Windows 11 Troubleshooting & Administration

A Complete 10-Chapter Operating Systems Course

Topics covered:

Task Manager/Resource Monitor/msinfo32 · Event Viewer · performance troubleshooting

The Registry · Group Policy & Local Security Policy · Task Scheduler

Windows Update & driver troubleshooting · networking troubleshooting · boot & startup issues

Capstone: a full multi-symptom diagnosis on a real workstation

Exercises: 30 hands-on scenarios with worked solutions

Format: A4 · Dark-theme code examples

Philip Osztromok · Generated with Claude

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CHAPTER 1 OF 10

The Support Engineer's Windows Toolkit

Windows 11 Troubleshooting & Administration

Chapter 1 · The Support Engineer's Windows Toolkit

Windows 11 Fundamentals 1 named a three-interface throughline — Settings, Control Panel, PowerShell — and promised a fourth, deeper layer still. *Windows 11 Fundamentals 12*'s own honest scope note named exactly what that layer covers: "no domain join, no Group Policy... and no deep Registry work." This chapter formalizes that fourth (and fifth) layer, and introduces three real diagnostic tools this course leans on constantly from here forward.

Four Interfaces, Formally — When to Reach for Each

Windows 11 Fundamentals 5 mapped which settings had, and hadn't, migrated from Control Panel to Settings, in three states: fully, partially, and not-migrated. This chapter adds the two remaining layers underneath both — Registry and Group Policy — completing the full picture:

	TYPICAL AUDIENCE	SCOPE	WHEN TO REACH FOR IT
Settings	Any user	One machine	Common, fully-migrated tasks — Windows 11 Fundamentals 5's own "fully migrated" category
Control Panel	Any user, more often IT support	One machine	Partially- or not-migrated tasks Settings doesn't (yet) expose
Registry	IT support / power users	One machine (or scripted across many)	A setting with no GUI at all, or a change needed precisely and repeatably via script
Group Policy	IT administrators	One machine (Local) or an entire domain (Group Policy Objects)	Enforcing a setting consistently across many machines, or a policy with no per-machine GUI equivalent at all

The Registry and Group Policy chapters later in this course (Chapters 4 and 5) cover each in real depth — this chapter's job is just placing all four on one map, so the rest of the course has a shared frame of reference.

GROUP POLICY DOESN'T EXIST AT ALL ON WINDOWS 11 HOME

The Local Group Policy Editor (`gpedit.msc`) is a Pro/Enterprise/Education-only tool — it's simply absent on Home edition, not merely hidden or harder to reach. A Home-edition machine needing the exact behavior a Group Policy

setting would otherwise control has to fall back to an equivalent Registry change instead (covered in Chapter 4) — a genuinely important edition distinction worth confirming before promising a Group Policy fix to anyone.

Task Manager — Six Tabs, Not Just "End Task"

Most users know Task Manager only as the "force-quit a frozen app" tool. Its six tabs go considerably further: **Processes** (resource usage grouped by app), **Performance** (live CPU/memory/disk/network graphs per hardware component), **App history**, **Startup apps** (already previewed in *Windows 11 Fundamentals 5*'s own Apps category tour), **Users** (resource usage broken out per signed-in user), and **Details** — the tab that exposes each process's actual **PID** (Process ID), the exact identifier needed to cross-reference the same process in Resource Monitor or Event Viewer (covered next chapter).

Resource Monitor — A Genuinely Deeper Layer

`resmon.exe` goes further than Task Manager in one specific, high-value way: its **Disk** tab shows exactly which process has a given file open, by full file path — the direct answer to "why won't this file let me delete/rename it," a question Task Manager alone can't answer. Its Network tab similarly breaks down bandwidth usage by process and remote address, rather than Task Manager's own simpler per-app total.

msinfo32 — A Complete System Snapshot

System Information (`msinfo32`) generates a full inventory of hardware, drivers, running services, and startup programs in one place — genuinely useful as the first thing a remote support session or a vendor's own technical support often asks for, since it captures the whole environment in one file rather than requiring several separate screenshots.

EXPORTING MSINFO32 FOR SOMEONE ELSE TO REVIEW

File > Export inside System Information saves the entire report as a plain `.nfo` (or `.txt`) file — genuinely useful for attaching to a support ticket or sending to a colleague, rather than describing hardware and driver details from memory over chat.

Hands-On Exercises

EXERCISE 1

A colleague on Windows 11 Home asks you to help them configure a Group Policy setting you know how to set on your own Pro-edition machine. Using this chapter's own warn-box, explain why your instructions won't work for them and what the real alternative is.

View solution

EXERCISE 2

A file refuses to delete with a "this file is open in another program" error, but Task Manager shows no obviously related app running. Explain which tool from this chapter would help identify the culprit, and how.

View solution

EXERCISE 3

Using this chapter's own four-way compare-table, explain why a setting that's "not migrated at all" per Windows 11 Fundamentals 5 might still need the Registry or Group Policy rather than simply Control Panel.

View solution

CHAPTER 1 QUICK REFERENCE

- **Four layers, formally:** Settings → Control Panel → Registry → Group Policy, resolving Windows 11 Fundamentals 5's own migration preview
- Group Policy (`gpedit.msc`) doesn't exist on Windows 11 Home — a Registry equivalent is the real fallback
- **Task Manager's Details tab** exposes a process's PID, needed for cross-referencing other tools
- **Resource Monitor's Disk tab** shows exactly which process has a specific file open
- **msinfo32** — a full system snapshot, exportable as one file for a support ticket
- **Next chapter:** Event Viewer In Depth

CHAPTER 2 OF 10

Event Viewer In Depth

Windows 11 Troubleshooting & Administration

Chapter 2 · Event Viewer In Depth

Chapter 1 introduced the PID as the identifier that lets Task Manager's Processes tab, Resource Monitor's Disk tab, and other tools all talk about the same running process. Event Viewer adds the historical dimension those live tools can't provide — what happened, in what order, before, during, and after a problem — with the **Event ID** serving a genuinely similar cross-referencing role, and one real, important caveat this chapter names directly.

Two Kinds of Logs

	CONTENTS	TYPICAL USE
Windows Logs	Application, Security, Setup, System, Forwarded Events — five broad, system-wide categories	General system health, security auditing, install/update history
Applications and Services Logs	A separate, much larger tree — one branch per installed app or Windows component, often further split into Operational/Admin/Analytic/Debug channels	Diagnosing one specific app or component's own detailed behavior, when the general System/Application log doesn't have enough detail

A crash visible only as a generic entry in the Application log often has a much richer, more specific trail waiting in that same app's own dedicated branch under Applications and Services Logs — worth checking there first for anything app-specific, rather than assuming the general log tells the whole story.

