

IE.1102 / IE.1202 – Computer Architecture

General information

Module Title: Computer Architecture
Module ID: IE.1202
Person in charge: Frédéric AMIEL
ECTS: 4
Average amount of work per student: 100 hours including 30 hours supervised
Teamwork: no
Keywords: Architecture, C language, microcontroller

Presentation

This module operates the link between electronics and computer science. It allows us to understand how a programming language, by nature abstract, is materialized through electronic components. This module presents the fundamental electronic components that make up a computer and describes the layout that allows computer programs to be executed. To do this, a detour through the coding systems (of numbers, basic data) is made.

Educational objectives

This module is intended to be the link between computer science and electronics. As such, all future engineers at ISEP are concerned, regardless of the course they choose later. For computer scientists, it provides the necessary completeness of knowledge allowing them to link their field to physics, it also allows them to understand optimizations, technical problems that impose some limits on their discipline. For those who choose a more electronically oriented course, this module is the first level of their knowledge of the computer, knowledge that they will have to deepen later

Specialized skills

- Design a software technology object with safe and standardized operation

Transversal skills

- Acting as a responsible professional

More specifically...

- Design technological objects based on processors and digital electronics (hardware and software)
- Model the design problems of this type of object and know how to partition software and hardware

Prerequisite

- Basic knowledge of logic

Content/Program

Concepts and know-how

- Computer architecture
- Hardware-Software Partitioning
- Speed of Computation - Approach to the Complexity of Algorithms
- Notion of program, context, data, process
- Integer and fixed-point encoding
- Assembly programming
- Basic programming in C

- Manipulation of microprocessor-based architectures of small electronic systems

Tools used

- Simulator and educational models based on ARM microcontroller

Pedagogical methods

Learning methods

This module consists of a course followed by tutorials and practical work

- The course describes the underlying components and technologies, describes the low-level architecture of a computer, number encoding, and assembly programming.
- The practical exercises allow you to implement and understand the interest and limits of assembly programming (low-level) and its relationship with a higher-level language (C language).

Evaluation methods

- The course is evaluated by a written examination at the end of the semester.
- The practical work is evaluated by a continuous assessment session after session and a small individual examination at the end of the session.
- The validation of the module is obtained by the average of the two grades (course control and practical work).

Language of work

- English

Bibliography, Webography, Other sources

- Course materials (available on Moodle)
- WEB links will also be provided by the teacher at the start of the semester

Commenté [MM1]: Give references