

## **Tutorial : Energy-aware Software Systems**

### **Abstract:**

The importance of saving energy in general need not be over-emphasized. Computing equipment of various kinds, e.g., mobile phones, laptops, portable games, desktops, servers, and large data centres, all deserve to be considered seriously as candidates for saving energy. The techniques for saving energy that need to be deployed in various environments, e.g., in a data centre and in an embedded device, will be certainly different. The former looks at work load characterization and the latter heavily depends on the compiler to do the job. However, the operating system and the network management system also need to be designed with energy conservation in mind.

This tutorial will provide an overview of various techniques for saving energy, such as, architectural and hardware techniques, compilation techniques, OS techniques, and others.

### **Topics:**

Introduction: power models, energy management in the layers of a computer system, examples. Energy management in large ware houses. Dynamic voltage scaling, instruction scheduling and other compilation techniques. Energy management in operating system and network layers (briefly).

Pre-rerquisites: Knowledge of basic computer architecture, and computer system organization (BE CSE or ECE)

He is the editor of a handbook on advanced compiler design published by CRC Press in 2002 and 2008 (2nd ed.). His most recent research includes compiler optimizations for power reduction in embedded systems, efficient profiling techniques, and performance estimation of programs through program analysis.

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