Anatomy of an Event

Every logged event carries a **Level** (Information, Warning, Error, or Critical), a **Source** (the specific component or app that logged it), an **Event ID** (a numeric identifier for the specific kind of event), a **Task Category**, and a timestamp. The Event ID is the single most useful field for research — searching a specific Event ID plus its Source name is usually far more productive than searching the event's own free-text description.

THE SAME EVENT ID NUMBER CAN MEAN COMPLETELY DIFFERENT THINGS

Event IDs are only unique **within a given Source** — Event ID 1000 logged by one app's source has no necessary relationship at all to Event ID 1000 logged by a different source. Searching an Event ID number alone, without

including its Source, is a genuinely common way to land on someone else's unrelated problem that just happens to share the same number.

Filtering & Custom Views

"Filter Current Log" narrows a log by level, a specific Event ID (or a comma-separated list, or a range), time range, and Source — and can be saved as a reusable **Custom View** for a recurring investigation. For anything the filter wizard's own GUI can't express directly — an OR condition across multiple Event IDs from different sources, for instance — the same dialog's **XML tab** accepts a raw XPath query.

```
<!-- A raw XPath query: events from either of two sources, Error level or above -->
<QueryList>
  <Query Id="0" Path="Application">
    <Select Path="Application">
      *[System[(Level=1 or Level=2) and (Provider[@Name='AppA' or @Name='AppB'])]]
    </Select>
  </Query>
</QueryList>
```

Correlating Logs Into a Real Incident Timeline

A genuine investigation rarely lives in one log alone. Chapter 1's own PID is the connective thread: a crash noted in the Application log at a specific timestamp, cross-referenced by PID against a resource spike Resource Monitor showed moments earlier, cross-referenced again against a driver-related warning in the System log at almost the same time, together tell a far more complete story than any single log entry alone.

A PRACTICAL CORRELATION WORKFLOW

Start from the clearest, most specific error (often in Applications and Services Logs), note its exact timestamp and any PID mentioned, then filter the System and Application logs to a narrow window around that same timestamp — a few minutes each side — to see what else was happening at the same moment, rather than reading each log in isolation from the top.

ATTACHING AN EVENT'S FULL DETAIL TO A SUPPORT TICKET

Right-clicking any event and choosing "Copy" > "Copy Details as Text" (or "Copy Details as XML" for the complete raw structure) is far more useful to include in a ticket or a colleague's message than retyping the visible description by hand.

Hands-On Exercises

EXERCISE 1

A web search for a specific Event ID number returns results describing a completely unrelated problem. Using this chapter's own warn-box, explain what likely went wrong with the search.

View solution

EXERCISE 2

Explain why checking an app's own branch under Applications and Services Logs can reveal more than the general Application log entry for the same crash, using this chapter's own compare-table.

View solution

EXERCISE 3

Explain how a PID from Chapter 1's own Task Manager material could be used alongside Event Viewer to connect a crash entry to an earlier resource-usage spike.

View solution

CHAPTER 2 QUICK REFERENCE

- **Windows Logs** (Application/Security/Setup/System/Forwarded Events) vs. **Applications and Services Logs** (per-app/component detail)
- **Event ID** is only unique per **Source** — always search both together, never the ID alone
- Filter Current Log's XML tab accepts raw XPath queries for conditions the GUI wizard can't express
- A real incident timeline correlates multiple logs by timestamp and PID (Chapter 1), not just one log read top to bottom
- **Next chapter:** Performance Troubleshooting

CHAPTER 3 OF 10

Performance Troubleshooting

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Chapter 3 · Performance Troubleshooting

Chapter 1 introduced Task Manager and Resource Monitor as general-purpose tools; Chapter 2 added Event Viewer's own historical dimension. This chapter puts all three to work specifically on performance problems, adds a fourth tool built for logging performance over time rather than watching it live, and gives an honest comparison against *Linux Performance Tuning*'s own, very differently organized toolset.

Task Manager's Performance Tab — Reading It Correctly

Four resource graphs, each measuring something genuinely different: **CPU** (utilization percentage, speed, process/thread/handle counts), **Memory** (in use vs. available, committed, cached), **Disk** (active time percentage and read/write throughput), and **Network** (send/receive throughput per adapter).

> **"100% DISK" DOESN'T MEAN WHAT MOST PEOPLE ASSUME**
>
> The Disk graph's headline percentage measures **active time** — the fraction of time the disk had at least one outstanding request — not raw throughput. A slow drive handling a single, small, queued request can show 100% active time while transferring only a trickle of actual data. Seeing "100% Disk" and assuming the drive itself has failed, rather than checking the actual MB/s figure right alongside it, is a genuinely common misdiagnosis.

Resource Monitor's Memory Tab — Hard Faults, Not Just Percentage Used

High memory usage alone doesn't necessarily mean a machine is struggling — Windows deliberately caches aggressively, and "available" memory being low is often just unused cache ready to be reclaimed instantly. The more reliable indicator of real memory pressure is **Hard Faults/sec**, visible in Resource Monitor's Memory tab: a hard fault means data had to be read back from disk because it had been paged out, a genuinely expensive operation and a much more direct sign of insufficient memory than the raw usage percentage alone.

Performance Monitor — Logging Over Time, Not Just Watching Live

Task Manager and Resource Monitor both show a live snapshot — neither one is built to answer "what was happening at 3 AM last night when this machine locked up." **Performance Monitor** (`perfmon.exe`) solves that with **Data Collector Sets** — a defined group of performance counters logged to disk continuously or on

a schedule, reviewable afterward regardless of whether anyone was watching when the problem actually occurred.

	VIEW	BEST FOR
Task Manager	Live snapshot, high-level	A quick first look, ending a frozen app
Resource Monitor	Live snapshot, per-process detail	Identifying exactly which process/file/connection is responsible right now
Performance Monitor	Logged over time, via Data Collector Sets	Intermittent or overnight problems nobody was watching happen live

A Worked Example — Finding a Real Resource Hog

Task Manager's Performance tab shows Disk at a sustained 100% active time, but the throughput figure alongside it is only a few hundred KB/s — the exact misleading pattern this chapter's own warn-box named. Opening Resource Monitor's Disk tab and sorting by IOPS (rather than raw throughput) reveals one process issuing a huge number of tiny read requests. Cross-referencing its PID against Task Manager's Details tab (Chapter 1) identifies the exact application; checking Event Viewer (Chapter 2) around the same timestamp turns up a warning from that same app about a corrupted local cache file it's been repeatedly trying, and failing, to read.

