

Embedded Systems

2017/2018

Overview

Embedded Systems

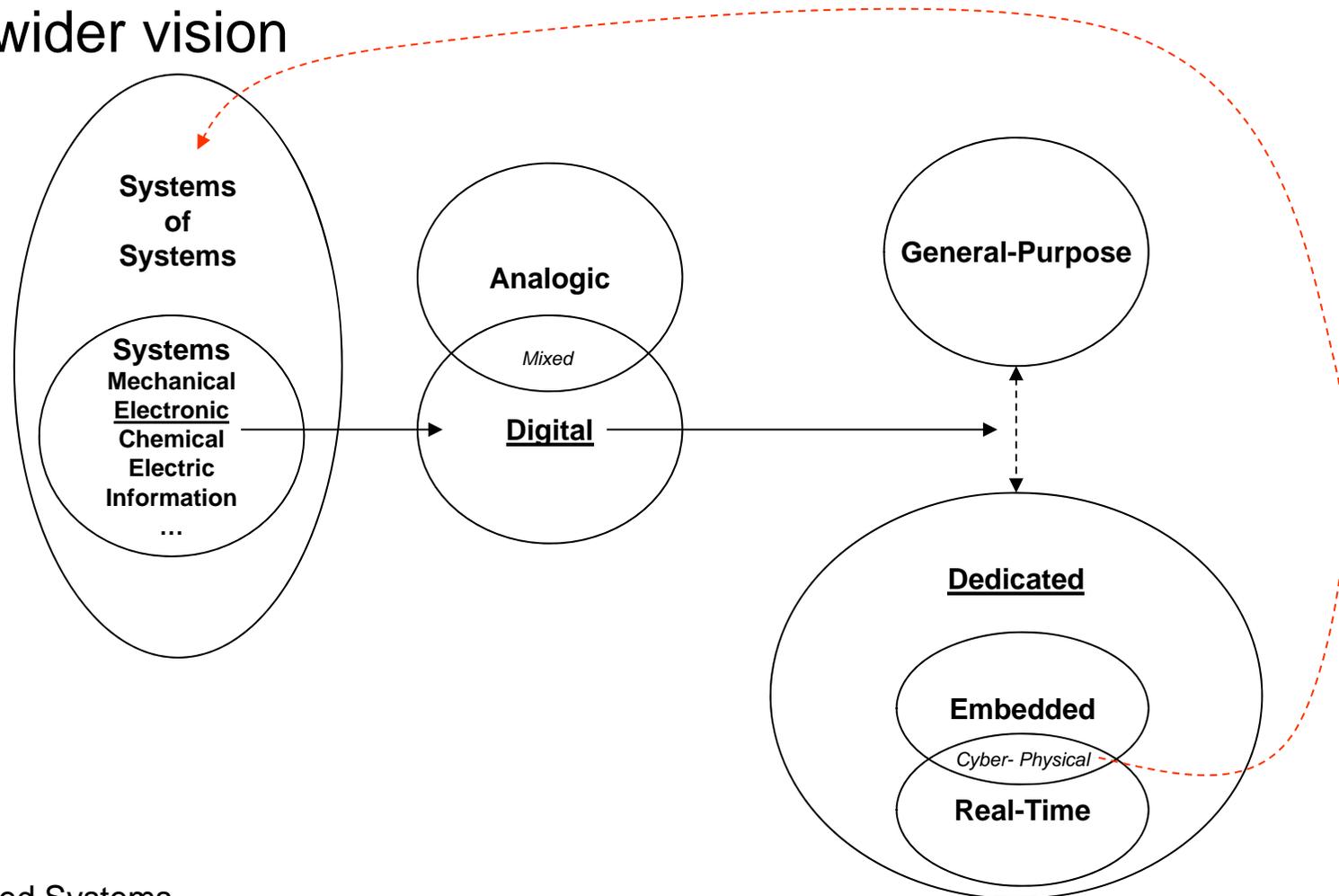
- Excuse me, please. But...

...what is an embedded system?!?!

