AQA Computer Science A-Level

4.7.2 The stored program concept

Advanced Notes

Specification:

4.7.2.1 The meaning of the stored program concept:

Be able to describe the stored program concept: machine code instructions stored in main memory are fetched and executed serially by a processor that performs arithmetic and logical operations.

The stored program concept

A computer that uses the stored program concept is defined as “serially fetching and executing machine code instructions stored in main memory by a processor that performs arithmetic and logical operations”. There’s a lot to understand in the definition; the following table breaks down each stage.

Term	Meaning
Serially	Instructions are fetched and executed (see below) in order. The first instruction is fetched and then executed before the second instruction is fetched.
Fetching	Retrieving an instruction from main memory.
Executing	Carrying out what is specified by the instruction that has been fetched.
Machine code instructions	Instructions formed from just 1s and 0s that the processor can execute directly without the need for translation.
Main memory	Where a computer stores instructions and frequently used data. Examples include RAM and ROM.
Arithmetic	Operations that involve mathematical operations such as addition, subtraction and multiplication.
Logical	Operations that involve the use of logic gates like AND, OR and NOT.

Some early computers were designed to execute just one specific program. The stored program concept, and the way that it stores program instructions in main memory, allows one set of instructions to be switched out for another. This is the foundation of what allows modern computers to run numerous different applications.

Computers that use the stored program concept can be based on one of two different architectures: Harvard architecture and von Neumann architecture. In Harvard architecture, instructions and data are stored in different pieces of main memory whereas the two are stored together in von Neumann architecture.

Synoptic Link

Harvard architecture and von Neumann architecture are covered in the notes for **internal hardware components of a computer**.