Pearson BTEC **Level 3 National Extended Certificate in Information Technology**

Unit 1: Information Technology Systems
A Digital devices in IT systems
A3 Computer software in an IT system

Types of Operating Systems

Type	How does it work?	Example
Real-Time Operating Systems	They process data as soon as it enters the computer system allowing it to respond immediately to input.	We see it used in traffic lights, manufacturing robots & air traffic control systems.
Single-user, single-task	They can only be used by one person at a time, using a single application.	They were used in old mobile phones and PDA devices.
Single-user, multi-tasking operating systems	They are designed for only a single user at a time, however, it can run multiple applications simultaneously.	This is commonly used in general purpose computing devices like smartphones, tablets and PCs.
Multi-user operating systems	They allow many different users to make use of a computer system and its resources at the same time.	This is commonly seen used in powerful servers, supercomputers and mainframes.

The role of the operating system examples

Networking	An example of this is that TCP/IP is built into all major operating systems. TCP/IP are the protocols that are fundamental in allowing us to transmit data over a network like the Internet.
Security	Well known examples would be built-in anti-virus and firewall software, but it also includes features like user authentication (like a login system) to prevent unauthorised access and backup
Memory Management	It is the responsibility of your operating system to assign memory to each of your applications running in order to allow them to run. This involves both the allocation of memory to the various
Multi-Tasking	The operating system will assign small amounts of the processor time to each application though and this happens so quickly it appears that they are running simultaneously.
Device Drivers	Software programs that allow peripherals to communicate with a computer

Factors affecting the use and performance of an operating system

Hardware
Is an issue where you don't have enough memory for the operating system & applications running.

Malware	Virtual memory
Malware, such as viruses, will corrupt data and take over O/S functions to hinder performance.	Virtual memory being used excessively can lead to thrashing. You also might not have a large enough pagefile.

Utility Software

Disk Defragmenter	Backup	Disk/Registry Cleaner	Software Updates	Anti-Virus	Firewalls
Hard Disk Drives (note: not Solid State Drives) are prone to fragmentation which negatively affects disk read/ write times. The disk defragmenter will analyse the hard disk and regroup data so that data relating to the same application or file are in the same location of the hard disk.	If the data on our hard disk is damaged (such as by a virus) we often use a backup to recover the lost data. Backup utility software can help simplify and automate the backup process to make it easier to recover.	Disk cleaner utilities will identify data that can be removed in order to save hard disk space that can be used for newer data. The registry cleaner will remove old redundant registry entries, such as from deleted software programs.	Software running on your system, including the operating system, need regular updates in order to keep them secure, to access the latest features & to remove any bugs. Doing this manually is a time-consuming task so software update utility software will manage the updating of your software automatically.	Anti-virus will detect any suspicious programs and remove them before they can cause problems. They usually do this through scanning newly added files and software, as well as through regularly scheduled scans of the storage devices connected to your system.	This application will monitor the traffic coming into and out of your computer system (via its ports) over a network to look for anything suspicious. This might be hackers or malware for example. It will block off any suspicious data to prevent harm being caused.

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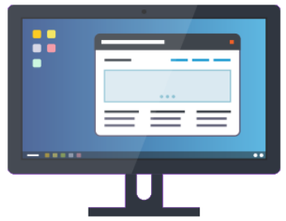
The User Interface

The user interface is the way in which users interact with a computer system. It provides us with a set of commands and menus that we can use through our input & output system in order to perform the actions we wish to complete.



