TROUBLESHOOTING ESSENTIALS · COURSE TOOLKIT

Diagnostic Commands Quick Reference

> **Toolkit 5 of 10** · Diagnostic Commands Quick Reference · Adapted from Appendix C and §7.1–7.4 of Dr. Tahseen Al Doori's *Troubleshooting Essentials*, University Edition (2026). Notes marked *Beyond the book* are additions by the course, checked against the official sources listed.

How to use this sheet

Find the **task** you need in the left-hand column, then read across to the command for Windows, macOS or Linux. The second table tells you what to look for in the output. Run commands on a training machine or virtual machine while you are learning. Some commands need administrator rights; repair commands change the system and are marked with a warning.

> **Warning. Repair commands change your system.** `chkdsk /f`, `fsck`, `sfc /scannow` and Disk Utility First Aid repair file systems or system files. Never run a disk repair on a drive that may be failing or that holds the only copy of important data: back up first, and if a drive may be failing, stop and escalate. Practise on a training machine or virtual machine.

Part 1 — Command reference

Adapted from Appendix C of the book.

TASK	WINDOWS	MACOS	LINUX
Show IP configuration	`ipconfig /all`	`ifconfig`	`ip addr`
Renew IP address	`ipconfig /release` then `ipconfig /renew`	System Settings > Network > Renew DHCP	`sudo dhclient -r; sudo dhclient`
Flush DNS cache	`ipconfig /flushdns`	`sudo dscacheutil -flushcache`	`resolvectl flush-caches`
Test reachability	`ping host`	`ping host`	`ping host`
Trace route	`tracert host`	`traceroute host`	`traceroute host`
DNS lookup	`nslookup name`	`nslookup name`	`nslookup name` / `dig name`
Connections and ports	`netstat -an`	`netstat -an`	`ss -tuln`
Running processes	`tasklist` / Task Manager	Activity Monitor / `top`	`top` / `ps aux`
System logs	Event Viewer	Console	`journalctl`
Check disk	`chkdsk /f`	Disk Utility > First Aid	`fsck` (unmounted)
Repair system files	`sfc /scannow`	—	Package manager reinstall

Part 2 — What to look for

Based on §7.3 of the book.

COMMAND	PURPOSE	WHAT TO LOOK FOR
`ipconfig /all`, `ip addr`, `ifconfig`	Show IP configuration	A valid IP address, subnet mask, default gateway and DNS servers. An address beginning **169.254** means no DHCP response
`ping`	Test reachability	Replies with low, stable times. "Request timed out" means no response
`tracert` / `traceroute`	Show the path to a host	The hop where replies stop or delays jump
`nslookup`	Test name resolution (DNS)	The correct IP address returned for a name
`netstat -an`	Show connections and listening ports	Expected services listening; unexpected connections
`ipconfig /release`, `/renew`, `/flushdns`	Refresh addressing and the DNS cache	A new valid address; stale names cleared

Part 3 — The five-step connectivity test

From §7.3 of the book. Run in order; the first command that fails shows where the fault lies.

```
ping 127.0.0.1            # 1. Is the TCP/IP stack working locally?
ipconfig                  # 2. Do I have a valid IP address and gateway?
ping <default gateway>    # 3. Can I reach my router?
ping 8.8.8.8              # 4. Can I reach the internet by IP address?
ping google.com           # 5. Does name resolution (DNS) work?
```

Part 4 — Monitoring and recovery tools

From §7.1, §7.2 and §7.4 of the book.

TOOL	PLATFORM	USE
Task Manager (Ctrl+Shift+Esc)	Windows	Applications, CPU, memory, disk and network use; startup programs
Resource Monitor	Windows	Detailed per-process use of CPU, memory, disk and network
Activity Monitor	macOS	Processes, CPU, memory, energy, disk and network use
`top` / `htop`	Linux, macOS	Live list of processes and resource use in the terminal
Device Manager	Windows	Hardware devices and driver status; warning icons for faulty devices
Event Viewer	Windows	Windows Logs: Application, System and Security
Console	macOS	System logs
`journalctl`, /var/log	Linux	System logs
Safe mode	All	Start with minimal drivers and software, for isolation
System Restore / Time Machine	Windows / macOS	Return the system to an earlier working state
Automated troubleshooters / Wireless Diagnostics	Windows / macOS	Check common settings automatically

Part 5 — Notes for current systems

Beyond the book (2026 note): `netstat` on Linux is legacy. The Linux manual page for `netstat` describes the program as "mostly obsolete" and names `ss` as its replacement (and `ip route` in place of `netstat -r`). This is why the book's table uses `ss -tuln` for Linux: `-t` shows TCP sockets, `-u` UDP sockets, `-l` only listening sockets and `-n` numeric ports instead of service names. On Windows and macOS, `netstat -an` remains the command shown in the book.

Beyond the book (2026 note): `ip` rather than `ifconfig` on Linux. The book already gives `ip addr` for Linux. `ip address` (which can be shortened to `ip addr`) shows the IPv4 and IPv6 addresses on every interface. The Linux `ifconfig` manual page itself points to `ip link` from the iproute2 package for full link-layer details such as hardware addresses. For macOS, the book gives `ifconfig`.

Beyond the book (2026 note): Linux DNS cache and DHCP renewal depend on the system's network services. `resolvectl flush-caches` clears the caches kept by the

systemd-resolved service, so it applies only where that service is in use. Likewise, `dhclient` works only where that DHCP client is installed and managing the interface; if your distribution manages networking with a different service, renew the address with that service's own tool, as described in your distribution's documentation.

Beyond the book (2026 note): renewing a DHCP lease on current macOS. In current versions of macOS the path is: Apple menu > System Settings > Network > choose the network service > Details > TCP/IP > Renew DHCP Lease. The button is available only when the service is set to use DHCP.

Beyond the book (2026 note): `chkdsk /f` locks the drive. Microsoft's reference states that `/f` fixes errors only if the disk can be locked; if files are open, `chkdsk` offers to check the drive at the next restart, and you cannot open files on the drive until it finishes. Run without parameters, `chkdsk` reports the volume's status without fixing anything, which is the safer first look. Administrator rights are required.

Beyond the book (2026 note): run DISM before `sfc /scannow`. Microsoft's guidance for current versions of Windows is to run `DISM.exe /Online /Cleanup-image /Restorehealth` in an elevated Command Prompt before running `sfc /scannow`. Both commands need administrator rights and should be run only where policy allows.

Beyond the book (2026 note): a PowerShell alternative on Windows. `ipconfig`, `ping`, `tracert` and `nslookup` are all current on Windows. PowerShell also offers `Test-NetConnection`, which can run a ping test (`Test-NetConnection <host>`), a route trace (`-TraceRoute`) or a TCP port test (`-Port <number>`), useful when one application cannot connect on its port.

Sources

- Dr. Tahseen Al Doori — *Troubleshooting Essentials*, University Edition (2026), Appendix C, §7.1–7.4
- netstat(8) — Linux manual page (man7.org)
- ss(8) — Linux manual page (man7.org)
- ip-address(8) — Linux manual page (man7.org)
- ifconfig(8) — Linux manual page (man7.org)
- resolvectl(1) — Linux manual page (man7.org)
- Change TCP/IP settings on Mac — Apple Support
- ipconfig — Microsoft Learn
- chkdsk — Microsoft Learn
- Use the System File Checker tool to repair missing or corrupted system files — Microsoft Support
- Test-NetConnection — Microsoft Learn