

Fetch- Decode- Execute cycle – How the CPU processes instructions:

FETCH: - The processor checks the **program counter (PC)** to see which instruction to run next. The program counter gives an address value in the memory of where the next instruction is. The processor fetches the instruction value from this memory location in the **RAM (main memory)**.

DECODE: - Decoding the instructions in the **ALU**, storing the result of this in the **CIR**.

EXECUTE: - The instruction is performed. Once this is complete, the processor goes back to the **program counter** to find the next instruction. This cycle is repeated until the program ends.

FACTORS AFFECTING PERFORMANCE OF CPU:

Clock Speed (measured in Hertz)

- Represents the number of fetch execute cycles / instructions the CPU can process in a given time. The higher the clock speed the faster the CPU will run WHY? – Because it will be doing more Fetch-Decode and Execute cycles per second which means more instructions are being processed.

Cache Size

- The holding area for data from the RAM – stores frequently used instructions. More cache then the better the performance. WHY? The more cache the CPU has the less time is spent accessing memory (RAM) this means it can retrieve instructions quicker and programs can run faster.

Number of Cores

- Number of Independent processors within the CPU. Meaning multiple Instructions able to be processed simultaneously in the same cycle. The more cores the quicker the performance – WHY? Quad Core = 4 cores. Can perform 4 instructions at same time in same cycle,

PROGRAM COUNTER (PC)	STORES THE LOCATION OF THE NEXT INSTRUCTION IN A PROGRAM WAITING TO BE FETCHED
MEMORY ADDRESS REGISTER (MAR)	STORES THE LOCATION FOR DATA TO BE FETCHED FROM OR SENT TO MEMORY
MEMORY DATA REGISTER (MDR)	STORES THE DATA THAT HAS BEEN FETCHED FROM OR IS WAITING TO BE SENT TO MEMORY
ACCUMULATOR	STORES THE RESULT OF THE CALCULATION PERFORMED BY THE ALU
CURRENT INSTRUCTION REGISTER	STORES THE INSTRUCTION READY TO BE DECODED BY THE ALU
ARITHMETIC LOGIC UNIT (ALU)	PART OF A (CPU) THAT CARRIES OUT ARITHMETIC AND LOGIC OPERATIONS IN COMPUTER INSTRUCTION
CONTROL UNIT (CU)	WORKS WITH THE CPU TO CONTROL THE FLOW OF DATA WITHIN THE SYSTEM AND TO DECODE INSTRUCTIONS
CACHE	SMALL TEMPORARY VOLATILE MEMORY, STORES FREQUENTLY USED INSTRUCTIONS. QUICKER FOR CPU TO ACCESS THAN MAIN MEMORY
MAIN MEMORY (RAM)	THIS THE VOLATILE MEMORY THAT STORES DATA AND PROGRAMS CURRENTLY IN USE.
EMBEDDED SYSTEM	THEY ARE DEDICATED SYSTEMS THAT ARE DESIGNED FOR A FIXED PURPOSE. THEY ARE A COMPUTER SYSTEM WITHIN A LARGER SYSTEM E.G. WASHING MACHINES, CAR PARK BARRIERS, MICROWAVES, CAR ENGINES, MP3 ETC
GENERAL PURPOSE SYSTEM	A MACHINE THAT IS CAPABLE OF CARRYING OUT SOME GENERAL DATA PROCESSING UNDER PROGRAM CONTROL. E.G PC, LAPTOP, PHONE, ETC.