An Honest Contrast With Linux Performance Tuning

Linux Performance Tuning covers a CLI-first toolset — `top` / `htop`, `iostat`, `vmstat` — reflecting Linux's own general command-line-centric culture. Windows's equivalent tools are GUI-first by default, though real CLI/scriptable equivalents do exist: `typeperf` and PowerShell's own `Get-Counter` cmdlet (Chapter 10 of Windows 11 Fundamentals) can capture the exact same underlying performance counters Performance Monitor's GUI displays, entirely from a script — genuinely useful for automated monitoring, just not the default first tool most Windows users or documentation reach for.

> **A SCRIPTABLE BRIDGE BETWEEN THE TWO PHILOSOPHIES**
>
> `Get-Counter '\Processor(_Total)\% Processor Time'` pulls the same live CPU figure Task Manager's own graph shows, directly in PowerShell — a genuinely useful middle ground when a quick, scriptable check is needed without opening a GUI tool at all.

Hands-On Exercises

EXERCISE 1

A user reports "100% disk usage" in Task Manager and assumes their drive is failing, but transfer speeds shown alongside it are very low. Using this chapter's own warn-box, explain what's actually being measured and why the assumption may be wrong.

View solution

EXERCISE 2

A machine has 90% memory usage shown in Task Manager but feels perfectly responsive. Explain why this alone isn't proof of a real memory problem, and what a more reliable indicator would be.

View solution

EXERCISE 3

A machine slows down every night around 3 AM, but nobody is available to watch Task Manager at that time. Explain which tool from this chapter is actually built for this scenario, and why Task Manager and Resource Monitor alone aren't sufficient.

View solution

CHAPTER 3 QUICK REFERENCE

- Task Manager's "100% Disk" measures active time, not throughput — check the actual MB/s figure too
- **Hard Faults/sec** (Resource Monitor) is a more reliable memory-pressure signal than raw usage percentage
- **Performance Monitor** and its Data Collector Sets log counters over time — the tool for problems nobody was watching happen live
- A real resource-hog investigation chains Task Manager → Resource Monitor → PID → Event Viewer
- Windows tools are GUI-first by default, unlike Linux Performance Tuning's own CLI-first culture — though `Get-Counter` / `typeperf` bridge the two
- **Next chapter:** The Registry

CHAPTER 4 OF 10

The Registry

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Chapter 4 · The Registry

Chapter 1 named the Registry as the layer to reach for when "a setting has no GUI at all" — and specifically as the real fallback when Group Policy isn't available on Windows 11 Home. *Windows 11 Fundamentals 6* deferred leftover-uninstall cleanup here directly. This chapter delivers on both promises, plus the structure, workflow, and real risk involved.

Hive Structure — Five Root Keys

ROOT KEY	WHAT IT ACTUALLY REPRESENTS
HKEY_LOCAL_MACHINE (HKLM)	Machine-wide settings, applying to every user on this PC
HKEY_CURRENT_USER (HKCU)	The signed-in user's own settings — a live view into one specific branch of HKEY_USERS
HKEY_USERS (HKU)	Every loaded user profile's own settings, each under its own SID subkey
HKEY_CLASSES_ROOT (HKCR)	File type/COM registration data — actually a merged view of HKLM\Software\Classes and HKCU\Software\Classes, not a real independent hive
HKEY_CURRENT_CONFIG (HKCC)	The current hardware profile — a view into part of HKLM, rarely edited directly

Underneath each root key, **keys** nest like folders, and each key holds **values** — named data entries typed as `REG_SZ` (a string), `REG_DWORD` (a 32-bit number, the most common type for on/off-style settings), `REG_BINARY`, `REG_MULTI_SZ` (multiple strings), or `REG_EXPAND_SZ` (a string containing an environment variable reference, expanded at read time).

Navigating regedit

`regedit`'s address bar accepts a full path pasted directly — right-clicking any key and choosing "Copy Key Name," then pasting that path into the address bar of a fresh `regedit` window, is consistently faster than manually expanding a dozen nested folders by hand. `Ctrl + F` searches key names, value names, and value data, though only sequentially — there's no equivalent to a database index here.

Delivering on Chapter 1's Own Promise — a Group Policy Equivalent on Home

Many settings a Pro-edition machine would configure through `gpedit.msc` have a direct Registry equivalent — the same underlying value Group Policy itself ultimately writes, just set by hand instead of through that GUI. A Home-edition machine can achieve the identical result by creating that same key and value directly:

```
# Example: disabling a specific policy-controlled behavior directly via the Registry,
# the same value a Group Policy setting would write on a Pro-edition machine
reg add "HKLM\SOFTWARE\Policies\Microsoft\Windows\ExampleFeature" /v DisableFeature /t REG_DWORD /d 1 /f
```

Delivering on Windows 11 Fundamentals 6's Own Deferred Promise

Leftover entries from an uninstalled program most commonly live under `HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall` — each subkey there corresponds to one entry in the Settings app's own "Installed apps" list. A subkey surviving after its program has been removed (recognizable by a `DisplayName` value referencing software no longer present) can be safely deleted directly, exactly the kind of manual cleanup that chapter named as this course's own territory.

Backup Before Editing — Always

Right-clicking any key and choosing **Export** saves that key (and everything underneath it) as a `.reg` file — double-clicking that file later merges its contents back in, effectively an undo for anything changed since. Exporting the specific key about to be touched, every time, takes seconds and is the single most effective safety net available before any Registry edit.

THE REGISTRY HAS NO BUILT-IN SANITY CHECKING

Unlike a Settings page or Control Panel dialog, the Registry Editor doesn't validate that a value makes sense before accepting it — nothing stops an incorrect value type, a typo in a critical path, or an accidental deletion under `HKLM\SYSTEM\CurrentControlSet` from being applied instantly. A mistake in the wrong key, particularly anywhere under `SYSTEM`, can render a machine unable to boot at all — exactly the scenario Chapter 9 covers recovering from, but one this chapter's own export-first habit exists specifically to avoid needing in the first place.

