

1.3 Operating Systems

Syllabus 2026 - 2028

WHAT YOU NEED TO KNOW

- Characteristics of operating systems, including command line, graphical, dialogue based and gesture based interfaces
- The differences between the types of operating system interface
- The advantages and disadvantages of each type

What an operating system does

An **operating system (OS)** is system software that manages the computer's hardware and software and provides the **user interface**, the way the user communicates with the computer. It manages memory, files, input and output devices and running programs. Operating systems are described by the type of interface they offer.

1. Command line interface (CLI)

The user types text commands at a prompt to make the computer do something. There are no icons or menus.

Advantages	Disadvantages
+ Gives the user direct control and access to more settings	- The user must learn and remember the exact commands
+ Fast for an expert, and commands can be scripted to repeat tasks	- A typing mistake makes the command fail
+ Needs little memory and a low-specification computer	- Hard for beginners and not intuitive
+ Does not need a pointing device	- Results are shown as text, so it is poor for graphics

2. Graphical user interface (GUI)

The user interacts using windows, icons, menus and a pointer (WIMP), selecting items with a mouse, trackpad or touch screen.

Advantages	Disadvantages
+ Easy to learn and use; no commands to remember	- Needs more memory, processing power and storage
+ Icons and menus make options visible	- Slower for an expert than typing a command
+ Several programs can be seen and used at once in windows	- Less direct control over low-level settings
+ Suits beginners and is widely used	- Needs a pointing device and a graphical display

3. Dialogue based interface

The user speaks to the computer and it responds, for example voice assistants and voice-controlled systems. The computer recognises speech and carries out the request or replies.

Advantages	Disadvantages
+ Hands-free, so it suits users who are driving, busy or have a disability	- Speech recognition can misunderstand accents or unclear speech
+ Natural, with no need to learn commands or use a keyboard	- Background noise affects accuracy
+ Quick for simple requests	- Not private or practical in quiet or public places
	- Limited for complex tasks

4. Gesture based interface

The user controls the device with movements, such as swiping, pinching or tapping a touch screen, or body and hand movements detected by a camera or sensors.

Advantages	Disadvantages
+ Natural and quick to learn, with no keyboard or mouse needed	- Movements can be misread, causing mistakes
+ Suits touch devices such as phones and tablets	- Gestures must be learned, and may differ between devices
+ Useful for games and virtual reality, and where touching a device is not possible	- Needs a touch screen, camera or sensors
	- Tiring if used for long periods, and imprecise for fine detail

Comparing the four types

	CLI	GUI	Dialogue	Gesture
User inputs	Typed commands	Mouse, touch, clicks	Spoken words	Movements, swipes
Ease of use	Hard	Easy	Easy	Easy
Learning needed	A lot	Little	Little	Some
Resources needed	Low	High	Medium to high	Medium to high
Typical use	Technical users, servers	PCs, laptops	Voice assistants	Phones, tablets, VR

EXAM TIP

Do not just say 'easy to use' or 'hard to use'. Give a reason, for example 'a CLI is hard to use because the user must remember exact commands'. Advantage and disadvantage answers need to be specific to the interface.

Key terms

Term	Meaning
Operating system	System software that manages the hardware and software and provides the user interface.
User interface	The means by which the user communicates with the computer.
CLI	Command line interface; the user types commands.
GUI	Graphical user interface using windows, icons, menus and a pointer.
WIMP	Windows, icons, menus and pointer.
Dialogue based	An interface controlled by speaking.
Gesture based	An interface controlled by movements, swipes or touch.
Prompt	The place on a CLI where commands are typed.