Report

(1) Name of Lecturer: Victor Poupet

(2) Position: Associate Professor

(3) Affiliation: Université Montpellier 2 (France)

(4) Short Biography: Victor Poupet is a researcher at the Laboratoire d'informatique, robotique et micro-électronique de Montpellier (LIRMM). His research topics include decidability and complexity problems on discrete dynamical systems such as cellular automata and Wang tile sets, low complexity classes of language recognition on parallel models of computation and Kolmogorov complexity.
In addition to his main research topics, Victor Poupet has been programming on iOS devices for several years, both as a hobby and as an experimental tool for his research.

(5) Subject and Schedule of the Lectures:
The lecture was given in five sessions of 90 minutes each on July 13th, 14th, 15th, 16th and 17th, from 12:50 to 14:20.The slides and the presentation were given in English.

The lecture was part of a course on embedded systems in the department of engineering. It presented an introduction to Apple's mobile device operating system iOS from a developer's point of view. The following aspects were discussed during the lecture:

A general presentation of iOS: brief history of the system, differences and similarities to other mobile operating systems.

Mobile development: differences between developing applications for a desktop computer (or server) and a mobile device (cross compilation, memory, energy and security constraints, etc.).

A general introduction to events programing: events, call-backs, exceptions and interruptions.

Swift: presentation of the basic syntax and specificities of Apple's new language (introduced in 2014) as well as a brief introduction to object programming (classes, instances, methods, etc.).

Graphical user interface: presentation of the Model-View-Controller architecture, and focus on the UIView and UIViewController classes (and their main subclasses) to create and manage views and view controllers in iOS.

Events handling: how to react to specific events (in particular touches on the screen and shakes of the device). Presentation of the UIResponder class, and the responder chain to determine which object will handle a given event.

Table Views: a chapter was devoted to the study of Table Views, that are a standard way of representing large sets of data on a limited screen-size as a scrollable list of cells. A more in-depth discussion about the classes UITableView and UITableViewController gives a good opportunity to illustrate many key concepts that were introduced in the previous chapters of the lecture (model-view-controller, events handling, etc.).

Memory Management: a short presentation of the Automatic Reference Counting mechanism used by iOS to manage memory, and some of the difficulties that can arise (reference cycles).

Miscellaneous: the last chapter of the lecture covered a wide variety of other aspects that are interesting in iOS but could not be developped in the lecture (device motion, geolocation, notification center, thread programming (Grand Central Dispatch), persisting data, 2D and 3D graphics frameworks).

Most elements presented in the lecture were illustrated by commenting code on example applications.

(6) Comments:

About 20 students attended the lecture. Although the duration of the lecture was insufficient to cover all aspects of iOS, many key concepts were presented which should give a good general idea of how to develop an application for an iOS device and might hopefully spark enough curiosity to push some of the students to learn more on their own.

Even though the lecture was specifically directed towards iOS development, most of the general ideas apply to all current mobile operating systems, in particular Android and Windows Phone. Some of the topics presented are also used in a much broader range of applications (object-oriented programming and the model-view-controller architecture for instance).

The slides and all the examples presented during the lecture were made available for the students as a reference.

A homework assignment was given to the students at the end of each session to evaluate their understanding of the contents of the lecture.