1.5 System Software

1.5.1 Operating Systems

The operating system (OS) manages the hardware in a computer and provides an environment for applications to run. The OS controls different aspects of the running of the computer or device.

Systems software controls the hardware inside the computer and provides an interface for users to interact with it and is comprised of the operating system and utility software. Application software is the end-user programs that are designed to perform specific tasks, such as word processing, photo editing.

The functions controlled by the OS include:

- a user interface to allow the user to interact with the system
- memory management to control the use of the RAM and to share processor time between different programs and processes. The OS uses buffering to set aside memory for the temporary storage of data. For example, a process may output data which can be temporarily stored in the buffer so that the next process can be executed. Several programs running at the same time is known as multitasking.
- peripheral management to control peripheral devices using drivers. Drivers act as a translator to allow the CPU and the devices to communicate correctly
- user management to control who can access the computer and what resources they can use
- file management to allow users to organise their work into folders and subfolders

1.5.2 Utility Software

Utility software is a collection of programs each of which does a specific housekeeping task to help maintain a computer system.

Encryption software - this is used to encode data so that it cannot be understood if it is intercepted by unauthorised users. The encryption process uses an algorithm and key to transform the plaintext into ciphertext. The same software and key are needed to decrypt the data.

Defragmentation - Over time, data on a hard drive becomes fragmented. Parts of a file are saved to different areas of the disk where there is free space. This slows down the computer as more disk accesses are needed to read all of a file. Defragmentation software reorganises the files, putting all of the free space together and all of the parts of the same file together. This improves performance.

Data compression software - Data compression software uses algorithms to reduce the size of files so that they take up less storage space. There are two types of compression known as lossy and lossless.