CPU PERFORMANCE IN EMBEDDED SYSTEMS

--Multi Core Processors

--Pipelining

--Cache

MULTI CORE PROCESSORS

Definition:

CPUs with multiple cores (processing units) integrated into a single chip.

Purpose:

- **Parallel Processing:** Each core can execute a separate task simultaneously, increasing overall processing capacity.
- **Improved Multitasking:** Multiple tasks or threads can run concurrently without affecting each other.
- **Energy Efficiency:** Distributing the workload across multiple cores often reduces the need for high clock speeds, saving power.

PIPELINE PROCESSING

Definition:

- A method where instruction execution is divided into stages (e.g., fetch, decode, execute), allowing multiple instructions to be processed simultaneously in different stages.

Purpose:

- **Improved Throughput:** Instead of waiting for one instruction to finish, the CPU processes parts of multiple instructions at the same time.
- **Efficient Resource Usage:** Each stage of the pipeline operates continuously, minimizing idle CPU cycles.

Working

- Instruction 1: **Fetch Stage**

  (fetches the instruction from memory).
- Instruction 2: **Decode Stage**

  (interprets the instruction).
- Instruction 3: **Execute Stage**

  (performs the operation).

CACHE MEMORY

Definition:

- A small, high-speed memory located close to the CPU that stores frequently accessed data and instructions.

Purpose:

- **Faster Access:** Reduces the time the CPU spends waiting for data from slower main memory.
- **Improved System Performance:** High cache hit rates significantly boost CPU efficiency.

Thank you