Definitions and Concepts for CAIE Computer Science IGCSE

Topic 4: Software

4.1 Types of software and interrupts

System Software: Software that manages and controls the computer hardware and acts as a platform to run application software.

Application Software: Software that performs specific tasks for the end-user (e.g., word processors or web browsers).

Operating System (OS): System software that manages the computer's hardware and software resources and provides an interface between the user and device.

Utility Programs: System software designed to help maintain, enhance, and troubleshoot a computer system (e.g., disk defragmenter, antivirus).

Firmware: Permanent software stored in non-volatile memory (such as ROM) that runs as soon as the computer is powered on. It provides low-level control over the hardware and starts the boot process.

Bootloader: Part of the firmware that checks that the hardware is working correctly and then loads the operating system into memory.

Interrupt: A signal sent to the processor to indicate that an event needs immediate attention.

Interrupt Service Routine: A block of code that executes in response to a specific interrupt signal.

4.2 Types of programming language, translators and integrated development environments (IDEs)

Low-level Language: A programming language that is closer to machine code and the hardware's instruction set (e.g., machine code, assembly language).

High-level Language: A programming language that is closer to human language, designed for ease of use, readability, and portability across different computer architectures.

Machine Code: The lowest-level programming language, specific to a single type of processor, consisting of binary instructions that a computer's CPU can directly execute.

Assembly Language: A low-level programming language that uses mnemonics to represent machine code instructions, which often have a 1:1 correspondence with machine code.

Translator: A program that converts source code written in one programming language into another language (often converting programs written in high-level languages into machine code so that they can be executed by a computer's hardware).

Interpreter: A type of program translator that executes source code line by line, without first compiling the entire program into machine code.

Compiler: A type of program translator that translates the entire source code of a program into machine code (an executable file) before the program is run.

Assembler: A type of program translator that translates assembly language code into machine code.

Integrated Development Environment (IDE): Software that brings together tools needed to write, test, and debug programs in one place, making development faster and easier.