MPhil in Advanced Computer Science
Programming Logics and Software Verification

Leader:	Mike Gordon (guest lecturers will present advanced topics)
Timing:	Lent
Prerequisites:	familiarity with elementary logic
Structure:	16 Lectures

AIMS

This module introduces Hoare logic and recent developments based on it, including separation logic.

SYLLABUS

1. Introduction to Hoare logic.
2. Simple semantics models of programming languages; stores and heaps.
3. The frame problem, local reasoning and the core ideas of separation logic.
4. Advanced topics and selected current research (presented by guest lecturers).

OBJECTIVES

On completion of this module students should:

- understand the foundations of formal program verification;
- be able to verify simple sequential programs involving pointers;
- have an insight into current research challenges;
- be able to read current research papers and start research in the area.

COURSEWORK

Exercise sheets and reading material will be provided.

ASSESSMENT

A combination of a final exam and an optional essay will be used for assessment.

RECOMMENDED READING

Suggested preparatory reading is Glynn Winskel's textbook "The Formal Semantics of Programming Languages" (particularly chapters 6 and 7). Course notes on Hoare logic and basic separation logic will be provided. The advanced material will be supported by papers specified by the guest lecturers.

Last updated: February 24, 2010