Software

Systems Software = Software designed to maintain and control the hardware, it also provides and interface between software and hardware.

The two main types of systems software are operating systems and utility programs:

Operating system = controls the hardware and software and provides and interface for the user

Utility programs = help to maintain the computer

Application Software = Application software is a collection o one or more programs used to solve a specific task. For example:

- Word processing software
- Spreadsheet software
- Database software
- Education software
- Entertainment software

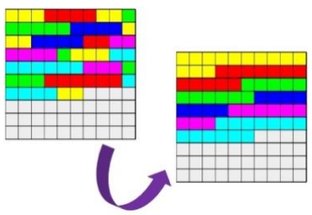
Types of Utility Software

Compression

Compression software reduces the size of a file stored on secondary storage.

Smaller files are easier to transmit across a network as they require fewer packets to be sent. Their reduced size also means more files can be stored in any given area of storage.

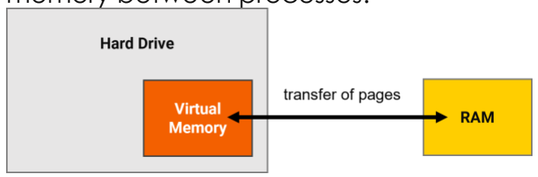
Defragmentation



Defragmentation software takes the fragmented files and rearranges the segments so that they run contiguously. This decreases read/write time, thereby speeding up computer performance.

- Automatic back up and system updates
- Anti-virus and firewalls
- Disk Repair – fix corrupted files

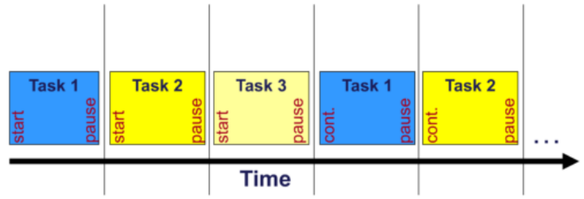
Functions of an Operating System Notes:

Function	Why its Needed
User Interface	**Different Types: Command line, Graphical User Interface (GUI) Voice** Allows the user to communicate with the hardware.
Memory Management Multitasking	**Using paging** by allocating sections of RAM to share memory between processes.  Moves data between **RAM and Virtual Memory** to free up space, such as higher priority processes. Moves inactive processes to virtual memory and swapped back when the process becomes active
Peripheral Management and Drivers	ⓘ A **device driver** is a program that controls a peripheral device such as a printer. It allows the operating system to **communicate** with the device ⓘ A **peripheral** is an external device not directly connected to the CPU such as a monitor or keyboard ⓘ The operating system deals with taking input from the devices and sending output to them.
User Management	ⓘ To allow a user to **log on** by checking the username and password/authenticate user logins ⓘ Users can be added/deleted so multiple users can use the same computer ⓘ **Enforce user permissions** - Gives different users access to specific folders/drives or resources/permission to install files. ⓘ Control the amount of storage each user has access.
File Management	ⓘ Stores data in a hierarchical structure which allows data to be stored in an organised way ⓘ File management gives the user the ability to: ○ **Create files/folders** ○ **Name files/folders** ○ **Rename files/folders** ○ **Copy files/folders** ○ **Move files/folders** ○ **Delete files/folders** ⓘ Seach for files ⓘ Allows files and data to be retrieved and edited.

Process Scheduling

A multitasking OS executes 1 process at time, but allows multiple application to run by rapidly switching between processes.

Processes are allocated **time slices** and allocates CPU time for each process and



A **scheduling algorithm** controls processes

All processes are held in a **queue**.

Processes are switched at the end of their time slice.

Unfinished processes are put to the back of the queue.

Each process maybe held in order, higher priority first.

Robust Software

Authentication is a process used to test that a person is who they claim to be.

Code Reviews

Code reviews involve checking your own program code with a colleague or partner to find errors that may have been left in it.

Code review carried out by	Disadvantage
By a programmer	• Adds additional/significant time (to the development cycle) (1) • Introduces human error (1) • Requires an extra person/resource/labour (1) • Requires more experienced programmer (1)
By an automated system	• May not identify all issues (that it is not programmed to find) (1) • May only find well known problems (1)

Audit Trails

An audit trail provides a list of changes that have been made to software, by whom and on what date.
They are sorted into chronological order so changes can be traced back to their original form to better understand any bugs or security flaws that reveal themselves for patching.