SCRIPTING A REGISTRY CHANGE ACROSS MANY MACHINES

The same `reg add` command shown above (or PowerShell's own Registry provider, navigable exactly like a filesystem via `Get-ItemProperty HKLM:\...`) can be dropped into a script and run identically across many machines — directly delivering on Chapter 1's own note that the Registry can be edited "on one machine (or scripted across many)."

Hands-On Exercises

EXERCISE 1

A Windows 11 Home user needs a specific behavior that would normally be set via Group Policy on Pro edition. Explain how this chapter delivers on Chapter 1's own promised alternative, and what real risk comes with editing the Registry directly instead.

View solution

EXERCISE 2

Explain why exporting a key before editing it is described as "the single most effective safety net," and specifically what exporting protects against that Windows's own lack of built-in Registry validation doesn't.

View solution

EXERCISE 3

A colleague wants to remove leftover entries from several old uninstalled programs across many machines at once, rather than one key at a time in regedit. Explain how this chapter's own tip-box addresses that need.

View solution

CHAPTER 4 QUICK REFERENCE

- **Five root keys:** HKLM (machine-wide), HKCU (current user), HKU (all users), HKCR (merged Classes view), HKCC (current hardware profile)
- Group Policy's Home-edition gap (Chapter 1) has a direct Registry equivalent for many policies
- Uninstall leftovers live under `HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Uninstall` — delivering on Windows 11 Fundamentals 6's own deferred promise
- **Always export the key before editing it** — the Registry has no built-in validation, unlike a Settings page
- A mistake under `HKLM\SYSTEM` can make a machine unbootable — Chapter 9 covers recovering from exactly that
- `reg add` and PowerShell's Registry provider make Registry changes scriptable across many machines at once
- **Next chapter:** Group Policy & Local Security Policy

CHAPTER 5 OF 10

Group Policy & Local Security Policy

Windows 11 Troubleshooting & Administration

Chapter 5 · Group Policy & Local Security Policy

Chapter 1 named Group Policy as the layer for "enforcing a setting consistently across many machines," available only on Pro/Enterprise/Education. Chapter 4 revealed what it actually does underneath: write the same Registry values a manual edit could set by hand. This chapter covers the tool itself — on the machines where it exists — plus a genuinely important scope rule Chapter 1 only gestured at.

gpedit.msc — The Local Group Policy Editor

Local Group Policy splits into two halves: **Computer Configuration** (settings applying to the machine itself, regardless of who signs in) and **User Configuration** (settings applying to whichever user is currently signed in). Both branch further into Windows Settings and **Administrative Templates** — the most commonly used node, exposing hundreds of settings as friendly toggles and dropdowns, each one ultimately writing to a specific Registry key exactly like Chapter 4's own manual example.

Local Security Policy — A Filtered View, Not a Separate System

`secpol.msc` isn't a genuinely separate tool — it's effectively a filtered view showing only the Computer Configuration > Windows Settings > Security Settings branch of the exact same Group Policy tree, presented on its own for convenience. Account Lockout Policy, Password Policy, Audit Policy, and User Rights Assignment all live here, covering security-specific configuration without needing to navigate the full `gpedit.msc` tree to reach them.

Applying & Verifying — gpupdate and gpresult

Policy changes apply automatically on a background refresh cycle (roughly every 90–120 minutes, with a randomized offset to avoid every machine in an organization refreshing simultaneously) — or immediately, via `gpupdate /force`, useful when testing a change rather than waiting. `gpresult /h report.html` generates a full, browsable report of exactly which policies are currently applied to this machine and — critically in a domain environment — precisely which Group Policy Object each one came from.

GPRESULT AS A REAL DIAGNOSTIC TOOL, NOT JUST DOCUMENTATION

When a setting doesn't seem to be behaving as configured, `gpresult /h report.html` is often faster than guessing — it shows the actual, currently-in-effect value and its source directly, rather than requiring a manual comparison between every policy location that could plausibly be responsible.

Domain vs. Local Scope — Resolving Chapter 1's Own Distinction

Local Group Policy applies only to the one machine it's configured on. In a domain-joined environment, centrally managed **Group Policy Objects (GPOs)** apply from Active Directory across many machines at once — and, critically, **domain GPOs take precedence over local policy** by default whenever the two conflict.

	SCOPE	CONFIGURED VIA	PRECEDENCE
Local Group Policy	One machine	`gpedit.msc`, this machine only	Lowest — overridden by any conflicting domain GPO
Domain GPO	Many machines, centrally	Active Directory, Group Policy Management Console	Wins over local policy by default
Local Security Policy	One machine	`secpol.msc` (a filtered view of local Group Policy's own Security Settings)	Same as Local Group Policy — same underlying rule

"I SET THIS LOCALLY AND IT KEEPS REVERTING" — DOMAIN PRECEDENCE, NOT A BUG

On a domain-joined machine, a locally configured policy that conflicts with a domain GPO will be silently overwritten at the next background refresh — exactly the behavior a user might report as a setting "reverting on its own." This is domain precedence working as designed, not a fault in the local configuration; `gpresult /h` confirms it directly by naming the domain GPO actually in control.

Hands-On Exercises

EXERCISE 1

A colleague configures a setting via Local Security Policy on a domain-joined machine, but it reverts within a couple of hours. Using this chapter's own warn-box, explain what's most likely happening and how to confirm it.

View solution

EXERCISE 2

Explain why secpol.msc is described as "not a genuinely separate tool" from gpedit.msc, and what practical difference (or lack of one) this has on the Account Lockout Policy settings found there.

View solution

EXERCISE 3

Explain why gpupdate /force is useful specifically while testing a policy change, given how Group Policy normally applies on its own.

View solution

CHAPTER 5 QUICK REFERENCE

- **gpedit.msc** — Computer Configuration (machine-wide) vs. User Configuration (per signed-in user)
- **secpol.msc** — a filtered view of Group Policy's own Security Settings branch, not a separate system
- **gpupdate /force** — applies changes immediately instead of waiting for the ~90–120 minute background refresh
- **gpresult /h** — shows exactly which policies apply and from which source, a real diagnostic tool
- **Domain GPOs override local policy by default** — a locally set, conflicting policy will silently revert on a domain-joined machine
- **Next chapter:** Task Scheduler

CHAPTER 6 OF 10

Task Scheduler

Windows 11 Troubleshooting & Administration

Chapter 6 · Task Scheduler

Every prior chapter in this course covered a tool for observing or configuring the system directly. This chapter covers the tool that runs things *automatically* — and reveals, along the way, just how much of Windows's own routine behavior is quietly implemented through it.

