

Lesson 03: Design Metrics

Design Metrics

- Power Dissipation
- Performance
- Process Deadlines
- User Interfaces
- Size
- Engineering cost
- Prototype Development and Manufacturing cost

Design Metrics

- Flexibility
- Prototype development Time
- Time-to- market System and
- User safety Maintenance

Amount and type of hardware needed

- Optimizing the microprocessors, ASIPs and single purpose processors in the system
- Optimizing according to the performance, power dissipation, cost and other design metrics the system
- Optimizing hardware (memory RAM, ROM or internal and external flash or secondary memory in the system, peripherals and devices internal and external to the system, ports and buses in the system and power source or battery in the system).

Optimizing the Power Dissipation

- Clock Rate Reduction
- Operating Voltage Reduction
- Wait, Stop and Cache Disable Instructions – Clever real-time programming.
- 'Wait' and 'Stop' instructions and disabling or controlling certain units when not needed – a of saving power during program execution

Disable use of certain structural units of the processor to reduce power dissipation

- Caches—when not necessary and
- Keep in disconnected state those structure units that are not needed during a particular software-portion execution, for example, display screen, timers or IO units
- Control of power requirement, for example, by screen auto-brightness control

Process Deadlines

- Meeting the deadline of all processes in the system while keeping the memory, power dissipation, processor clock rate and cost at minimum
- A challenging Task

Flexibility and Upgradeability

- Ability to offer the different versions of a product for marketing and offering the product in advanced versions later on.

Reliability

- Designing reliable product by appropriate design and thorough testing, verification and validation is a challenge.

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Summary

We learnt

- Challenges in Meeting Design Metrics in system design
- Process to Meet design metrics
- Reduction methods for Power dissipation

Summary

We learnt

- Enabling and controlling of processes and hardware units
- Flexibility, upgradeability and reliability

End of Lesson 03