MICROCONTROLLER

1. What is the meaning of a deadline? How can we ensure to be within of a deadline? (Example, tools, …)

DEADLINE:

A deadline is a timing milestone. If a deadline is missed by a computer-controller, the controlled system may transit to an undesirable state. In hard real-time systems, according to the usual definition, **a deadline that is not met can lead to a catastrophic failure**.

2. Details about embedded systems including different hardware platforms. (Concrete example of the one in the lecture). Example of continuous real-world value into discrete one.

Software embedded into a technical system that interacts with the real physical world, controlling some specific hardware.

Example: Bespoken System-on-chip design: FPGAs or ASICs that may incorporate microprocessors and memory (very expensive)

CHARACTERISTICS:

- REACTIVE SYSTEM:

A reactive system is a system that maintains a permanent interaction with its environment.

- REAL-TIME SYSTEM:

A real-time reactive system is a reactive system subject to externally defined timing constraints.

- CONTINUOUS SYSTEM:

In practice numerical solver or difference equations.

- DISCRETE SYSTEM:

Complex high-level programs.

- HYBRID SYSTEM:

Continuous and discrete elements.

ATTRIBUTES OF DEPENDABILITY:

- RELIABILTY:

Reliability is a quantitative measurement (as is availability), but it outlines the probability that the system will run without failure over a given time.

- AVAILABILITY:

Availability is a probability measure. It outlines the likelihood that the system will be operational at any given point in time in order to fulfil requests.

- SAFETY:

Safety is a property that indicates a system’s ability to run without posing harm to humans or to the system itself.