Triggers, Actions & Conditions

Every scheduled task is built from three parts: a **Trigger** (when it runs — a specific time, on startup, at logon, on a matching event log entry, or on system idle), an **Action** (what it does — almost always "start a program" today, since sending an email or displaying a message were both deprecated), and **Conditions** (additional constraints layered on top of the trigger — only run on AC power, only if a network connection is available, stop the task if it runs longer than a set time).

The Create Basic Task wizard covers the most common combinations quickly; the full **Create Task** dialog exposes every trigger, action, and condition option at once, including several the wizard never surfaces at all — the more capable path once anything beyond a simple schedule is actually needed.

The Task Scheduler Library — More of Windows Than Most Realize

Browsing to `Task Scheduler Library > Microsoft > Windows` reveals dozens of built-in tasks handling routine OS maintenance — disk defragmentation scheduling, telemetry collection, certificate maintenance, and much more. A meaningful share of what feels like "Windows just doing things in the background" isn't a hidden always-running service at all — it's an ordinary scheduled task, inspectable, and in some cases genuinely safe to disable, using the exact same tool covered in this chapter.

Diagnosing a Failed (or Silently Skipped) Task

The **History** tab shows every past run of a task, along with the specific action taken and its result — but it's **disabled by default** and must be turned on via Action > "Enable All Tasks History" before any history will be recorded going forward; it cannot retroactively show runs that happened before it was enabled. The **Last Run**

Result column reports a numeric result code — `0x0` means success, anything else points to a specific, lookupable failure reason.

> **A TASK CAN SILENTLY NEVER RUN AT ALL — WITH NO ERROR TO SHOW FOR IT**
>
> A task configured to run "only when the user is logged on" simply won't fire if nobody's signed in when the trigger occurs — and a condition like "start only if the computer is on AC power" causes the task to be skipped entirely on a laptop running on battery, with no failure logged, since the task was never actually started in the first place. "It never ran" and "it ran and failed" look identical at a glance in the task's overview, and only the History tab (once enabled) distinguishes them.

Task Scheduler vs. systemd Timers

systemd in Depth 7 covers systemd's own timer units as Linux's modern replacement for cron. The two tools solve the same underlying problem through very differently shaped interfaces:

	CONFIGURATION	MISSED-RUN CATCH-UP
Task Scheduler	GUI-first — the Create Task dialog, or scriptable via `schtasks`/PowerShell's `ScheduledTasks` module	A checkbox — "Run task as soon as possible after a scheduled start is missed"
systemd timers	Plain-text `.timer` unit files, paired with a `.service` unit, using `OnCalendar=` syntax	`Persistent=true`, covered directly in systemd in Depth 7

Both solve the identical real-world problem — a laptop that was asleep or powered off when a scheduled maintenance job should have run — with a single toggle, just expressed as a GUI checkbox on one platform and a text-file directive on the other.

> **ENABLE TASK HISTORY BEFORE IT'S NEEDED, NOT AFTER**
>
> Since History can't be backfilled, turning it on for any task worth monitoring — before a problem occurs, not after someone asks "why didn't this run last week" — is the only way to have an answer available when it's actually needed.

Hands-On Exercises

EXERCISE 1

A scheduled backup task on a laptop appears to have simply never run last night, with no error visible in the task's overview. Using this chapter's own warn-box, explain the most likely cause and what to check.

View solution

EXERCISE 2

Explain why enabling Task History only after a task has already started misbehaving won't help diagnose what happened on previous runs.

View solution

EXERCISE 3

Using this chapter's own compare-table, explain how Task Scheduler's "run as soon as possible after a missed start" checkbox and systemd in Depth 7's Persistent=true setting solve the same real-world problem.

View solution

CHAPTER 6 QUICK REFERENCE

- Every task is built from a **Trigger**, an **Action**, and optional **Conditions**
- **Task Scheduler Library > Microsoft > Windows** reveals how much routine OS behavior is implemented as ordinary scheduled tasks
- **Task History is disabled by default** and can't be backfilled — enable it before it's needed
- A condition like "only on AC power" can silently skip a task entirely, with no error logged — indistinguishable from "never ran" without History enabled
- Task Scheduler's missed-run checkbox and systemd in Depth 7's `Persistent=true` solve the identical problem on different platforms
- **Next chapter:** Windows Update & Driver Troubleshooting

CHAPTER 7 OF 10

Windows Update & Driver Troubleshooting

Windows 11 Troubleshooting & Administration

Chapter 7 · Windows Update & Driver Troubleshooting

Windows 11 Fundamentals 8 covered how updates and Storage Sense normally behave; this chapter covers what to do when an update fails outright, plus Device Manager — a tool Course 1 never opened at all.

SFC and DISM — Repairing Corrupted System Files

System File Checker (`sfc /scannow`) checks protected system files against a local reference copy and repairs any that don't match. But that local reference copy lives in the exact same **WinSxS component store** already introduced in *Windows 11 Fundamentals 8*'s own Disk Cleanup material — and if the store itself is damaged, SFC has nothing healthy left to repair from.

```
# The real recommended order: repair the source SFC relies on first
DISM /Online /Cleanup-Image /RestoreHealth
sfc /scannow
```

DISM's `/RestoreHealth` pulls replacement components directly from Windows Update (or a specified source) to repair the WinSxS store itself — the deeper fix, run first, so that SFC's own subsequent pass has a genuinely healthy source to repair from.

	WHAT IT ACTUALLY CHECKS	REPAIR SOURCE
SFC	Individual protected system files against a local reference copy	The local WinSxS component store
DISM /RestoreHealth	The WinSxS component store itself	Windows Update, or a specified alternate source

The Windows Update Troubleshooter — What It Actually Resets

Settings > System > Troubleshoot > Other troubleshooters > Windows Update runs an automated sequence that restarts the Windows Update-related services, clears the update cache, and resets several related components to their default state. It's a genuinely reasonable first step precisely because it's low-risk and quick — but it isn't a targeted fix for any specific cause, and running it repeatedly against an update failure it isn't actually addressing accomplishes nothing beyond resetting components that were never the problem.