From: <http://en.wikipedia.org/>

Embedded Systems

- A wider vision



Embedded Systems

- General structure of the course
 - 9 CFU ING-INF/05
 - Near 90 hours of lessons
 - Basic “theoretical” concepts about the development of HW/SW dedicated/embedded systems
 - Technical/practical seminars and case studies
 - 6 CFU INF/01
 - Only a subset of the full program will be requested for examination

Embedded Systems

- General structure of the course
 - Scheduling
 - Wednesday: 11.30-13.00
 - Thursday: 14.30-17.00 (one 15 min break)
 - Friday: 09.00-11.30 (one 15 min break)

Embedded Systems

- Lecturer
 - Dr. Luigi Pomante
 - Researcher (Assistant Professor) – DISIM/DEWS
 - Contacts
 - » email: luigi.pomante@univaq.it
 - » web site : www.pomante.net (**course website**)
 - » **Course mailing list:** embeddedsystemsqa1718
send an e-mail to luigi.pomante@univaq.it
 - » Office hours by appointment (e-mail)
 - Main collaborators
 - Dr. Marco Santic (Post-Doc)
 - Giacomo Valente, Vittoriano Muttillio, Walter Tiberti (PhD students)

Embedded Systems

- Goals
 - To provide a structured and homogeneous vision about technologies, methodologies and tools for HW/SW developments
 - To provide awareness about implementation issues during the analysis of theoretical concepts that needs a practical follow-up
 - To provide some (practical) knowledge about HW/SW development tools currently used in the academic and industrial worlds
 - Useful basic backgrounds
 - Computer Science, Algorithms, Structured/OOP Programming
 - Digital Electronics, Computer Architecture, Operating Systems
 - Electrical/Wireless Communications
 - Model driven/based development/engineering

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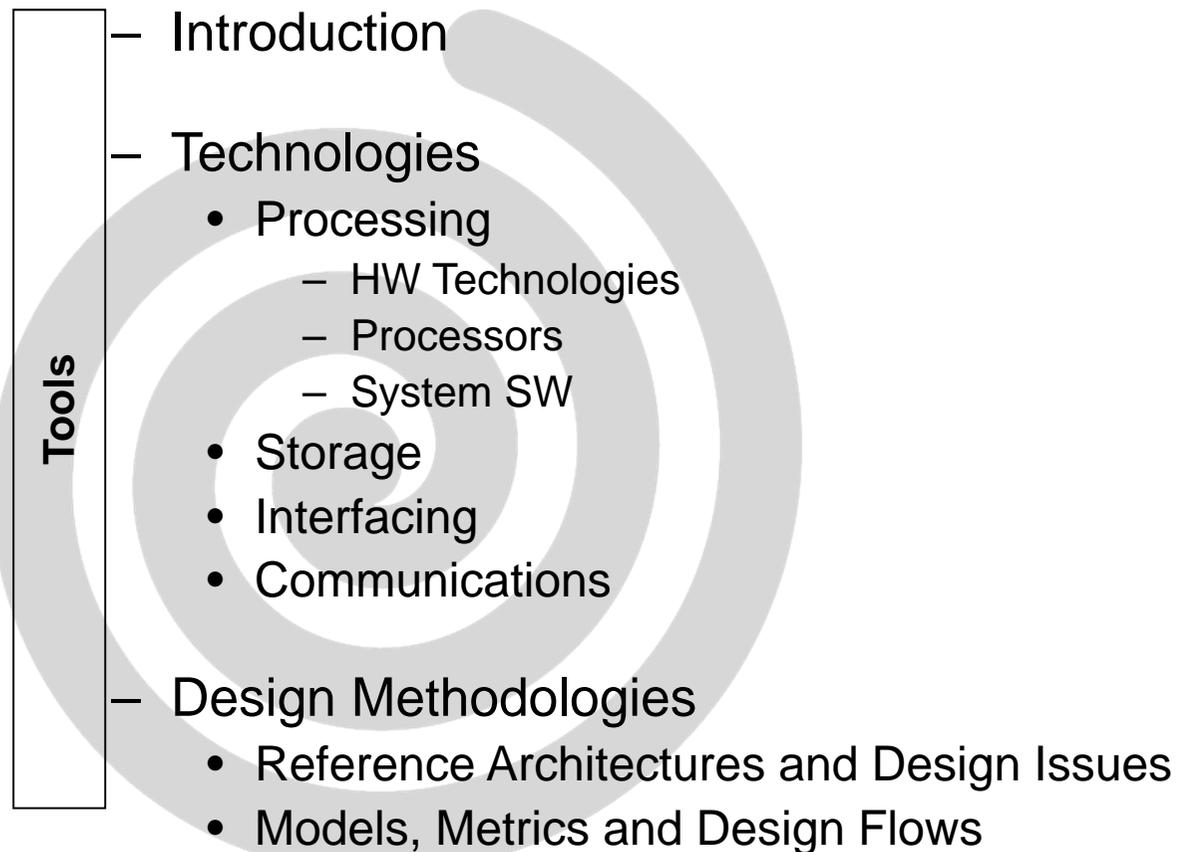
- Why?
 - The course is designed for all the professional figures related to the ICT domain
 - Modern/Innovative Electronic Engineer
 - “Not only web-gis” Computer Science Engineer/Graduate
 - Concrete Telecommunications/Automation Engineer
 - Concrete (i.e. HW/SW technologies aware) Computer Science Graduate

