AQA Computer Science A-Level
4.6.1 Hardware and software
Concise Notes

Specification:

4.6.1.1 Relationship between hardware and software:
Understand the relationship between hardware and software and be able to define the terms:
- Hardware
- Software

4.6.1.2 Classification of software:
Explain what is meant by:
- System software
- Application software

Understand the need for, and attributes of, different types of software.

4.6.1.3 System software:
Understand the need for, and functions of the following system software:
- Operating systems (OSs)
- Utility programs
- Libraries
- Translators (compiler, assembler, interpreter)

4.6.1.4 Role of an operating system (OS):
Understand that a role of the operating system is to hide the complexities of the hardware.
Know that the OS handles resource management, managing hardware to allocate processors, memories and I/O devices among competing processes.

Relationship between hardware and software

- Computer systems are composed of hardware and software

Hardware
- The term given to the physical components of the computer system
- If you can touch a part of a computer, it's hardware
- Includes both the internal and external components of a computer system

Software
- The name given to program code
- Sequences of instructions which are executed in order to perform a task

Examples of hardware and software

Hardware	Software	Hardware & software
Monitor	Word processor	Wireless router
Processor	Web browser	Wireless keyboard
Graphics card	Image editor	
Webcam	Video editor	

Classification of software

Application software

System software

Operating systems   Utility programs   Library programs   Translators

Application software
- The name given to programs that complete a specific task for the user
- Examples include word processors, web browsers and spreadsheet software

System software
- Operates, controls and maintains the computer and its components
- Includes the computer's operating system
- Also includes the categories utility programs, library programs and translators

Operating system
- Allows the user to control the computer with ease
- Provides a virtual machine, hiding the true complexity of the computer from the user
- Manages and controls access to the computer's resources including:
  - memory management
  - processor scheduling
  - handling interrupts

Utility programs
- Used for completing housekeeping tasks including:
  - data backup
  - defragmenting hard drives
  - data compression
  - encryption

Library programs
- Contain useful functions that are frequently used by a program
- Used by programmers to simplify the process of application development
- Must first be imported within program code

Translators
- Pieces of software which translate between different types of language
- This course covers three types of translator:
  - compilers
  - assemblers
  - interpreters