System Level Design and Modelling

COL 812: II Semester 2021-22

Slot J: Mon/Tue/Fri 12:00-12:50

(actual meeting slot to be decided after consulting the class)

Course Outline

Instructor: Preeti Ranjan Panda
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Topics

- Specification Models and SystemC
- Hardware/Software Co-design and Partitioning
- Customising programmable components
  - Processors
  - Hardware Accelerators
  - Memory Architectures and Management
- Power/Energy/Thermal Optimisation and Estimation
- Exploratory research topics

Course Content

- The course will address issues arising in the specification, design, and implementation of complex Systems-on-Chip (SoC) consisting of Hardware and Software components
- Among the questions addressed, will be:
  - How to specify complex systems-on-chip? Some models of computation and implementation languages (SystemC).
  - Which parts of a system should be implemented in software and which in hardware? The Hardware/Software partitioning problem.
  - How to customize and tune processor and memory in an Application-specific way?
  - How do we introduce power/energy/thermal awareness into SoC design?
- Apart from the above topics, exploratory projects will be assigned. It is assumed that the students will make original contributions to open research problems.

Necessary Background

- Digital Logic and Computer Architecture
- Data Structures and Programming

Grading

- Exams: 50%
  - Minor: 20%
  - Major: 30%
- Research Project: 50%