-troubleshooting?