Device Manager & Driver Error Codes

A yellow warning triangle over a device in Device Manager indicates a real problem, expandable into a specific numbered **Code** (Code 43, for instance, meaning Windows has stopped the device because it reported a problem) via that device's own Properties > General tab. Updating a driver offers "Search automatically" (checks Windows Update and locally cached drivers) or "Browse my computer" (pointing directly at a manufacturer-downloaded driver package) — the second option genuinely necessary whenever a manufacturer's own driver is newer or more specific than what Windows Update offers.

Driver Rollback — a Real, Time-Limited Option

A device's Properties > Driver tab includes "Roll Back Driver" — reverting to whichever version was in place immediately before the most recent update. This only works because Windows keeps exactly **one** previous driver package on hand for that purpose.

A GRAYED-OUT "ROLL BACK DRIVER" BUTTON DOESN'T MEAN THERE'S NO PROBLEM

The button is disabled whenever no previous driver package is stored — either because the current driver is the first ever installed for that device, or because a second update has since replaced the one rollback would have restored, or because a cleanup pass (including the Disk Cleanup material from *Windows 11 Fundamentals 8*) removed the stored copy. A grayed-out button means "no backup available to restore," not "everything is fine" — the real fix at that point is downloading and manually reinstalling a known-good driver version directly from the manufacturer.

THE TROUBLESHOOTER AS A QUICK FIRST PASS, NOT A DIAGNOSIS

Running the Windows Update troubleshooter before digging into logs or manual fixes is reasonable — but if it reports "no problems found" and the update still fails, that's real information too: whatever's wrong likely needs SFC/DISM, a specific error-code lookup, or a manual update download, not another troubleshooter pass.

Hands-On Exercises

EXERCISE 1

Running `sfc /scannow` reports errors it "could not fix." Using this chapter's own explanation, describe the likely underlying cause and the correct next command to run.

View solution

EXERCISE 2

A user updated a graphics driver two weeks ago, and it's been causing crashes ever since — but "Roll Back Driver" is grayed out. Using this chapter's own warn-box, explain why, and what the real fix is.

View solution

EXERCISE 3

Explain why running the Windows Update troubleshooter three times in a row, with no change in the update's own failure, isn't a productive next step.

View solution

CHAPTER 7 QUICK REFERENCE

- **DISM /RestoreHealth first, then SFC** — SFC's own repair source (the WinSxS store) needs to be healthy before it can fix anything
- The Windows Update troubleshooter resets components — a reasonable first pass, not a targeted diagnosis
- Device Manager's numbered **Code** errors (e.g. Code 43) are specific and lookupable
- "Roll Back Driver" only works because exactly one previous driver package is kept — grayed out means no backup exists, not that everything's fine
- A grayed-out rollback button means a manual manufacturer-driver reinstall is the real fix
- **Next chapter:** Networking Troubleshooting

CHAPTER 8 OF 10

Networking Troubleshooting

Windows 11 Troubleshooting & Administration

Chapter 8 · Networking Troubleshooting

Networking Fundamentals 10 already built a real diagnostic workflow around `ping`, `traceroute`, `ss`, and `tcpdump`. *Windows 11 Fundamentals 7* previewed `ipconfig /flushdns` without using it. This chapter delivers the Windows-specific tools and applies that same layered workflow directly.

ipconfig — Adapter State & DNS Cache

`ipconfig /all` shows every adapter's full configuration — IP address, subnet mask, default gateway, and DNS servers, whether assigned by DHCP or set manually. `ipconfig /release` followed by `ipconfig /renew` forces a fresh DHCP lease, useful when an adapter is stuck with an invalid or conflicting address. `ipconfig /flushdns` finally delivers on *Windows 11 Fundamentals 7*'s own preview — clearing the local DNS resolver cache, useful when a domain name has recently changed its IP address but Windows keeps resolving the stale one.

ping — Basic Reachability, Read Correctly

`ping -t` pings continuously until stopped; `ping -n <count>` sends a specific number of requests. Two very different failure messages are worth distinguishing precisely:

MESSAGE	WHAT IT ACTUALLY MEANS
Request timed out	No response came back at all within the wait period — could be a dropped packet, a firewall silently discarding it, or genuine unreachability
Destination host unreachable	A router along the way actively knows there's no valid path to that destination and said so — a routing-level "no," not silence

tracert — The Windows-Specific Hop-by-Hop Path

`tracert` shows every router hop between this machine and a destination, revealing exactly where a connection breaks down along the route. One genuine technical difference from *Networking Fundamentals 10*'s own `traceroute` coverage: Windows's `tracert` uses ICMP Echo requests by default, while several

Unix/Linux `traceroute` implementations default to UDP — the same underlying concept, a different default protocol, occasionally producing different results against a firewall that filters one but not the other.

nslookup — Isolating DNS Specifically

`nslookup <domain>` queries DNS directly and shows exactly what it resolves to. Pointing it explicitly at a known-good public DNS server (`nslookup example.com 8.8.8.8`) isolates whether a resolution failure is specific to the machine's own configured DNS server, or a broader problem affecting DNS resolution generally.

A Real Layered Troubleshooting Workflow

THE WINDOWS-TOOL VERSION OF NETWORKING FUNDAMENTALS 10'S OWN METHODOLOGY

1. `ipconfig /all` — does this machine have a valid IP address and gateway at all?
2. `ping` the default gateway — can this machine reach the local network?
3. `ping 8.8.8.8` (a known IP, bypassing DNS entirely) — can this machine reach the internet at all?
4. `nslookup` a domain — is DNS resolution itself working?
5. `ping` the domain name directly — does it resolve and respond together?

Each step isolates one specific layer, exactly matching Networking Fundamentals 10's own layered diagnostic philosophy — just expressed through Windows's own specific tools rather than their Linux counterparts.

PINGING A RAW IP TO SEPARATE CONNECTIVITY FROM DNS

Step 3 above is worth calling out on its own: pinging `8.8.8.8` directly, with no domain name involved, proves or disproves general internet connectivity completely independently of whether DNS is working — a fast, genuinely useful way to narrow "the internet doesn't work" down to either a connectivity problem or a DNS-specific one in a single command.

Network Reset — A Genuine Last Resort

Settings > Network & internet > Advanced network settings > Network reset reinstalls every network adapter and resets networking components to their default state.

NETWORK RESET IS DISRUPTIVE, NOT A QUICK FIRST STEP

Network Reset removes VPN configurations and resets adapter-specific settings entirely — a genuinely bigger action than anything else in this chapter, appropriate only once the layered workflow above has already been worked

through and hasn't isolated the problem. Reaching for it first, before ipconfig/ping/nslookup have even been tried, risks losing working configuration to fix a problem that a five-minute layered check might have identified precisely.

