

Control systems and Computer Networks

Embedded and Networked Systemn

Dr Alun Moon

Lecture 1.2

Jacquard Loom



- Punched Cards controlling loom
- 1804
- manufacturing textiles with such complex patterns as brocade, damask and matelassé

- Embedded systems outnumber PC "Computers"

- Embedded systems outnumber PC "Computers"
 - $\approx 100 : 1$

- Embedded systems outnumber PC "Computers"
 - $\approx 100 : 1$
- Many unseen

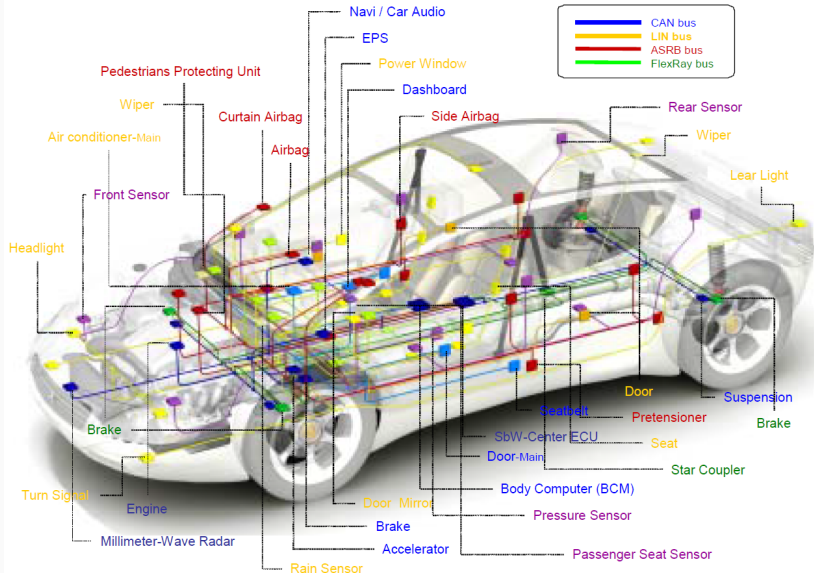
- Embedded systems outnumber PC "Computers"
 - $\approx 100 : 1$
- Many unseen
 - 5 or more in the kitchen

- Embedded systems outnumber PC "Computers"
 - $\approx 100 : 1$
- Many unseen
 - 5 or more in the kitchen
 - at least 2 on the outside of the PC

- Embedded systems outnumber PC "Computers"
 - $\approx 100 : 1$
- Many unseen
 - 5 or more in the kitchen
 - at least 2 on the outside of the PC
 - several in this room

- Embedded systems outnumber PC "Computers"
 - $\approx 100 : 1$
- Many unseen
 - 5 or more in the kitchen
 - at least 2 on the outside of the PC
 - several in this room
- A "Computer" is a collection of several micro-cotrollers/processors

Modern Network of systems



- Deal with physical signals

- Deal with physical signals
- Physical Quantities

- Deal with physical signals
- Physical Quantities
- Sense environment

- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages

- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages
 - Temperatures

- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages
 - Temperatures
 - Button Presses

- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages
 - Temperatures
 - Button Presses
- Effect environment

- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages
 - Temperatures
 - Button Presses
- Effect environment
 - Lights & Heating

- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages
 - Temperatures
 - Button Presses
- Effect environment
 - Lights & Heating
 - Motors – motion

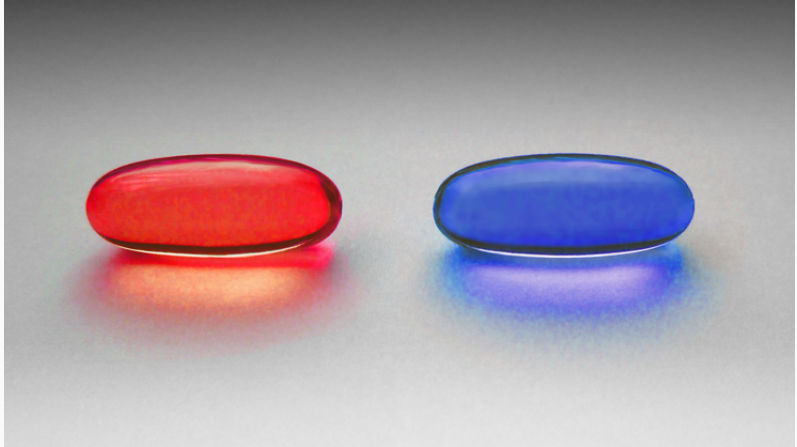
- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages
 - Temperatures
 - Button Presses
- Effect environment
 - Lights & Heating
 - Motors – motion
 - Change physical quantities

- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages
 - Temperatures
 - Button Presses
- Effect environment
 - Lights & Heating
 - Motors – motion
 - Change physical quantities
-

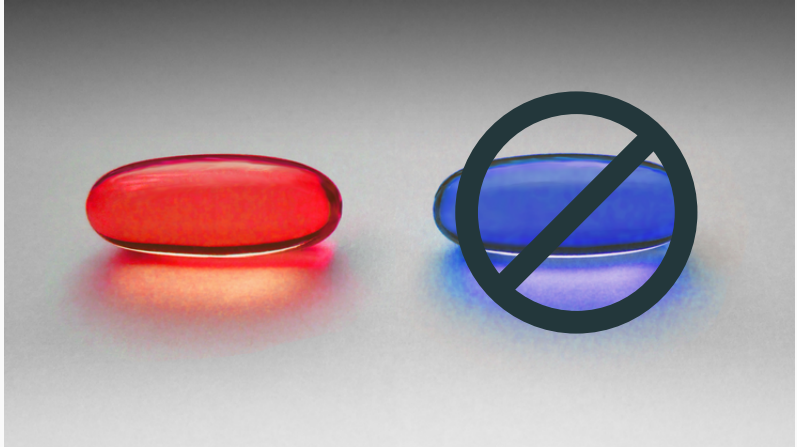
- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages
 - Temperatures
 - Button Presses
- Effect environment
 - Lights & Heating
 - Motors – motion
 - Change physical quantities
- Virtual Reality

- Deal with physical signals
- Physical Quantities
- Sense environment
 - Voltages
 - Temperatures
 - Button Presses
- Effect environment
 - Lights & Heating
 - Motors – motion
 - Change physical quantities
- ~~Virtual~~ Reality

We Deal with Reality



We Deal with Reality



You take the red pill – you stay in Wonderland, and I show you how deep the rabbit hole goes.

Morpheus, The Matrix