Graphical User Interface	Command Line Interface	Menu-Based Interface	Adapted Interface
This type of user interface is designed around graphical icons and images. We commonly know this as a WIMP interface. This stands for Windows, Icons, Menus & Pointers. This is because we use a pointer, such as a mouse cursor, to navigate and interact with the computer using windows, icons & menus.	This is still used by some expert users, particularly for tasks like managing and maintaining a network. These users find a CLI much more powerful and efficient for completing these types of tasks.	This type of user interface presents the user with a menu that contains a list of options. The user navigates through various submenus by choosing the relevant option in order to perform the function they want.	An adapted, or adaptive, interface is one that will alter its presentation, layout & even options in order to better support the user or the technology it is running on.
✓ It is easy to use and is easy to move data between applications.	✓ It is quicker to complete many tasks for experienced users that know the commands and requires very little processing power, memory and storage.	✓ This is very easy to use and easily adapted to different users.	✓ It fits the needs of users very effectively.
✗ it uses a lot of processing power, memory & storage. It can also be slow to complete tasks for experienced users.	✗ it is very difficult to use for beginners. Because they will need to learn all of the commands.	✗ It can be frustrating to complete tasks if there are many levels of submenus.	✗ It can be time-consuming to adapt the interface to individuals.

Application Software Purposes

software	Use	Examples
Productivity software	To allow users to perform their work-based tasks more efficiently.	Word processing, spreadsheet, database & presentation software.
Graphics/multimedia software	To produce graphics and multimedia products on your computer system.	CAD, graphics editing, desktop publishing & video editing software.
Personal software	Used in the home to help in our general lives.	Home finance, educational & entertainment
Communication software	To allow users to share information by passing it from one device to another.	Email, web browsing, VoIP & instant messaging software.

Application Software Choice

Compatibility	Use	User experience
Whether it works with your current hardware & software.	Whether it has the required functionality.	Whether the users are able to use the software comfortably.

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- File types define the kind of data that is being stored in a file.
- File types can greatly affect the compatibility, file size & quality of videos and images.

Image File Types

With images, you need to ensure that the file type you choose is compatible with the software you are using. If we do use a format that is specific to an application then we are locked into using it in future (and anyone receiving our image would need to have that software to view it).

BMP	JPG	GIF
Used for high-quality images, like photos.	Used for high-quality images, like photos, that are to be shared	Used for simple images on the web, like logos.

Video File Types

There are a lot of video file types that only work with certain devices & media players, which has to be considered when choosing which to use. If you choose a .mov format, for example, you won't be able to play the video on Windows Media Player.

AVI	MP4
Used for high-quality video, often during production.	Used for playing videos on mobile devices and for internet streaming.

Image File Type Uses

PNG	SVG
Used for high-quality images that require transparency.	Used for vector graphics and can be displayed on a web page.

Video File Type Uses

MOV	MKV
Used for internet streaming.	Used for HD video, commonly downloaded over the internet.

Application File Types

Your choice of application file types can define what software you must continue to use. It can also affect the features you can access and the file size.

File Types	Use
DOCX, DOC & RTF	Word processing.
XLSX, XLS & CSV	Spreadsheets
PPT & PPTX	Presentations
ACCDB & MDB	Databases
PDF	Can be used for presentations & other applications.

Open Source v Proprietary Licences

Software licences define how software can be redistributed and used.

Open source software	Proprietary software
Allows you to both use the software and access to view & modify the source code.	Allows you to use the software but retains intellectual property rights so you cannot view, modify & redistribute the source code.
This has simpler licensing, you can alter the source code to adapt it to your needs, there are more regular updates and there is less "tie-in" to the software.	It comes with the rights and expectations for the software to be maintained, it is usually simpler to update the software, there is usually good professional support and it often has better
However the software can be abandoned, maintaining the updates can be difficult, there is usually no professional support and code flaws can be identified & exploited easier.	However, licensing is often more complicated, the program can't be adapted to your needs, updates can often take a long time to arrive and it can be difficult to transfer data to alternative software.

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Security	
Memory Management	
Multi-Tasking	
Device Drivers	

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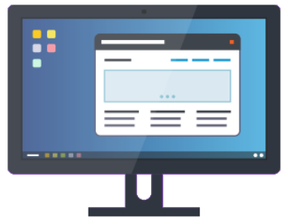

Graphical User Interface	Command Line Interface	Menu-Based Interface	Adapted Interface
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✗	✗	✗	✗

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software	Use	Examples

Application Software Choice

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