

Topic 15: Hardware

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
RISC	Reduced instruction set computer: simple instructions, each taking one cycle.	<i>RISC processors use less power.</i>	
CISC	Complex instruction set computer: many complex instructions.	<i>A CISC instruction can do several steps.</i>	
pipelining	Starting the next instruction before the previous one has finished.	<i>Pipelining increases the throughput.</i>	
throughput	The amount of work done in a given time.	<i>Pipelining increases throughput.</i>	
hazard	A problem in a pipeline, e.g. when an instruction needs a result that is not ready.	<i>A branch causes a pipeline hazard.</i>	
parallel processing	Using more than one processor at the same time.	<i>Parallel processing makes tasks faster.</i>	
SISD	Single instruction, single data.	<i>A single-core processor is SISD.</i>	
SIMD	Single instruction, multiple data.	<i>A GPU uses SIMD.</i>	
MISD	Multiple instruction, single data.	<i>MISD is rare.</i>	
MIMD	Multiple instruction, multiple data.	<i>Multicore processors use MIMD.</i>	
Flynn's taxonomy	A way of classifying computer architectures: SISD, SIMD, MISD, MIMD.	<i>Flynn's taxonomy has four classes.</i>	
massively parallel computer	A system with a very large number of processors working together.	<i>Supercomputers are massively parallel.</i>	
virtual machine	Software that behaves like a separate computer.	<i>A virtual machine can run another OS.</i>	
emulation	Making one system behave like another.	<i>Emulation allows old games to run.</i>	
half adder	A circuit that adds two bits. It gives a sum and a carry.	<i>A half adder uses XOR and AND gates.</i>	
full adder	A circuit that adds two bits and a carry in.	<i>Full adders are joined to add bigger numbers.</i>	

Keyword	Meaning	Example sentence	In my language
flip-flop	A circuit that stores one bit.	<i>A flip-flop remembers its state.</i>	
SR flip-flop	A flip-flop with Set and Reset inputs.	<i>SR flip-flops are built from NOR gates.</i>	
JK flip-flop	A flip-flop that avoids the invalid state of an SR flip-flop.	<i>A JK flip-flop can toggle.</i>	
Boolean algebra	A set of rules for working with true and false values.	<i>Boolean algebra simplifies circuits.</i>	
De Morgan's laws	Rules for changing AND to OR using NOT.	<i>$NOT(A AND B) = NOT A OR NOT B$</i>	
Karnaugh map (K-map)	A grid used to simplify Boolean expressions.	<i>A K-map groups the 1s.</i>	
sum-of-products	A Boolean expression written as ORs of ANDs.	<i>$A.B + C$ is a sum-of-products.</i>	
simplify	To make an expression shorter and use fewer gates.	<i>Simplify the expression using a K-map.</i>	