Hands-On Exercises

EXERCISE 1

A ping to a website returns "Destination host unreachable" while a ping to a different site returns "Request timed out." Using this chapter's own compare-table, explain the different underlying meaning of each result.

View solution

EXERCISE 2

A user reports "the internet is down." Using this chapter's own five-step workflow, explain what pinging 8.8.8.8 directly (rather than a domain name) actually isolates, and why that step matters before checking DNS.

View solution

EXERCISE 3

A colleague suggests running Network Reset as the very first troubleshooting step for a Wi-Fi connectivity issue. Using this chapter's own warn-box, explain why that's premature.

View solution

CHAPTER 8 QUICK REFERENCE

- **ipconfig /all, /release, /renew, /flushdns** — adapter state and DNS cache, delivering on Windows 11 Fundamentals 7's own preview
- "Request timed out" (no response) vs. "Destination host unreachable" (an active routing-level no) are genuinely different findings
- **tracert** uses ICMP by default — a real difference from some Linux traceroute implementations' own UDP default
- Pinging a known IP directly isolates general connectivity from DNS-specific problems
- A five-step layered workflow (gateway → known IP → nslookup → domain ping) mirrors Networking Fundamentals 10's own methodology using Windows tools
- **Network Reset** is genuinely disruptive — a last resort, not a first step
- **Next chapter:** Boot & Startup Issues

CHAPTER 9 OF 10

Boot & Startup Issues

Windows 11 Troubleshooting & Administration

Chapter 9 · Boot & Startup Issues

Chapter 4's own warn-box named this chapter directly as the destination for recovering from a bad Registry edit under `HKLM\SYSTEM`. *GRUB & Multibooting 6* already covered Windows Boot Manager from GRUB's own side, including a real, well-documented gotcha this chapter closes the loop on from the Windows side.

Windows Boot Manager & the BCD Store

Windows's own first-stage bootloader is **bootmgr**, reading configuration from the **Boot Configuration Data (BCD)** store — the modern replacement for the old `boot.ini` file. *GRUB & Multibooting 6* covered exactly how this coexists with GRUB in a dual-boot setup: either GRUB becomes the primary bootloader and chainloads to Windows Boot Manager, or Windows Boot Manager itself is configured to chainload to GRUB — the same chainloading mechanism that course covered generally, applied specifically to Windows's own bootloader here.

> **CLOSING THE LOOP ON GRUB & MULTIBOOTING 6'S OWN GOTCHA**
>
> That chapter named "the classic Windows-Update-breaks-GRUB gotcha" directly — from the Windows side, this happens because a Windows feature update can overwrite the boot entry in the EFI System Partition, silently removing whatever chainload configuration previously handed control to GRUB. Windows isn't being deliberately hostile to a dual-boot setup; it's simply re-asserting its own boot entry as part of a normal update, with no awareness that a second bootloader's own entry existed at all.

WinRE — Windows Recovery Environment

WinRE launches automatically after three consecutive failed boot attempts, or can be reached deliberately via Shift+Restart from the sign-in screen or Start menu, or by booting from install media. Its Advanced options offer **Startup Repair**, **System Restore**, **System Image Recovery**, a **Command Prompt**, **Uninstall Updates**, and **Startup Settings** (the gateway to Safe Mode).

WINRE TOOL	BEST FOR
Startup Repair	An automated first attempt — common boot-configuration problems, though not everything

WINRE TOOL	BEST FOR
System Restore	Reverting system files, installed programs, and Registry state to an earlier restore point — not personal files
Uninstall Updates	A recent quality or feature update specifically identified as the cause
Safe Mode (via Startup Settings)	Isolating whether a third-party driver or startup program, rather than core Windows, is responsible
Command Prompt	Manual intervention — running SFC/DISM (Chapter 7) or direct file operations when nothing automated works

Safe Mode — Minimal Drivers, Minimal Services

Safe Mode starts Windows with only the essential drivers and services running, deliberately excluding most third-party software. If a problem disappears in Safe Mode, that's real, useful evidence — pointing at a specific driver or startup program rather than a core Windows fault. Safe Mode with Networking adds network drivers for anything requiring internet access to fix; Safe Mode with Command Prompt boots directly to a command line instead of the desktop, for situations where the graphical shell itself is the problem.

System Restore — Chapter 4's Own Discipline, at Whole-System Scale

A restore point captures system files, installed programs, and Registry state at a specific moment — deliberately not personal files, which are unaffected by a restore. This is the exact same "capture a known-good state before risking a change" principle Chapter 4 taught for a single Registry key's own export, just applied at the scale of the entire system rather than one key.

Reading a BSOD

A modern Windows 11 Blue Screen shows a QR code (linking to Microsoft's own troubleshooting page for that specific error) and a **Stop Code** — a specific, named identifier like `CRITICAL_PROCESS_DIED` or `DRIVER_IRQL_NOT_LESS_OR_EQUAL`. This is the same pattern this course has already named twice: an Event ID (Chapter 2) and a Device Manager error Code (Chapter 7) are both specific, lookupable identifiers rather than vague free text — a Stop Code is the third instance of that same troubleshooting pattern, this time for the single most severe class of Windows failure.

> **BUILD A RECOVERY DRIVE BEFORE IT'S NEEDED**
>
> Settings > System > Recovery offers "Create a recovery drive" — a bootable USB with WinRE's own tools, worth building in advance rather than discovering, mid-crisis, that the recovery partition on the affected machine is itself damaged or inaccessible.

Hands-On Exercises

EXERCISE 1

A dual-boot machine that previously showed a GRUB menu now boots straight into Windows with no GRUB option at all, right after a Windows feature update. Using this chapter's own warn-box and GRUB & Multibooting 6, explain what most likely happened.

View solution

EXERCISE 2

A problem disappears entirely when booted into Safe Mode. Explain what this actually proves, and what it doesn't yet tell you about the specific cause.

View solution

EXERCISE 3

Explain why a BSOD's Stop Code is described as the same kind of troubleshooting anchor as an Event ID or a Device Manager error code, rather than something entirely new to this chapter.

