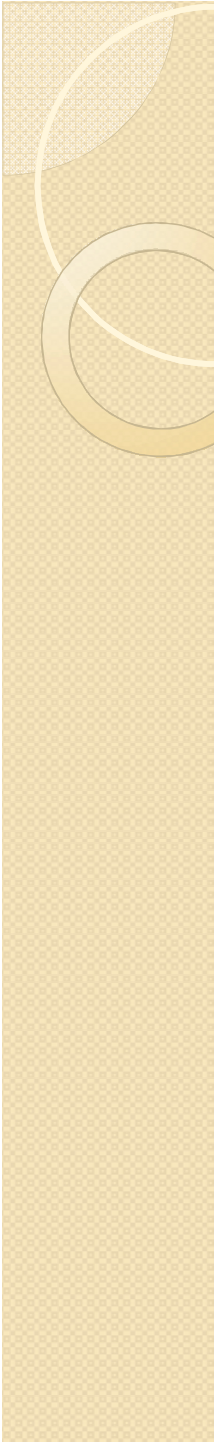# LECTURE 1

Embedded Microcontroller

Topics to be covered

- MicroController

- Structure

- Features

Microcontroller:

- **Dedicated to one task**
- **All h/w required is available on single chip**
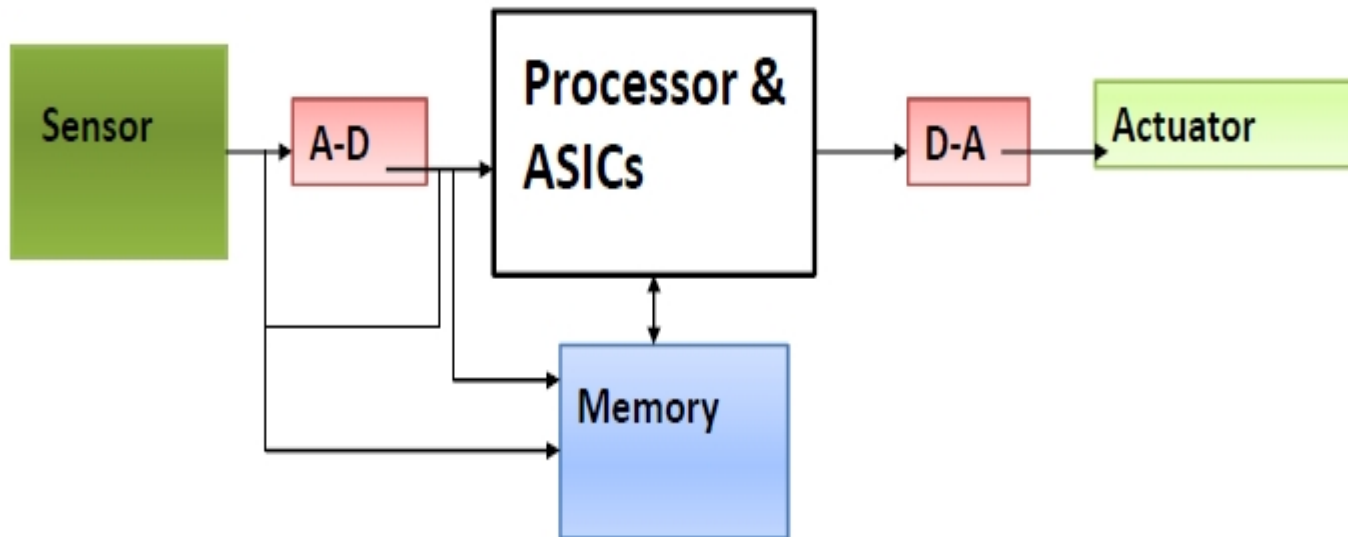- **Interacts with physical elements (Pressure, temp.) for measuring, controlling.**

*An Embedded System is a **microprocessor/microcontroller based system that is embedded as a subsystem, in a larger system** (which may or may not be a computer system).*

- Embedded system means the **processor is embedded** into that application.
- An embedded product uses a **microprocessor or microcontroller to do one task only.**
- In an embedded system, there is **only one application software** that is typically burned into ROM.
- **Example** ：printer, keyboard, video game player, microwave oven, etc.

Microprocessor

• A single chip that contains a whole CPU

– Has the ability to fetch and execute instructions stored in memory

– Has the ability to access external memory, external I/O and other peripherals

• Examples:

– Intel P4 or AMD Athlon in desktops/notebooks

– ARM processor in Apple iPod

Embedded System Structure (Generic)

All embedded systems are microprocessor based systems,

but all microprocessor based systems may not be amenable

to embedding (Area, Power, Cost, Payload parameters).

• Most of the embedded systems have real time constraints,
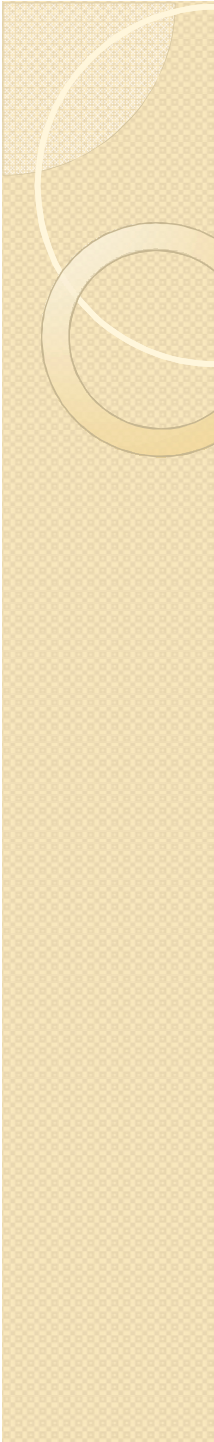
but there may be ES which are not hard RTS (for example

off line Palm tops)

• There may be RTS which are not embedded (e.g. Separate

Process Control Computers in a network)

• Embedded Systems are not GPS; they are
designed for

General Characteristics of Embedded Systems

Perform a single task

– Usually not general purpose

• **Increasingly high performance and real time constrained**

• **Power, cost and reliability are important considerations**

• **HW-SW systems**

– **Software is used for more features and flexibility**

– **Hardware (processors, ASICs, memory etc. are**

used for performance and security