Embedded Systems

- Why?
 - It is preparatory for the following ICT professional figures
 - Dedicated/Embedded HW/SW Systems Designer
 - A figure that knows, is able to select and use HW/SW technologies and related development tools
 - Embedded SW Developer
 - A figure that knows HW/SW technologies, is able to select and use SW technologies and related development tools
 - EDA (*Electronic Design Automation*) SW Developer
 - A figure that knows HW/SW technologies and (how work) related development tools, and is able to develop SW tools useful to support HW/SW designers
 - Project manager
 - A figure that knows and is able to select HW/SW technologies and related development tools in order to manage complex ICT projects (related in some way to the embedded domain)

Embedded Systems

- Syllabus

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- Introduction
 - Technologies
 - Processing
 - HW Technologies
 - Processors
 - System SW
 - Storage
 - Interfacing
 - Communications
 - Design Methodologies
 - Reference Architectures and Design Issues
 - Models, Metrics and Design Flows

Embedded Systems

- (Official) Educational Material
 - Main book (English)
 - Embedded System Design: A Unified HW/SW Introduction (ESD)
 - F. Vahid, T. Givargis - John Wiley & Sons 2001 (<http://esd.cs.ucr.edu/>)
 - How much is it?
 - » <http://www.addall.com/>
 - » <http://www.abebooks.com/>
 - » <http://www.abebooks.it/>
 - Low-quality pdf
 - » www.pomante.net/Temp/EmbeddedSystemDesign_UnifiedHWSWIntroduction_OK.zip
 - Slides and other electronic documents

Embedded Systems

- (Supplementary) Educational Material
 - Books
 - **Sistemi Embedded: Sviluppo HW e SW per sistemi dedicati**
 - W. Fornaciari, C. Brandolese - Pearson – Prentice Hall 2007
 - **Real-Time Concepts for Embedded Systems**
 - Qing Li & Caroline Yao - CMP Books 2003
 - Introduction to Embedded Systems
 - A Cyber-Physical Systems Approach
 - » E. A. Lee and S. A. Seshia, LeeSeshia.org, 2011

Embedded Systems

- Examination (WIP)
 - HomeLabs: 0 points
 - Fixed single/group basic activities with specific HW/SW development kits
 - » Output: brief reports to summarize the work done and the main problems
 - Project: up to 11 points
 - Single/group activity to be selected from a list (WIP) or related to projects from other courses (it could be also a starting point for a Master Thesis)
 - » Intermediate revision and final presentation/discussion
 - Written test about theory: up to 11 points
 - A mix of true/false and open questions related to the (Official) Educational Material and the HomeLabs
 - » The program will be properly reduced for 6 CFU course (INF/01)
 - Written test about C4uC: up to 11 points

>30 points == 30L

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Any question?