View solution

CHAPTER 9 QUICK REFERENCE

- **Windows Boot Manager (bootmgr) + the BCD store** — Windows's own first-stage bootloader, chainloading with GRUB per GRUB & Multibooting 6
- A Windows feature update can silently overwrite the EFI boot entry, removing a GRUB chainload configuration — closing that course's own named gotcha
- **WinRE** — Startup Repair, System Restore, Uninstall Updates, Safe Mode, Command Prompt
- **Safe Mode** disappearing symptoms point at a driver/startup program, not core Windows — but doesn't identify which one alone
- **System Restore** — Chapter 4's export-before-editing discipline, applied at whole-system scale, excluding personal files
- A BSOD **Stop Code** is the same lookupable-identifier pattern as an Event ID (Ch.2) or Device Manager Code (Ch.7)
- **Next chapter:** Capstone — Diagnosing a Real Multi-Symptom Windows Issue

CHAPTER 10 OF 10

Capstone: Diagnosing a Real Multi-Symptom Windows Issue

Windows 11 Troubleshooting & Administration

Chapter 10 · Capstone: Diagnosing a Real Multi-Symptom Windows Issue

Windows 11 Fundamentals 12 set up a real workstation for "Priya," a freelance developer, and closed with an honest scope note: "no domain join, no Group Policy, no centrally managed update rings, no deep Registry work." Nine chapters later, this capstone returns to that exact same machine, some months on, now showing four real, simultaneous symptoms — and delivers on every one of those named gaps in turn.

The Symptoms, Reported Together

- The machine has been noticeably sluggish most afternoons.
- Priya's database client crashes several times a week, always suddenly.
- Her nightly project-backup task hasn't actually run in over a week.
- This morning, right after a Windows Update, the machine blue-screened on boot.

Four symptoms, investigated one at a time — but, as the investigation shows, not entirely unrelated.

Step 1 — The Afternoon Slowdown (Chapters 1 & 3)

Task Manager's Performance tab shows Disk at a sustained 100% active time each afternoon, with throughput only a few hundred KB/s — Chapter 3's own named misreading pattern. Resource Monitor's Disk tab, sorted by IOPS rather than raw throughput, identifies the database client itself issuing a huge volume of tiny read requests, PID noted for the next step.

Step 2 — The Crashing Database Client (Chapters 2 & 4)

Cross-referencing that PID and timestamp in Event Viewer, the client's own branch under Applications and Services Logs shows repeated Error-level entries — the same Source and Event ID each time — describing a failed read against a local cache file. Following that Source into the Registry (Chapter 4) turns up a corrupted value under the client's own `HKCU` branch, left behind by a bad update months earlier — no Settings or

Control Panel equivalent exists for it at all, exactly the "no GUI" case Chapter 1's own four-layer table described. The key is exported first, then the value corrected directly.

Step 3 — Ruling Out Memory (Chapter 3, Revisited)

Before concluding the disk activity is the whole story, Resource Monitor's Memory tab is checked: Hard Faults/sec sit near zero throughout the afternoon slowdown, ruling out memory pressure as a contributing factor — the disk I/O from the corrupted-cache retries really is the whole explanation.

Step 4 — The Missing Backup Runs (Chapter 6)

Task Scheduler's History (enabled proactively, per Chapter 6's own tip-box, when the machine was first set up) shows the backup task being skipped every evening rather than failing — the exact "silently skipped, not failed" pattern that chapter warned about. Its Conditions tab confirms an "only start if on AC power" setting, and Priya has been working from the sofa on battery most evenings lately. The condition is removed.

Step 5 — The Local Policy Surprise (Chapter 5)

A well-meaning "optimization" utility Priya tried months ago turns out to have set a Local Group Policy value disabling a background service the backup task quietly depends on. `gpresult /h` confirms it directly by name — this machine was never domain-joined, so nothing here is overridden by a higher-precedence domain GPO; the local setting really is the final word, and reverting it in `gpedit.msc` resolves it for good.

Step 6 — This Morning's BSOD (Chapters 7 & 9)

The Blue Screen's Stop Code points at a display driver. Device Manager confirms a yellow warning triangle on the graphics adapter with a Code error, dated to right after this morning's update. "Roll Back Driver" is available this time — the update was recent enough that Windows still has the previous driver package stored — and rolling it back resolves the boot failure. WinRE launched automatically after the failed boot attempts; Safe Mode, tested first, confirmed the problem was driver-related rather than a deeper System file issue, before the rollback was even attempted.

CHAPTER-ATTRIBUTION TABLE

- **Chapters 1, 3** — Task Manager/Resource Monitor identifying the afternoon disk activity and ruling out memory pressure
- **Chapter 2** — Event Viewer correlating the crash to a specific cache-file failure
- **Chapter 4** — the Registry fix for a setting with no GUI equivalent, delivering on Windows 11 Fundamentals 12's own "no deep Registry work" gap

- **Chapter 5** — Group Policy, delivering on that same capstone's own "no Group Policy" gap
- **Chapter 6** — Task Scheduler History revealing the silently skipped backup
- **Chapter 7** — Device Manager and driver rollback resolving the BSOD's root cause
- **Chapter 9** — WinRE and Safe Mode confirming the cause before applying the fix

HONEST SCOPE NOTE

This machine was never domain-joined, so Chapter 5's own domain-GPO-precedence material and Chapter 9's own GRUB-coexistence contrast genuinely don't apply here — a single-workstation investigation like this one doesn't exercise every scenario this course covers, and that's expected, not a gap in the diagnosis. This capstone also doesn't cover a formal enterprise incident-response process, ticketing, or stakeholder communication — real support-engineer skills in their own right, but outside what this two-course track set out to teach.

Hands-On Exercises

EXERCISE 1

Explain why the afternoon slowdown and the database client crashes turned out to share a root cause, even though they were reported as two separate symptoms.

View solution

EXERCISE 2

Explain why Step 5's Group Policy fix didn't need to account for domain GPO precedence, using this chapter's own scope note and Chapter 5's own material.

View solution

EXERCISE 3

Explain why "Roll Back Driver" was available for this morning's BSOD, when Chapter 7's own worked example described a case where the same button was grayed out.

View solution

CHAPTER 10 QUICK REFERENCE

- Four reported symptoms, investigated with the full toolkit from Chapters 1–9, revealed genuine underlying connections rather than four unrelated problems
- The Registry and Group Policy chapters directly closed the two gaps Windows 11 Fundamentals 12's own capstone named as out of scope
- Not every chapter's own scenario applies to every real machine — this one was never domain-joined, and that's a legitimate, expected limit on scope, not an omission
- This closes the full Windows 11 track: Fundamentals covers running a workstation well; Troubleshooting & Administration covers diagnosing one when something goes wrong