

Topic 4: Processor Fundamentals

EAL keyword sheet - Cambridge International AS & A Level Computer Science 9618. Write the word in your own language in the last column.

Keyword	Meaning	Example sentence	In my language
CPU	The part of a computer that processes instructions.	<i>The CPU carries out the fetch-execute cycle.</i>	
Von Neumann architecture	A design in which data and instructions share the same memory.	<i>The Von Neumann model uses a single memory.</i>	
ALU	Arithmetic logic unit: does calculations and logical comparisons.	<i>The ALU performs addition.</i>	
control unit (CU)	Controls the timing and sends control signals.	<i>The CU decodes instructions.</i>	
register	A very fast storage location inside the CPU.	<i>A register holds a value for the ALU.</i>	
program counter (PC)	Holds the address of the next instruction.	<i>The PC is incremented after each fetch.</i>	
MAR	Memory address register: holds the address to be accessed.	<i>The address is copied into the MAR.</i>	
MDR	Memory data register: holds the data read or to be written.	<i>The MDR holds the fetched instruction.</i>	
CIR	Current instruction register: holds the instruction being decoded.	<i>The instruction is copied to the CIR.</i>	
accumulator (ACC)	Stores the result of ALU calculations.	<i>The answer is stored in the ACC.</i>	
index register (IX)	Holds a value that is added to an address, for example to access arrays.	<i>IX can be used for indexed addressing.</i>	
status register	Holds flags that show the result of an operation, e.g. overflow.	<i>The status register shows if the result was zero.</i>	
address bus	Carries memory addresses. It is one-way.	<i>A wider address bus can address more memory.</i>	
data bus	Carries data between the CPU, memory and I/O. It is two-way.	<i>The data bus carries the instruction.</i>	

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control bus	Carries control signals such as read and write.	<i>The control bus sends a 'memory read' signal.</i>	
fetch-execute cycle	The repeated process of fetching, decoding and executing instructions.	<i>The CPU repeats the fetch-execute cycle billions of times.</i>	
clock speed	The number of cycles the CPU processor performs per second.	<i>A 4 GHz CPU has a fast clock speed.</i>	
core	An independent processing unit in a CPU.	<i>A dual-core CPU can process two tasks at once.</i>	
cache	Fast memory that holds frequently used data close to the CPU.	<i>A larger cache reduces waiting time.</i>	
interrupt	A signal that makes the CPU pause and deal with an event.	<i>A mouse click causes an interrupt.</i>	
ISR (interrupt service routine)	The program that runs to handle an interrupt.	<i>After the ISR, the CPU resumes its previous task.</i>	
assembly language	A low-level language using mnemonics, e.g. LDA, ADD, STO.	<i>Assembly language is specific to one processor.</i>	
machine code	Binary instructions the CPU can run.	<i>Machine code is made of an opcode and an operand.</i>	
opcode	The part of an instruction that says what to do.	<i>The opcode for addition is ADD.</i>	
operand	The part of an instruction that holds the data or address.	<i>The operand is the memory address.</i>	
addressing mode	How the operand is used to find data: immediate, direct, indirect, indexed, relative.	<i>Immediate addressing uses the value itself.</i>	
bit manipulation	Changing individual bits using AND, OR, XOR and shifts.	<i>Use AND with a mask to test a bit.</i>	
mask	A binary pattern used to select or change certain bits.	<i>The mask 00001111 keeps the right-hand 4 bits.</i>	
assembler	A program that translates assembly language into machine code.	<i>A two-pass assembler reads the code twice.</i>	

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peripheral	A device connected to a computer, e.g. a printer.	<i>A scanner is a peripheral.</i>	